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2015-10-01

DOPSoft User Manual

DOPSoft User Manual

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Chapter 0 Revision Record

Release Date	Version	Revised Page(s)	Revision Contents
2012/07/17	DOPSoft-001	N/A	First release.
2014/03/01	DOPSoft-002	1. CH02 P.31 2. CH02 P.37 3. CH02 P.74 4. CH02 P.119 5. CH02 P.151 6. CH02 P.152 7. CH02 P.156 8. CH02 P.168 9. CH02 P.171 10. CH02 P.184 11. CH02 P.186 12. CH02 P.187 13. CH02 P.191 14. CH02 P.224、CH05 P.123 15. CH02 P.234 16. CH02 P.256 17. CH02 P.269 18. CH03 P.8~P.10 19. CH10 P.37 20. CH11 P.11、P.19	1. Add Make auto update data function. 2. Add when check password protect and execute make Ext. memory data, could select “Need to enter the password while copying screen data” function yes or not. 3. Add Synchronization of the content in text bank and the display text. 4. Add screen lock bit function. 5. Add prevent upload function. 6. Add Spanish system language. 7. Add print size ratio function. 8. Add default font style function. 9. Add after removing link connection will covert address function. 10. Add Modbus TCP Server Port. 11. Add Show warning in eRemote and eServer disconnection. 12. Add SMTP function. 13. Add Password setting cannot be null rule. 14. Add File Manage function.(Include FileSLot export and import button) 15. Add Real Time Clock Setting. 16. Add Turkish Interface. 17. Add Recipe CSV separator. 18. Add internal parameter for FW_VERSION1/2 and ALARM_COUNT and NET_STATUS1/NETSTATUS2 19. Add simple indicator could set text when status is on or off. 20. Add invisible address into numeric display and character display element.

Release Date	Version	Revised Page(s)	Revision Contents
2014/03/01	DOPSoft-002	21. CH13 P.9 22. CH13 P.15 23. CH14 P.14~P.15 24. CH15 P.31、P.5 25. CH15 P.33~P.34 26. CH16 P.8、P.12 27. CH19 P.40 28. CH20 P.1~P.26 29. CH23 P.4 30. CH23 P.54 31. CH23 P.57 32. CH24 P.16	21. Add the numeric format is Unsigned Decimal, a pop-up message of Data Overflow will show when entering the negative value. 22. Add Show ### when over range 23. Add Trend Graph element supports a total of 12 curves. 24. Add CSV file calculation and support DW and Char format in History function. 25. Add CSV title function. 26. Add Exit Screen Saver when Alarm is triggered and if display alarm LED or not function. 27. Add Grid Box element. 28. Add Embedded subscreen and Ladder monitor screen element. 29. Add RCP address rule with RCP65535 as Word data type, RCP65535.15 as Bit data type. 30. Add Indirect Recipe Index Register (*RCP) function. 31. Add Enhance Recipe function. 32. Add submacro protection.

Release Date	Version	Revised Page(s)	Revision Contents
2014/03/01	DOPSoft-002	33. CH24 ● ArrayCopy(P.80) ● SPRINTF(P.100) ● IPON(P.189) ● IPOFF(P.191) ● FileSlotRead(P.199) ● FileSlotWrite(P.200) ● FileSlotRemove(P.203) ● FileSlotGetLength(P.204) ● FileSlotExport(P.205) ● FileSlotImport(P.207) ● EXHISTORY(P.231) ● EXALARM(P.236) ● GetCircleCenter(P.246) ● ECAM(P.249) 34. CH26 P.16 35. CH26 P.17 36. CH27 37. CH28 P.1~P.22 38. Appendix A P.44 39. Appendix C P.3	33. Add macro command as below. ● ArrayCopy ● SPRINTF ● IPON ● IPOFF ● FileSlotRead ● FileSlotWrite ● FileSlotRemove ● FileSlotGetLength ● FileSlotExport ● FileSlotImport ● EXHISTORY ● EXALARM ● GetCircleCenter ● ECAM 34. Add support HMI model for Pictbridge 35. Add error code description for printer. 36. Add HMC model type support ECAM function. 37. Add G-CODE function. 38. Add PLC upload and download description. 39. Add communication error code description.

Release Date	Version	Revised Page(s)	Revision Contents
2015/11/09	DOPSoft-003	1. CH02 P.7 2. CH02 P.50 3. CH02 P.107 4. CH02 P.123 5. CH02 P.134~P.135 6. CH02 P.151 7. CH02 P.151 8. CH02 P.154 9. CH02 P.172 10. CH02 P.189、P.192 11. CH02 P.199~P.200、P.319~P.320 12. CH02 P.203 13. CH02 P.213 14. CH02 P.230 15. CH02 P.274 16. CH02 P.277 17. CH02 P.299 18. CH03 P.12 19. CH04 P.12 20. CH04 P.24~26、P.39~P.41 21. CH05 P.113 22. CH08 P.18~P.19 23. CH11 P.51 24. CH12 P.22 25. CH13 P.35、P.54 26. CH14 P.14、P.35 27. CH14 P.21、P.41 28. CH14 P.54~55 29. CH15 P.49 30. CH15 P.67	1. Add CDC driver installation. 2. Add Make Exe of Screen Download Data function. 3. Add Paste the Specified Screen function. 4. Add how to delete screen saver. 5. Add Show Border function. 6. Add Download Boot Screen. 7. Add Reset Default Logo. 8. Add Monitor I/O function. 9. Add Don’t show password input window when low grade function. 10. Add Power on Screen and Speed up HMI page changing. 11. Add USB Download Mode, Brightness, TP Force and TP Delay option. 12. Add Multilanguage to 32. 13. Add Time Zone. 14. Add Mark and Space Parity. 15. Add HMI Identifier Setting. 16. Add Global Keypad Setting. 17. Add Device Table. 18. Add EMS_STATUS, LSWITCH_STATUS and HANDWHEEL_COUNTER of Internal Parameter. 19. Add how to use B10VS511 to connect with DMV. 20. Add Enhance recipe control flag of Control area. 21. Add Cancel Act. Address. 22. Add Variable Color of Pipe (6) and Pipe (7). 23. Add Invisible address of Prestored Message. 24. Add Invisible address of Static Graphic. 25. Add Support EASCII. 26. Add Projection of Trend Graph and X-Y Chart. 27. Add transparent style of Trend Graph and X-Y Chart. 28. Add Line width, Dot width and Non-current screen background processing permit. 29. Add Save as Multi of Sampling History data. 30. Add Scale width.

Release Date	Version	Revised Page(s)	Revision Contents
2015/11/09	DOPSoft-003	31. CH15 P.83~P.84 32. CH15 P.93 33. CH15 P.32、P.108 34. CH16 P.28~P.29 35. CH16 P.37~P.38 36. CH16 P.47~P.48 37. CH16 P.55 38. CH17.P.6、P.18、P.28 39. CH19 P.31 40. CH19 P.59、P.69、P.76 41. CH19 P.81、P.90 42. CH19 P.94 43. CH22 P.15 44. CH24 P.89、P.193、P.202 45. CH26 P.19 46. CH28 47. CH29 48. Appendix A P.14 49. Appendix A P.22. 50. Appendix A P.47、P.52~P.53 51. Appendix D 52. Appendix E	31. Add draw vertical line and draw horizontal line of Historical data table. 32. Add show title of Historical data table. 33. Add Historical Overview Table example and element. 34. Add draw vertical line and draw horizontal line of History Alarm Table. 35. Add draw vertical line and draw horizontal line of Active Alarm List. 36. Add draw vertical line and draw horizontal line of Alarm Frequency Table. 37. Add Direction of Alarm Moving Sign. 38. Add Mode of Keypad (1)/Keypad (2)/Keypad (3). 39. Add Show frame of ListBox. 40. Add Across to left, 17~32 columns, Max Item count and Replace trigger address. 41. Add Details-2 and Appearance. 42. Add Text List element. 43. Add Penetrate of Rectangle. 44. Add STRCAT, STATIONCHK and IPCHANGE Macro. 45. Add USBWriter and SDWriter function. 46. Add G-CODE 10MC, 20MC, 20PM and G-CODE keypad. 47. Add DOP-W function. 48. Add five-point calibration. 49. Add USBCommMode = 2 (CDC Mode) 50. Add PLC model type and version of Transfer Mode. 51. Add description for Write and Read offset address. 52. Add description of DirectLink.

Contents

1-1 DOPSoft Operating Environment 2

Chapter 1 Welcome to DOPSoft

The DOPSoft is the brand new software interface launched by the HMI interface (HMI) department of Delta Electronics. In addition to integrating the components and functions of conventional screen editors, it delivers greater convenience to use, quicker response, and more flexible component planning for users to plan multifunctional HMIs more easily and in simpler ways.

1-1 DOPSoft Operating Environment

The system requirements for running the DOPSoft are as follows:

Hardware/Software	Specifications
PC	Pentium 4.1Hz and above
RAM	1G MB and above
Disk Space	400 MB and above
Display	True color at 1024x768 or higher
Printer	Windows 2000/Windows XP/Windows Vista/Windows 7 /Windows 8 compatible printers
Operating System	Windows 2000 / Windows XP / Windows Vista / Windows 7 / Windows 8

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Chapter 2 Operation Instructions of DOPSoft

This chapter provides the instructions for the installation of DOPSoft in Windows XP and Windows Vista/7 and the operations of associated editing screens.

2-1 Installation of DOPSoft

DOPSoft can be installed in operation systems such as Windows XP / Vista / Windows 7 / Windows 8. Details of the installation in Windows XP, Windows 7 and Windows 8 are described below, respectively.
DOPSoft can be downloaded at the following link on the webpage of Delta:
http://www.deltaww.com/services/DownloadCenter2.aspx?secID=8&pid=2&tid=0&CID=06&itemID=060302&typeID=1&downloadID=,&title=Select%20Product%20Series&dataType=8;&check=1&hl=en-US

2-1-1 Installation of DOPSoft in Windows XP

Upon obtaining DOPSoft from the website of Delta, open you PC and log into Windows XP, followed by running DOPSoft. Once DOPSoft is opened, please follow the following instructions to conduct the installation:

- Please select [Language], where three languages Traditional Chinese, Simplified Chinese, and English are available. Upon completion of selection, please press [OK].

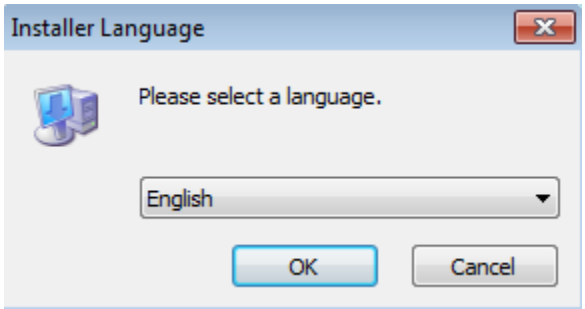


Figure 2-1-1Installer language in Windows XP

- To install DOPSoft to other storage locations, please press [Browse]; if the default path is selected, please click [Next].

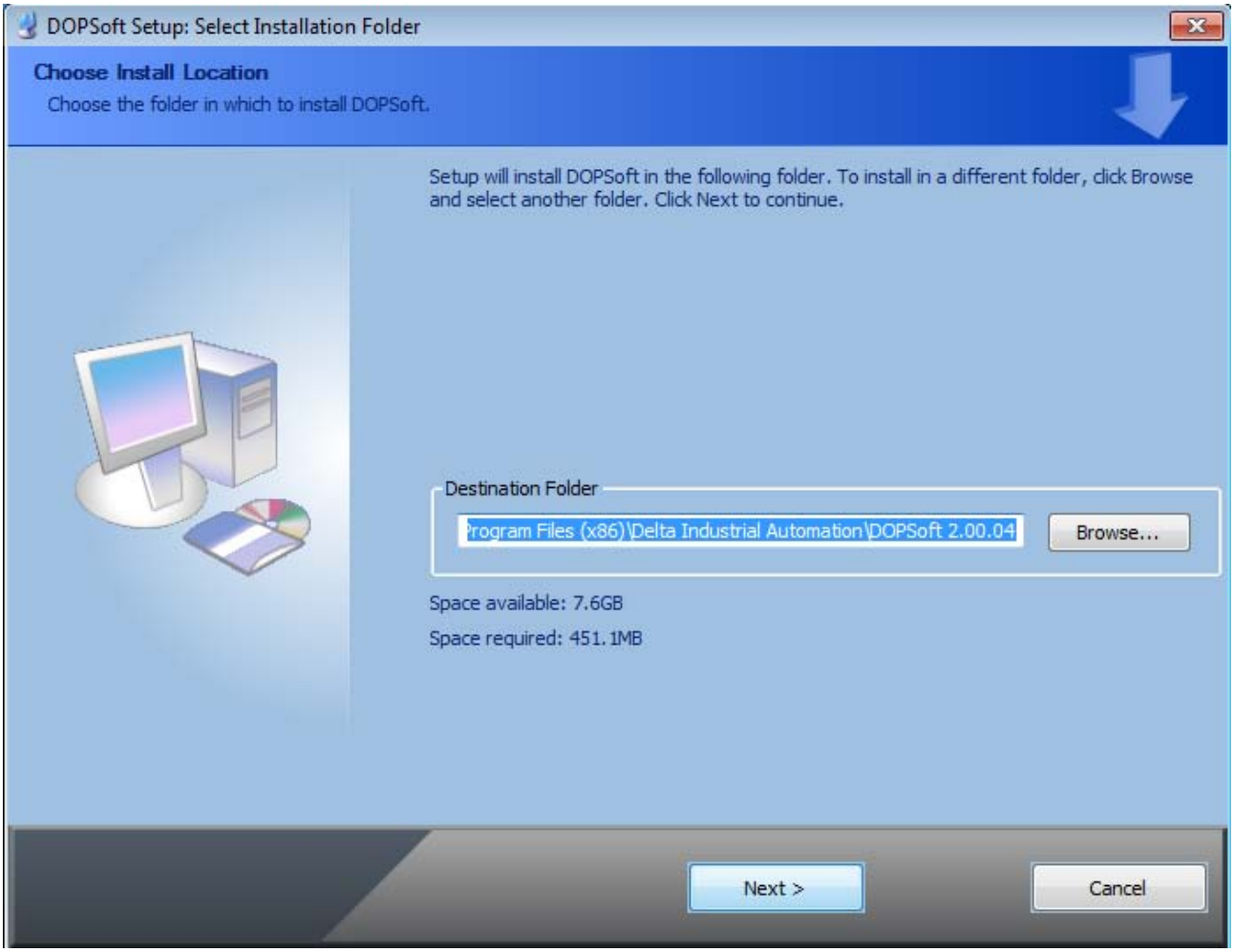


Figure 2-1-2Select Installation Folder in Windows XP

◆ Please check if the DOPSoft component is checked, as shown in Figure 2-1-3 below, followed by clicking [Install].

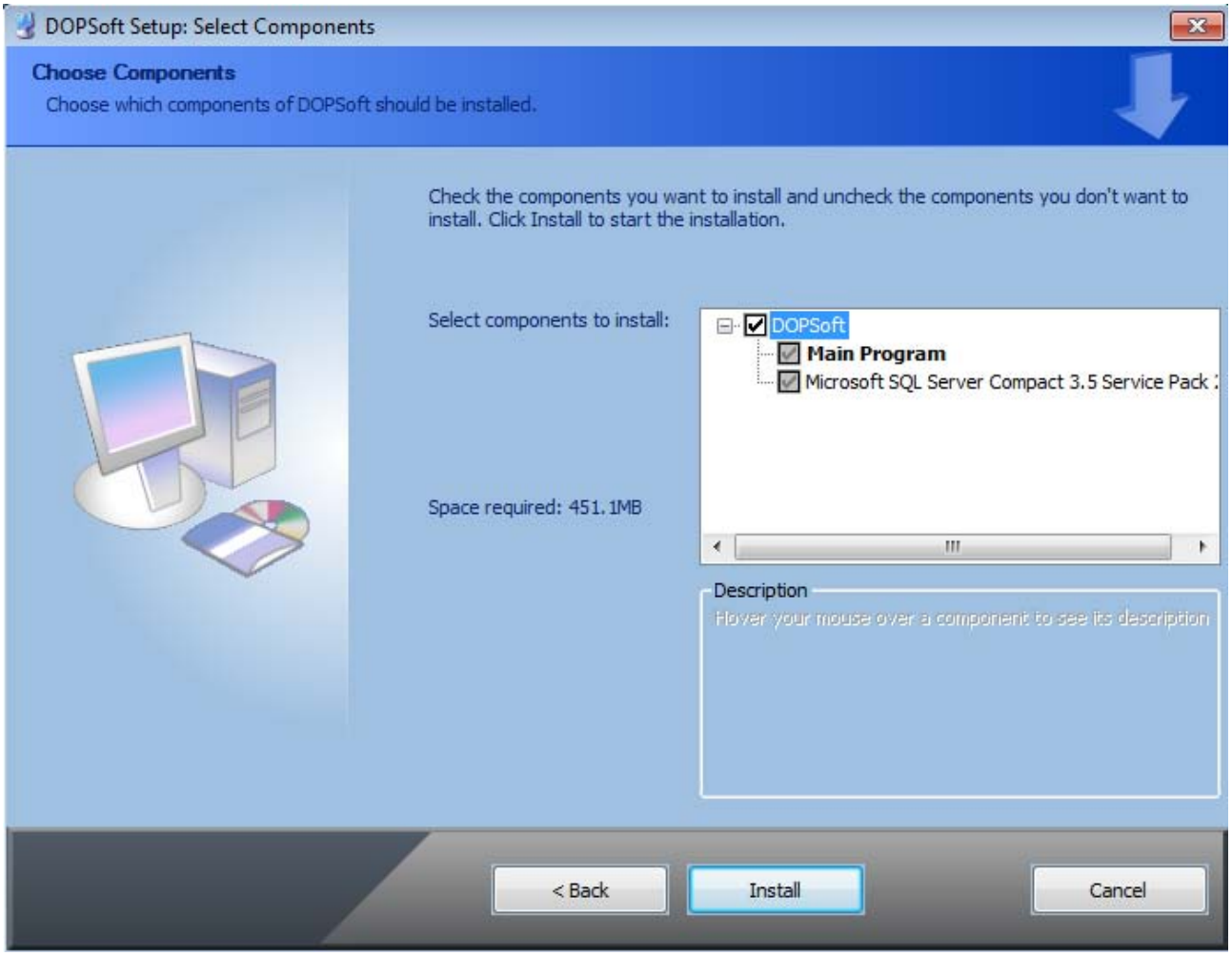


Figure 2-1-3Select Components in Windows XP

- Once the installation is confirmed, the system will display the status bar that shows the progress of software installation.

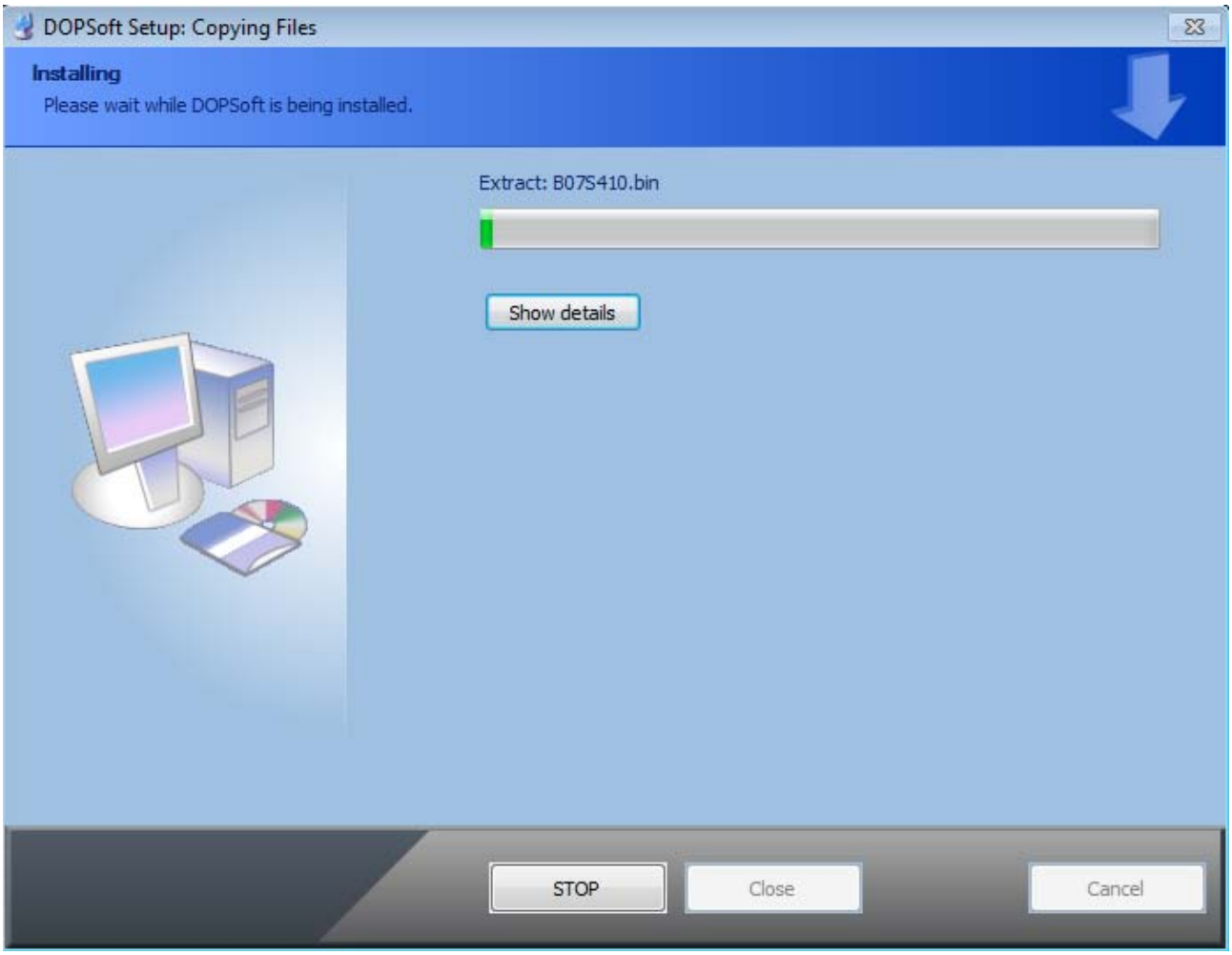


Figure 2-1-4Process bar of installation in Windows XP

- Then, it will show “Completed” once the installation is complete. And your PC will inform you to install the device driver. Please click [Next] for installation.

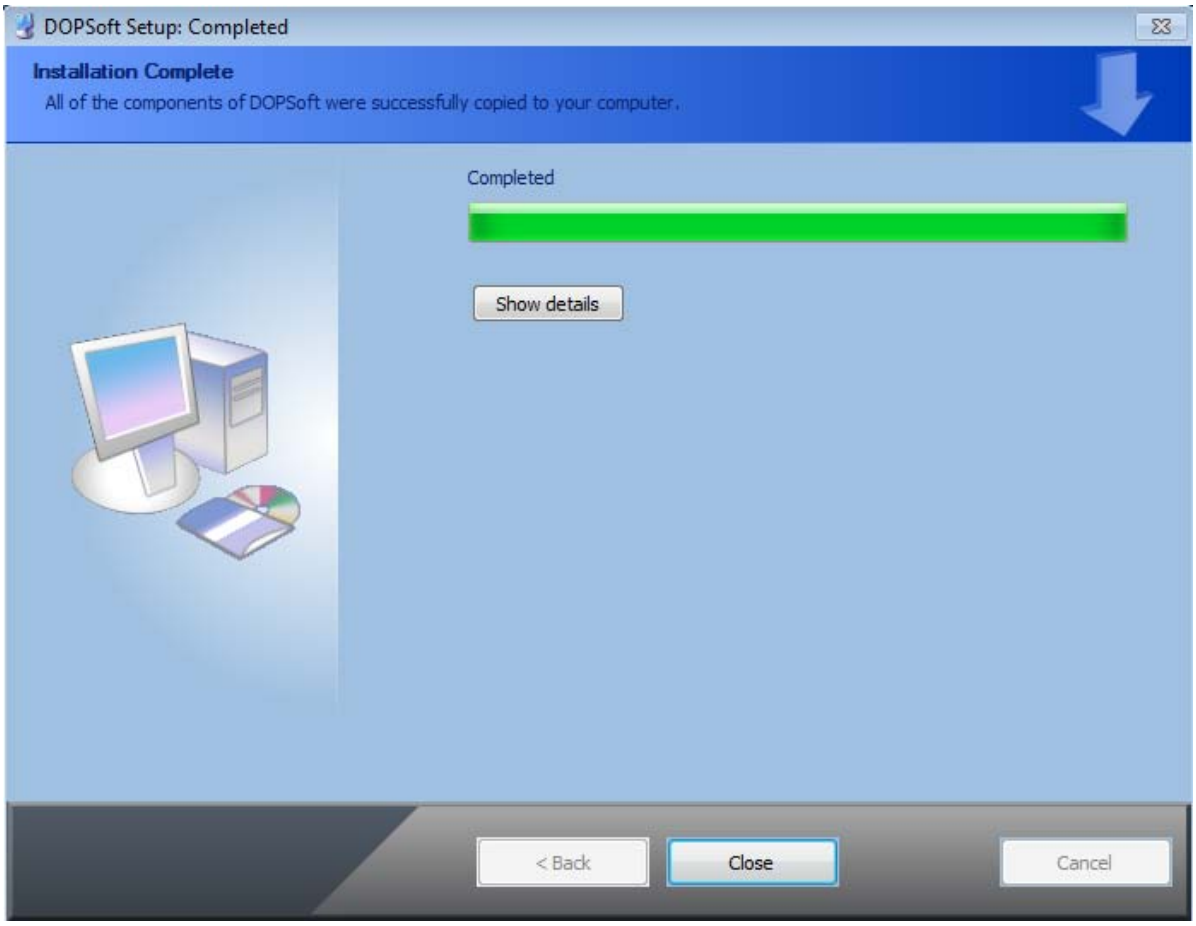


Figure2-1-5 Process bar of installation completion in Windows XP

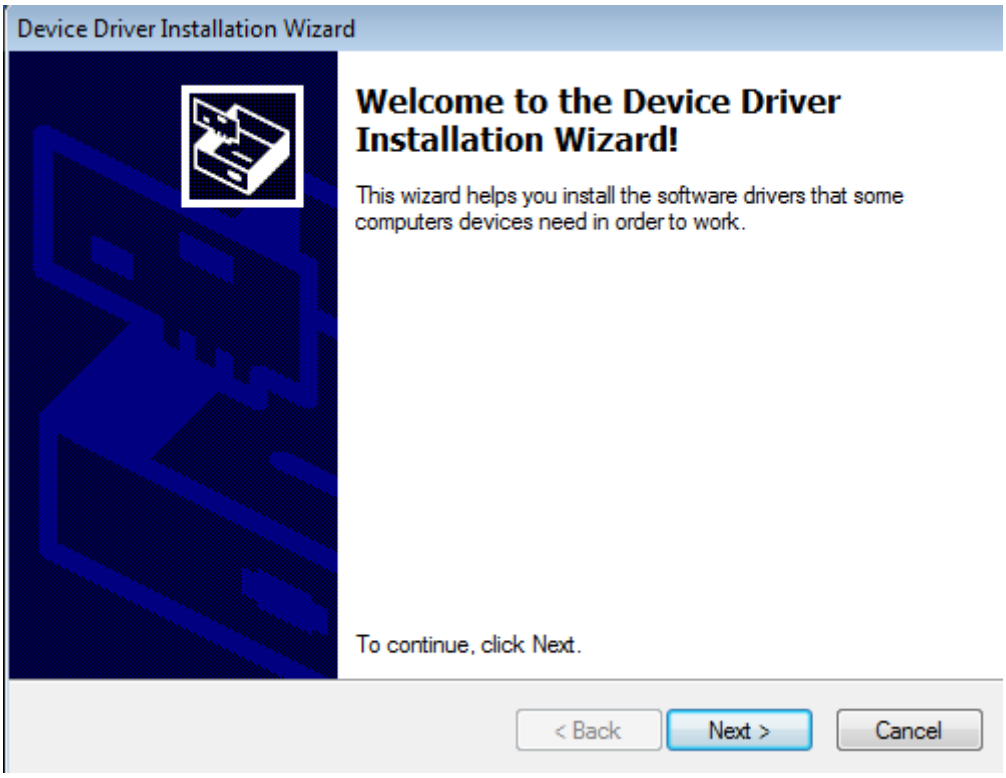


Figure 2-1-6 Device driver installation wizard.

- Please click on [Install] to execute the installation of device driver. Your PC screen will show “The drivers are now installing”.

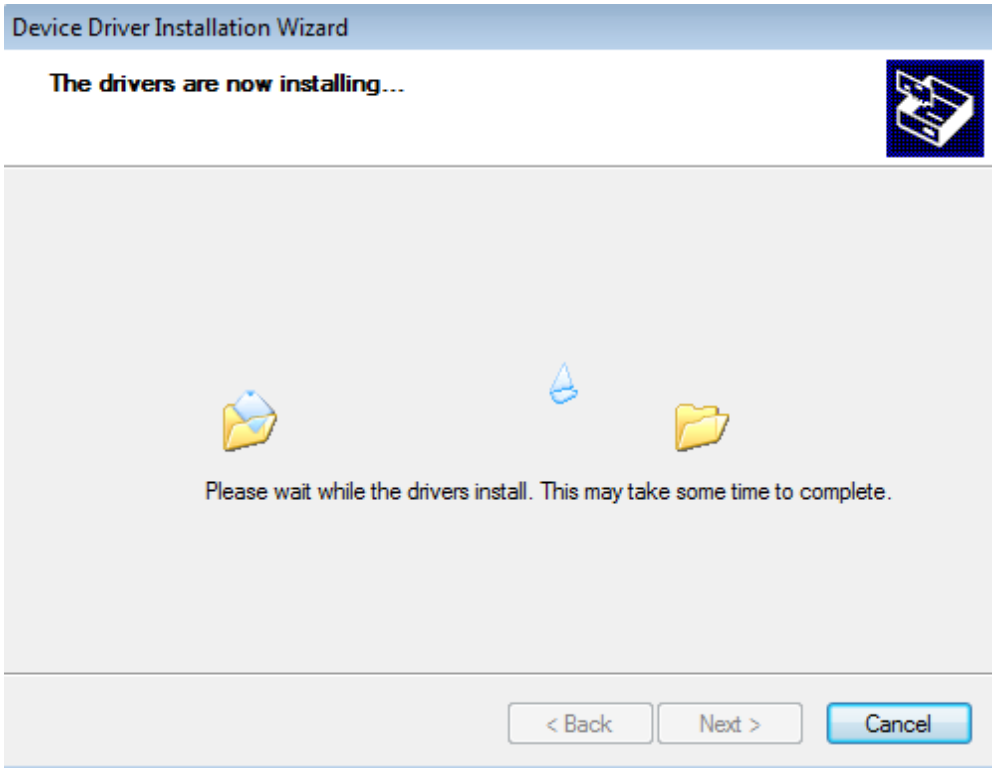


Figure 2-1-7 Installing the driver

- It will show “Installation Complete” in the screen. Click on [Finish] to close the screen of device driver installation. Then, click on [Close] to close the installation screen of DOPSoft software.

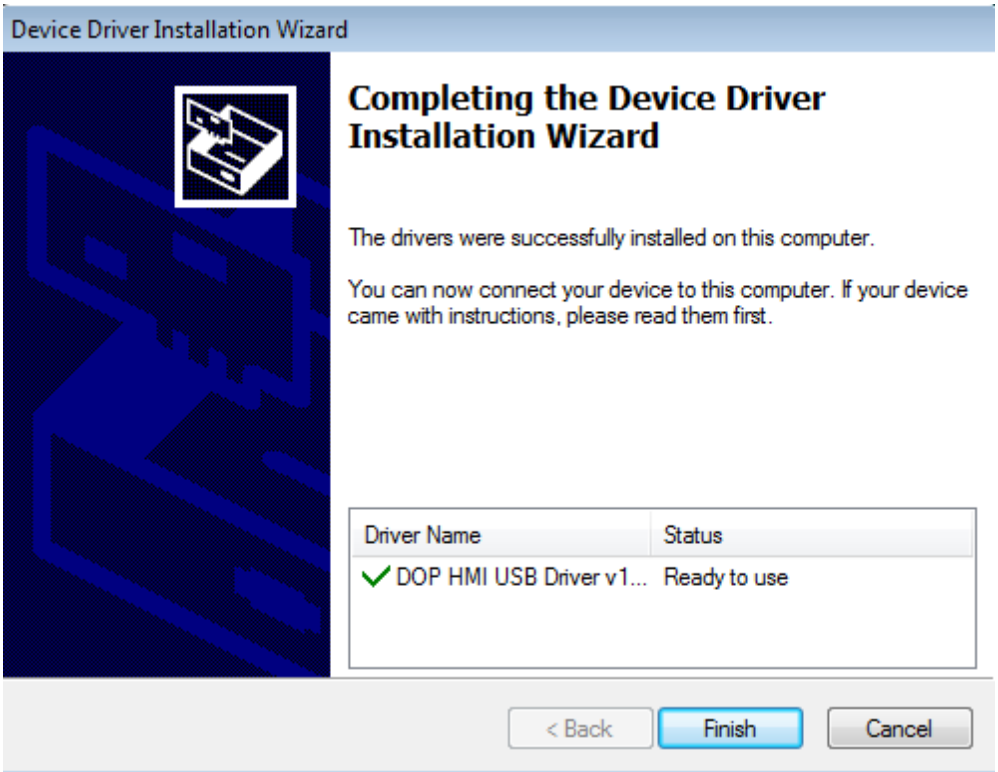


Figure 2-1-8 Driver installation complete

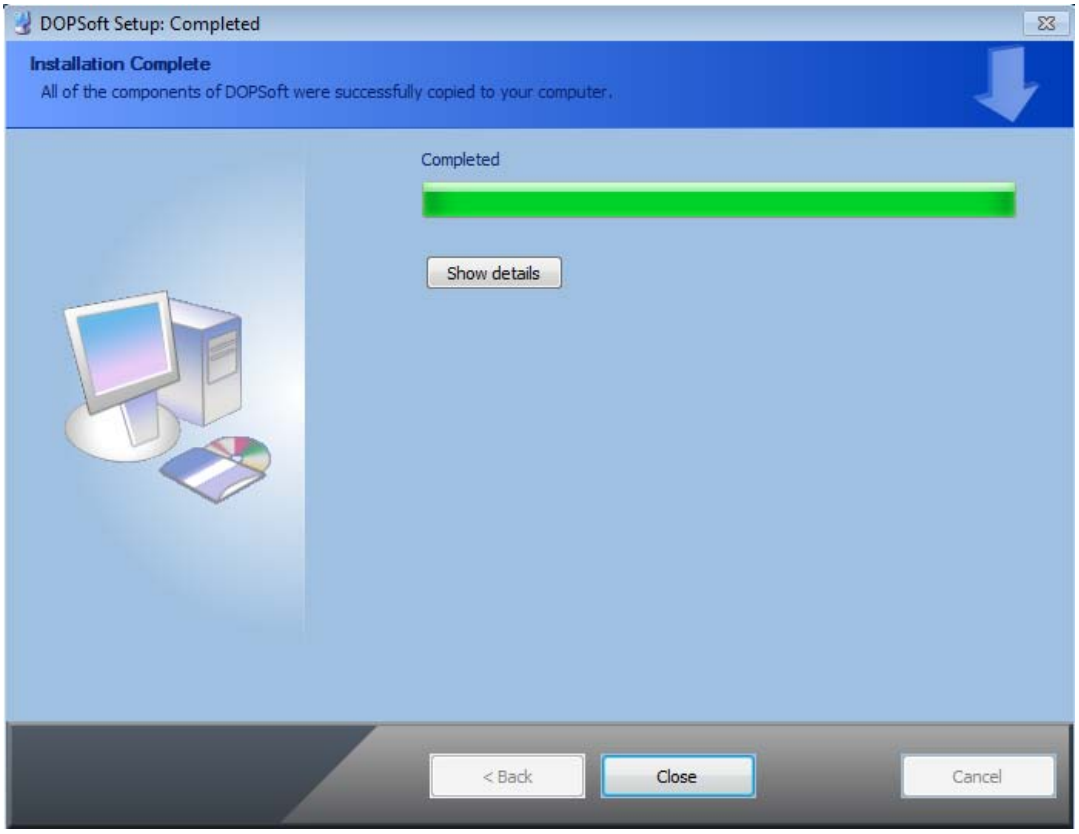


Figure 2-1-9 Installation complete in Windows XP

- Please click the toolbar at the bottom of PC on [Start]→[All Programs]→[Delta Industrial Automation]→[HMI]→ [DOPSoft2.00.04]→[DOPSoft2.00.04] to execute DOPSoft.

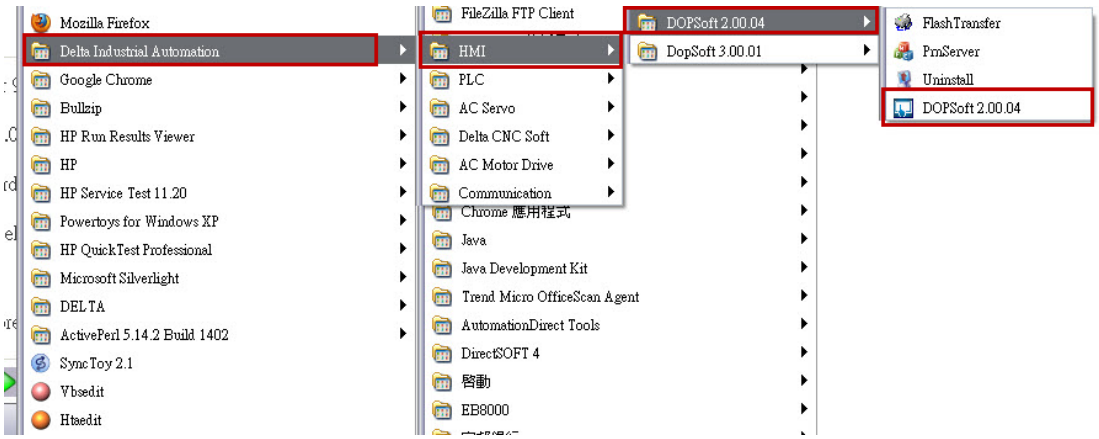


Figure 2-1-10 Execute DOPSoft from the installation path in Windows XP.

2-1-2 Installation of DOPSoft in Windows 7

Once acquiring DOPSoft from the website of Delta, open your PC and log into Windows 7. Please first go to [Control Panel]→ [User Accounts]→[Change User Account Settings] to set the level of user control to [Do Not Notify], as shown in Figure 2-1-11 and 2-1-12.

Figure 2-1-11 Changingthe settings of user account control in Windows 7

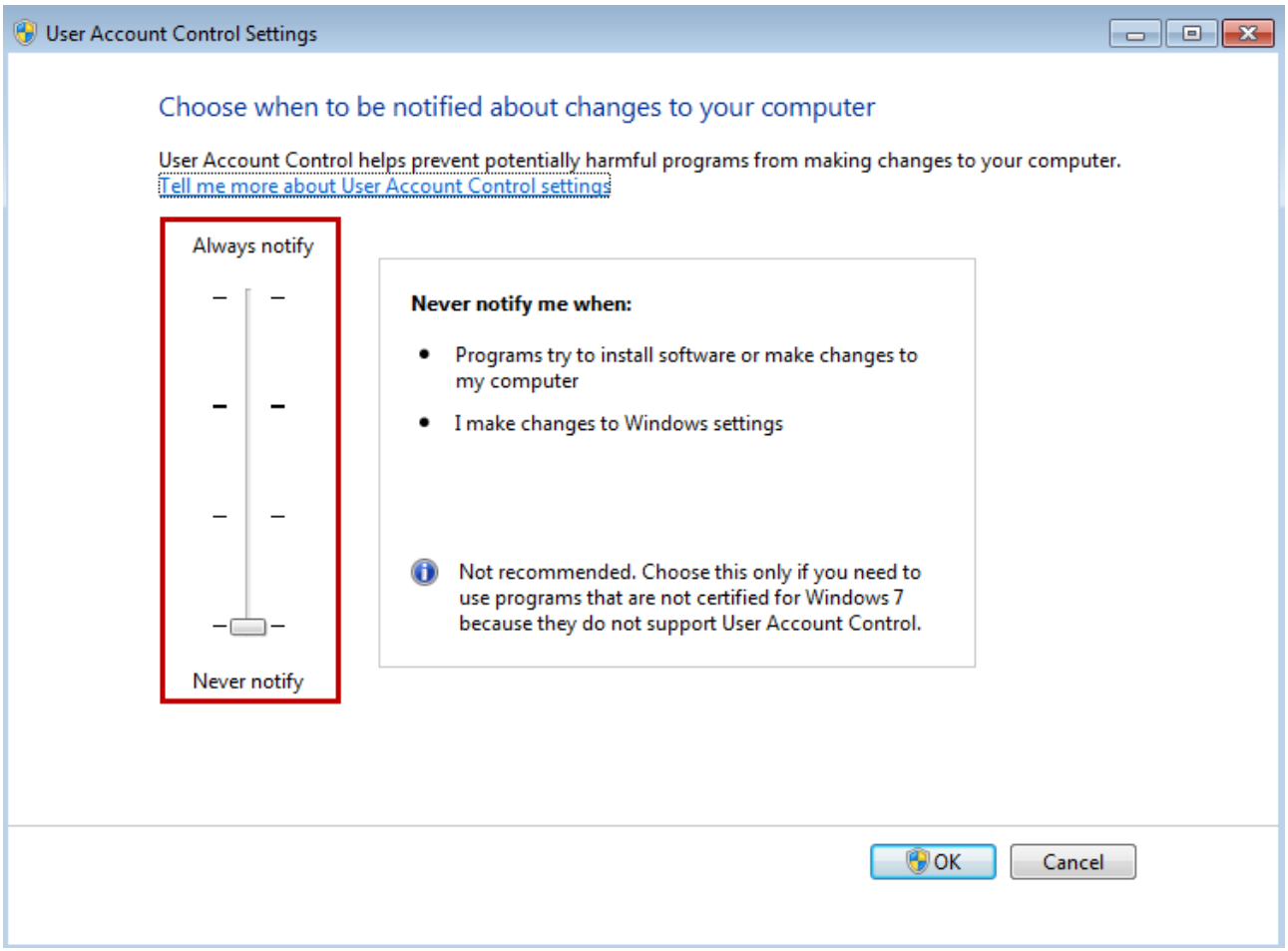


Figure 2-1-12 the user account control to “Do Not Notify” in Windows 7.

Upon completion of setting the user account control, please execute DOPSoft and follow the instructions below for installation:

◆ Please select [Language], where the three languages Traditional Chinese, Simplified Chinese, and English are available. Upon completion of selection, please press [OK].

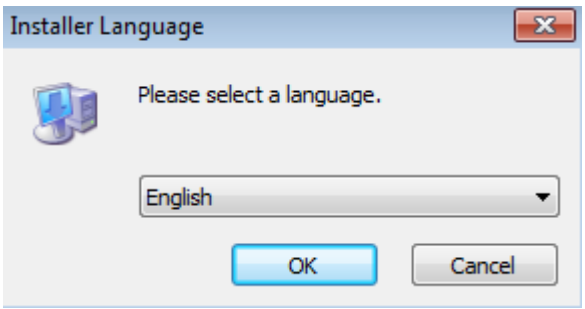


Figure 2-1-13 Installer language in Windows 7

◆ To install DOPSoft to other storage locations, please press [Browse]; if the default path is selected, please click [Next].

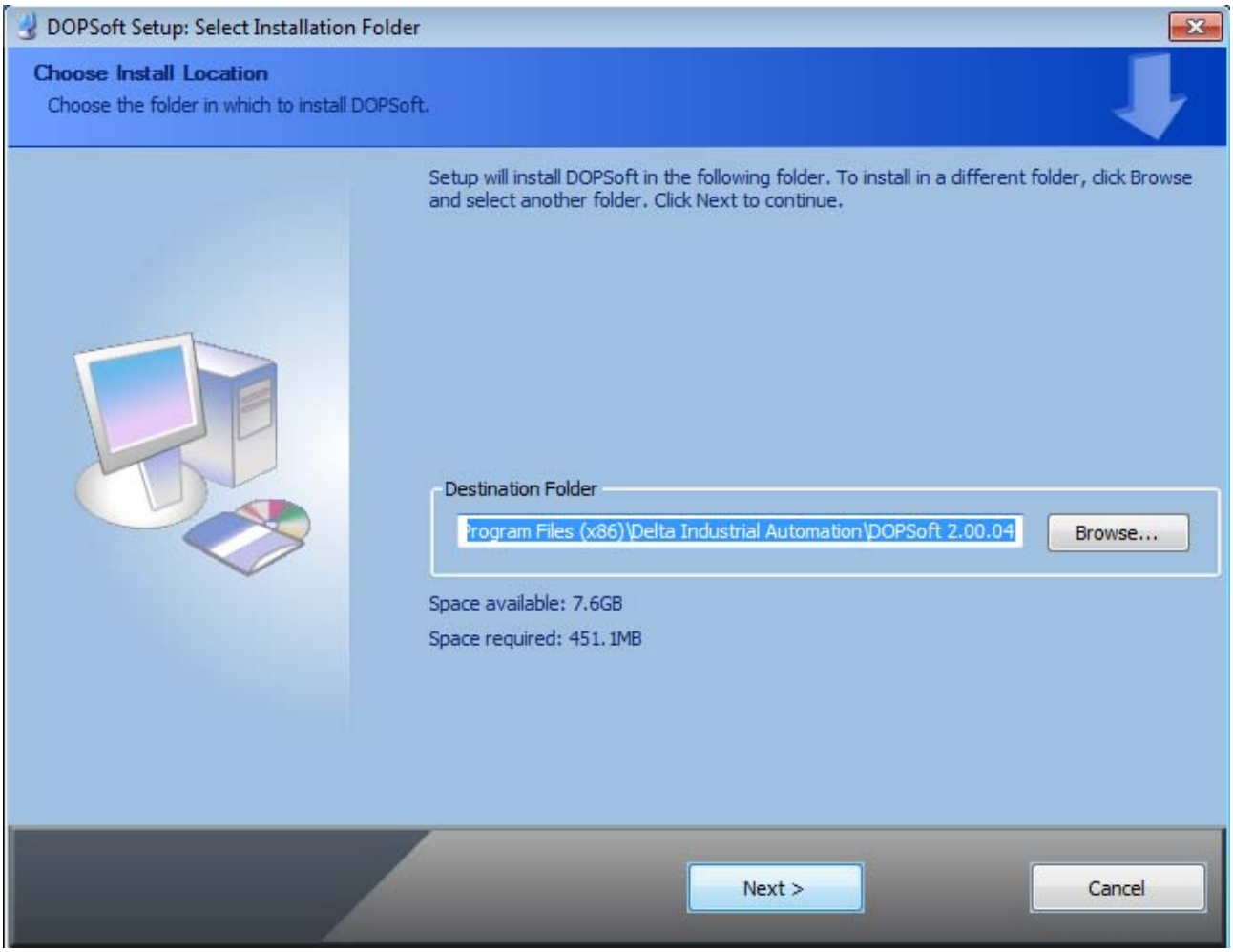


Figure 2-1-14 Select installation folder in Windows 7

◆ Please check if the DOPSoft device is checked, as shown in Figure 2-1-15 below, followed by clicking [Install].

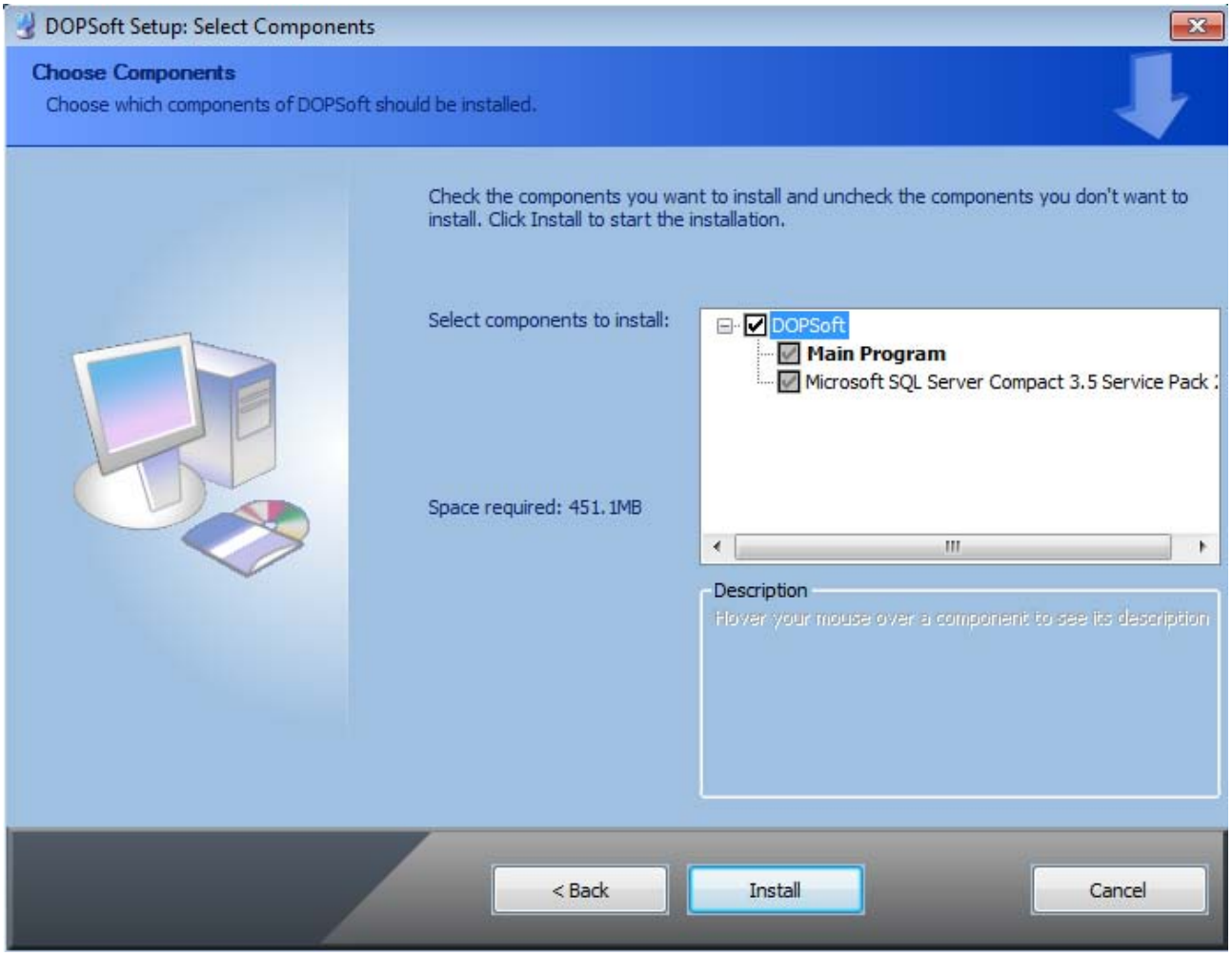


Figure 2-1-15 Select components in Windows 7

- Once the installation is confirmed, the system will display the status bar that shows the progress of software installation.

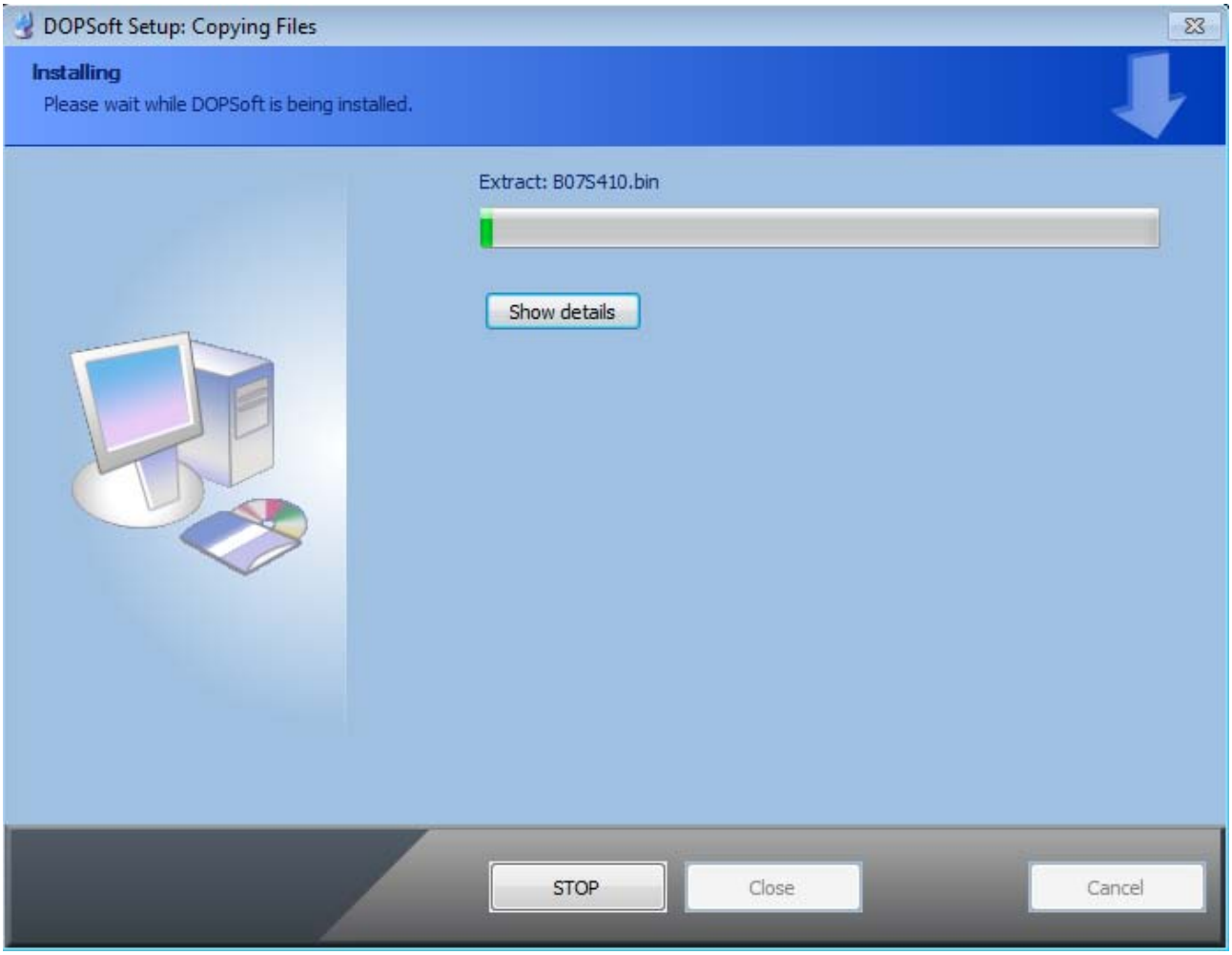


Figure 2-1-16 Progress bar of installation in Windows 7

- The Windows Security Authentication will pop up during installation, please select [Continue the Installation of this Driver], as shown in Figure 2-1-17.

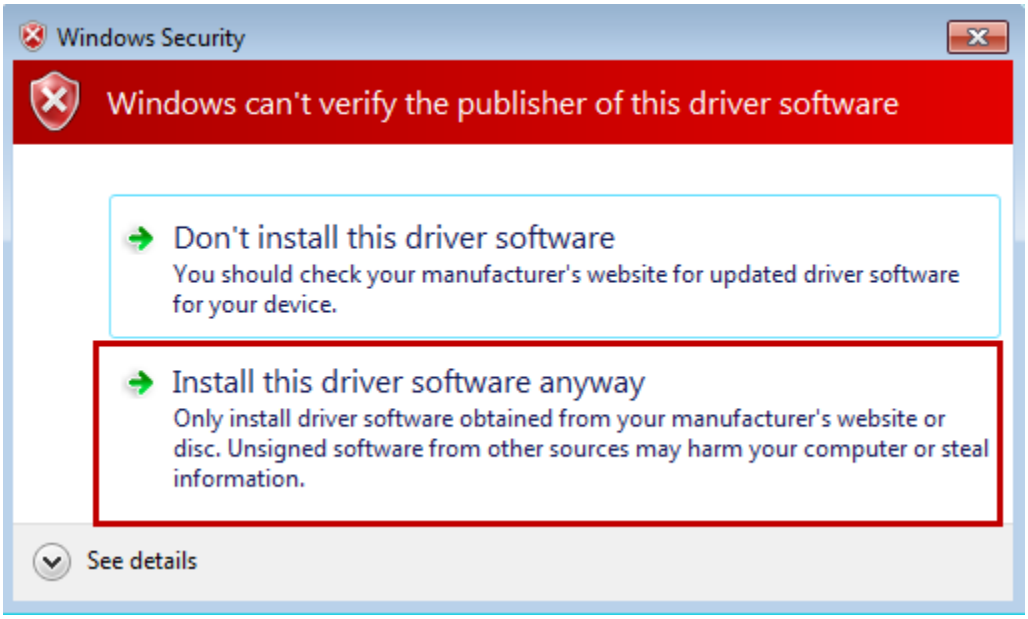


Figure 2-1-17 Security authentication in Windows 7.

◆ Then, it will show “Completed” once the installation is complete. And your PC will inform you to install the device driver. Please click [Next] for installation.

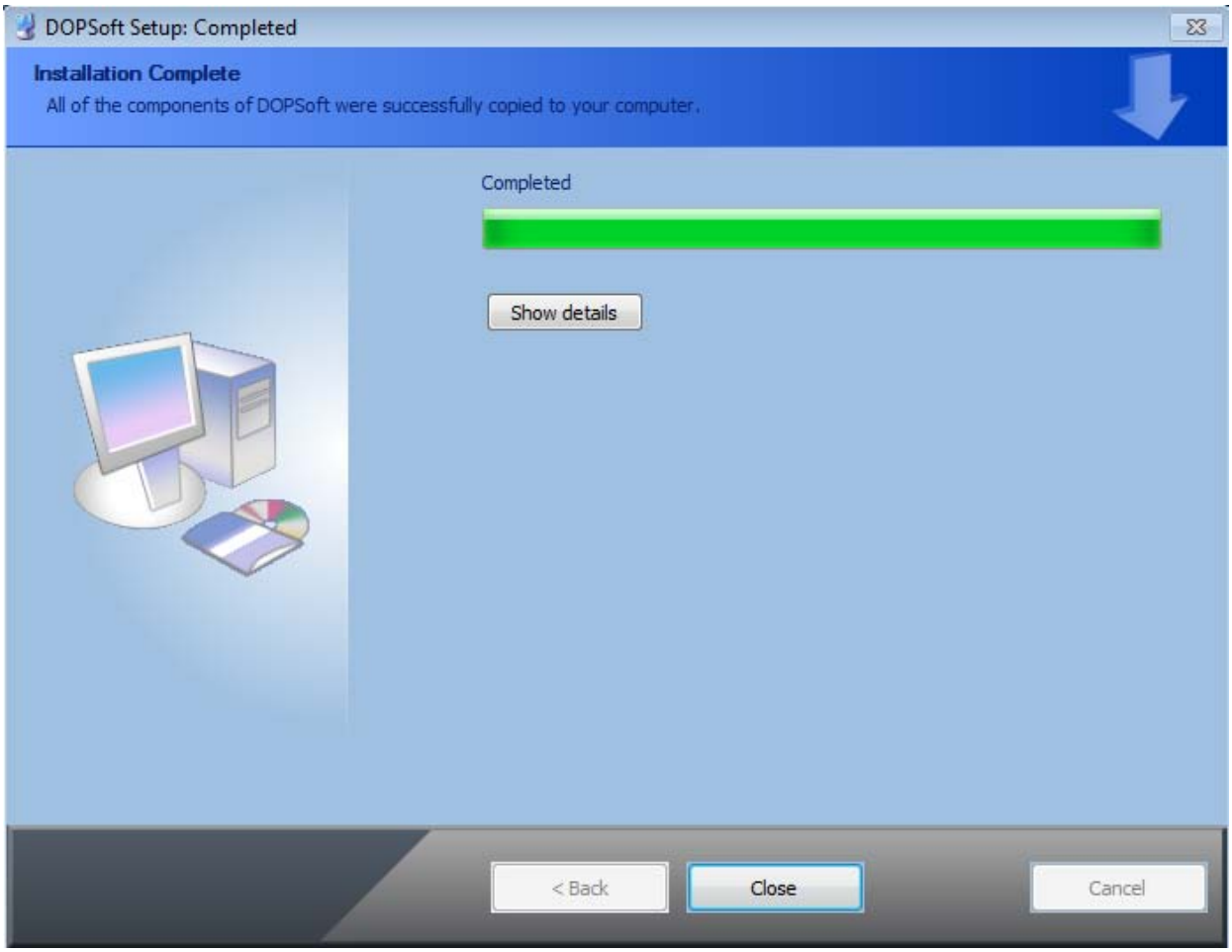


Figure 2-1-18 Installation is completed in Windows 7

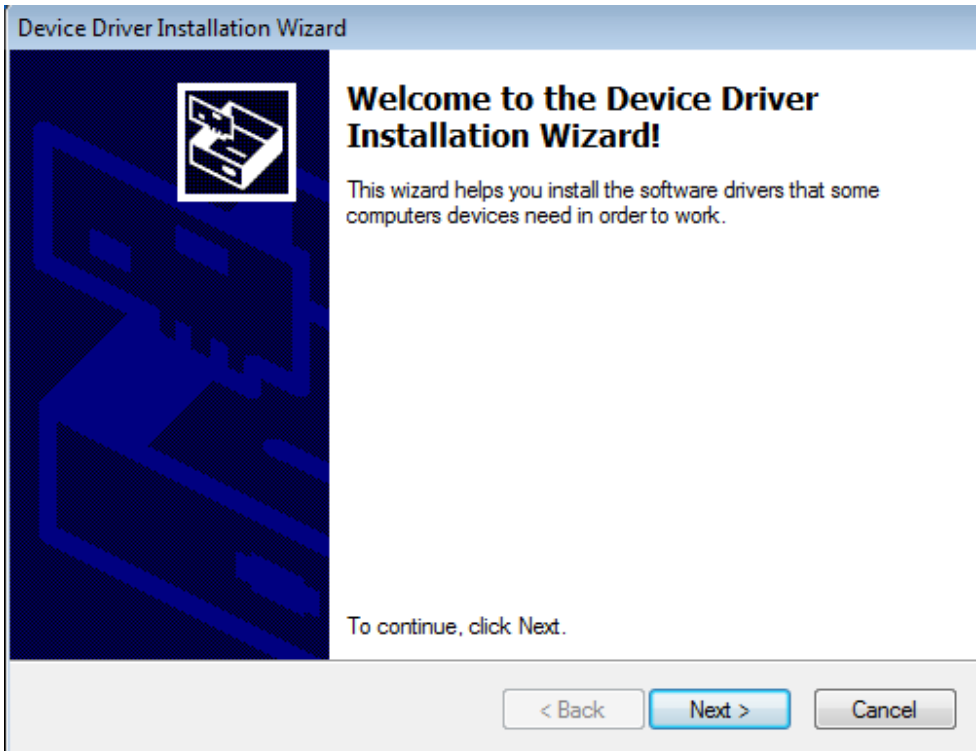


Figure 2-1-19 Device driver installation wizard

- Please click on [Install] to execute the installation of device driver. Your PC screen will show “The drivers are now installing”.

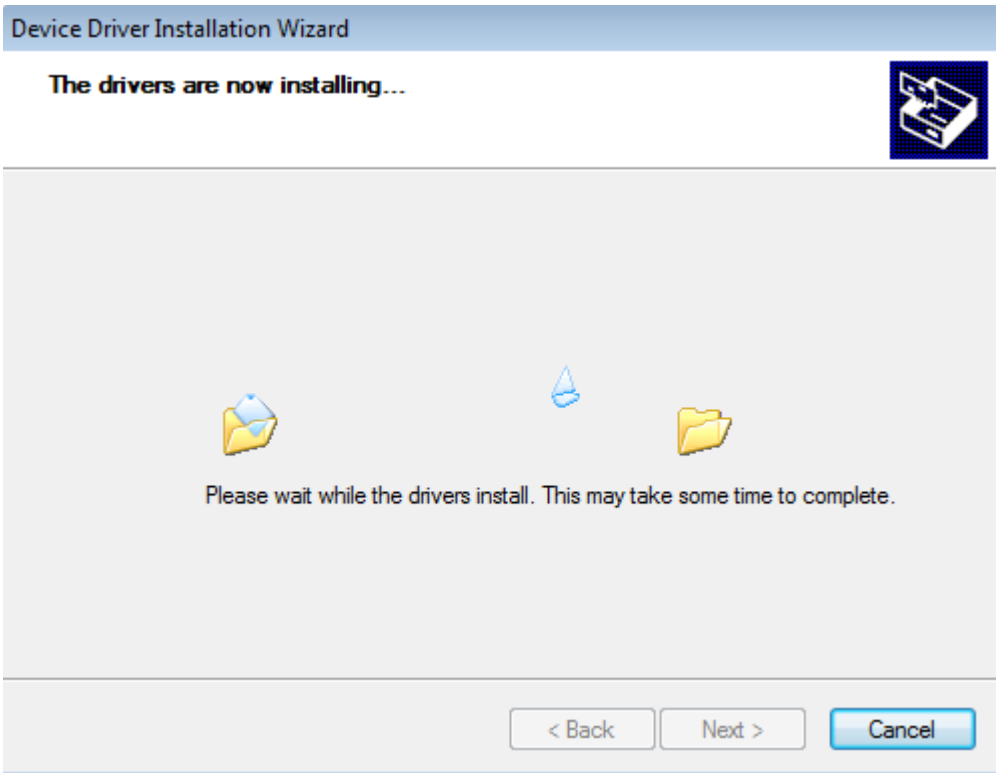


Figure 2-1-20 Installing the driver

- It will show “Installation Complete”in the screen. Click on [Finish] to close the screen of device driver installation. Then, click on [Close] to close the installation screen of DOPSoft software.

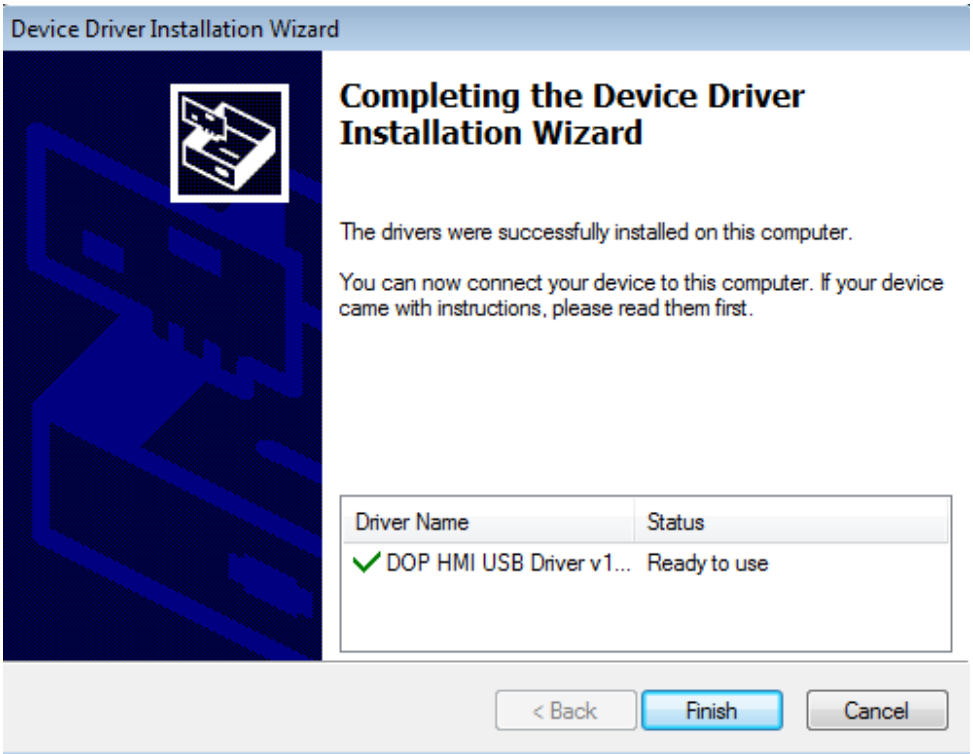


Figure 2-1-21 Installation complete

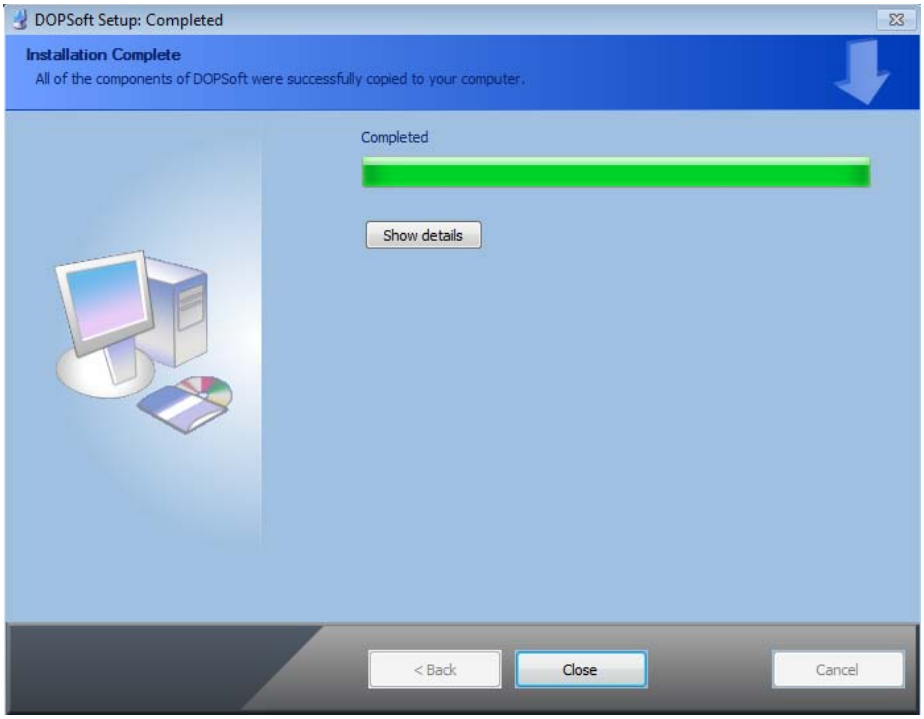


Figure 2-1-22 Installation is complete in Windows 7

◆ Please click the toolbar at the bottom of PC on [Start]→[All Programs]→[Delta Industrial Automation]→[HMI]→ [DOPSoft2.00.04]→[DOPSoft2.00.04]to execute DOPSoft.

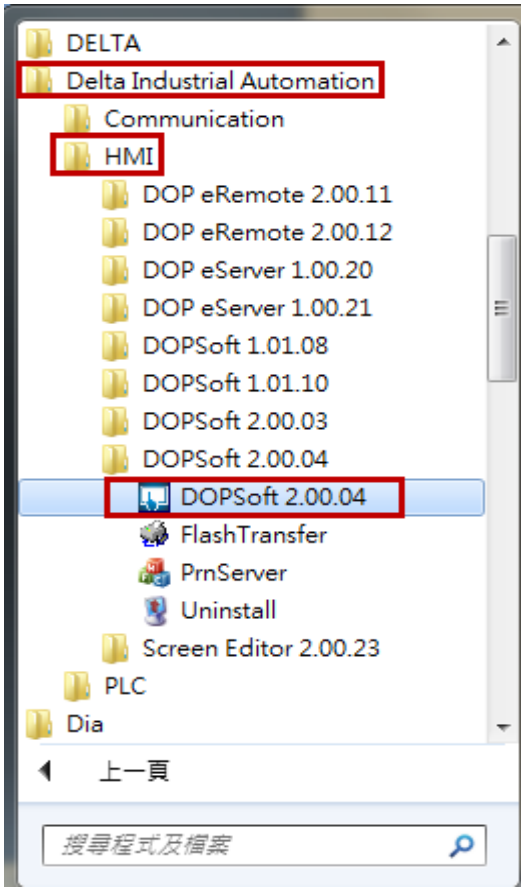


Figure 2-1-23 Execute DOPSoft from the installation path in Windows 7

2-2 Descriptions of DOPSoft Screen and Window Menu List

2-2-1 Execute DOPSoft

Click [Start]→[All Programs]→[Delta Industrial Automation]→[HMI]→[DOPSoft1.00.00]→[DOPSoft 1.00.00]to execute DOPSoft.

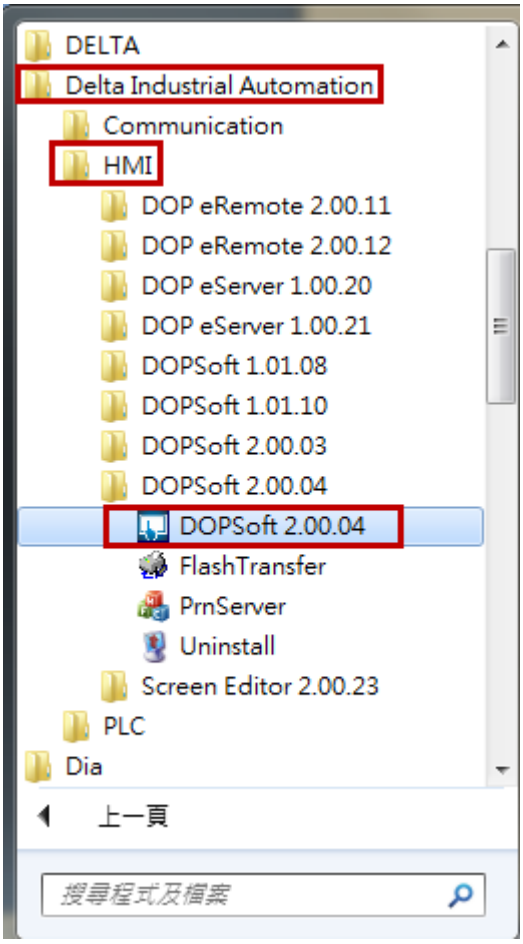


Figure 2-2-1 Execute DOPSoft.

Once the software is executed, a screen with no new project will show up, as shown in Figure 2-2-2.

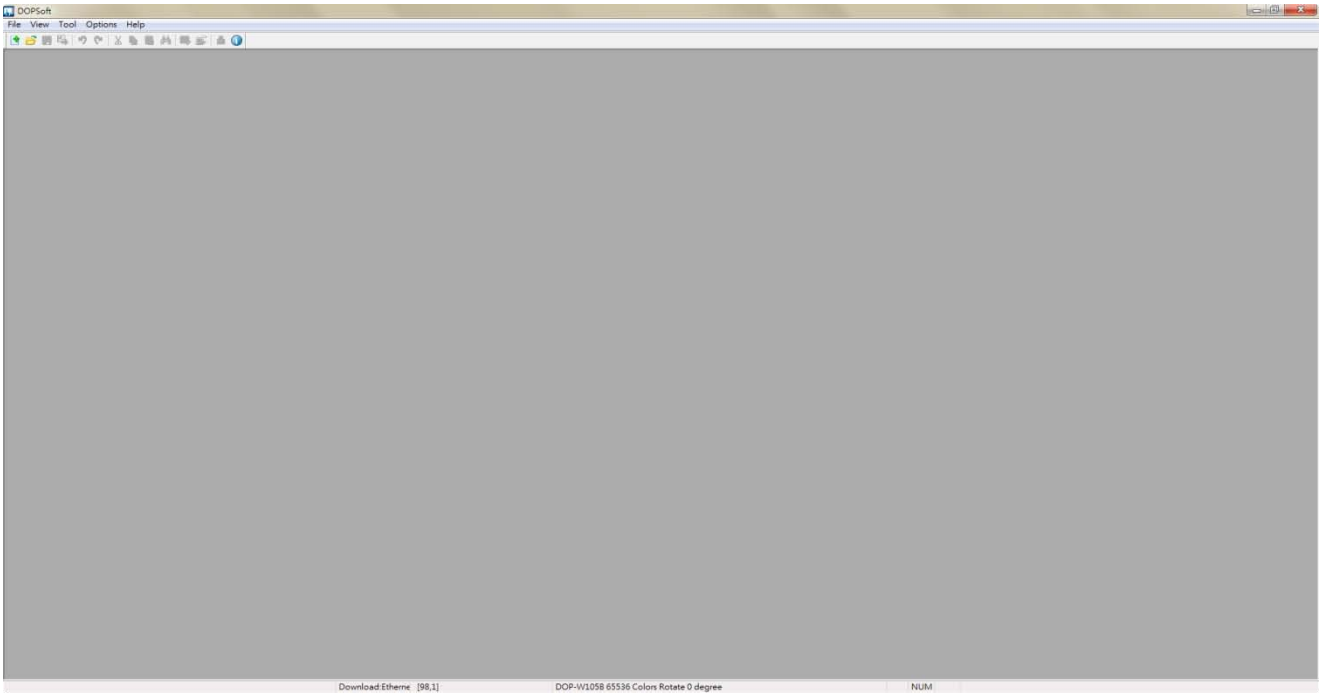


Figure 2-2-2 Screen that shows no new projects in DOPSoft.

2-2-1-1 Add New Projects

Please click or use the system-defined hotkey [Ctrl+N]to add a new project. The Configuration Wizard of DOPSoft will pop up, which allows the user to select the model number of HMI unit or printer and edit project and screen names.Upon completion of the basic configuration of the project, please click [Next]to configure the communication protocol.

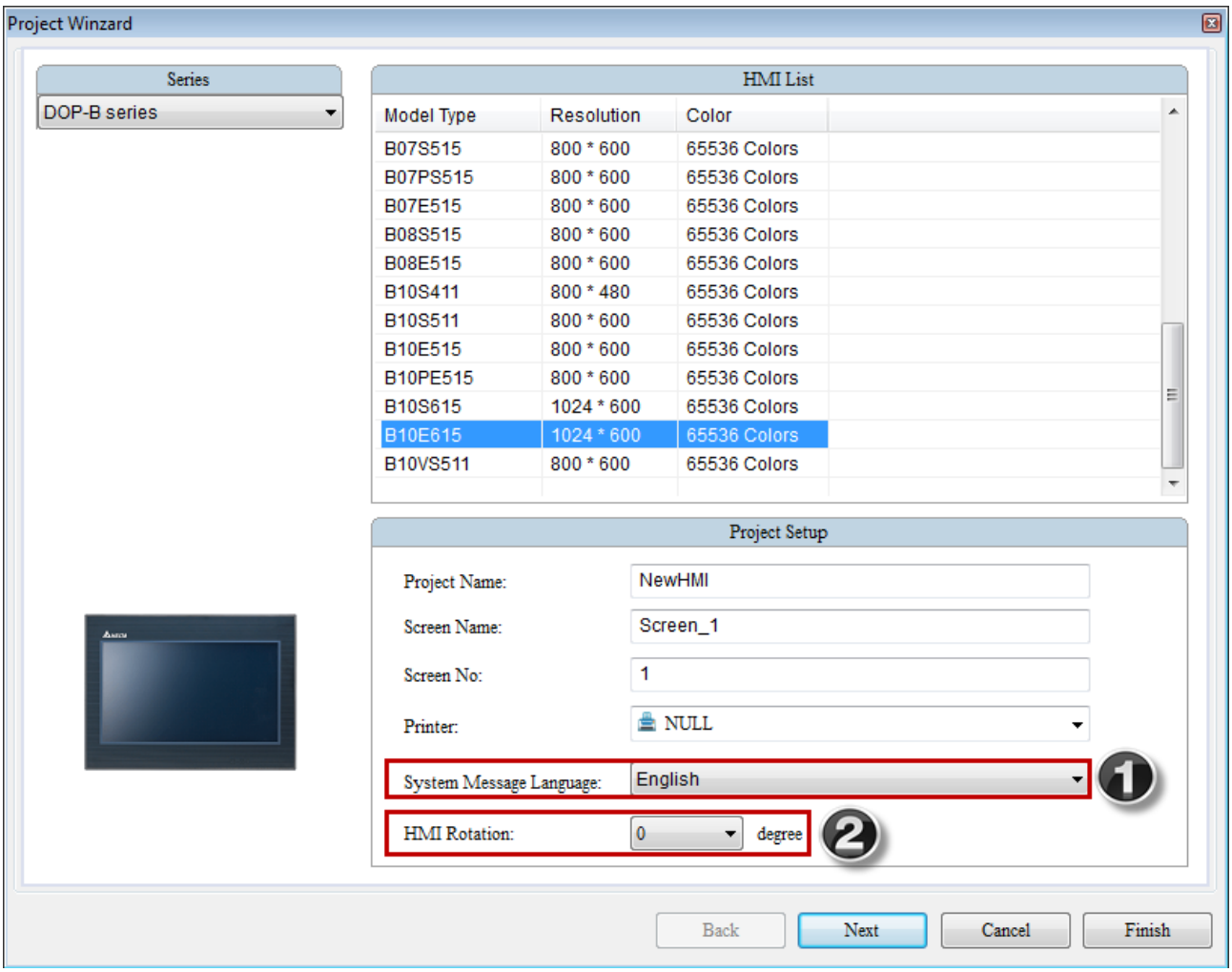


Figure 2-2-1-1 Project Wizard

No.	Item to Note	Description
1	System Message Language	English, Traditional Chinese, and Simplified Chinese are available for selection as the language of system index.
2	HMI Rotation	Select the degree for HMI rotation to be 0degrees, 90 degrees, 180 degrees, and 270 degrees.

Table 2-2-1-1 Project Wizard

Regarding the communication setting, the user can set the model number of controller, select COM Port or Ethernet as the communication port, and communicationParameter between the HMI and controller, as shown in Figure 2-2-1-2.

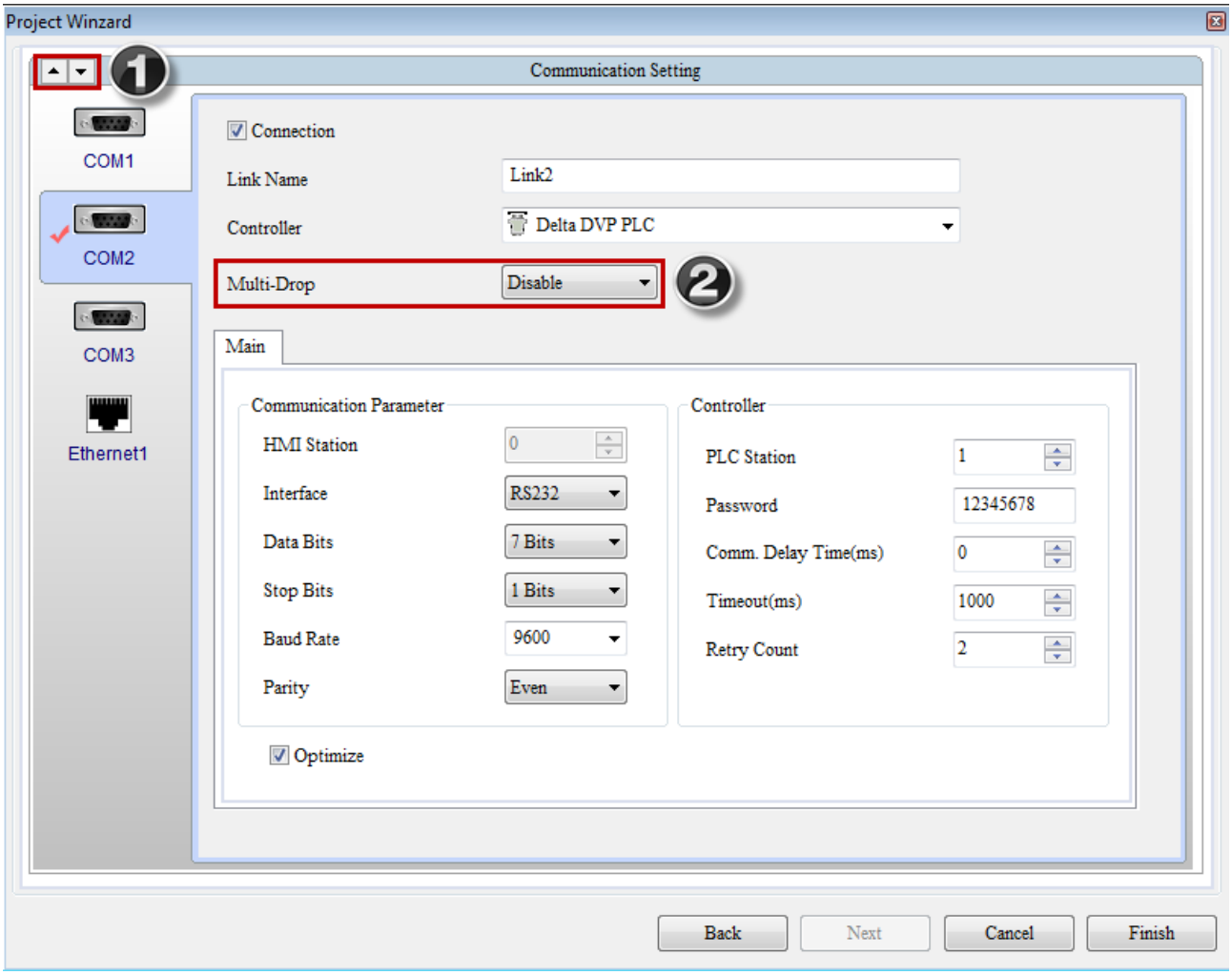


Figure 2-2-1-2 Project Wizard

Tag	Item to Note	Description
1	Up and Down Arrows	The user can use the up and down small arrows to switch between COM Port 1, COM Port 2, and COM Port 3.
2	Multi-Drop	To run the system in the Multi-Drop mode, one only needs to open the Multi-Drop mode by selecting Host or Client in the Multi-Drop. Select “Disable” to turn off the Multi-Drop communication.

Table 2-2-1-2 Project Wizard

If the communication is through Ethernet, please directly click the [Ethernet] icon to enter the configuration of network controller. Click in the [Device]page to add a new Ethernet Link, configure parameters such as the model number of the associated controller, controller IP address, communication delay time, Timeout, and Retry Count, as shown in Figure 2-2-1-3.

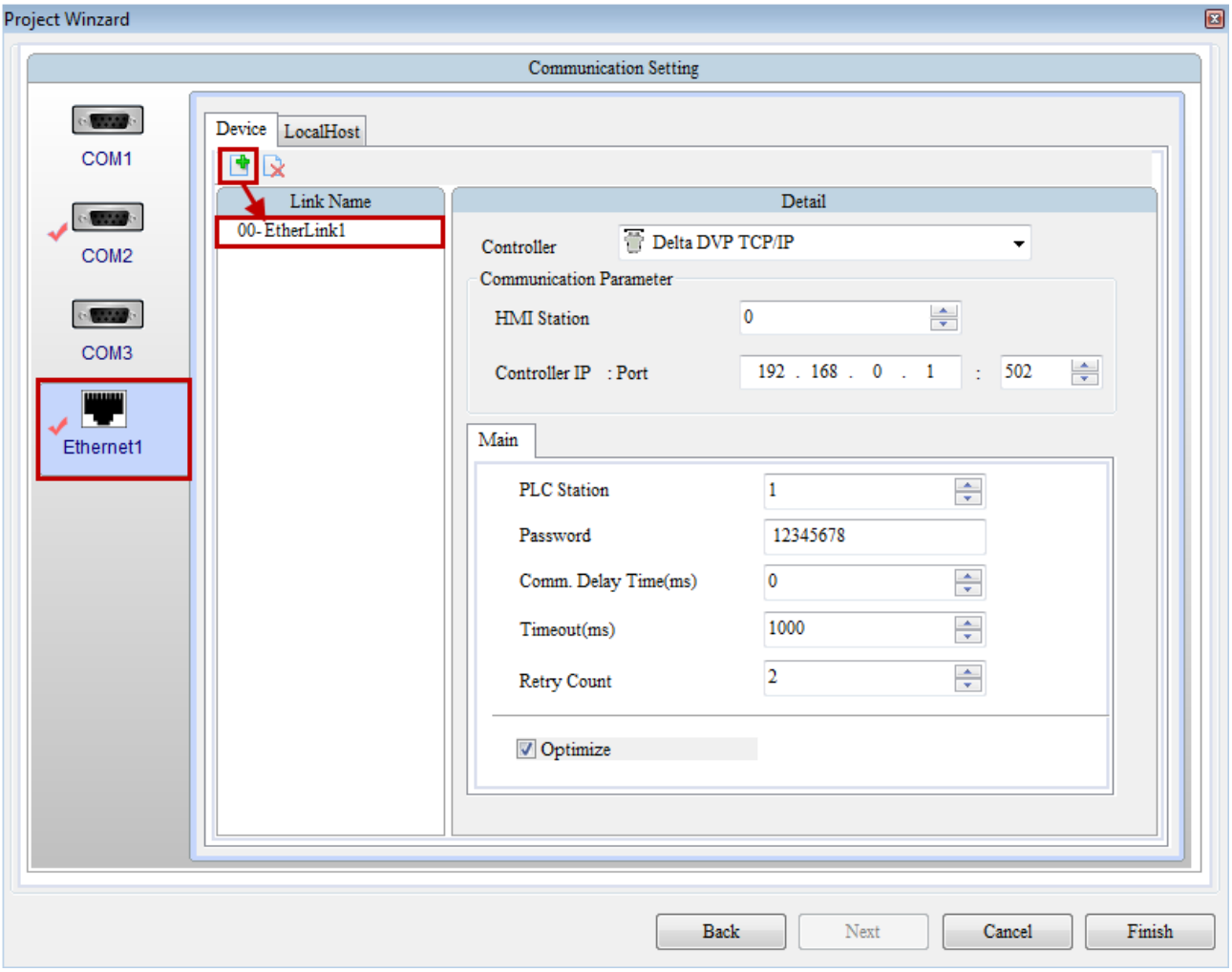


Figure 2-2-1-3 Project Wizard

One can also switch to the [Localhost] page to configure the IP address and enable network applications for the LocalHost of HMI, as shown in Figure 2-2-1-4.

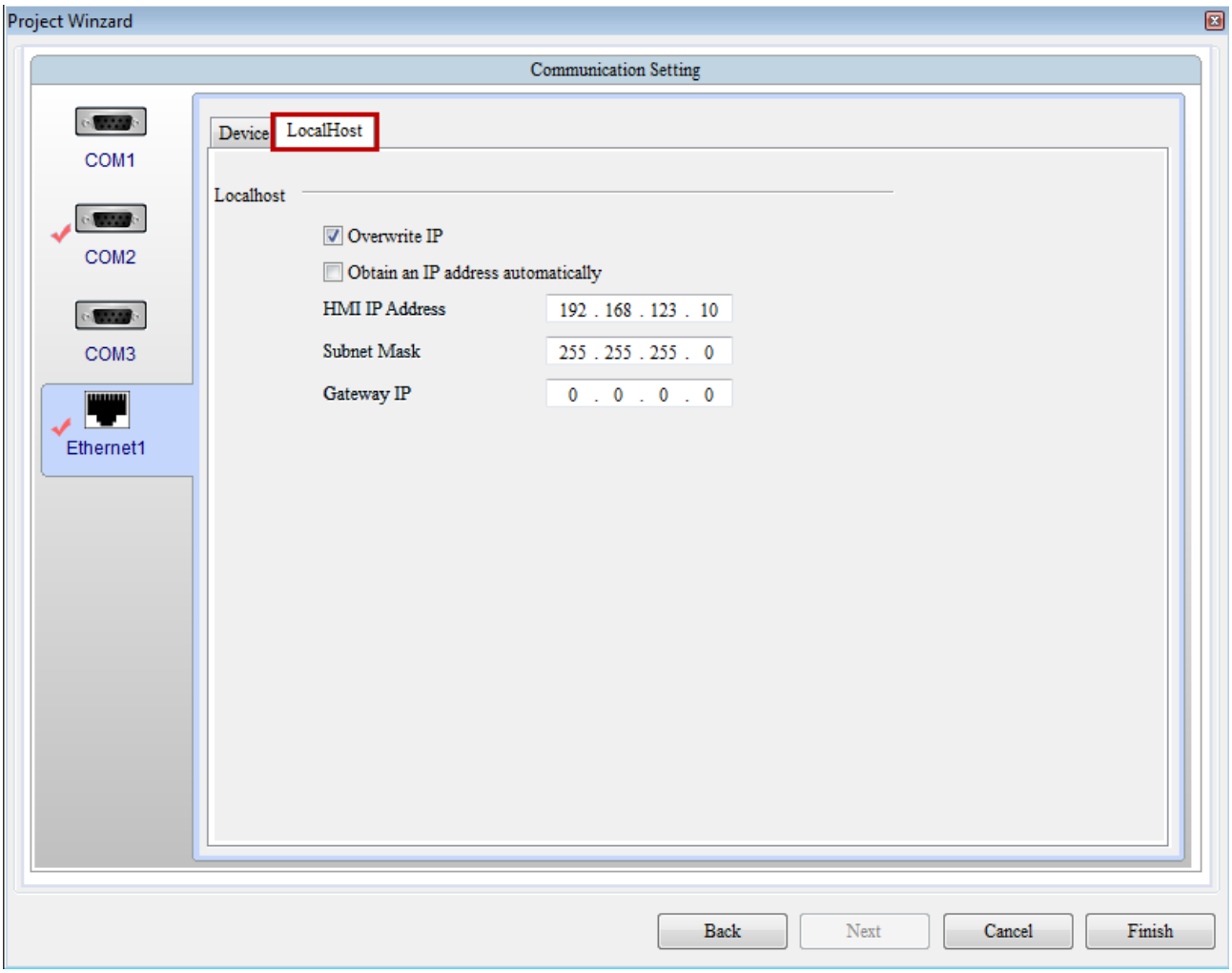


Figure 2-2-1-4 Project Wizard

Item to Note	Description
HMI Localhost	HMI local host indicates the IP address of the HMI. The IP address can be manually configured or automatically acquired. ➢ Unchecked [Overwrite IP]: When this option is unchecked, the HMI will use the default IP address 0.0.0.0. If the user chooses not to write in the IP from software, he/she can still change the IP address through the system screen [System Setting]→ [Network]. ➢ Check [Overwrite IP]: If this option is checked, it indicates the IP address is to be changed from the software end. As a result, the user can configure the parameters such as the IP address to write in

	and name of HMI unit. ➢ Check[Overwrite IP]and [Obtain an IP address automatically]: If both options are checked, it indicates that the HMI will acquire the IP address by DHCP mode. The user can learn about the current IP address by entering the system screen through [System Setting]→ [Network].

Table 2-2-1-3 Project Wizard

Upon completion of all configurations, please click [Finish]to open the Project Edit Page in DOPSoft.

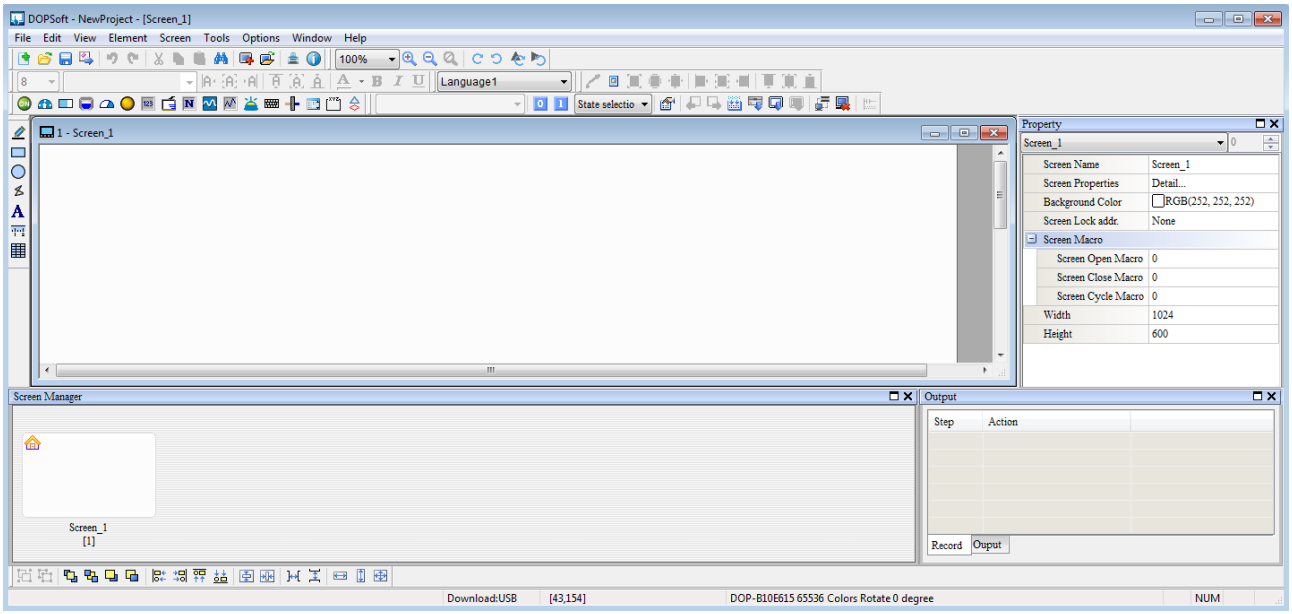


Figure 2-2-1-5 Edit screen of DOPSoft

2-2-1-2 Open Projects

To open project files saved previously in DOPSoft, one can click [File]→ [Open], as shown in Figure 2-2-1-6 below, click the icon in the toolbar, or use the system hotkey Ctrl+O.

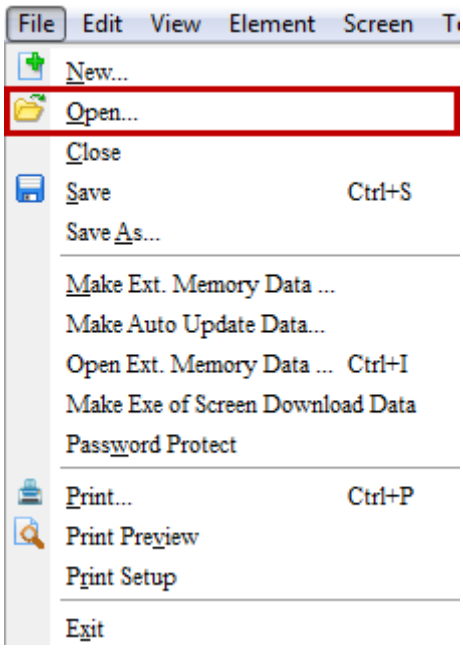


Figure 2-2-1-6 Option of Open Project

If the software editing window already contains a modified project, when another existing file is opened, the software will notify the changes and ask whether to save the file, as shown in Figure 2-2-1-7.

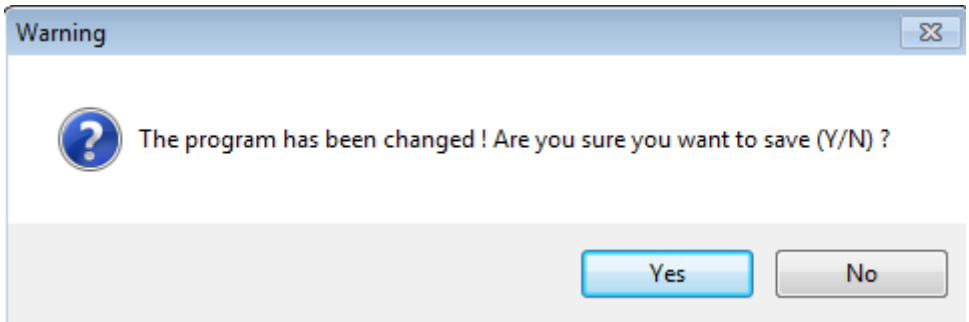


Figure 2-2-1-7 Window that prompts whether to save the existing file with changes.

Once the user chooses whether to save the changes, whether the decision is [Yes]that will save the file or [No]that will not save the file, the existing project file will be directly opened afterwards, as shown in Figure 2-2-1-8.

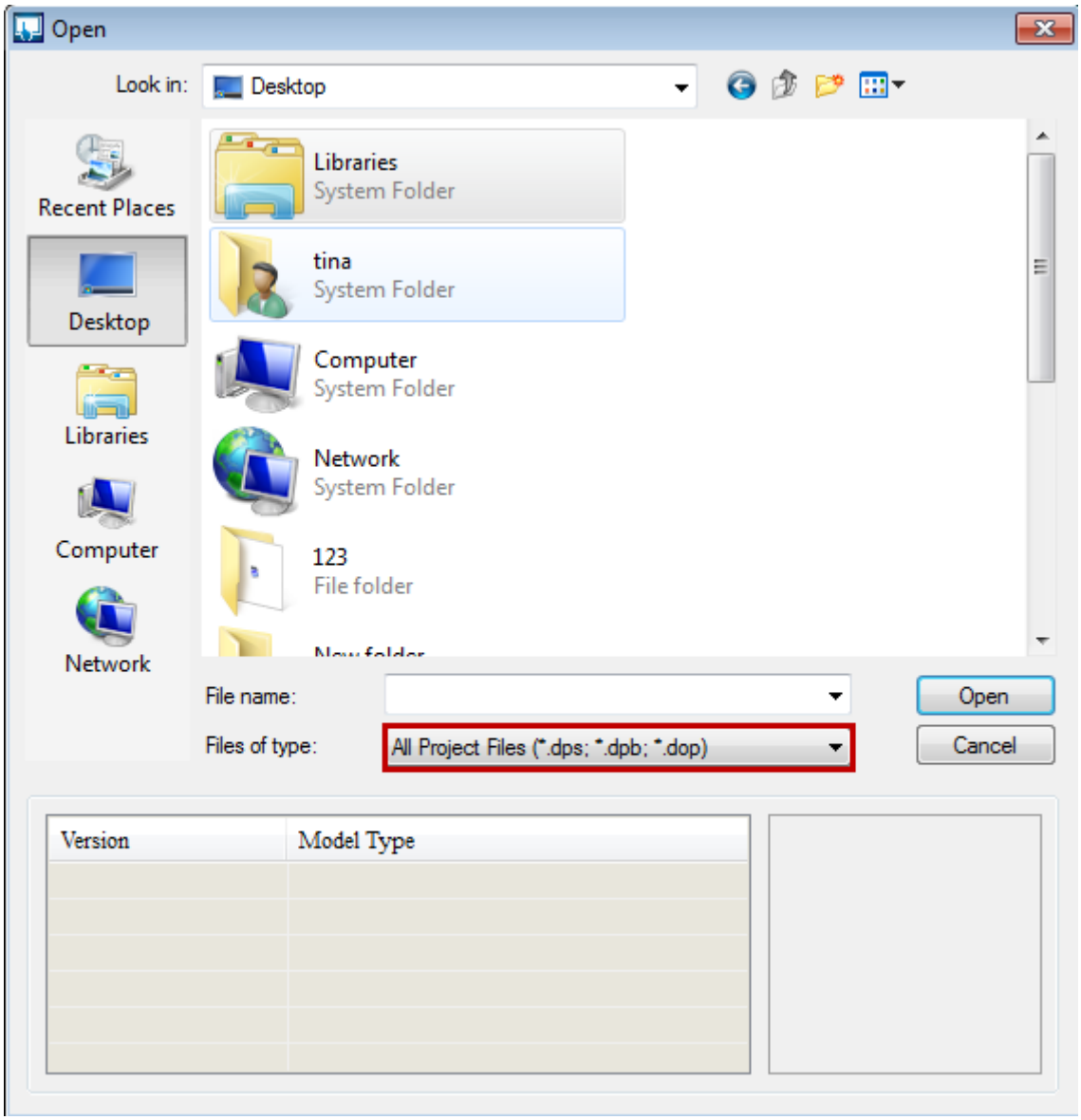


Figure 2-2-1-8 Open existing project

The file extension of DOPSoft is .dps. However, one can also open the .dpb files (Screen Editor 2.00.xx) and .dop files (Screen Editor 1.05.xx) edited by Screen Editor. To open the .dpb files, one simply copies the old screen data into DOPSoft for editing, where no changes are made. If one opens the .dop files, DOPSoft will convert all the data in series A HMI into series B HMI for scree editing. In this case, a window for HMIconversion will pop up to ask the user which series of HMI to use, as shown in Figs. 2-2-1-9 and 2-2-1-10.

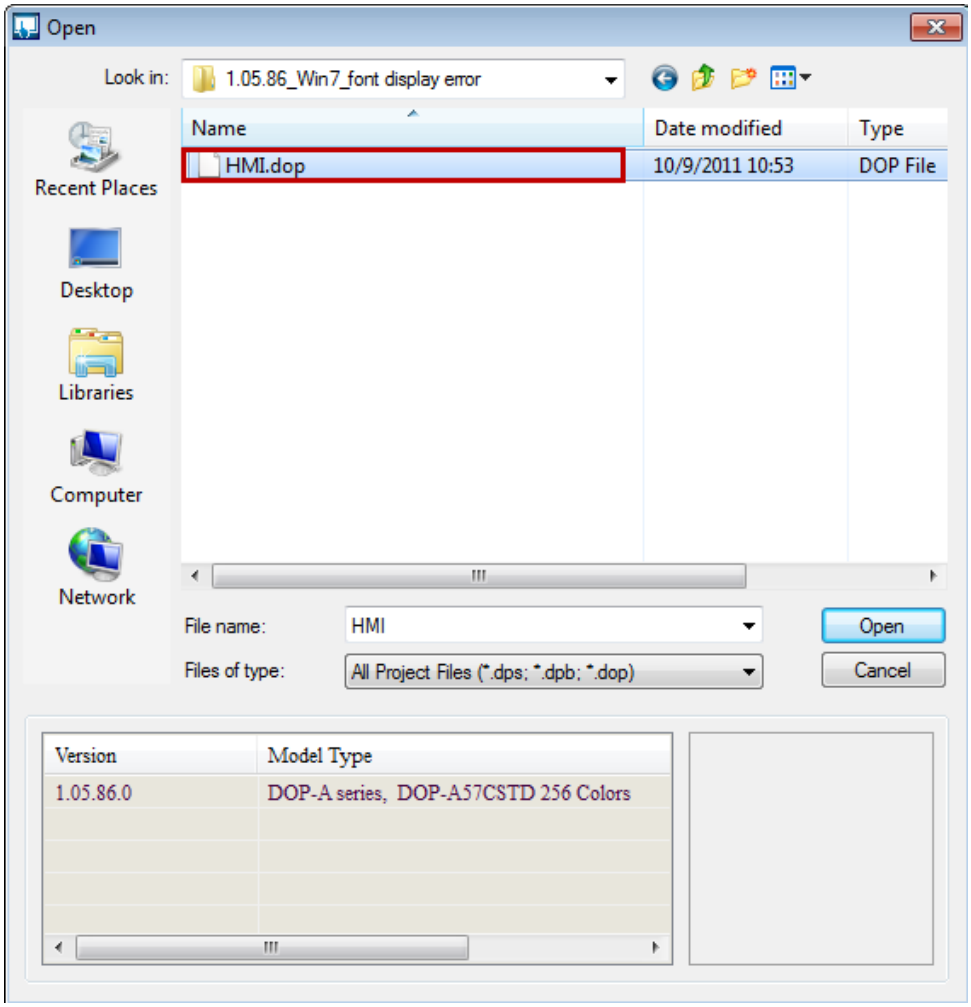


Figure 2-2-1-9 Open series A HMI file

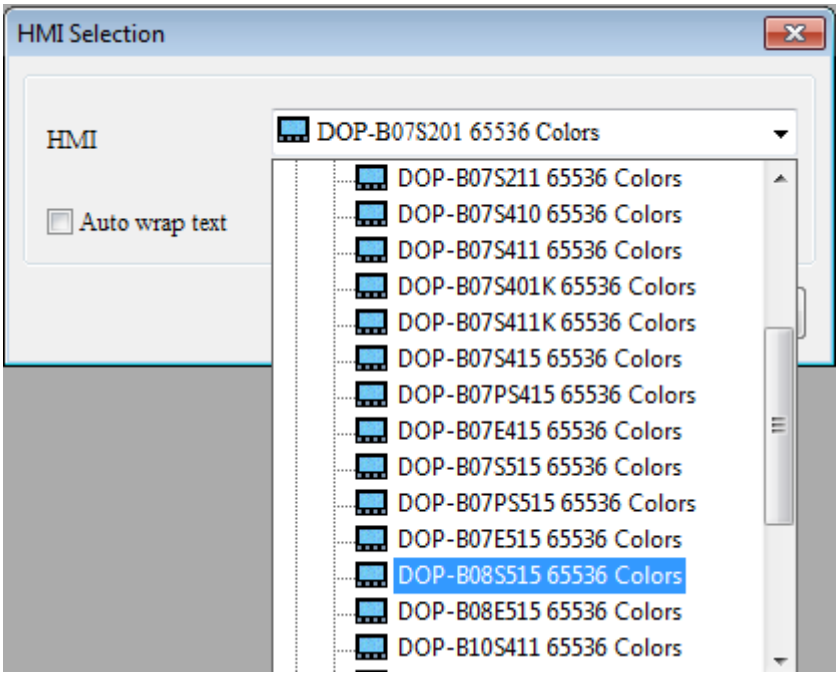


Figure 2-2-1-10 Select the HMI model to change to

NOTE:

✓ When an old version of the HMIproject is opened, such as the .dpb or .dop file edited in Screen Editor, if it has been edited by DOPSoft and the original file overwritten in file saving, the old version of Screen Editor won't be able to open this file again. Therefore, please save an additional copy of the original file as the backup for future uses.

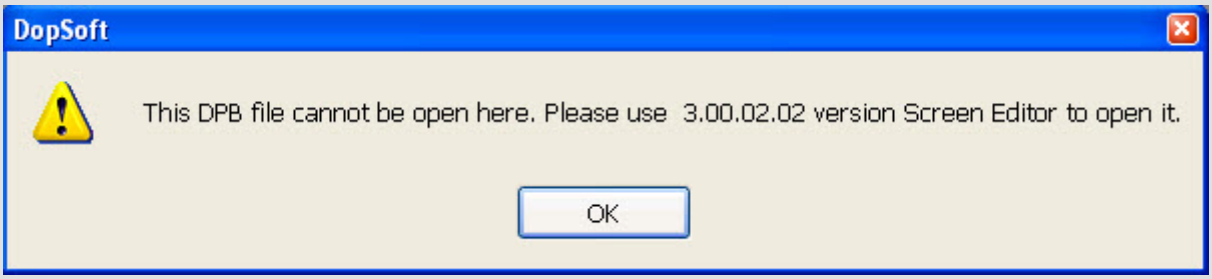


Figure 2-2-1-11Unable to open the new version of file for editing

2-2-1-1 Save Projects

Projects can be saved in two ways: Save or Save As.

2-2-1-1-1 Save

To save the file, one can follow [File]→ [Save]to save the current project file, or do it through the icon in the toolbar, or use the hotkey Ctrl+S provided by the software. All these methods can save the file. When the above three actions are executed, the software will check if the project file to save is a new project or an existing one and make decisions accordingly. If a new project is to be saved, a window for saving as a new file will pop up for the user to save the current project, as shown in Figure 2-2-1-12. On the contrary, if the file to be saved is an existing project, no window will pop up when the file is saved. The current project will simply be saved.

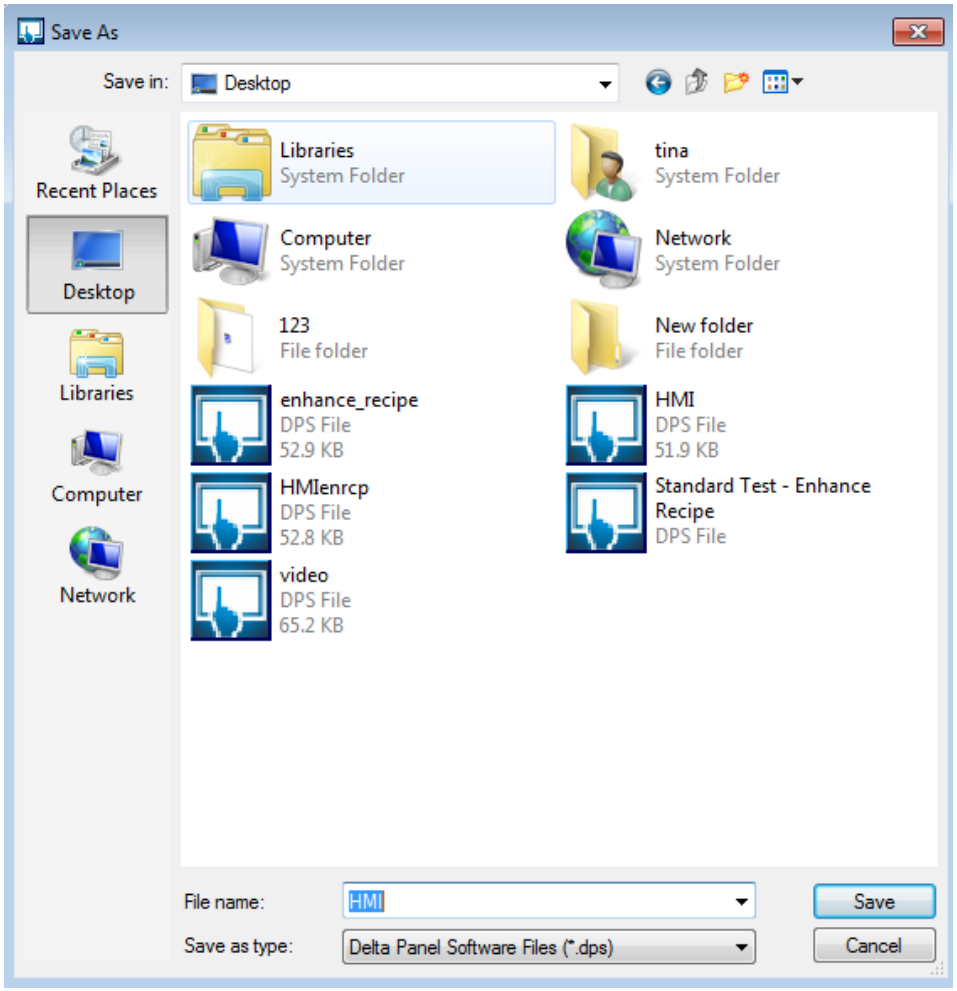


Figure 2-2-1-12 Save file

2-2-1-1-2 Save As

To save a file as a new file means saving the screen data currently being edited to the system hard drive disk with a different filename. This action can only be executed through choosing [File]→ [Save As]. In addition, this function will not consider whether the current project is a new file or an old one. Once this function is executed, a window for saving as new file will pop up, as shown in Figure 2-2-1-13. Once Save is clicked, the path to save the project will be designated to that selected in the Save as new file action.

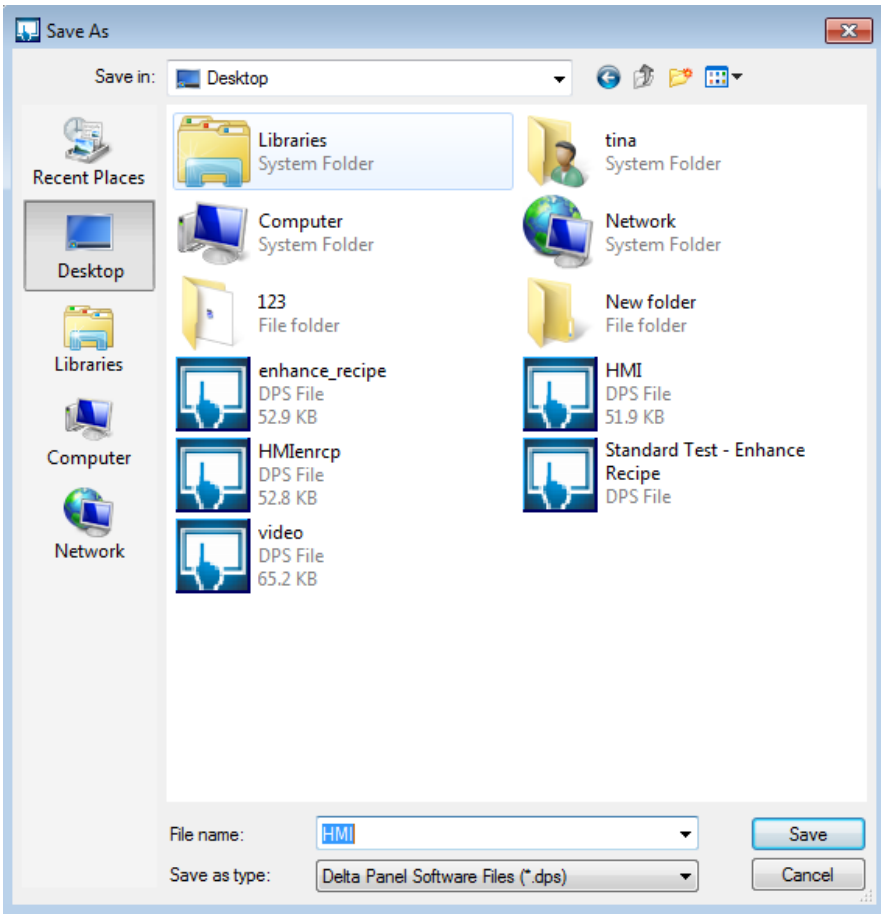


Figure 2-2-1-13 Save As

2-2-1-2 Close Project

Closing project means to end editing the project that is being currently edited. To execute this function, one can only go through [File]→ [Close]. Once it's being executed, if there is any project that have been edited in the window, a window for saving files will pop up to ask the user whether to save it. Clicking [Yes] will save the changed project followed by closing it, while clicking [No] will close the project directly without saving the changes. One can also click [Cancel] to abort the action of closing project.

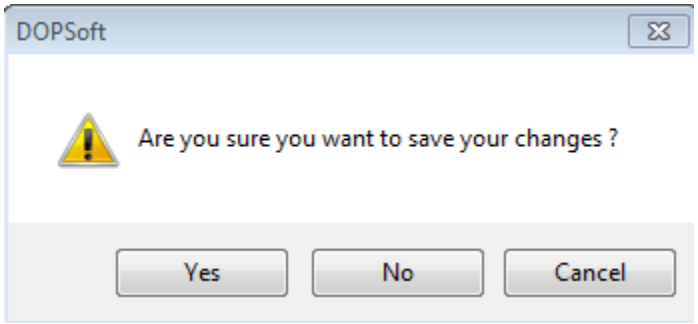


Figure 2-2-1-14 Close project

2-2-2 Window Function Bar

The editing window of DOPSoft consists of eight areas, including Menu, Toolbar, Element Tool (Element list and Element bank), Property, Output, Screen Manager, Edit Area, and Status Bar. The layout of these eight areas is shown in Figure 2-2-2-1.

The toolbar contains all standard Windows® programs, which can be rearranged as the toolbar in Windows®. For example, the device toolbar can be moved to the left side of the screen. The user can click and drag to place the toolbar to wherever is preferred, as shown in Figure 2-2-2-2.

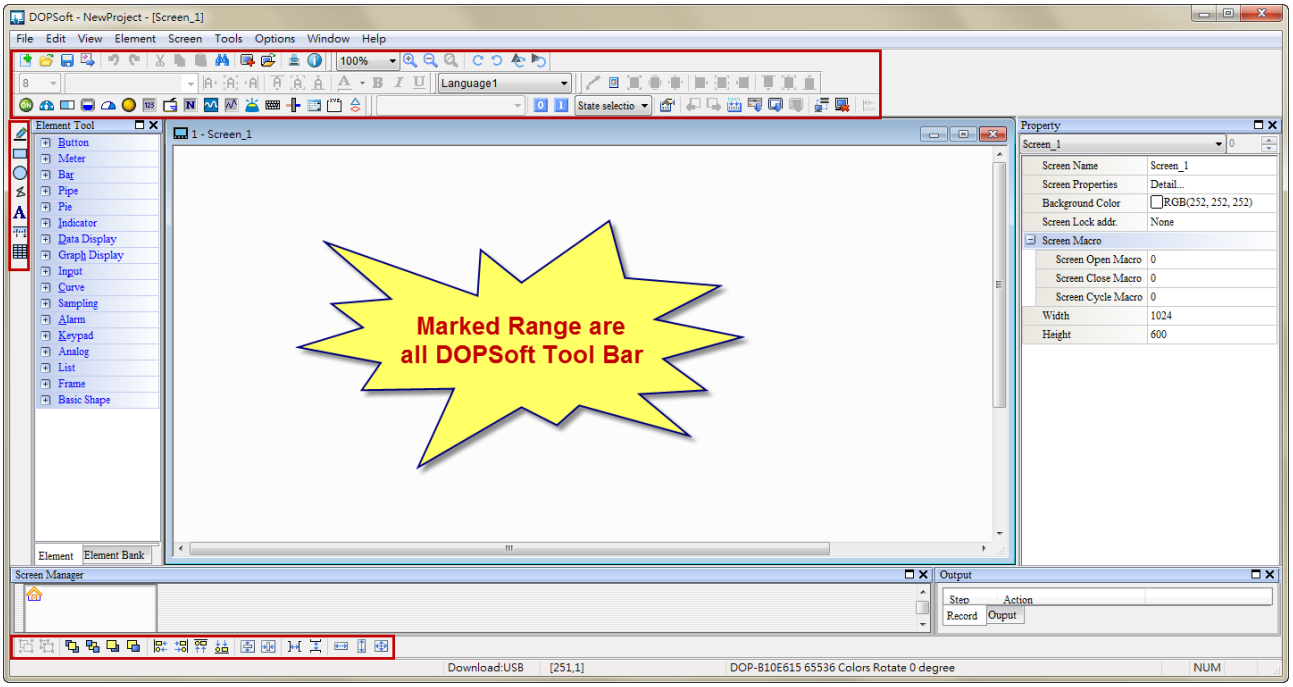


Figure 2-2-2-1 DOPSoft toolbar

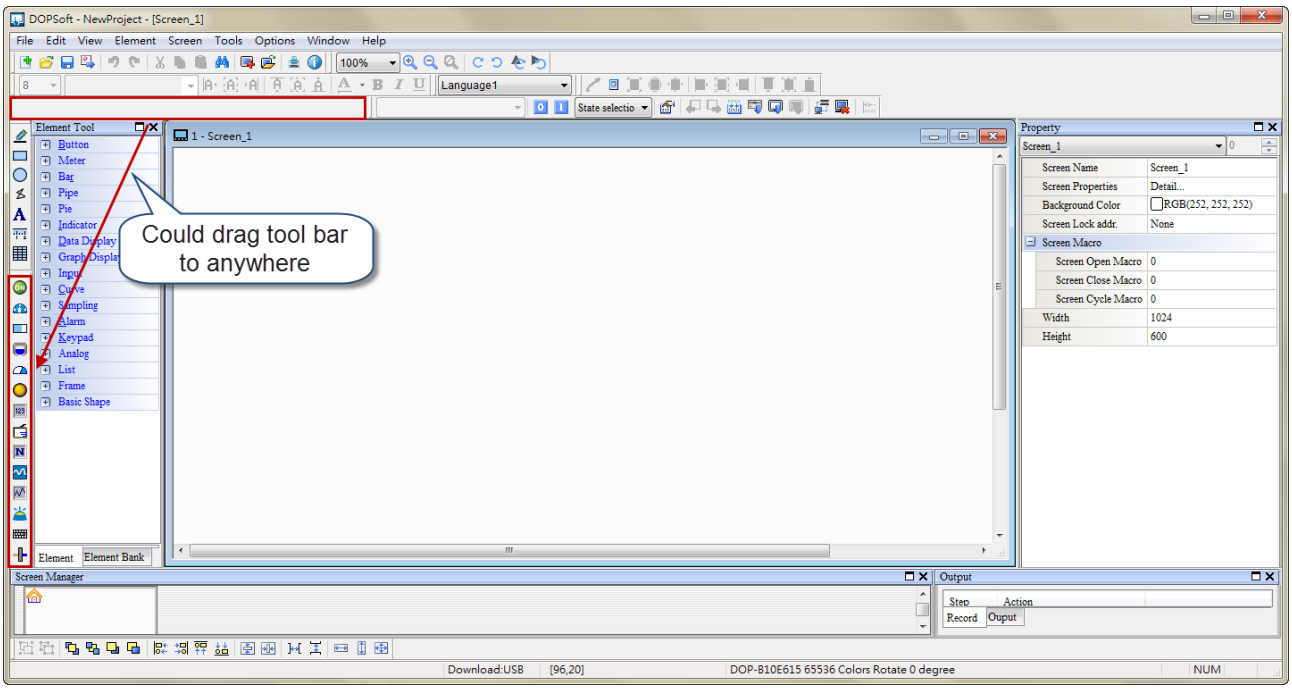
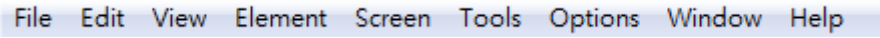


Figure 2-2-2-2 Click and drag toolbar in DOPSoft

◆ Menu

DOPSoft offers nine major items in its Menu.



◆ Toolbar

DOPSoftoffers eight major toolbars.

Standard bar

Text bar

Bitmap bar

Element bar

Layout bar

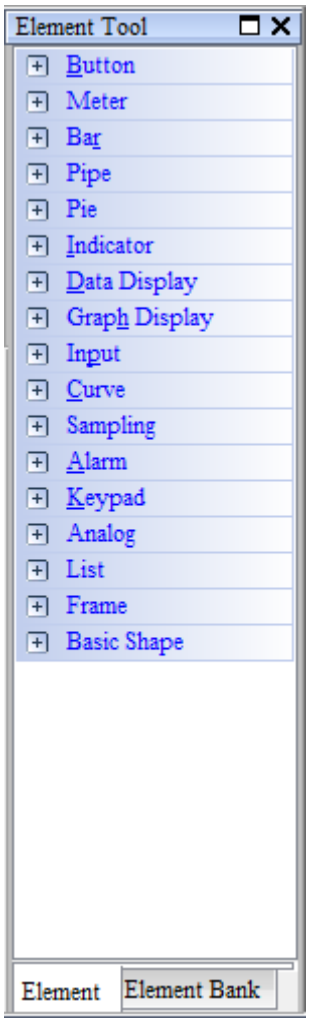
Zoom bar

Language Selection list

Drawing toolbar

◆ Element Tool

The Element Tool includes the element list and element bank, which provides the list of available elements and the bank to store the edited elements. The user can store the edited elements into the Element Bank and only needs to drag them to the screen editing window the next time they are to be used.



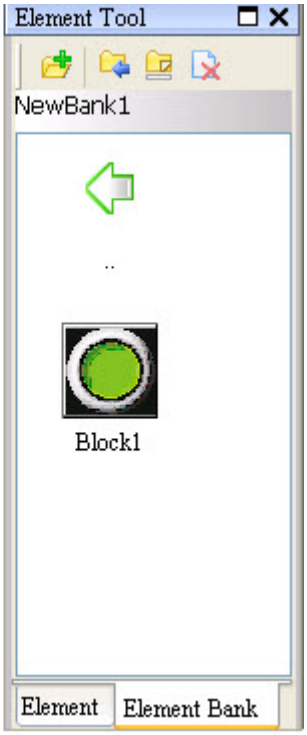


Figure 2-2-2-3 Element List

Figure 2-2-2-4 Element Bank

Figure 2-2-2-5 Description on how to create the Element Bank. (1) Please first click the Element Bank page. (2) Please click to create a new Element Bank. (3) Please create an element. (4) Please click to import the element data.

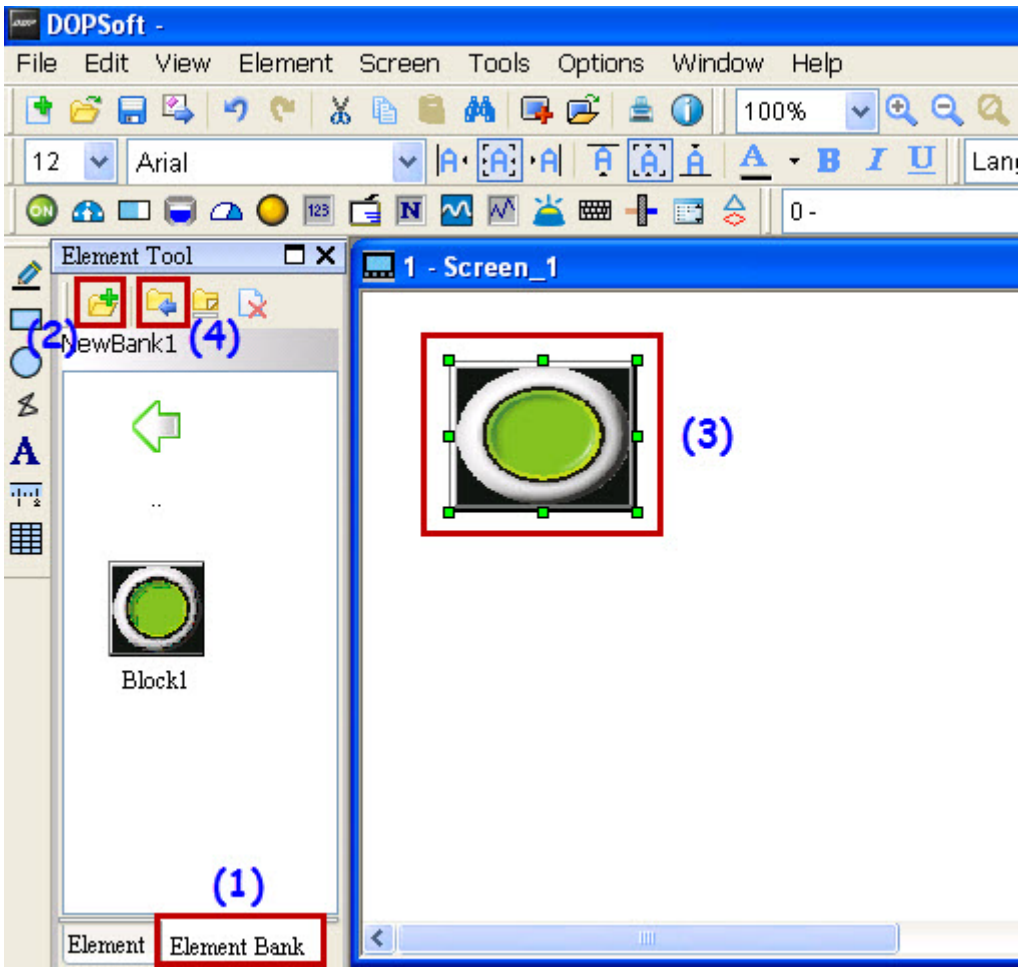


Figure 2-2-2-5 Steps of creating the Element Bank

◆ Property

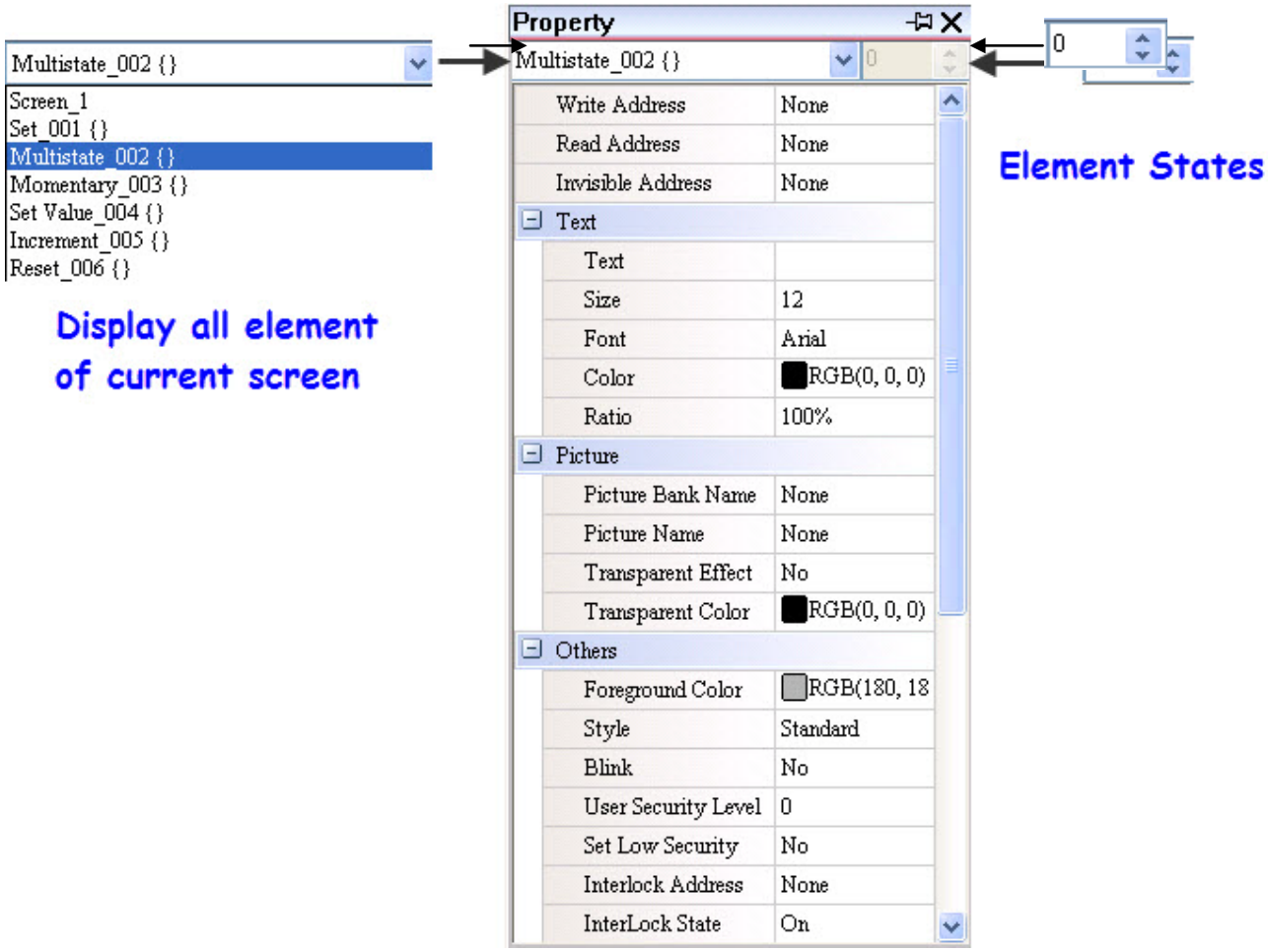


Figure 2-2-2-6 Property window

◆ Output

The Output records the editing actions of the user and the output messages after screen editing. When the editing function is executed, DOPSoft will conduct program compiling and the output field will generate the corresponding messages in case of errors. When the user clicks the error message, the system will jump to the screen where the device with error is located for debugging, as shown in Figure 2-2-2-7.

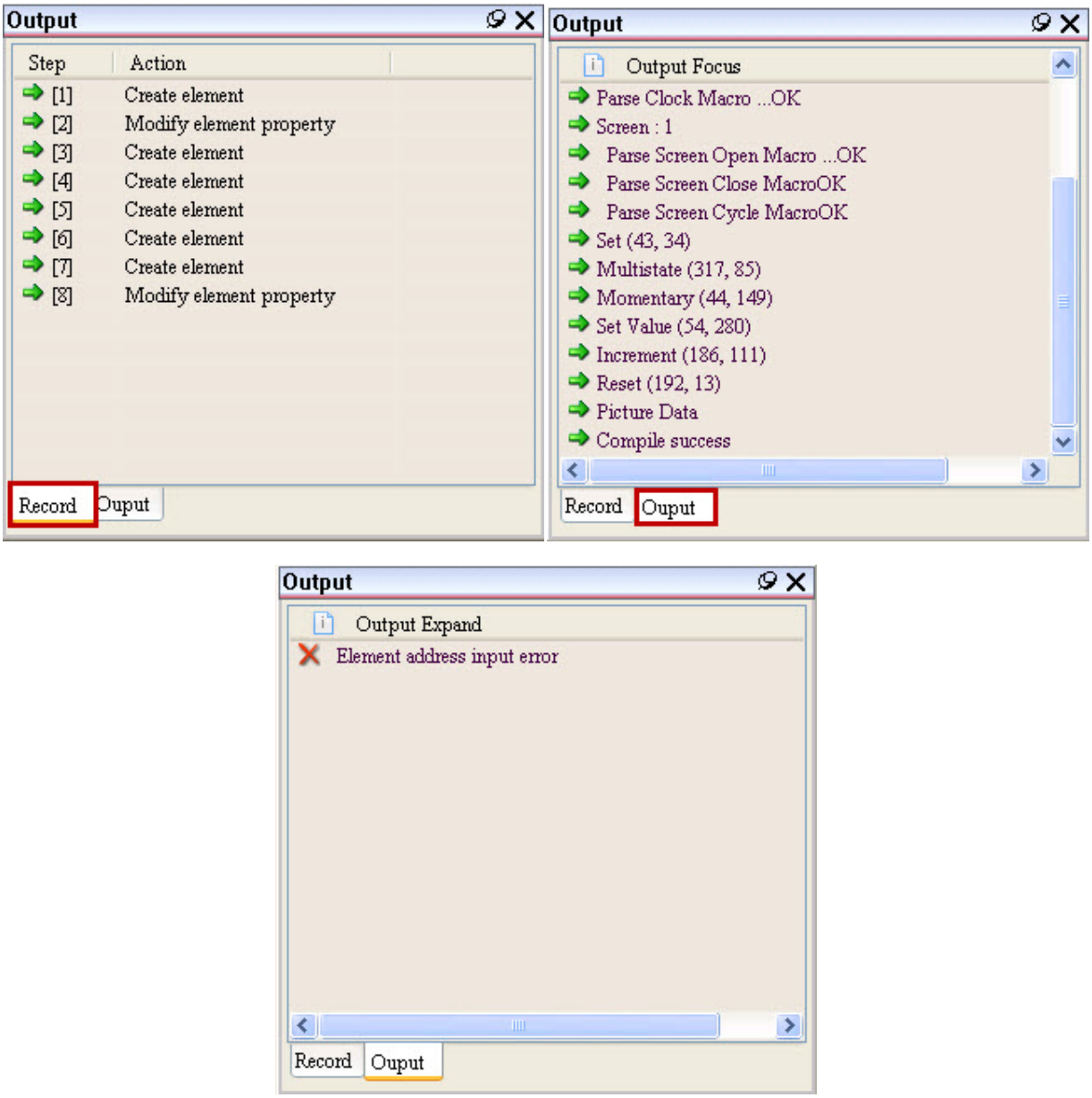


Figure 2-2-2-7 Output

◆ Screen Manager

If the user creates several screens, he/she can use the function of Screen Manager to preview the content, which allows the user to learn what types of devices are located in the screen without having to switch to the particular screen. One can also double click the screen of interest in the window to quickly switch to this particular screen.

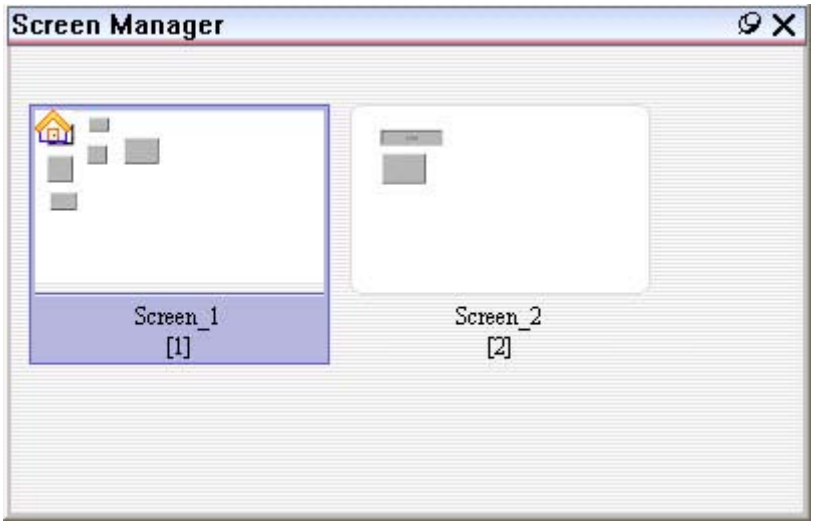


Figure 2-2-2-8 Screen Manager

◆ Status Bar

The status bar will display the current editing status, as shown in Figure 2-2-2-9.

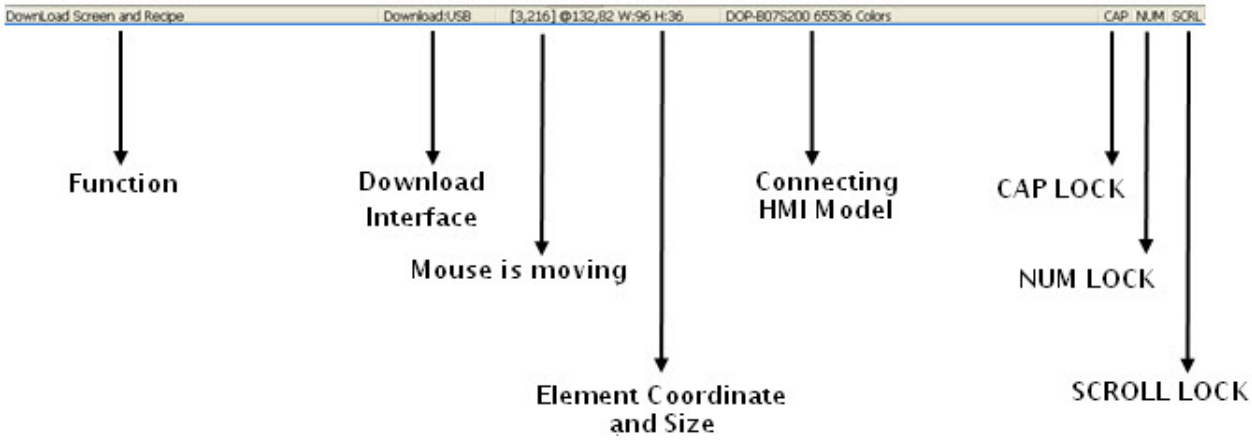


Figure 2-2-2-9 Status bar

◆ Edit Area

Proper editing range is provided according to the type of HMI selected by the user.

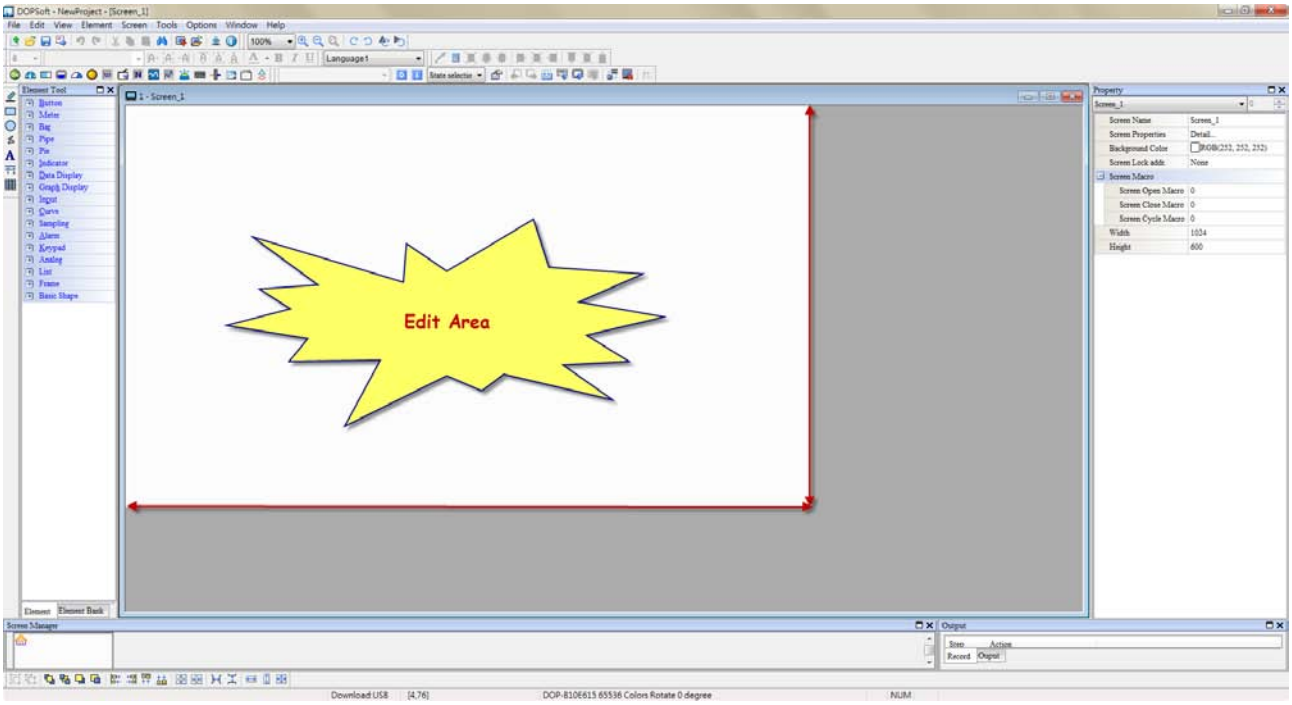


Figure 2-2-2-10 Edit area

2-2-3 File

The [File]in the Menu provides functions that include “Make Ext. Memory Data”, “Open Ext. Memory Data”, and “Password Protect”.

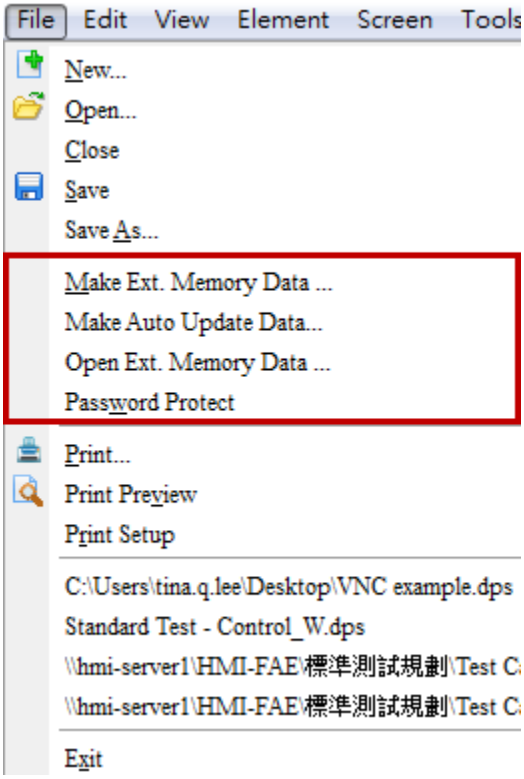


Figure 2-2-3-1 File in Menu

2-2-3-1 Make Ext. Memory Data

Once the action of creating the screen data file is executed, DOPSoft will automatically edit the current screen data. In the past, Screen Editor must first go through manual editing before the function of creating screen data file can be executed. Upon editing, a window will pop up for selection of directory path for file saving. Once the directory for file saving is selected, software will copy the edited screen data file to the designated directory, which normally is located in an SD card or a USB drive, as shown in Figure 2-2-3-2. The user can insert the SD card or USB drive into the HMI. Once the HMI is started, one can enter the system screen through [System Setting]→ [File Manager]for Copy File, F/W Update, and Multi Screen File. The details of these three functions will be described in the chapter of system screen in Appendix A.

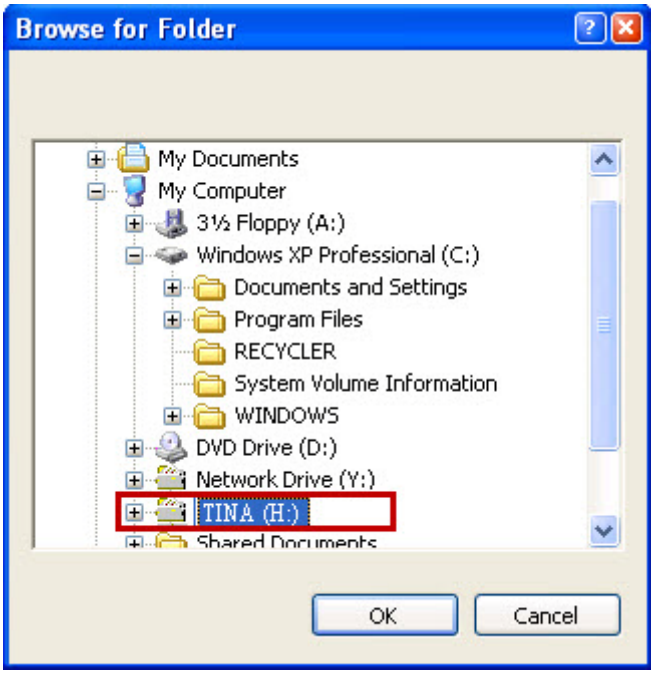


Figure 2-2-3-2 Directory to save the created screen data file.

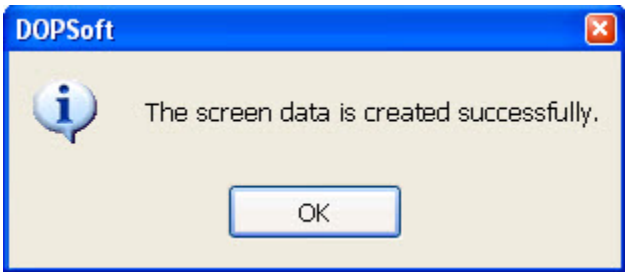


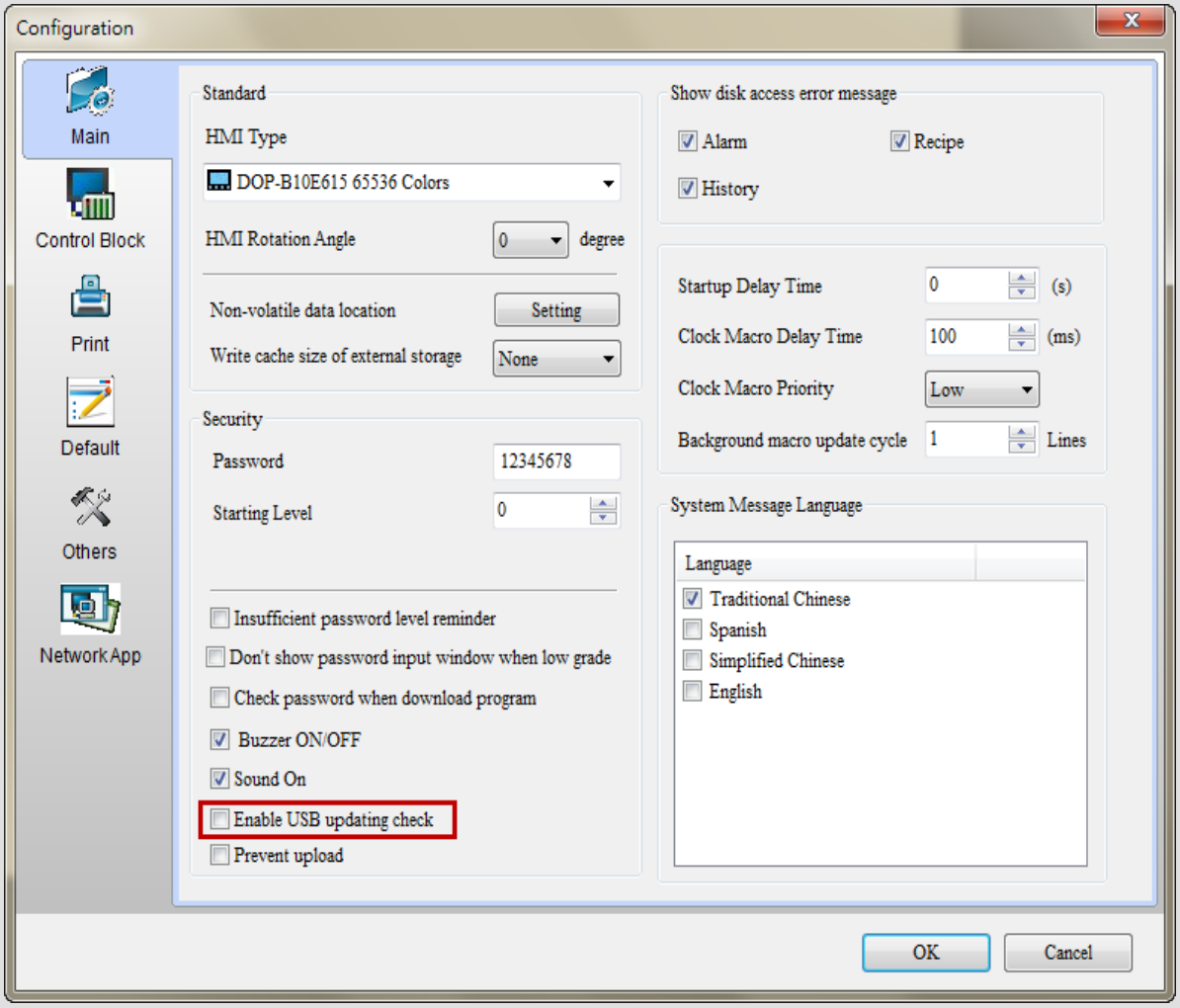
Figure 2-2-3-3 Completion of creating screen data

2-2-3-2 Make Auto Update Data

After execute Make Auto Update Data function,DOPSoft will compile the current data. A window will pop up for users to select the storage directory path. The software will copy the compiled data into the specified directory, which is usually either SD card or USB. See figure 2-2-3-4. This function is different from the function of creating data file. Before HMI is powered on or returning to the HMI screen, HMI does Disk AutoUpdate Check to the external device when inserting USB Disk. If it does, a message of "【Enter Auto Update Procedure】" will show (see figure 2-2-3-6). Click【Yes】, HMI will automatically update the firmware and its screen; click【No】, HMI will do nothing.

NOTE：

- ✓ If check "Enable USB updating check"and enter 【System Setting】→【File Manager】 to Copy File, users will be unable to copy files at the moment.
- ✓ If check "Enable USB updating check", and then execute Auto Update File, users will be able to update firmware only, not the screen file.



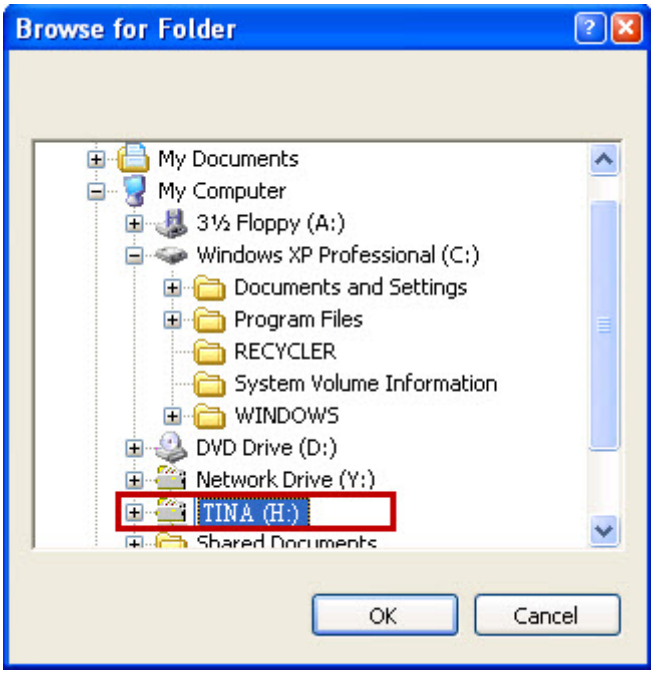


Figure 2-2-3-4 Storage directory for update file

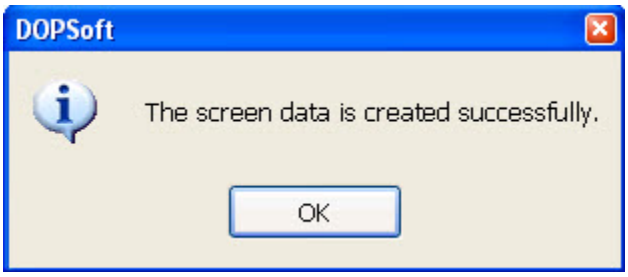


Figure 2-2-3-5 The screen data is created successfully.

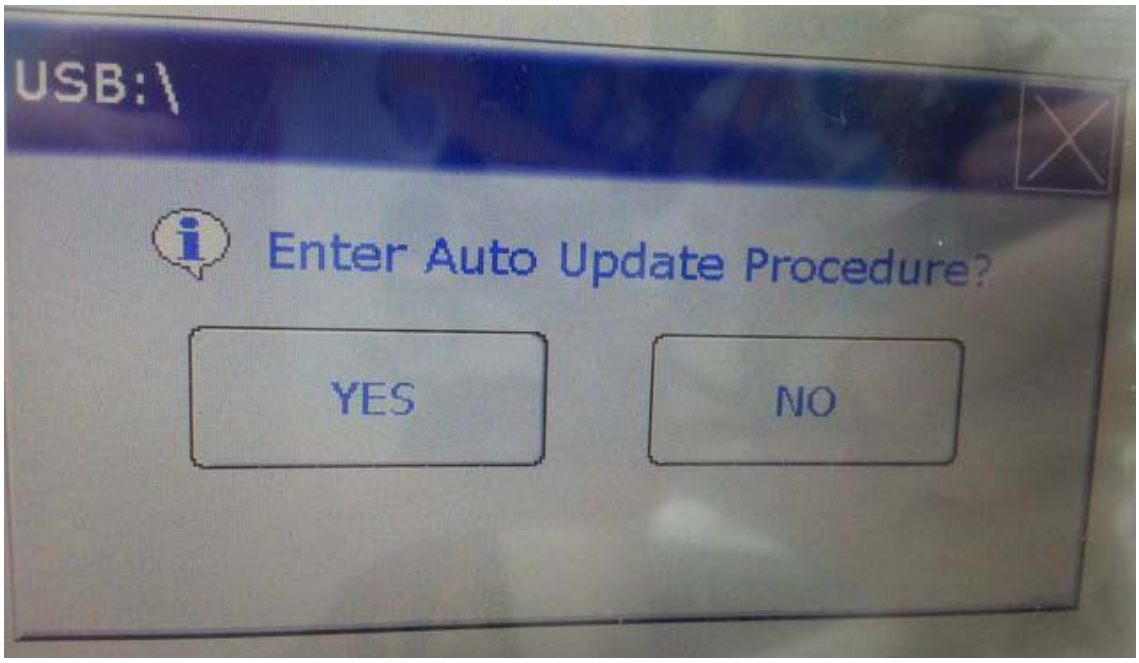


Figure 2-2-3-6 Message window of【Enter Auto Update Procedure】

When the update filed is created, one folder of HMI_AutoUP will be stored in external device.

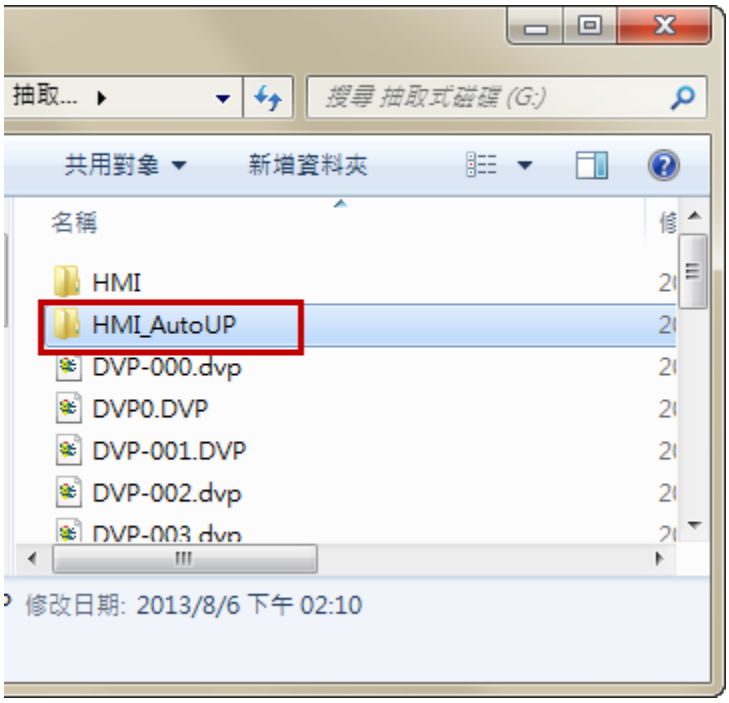


Figure 2-2-3-7 Folder is created after auto update the file

NOTE：

✓ If both USB Disk and SD Card have the folder of HMI_AutoUP and need to update firmware and screen data, HMI will update the data in USB Disk first, then SD Card.

Operating procedure of other functions are identical, users insert SD card or USB into HMI. When HMI is activated, enter 【System Setting】→【File Manager】 to Copy File, update F/W and Multi Screen File. These three functions will be elaborated in Appendix A.

2-2-3-3 Open Ext. Memory Data

When one clicks “Open Ext. Memory Data”, the software will pop up a window for the user to choose the directory to save the file, asshown in Figure 2-2-3-8.

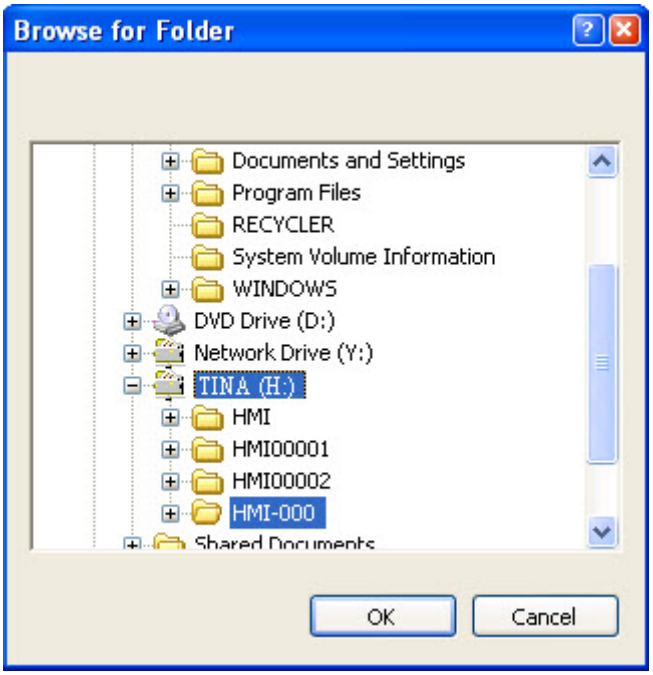


Figure 2-2-3-8 Choose screen data file

Once the screen data file is selected, the software will ask the user whether to rename and save the opened file, as shown in Figure 2-2-3-9

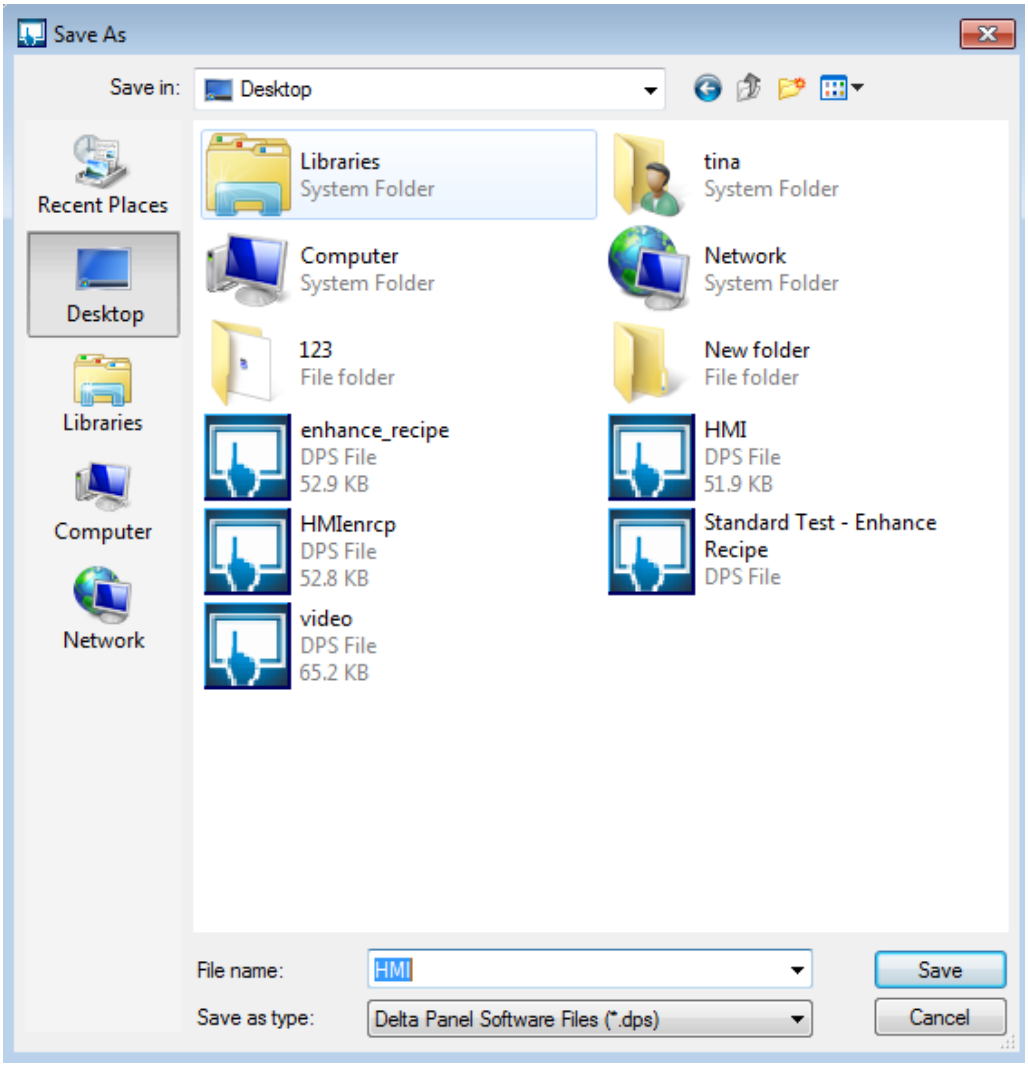


Figure 2-2-3-9 Save screen data file

2-2-3-4 Make Exe of Screen Download Data

This function is used to generate an executable file. With the executable file, users can download the screen program to HMI without installing DOPSoft software.
Click on Make download screen program to download the executable file. And a screen of selecting the directory path for storing the executable file will pop up. See figure 2-2-3-10.

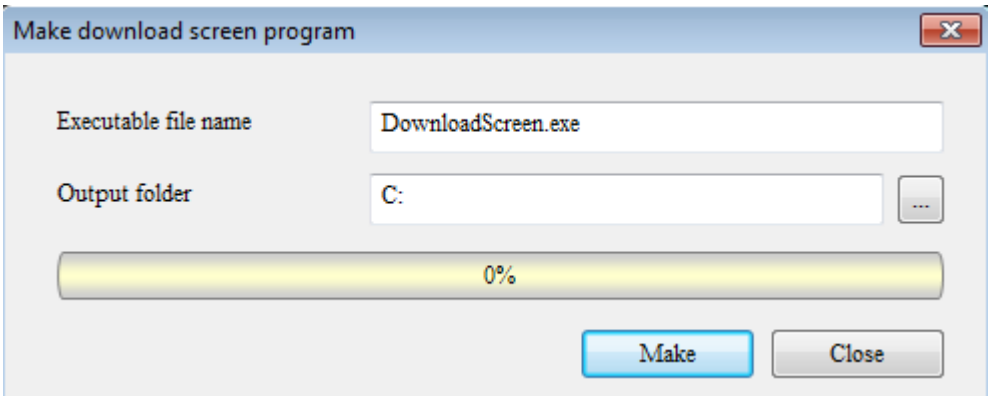


Figure2-2-3-10 Select the output folder

Select the output folder and the name of executable file. Users can change the output folder. See figure 2-2-3-11.

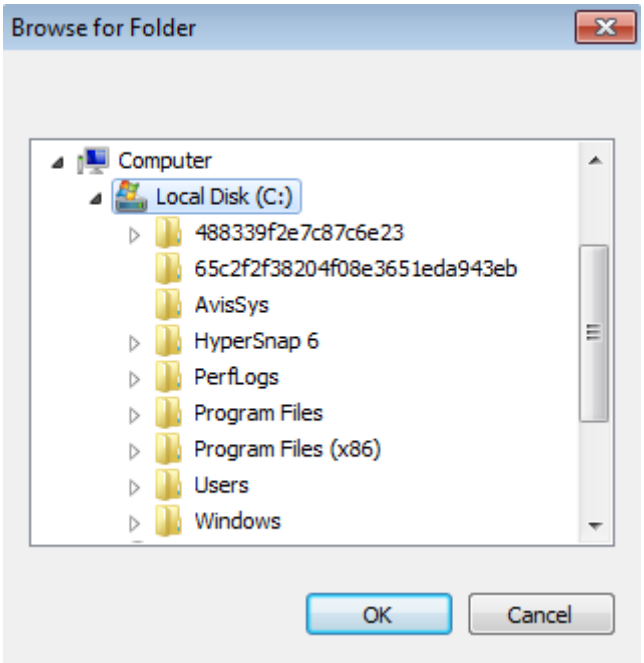


Figure2-2-3-11 Directory for saving the made screen download .exe file

Press the Make button and start to make download screen program.

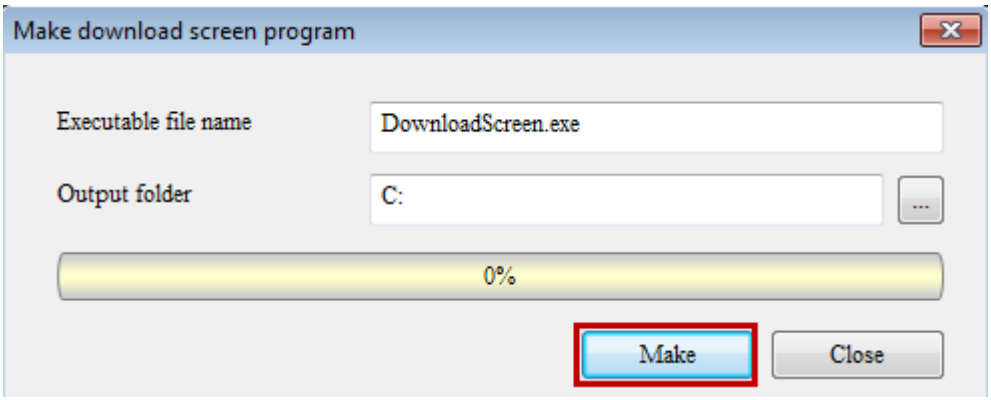


Figure2-2-3-12 Start to make download screen program

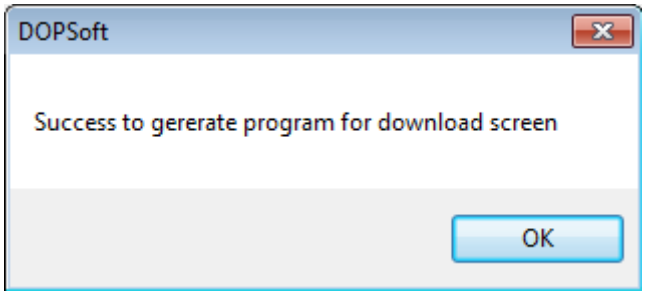


Figure2-2-3-13 Successfully create the download screen

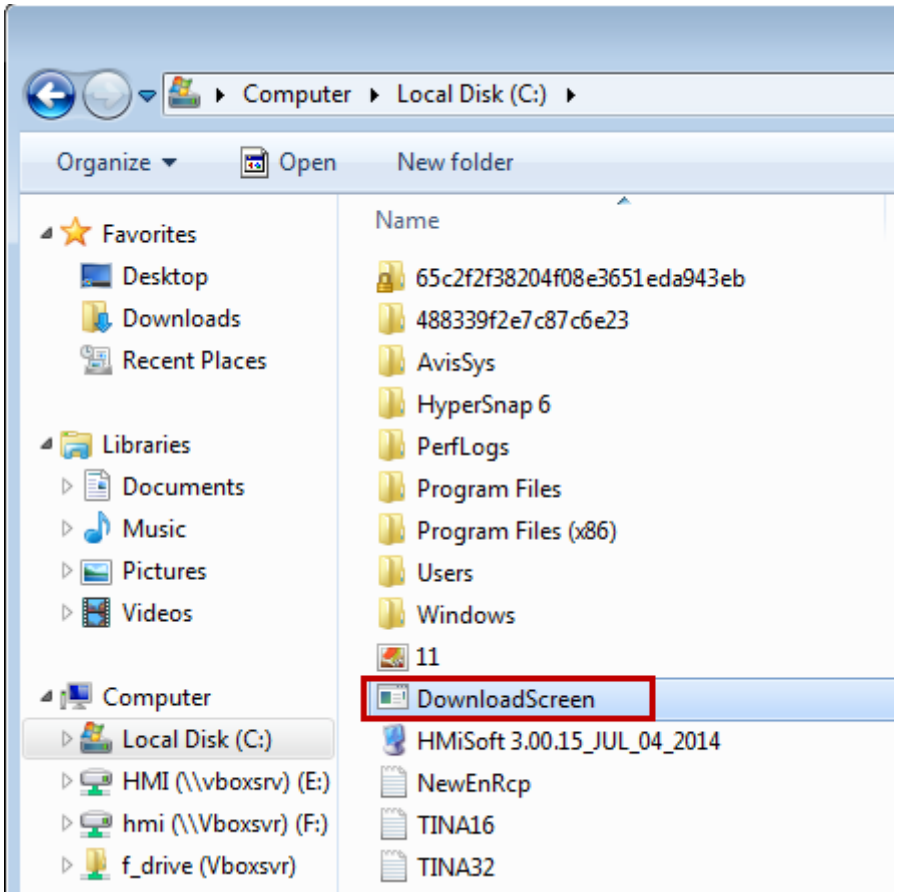


Figure2-2-3-14 Icon of the executable file

In output folder, you will find DownloadScreen.exe (executable file). It can be executed by directly double clicking on it. This enables users to download the screen program to HMI when not installing DOPSoft software.

Click on DownloadScreen.exe and the screen will show as below:

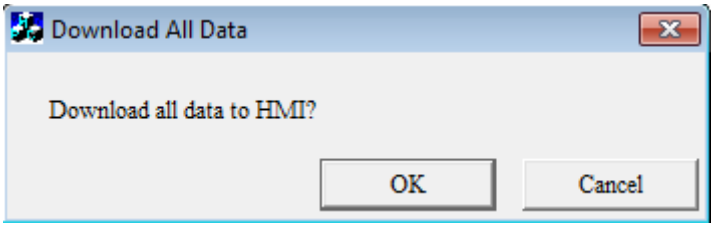


Figure2-2-3-15 Start to download

Click OK to download the screen program to HMI.

2-2-3-5 Password Protect

To execute password protect, one can click directly [File]→ [Password Protect]to enable this function. After the user clicks this function, the software will pop up a window to notify the user that Password Protect is enabled.

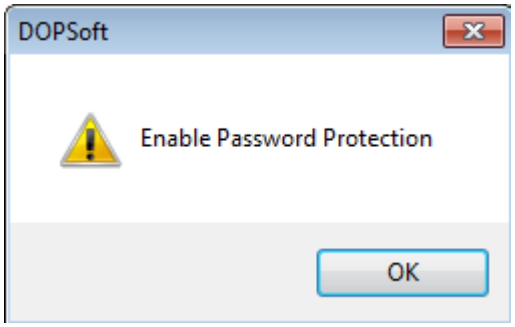


Figure 2-2-3-16 Enable Password Protect

The user can click again on [File]→ [Password Protect]to check if this function is enabled in the current project file. If so, the result will be as shown in Figure 2-2-3-17.

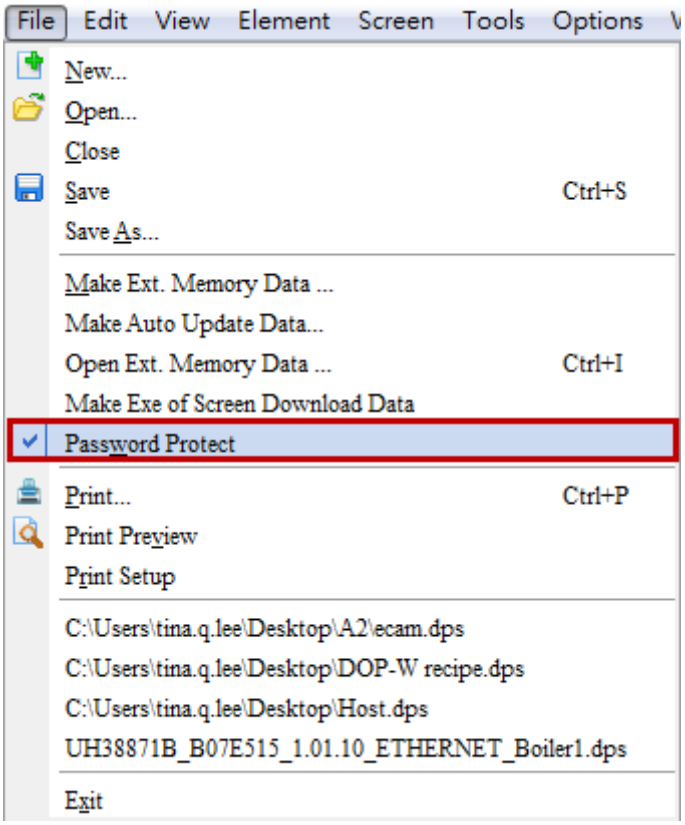


Figure 2-2-3-17 Password protect is successfully enabled.

Once the feature of Password Protect is enabled, the user can change the password. The password can be changed by modifying the default password “12345678” through [Options]→ [Configuration].

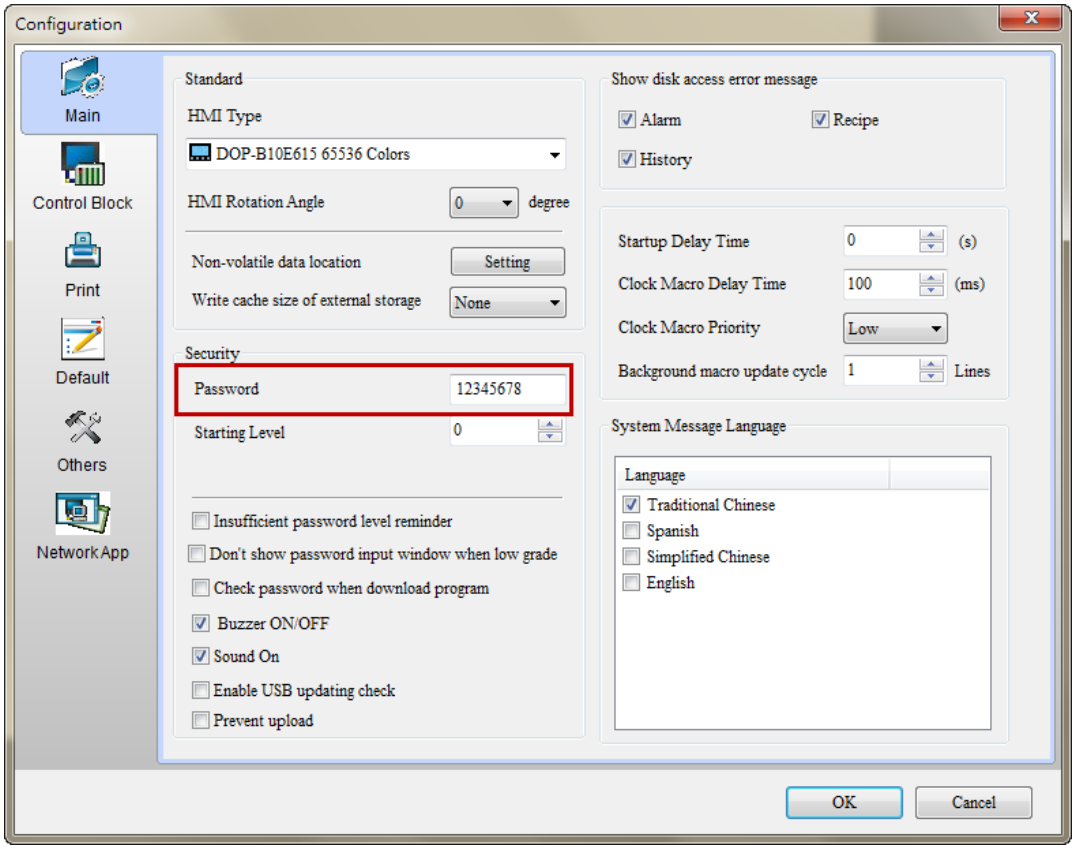


Figure 2-2-3-18 Set up password permission level

After the password is set, please close and save the project. When the project is opened the next time, the system will ask the user to enter password to open the file protected by password.

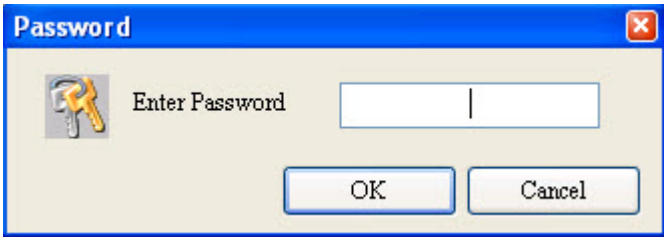


Figure 2-2-3-19 Password needs to be entered.

If the entered password is incorrect, the software will display the window with the message of incorrect password to notify the user.

Figure 2-2-3-20 Entered password is incorrect

Press [Retry]to enter the password again. Click [Cancel]to exit the window for password entry.

If the entered password is correct, the associated project can be opened.

To cancel password protect, one must click [File]→ [Password protect]to disable this function. Similarly, the software will also notify the user that password protect is disabled.

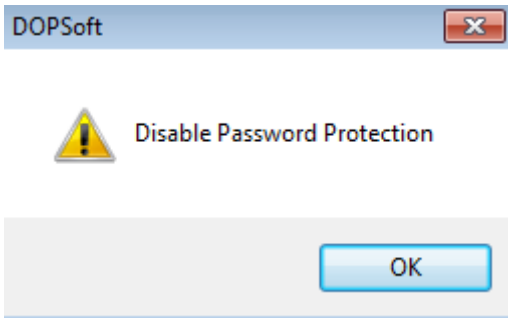


Figure 2-2-3-21 Cancel password protection.

The user can also click [File]→ [Password protect]again to check if password protect is disabled on the current project file. If so, the result is as shown in Figure 2-2-3-22, where the option of Password Protect is unchecked.

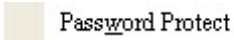
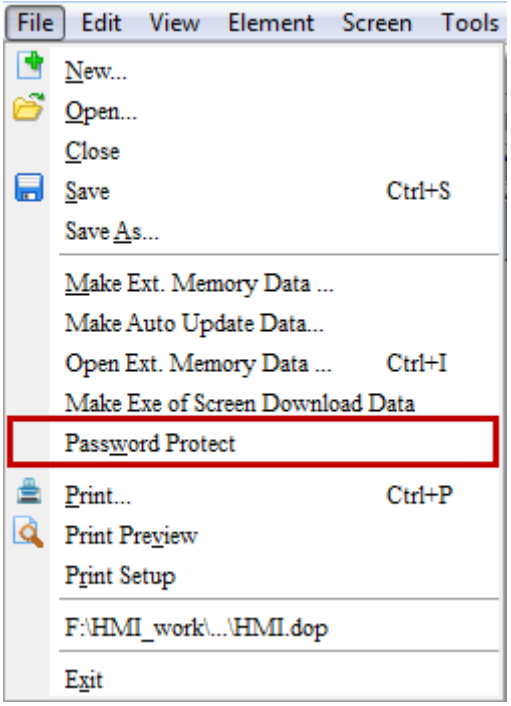
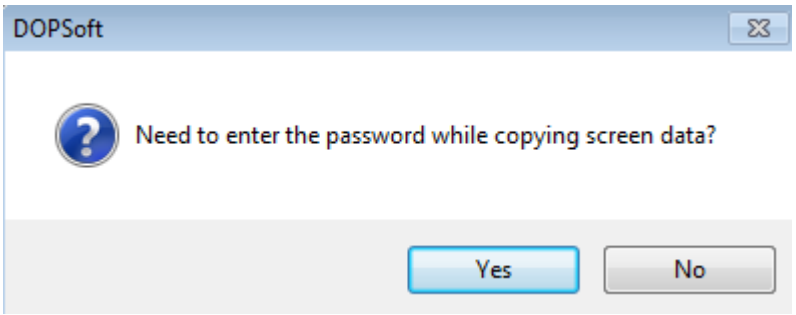


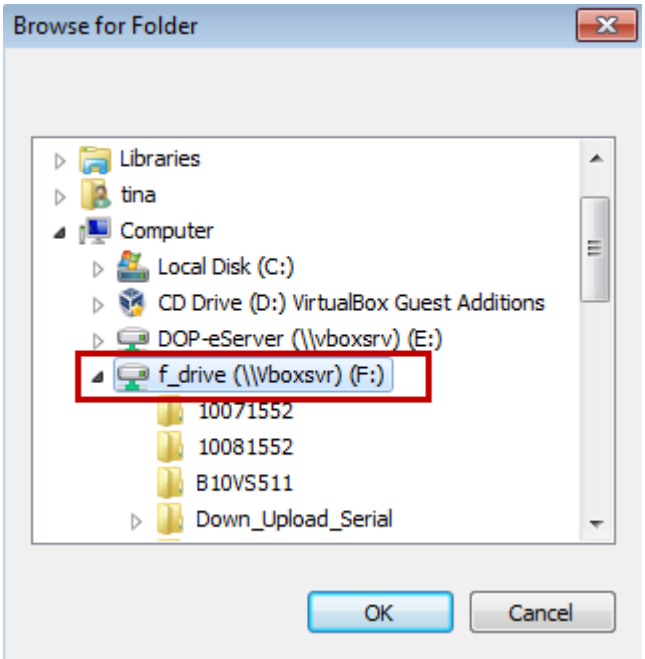
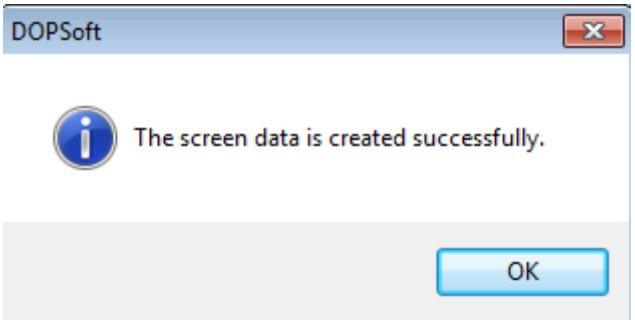
Figure 2-2-3-22 Password protect is cancelled successfully.

After cancelling Password Protect, please close and save the project. The next time when the project is opened, the user will not need to enter the password to open the project.

Password Protect can be executed with Creating Screen Data File. Users can decide whether to enter password and determine if Password Protect is needed when copying the file from external device to HMI. Please the descriptions below:

Password Protect Table 2-2-3-1 Example of Password Protect	
Check Password Protect	➢ Please click【File】→【Password Protect】.

Password Protect Table 2-2-3-1 Example of Password Protect	
	
Creating Screen Data File	Please click【Make Ext. Memory Data】. A message will pop to ask if Password Protect is needed.  ➢ If users click【No】 and select the external storage device, when screen data file is created, please enter the system screen of HMI.

Password Protect Table 2-2-3-1 Example of Password Protect	
	 
Result	➢ Insert the external storage device to HMI, enter System Setting→File Manager and copy files from external device to HMI. Files can be copied without Password Protect.

2-2-4 Edit

The [Edit]in Menu offers the following functions for the user to utilize.

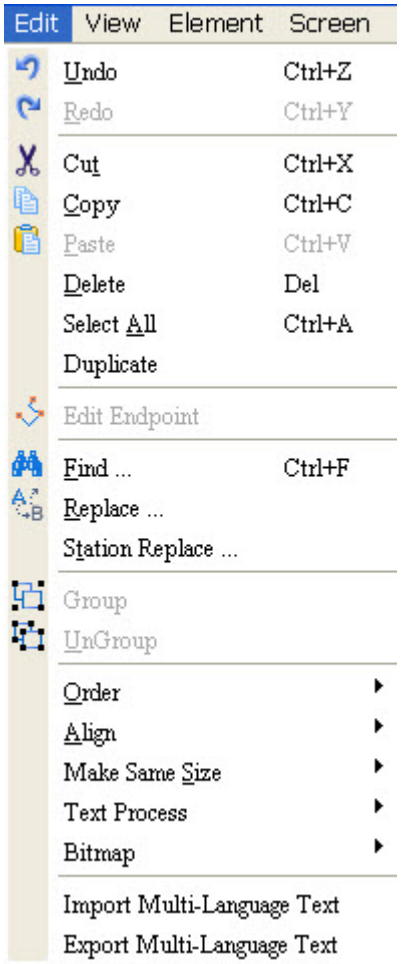


Figure 2-2-4-1 Option of Edit in Menu.

2-2-4-1 Duplicate

The function of Duplication allows one to execute Duplicate by directly selecting a certain device followed by clicking the right button of mouse. Or one can select a certain device and automatically increase or decrease address according to need to reduce the time for manual device address duplication. Click [File]→ [Duplicate] can also execute this function. Once this function is clicked, the result is as shown in Figure 2-2-4-2.

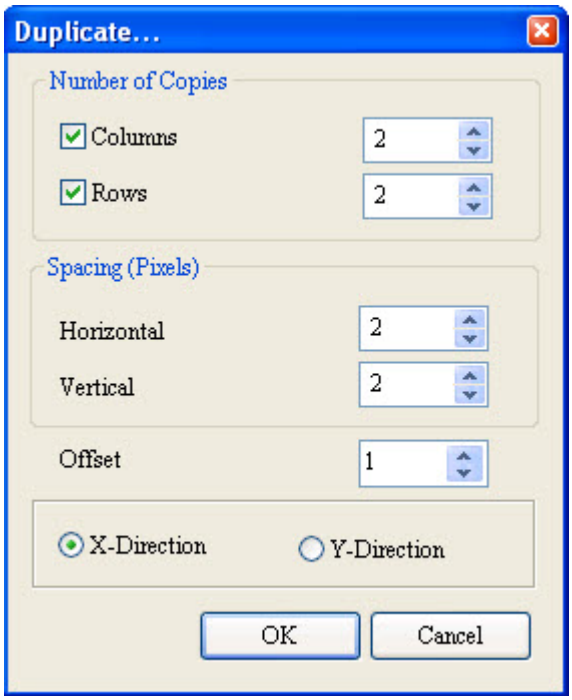


Figure 2-2-4-2 Duplicate

The following table describes the details in Duplicate, including Number of Copies, Spacing (Pixels), and Offset.

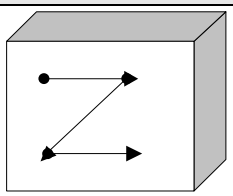
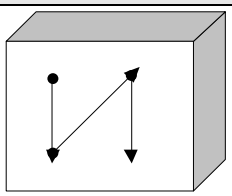
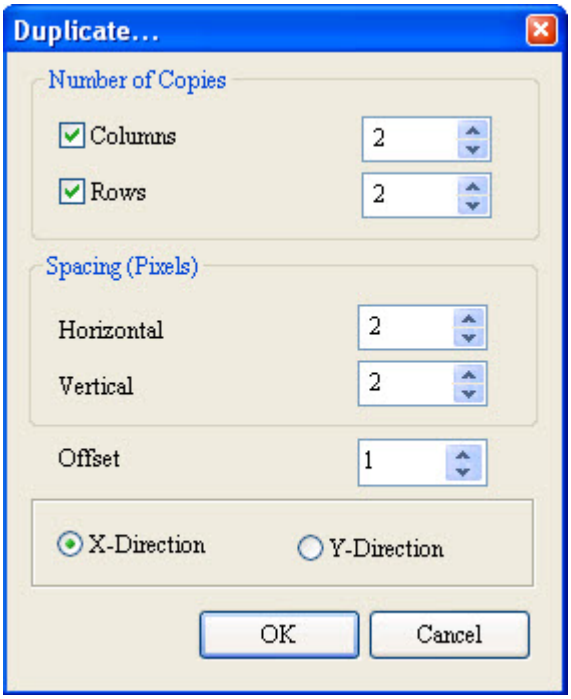
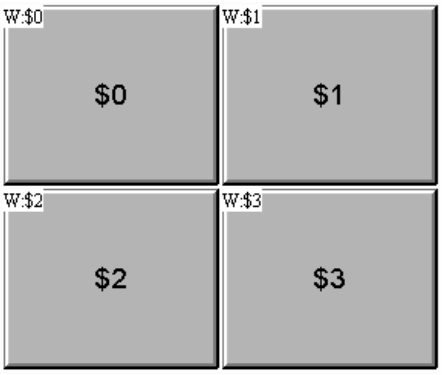
Number of Copies	Columns	In the quantity to duplicate, select the numbers to duplicate along the Columns(X) and vertical (Y) directions to obtain a total of X * Y devices. If duplication along only the X-Direction or Y-Direction is needed, one can do it by checking or unchecking the selections to enable or disable the corresponding duplication.
	Rows	
Spacing (Pixels)	Horizontal	The spacing refers to the spacing between each input device. Upon entry of the spacing, the new devices will be spaced out accordingly after duplication.
	Vertical	
Offset	X-Direction	The offset address can configure the number of addresses to increase (positive number) or decrease (negative number). Upon configuration, one can conduct the duplication along the X-Direction or Y-Direction. The device is set by the unit of Word, the increase/decrease will operate by Word. If the device is set by Bit, the increase/decrease will operate by Bit.
	Y-Direction	**X-Direction**  **Y-Direction** 

Table 2-2-4-1 Duplicate

Please refer to the table below for the example of how to configure Duplicate.

Example of Duplicate

Table 2-2-4-2 Example of Duplicate

Element Address	**Word**	**Bit**
	$0	$0.0
Number of Copies		
Spacing (Pixels)		
Offset		
Result of Execution	**Word**	**Bit**
		

2-2-4-2 Edit Endpoint

DOPSoft also offers the function of Edit Endpoint, which only applies to freeform, donut, “No” symbol, arc, and pie devices. Therefore, to use this function, one can only click [Edit]→ [Edit Endpoint]by first creating one of the above devices.

The following table lists the endpoints for editing by clicking [Edit]→ [Edit Endpoint]after

freeform, donut, “No” symbol, arc, and pie are created, as shown in Table 2-2-4-3.

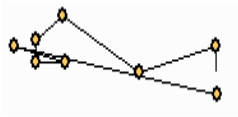
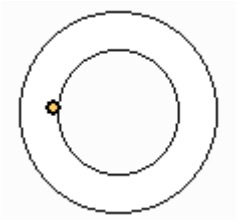
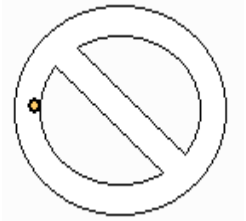
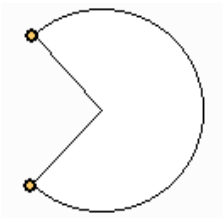
Before Edit Endpoint				
Freeform	**Donut**	**“No” Symbol**	**Arc**	**Pie**
				

Table 2-2-4-3 Before Edit Endpoint

The user can adjust the shapes by editing the endpoints, which highlights the flexibility of this function, as shown in Table 2-2-4-4.

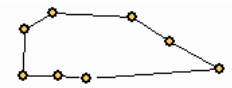
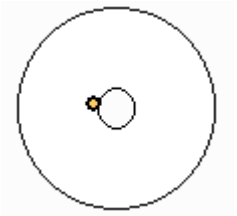
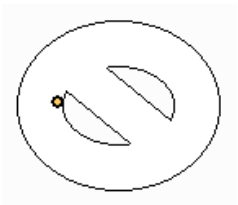
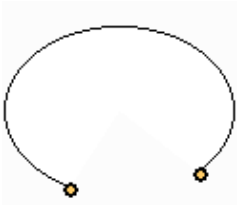
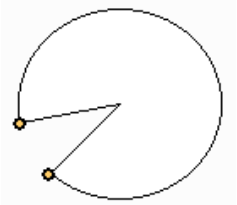
After Edit Endpoint				
Freeform	**Donut**	**“No” Symbol**	**Arc**	**Pie**
				

Table 2-2-4-4 After Edit Endpoint

2-2-4-3 Find

To find the designated texts and addresses, one can click [Edit]→ [Find]or use the hotkey CTRL + F provided by the system. This function can enable the user to quickly find the results. Once the Find function is clicked, please first enter the content to find, followed by choosing to searchthe current screen or All Screen in the find selections. The find type can beused to find the text, Read Address, Write Address, or All Address of the element, as shown in Figure 2-2-4-3.

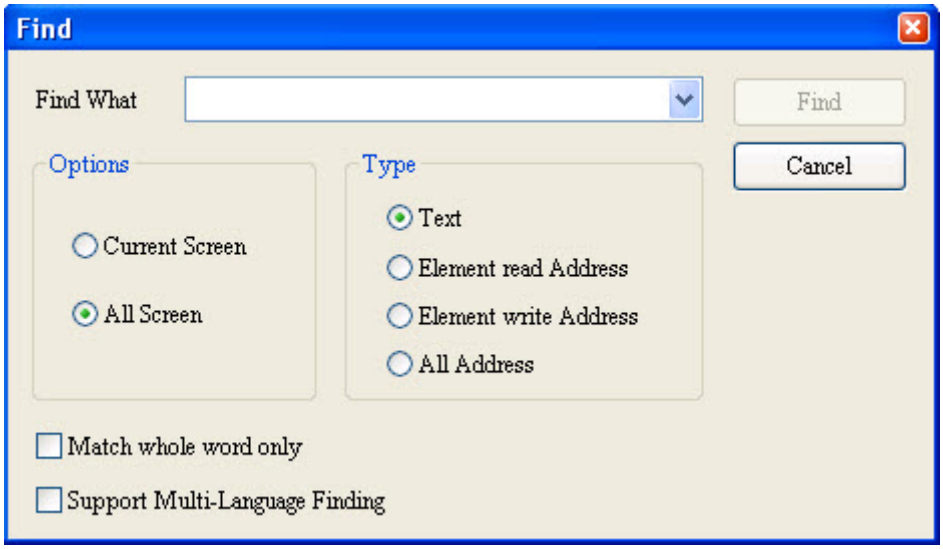


Figure 2-2-4-3 Find

Once the method of Find is verified, click “Find” and the system will start searching for the content that matches the entry. Once the matched content is located, the associated element will be output to the options in the output field. When one clicks the options in the output field, the cursor will automatically lock in this particular element, as shown in Figure 2-2-4-4.

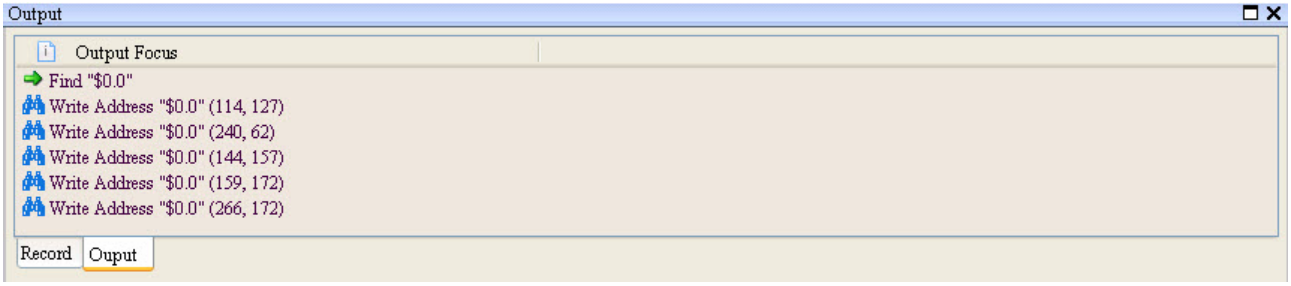
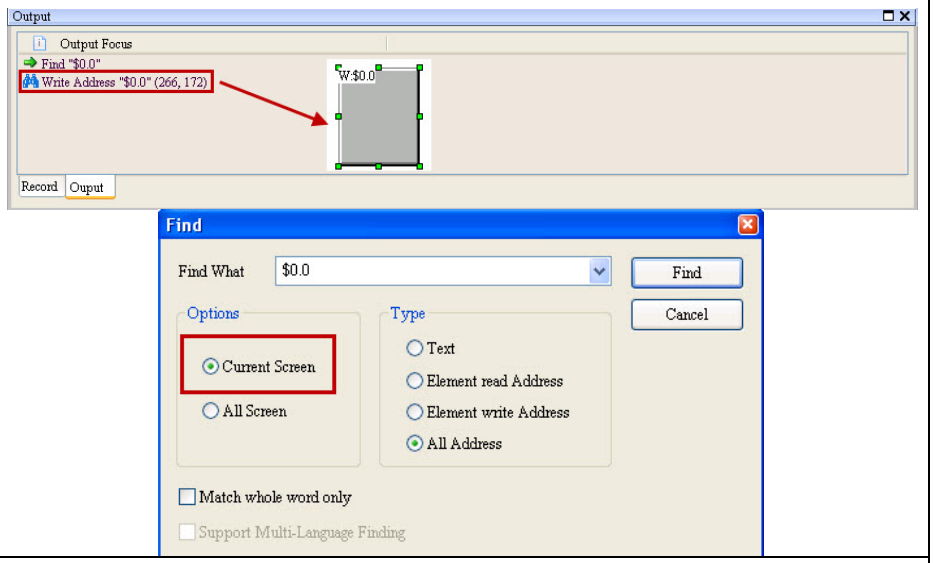
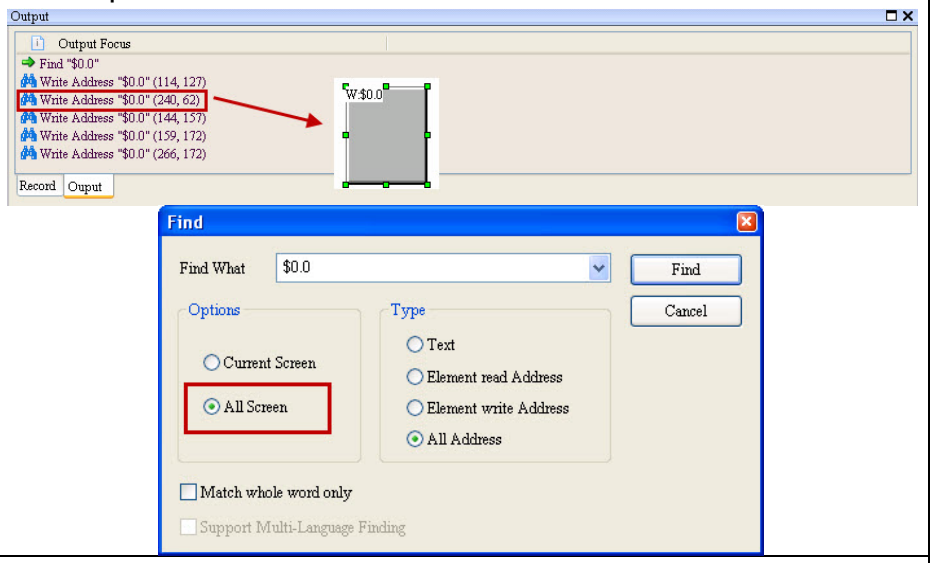


Figure 2-2-4-4 Output field

The detailed configuration screen of the Find function will be described below.

Find Table2-2-4-5 Description of Find Function		
Find What	Enter the data content to find.	
Options	Current Screen	The find is limited to the screen currently being edited. All devices in the current screen will be compared and those that match the find content will be displayed in the window of the output field. The user can double click in the Output to find the devices that are found. 
	AllScreen	The find will cover All Screen and compare all elements in All Screen. Those that match the find content will be displayed in the window of output field. Similarly, the user can double click in the Output to find the elements that are found. 
Type	Text	Compare the text entered by element
	Element Read	Compare the read address of element

Find Table2-2-4-5 Description of Find Function		
	Address	
	Element Write Address	Compare the write address of element
	All Address	Compare the read and write addresses of element
Check box	Match whole word only	All entered find contents will be compared. If unchecked, it is a match if part of the entered contents are found. On the contrary, if checked, it is only a match when all entered contents match.
	Support Multi-Language Finding	Only effective when the find type is text. If unchecked, the matching is done by only finding texts in the current language. On the contrary, if checked, the matching will not be limited to the current language while all languages will be compared.

2-2-4-4 Replace

To replace a certain designated text or address, one can use [Edit]→ [Replace]or use the hotkey CTRL + R provided by the system. Enter the content of Find What, followed by choosing Current Screen or All Screen in Options. The replacement type can be text, read address, or write address. The item for the Data Type is only available when the replacement type is Read Address or write address, with options of BIT, WORD, or DWORD, as shown in Figure 2-2-4-5.

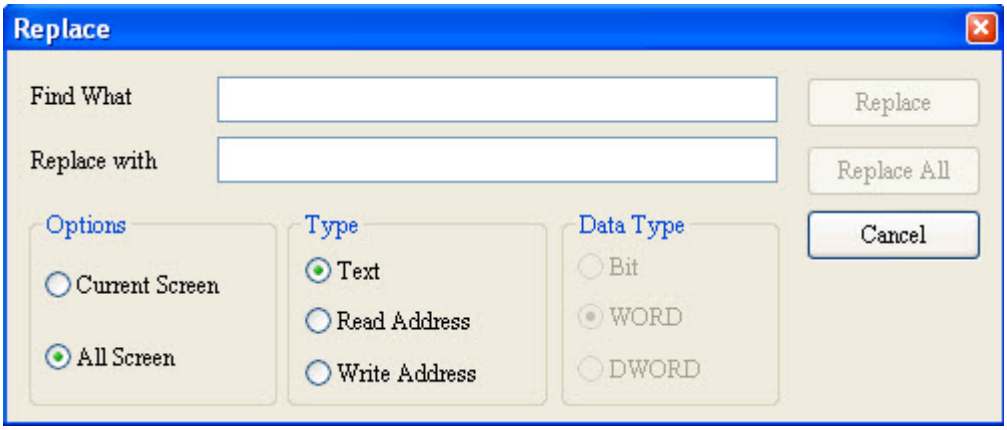
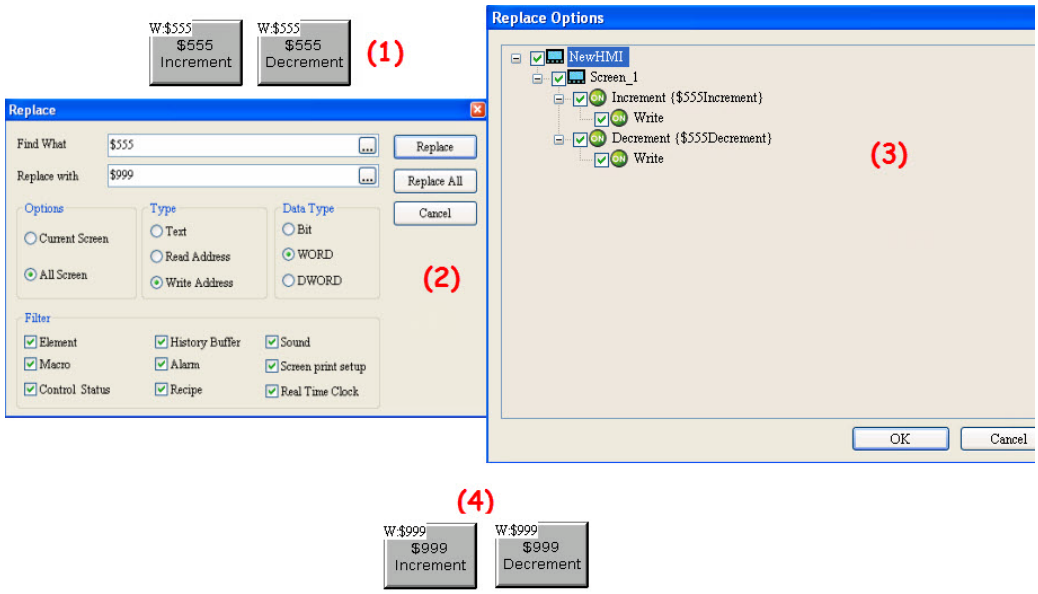


Figure 2-2-4-5 Replace

The detailed configuration screen of the Replace function will be described below.

Replace Table2-2-4-6 Example of Replace		
Find What	Enter the data content to find	
Replacement Content	Enter the data content to replace	
Options	Current Screen	The search is only limited to the screen currently being edited and all elements in this screen will be compared. Those that match the search conditions will be substituted by order.
	All Screen	The search will cover All Screen and compare all elements therein. Those that match the search conditions will be substituted by order.
Replacement Type	Text	Replace those with matched text after search.
	Read Address	Replace those with matched Read Address after search.
	Write Address	Replace those with matched Write Address after search.
Data Type	Bit	The Data Type is only effective when the replacement type is Read Address or Write Address, with available options of Bit, WORD, or DWORD. Selection of Bit, WORD, or DWORD is determined by the format of the Data Type of the elements being searched.
	WORD	
	DWORD	
Filtering Condition	The filtering condition is only enabled when the replacement type is read address or write address, with available options of element, macro, Control State, History, alarm, recipe, sound, and Screen print setup.	
Example	(1) Set the Write Address for the add and minus buttons to be $555 (2) Execute the replacement function and enter the find content of [$555] and replacement content of [$999]. Since the address of the add and minus buttons are set to be the memory to write in, the replacement type is therefore selected to be [Write Address]. When the Data Type of the add and minus buttons is Word, [Word]must be selected. (3) Upon configuration, click [Replace All]to show the screen with No. (3). (4) Click [Yes]in screen No. (3) and the $555 of the add and minus buttons will be changed to $999.	

Replace Table2-2-4-6 Example of Replace	
	

2-2-4-5 Station Replace

To replace the PLC address, one can directly click [Edit]→ [Station Replace]. This function allows the user to quickly obtain the station number, replace it with the new number, and select the link name and the associated replacement type. If there are multiple links in the project file, one can also select other link names and replace the corresponding station numbers.

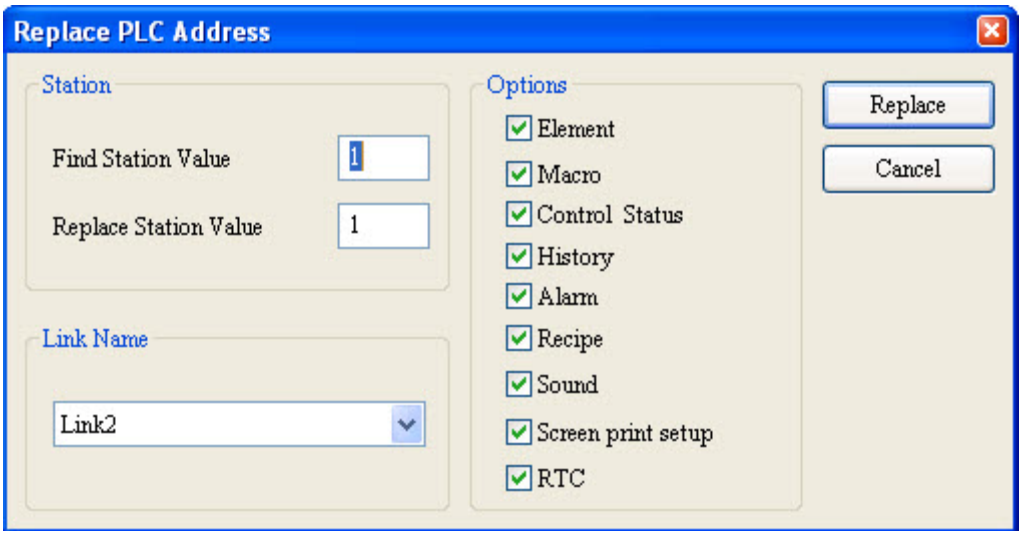
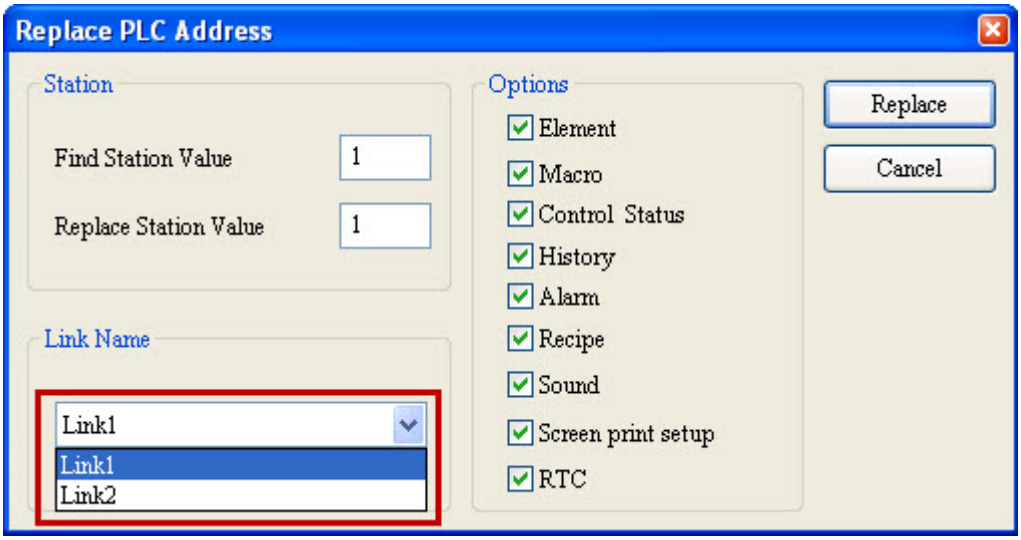
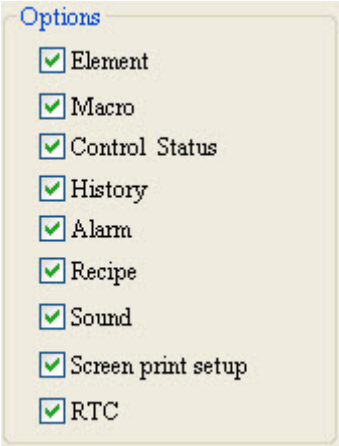


Figure 2-2-4-6 Replace PLC address

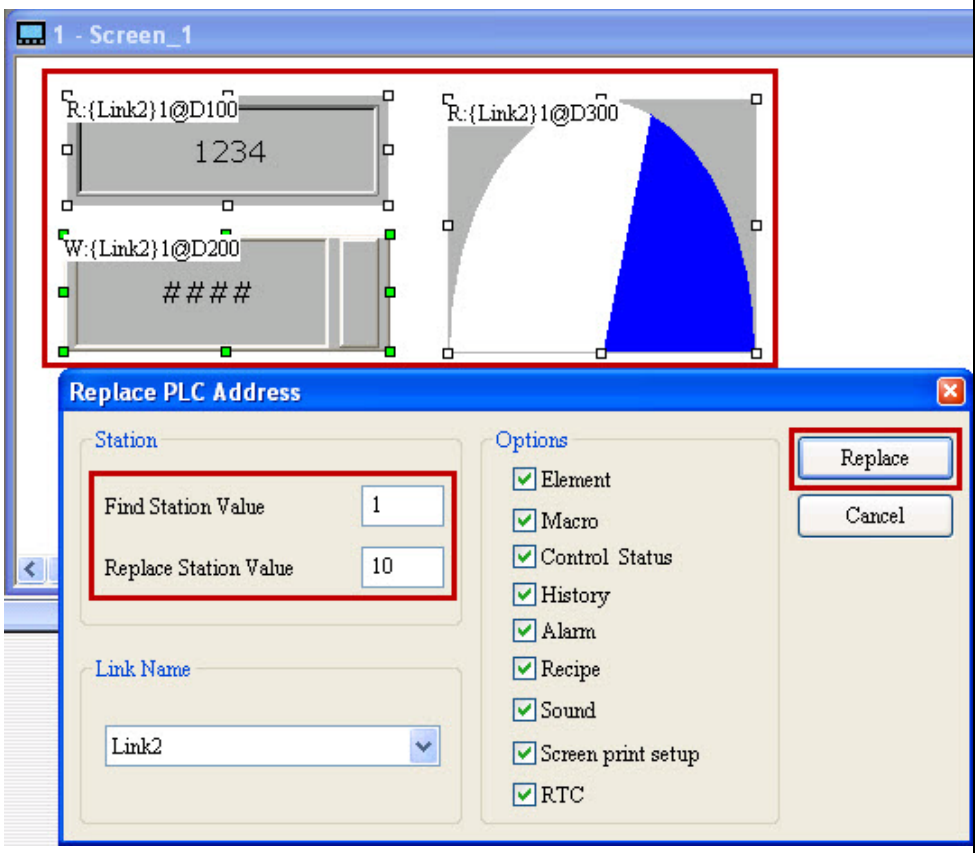
Replace PLC Address Table 2-2-4-7 Example of Replace PLC Address	
Find Station Value	Enter the data content to be found
Replace Station Value	Enter the data content that replaces the existing data
Link Name	The Link Name for replacement can be determined based on the Base Port created by the user, as shown in the figure below. 
Replacement type	There are eight categories in the replacement type available for the user to select from, which are listed in the figure below: 

Replace PLC Address

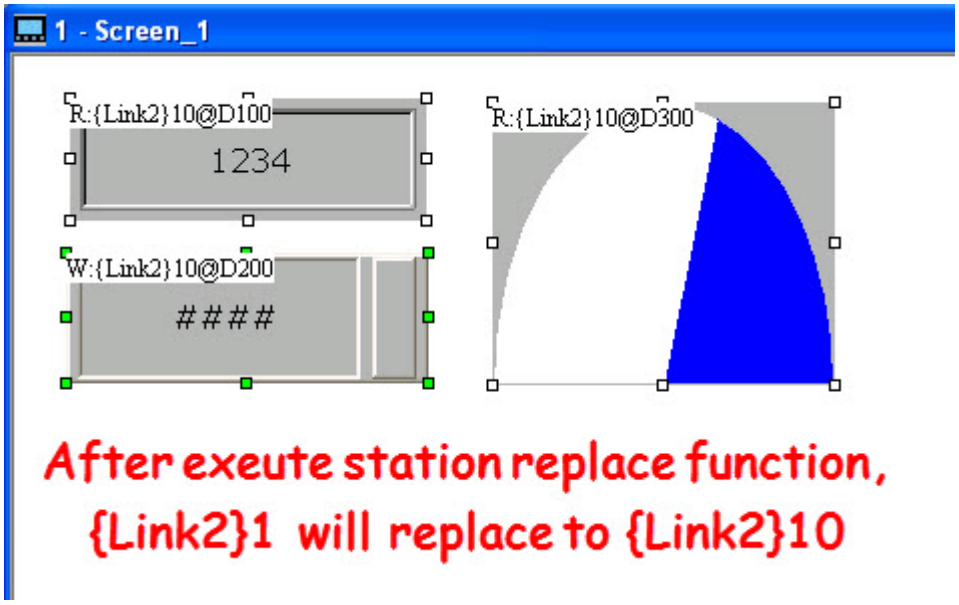
Table 2-2-4-7 Example of Replace PLC Address

Example

Before station number replacement

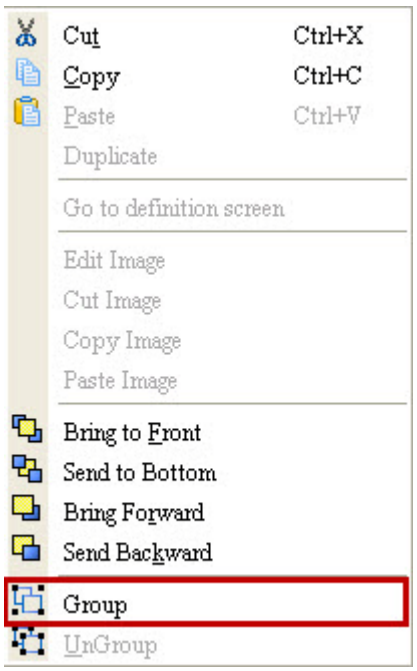


After station number replacement



2-2-4-6 Group

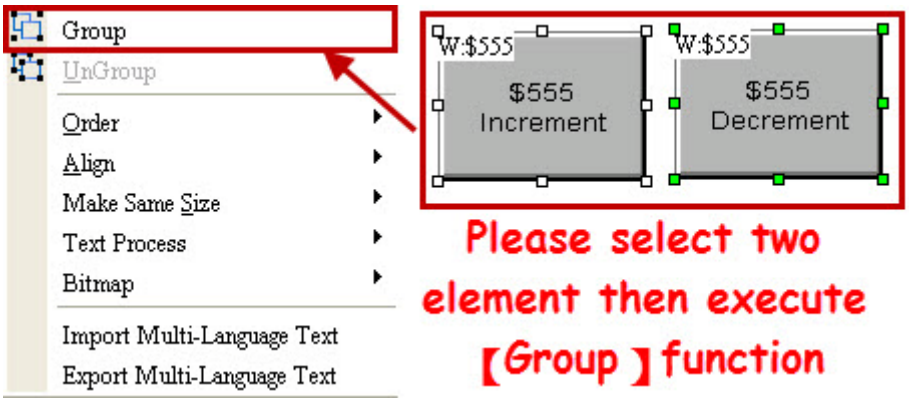
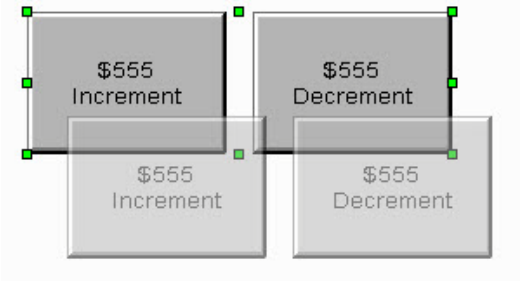
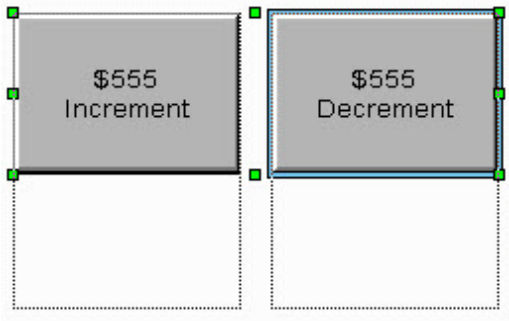
To utilize the Group function, please first select at least two elements before the Group action can be conducted. One can directly click [Edit]→ [Group]or click the group icon in the Layout bar , or use the [Group] menu by clicking the right button of the mouse.



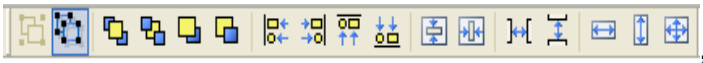
To edit the grouped elements as a single element, one only needs to click the grouped element and select the single element to edit, followed by double clicking the selected element to start editing.

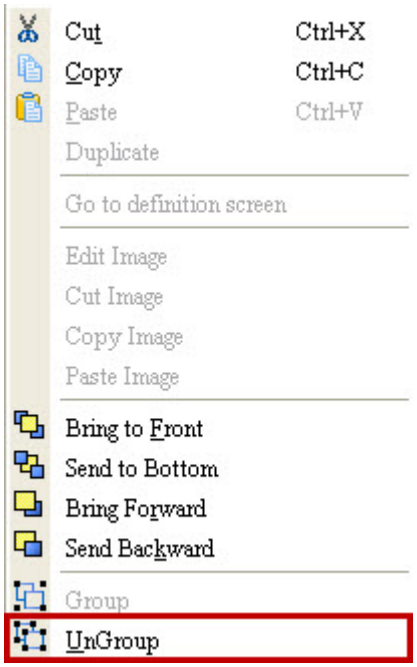
NOTE:

✓ Regardless of how many single elements are selected originally, once they are grouped, they will be treated as one single element by the software. For example, moving one element will move all the elements that are grouped together. Similarly, resizing one element will resize all the elements that are grouped together.

Group Table 2-2-4-8 Example of Group function		
Before grouping		
After grouping	**Move**	**Resize**
	 After grouping, the two elements move together	 After grouping, the two elements are resized together

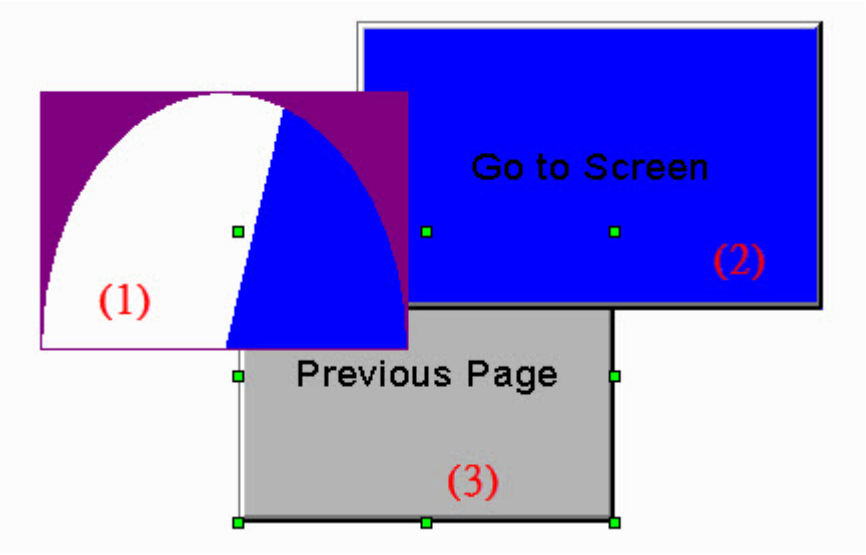
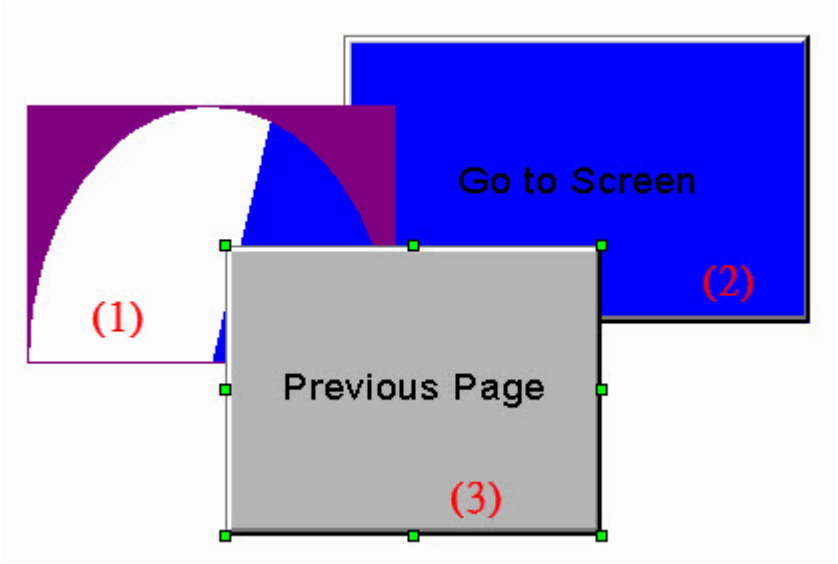
2-2-4-7 Ungroup

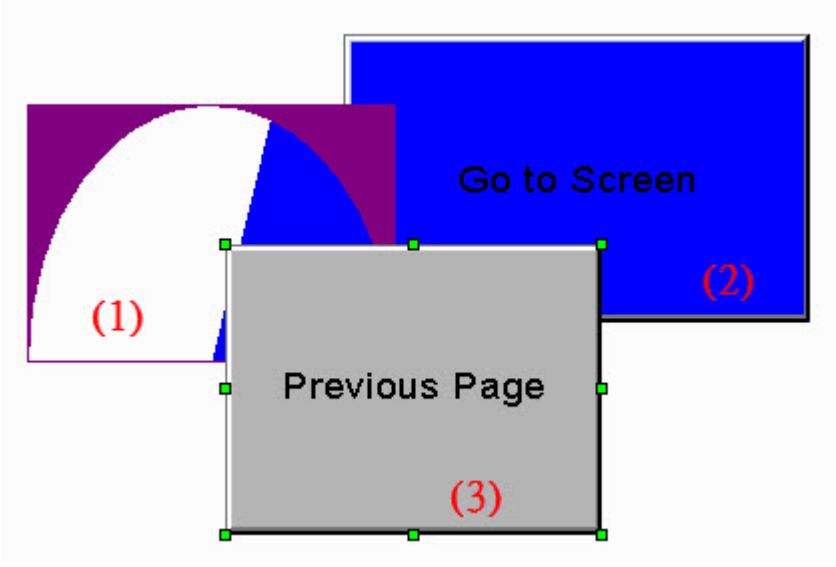
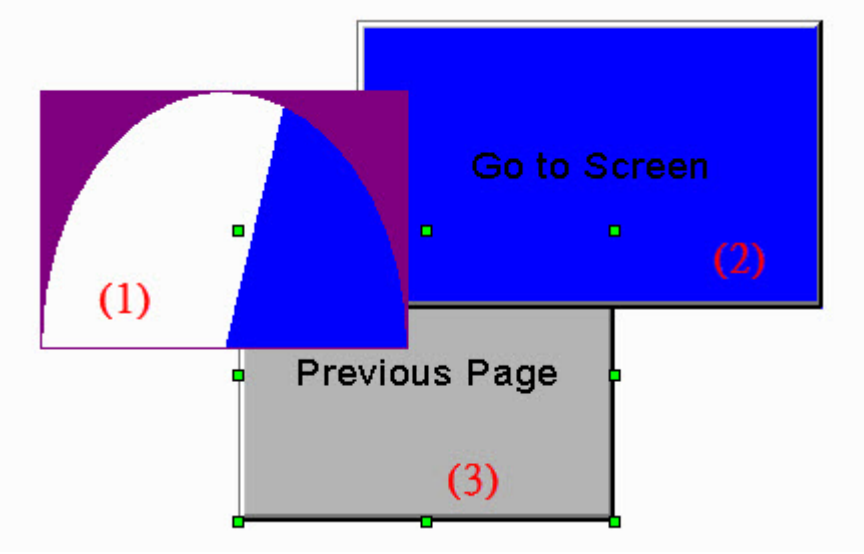
To use the ungroup function, please select grouped elements first. One can click directly [Edit]→ [Ungroup] or click the icon in the Layout Bar  , or use the [Ungroup] menu by clicking the right button of the mouse. The ungrouped elements will no longer be treated as one element and can only be processed individually.

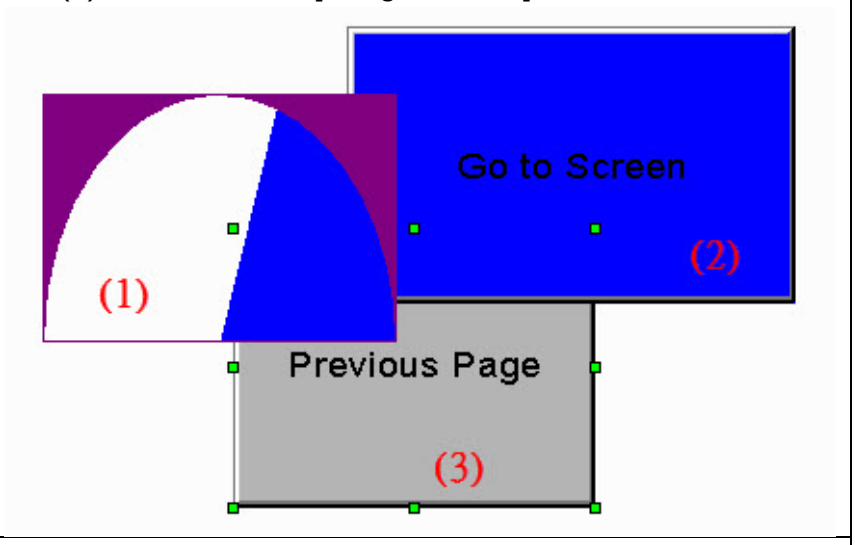
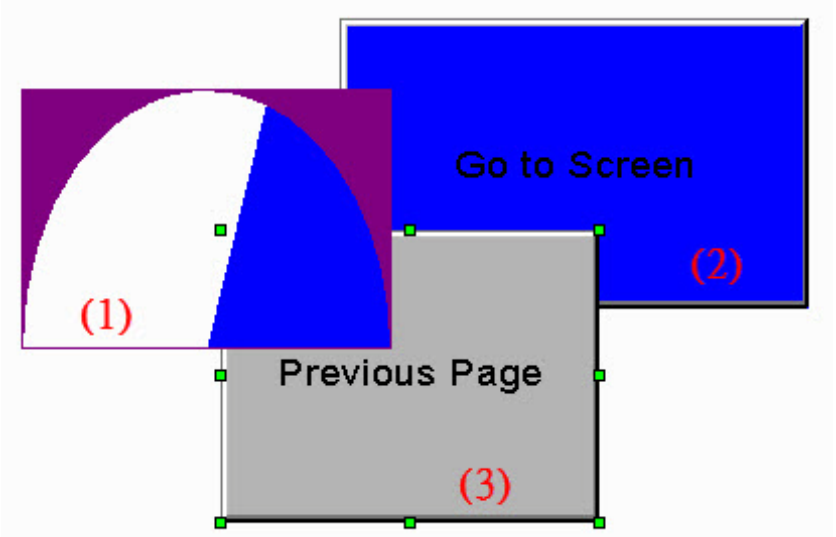
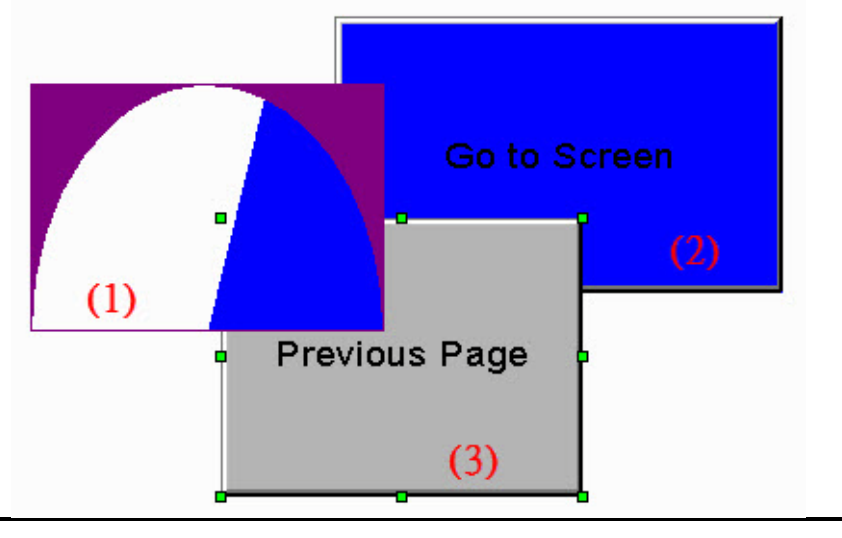


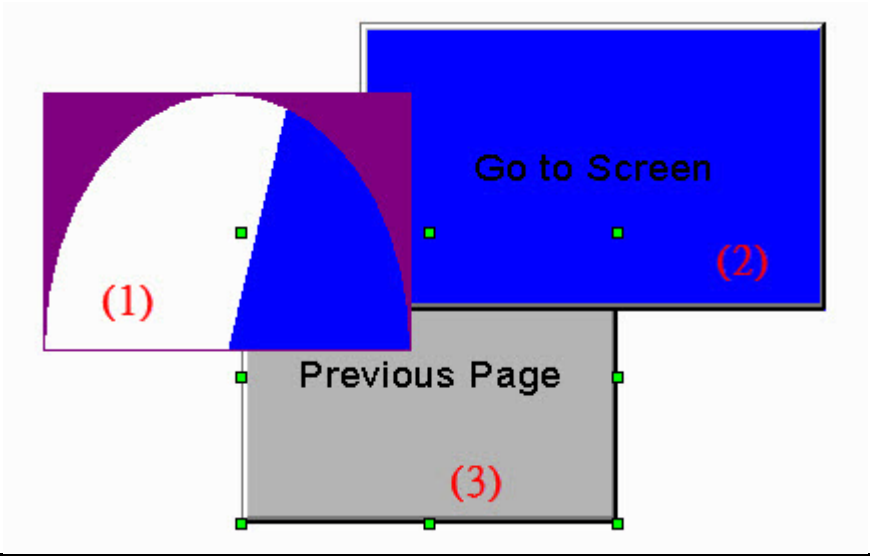
2-2-4-8 Order

The function Order includes the options of [Bring to Front], [Send to Bottom], [Bring Forward], and [Send Backward]. Once the order within the element is configured, the associated element order will vary with the sequence by which the elements are created, which will affect the order the elements are blocked by each other. The user can directly select [Edit]→ [Order] or click the icon in the Layout Bar.

Order Table2-2-4-9 Example of the function of order			
Icon	Item	Content	
	Bring to Front	Before	The figure below contains three elements and No. (3) is selected for [Bring to Front]in this example. 
		After	After the process, No. (3) has been brought to the very top level of the three elements. 

Order Table2-2-4-9 Example of the function of order				
	Send to Bottom		Before	No. (3) is selected for [Send to Bottom]. 
			After	After the process, No. (3) has been sent to the very bottom level of the three elements. 

Order Table2-2-4-9 Example of the function of order				
	Bring Forward	Before	No. (3) is selected for [Bring Forward].  	
		After	After the process, No. (3) has been broughtforward on top of the second elements.  	
	Send Backward	Before	No. (3) is selected for [Send Backward].  	

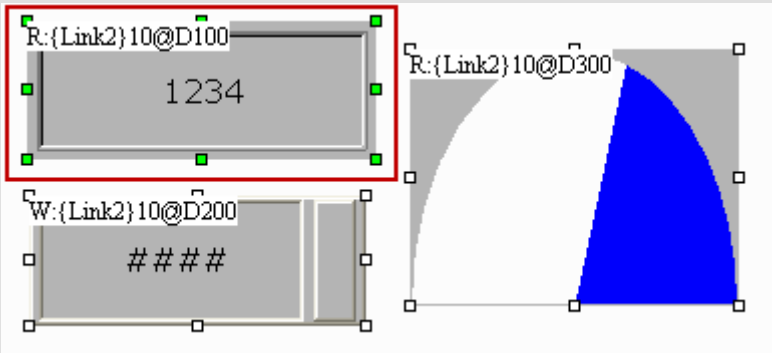
Order Table2-2-4-9 Example of the function of order				
			After	After the process, No. (3) has been sent back by one level and located at the last level among the three elements. 

2-2-4-9 Align

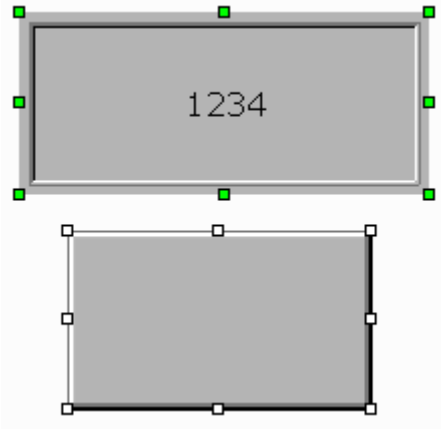
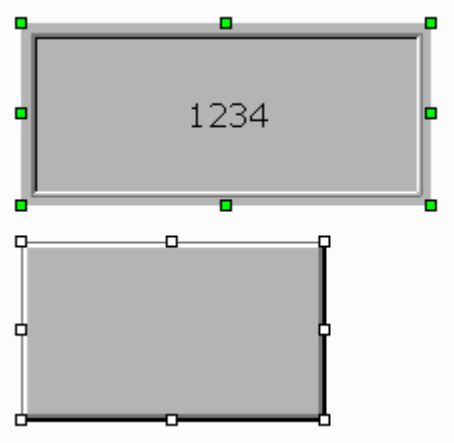
The align functions allows the user to conduct actions such as [Align Left], [Align Right], [Align Top], [Align Bottom], [Centered], [Middle Centered], [TransverseUniform Spacing], and [LongitudinalUniform Spacing]. This function enables the user to align the coordinates of the elements. To execute this function, please directly select [Edit]→ [Align]or click the icon in the Layout Bar.

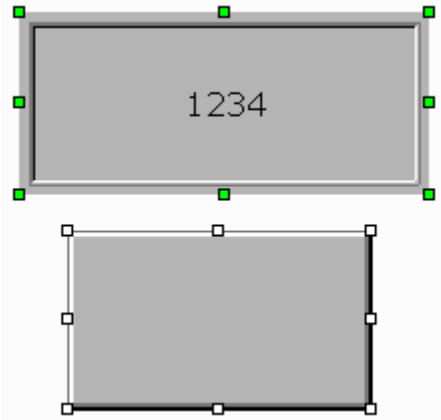
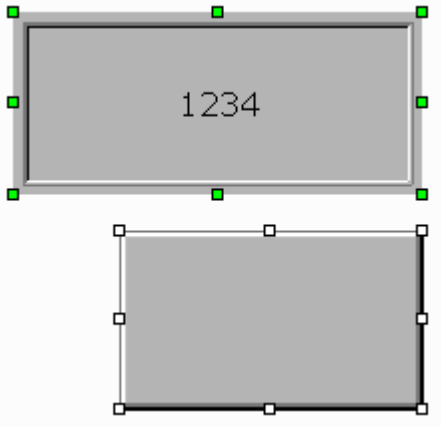
NOTE:

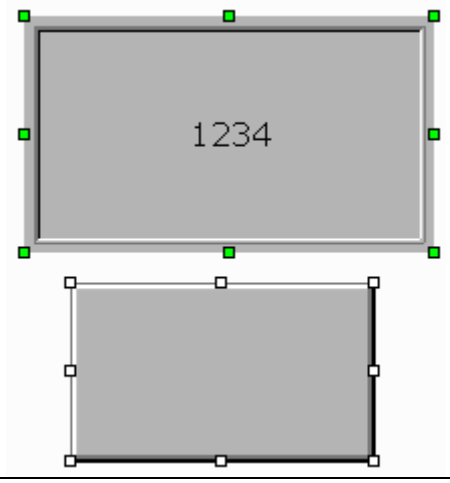
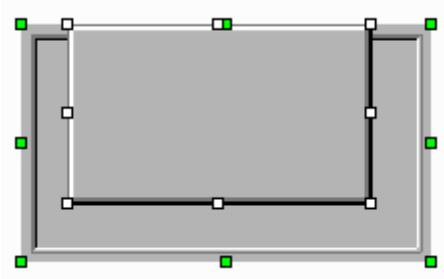
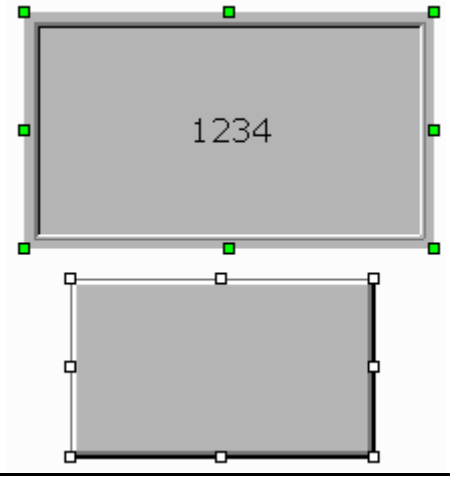
- ✓ The reference element is the one that is selected first. If multiple elements are selected, the one enclosed by the green frame is the reference element.

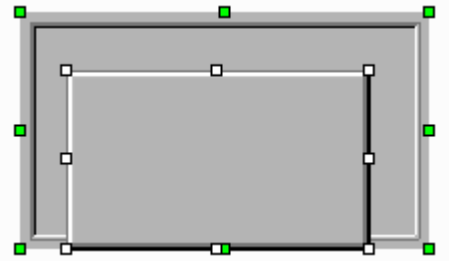
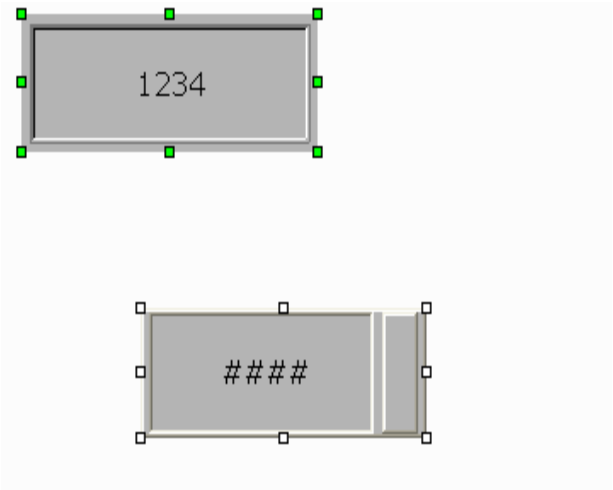
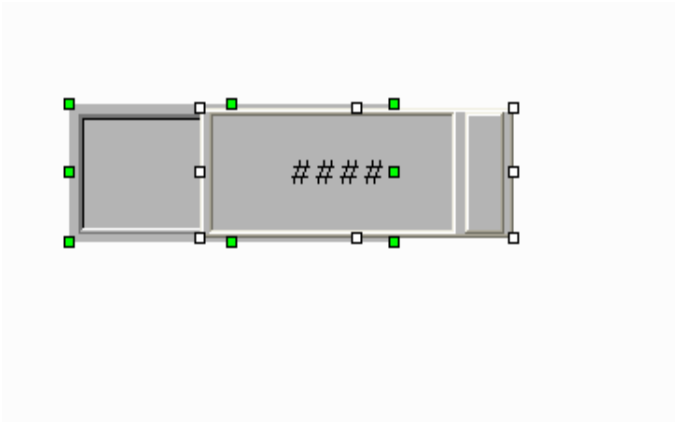


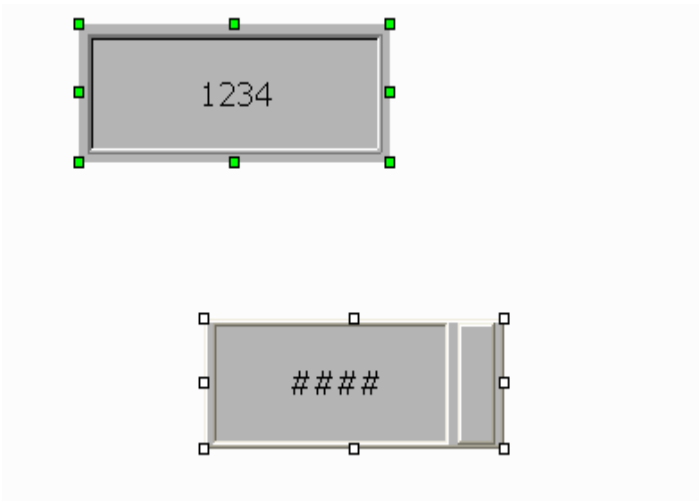
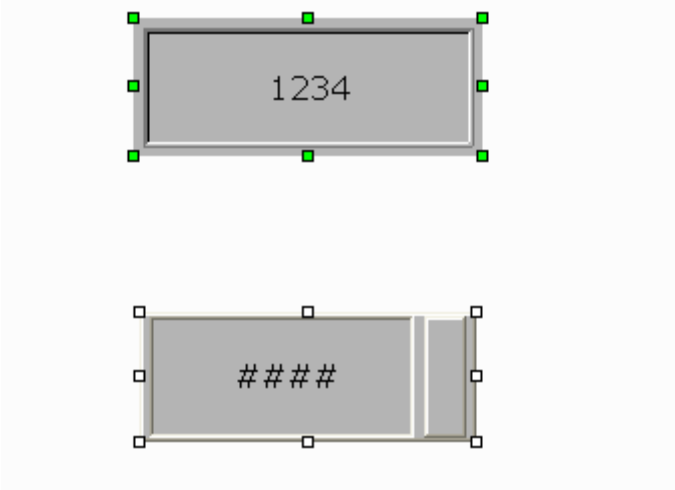
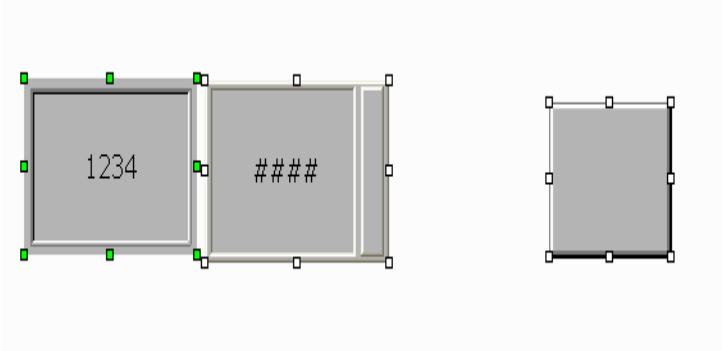
- ✓ [Align Left], [Align Right], [Align Top],and [Align Bottom]can only be executed when at least two elements are selected. This is because that the alignment needs to be done by using the left, right, top, and bottom coordinates of the reference element as the new coordinates of all elements.
- ✓ [Centered]and [Middle Centered]can be used on a single element, which will automatically align the center coordinate of the element according to the settings.
- ✓ [Transverse Uniform Spacing]and [Longitudinal Uniform Spacing]can only work when at least three elements are selected. To execute the horizontal uniform spacing, the software will calculate the horizontal spacing between adjacent elements and make it uniform through rearrangement. In the case of longitudinal uniform spacing, the software will calculate the height between adjacent elements and make it uniform through rearrangement.

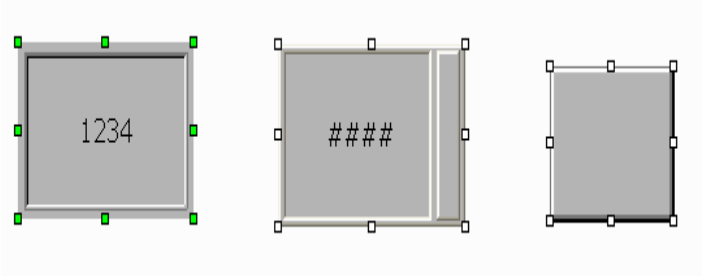
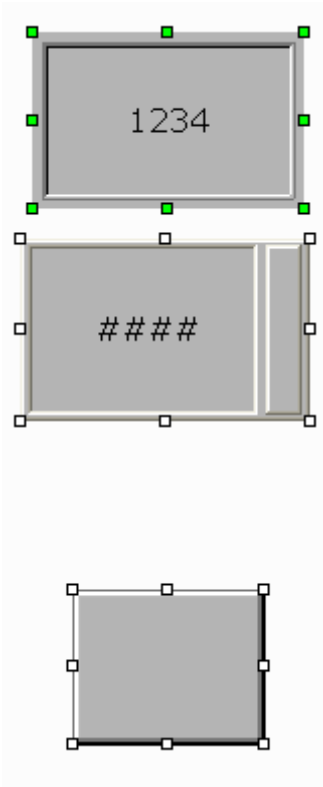
Align Table 2-2-4-10 Example of the Align function			
Icon	Item	Content	
	Align Left	Before	At least two elements need to be selected to execute Align Left. 
		After	

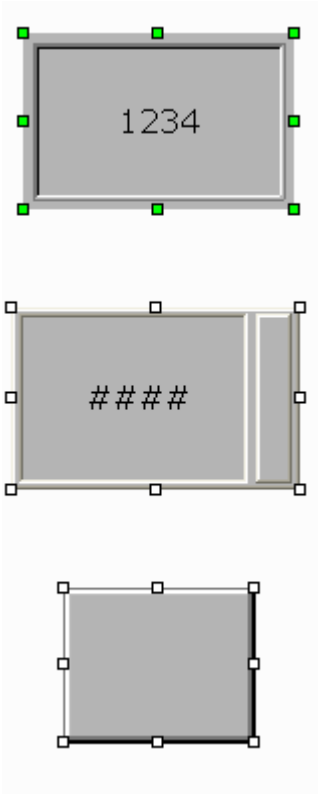
Align Table 2-2-4-10 Example of the Align function			
	Align Right	Before	At least two elements need to be selected to execute Align Right. 
		After	

Align Table 2-2-4-10 Example of the Align function				
	Align Top	Before	At least two elements need to be selected to execute Align Top. 	
		After		
	Align Bottom	Before	At least two elements need to be selected to execute Align Bottom. 	

Align Table 2-2-4-10 Example of the Align function			
		After	
	Centered	Before	
		After	

Align Table 2-2-4-10 Example of the Align function			
	Middle Centered	Before	
		After	
	Transverse Uniform Spacing	Before	At least three elements need to be selected to execute transverse uniform spacing 

Align Table 2-2-4-10 Example of the Align function				
			After	The software will automatically calculate the transverse spacing between the three elements and make them the same 
	Longitudinal Uniform Spacing		Before	At least three elements need to be selected to execute longitudinal uniform spacing 

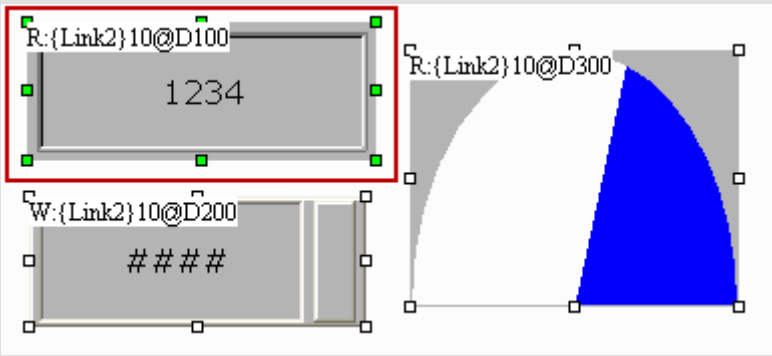
Align Table 2-2-4-10 Example of the Align function					
			After	The software will automatically calculate the longitudinal spacing between the three elements and make them the same  	

2-2-4-10 Make Same Size

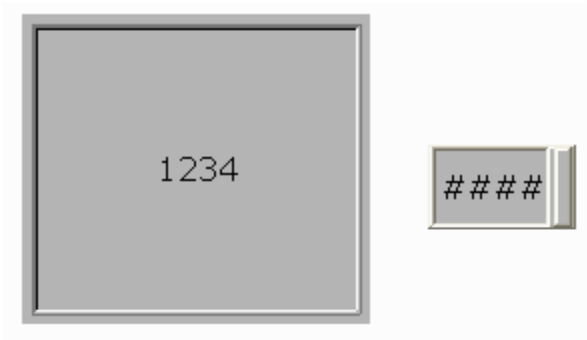
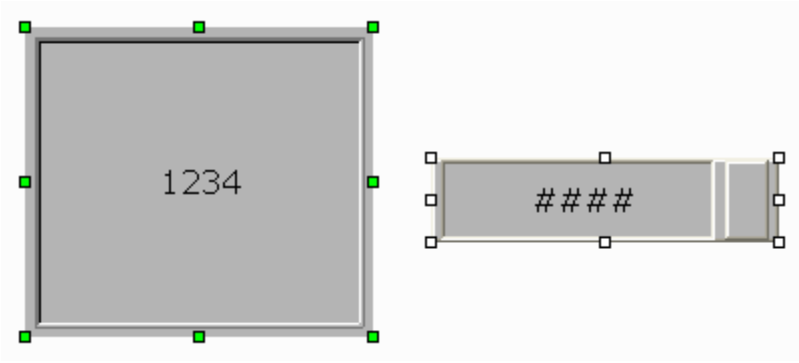
The uniform function includes [Uniform Width], [Uniform Height], and [Uniform Size], which allows the user to align the elements by their sizes. The user can directly use [Edit]→ [Make Same Size]or click the icon in the Layout Bar.

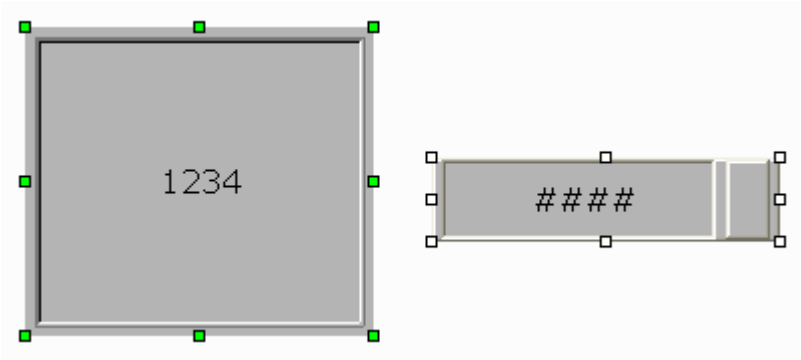
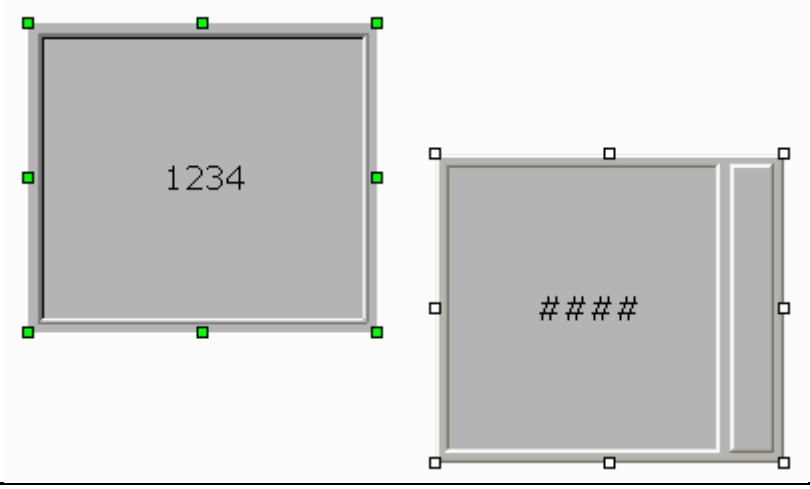
NOTE:

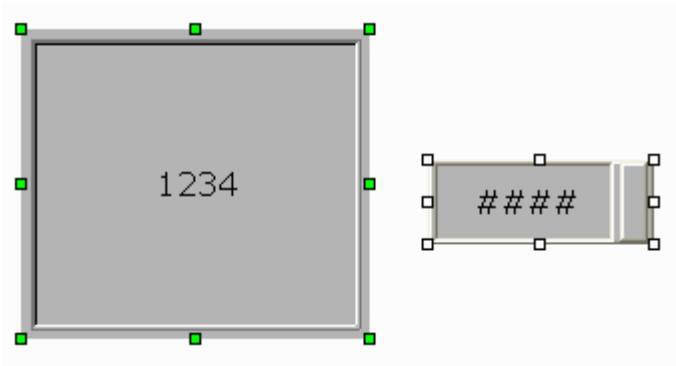
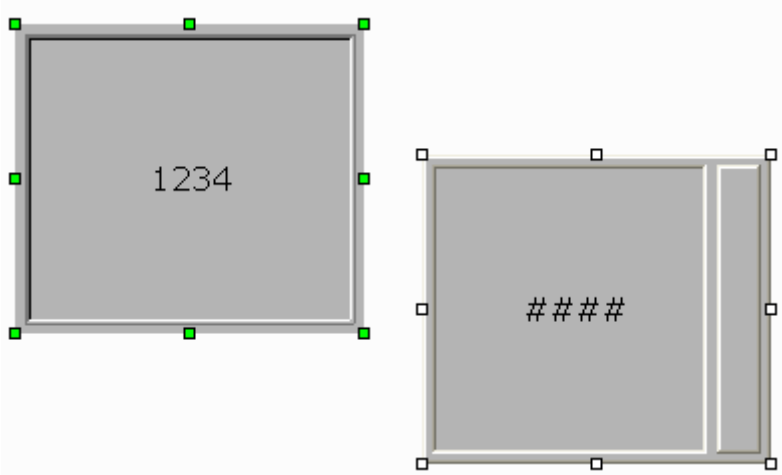
✓ The reference element is the one that is selected first. If multiple elements are selected, the one enclosed by the green frame is the reference element.



✓ To execute the Make Same Size function, please select at least two elements. The software will be based on the selected reference element to conduct uniform width, uniform height, or uniform size.

Make Same Size Table 2-2-4-10 Example of the Make Same Size function			
Icon	Item	Content	
	Uniform Width	Before	Uniform Width is conducted with the element on the left as reference. 
		After	After the process, the element on the right will be resized to the same width as that of the reference element on the left. 

Make Same Size Table 2-2-4-10 Example of the Make Same Size function			
	Uniform Height	Before	Uniform Height is conducted with the element on the left as reference. 
		After	After the process, the element on the right will be resized to the same height as that of the reference element on the left. 

Make Same Size Table 2-2-4-10 Example of the Make Same Size function			
	Make Same Size	Before	Uniform Height is conducted with the element on the left as reference. 
		After	After the process, the element on the right will be changed to the same size as that of the reference element on the left. 

2-2-4-11 Text Process

This function can process the state of the element text, such as Align Left, Align Right, Centered, etc. The user can directly select [Edit]→ [Text Process]or click the icon in the Text toolbar.

Text Process Table 2-2-4-11 Example of Text Process			
Icon	Item	Content	
	Align Text to Left	Before	
		After	
	Text Center Horizontally	Before	
		After	

Text Process Table 2-2-4-11 Example of Text Process			
	Align Text to Right	Before	
		After	
	Align Text to Top	Before	
		After	
	Text Center Vertically	Before	
		After	

Text Process Table 2-2-4-11 Example of Text Process			
	Align Text to Bottom	Before	
		After	

The function of Text Process further enables the user to link to the Text Bankto import existing texts into the selected element, as shown in the figure below.

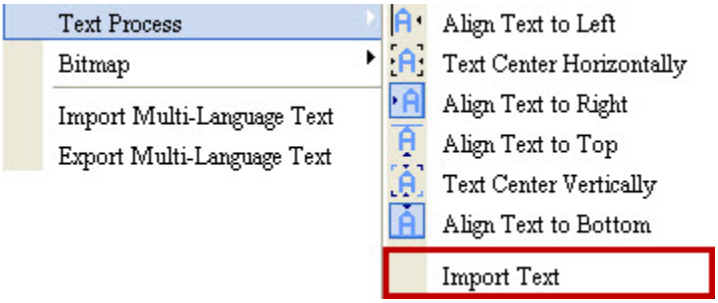


Figure 2-2-4-7 Import text into the Text Bank.

When Text Bank is used to create the text, the user can choose whether to use the fonts therein. If so, after text import, the fonts of texts in the corresponding elements will also be changed accordingly.

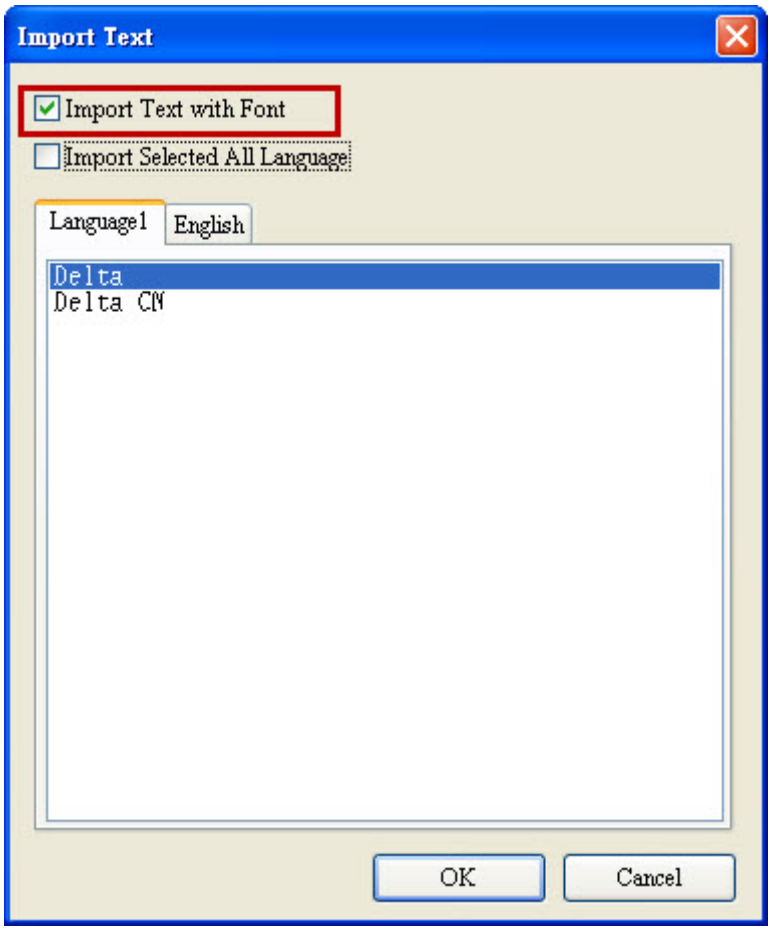


Figure 2-2-4-8 Use the font from the Text Bank on the imported texts.

In addition, if the user has created multiple languages, the associated text data can also be edited in advance in the Text Bank, as shown in Figure 2-2-4-9.

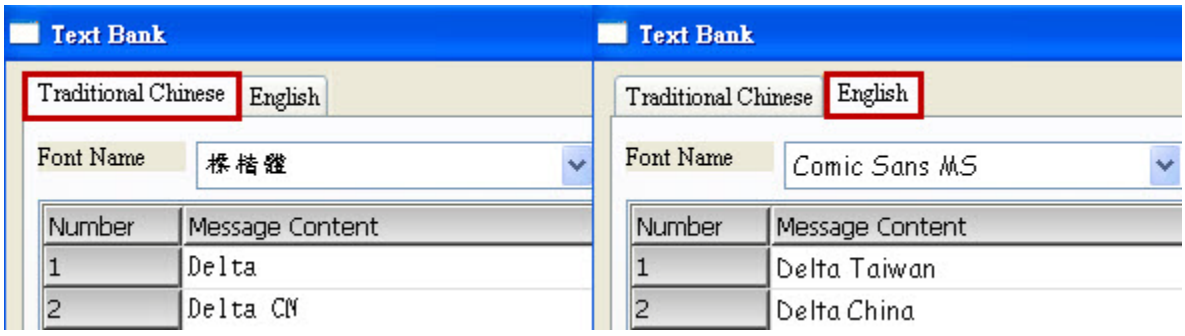
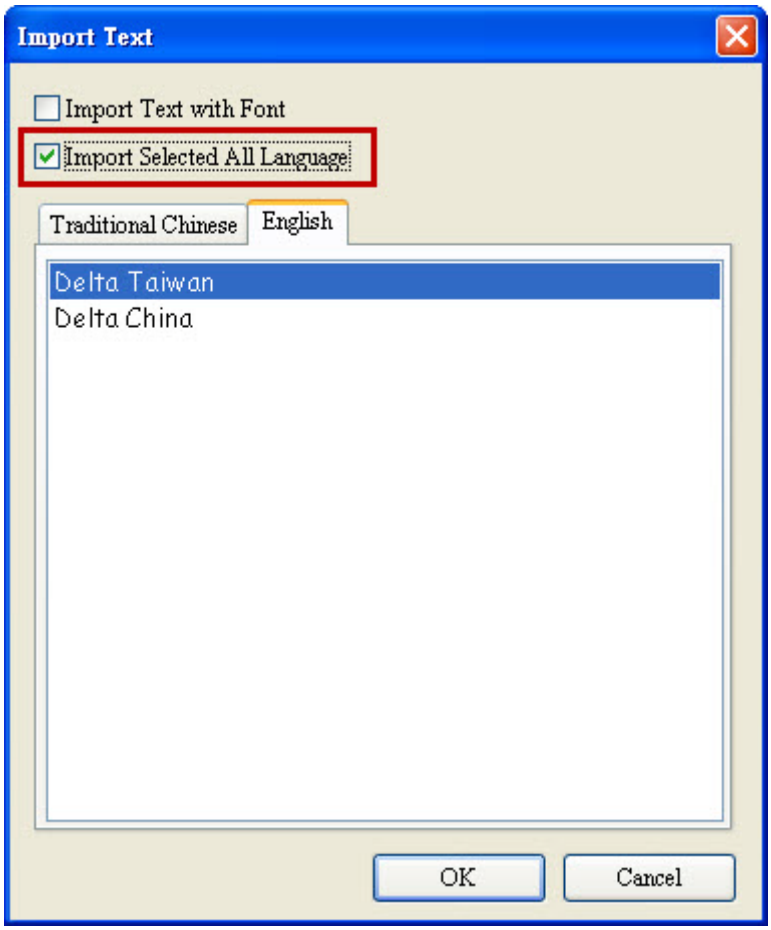


Figure 2-2-4-9 Editing texts of multiple languages in the Text Bank.

Execute [Text Process]→ [Import Text] and check [Import Selected All Languages], then the edited data of multiple languages in the Text Bankwill be imported into the selected element.



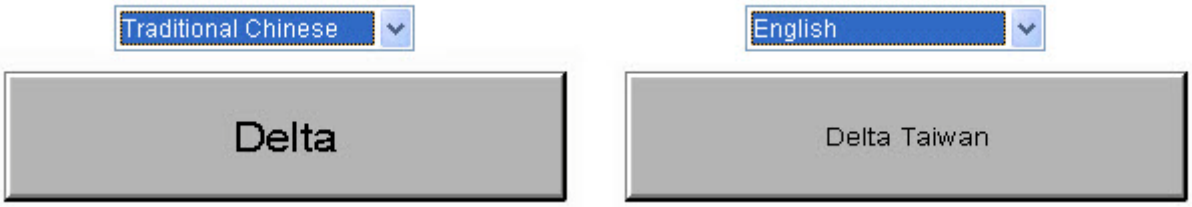


Figure 2-2-4-10 After import of multiple languages data from the Text Bank.

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After importing the text from Text Bank, users can modify the text in Text Bank again. Then, click close. A message will pop up to ask if users are going to update the message. Choose 【Yes】, the text will be updated immediately; choose 【No】, the text will remain the same.

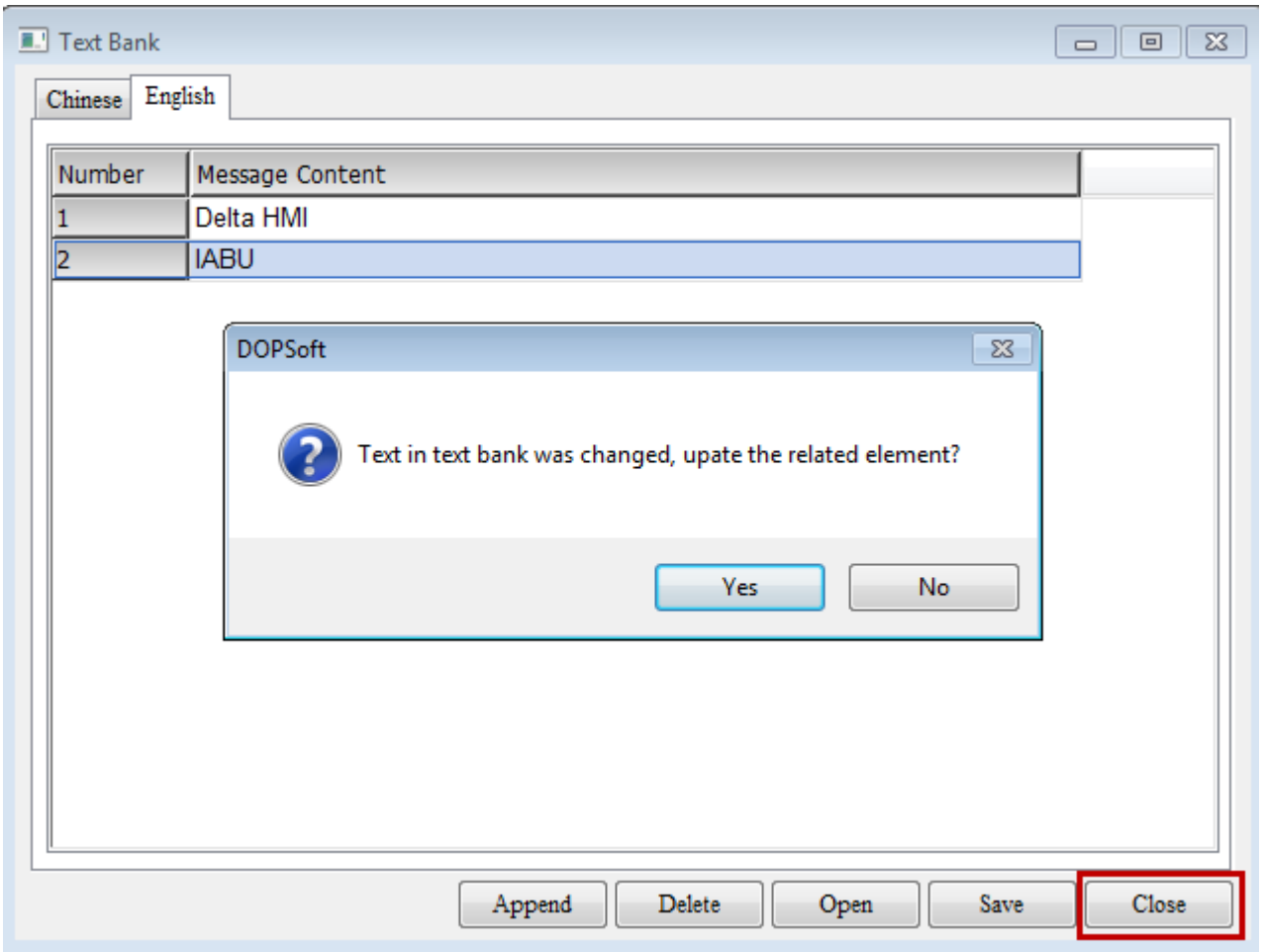


Figure 2-2-4-11 Synchronization of the content in text bank and the display text

Please see 2-2-8-13 Introduction of Text Bank for details of how to create and utilize the Text Bank

2-2-4-12 Bitmap

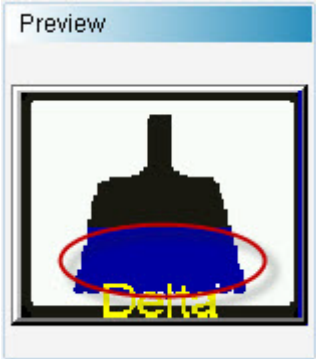
This function can process the state of the element graph, such as Align Left, Align Right, and Centered, etc. The user can use [Edit]→ [Bitmap]or click the Bitmap Bar .

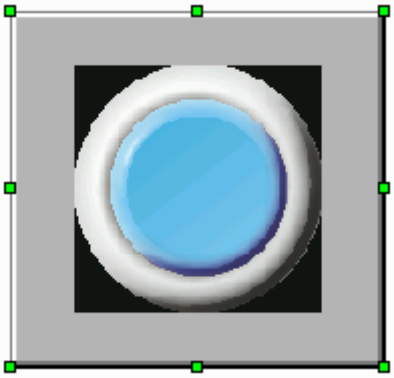
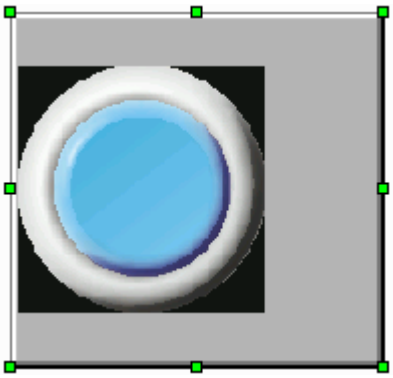
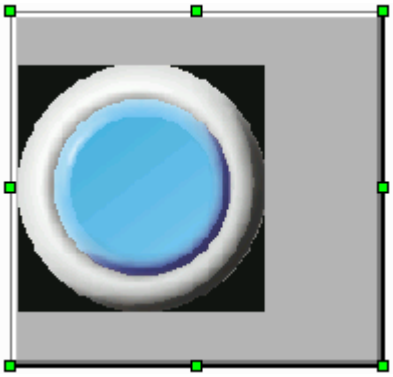
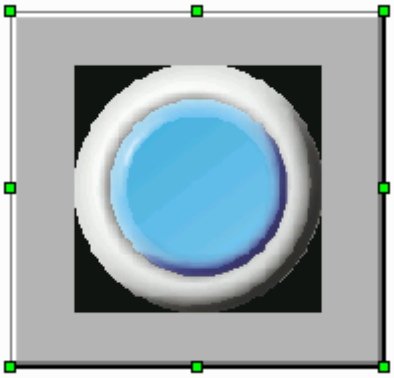
Bitmap Table 2-2-4-12 Example of bitmap		
Icon	Item	Content
	Make Element Transparent	➢ This function can make a certain color in a graph transparent. In the example of the figure below, the foreground color of the element is set to be blue. When one graph is imported, one can use the Make Element Transparent icon to click on the orange part on the broom. The software will change the orange

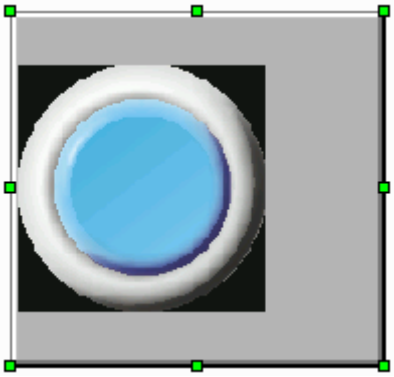
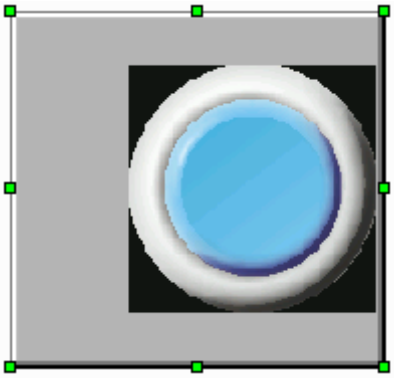
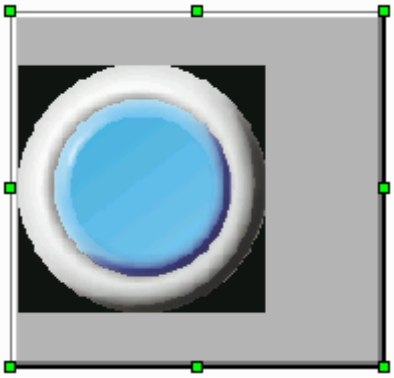
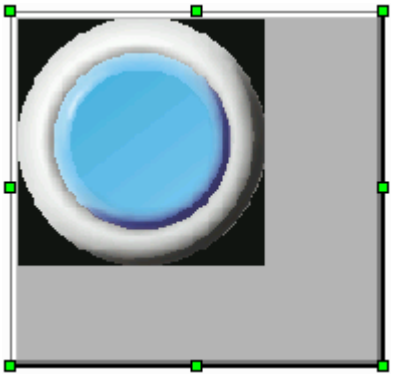
Bitmap

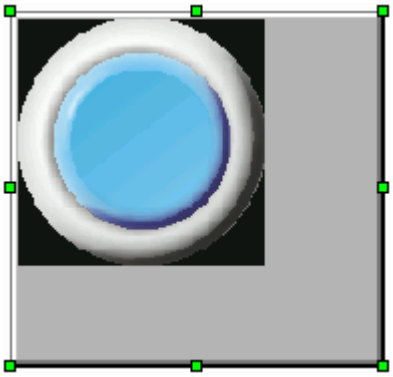
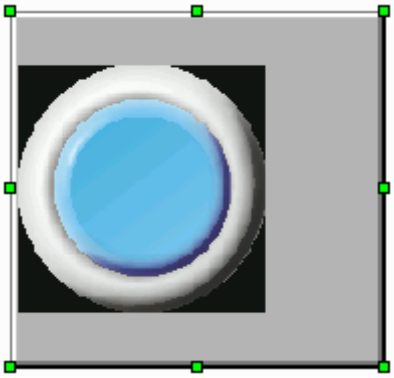
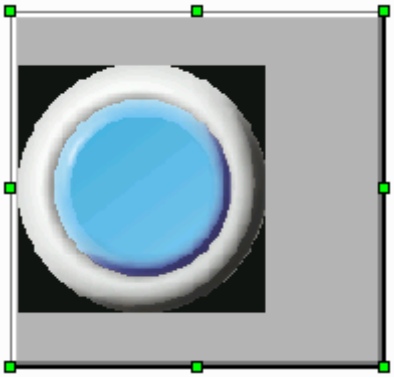
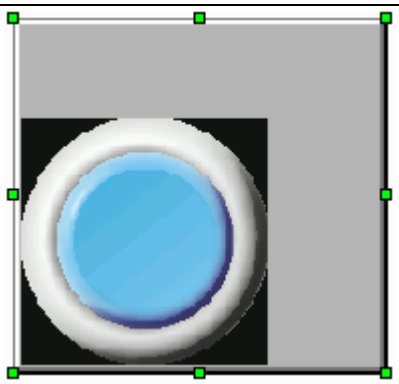
Table 2-2-4-12 Example of bitmap

<table>
<tr><td></td><td></td><td>part in the graph to transparent and only the blue foreground of the element will be visible.

<table>
<tr><td>Before</td><td>
</td></tr>
<tr><td>After</td><td> 
</td></tr>
</table></td></tr>
<tr><td> </td><td>Process All States Graph Mode Switch</td><td>➢ If the user checks to process graphs with all states, it means that the element has various state values and the associated graph does no expand over the entire area. All graphs therein can be processed by checking this function, which avoids individual configurations and renders time-saving editing.</td></tr>
<tr><td> </td><td>Expand over all the area</td><td rowspan="2"><table>
<tr><th>All area</th><th>Maintained Aspect Ratio</th><th>Actual Size</th></tr>
<tr><td>Graph expands over all the element area</td><td>Graph will be expanded by the original aspect ratio,</td><td>Actual size means an expansion ratio of 1:1, with the graph displayed by its</td></tr>
</table></td></tr>
<tr><td> </td><td>Expand with maintained aspect ration</td></tr>
</table>

Bitmap Table 2-2-4-12 Example of bitmap				
	Actual Size			
	AlignGraph to Left	Before		
		After		
	Graph Center Horizontally	Before		
		After		

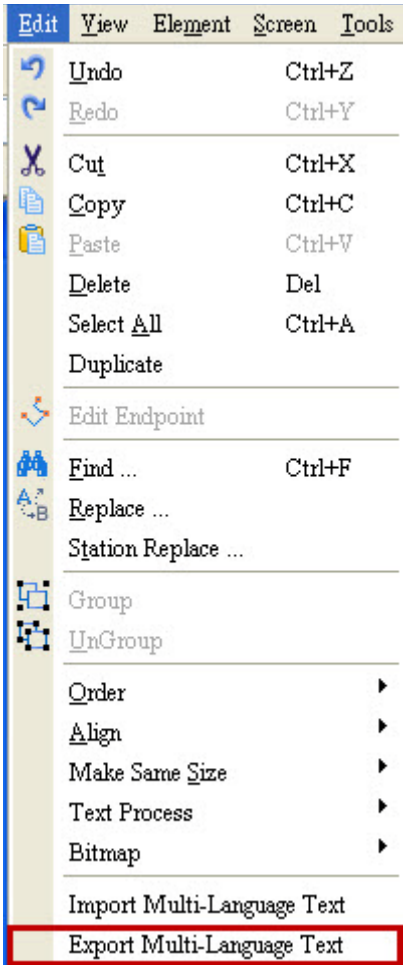
Bitmap Table 2-2-4-12 Example of bitmap					
	AlignGraph To Right		Before		
			After		
	Align Graph to Top		Before		
			After		

Bitmap Table 2-2-4-12 Example of bitmap					
	Graph Center Vertically		Before		
			After		
	Align Graph to Bottom		Before		
			After		

2-2-4-13 Export/Import Multi-Language Text

DOPSoft provides functions that are different from Screen Editor, which are export and import of texts in multiple languages. The user can directly select [Edit]→ [Import Multi-Language Text]/ [Export Multi-Language Text]. The function of these two features enables the user to import or export the text quickly with ease when editing text data in multiple languages. It is particularly convenient when the user needs to edit text in multiple languages or multiple states, which can be done more easily by using this function. The format of all the files for import or export is .xls, which can be opened by Excel. The content of the file for export or import displays the language data for texts in all the elements on the screen.

◆ Export Multi-Language Text



After the user exports multi-languages text, the software will ask the user whether to save the exported file.

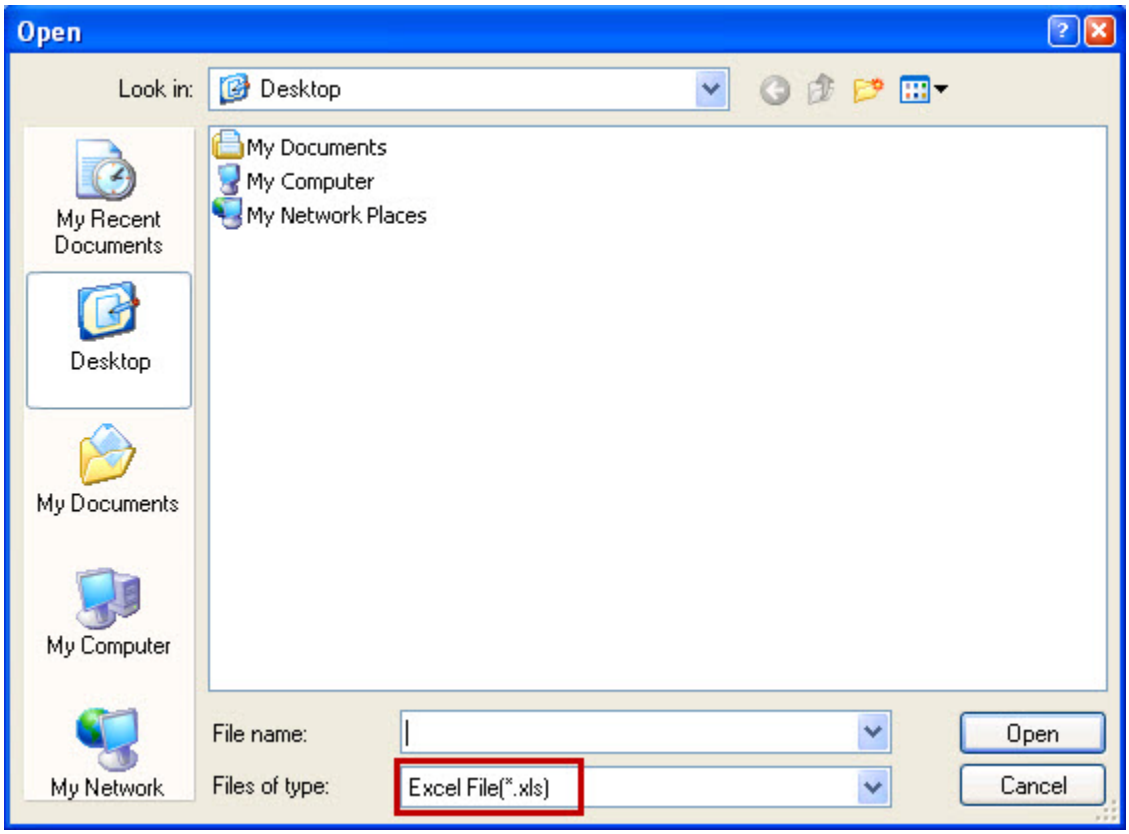


Figure 2-2-4-11 Save the file Export Multi-Language Text

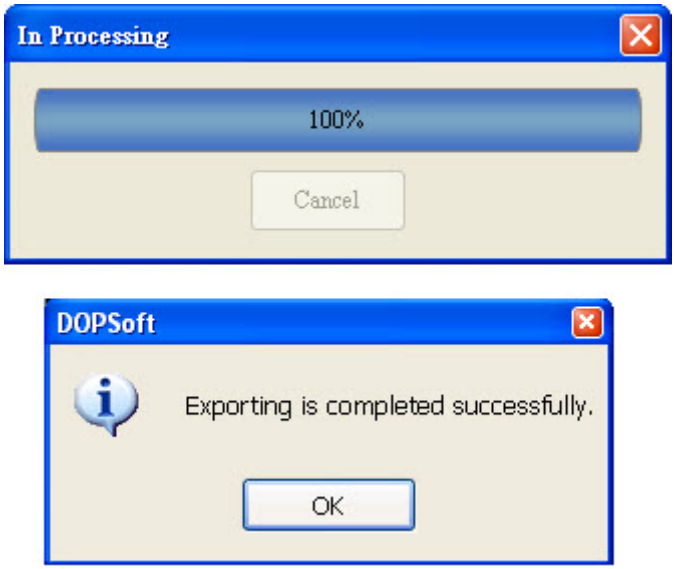


Figure 2-2-4-12 Completion of saving Export Multi-Language Text

Upon completion of saving, please open the associated file at the path where it is saved. One can find that the file will display the text data in multiple languages located in the current project, as shown in the figure below.

tina.xls

	D	E
1	Chinese	English
2		
3		
4		
5	$0.0	
6		
7		
8	換畫面	change screen
9		
10	回前頁	go back
11		
12	系統時間日期	system time and date
13		
14	系統目錄	system menu
15		
16	設定密碼表	set password table
17		
18	調整對比亮度	contrass
19		
20	設為最低權限	level 0
21		
22	輸出報表	report list
23		
24	擷取畫面	capture
25		
26	移除儲存媒體	remove storage
27		
28	匯出配方	Export Recipe
29		
30	匯入配方	Import Recipe
31		
32	觸碰校正	Calibrate
33		
34	語系切換至英文	change language to EN
35		

Figure 2-2-4-13 Content of Export Multi-Language Text

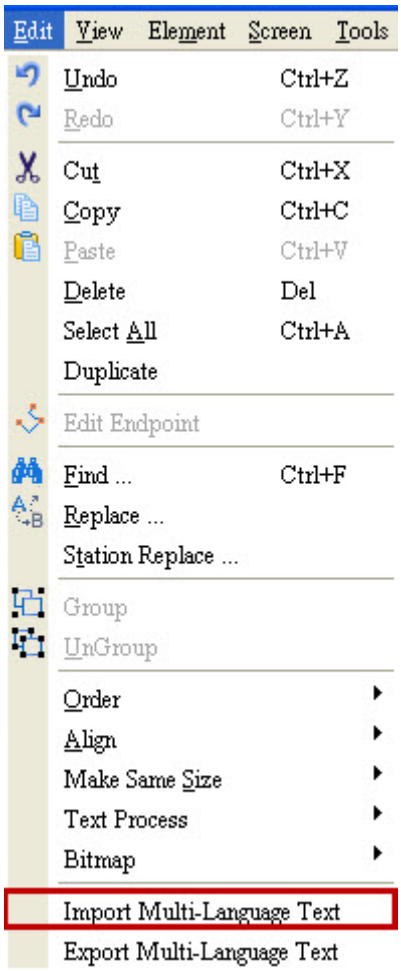
◆ Import Multi-Language Text

The user can first modify the text message in the exported text data in multiple languages, followed by import. In the example as shown in the figure below, the Chinese language $0.0 in line 5 is set as the ON button and the English On Button message is added.

tina.xls *

	D	E
1	Chinese	English
2		
3		
4		
5	設ON按鈕	ON Button
6		
7		
8	換畫面	change screen
9		
10	回前頁	go back
11		
12	系統時間日期	system time and date
13		
14	系統目錄	system menu
15		
16	設定密碼表	set password table
17		
18	調整對比亮度	contrass
19		
20	設為最低權限	level 0
21		
22	輸出報表	report list
23		
24	擷取畫面	capture
25		
26	移除儲存媒體	remove storage
27		
28	匯出配方	Export Recipe
29		
30	匯入配方	Import Recipe
31		
32	觸碰校正	Calibrate
33		
34	語系切換至英文	change language to EN
35		

Figure 2-2-4-14 Content of Import Multi-Language Text.



When the user imports Multi-Language Text, the software will ask the user to select which file to import.

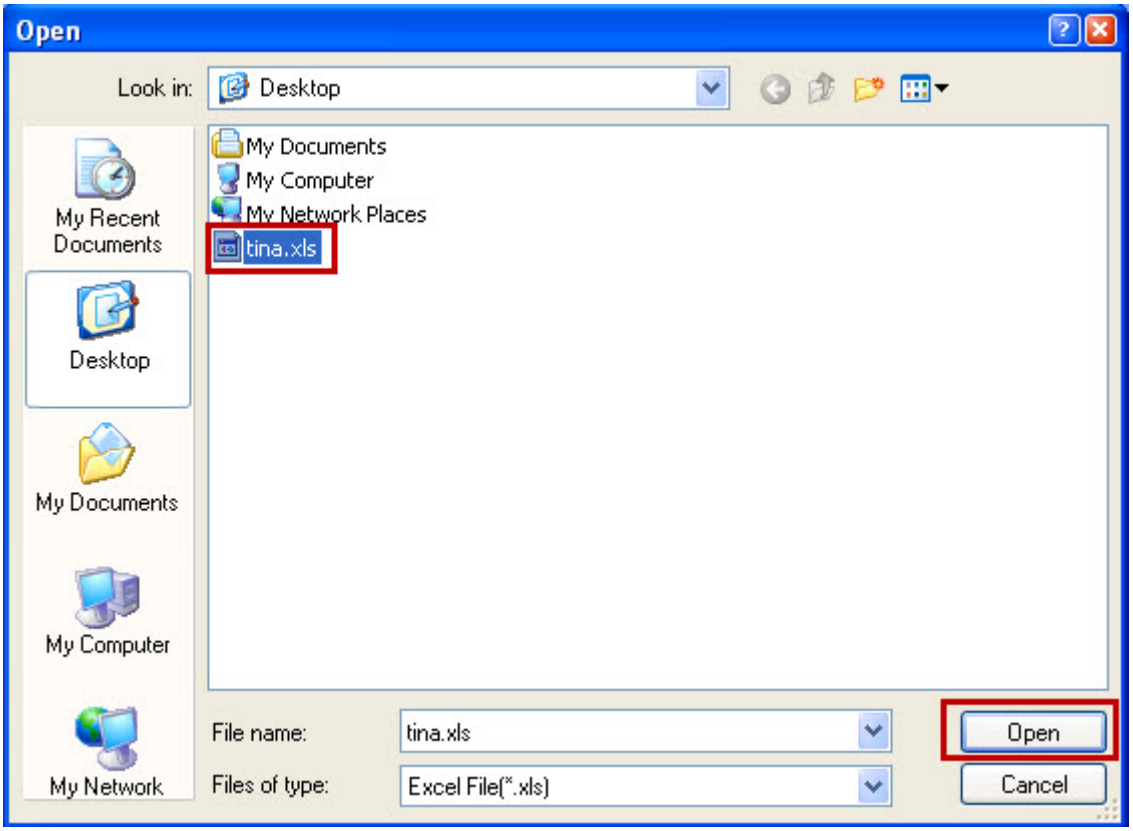


Figure 2-2-4-15 File of text in multiple languages to be imported

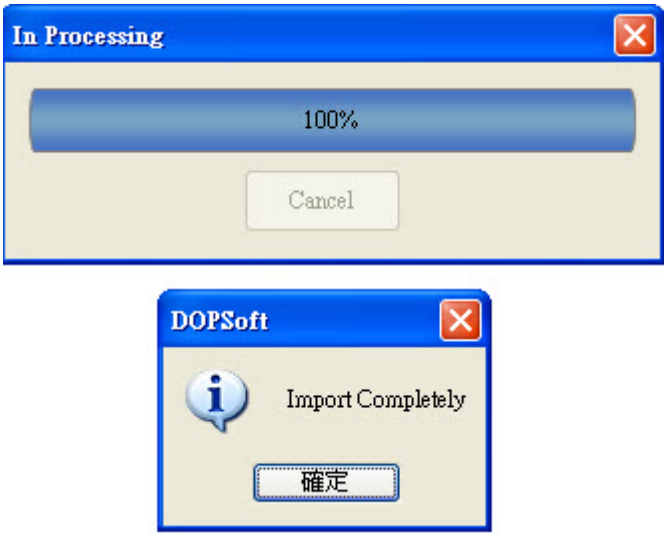
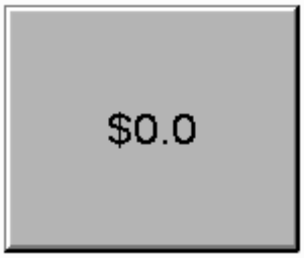


Figure 2-2-4-16 Completion of importing file of text in multiple languages

Once the text in multiple languages is imported, the user can check if the edited data has been completely imported.

	Chinese	English
Before Import		
After Import		

Please see Chapter 25 for complete details on how to use the multi-languages.

2-2-5 View

The [View]in the function menu provides the following functions for the user to utilize.

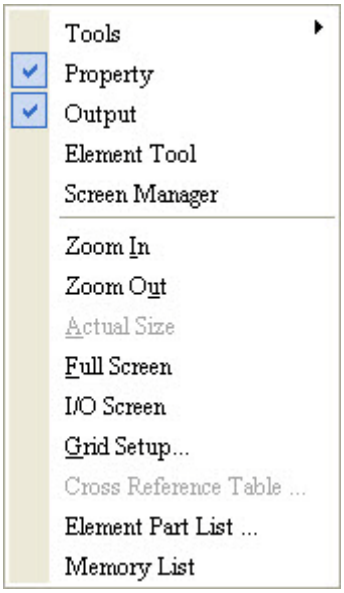


Figure 2-2-5-1 Function menu of View

Details of [Screen Manager], [Zoom In], [Zoom Out], [Actual Size], [Full Screen], [I/OScreen], [Grid Setup], [Cross Reference Table], [Element Part List], and [Memory List].

2-2-5-1 Screen Manager

DOPSoftprovides the Screen Manager for the user to view the elements in all screen more easily. The user can use [View]→ [Screen Manager]to decide whether to display this window.

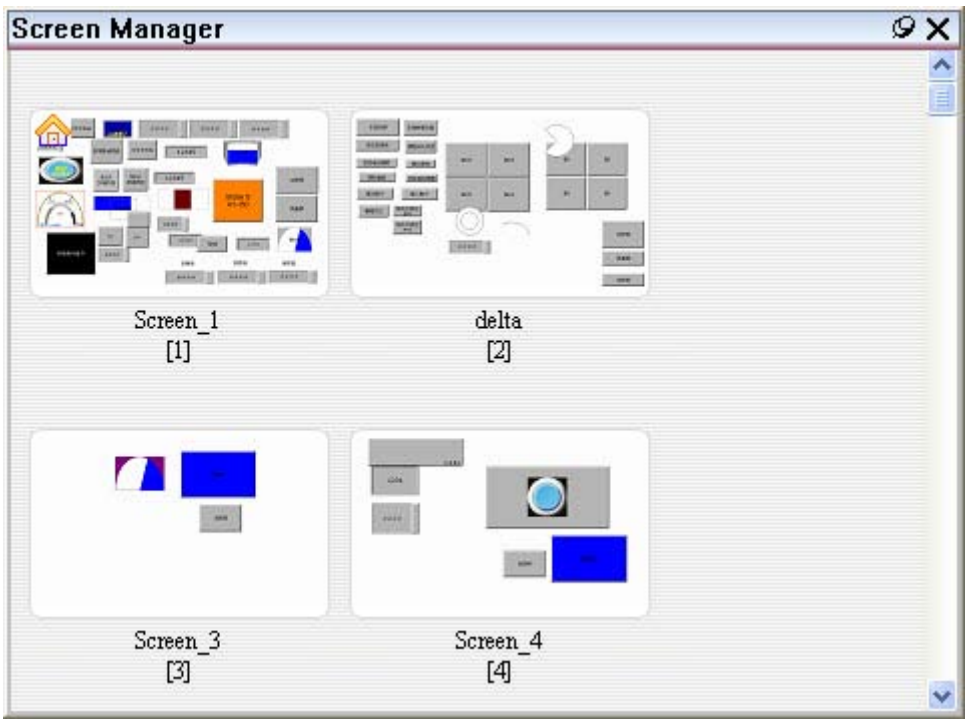


Figure 2-2-5-2 Screen Manager

In the Screen Manager, one can click the right button of mouse to execute certain actions involving the screen, as shown in the figure below.

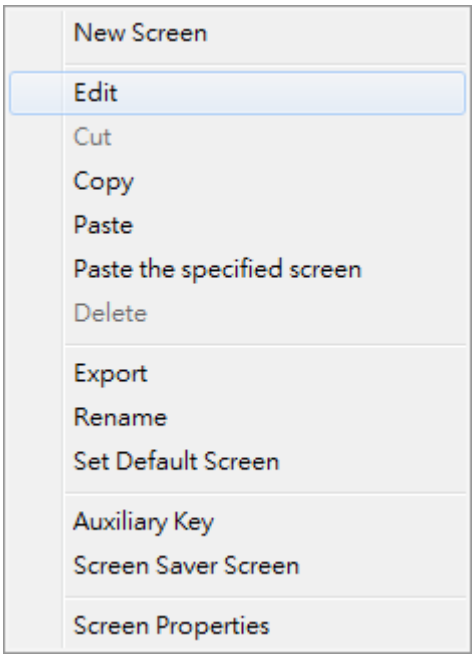
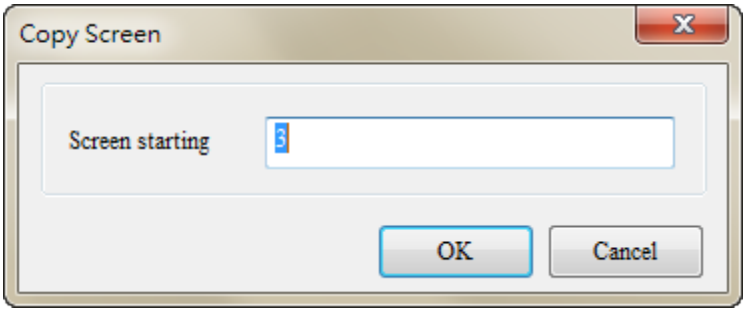


Figure 2-2-5-3 Settings of Screen Manager

New Screen	This function is the same as [Screen]→ [New Screen]. Both can create a new screen. Please see 2-2-6-1 New Screen for details of configuration.
Edit	The user can directly click on a certain screen in the Screen Manager and press edit to go to the editing window of the selected screen.
Cut **Copy** **Paste** **Delete**	The functions of cut, copy, paste and delete screens are the same as those through [Screen]→ [Cut]/ [Copy]/ [Paste]/ [Delete]. Please see 2-2-6-4 Cut Screen,2-2-6-5 Copy Screen,2-2-6-6 Paste Screen, and 2-2-6-7 Delete Screen for details of configuration.
Paste the Specified Screen	With this function, users can paste the copied screen to the specified screen ID. It is also allowed to copy batch screen. Users can copy multiple screens, specifying the start screen ID to be pasted and the system will assign the number in sequence automatically.  NOTE: ✓ If the specified screen No. exists, a new screen number will automatically be generated (exists number +1).
Export	The Export function in the Screen Manager is the same as [Screen]→ [Export], both of which can export the selected screen and decide whether to display the frame. Please see 2-2-6-8 Export for details of configuration.
Rename	Rename refers to changing the name of a previously configured screen.

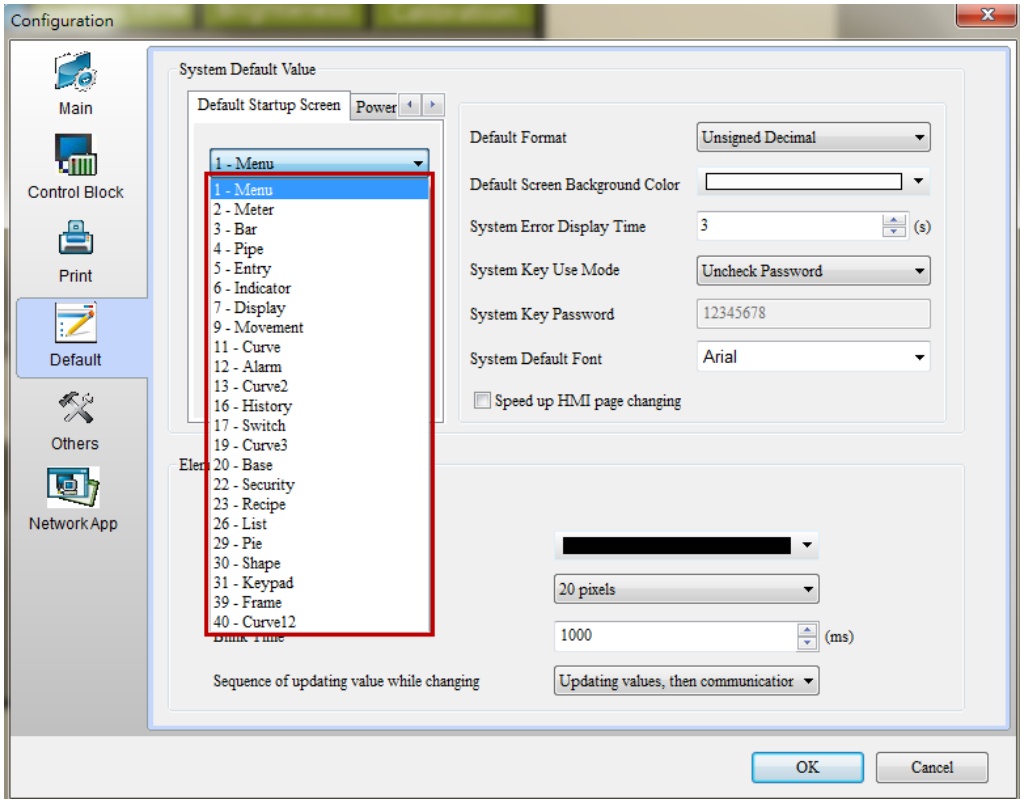
Set Default Screen	The function of set as default initial screen is the same as [Selection]→ [Configuration]→ [Default]in setting the default initial screen, both of which can configure the first screen to display once the HMI interface is started. 
Auxiliary Key	The Auxiliary Key only supports the HMI models equipped with this feature, such as B07S201 and B07S211. If the HMI model in use does not have Auxiliary Key, this function will be disabled. Please see 2-2-6-14 Auxiliary Key for details.
Screen Save Screen	The screen protection has the same function as [Screen]→ [Screen Save Screen]. Please see 2-2-6-3 Screen Save Protection for details.
Screen Properties	One can click the screen properties function to configure the features of screen. These include configuring whether the screen is the sub-screen and the name of the sub-screen, width and height of screen, and X-Y coordinates, etc. Please see 2-2-6-15 Screen Properties for details.

Table 2-2-5-1 Settings of Screen Manager

2-2-5-2 Zoom In

The user can use the function of Zoom In to enlarge the screen for the convenience of editing. The user can also directly click the icon in the Zoom toolbar to enlarge the screen. Please see Table 2-2-5-2 below for details.

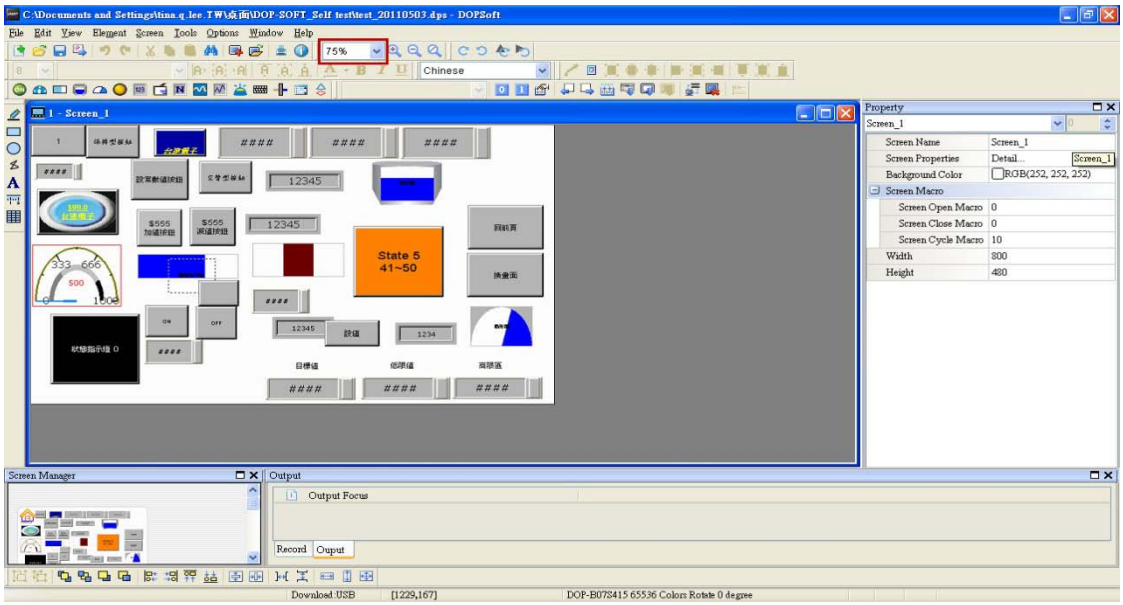
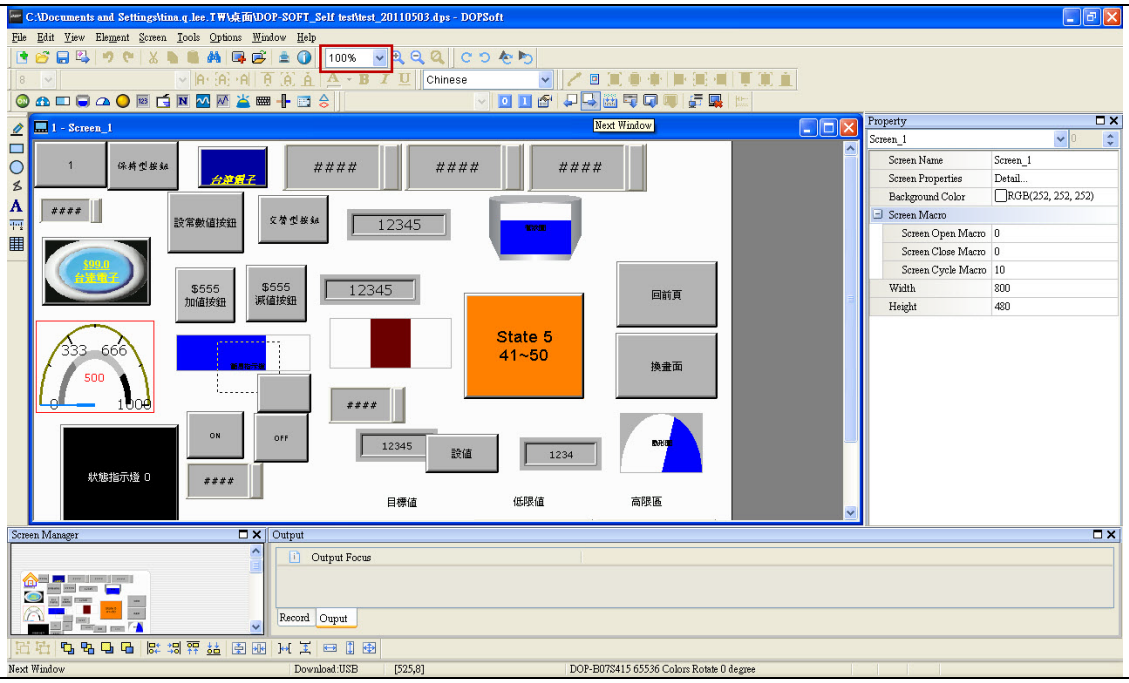
Screen size is 75% of window size before zoom in	
Screen size is 100% of window size after zoom in	

Table 2-2-5-2 Example of zoom in

2-2-5-3 Zoom Out

The user can use the function of Zoom Out to shrink the screen. The user can also directly click the icon in the Zoom toolbar to shrink the screen. Please Table 2-2-5-3 below for details.

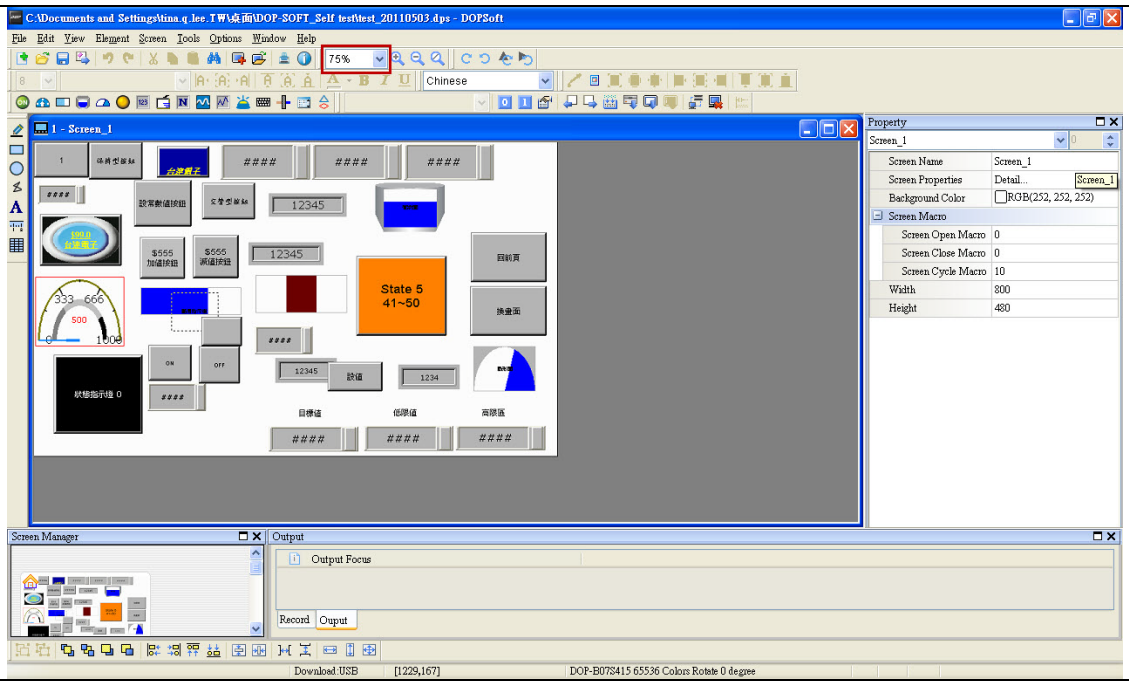
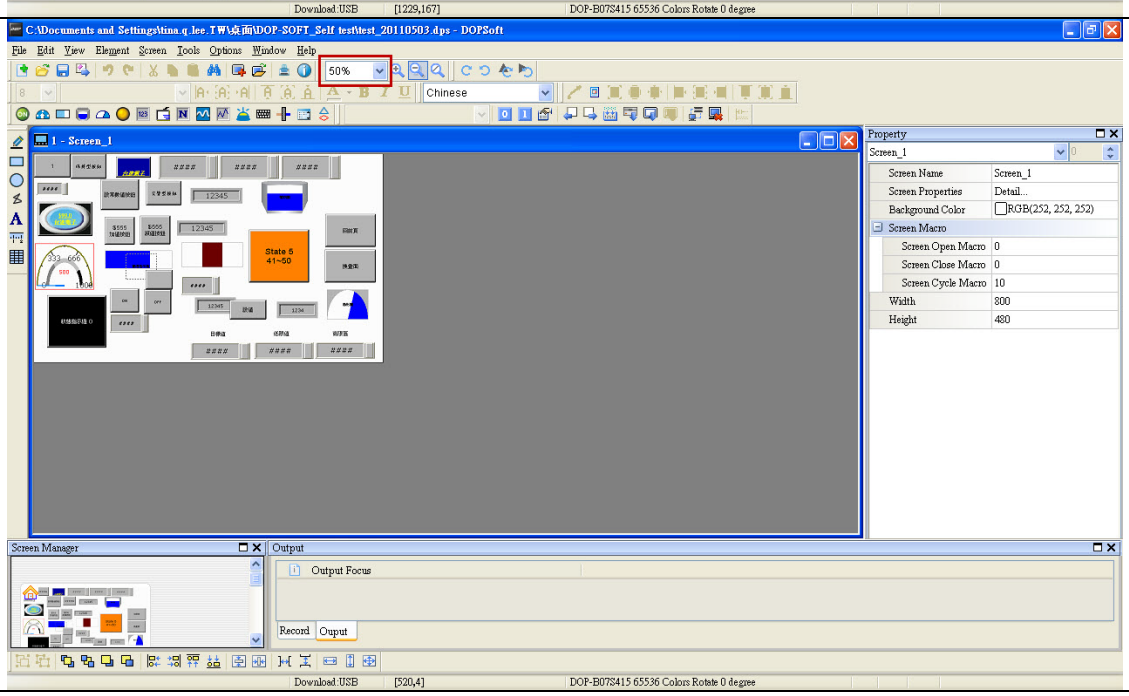
Screen size is 75% of window size before zoom out	
Screen size is 50% of window size before zoom out	

Table 2-2-5-3 Example of zoom out

2-2-5-4 Actual Size

The function of actual size is simply to restore the editing screen back to its original size by

100%, which is scaled with respect to the screen size of the HMI. The user can also directly click icon in the Zoom toolbar to restore the screen back to 100%. Please see Table 2-2-5-4 below for details.

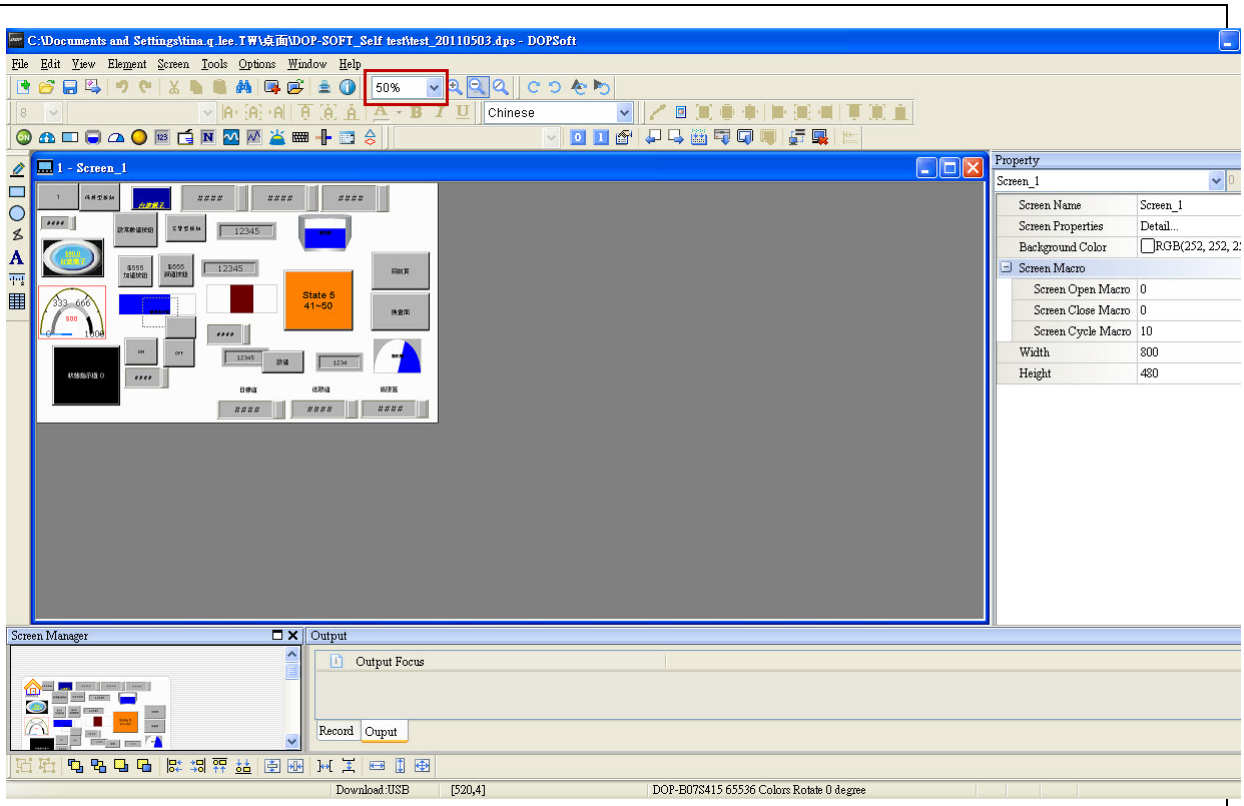
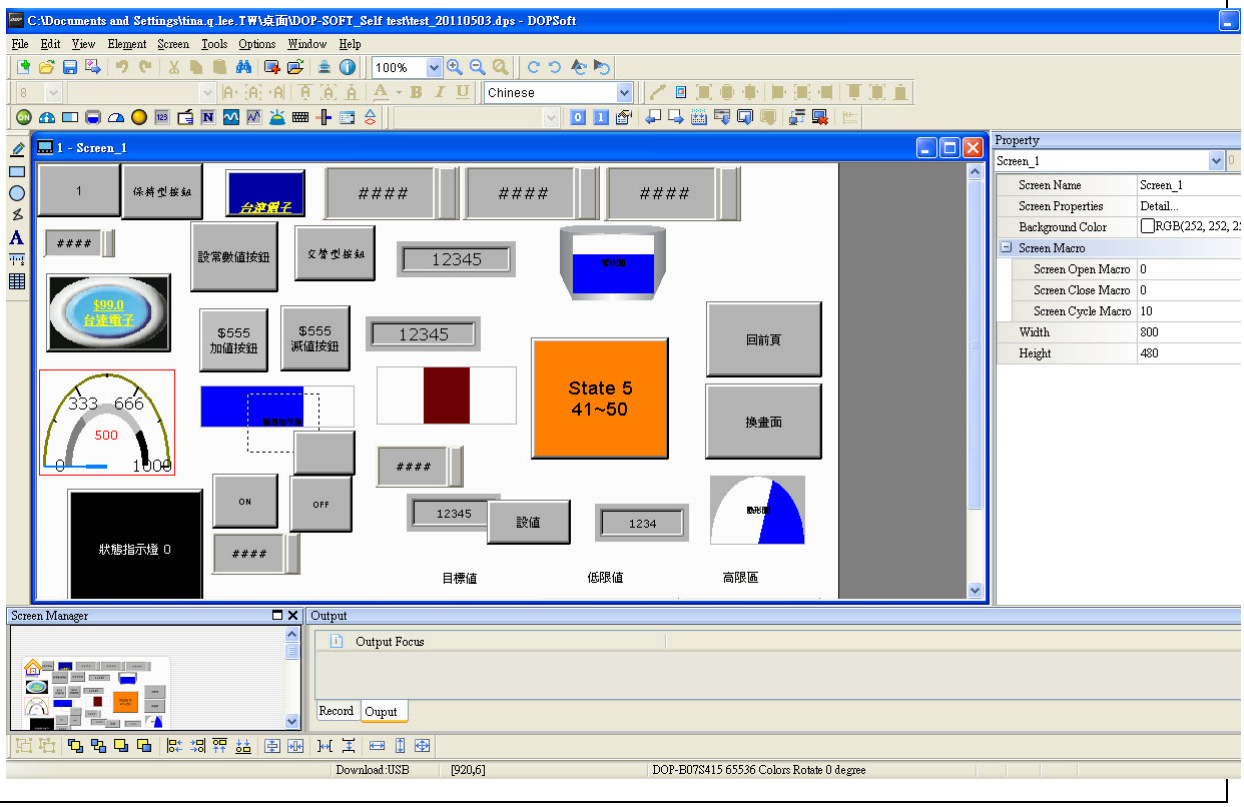
Screen size is 50% of window size before zoom out	
Screen size is 100% of window size afterzoom out	

Table 2-2-5-4 Example of actual size

2-2-5-5 Full Screen

This function can display the editing screen in full screen mode. In addition, the number of macro lines configured in the screen will be displayed at the lower left corner of the screen. The user can click ESC or the left button of the mouse to exit the full screen mode.

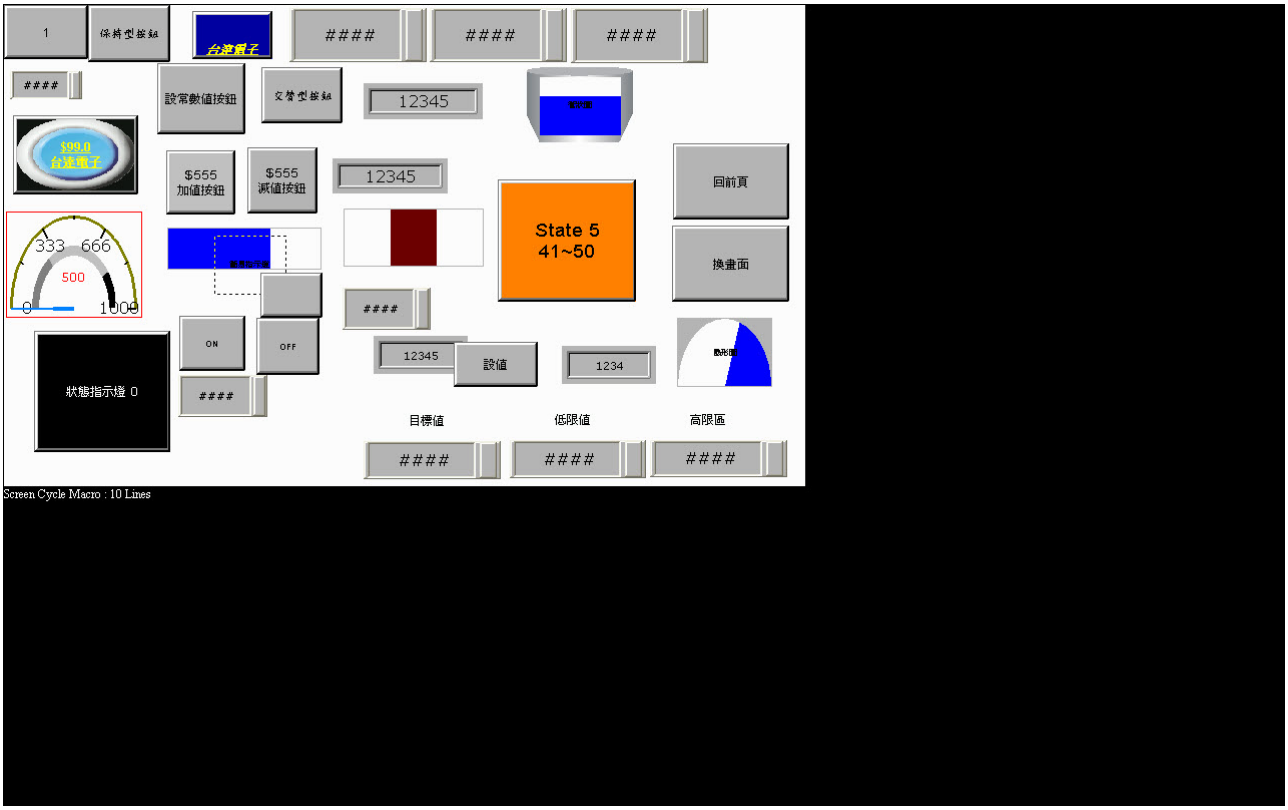


Figure 2-2-5-4 Full screen

2-2-5-6 I/O Screen

The function of this feature is approximately the same as full screen, with the only difference being that it will also display the memory address of the associated element. The number of macro lines therein will also be displayed and the full screen mode can be exited by clicking ESC or left button of mouse.

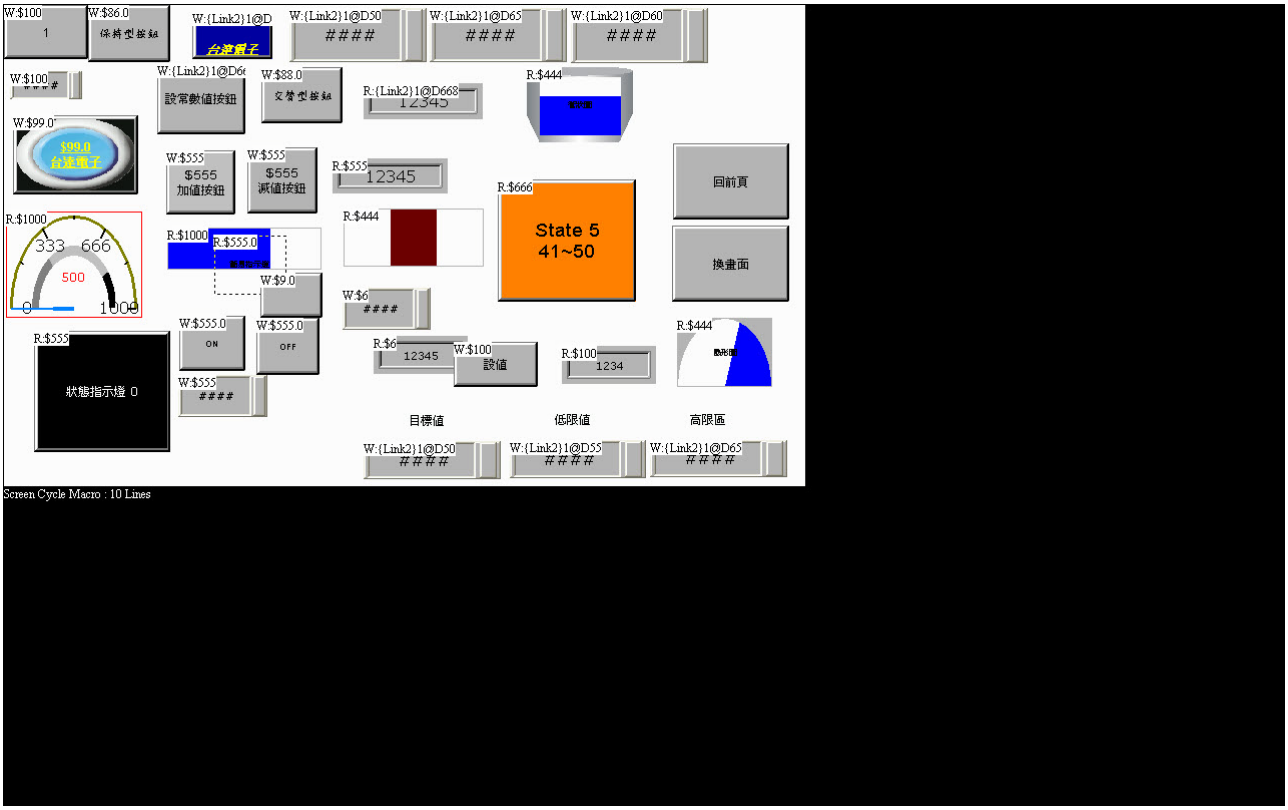


Figure 2-2-5-5 I/O Screen

2-2-5-7 Grid Setting

There are two items for selection in Grid Setting, which are Show Grid and Snap to Grid. When the user checks [Show Grid], the grid will display in the editing screen. [Snap to Grid]helps the user align the elements more easily when moving them. In addition, the user can also define his/her own grid spacing, which are integers between 4~50. The default horizontal and vertical spacing are both 4.

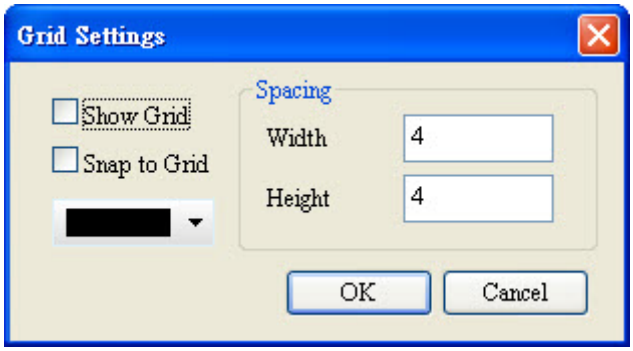
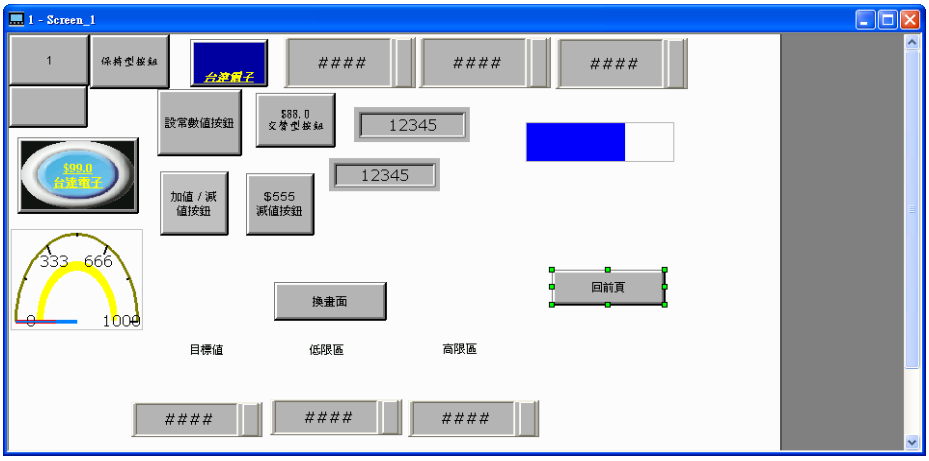


Figure 2-2-5-6 Grid Setting

Show Grid is not checked	

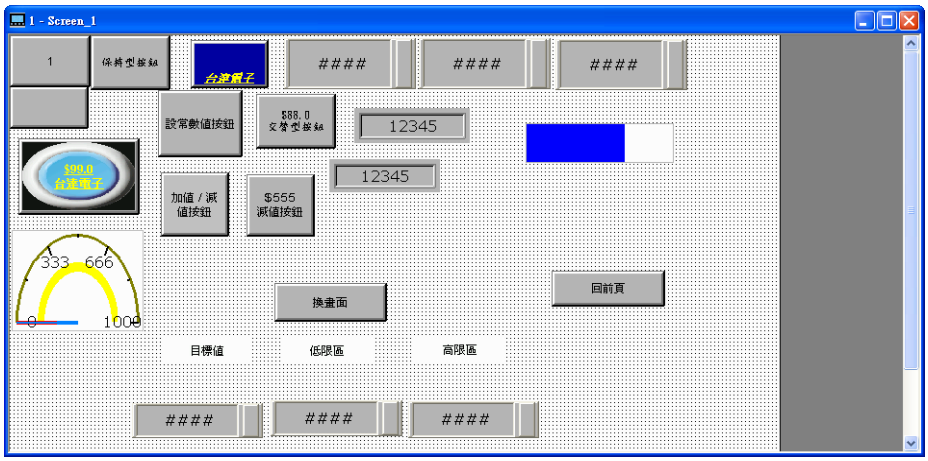
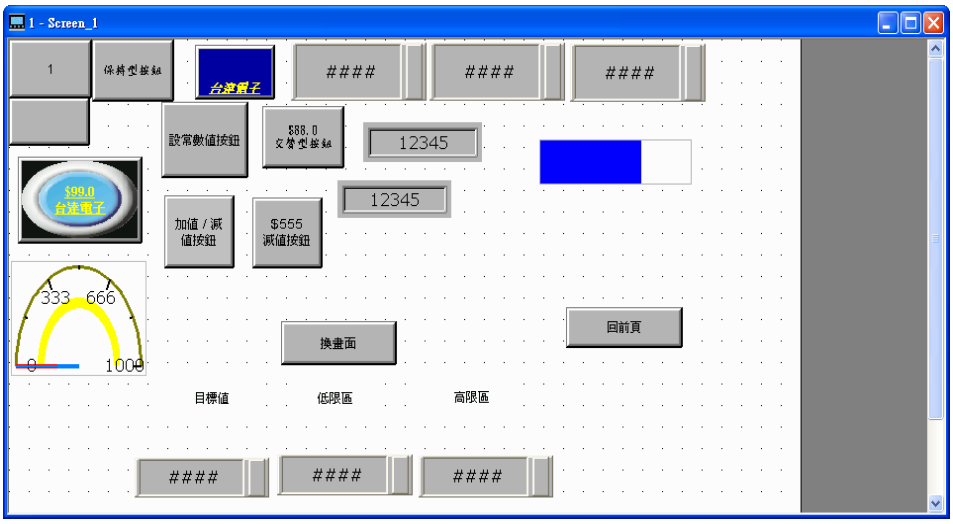
Show Grid is checked	
Grid Setting Spacing	Both the horizontal and vertical spacing are set to be 20. 

Table 2-2-5-5 Example of Grid Setting

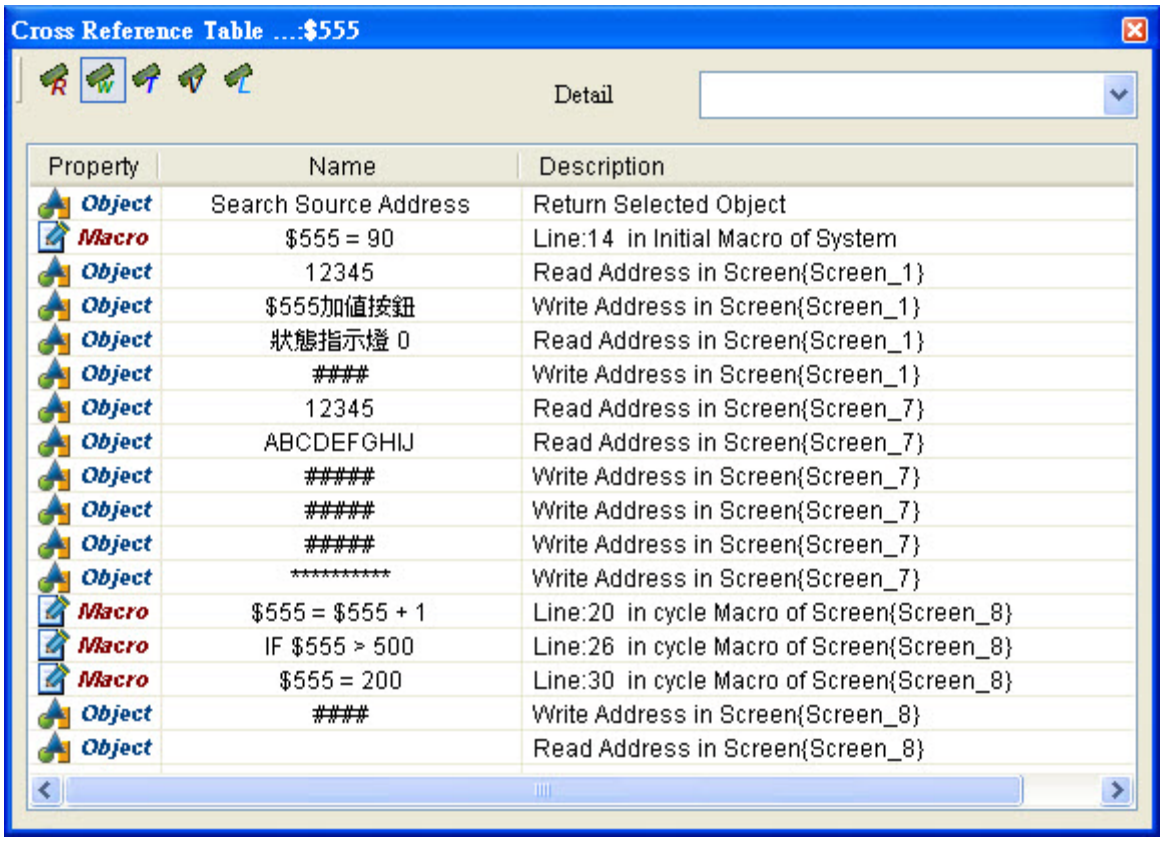
2-2-5-8 Cross Reference Table

When the user creates or edits several elements, very often the same address will be used repeatedly by mistake. To avoid such incidence, the software provides the Cross Reference Table for the user to examine how and on what elements the address is used. It also provides Read Address, Write Address, and trigger memory addresses for the user to locate the associated address list more easily and quickly.

The user can examine the Read Address, Write Address, trigger memory address, invisible bit and ADP bit to learn their relationships. If the same address is used repeatedly, its properties can also be found by checking the associated element, macro command, or control area.

NOTE:

✓ To use the Cross Reference Table, please first select a certain element. It is noteworthy that the address listed in the cross reference table is the address that does not include the memory address of the current element.



Property	Name	Description
Object	Search Source Address	Return Selected Object
Macro	$555 = 90	Line:14 in Initial Macro of System
Object	12345	Read Address in Screen{Screen_1}
Object	$555加值按鈕	Write Address in Screen{Screen_1}
Object	狀態指示燈 0	Read Address in Screen{Screen_1}
Object	####	Write Address in Screen{Screen_1}
Object	12345	Read Address in Screen{Screen_7}
Object	ABCDEFGHIJ	Read Address in Screen{Screen_7}
Object	#####	Write Address in Screen{Screen_7}
Object	#####	Write Address in Screen{Screen_7}
Object	#####	Write Address in Screen{Screen_7}
Object	**********	Write Address in Screen{Screen_7}
Macro	$555 = $555 + 1	Line:20 in cycle Macro of Screen{Screen_8}
Macro	IF $555 > 500	Line:26 in cycle Macro of Screen{Screen_8}
Macro	$555 = 200	Line:30 in cycle Macro of Screen{Screen_8}
Object	####	Write Address in Screen{Screen_8}
Object		Read Address in Screen{Screen_8}

Figure 2-2-5-7 Cross Reference Table

2-2-5-9 Element Part list

The user can use the Element Part list to categorize all the screen elements according to their screen numbers and element types or addresses. The properties of each element will be listed by category, including element name, write address, read address, trigger address, trigger mode, active address, Interlock State, Data Type, Data Format,element coordinates, and width and height.

◆ Categorize by element type

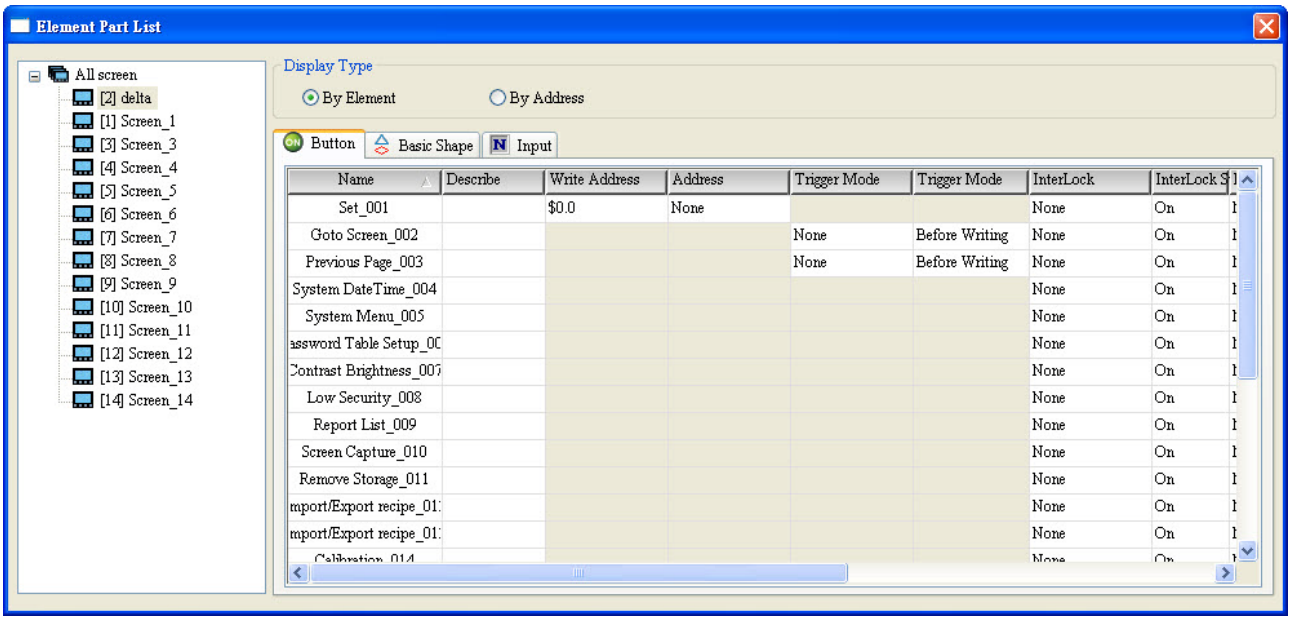


Figure 2-2-5-8 Element Part list-element type

◆ Categorize by address

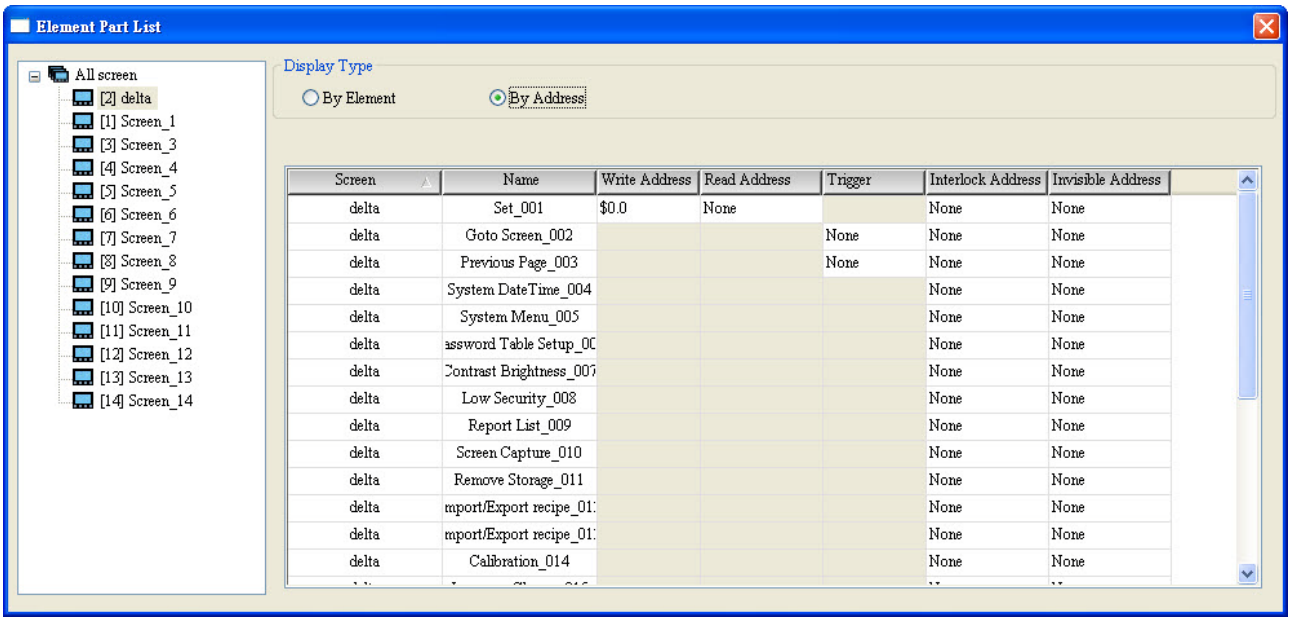
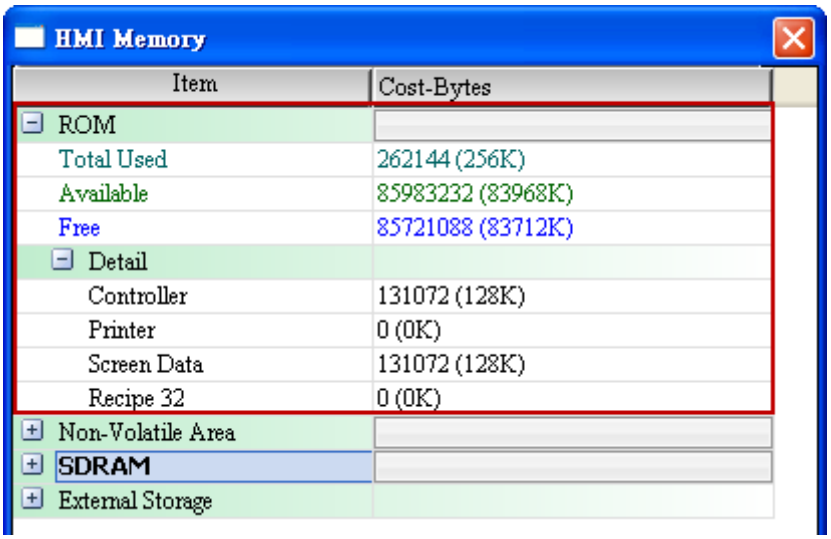
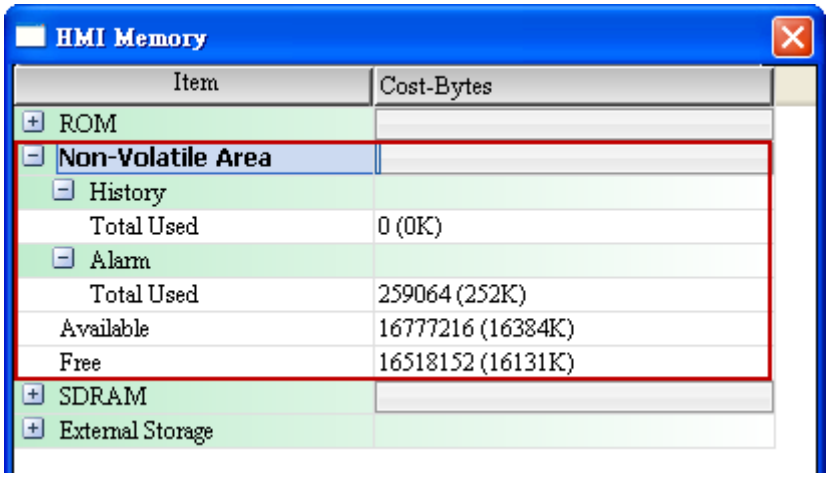
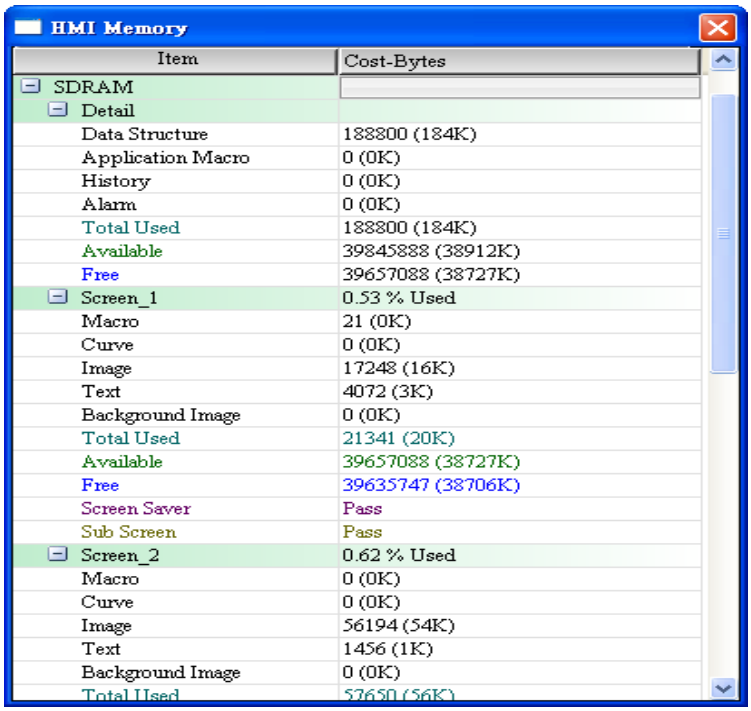


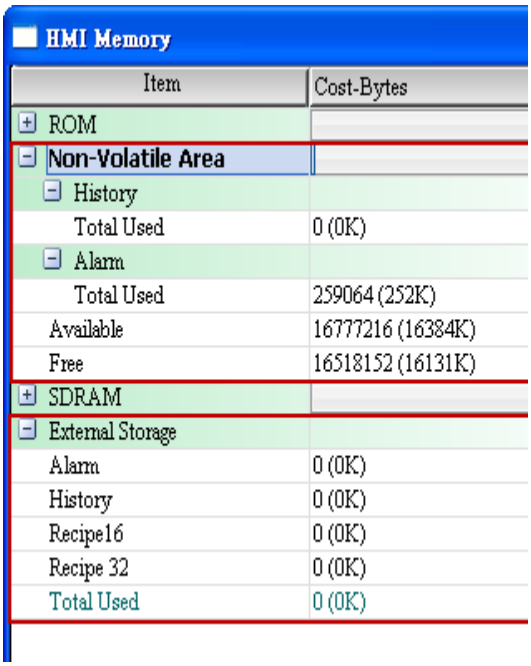
Figure 2-2-5-9 Element Part list-address

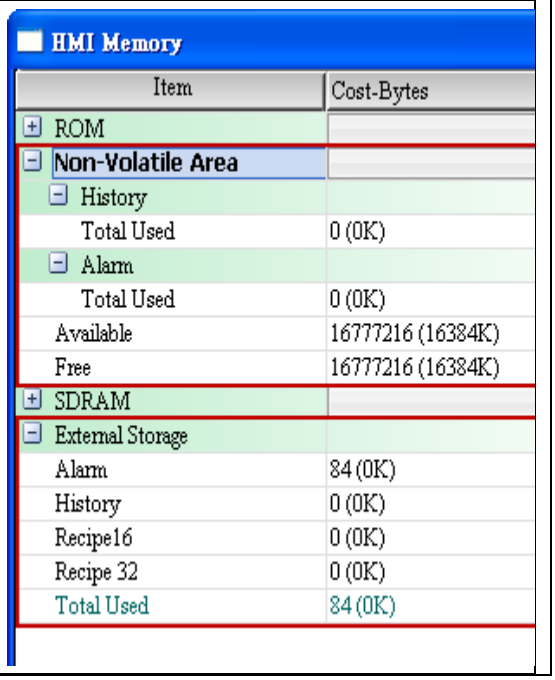
2-2-5-10 Memory List

The Memory List can be used to check the memory used by the designed HMI screen and the remaining capacity. The associated data will only be available after the user first creates a new project and completes editing. The content of the list contains the following four parts: ROM,Non-Volatile Area,SDRAM, and External Storage.

ROM	Actual size of the file after the screen is downloaded to the HMI (including recipe, screen data, printer data, etc.) 
Non-Volatile Area	The default storage location in case of power outage is static random access memory (SRAM). When the project file edited by the user contains data such as history and alarm, they can be used to check the usage. 
SDRAM	It displays the SRADM space required for the operation of each screen, where the usage is calculated by page. If the project has two pages, SDRAM will displaydata of two screens.

<table>
<tr><td></td><td>


</td></tr>
<tr><td>External Storage</td><td>
This feature refers to the space used by external storage. When the location of non-volatile area is set as an external device such as USB disk or SD card, the data blocks originally stored in the non-volatile area (SRAM) will be moved to the external storage.
<table>
<tr><th>Non-volatile storage</th><th>USB Disk / SD card</th></tr>
<tr><td>


</td><td>


</td></tr>
</table>
</td></tr>
</table>

Table 2-2-5-6 Memory List

2-2-6 Screen

The [Screen]in the function menu offers the following features for the user to utilize.

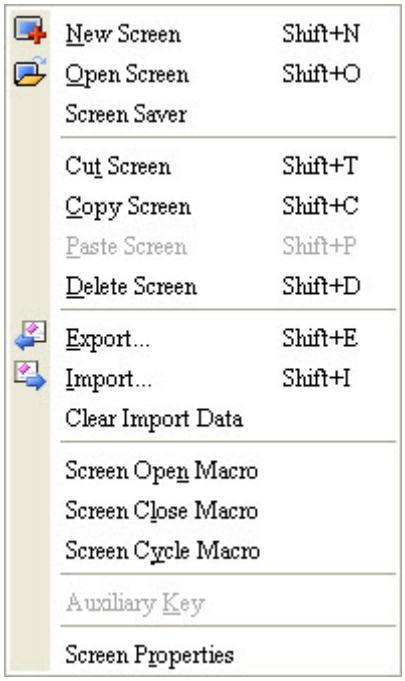


Figure 2-2-6-1 Function menu of screen

2-2-6-1 New Screen

To add a new screen for editing, please select [Screen]→ [New Screen], or click the icon in the standard toolbar. One can also directly use the system hotkey [Shift + N]. Once the new screen is added, the user can define the screen name and number (ID) as preferred.

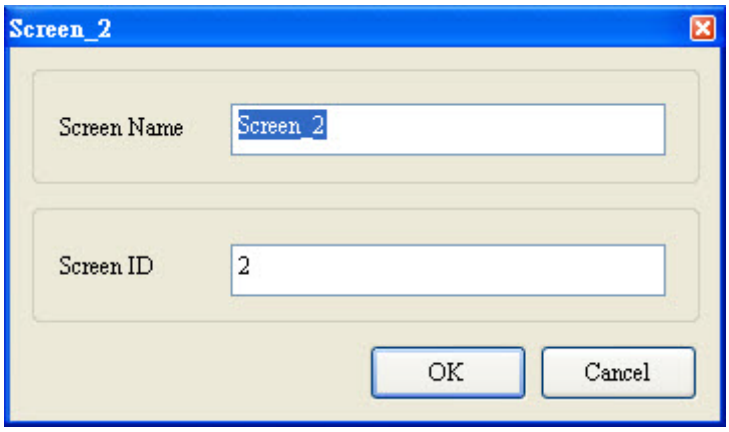


Figure 2-2-6-2 New screen

2-2-6-2 Open Screen

To open screens previously created, one can click [Screen]→ [Open Screen], or click the icon in the standard toolbar. One can also use the system hotkey [Shift + O]. When the user selects the screen to open, all the elements in the associated screen can be seen in the preview screen on the right.

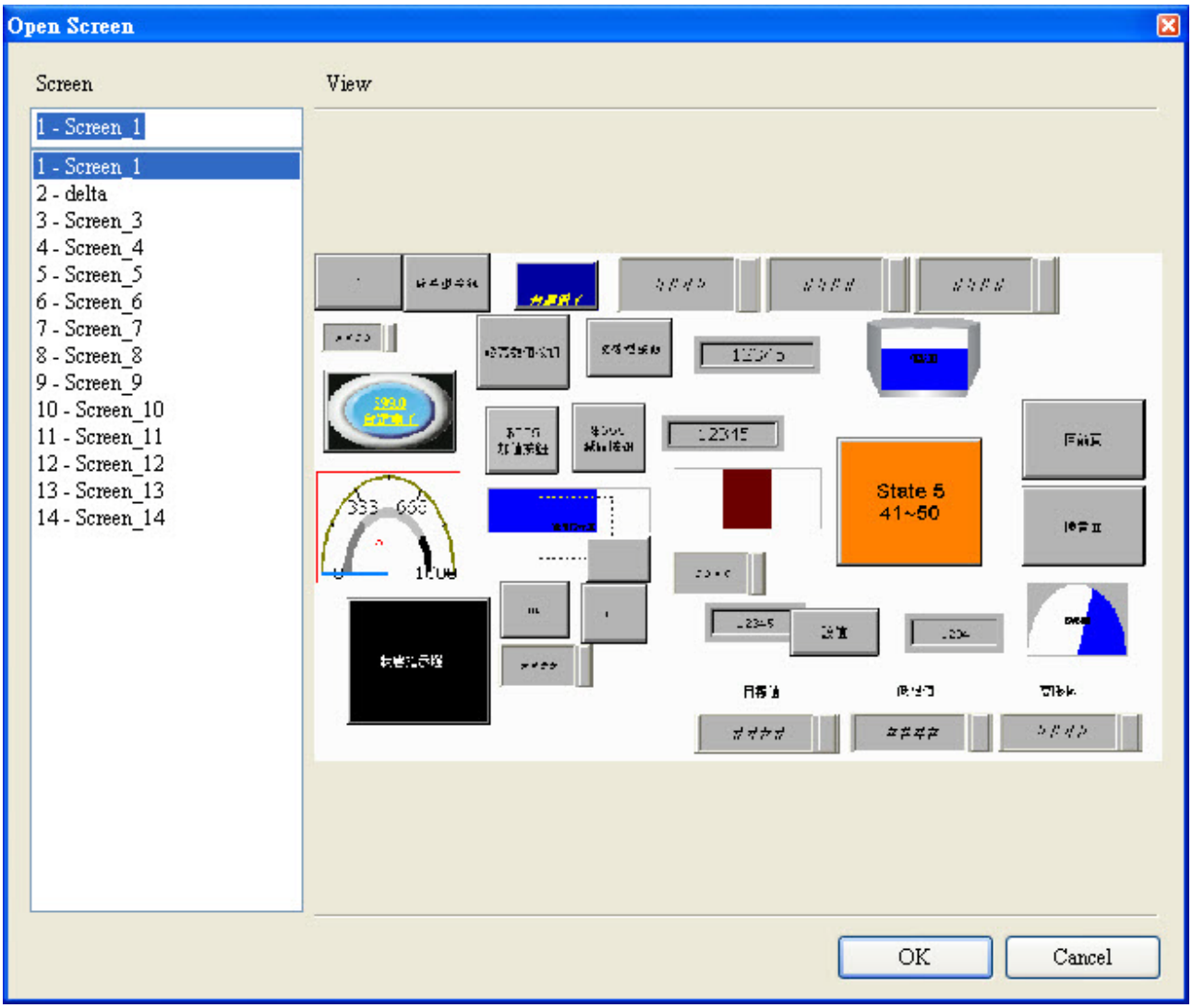
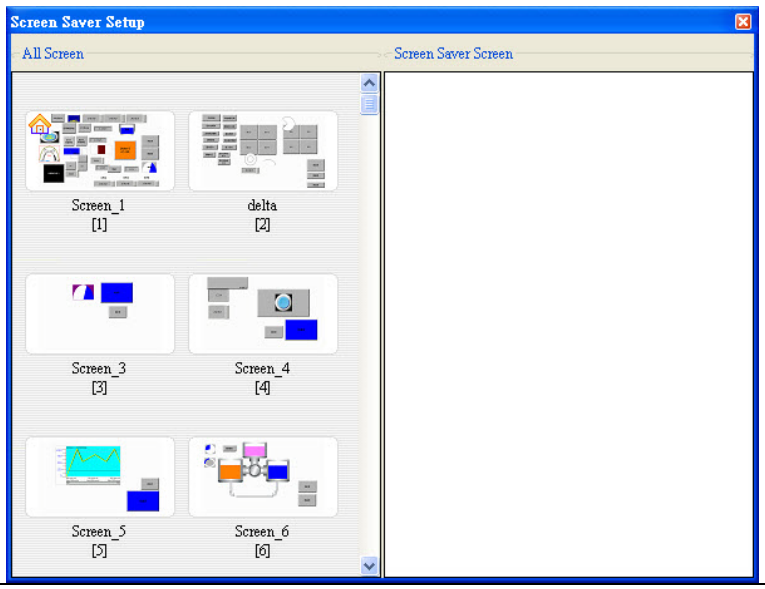
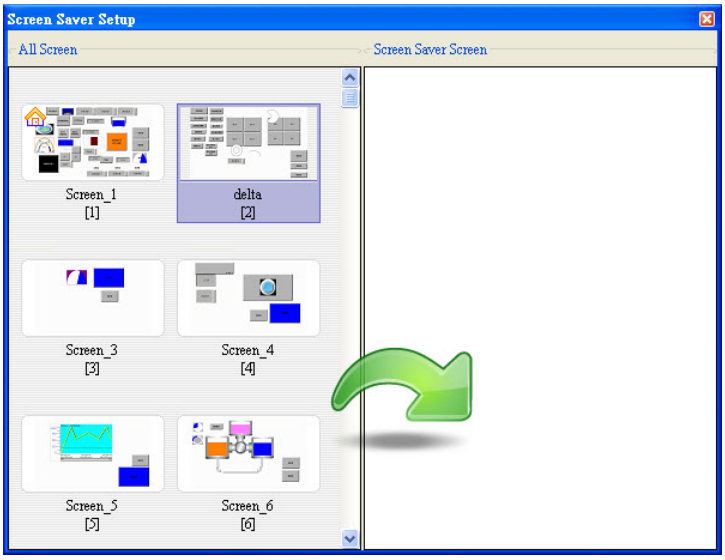
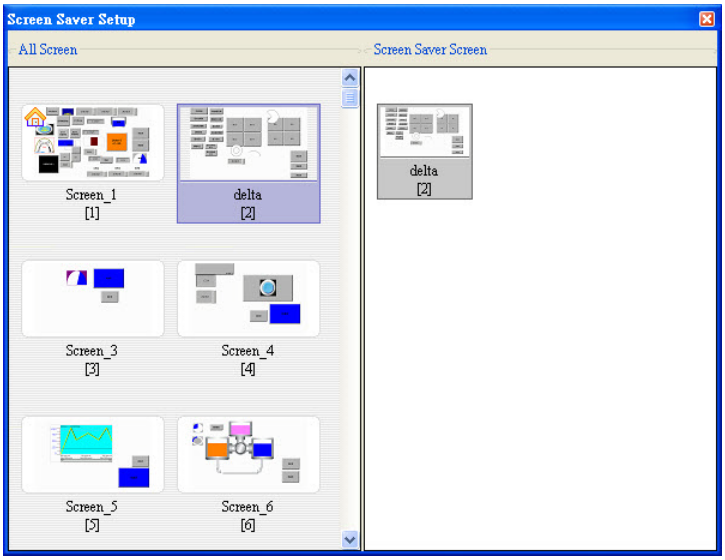
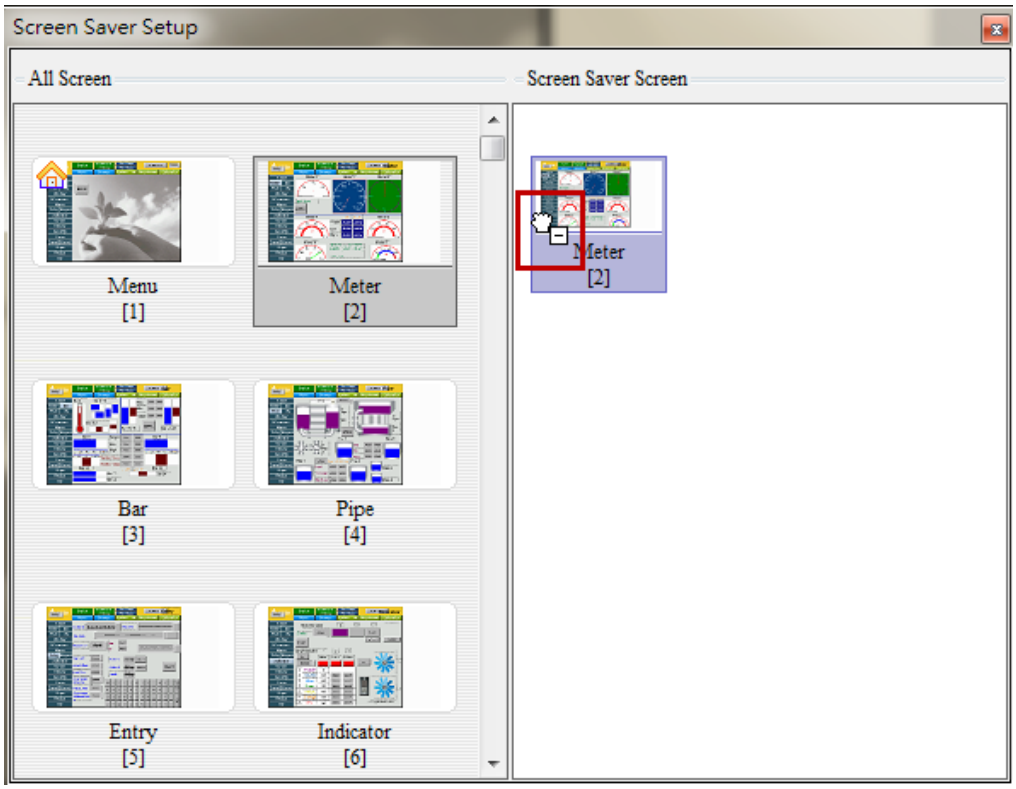


Figure 2-2-6-3 Open screen

2-2-6-3 Screen SaverScreen

In DOPSoft, the screen saver is set to use that of Windows. To set up the screen saver, one just needs to select the screen and drag it to the screen saver window on the right.

Step1	Click [Screen]→ [Screen SaverScreen]to enter editing of screen saver configuration. 
Step2	First, select the screen for screen saveron the left. Next, click and hold the left button of the mouse, a green arrow will appear that allows the user to drag the selected screen. 
Step3	Once the screen greenarrow appears, one can start dragging the screen. The figure below shows screen with No. 2 has been dragged into screen saver.

	
Step4	If desire to delete the screen saver screen, long press the screen that you wish to delete and the screen will be shown as below. See the part that marked by red frame. 
Step5	Click and hold the left button of the mouse. Drag the screen to the left area. A big black X symbol will appear. Release the button to delete the screen.

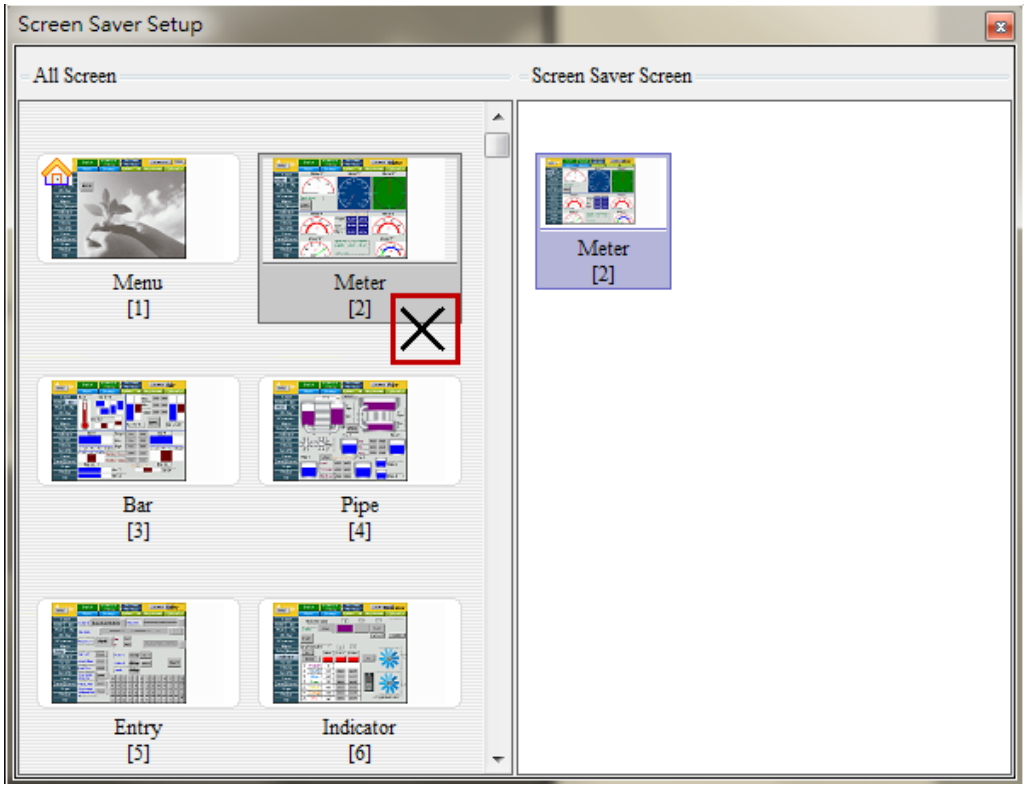


Table 2-2-6-1 Screen saver

2-2-6-4 Cut Screen

To cut a certain screen, one can click [Screen]→ [Cut Screen] or can directly use the system hotkey [Shift + T]. Similar to the cut function in text editing, cut screen can be followed by pasting the screen.

NOTE:

✓ Once the screen is cut, it cannot be recovered by undo.

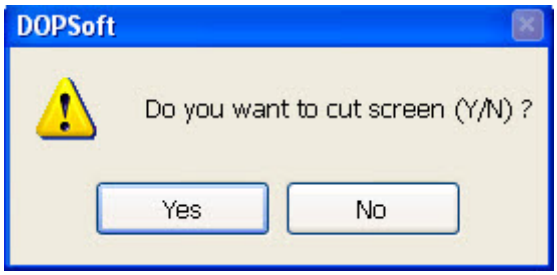


Figure 2-2-6-4 Cut screen

2-2-6-5 Copy Screen

To copy screen, one can click [Screen]→ [Cut Screen]or directly uses the system hotkey [Shift + C]. Once the screen is copied, if the past screen is selected, the copied screen will be pasted, which is similar to copy in text editing.

2-2-6-6 Paste Screen

To paste the screen, one can click [Screen]→ [Paste Screen] or directly uses the system hotkey [Shift + P]. The function of paste screen can be used after cut screen and copy screen. Once the screen is pasted, the software will automatically assign the associated screen number.

2-2-6-7 Delete Screen

To delete the screen, one can select [Screen]→ [Delete Screen] or directly uses the system hotkey [Shift + D].

NOTE:

✓ Once the screen is deleted, it cannot be restored by undo.

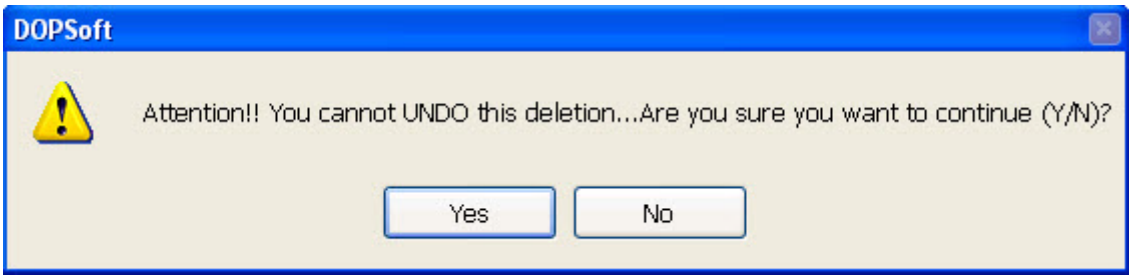


Figure 2-2-6-5 Delete Screen

2-2-6-8 Export

To save the screen data currently being edited to the hard drive disk in graphic format (.bmp file), one can click [Screen]→ [Export] or the icon in the standard toolbar. One can use the system hotkey [Shift + E].

Once the export action is done, the system will ask the user whether to show the frames on the exported screen.

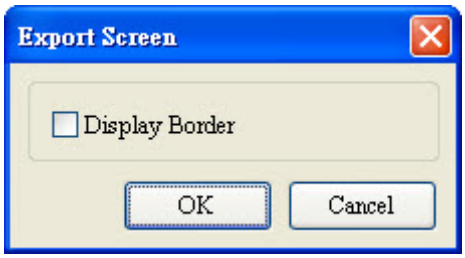


Figure 2-2-6-6 Export

When one clicks “Yes”, the default filename is HMI with the format of .bmp.

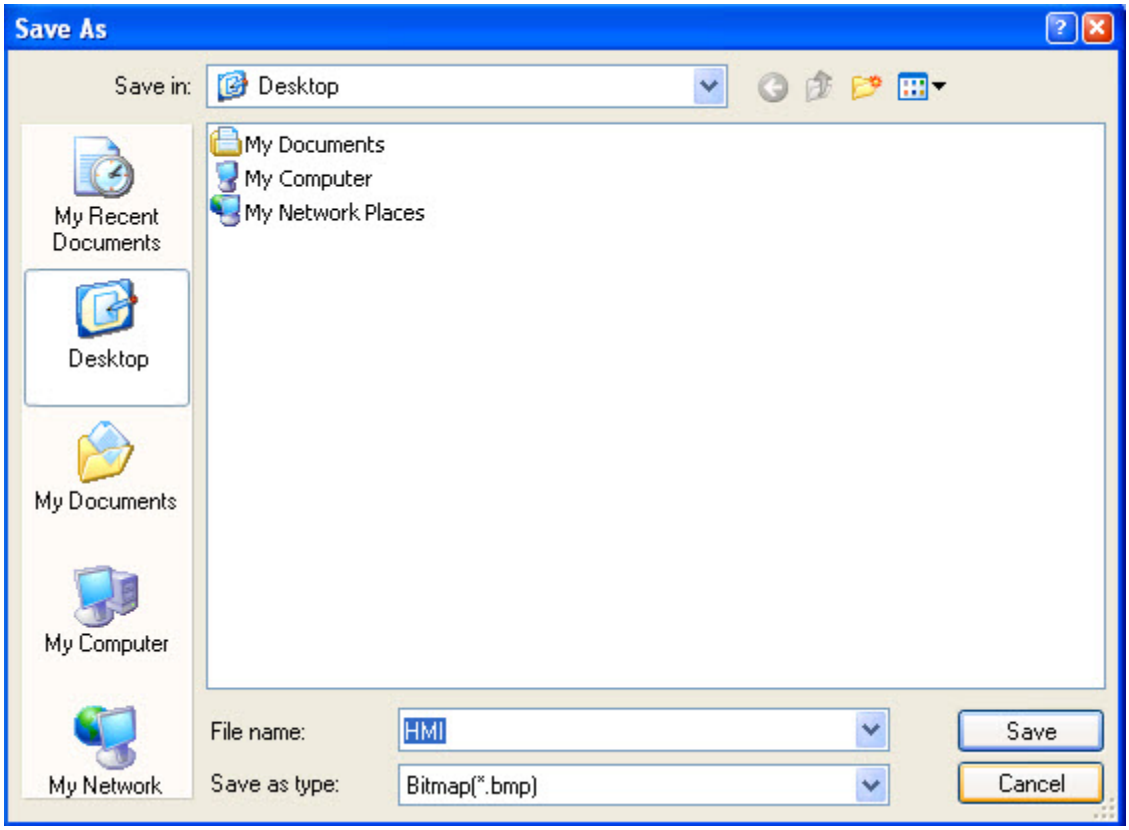


Figure 2-2-6-7 Export file

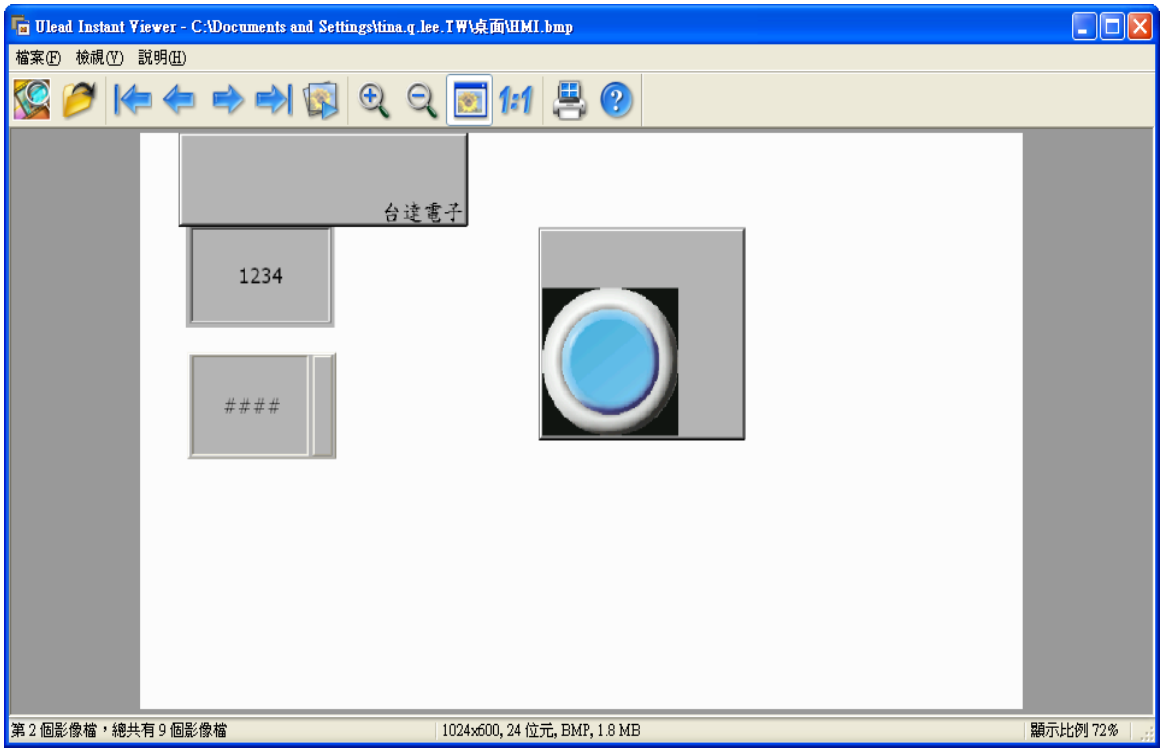


Figure 2-2-6-8 Format of the exported picture

If the option of show frame is checked, the picture will be framed by bold black borders.

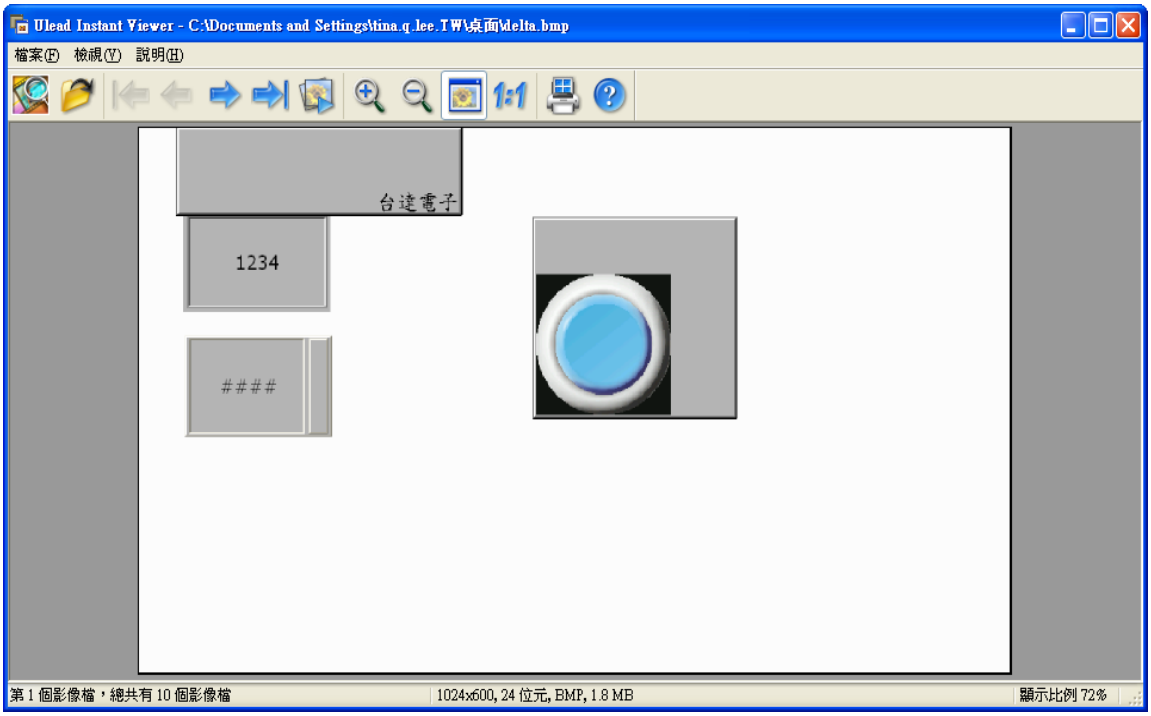


Figure 2-2-6-9 Picture format framed by black borders

2-2-6-9 Import

This feature involves loading any of the available pictures as the background figure of the associated screen. The formats available for import include BMP,JPG,GIF,ICO, and PNG. One can select [Screen]→ [Import] or use the system hotkey [Shift + I].

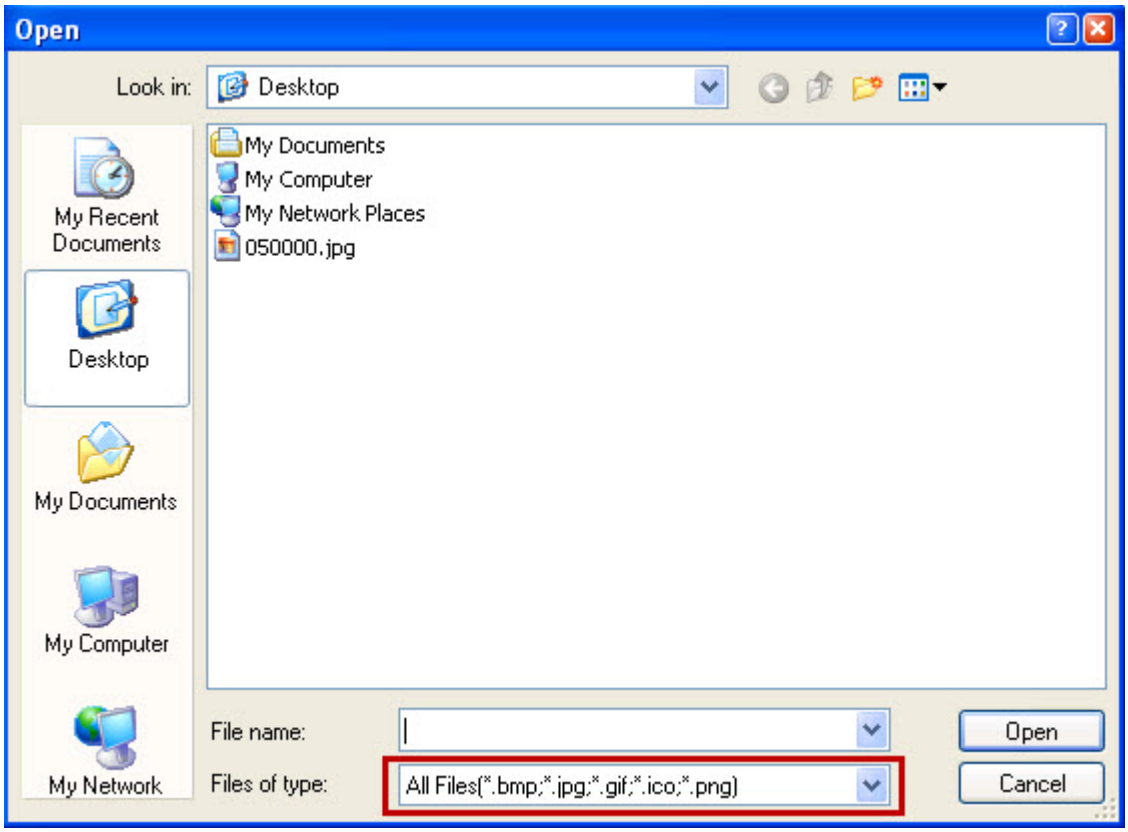


Figure 2-2-6-10 Supported formats for import

NOTE:

- ✓ Import base screen is different from selecting the base screen. The imported picture data will not be treated as element. After the base picture is edited, however, it will be saved in the associated screen as element.
- ✓ Please see 2-2-6-15 Screen Properties for the definition and method of use for the base screen.

2-2-6-10 Clear Import Data

If the user would like to clear imported base screen image, one can directly click [Screen]→ [Clear Imported Data]to remove the external background image used in the screen currently being edited.

2-2-6-11 Screen Open Macro

The screen open macro is the macro in the screen that will be automatically opened when the HMI switches to a new screen. To see how the screen open macro works, one can click [Screen]→ [Screen Open Macro] or click in the properties table on the right side of screen. Please see Chapter 23 Macro Commands for detailed descriptions.

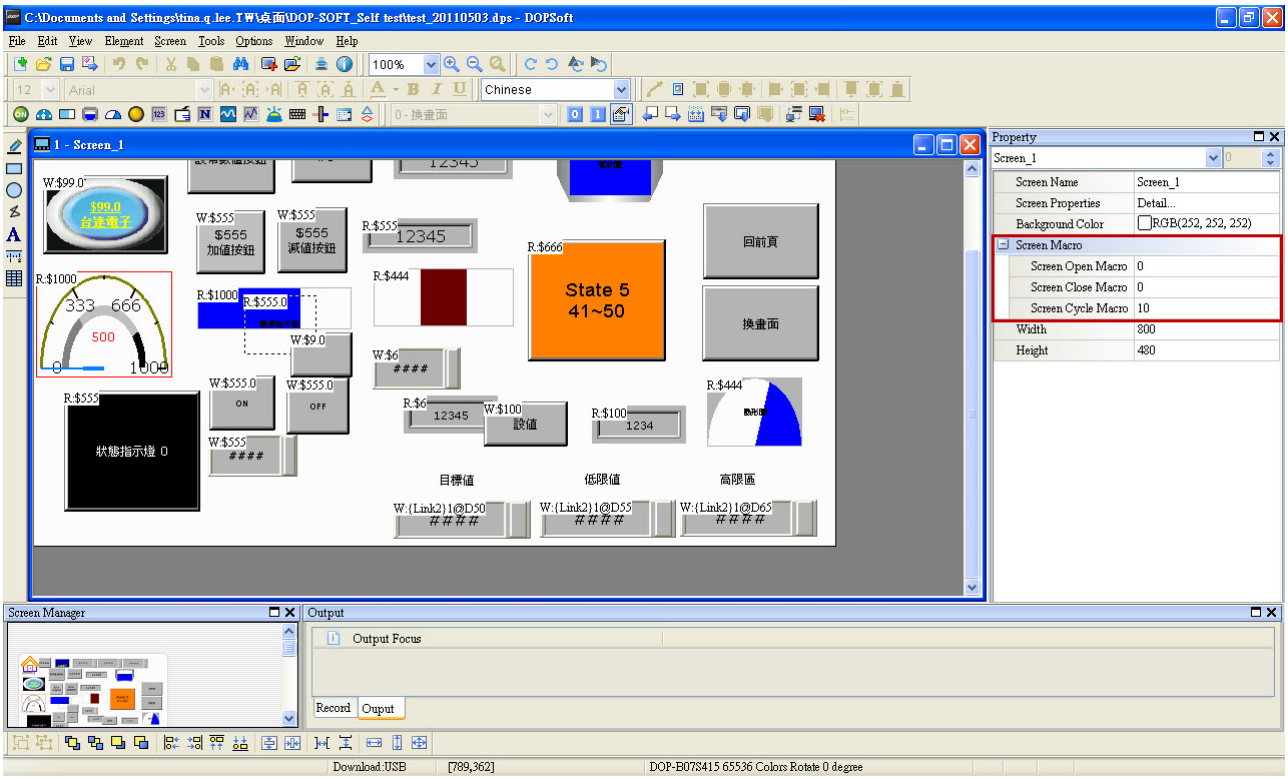


Figure 2-2-6-11 Properties of screen macro

2-2-6-12 Screen Close Macro

The screen close macro is the macro in the screen that will be automatically executed when the HMI exits a certain screen. To see how the screen close macro works, one can click [Screen]→ [Screen Close Macro]or click in the properties table on the right side of screen. Please see Chapter 23 Macro Commands for detailed descriptions.

2-2-6-13 Screen Cycle Macro

The screen cycle macro is the macro that constantly executes screen cycle by the cycle time set in [Macro Cycle Delay]. The user can click [Screen]→ [Screen Properties]to set [Macro Cycle Delay].

Please see Chapter 23 Macro Commands for detailed descriptions.

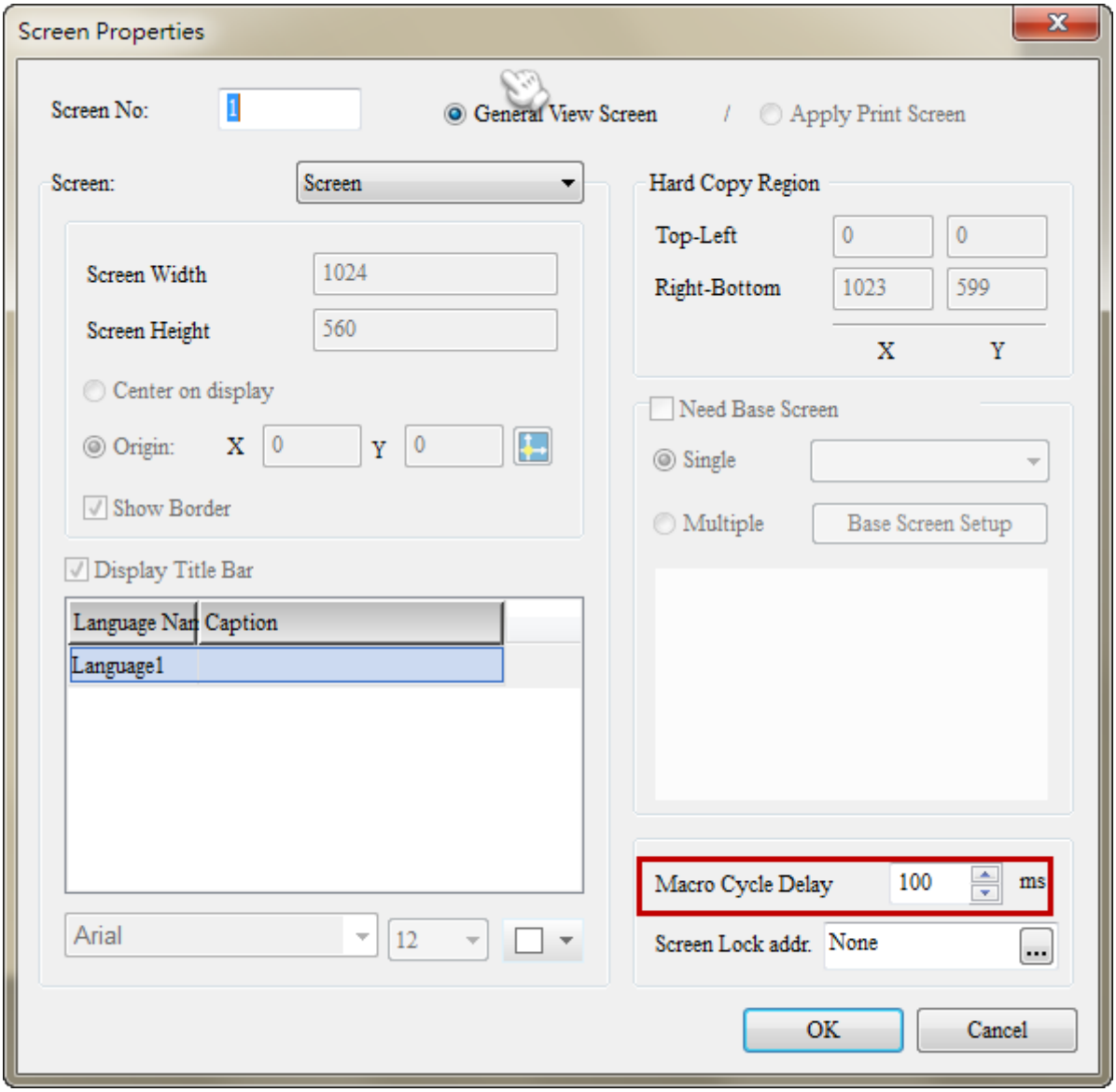
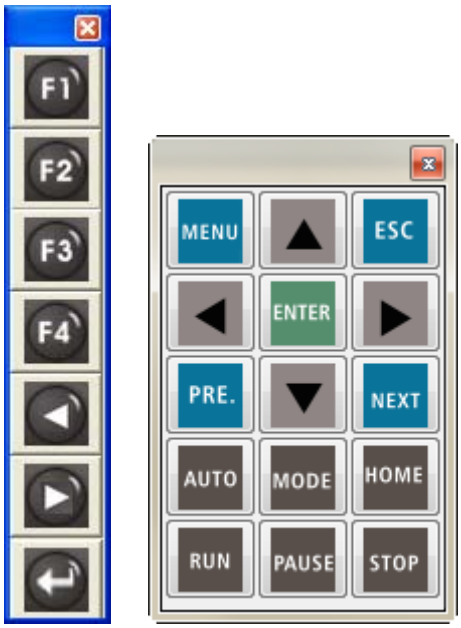


Figure 2-2-6-12 Delay of screen macro cycle

2-2-6-14 Auxiliary Key

Whether the Auxiliary Key is activated depends on the type of the HMI interface. At present, the DOP-B series Auxiliary Key for HMI only supports DOP-B07S201, DOP-B07S211, DOP-B07S401K, DOP-B07S411K, DOP-H Series and HMC07-N411 are all support Auxiliary key. If HMI other than these two models are selected, then [Screen]→ [Auxiliary Key] will appears as “Disable”. ON the contrary, if any of these two models is selected, it will appear as “Enable”.



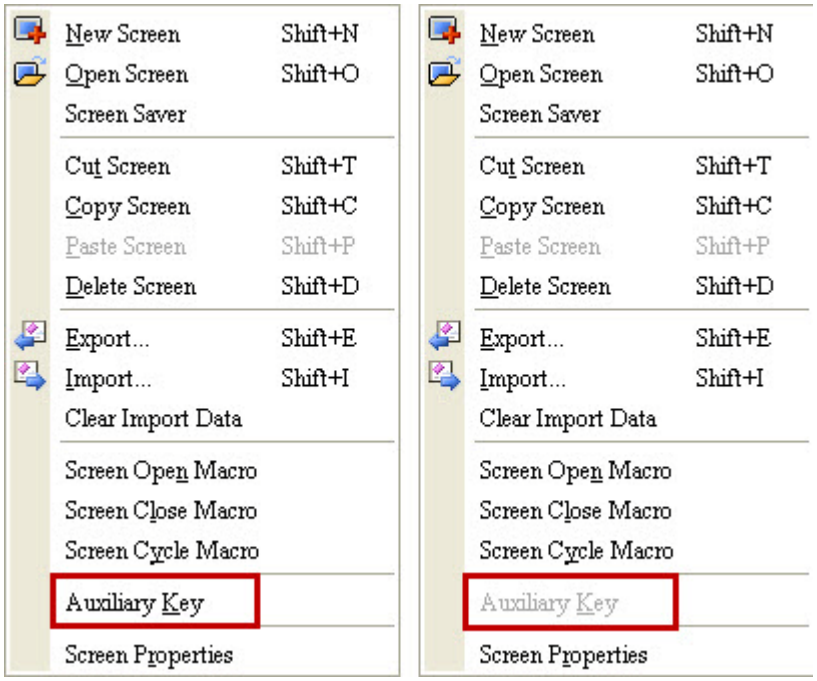


Figure 2-2-6-13 Options of Auxiliary Keys

The Auxiliary Key has Global and Local settings available for selection. After pressing

[Auxiliary Key], the user can click on the Auxiliary Key to show the options of Local and Global.

NOTE:

✓ If both Local and Global settings are being configured, the software will choose to operate by the Local settings.

Figure 2-2-6-14 Local and Global

◆ Global

When the user configure key F1 to be [System Menu]and set it to [Global], it means that if there are ten screens, no matter which screen the user switches to, [System Menu]will always be executed whenever F1 is pressed.

◆ Local

When the user configure key F1 to be [System Menu]and set it to [Global]in the first screen, it means that [System Menu]will only be executed when F1 is pressed in the first screen.

2-2-6-15 Screen Properties

The function of Screen Properties is to configure the properties of screen, including setting all properties relevant to the screen. One can even decide whether to set a screen to be sub-screen and its title, width and height of screen, X-Y coordinates, etc. To utilize the screen properties feature, one can click [Screen]→ [Screen Properties]or select the screen properties in the properties table after clicking on a certain screen, as shown in Figs. 2-2-6-15 and 2-2-6-16.

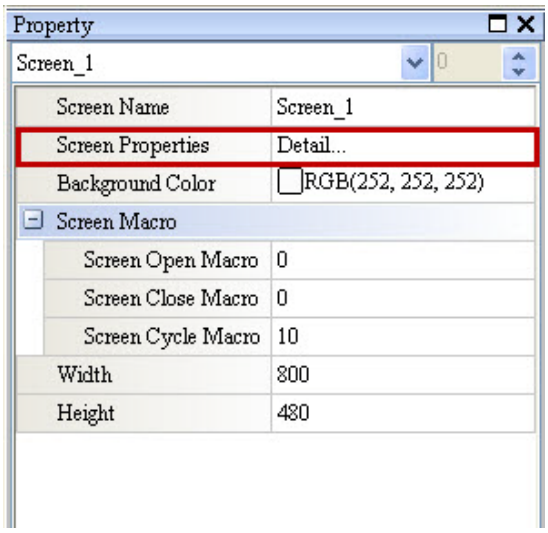


Figure 2-2-6-15 Screen properties

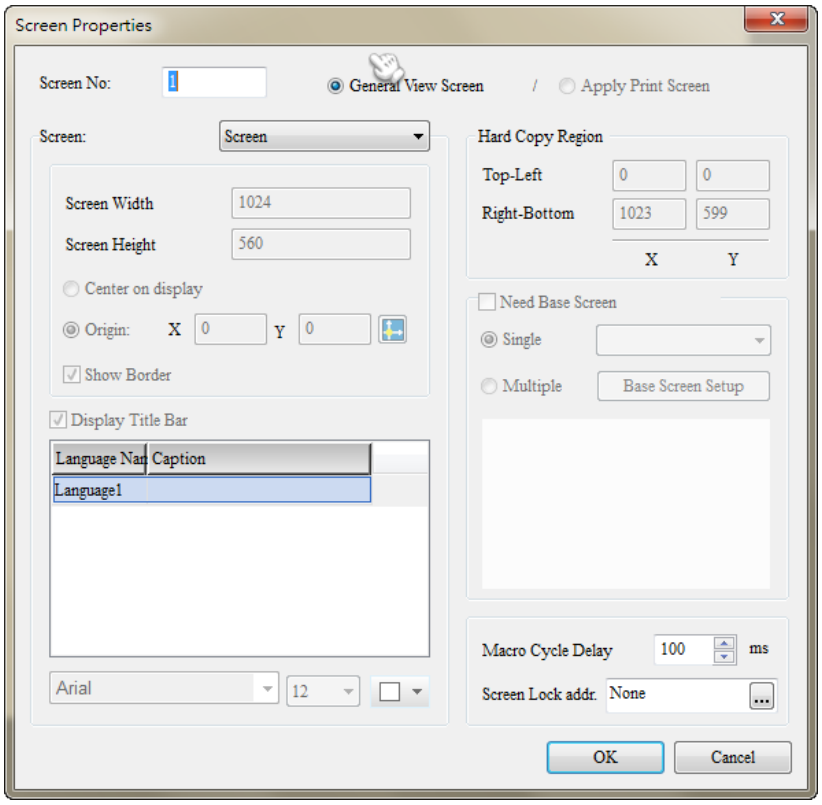
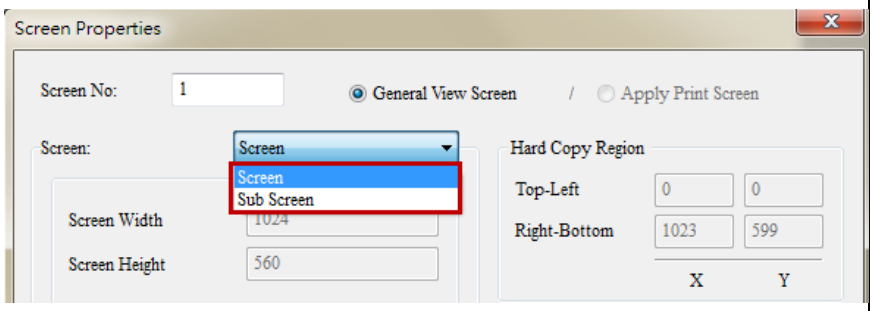
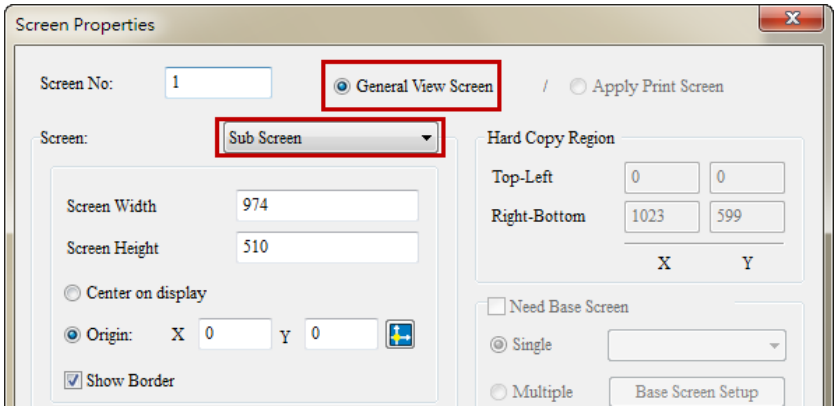
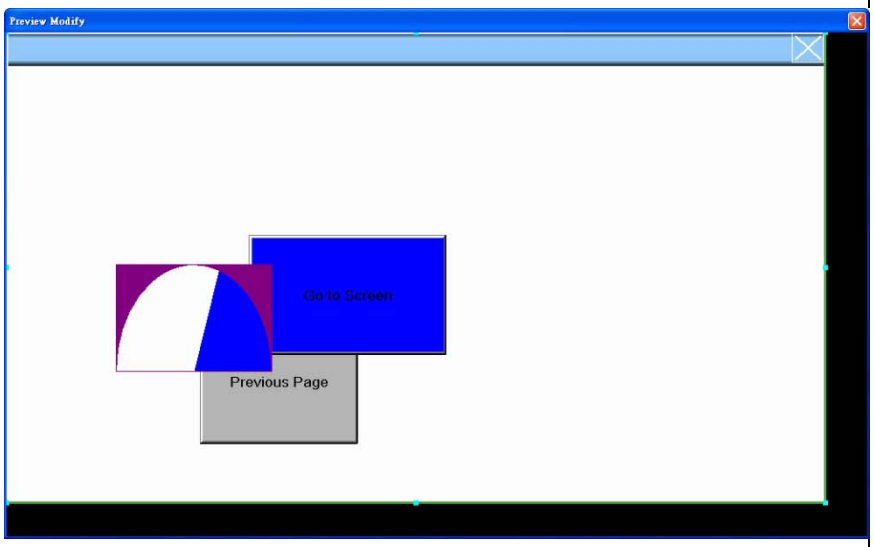
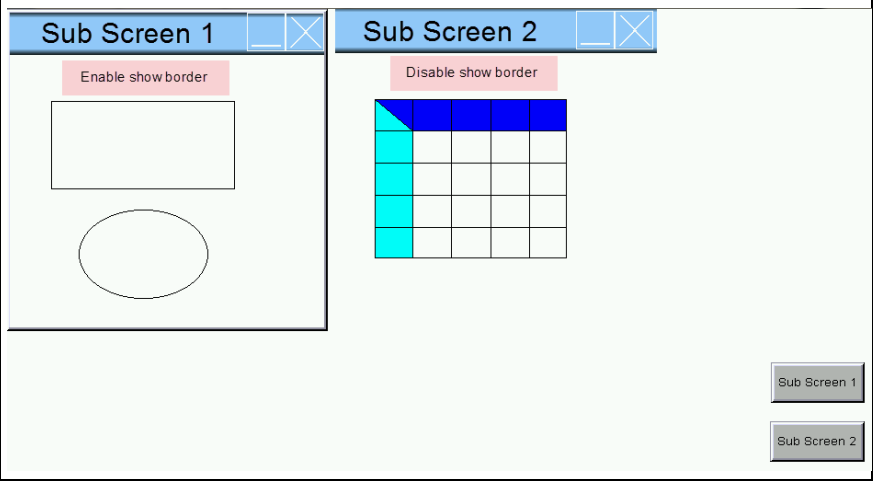
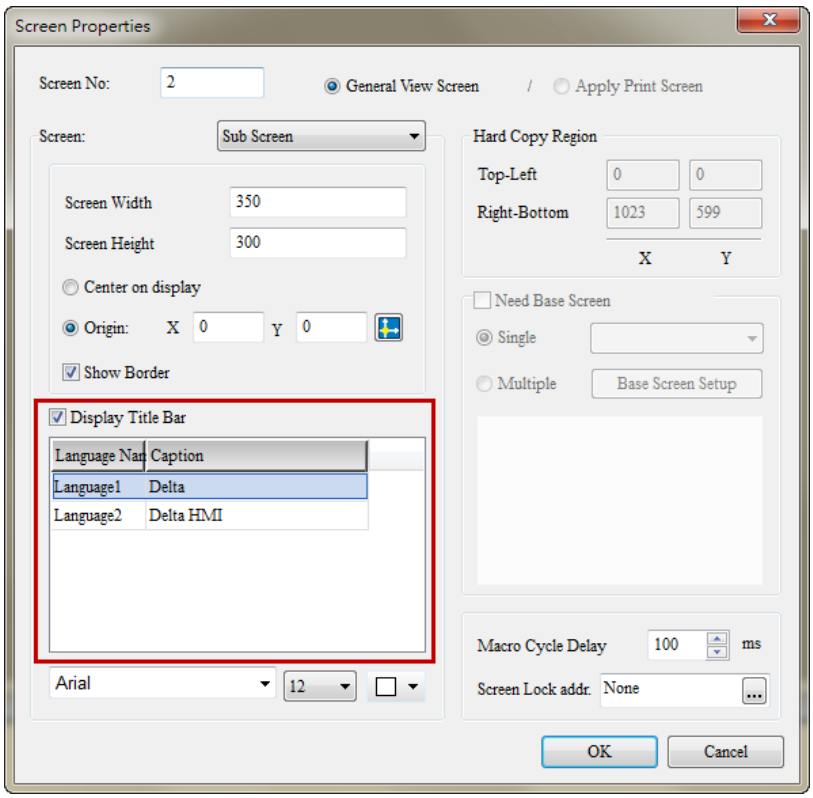


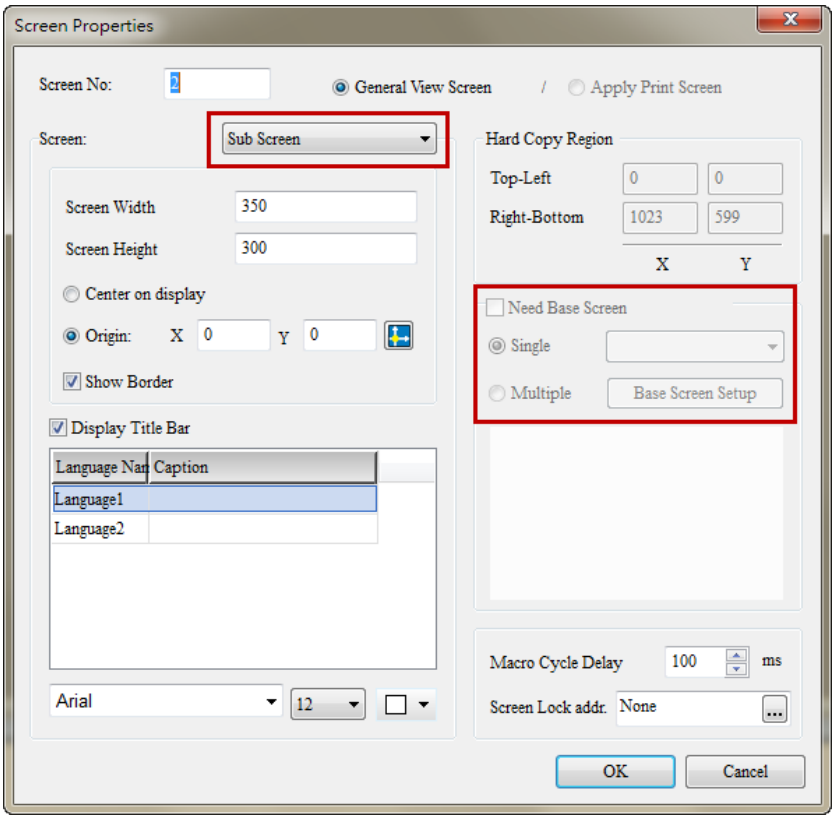
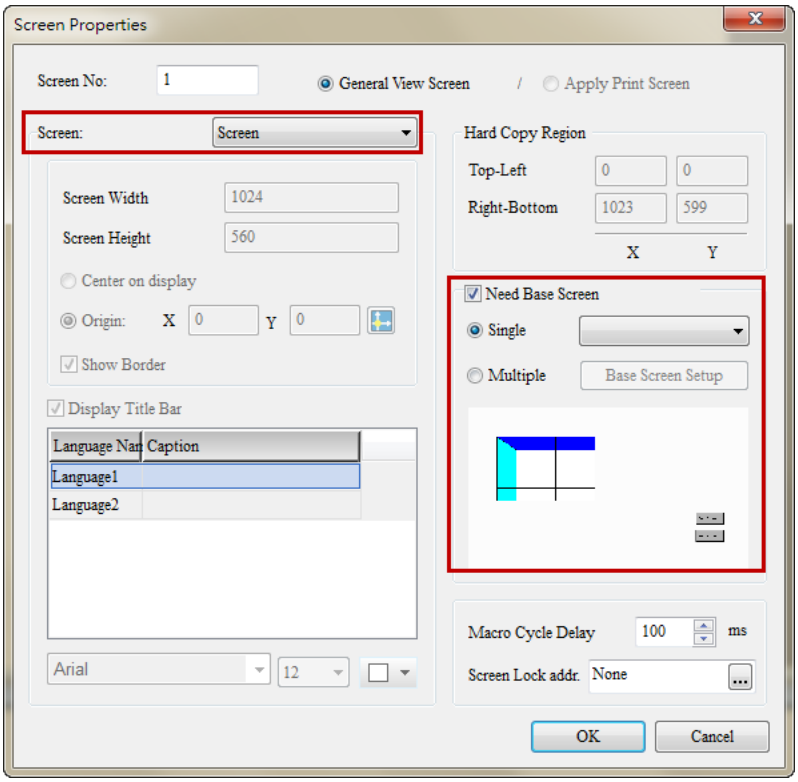
Figure 2-2-6-16 Configuration of screen properties

Please refer to Table 2-2-6-2 below for details on how to configure the screen properties.

Item		Content of Description
Screen No.		The content number of screen No. can be 1 ~ 65535 and different screen cannot share the same number.
Screen Applications	General View Screen	Use as the general view screen.
	Apply Print Screen	Specify the screen as the print screen. This option is only available when the project file has a designated printer model.Please see Chapter 26 Print Settings for details.
Screen		This can be set as Screen or Sub Screen. 
Settings of Sub-screen	Check	The selection of sub-screen can only be checked when [**General View Screen]**is selected.  NOTE: ✓ Only support open 15 sub-screens at the same time.
	Screen Width	Set the width of screen, with the unit of Pixel.
	Screen Height	Set the height of screen, with unit of Pixel.

Item		Content of Description
Settings of Sub-screen	Display Location of Sub-screen	The sub-screen can be set automatically [Place at Screen Center] when opened or the user can specify the location. Please directly enter the coordinates or click to enter modify preview to resize or move the location, as shown in the figure below: 
	Show Border	Enable this function means the sub screen will show border. Disable it will not show border on sub screen. See the figure below. 

Item		Content of Description
	Display Title Bar	The user can decide as preferred whether to display the title bar and can also select the associated languages. The size, font, and color of text can also be changed. 
Macro Cycle Delay		The interval of running screen Cycle macro, which ranges from 100ms ~ 5000ms, with the default delay of 100ms.
HardCopy Region	Settings	This feature is only available when the project has a designated printer model. Please see Chapter 26 Print Settings for details.
	Top-left	Define the area to be printed through hard copy, with the unit of Pixel.
	Right-Bottom	

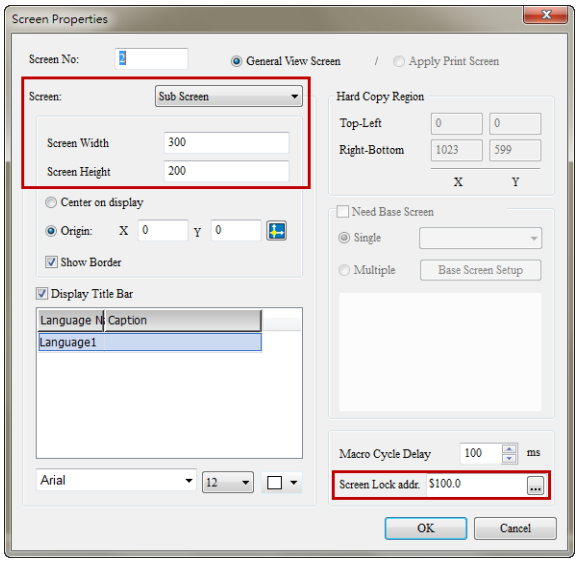
Item		Content of Description
Base Screen	Check “Need Base Screen”	IfScreen selectas sub-screen, the need base screen option is unavailable for selection.  Every screen can designate any screen as its base screen. Once the base screen is configured, it will be placed at the very bottom in the editing area as the background image. 

Item		Content of Description
	Single	The user can go to any screen and use other screens as the base screen. “Single” means that only one screen is used as the base screen.
	Multiple	Similarly, "Multiple" also uses screens other than a screen itself as the base screen. The major difference between “Multiple” and “Single” lies in that more than one screen can be used as base screen in “Multiple”.

Item	Content of Description
Screen Locked Bit	Users can use this bit to lock the screen. When the setting value is 1, the screen is locked. Users can only select the element on current screen. If the setting value is 0, the screen is unlocked. All elements on HMI can be chose. Users can use constant or memory address to control the screen locked bit.

Variables	Type		
	Internal Memory	PLC Register	Constant
Screen Locked Bit	◎	◎	◎

Example of Screen Locked Bit

Create the sub-screen	➢ Firstly, please create 2 pages. Set screen 2 as sub-screen and set the Screen Locked Bit as $100.0. 
Create maintained button	➢ Create two buttons on screen 1 and set the addresses as $100.0 and $100.1, respectively. ➢ Create one button on screen 2and set the address as $100.2.
Create a button to change the screen	➢ Create a button to change the screen. Set this button to change the screen to screen 2.

Maintained button

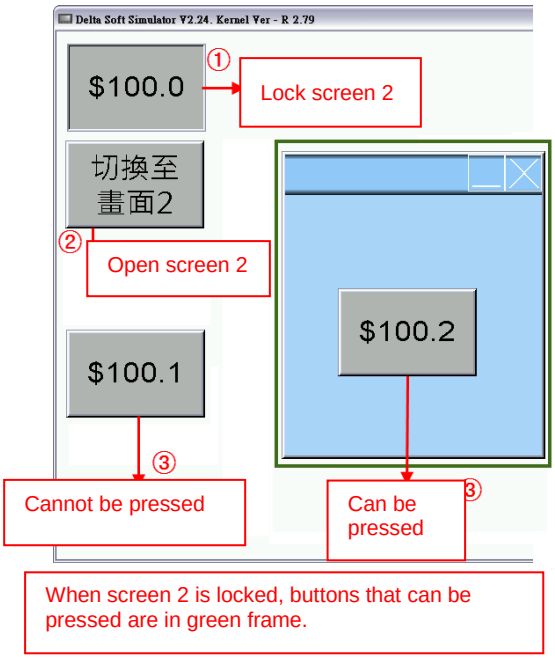
Write to Memory address	Screen 1		Screen 2
	$100.0	$100.1	$100.2

Item	Content of Description

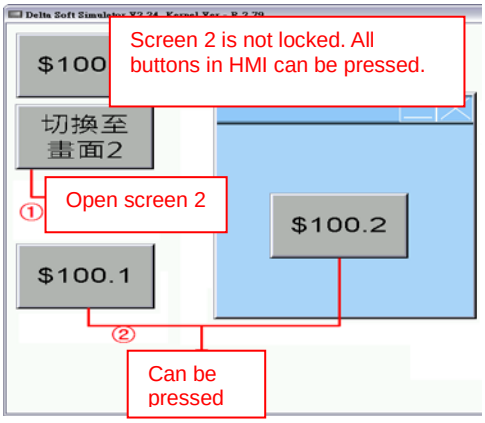
Example of Screen Locked Bit

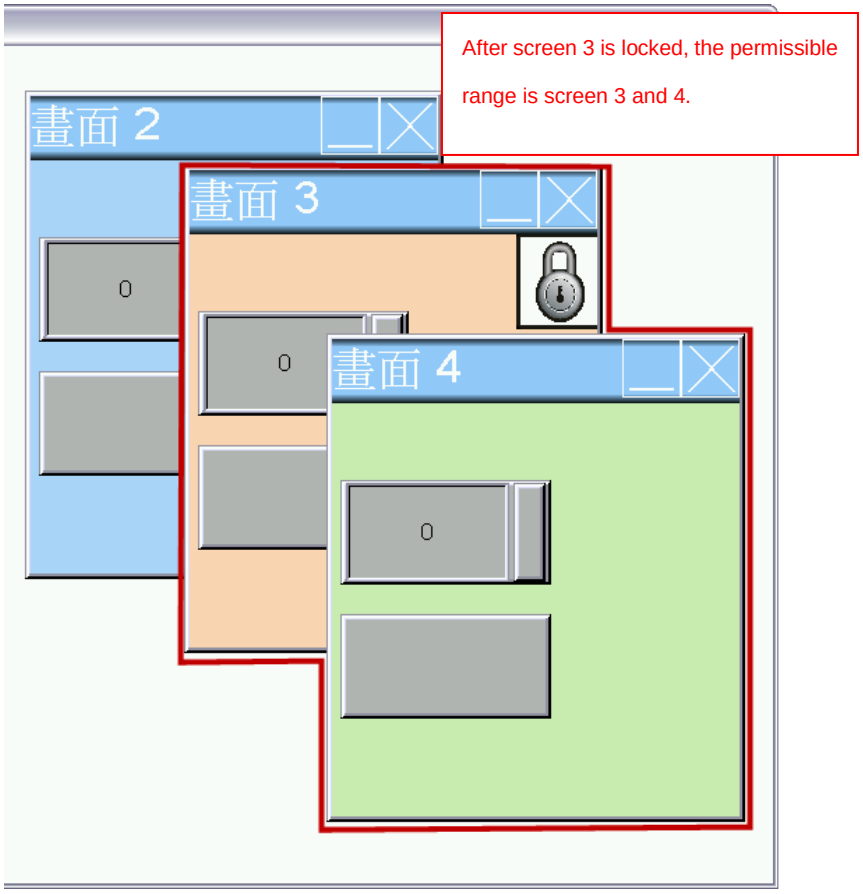
Result

- Then, compile it and download into HMI.
- Press $100.0 button first and press the screen-changed button to go to screen 2.
- At the moment, screen 2 is locked, users can only choose $100.2, but not $100.1 in screen 1. Users have to close screen 2 in order to choose $100.1 button in screen 1.



- On the contrary, if$100.0 button is not pressed and directly go to screen 2. Then, $100.1 button can be chose since screen 2 is not locked.



Item	Content of Description
	➢ When desire to lock more than one screen, the screen opening sequence determines the range users can select. Screens after the locked one all can be chose. For example, the switching sequence is screen 1→ 2→ 3→ 4. If screen 3 is locked, the range users can choose is screen 3 and 4. Buttons in screen 3 and 4 all can be used.  NOTE： ✓ The embedded sub-screen does not support Screen Lock Bit. ✓ The sub-screen is still locked even when it is minimized. ✓ The sub-screen can be locked even when it has no title. Please remember to create the button for switching the screen. This is for avoiding the problem that sub-screen cannot be closed. ✓ For models without System Key (Please see Appendix A), when the screen is locked, long press the background can enter the system directory.

2-2-7 Tools

The [Tools]in the function menu offers the following features for the user to utilize.

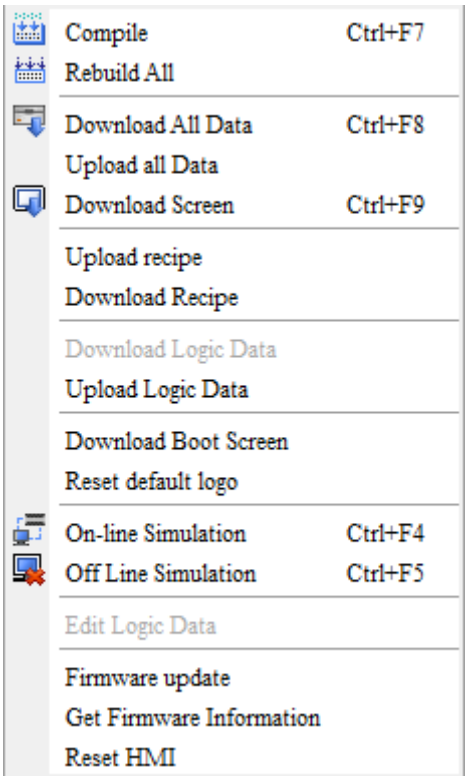


Figure 2-2-7-1 Function menu of tools

NOTE：

- ✓ Edit Logic Data and Download Logic Data is only support at HMC Model.
- ✓ If select non-HMC model, the above two options will disable.

2-2-7-1 Compile

To provide the user with more convenient operation and use of DOPSoft, the function of page compiling is made available. This compiling function is different from Rebuild All. For example, if several screens are created but the user only edits one of them, the user only needs to execute [Compile]instead of [Rebuild All], which can save the compiling time, unlike the time-consuming process with Rebuild All.

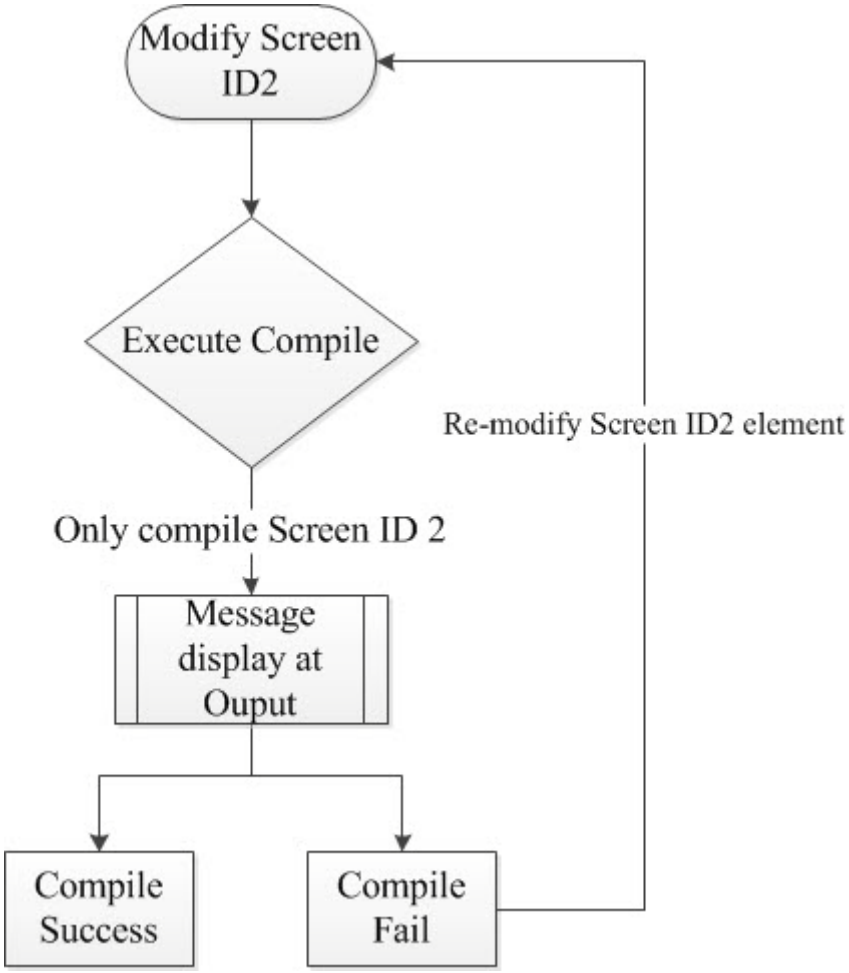


Figure 2-2-7-2 Flowchart of compiling

The user can click [Tools]→ [Compile], use the icon in the Layout Bar, or the system hotkey [Ctrl+F7].

2-2-7-2 Rebuild All

The function of Rebuild All is the same as that of Compile, except it compiles All Screen. In the compiling process, all relevant messages will be displayed in the output field. In case of any compiling error, the associated error messages will also be displayed as a reminder to the user. The user can click on the messages generated and displayed in the output field to

link to the elements where error occurs. The user can click [Tools]→ [Rebuild All] or click the icon in the Layout Bar.

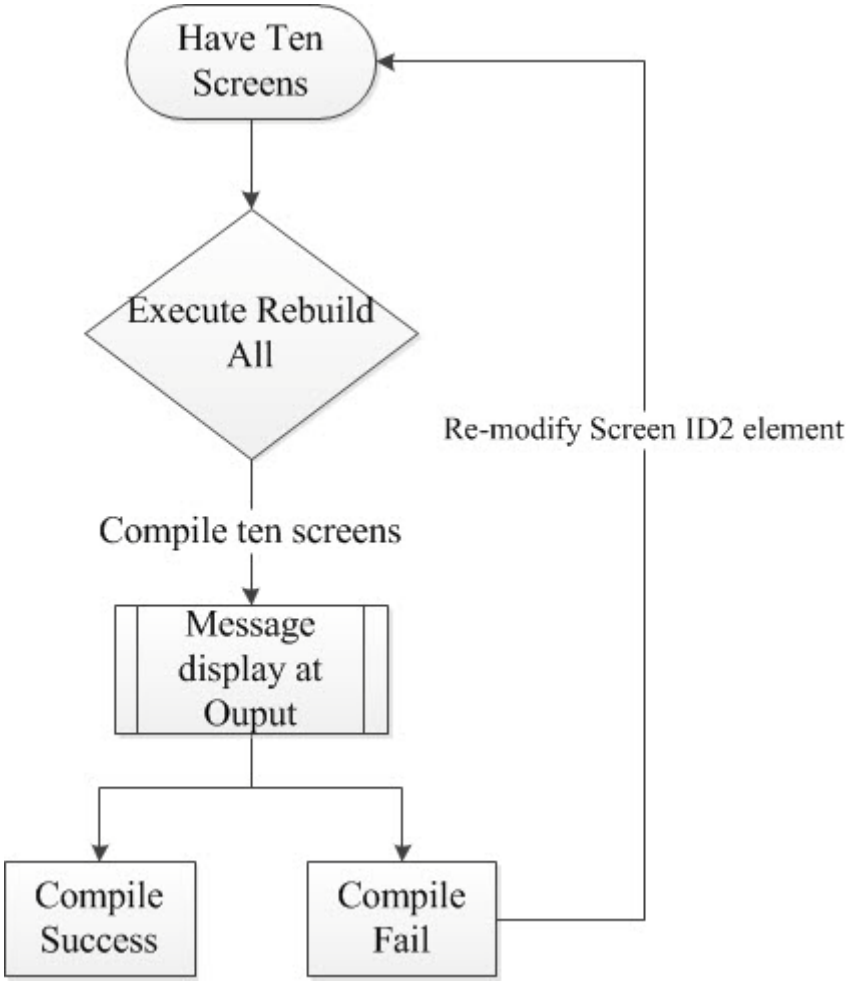


Figure 2-2-7-3 Flowchart of Rebuild All

Both Compile and Rebuild All are provided to ensure there is no error in the edited screen. The compiling message will be displayed in the output field. In case of errors after compiling, the associated error information will also be shown as a reminder to the user. The user can click on the message generated and displayed in the output field to link to the elements where the error occurs.

2-2-7-3 Download All Data

Download All Data will download both the screen data and recipe into the HMI. The user can click [Tools]→ [Download All Data] or directly click the icon in the Layout Bar, or use the system hotkey [Ctrl+F8]. When the user executes Download All Data, the software will check if HMI is connected to PC. If the communication between them is not established, an error message window will pop up during download as a warning to the user.

◆ Normal transmission

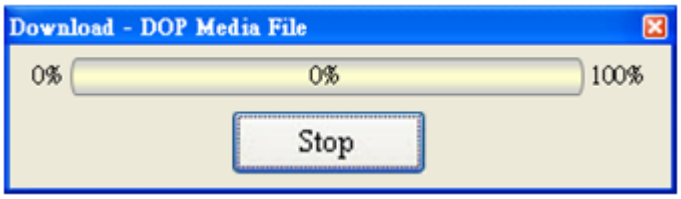


Figure 2-2-7-4 Download all data

◆ Abnormal transmission

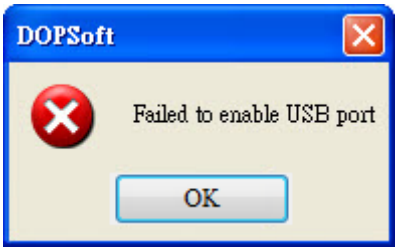
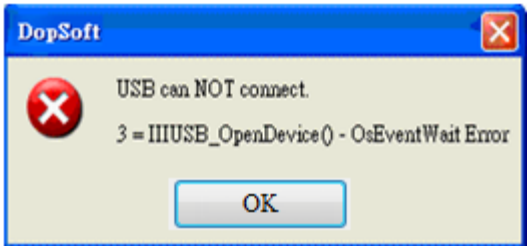
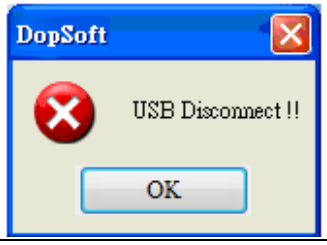
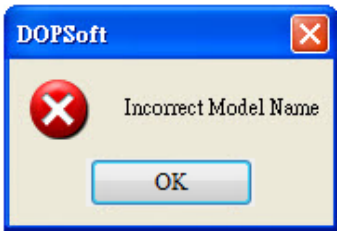
Check USB channel	➢ Error message when opening USB  
	➢ Error message when transmission cable is unplugged or interrupted during download. 
Check Model	➢ Incorrect HMI model No. 

Table 2-2-7-1 Check transmission in Download All Data

2-2-7-4 Upload All Data

When the user executes Upload All Data, the software will first ask the user to enter the password, as shown in Figure 2-2-7-5. The entered password is the system default password [12345678]. The user can change it in [Options]→ [Configuration].

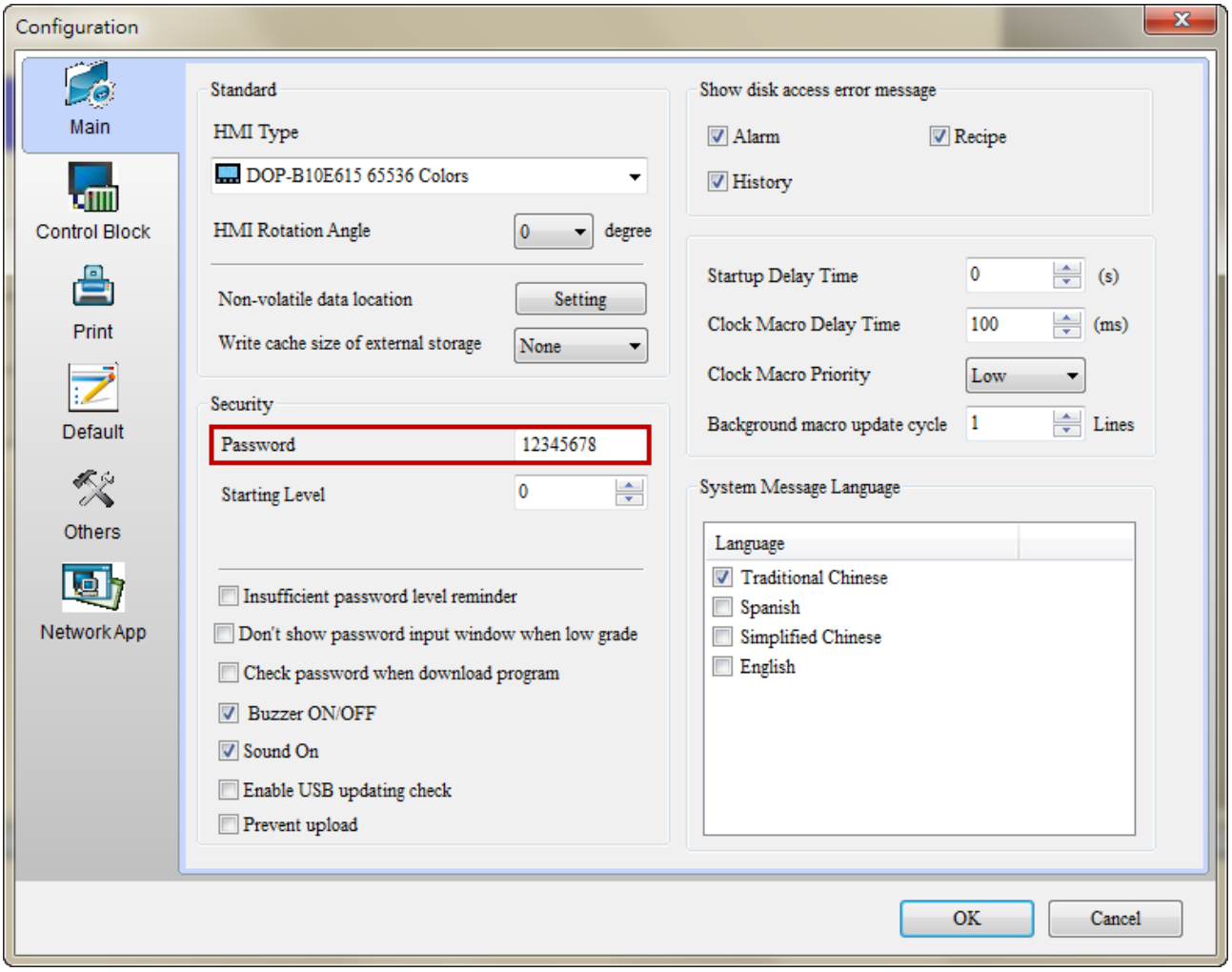


Figure 2-2-7-5 Set the security password

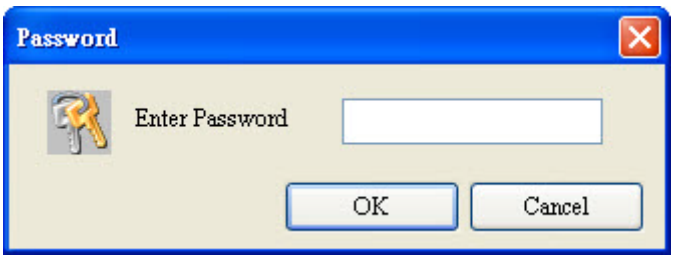


Figure 2-2-7-6 Upload all data

Upon entering the new password, the software will ask the user to save the screen to be uploaded, as shown in Figure 2-2-7-6.

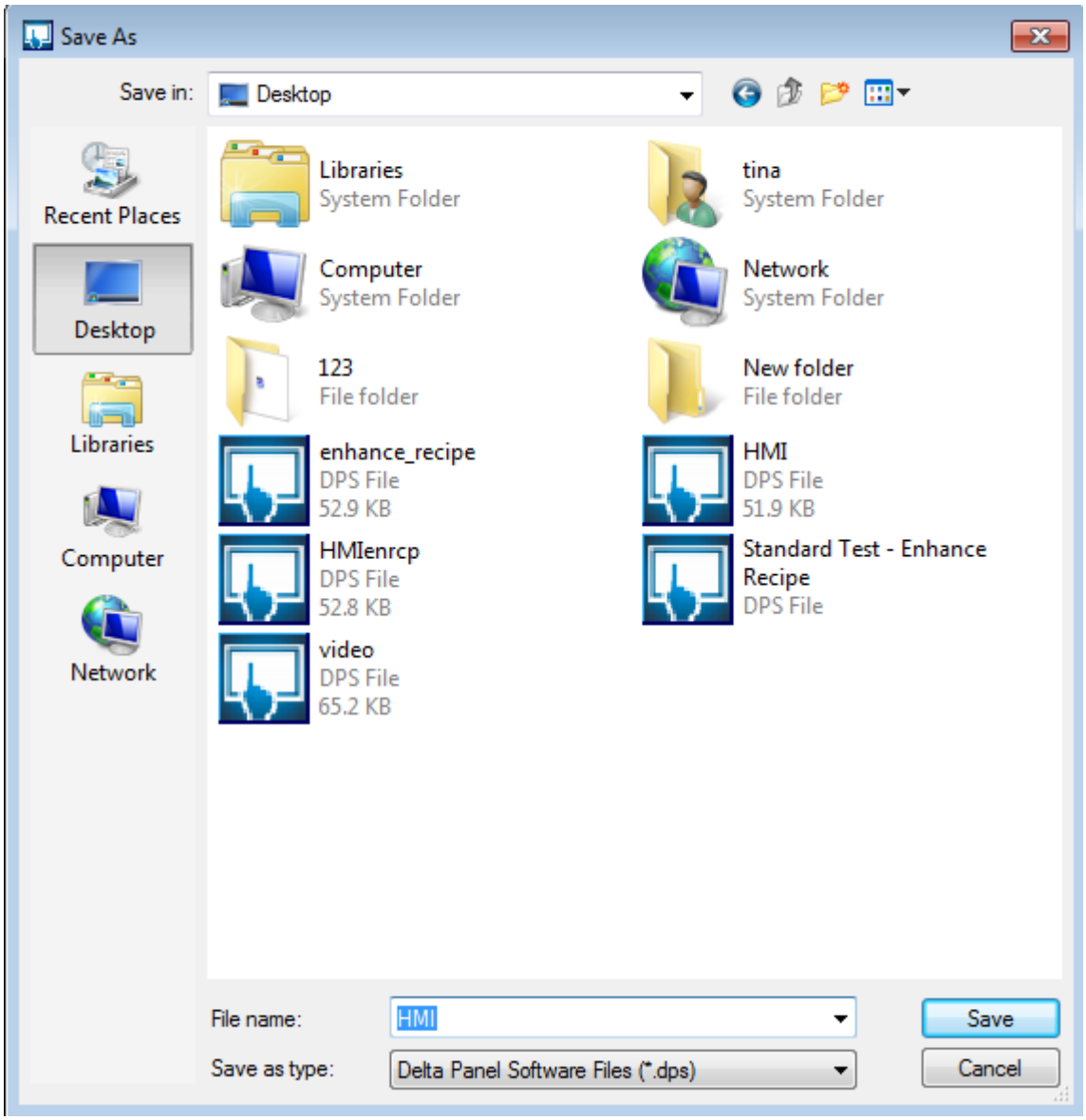


Figure 2-2-7-7 Save the uploaded file as a new file

Upon configuring the file to be saved and the associated path, the upload of screen data will start until 100% complete. One can also click Cancel to stop the upload.

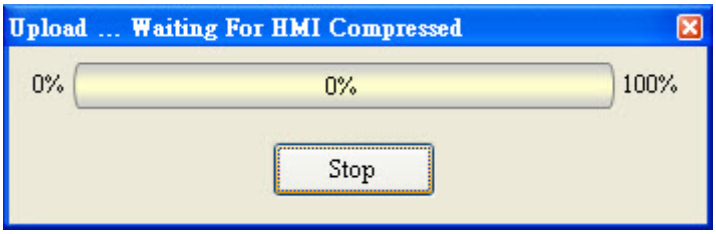


Figure 2-2-7-8 Data upload in progress

In addition to uploading the data to the PC end, the user can also check through [Options]→ [Environmental]to determine whether to send the graph data in upload.

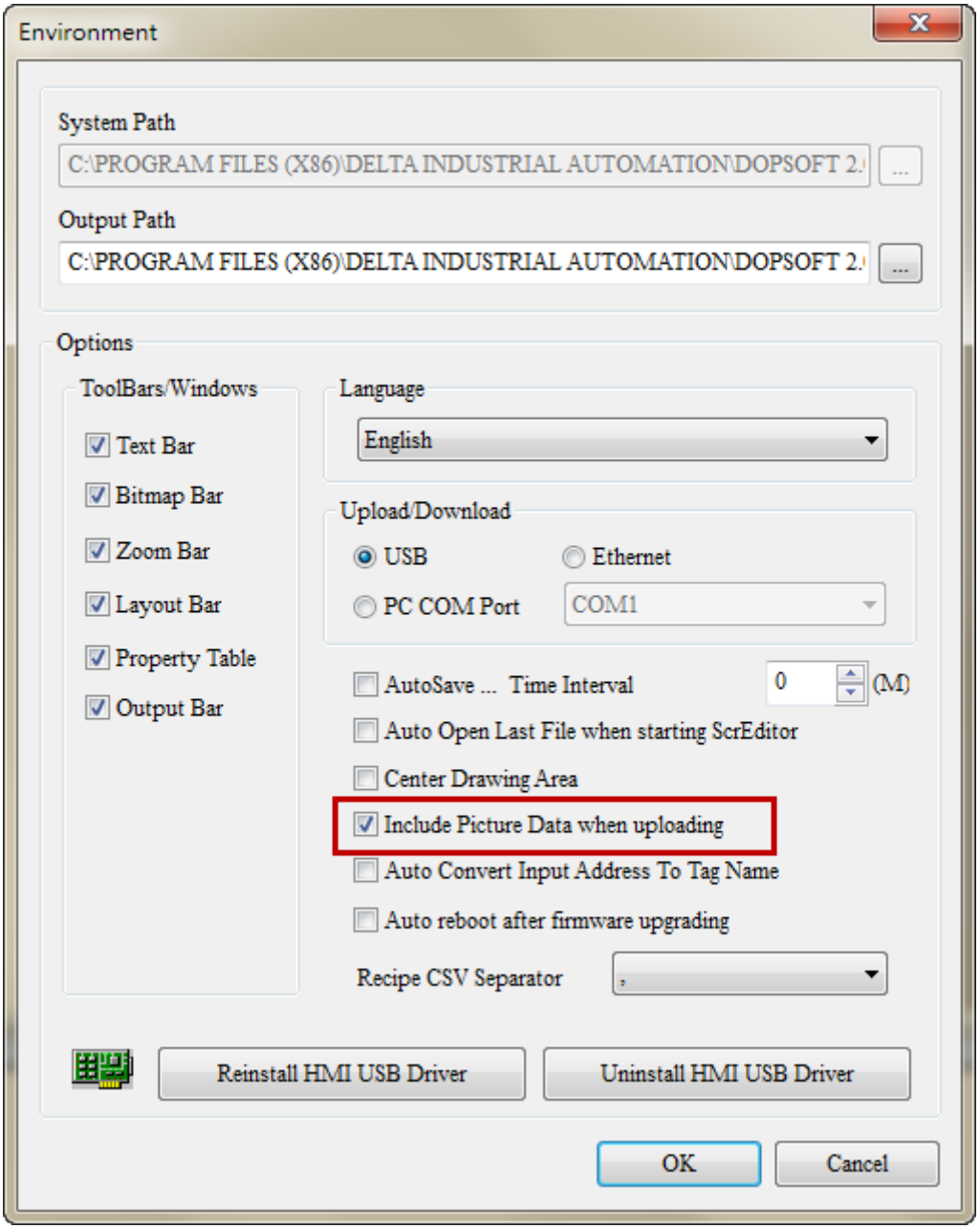


Figure 2-2-7-9 Include Picture Data when uploading

2-2-7-5 Download Screen Data

Download Screen Data refers to download the screen data only, which excludes the recipe data. Other than that, the download method is the same as Download All Data. The user can refer to 2-2-7-3 Download All Data for details. The user can select [Tools]→ [Download Screen Data]or directly click the icon in the Layout Bar, or use the system hotkey [Ctrl+ F9].

2-2-7-6 Upload Recipe

Similar to Upload All Data, to execute Upload Recipe, the password must be entered to transmit the recipe to the PC end. The steps to set the password are the same as those described in 2-2-7-4 Upload All Data and please refer to the details therein.

2-2-7-7 Download Recipe

If the user only wants to download the recipe data, he/she simply has to execute Download Recipe. If only the recipe is modified, other screen data will not be changed. Executing this function can save the time in screen download. After recipe download, the software will ask the user to select the recipe file (.rcp) to download. Once it's selected, the recipe file can be downloaded to the HMI.

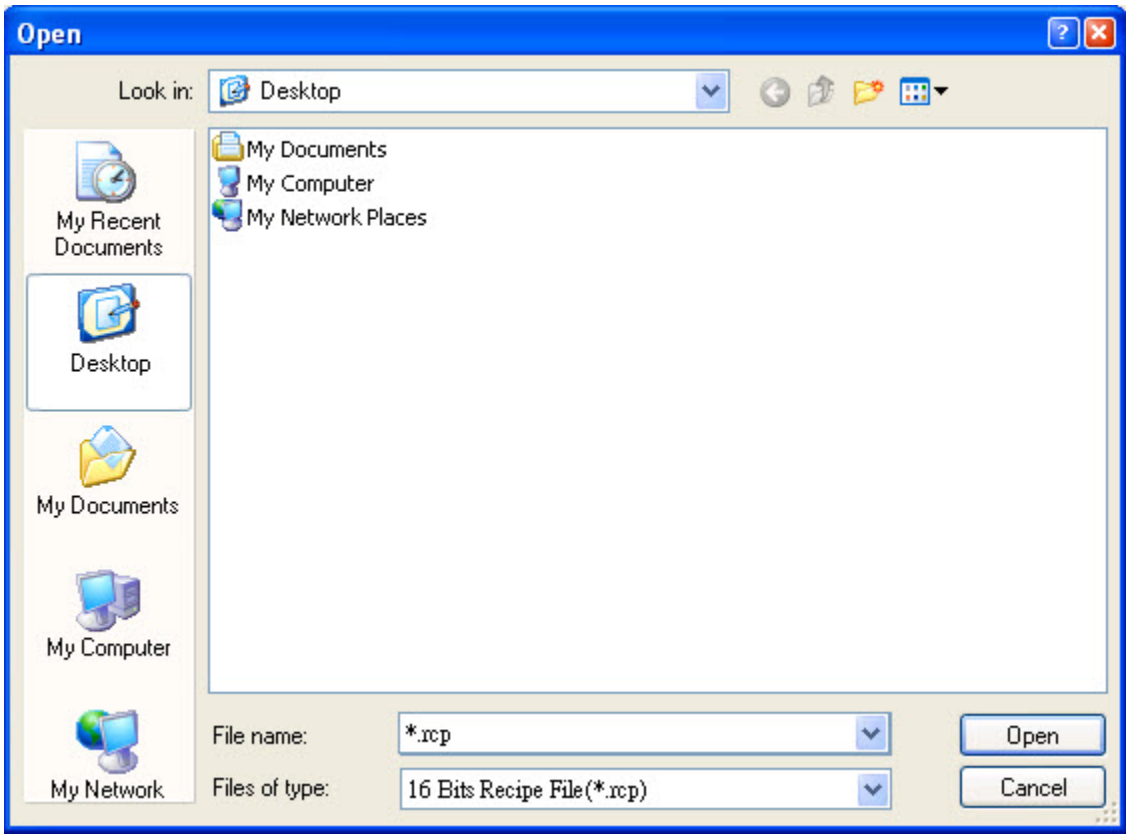


Figure 2-2-7-10 Select the recipe file to download

2-2-7-8 Download Logic Data

Execute Download Logic Data could download Logic data to HMC.

2-2-7-9 Upload Logic Data

Execute Upload Logic Data could upload logic data from HMC to PC.

2-2-7-10 Download Boot Screen

When you wish to change the boot screen, please directly download the boot screen. Then, a window of “Download Logo…” will pop up.

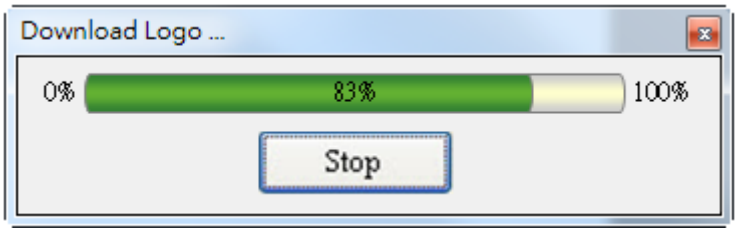


Figure2-2-7-11 Download boot screen

If the boot screen function is not enabled, an error will occur which shown as below.

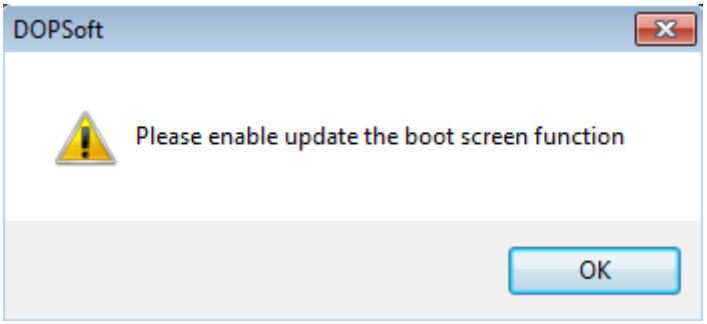


Figure2-2-7-12 Enable boot screen function

If no boot screen is selected, an error will occur when downloading the screen which shown as below.

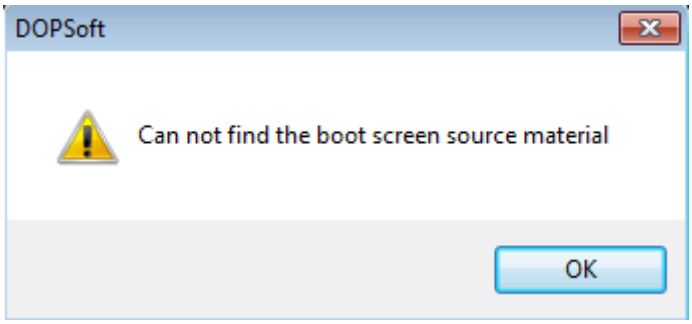


Figure2-2-7-13 Cannot find the boot screen source material

2-2-7-11 Reset default logo

If desire to use Delta’s default screen, please select “Reset default logo”.

2-2-7-12 On-line Simulation

On-line Simulation simulates the communication between HMI and PLC using PC, with the COM port and PLC as the communication interface. If the case of normal communication for On-line Simulation, PC can simulate the actual HMI operations. After On-line Simulation, the software will conduct compiling to check for any error in the screen. The user can click [Tools]→ [On-line Simulation]or click the icon in the Layout Bar, or use the system hotkey [Ctrl+F4].

◆ Flow of On-line Simulation

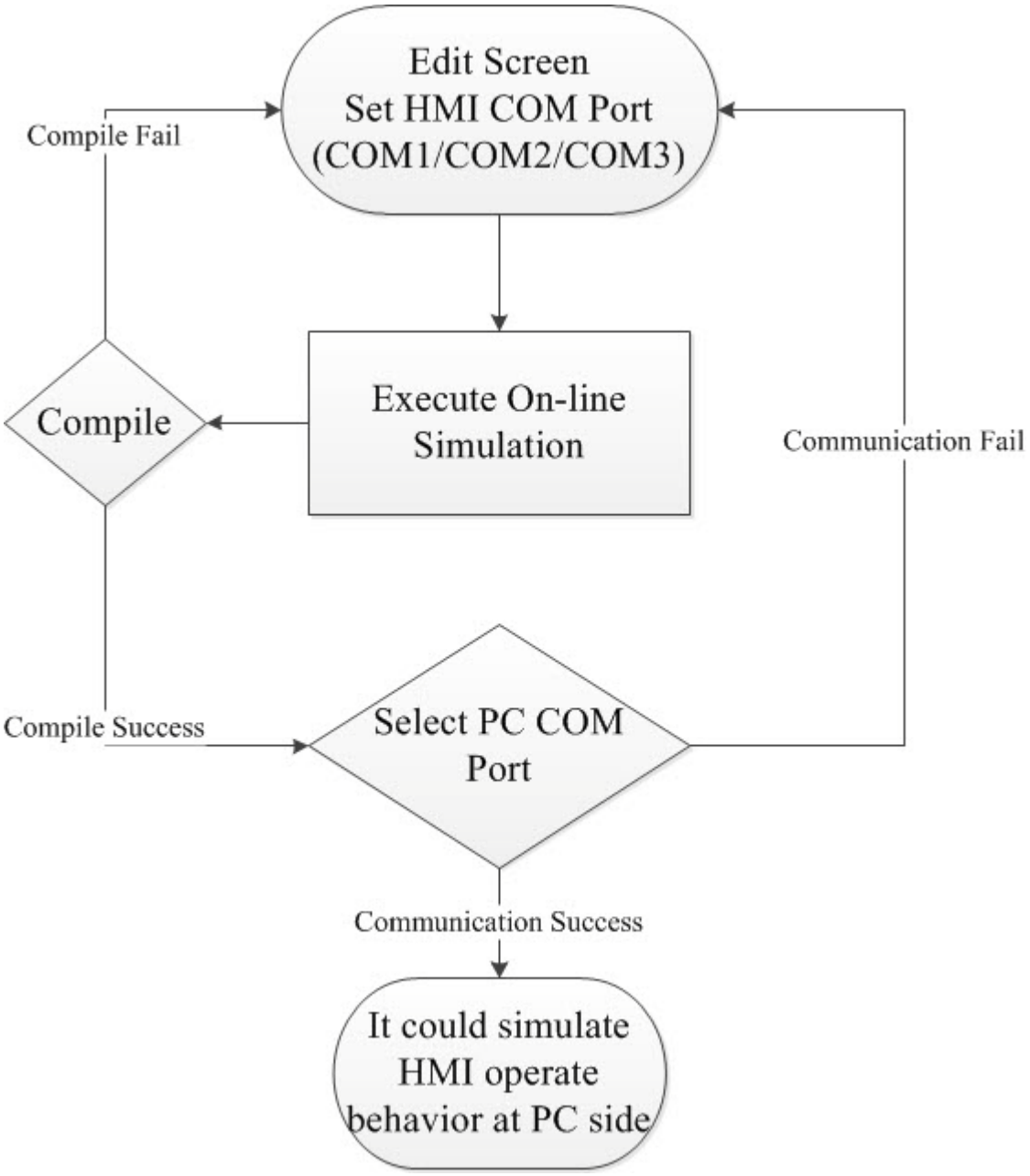


Figure 2-2-7-14 Flowchart of On-line Simulation

After the user executes On-line Simulation, the software will ask the user to set the number of the communication port at the PC end that corresponds to HMI, as shown in the figure below.

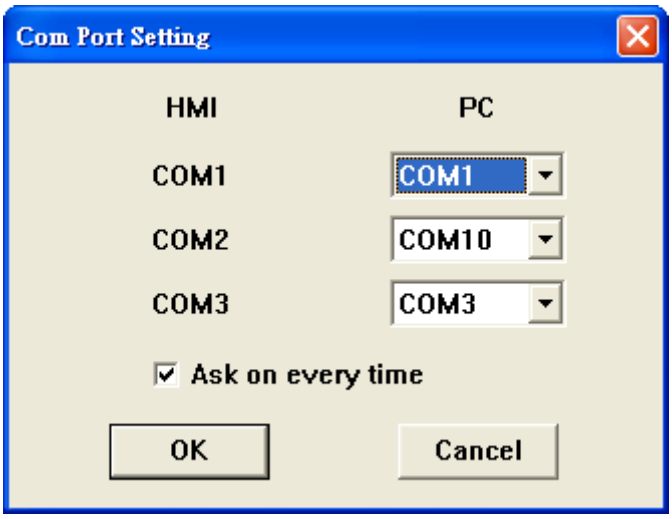


Figure 2-2-7-15 Com Port Setting

When all the settings are correct, the On-line Simulation can represent the communication between HMI and PLC.

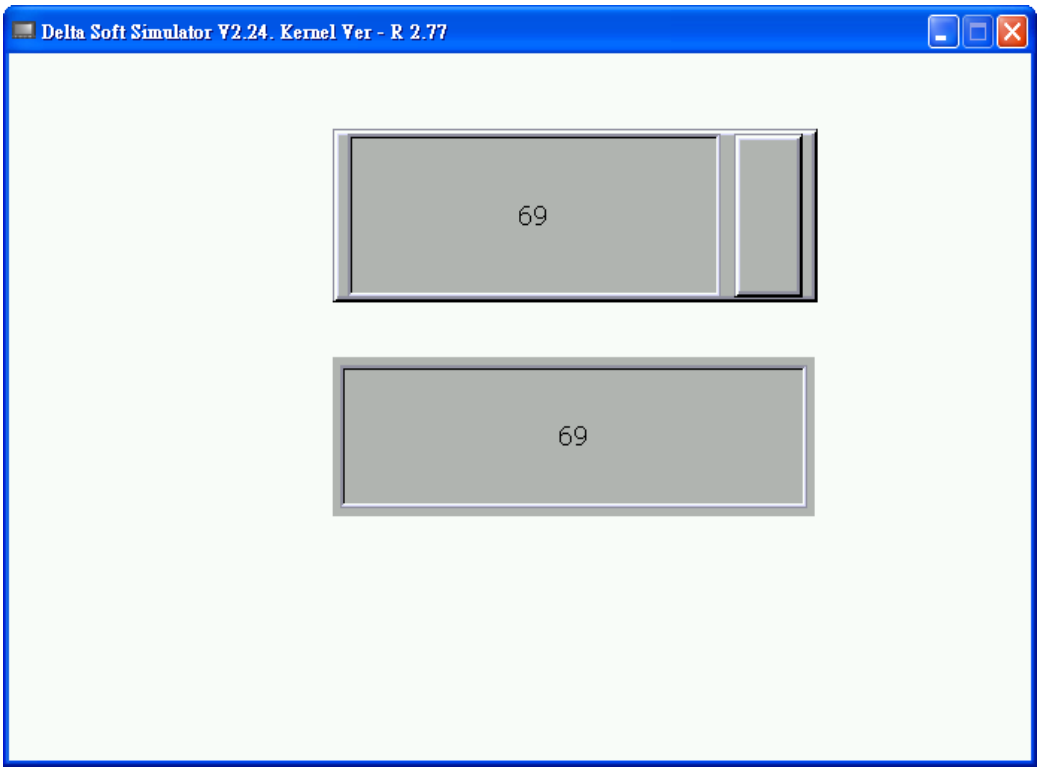


Figure 2-2-7-16 Result of On-line Simulation

The Com Port Setting window contains the [Ask on every time] option, which allows the user to determine whether the Com Port Setting window pops up everytime On-line Simulation is executed. If [Ask on every time] is unchecked, please click the right button of

mouse in the On-line Simulation screen to select [Com Setting] to show the window in Figure 2-2-7-17 again.

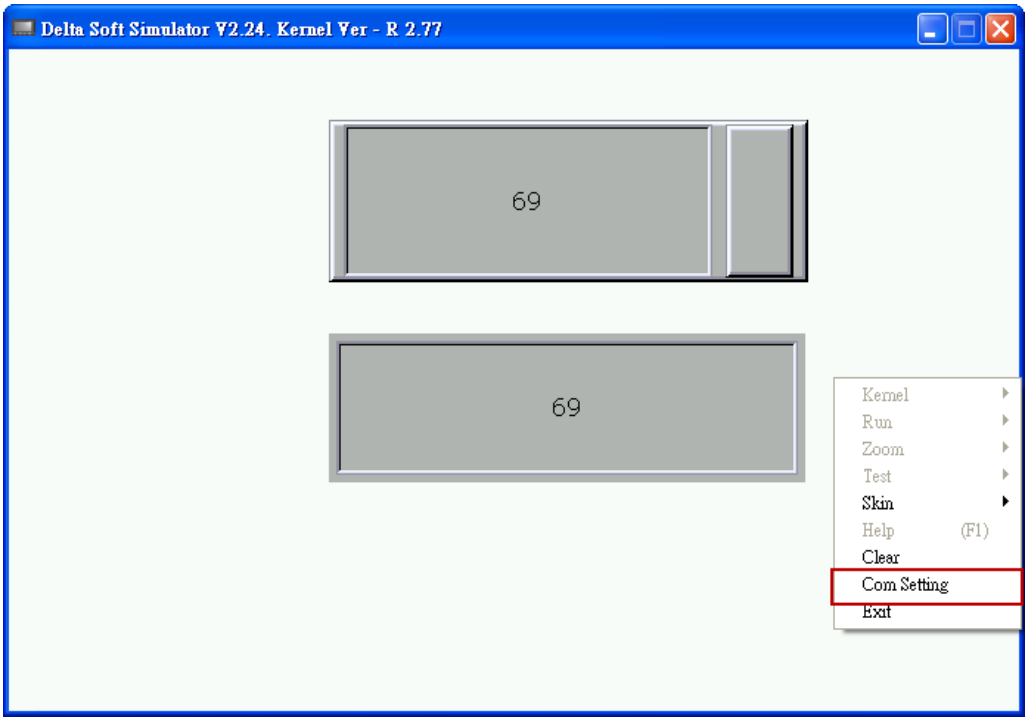


Figure 2-2-7-17 Click the right button of mouse to enter Com Setting

On-line Simulation also provides Monitor IO function, which can monitor the content of I/O device.

Right click the mouse in the screen of On-line Simulation and select [Monitor IO]. A window which shown as figure 2-2-7-18 will pop up so that users can set up and monitor I/O device.

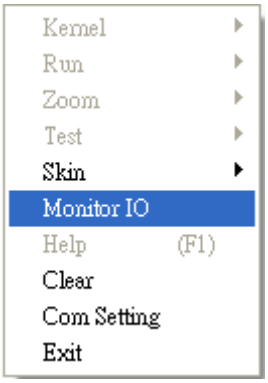
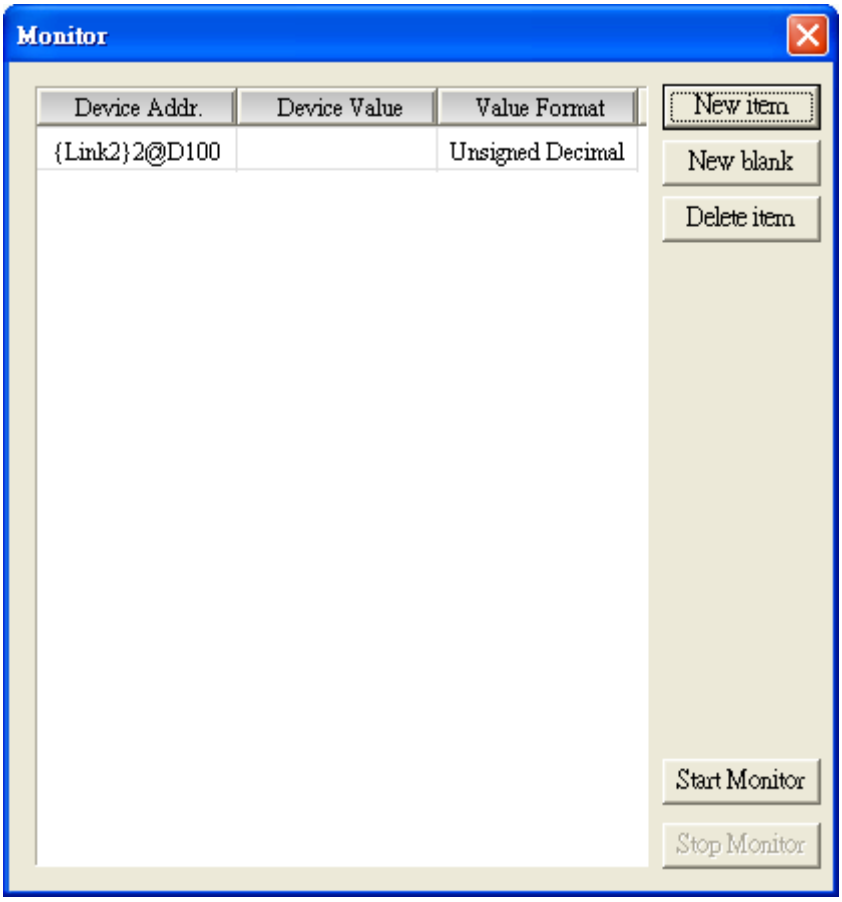
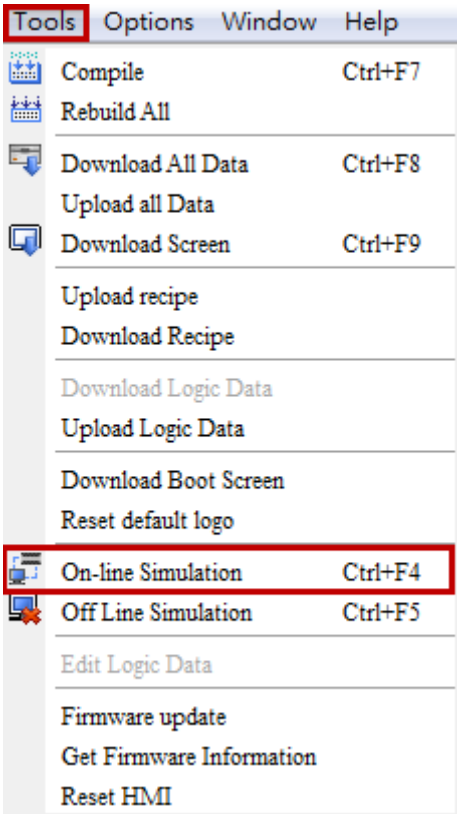


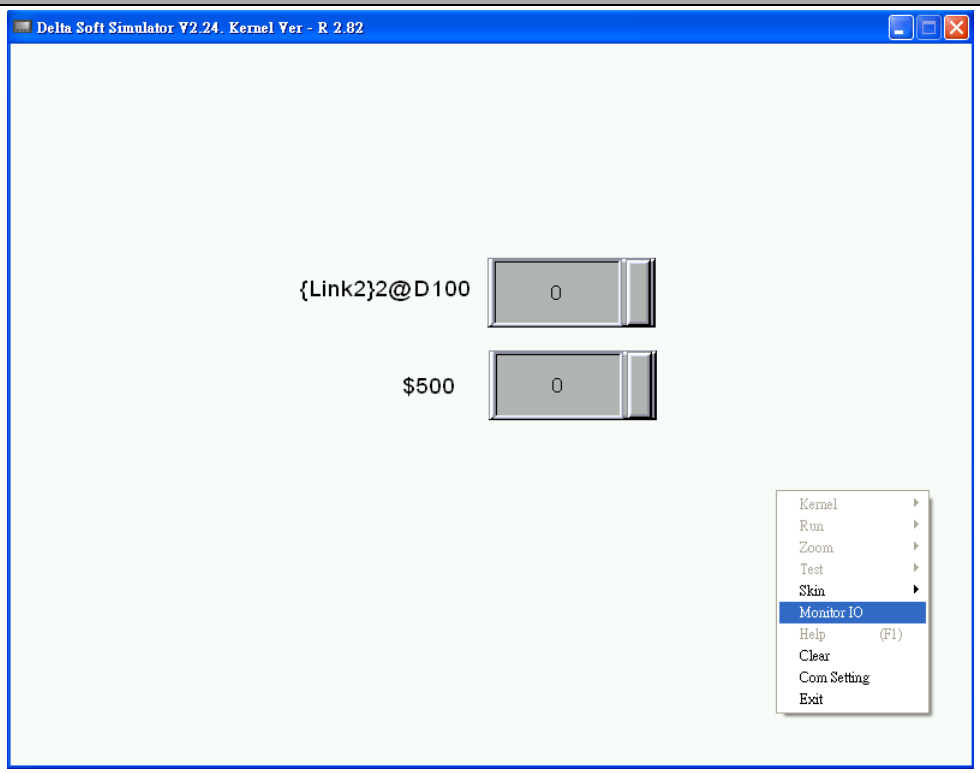
Figure 2-2-7-18 Right click the mouse to enter Monitor IO

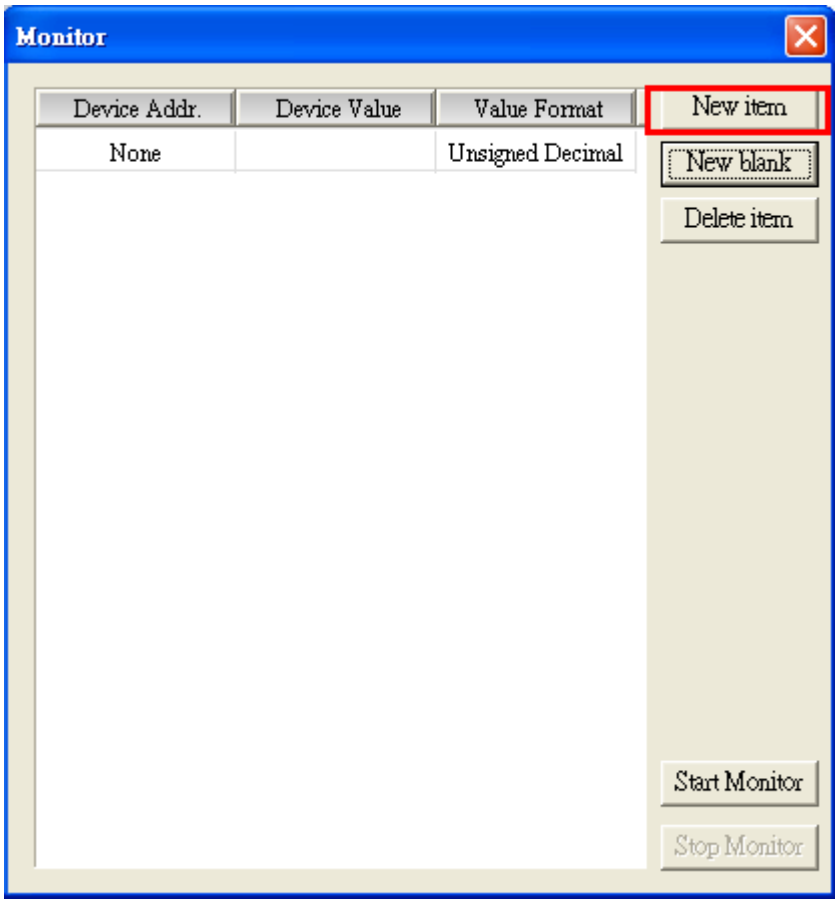
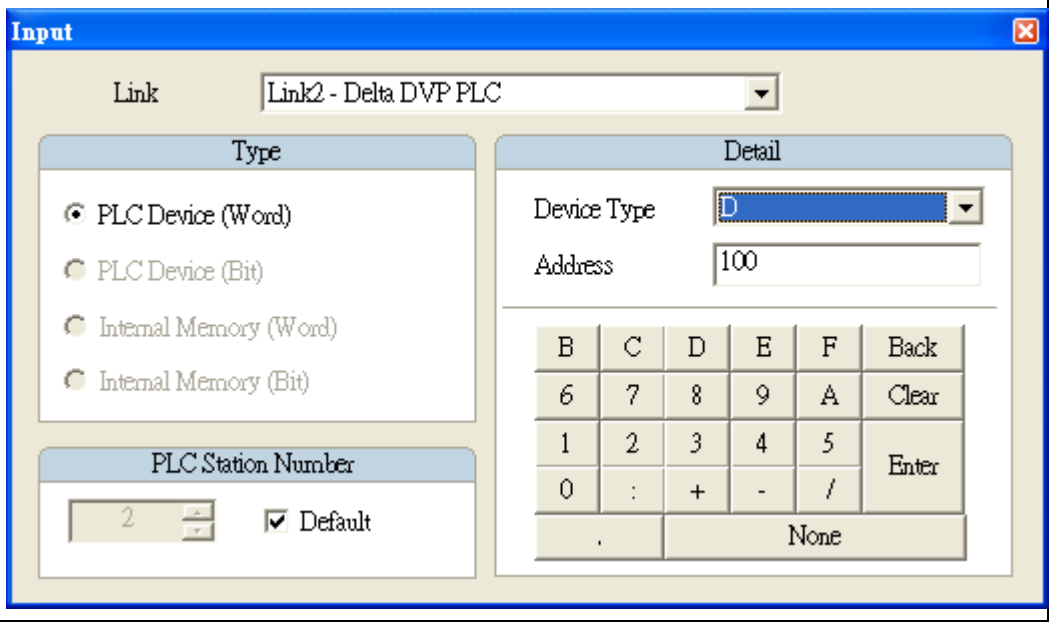
Description of Monitor IO Property Table 2-2-7-2 Description of Monitor IO Property	
	
New item	➢ Users can add an address to be monitored in an entry box.
New blank	➢ If you wish to add new blank to be monitored, there is no need to enter the address by the entry box. You can just copy and paste the monitoring address on the screen.
Delete item	➢ It can used to delete the selected monitoring address.
Start Monitor	➢ Press this button to start monitoring. When it starts to monitor, this button will be reversed out.
Stop Monitor	➢ Press this button to stop monitoring. When it stop monitoring, this button will be reversed out.

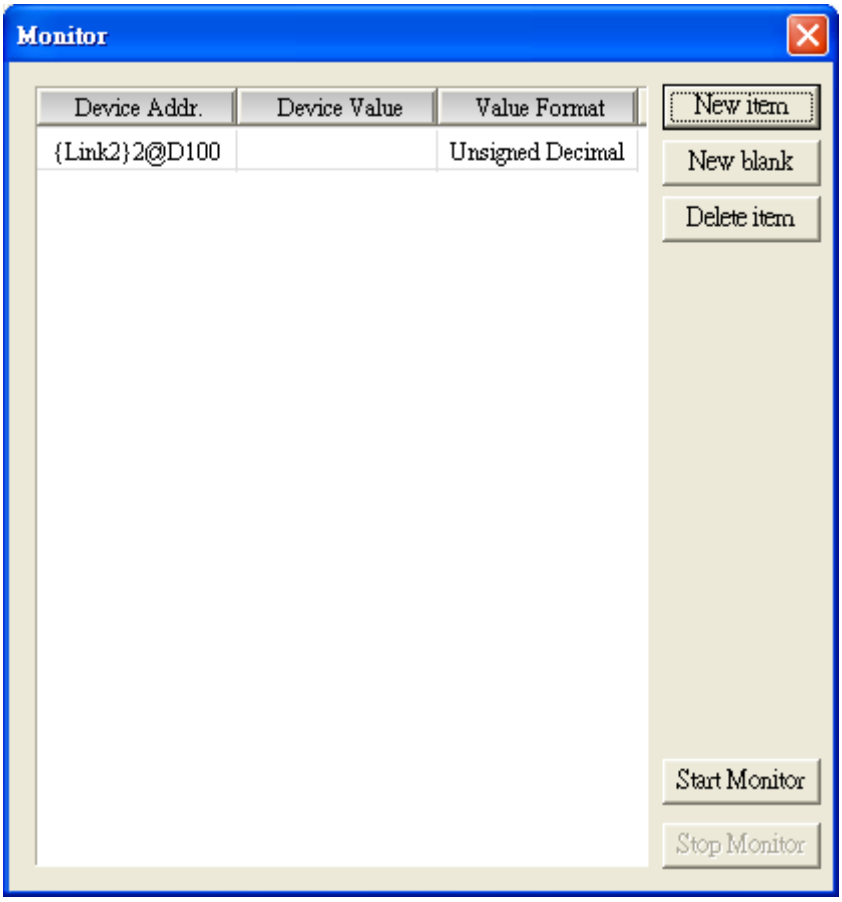
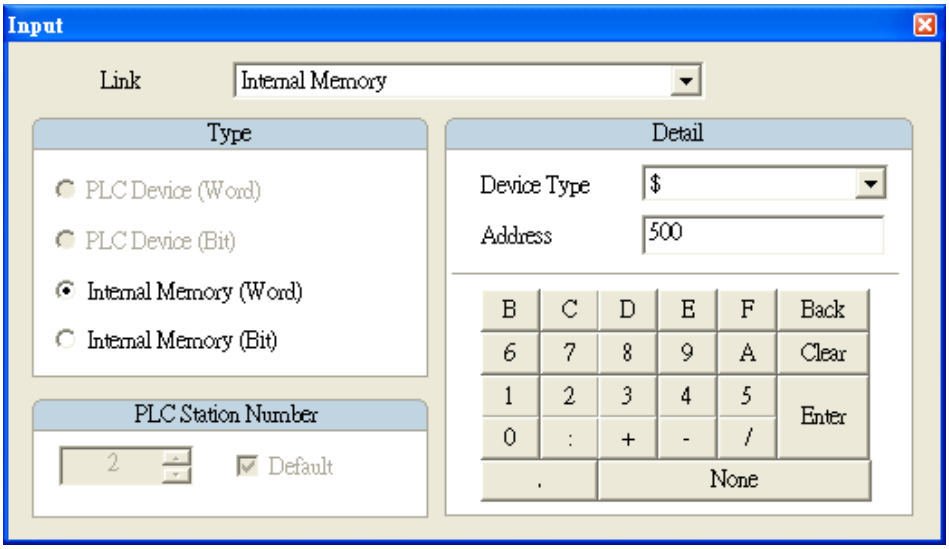
Description of Monitor IO Property Table 2-2-7-2 Description of Monitor IO Property	
Device Addr.	➢ Users can select the address of internal memory or controller register.
Device Value	➢ It displays the monitoring content in internal memory or controller register. It also allows users to change the content in time. ➢ If you select Delta's PLC as the controller, then there is no need to set up the data length.
Value Format	➢ It sets the value format, which has four can be selected, namely，signed decimal, unsigned decimal, hexadecimal andbit.

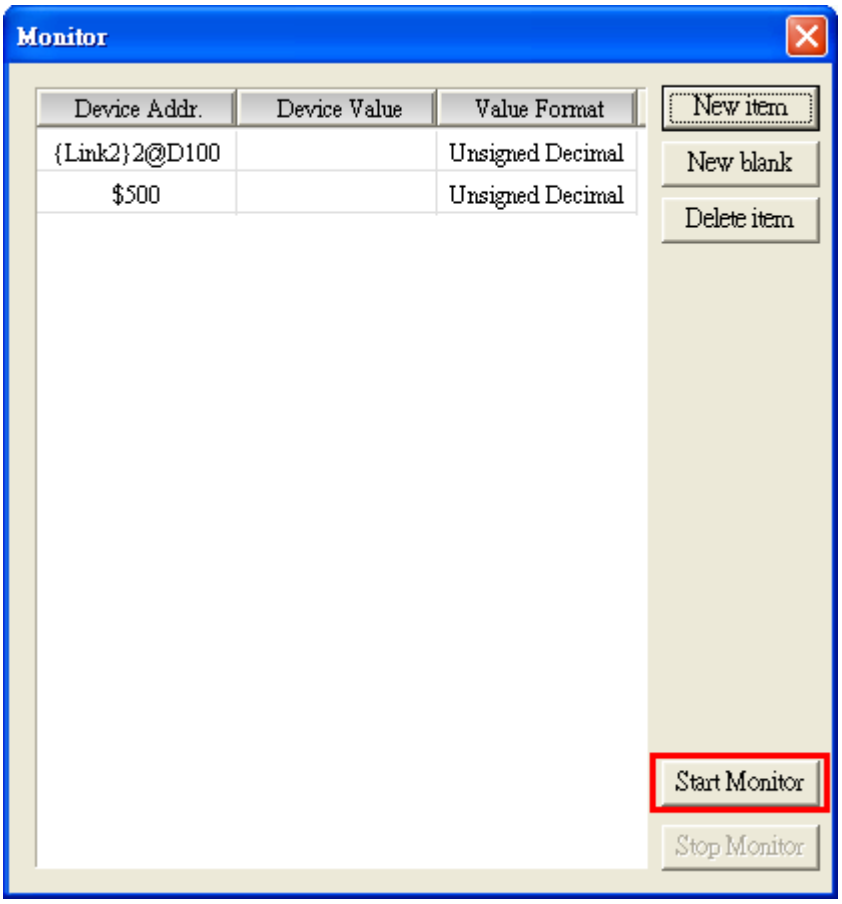
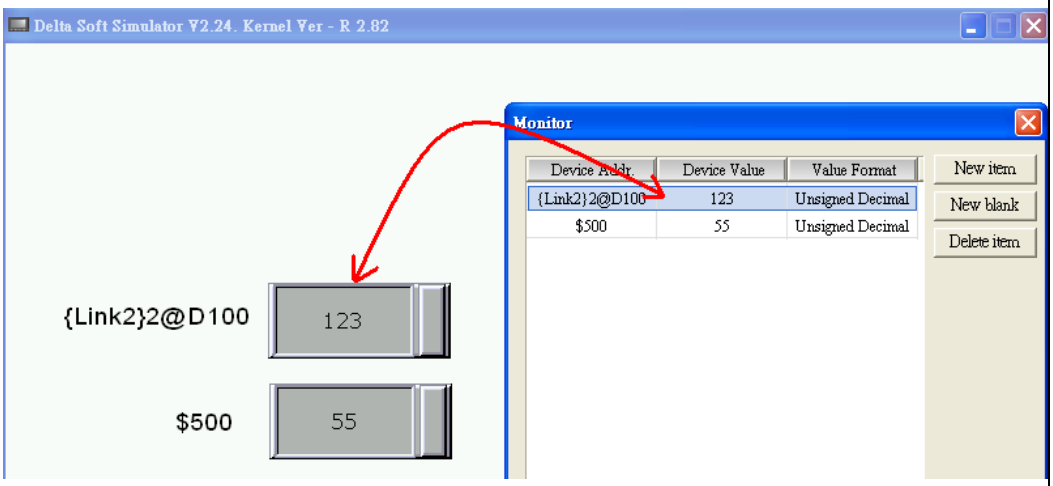
Following describes the example of [Monitor IO].

Example of **Monitor IO** Table 2-2-7-3 Example of Monitor IO	
Create numeric entry elements	➢ Step1: Create two numeric entry elements and set the write-in memory address to $500 and {Link2}2@D100.
Enter Monitor IO	➢ Step1: Select [Tools] > [On-line Simulation].  ➢ Step2: Right click the mouse on On-line Simulation screen and select [Monitor IO].

Example of **Monitor IO** Table 2-2-7-3 Example of Monitor IO	
	

Example of **Monitor IO** Table 2-2-7-3 Example of Monitor IO	
Setup monitoring address	➢ Step1: Click on [New blank] to add one monitoring address.  ➢ Step2: Select the monitoring address, {Link2}2@D100. 

Example of **Monitor IO** Table 2-2-7-3 Example of Monitor IO	
	➢ Then, the screen will show as below.  ➢ Repeat Step1 and Step2 to setup another monitoring address, $500. 

Example of **Monitor IO** Table 2-2-7-3 Example of Monitor IO	
Start Monitor	➢ Click the [Start Monitor] button to monitor the device. 
Result	➢ Monitor IO can timely monitor the set address. Users can monitor the content of {Link2}2@D100 and $500 in the field of Device Value. It also allows users to change the device content in Monitor IO screen. 

2-2-7-13 Off Line Simulation

The major difference between Off Line Simulation and On-line Simulation lies in that the former does not require the actual communication with PLC. Therefore, Off Line Simulation is mainly used to inspect the screen being edited, and check if the addresses of read/write memories and macro are correct. To utilize this feature, the user can select [Tools]→ [Off Line Simulation], or directly click the icon in the Layout Bar or use the system hotkey [Ctrl+F5].

After Off Line Simulation, the software will also conduct compiling first and then enter the olline simulation screen, same as shown in Figure 2-2-7-16.

2-2-7-14 Edit Logic Data

When execute edit logic data, it will start Ladder Editor, please refer to HMC user manual for detail information.

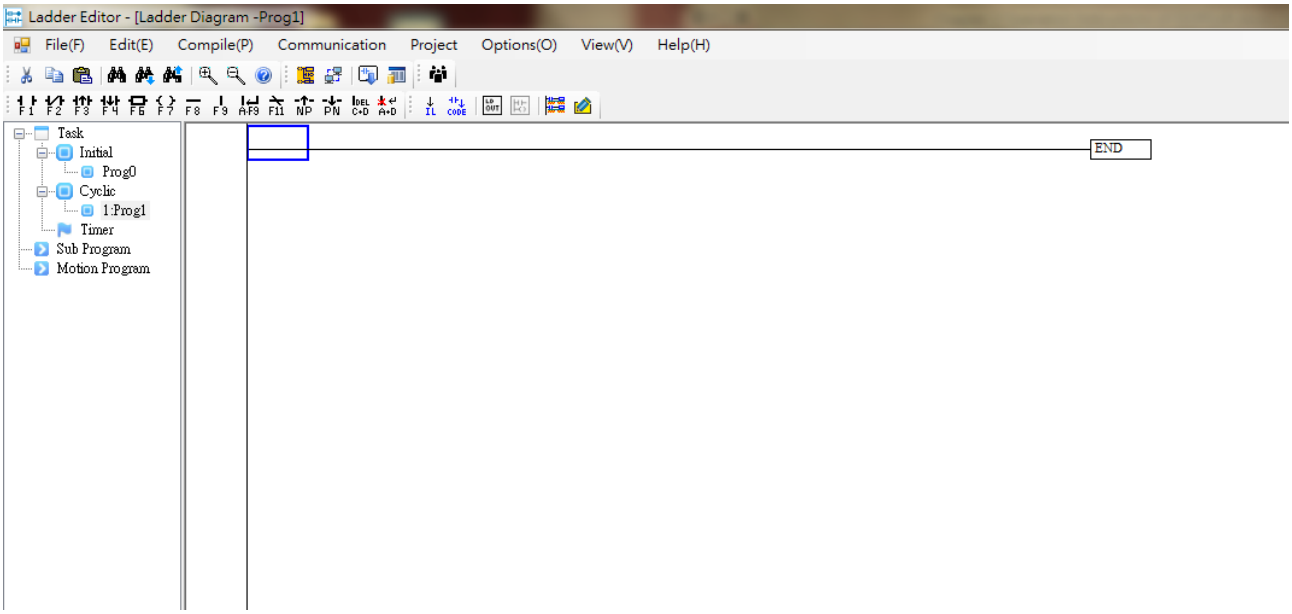


Figure 2-2-7-19 Ladder Editor Window

2-2-7-15 Update Firmware

Update Firmware is used mainly to update the firmware version of the HMI, which can ensure that the HMI is equipped with the most recent version of firmware and render more stable operation of HMI. As a result, prior to using DOPSoft, please once again verify that

the software version is consistent with that of the HMI firmware.

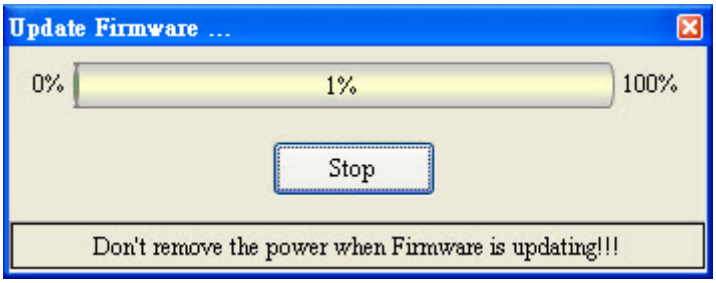


Figure 2-2-7-20 Update Firmware

2-2-7-16 Get Firmware Information

The user can acquire the related information of the current HMI firmware version by through the firmware serial number.

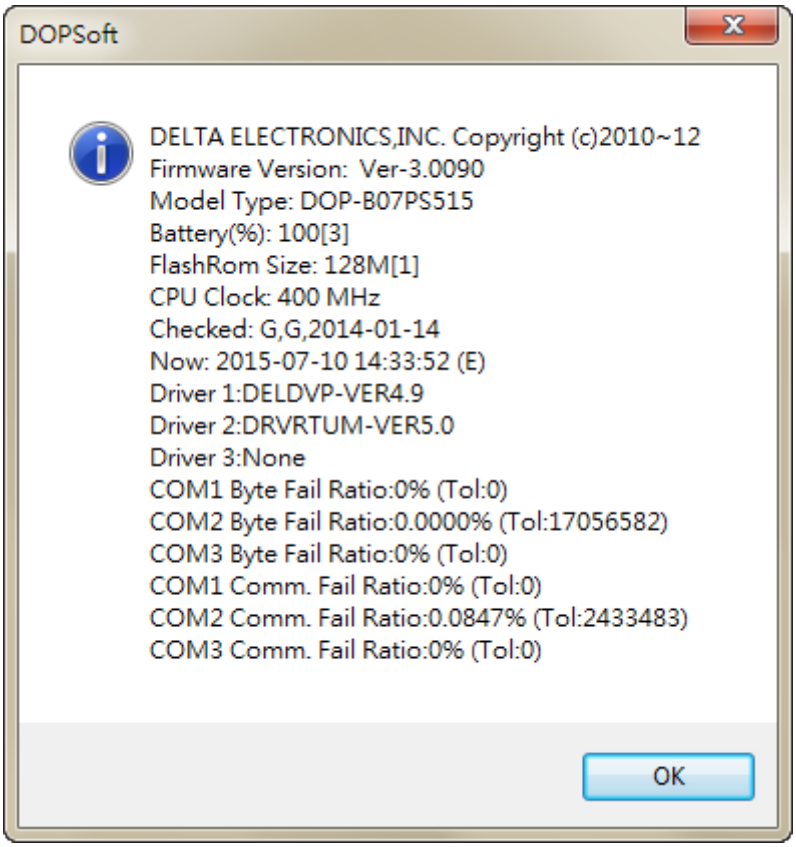


Figure 2-2-7-21 Get Firmware Information

2-2-7-17 Reset HMI

If the user forgets the security password set previously and checks [Check password when download program], password is needed when the software uploads all data back to the PC end. If the user wants to enter the system screen to format the screen, the format process also requires the password for authentication. In such situation, the HMI will be unable to conduct upload/download or format. As a result, DOPSoft allows the user to restore the HMI back to its default settings by executing [Reset HMI], which includes file formatting, removal of all screen data, and password deletion, etc.

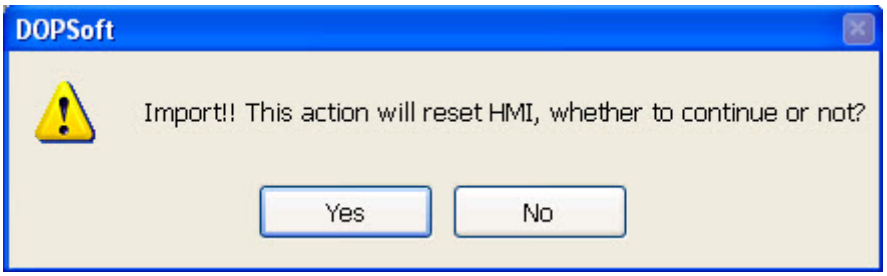


Figure 2-2-7-22 Reset HMI

When [Yes] is selected, the HMI will immediately execute the Recovery action.

NOTE:
- ✓ After the recovery, the HMI is restored to the default settings.
- ✓ After the recovery, all screen data will be deleted, including those of which the passwords are lost.

2-2-8 Options

The [Options]in the function menu provides the following features for the user to utilize.

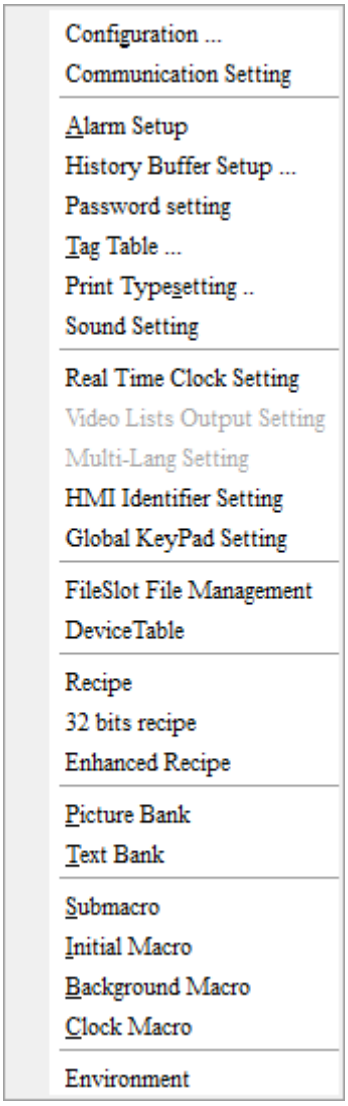


Figure 2-2-8-1 Options Menu

The descriptions of [Alarm Setup],[History Setup], [Recipe], [32bits recipe],[Submacro],[Initial Macro],[Background Macro], and [Clock Macro]will be given along with other functions in other sections.

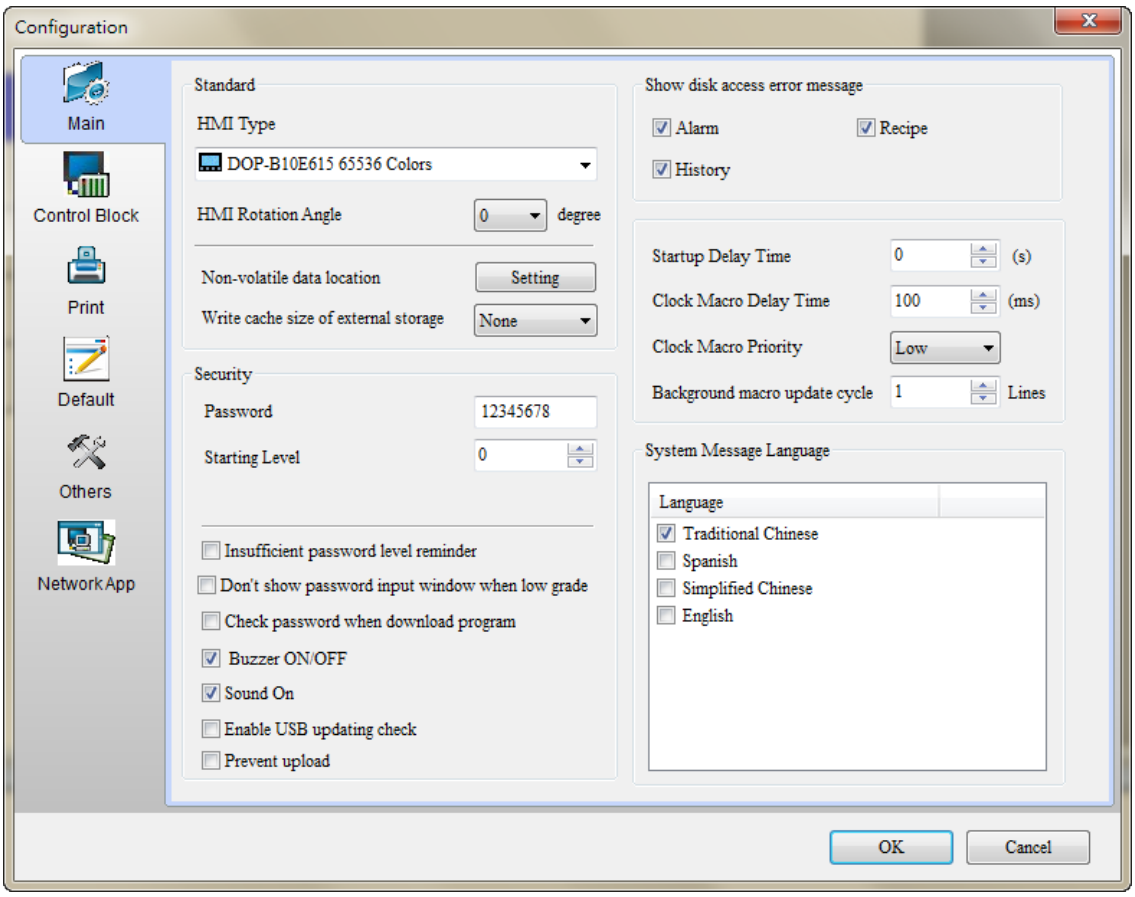
2-2-8-1 Configuration

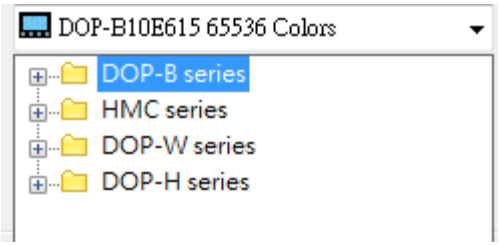
Configuration contains five pages: Main, Control Block, Print, Default, Others and Network App.

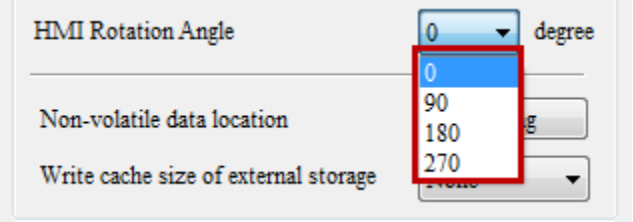
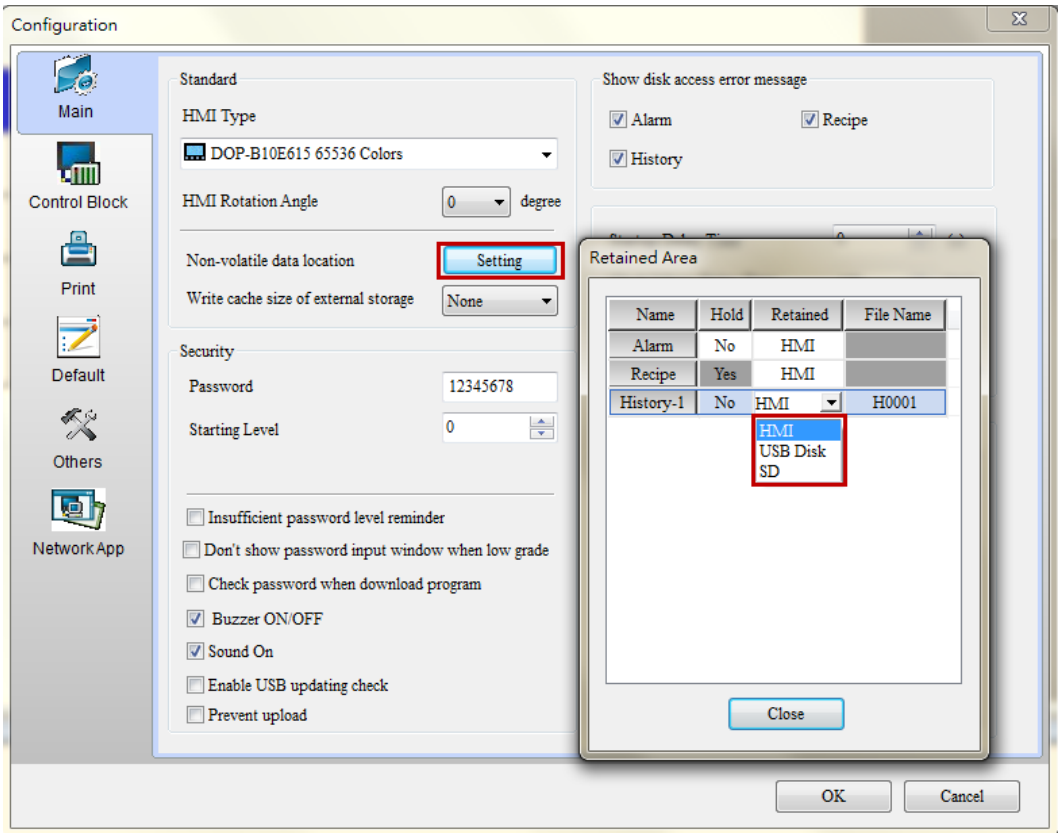
The content configurations of [Main], [Print], [Default], [Others] and [Network App] will be described below. Please see Chapter 4, Control Area and Status Area, for details of Control command.

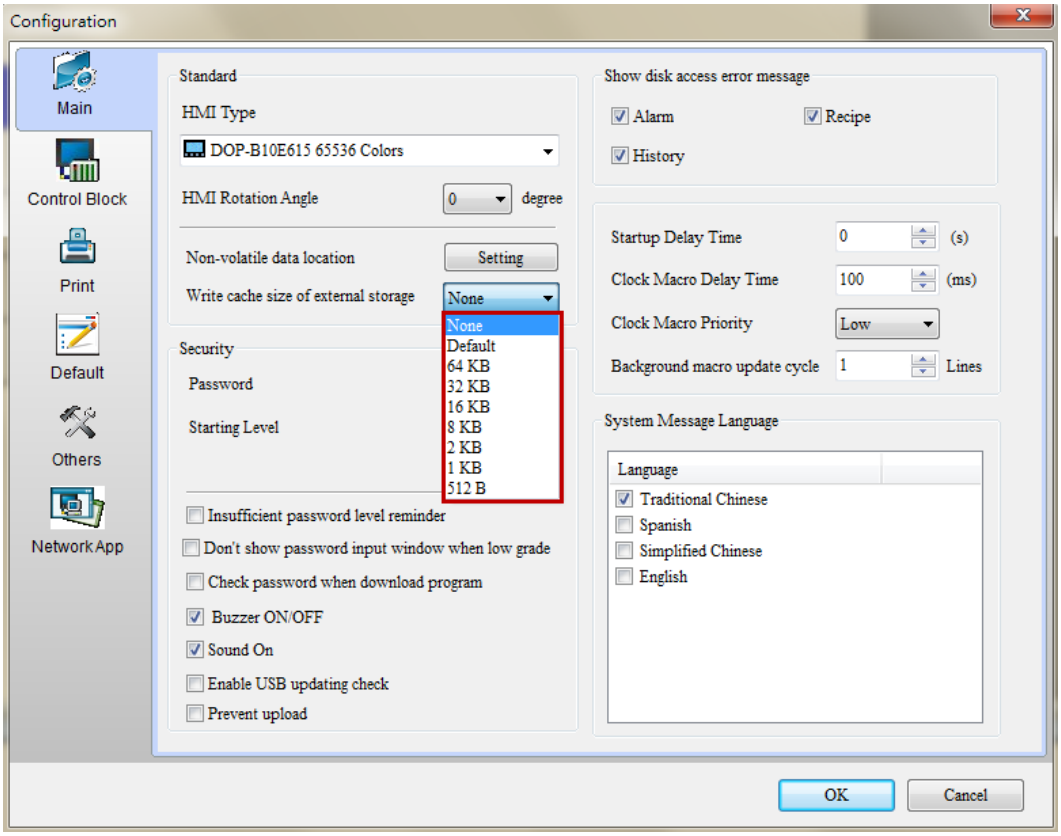
[Configuration]－ [Main]

Table 2-2-8-1 Configuration-Main



HMI Type	➢ One can select the HMI model. ➢ HMI type separateDOP-B Series、HMC Series、DOP-W Series、DOP-H Series.  ➢ The software will have different functions depending on which HMI model is selected. For example, models without network are unable to

[Configuration]－ [Main] Table 2-2-8-1 Configuration-Main	
	add new Ethernet link. Models without Auxiliary Key cannot utilize the associated function.
HMI Rotation Angle	➢ DOPSoftoffers the function of HMI Rotation, which allows the user to decide the screen angle according to the actual need. Rotation angles of 0 degree, 90degrees, 180degrees, and 270 degrees. 
Non-volatile Data Location	➢ The non-volatile data location consist three major parts by categories: the first is alarm, second is recipe, and the third is History. If the user needs to access data in these three parts, he/she can choose where to save the data with available storage locations being HMI, USB disk and SD. ➢ The user can click [Setting] to enter the non-volatile data location for the configurations of alarm, recipe, and History. 
The size of writing USB cache	➢ The data written by HMI into USB disk will be temporarily stored in the cache. However, the size of writing USB cache applies only when the data size in cache is below this value. Data will not be actually written

[Configuration]－ [Main] Table 2-2-8-1 Configuration-Main	
	into the USB disk. This measure can avoid damaging the USB disk due to constant writing in. ➢ If the data size the user plans to save is smaller than the buffer capacity or three is an unexpected outage, it may lead to data loss. To avoid such incidence, regular forced triggering the associated flag top write the data into the USB disk can be done to ensure the data exist. 
Security password	➢ The security password is the one with the highest security level in HMI, which is level 8. The default security password is [12345678], which is used to control upload and download of screen data and recipe (Password Authentication must be checked first), Password Protect, execution of system formatting, system file encryption, and copy file (Enable USB updating check must be checked first). The format for the password text is 0~F by hexadecimal unit.
Starting Level	➢ The Starting Level must be used along with the user security level of each individual element properties. ➢ The Starting Level is the authorization level when HMI starts, which

[Configuration]－ [Main]

Table 2-2-8-1 Configuration-Main

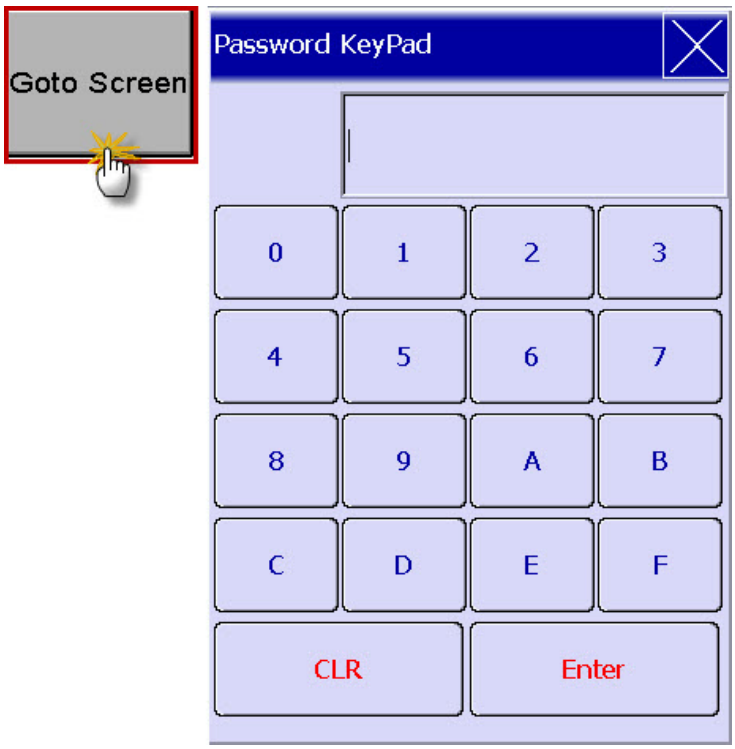
ranges from 0 ~ 7 with the default password of [12345678].

- If the Starting Level is 5 and the Goto Screenbutton has a user level of 6, when the Goto Screenbutton is clicked, the system will ask the user to enter the password for user security level 6 to execute screen switching. On the contrary, if the user security level of Goto Screenbutton is below 5, no password is needed when it is clicked. Please see the table below for details.

[User security level]higher than [Starting Level]		
Step1	Set Starting Level to 5	Enter [Options]→ [Configuration] to set the Starting Level to 5.
Step2	Set the user security level of Goto Screen to 6	Create the Goto Screen button and set the associated user security level to 6.

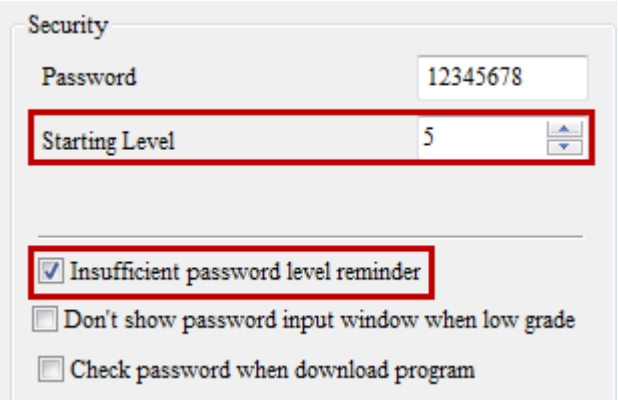
[Configuration]－ [Main]

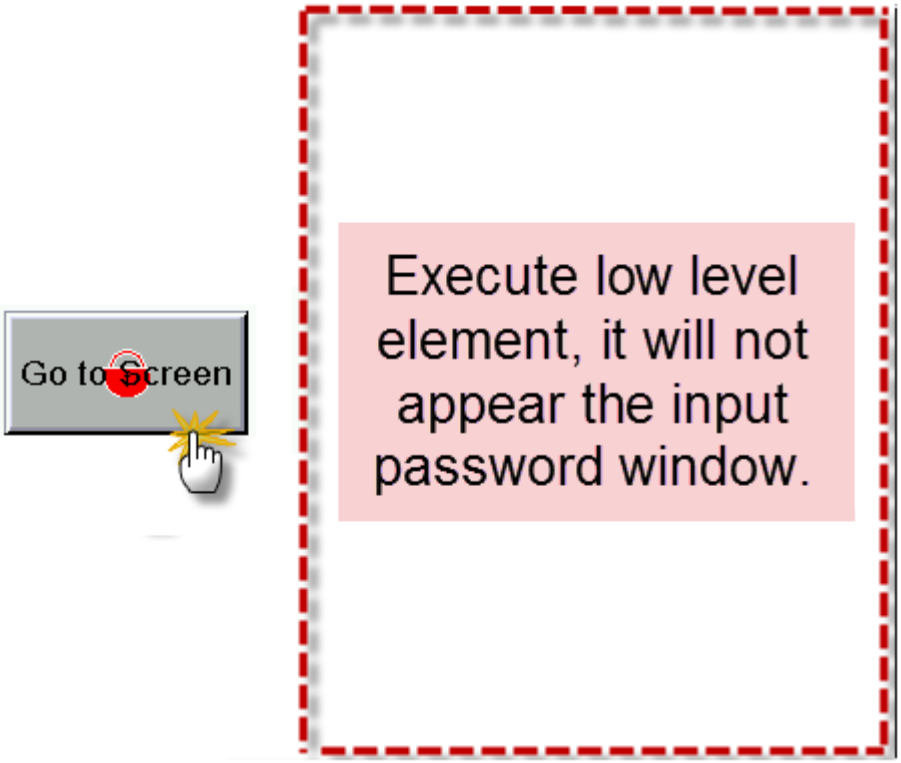
Table 2-2-8-1 Configuration-Main

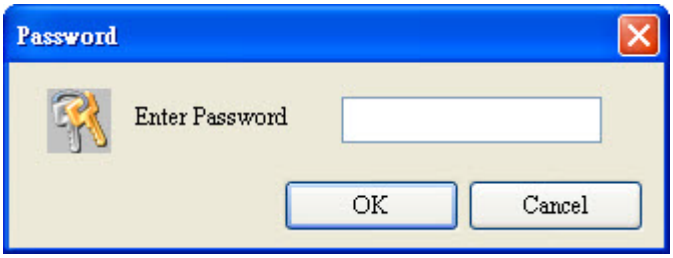
	Step3	Execute Goto Screenup on downloading it to HMI	Please enter the password for user security level above 6 to execute the action of Goto Screen. Passwords for levels 0~7 can be changed through [Options]→ [Password setting]. Please see 2-2-8-3 Password Table Configuration for details. 
Insufficient Password Level Reminder	➢ If the user security level of an element is higher than the Starting Level and the user also checks this option, the will appear upon being downloaded to HMI as a reminder to the user for insufficient password level. **[User security level]higher than [Starting Level]**		

[Configuration]－ [Main]

Table 2-2-8-1 Configuration-Main

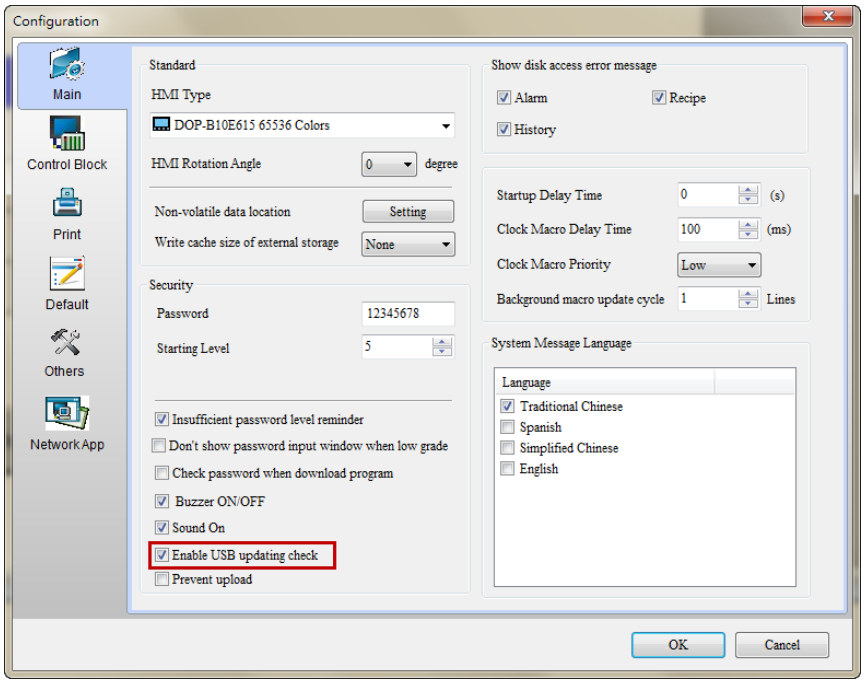
	Step1	Insufficient password level reminder when Set Starting Level is 5	Enter [Options]→ [Configuration]and set Starting Level to 5. Also check [Insufficient Password Level Reminder]. 
	Step2	Set the User Security Level of Goto Screen button to 6	Create the Goto Screen button and set the associated User Security Level to 6.
	Step3	Edit the screen and download to HMI	Upon downloading the screen to HMI, one can find that the red lock icon appears on the Goto Screen button, as shown in the figure below.
Don't show password input window when low grade	➢ When you check "Don't show password input window when low grade", screen that requires users to enter the password will not pup up when you have no authority to access the system.		

[Configuration]－ [Main] Table 2-2-8-1 Configuration-Main	
	

[Configuration]－ [Main] Table 2-2-8-1 Configuration-Main	
Enable / disable buzzer	➢ When Enable / disable buzzer is checked, it will be enable. If unchecked, it will be disable. The sounds of the HMI buzzer include that for triggering button, message popup, HMI error, etc. AS a result, once the Buzzer is disabling, HMI will not emit any sound.
Sound ON	➢ When Sound ON is checked, it means sound is activated for files with sound effect. If unchecked, there will be no audio output. Please see 2-2-8-6 Sound setting for details.
Download Password	➢ If this option is checked, one must first download this setting to HMI before executing the download of screen data and recipe for the second time. The software will then ask the user to enter the Password.  It is only when the password is entered successfully can the screen data be downloaded to HMI. If unsuccessfully, a warning window will pop up to notify the user that download cannot be conducted due to incorrect password.
Enable USB updating check	➢ Enable USB updating check mainly involves file encryption and file duplication. As a result, the user can encrypt the screen data and meanwhile configure the limit of times of duplication, which provides the user with safe and flexible file protection. Please see the description below for details: **Step1** ➢ Enter [Options]→ [Configuration]and check [Enable USB updating check].

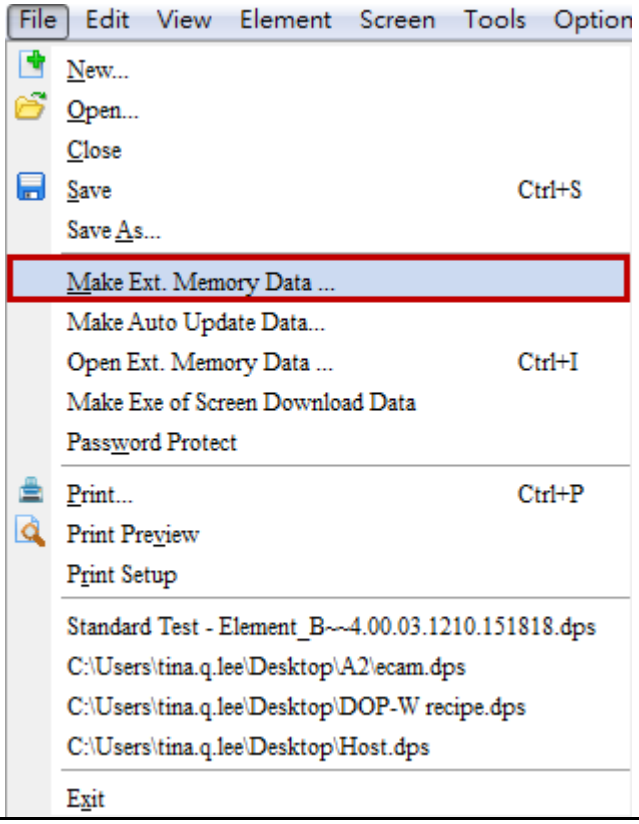
[Configuration]－ [Main]

Table 2-2-8-1 Configuration-Main



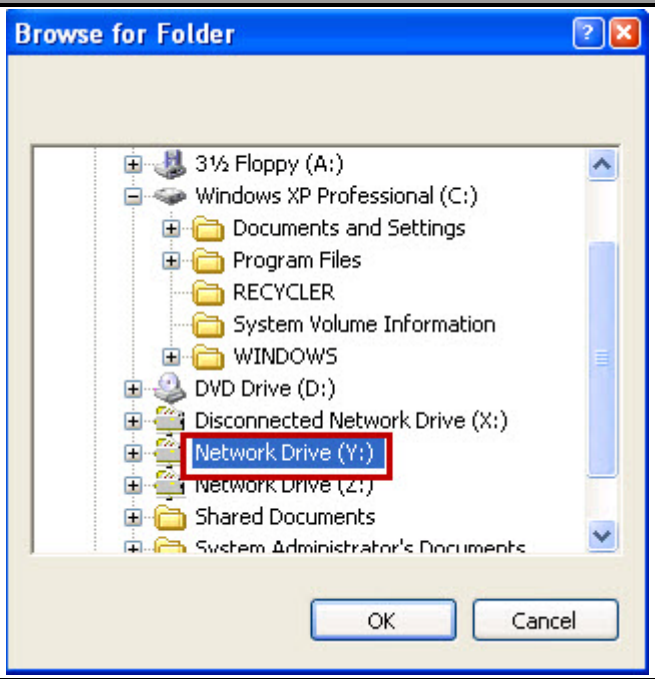
Step2

➢ Convert the edited screen into a screen data file. Click [File]→ [Make Ext. Memory Data]and choose to save the file in external disk such as USB Disk or SD card.



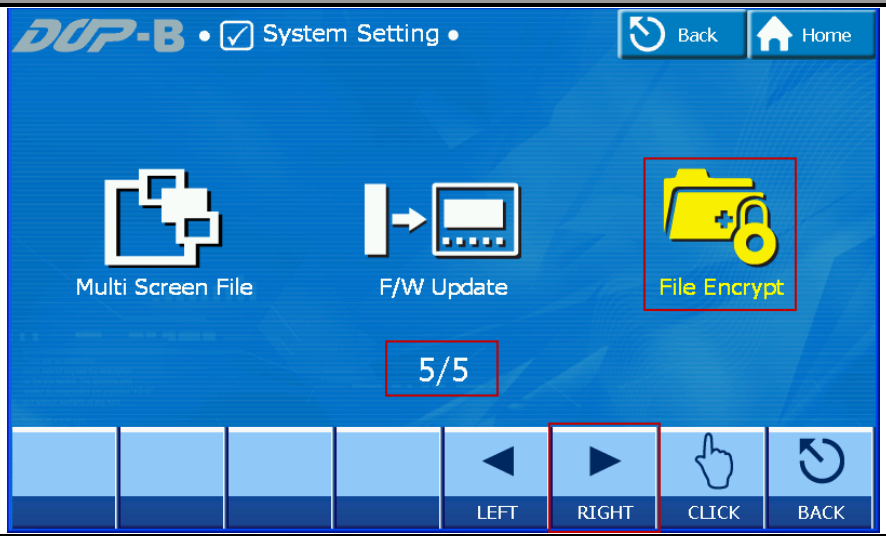
[Configuration]－ [Main]

Table 2-2-8-1 Configuration-Main

	
Step3	➢ Once the screen data file is created successfully, a confirmation window will appear.
Step4	➢ Insert the external disk into HMI. ➢ Log in the HMI system screen and select [System Setting]→ [File Manager]→ [File Encrypt]. If the [File Encrypt]icon cannot be found in [File Manager], please click [ ] to go to the next page.

[Configuration]－ [Main]

Table 2-2-8-1 Configuration-Main



Step5

➢ Select the screen data file to be encrypted and click [ENCRYT].

Step6

➢ The Security Password is requested to evaluate whether the user has valid authorization to execute file encryption.

[Configuration]－ [Main]

Table 2-2-8-1 Configuration-Main

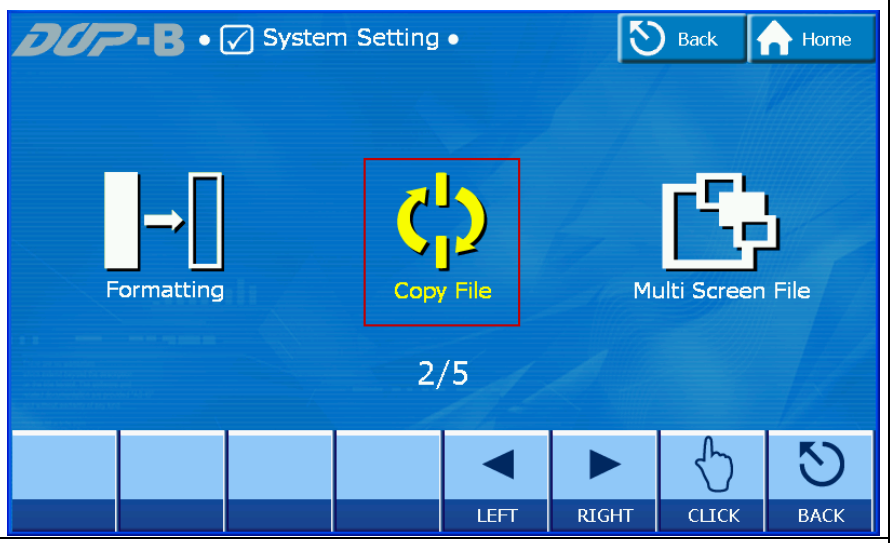
Step7	➢ Set the limit of times for file duplication. When the Copy Counter reaches 0, the associated screen file cannot be duplicated any more.	
Step8	➢ Set the password that monitors the duplication. The system will ask for the [Copy Password]every time the file is copied.	
Step9	➢ [File Encrypt Success!!]message is displayed, indicating successful encryption of screen file.	

[Configuration]－ [Main]

Table 2-2-8-1 Configuration-Main

Step10

When the screen file is encrypted successfully, one can execute [Copy File]and use the copied file in the external disk or within HMI.



Step11

➢ Select the screen file encrypted successfully to be copied.

[Configuration]－ [Main]

Table 2-2-8-1 Configuration-Main

Step12

- Once COPY is executed, the user will be asked to enter the Password.

- If the entered Password is correct, the user will be asked to enter the Copy Password. Then the user can copy the file.

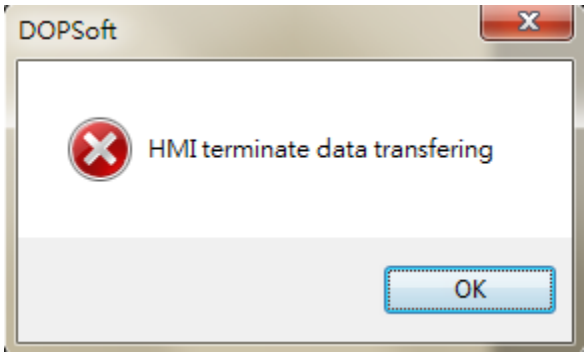
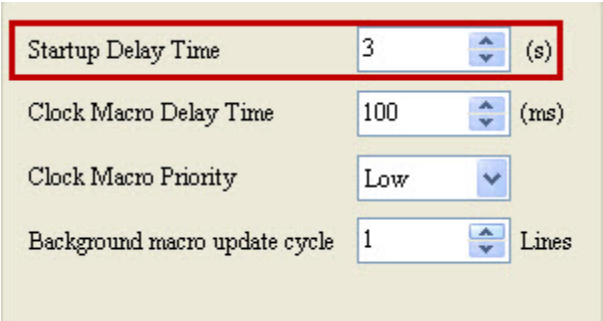
Step13

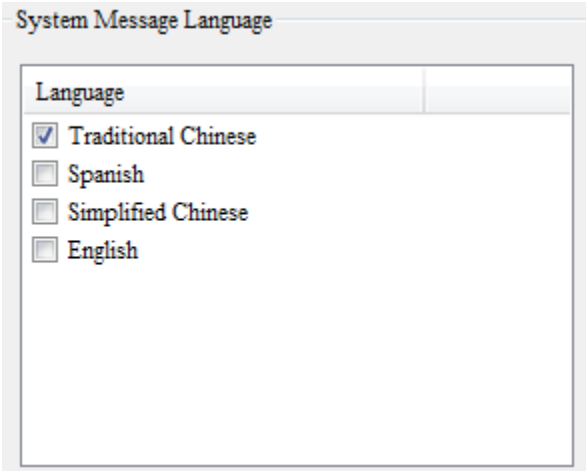
- Upon completion of copy, the system will display the remaining allowable times of duplication.

[Configuration]－ [Main]

Table 2-2-8-1 Configuration-Main

	Step14	➢ When the number of remaining duplication times reaches 0, no more file copies can be executed.
	Step15	➢ If copy file is to be executed again, the system will display the following error message.

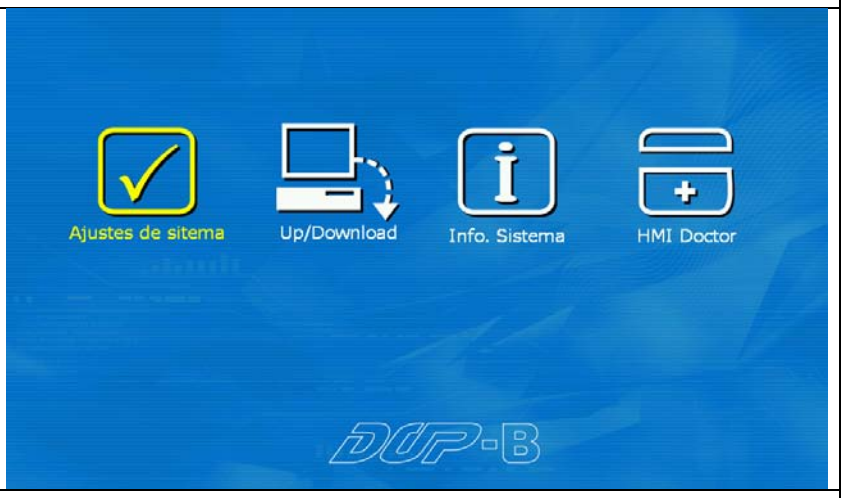
[Configuration]－ [Main] Table 2-2-8-1 Configuration-Main	
Prevent Upload	➢ This function works when users download the screen into HMI and then upload all data, DOPSoft will display the following message to inform users that the data is unable to be uploaded. 
Show disk access error message	➢ The non-volatile data location for alarm, History, and recipe can be USB disk or SD card. As a result, when the read/write in the external disk fails, one can use this option to decide whether to show the associated warning. ➢ The disk read/write failure means that if the non-volatile data location for history is USB disk but it cannot be detected by HMI and the data cannot be written. ➢ Therefore, if [Show disk access error message] is unchecked, when HMI cannot detect the USB Disk and is unable to write the data into it, no error message will appear to notify the user.
Startup Delay Time	➢ Startup Delay Time is set to wait for the controller to start, with a range of 0~ 255 seconds. ➢ If the Startup Delay Time is set to 3 seconds, once the file is downloaded to HMI, the system will countdown from 3 seconds to 0 second to start HMI, as shown in the figure below. 

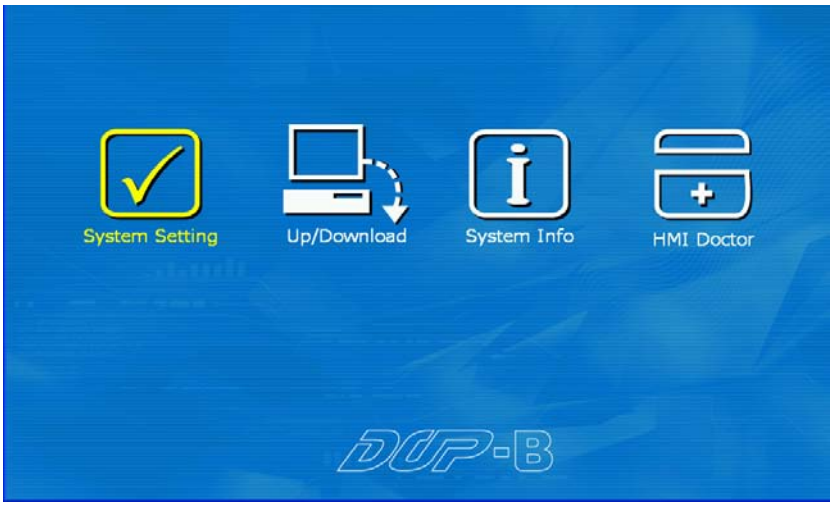
[Configuration]－ [Main] Table 2-2-8-1 Configuration-Main	
Clock Marco Delay Time	➢ Clock Marco Delay Time has a range of 50 ms ~ 65535 ms. This time refers to the length of delay after each execution of Clock macro.
Clock Marco Priority	➢ Clock Marco Priority has three levels: low, medium, and high. ➢ This function determines the priority for Clock macro execution. Higher priority can ensure more precise Clock macro delay time.
Background marco update cycle	➢ Set the times of macro execution within each cycle. ➢ The range of numbers of lines is 1 ~ 512.
System Message Language	➢ System Message Language involves System Menu screen message, error message, warning message, etc., all of which can be set to Traditional Chinese, Spanish, Simplified Chinese, or English.  Shown below is the System Menu screen messages, which are set to Traditional Chinese, Spanish, Simplified Chinese, and English,

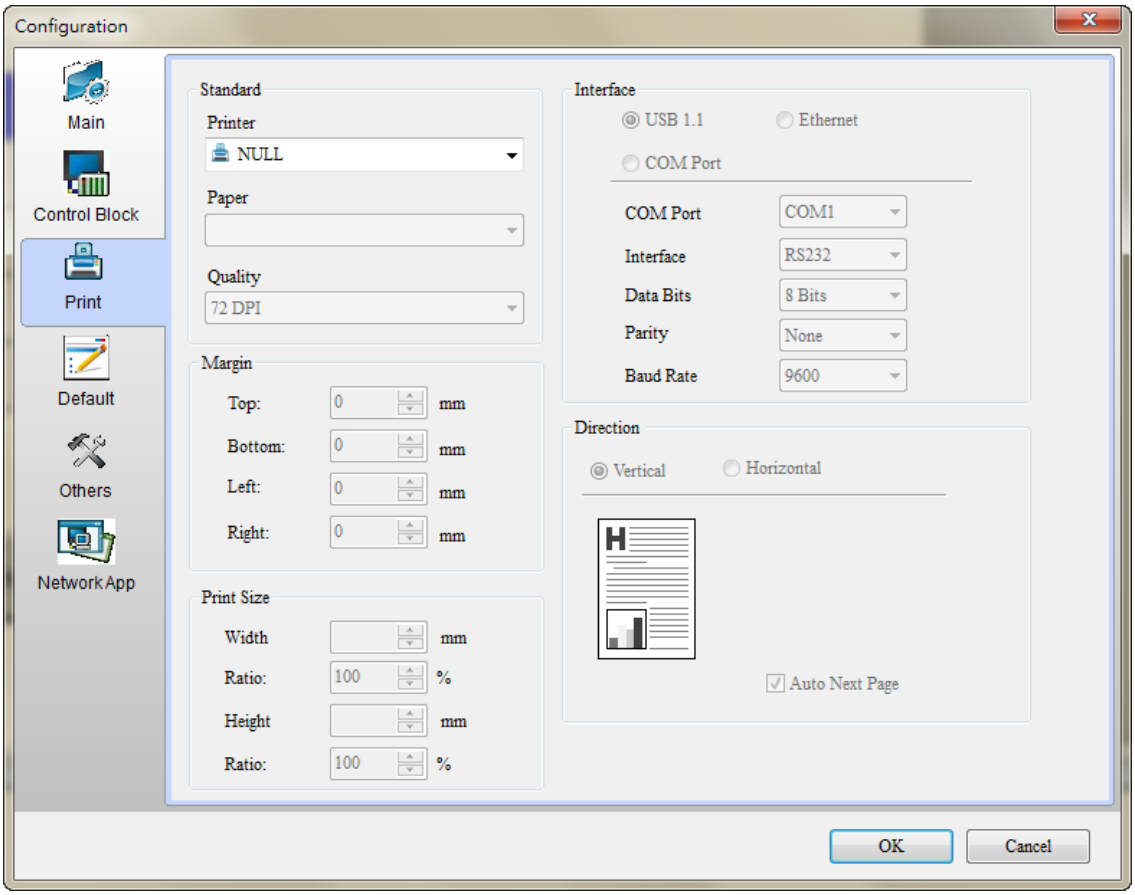
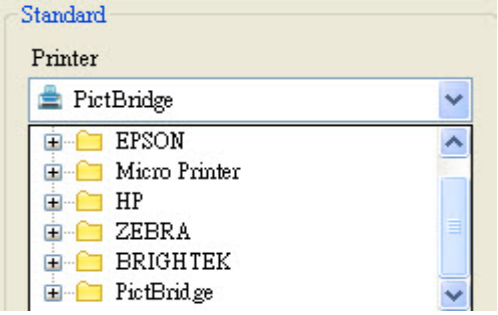
[Configuration]－ [Main]

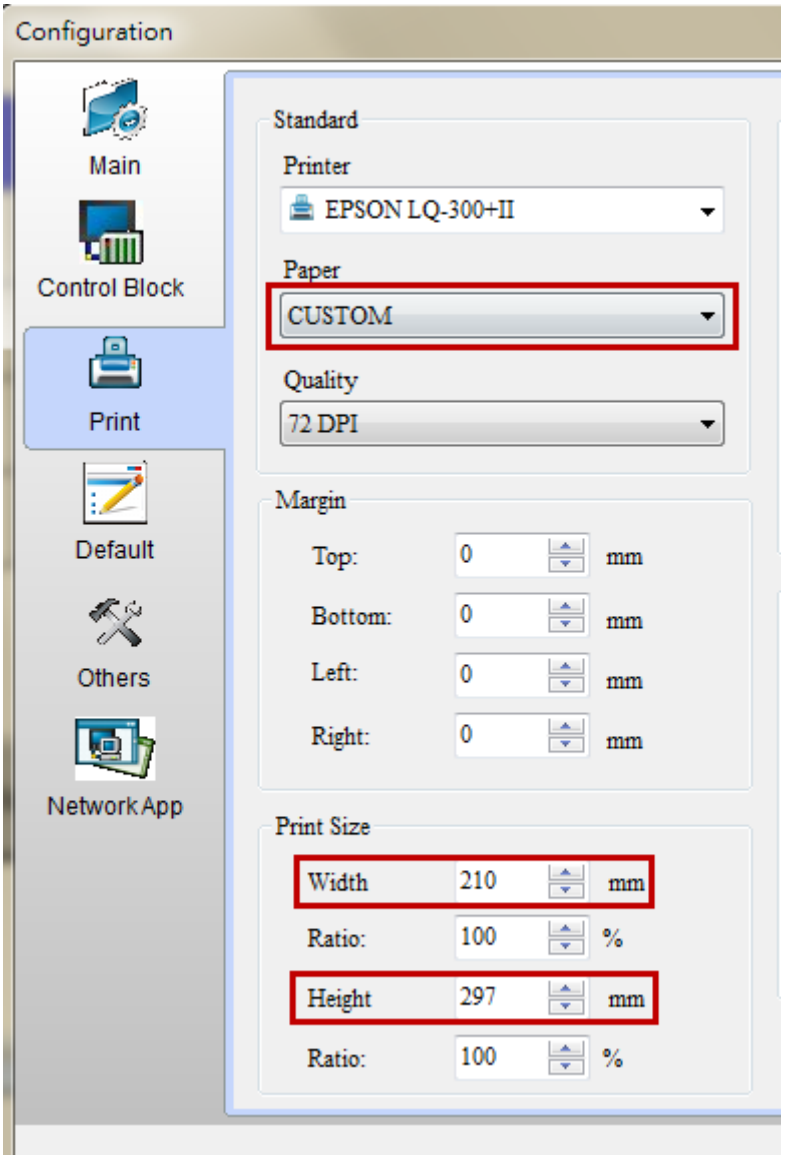
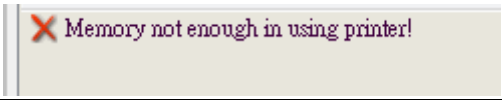
Table 2-2-8-1 Configuration-Main

respectively.

Traditional Chinese	
Spanish	
Simplified Chinese	

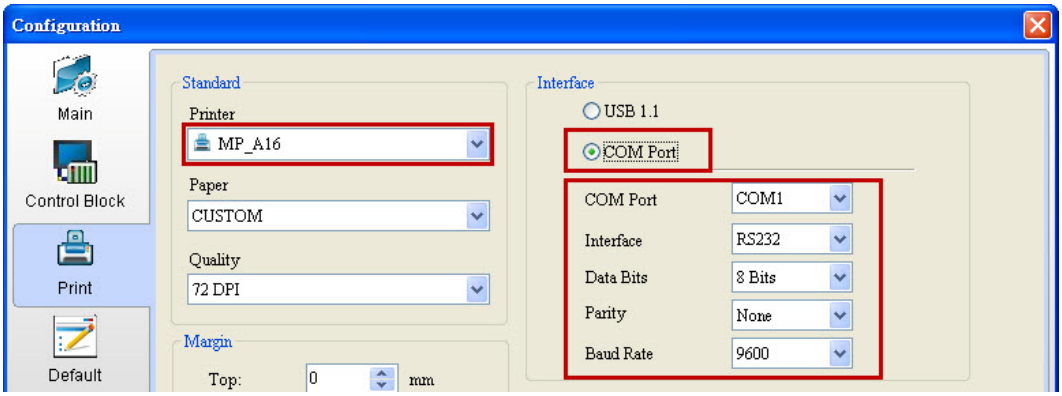
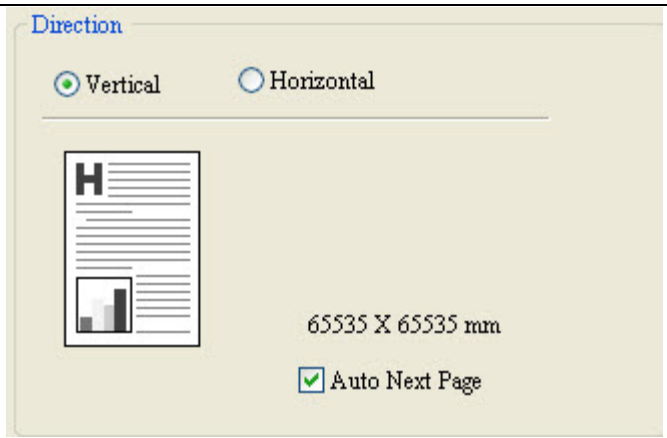
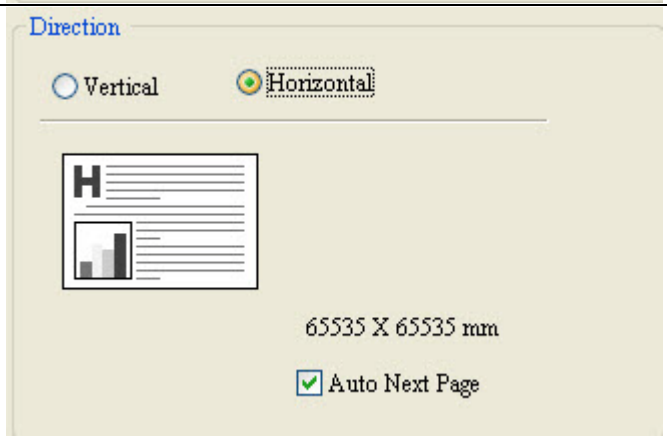
[Configuration]－ [Main]		
Table 2-2-8-1 Configuration-Main		
	English	

[Configuration]— [Print] Table 2-2-8-2 Configuration-Print	
	
Print includes Screen Print and Hard Copy. Please see Chapter 26, Print Setting, for details of Print.	
Printer	➢ The user can choose what type and model of printer to use. DOPSoft offers printer with the following brands for the user to choose. 
Paper	➢ The paper type will differ according to the printer model. In general, available options are A4, Letter, Report, and CUSTOM.
Quality	➢ Quality refers to the resolution of printer. ➢ Currently, the only available resolution is 72DPI.
Margin	➢ The user can define the top, bottom, left, and right margins that are reserved in printing, namely, the regions to be left blank. ➢ The margin is measured by the unit of mm, with the range of 0 mm ~

[Configuration]－ [Print] Table 2-2-8-2 Configuration-Print	
	550 mm.
Print Size	➢ Print Size is only effective to set the width and height of printing when Paper is set to CUSTOM. ➢ Width and height of Print Size are measured by the unit of mm.  ➢ Width and height of Print Size can be set. It can be magnified to 400% and minimized to 10%. Its default is 100%. ➢ When the scaling ratio of width and height is set to high, a warning message will pop up after compiling. 
Interface	➢ The printer interface includes USB and COM Port, which are available for selection depending on the printer selected to be used. ➢ When COM Port is selected as the interface, the associated communication port, interface, data bit, parity, and Baud rate must be

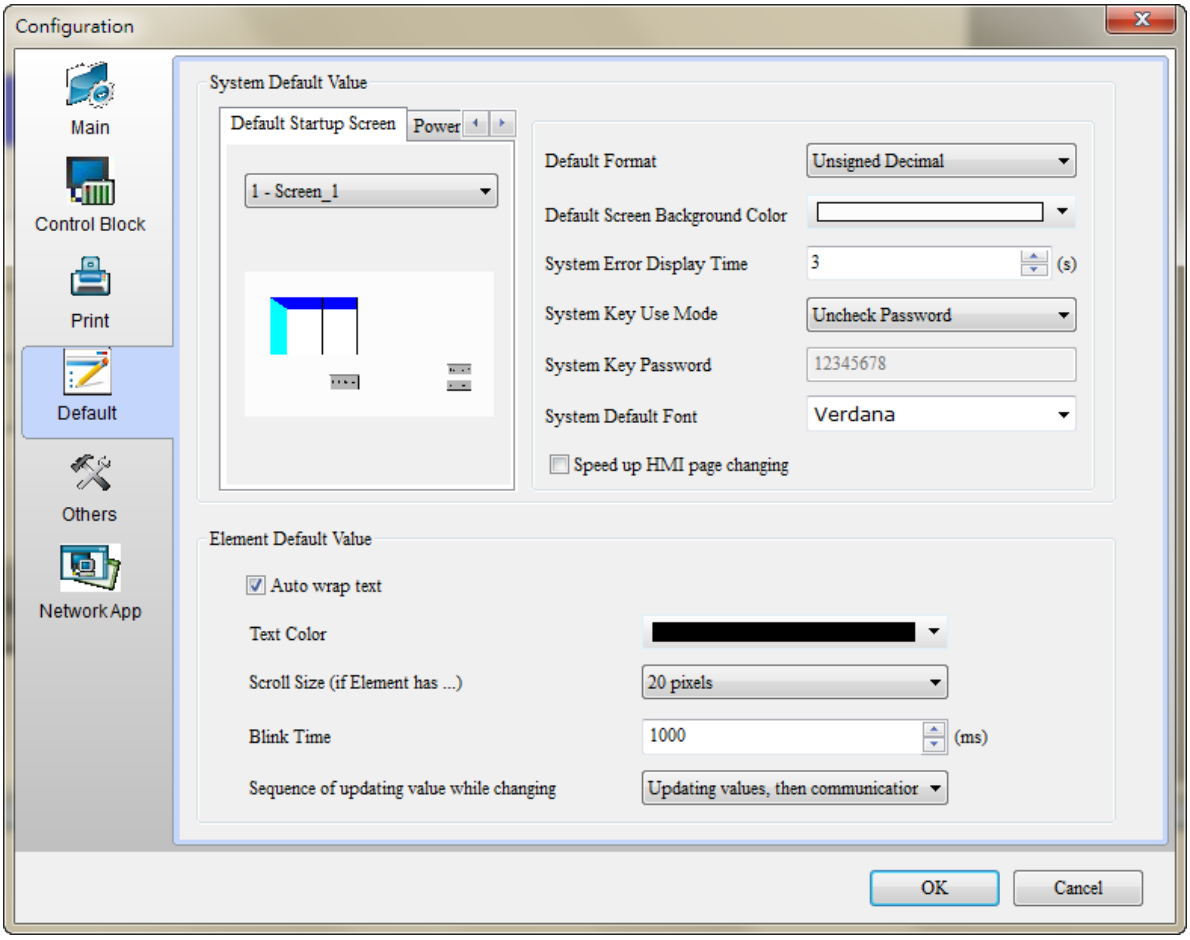
[Configuration]— [Print]

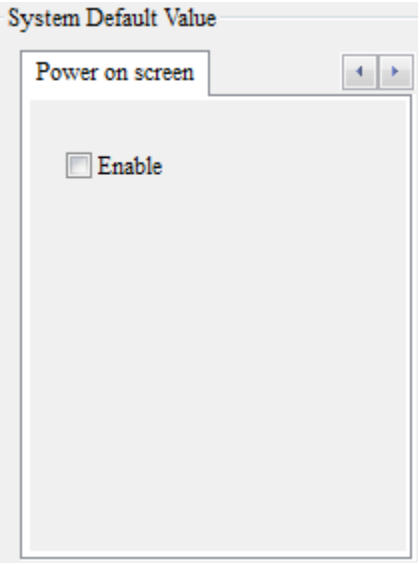
Table 2-2-8-2 Configuration-Print

<table>
<tr><td></td><td>configured to enable normal communication with the printer.
 
</td></tr>
<tr><td>Direction</td><td>➢ Direction for printing includes Vertical and Horizontal.
<table>
<tr><td>Vertical</td><td> 
</td></tr>
<tr><td>Horizontal</td><td> 
</td></tr>
</table></td></tr>
<tr><td>Auto Next Page</td><td>➢ Auto Next Page means that the printer will automatically back the paper and put on a new page to print. When the first page finishes printing, the printer will automatically change to the next page and continue printing. If unchecked, when the current page finishes printing, it will be backed and the user is asked to manually change the page.</td></tr>
</table>

[Configuration]－ [Default]

Table 2-2-8-3 Configuration-Default

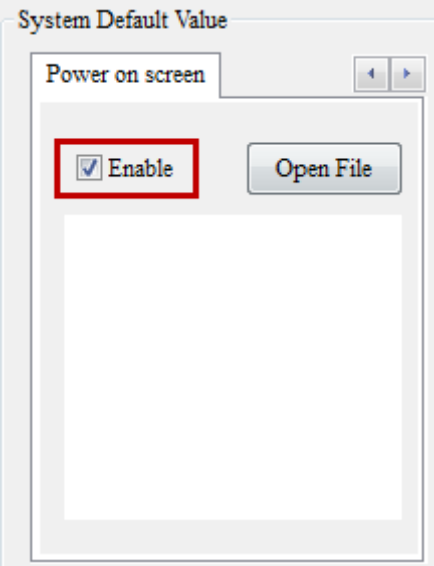


System Default	Start up Screen	➢ The initial screen when HMI starts. The user can choose other screens as preferred as the Start up screen, which is by default screen No. 1.
	➢ Power on Screen	➢ The initial screen when HMI power on. Users can set the selected figure as the power on screen. 

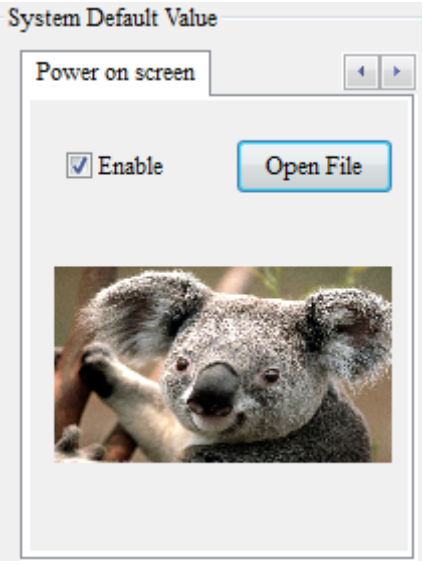
[Configuration]－ [Default]

Table 2-2-8-3 Configuration-Default

➢ Check [Enable] and click [Open File] to select the figure.



➢ Then, the creation of power on screen is complete.



When power on screen is enabled, it can be changed from [Tools] → [Download boot screen]. Users can also directly download the start-up screen via the function of [Download all data].

NOTE:

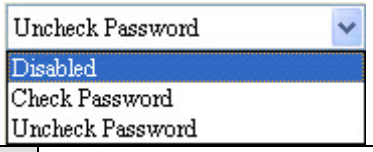
✓ Please re-power on the HMI after downloading the power on screen.

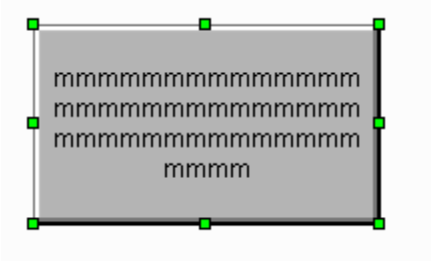
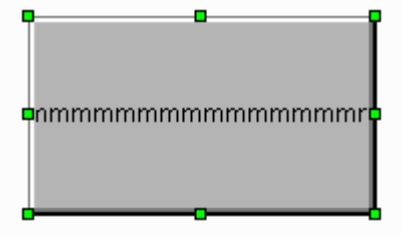
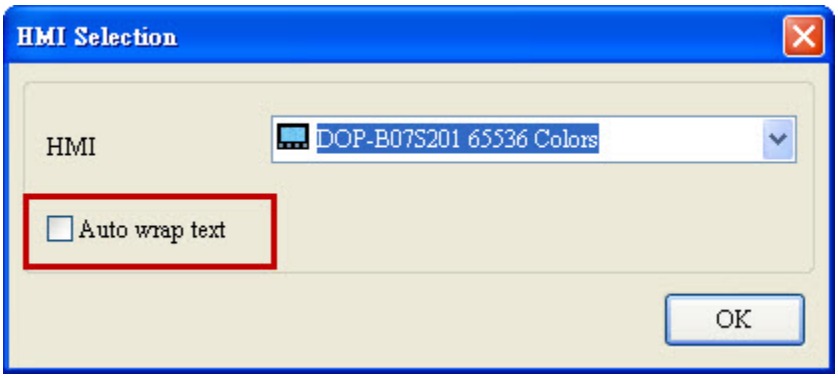
✓ The following models do not support the function of setting power on screen: B04S211, B05S100, B05S101, B07S201 and B07S211.

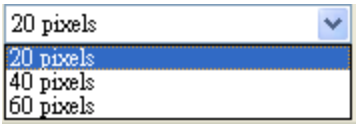
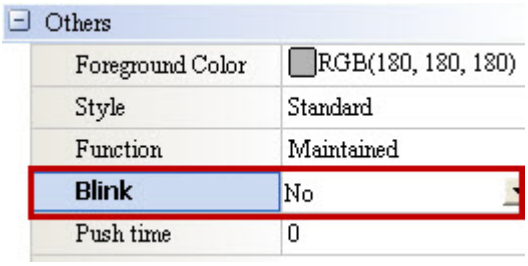
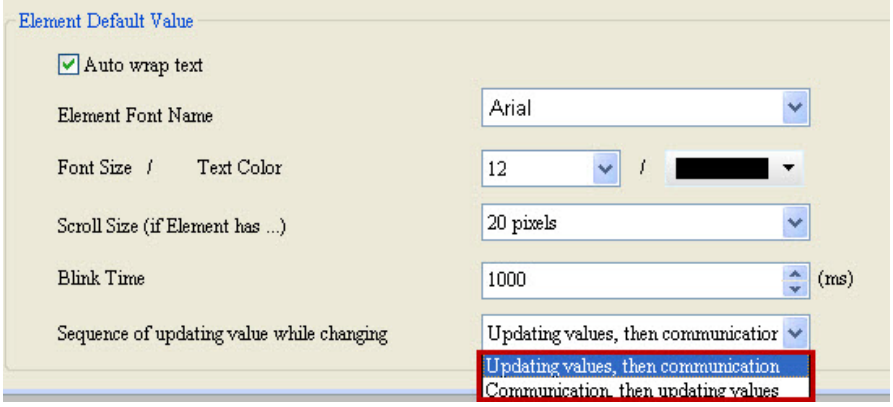
✓ The supported image file formats are BMP, JPG, GIF, ICO

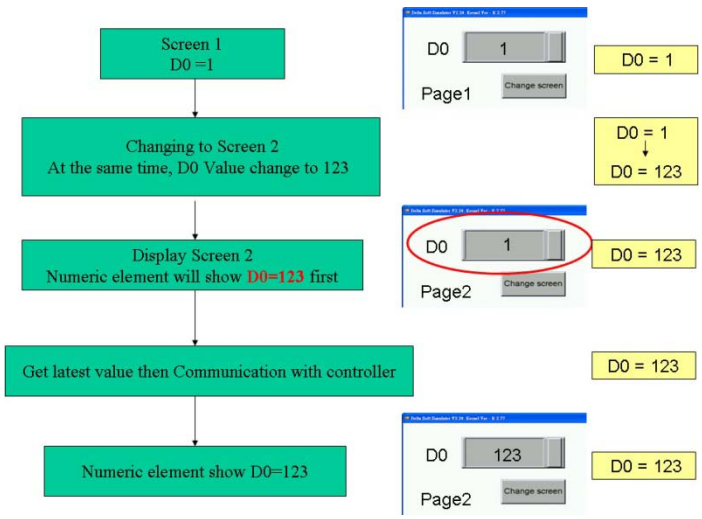
[Configuration]－ [Default]

Table 2-2-8-3 Configuration-Default

		and PNG.
	Default Format	➢ This is the default Data Format in creating an element. All default formats are Unsigned Decimal.
	Default Screen Background	➢ This determines the background color of the HMI screen. The default background color is white.
	System Error Display Time	➢ This is the time that the error message is displayed in case of error. The default length of time is 3 and the available range is 0 second ~ 5 seconds. NOTE： ✓ When this number is set to 0 seconds, in case of any system error, no message will be displayed in HMI.
	System Key Use Mode	➢ This refers to the normal response by HMI when the System Key is pressed. Available options include [Disabled], [Check Password], [Uncheck Password].  **Disabled**: If Disabled is checked, it means the HMI system screen cannot be accessed when the System Key is pressed. **Check Password**: If Check Password is selected, it means the HMI system will ask the user to enter System Key Password when the System Key is pressed. **Uncheck Password**: If Uncheck Password is selected, it means the HMI system screen can be accessed without entering the System Key Password.
	System Key Password	➢ System Key Password is needed when the System Key Use Mode is set to Check Password. The user can change the System Key Password as preferred and the default password is 12345678.
	System Default Font	➢ The System Default Font is Verdana and the user can change the default font as preferred.

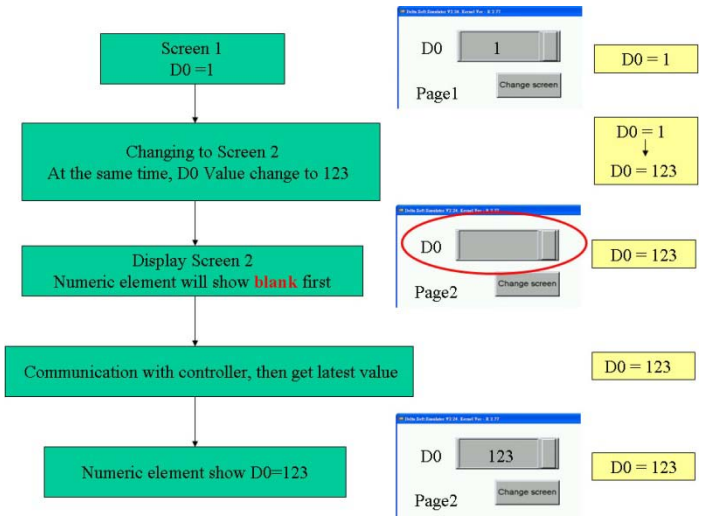
[Configuration]－ [Default] Table 2-2-8-3 Configuration-Default		
	Speed up HMI page changing	➢ This function can speed up the speed when changing pages. However, it may occupy more memory space. ➢ This function can speed up the speed when changing pages especially when the screen containsa large amount of image files and texts.
Element Default Value	Auto wrap text	➢ If [Auto wrap text] is selected, when the text is entered into any element, it will be wrapped whenever it reaches the margin, as shown in the figure below.  ➢ If [Auto wrap text] is not selected, the text will not be wrapped when it reaches the margin. Instead, it will extend across the margin, as shown in the figure below.  ➢ In addition, if the user wants to convert .dop file (Series A program) to DOPSoft for editing, the window for Auto wrap text will pop up to the user for selection. 
	Element Font Size/Text Color	➢ This refers to the default element font, font size, and text color in creating an element. The default element font is Arial, the default font size is 12, and the default text color is black.

[Configuration]－ [Default] Table 2-2-8-3 Configuration-Default		
	Scroll Size	➢ This applies to elements that have scrolls, such as tables of history data and alarm. The default scroll size is 20 pixels and the available range is 20 ~ 60 pixels. 
	Blink Time	➢ This refers to the [Blink]property of all created elements.  ➢ Blink Time is only effective when [Blink]is set to YES. The default time is 1000ms and the available range is 500ms ~ 5000ms.
	Sequence of updating value while changing	➢ Since HMI is multiplexing, sometimes the numbers will not be displayed until after the communication is completed with system heavily occupied. To avoid misunderstanding by the user, the user has the option to decide the sequence of updating value while changing. The available options are [Updating values, then communication]and [Updating values after communication].  ➢ Support this function of elements as below. ✓ Input：Numeric Entry, Character Entry, and Barcode. ✓ Button：Set, Reset, Momentary, Maintained, and

[Configuration]－ [Default] Table 2-2-8-3 Configuration-Default			
			Multistate. ✓ Indicator：Multistate Indicator, Range Indicator and Simple Indicator. ✓ Meter：Meter(1), Meter(2) and Meter(3). ✓ Display：Numeric Display, Character Display, PrestoredMessage and Moving Sign. ✓ Movement：State Graphic, Animated Graphic, Dynamic Line, Dynamic Rectangle, Dynamic Ellipse. ✓ Curve：Trend Graph. ✓ Pipe：Pipe (1) and Pipe (2). ✓ Analog：Slider.
		Updating values, then communication	➢ With this option, all value readings are normal after changing screen and is not affected by communication. 
		Updating values after communication	➢ The display of element value will be delayed due to changing screen.

[Configuration]－ [Default]

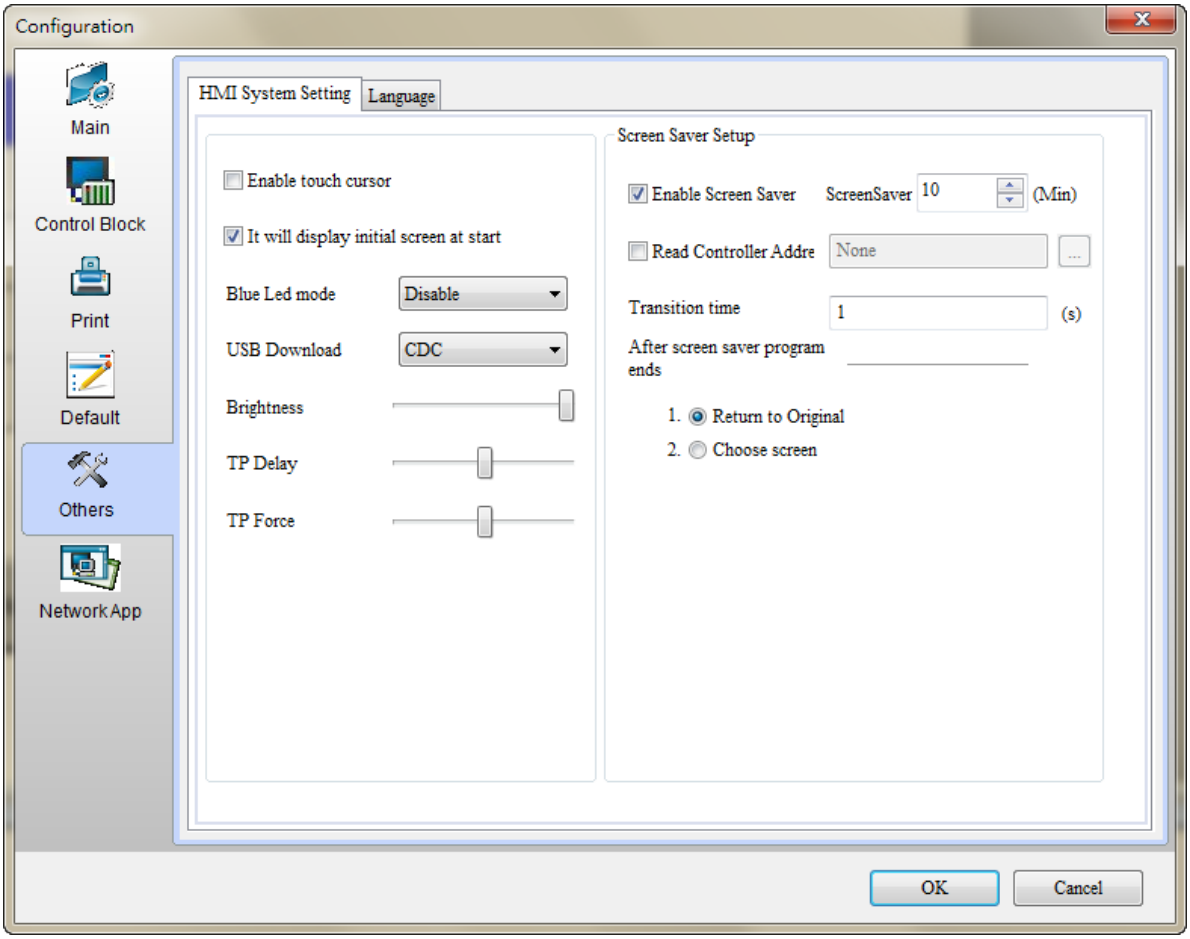
Table 2-2-8-3 Configuration-Default



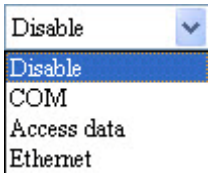
[Configuration]－ [Others]

Table 2-2-8-4Configuration-Others

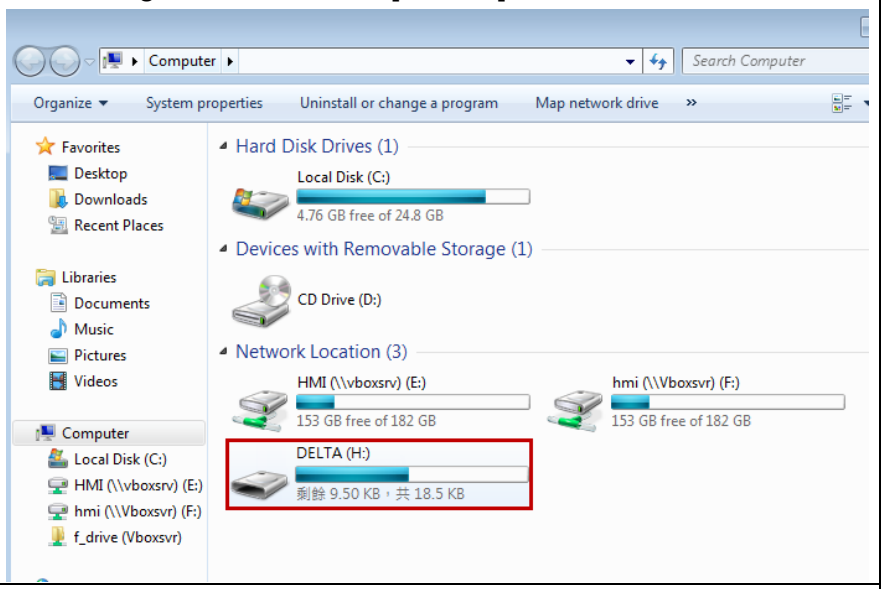
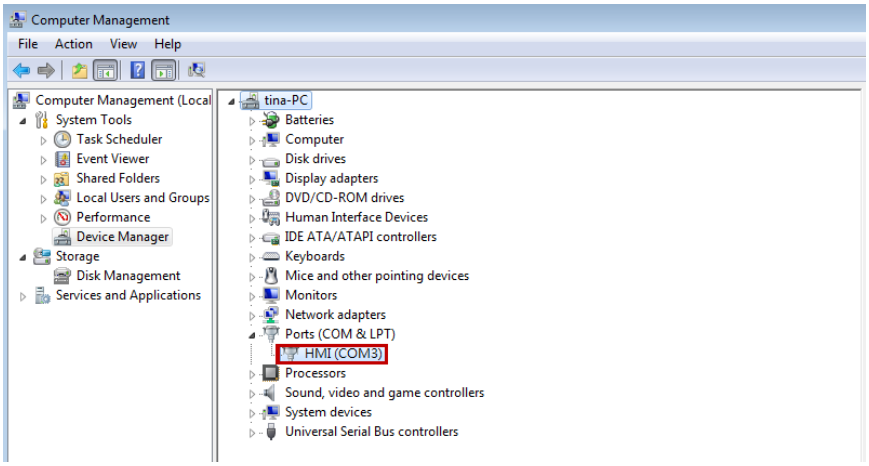
➢ HMI System Setting

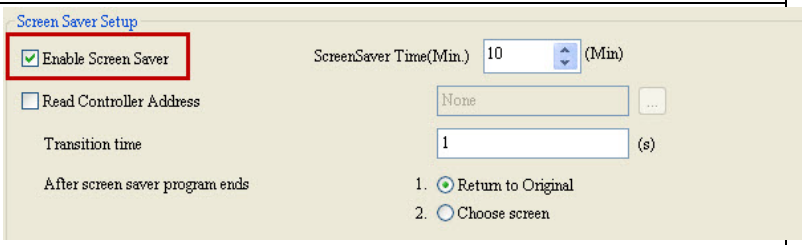
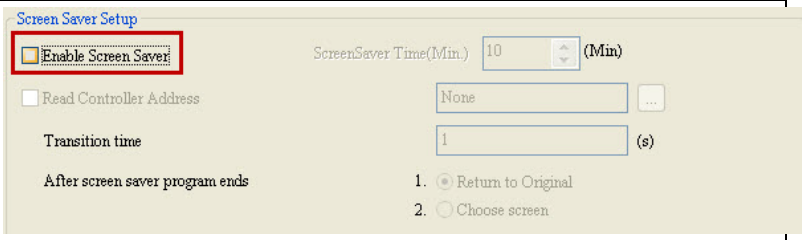


Enable touch cursor	➢ HMI provides the same cursor as in the Windows system. When the HMI screen is touched, the cursor icon will appear. ➢ HMI support wireless mouse with Unifying receiver.

<table>
<tr><td>It will display initial screen at start</td><td>➢ If display initial screen at start is checked, it means the Start up screen will be displayed every time HMI starts, as in the figure below. The user can choose whether to display the Start up screen.
</td></tr>
<tr><td>Blue LED mode</td><td>➢ Blue LED mode has four modes: [Disable], [COM], [Access Data], and [Ethernet].
 

➢ When the Blue LED mode is set to be COM, Access Data, or Ethernet, the system will show that Blue LED is blinking when the COM port is in communication, access data is in process, or Ethernet is in use, as shown in the figure below.
<table>
<tr><td>Disable</td><td>➢ No display of Blue LED regardless of the HMI status.</td></tr>
<tr><td>COM</td><td>➢ Blue LED will blink when COM is active.</td></tr>
<tr><td>Access Data</td><td>➢ Blue LED will blink when access data is in process.</td></tr>
</table></td></tr>
</table>

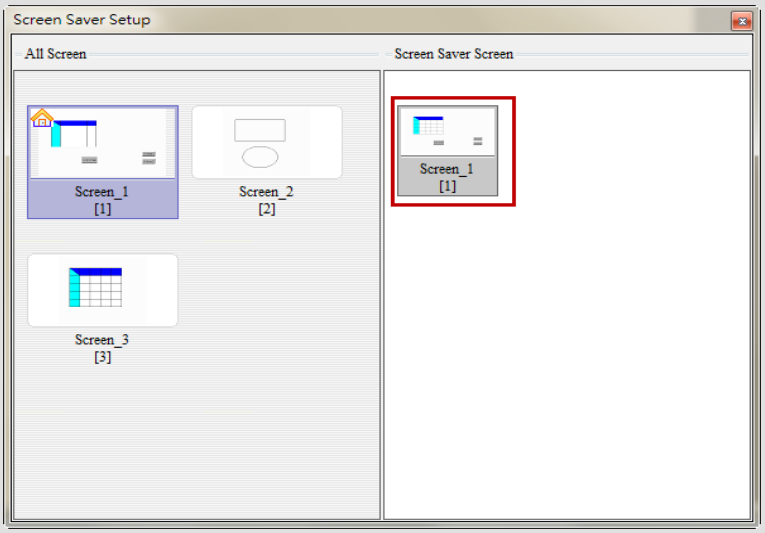
	Ethernet	➢ Blue LED will blink when the Ethernet is in use.
USB Download	Normal	➢ Normal means USBCommMode is set to 0. This is the USB upload/download mode that users have to manually install USB driver program before uploading / downloading files.
	Disk	➢ Disk means USBCommMode is set to 1. When the setting is Disk, users can check if there is a removable storage device named [DELTA] in Network Location. 
	CDC	➢ Create one project and the default USB upload/download mode as CDC. ➢ CDC means USBCommMode is set to 2. When the setting is CDC, users can go to computer ➔ right click on the mouse and select [Content] ➔ [Device Manager] and check if there is a device named [HMI] under [Ports]. 
Brightness	➢ Users can adjust the brightness of HMI.	
TP Delay	➢ It sets the delay time to process the movement when touching HMI. Move the bar to the right will shorten the delay time; move the bar to the left, the delay time will be longer.	

TP Force	➢ It sets the sensitivity to forcewhen touching the HMI panel. Left move the bar to for higher the sensitivity; right move the bar to lower the sensitivity.		
Screen Saver Setup	Enable Screen Saver	➢ Only when [Enable Screen Saver] is checked can the related screen saver settings be enabled. ➢ Once Screen Saver is enabled, touch the HMI screen once again to exit it. **Check**:  **Uncheck**:  ➢ If [Enable Screen Saver] is checked but there is no screen saver available for selection in [Screen]→ [Screen Saver], then the screen saver will appear as the dark screen in HMI. ➢ If [Enable Screen Saver] is not checked, even when a screen saver is edited in [Screen]→ [Screen Saver], the screen saver will not be enabled.	
	Screen Saver Time	➢ If [Enable Screen Saver] is checked, the user can set the time HMI is idle before the screen saver starts. The range is 1 min. ~ 100 min. with the default time of 10 min.	
	Transition time	➢ If [Enable Screen Saver] is checked, the user can set the Transition time, which is the time between screen transition. Its range is 1s ~ 255s, with the default time of 1s.	
	After screen saver program ends	Return to original	➢ If[Enable Screen Saver] is checked, the user can choose the screen to go to after screen saver program ends. It means after screen saver ends, the system will return to the screen when Enable Screen Saver was done.
		Choose screen	➢ If [Enable Screen Saver] is checked, the user can also choose the number for the screen to go to after screen saver program ends. Choose screen means the user can choose the screen number

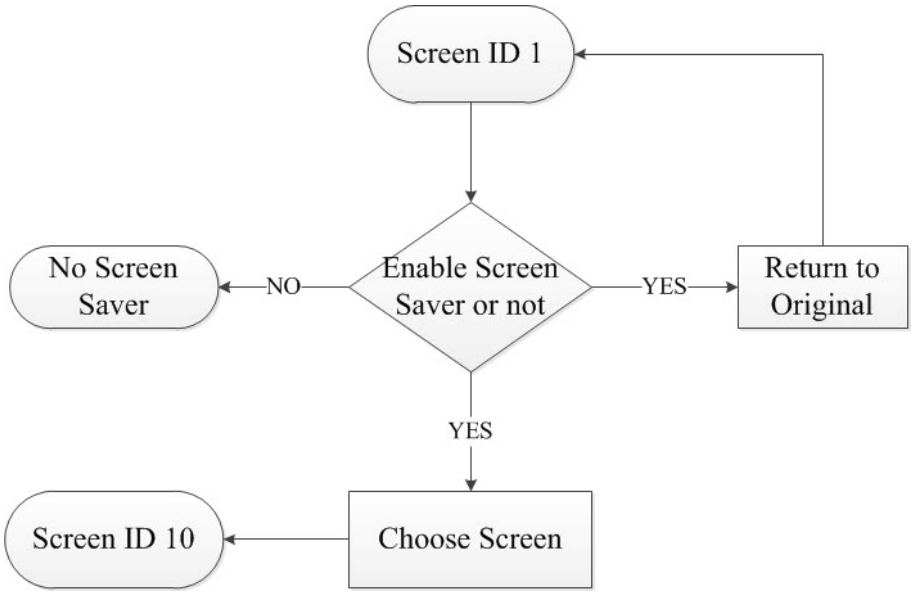
and go to the associated screen after screen saver ends.

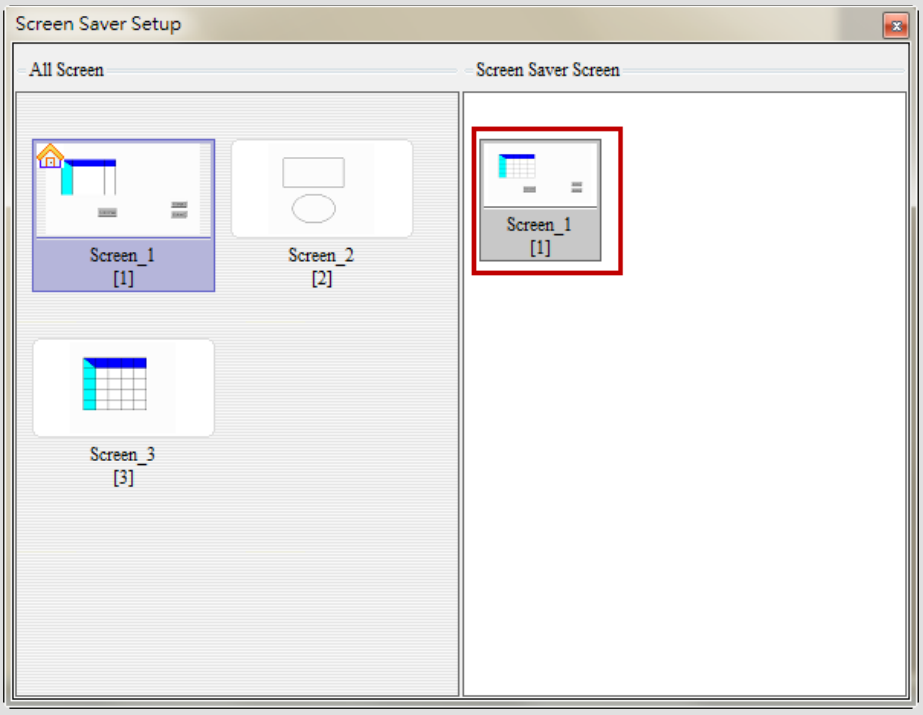
NOTE：

✓ If select choose screen, users have to create screen saver screen like as below.

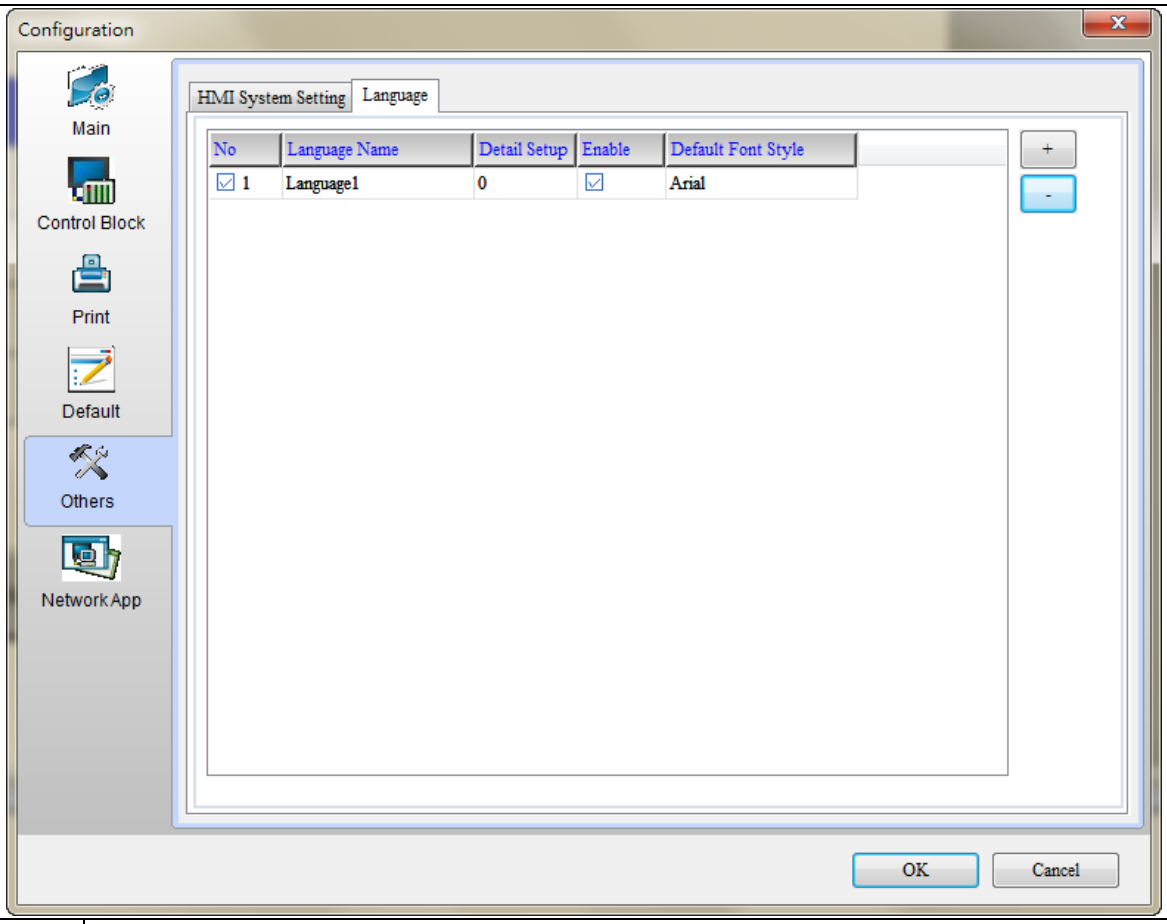


The figure below shows the flowchart of screen saver:



Read Controller Address	➢ The user can trigger the Enable Screen Saver screen by checking [Read Controller Address]. If the memory address being read is 0, the screen saver will end. Otherwise, Enable Screen Saver is active. ➢ If [Read Controller Address] is not checked to control the Enable Screen Saver screen, screen saver will be activated by the wait time. In addition to setting it in software, the user can also set the wait time by entering the system screen→ [System Setting]→ [MISC.]to configure [Screen Saver Time(Min.)]. NOTE： ✓ If would like to trigger read controller address to start screen saver, users should create screen saver screen at first like as below. 

➢ <u>Language</u>

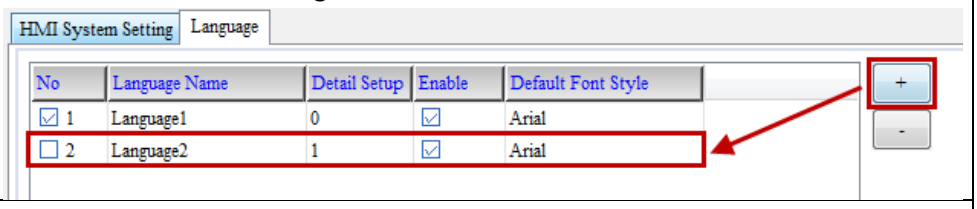


Multi-Language Setup

➢ The function of Multi-Language supports up to 32 languages. All languages can be set up as long as it does not exceed 32 languages. Please see Chapter 25, Multi-Languages, for details.

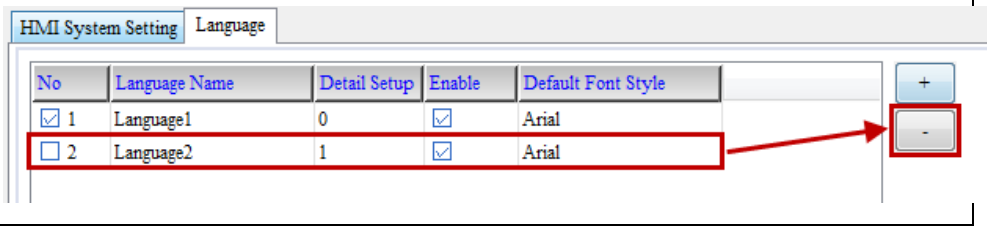
Add

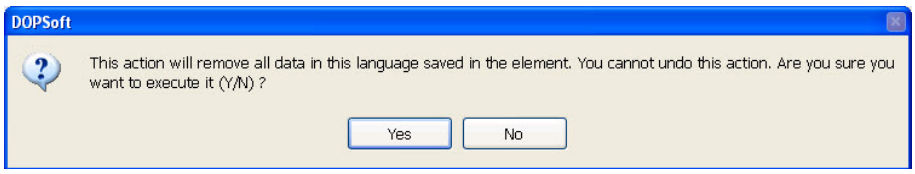
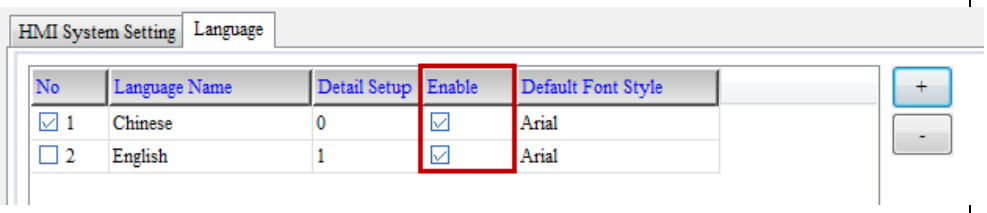
➢ Multi-Language Setup allows the user to add, change, and delete the language settings. There is a default [Language 1], of which the user can change the name to Default. The user can add new languages by clicking the ＋ button on the right, as shown in the figure below.

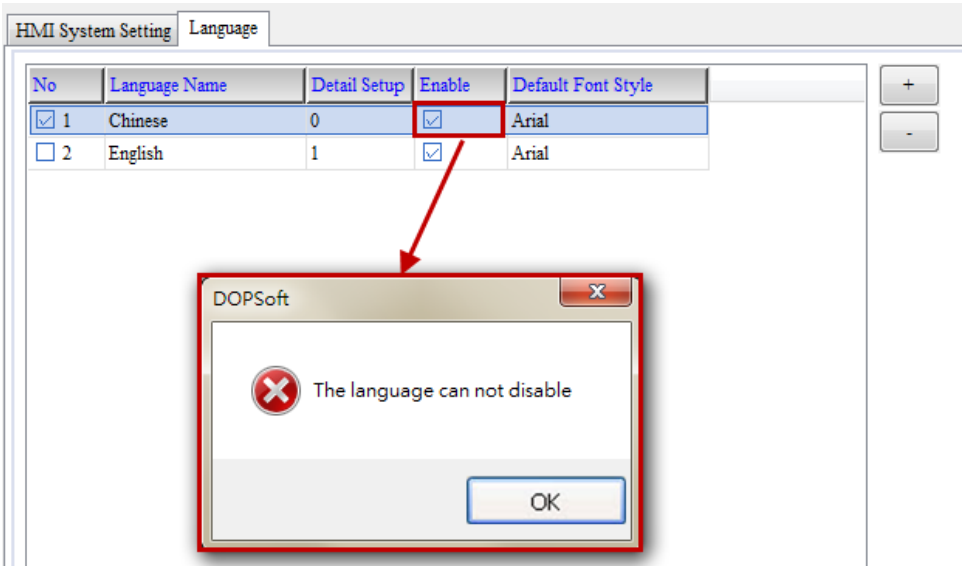


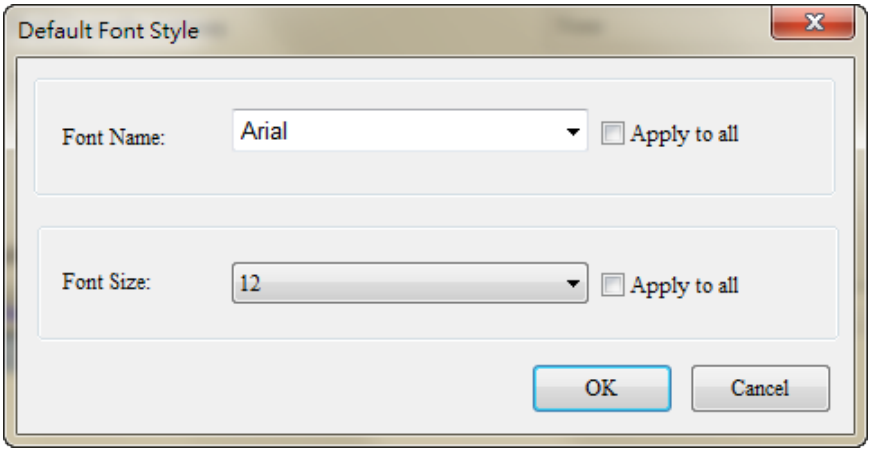
Delete

➢ To delete a language, please first select the language to be deleted, followed by clicking the ― button on the right. After that, the software will open up warning windows that ask if the user wants to delete the language.



<table>
<tr><td></td><td></td><td colspan="2"> 
</td></tr>
<tr><td></td><td rowspan="2">Change</td><td>Language Name</td><td>➢ Language Name can be determined by the user according to the associated nation or other preferences.</td></tr>
<tr><td></td><td>Detail Setup</td><td>➢ Detail Setup contains the value by which the language is switched. Software will switch languages according to the [System Control Flag] in [Control Block]. The [Language Change]of button element also switches to the corresponding language according to this value.</td></tr>
<tr><td></td><td>Enable</td><td colspan="2">➢ The user can decide whether to enable the newly added other languages. As shown in the figure below, the newly added language No.2 "English" is enabled.
 

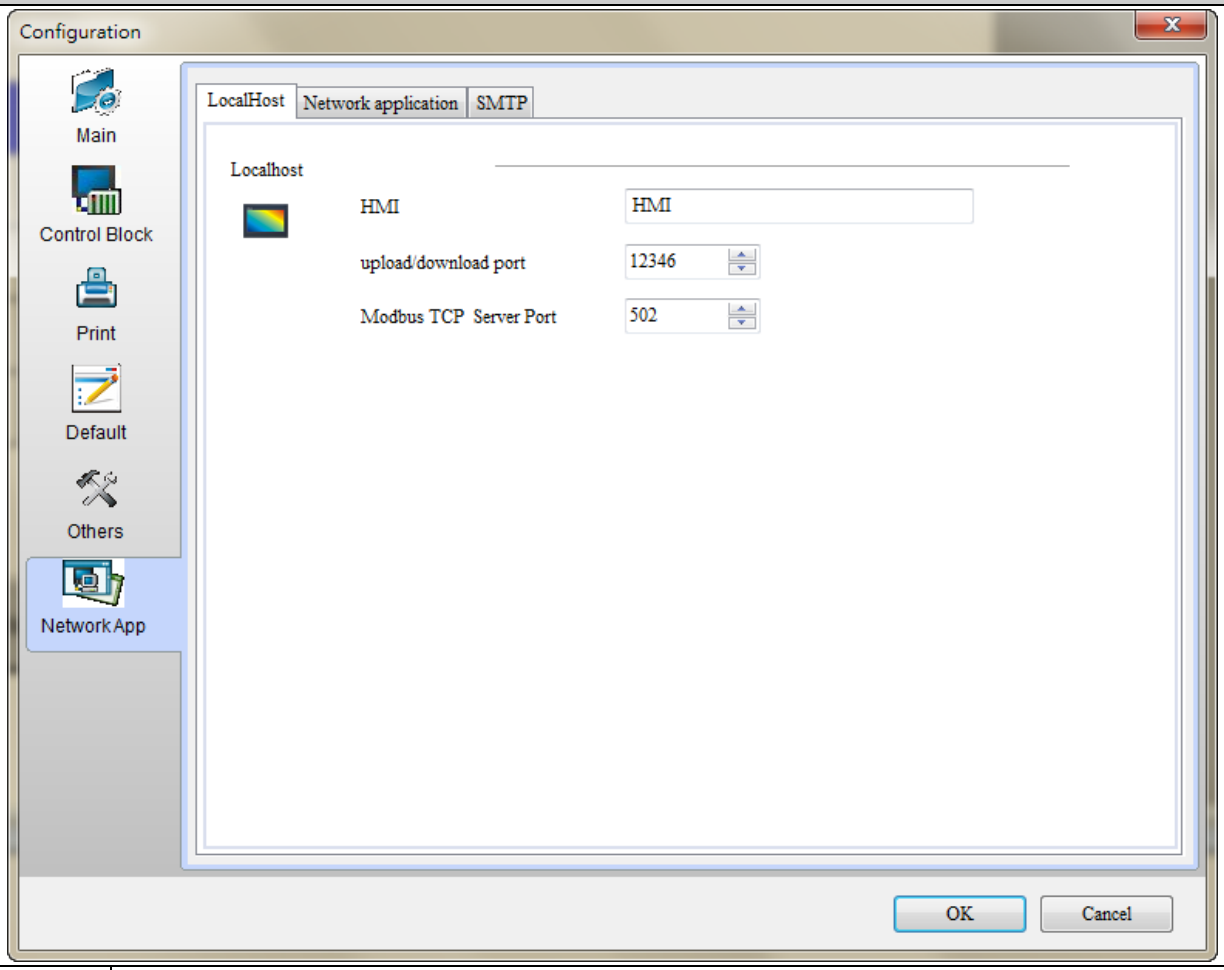
➢ If [Enable]for the [Default] language is unchecked, a warning window will pop up to notify the user that the associated language cannot be disabled.
 
</td></tr>
</table>

	Default Font Style	➢ According to the selected language, users can apply the default font name and size.  ➢ If users choose to apply font name or font size, it will only take effect to the newly created elements after applying. ➢ If users choose to apply both, font name and font size, the effect will be taken to the original and newly created elements. NOTE： ✓ Elements that applied with font name and font size are the one that users can enter text.

【Configuration】 - 【Network APP】

Table 2-2-8-5 Configuration-Network APP

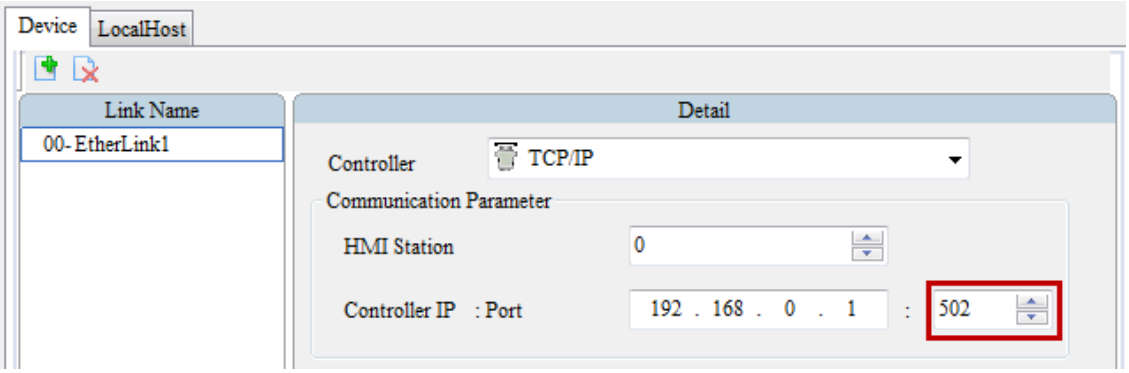
➢ LocalHost



HMI	➢ The user can define the HMI name as preferred, which can be used to identify HMI. When remote monitoring or data logging is used over the network, the HMI name can be used to quickly identify the HMI being used.
Upload/ Download port	➢ This port is the designated link address, which enables communication between different programs in the computer. There are 65536 such ports, some of which are reserved for specific programs. ➢ The default Upload/Download port of HMI is 12346.
Modbus TCP Server Port	➢ The default communication port of Modbus TCP Server is 502. ➢ This communication port has to be the same as the one of Modbus TCP/IP controller.

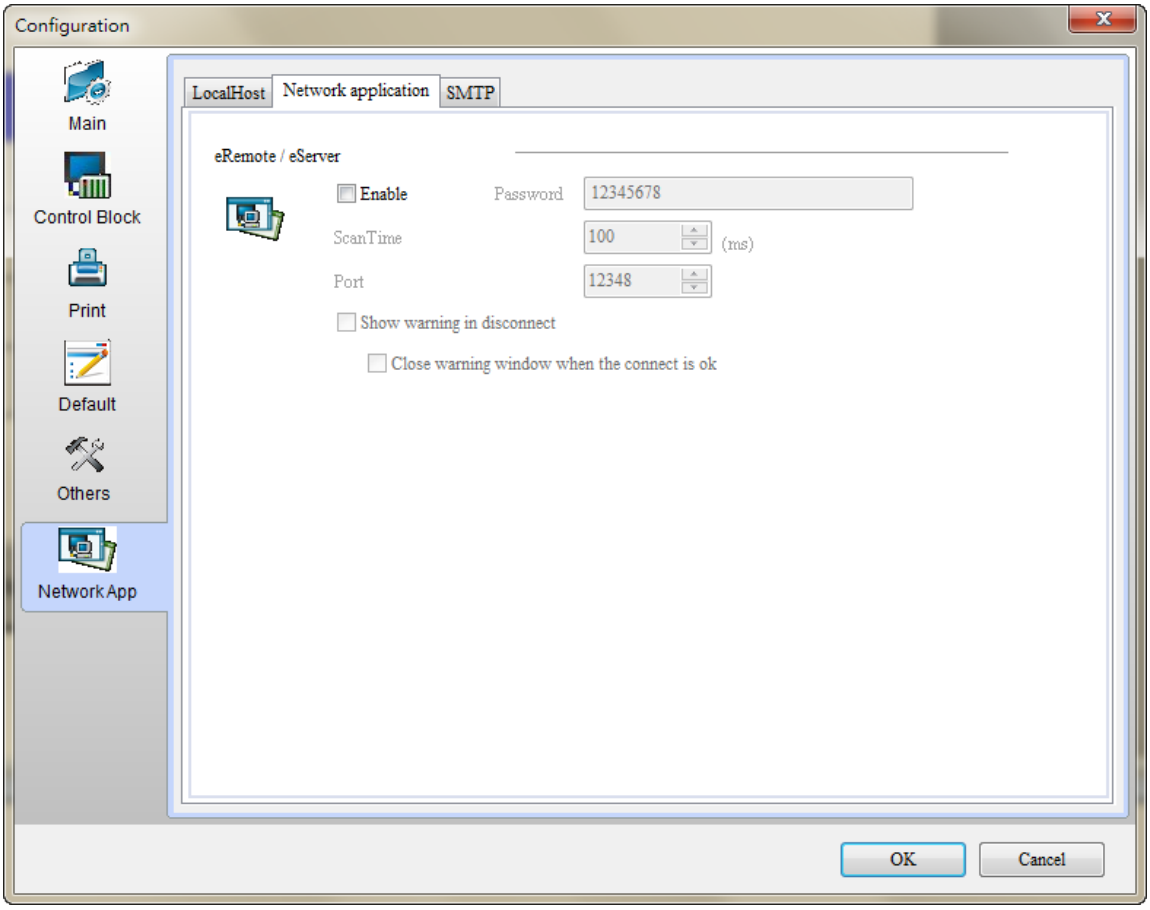
【Configuration】 - 【Network APP】

Table 2-2-8-5 Configuration-Network APP

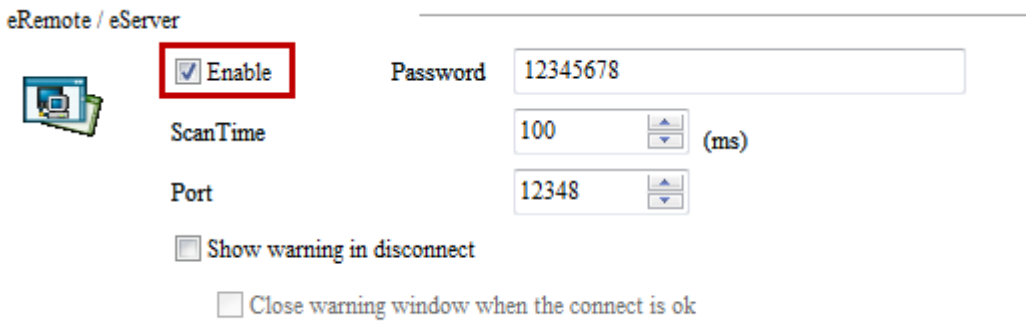
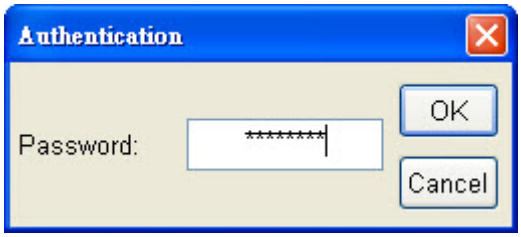
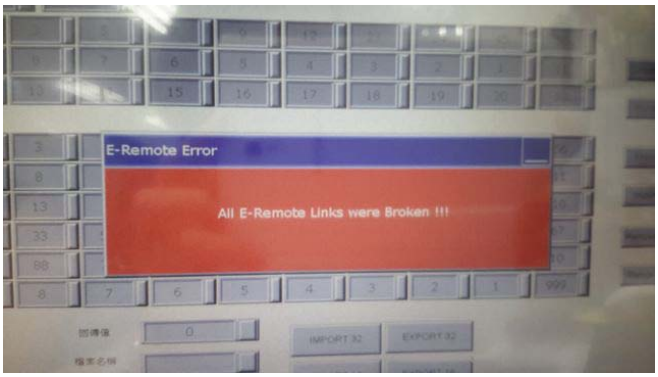


- Users can determine the communication port number. Please make sure the setting of both has to be the same.
- If HMI connect with Modbus software of PC, please change this Modbus TCP Server Port.

➢ Network Application

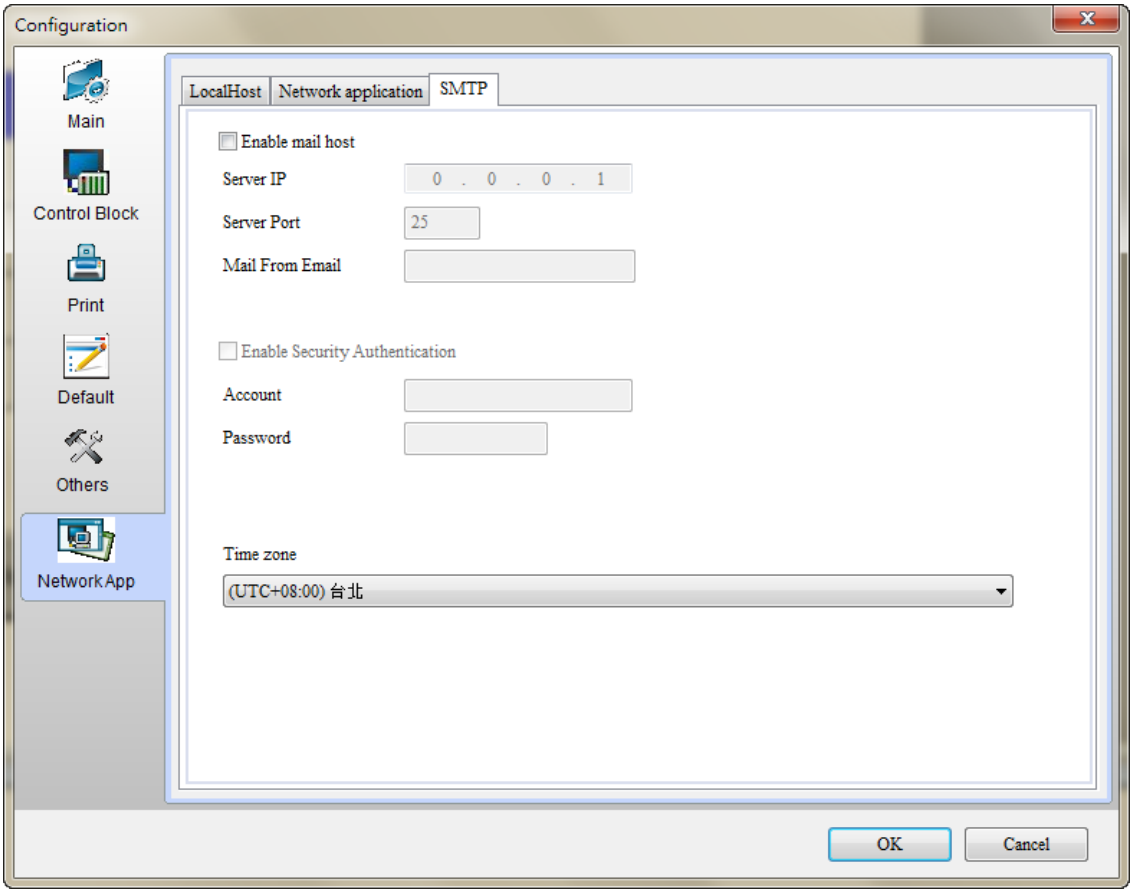


Enable	➢ Only when [Enable] is checked can [Password], [Scan Time], and [Port]be configured.

【Configuration】 - 【Network APP】 Table 2-2-8-5 Configuration-Network APP	
	
Password	➢ The password can be changed by the user as needed. The default is 12345678. ➢ This password is required when one needs to access or monitor HMI project data after executing eServer and eRemote. 
Scan Time	➢ Scan Time is the interval between each scan by eServer and eRemote. The available range is 100 ms ~ 5000 ms and default is 100 ms.
Port	➢ The port of eServer and eRemote is set to be 12348 and is different from the Upload/Download port in HMI. Different programs have their own designated ports.
Show warning in disconnection	➢ This function is enabled once it is activated. ➢ When the communication between HMI and eServer or eRemote is disconnected, a warning message will show. 

【Configuration】 - 【Network APP】 Table 2-2-8-5 Configuration-Network APP	
Close warning window when the connection is ok	➢ When "Show warning in disconnection" is checked, this function is activated. ➢ When the function is checked, the warning message will continuously pop up until the connection between HMI and eServer or eRemote is resumed. ➢ When the user does not check this function, the warning message will only pop up for once.

➢ **SMTP**



➢ SMTP stands for Simple Mail Transport Protocol, which is used to transmit the mail to be sent out. SMTP is a protocol that regulates the mail transmission from the source address to the destination address and controls how the mails are transferred.

➢ DOPSoft offers the SMTP service for the user to receive the alarm by email in case of emergency.

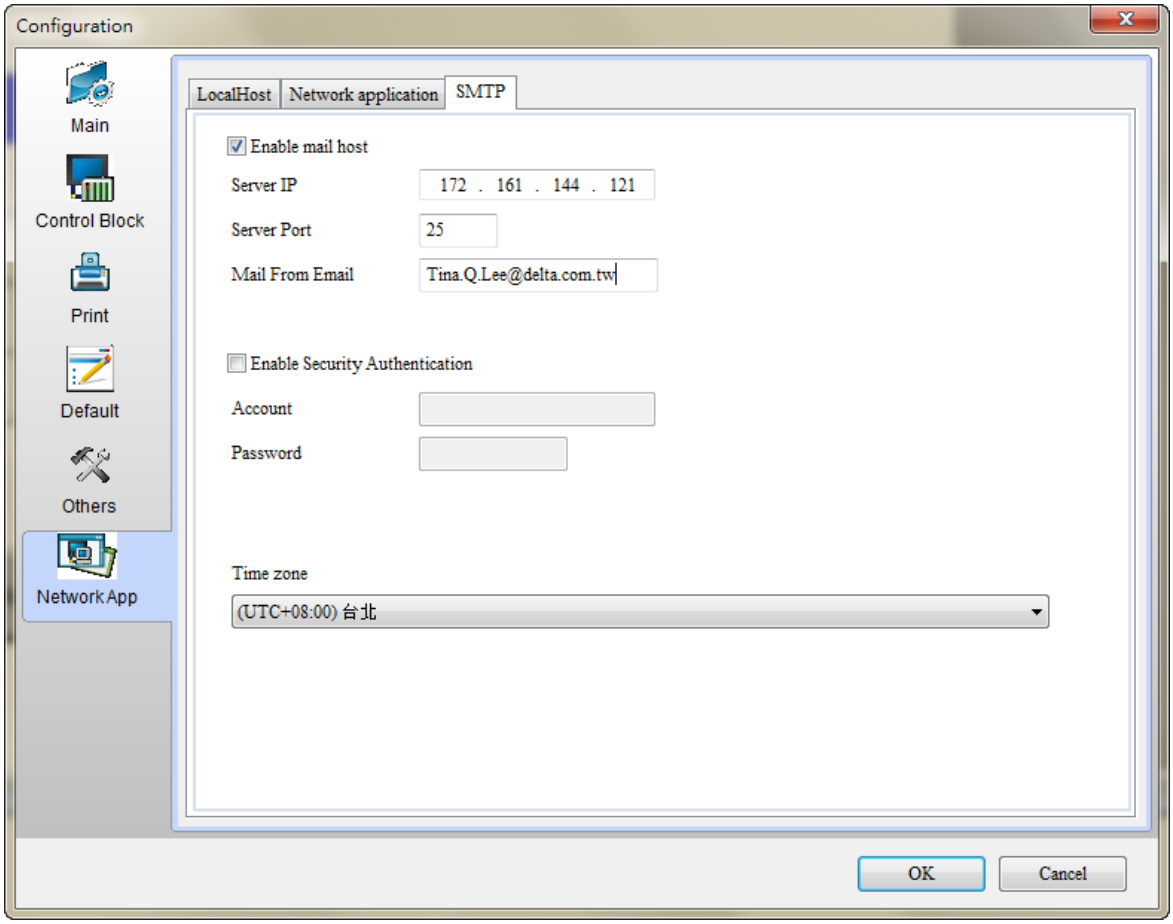
➢ Once SMTP parameters are set, the user must enter [Options]→ [Alarm Setup]→ [Mail sever] to enter receiver's email address and related warning information.

➢ The setup steps are as follows:

I. Enter the [Options]→ [Communication Setting]→ [Ethernet]page and set up SMTP.

【Configuration】 - 【Network APP】

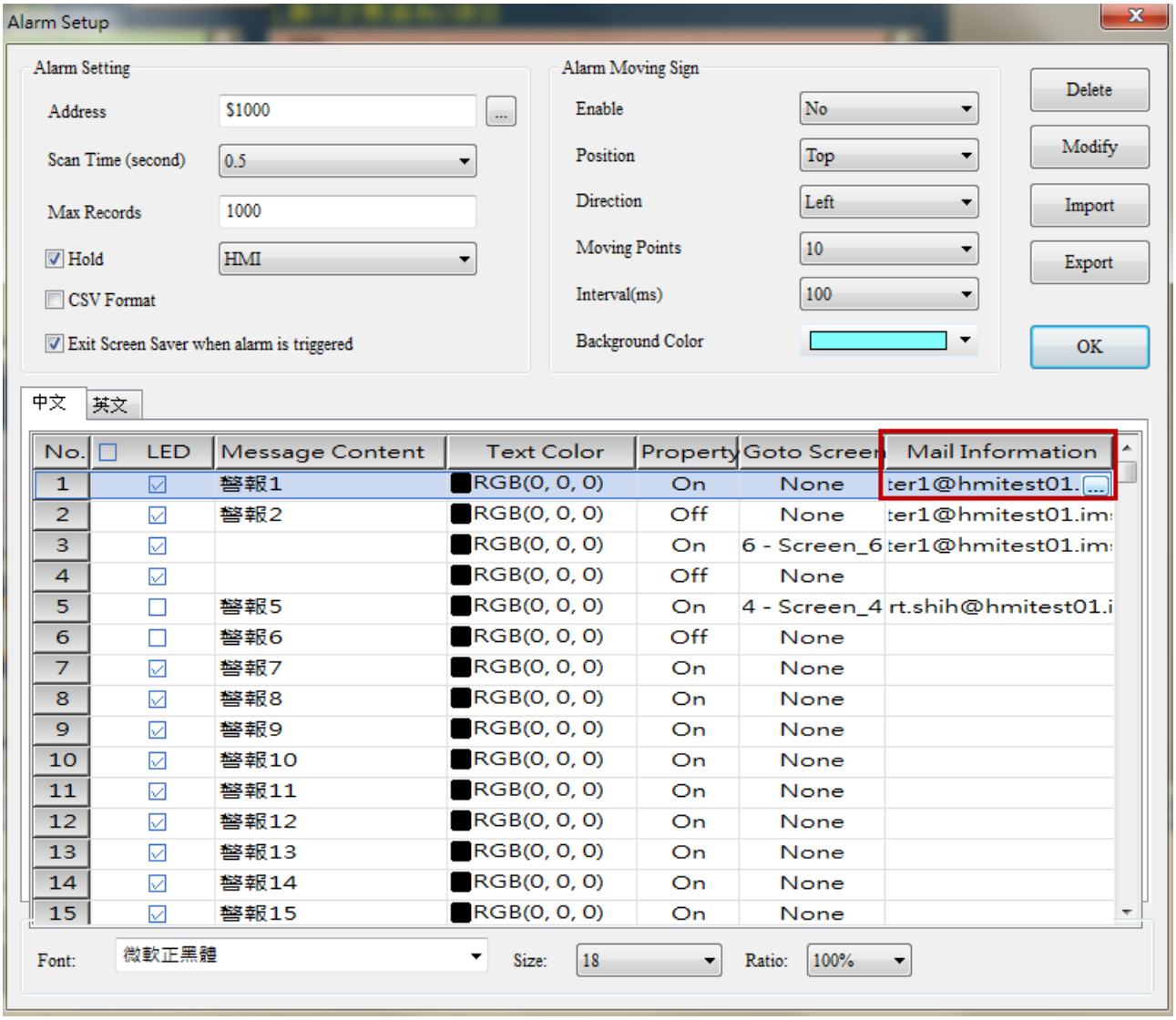
Table 2-2-8-5 Configuration-Network APP



II. Enter [Options]→ [Alarm Setup]to set up the email information.

【Configuration】 - 【Network APP】

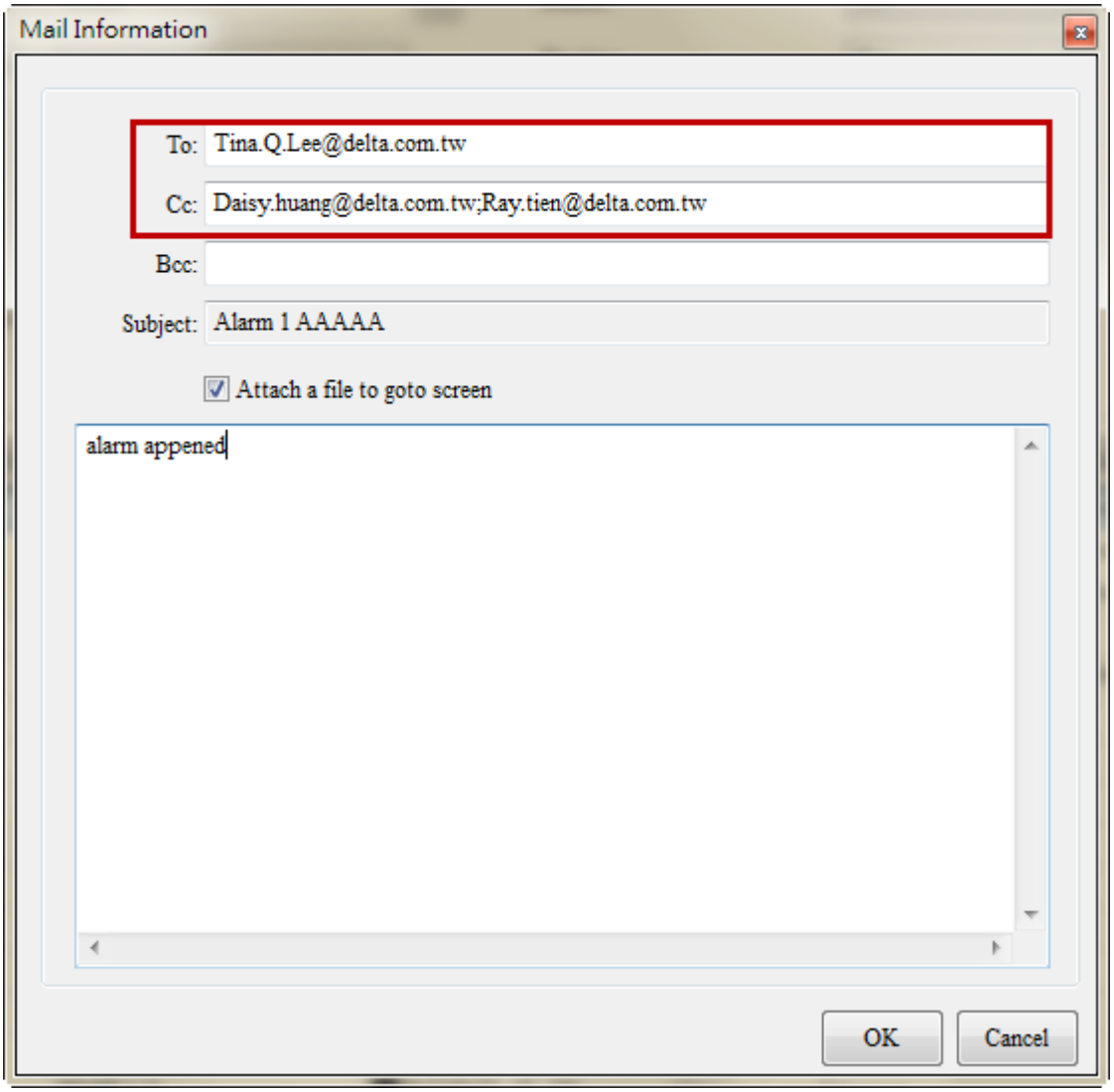
Table 2-2-8-5 Configuration-Network APP



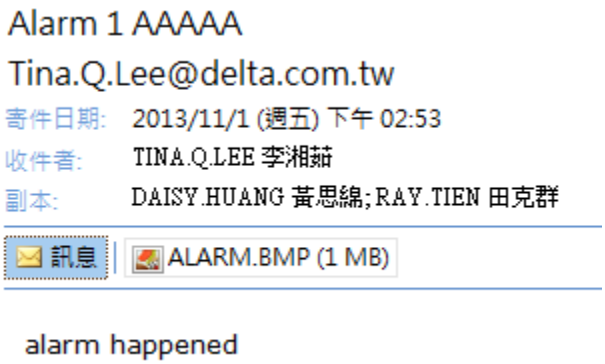
III. Enter the users to receive mails and check whether to send the alarm screen.

【Configuration】 - 【Network APP】

Table 2-2-8-5 Configuration-Network APP



IV. Check the mailbox to see if there is any new mail.



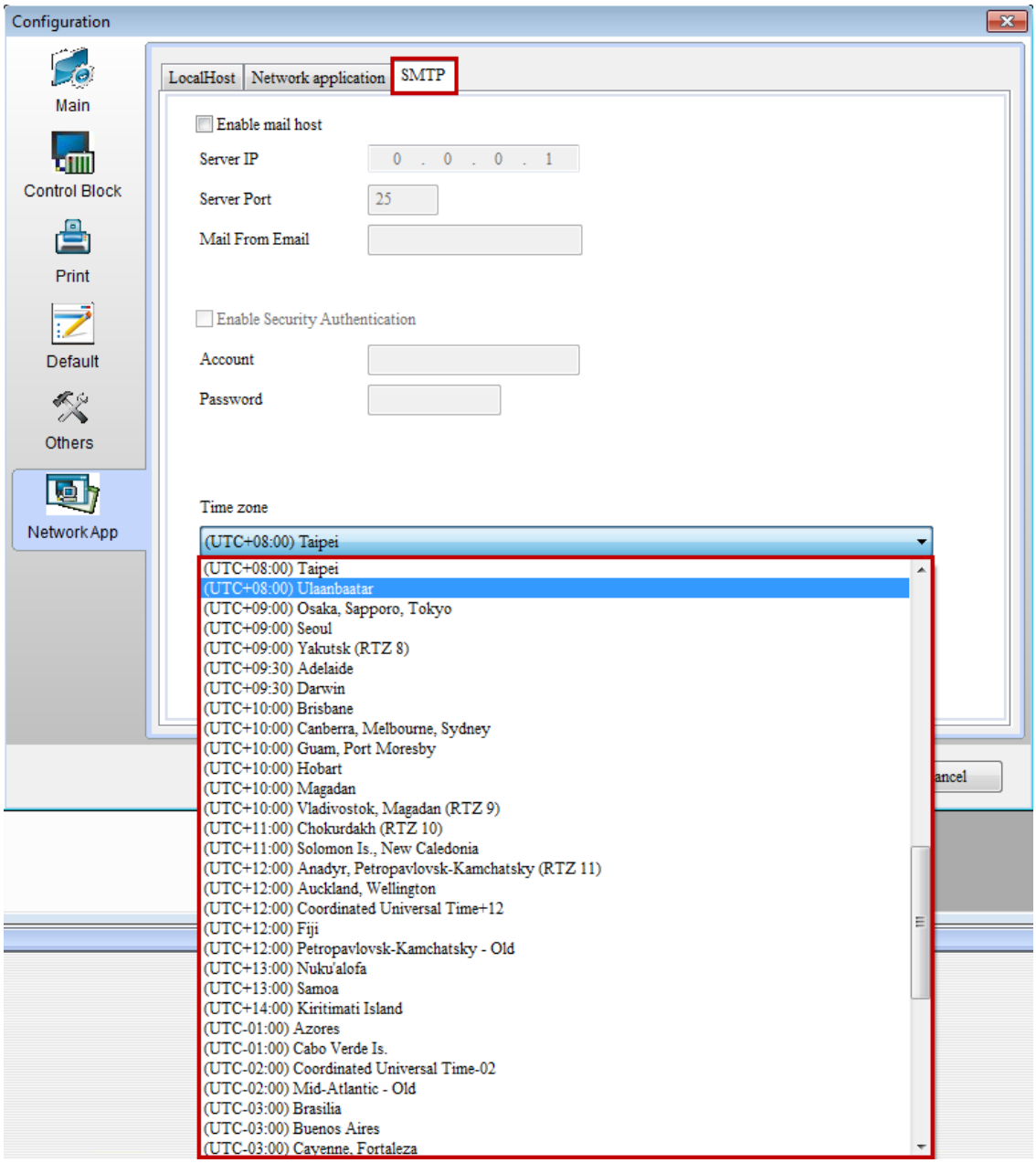
➢ If the user wants to enable SMTP, please first check [Enable Mail Host] before setting the host IP address, host port, account, and password security authentication.

Enable Mail	IP address of Mail Host	This IP address corresponds to the Mail Server created by user. Before using SMTP, please first have the Mail Server

【Configuration】 - 【Network APP】 Table 2-2-8-5 Configuration-Network APP		
Host		ready.
	Mail Host Port	The default mail host port is 25, which is the SMTP communication port.
	From Address	Please fill in sender's mail address.
➢ Before enabling account security authentication, [Enable Mail Host] must first be checked before setting up the associated account and password.		
Enable Security Authentication	Account	The account and password must comply with what is required by the SMTP server. When the SMTP Mail Server is being set up, if security authentication for account and password is checked, a set of account and associated password needs to be entered first. The entered account and password are used to check if the receiver is a legitimate system user at the backend to prevent unclaimed mails from occupying the system resource, which may cause invisible issue of mail security.
	Password	
Time Zone	➢ This function enables users to select the local time zone to avoid the trouble caused by time difference in each area and the time it sends alarm reminder will be more accurate.	

【Configuration】 - 【Network APP】

Table 2-2-8-5 Configuration-Network APP



2-2-8-2 Communication Setting

If the user wants to configure the communication parameters or Ethernet communication settings, all can be done through [Options]→ [Communication Setting]to configure COM 1,COM 2,COM 3 and the associated Ethernet the parameters.

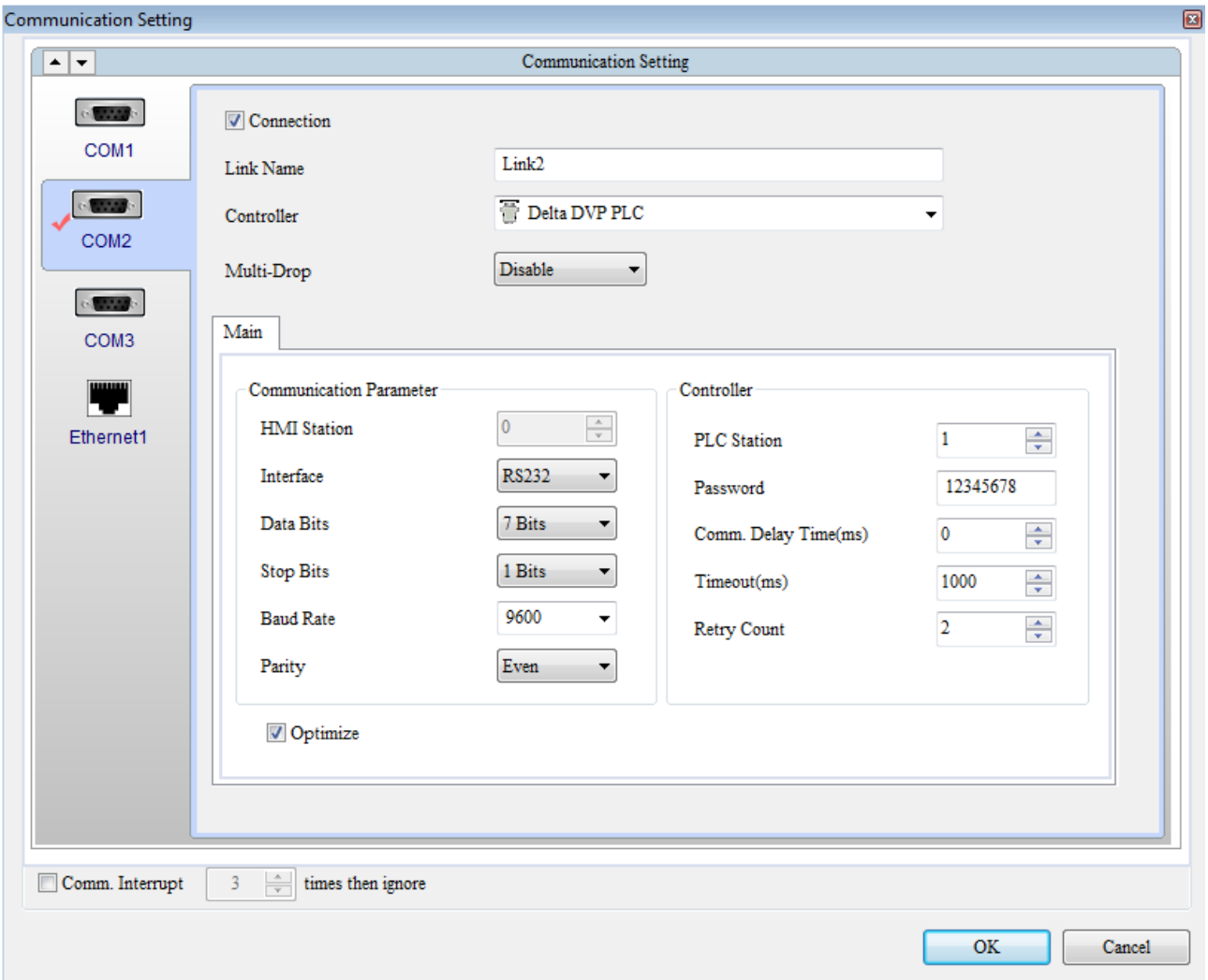
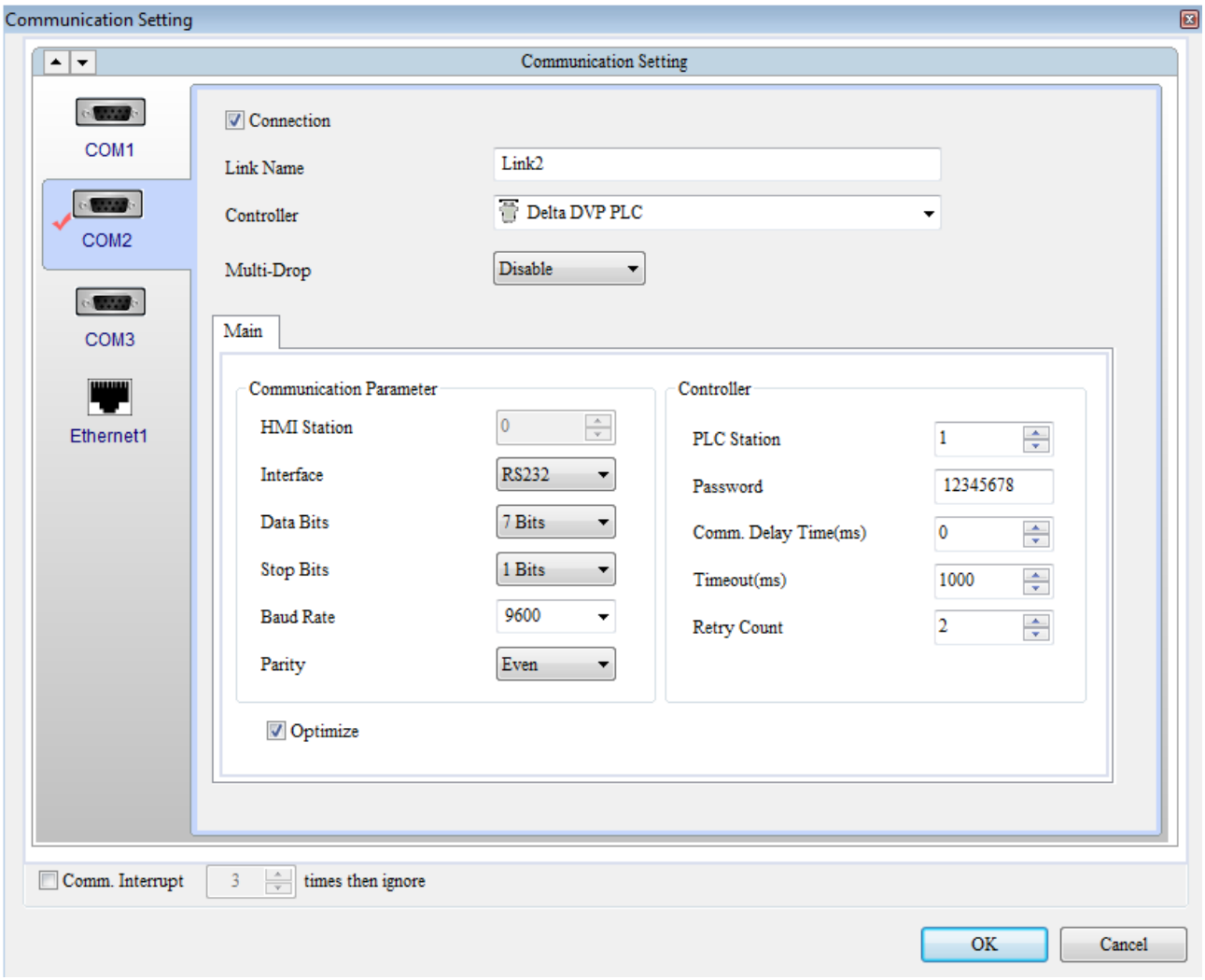


Figure 2-2-8-2 Communication setting

Details of communication parameters of COM ports, controller setting, and the associated Ethernet parameter setting will be given below.

[Communication Setting]

Table 2-2-8-6 Communication Setting

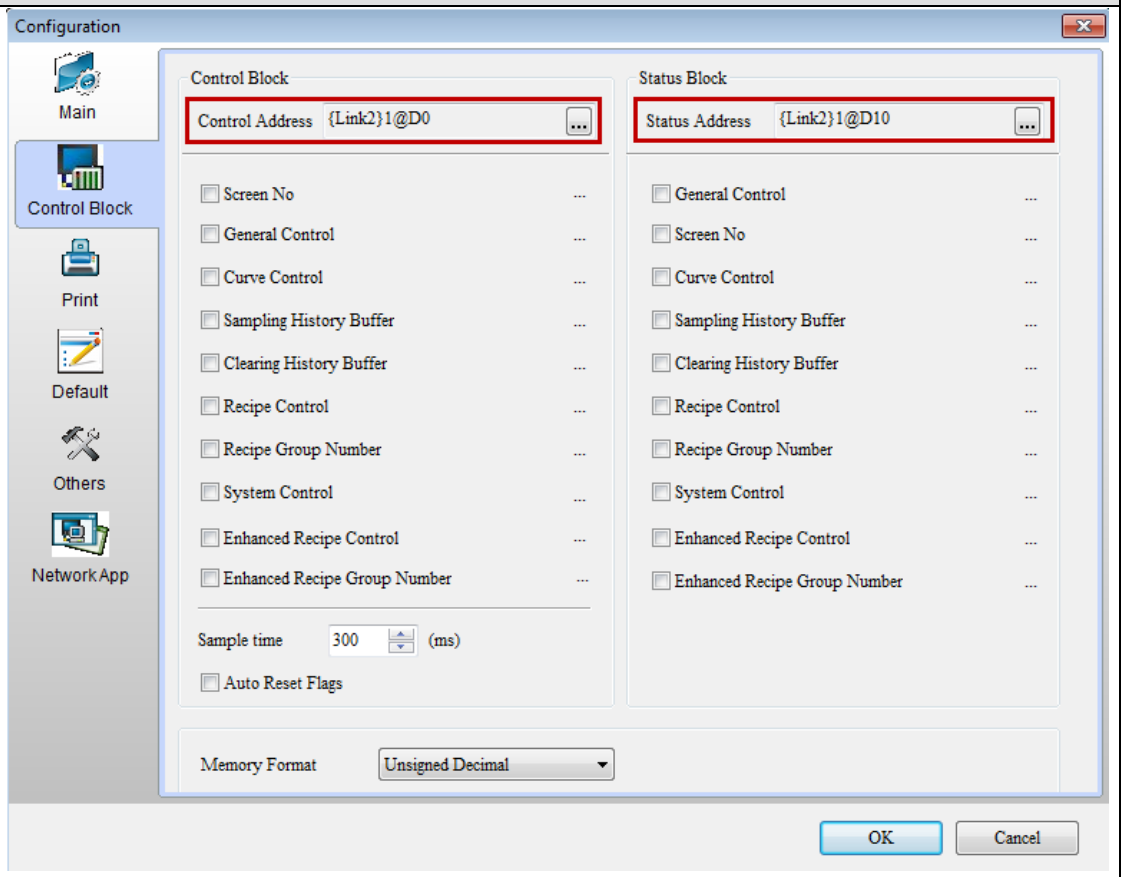


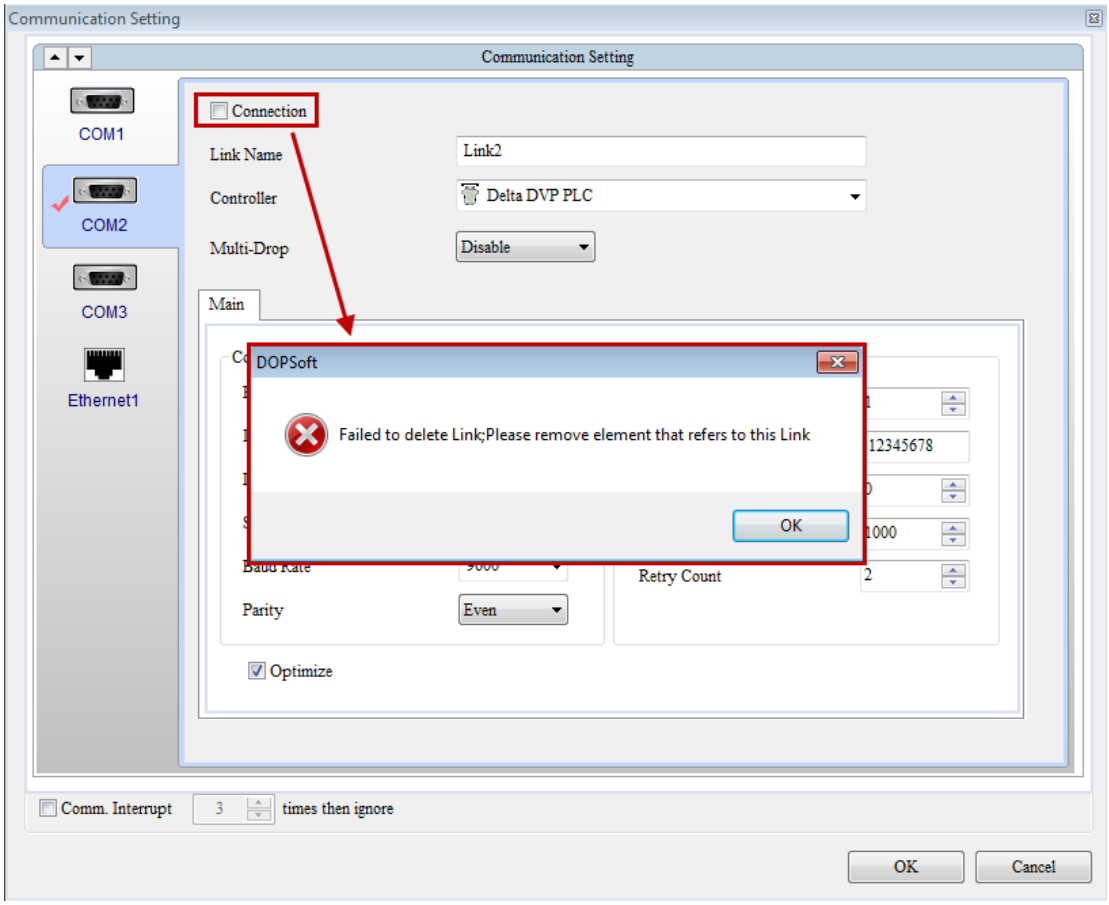
➢ **The following are detailed descriptions for the settings of communication parameters and controller of COM 1, COM 2, and COM 3.**

Connection	➢ [Connection] means to enable COM port for communication. The user can choose which COM port to be enabled, such as COM 1, COM 2, or COM 3. ➢ Only when [Connection] is checked can the user configure the associated [Link Name] and choose the [Controller](i.e., PLC) to use. Please see the Link Manual for the selection and use of controllers. ➢ If [Connection] is unchecked, the software will detect that the current Link2 has been used in the Control Block and Status Block. A corresponding warning will pop up to remind the user that the link name cannot be removed since it is currently referenced by the element.

[Communication Setting]

Table 2-2-8-6 Communication Setting





➢ If the user wants to cancel using Link2 on COM 2, there are three options:

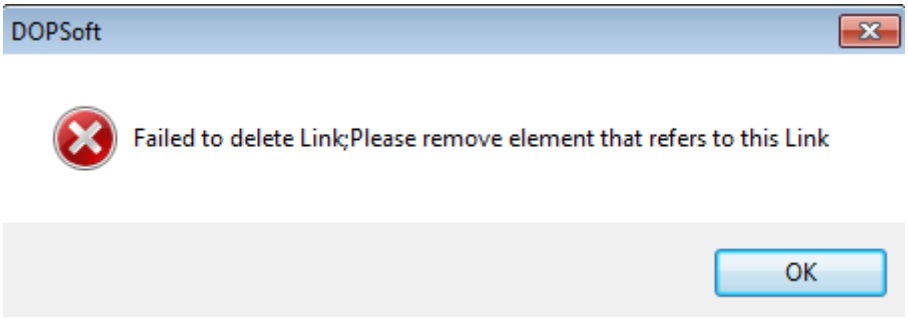
[Communication Setting]

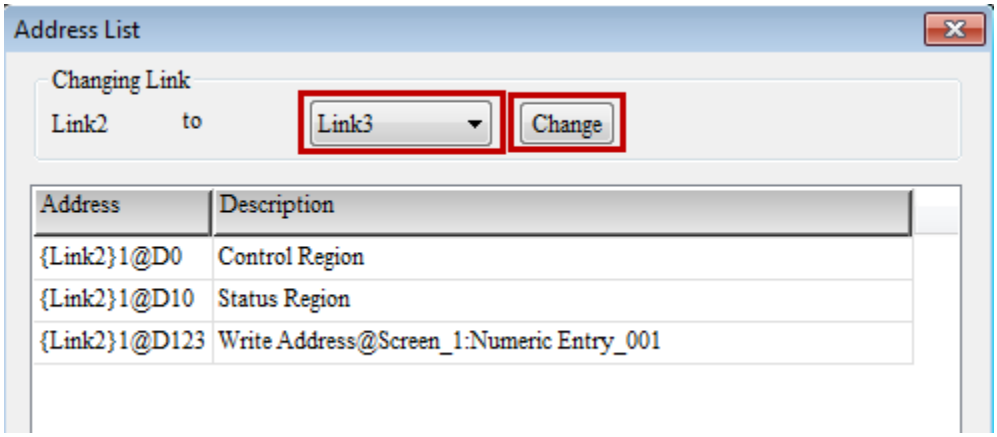
Table 2-2-8-6 Communication Setting

A. Add new controller on COM 1 or COM 3 and select to the same controller.

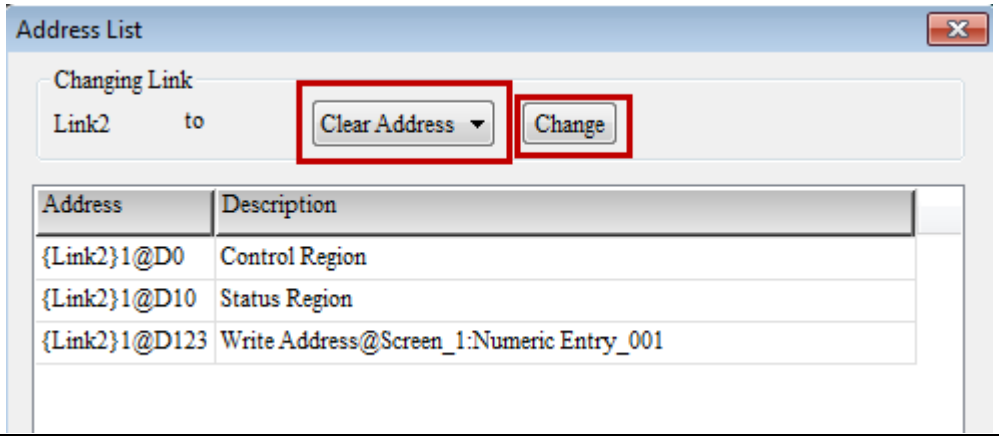
I. Add another Link on COM 3 or COM 1. Then, select the same controller. Click OK to complete the setting. (This example is to add COM 3.)

II. Cancel the connected selection on COM 2. A delete failed message will pop up. Click OK to convert the Link address. Select the converting Link name (Link3), then click convert.



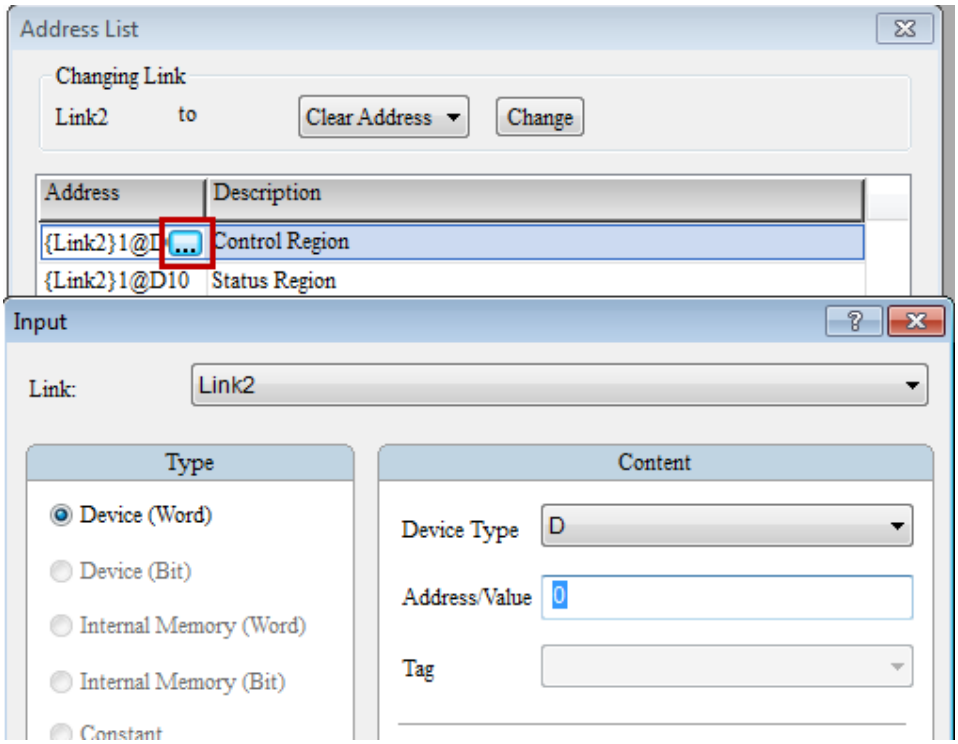


B. When adding different controller on COM 1 or COM 3, users can only choose to clear the address or setup each address directly.



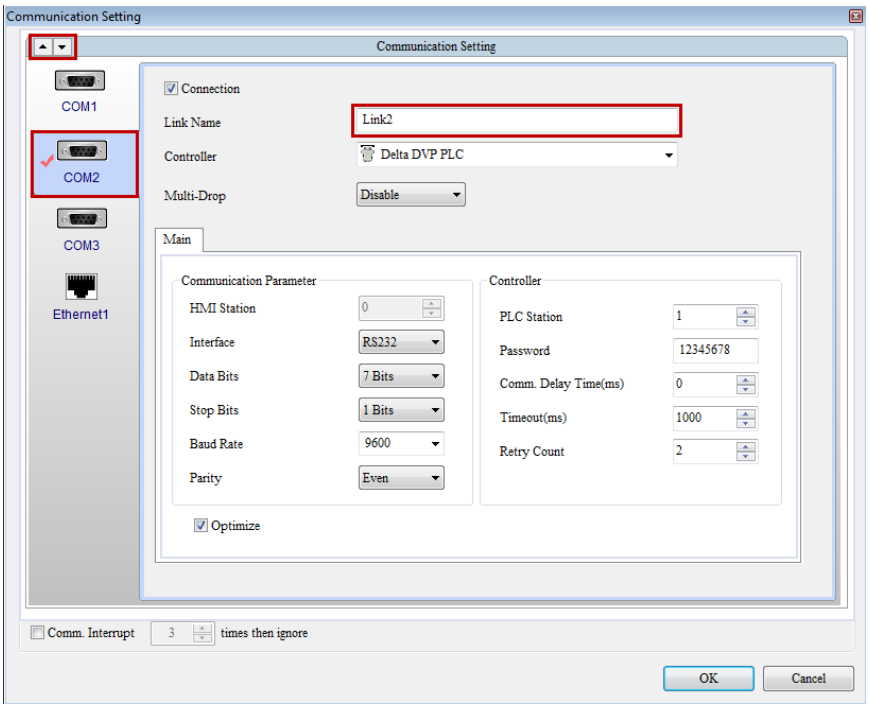
[Communication Setting]

Table 2-2-8-6 Communication Setting



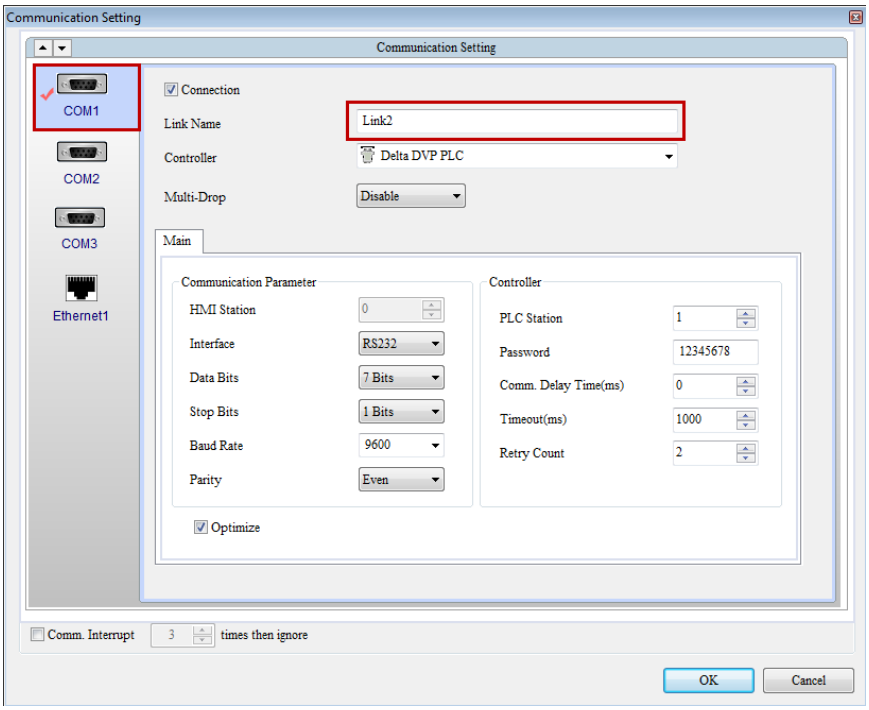
C. Use the feature of Move arrow to select COM Port on the upper left to move Link2 to COM 1. Once Link2 is moved, the user can go to COM 2 to check that Link Name has been changed to Link 1. As a result, this arrow is used to more Link directly to other communication ports.

Please see the following steps for details.

Step1	➢ Click the Move Up arrow on COM 2. 
Step2	➢ After the previous step, Link 2 is moved to COM 1.

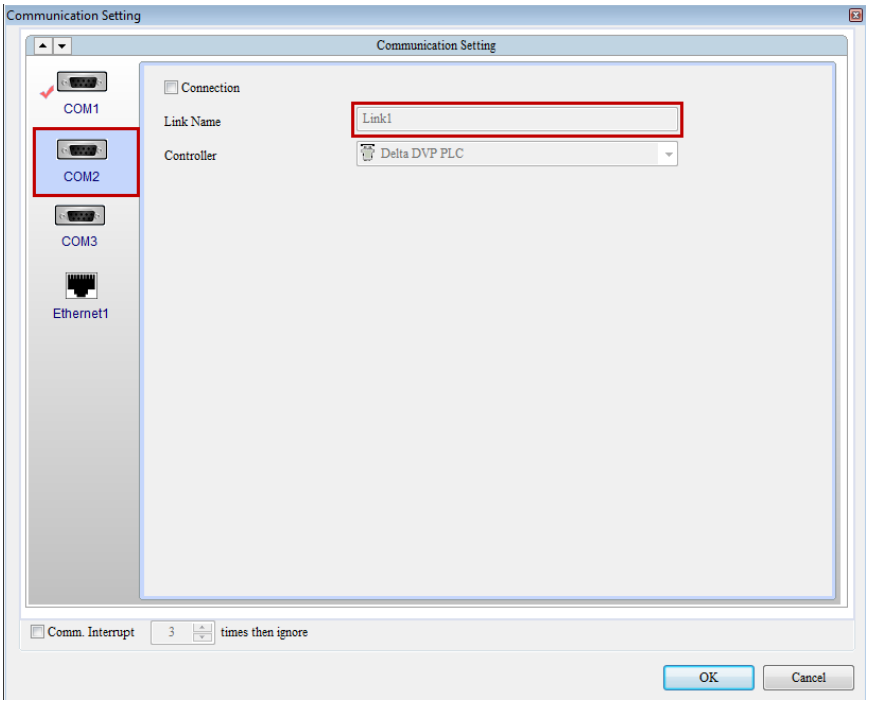
[Communication Setting]

Table 2-2-8-6 Communication Setting



Step3

➢ Then check COM 2 and the Link Name of COM 2 is changed to Link 1.



NOTE:

✓ Default link of COM 1 is Link 1,COM 2 is Link 2, and COM 3 is Link 3.

✓ When moving link through the Move Up/Down arrows and Link 2 is moved up to COM 1, the link of COM 2 becomes Link 1. Similarly, when

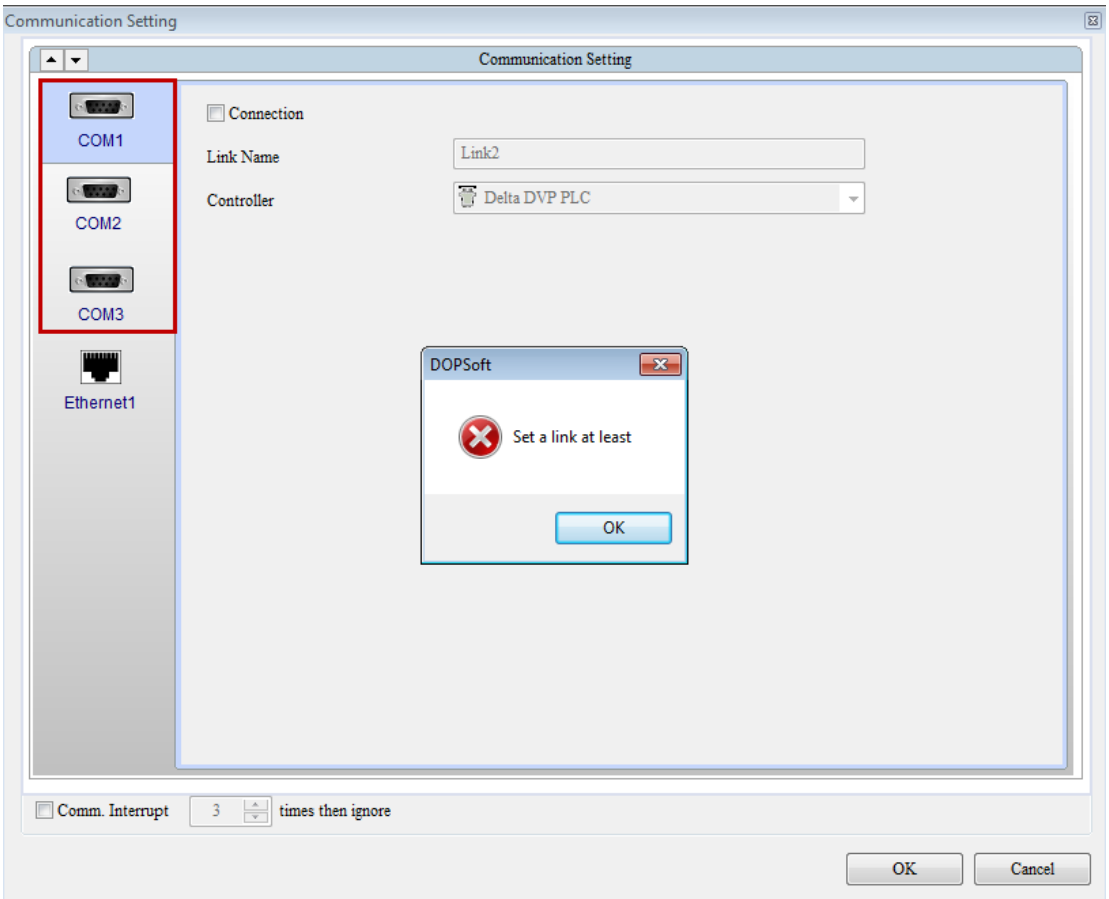
[Communication Setting]

Table 2-2-8-6 Communication Setting

Kink 2 is moved down to COM 2, the link of COM 2 becomes Link 3.

✓ Since such method of moving will not change the link name, the software will not show any warning message. How the Move Up/Down arrows work is the same as the function of the Move Up/Down in the old version Screen Editor.

➢ When the user cancels all links, the software will notify the user that there must be at least one link.

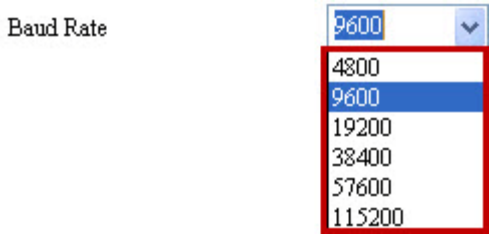
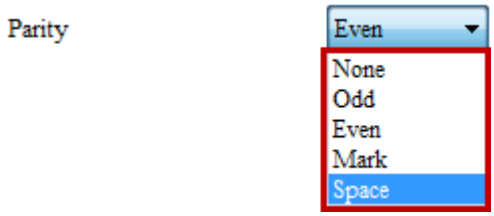


Communication Parameter	HMI Station	➢ To set HMI Station Number, with a range of 1 ~ 255 and a default station number of 0.
	Interface	➢ The interface is the method of transmission, including RS232,RS422, and RS485. ➢ When the user chooses COM 1, the only interface available is RS232. If COM 2 and COM 3 are selected, the available interfaces are RS232, RS422, and RS485.

	COM 1	COM 2	COM 3
RS232	◎	◎	◎
RS422		◎	◎

[Communication Setting]

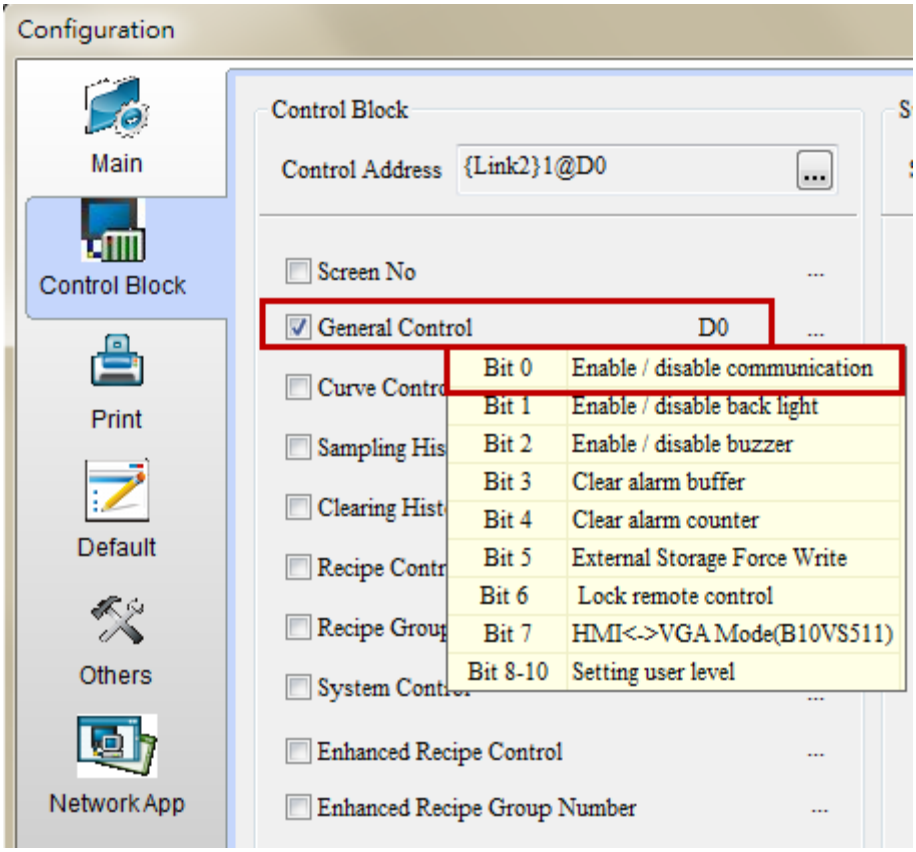
Table 2-2-8-6 Communication Setting

			RS485		◎	◎	
	Data Bits	➢ The available Data Bits for the user to choose from are 7 Bits and8 Bits. ➢ Whether the format of Data bits is 7 Bits or 8 Bits, it all represents the length of the received data package.					
	Stop Bits	➢ The available options of Stop Bits are 1 Bits and 2 Bits. ➢ Stop Bits represents informing the receiving end that the character signal of data has ended.					
	Baud Rate	➢ Baud Rate is available at 4800, 9600, 19200, 38400, 57600, and 115200.  ➢ Baud Rate represents the speed of data transmission, with the unit of bps.					
	Parity	➢ The types of Parity include None (no parity), Odd (same odd number bits), Even (same even number bits), Mark and Space.  ➢ Parity is a mechanism used to check for error in data transmission, which includes checking by Odd parity, Even parity, No parity, Mark parity and Space parity.					
Controller	PLC Station	➢ PLC Station refers to that the software automatically creates a station for the associated PLC for the user after the user selects the controller to use.					

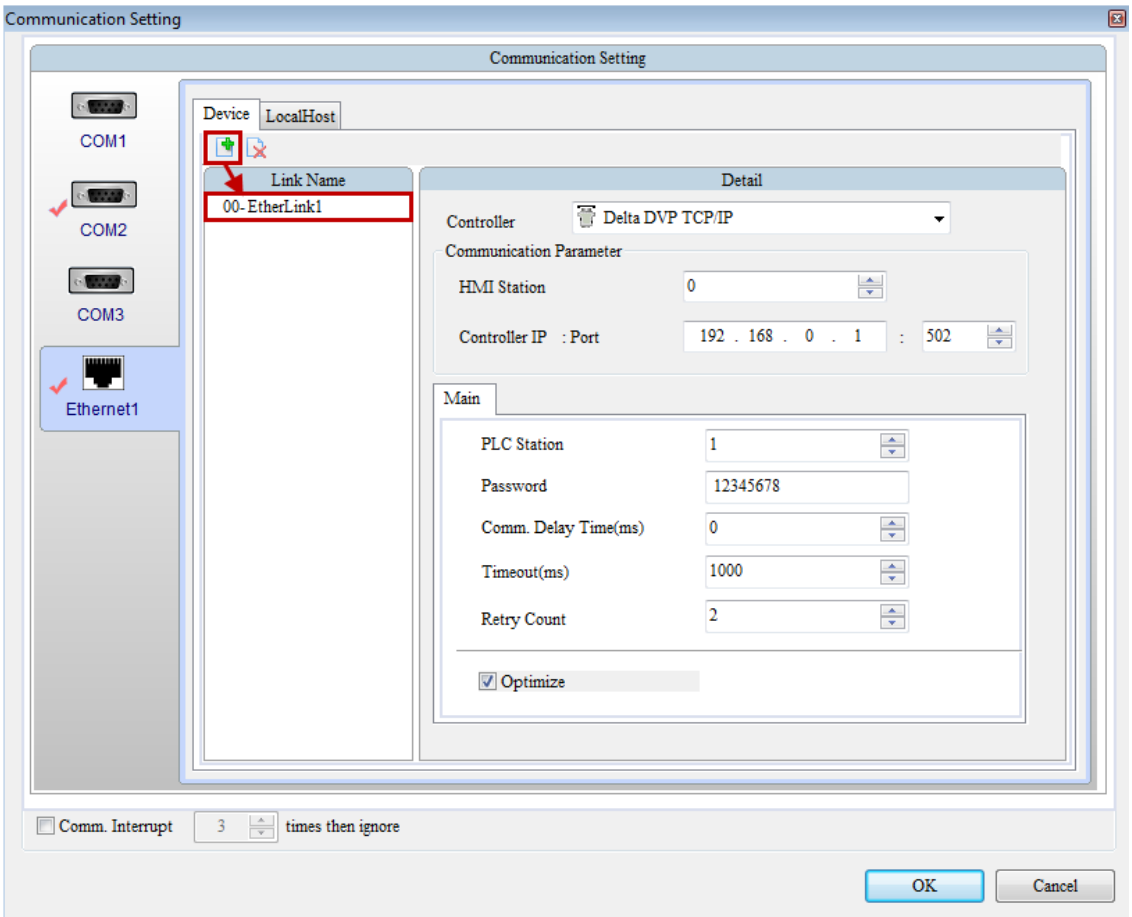
[Communication Setting] Table 2-2-8-6 Communication Setting		
		➢ The user can change the default station, with a range of 0 ~ 255.
	Password	➢ If the configured PLC requires password check, communication cannot be started without setting the corresponding password. The default password is 12345678.
	Communication Delay Time (ms)	➢ This refers to the time to wait after each communication, with a range of 0 ms ~ 255 ms. The default delay is 0 ms.
	Timeout (ms)	➢ This feature defines the time for Timeout after which there is no response of PLC. The range is 10 ms ~ 2000 ms and the default is 1000 ms.
	Retry Count	➢ If there is no response from PLC after the communication starts, HMI will resend the communication command. If the preset Retry Count has been reached, HMI will display a warning message. The range is 0 ~ 15 times and the default is 2 times.
Optimize	➢ When [Optimize] is checked, the communication will be optimized when it accesses the element and speed up communication. If [Optimize] is unchecked, it will slow down the speed to access the element. ➢ By default this feature is checked. Therefore, all element address access referenced to this link will be optimized.	
Comm. Interrupt	 ➢ Only when [Comm. Interrupt] is checked is the Retry Count available to set. If checked, when communication interruption occurs and the Retry Count reaches the setting, HMI will not attempt connection with controller. The available range is 0 ~ 255 times and the default is 3times. ➢ When HMI and controller ends communication because Comm. Interrupt reaches the set number and the user wants to resume the communication, he/she can control the status of communication switch by using Bit 0 in Control Block D1.	

[Communication Setting]

Table 2-2-8-6 Communication Setting

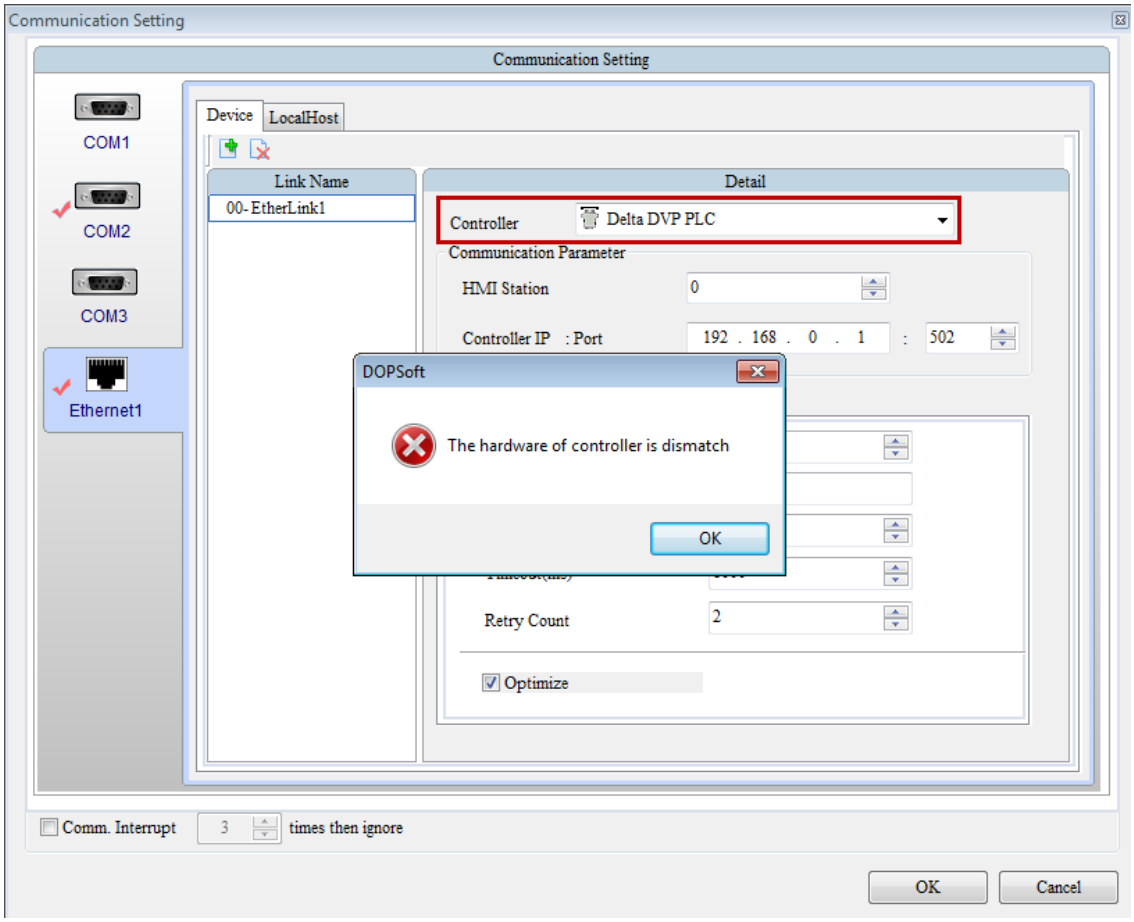


➢ **The following are details of operation setting for Ethernet.**

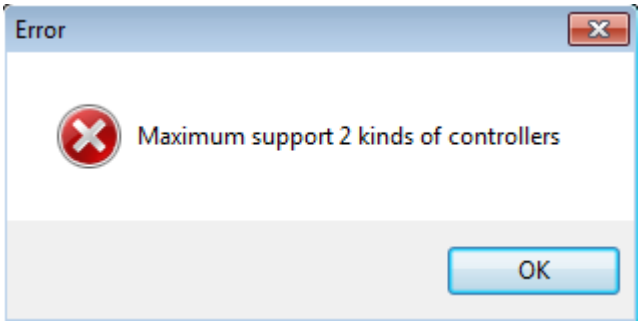
[Communication Setting] Table 2-2-8-6 Communication Setting	
Device	
	➢ Click the icon in [Device] page, a new [EtherLink1] link device will be added, which can be renamed by the user as preferred. ➢ After the new device is added, please select the controller to use. If a non-network PLC is selected, a warning will pop up to notify the user that the associated hardware is dismatch.

[Communication Setting]

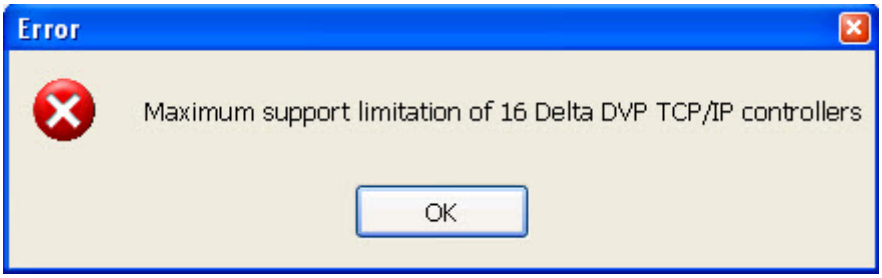
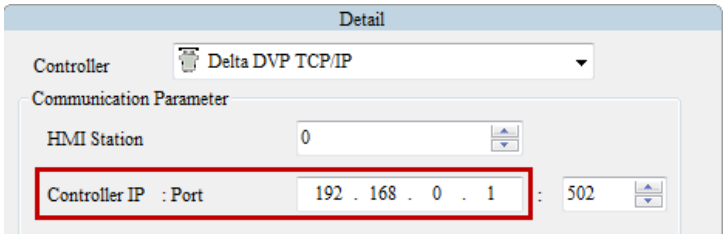
Table 2-2-8-6 Communication Setting

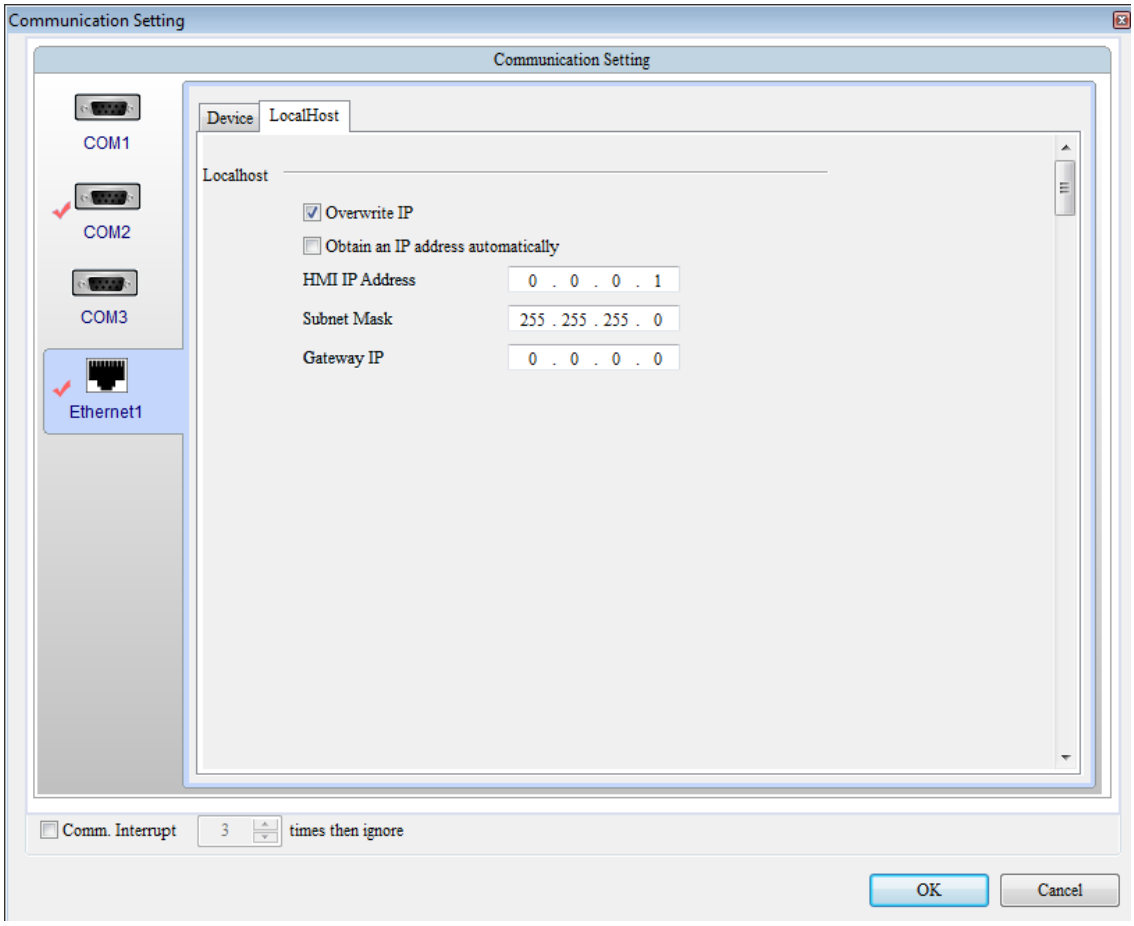


- Ethernet device only support two protocol, for example Delta DVP TCP/IP and S7 300 (ISO TCP). If add third protocol, it will display as below message to inform.



- Once the new network device is added, only two Protocols can be included. For example, they can be Delta DVP TCP/IP and S7 300 (ISO TCP), with each Protocol having up to 16 links. If any Protocol has more than 16 links, the software will pop up the warning message to notify the user that too many controllers are added, which exceeds the allowable number.

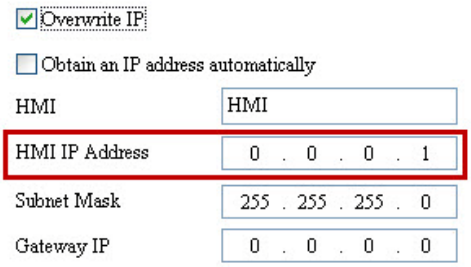
[Communication Setting] Table 2-2-8-6 Communication Setting			
			
	Communication Parameter	HMI Station	➢ This feature allows one to set HMI Station number, with a range of 1 ~ 255 and default of 0.
		Controller IP	➢ The user can set the IP address of PLC here. ➢ Please set the address that is located in the same network segment as HMI IP to ensure normal communication with HMI. 
		Port	➢ Port will vary with the controller selected by the user. The user can also change the port as preferred and the port setting of the associated PLC.
	Controller	PLC Station	➢ PLC Station refers to that the software automatically creates a station for the associated PLC for the user after the user selects the controller to use. ➢ The user can change the default station, with a range of 0 ~ 255.
		Password	➢ If the configured PLC requires password check, communication cannot be started without setting the corresponding password. The default password is 12345678.
		Comm. Delay Time	➢ This refers to the time to wait after each communication, with a range of 10 ms ~ 255 ms. The default delay is 0 ms.
		Timeout (ms)	➢ This feature defines the time for Timeout after which there is no response of PLC. The range

[Communication Setting] Table 2-2-8-6 Communication Setting			
			is 10 ms ~ 2000 ms and the default is 300 ms.
		Retry Count	➢ If there is no response from PLC after the communication starts, HMI will resend the communication command. If the preset Retry Count has been reached, HMI will display a warning message. The range is 0 ~ 15 times and the default is 3 times.
	Optimize	➢ When [Optimize] is checked, the communication will be optimized when it accesses the element and speed up communication. If [Optimize] is unchecked, it will slow down the speed to access the element. ➢ By default this feature is checked. Therefore, all element address access referenced to this link will be optimized.	
Local Host			
	LocalHost	Overwrite IP	LocalHost stands for the IP address of HMI, with options of Overwrite IP and Obtain an IP address automatically. ➢ [Overwrite IP] unchecked: When this option is unchecked, it means HMI

[Communication Setting] Table 2-2-8-6 Communication Setting			
			will use the default IP address, which is 0.0.0.0. If the user chooses not to enter IP from software, he/she can change the IP through [System Setting]→ [Network]. [Overwrite IP] checked: If Overwrite IP is checked, it means the IP is changed from software. The user can configure the IP address to write in and associated parameters such as HMI name.

[Communication Setting]

Table 2-2-8-6 Communication Setting

		Obtain an IP address automatically	➢ [Overwrite IP] must first be checked before [Obtain an IP address automatically] can be opened. ➢ When both are checked, it means HMI will obtain IP address through DHCP. If the user wants to know the current IP address, he/she can check through [System Setting]→ [Network]in the system screen.
		HMI IP address	➢ The HMI IP address must be located in the same network segment as the controller IP address. 
		Subnet Mask	➢ Subnet Mask is used for ”Network Fragment” and”Find Destination Location”, which has the same format of IP address and represented by bytes separated by decimal points. ➢ When configuring the IP address of each computer, the Subnet Mask must also be set. For Class C in the figure above, the first 3 bytes in its IP address is the Network ID. Therefore, the first 3 bytes in Subnet Mask are all 255. The last byte is Host ID, which is 0.

IP Level	IP Address	Subnet Mask
Class A	1.x.x.x~126.x.x.x	255.0.0.0
Class B	128.0.x.x~191.255.x.x	255.255.0.0
Class C	192.0.0.x~223.255.255.x	255.255.255.0

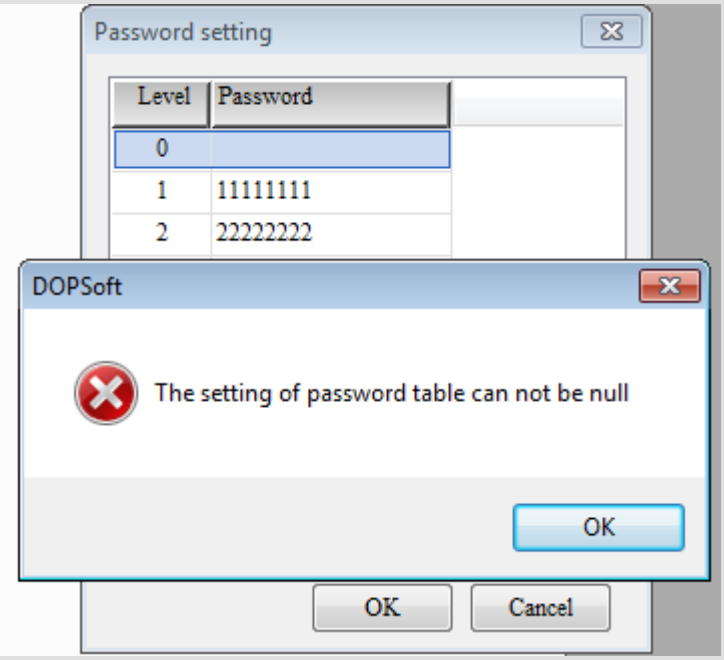
[Communication Setting] Table 2-2-8-6 Communication Setting			
		Gateway IP	➢ The so-called Gateway is mostly used in connection with local area networks and large computer host systems. In general, however, Gateway is needed when systems on two different levels are connected. ➢ Gateway is the exit of local area network, through which all packages to be sent to internet network must pass and are transferred to other hosts on internet and eventually arrives at the destination host. ➢ If the user needs to connect to an external network, he/she can configure the Gateway address by the network rules. The default address is 0.0.0.0.

2-2-8-3 Password Setting

Password Setting is mainly used to differentiate the permission level of HMI. There are seven permission levels, each of which has its default password.

NOTE：

✓ Password setting cannot be null.



Permission Level 0	No protection function is available. Any person can operate the system.
Permission Levels 1 ~ 7	Entry of password or override with high permission level is required to operate the system.
Permission Level 8	This is password for the highest permission level and is higher than those for levels 1 ~ 7. Meanwhile, this password is the protection password once a project is saved and is also used for Check password when download program and system file formatting.

Table 2-2-8-7 Table of permission levels.

When the user wants to change the password in each level, this can be done by changing the password entry through [Options]→ [Password Setting]. The entered password can have up to8 digits, which consist of numbers of 0 ~ 9 and alphabets of A ~ F regardless of capitalization or lower-case. The user can choose the digits and characters of the password as preferred with flexibility.

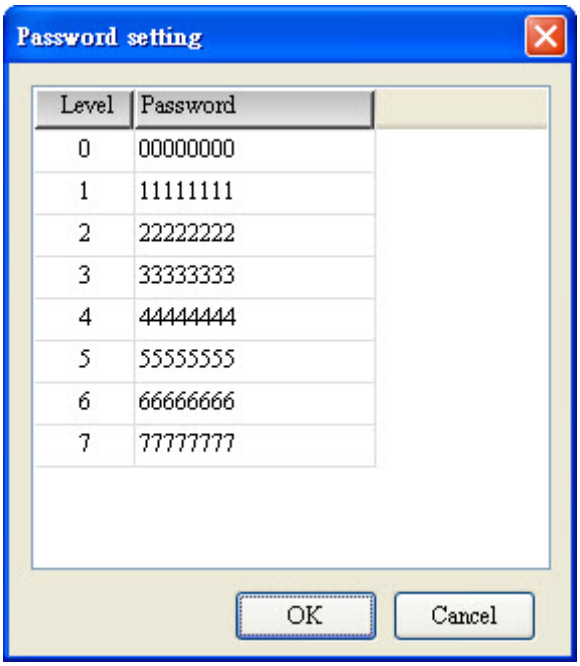


Figure 2-2-8-3 Password Editing.

The user can also change the password through the“Set up Password” button element.

Figure 2-2-8-4 Set up password button

2-2-8-4 Tag Table

Tag Table is mainly used to help the user set up the stage for the memory address. For example, a certain address is $100 with a tag called TINA. In the future, everytime when $100 needs to be entered, it can be replaced by TINA, as shown in the figure below.

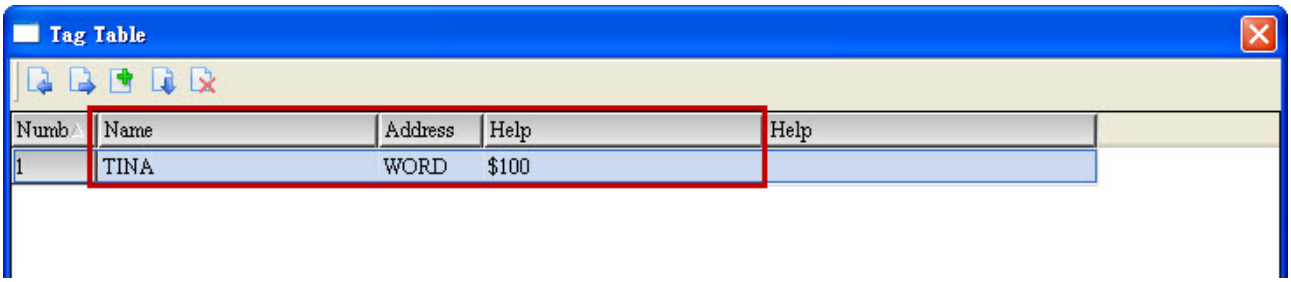


Figure 2-2-8-5 Tag Table

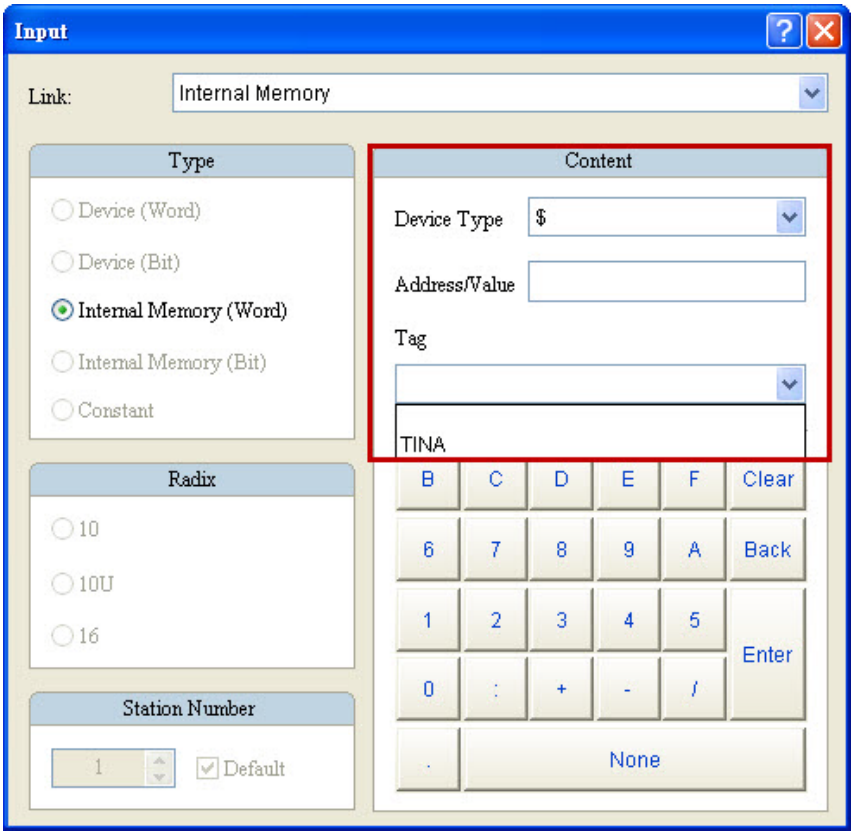
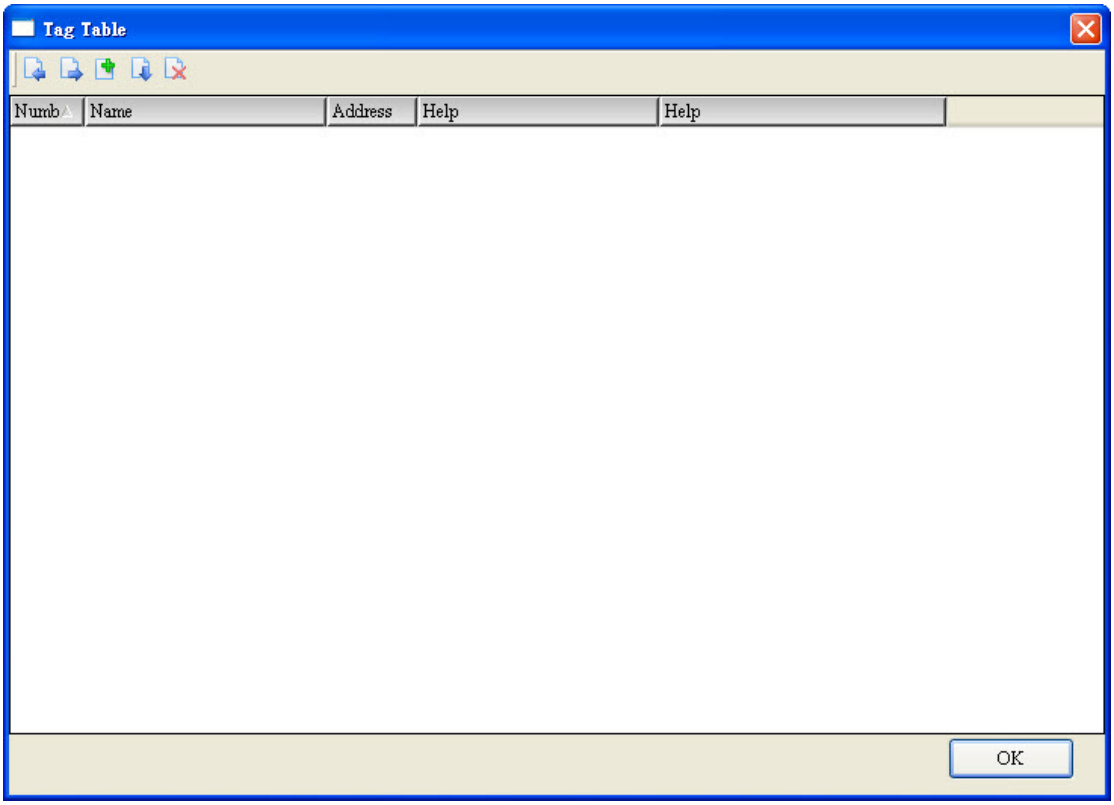
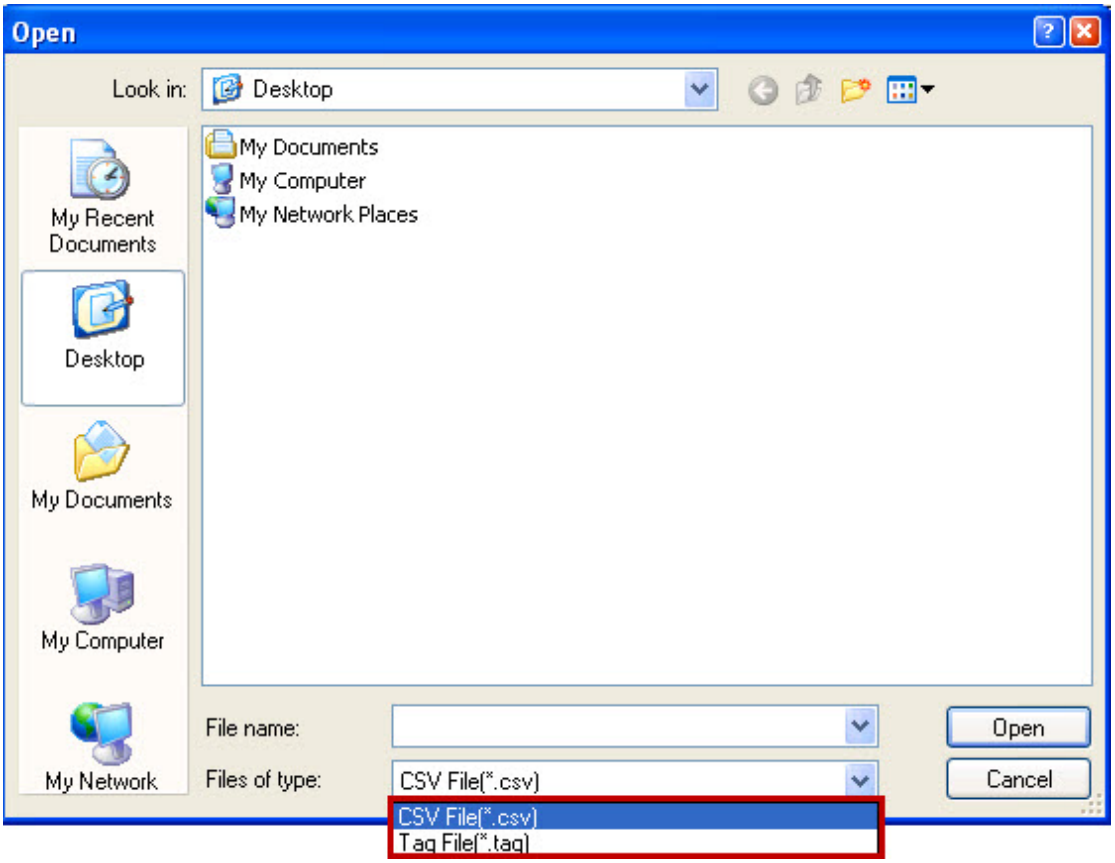
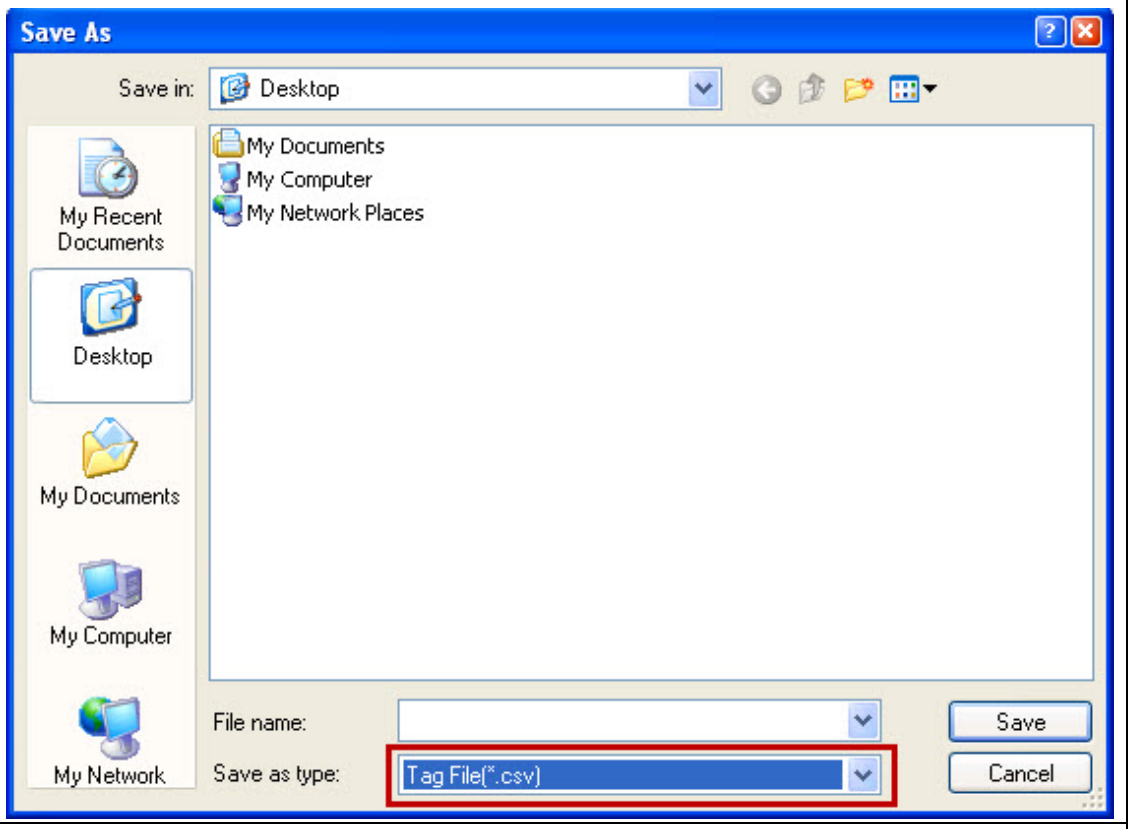
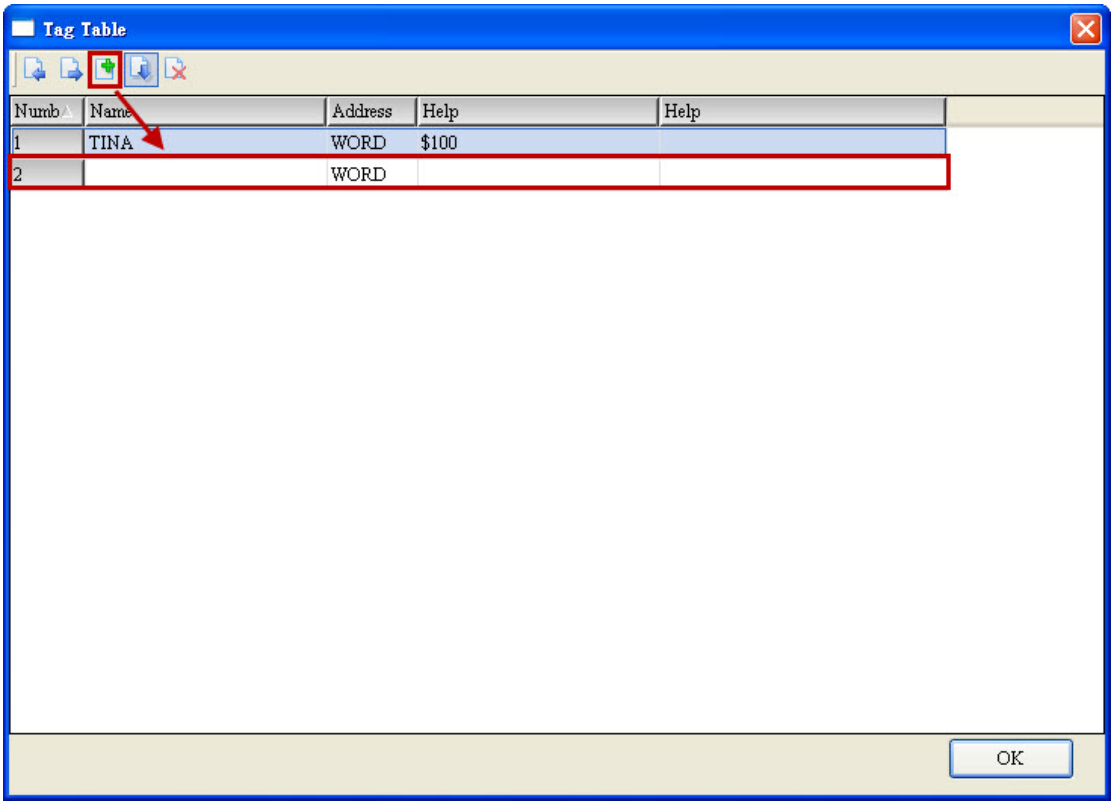
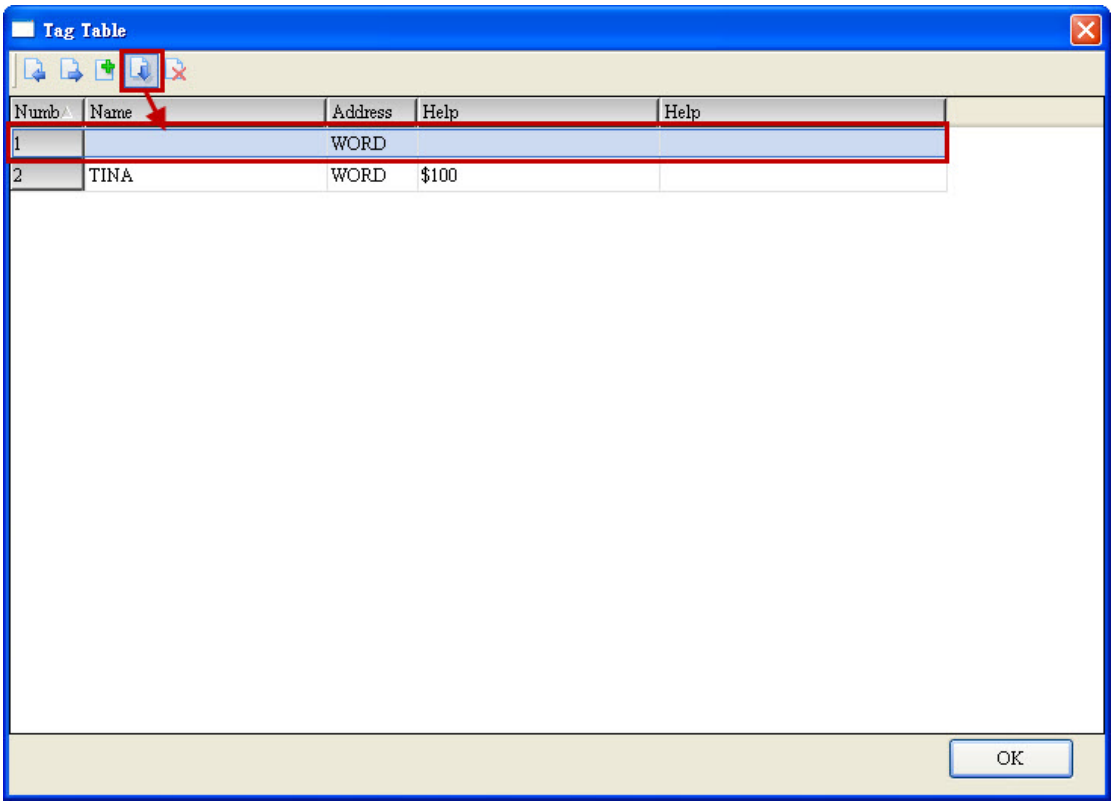
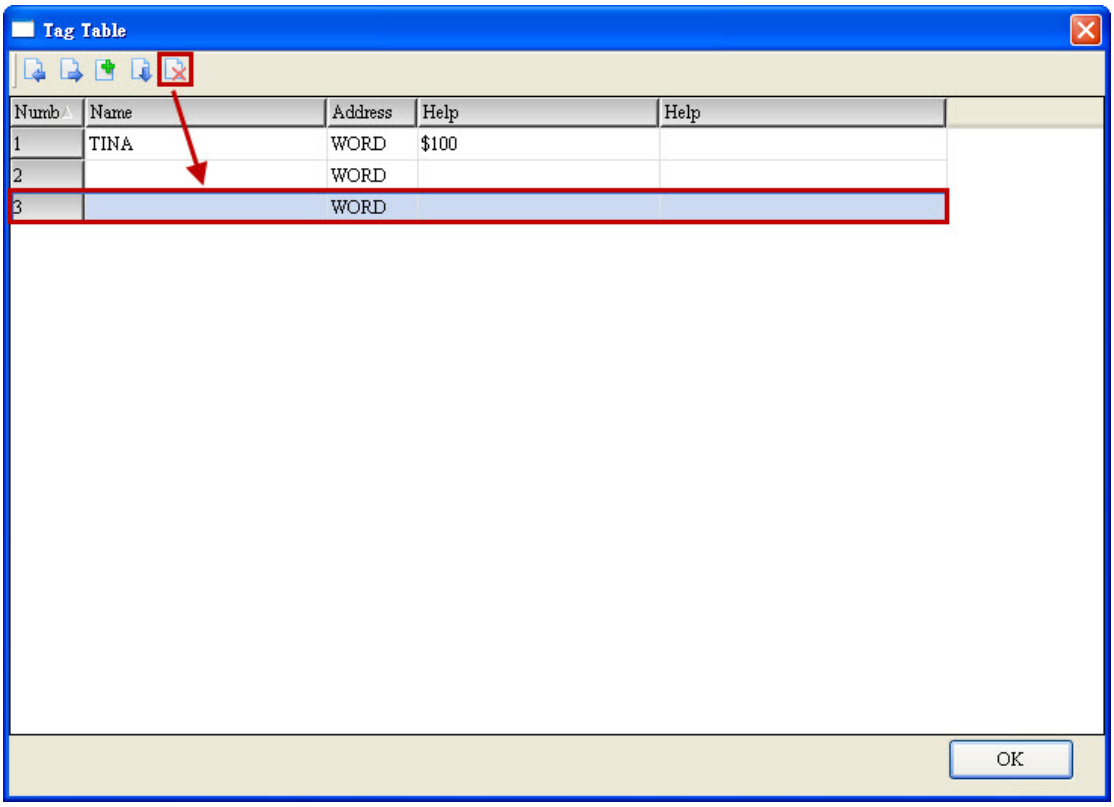


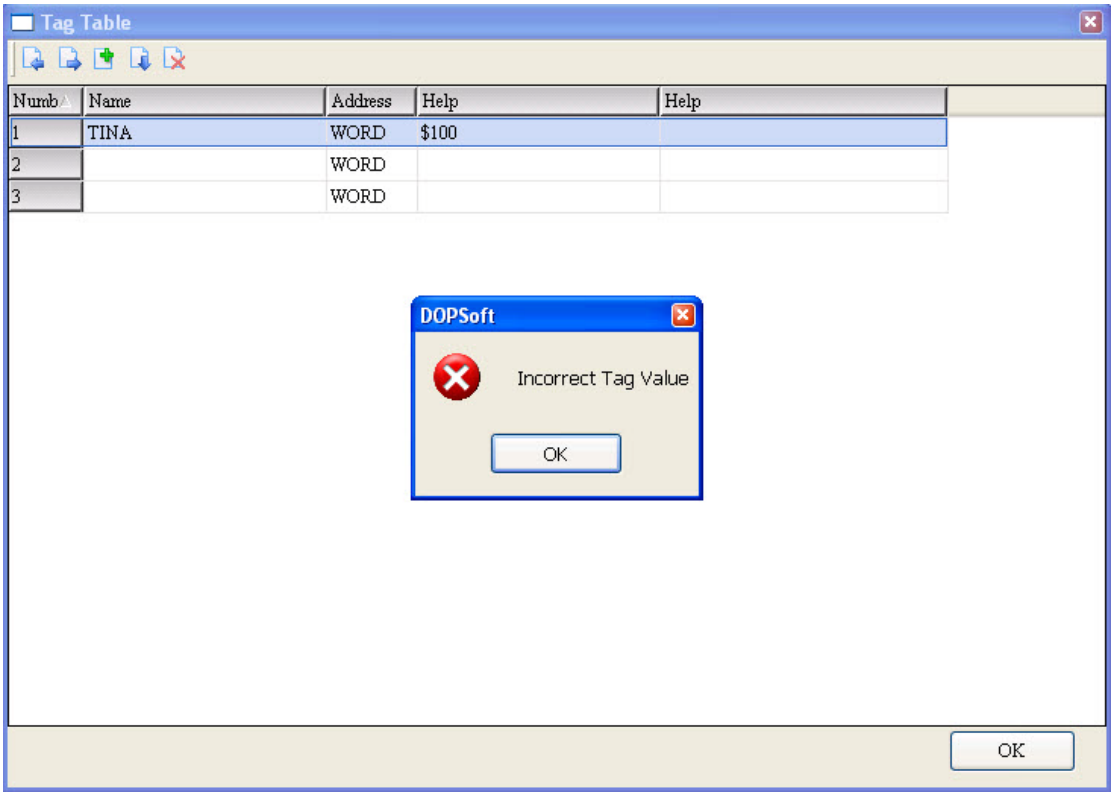
Figure 2-2-8-6 Set up tag.

Descriptions of items in Tag Table are given below.

Tag Table Table 2-2-8-8 Tag Table	
	
Open	➢ The use can open the existing tag file or the CSV file in Tag Table. 

Tag Table Table 2-2-8-8 Tag Table	
Save As	➢ The user can save the edited tag file as a new file in the format of CSV file. 
Add	➢ To Add new tag data, the user only has to click the Add icon to create the new data. 

Tag Table Table 2-2-8-8 Tag Table	
Insert	➢ Insert means to insert the new data above the existing data. 
Delete	➢ Delete is used to remove the data that is selected by the user. 
Yes	➢ After the user makes changes or deletion, the “Yes” button must be

Tag Table Table 2-2-8-8 Tag Table	
	pressed to save the changes. In addition, if data is added or inserted but "Yes" is pressed without entering any data, the software will pop up a warning message to notify the user that the current tag data is incorrect. 

2-2-8-5 Print Typesetting

Prior to executing Print Typesetting, please check the following:

- ✓ **The screen selected for Goto Screen cannot be the Print screen.**
- ✓ **Cannot change to the print screen via goto screen or control area command.**
- ✓ **Print Screen cannot be the default screen.**
- ✓ **Print Screen cannot be the Base Screen.**
- ✓ **Print Screen cannot be the sub-screen.**
- ✓ **Print screen cannot be one used for screen saver.**

Print Typesetting includes [PrintAll]and [Custom Print].

[Print All] refers to when the user drags 4 screens to be printed to the Print Screen on the right, these 4 screens will all be printed. Printed screen can also be the history screen. The user can select the screen to be printed and choose the associated typesetting or remove the screen not to be printed.

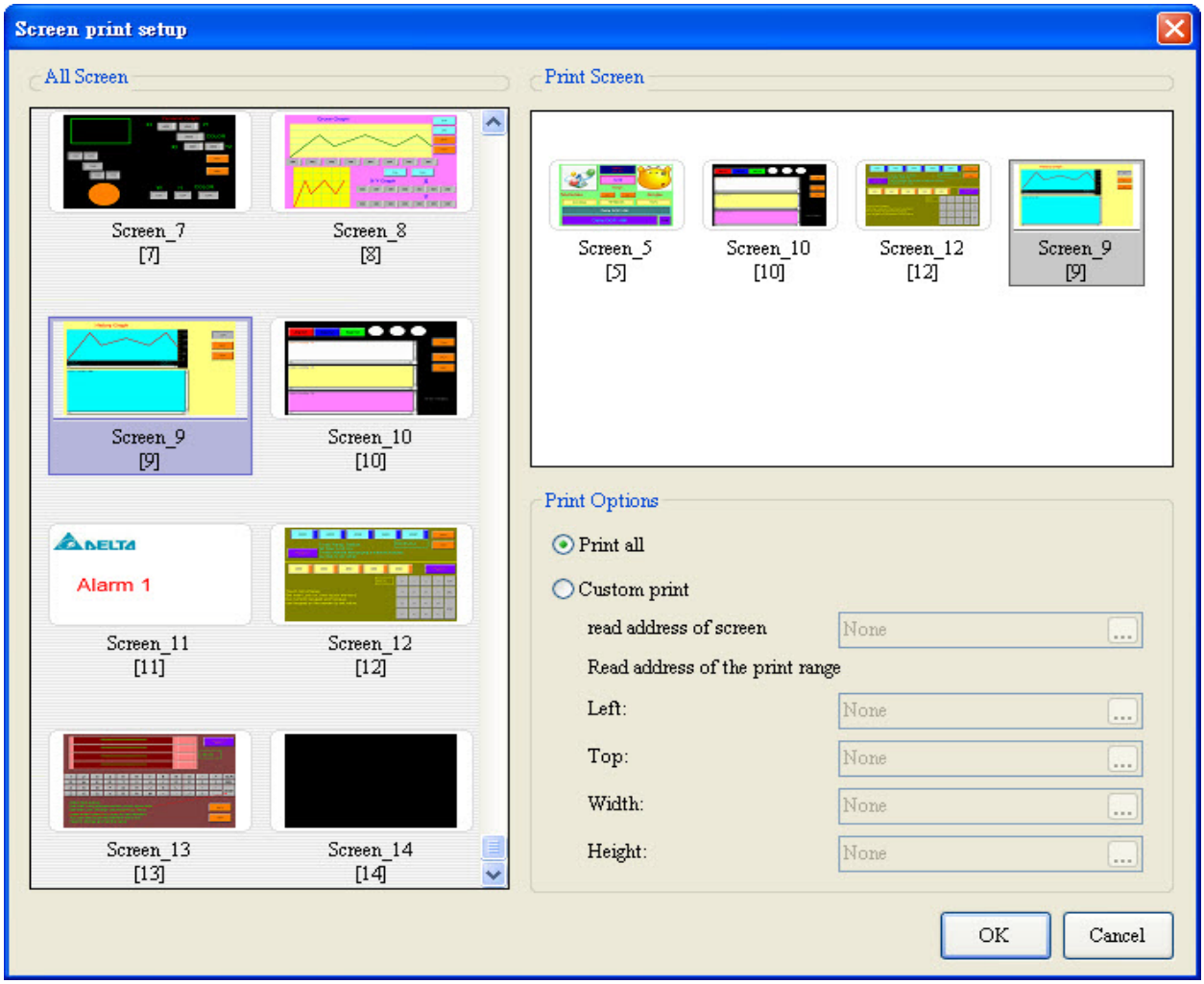


Figure 2-2-8-7 Screen of Print Typesetting Management.

[Custom Print] refers to the user defines the screen to be printed. Therefore, the read address of screen, height and width, X coordinate (Left), and Y coordinate (Top) can be changed. This function can work with flags in Control Block to output the Report button.

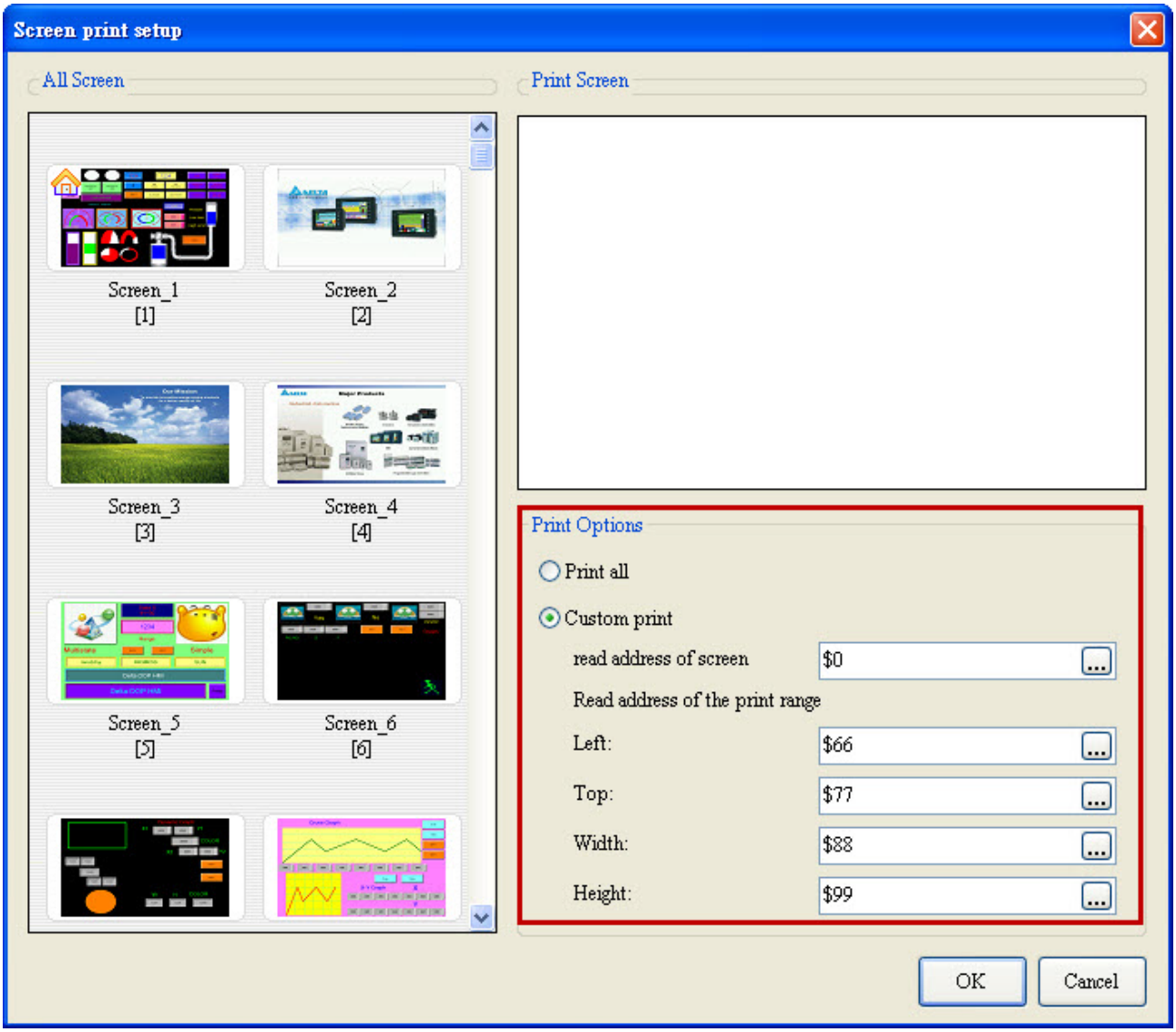


Figure 2-2-8-8 Screen of Custom Print.

Read Address of Screen	Read Address of Screen refers to the screen number of the screen to be printed. The user can set this number individually in the screen to be printed. When the entered value is 0, the entire screen in Print Type setting will be printed. This Read Address can also work with the Print Flag in Control Block.
Left	Set the X coordinate of the starting point of the range to be printed.
Top	Set the Y coordinate of the starting point of the range to be printed.
Width	Set the width of the area to be printed.
Height	Set the height of the area to be printed.

Table 2-2-8-9 Set the Custom Print screen.

2-2-8-6 Sound Setting

The user can utilize Sound Setting to inform the onsite operator whether there is any error. This function can be triggered by the Bit address of the sound file to send out the desired sound and can work with the numbers in Word buffer to play different sound files as designated. The audio formats supported by Sound Setting are MP3 and WAV. Currently, the models supported by Sound Setting are B07E415, B07E515, B08E515, and B10E615. If the project being edited is not on the model being supported, this feature will not be available for selection.

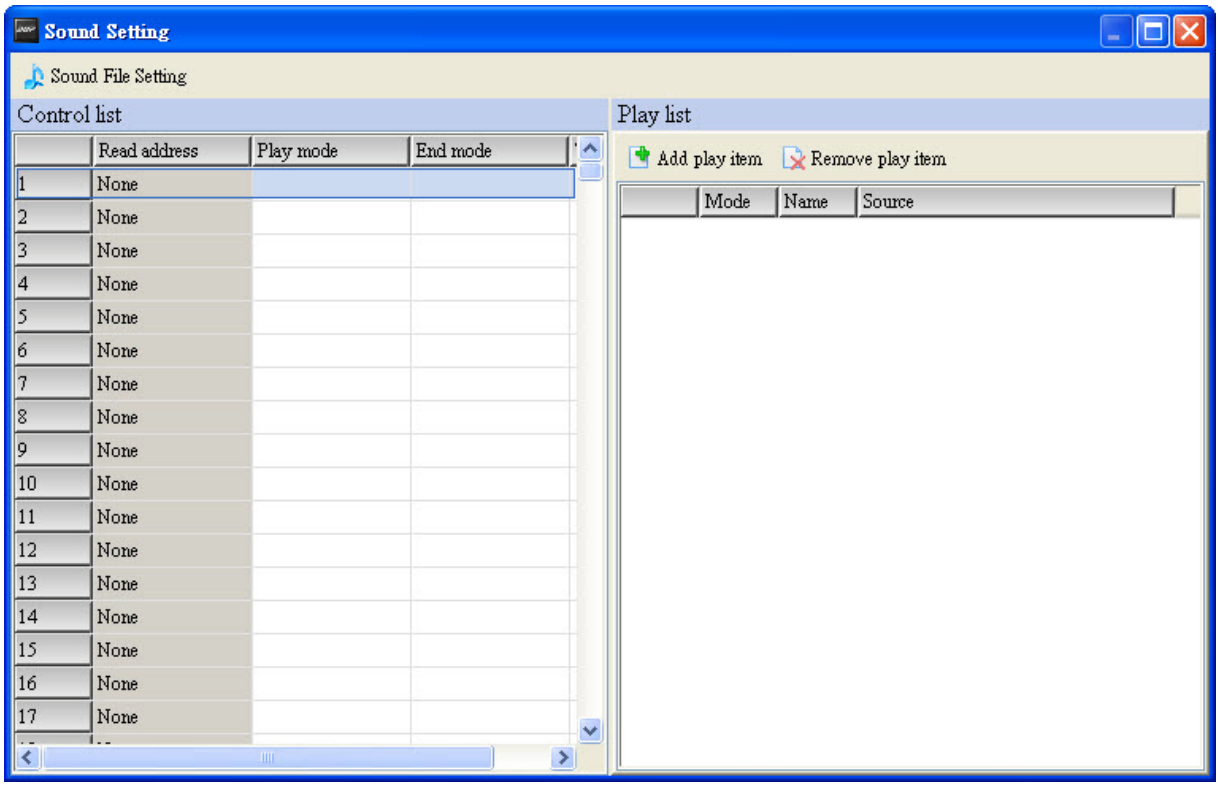


Figure 2-2-8-9 Sound Setting

Sound Setting can be described with three major items: I, Sound File Setting, II, Control List and III, Play List.

Sound File Setting involves add, delete, export, and where to save the sound files.

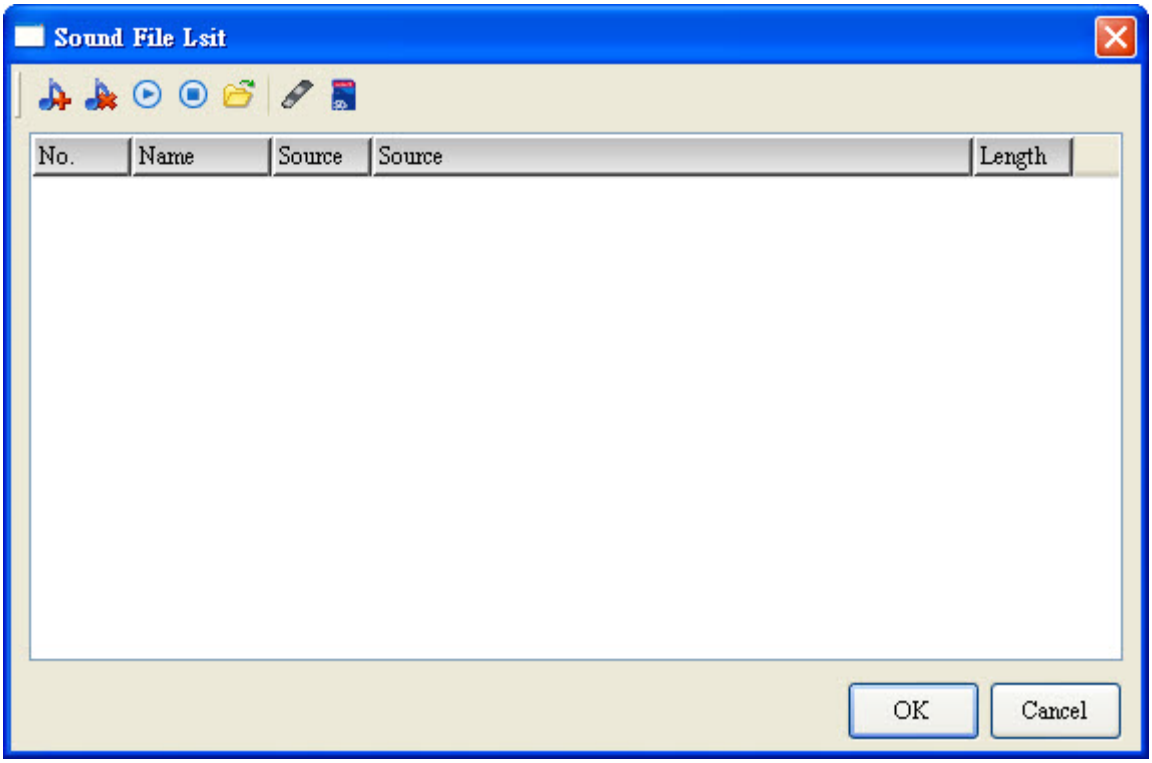


Figure 2-2-8-10 Sound Setting

Control List manages how the sound file is played, ended, and triggered.

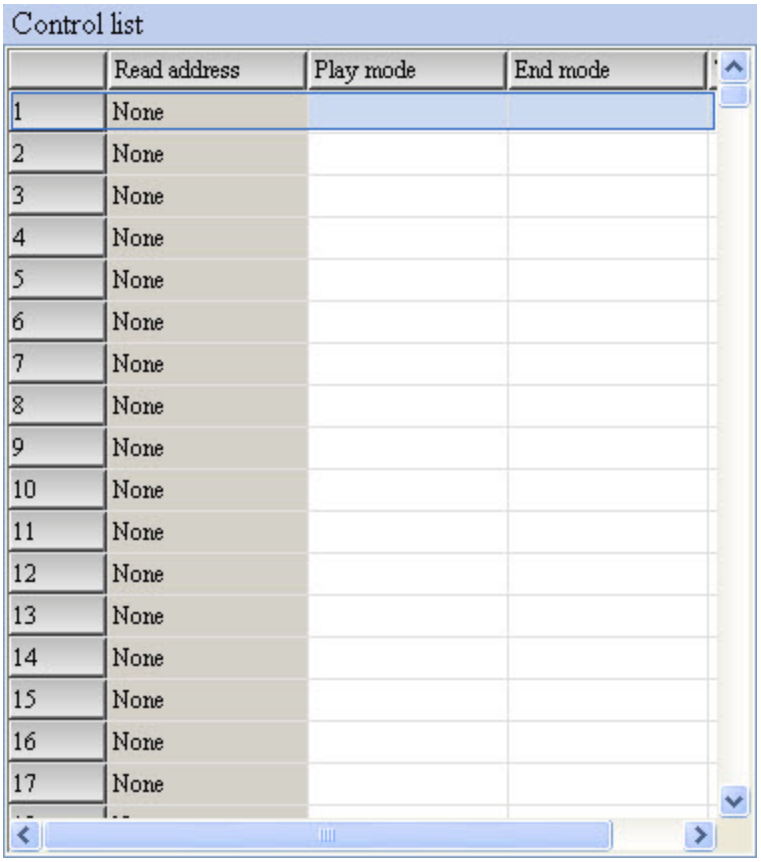


Figure 2-2-8-11 Control List

Play List decides if the sound file is to be played through reading Bit or Word.

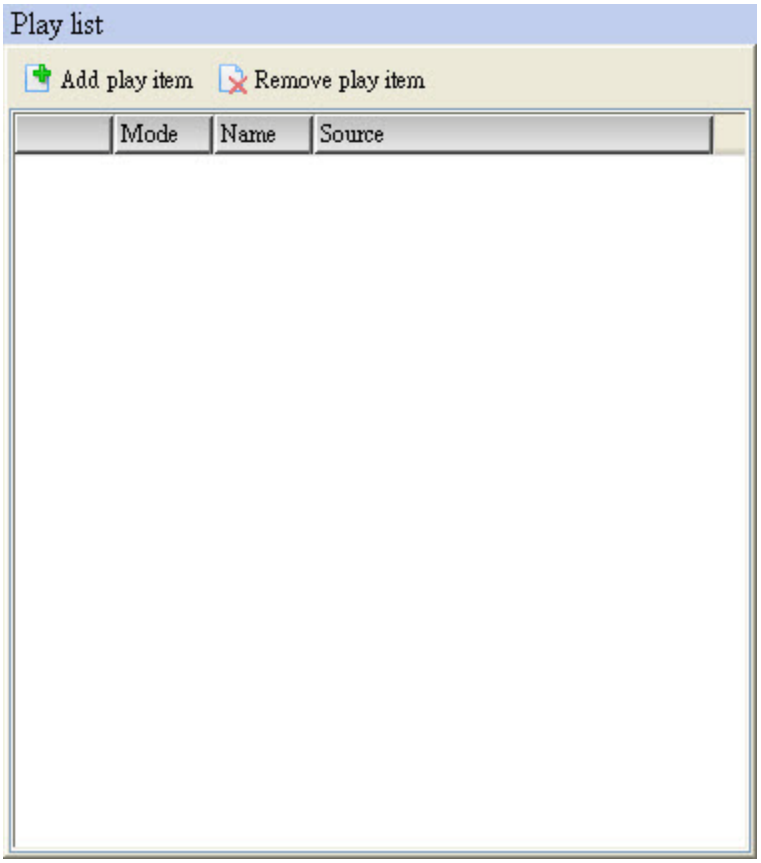
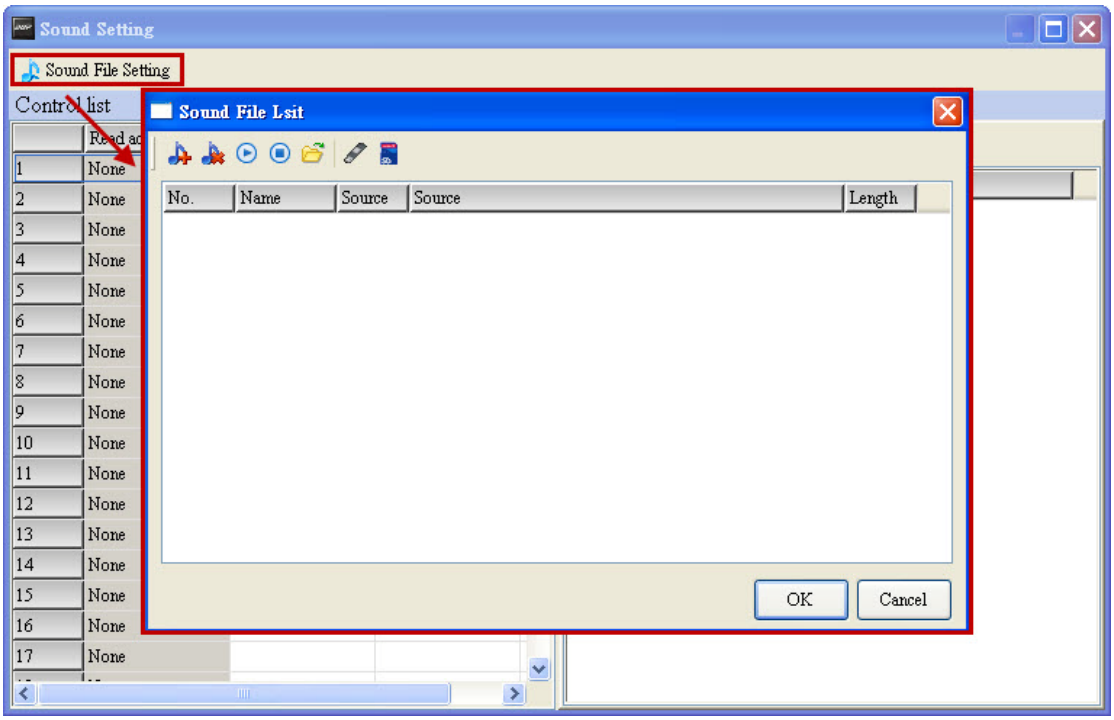


Figure 2-2-8-12 Play List

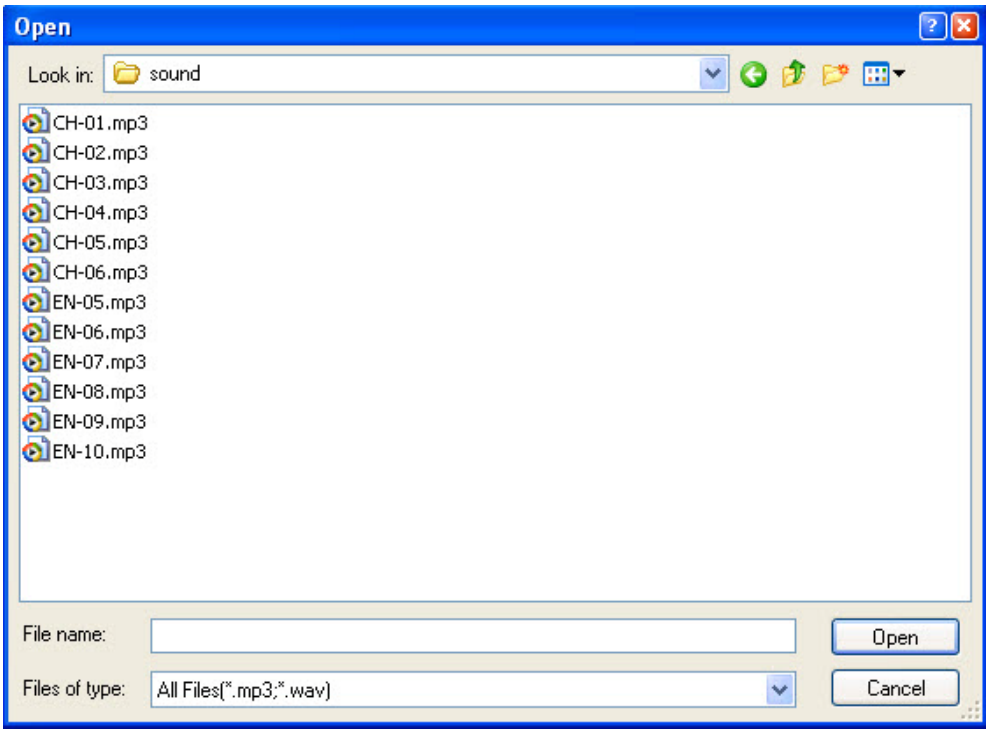
[Sound File Setting], [Control List], and [Play List].Are described in the details below.

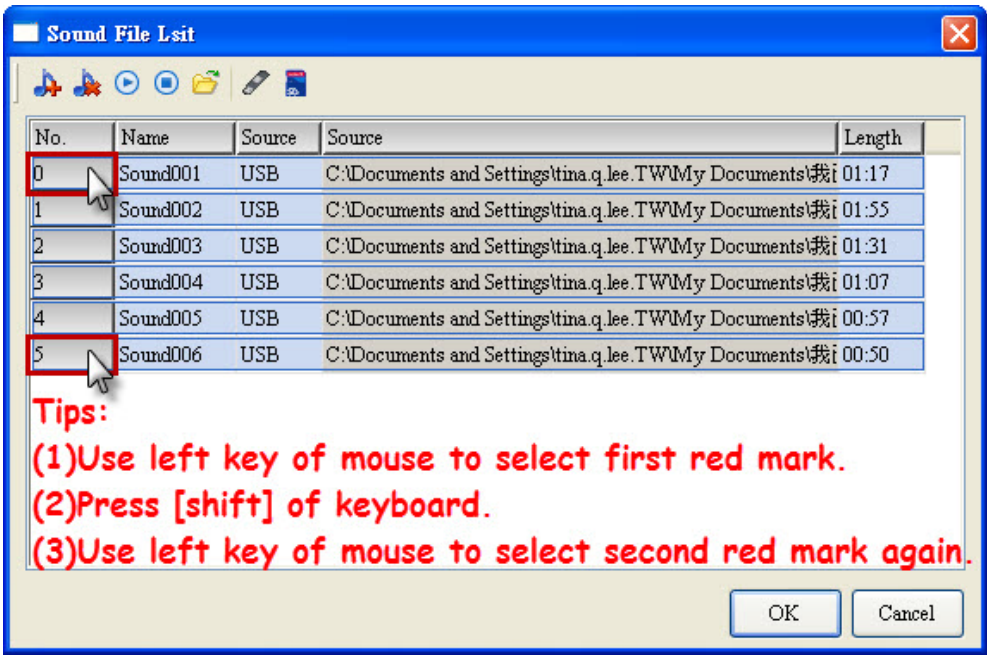
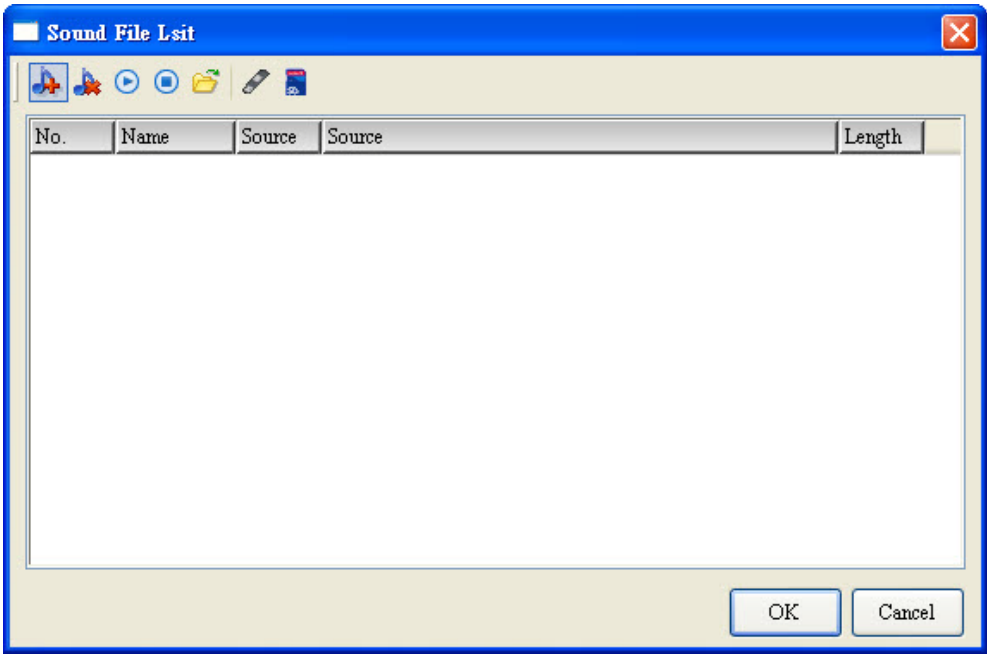
Sound File Setting

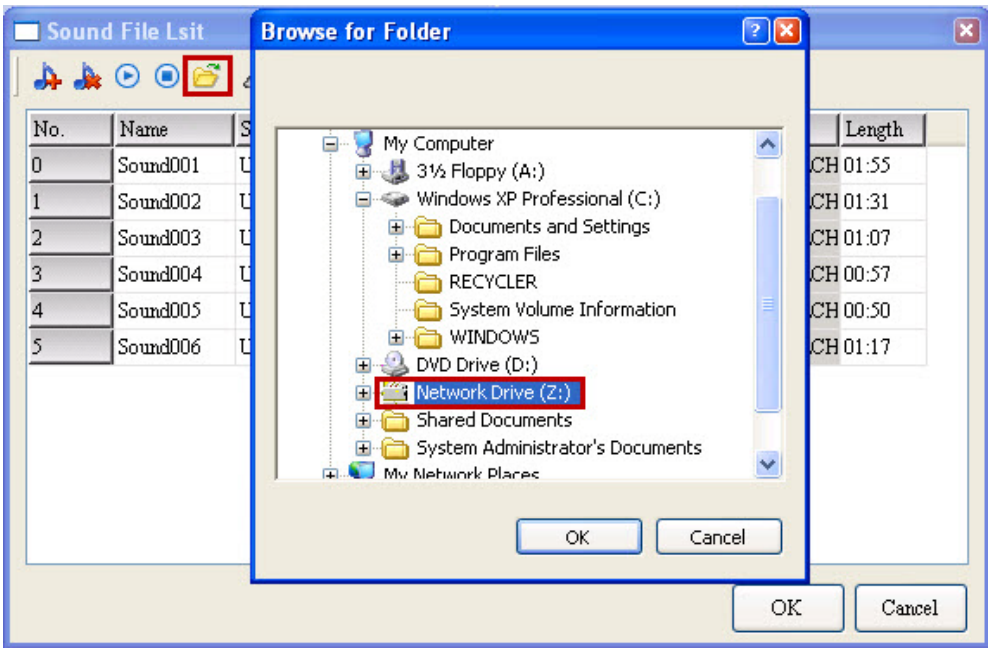
Table 2-2-8-10 Sound File Setting

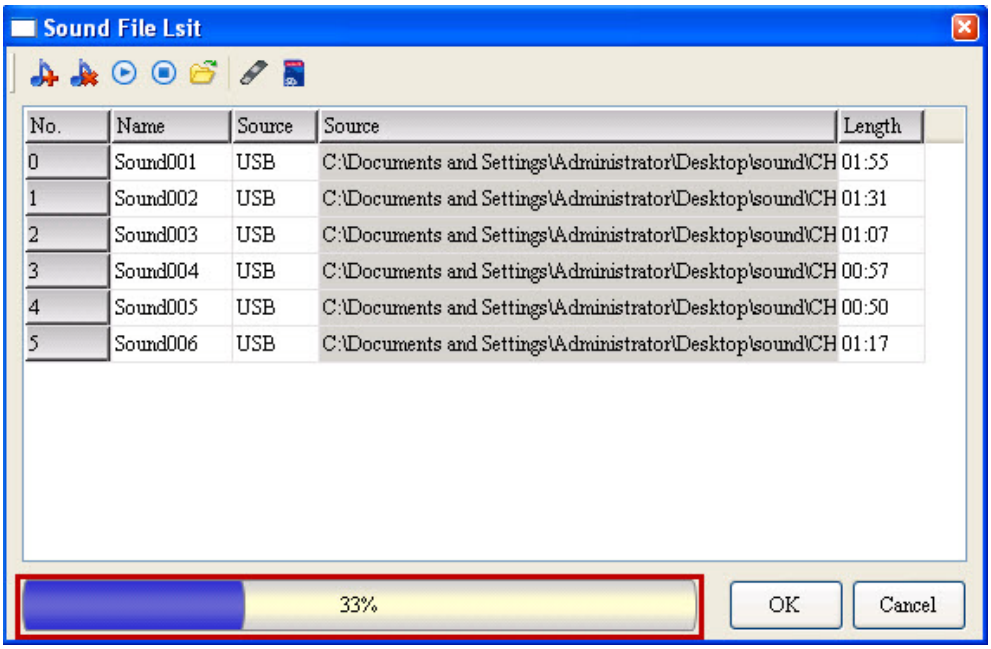
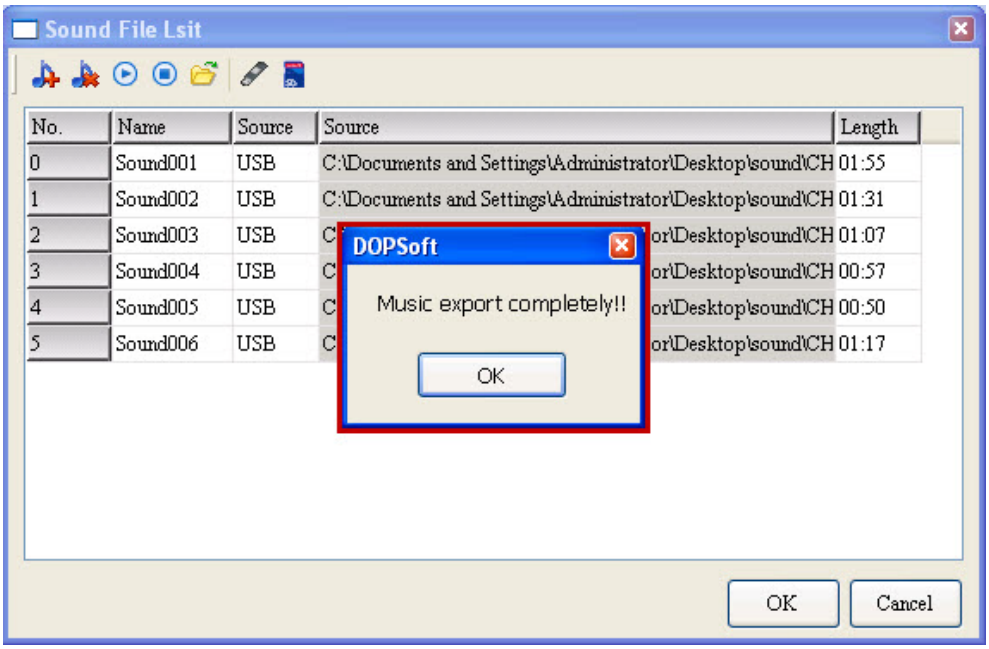


◆ Description of icons in Sound File toolbar

Add	➢ Once the Add icon is clicked, the system will ask the user to select the sound file to be played. ➢ The user can add up to 1000 (0 ~ 999) sound effect files. 
Delete	➢ Once the sound to add is selected, to delete a certain sound file or multiple files, one can click the sound file or use SHIFT + left button of

Sound File Setting Table 2-2-8-10 Sound File Setting	
	mouse or Ctrl + left button of mouse to select multiple file. Once the selection is done, one can click the Delete icon to execute deletion of sound files.  ➢ List after deleting sound files. 
Play	➢ The user can use this feature in Sound File Setting to play the selected sound files and check if the associated sound file can be played correctly.

Sound File Setting Table 2-2-8-10 Sound File Setting	
Stop	➢ The user can use this feature to stop playing the current sound file in play.
Export	➢ When a sound file is being exported, the software will ask the user to select which device to save the file. Please note that the root directory must be selected as the storage location. Namely, do not save the sound file in any file folder.  ➢ After the sound file is exported, one can see that the software is executing the export.

Sound File Setting Table 2-2-8-10 Sound File Setting	
	 ➢ Upon completion of export, the software will notify the user with a message that the sound file has been exported. 
Save to USB	➢ The function of saving sound files to USB or SD allows the user to more quickly change the storage location of multiple sound files. A single sound file can change its storage devices by using these two buttons. Selection of multiple sound files is the same as that for deleting files.

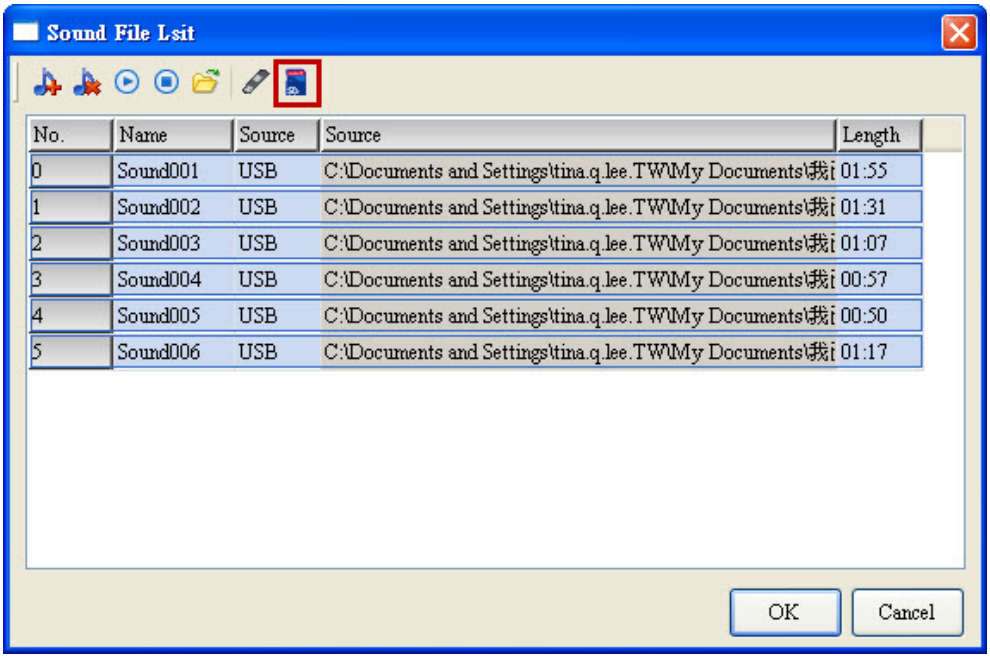
Sound File Setting

Table 2-2-8-10 Sound File Setting

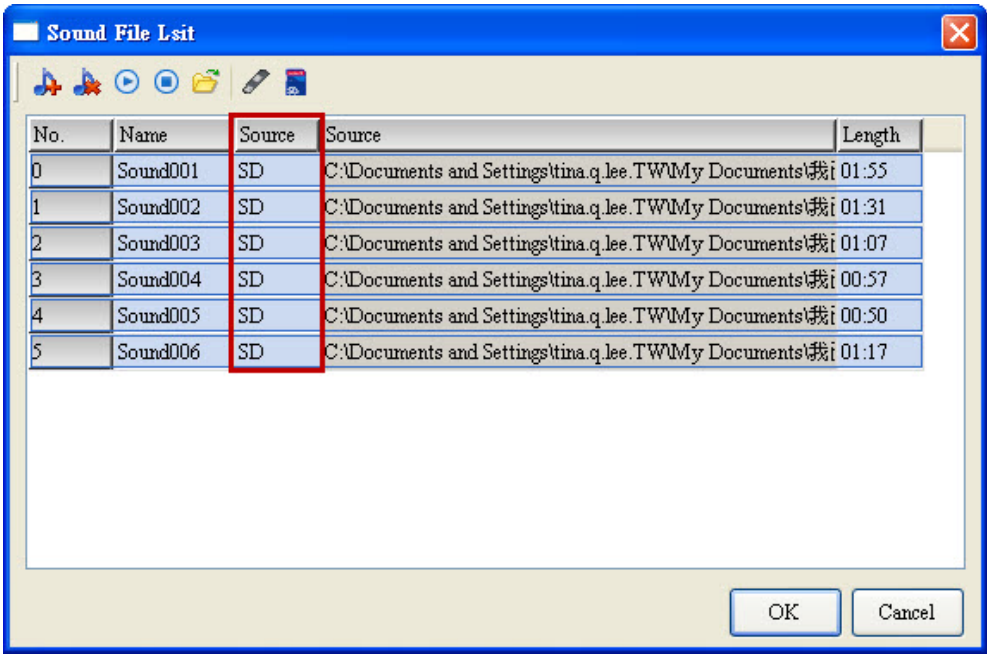
Save to SD

Please refer to the latter for details of use.

➢ Before changing the storage device to SD:

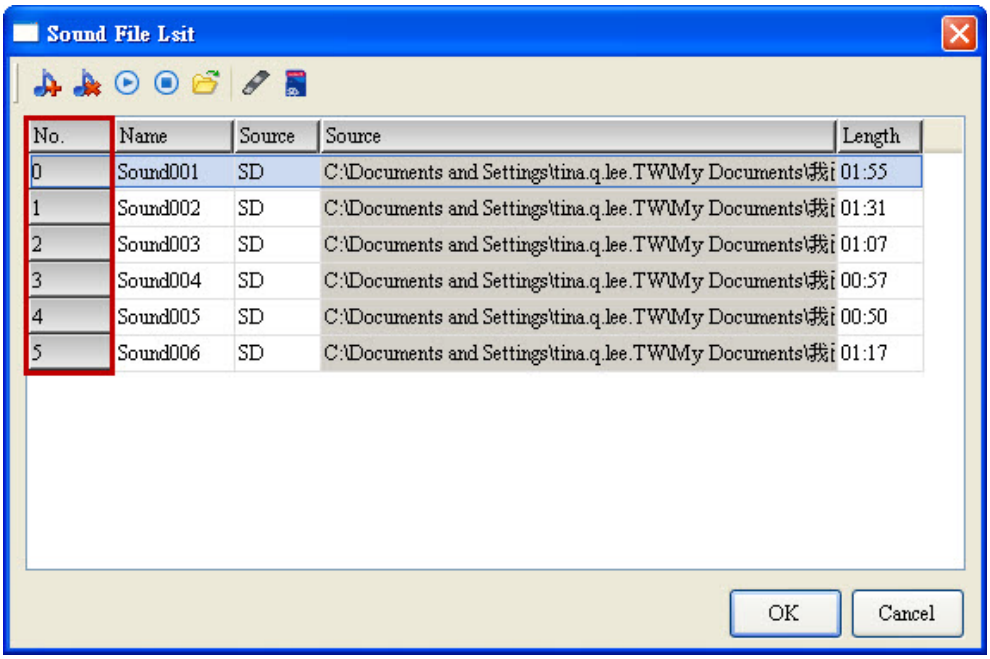
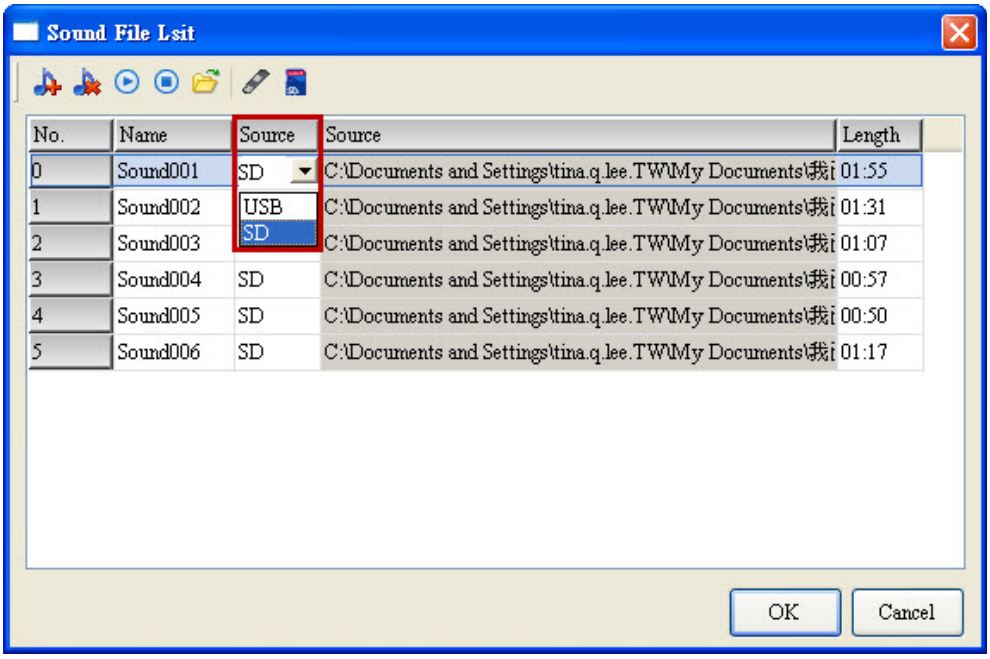


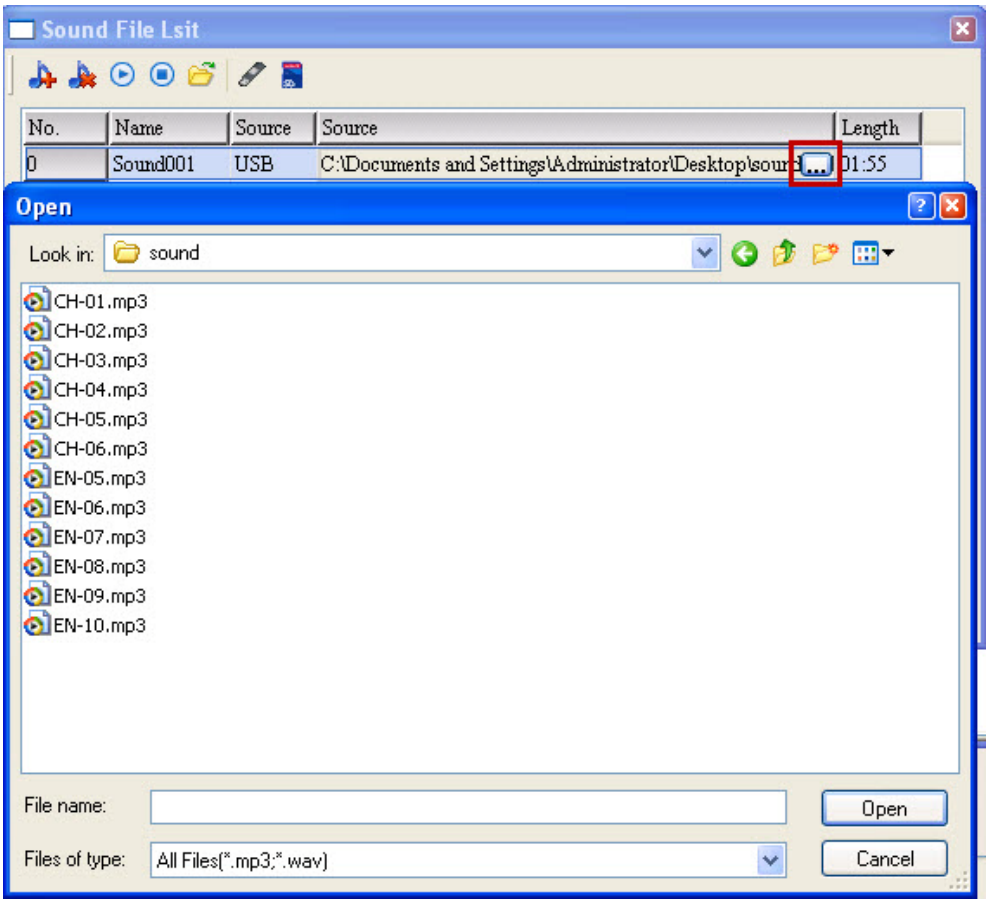
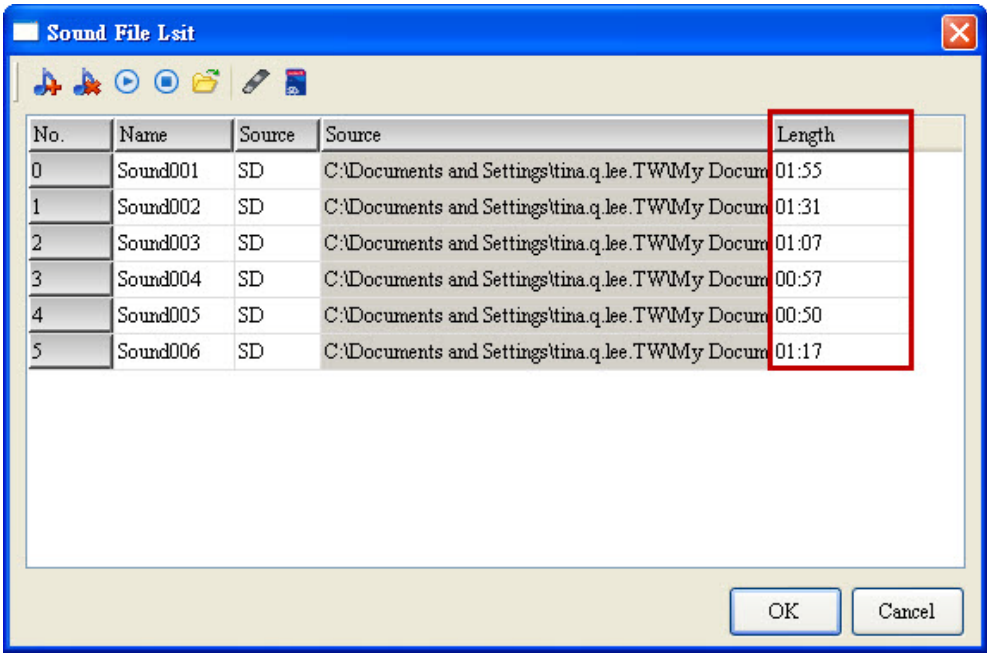
➢ After changing the storage device to SD:

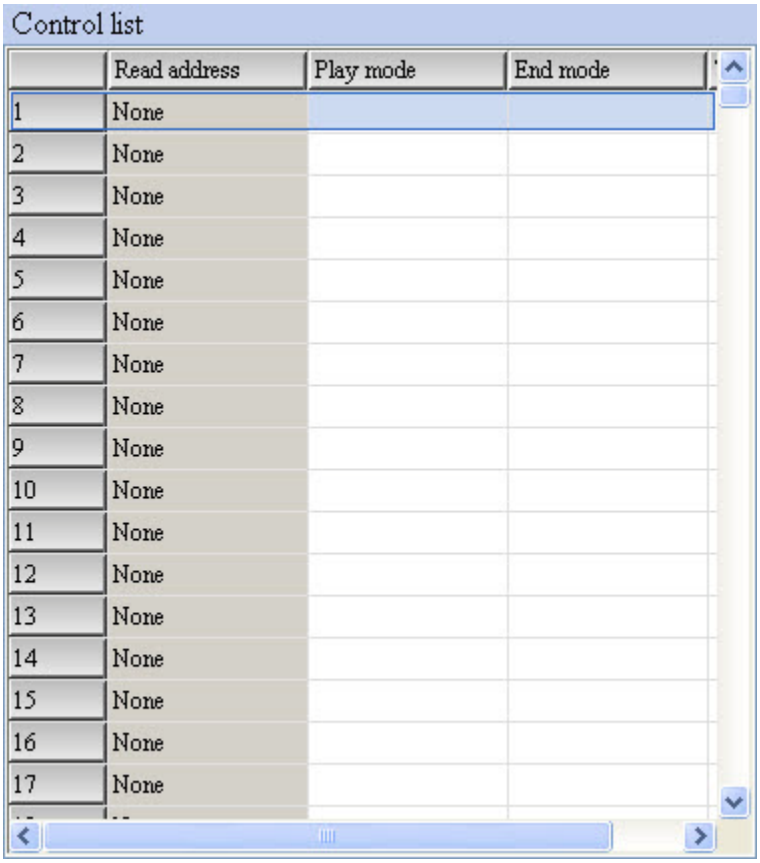
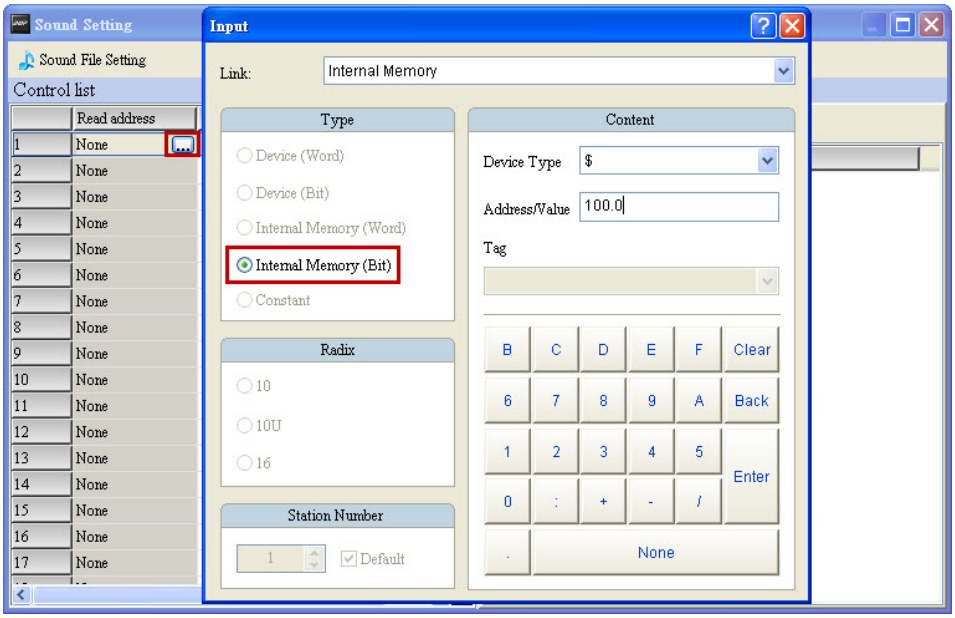


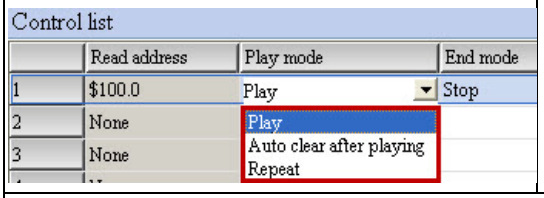
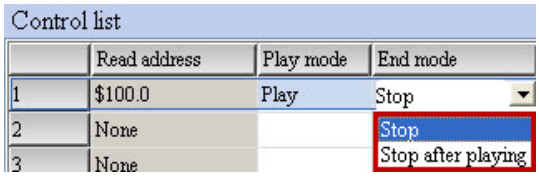
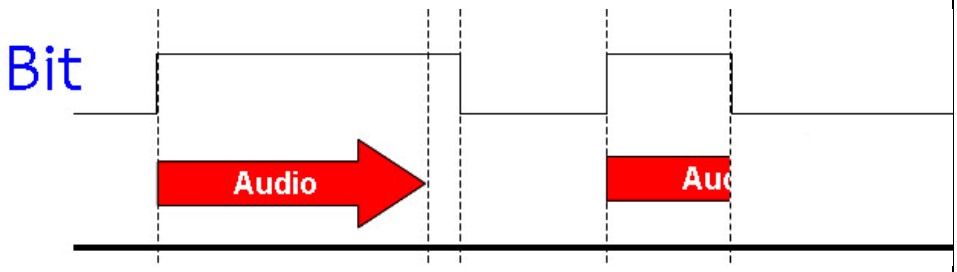
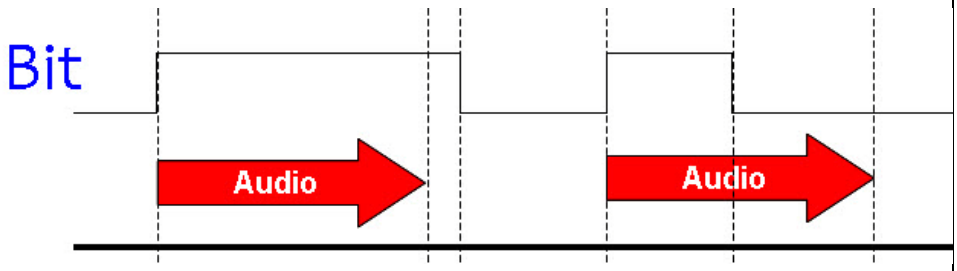
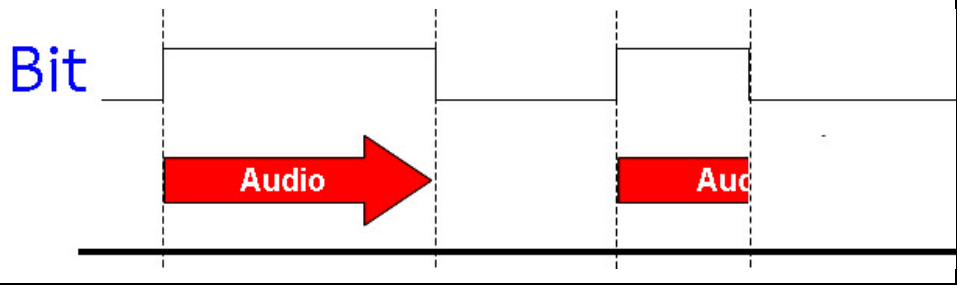
◆ Description of Field Name

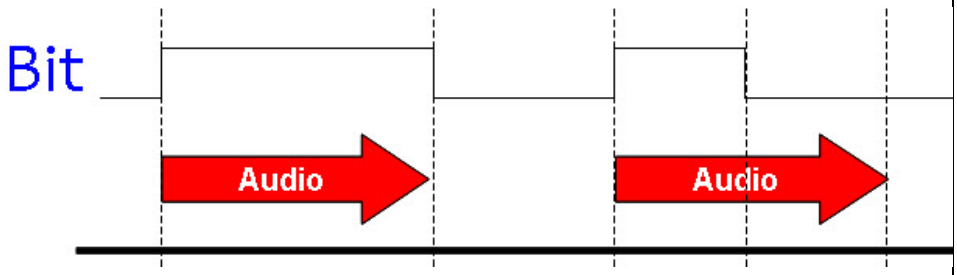
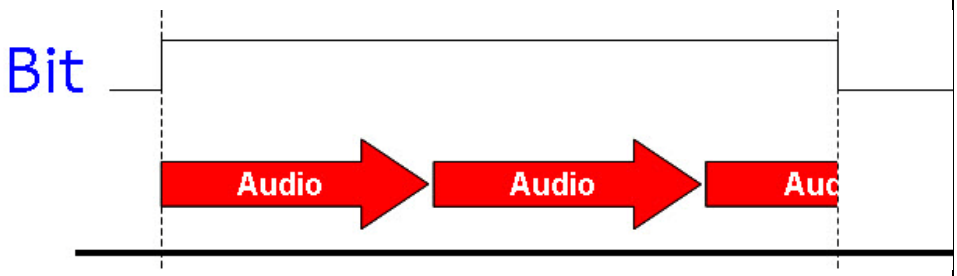
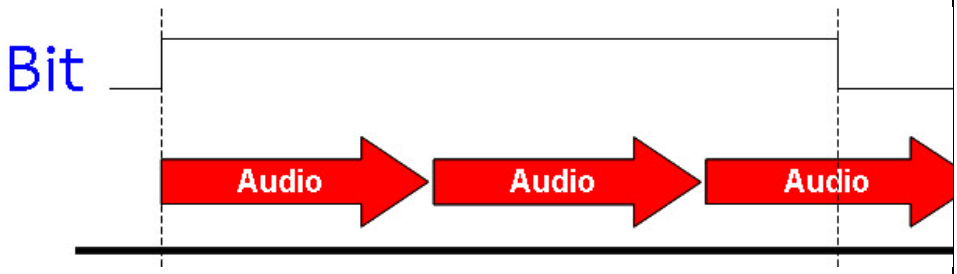
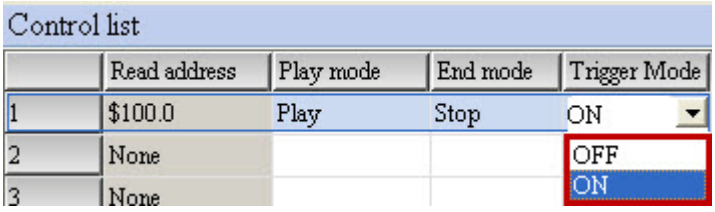
Number	➢ Number is a major reference value in playing sound files. When the user uses Address Read in the Play List, the software will decide which sound file to play according to the preset memory addresses.

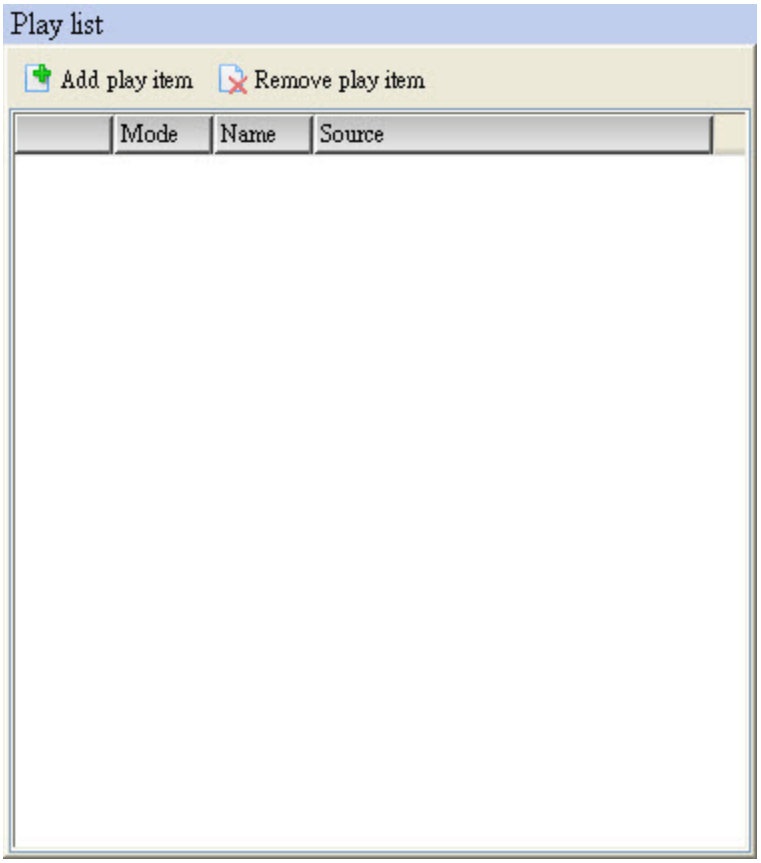
Sound File Setting Table 2-2-8-10 Sound File Setting	
	
Name	➢ The filename of the sound file added to the list will be displayed as Sound, with the first sound file starting at 001 and the following files go by Sound001,Sound002, and Sound003.
Data Location	➢ Available Data Locations are USB and SD. The user can change the Data Location as preferred with the default as USB. 
Source	➢ Source refers to the path and address of the sound file after being added. After adding the sound file, the user can change the source file, namely, replace other sound files.

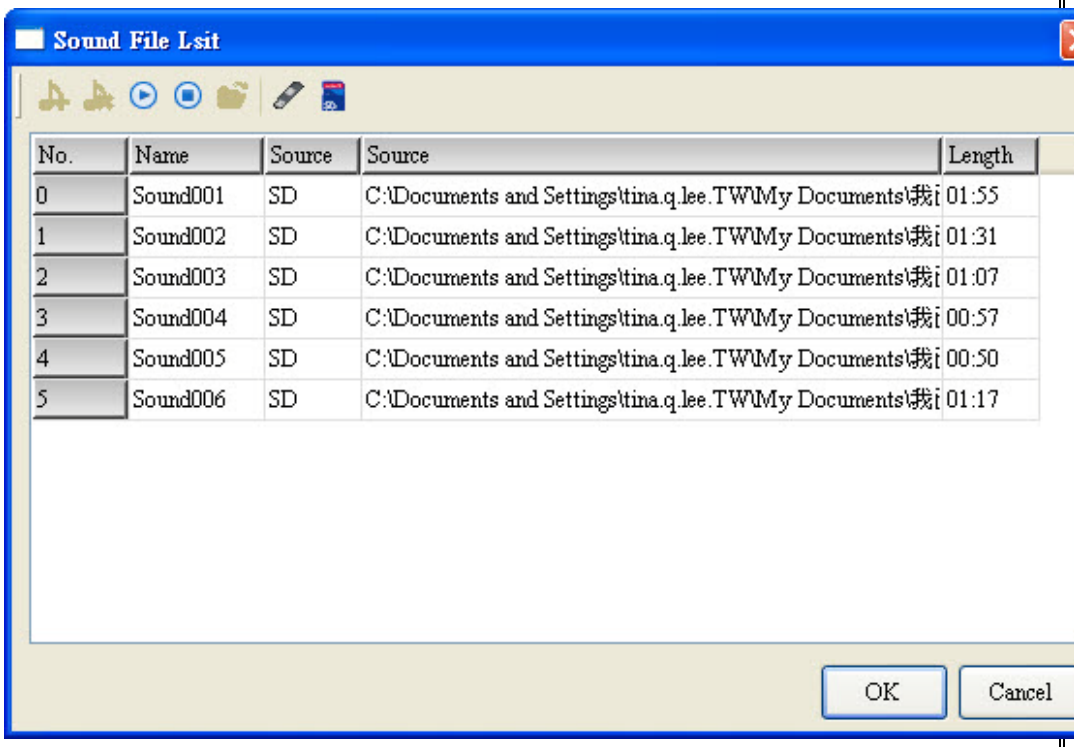
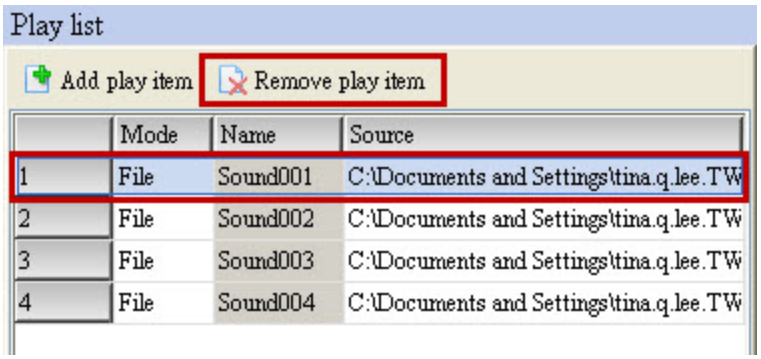
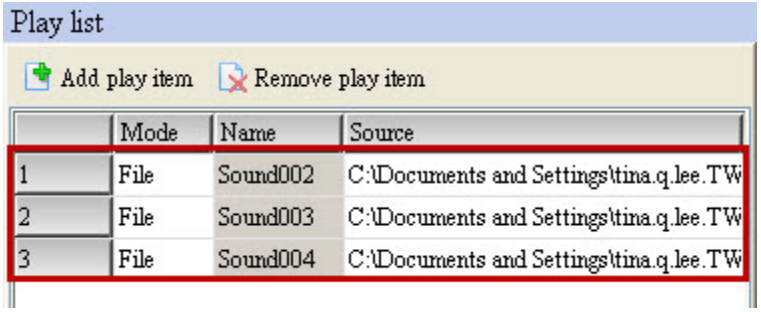
Sound File Setting Table 2-2-8-10 Sound File Setting	
	
Length	➢ This feature displays the length of the associated sound file. 

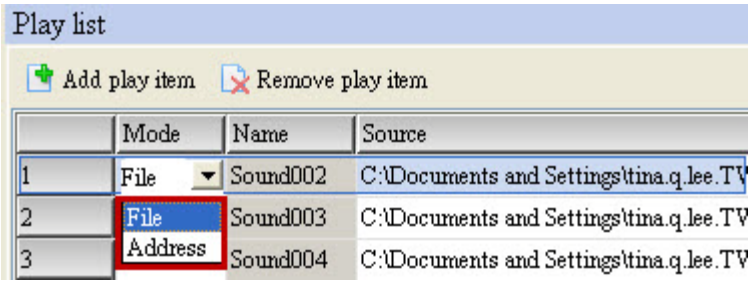
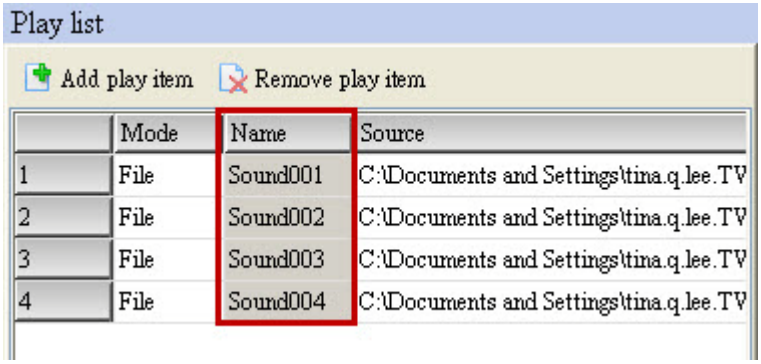
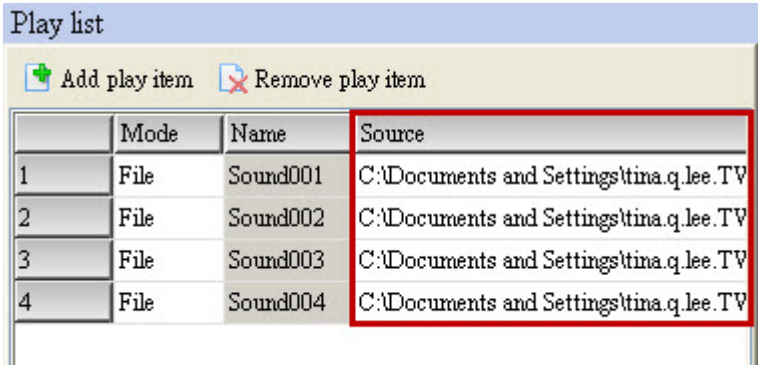
Control List Table 2-2-8-11 Control List		
		
➢ Control List includes read address, play mode, end mode, and trigger method. ➢ Control List can contain up to 512 pieces of data.		
Read Address	➢ Read Address can only be set as Bit to trigger a certain sound file and start playing it. 	
Mode	**Play Mode**	**End Mode**
	➢ Play Mode in Control	➢ End Mode in Control List includes

Control List Table 2-2-8-11 Control List		
	Listincludes [Play],[Auto clear after playing], and [Repeat].	[Stop]and [Stop after playing].
		
	◆ **Play Mode: Play.** ➢ Play means the playing will begin immediately after Bit trigger.	
	End **Mode: <u>Stop</u>**	➢ If End Mode is selected to stop, regardless if the sound file is still being played, it will stop immediately. 
	End Mode**: <u>Stop after playing</u>**	➢ If End Mode is selected to Stop after playing, the sound file will finish playing and stop. 
	◆ **Play Mode: Auto clear after playing** ➢ Auto clear after playing means that the associated Bit will be cleared after the sound file finished playing. ➢ If the same address is selected to trigger two sound files, the associated Bit will be cleared after both files finish playing.	
	End Mode**: <u>Stop</u>**	

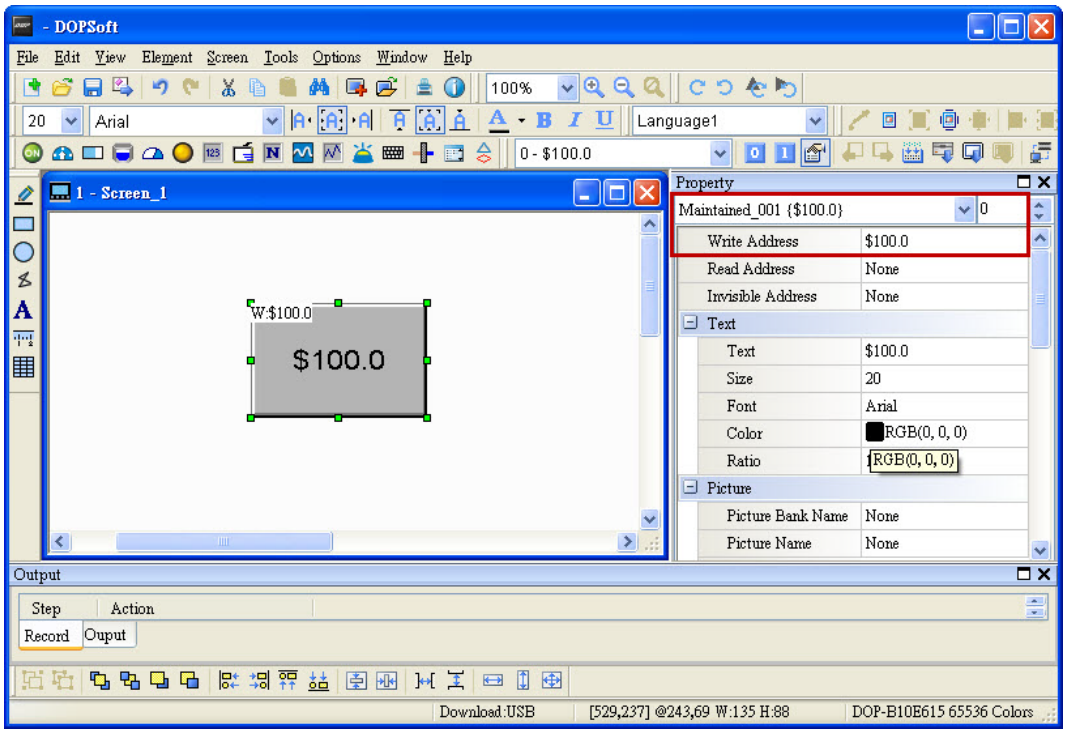
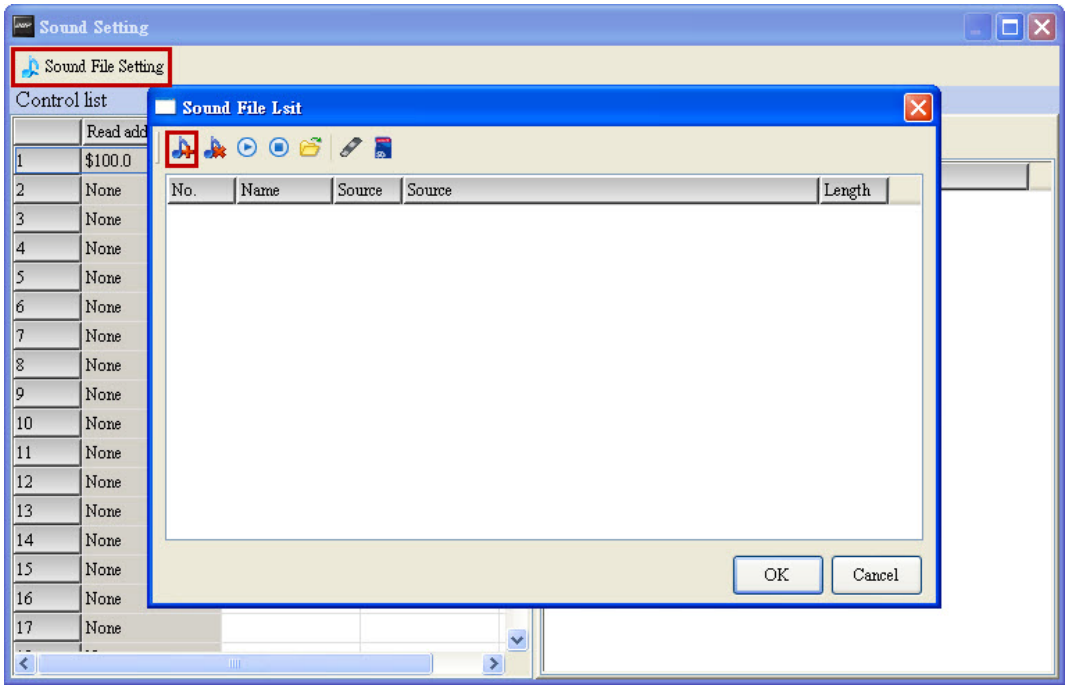
Control List Table 2-2-8-11 Control List		
	End Mode: **Stop after playing**	
	◆ **Play Mode: Repeat**	
	End Mode: **Stop**	
	End Mode: **Stop after playing**	
Trigger Method	➢ Trigger methods include ON and OFF status, which means the user needs to select to trigger the playing of sound file when the button is ON or OFF. 	

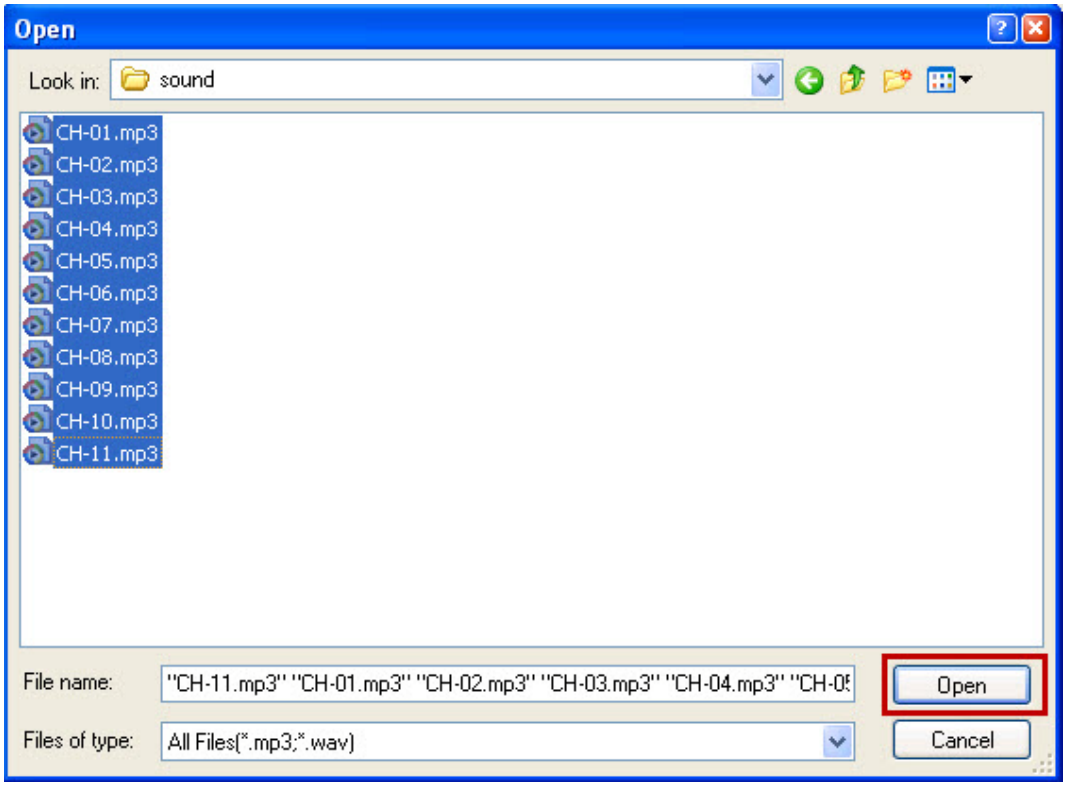
Play List Table 2-2-8-12 Play List

➢ Play List includes Add play item and Remove play item. ➢ Every trigger address in Play List can support up to 100 sound files. ➢ How the Play List is read depends on the sound files added to be played. ➢ The read methods include [File] and [Address].

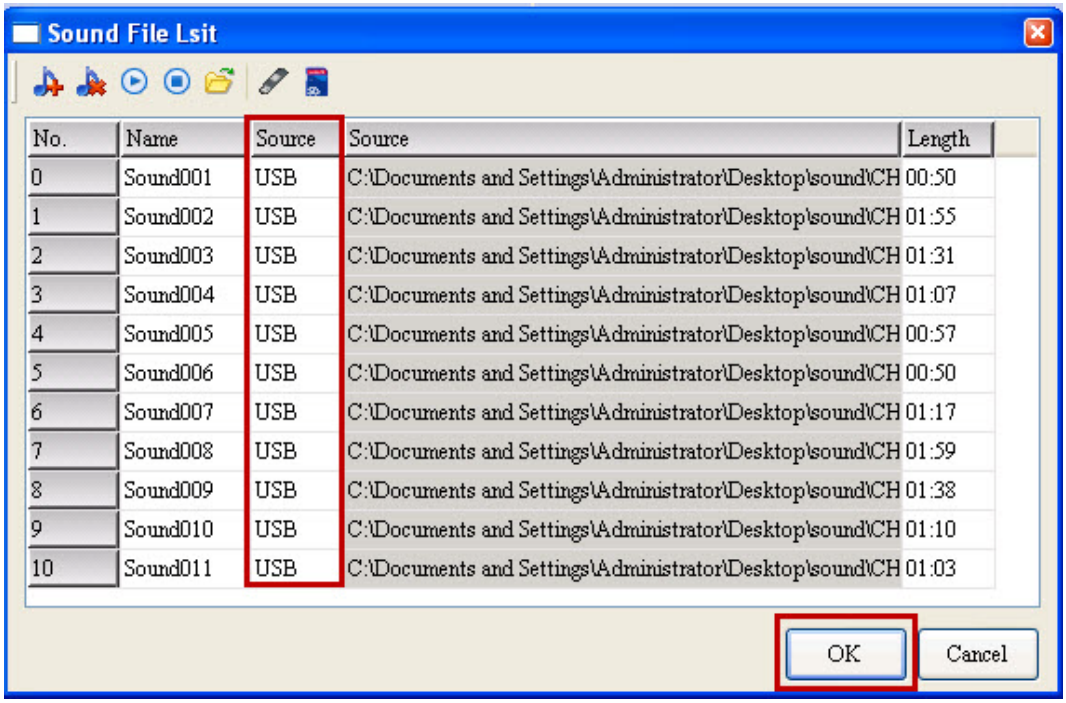
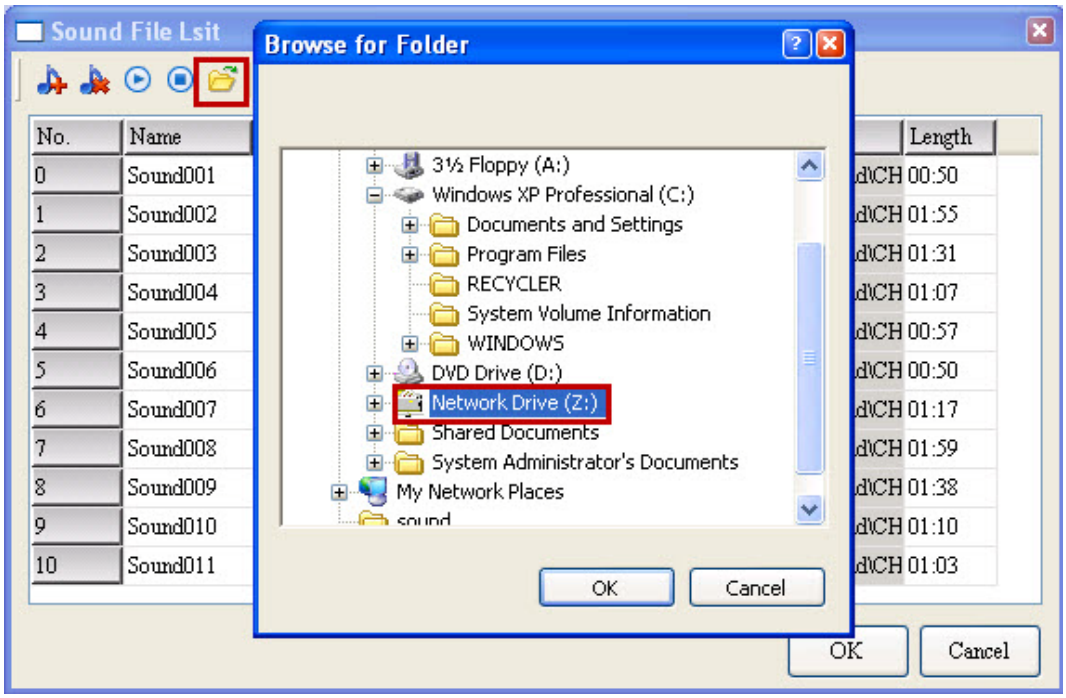
Play List Table 2-2-8-12 Play List	
Add play item	➢ When Add play item is selected, the software will ask the user to select the sound files to be added to Play List. 
Remove play item	➢ For the sound files already added to Play List, the user can delete unwanted files as needed.  

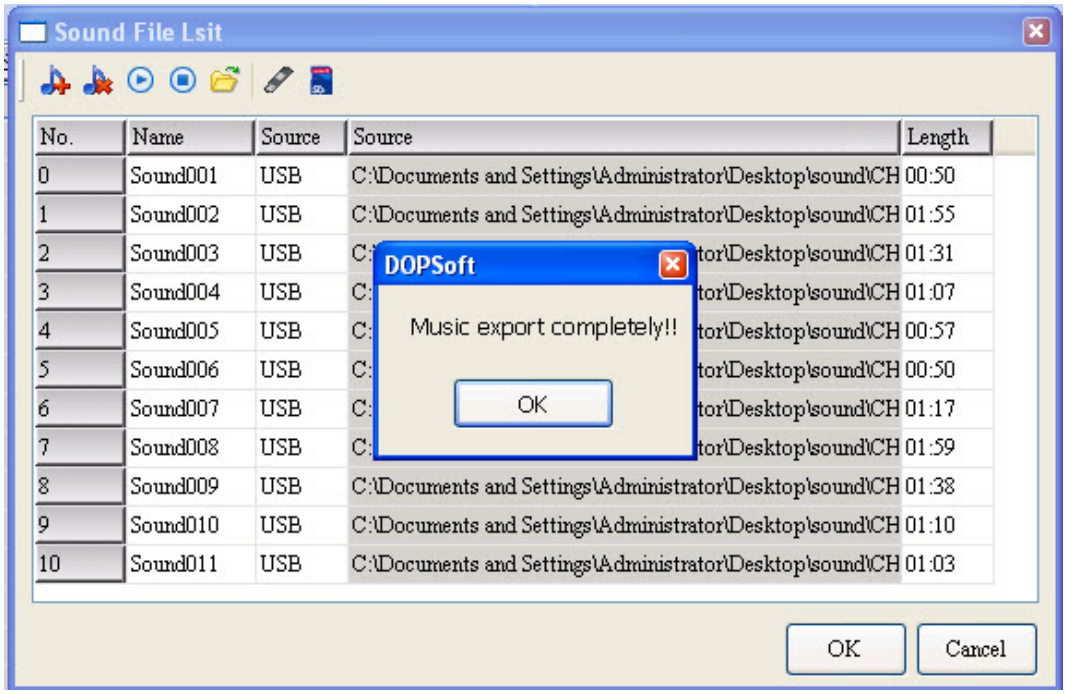
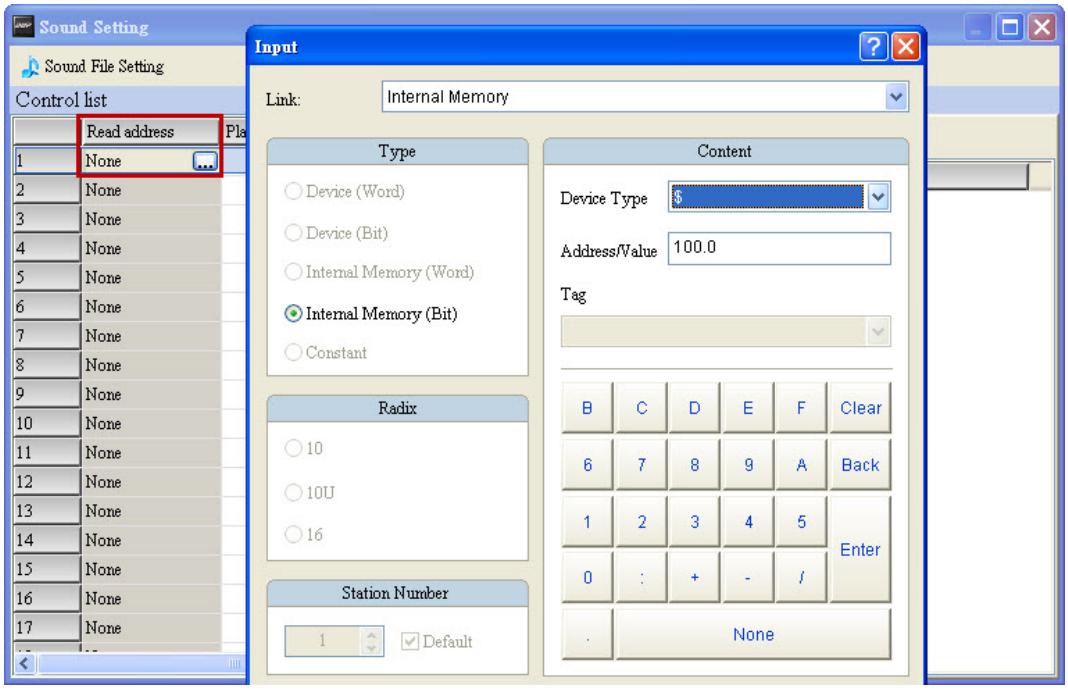
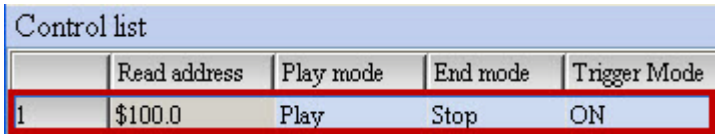
Play List Table 2-2-8-12 Play List	
Mode	➢ Mode includes File and Address. ➢ File: The user directly selects the sound files to be played in the list and add them to Play List. When the Bit in Control List is triggered, the selected sound files will be played. ➢ Address: A certain register address will be designated. When the trigger condition matches, the number entered into the register will be read and the corresponding number in [Sound File Setting]→ [Sound File List] to play the associated sound file. 
Name	➢ Name is defined by the fixed filename Sound with number starting at 001. The filenames of the subsequent files follow by Sound002, and Sound003, etc. 
Source	➢ [Source] in [Play List]cannot change the source path of the associated sound file. It can only be used to display purposes and allow the user to check the path of sound files. To change the actual source, please do it through [Source] in [Sound File Setting]. 

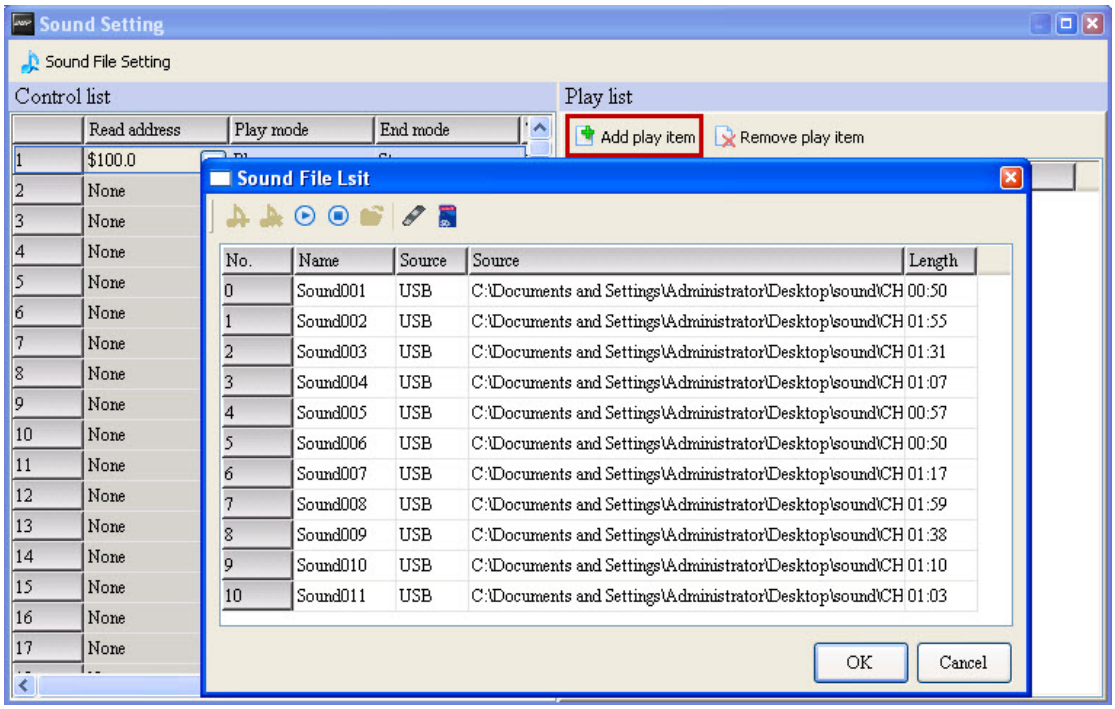
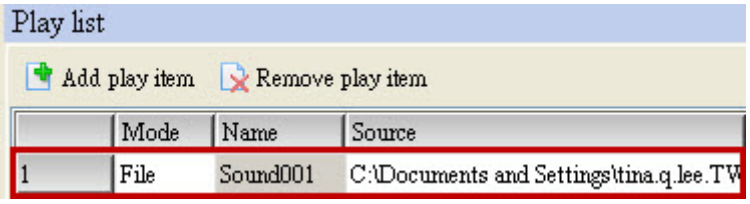
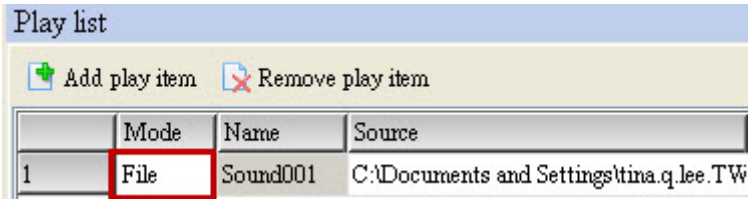
◆ The setup of Sound will be described below.

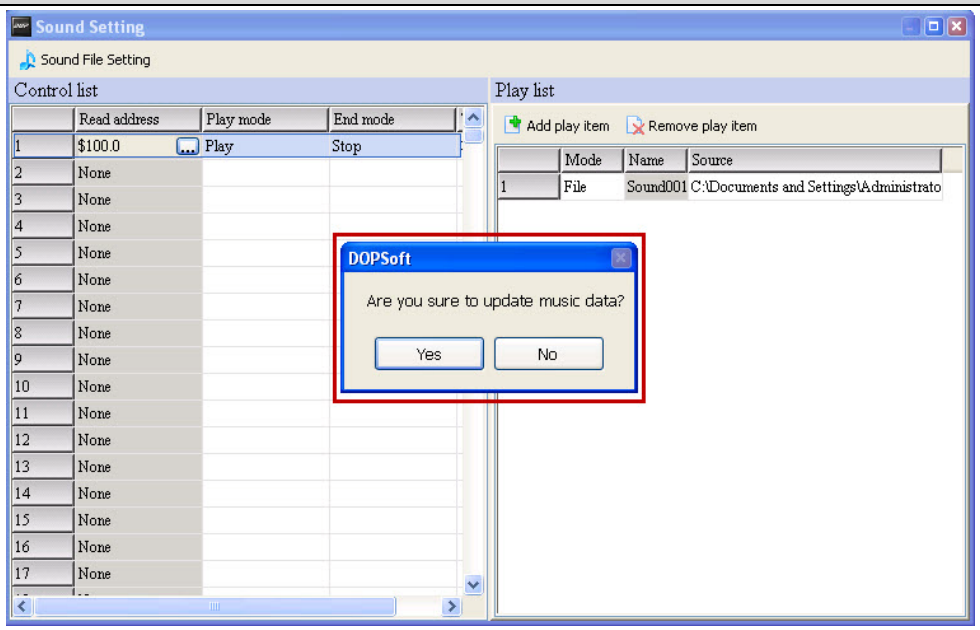
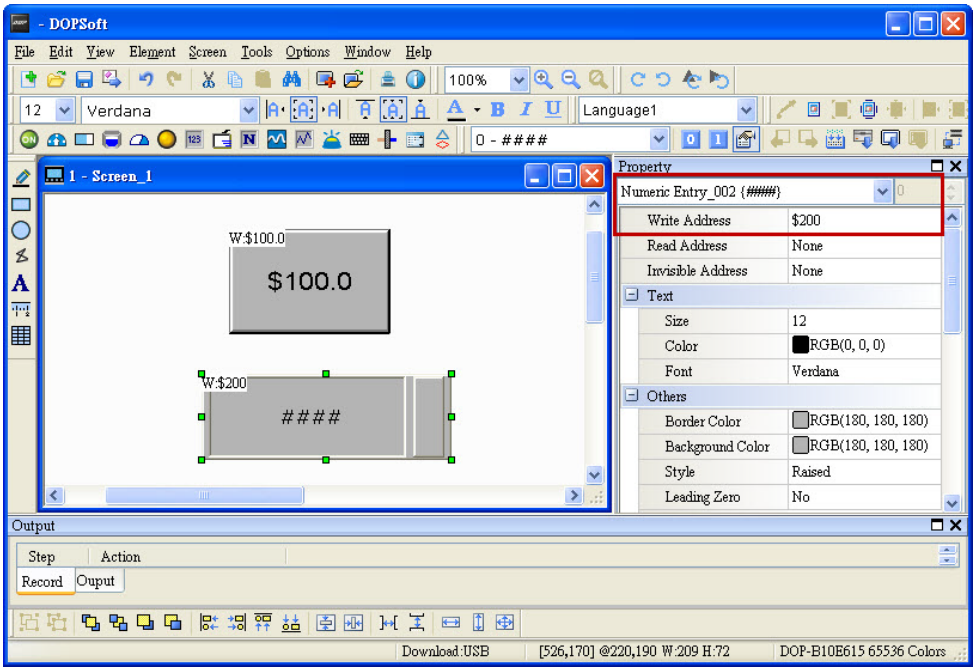
Example of Sound Table 2-2-8-13 Example of Sound	
Step 1	➢ Create anmaintained button in the software edit screen of DOPSoft and set the write address to $100.0. 
Step 2	➢ Enter [Options]→ [Sound Setting]→ [Sound File Setting] and click the Add icon . 

Example of Sound Table 2-2-8-13 Example of Sound	
Step 3	➢ Afterwards, please select the sound files to be added into the Sound File List. 

Example of Sound Table 2-2-8-13 Example of Sound	
Step 4	➢ After adding the sound files, please select the data location to be [USB] and press [Yes]. 
Step 5	➢ Click Export to save data to USB disk. Please note that all sound files must be saved in the root directory and cannot be placed in any file folders. 
Step 6	➢ Once the export is completed, the message showing [Music export completely] will be displayed.

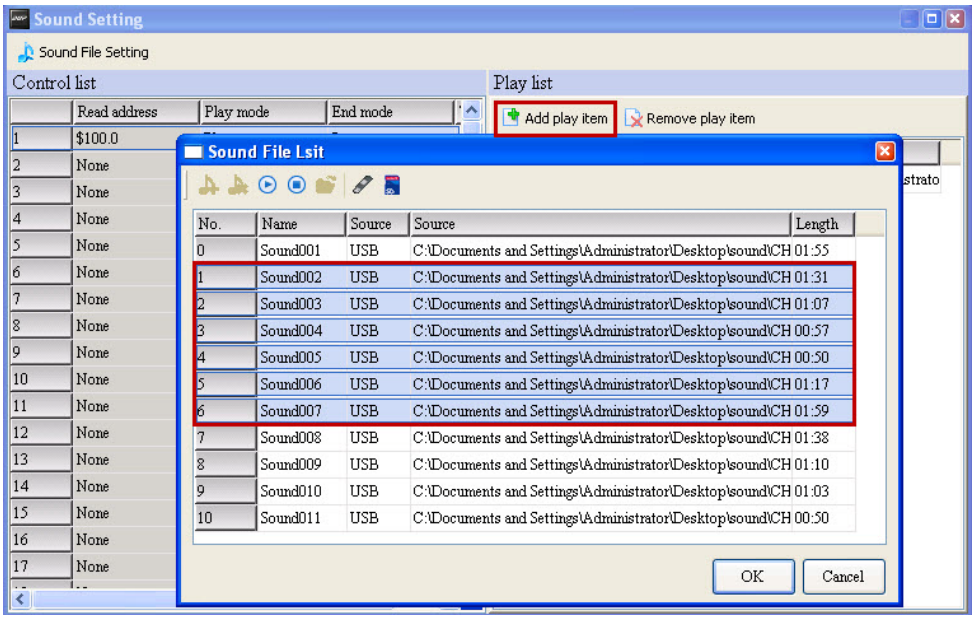
Example of Sound Table 2-2-8-13 Example of Sound	
	
Step 7	➢ Set Read Address to $100.0 inControl List (this is the Write Address of the maintained button set up in Step1).  ➢ Upon setting up Read Address, set the Play Mode to [Play],End Mode to [Stop], and trigger method to [ON]. 

Example of Sound Table 2-2-8-13 Example of Sound		
Step 8	➢ Click [Add play item]in Play List.  ➢ Select Sound001 sound file and add it to Play List.  	
Step 9	**File**	➢ When the Use mode is File, the system will directly read the sound files set up in Play List to play.  ➢ To delete the sound file, please click it first and select [Remove play item] to remove the sound file. ➢ After the Sound Setting has been changed, when the X on Sound Setting window is clicked to exit the setting, the system will ask the user whether to update with the new sound file data. If [Yes]is clicked, the changes will be saved. When [No]is clicked, all changes will be canceled.

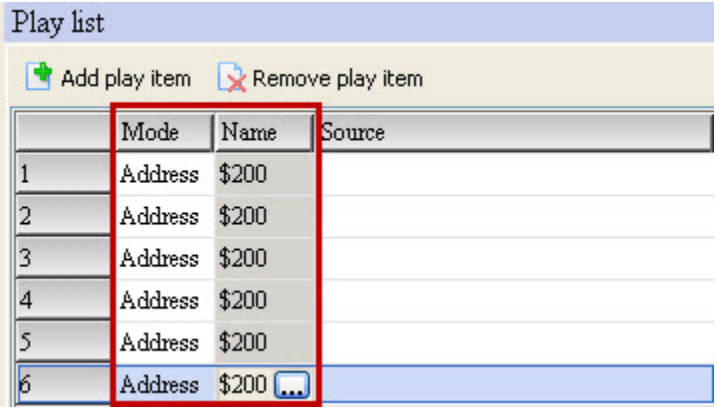
Example of Sound Table 2-2-8-13 Example of Sound		
		 ➢ Please first insert the external storage device such as USB into HMI and download the screen data into HMI and trigger $100.0 maintained button. The playback of the sound file is complete.
	Address	➢ Please create again a numerical input element in the software edit screen and set the write address to $200.  ➢ Enter [Options]→ [Sound Setting]→ [Play List] and click [Add play item]to add multiple sound files to Play List.

Example of Sound

Table 2-2-8-13 Example of Sound

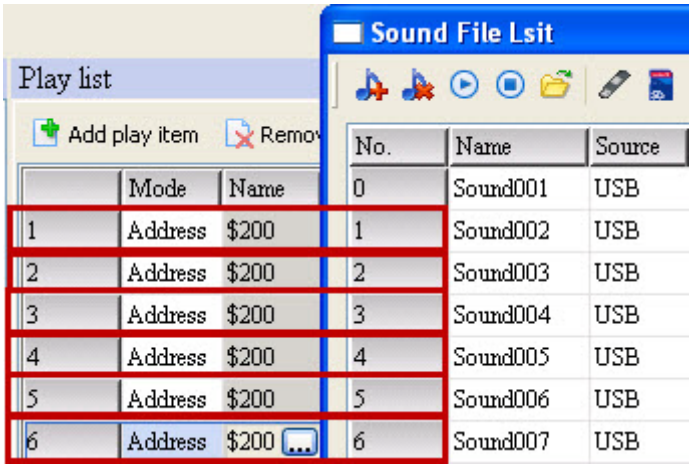


- Once Add play item is done, set Mode to Address and Read Address to $200. The user can use $200 to enter numbers in the associated sound file list.
- When $100.0 is entered for triggering Control List and the associated number is entered, the corresponding sound file can be played.

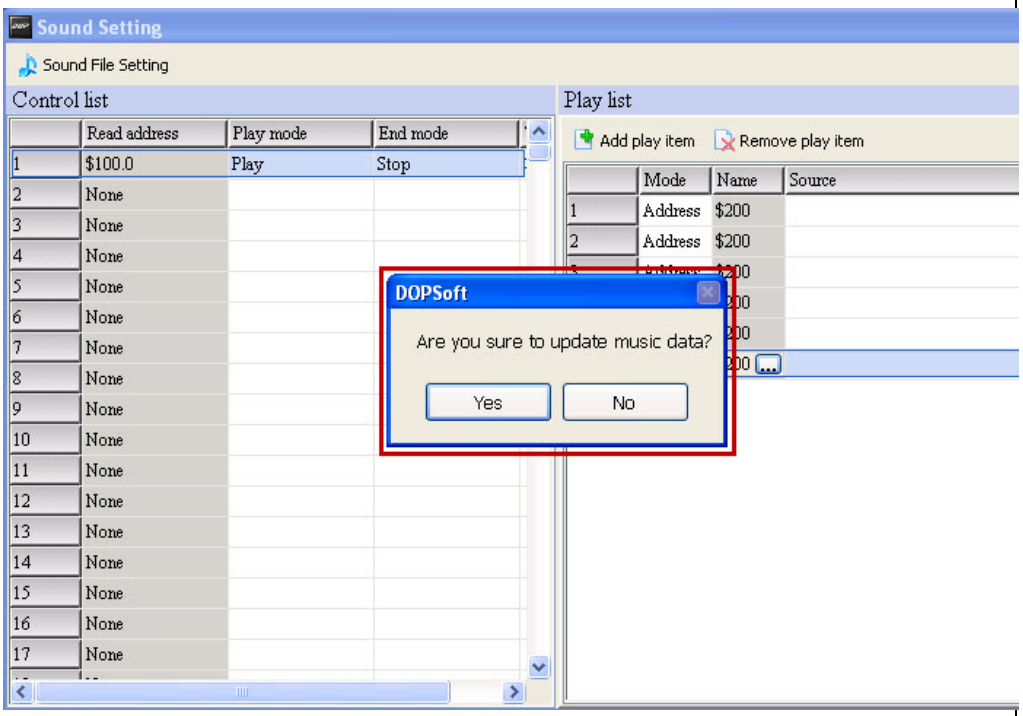


Example of Sound

Table 2-2-8-13 Example of Sound



- To delete the sound file, please click the file first and click [Remove play item] to remove the selected file.
- After the Sound Setting has been changed, when the X on Sound Setting window is clicked to exit the setting, the system will ask the user whether to update with the new sound file data. If [Yes]is clicked, the changes will be saved. When [No]is clicked, all changes will be canceled.



- Please first insert the external storage device such as USB into HMI and download the screen data into HMI. Set $200 for selection of sound and trigger $100.0 maintained button. The playback of the sound file is complete.

2-2-8-7 Real Time Clock Setting

This chapter mainly describes the updating function of real time clock provided by DOPSoft. Some PLC controller has no built-in Real-time clock (RTC), thus, it cannot be applied to the operation which is related to time setting, such as machine with daily timer setting, door access management and etc. If PLC controller has built-in RTC, the synchronous function provided by HMI enables users to synchronize the RTC of HMI with PLC or vice versa.

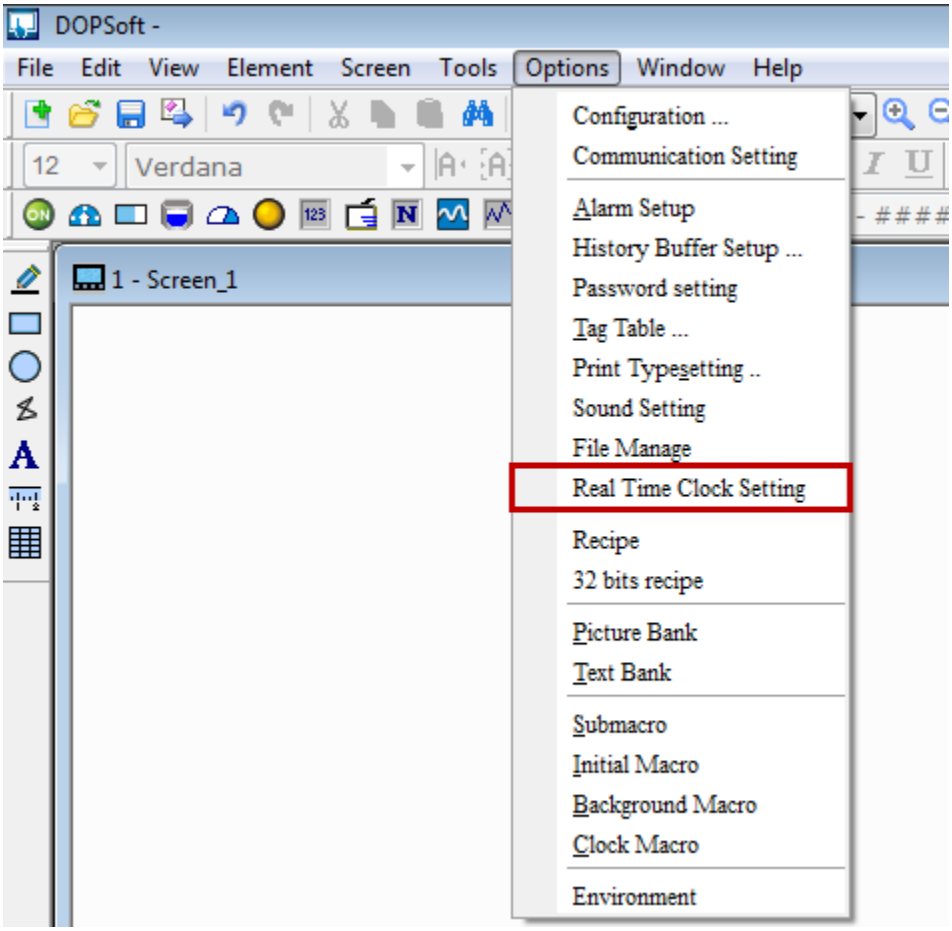


Figure2-2-8-13 Update the Real Time Clock Setting

Users have to check【Enable RTC Updates】before update the calendar setting, which includes PLC connection setting and time setting.

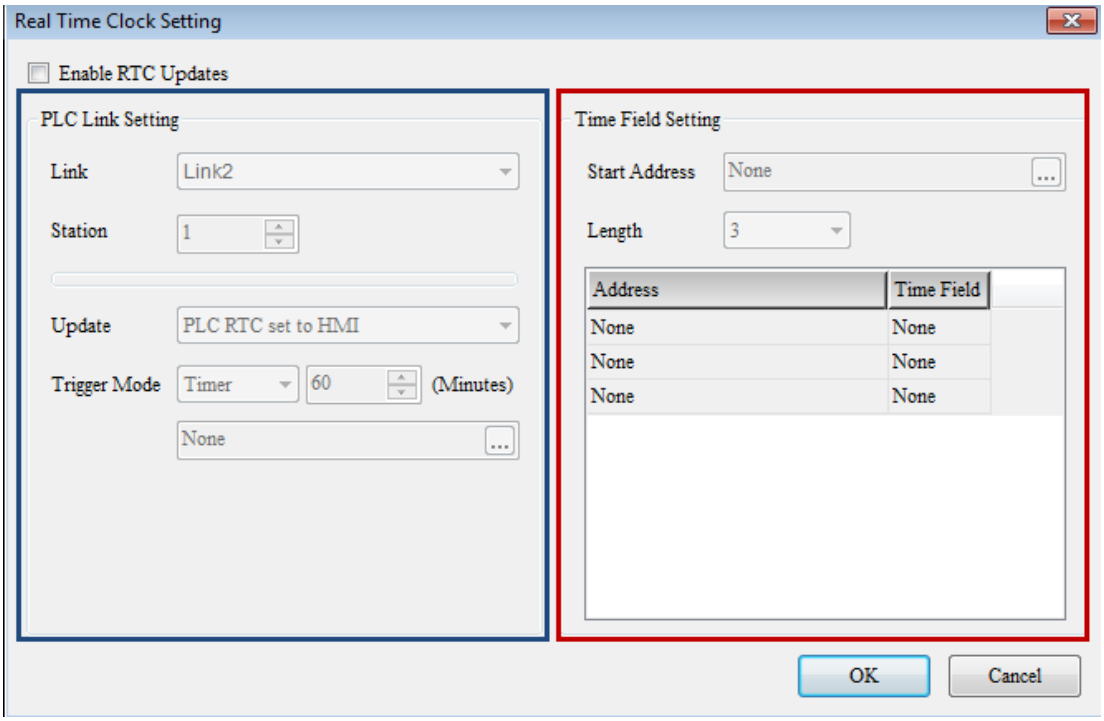
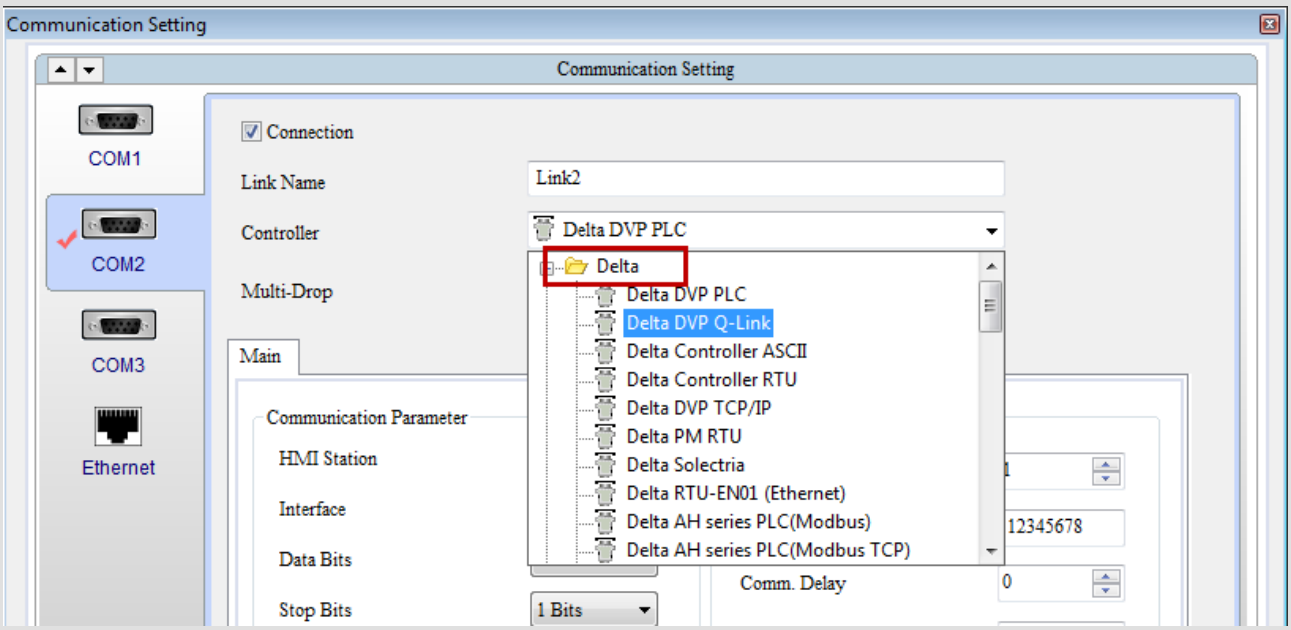


Figure 2-2-8-14 Interface of RTC update

NOTE:

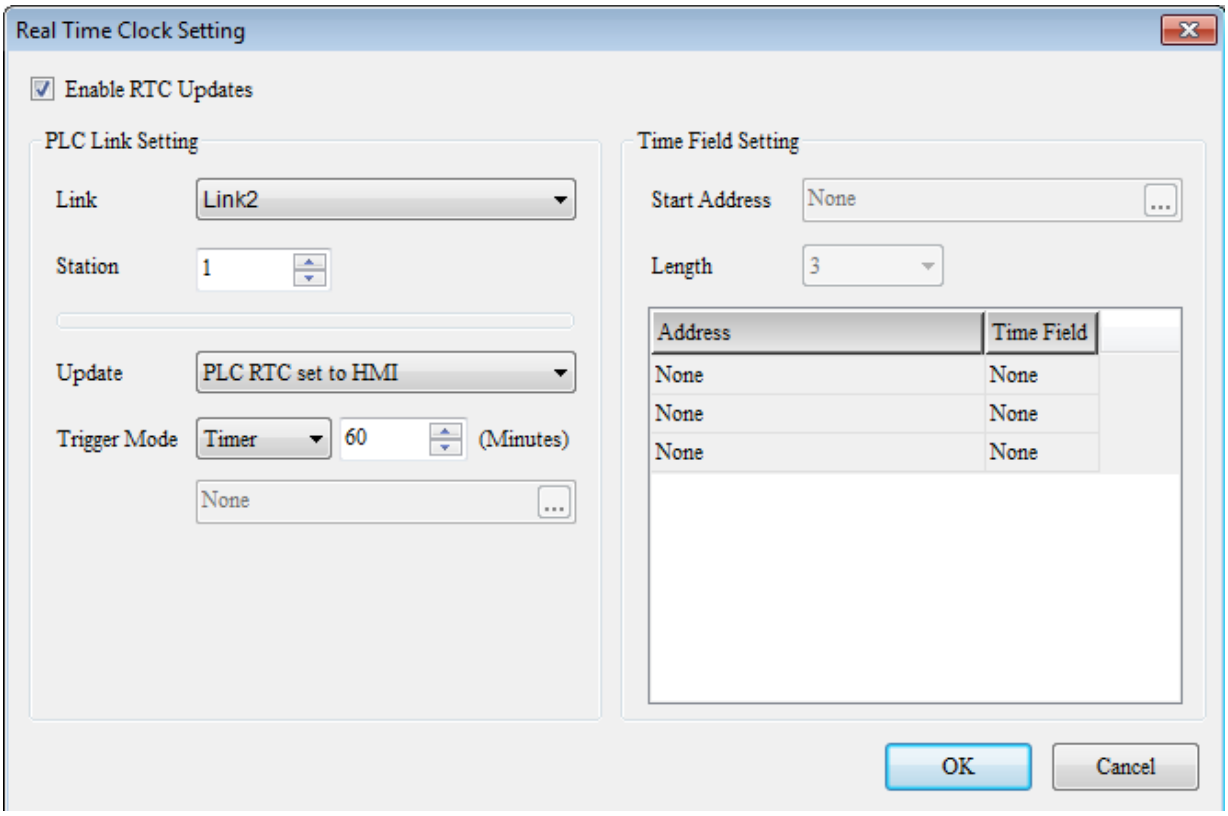
✓ When users choose Delta's PLC as the controller, time setting is no need. DOPSoft will automatically disable the function of time setting and HMI will automatically set the time field to the perpetual calendar (D1319~D1313) from Delta's PLC.



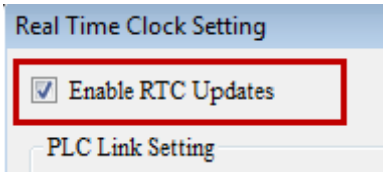
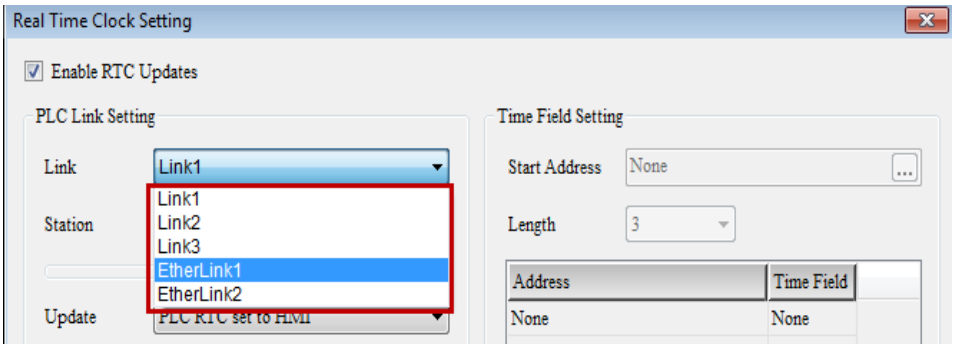
✓ Some old models of Delta's PLC (ES/SS/EC) do not support the function of RTC Update.

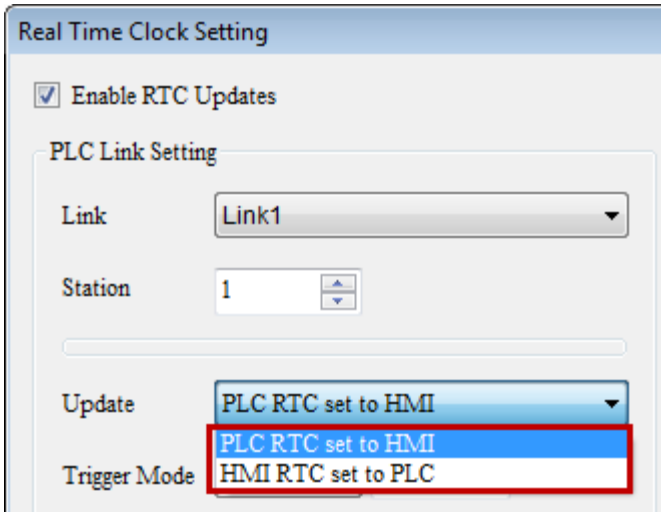
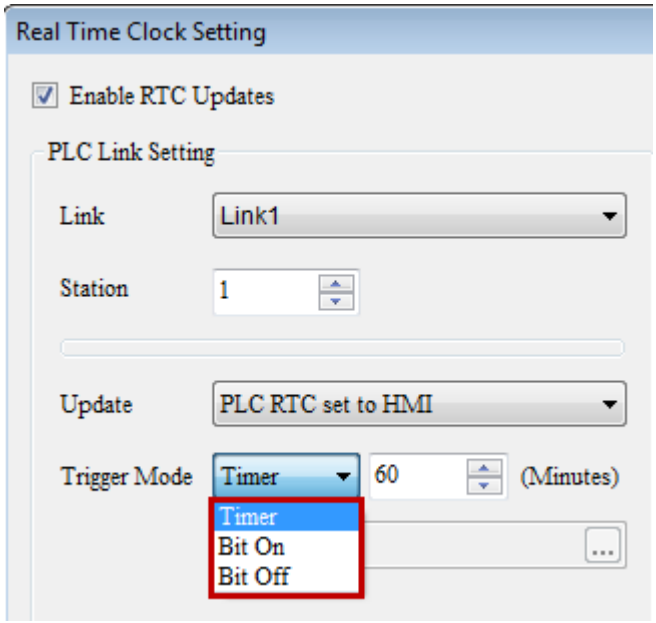
Property Description of RTC Update

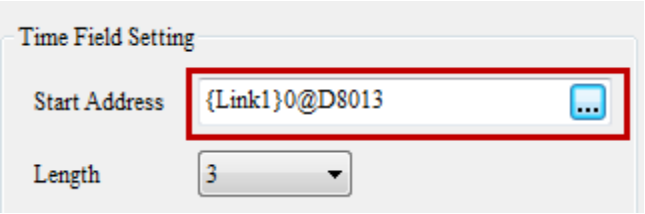
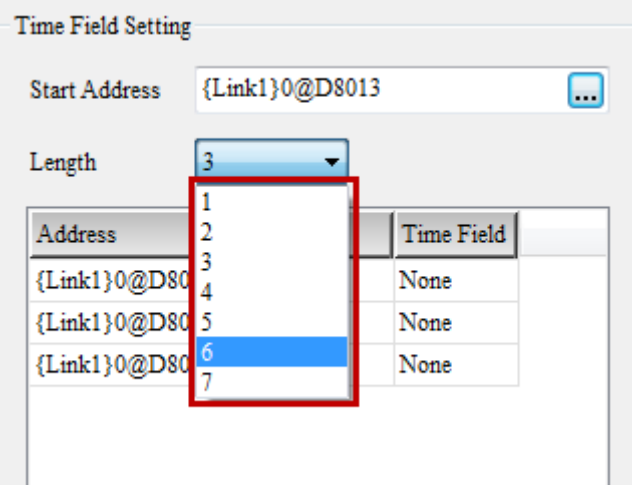
Table 2-2-8-14 Property Description of RTC Update



➢ PLC connection setting

Enable RTC Updates	➢ Check to enable RTC updates 
Connection Name	➢ Choose one connection name, no matter the controller is COM1/COM2/COM3 or Ethernet. 
Station Number	➢ Setup the controller station number to update the time. ➢ If the chosen controller does not support the setting, this selection will be disabled.

Property Description of RTC Update Table 2-2-8-14 Property Description of RTC Update	
Update Setting	➢ There are two modes for users: 【Synchronize the HMI RTC time to PLC】 or 【Synchronize PLC RTC time to HMI】 . 
Triggering Method	➢ Three triggering methods are provided: 【Timer】, 【Bit On】 and 【Bit Off】 .  ➢ If select 【Timer】 , users can setup the cycle that system updates the setting, the minimum is 1 minute and the maximum is 1440 minutes (1 day). The default value is 60 minutes. ➢ If select 【Bit On】 , it means it updates the setting when Bit is ON. ➢ If select 【Bit Off】 , it means it updates the setting when Bit is OFF. ➢ If select 【Bit On】 or 【Bit Off】 , users have to select the triggering address, which is the internal memory or register address.
➢ **Time Field Setting**	

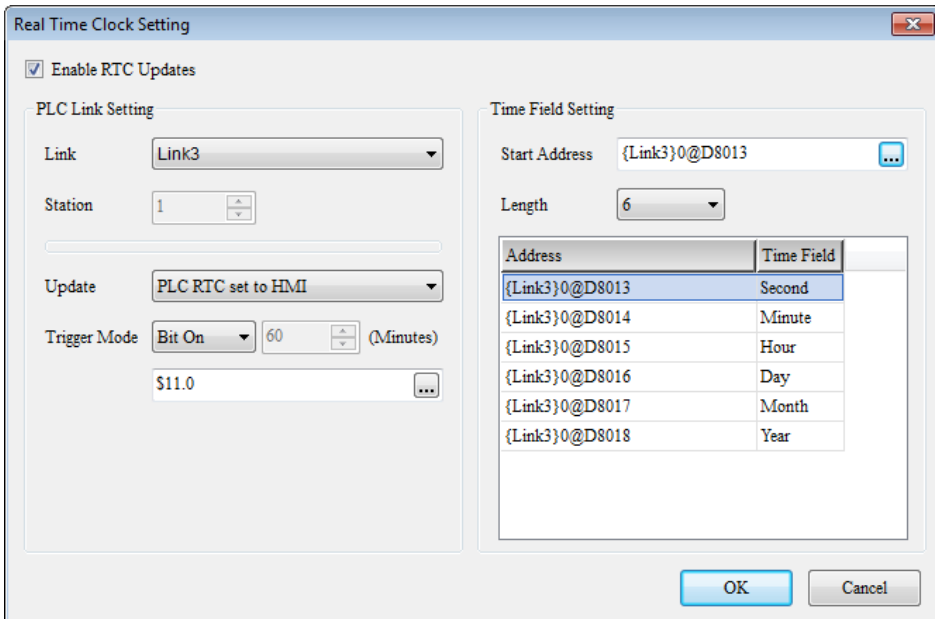
Property Description of RTC Update Table 2-2-8-14 Property Description of RTC Update	
Start Address	➢ Setup the register address of RTC synchronization.  ➢ If the controller is Delta's PLC, then there is no need to setup the start address.
Length	➢ Users can select the length according to the number of synchronous time field setting. ➢ The minimum value is 1 and maximum is 7.  ➢ If the controller is Delta's PLC, then there is no need to setup the length.

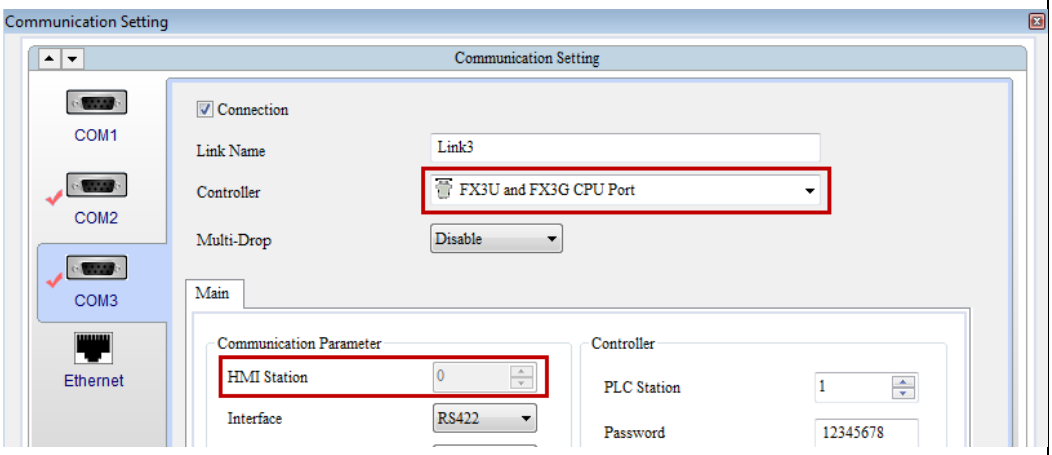
The following introduces the example of【RTC Update Setting】

Example of RTC Update Table 2-2-8-15 Example of RTC Update	
Setting Steps of RTC update	➢ Step1: Enter【Option】→【RTC Update Setting】 ➢ Step2: Setup the related properties of updating the RTC: ● Enable Time Auto Update ● Select the connection name as Link3 (Mitsubishi – FX3U and FX3G CPU Port) ● Select the updating setting【Synchronize PLC RTC with HMI】 ● Triggering method:【Bit On】 ● Set the triggering address as $11.0 ● The start address is set to {Link3}1@D8013. ● Select 6 as the length. ● Select “Second” as the corresponding time field of {Link3}1@D8013. ● Select “Minute” as the corresponding time field of {Link3}1@D8014. ● Select “Hour” as the corresponding time field of {Link3}1@D8015. ● Select “Day” as the corresponding time field of {Link3}1@D8016. ● Select “Month” as the corresponding time field of {Link3}1@D8017. ● Select “Year” as the corresponding time field of {Link3}1@D8018. ➢ Please click OK to complete the setting. See the figure below. ➢ Mitsubishi – FX3U and FX3G CPU Port Controller does not need to setup station number, thus, there is no need to set it up in RTC Update Settin

Example of RTC Update

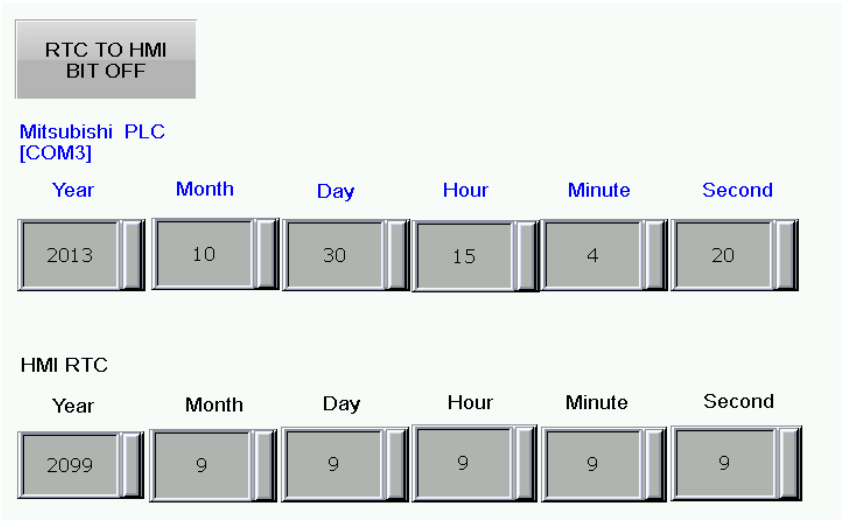
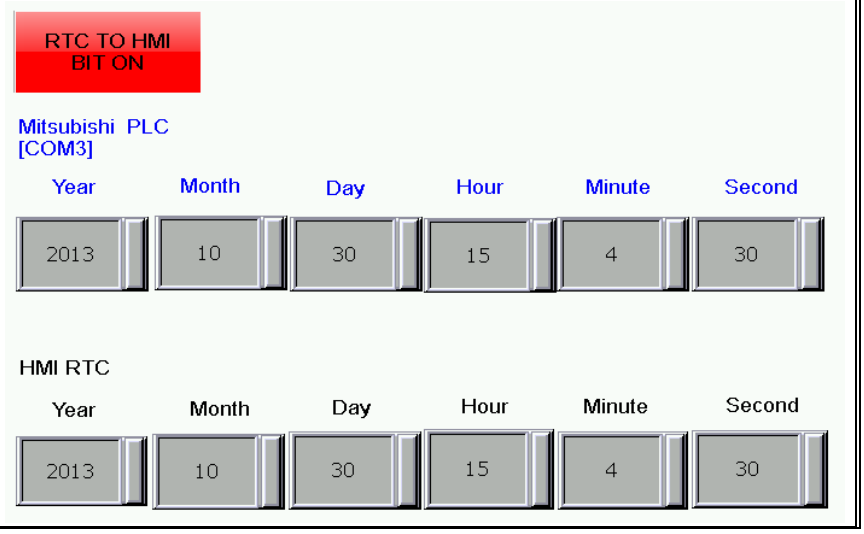
Table 2-2-8-15 Example of RTC Update





Example of RTC Update Table 2-2-8-15 Example of RTC Update	
Create Maintained Button	➢ Step1: Create one maintained button and set its written memory address as $11.0. ➢ Step2: Edit the text of state0 (maintained button) as “RTC TO HMI BIT OFF”, state1 as “RTC TO HMI BIT ON”. When the button is triggered, the foreground color will be red which means it is ON. **State 0**: W:$11.0 RTC TO HMI BIT OFF **State 1**: W:$11.0 RTC TO HMI BIT ON
Create Numeric Entry Element	➢ Step1: Create 6 numeric entry elements and set the address as {Link3}1@D8013 ~ {Link3}1@D8018 in sequence. ➢ Step2: Create another 6 numeric entry elements and set the system parameters as TIME_YEAR, TIME_MONTH, TIME_DAY, TIME_HOUR, TIME_MINUTE, TIME_SECOND in sequence. **PLC address** W:{Link3}1@D8018 ##### W:{Link3}1@D8017 ##### W:{Link3}1@D8016 ##### W:{Link3}1@D8015 ##### W:{Link3}1@D8014 ##### W:{Link3}1@D8013 ##### **System Parameters** W:TIME_YEAR #### W:TIME_MONTH #### W:TIME_DAY #### W:TIME_HOUR #### W:TIME_MINUTE #### W:TIME_SECOND ####

Example of RTC Update Table 2-2-8-15 Example of RTC Update	
Result	➢ Please compile the elements and download them into HMI after all are created. When triggering maintained button (BIT ON) of RTC, the system will set RTC time of PLC to HMI. Thus, the system parameter inside HMI, TIME_YEAR, TIME_MONTH, TIME_DAY, TIME_HOUR, TIME_MINUTE and TIME_SECOND will be synchronized with PLC RTC.

BIT OFF	
BIT ON	

2-2-8-8 HMI Identifier Setting

This section describes the function of HMI identifier setting provided by DOPSoft software. If it sets HMI identifier setting, when it opens the screen which has no identical HMI identifier, a warning message will pop up. The specific screen can only be downloaded to the specific HMI. Once the function of HMI identifier is enabled, only when it has correct password of HMI identifier, can HMI run properly. There two sets of HMI identifier, HMI and screen.

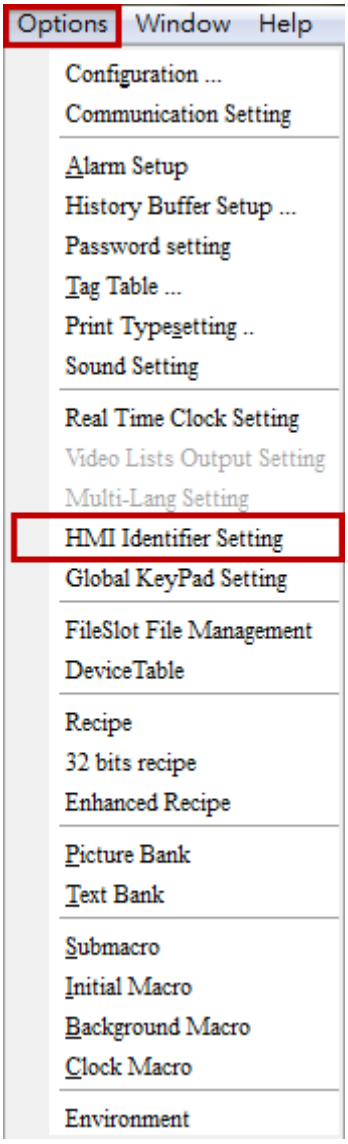
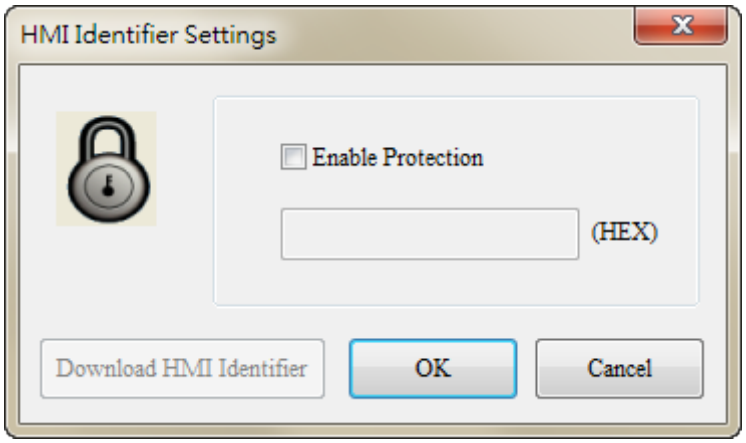
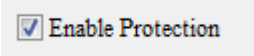
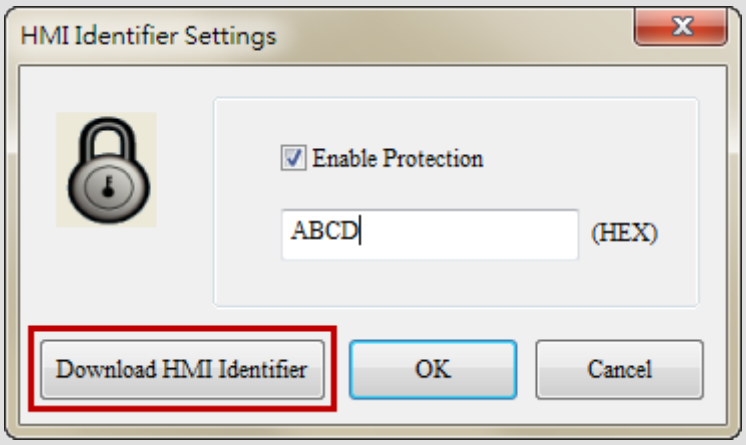


Figure 2-2-8-15 HMI Identifier Setting

Description of HMI Identifier Settings Table 2-2-8-16 Description of HMI Identifier Settings	
	
Enable Protection	➢ It enables the function of HMI identifier protection. 
Password	➢ The password input format is HEX, supporting numbers from 0 to 9 and alphabets from A to F. Other charactersare invalid in the password field.
Download HMI Identifier	➢ Press this button to write identifier into HMI. ➢ After downloading HMI identifier, when HMI starts up, it will check if the set identifier of the screen file is identical to the HMI's.

NOTE:

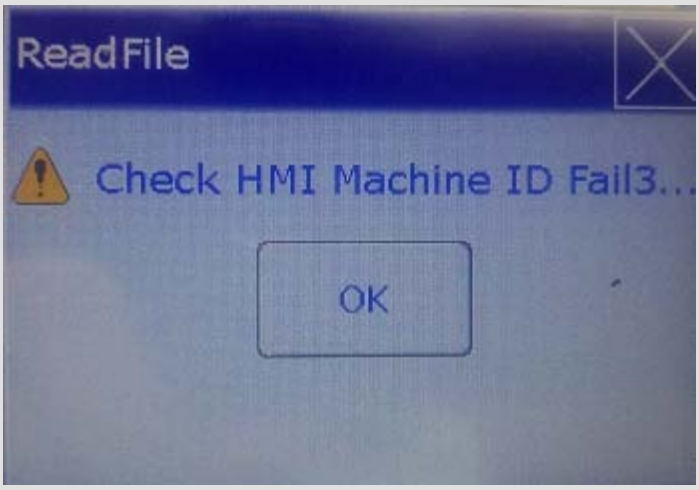
✓ Check to enable HMI identifier protection and set the password. When selecting [Download all] without executing [Download HMI Identifier], it will only download the identifier for the screen.



✓ When only HMI is set with an identifier, a message of [Check HMI Machine ID Fail 1]

will pop up.

- ✓ When only screen is set with an identifier, a message of [Check HMI Machine ID Fail 2] will pop up.
- ✓ When both HMI and screen are set with identifiers, but the identifier does not match,a message of [Check HMI Machine ID Fail 3] will pop up.



- ✓ If you forget the set identifier, you can clear the set one from [Tool] → [Restore the default value] and set the new one. However, the screen file will all be deleted.

2-2-8-9 Global Keypad Setting

This function provides decimal, hexadecimal, binary and ASCII keypad for users to define. Users can create more than one numeric entry or character entry elements inediting screen, then select the keypad type, decimal, hexadecimal, binary or ASCII to apply so that the system keypad will be updated to a new format that you just defined. There is no need to worry thatthe previous set numeric entry or character entry elements for old keypad typecannot be updated to the new one. Users can use Apply to all function to replace the old one with the new one. If the element is newly added, we also provide the function of Apply to new. And the newly added element will be applied to the newly created keypad. It is a convenient and quick way for users to define the keypad type.

NOTE:

✓ Global keypad setting in DOP-B series HMI does not allow users to define the keypad setting.

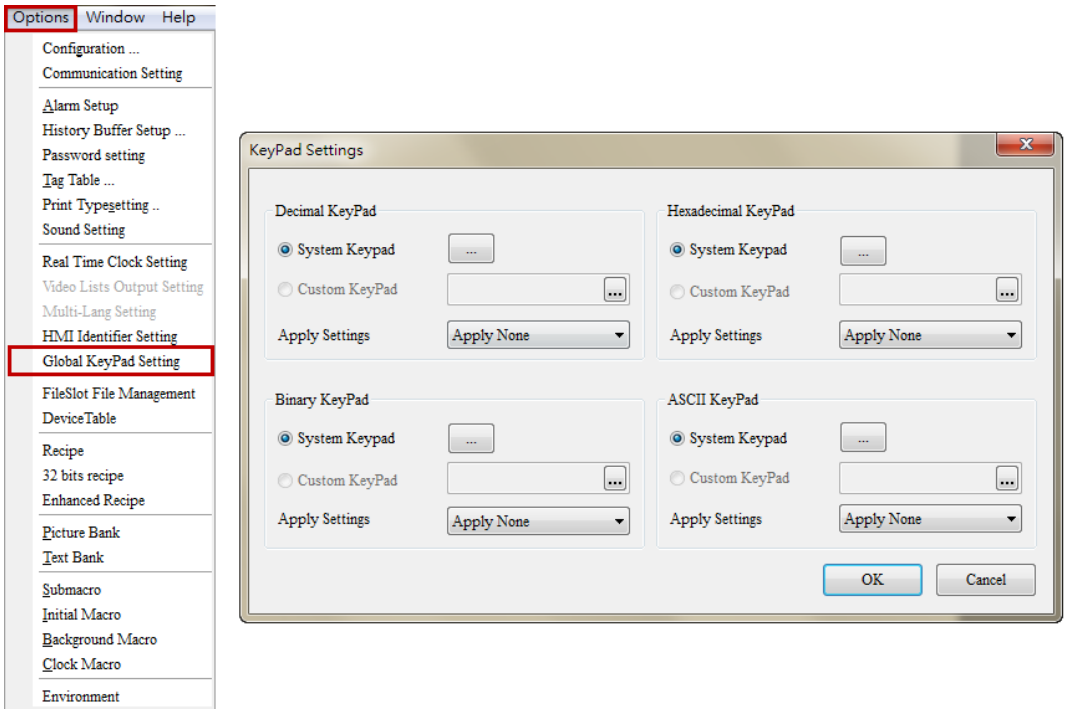
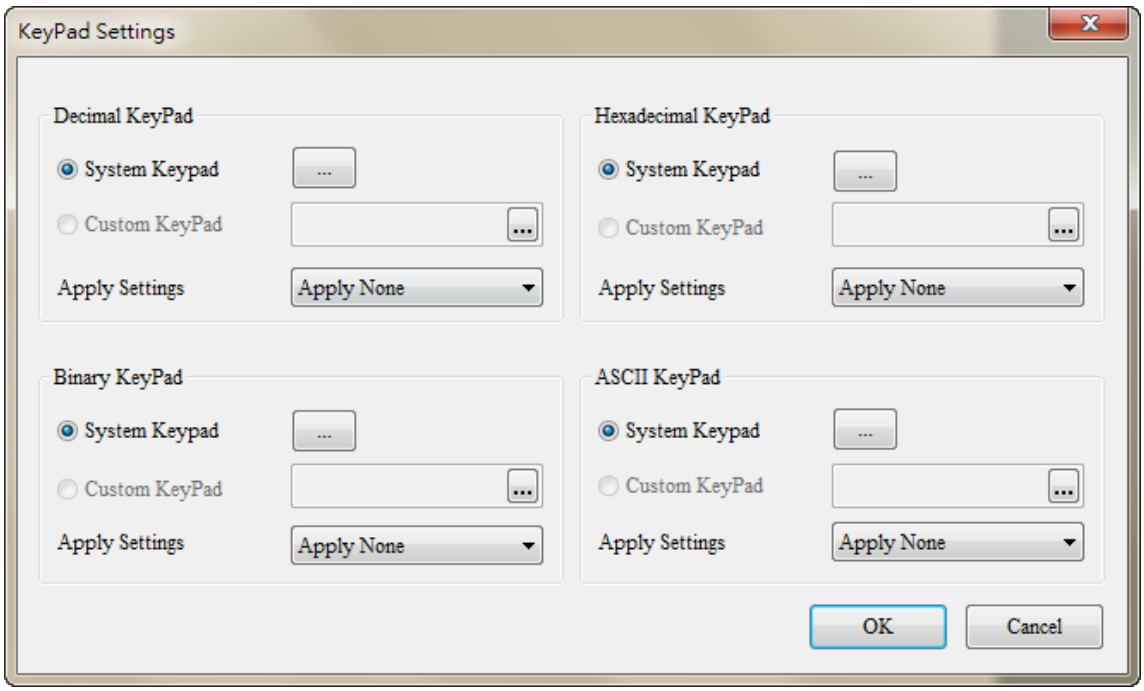
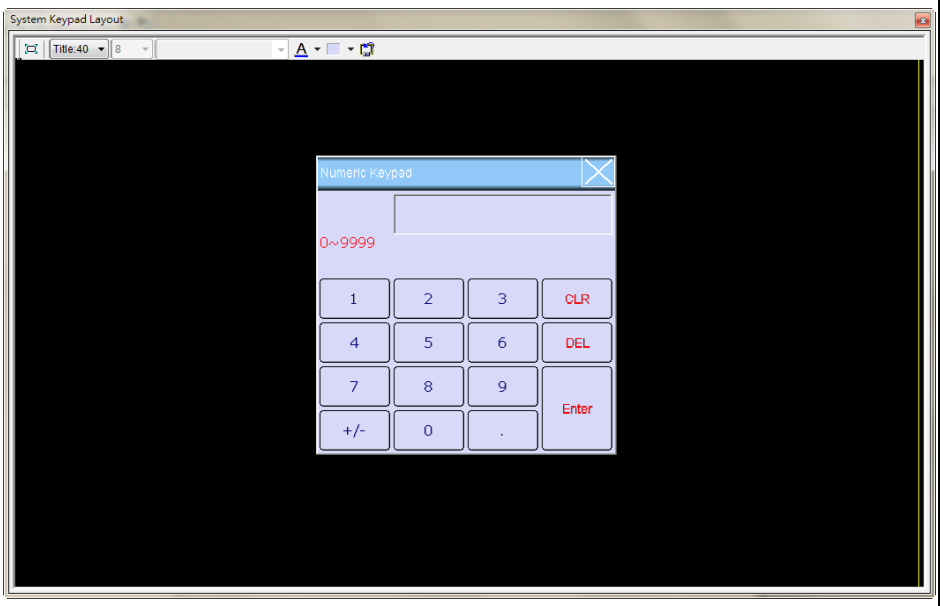
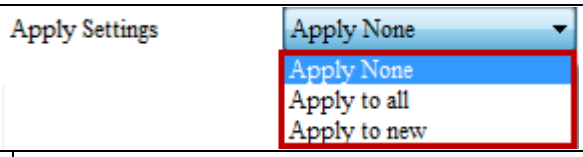
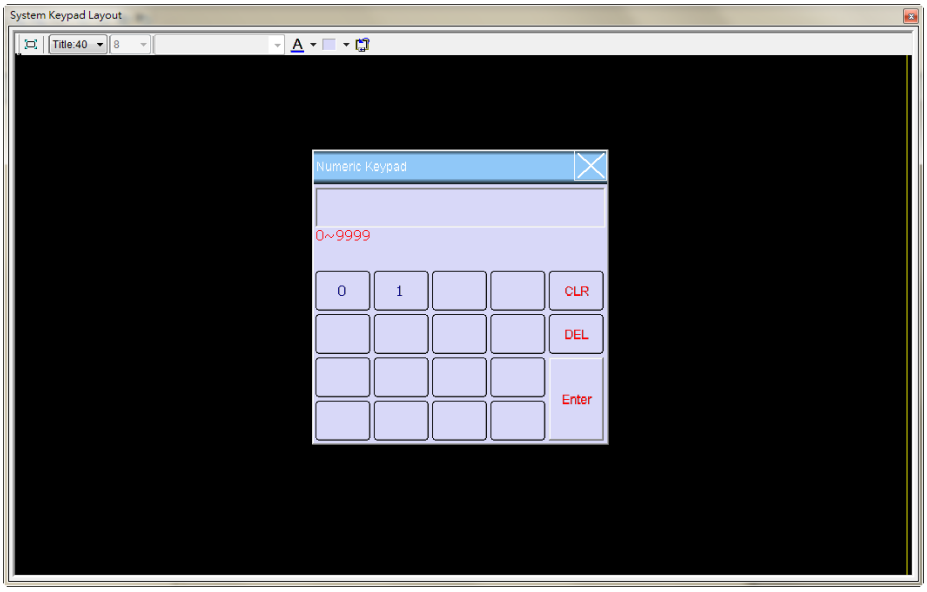
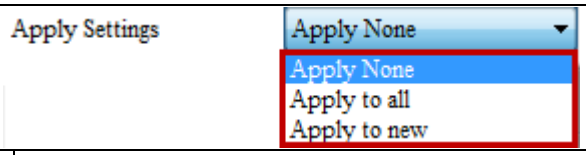


Figure 2-2-8-16 Global Keypad Setting

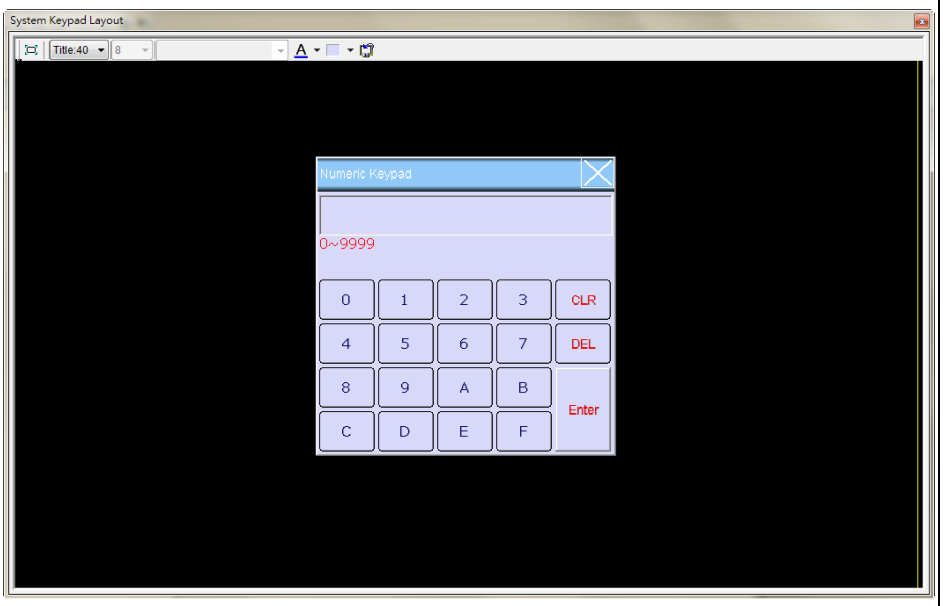
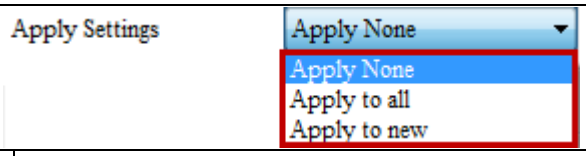
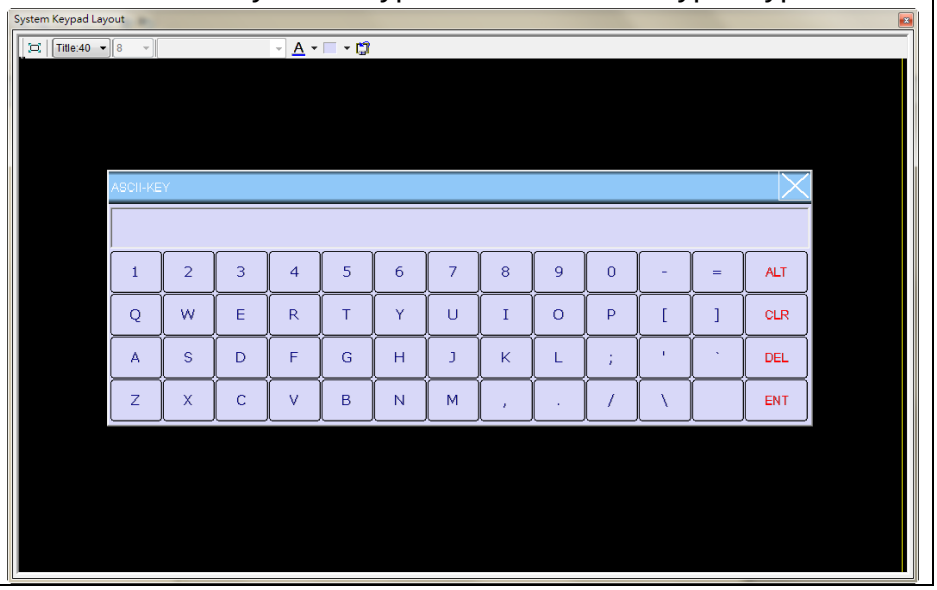
Followings describe the property of [Global Keypad Setting].

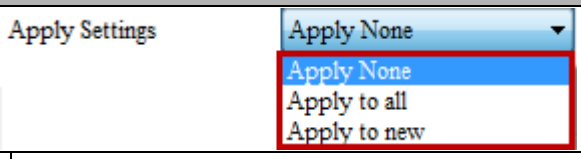
Global Keypad Setting Table 2-2-8-17 Description of Global Keypad Setting			
			
Decimal Keypad	System Keypad	➢ Go to decimal system keypad to define the keypad type. 		
	Apply Settings			
		Apply None	➢ When you select [Apply None], it means even when youhave defined the keypad type, the old and newly added keypad will remain the original one.	

Global Keypad Setting Table 2-2-8-17 Description of Global Keypad Setting			
		Apply to all	➢ When you select [Apply to all], then the old type of keypad will be replaced with the new one.
		Apply to new	➢ When you select [Apply to new], it means the setting only applies to the newly added keypad.
Binary Keypad	System Keypad	➢ Go to binary system keypad to define the keypad type.  	
	Apply Settings	 	
		Apply None	➢ When you select [Apply None], it means even when you define the keypad type, the old and newly added keypad will remain the original one.
		Apply to all	➢ When you select [Apply to all], then the old type of keypad will be replaced with the new one.
		Apply to new	➢ When you select [Apply to new], it means the setting only applies to the newly added keypad.
Hexadecimal Keypad	System Keypad	➢ Go to hexadecimal system keypad to define the keypad type.	

Global Keypad Setting

Table 2-2-8-17 Description of Global Keypad Setting

<table>
<tr><td rowspan="4"></td><td></td><td colspan="2"> 
</td></tr>
<tr><td rowspan="3">Apply Settings</td><td colspan="2"> 
</td></tr>
<tr><td>Apply None</td><td>➢ When you select [Apply None], it means even when you define the keypad type, the old and newly added keypad will remain the original one.</td></tr>
<tr><td>Apply to all</td><td>➢ When you select [Apply to all], then the old type of keypad will be replaced with the new one.</td></tr>
<tr><td>Apply to new</td><td>➢ When you select [Apply to new], it means the setting only applies to the newly added keypad.</td></tr>
<tr><td>ASCII Keypad</td><td>System Keypad</td><td colspan="2">➢ Go to ASCII system keypad to define the keypad type.
 
</td></tr>
</table>

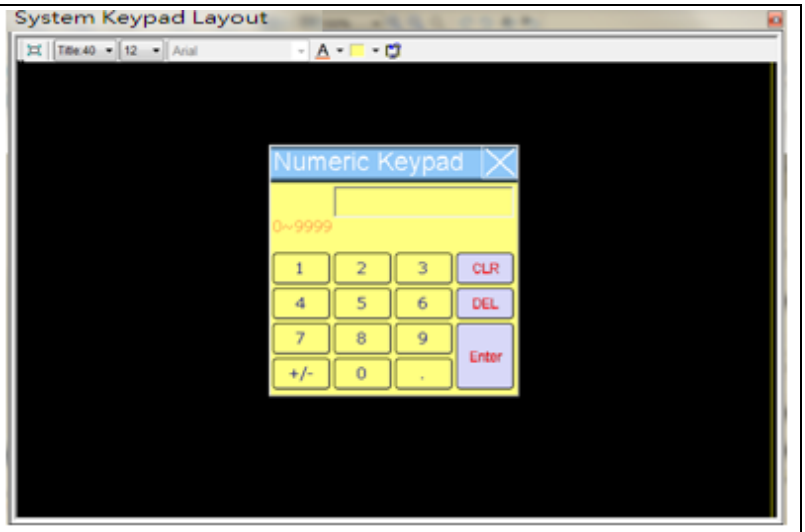
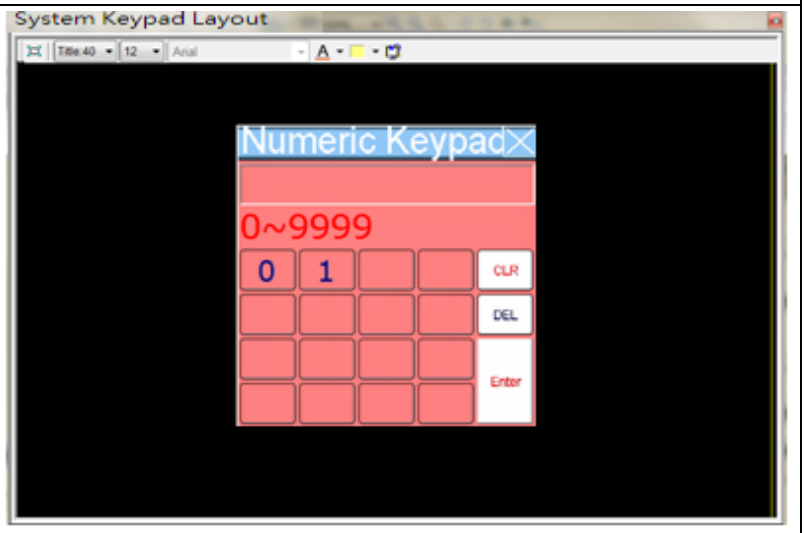
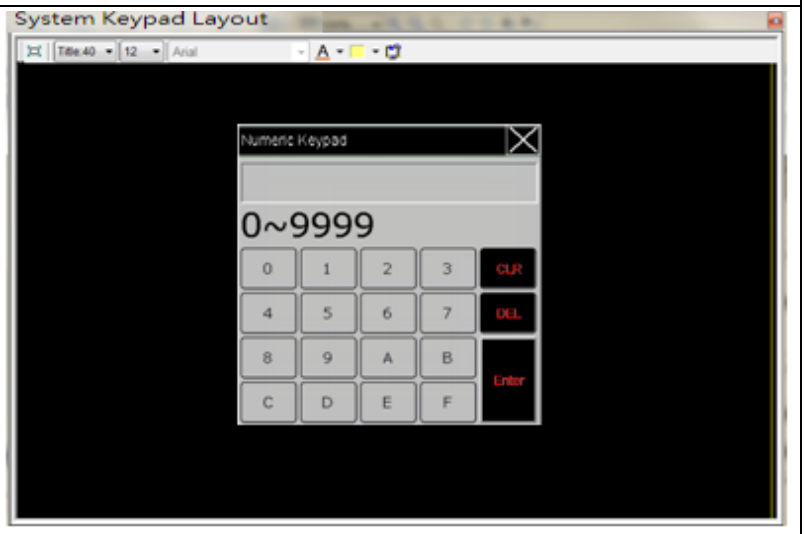
Global Keypad Setting Table 2-2-8-17 Description of Global Keypad Setting			
	Apply Settings	Apply Settings	
		Apply None	➢ When you select [Apply None], it means even when you define the keypad type, the old and newly added keypad will remain the original one.
		Apply to all	➢ When you select [Apply to all], then the old type of keypad will be replaced with the new one.
		Apply to new	➢ When you select [Apply to new], it means the setting only applies to the newly added keypad.

Example of Global Keypad Setting

Table 2-2-8-18 Example of Global Keypad Setting

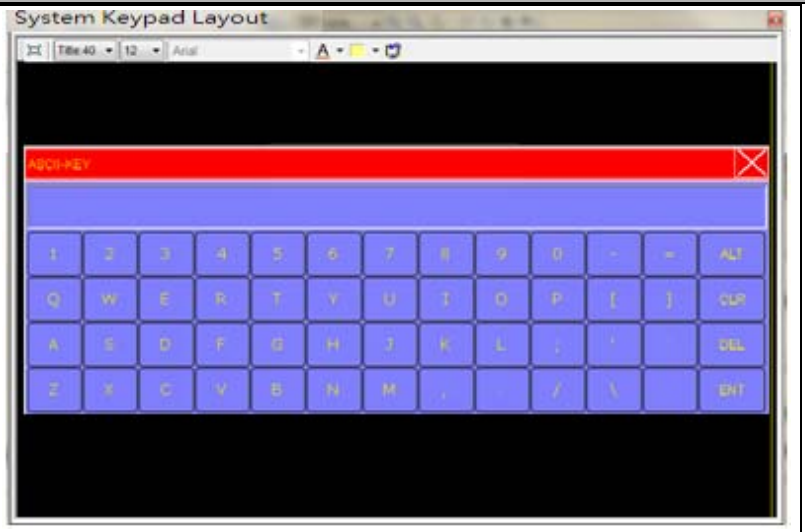
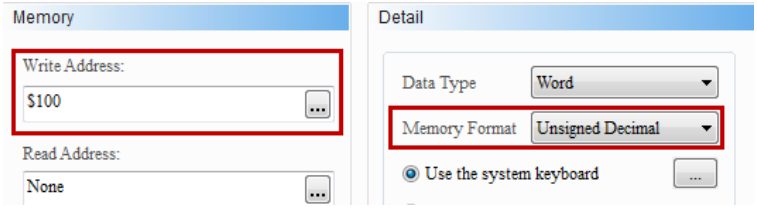
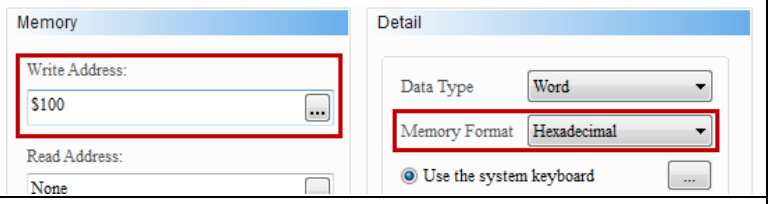
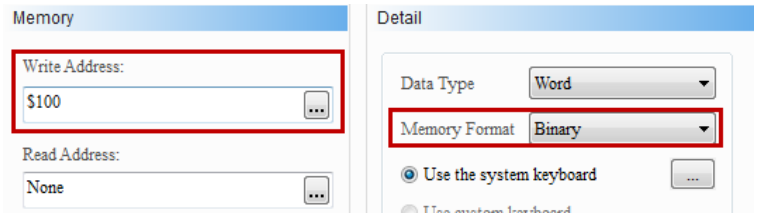
Steps of Global Keypad Setting

- Step1: Go to [Options] → [Global Keypad Setting].
- Step2: Set the keypad type as decimal, hexadecimal, binary or ASCII keypad.

Decimal Keypad	
Binary Keypad	
Hexadecimal Keypad	

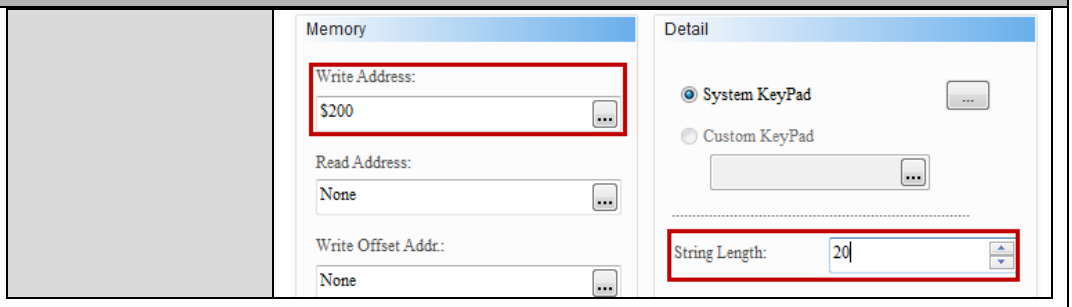
Example of Global Keypad Setting

Table 2-2-8-18 Example of Global Keypad Setting

	ASCII Keypad	
	➢ Step3: When the setting is complete, press on OK to exit the screen of global keypad setting.	
Create the element	Numeric Entry Element	✓ The data format is Unsigned Decimal and the write address is $100. 
	Numeric Entry Element	✓ The data format is Hexadecimal and the write address is $100. 
	Numeric Entry Element	✓ The data format isBinary and the write address is $100. 
	Character Entry Element	✓ Set the string length to 20 and the write address is $200.

Example of Global Keypad Setting

Table 2-2-8-18 Example of Global Keypad Setting

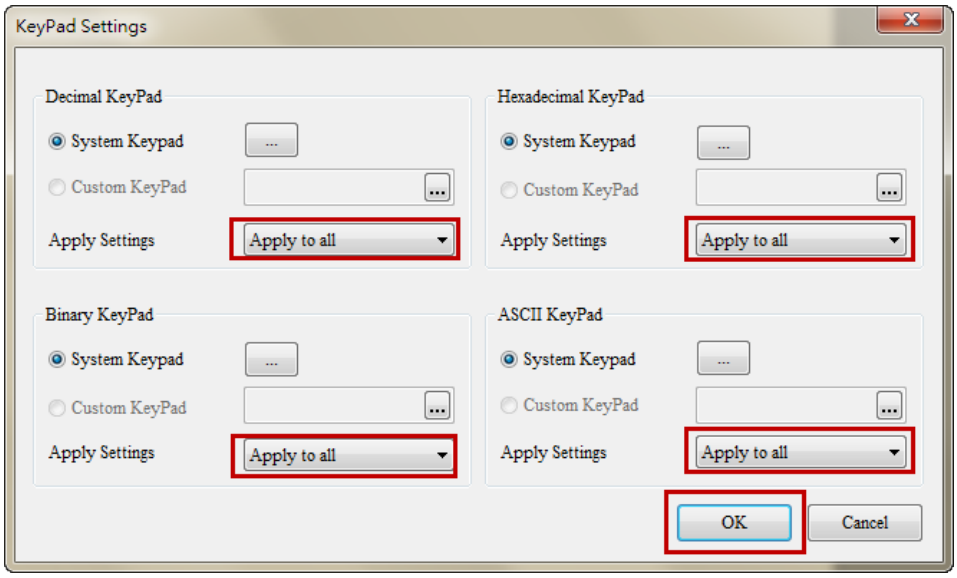


Example of Global Keypad Setting

Table 2-2-8-18 Example of Global Keypad Setting

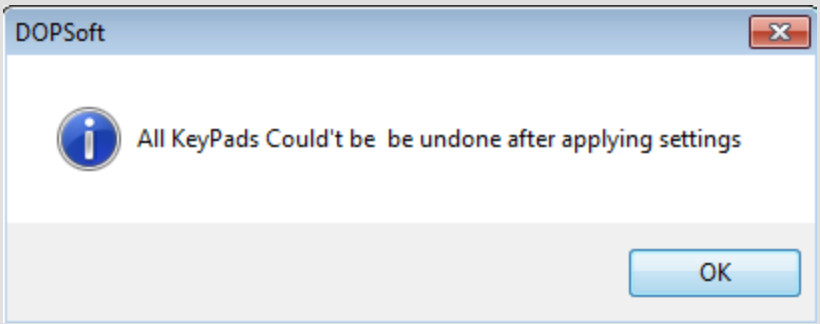
Apply settings

- Step1: Go to [Options] → [Global Keypad Setting]
- Step2: Set all apply settings to [Apply to all].



NOTE:

✓ When you select [Apply to all], the following message will pop up. Please press [OK] to complete the setting.



Example of Global Keypad Setting

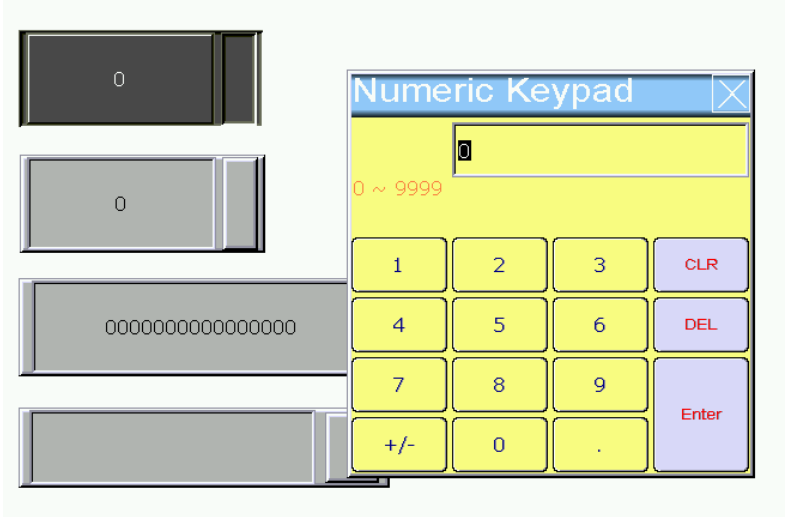
Table 2-2-8-18 Example of Global Keypad Setting

Result

➢ After complete the creation of all elements, please compile and download the screen to HMI.

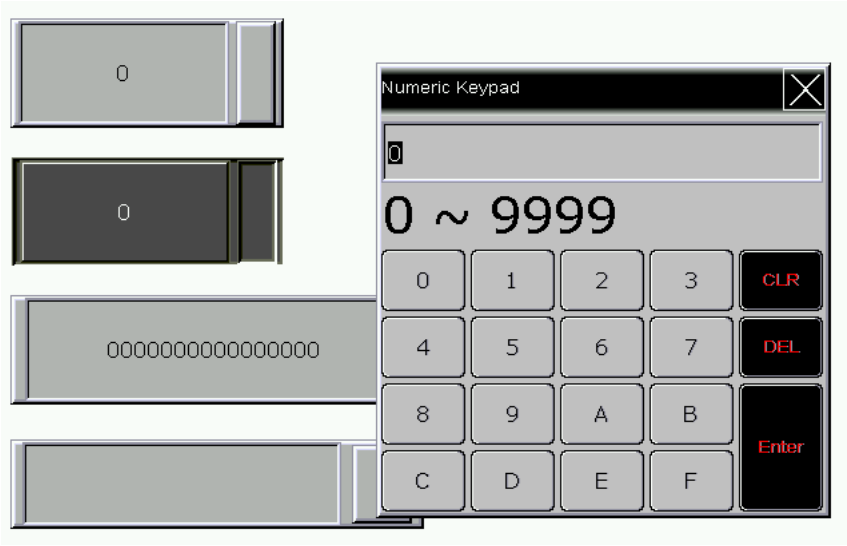
Unsigned Decimal

➢ Execute the numeric entry element with unsigned decimal format.



Hexadecimal

➢ Execute the numeric entry element with hexadecimal format.

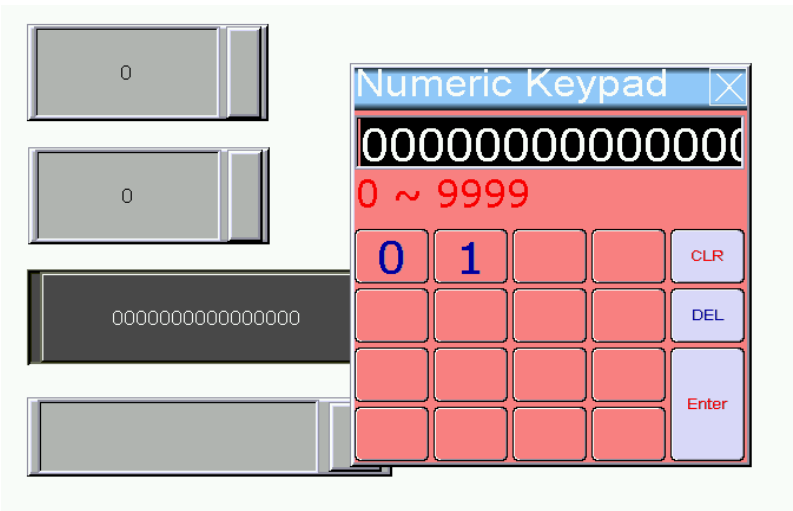
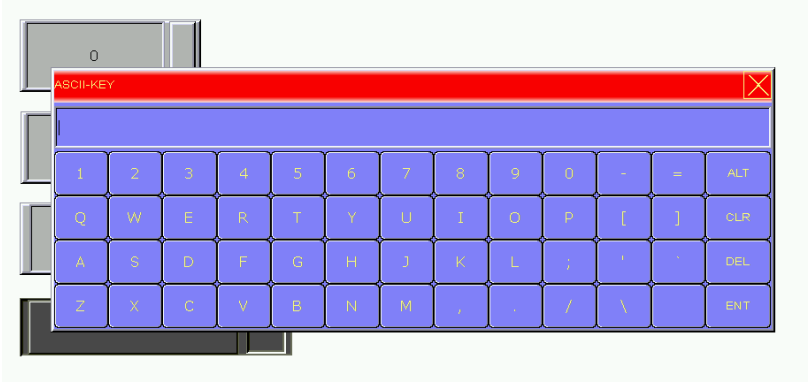


Binary

➢ Execute the numeric entry element with binary format.

Example of Global Keypad Setting

Table 2-2-8-18 Example of Global Keypad Setting

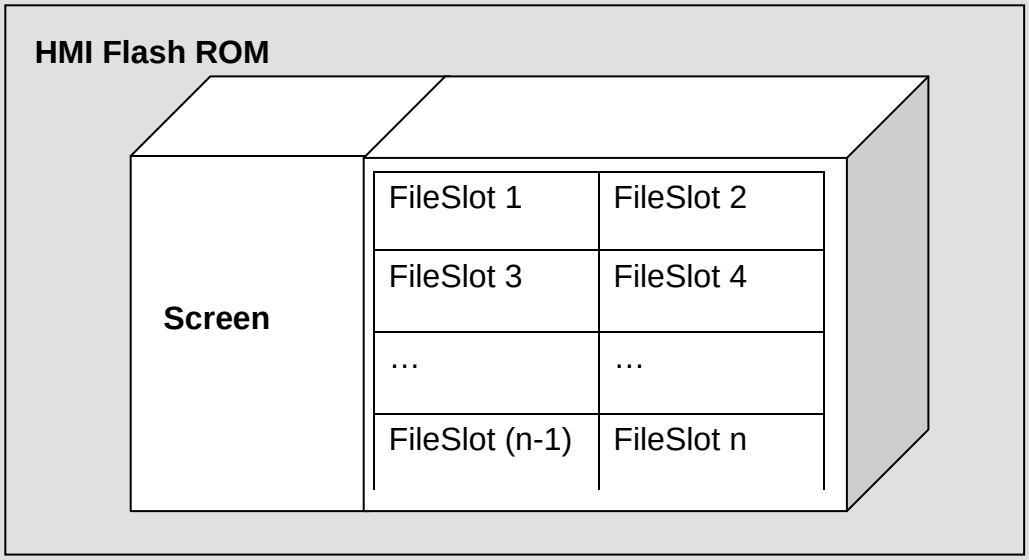
	
ASCII	➢ Execute thecharacter entry element. 

2-2-8-10 File Manage

In setting window of FileSlot management, users can plan the size and content of each FileSlot. FileSlot provides a more flexible and convenient way for users to program data storage and use. After creating FileSlot, the data content can be accessed and stored in register through macro command (FileSlotRead). Data in register can also be stored in these files, too. For example, the pickup arm procedure of each product is different. Users can store the procedure from each product into different FileSlots. Then, through accessing different FileSlots, switch the procedure within a very short time.

NOTE：

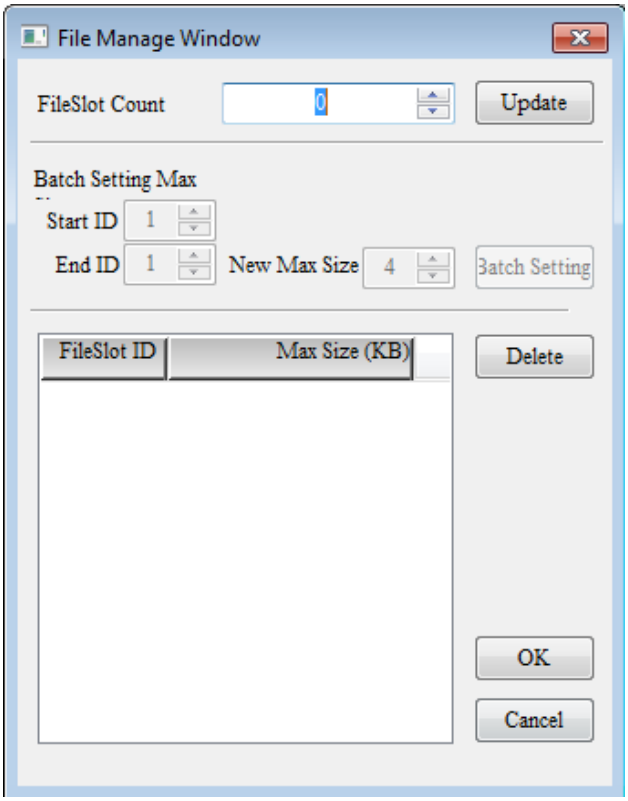
- ✓ Download FileSlot into HMI. The ROM will reserve the memory space which is required byFileSlot.

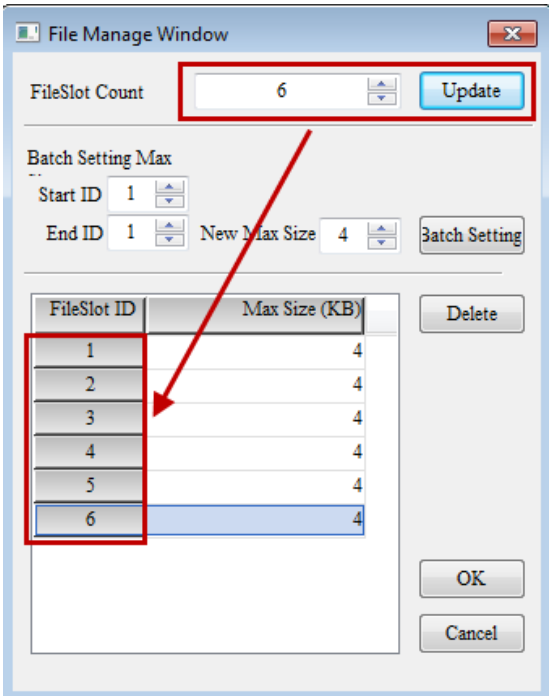
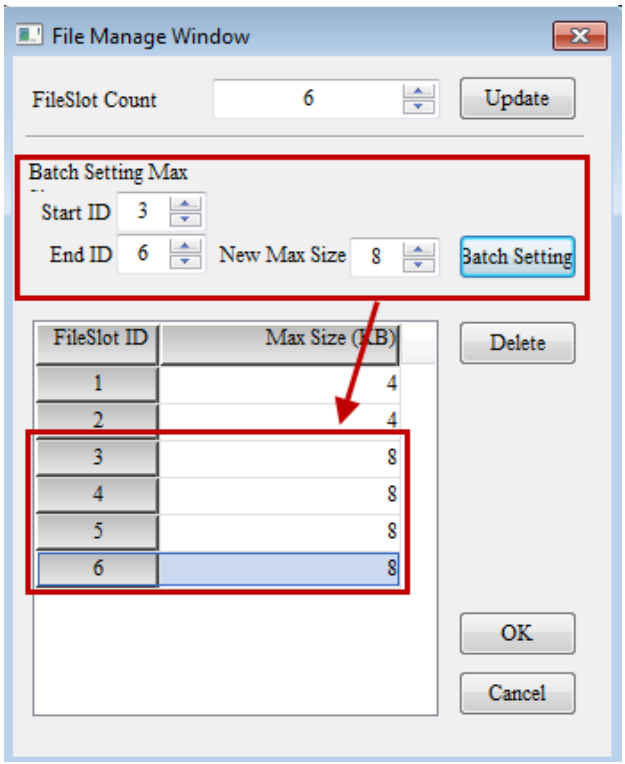


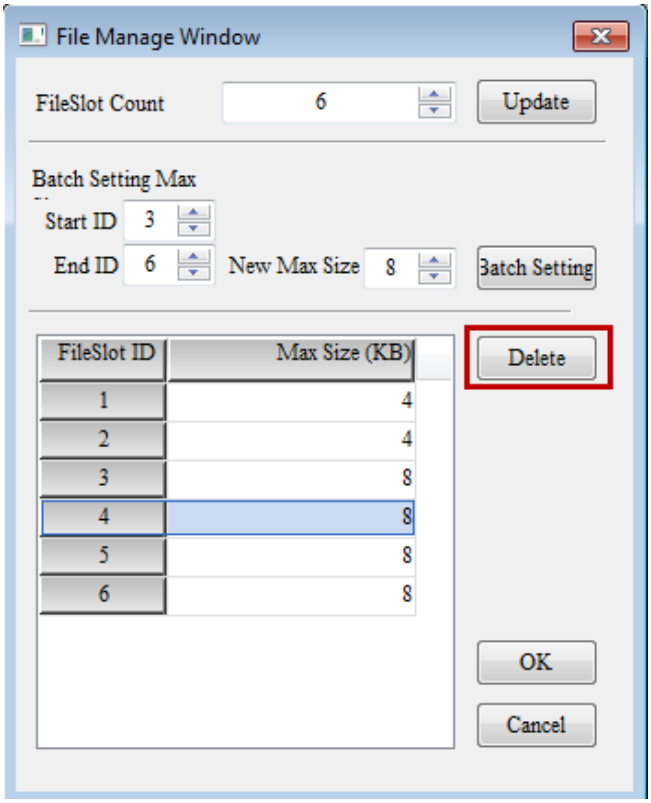
- ✓ Base on the consideration of HMI efficiency and data storage, when downloading the programmed FileSlot, HMI can only reserve the memory space. It is unable to create the file. Users have to use macro (FileSlotWrite, ImportFileSlot) to create the file.
- ✓ 【Format HMI】,【Reset】or remove the macro command(FileSlotRemove) ofFileSlot has to be used to delete FileSlot file in HMI.
- ✓ When HMI has FileSlot file, to download the screen will not change the content of FileSlot. To copy the Screen Data File created by DopSoft and Auto Update File to FileSlot file through 【Copy File】in HMI system will not change the content, either.
- ✓ It is suggested that before re-programming the screen and FileSlot size, execute【Format HMI】or【Reset】.
- ✓ Function of【Copy File】can export the FileSlot file. The exporting file is stored in HMI-000\FILESLOT. Through this method, other FileSlot files can be imported into other HMI. If other HMI has FileSlot file, then the data will be covered.
- ✓ B03S210, B04S211, B05S100, B05S101, B07S201, B07S211 and B07S410 models do not

support function of FileSlot.

Following describes the property of【File Manage】.

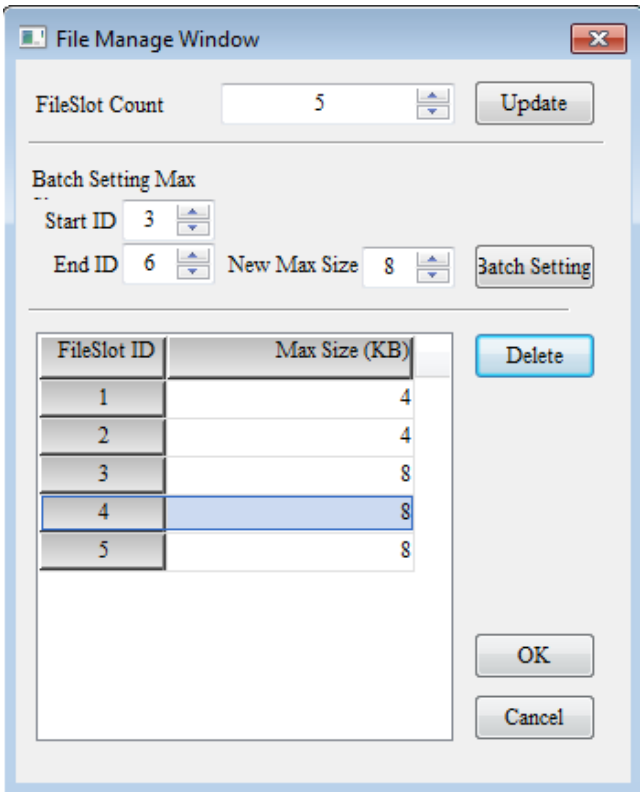
Property Setting of File Manage Table 2-2-8-19 Property Setting of File Manage	
	
Total Number of FileSlot	➢ Enter the required number of FileSlot, 1024 at most.
Update	➢ Enter the total number of FileSlot and click【Update】to program the number . See as below. The total number of FileSlot is set to 6, then there are 6 FileSlots.

Property Setting of File Manage Table 2-2-8-19 Property Setting of File Manage	
	
Max Size in Batch Setting	➢ The Max Size of FileSlot can be setup in batch. Enter 【Start ID】, 【End ID】and【New Max Size】, then click【Batch Setting】to specify the setting of New Max Size to FileSlot ID. See as below. The start ID is set to 3, end ID is 6 and the New Max Size is 8. The Max Size of FileSlot between ID3 and ID6 will be changed to 8. The rest will be remained as 4, the default value. 

Property Setting of File Manage Table 2-2-8-19 Property Setting of File Manage		
Delete	➢ Use【Delete】button can delete FileSlot in the window of File Management.	
	Before	➢ Select one FileSlot and then click Delete. 
	After	➢ It had 6FileSlots before. Now there are 5.

Property Setting of File Manage

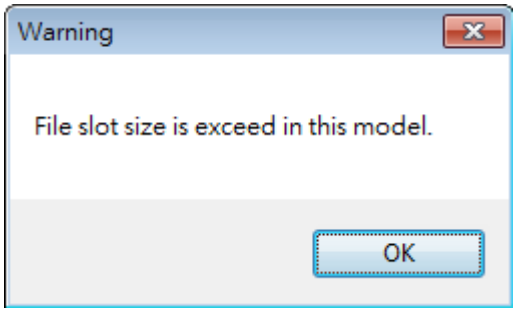
Table 2-2-8-19 Property Setting of File Manage



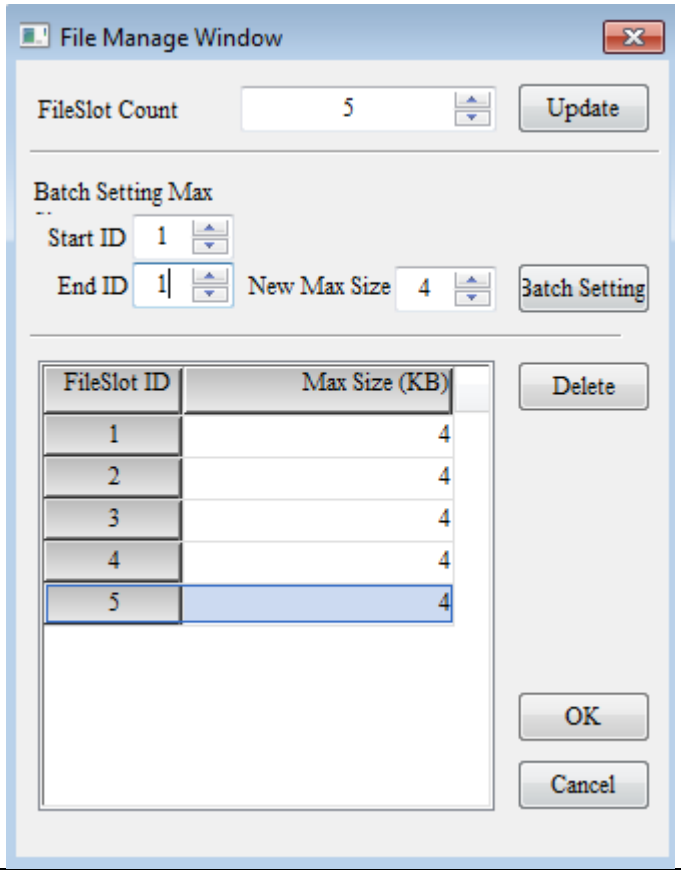
Max Size

➢ Each FileSlot can setup the Max Size individually. The maximum value of Max Size is 102400KB and the minimum value is 4 KB and 64 KB, which varies withdifferent models. See the following table:

4KB	B03S211
	B03E211
	B07S411
	B07S401K
	B07S411K
	B07S415
	B07E415
	B07S515
	B07E515
	B08S515
	B08E515
	B10S411
	B10S511
	B10E515
	B10S615
	B10E615
	HMC07-N500H52

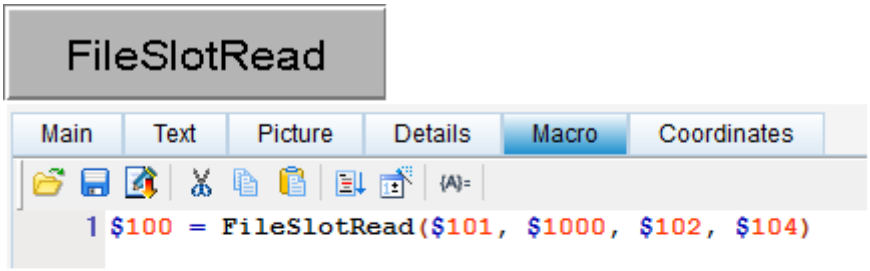
Property Setting of File Manage Table 2-2-8-19 Property Setting of File Manage				
			HMC08-N500S52	
		64KB	B05S111	
			B07PS415	
			B07PS515	
OK	➢ After setting up the property of FileSlot file management, click【OK】to save the previous change. If the total file size of programmed FileSlot is larger than the provided space of User Application in Flash ROM, a warning message will pop up. See as below. Please refer to the user manual of each model for further information about the space size of User Application in Flash ROM. 			
Cancel	➢ The file will not be saved if click 【Cancel】. The function is the same as click ☒ on upper right corner.			

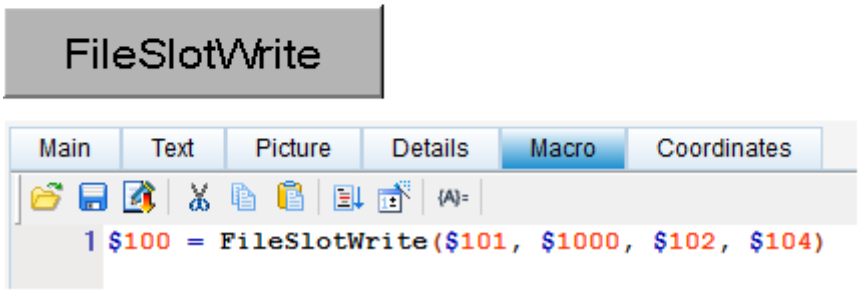
Following introduces the example of 【File Manage】.

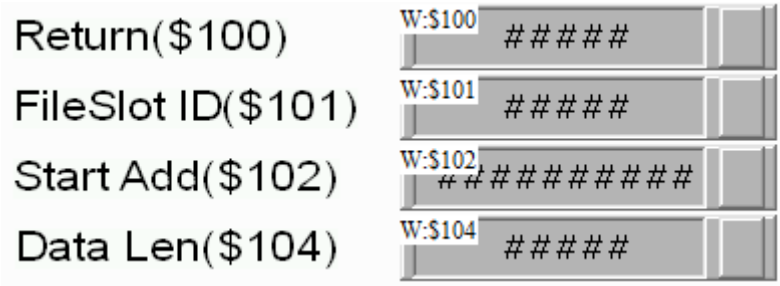
Example of File Manage Table 2-2-8-20 Example of File Manage	
New FileSlot	➢ Enter【Option】→【File Management】。 ➢ Set the total number of FileSlot as 5. Click【Update】and the FileSlot number will show. Users can setup the Max. Size of each FileSlot. When the setting is complete, click【OK】to exit. 
Create the button of executing macro command	➢ Create two maintained buttons in DOPSoft edit screen and to setup the memory written address as $50.0 and $50.1. Then, enter FileSlotRead command **$100 = FileSlotRead($101, $1000, $102, $104)** and FileSlotWrite command, **$100 = FileSlotWrite($101, $1000, $102, $104)** in On macro, respectively.

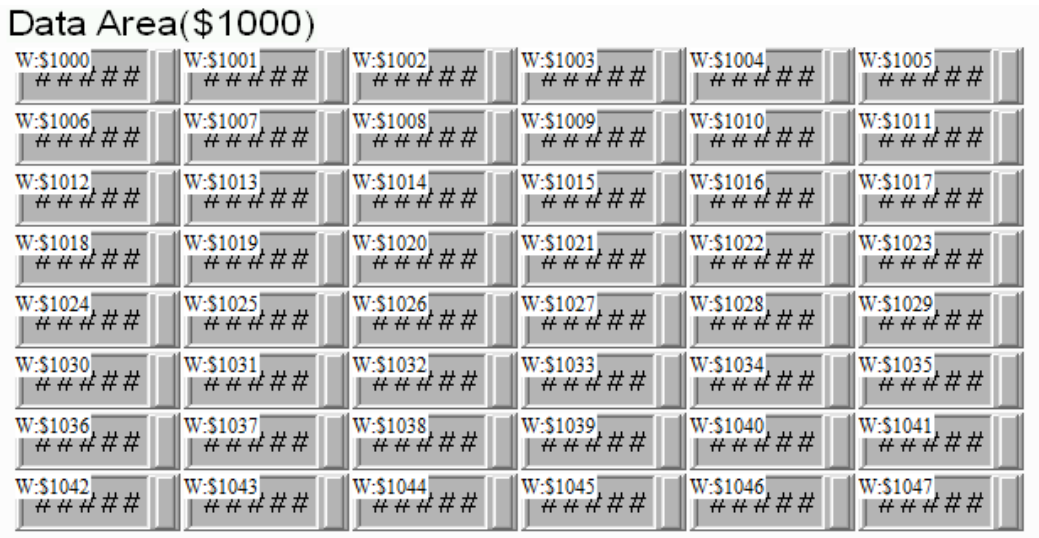
Example of File Manage

Table 2-2-8-20 Example of File Manage

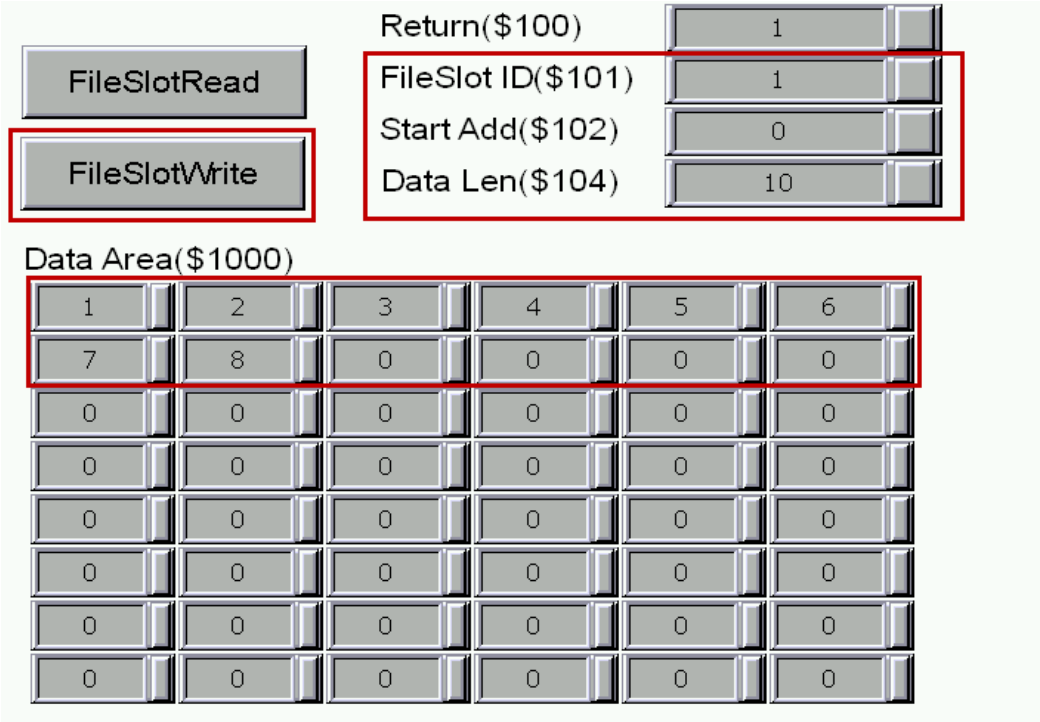
<table>
<tr>
<td>Create the numeric entry element</td>
<td>


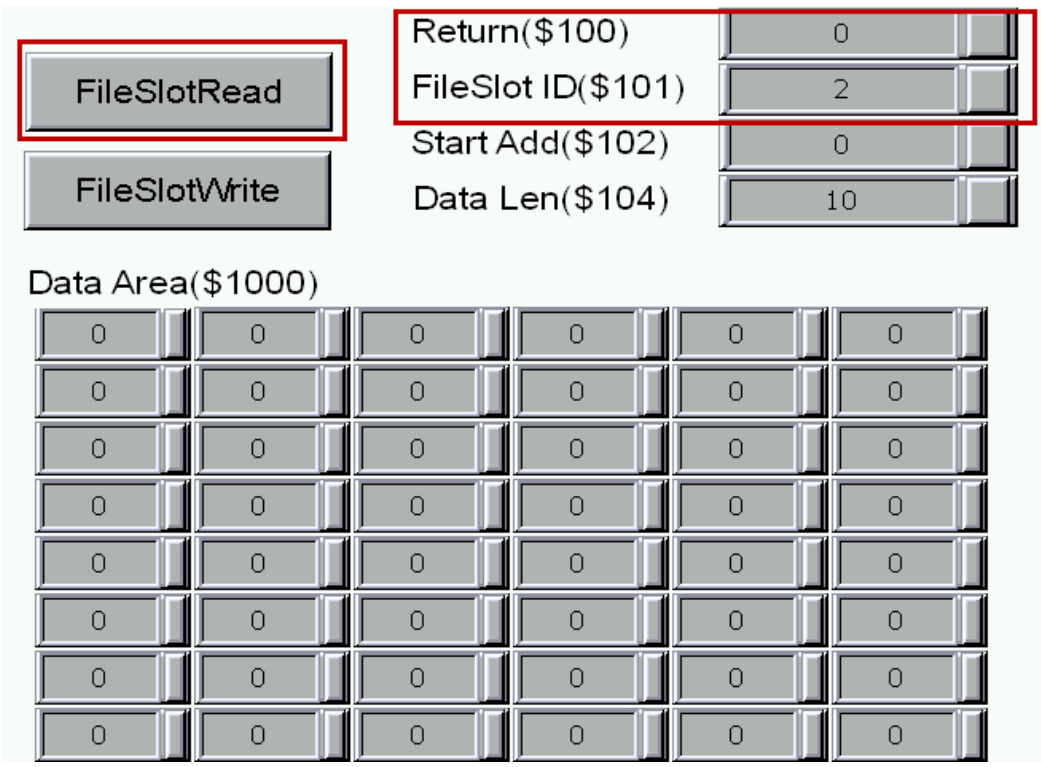


➢ Create the numeric entry element which corresponds to macro parameters on the screen. See as below:


➢ Create the numeric entry element which can read the content of FileSlot on the screen. Its address is between $1000 and $1047. See as below:


</td>
</tr>
</table>

Example of File Manage Table 2-2-8-20 Example of File Manage	
Result	➢ When elements are all created, please compile them and download the screen into HMI. ➢ Use macro FileSlotWrite to write the data into the specified file of FileSlot. The following example writes 10 words from data area into FileSlot which named 1 as its ID. Then, users can read the data via button of FileSlotRead.  ➢ Before using FileSlotRead, users have to use FileSlotWrite or FileSlotIMPORT to create the actual file. See as below. If desire to read FileSlot whose ID name is 2, it will be failed to do so since the file has not been created, the return value is 0.

Example of File Manage Table 2-2-8-20 Example of File Manage	
	

2-2-8-11 Device Table

Device table enables users to import or export $M non-volatile data. However, users will not be able to edit and download the data in DOPSoft. Users have to read $M data in HMI A and upload the data via the function provided by DOPSoft and then export it. Then, import the data in HMI B so that it can share the same $M data with HMI A.
When checking [Include device table], $M data can be updated to HMI when you apply the function of downloading all screen file, making screen file or copying files.

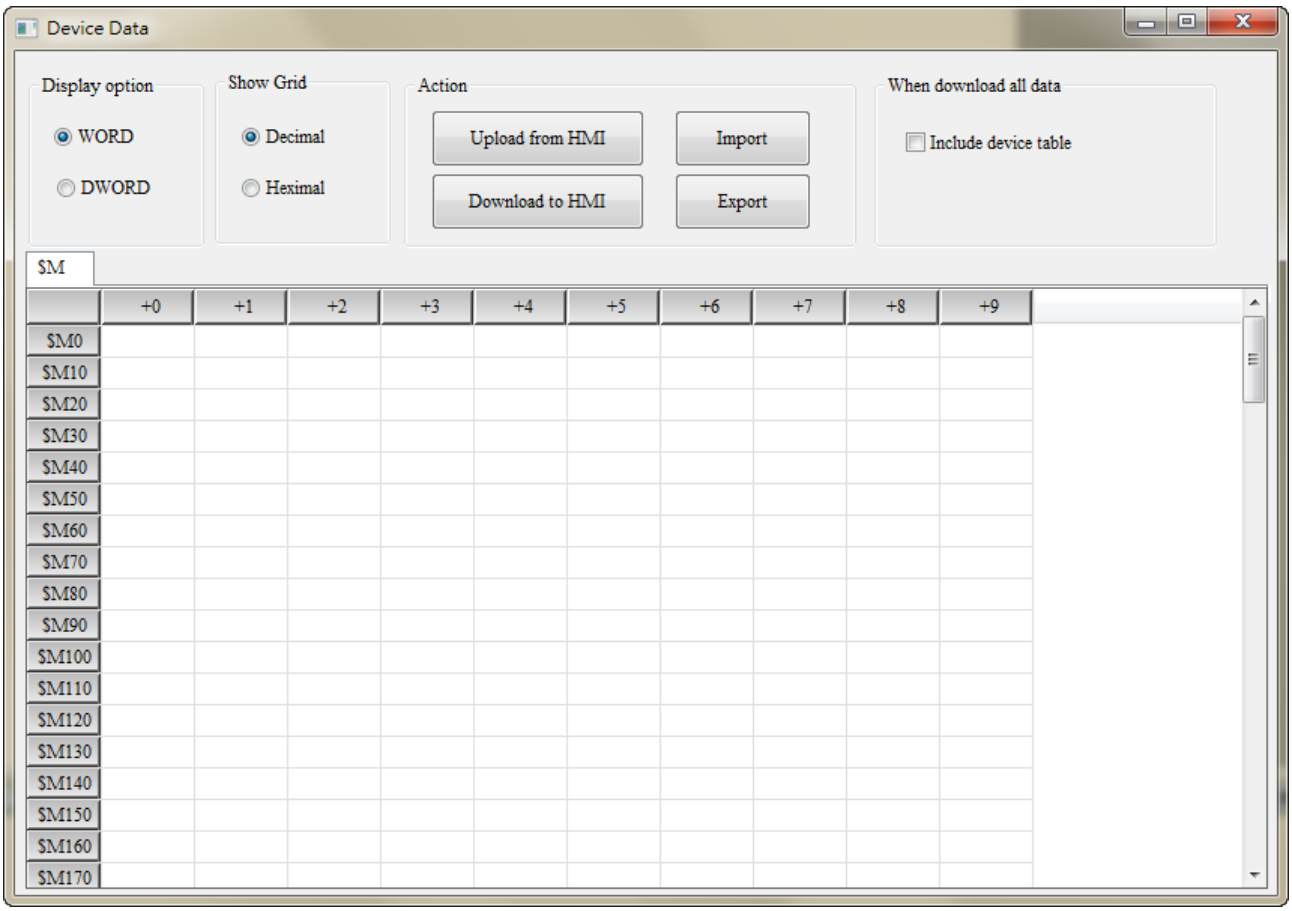
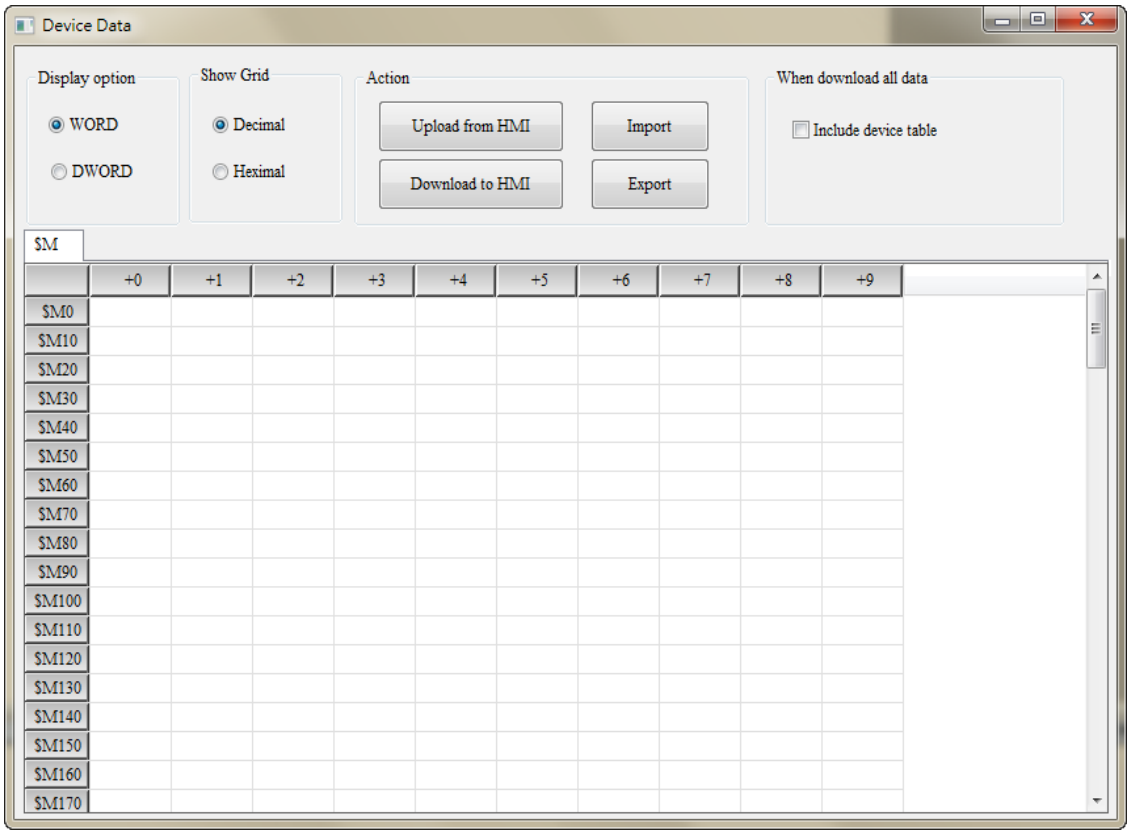


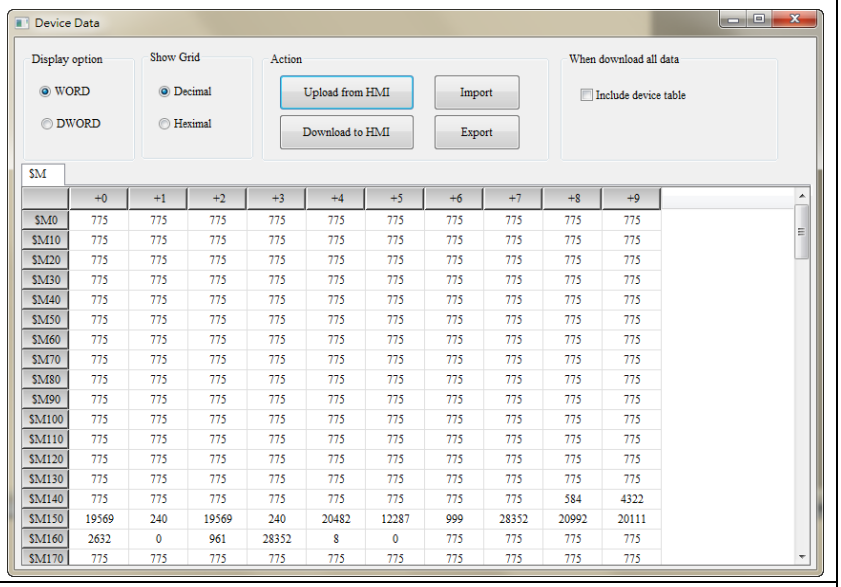
Figure 2-2-8-17 Device Table

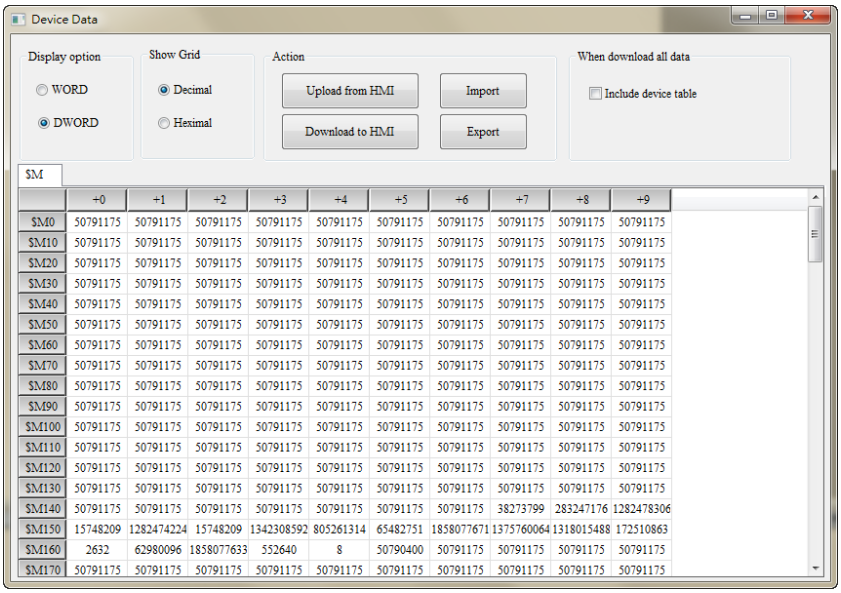
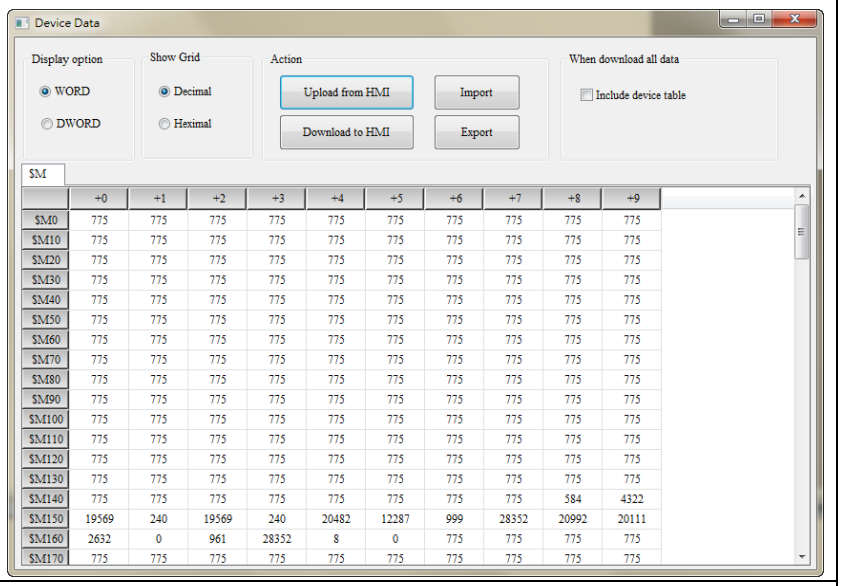
Device Table

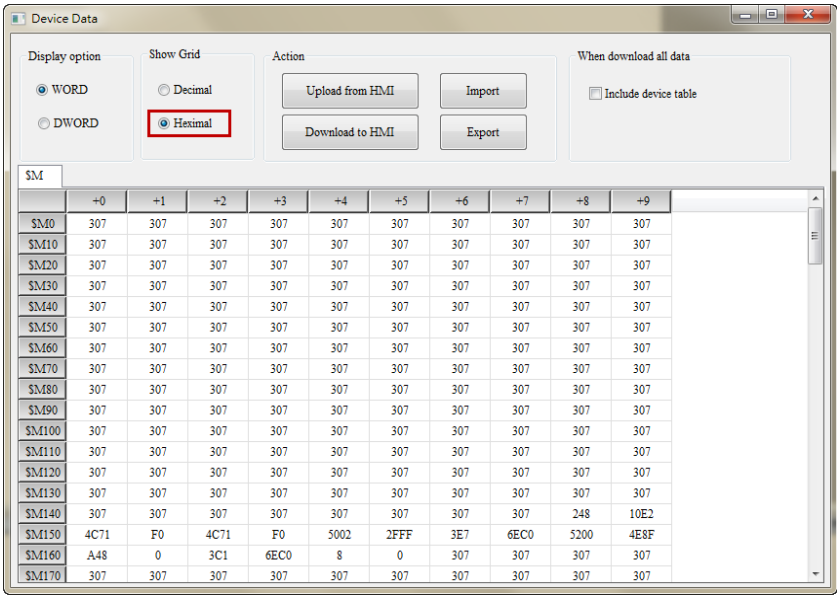
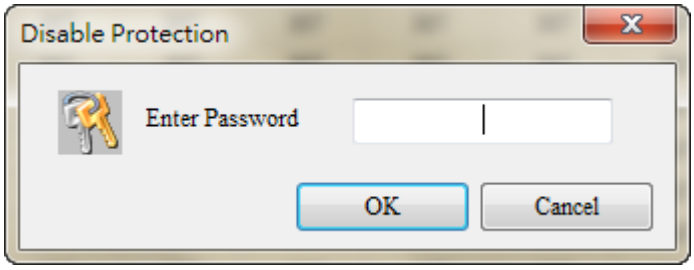
Table 2-2-8-21 Description of Device Table

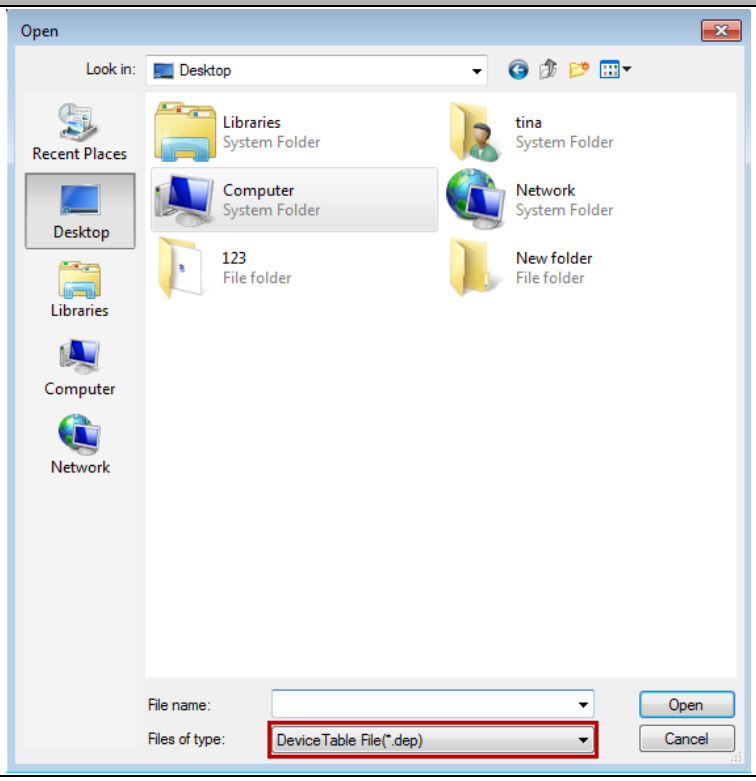
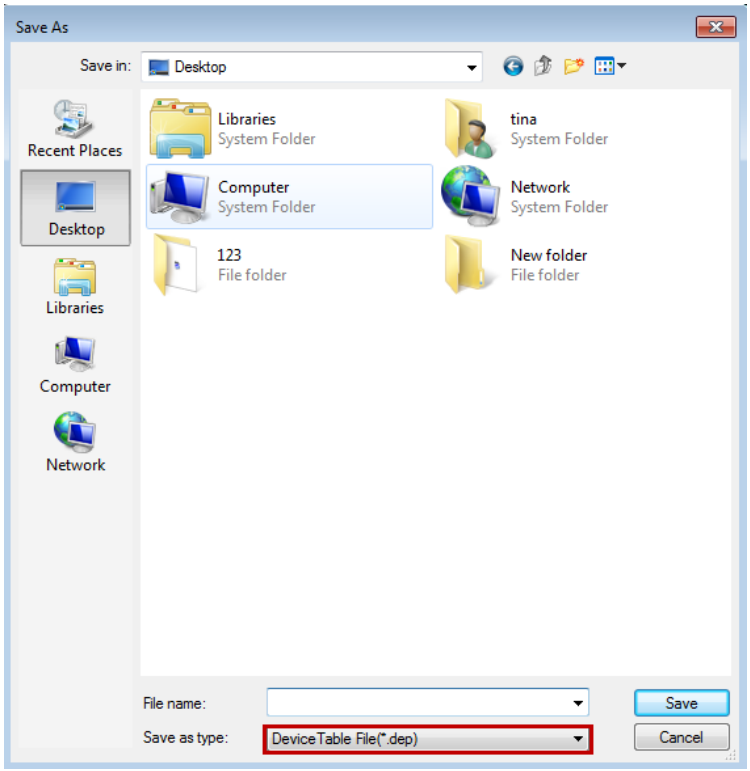


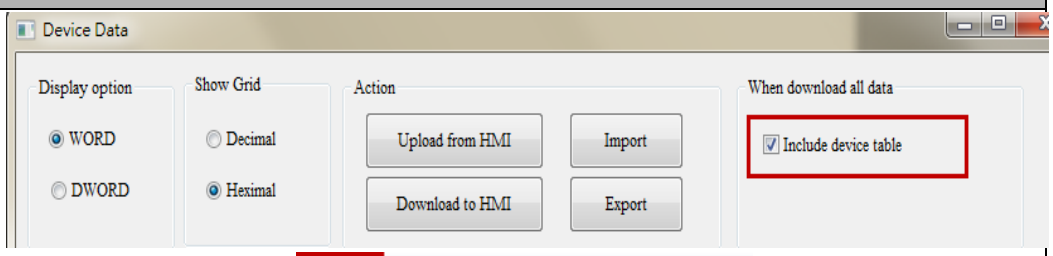
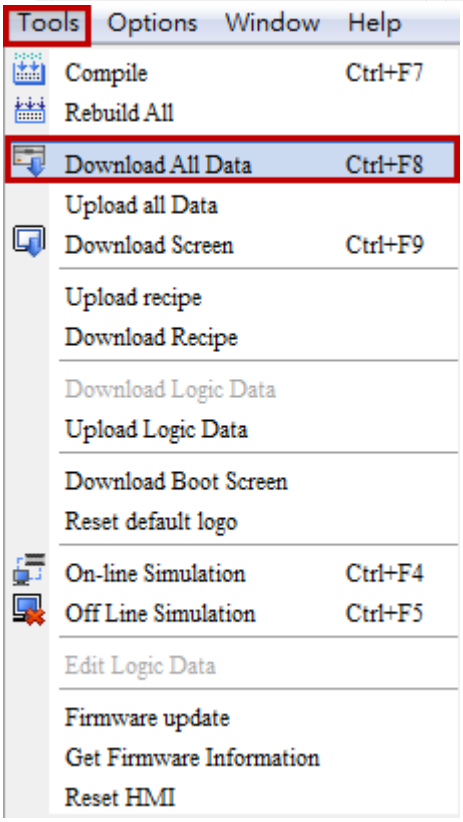
➢ Device table displays $M non-volatile data, range from $M0 to $M1023. Users can define the displayed data type and data format.

Display Option	WORD	➢ The default displayed data type is WORD. 
	DWORD	➢ Users can change the displayed data type of $M data to DWORD.

Device Table Table 2-2-8-21 Description of Device Table		
		
Show Grid	Decimal	➢ The default displayed data format is decimal. 
	Hexadecimal	➢ Users can change the displayed format of $M data to hexadecimal.

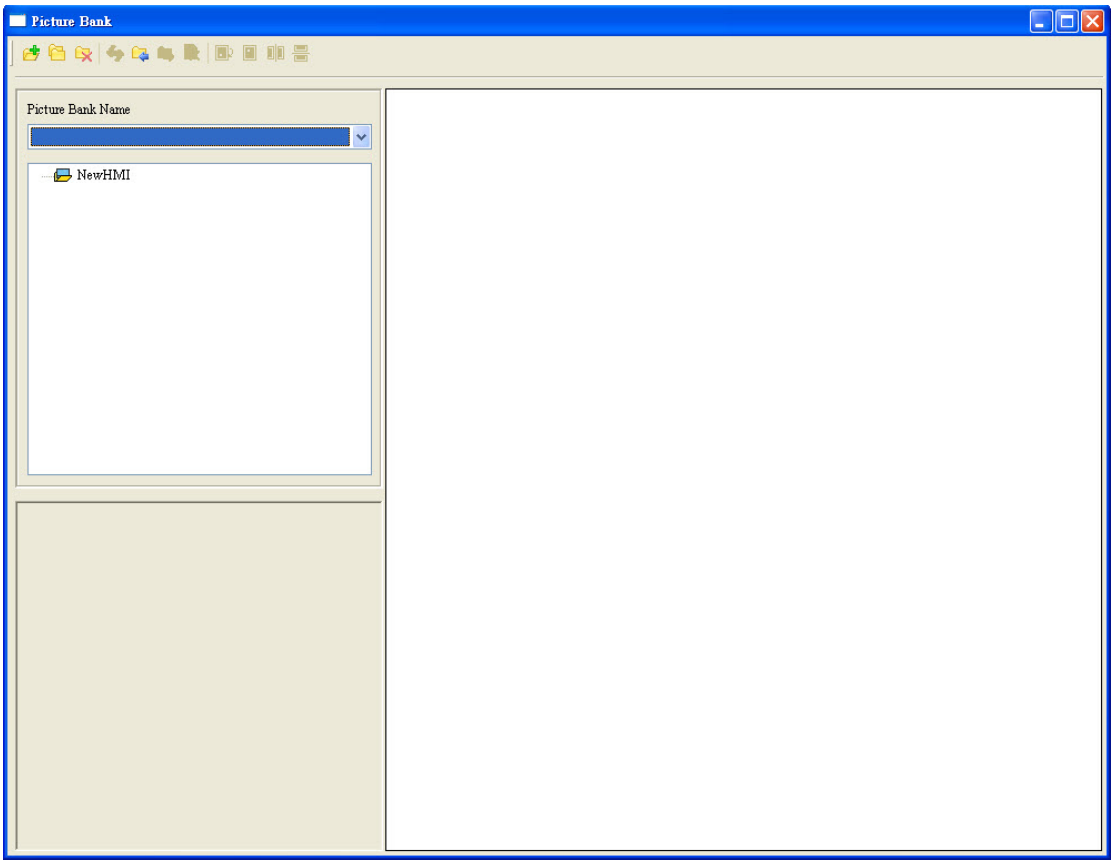
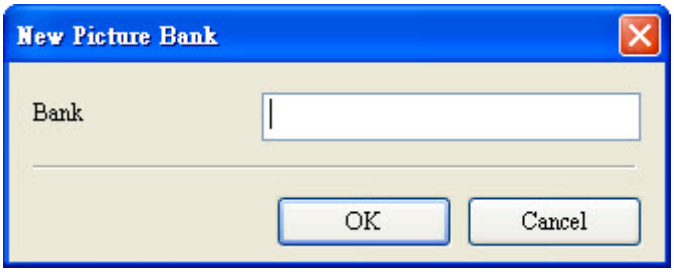
Device Table Table 2-2-8-21 Description of Device Table		
		
Action	Upload from HMI	➢ This function will read the current $M data on HMI and upload it to this device table for display. ➢ Before executing this function, users will be required to enter the password. The default password is 12345678. 
	Download to HMI	➢ This function will download the $M data displayed in device table to HMI. ➢ HMI can check if the data is correct by creating $M0~$M1023register.
	Import	➢ Users can import the device table that stored in other HMI. Its supported file format is .dep.

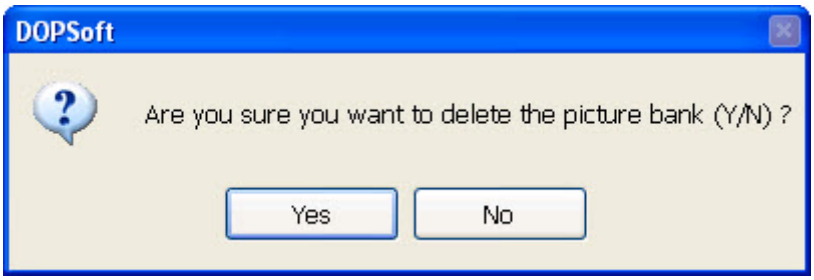
Device Table Table 2-2-8-21 Description of Device Table		
		
	Export	➢ It can export the $M data displayed in the current device data. The storing file format is .dep. 
When downloading all data	➢ When you check [Include device table], it means users can download $M non-volatile data to HMI via the function of Download All Data.	

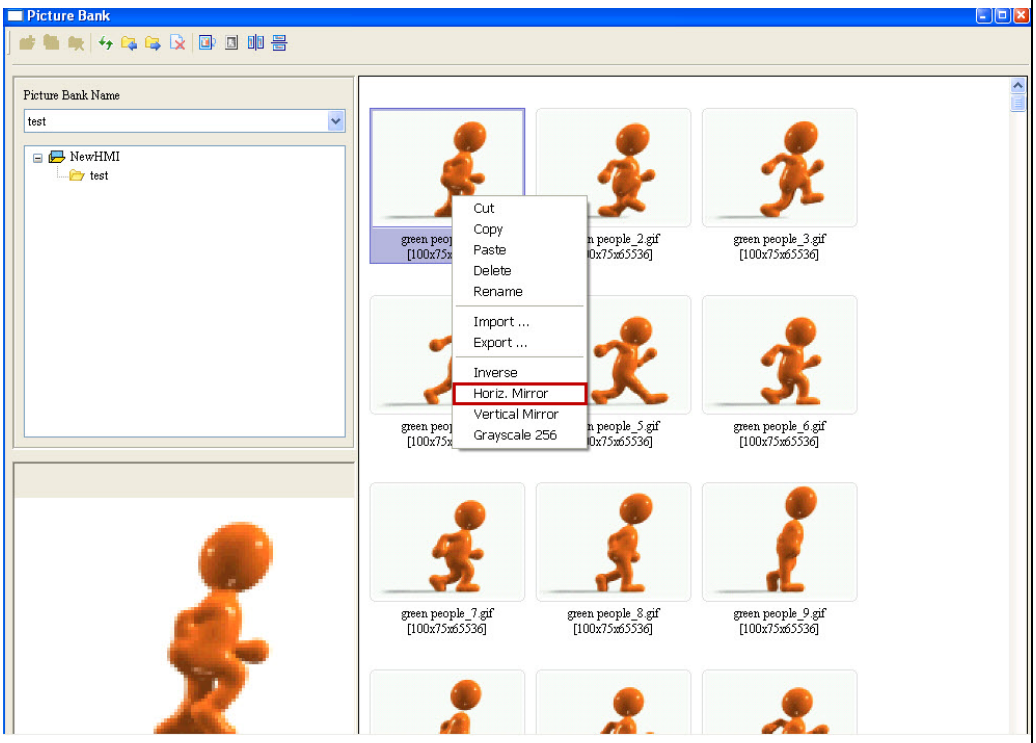
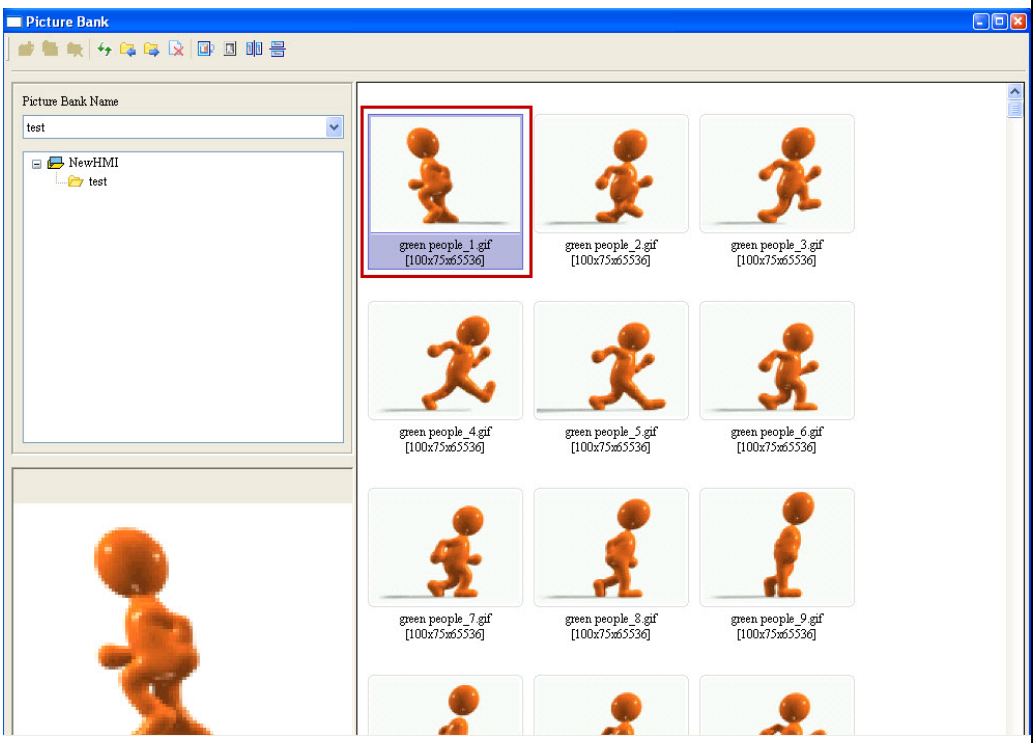
Device Table Table 2-2-8-21 Description of Device Table	
	  ➢ Check [Include device table] to synchronize the device data to other HMI when applying the function of making screen file.

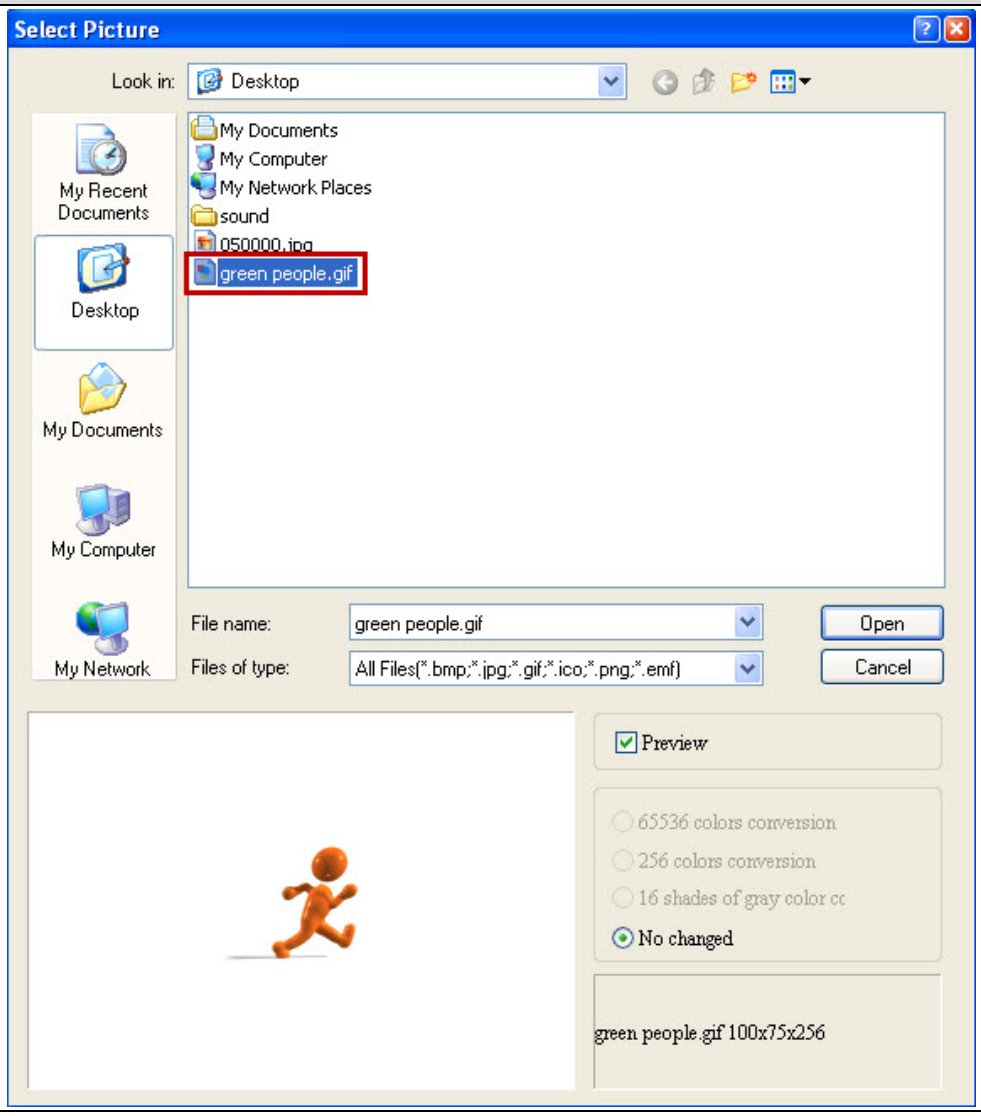
2-2-8-12 Picture Bank

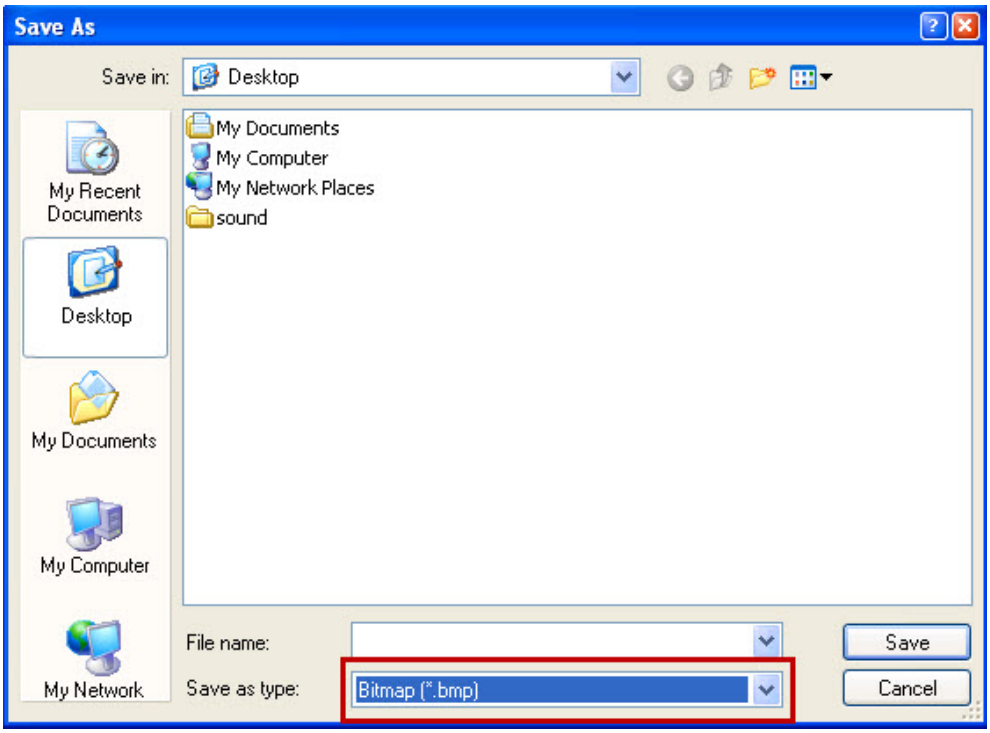
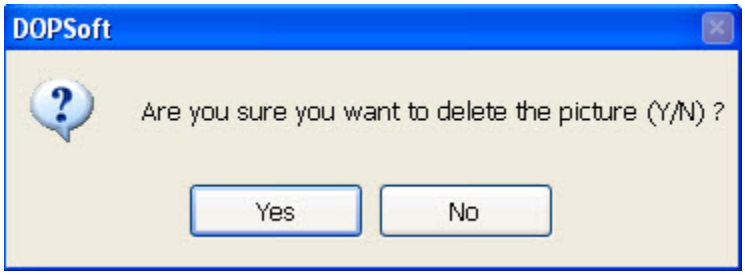
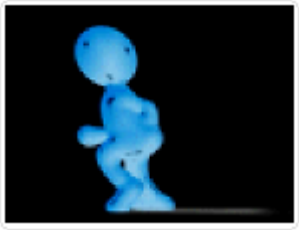
Picture Bank allows the user to apply the pictures more quickly on elements. As a result, the user can import pictures not provided by the system and make simple picture processing such as Inverse, Grayscale 256, Horizontal Mirror, and Vertical Mirror.

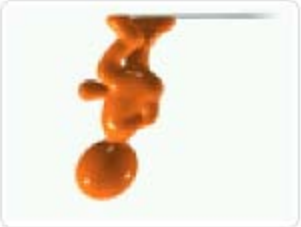
Picture Bank Table 2-2-8-22 Picture Bank	
	
➢ Picture Bank provides features such as [Add Picture Bank], [Open/Install Picture Bank], [Remove Picture Bank], [Update Picture Bank Content], [Import Picture Data], [Export Picture Bank Content to File], [Delete], [Inverse], [Grayscale256], [Horizontal Mirror], and [Vertical Mirror].	
Add Picture Bank	➢ Once this button is clicked, the software will ask the user to enter the name of Picture Bank.  ➢ Once a new Picture Bank is added, the user can click [Import Picture

Picture Bank Table 2-2-8-22 Picture Bank	
	Data]to load the picture into Picture Bank.
Open/Install Picture Bank	➢ The feature of Open/Install Picture Bank allows the user to install the Picture Bank created in other projects using this button for future use. The user must choose where to save the old Picture Bank.
Remove Picture Bank	➢ When Remove Picture Bank is selected, the system will display the message that asks if the user is sure to remove the selected Picture Bank. 
Update Picture BankContent	➢ The button of Update Picture Bank Content only shows up when a picture is clicked. ➢ This feature mainly applies when the user has done simple processing of pictures such as Inverse, Grayscale 256, Horizontal Mirror, and Vertical Mirror. To update the changes made by processing, Update Picture Bank Content must be clicked. If not, the processing just made will become ineffective. ➢ When the user clicks the picture, please click the right button of mouse and select Inverse, Grayscale 256, Horizontal Mirror, or

Picture Bank Table 2-2-8-22 Picture Bank	
	Vertical Mirror. Click Picture Bank Content again to enable the effect to be made on the selected picture.  
Import Picture Data	➢ Once a new Picture Bank is added, the user can click this button to load the picture data into Picture Bank.

Picture Bank Table 2-2-8-22 Picture Bank	
	
Export Picture Bank Content to File	➢ Once the picture data is imported, the associated Picture Bank Content will be saved as .bmp file.

Picture Bank Table 2-2-8-22 Picture Bank	
	
Delete	➢ Delete means to remove the imported picture data and the associated picture. Before deleting, the software will also ask if the user is sure about deleting the data. 
Inverse	➢ Inverse processing the original picture and display it as the negative. **Before Inverse** / **After Inverse** 
Grayscale 256	➢ Grayscale 256 will display colors in the original picture with 256 levels of grayscale. **Before Grayscale 256** / **After Grayscale 256**

Picture Bank Table 2-2-8-22 Picture Bank		
Horizontal Mirror	➢ Horizontal Mirror creates the left/right mirror of the original picture.	
	Before Horizontal Mirror	**After Horizontal Mirror**
Vertical Mirror	➢ Vertical Mirror creates the Top/Bottom mirror of the original picture.	
	Before Vertical Mirror	**After Vertical Mirror**
		

2-2-8-13 Text Bank

The user can edit certain text often used and save them in Text Bank. This way when texts need to be entered into the element, they can directly be loaded from the edited strings in Text Bank and no reentry is needed. As a result, the function of Text Process allows the user to connect with Text Bank to directly import the texts already created into the selected elements, as shown in the figure below.

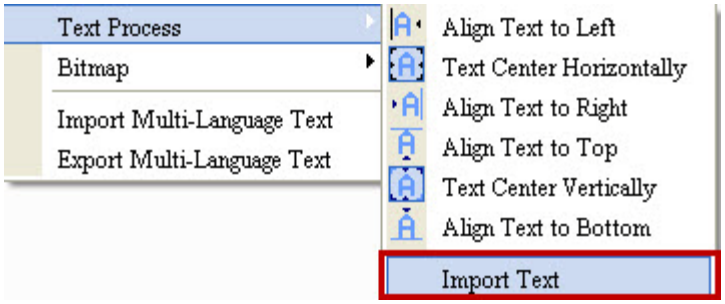
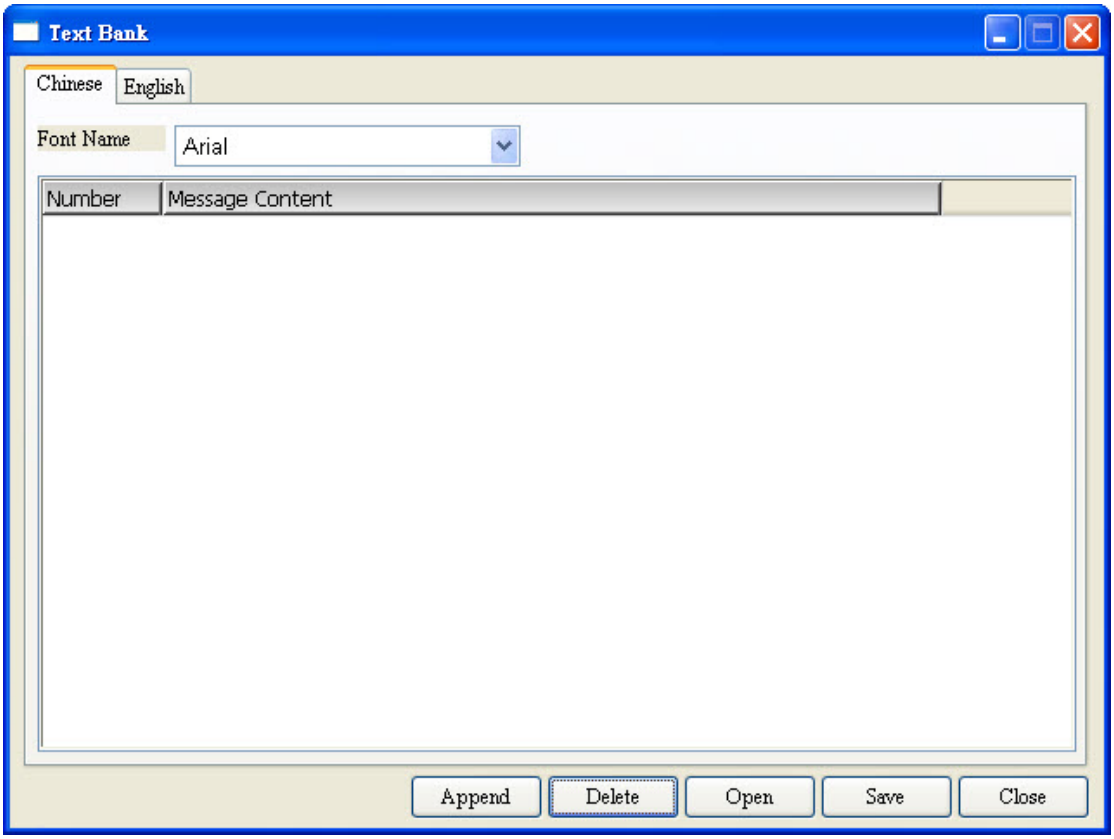
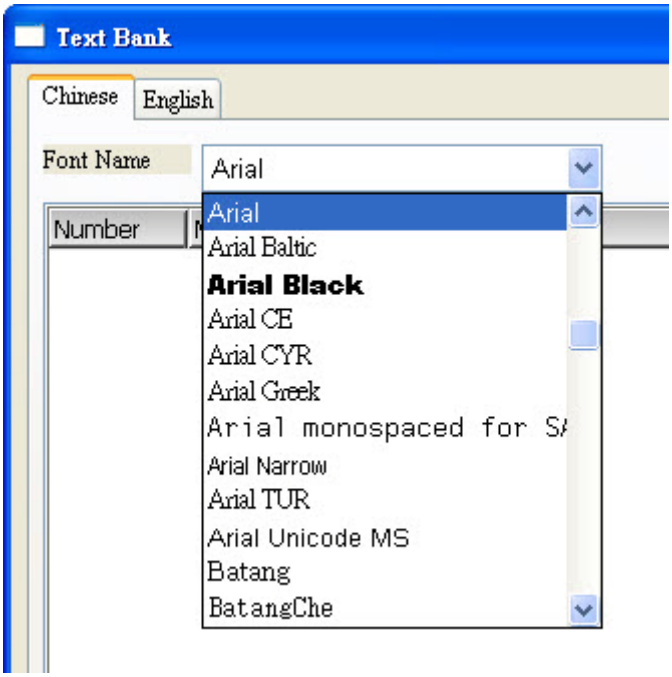
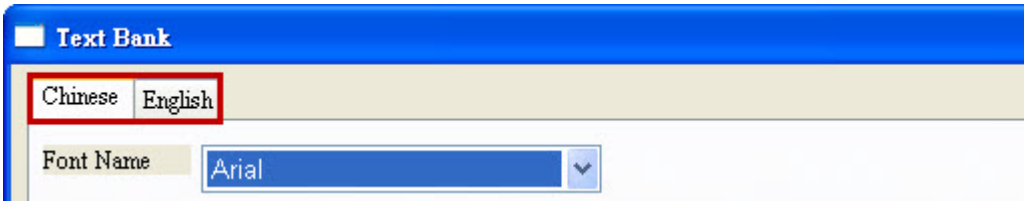
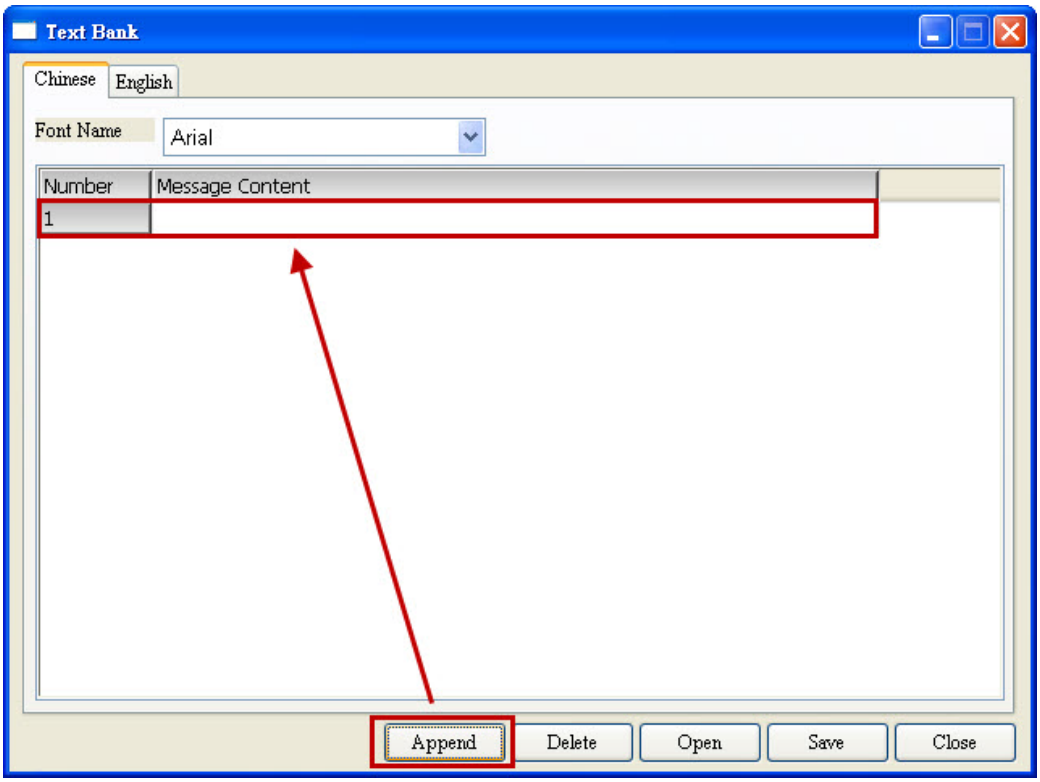


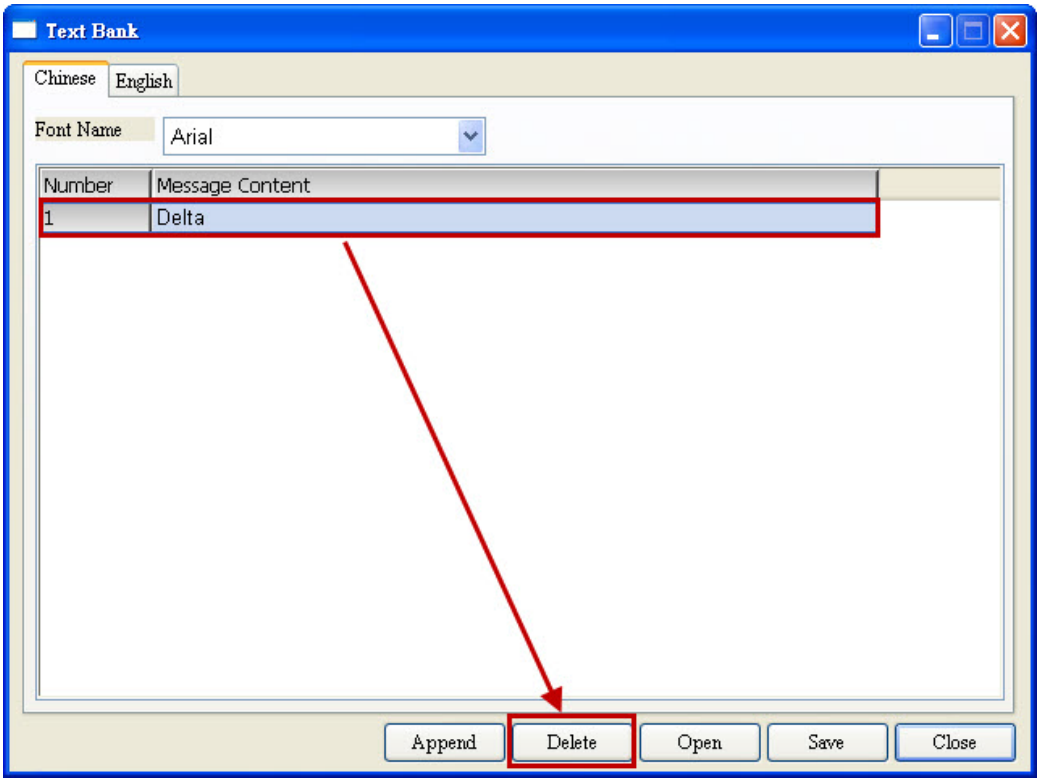
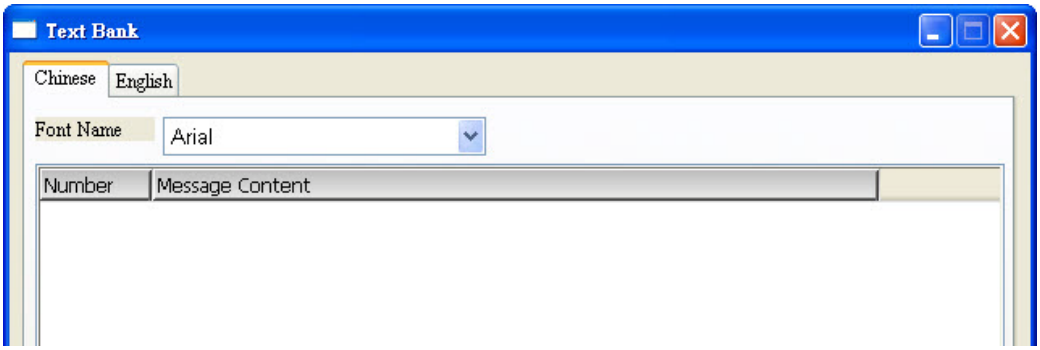
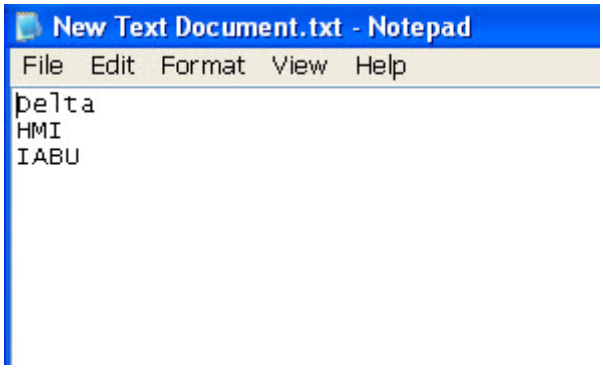
Figure 2-2-8-18Import text from Text Bank

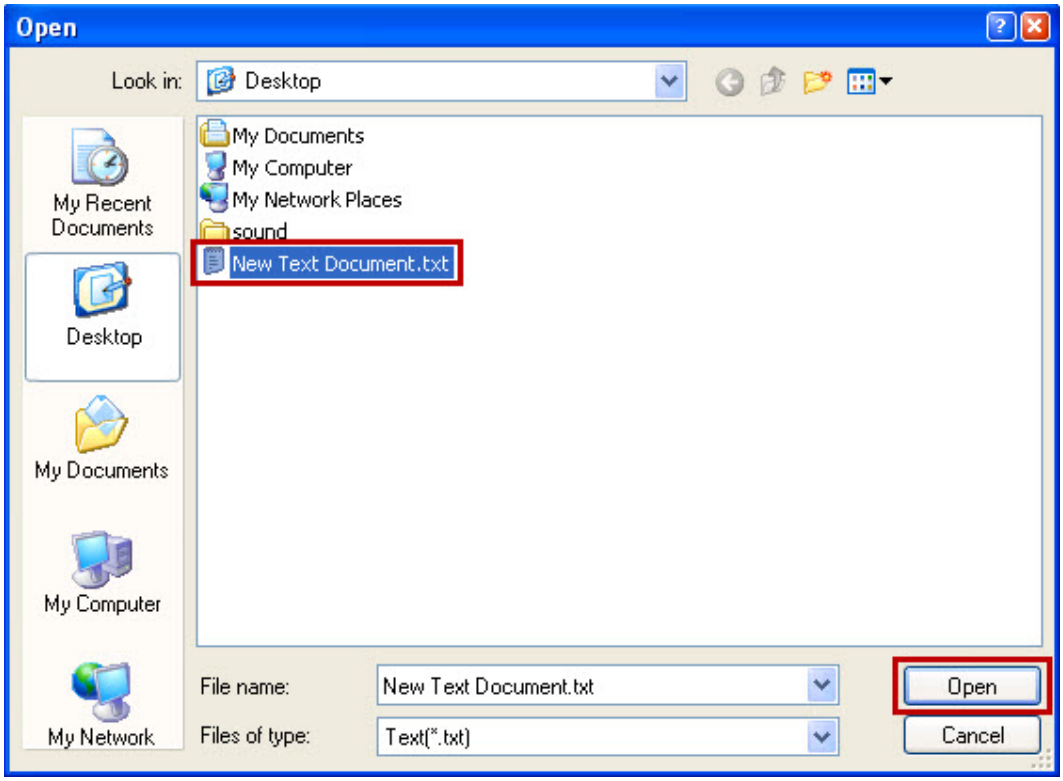
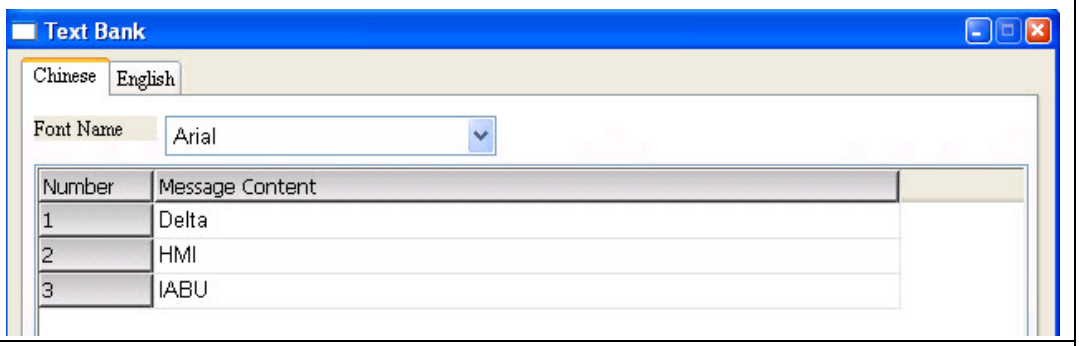
If multiple languages have been created by the user, the associated text data can also be edited in advance in Text Bank.

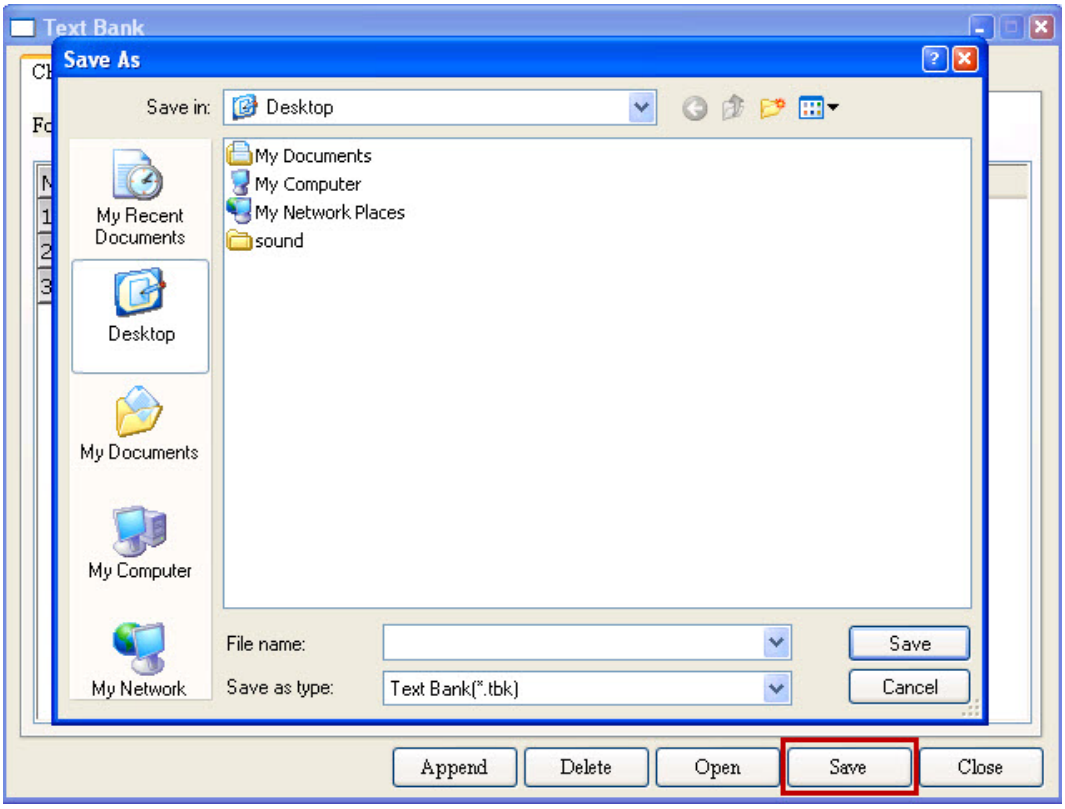
Figure 2-2-8-19 Text BankContent in multiple languages

Text Bank Table 2-2-8-23 Text Bank

➢ Text Bank includes [Add], [Delete], [Open], [Save],and [Close]. ➢ Text Bank can also change the font of the entered texts.  ➢ If multiple languages have been created by the user, the corresponding language pages will be added accordingly.

Text Bank Table 2-2-8-23 Text Bank	
	
Add	➢ When the Add button is pressed, a new line of data is added for the user to fill in the content. 
Delete	➢ To delete the data line, please click the data to be removed first and click the Delete button.

Text Bank Table 2-2-8-23 Text Bank	
	 
Open	➢ The user can use this feature directly on the created text file (.txt) to import data. ➢ The figure below shows the created text file.  ➢ Click Open and select the text file to be imported.

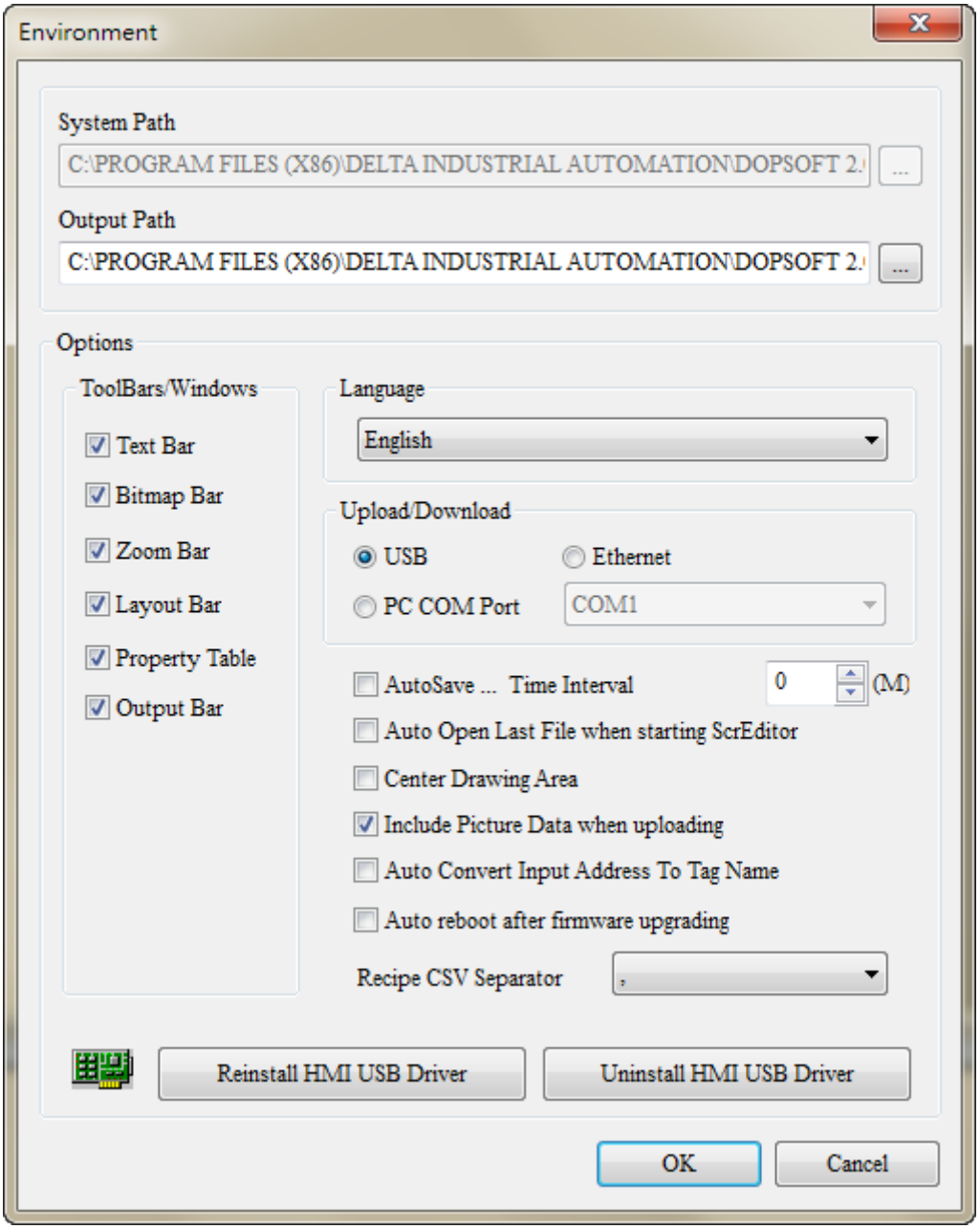
Text Bank Table 2-2-8-23 Text Bank	
	 ➢ Once the text tile is opened, Text Bank will load the data therein. 
Save	➢ Save allows the user to export the content of Text Bank and save it as text file.

Text Bank Table 2-2-8-23 Text Bank	
	
Close	➢ Close means to exit the program.

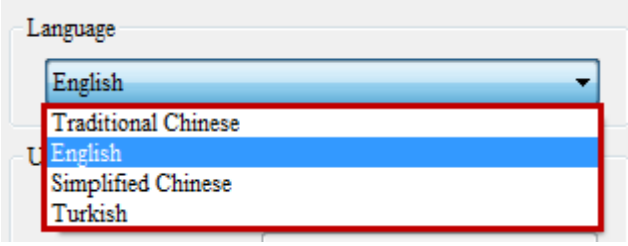
2-2-8-14 Environment

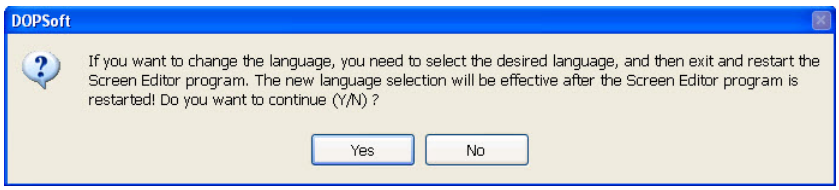
Environment allows the user to set up the environment parameters related to the HMI, including display of software language interface and download mode, which will be described individually below.

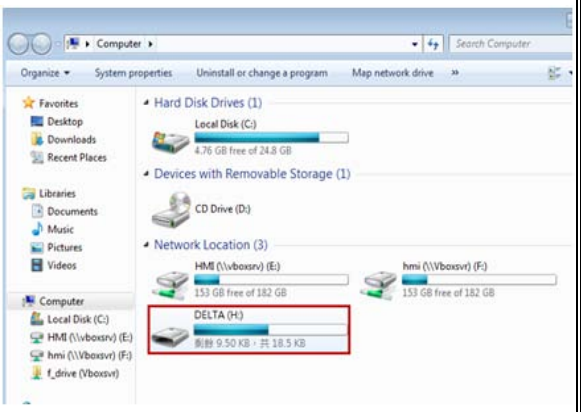
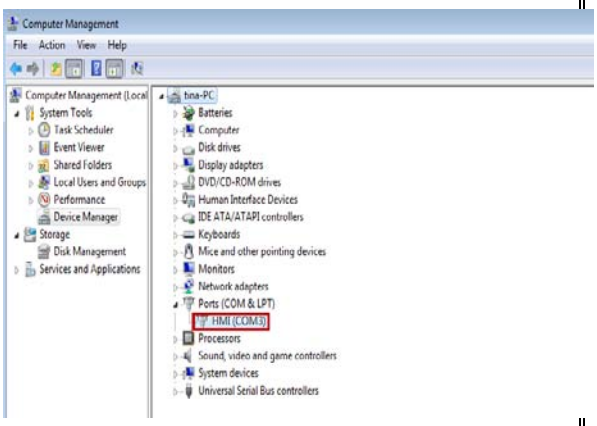
Environment
Table 2-2-8-24 Environment

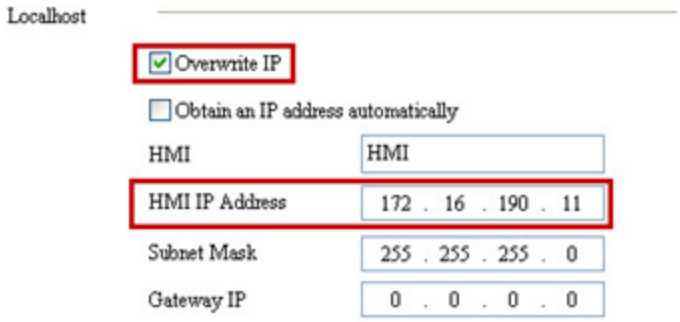


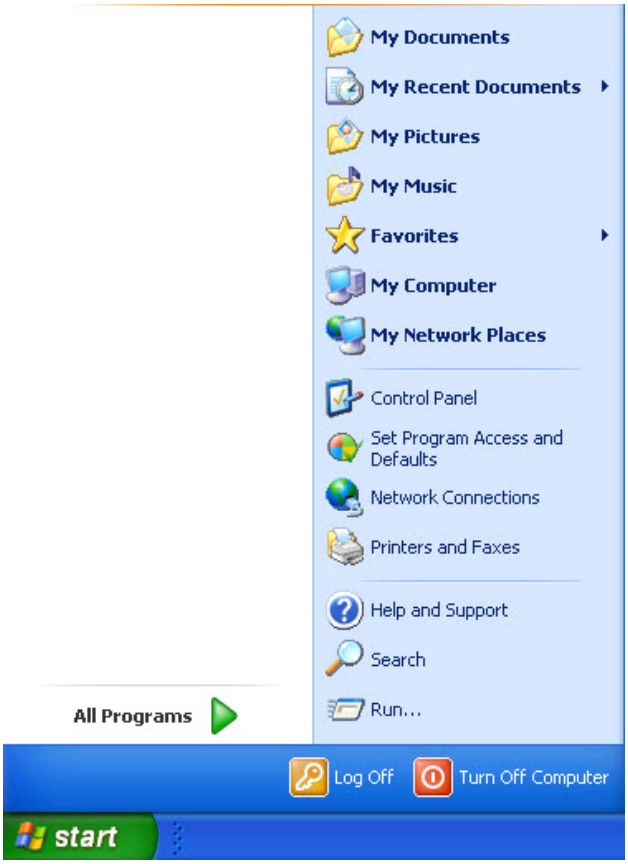
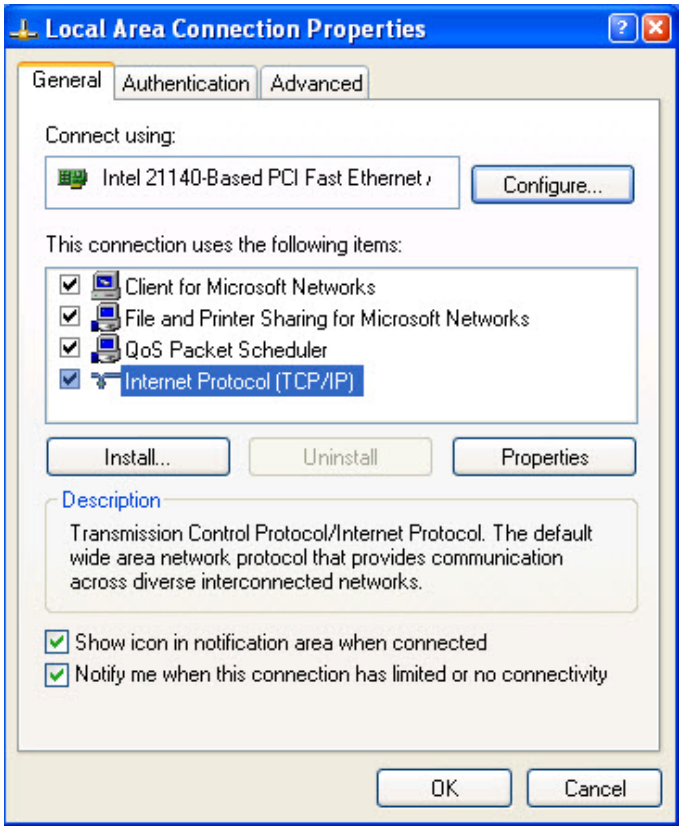
➢ System path and output path can be checked in Environment. Display of system environment parameters such as toolbar, window, upload/download setup, and USB driver can also be set here.

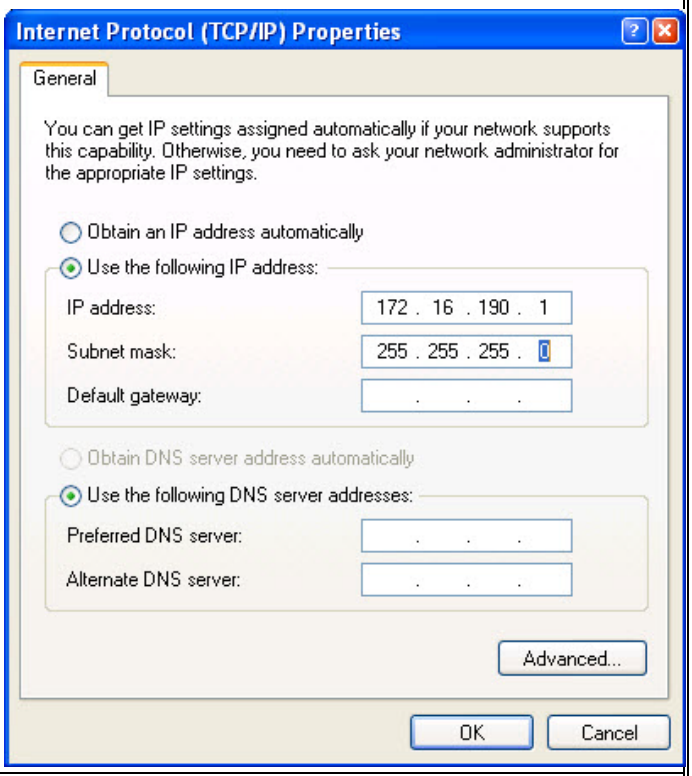
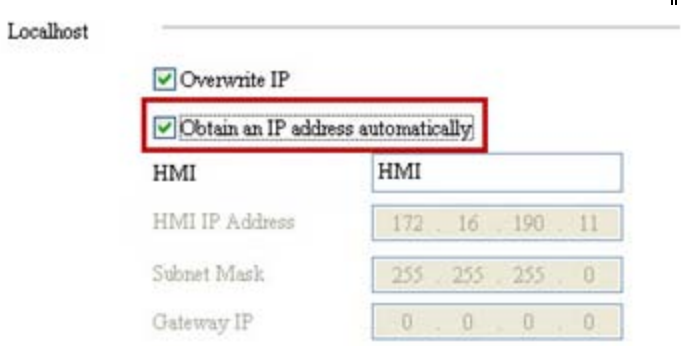
Environment Table 2-2-8-24 Environment		
System Path	➢ This refers to the path to save file when the software executes files, including some reference data and dynamic-link library files (*.DLL), which will be saved in this path altogether. This item cannot be changed by the user as preferred.	
Output Path	➢ This refers to the output path for the CIN file after screen editing, to which some functions such as On-line Simulation, Off Line Simulation File Upload/Download will reference. As a result, unless necessary or there is no change in software version, please do not modify this path to avoid program execution error orfailure to locate files.	
Options	Text Bar Bitmap Bar Zoom Bar Layout Bar Property Table Output Bar	➢ The user can check here whether to display or not the toolbar and window next time. ➢ After checking this feature, the user must click Yes and exit the software. The setting just made will become enabled when the software is started again.
Language	Traditional Chinese English Turkish	➢ The software offers four languages for the user to choose from, which are Traditional Chinese,English,Simplified Chinese and Turkish.  ➢ When the user chooses one of the languages and click Yes, the software will display the message of "If you want to change the language, you need to select the desired language, and then exit and restart the Screen Editor program. The new language selection will be effective after the Screen Editor program is restarted! Do you want

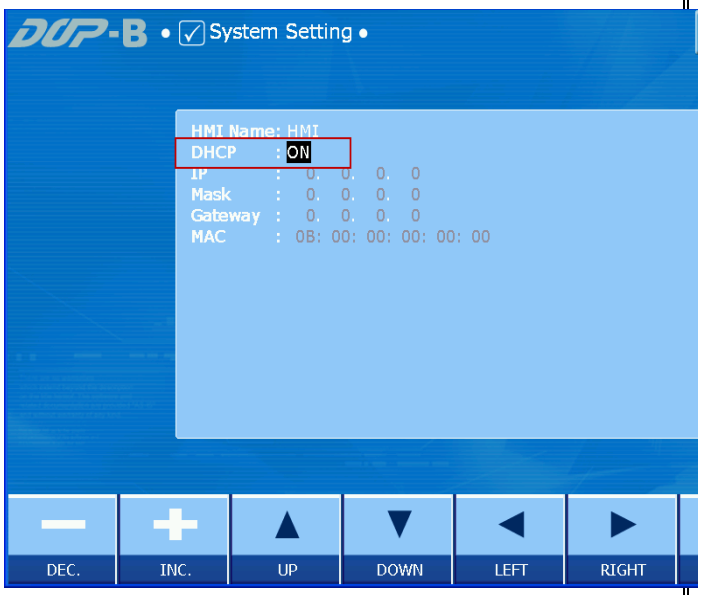
Environment Table 2-2-8-24 Environment		
	Simplified Chinese	to continue (Y/N)?". If [Yes]is selected, the software will automatically close and restart. The user will find that the software interface has switched to the other language chosen earlier. 
Upload/Download Setup	USB	➢ The default Upload/Download setup between the software and HMI is USB. ➢ There are three formats for USB transmission mode, the traditional upload / download format (Normal = USBCommMode 0) that users have to manually install the driver, USB Disk format (Disk = USBCommMode 1) that users can directly upload / download HMI program without installing the driver and USB CDC format (CDC = USBCommMode 2) that requires additional driver. ➢ Except for HMI models of B05S100, B05S101, B07S201, and B07S211, all other models have mandatorily made Disk mode USBCommMode2, which prohibits any alternation by user. ➢ USBCommMode 1 and USBCommMode 2are compatible with Windows XP/Windows Vista/Windows 7 / Windows 8. ➢ The follow two modes can only be changed by entering the system screen of HMI→System Setting→MISC. **USBCommMode 0**: USBCommMode 0 is the conventional upload/download mode for USB, where manual installation of USB driver in HMI is needed to render normal upload/download in HMI. **USBCommMode 1**: USBCommMode 1 is the USB Disk mode. When USBCommMode is set to 1, after the user saves the settings, and back to HMI, one can see a

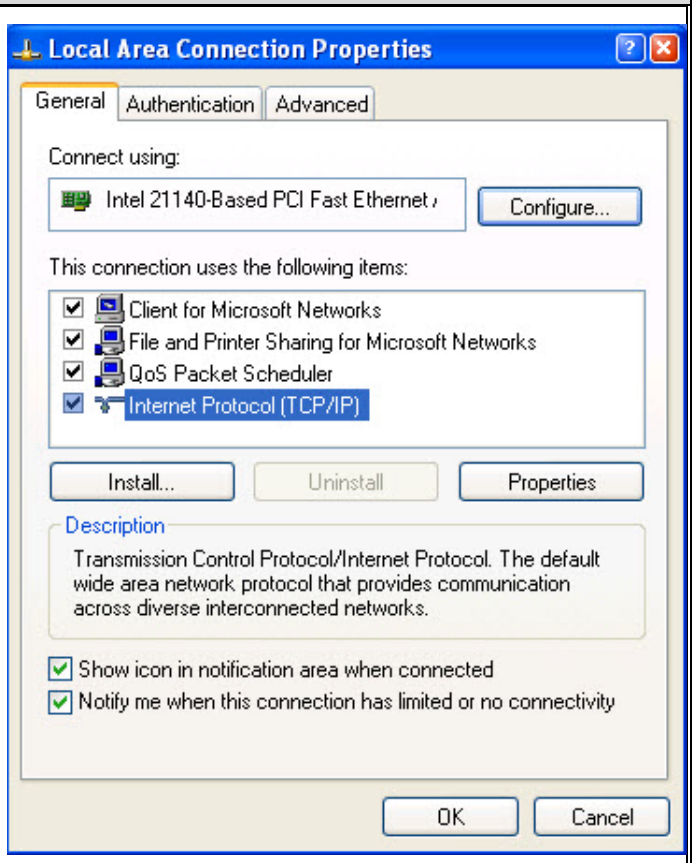
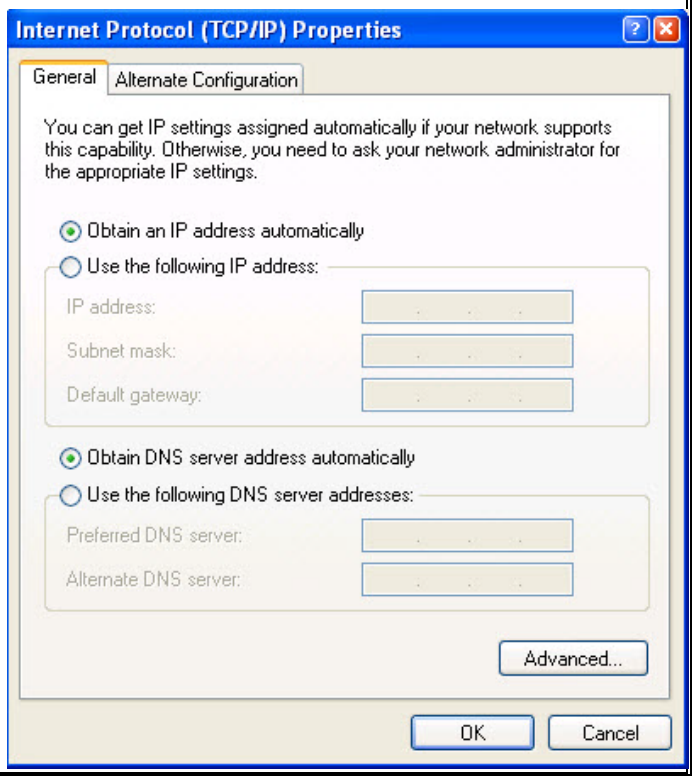
Environment Table 2-2-8-24 Environment			
			removable device named “DELTA”in My Computer. 
		USBCommMode 2	USBCommMode 2 is USB CDC mode. When USBCommMode is set to 2, users can go to [Computer]➔ right click the mouse and select [Content] ➔ [Device Manager] and check if [HMI] is displayed under [Ports]. 
	Ethernet	➢ Ethernet involves the transmission of upload and download on HMI through network. ➢ If Ethernet is used for upload/download, one has to make sure the IP addresses of HMI and computer are in the same network segment. Setup of HMI IP includes Custom IP and Obtain an IP address automatically.	
		CustomIP	➢ HMI end: Enter [Options]→ [Communication Setting]→ [Ethernet] and set the customized IP address. The user can also enter the system screen→ [System Setting]→ [Network]to set the IP

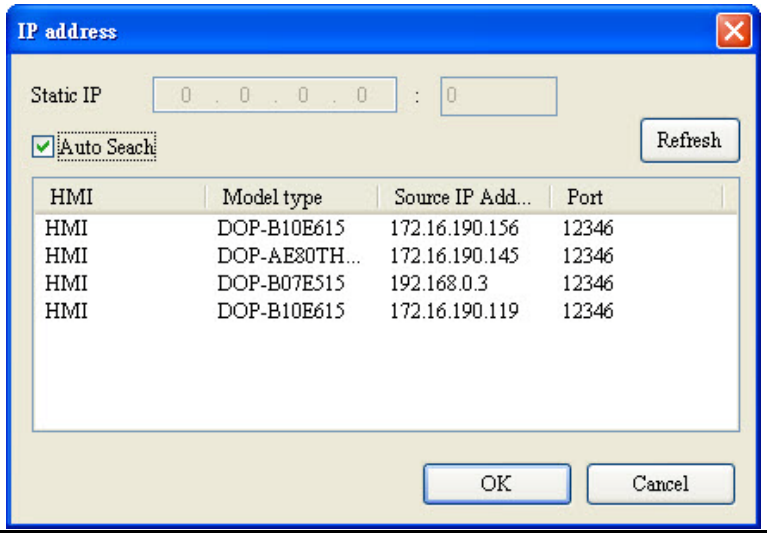
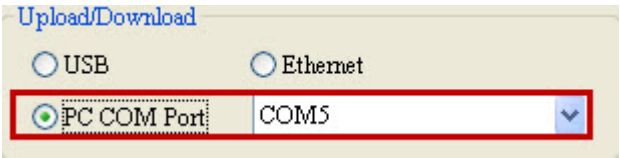
Environment Table 2-2-8-24 Environment			
			address. The figure below shows the interface set up by software:  The figure below shows the interface set up by the system screen: ➢ Computer end: Select“Control Panel” in the Start Menu in Windows and select “Network Connections 網路連線 ”. Then choose “Local Area Network 區域連線 ” and select “Internet Protocol (TCP/IP)” in LAN settings.

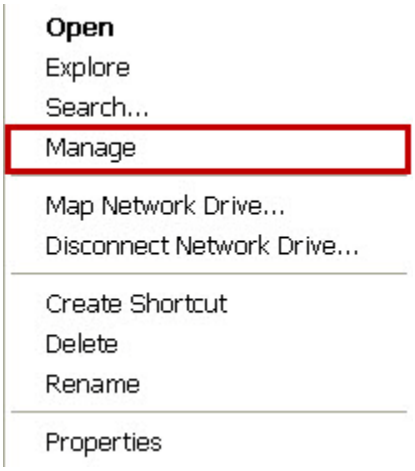
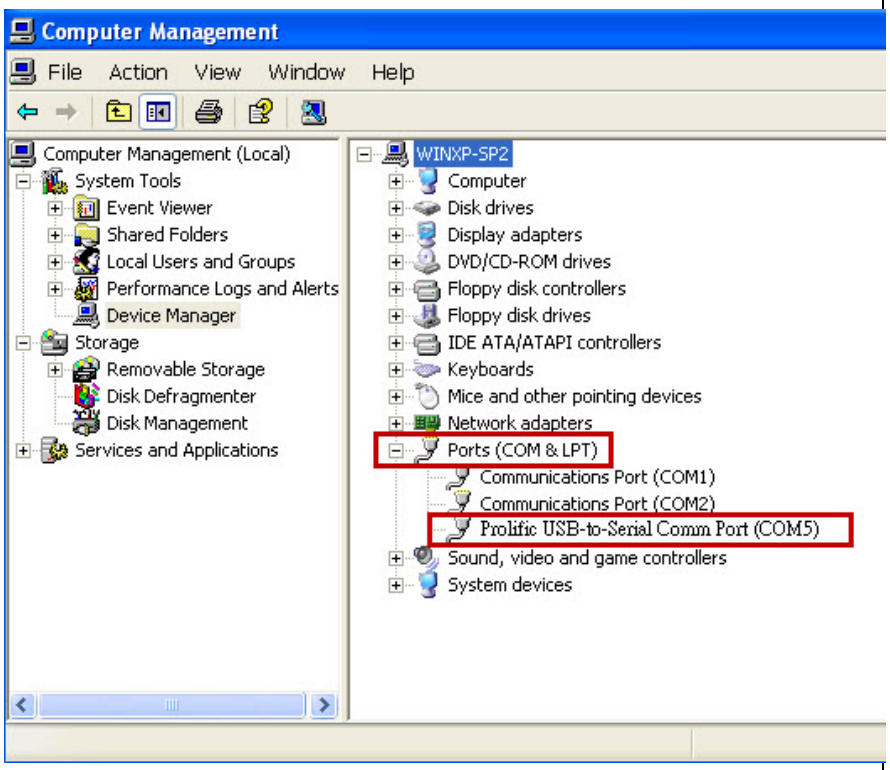
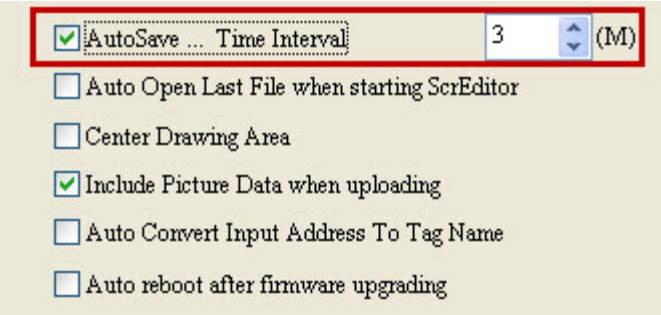
Environment Table 2-2-8-24 Environment			
			 

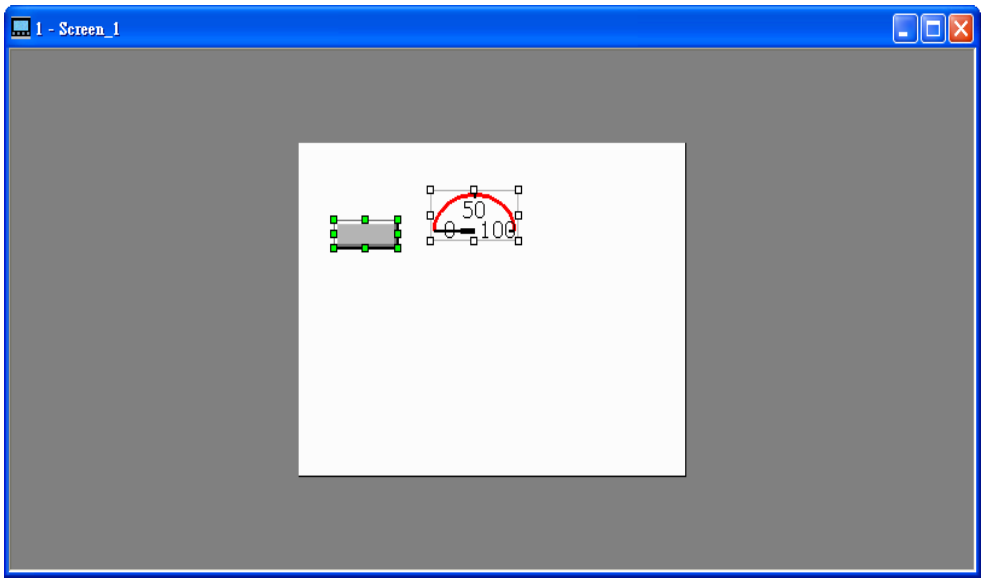
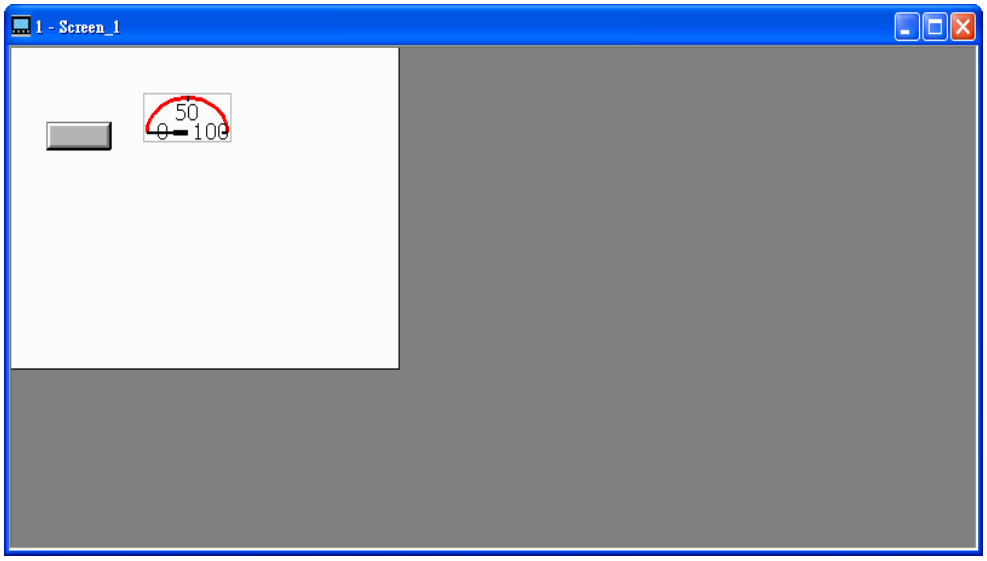
Environment Table 2-2-8-24 Environment			
			Click [Properties]to enter the configuration for TCP/IP, as shown in the figure below. 
		Obtain an IP address automatically	➢ HMI end: Obtain an IP address automatically means no setup of IP address is required. Instead, the IP is assigned to HMI by DHCP. The user can still enter the system screen→ [System Setting]→ [Network]to set DHCP to be ON. The figure below shows the interface set up by software:  The figure below shows the interface set up by system screen:

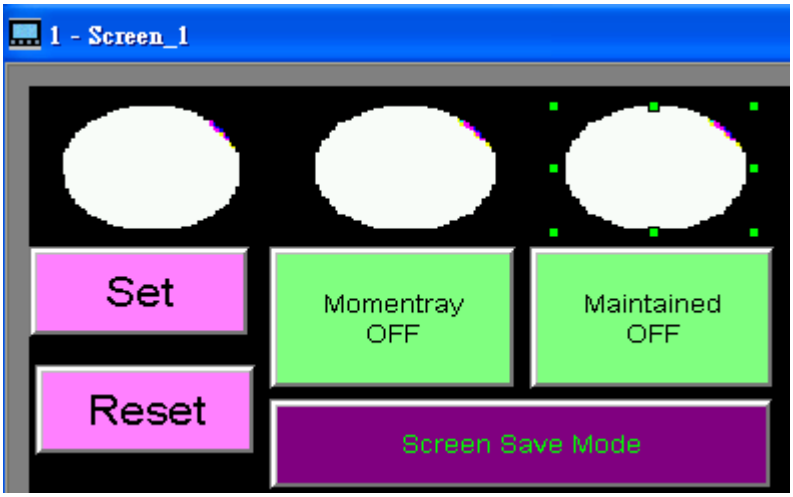
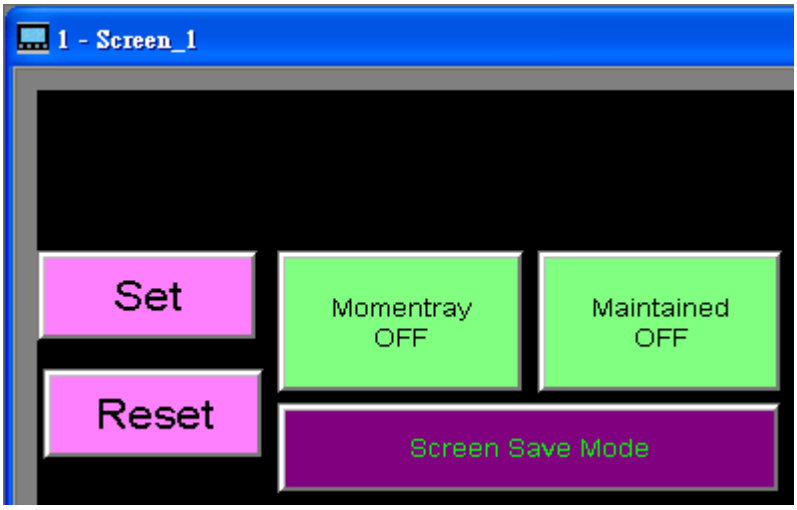
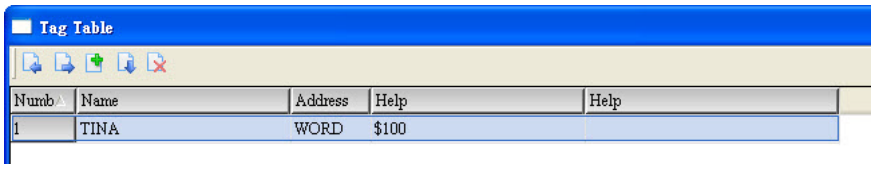
Environment Table 2-2-8-24 Environment			
			 ➢ Computer end: “Control Panel” in the Start Menu in Windows and select “Network Connections ”. Then choose “Local Area Network ”and select ”Internet Protocol (TCP/IP)”in LAN settings.

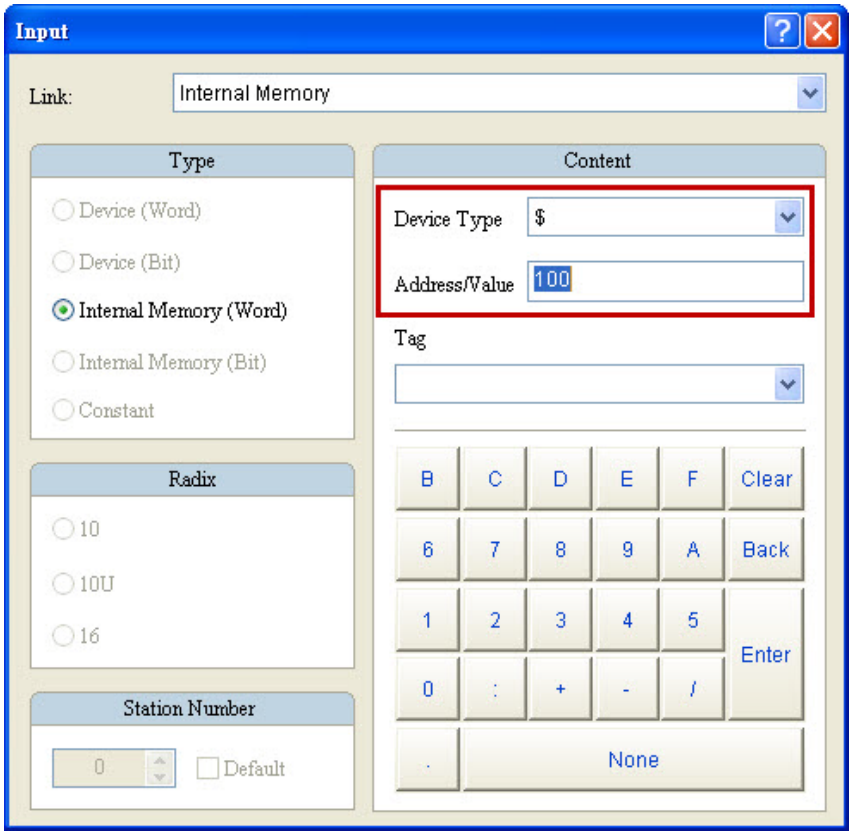
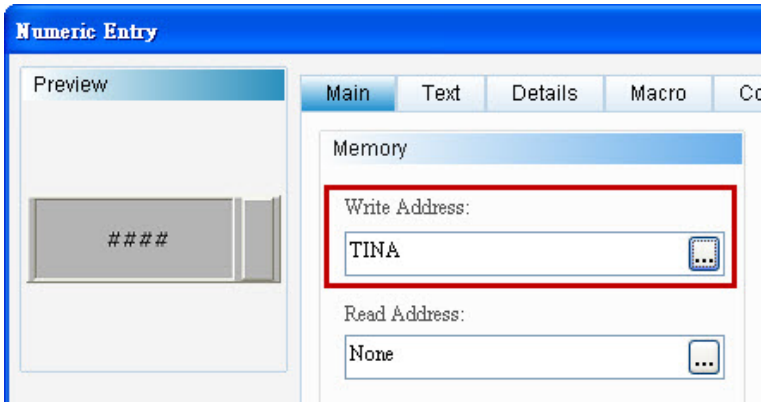
Environment Table 2-2-8-24 Environment			
			 Click [Properties]to enter the configuration for TCP/IP, as shown in the figure below. 

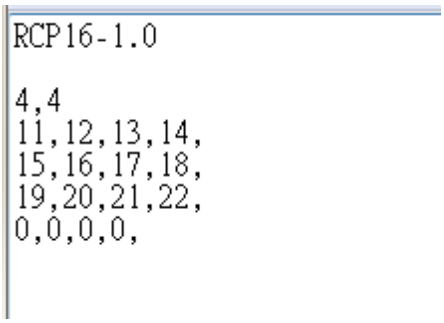
Environment Table 2-2-8-24 Environment		
		➢ After the HMI IP and the computer IP are configured in the same network segment, one can start upload/download transmission through Ethernet. When the user clicks Download Screen Data or Upload Screen Data, the software will automatically search the HMI located in the same segment. Press [Start Transmission]to download the HMI screen or upload data onto HMI. 
	PC Port	➢ PC Port refers to the COM port at PC end that conducts upload/download transmission with HMI. However, before choosing PC port for upload/download, one must first enter the system screen of HMI→ [Up/Download]→ [Standard Mode] and select COM 1 or COM 2 to stand by for operation. ➢ Then set the COM number on PC port at the software end.  ➢ To check the number, one can click the right button of the mouse on My Computer to enter [Manage] and check [Ports] to obtain the COM number at the computer end.

Environment Table 2-2-8-24 Environment		
		 
Auto Sace…Time Intervcal		➢ The software allows the user to choose how often the software saves the projects being edited. The minimum length is 0 Min., meaning this option is not selected. If selected, the minimum default value is 3 Min., and the maximum is 120 Min. 

Environment Table 2-2-8-24 Environment	
Auto Open Last File when starting ScrEditor	➢ When [Auto Open Last File when starting ScrEditor] is checked and as the user closes a project, the screen displayed next time when DOPSoft starts is the project being edited previously.
Center Drawing Area	➢ When “Center Drawing Area” is selected, the editing screen of software will be displayed in the block located at center.  ➢ If no selected, the default edit screen will be displayed, which is located on the upper left corner. 

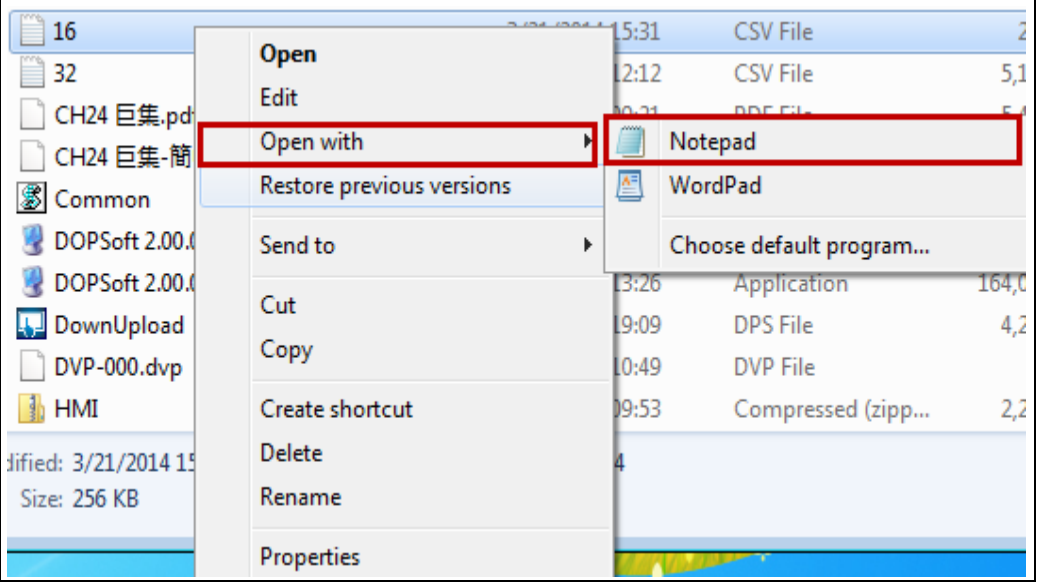
Environment Table 2-2-8-24 Environment		
Include Picture Data When Uploading	➢ If the project being edited contains picture data but this option is not checked, all the associated picture data will not be uploaded when uploading screen data to HMI.	
	➢ **Include Picture Data When Uploading is not checked**	
	Original Screen Data	
	Screen Data after Upload	
Auto Convert Input Address To Tag Name	➢ This feature mainly allows the user to automatically convert the memory address of the elements to be created from existing data in the Tag Table into numerical codes for display.	
	➢ **"Auto Convert Input Address To Tag Name" is checked**	
	Step1	➢ Enter [Options]→ [Tag Table] to edit the numeric data. 
	Step2	➢ Enter [Options]→ [Environment] and select [Auto Convert Input Address To Tag Name].

Environment Table 2-2-8-24 Environment		
		➢ Create a numeric element and set the write address to be $100. 
	Step3	➢ After entering the address, one will find out that the memory address has been automatically converted to numeric code and displayed as TINA. 

Environment Table 2-2-8-24 Environment	
Auto reboot after firmware upgrading	➢ When this option is checked, it means that HMI will restart after firmware upgrading and will not display the window with message [Update Firmware Succeed!!!] to notify the user.
Reinstall HMI USB Driver Uninstall HMI USB Driver	➢ After executing [Reinstall HMI USB Driver], the system will install the HMI USB driver again. ➢ After executing [Uninstall HMI USB Driver], the system will uninstall the HMI USB driver. ➢ These two features mainly address the issue that happens when upload/download fails using USB transmission, the user can restore the USB transmission between HMI and software to render normal upload/download through uninstallation and reinstallation of HMI USB driver. ➢ This function is only suitable for USB download mode is Normal or CDC.
Recipe CSV Separator	➢ Four kinds of delimiters are provided for users to separate the content in CSV file. , 

Environment Table 2-2-8-24 Environment		
;		RCP16-1.0 4;4 11;12;13;14; 15;16;17;18; 19;20;21;22; 0;0;0;0;
TAB		RCP16-1.0 4 4 11 12 13 14 15 16 17 18 19 20 21 22 0 0 0 0
SPACE		RCP16-1.0 4 4 11 12 13 14 15 16 17 18 19 20 21 22 0 0 0 0

➢ Users can open the Notepad to make sure the displayed delimiter in CSV is correct.



Environment Table 2-2-8-24 Environment	
	RCP16-1.0 4,4 1,12,13,14, 15,16,17,18, 19,20,21,22, 0,0,0,0,

2-2-9 Window

The function of Window mainly enables the user to manage the order and display of windows more effectively.

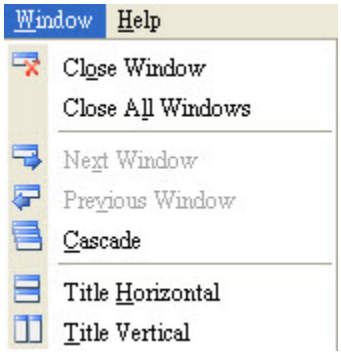


Figure 2-2-9-1 Window

2-2-9-1 Close Window

After execution of “Close Window”, the current editing screen displayed by the software will be closed.

2-2-9-2 Close All Windows

This feature executes the action of closing all windows, meaning all windows in the current project will be closed and end with no editing window.

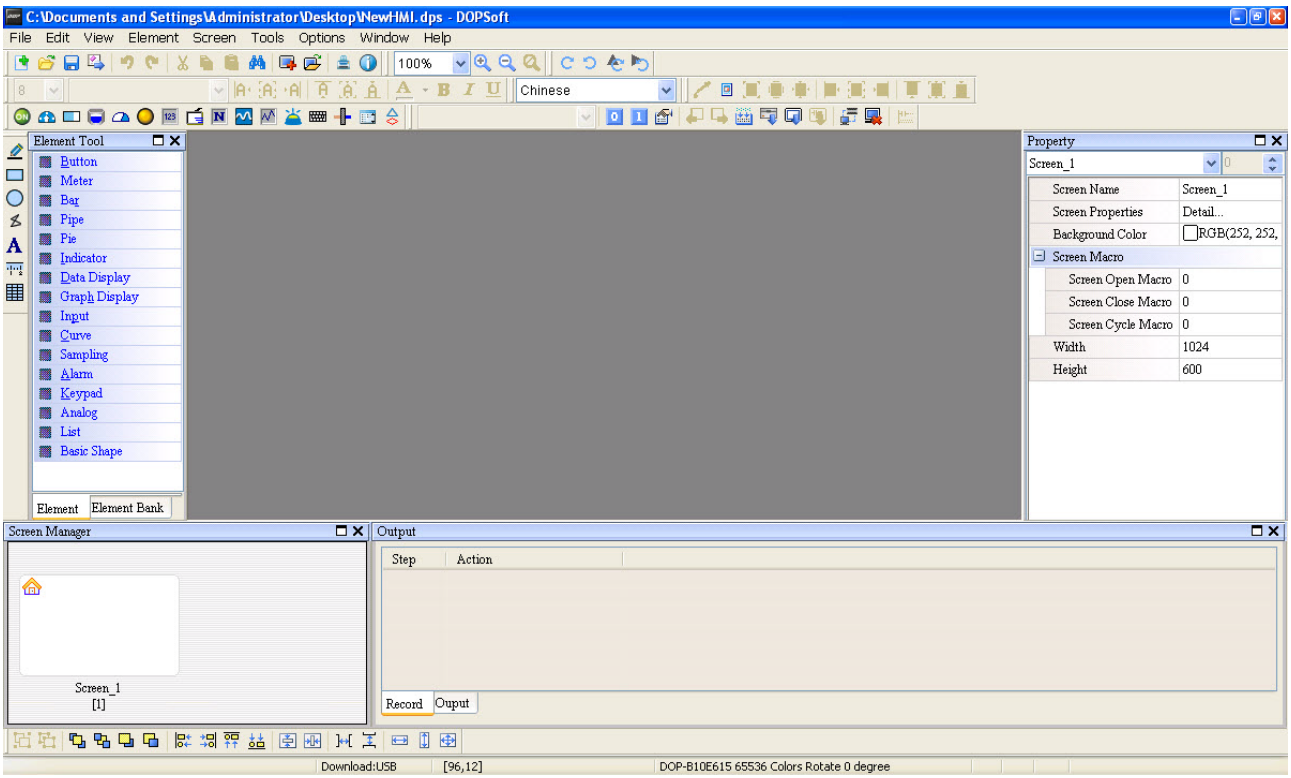


Figure 2-2-9-2 Close all windows

2-2-9-3 Next Window

Executing Next Window will start the next window by the order of ascending screen number.

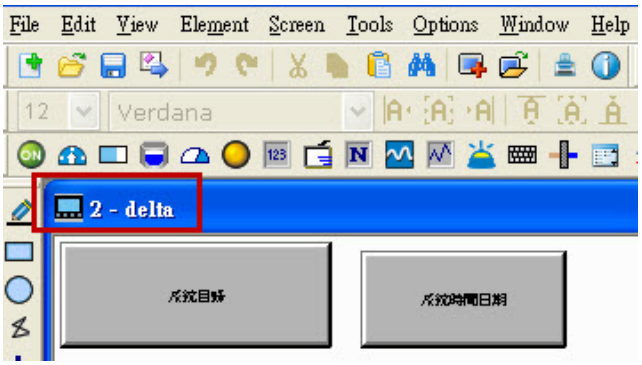
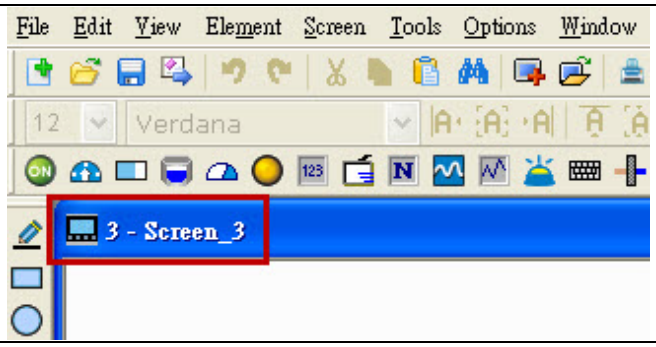
Before	
After	

Table 2-2-9-1 Next window

2-2-9-4 Previous Window

Executing Previous Window will start the next window by the order of descending screen number.

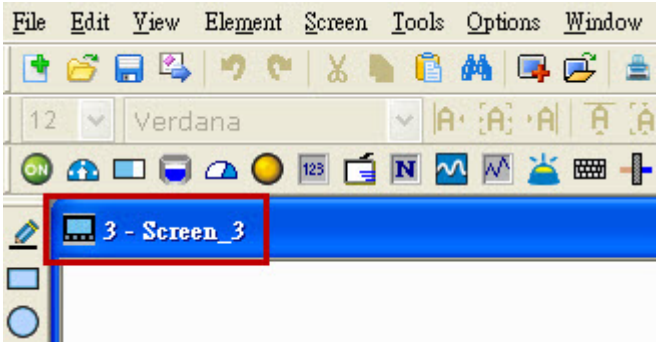
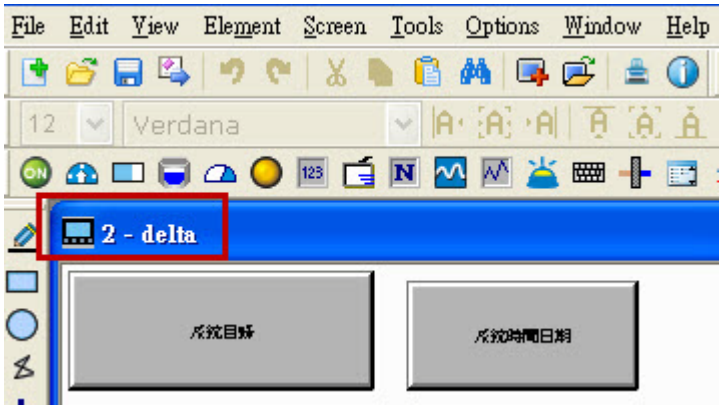
Before	
After	

Table 2-2-9-2 Previous window

2-2-9-5 Cascade

When Cascade is selected, all windows on the screen will be displayed in the Editing window by cascade.

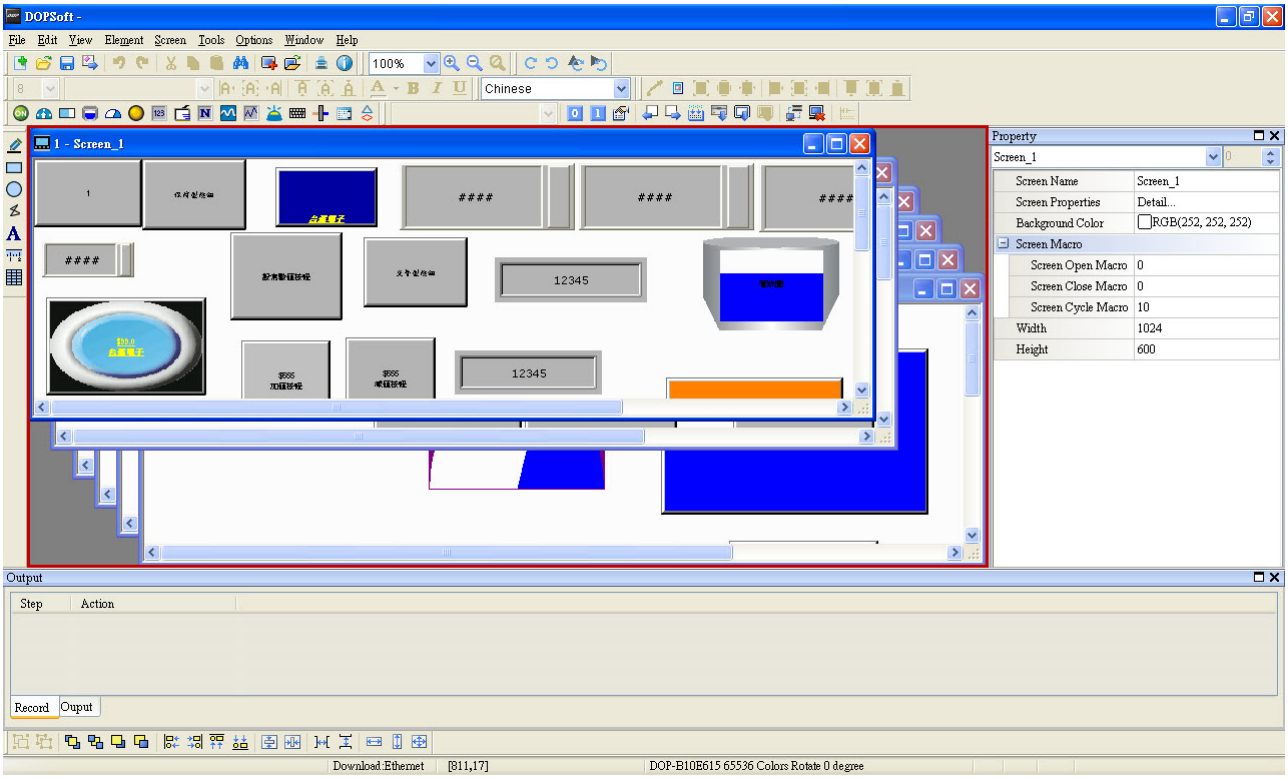


Figure 2-2-9-3 Cascade

2-2-9-6 Title Horizontally

When Tile Horizontally is executed, all windows will be displayed by tilting the screen horizontally.

NOTE:

✓ Tile horizontally will determine the order to tile according to the current screen the user is working on.

➢ **Currently Stay at Screen No.1**

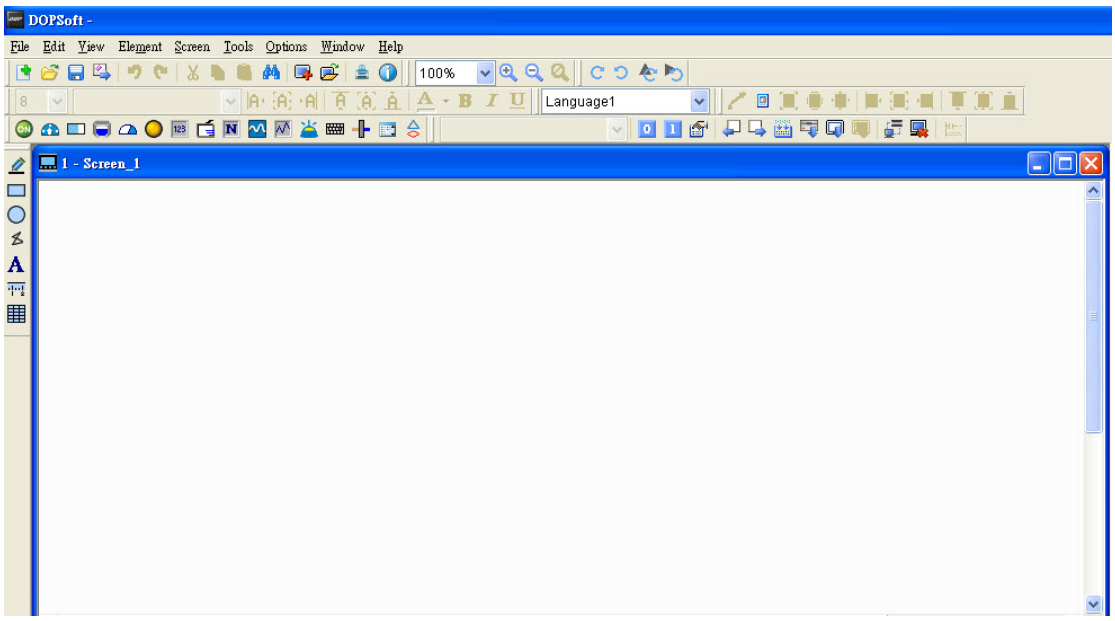
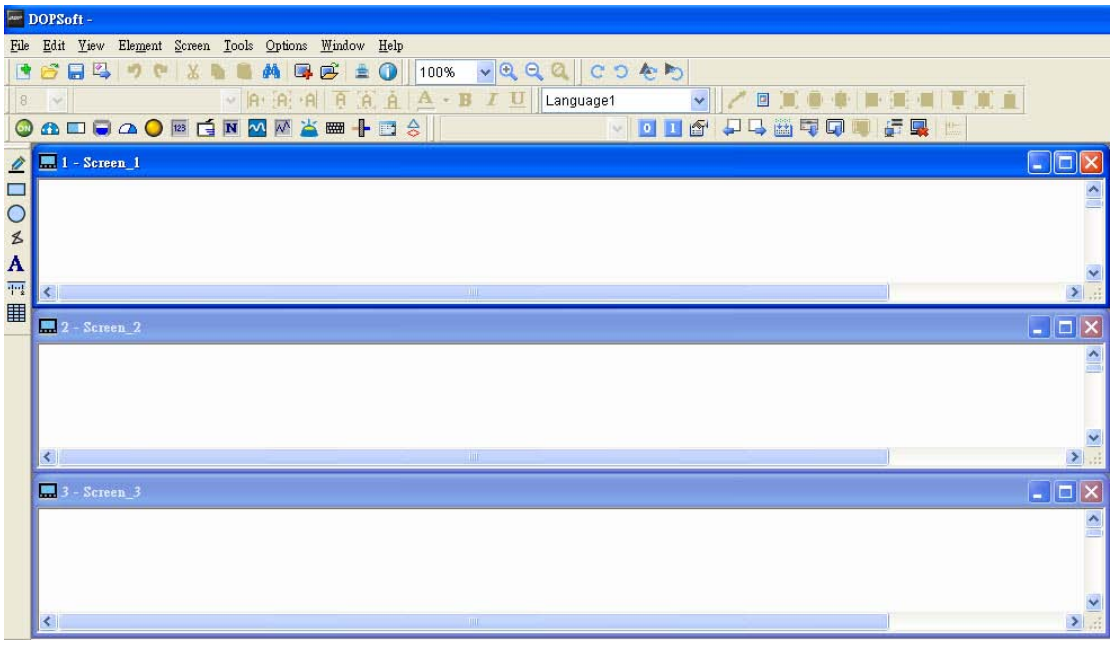
Before	
After	➢ The order of screen number is Screen No.1→Screen No.2→Screen No.3. 

Table 2-2-9-3 Tile Horizontally

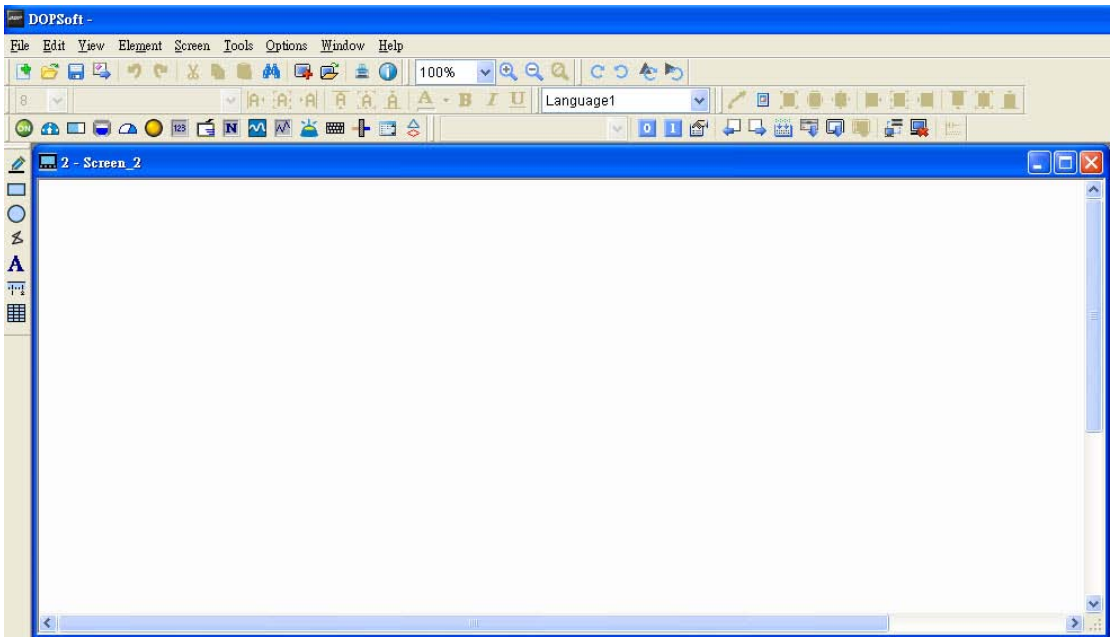
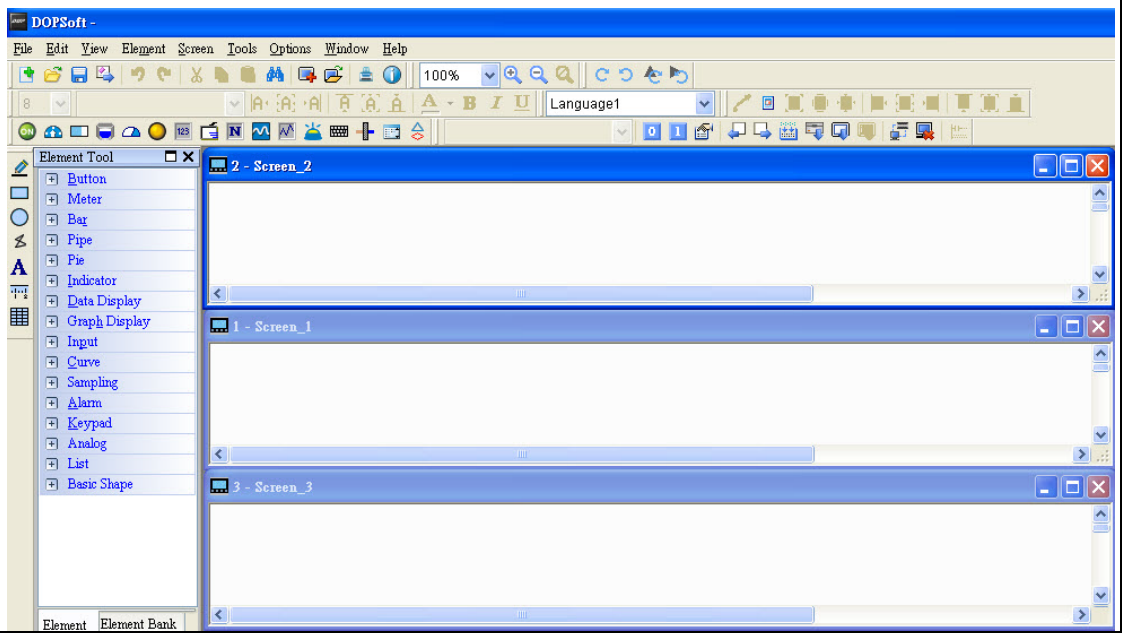
➢ **Currently stay at Screen No.2**	
Before	
After	➢ The order of Screen number is Screen No.2→Screen No.1→Screen No.3. 

Table 2-2-9-4 Tile Horizontally

2-2-9-7 Title Vertically

When Tile Vertically is executed, all the windows will tile the screen vertically.

NOTE:

✓ Same as Tile Horizontally, Tile Vertically will also determine the order to tile according to the current screen the user is working on.

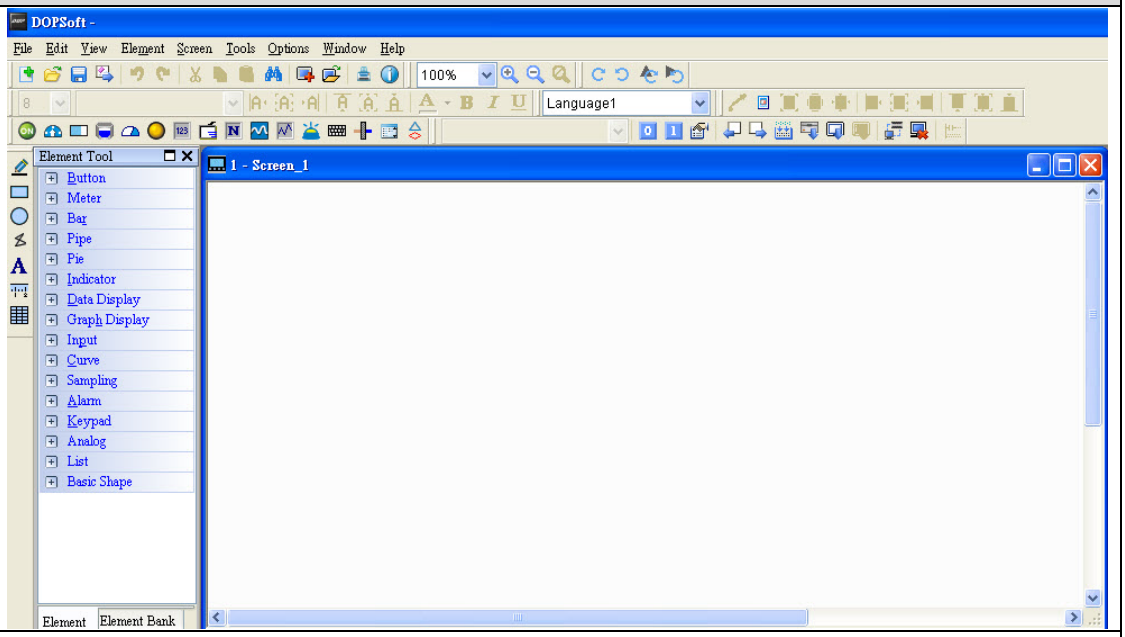
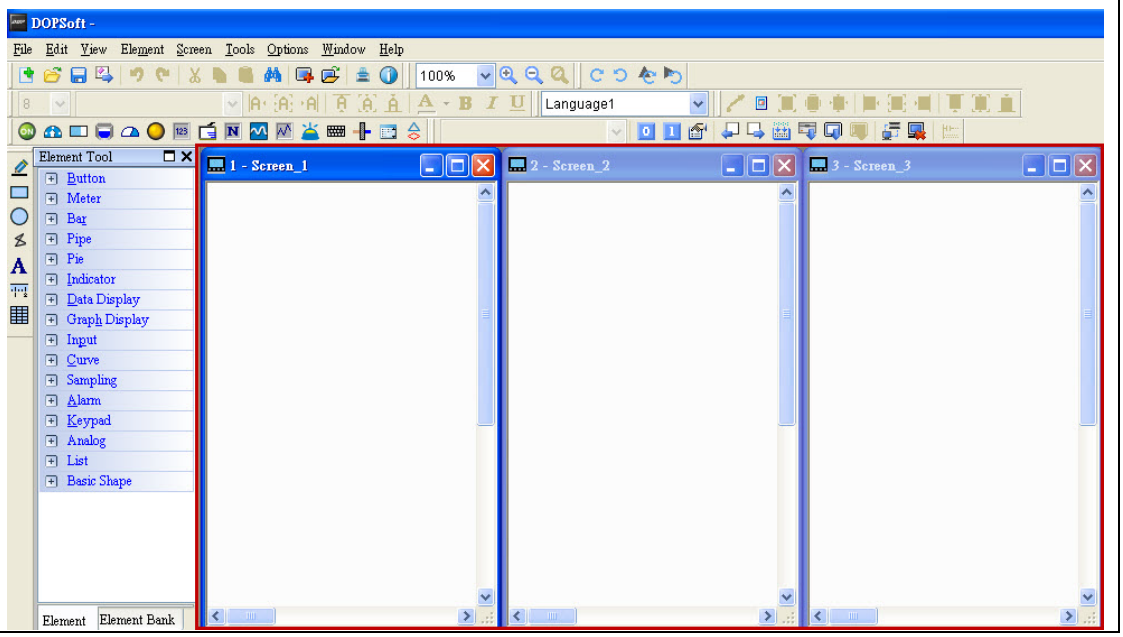
➢ **Currently stay at Screen No.1**	
Before	
After	➢ The order of Screen number is Screen No.1→Screen No.2→Screen No.3. 

Table 2-2-9-5 Tile Vertically

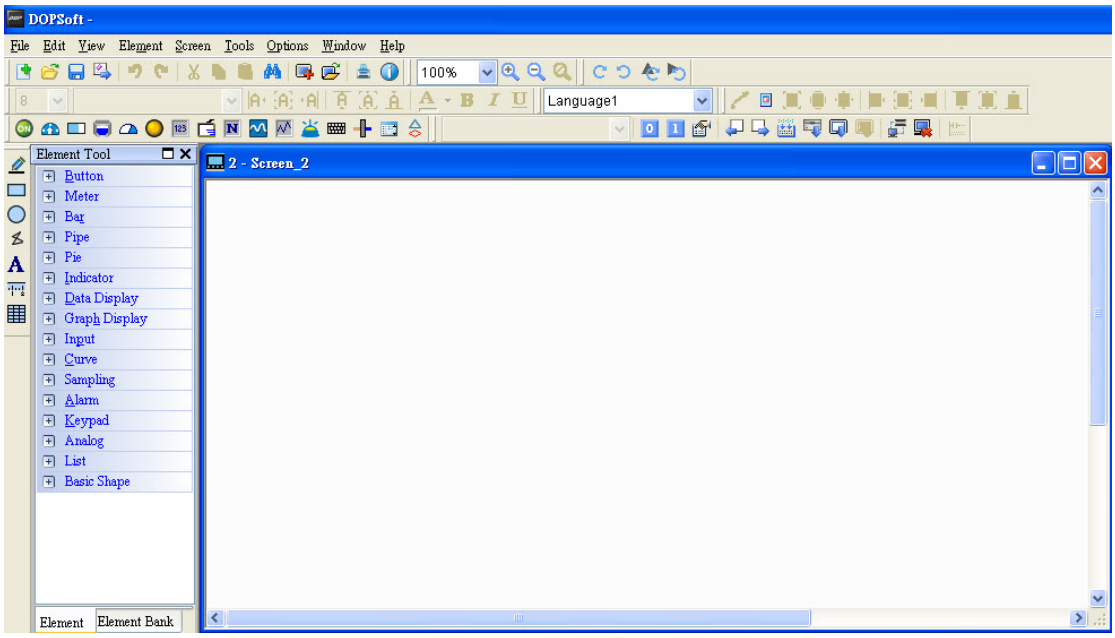
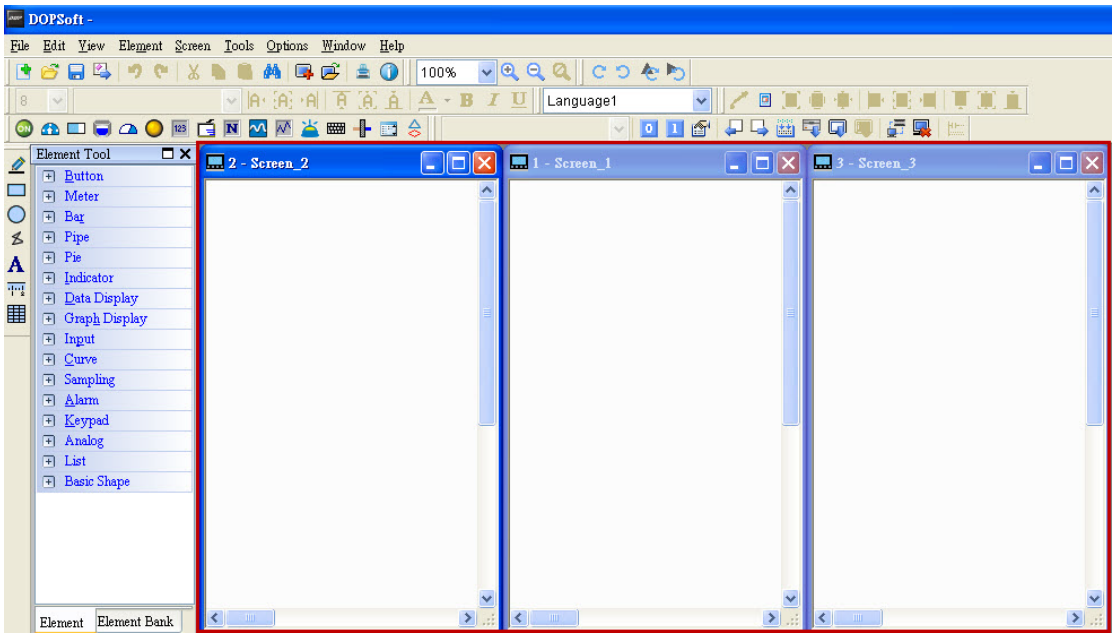
➢ Currently stay at Screen No.2	
Before	
After	➢ The order of Screen number is Screen No.2→Screen No.1→Screen No.3. 

Table 2-2-9-6 Tile Vertically

2-2-10 Help

The Help part mainly provides the user with information such as the current software version and firmware version through this toolbar.

Figure 2-2-10-1 Help menu

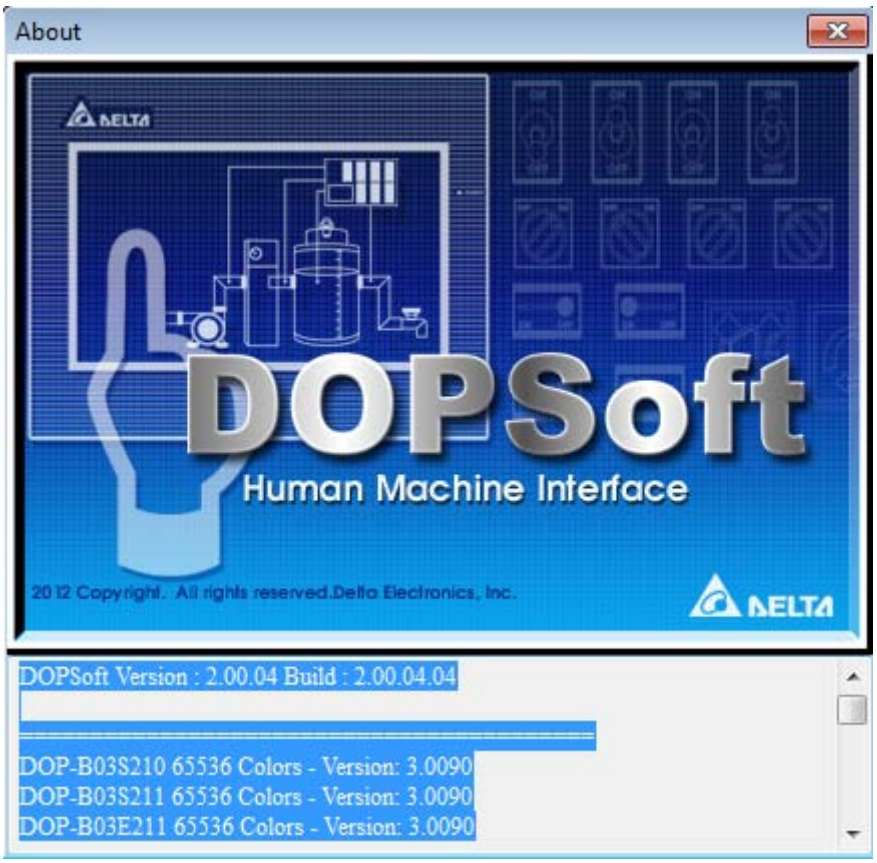


Figure 2-2-10-2 Information of software and firmware versions

2-2-11 How to Create a Project

After all the above descriptions, the user must have basic understandings of this software. Described in the following will be a simple example on how to create a new project.

2-2-11-1 Flowchart of Creating Project

Please see the flowchart below, which contains the basic steps of creating a new project.

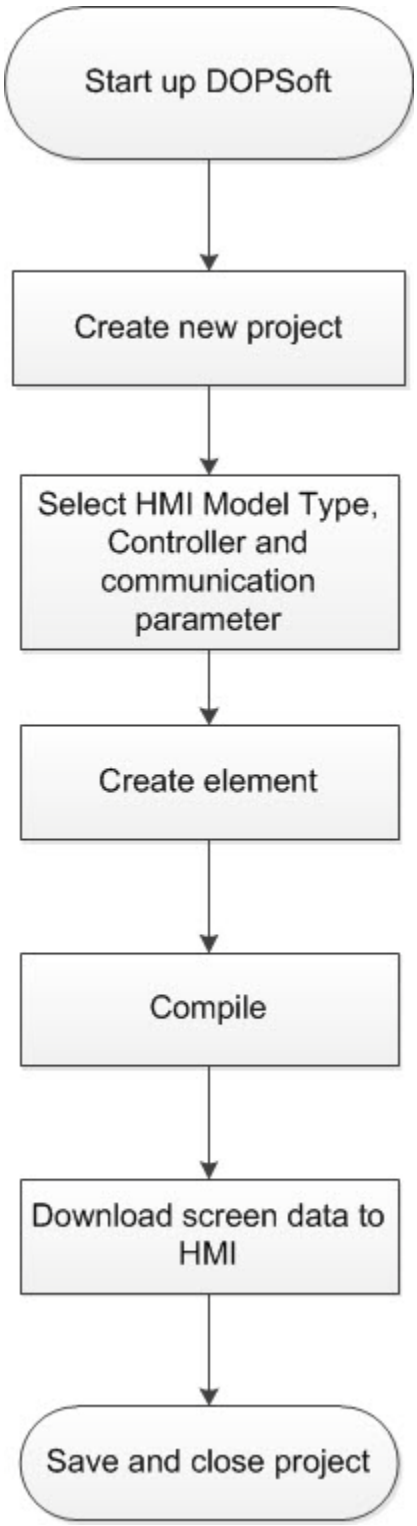
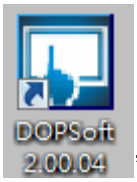


Figure 2-2-11-1 Flowchart of creating a project

In the last section, the process has been described through the flowchart starting from how to create a new project to end the project. In the following, the operation and setup of each step in the flowchart will be described below.

Open DOPSoft

1. Please click in the Desktop on the“ 

”icon or clock [Start]→ [All Programs]→ [Delta Industrial Automation]→ [HMI]→ [DOPSoft 1.00.xx]to execute DOPSoft 1.00.xx program.

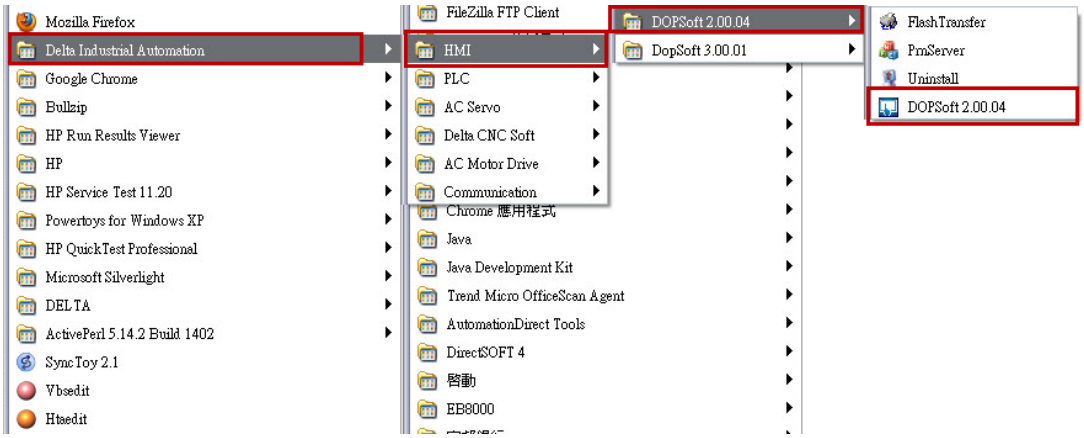


Figure 2-2-11-2 Open DOPSoft

2. After DOPSoft1.00.00 program is executed, the following screen will be displayed.

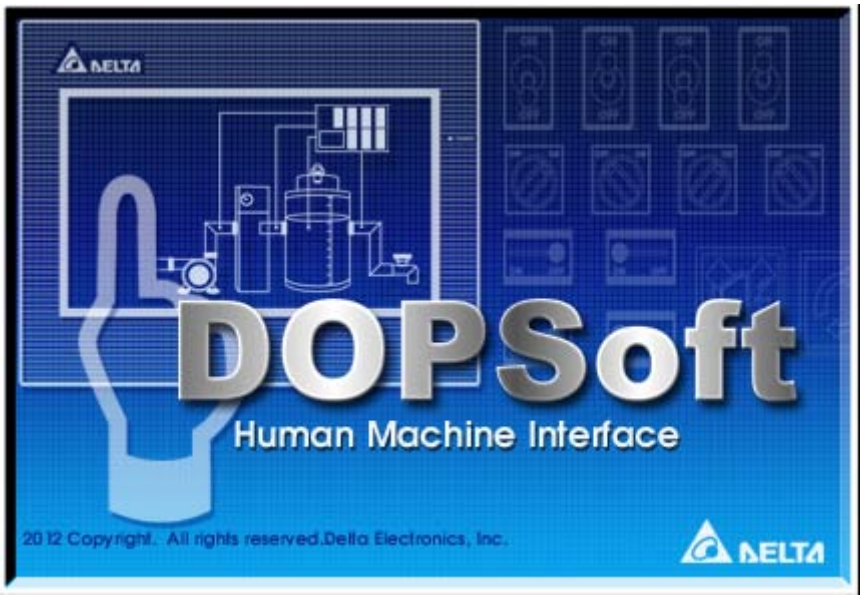


Figure 2-2-11-3 Screen displayed by DOPSoft

Create a new project

3. Once DOPSoft is started successfully, the following window will appear. Please click the Add Project icon“
”or select [File]→ [New]to create a new project.

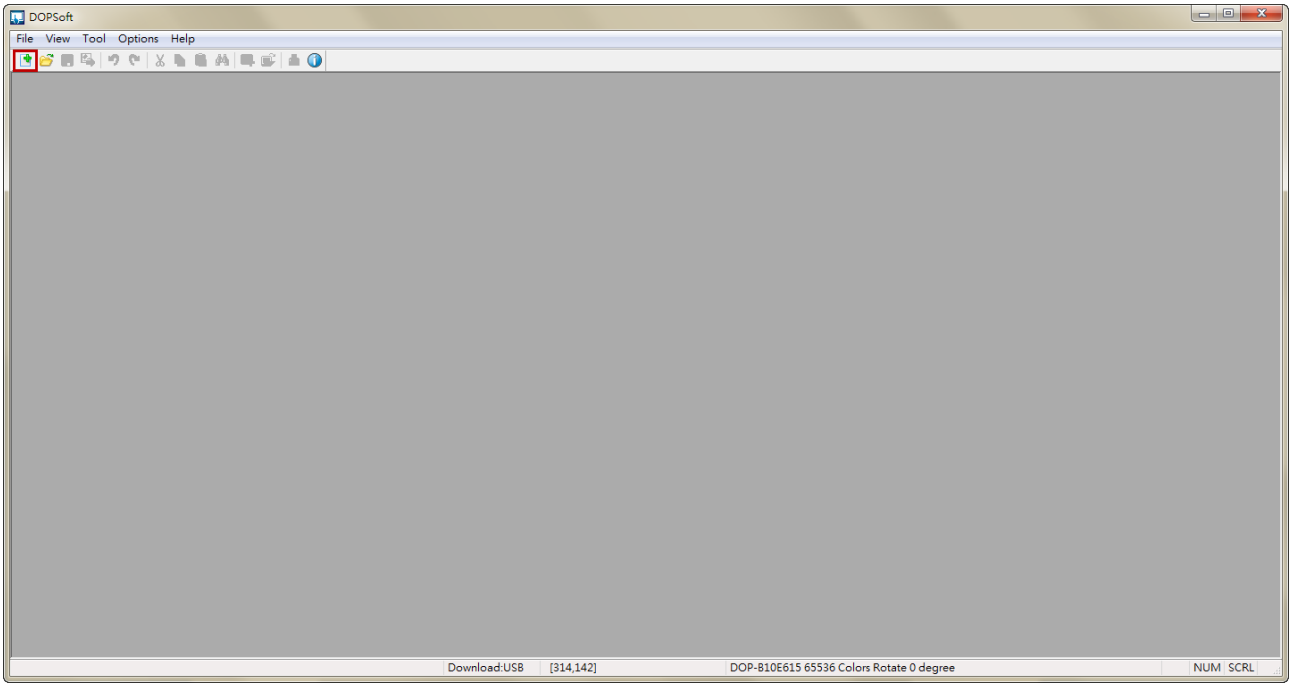


Figure 2-2-11-4 Clock the icon to create a new project

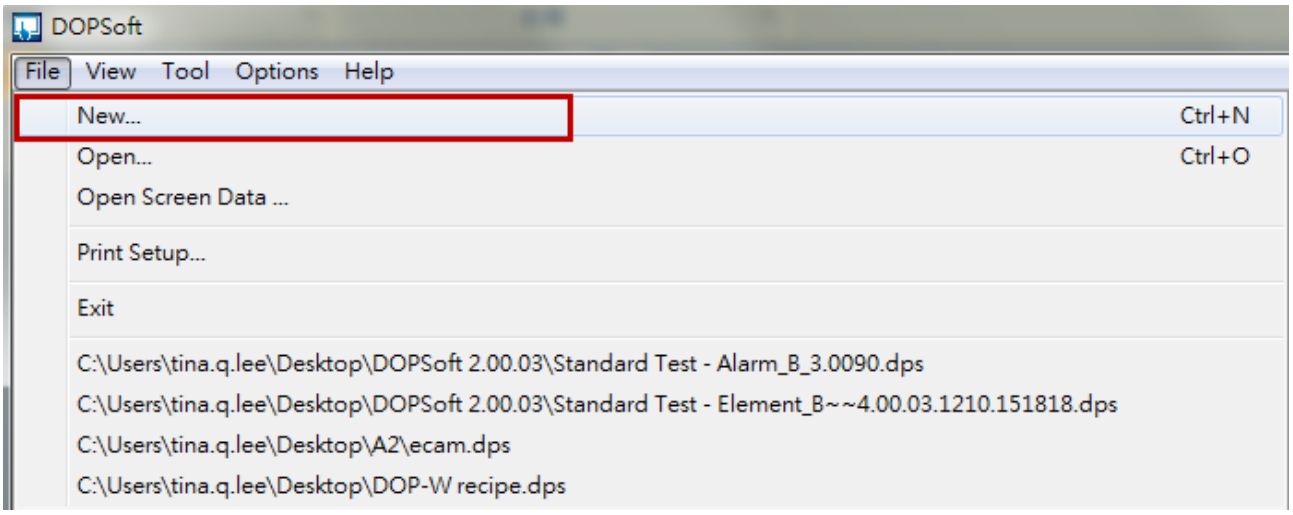


Figure 2-2-11-5 Click “New: to create a new project

Choose HMI model, controller and communication format

4. After the new project is created, the Project Wizard will appear to guide the user through the selections of HMI model, controller, and communication format. In the following example, model 『**B10E615**』 is selected and the associated project is named 『**test**』.

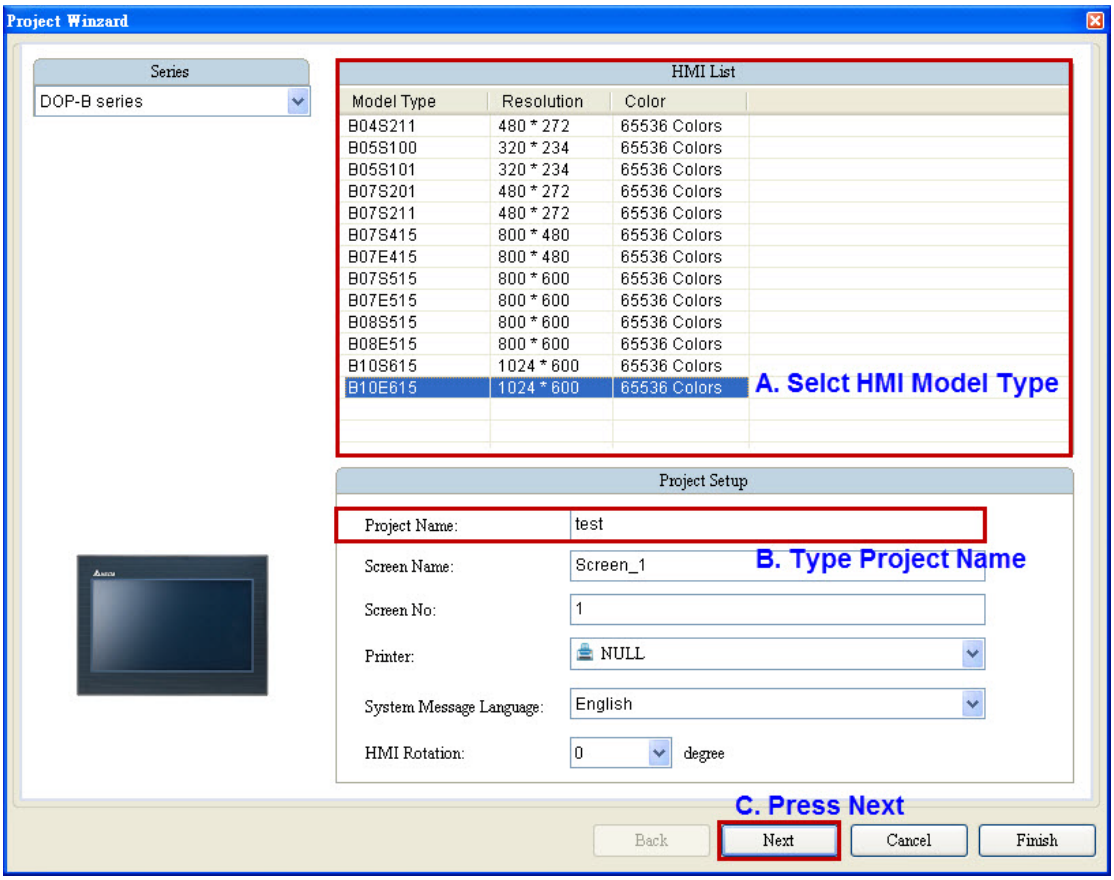


Figure 2-2-11-6 Select HMI model and enter project name

5. Next, please select COM port, controller, and communication format. The user can use the Up/Down arrows on the upper-left corner to move COM 1, COM 2, or COM 3 for use. Please see 2-2-8-2 Communication Setting for details. In the following example, 『**COM 2**』 is selected and controller is 『**Delta DVP Q-Link**』.

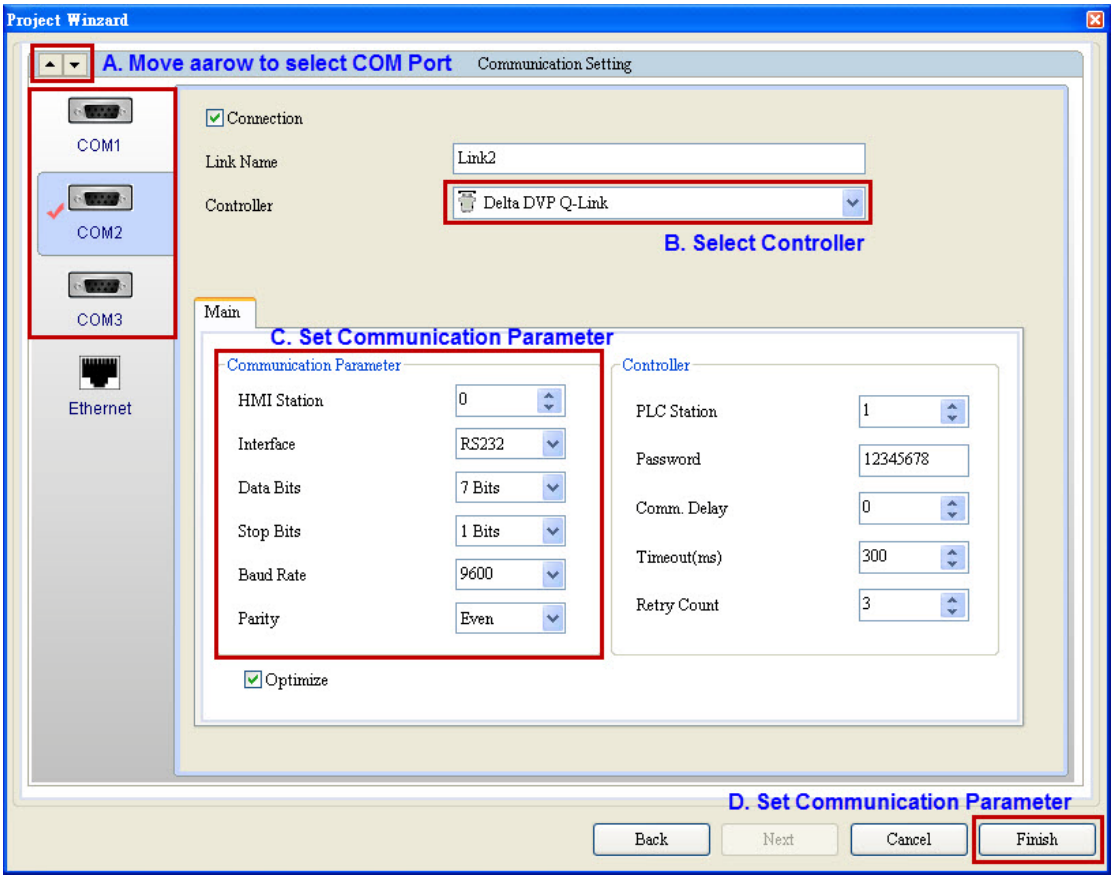


Figure 2-2-11-7 Select COM port, controller, and communication format.

Create Element

6. Once the Project Wizard is completed, a new project is created. Now one can start screen editing and element creation.

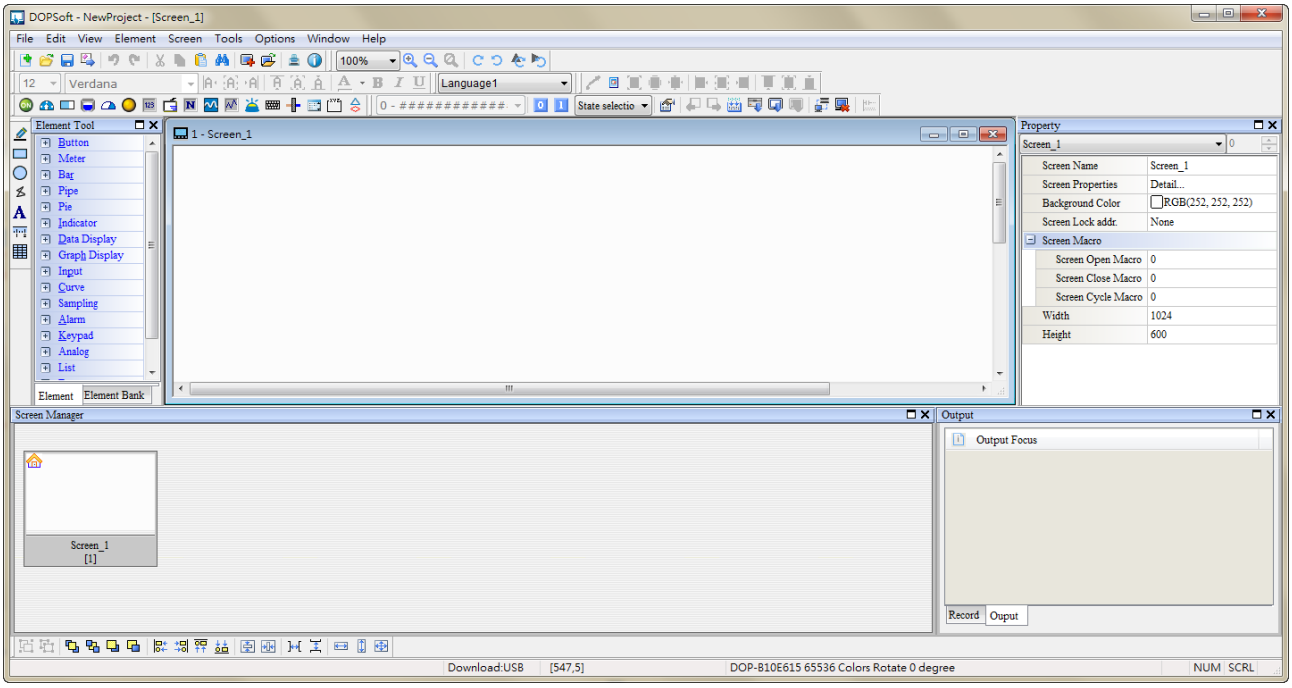
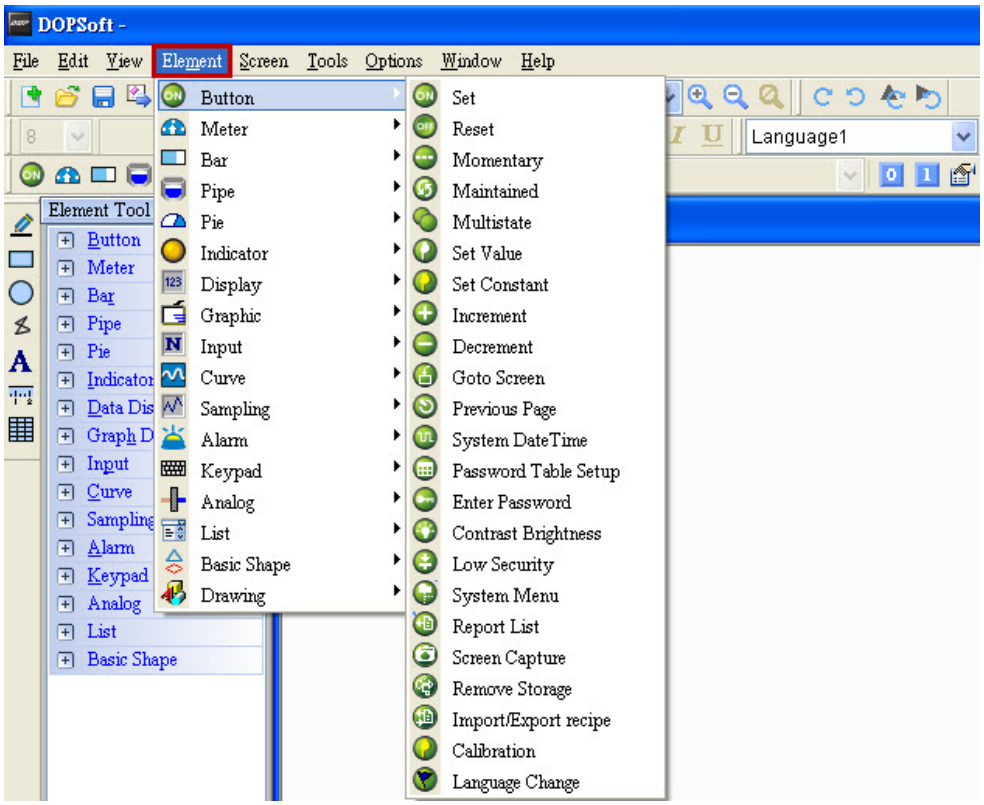


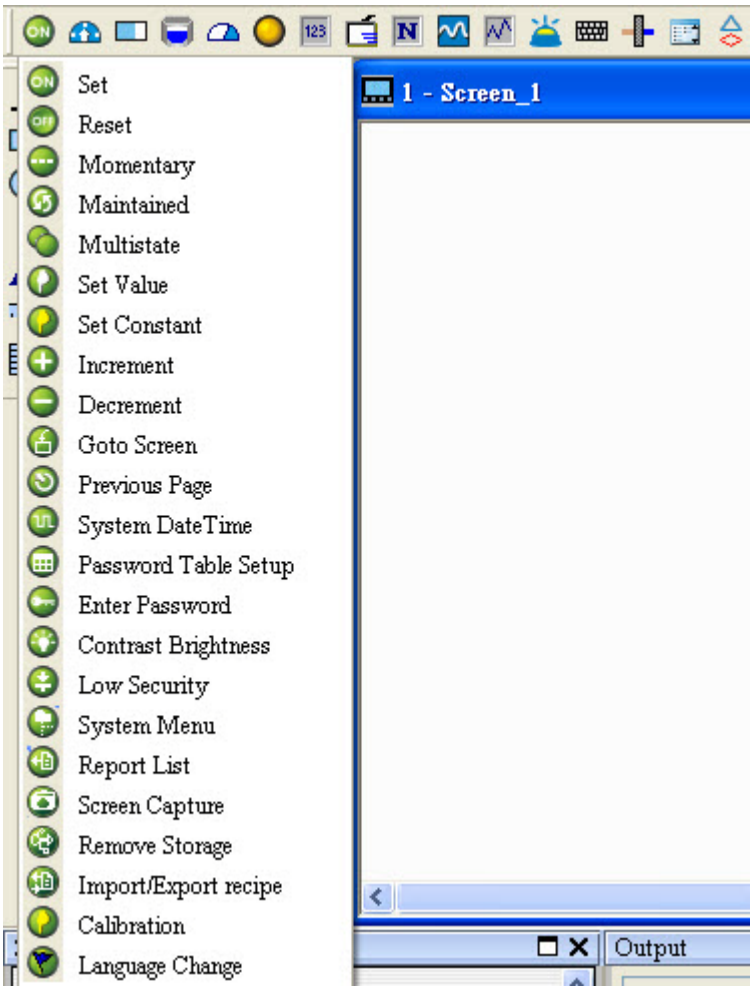
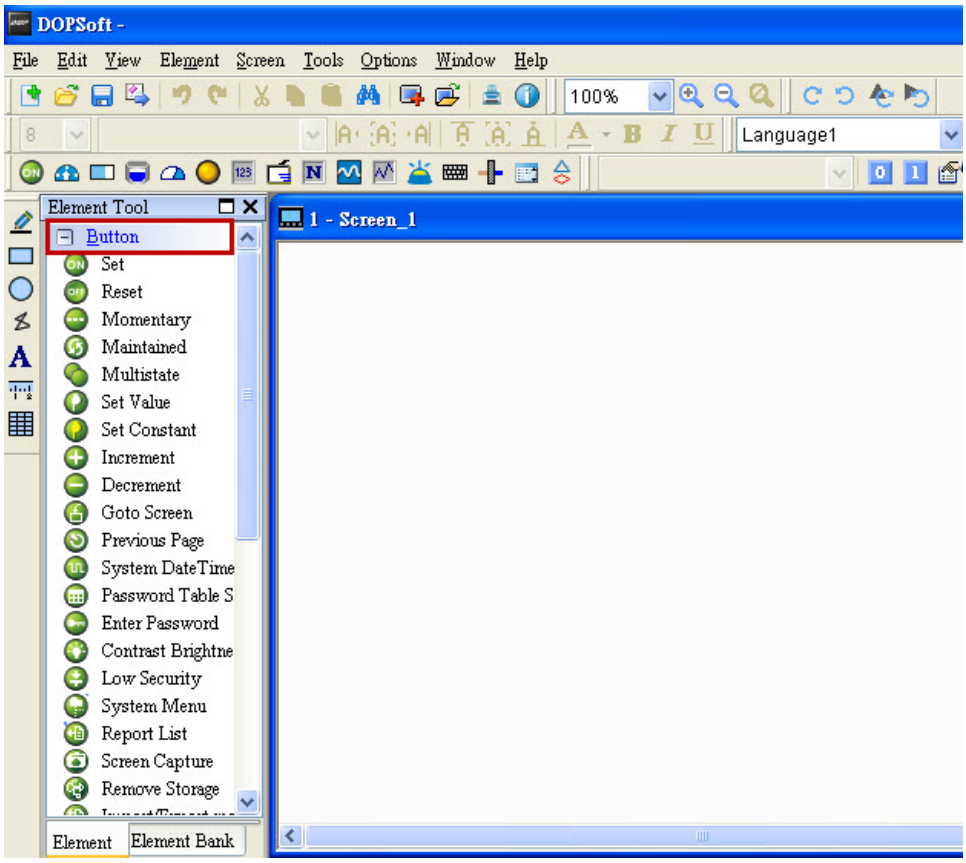
Figure 2-2-11-8 Edit

The following example is a simple demonstration through [Element]→ [Button]→ [**Set to ON**], [**Set to OFF**], [**Momentary**] and [**Maintained**] combined with [Element]→ [Indicator]→ [**Multistate Indicator**].

The software offers four methods for the user to create elements, which allow the user to choose as preferred.

Please see Table 2-2-11-1 below for detailed descriptions.

Menu	

Element Toolbar	
Element Window	

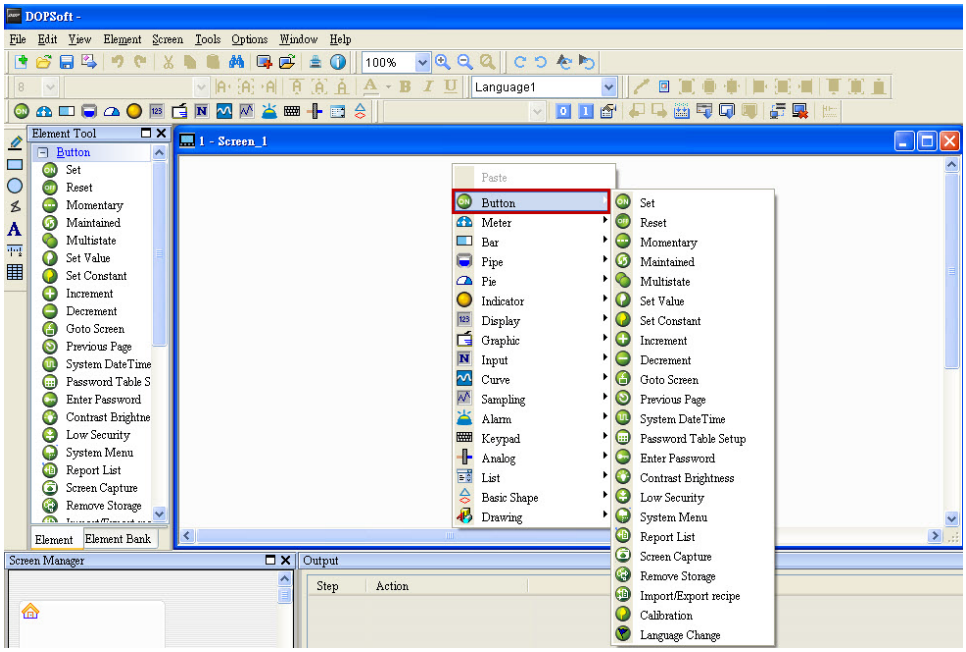
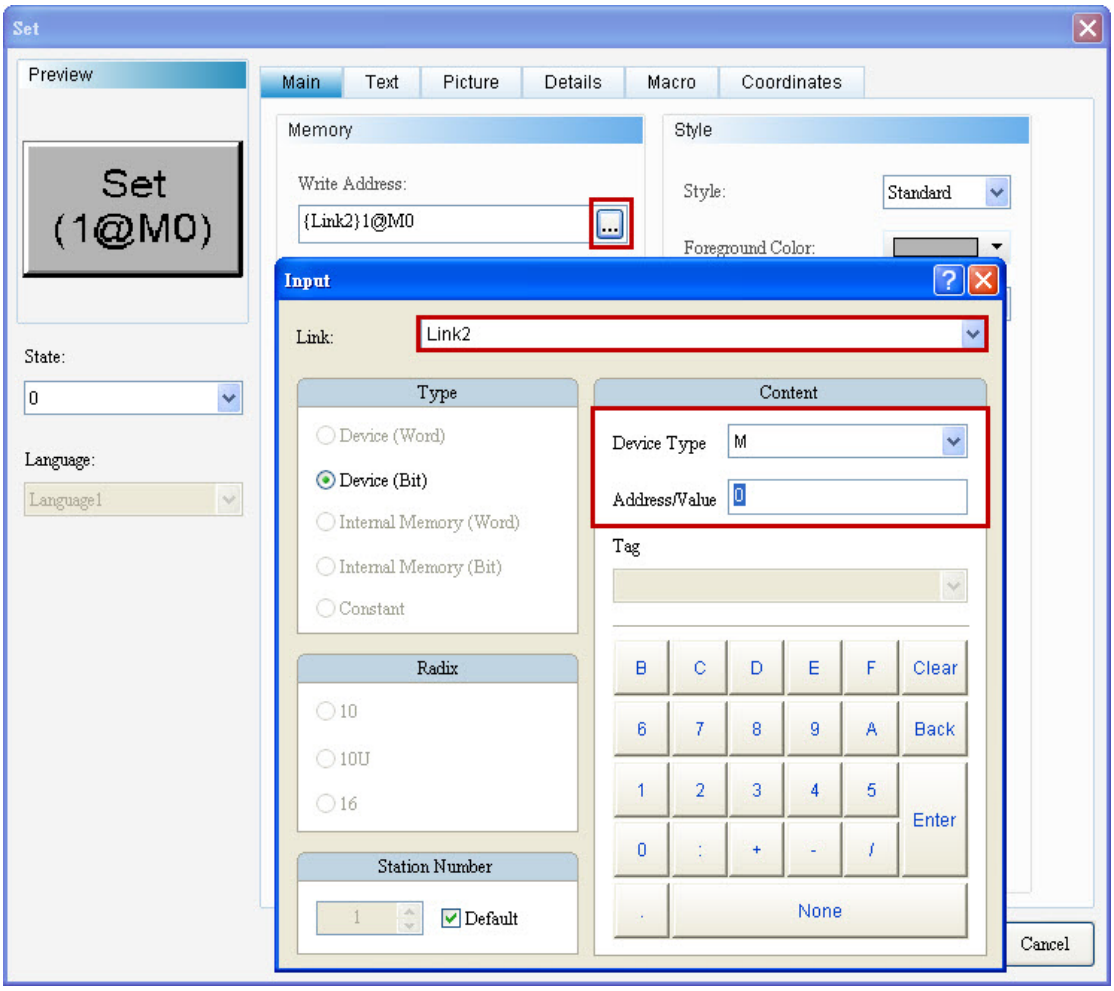
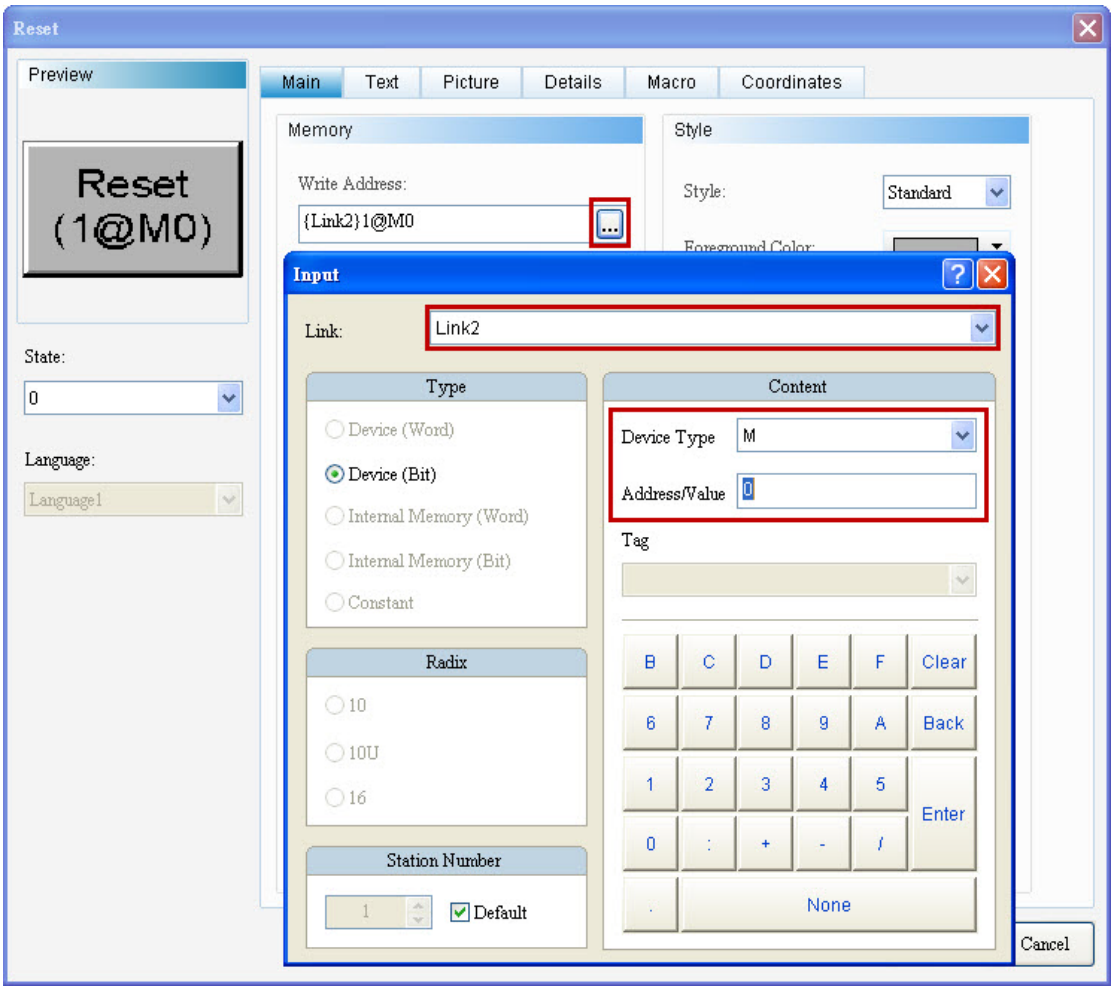
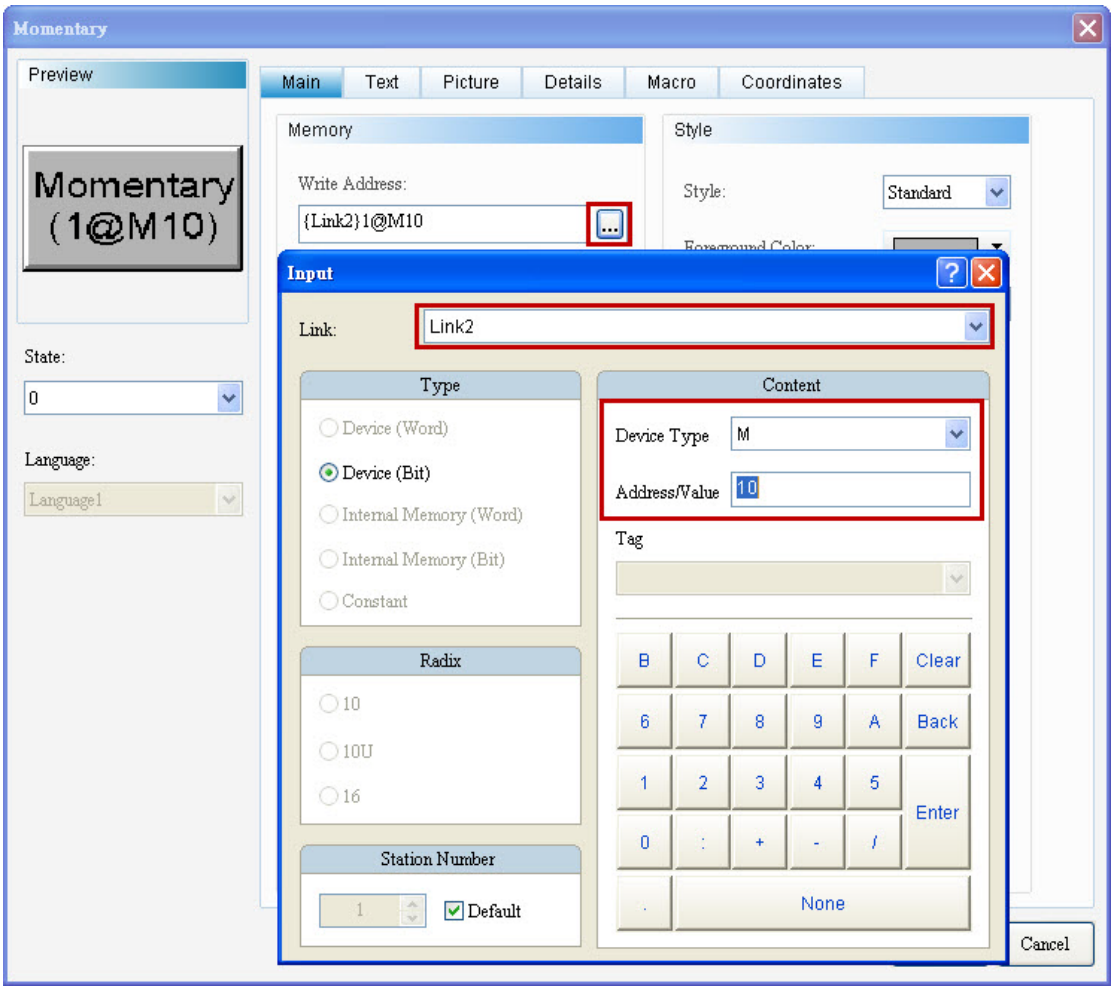
Click Right Button of Mouse in Edit Screen	

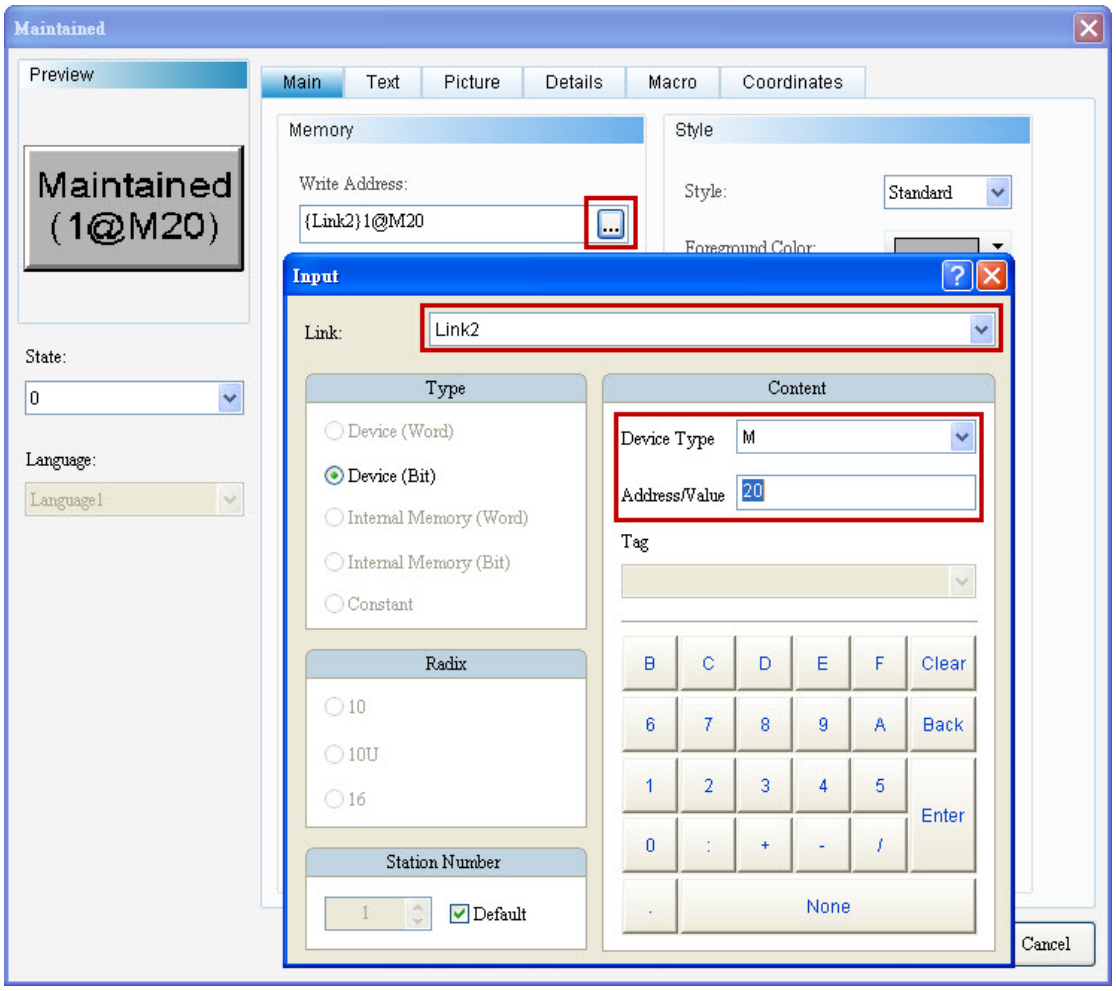
Table 2-2-11-1Method to create elements.

7. In the example, Menu is used to create properties of the button element in Set ON, Set Off, Momentary, Maintained, and Multistate Indicator of the Indicator element. Once the element is created, the associated memory address needs to be entered to enable the element actions. In order for the user to understand the functions of the element, the corresponding texts and memory addresses of all created elements are entered. Please see Table 2-2-11-2 below for the steps of creating elements.

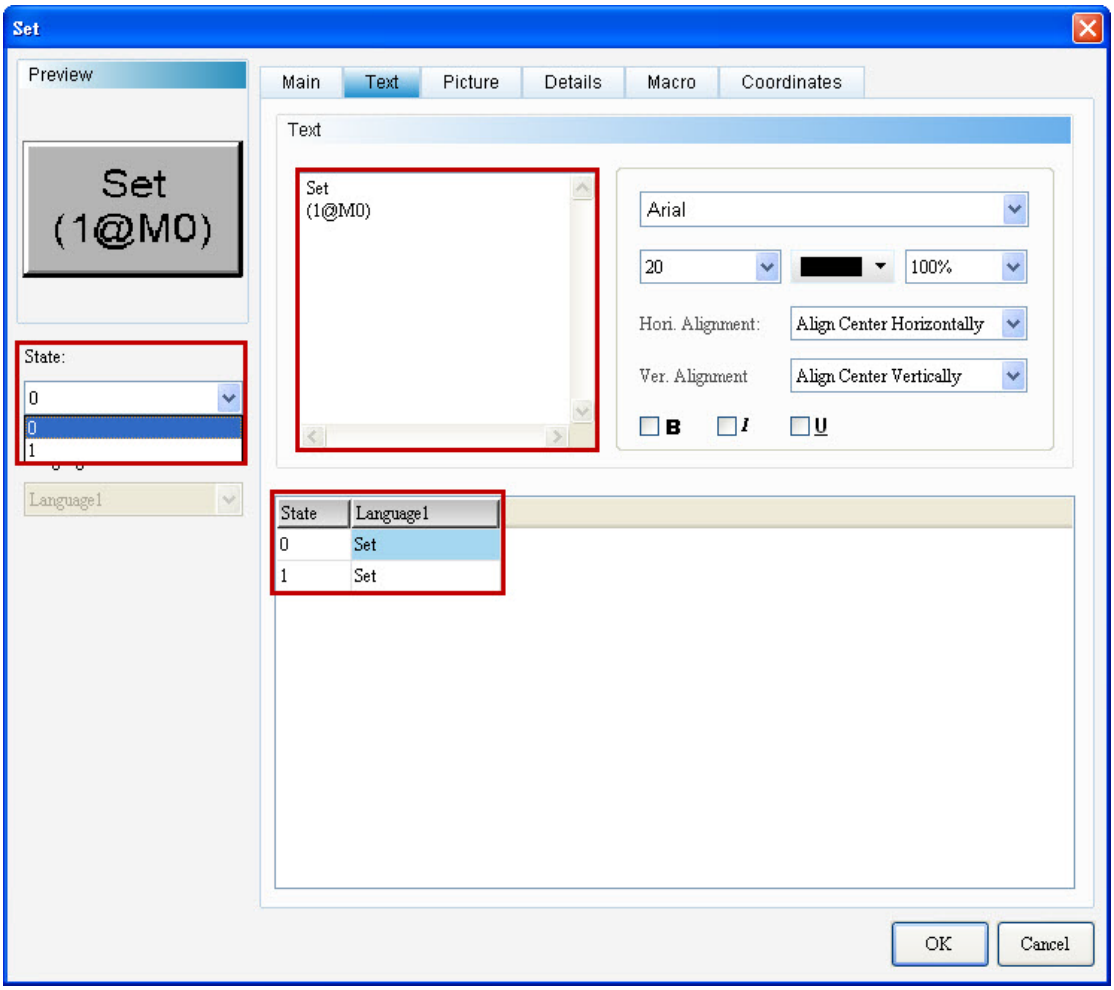
Description of Steps of Creating Elements Table 2-2-11-2 Steps of Creating Elements	
Step1	➢ Select [Element]→ [Button]→choose [Set ON], [Set OFF], [Maintained], and [Momentary]elements. ➢ Please double click the element or select it and use the Property Window to set the memory address, where write addresses of [Set ON]and [Set OFF]are **M0,** the write address of [Maintained] is **M10**, and that of [MomentaryButton]is **M20**. 


Reset
Preview
Reset
(1@M0)
State:
0
Language:
Language1
Main
Text
Picture
Details
Macro
Coordinates
Memory
Write Address:
{Link2}1@M0
Style
Style:
Standard
Input
Link:
Link2
Type
Device (Word)
Device (Bit)
Internal Memory (Word)
Internal Memory (Bit)
Constant
Content
Device Type
M
Address/Value
0
Tag
Radix
10
10U
16
B
C
D
E
F
Clear
6
7
8
9
A
Back
1
2
3
4
5
Enter
0
:
+
-
/
.
None
Station Number
1
Default
Cancel

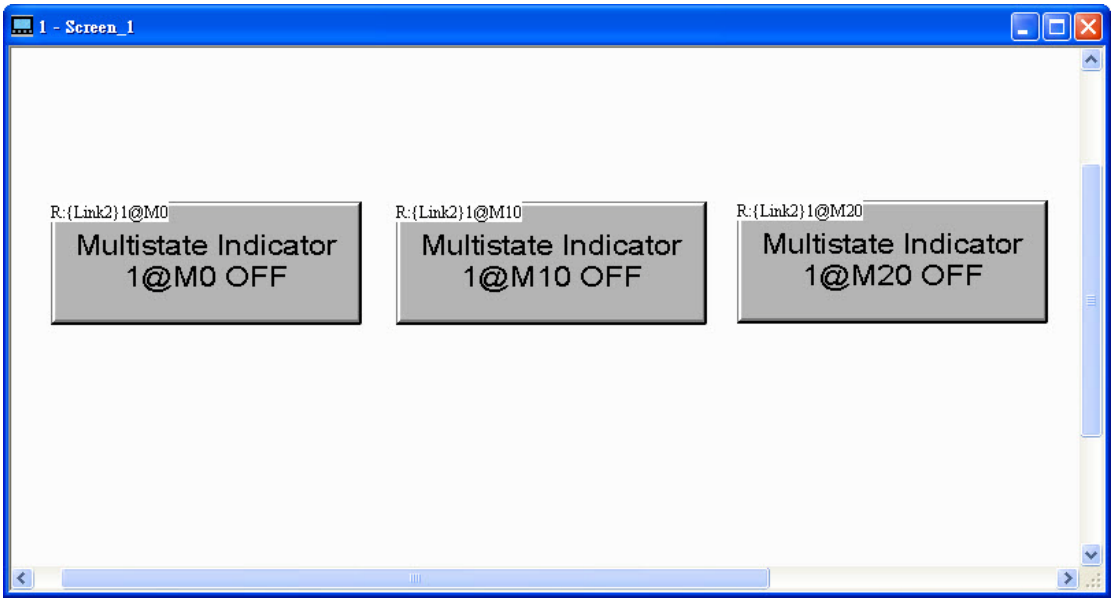

Momentary
Preview
Momentary
(1@M10)
State:
0
Language:
Language1
Main
Text
Picture
Details
Macro
Coordinates
Memory
Write Address:
{Link2}1@M10
Style
Style:
Standard
Input
Link:
Link2
Type
Device (Word)
Device (Bit)
Internal Memory (Word)
Internal Memory (Bit)
Constant
Content
Device Type
M
Address/Value
10
Tag
Radix
10
10U
16
Station Number
1
Default
B
C
D
E
F
Clear
6
7
8
9
A
Back
1
2
3
4
5
Enter
0
:
+
-
/
.
None
Cancel



➢ After double clicking on the element, enter the corresponding texts in the Content tab. The [Set ON] button is set to input **Set ON (1@M0)** for both State0 and State1; the [Set OFF]button is set to input **Set OFF (1@M0)** for both State0 and State1; the [Maintained]button is set to input **Maintained (1@M10)**for both State0 and State1; the [Momentary] button is set to input **Momentary (1@M20)**State0 and State1.

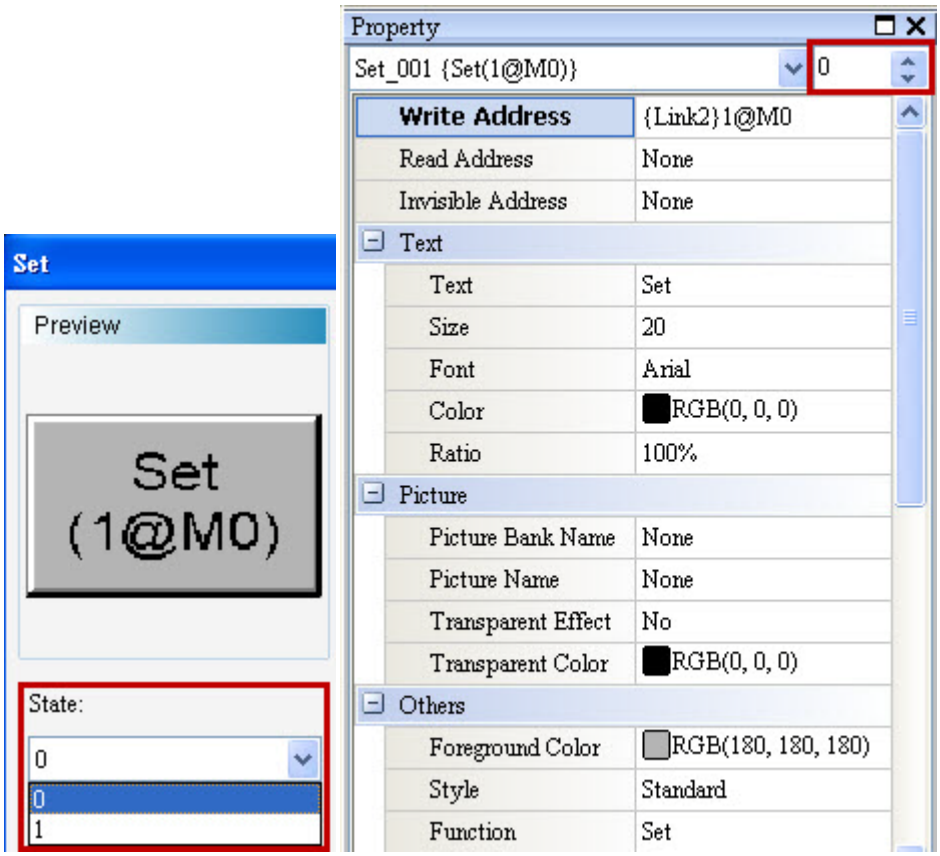


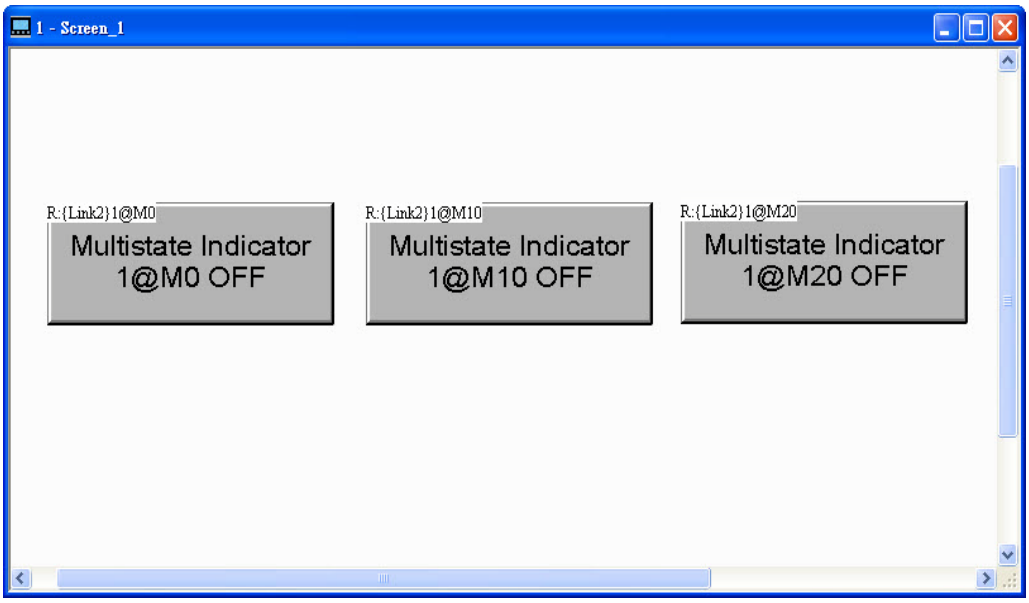
➢ Once the Set ON, Set OFF, Maintained, and Momentary elements are created, the figure below will be displayed.



NOTE:

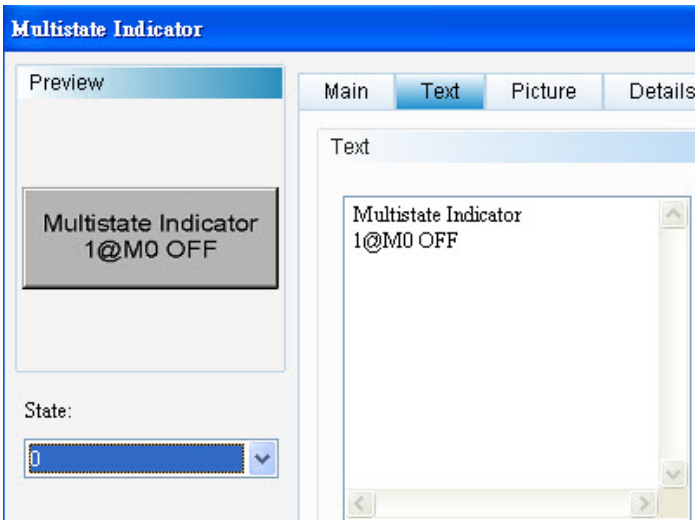
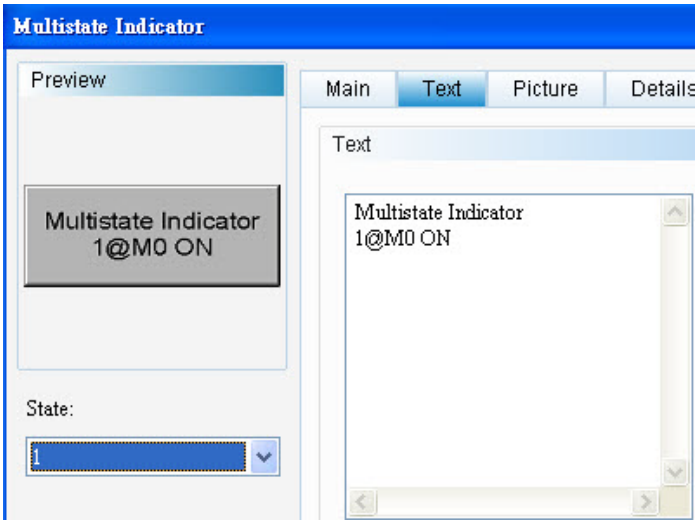
✓ Set ON, Set OFF, Maintained, Momentary all have states 0 and 1, on which the user can double click to enter the setup of State 0 and State 1 or check if it's State 0 or State 1 using the upper-right corner of the

	Property Window. 
Step2	➢ Click [Element]→ [Indicator]→select [Multistate Indicator]element. Please create **<u>three Multistate Indicator</u>** elements that correspond to the write addresses of Set ON/Set OFF, Maintained, and Momentary. ➢ Please double click the element or select the element, use the Property Window on the right to set the memory address. The setup method of memory is the same as that for the button element. 1. Set the write address of [Multistate Indicator] to be **<u>M0</u>** to correspond to Set ON and Set OFF. 2. Set the read address of [Multistate Indicator] to be **<u>M10</u>** to correspond to Maintained. 3. Set the read address of [Multistate Indicator] to be **<u>M20</u>** to correspond to Momentary.

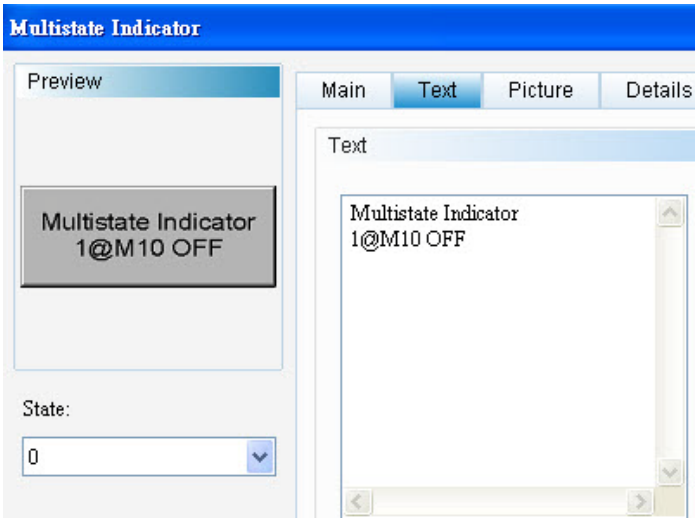
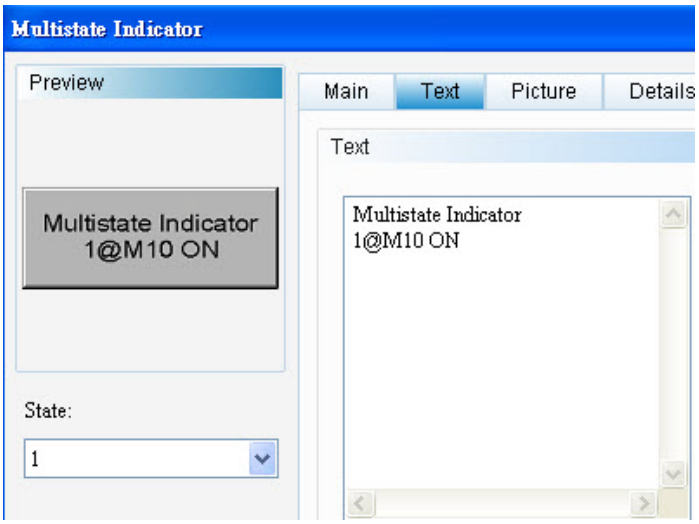


➢ After double clicking the element, enter the corresponding texts in the [Content] tab.

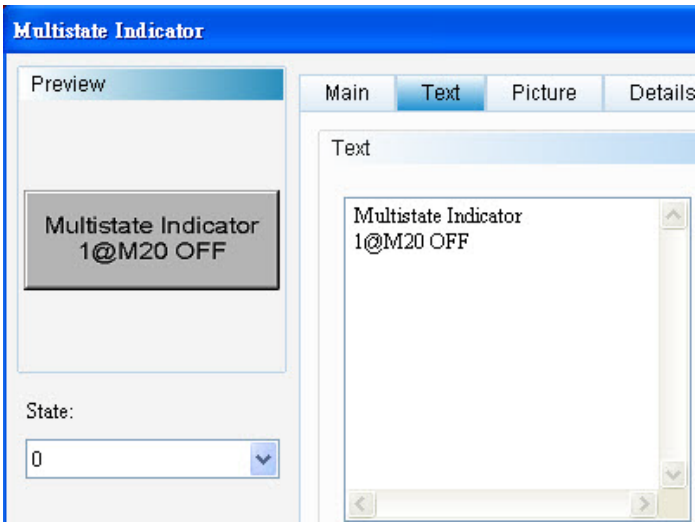
1. Enter **Multistate Indicator (1@M0) OFF** for State0 and **Multistate Indicator (1@M0) ON** for State1.

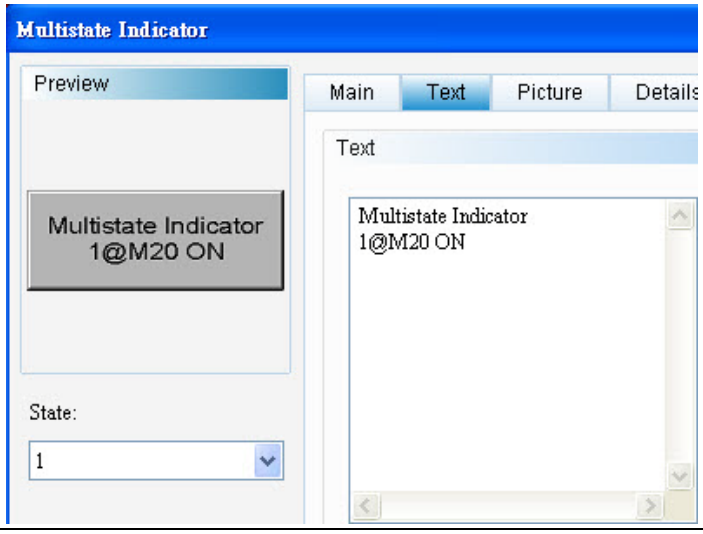
State 0	
State 1	

2. Enter **Multistate Indicator (1@M10) OFF** for State0 and **Multistate Indicator (1@M10)ON** for State1.

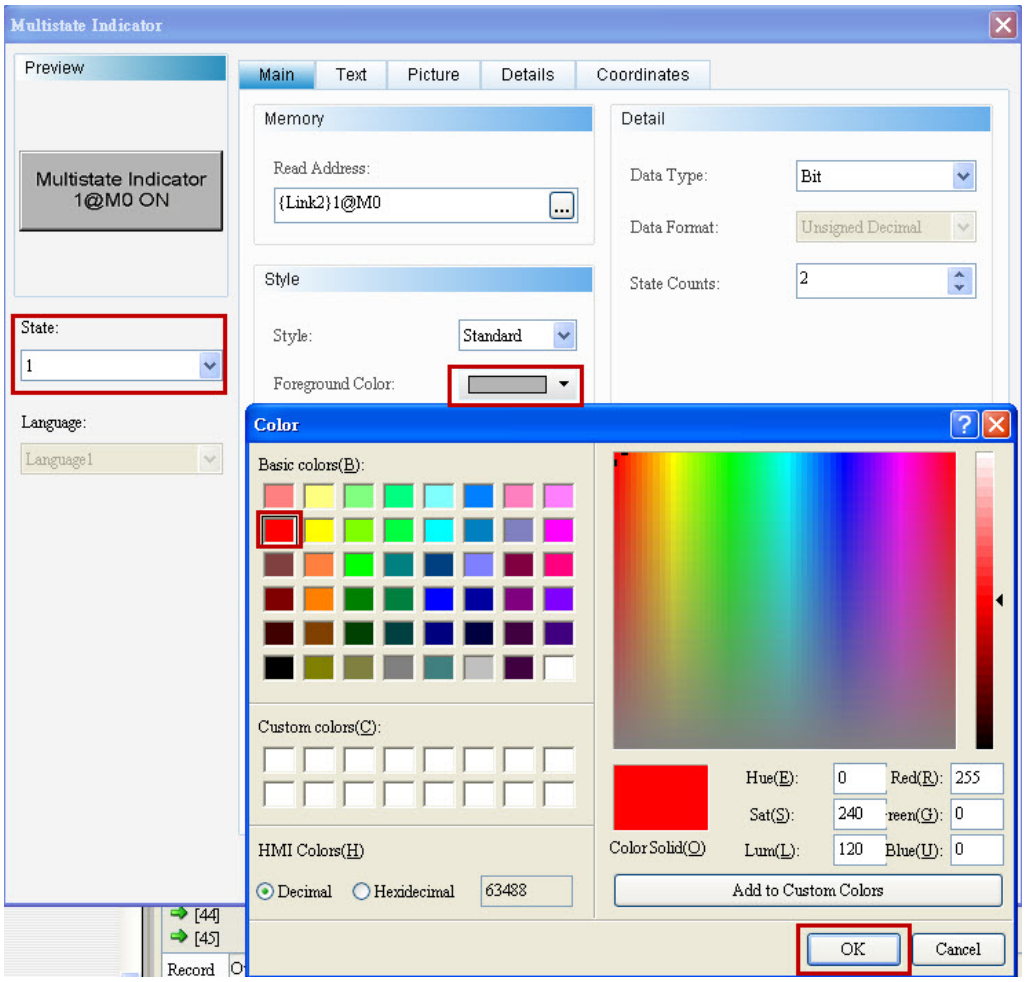
State 0	
State 1	

3. Enter **Multistate Indicator (1@M20) OFF** for State0 and **Multistate Indicator (1@M20) ON** for State1.

State 0	

State 1		

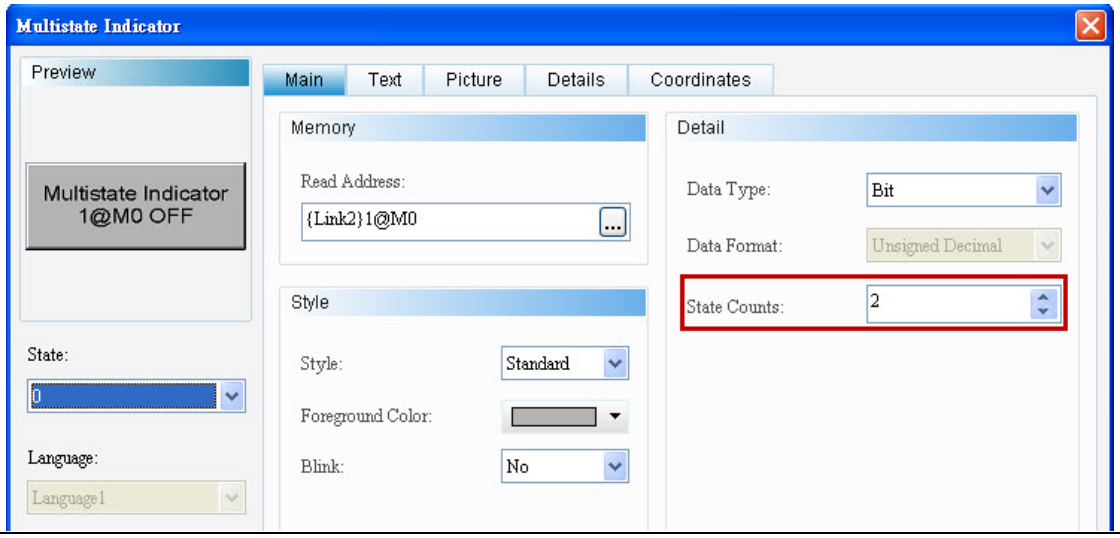
➢ Please double click the three Multistate Indicator elements and enter [Main] tab to change the [Foreground Color] for State1 to **Red** to differentiate between State0and State1.



NOTE:

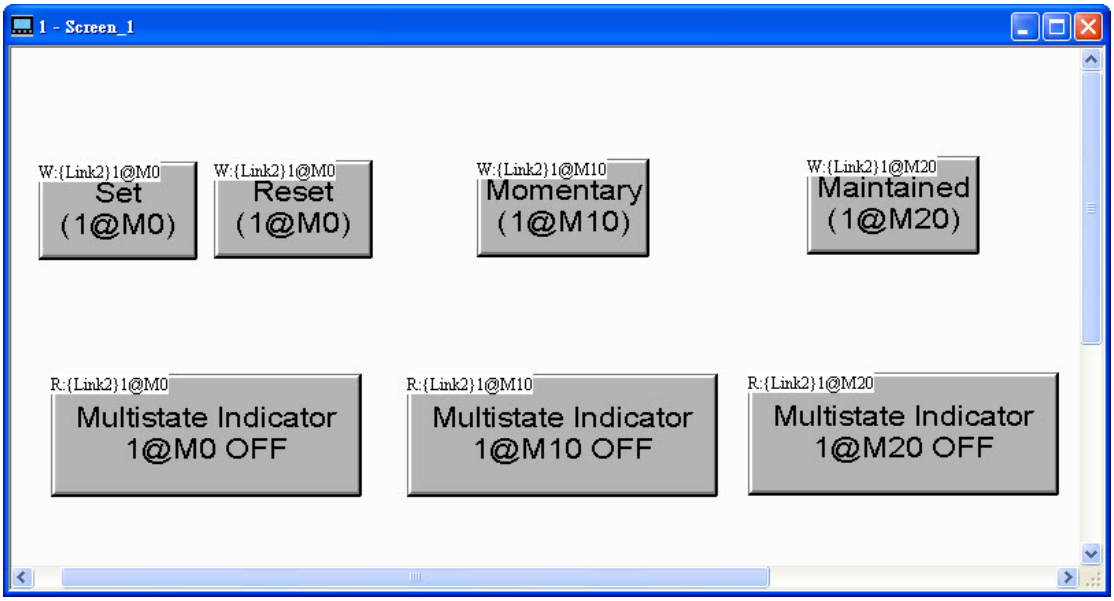
✓ The state value of Multistate Indicator will vary with the total number of states. Two states are available for Set ON, Set OFF, Maintained, and Momentary (State0 and State1). The user can double click the element

to access [State Counts] in the setup of General tab.



Step3

➢ After the element is created, the figure below will be displayed.



Compile

8. To complete the creation of all elements, please compile the elements on the screen to check for any errors. Compile is used to check if the correct memory format is used and correct address is entered. Two options are available for compiling as shown below:

◆ Compiling can be done through [Tools]→ [Rebuild All].

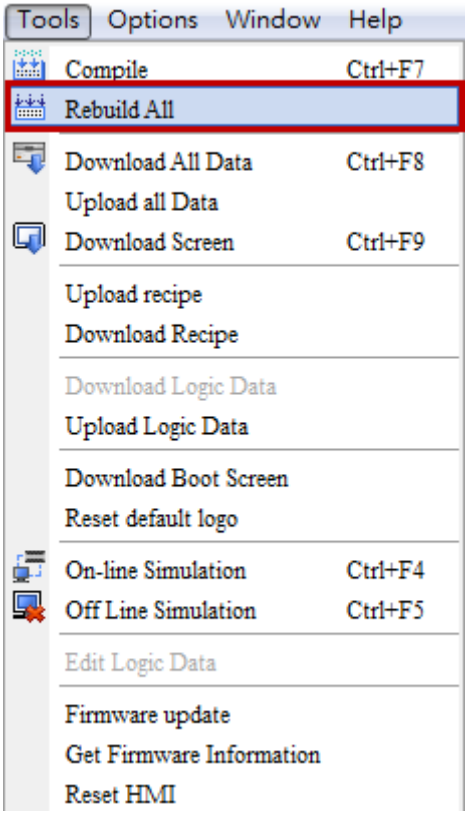


Figure 2-2-11-9 Rebuild All

◆ Use the Rebuild All icon 『 』 in the Layout bar

After compiling, the output message will be displayed, as shown in Figure 2-2-11-10 below.

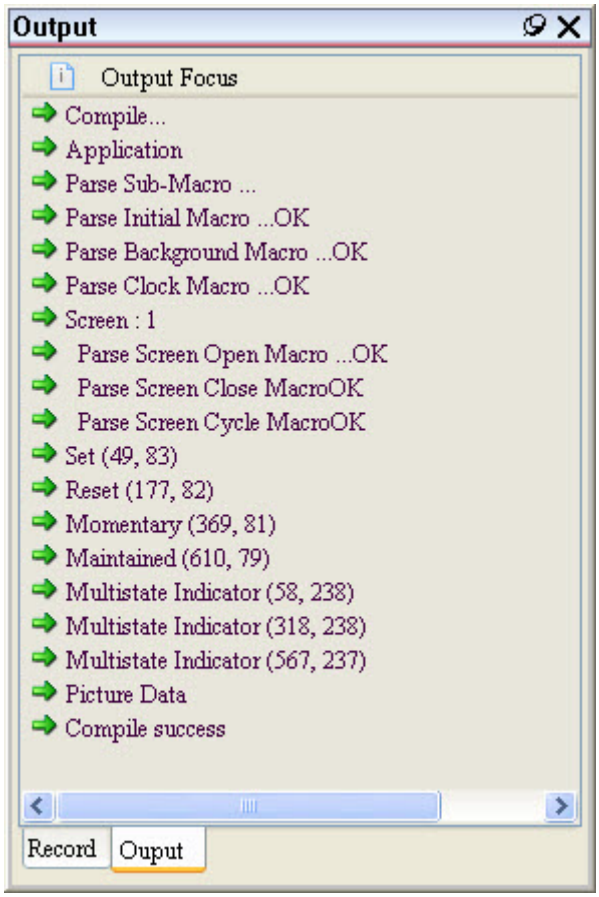


Figure 2-2-11-10 Compile Output

Download Screen Data to HMI

9. When compiling is successful, it means the screen layout created by the user is free of error. Now user can execute Download Screen Data to HMI. There are three ways to download screen data as described below:

◆ One way is through [Tools]→ [Download All Data]in Menu.

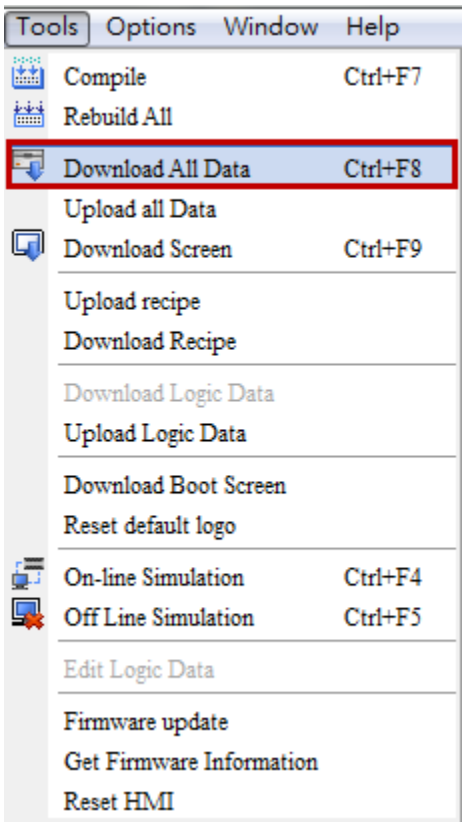


Figure 2-2-11-11 Option of Download All Data in Menu

◆ The other way is to use the Download Screen Data icon“ ”in the Layout bar

◆ The third way is to use the system hotkey『Ctrl + F8』.

Before executing downloading screen data, please verify that HMI has been connected with the computer through a USB cable and the PLC cable is connected to COM 2.

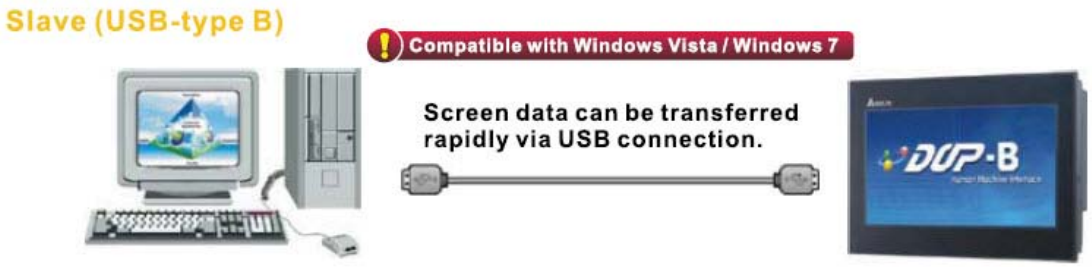


Figure 2-2-11-12 USB transmission interface

Upon verification, the screen data can be downloaded to HMI. And the software will display the download progress, as shown in the figure below.

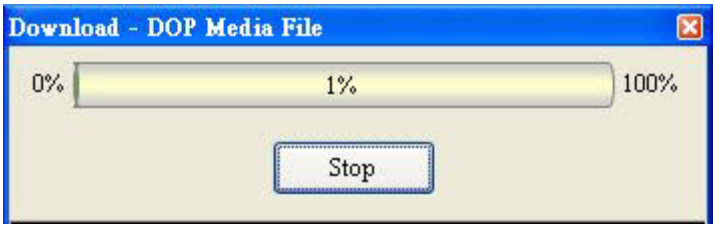
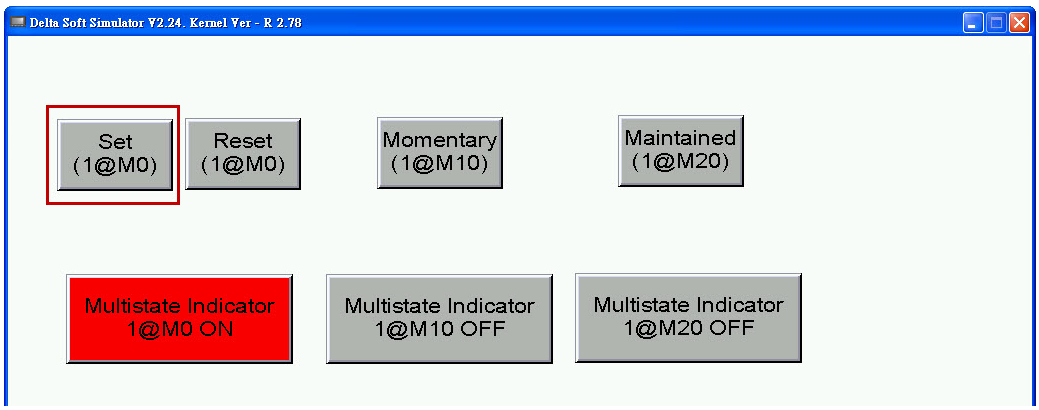
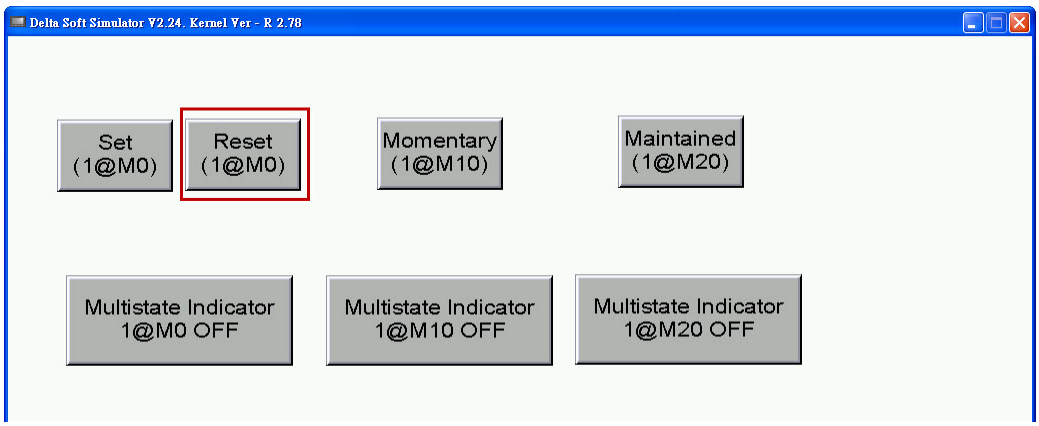
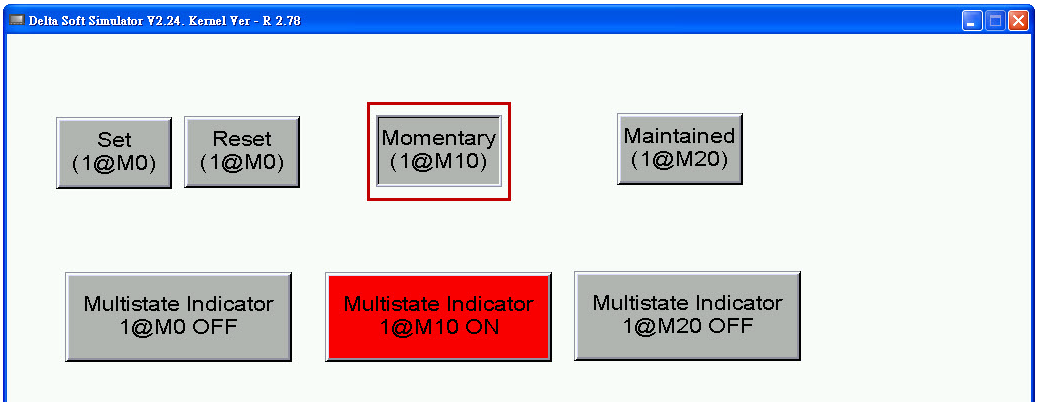
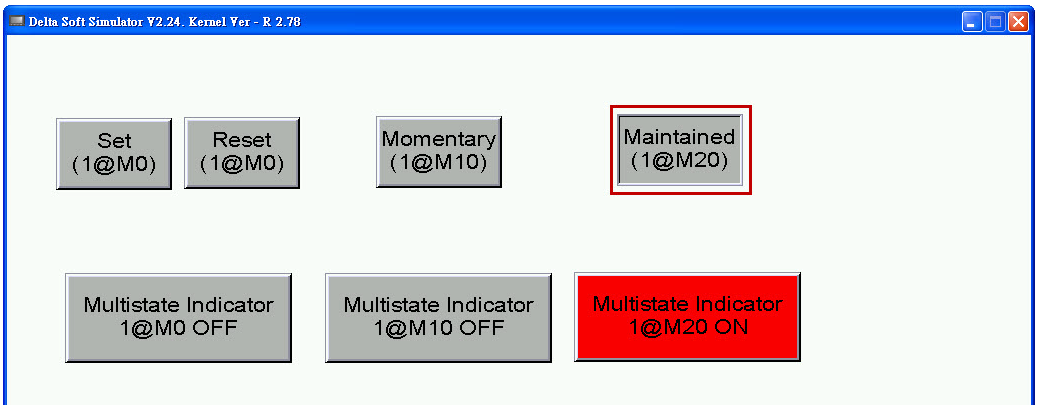


Figure 2-2-11-13 Downloading screen data

10. After screen data download is completed, one can check the screen at the HMI end to see if it is the same as that being edited at the computer end and if there is any error.
11. Description of execution.

Operation Table 2-2-11-3 Description of Actions	
Touch Button	**Result**
Set ON	➢ Touch Set ON button and one will find that when Set ON is pressed, Multistate Indicator1@M0 will display ON. 
Set OFF	➢ Touch Set OFF button, Multistate Indicator1@M0 will display OFF. 
Momentary	➢ Touch Maintained button, Multistate Indicator1@M10 will display ON. However, when the finger leaves the Maintained button, Multistate Indicator1@M10 will display OFF.

	
Maintained	➢ Touch the Momentary button, Multistate Indicator1@M20 will constantly display ON. Touch the Momentary button to cancel the ON state. 

Save and Close Project

12. Before closing the project, please save the screen that was being edited. There are three ways to save the project, which are described below:

◆ The first way is through [File]→ [Save]in Menu.

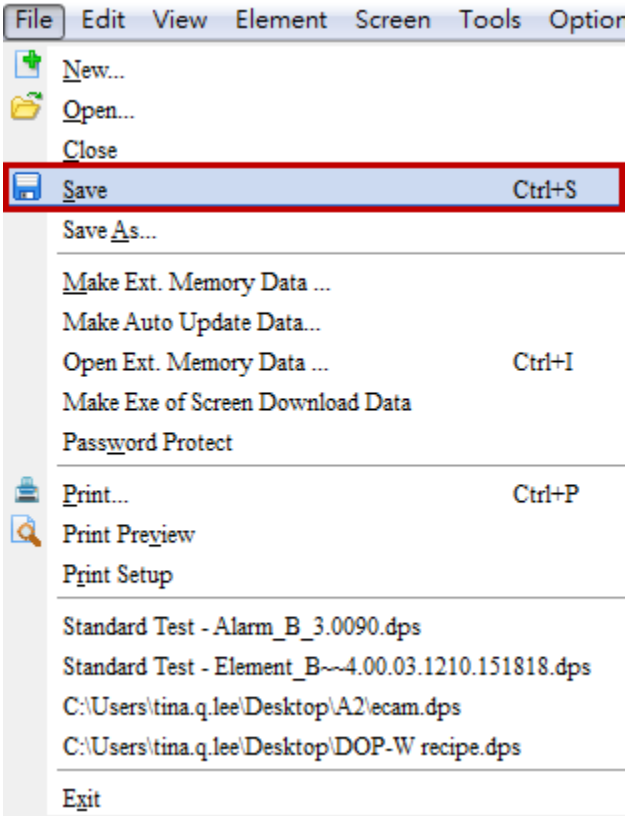


Figure 2-2-11-14 Option of Save in Menu

- The second way is to use the Save icon“ ”in Standard bar

.

- The third way is to use the system hotkey ”Ctrl + S”.

After the project is saved, the software will pop up a window that asks the user to choose where to save the project and enter the filename. However, [**test**] is already entered as the project name with the assistance of Project Wizard. When Save is clicked, the filename displayed is test. The user can still change the filename without affecting the project operation.

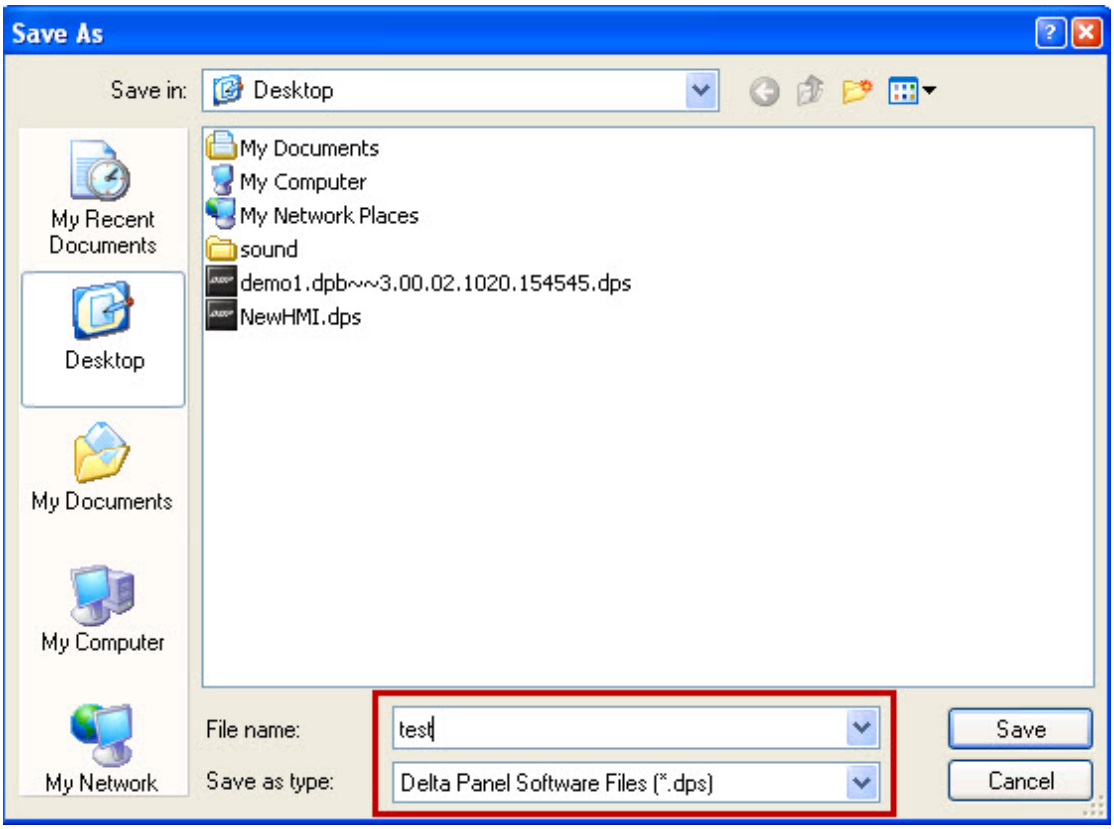


Figure 2-2-11-15 SaveWindow

13. After the project is saved, the user can go to the path where the file is saved to check if the associated project is there. To open the project again, one can double-click the file by mouse, or directly execute DOPSoft, or through [File]→ [Open], as shown in the figure below.

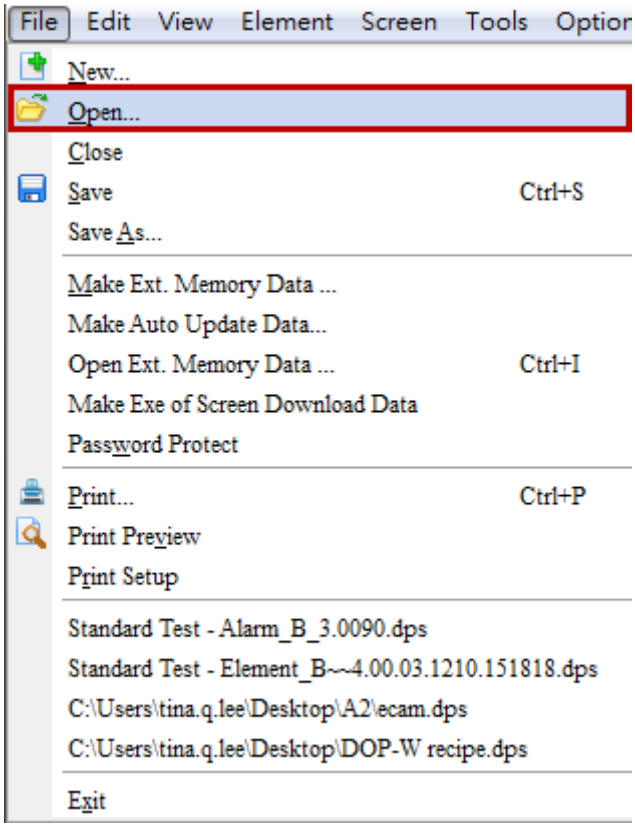


Figure 2-2-11-16 Option of Open in Menu

The existing file can also be opened by using the Open icon“ ”in Standard bar

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Chapter 3 Internal Memory

Delta human-machine provides registers of six different functions, including the internal register ($), the non-volatile internal register ($M), indirect addressing register (*$), recipe register (RCP), recipe number register (RCPNO), and recipe group register (RCPG).
The details of the RCP, RCPNO, and RCPG will be described in Chapter 22 along with the 16-bit and 32-bit recipes.

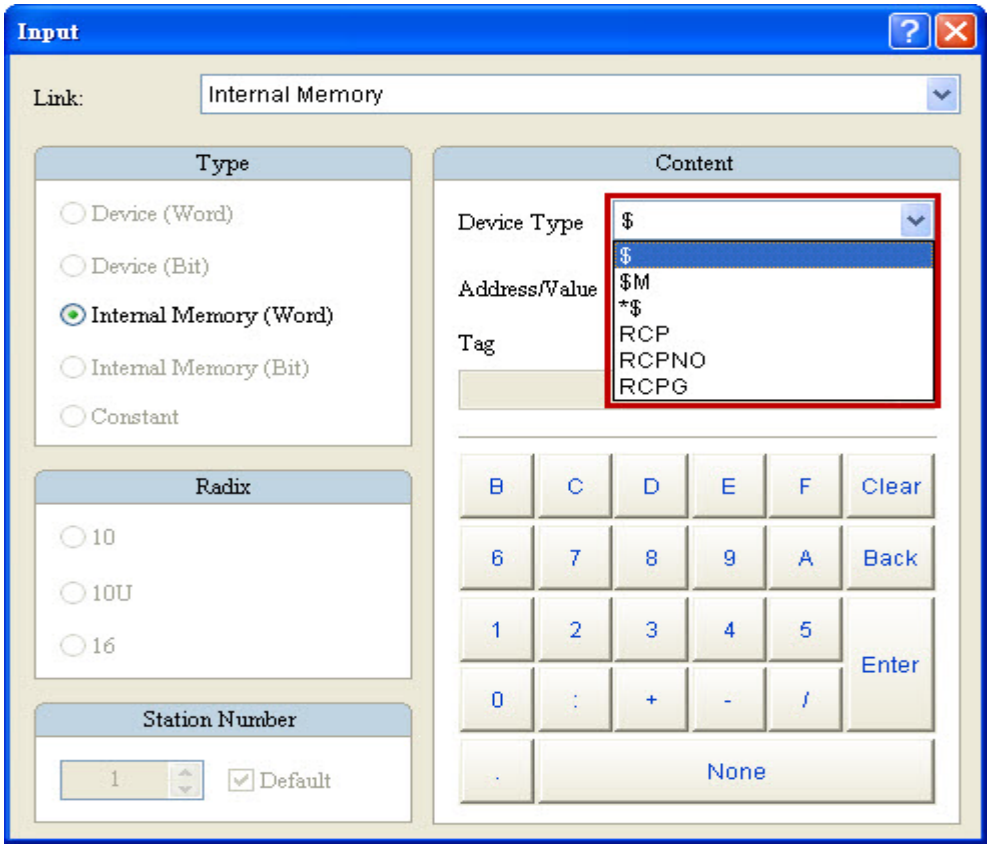


Figure 3-1-1 Internal memory classification

3-1 Internal Register ($)

The internal register is the memory in the human-machine available for free reading and supporting different configurations, such as the element communication address. As the internal register does not support the non-volatile function, when the human-machine is disconnected from the power supply, data in the register cannot be maintained. The human-machine provides a total of 65536 internal registers, each 16-bit.

Access Type	Element Type	Access Range
Word	$n	$0 - $65535
Bit	$n.b	$0.0 - $65535.15
Note: n = Word (0-65535); and b = Bit (0-15)		

Table 3-1-1 Internal Register

3-2 Non-volatile Internal Register ($M)

This type of internal registers provides the non-volatile function. When the human-machine is disconnected from the power supply, data in the register will be maintained. Users can record important value data in this type of internal register. The human-machine provides a total of 1024 non-volatile internal register ($M0.0 - $M1023.15), each being 16-bit.

Access Type	Element Type	Access Range
Word	$Mn	$0 - $1023
Bit	$Mn.b	$0.0 - $1023.15
Note: n = Word (0-1023); b = Bit (0-15).		

Table 3-2-1 Non-volatile internal registers

3-3 Indirect Addressing Register (*$)

The indirect addressing register does not provide the non-volatile function. When the human-machine is disconnected from the power supply, data in the register cannot be maintained.

Access Type	Element Type	Access Range
Word	*$n	$0 - $65535
Note: n = Word (0-65535).		

Table 3-3-1 Indirect Addressing Register

After obtaining the value from $n, the indirect addressing register *$n will use this value as the new address and access the value in this new address. For example, when $10 = 101 and $101 = 55, *$10 = 55, as shown in Figure 3-3-1.

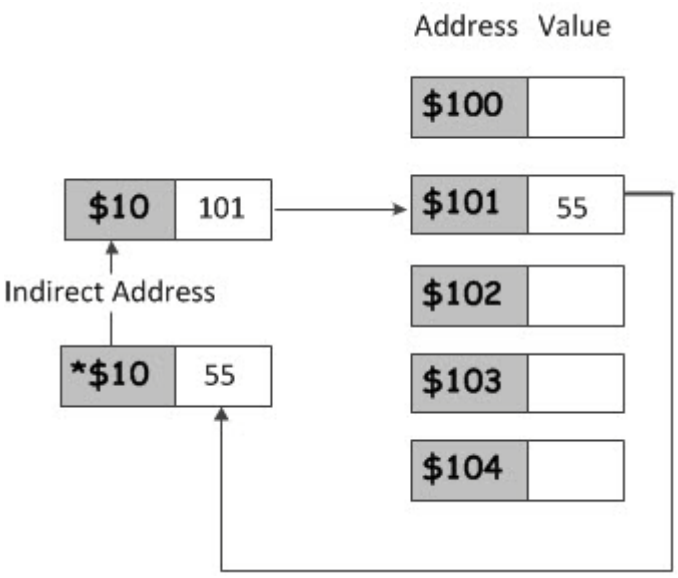


Figure 3-3-1 Illustration of Indirect addressing

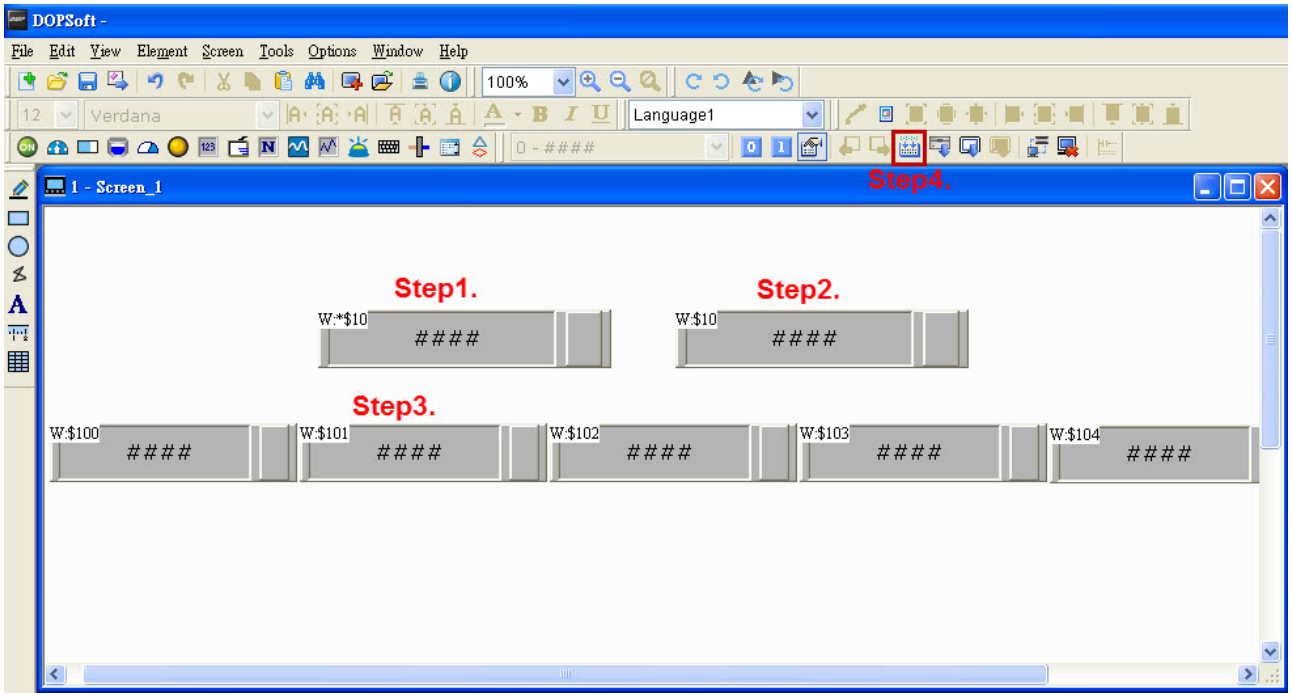


Figure 3-3-2 Example of indirect addressing registers

Function Element	Step	Actions
Indirect Addressing Registers	Step 1	Create a value, input the element, set write memory address as *$10.
	Step 2	Create a value, input the element, set write memory address as $10.
	Step 3	Create a value, input the element, set write memory address as $101.
	Step 4	Run compilation and download to the human-machine. Input “101” in element $10. Next, input

		any value in element $101. Then, all value data input by $101 will be generated by *$10.

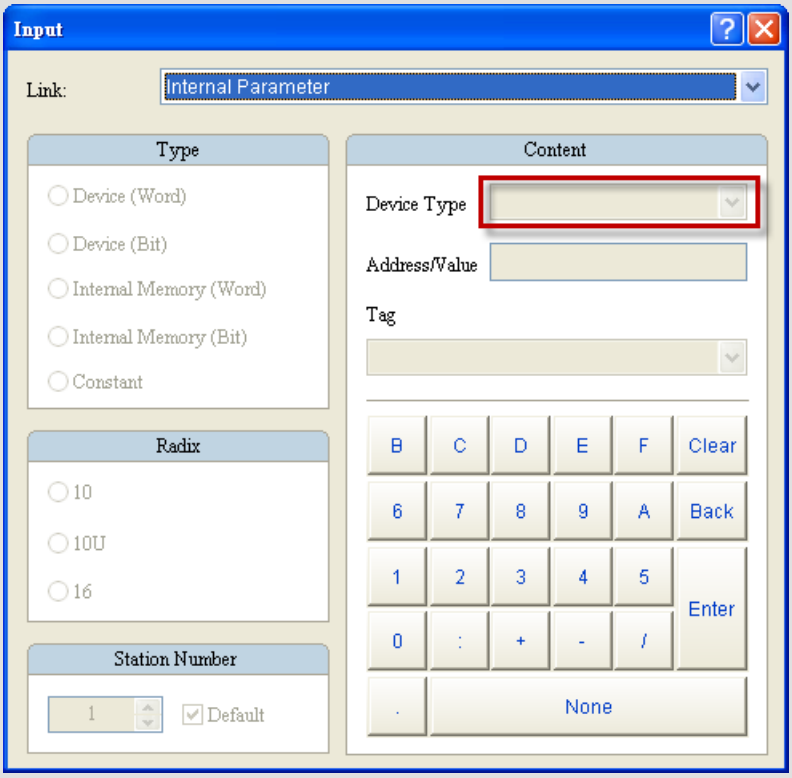
Table 3-3-2 Indirect Addressing Register

3-4 Internal Parameter

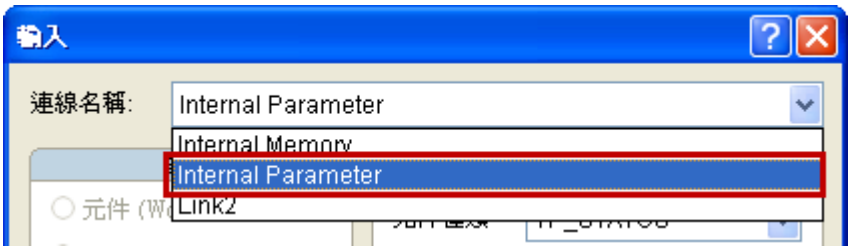
Apart from six types of internal memories (the internal register ($), the non-volatile internal register ($M), indirect addressing register (*$), recipe register (RCP), recipe number register (RCPNO), and recipe group register (RCPG)), the human-machine provides the internal parameter function. This function allows users to understand the values of the human-machine's internal system status, including the system time value, the external storage device status, the touch X/Y coordinate, the touch status, the remaining battery voltage, and the network parameter.

NOTE:

✓ The internal parameter function is available only for Word elements. Users creating bit element will be unable to select this function.



When setting the memory address with the Word element, users can directly select the Internal Parameter from the pull-down menu of the "Link Name" to select the 24 types of internal parameters available from the human-machine.



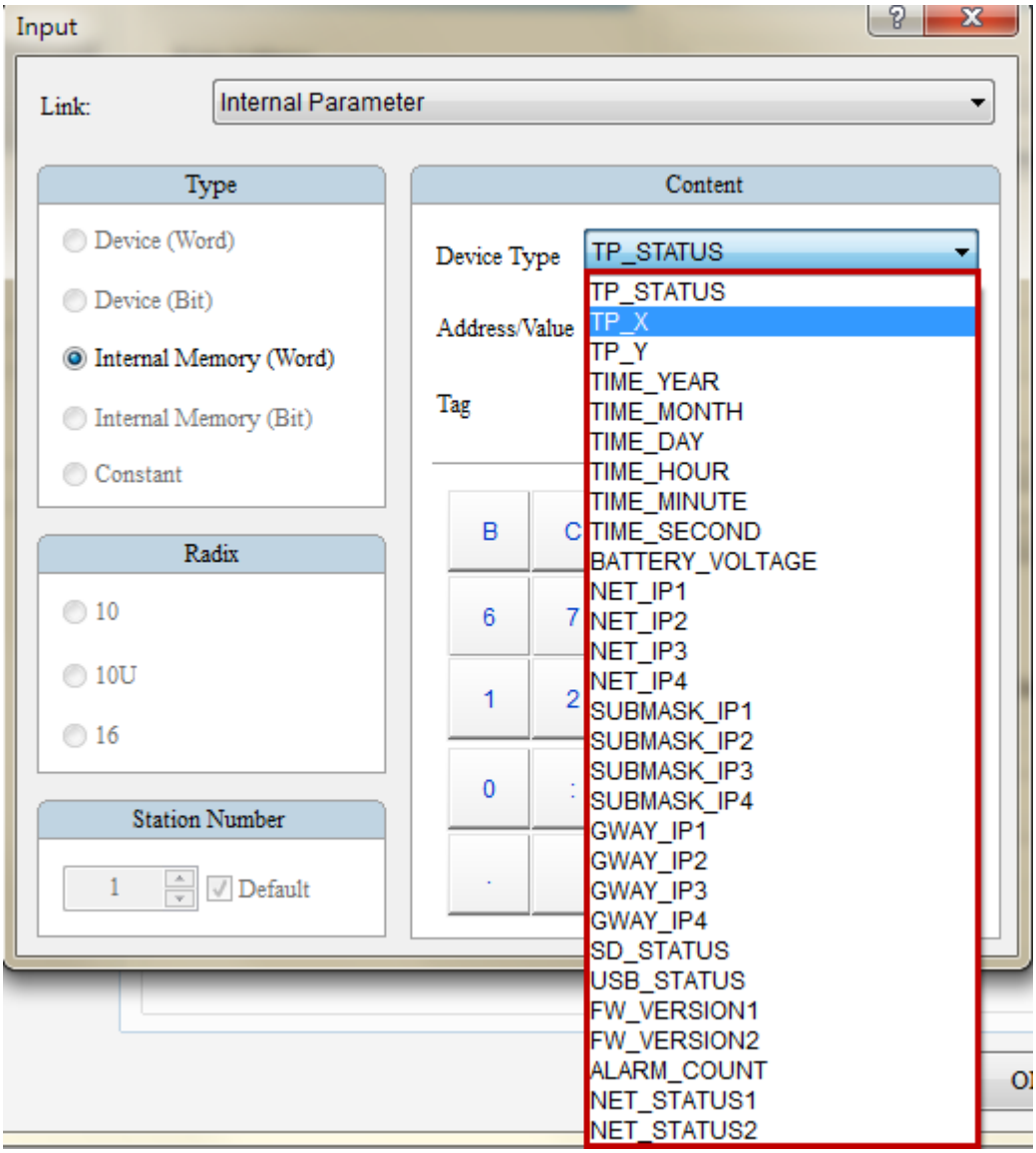
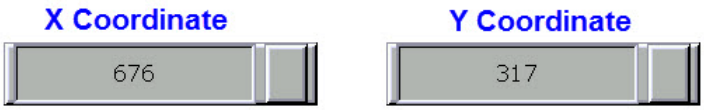
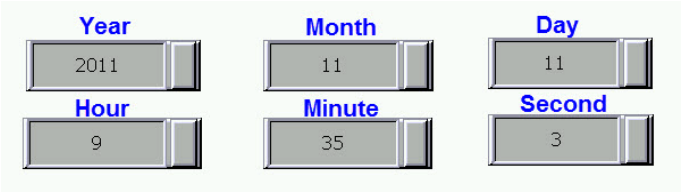
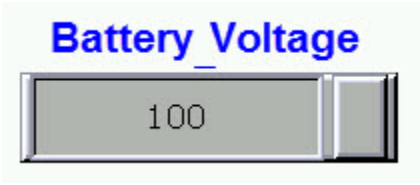
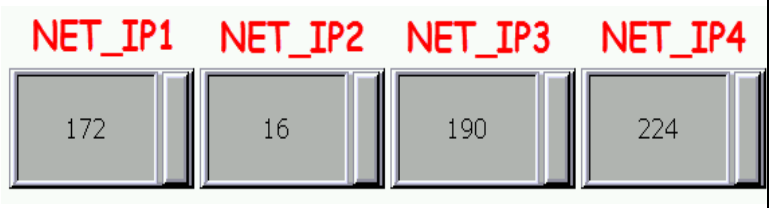


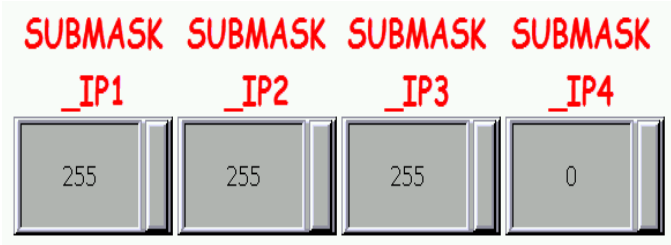
Figure 3-4-1 Internal parameters

Internal Parameters

Table 3-4-1 Internal Parameters

<table>
<tr><td>TP_STATUS</td><td>➢ Human-machine panel status
<table>
<tr><th>Status Value</th><th>Results</th></tr>
<tr><td>0</td><td>Panel not touched: “0”</td></tr>
<tr><td>1</td><td>Panel is touched: “1”</td></tr>
</table></td></tr>
<tr><td>TP_X</td><td rowspan="2">➢ Touching the X/Y coordinate of the human-machine panel.
<table>
<tr><th>Coordinate Value</th><th>Results</th></tr>
<tr><td>X</td><td rowspan="2"> 
</td></tr>
<tr><td>Y</td></tr>
</table></td></tr>
<tr><td>TP_Y</td></tr>
<tr><td>TIME_YEAR</td><td rowspan="6">➢ Displays the system time of the human-machine, including yyyy/mm/dd/tt/mm/ss.
<table>
<tr><th>Time Value</th><th>Results</th></tr>
<tr><td>TIME_YEAR (yyyy)</td><td rowspan="6"> 
</td></tr>
<tr><td>TIME_MONTH (mm)</td></tr>
<tr><td>TIME_DAY (dd)</td></tr>
<tr><td>TIME_HOUR (tt)</td></tr>
<tr><td>TIME_MINUTE (mm)</td></tr>
<tr><td>TIME_SECOND (ss)</td></tr>
</table></td></tr>
<tr><td>TIME_MONTH</td></tr>
<tr><td>TIME_DAY</td></tr>
<tr><td>TIME_HOUR</td></tr>
<tr><td>TIME_MINUTE</td></tr>
<tr><td>TIME_SECOND</td></tr>
<tr><td>BATTER_VOLTAGE</td><td>➢ Displays the remaining battery voltage (%)

</td></tr>
<tr><td>NET_IP1</td><td rowspan="2">➢ Displays the human-machine IP address; e.g. 172.16.190.224:</td></tr>
<tr><td>NET_IP2</td></tr>
</table>

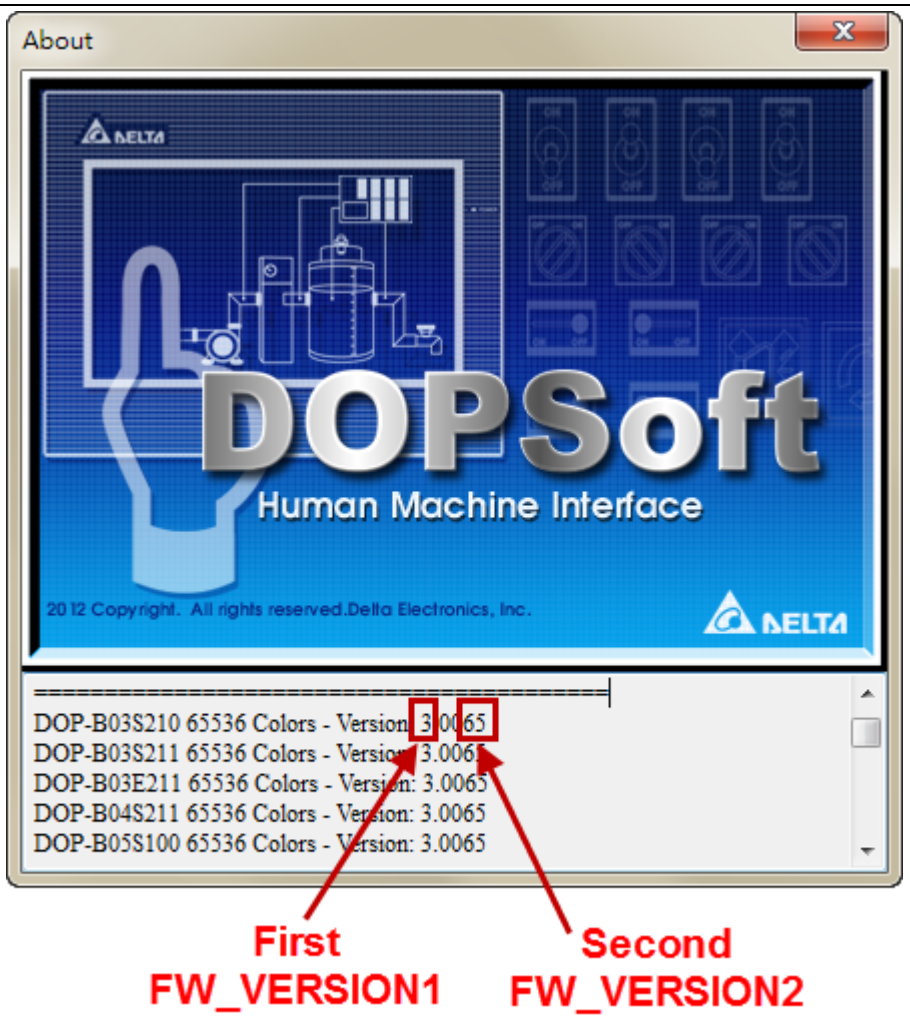
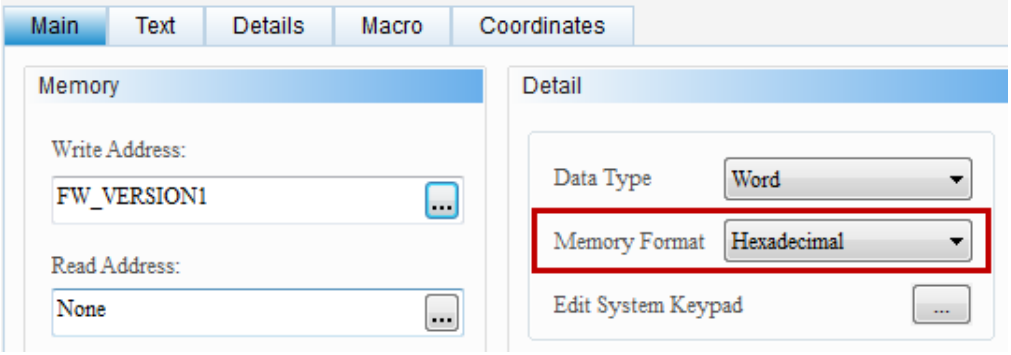
NET_IP3	**NET_IP**	**Results**
	NET_IP1	
NET_IP4	NET_IP2	
	NET_IP3	
	NET_IP4	

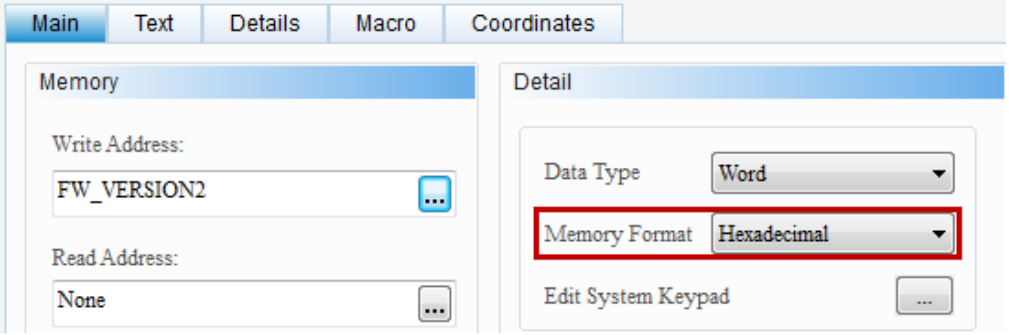
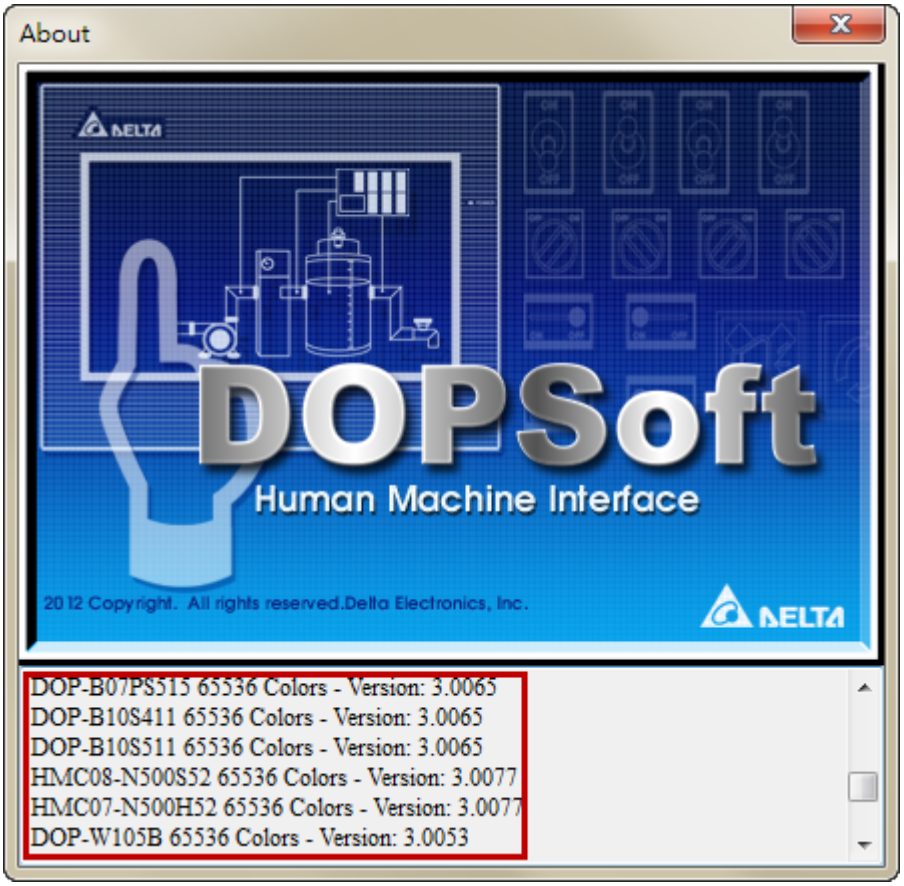
SUBMASK_IP1	➢ Displays human-machine SUBMASK_IP address, e.g. 255.255.255.0:	
SUBMASK_IP2	**SUBMASK_IP**	**Results**
	SUBMASK_IP1	
SUBMASK_IP3	SUBMASK _IP2	
	SUBMASK _IP3	
SUBMASK_IP4	SUBMASK _IP4	

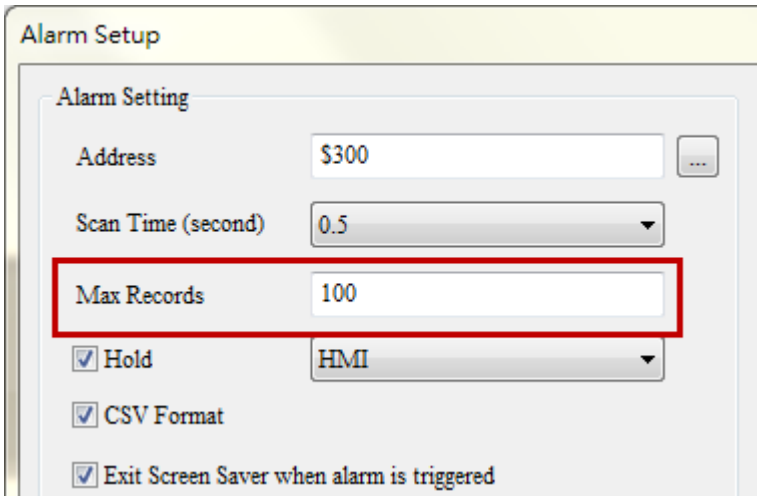
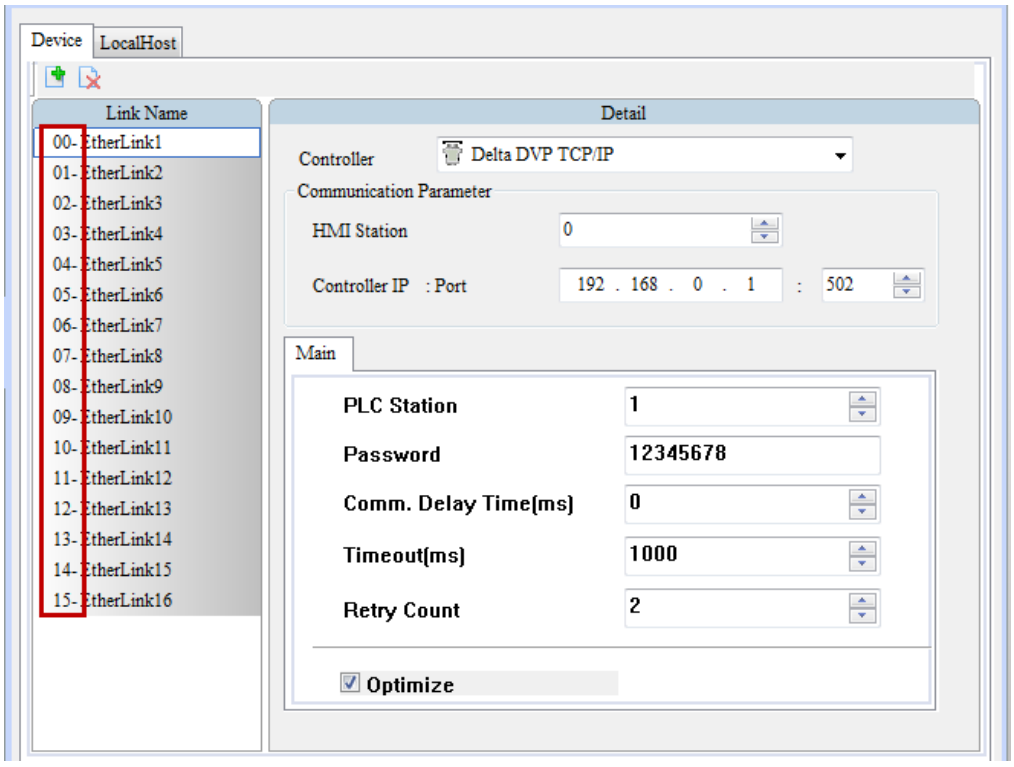
GWAY_IP1	➢ Display human-machine GATEWAY_IP address, e.g. 172.16.190.1:	
GWAY_IP2	**GWAY_IP**	**Results**
	GWAY _IP1	
GWAY_IP3	GWAY _IP2	
	GWAY _IP3	
GWAY_IP4	GWAY _IP4	

SD_STATUS	➢ Displays the status of external SD storage of the human-machine:	
	Status Value	**Results**
	0	No external SD: “0”
	1	With external SD: “1”

USB_STATUS	➢ Displays the status of external USB storage of the human-machine:	
	Status Value	**Results**
	0	No external USB: “0”
	1	With external USB: “1”

FW_VERSION1	
	➢ It displays the main version number of HMI firmware. ➢ When setting up this parameter, please set the format as Hexadecimal. 

FW_VERSION2	➢ It displays the sub-version number of HMI firmware. ➢ When setting up this parameter, please set the format as Hexadecimal.  ➢ It will display the corresponding sub-version number according to the series of HMI (B or HMC). See the figure below. The value of FW_VERSION2 shows 62 if it is B series. 74 is for HMC series. 

ALARM_COUNT	➢ It displays current alarm counts, including the triggering one and the ones that were cancelled. ➢ This function is used to remind users when the alarm reaches the max to save alarm counts, users can export the alarm so as to avoid the alarm data that saved earlier is removed. 
NET_STATUS1 / NET_STATUS2	➢ It can show if HMI is connected to the Net. ➢ Two Protocol connections are supported. One Protocol can have 16 connections (e.g. Delta_TCP/IP can have 16 connects at the same time). Thus, each NET_STATUS represents 16 connections. ➢ According to the EthernetLink device number in sequence, if it is connected, it displays 1; if not, it displays 0. ➢ When setting up this parameter, please set the format as Binary. 

<table>
<tr><td>EMS_STATUS</td><td>➢ This function is available for DOP-H series / HMC07-N411 HMI only.
➢ This parameter is used to display the status of emergency stop switch.
<table>
<tr><th>Value</th><th>Result</th></tr>
<tr><td>0</td><td>If the emergency stop switch is not pressed, it displays 0.</td></tr>
<tr><td>1</td><td>If the emergency stop switch is pressed, it displays 1.</td></tr>
</table></td></tr>
<tr><td>LSWITCH_STATUS</td><td>➢ This function is available for DOP-H series / HMC07-N411 HMI only.
➢ This parameter is used to display the status of enabling switch.
<table>
<tr><th>Value</th><th>Result</th></tr>
<tr><td>0</td><td>If the enabling switch is not pressed, it displays 0.</td></tr>
<tr><td>1</td><td>If the enabling switch is pressed, it displays 1.</td></tr>
</table></td></tr>
<tr><td>HANDWHEEL_COUNTER</td><td>➢ This function is available for DOP-H series / HMC07-N411 HMI only.
➢ This parameter is used to display accumulated counts of the handwheel.
➢ Turn the handwheel in right direction, the value increases; turn the handwheel in left direction, the value decreases.</td></tr>
</table>

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4-1 Control Block.....8
4-2 Status Block 27

Chapter 4 Control and Status Blocks

The Delta HMI provides both the command and status blocks for users to run or monitor part of the execution or status of system actions in the DOPSoft. Users can set the control the address of the command and status blocks from [Options]→[Configuration…]→[Control Block].

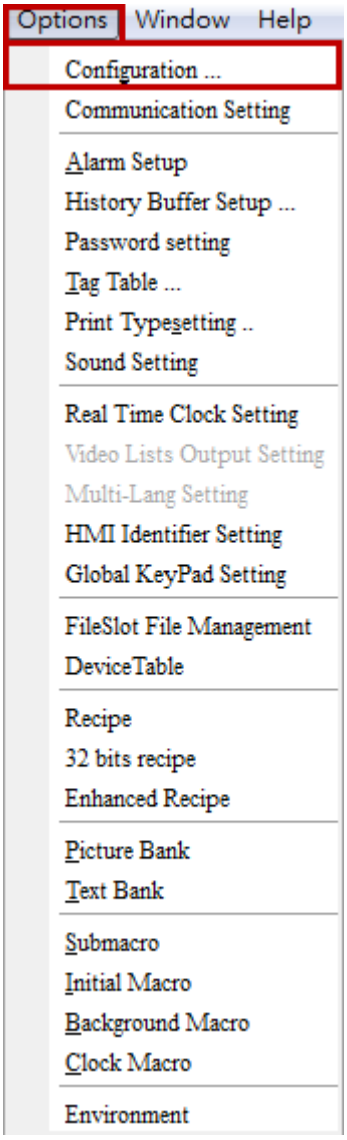


Figure 4-1-1 Configuration

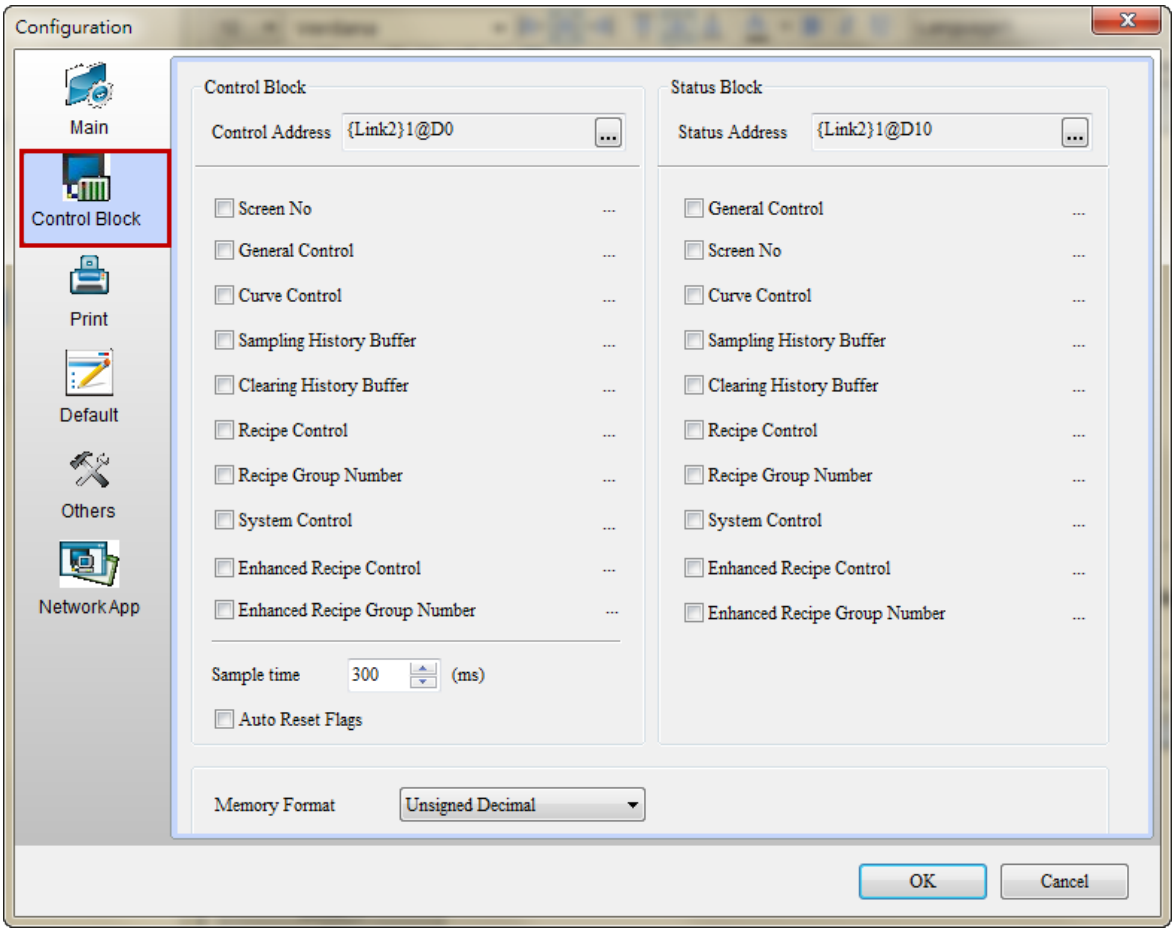


Figure 4-1-2 Control and Status Blocks

With a layout different from that of conventional screen editors, the DOPSoft allows users to customize their control and status blocks by selecting the required features. Take the control block for example, by selecting the [Screen No] and [Recipe Group Number] features, the layout of the control block will be automatically sorted by continuous address and will open and change the applications of the screen and recipe group number features, as shown in Figure 4-1-3.

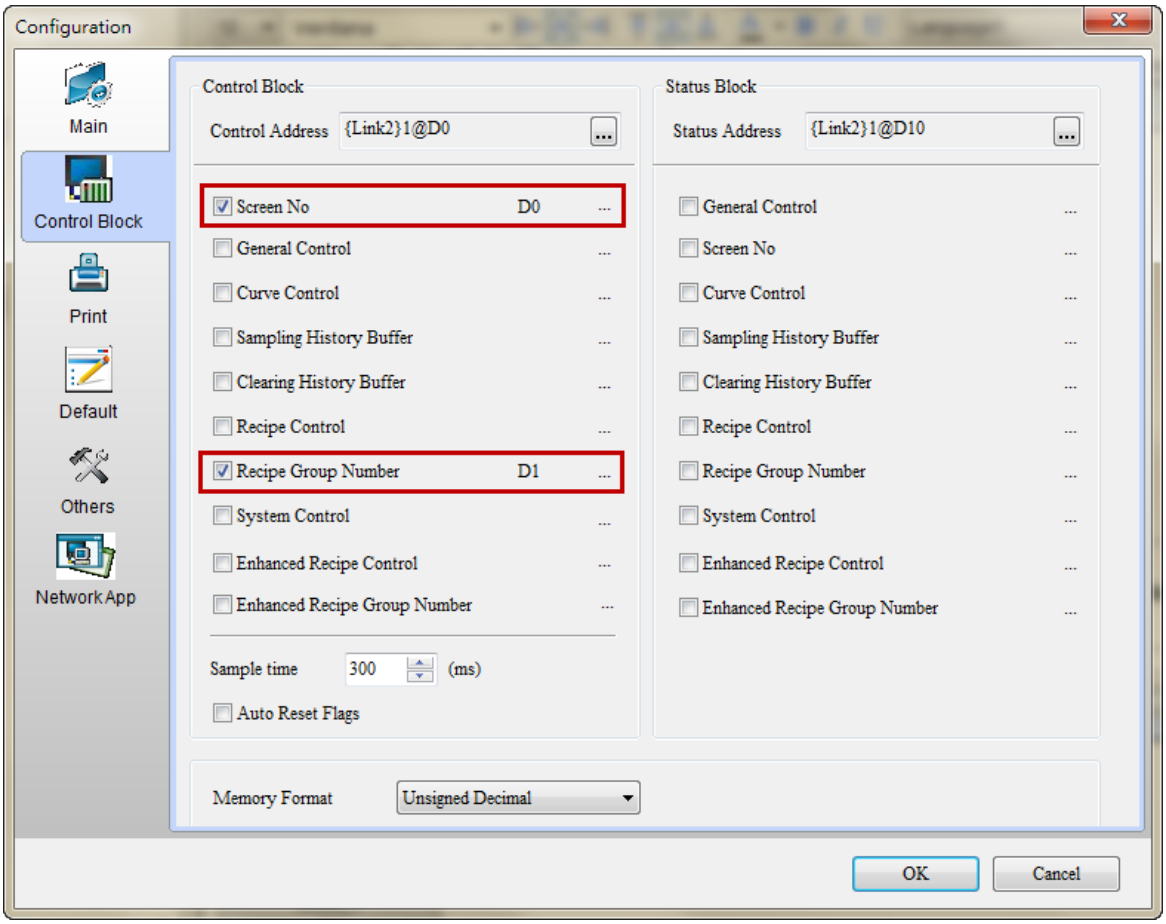


Figure 4-1-3 Description of the control block layout of the DOPSoft

If another feature is selected, such as the [General Control], the address will be sorted in ascending order to form the continuous memory layout as shown in Figure 4-1-4.

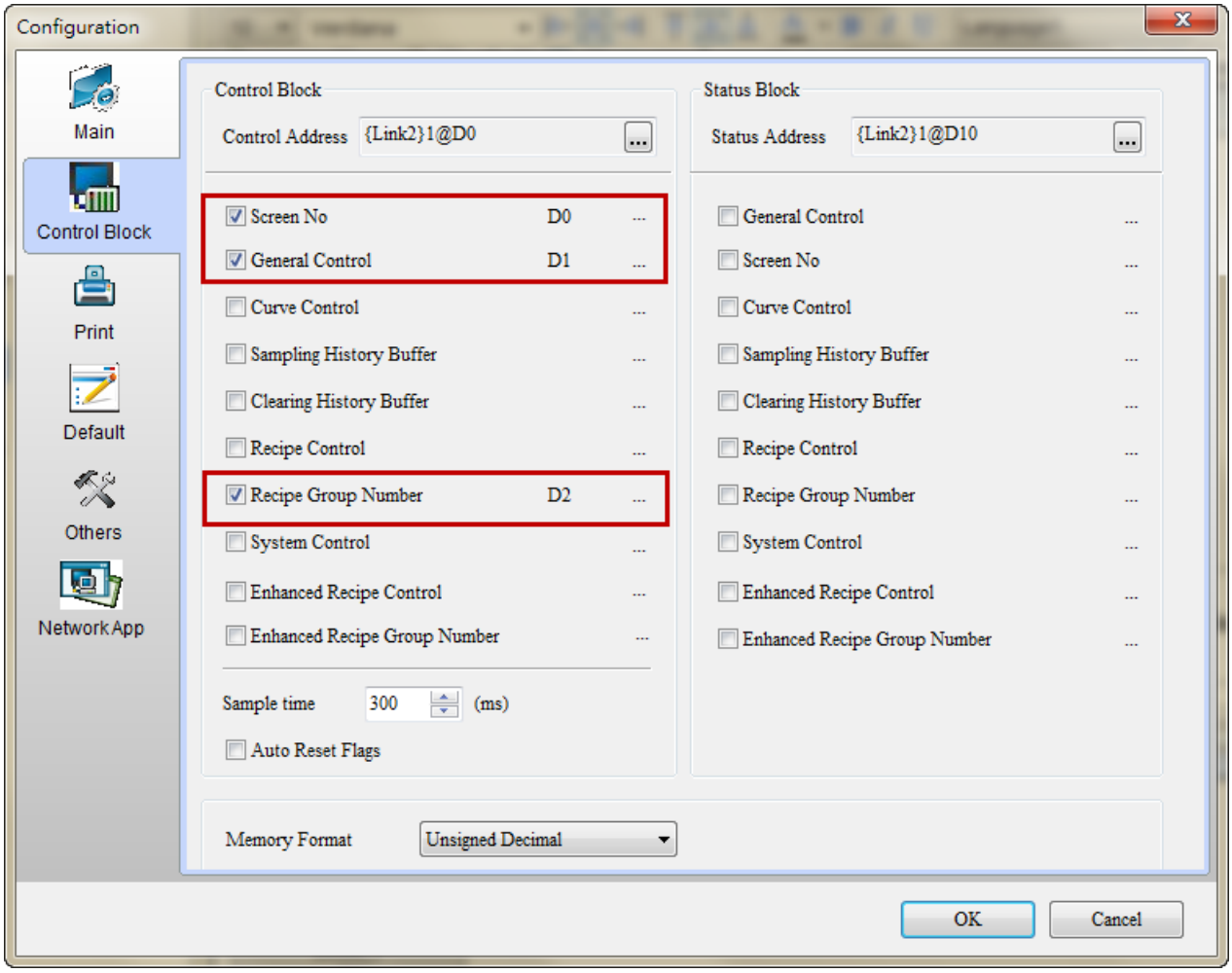
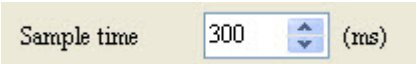


Figure 4-1-4 Description of the control block layout of the DOPSoft.

◆ Sample Time

This feature allows users to flexibly control the sampling time. The default is 300ms. This means the system will take a sample at every 300ms. The sample time range is 200ms-1000ms.



◆ Auto Reset Flags

Users wishing to use the same feature repeatedly in the control block should set the flag of this feature to OFF before re-activate the feature. With the “Auto Reset Flags” function, the HMI can automatically reset flags.

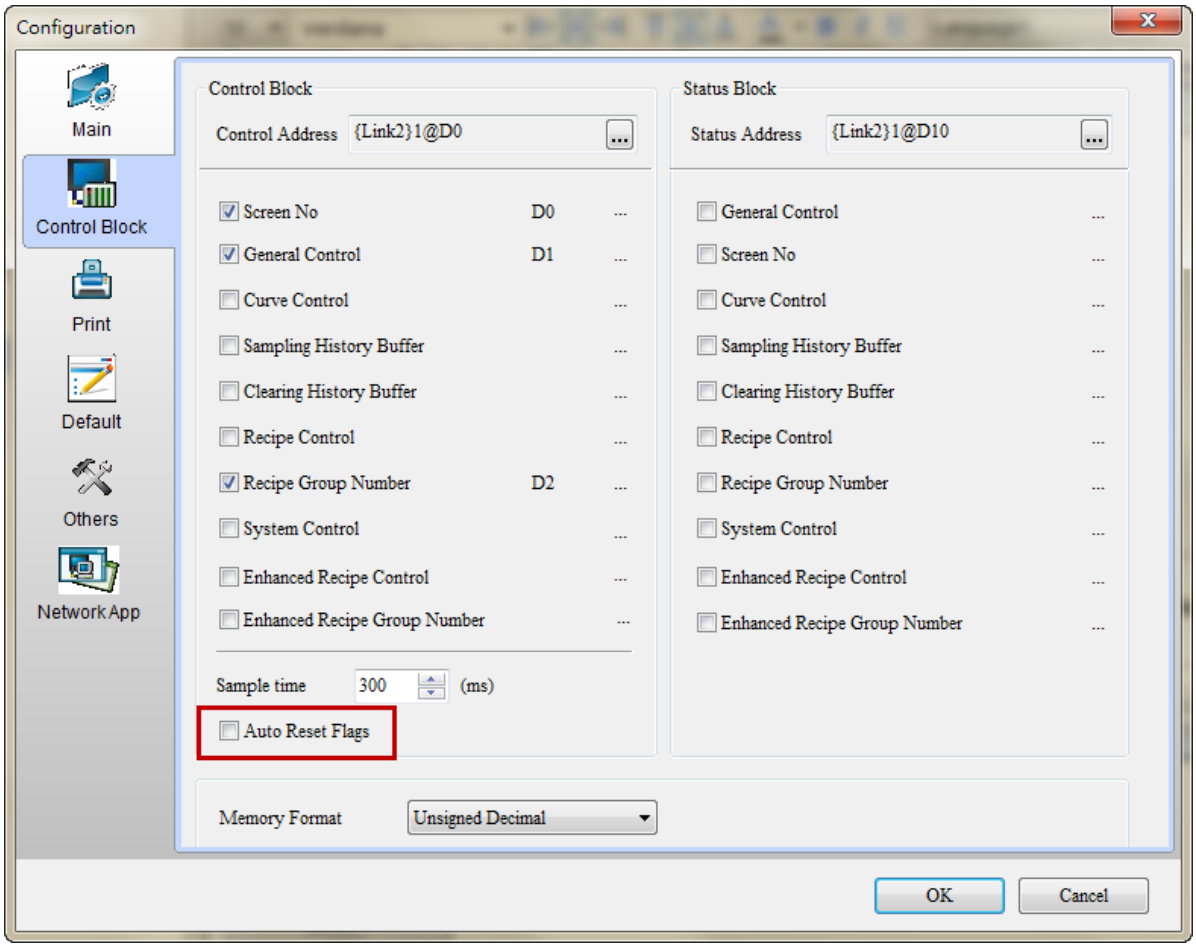


Figure 4-1-5 Auto Reset Flags

◆ Memory Format

Memory Format provides Unsigned Decimal and BCD format.

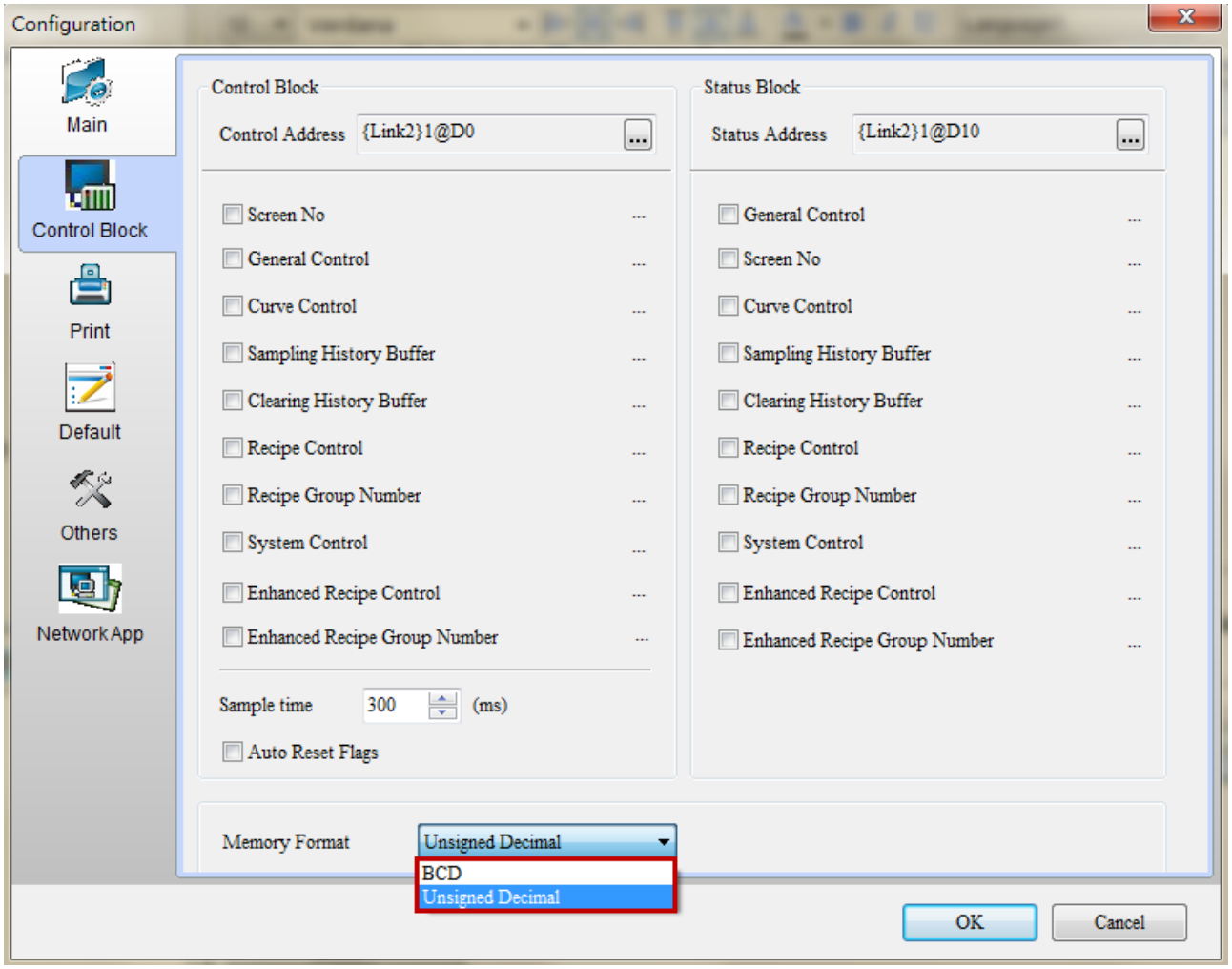


Figure 4-1-6 Memory Format

4-1 Control Block

Users can define the controller or the address of registers at a particular section in the control block set by the HMI. This way, users can operate the HMI actions by setting the control block. These actions include screen change, backlight off, user security level setup, sampling or clearing the curve and history buffer, recipe control, multi-language settings, and printing. The control block is a word-based continuous data block.

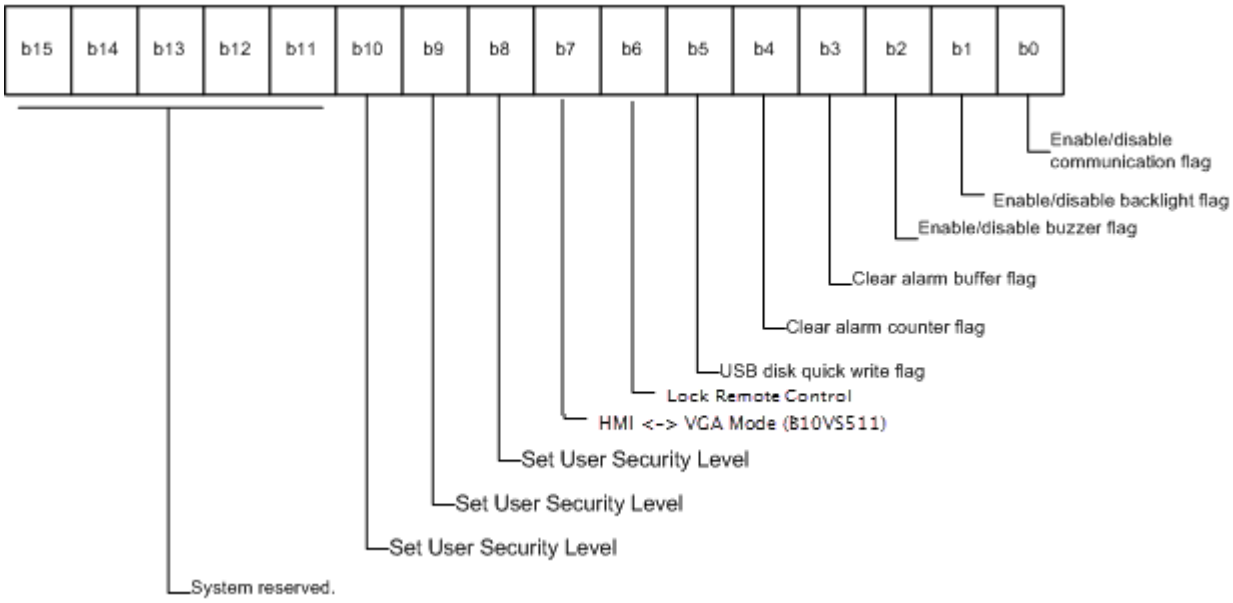
Control Block Register	Controller Register		Internal Memory	
	Register (D)	Demo Address	Register ($)	Demo Address
Screen No.	**D**n	**D**0	**$**n	**$**15
General Control	**D**n+1	**D**1	**$**n+1	**$**16
Curve Control	**D**n+2	**D**2	**$**n+2	**$**17
Sampling History Buffer	**D**n+3	**D**3	**$**n+3	**$**18
Clearing History Buffer	**D**n+4	**D**4	**$**n+4	**$**19
Recipe Control	**D**n+5	**D**5	**$**n+5	**$**20
Recipe Group Number	**D**n+6	**D**6	**$**n+6	**$**21
System Control	**D**n+7	**D**7	**$**n+7	**$**22
Enhanced Recipe Control	**D**n+8	**D**8	**$**n+8	**$**23
Enhanced Recipe Group Number	**D**n+9	**D**9	**$**n+9	**$**24

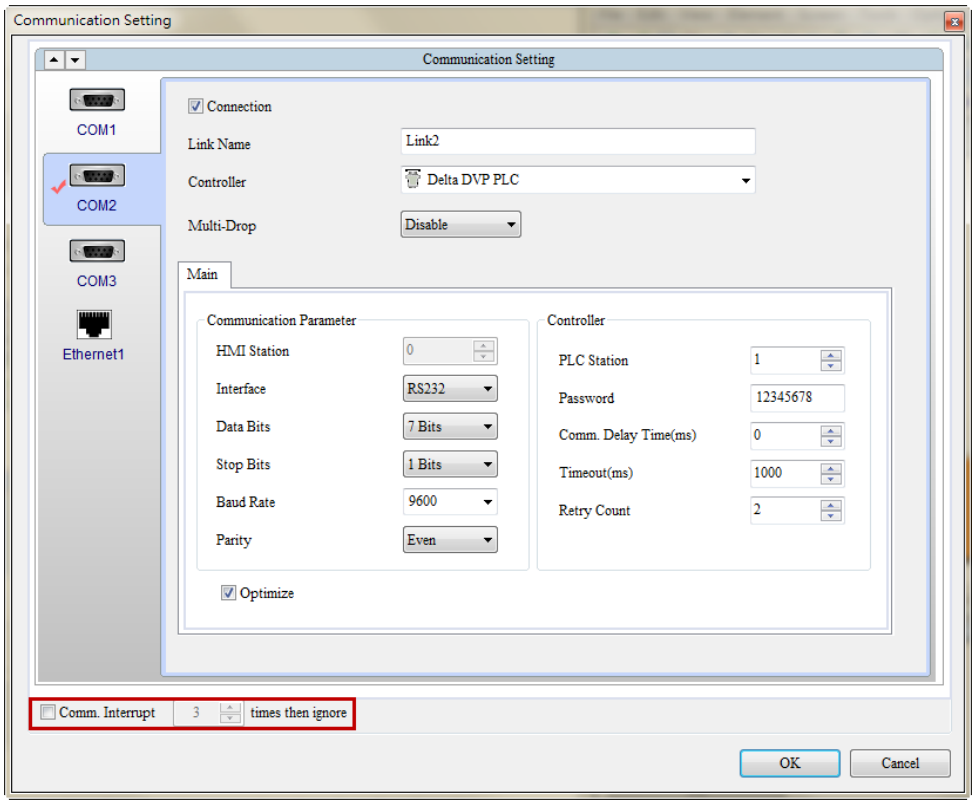
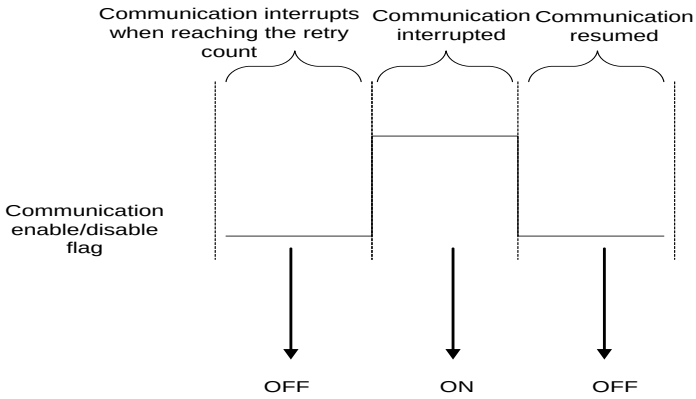
Table 4-1-1 Control Block Register Type

◆ Screen Number Register

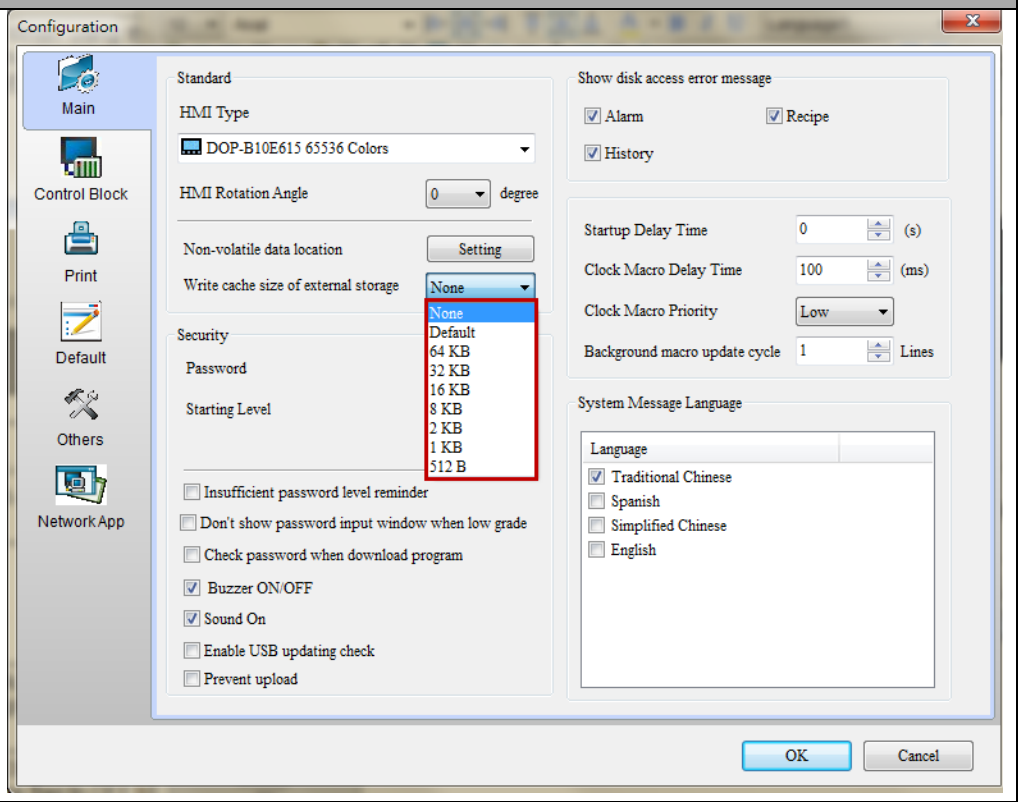
Screen Number Register Table 4-1-2 Control Block Screen Number Register	
Screen Nos. b0 to b15.	➢ Write the designated screen number to the register, and the HMI will immediately jump to that screen. ➢ As shown in the following example, by inputting the device number “D0” and the value “1” (D0=1), the HMI will jump to page 1.

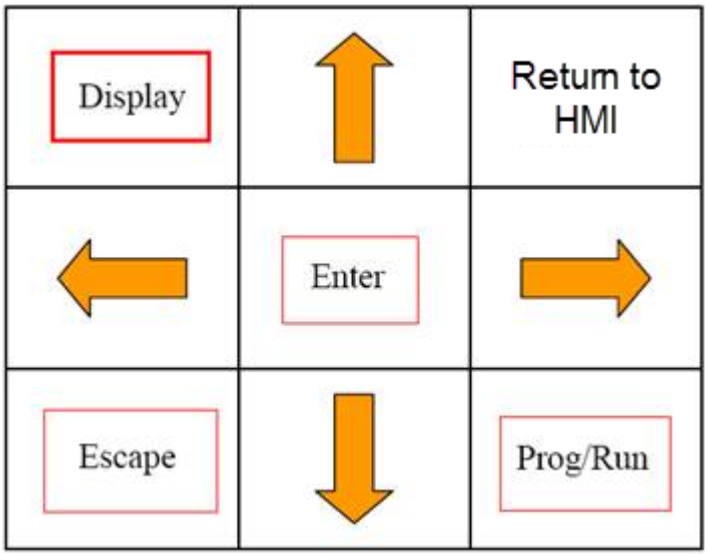
◆ Control Block—General Control Registers

General Control Registers Table 4-1-3 Control Block—General Control Registers	
	
b0: Enable/disable	➢ Enables/disables the communication of the HMI. When using the enable/disable flag of this communication, users should select “Comm. Interrupt XXX times then ignore” and input the retry count

General Control Registers Table 4-1-3 Control Block—General Control Registers	
communication	from [Options]→[Communication Setting].  ➢ In the communication between the HMI and the controller, when the communication reaches the set retry count, the HMI will interrupt the communication with the controller and set the flag to ON. At the same time, the communication will be interrupted and the communication error message box will not pop up (the communication between the HMI and other controllers will not be affected). Users can reset this flag to reactivate the communication between the HMI and the controller.  ➢ This flag can only be used to resume communication after it is interrupted automatically and cannot be used to set the flag to ON to directly interrupt the communication between the HMI and controller. If it is necessary to manually disable or enable the communication between the HMI and controller, run the STATIONON/STATIONOFF macro commands.

General Control Registers Table 4-1-3 Control Block—General Control Registers	
	➢ This flag is not applicable to “Auto Reset Flags”.
b1 - Enable/disable backlight	➢ Enables/disables HMI backlight. When the flag is ON, the HMI backlight is disabled. When the flag is OFF, the HMI backlight is enabled. ➢ This flag is not applicable to “Auto Reset Flags”.
b2 – Enable/disable buzzer	➢ Enables/disables HMI buzzer. When the flag is ON, the HMI buzzer is disabled. When the flag is OFF, the HMI buzzer is enabled. ➢ This flag is not applicable to “Auto Reset Flags”.
b3 – Clear alarm buffer	➢ Clears data in the HMI alarm buffer. If the flag is ON, the data in the alarm buffer will be cleared. Users must set the flag to OFF to reactive buffer before reusing it.
b4 – Clear alarm counter	➢ Clears data in the HMI alarm counter. If the flag is ON, the data in the alarm counter will be cleared. Users must set the flag to OFF to reactive buffer before reusing it.
b5 – USB Disk Quick Write	To quickly update data in the HMI cache to the USB disk. If the alarm, history or recipe is activated, and the USB disk is held, the HMI will update the cache data to the USB disk concurrently. Users must set the flag to OFF to reactive buffer before reusing it. ➢ The HMI will first store in the cache the data written to the USB disk. When the data do not reach the default volume (as shown in the figure below), data in the cache will not be written to the USB disk, in order to prevent USB disk damage as a result of continuous writing. Part of the data will be lost when the data volume is smaller than the buffer capacity or there is an unexpected power interruption. To prevent this, users can force the system to activate this flag to write data to the USB disk to maintain data existence.

General Control Registers Table 4-1-3 Control Block—General Control Registers	
	
b6 – Lock Remote Control	➢ Enable / disble control can be operated eRemote. When the flag is ON, the eRemote could not be operated. When the flag is OFF, the eRemote could be operated. ➢ This flag is not applicable to “Auto Reset Flags”.
b7 – HMI <-> VGA Mode (B10VS511)	➢ This Bit function/setting is only available for model B10VS511. ➢ COM1 from B10VS511 should connect to the COM from DMV; VGA Port from B10VS511 should connect to VGA Port of DMV. Then, trigger this Bit to enter VGA mode. NOTE： ✓ The station number of communication protocol should be set in DMV communication setting. ✓ Users can complete the output setup in DMV program menu/output/RS-232. (In this case, PLC station number is not equal to DMV station number. There is no need to change it. Be sure to select MODBUS mode in output setting.) ✓ The communication between DMV and HMI must apply RS-232 and no crossover. (2⟷2、3⟷3)。 ✓ Please select “Delta Controller ASCII” for communication setting on HMI side and the station number must identical to DMV.

General Control Registers Table 4-1-3 Control Block—General Control Registers	
	➢ When it is in VGA mode, a nine-square-grid will appear on HMI. Press “Return to HMI” on the top-right corner can return to HMI mode.  ➢ “Auto Reset Flag” is in valid to this function..

General Control Registers

Table 4-1-3 Control Block—General Control Registers

b8, b9, b10 – Set User Security Level

- Users can change the present security level of HMI users by activating the flag of Bits 8-10 provided by general control registers. The internal security level of the HMI includes:

  (1) Privilege 0-7: From the lowest to the highest;

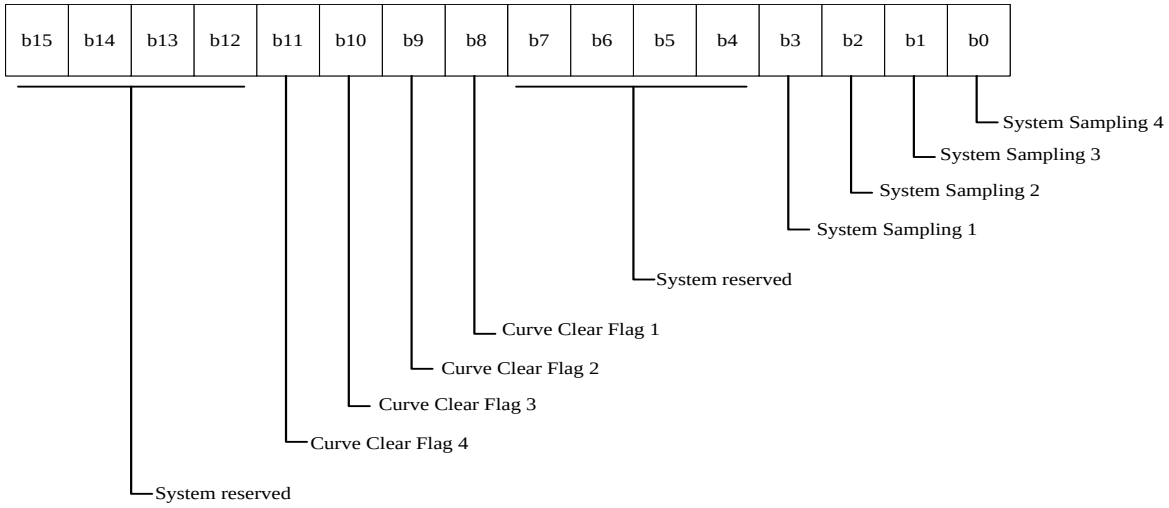
  (2) Supreme Privilege: No need of control by these three flags.
- Users can set privilege 0-7 with these three flags as shown below:

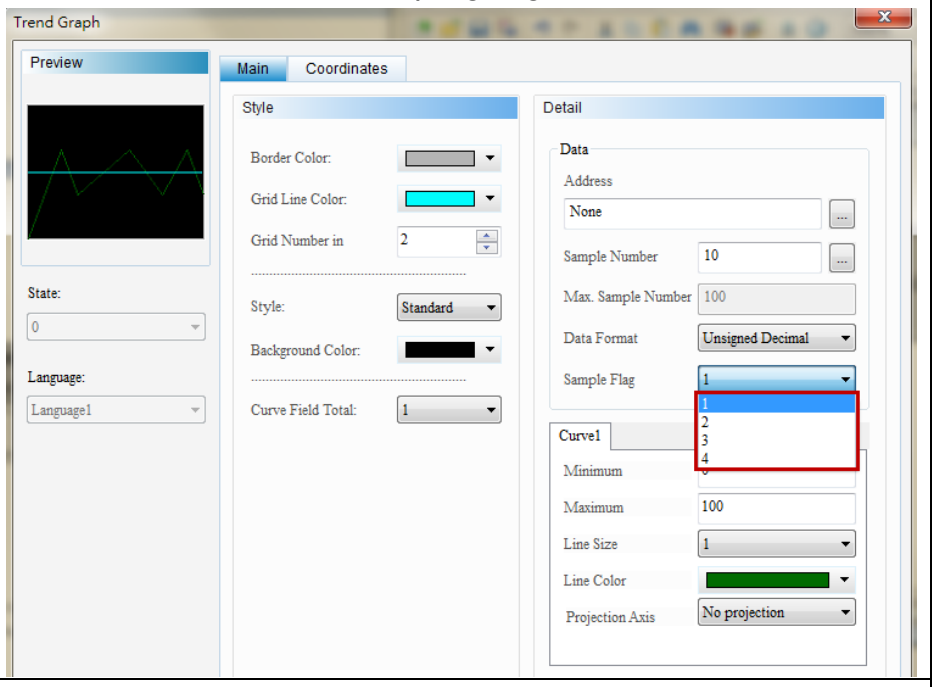
Security Level	Flag Control		
	Bit 10	Bit 9	Bit 8
Security Level 0	0	0	0
Security Level 1	0	0	1
Security Level 2	0	1	0
Security Level 3	0	1	1
Security Level 4	1	0	0
Security Level 5	1	0	1
Security Level 6	1	1	0
Security Level 7	1	1	1

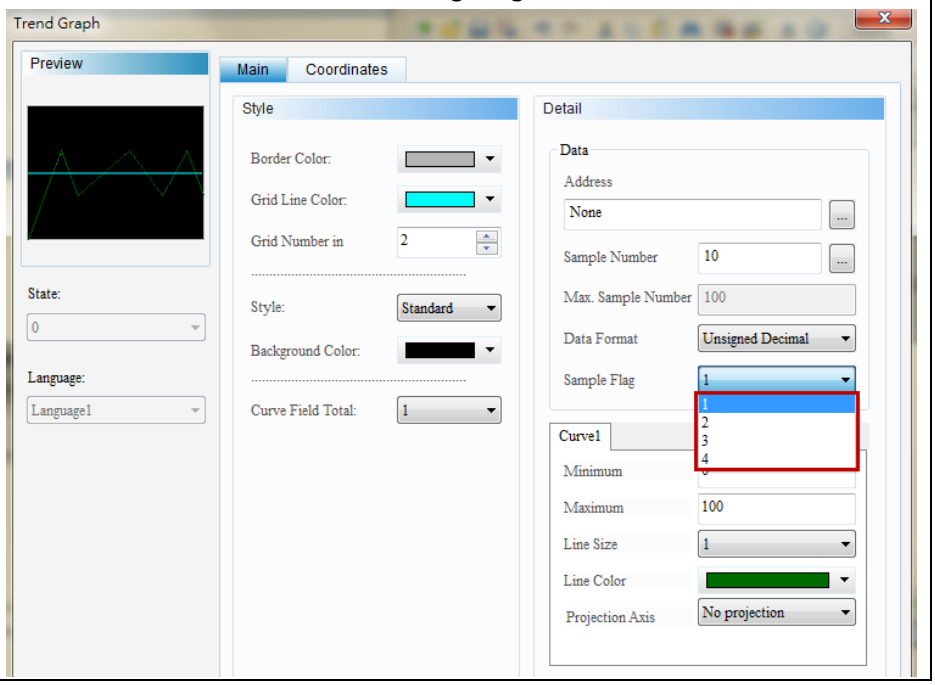
◆ Curve Control Register

Curve Control Register

Table 4-1-4 Control Block—Curve Control Register



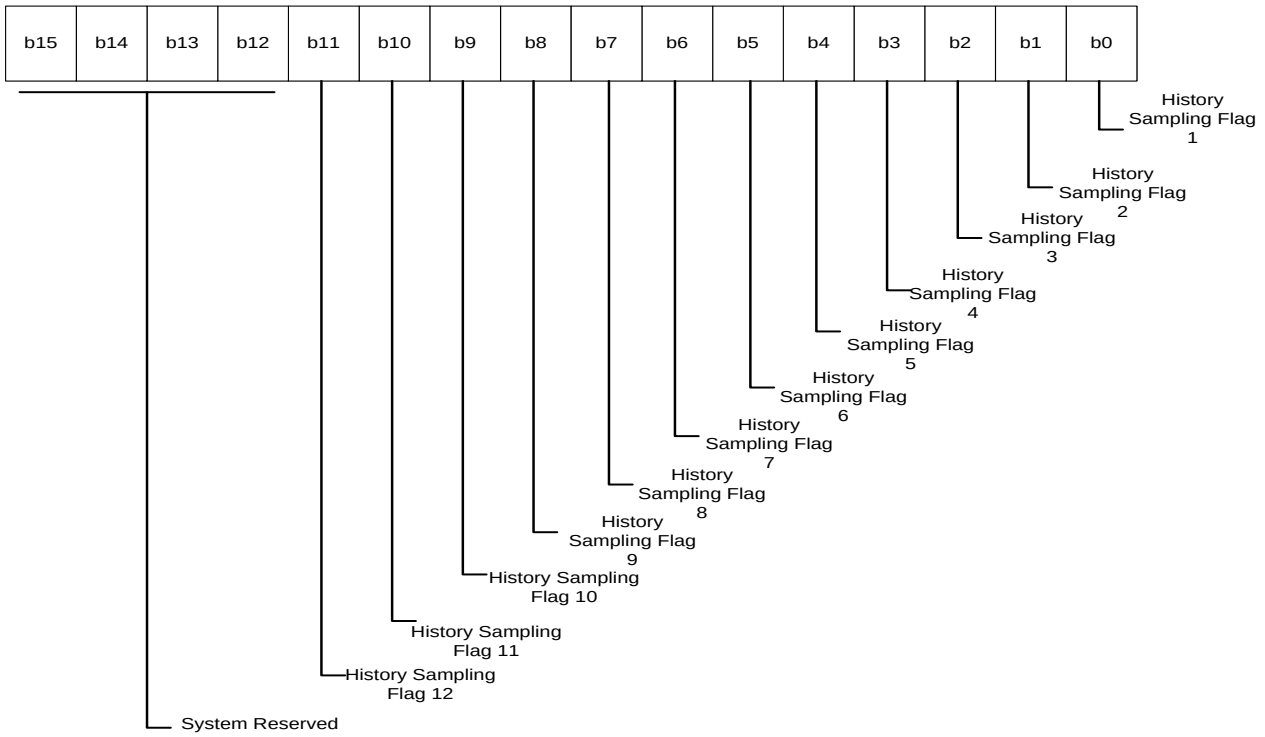
b0 ~ b3 – Curve Sampling Flags (1 ~ 4)	➢ The DOPSoft provides four curve sampling flags. Curves include the general curve and X-Y curve. The curve drawing action is controlled by the curve sampling flags. ➢ If these flags are ON, the corresponding curve elements will sample and draw the curve on the elements. Turn these flags OFF and reactivate them to use this function repeatedly. ➢ The sampling flag 1 of the curve element should correspond to the curve sampling flag 1, sampling flag 2 of the curve element to the curve sampling flag 2, etc. 
b8 ~ b11 –	➢ The DOPSoft provides four curve clearing flags. Curves

Curve Control Register Table 4-1-4 Control Block—Curve Control Register	
Curve Clearing Flags (1 ~ 4)	include the general curve and X-Y curve. The curve clearing action is controlled by the curve sampling flags. ➢ If these flags are ON, the corresponding curve elements will clear the curve on the elements. Turn these flags OFF and reactivate them to use this function repeatedly. ➢ The sampling flag 1 of the curve element should correspond to the curve clearing flag 1, sampling flag 2 of the curve element to the curve clearing flag 2, etc. 

◆ History Sampling Register

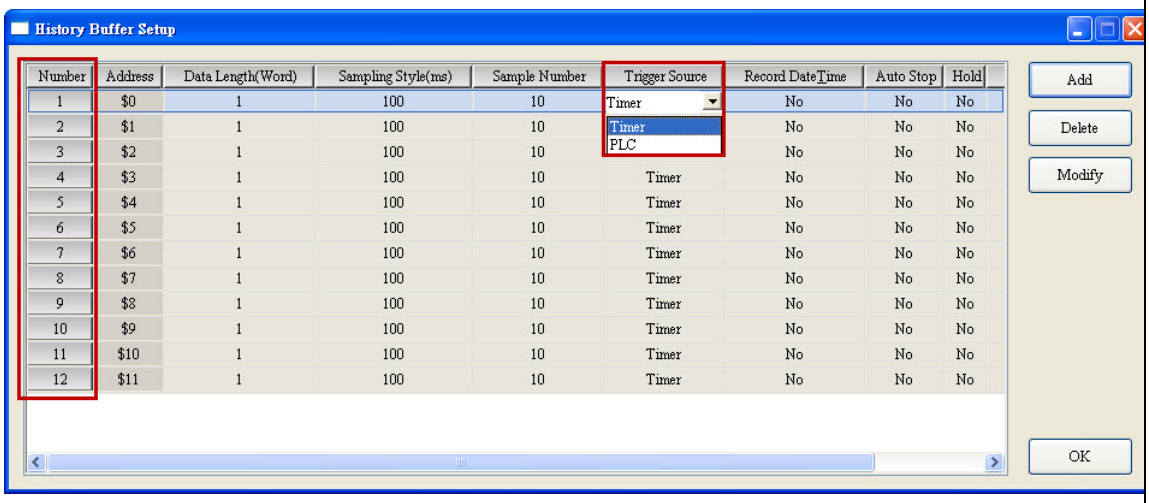
History Sampling Register

Table 4-1-5 Control Block—History Control Register



b0 ~ b11 – History Sampling Flags (1~12)

➢ It can record up to 12 sets of history data, and each set of history data corresponds to a history sampling flag. History can be activated by the [Timer] or [PLC]; i.e. it is activated by the history sampling flag.



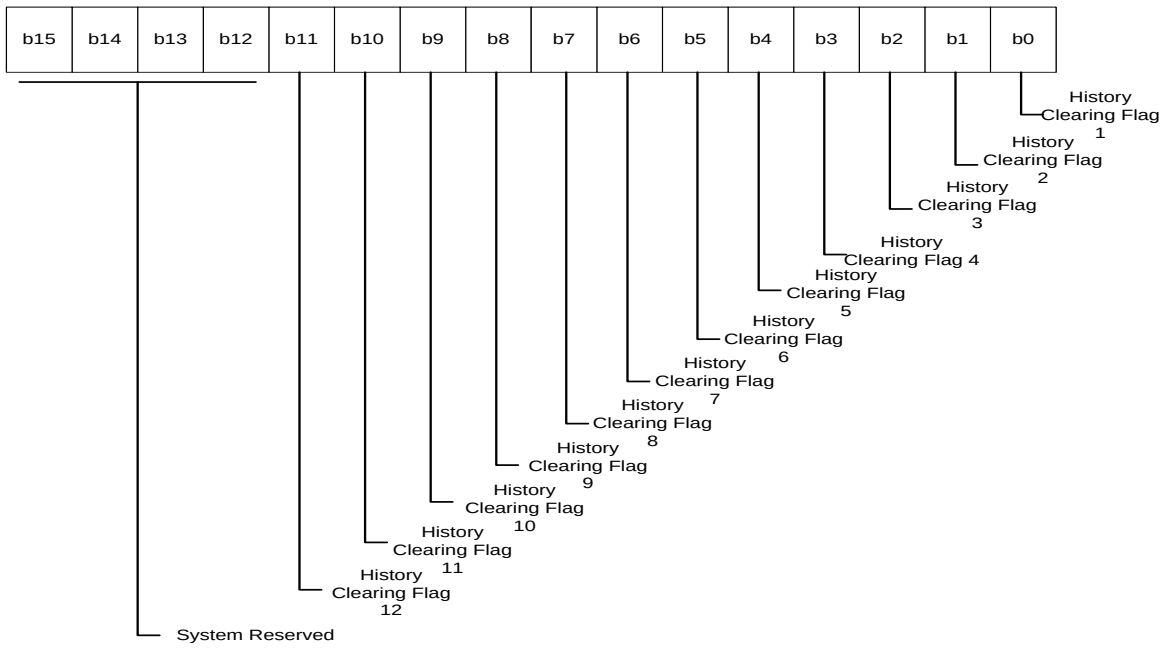
Number	Address	Data Length(Word)	Sampling Style(ms)	Sample Number	Trigger Source	Record DateTime	Auto Stop	Hold
1	$0	1	100	10	Timer	No	No	No
2	$1	1	100	10	Timer / PLC	No	No	No
3	$2	1	100	10		No	No	No
4	$3	1	100	10	Timer	No	No	No
5	$4	1	100	10	Timer	No	No	No
6	$5	1	100	10	Timer	No	No	No
7	$6	1	100	10	Timer	No	No	No
8	$7	1	100	10	Timer	No	No	No
9	$8	1	100	10	Timer	No	No	No
10	$9	1	100	10	Timer	No	No	No
11	$10	1	100	10	Timer	No	No	No
12	$11	1	100	10	Timer	No	No	No

➢ Users can determine the sampling time by activating the history sampling flag. When the history sampling flag is ON, data are sampled once. Turn these flags off and reactivate them to use this function repeatedly.

◆ History Clearing Register

History Clearing Register

Table 4-1-6 Control Block-- History Clearing Register

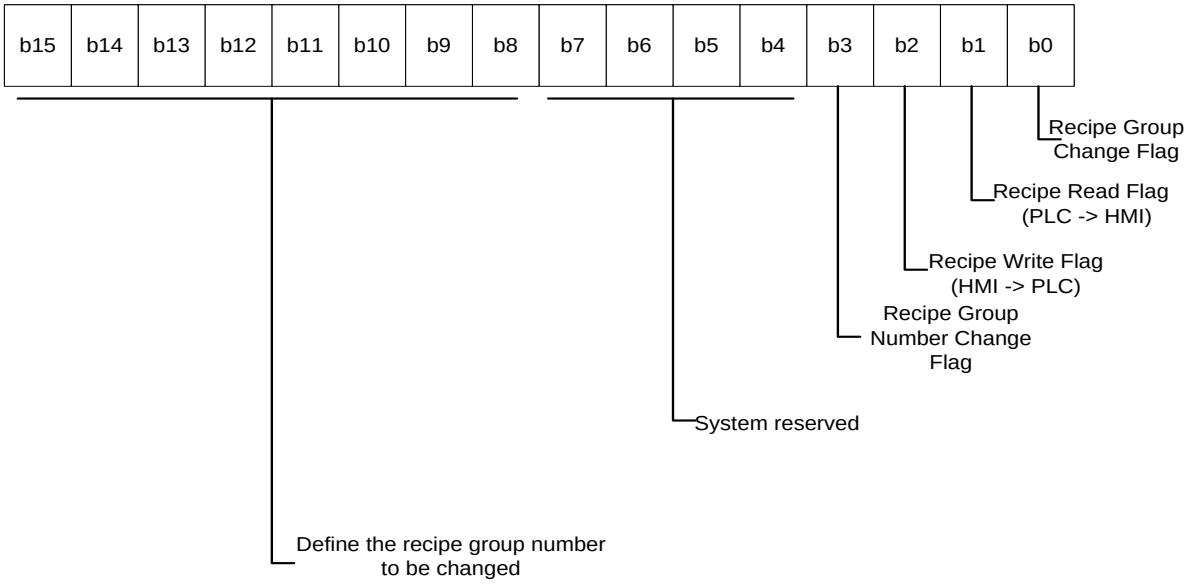


b0 ~ b11 – History Clearing Flags (1~12)	➢ Users can clear history data by activating the history clearing flag. When the history clearing flag is ON, history data are cleared. Turn these flags off and reactivate them to use this function repeatedly.

◆ Recipe Control Register

Recipe Control Register

Table 4-1-7 Control Block-- Recipe Control Register



b0 – Recipe Group Number Change Flag	➢ For use on 16-bit recipes. ➢ Users can call or change a recipe group in two ways: (1) Change directly from the RCPNO of the HMI's internal register. Value Input Element (2) Change with the recipe group change flag. ➢ Users wishing to change the HMI's recipe group number with this flag should write in the group control register (Table 4-1-18 Recipe Control Register) the recipe group to be changed before activating the recipe group change flag. ➢ When the recipe group change number flag is ON, the recipe group number will be change according to the number defined in the recipe group control register. Also, the RCPNO number in the internal register will be changed automatically. Turn the flag off and reactivate it to use this function repeatedly.
b1 – Recipe Read Flag (PLC →HMI)	➢ When the recipe read flag is ON, the HMI will read the recipe data in the controller and write in the recipe data register assigned. Turn the flag off and reactivate it to use this function

Recipe Control Register Table 4-1-7 Control Block-- Recipe Control Register	
	repeatedly.
b2 – Recipe Write Flag (HMI → PLC)	➢ When the recipe write flag is ON, the HMI will write the selected data in toe controller register. Turn the flag off and reactivate it to use this function repeatedly.
b3 – Recipe Group Change Flag	➢ For use on 32-bit recipes. ➢ Users can call or change a recipe group in two ways: (1) Change directly from the RCPG of the HMI's internal register. Value Input Element (2) Change with the recipe group change flag. ➢ When the recipe group change flag is ON, the recipe group number will be change according to the number defined in the recipe group control register (b8 ~ b15). Also, the RCPG number in the internal register will be changed automatically. Turn the flag off and reactivate it to use this function repeatedly.
b8 ~ b15 – Define the number of the recipe groups to be changed	➢ Users can define the number of the recipe groups to be changed with the high bit groups Bits 8-15 from the recipe group control register. By activating the RCPG change flag, the HMI will change the number of the RCPG in the internal register, thus changing the recipe group.

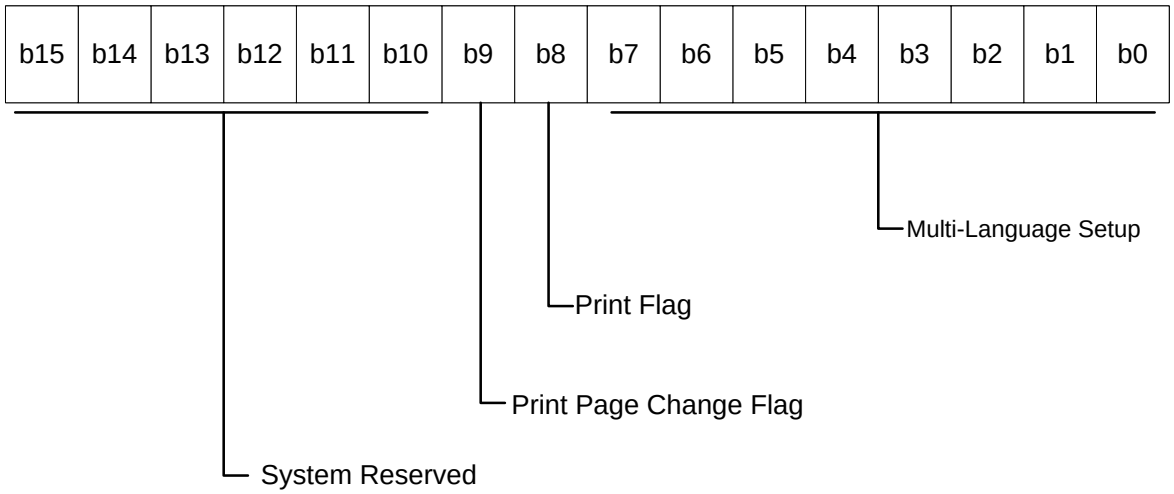
◆ Recipe Group Control Register

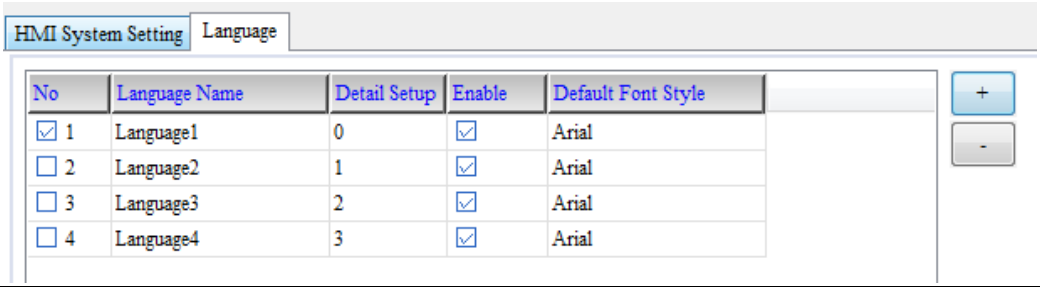
Recipe Group Control Register Table 4-1-8 Control Block-- Recipe Group Control Register	
b15 b14 b13 b12 b11 b10 b9 b8 b7 b6 b5 b4 b3 b2 b1 b0 Define recipe group	
b0 ~ b15 – Define Recipe Group	➢ Users can define the number of the recipe group to be changed from the recipe group control register. By activating the recipe group change flag (Table 4-1-7 Recipe Control Register b0), the HMI will automatically change the RCPNO in the internal register, thus changing the recipe group.

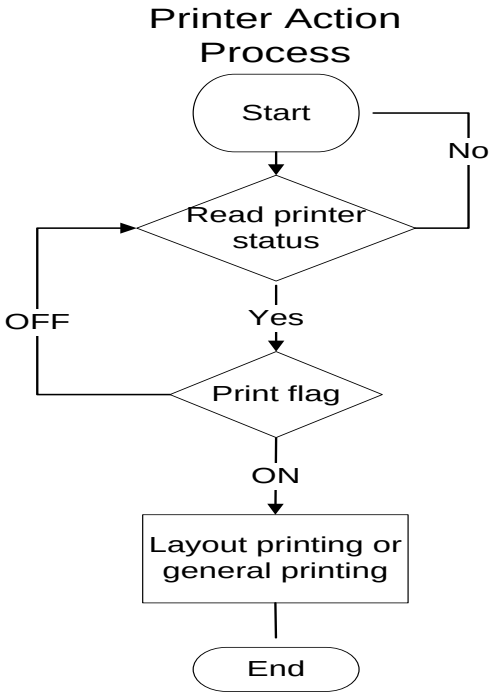
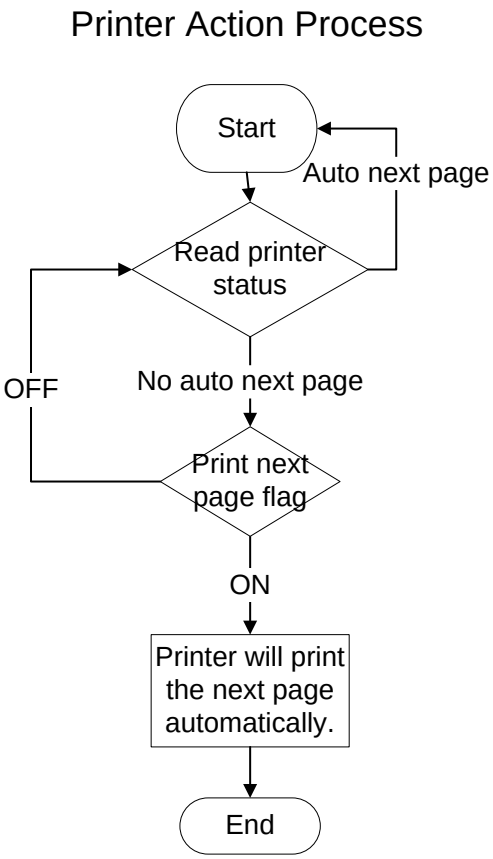
◆ System Control Flag Register

System Control Flag Register

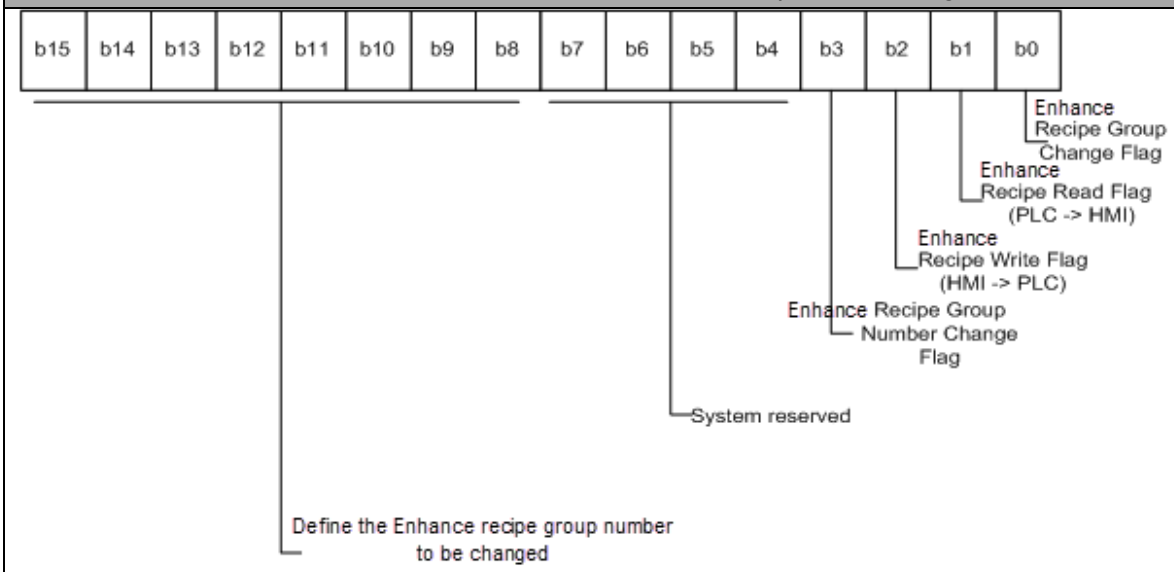
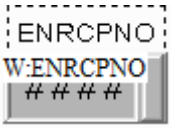
Table 4-1-9 Control Block-- System Control Flag Register

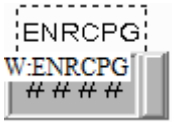


b0 ~ b7 – Multi-language Setup	➢ Supports 16 languages. Users can change a language with the multi-language setup. Users can change a language from [Options]→ [Configuration...]→ [Others] → [Language], as shown below. 
b8 – Print Flag	➢ The DOPSoft provides to printing options: (1) Print general screen (hard copy); (2) Screen layout. ➢ Please note that only one option can be used, and the screen layout mode is prioritized. ➢ When the print flag is ON, the printing task will be run according to the selected mode: print general screen or print screen layout. When the flag is OFF, the printer is idled

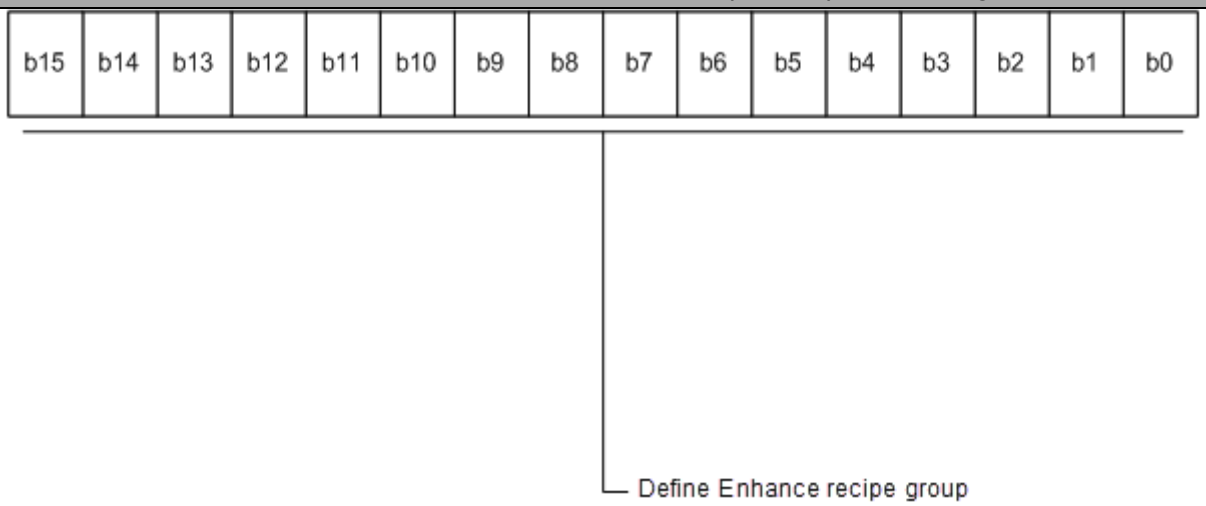
System Control Flag Register Table 4-1-9 Control Block-- System Control Flag Register	
	
b9 – Print Next Page Flag	➢ When the print next page flag is ON, the printer will automatically eject paper and turn to the next page. When the flag is OFF, the printer is idled. 

◆ Enhanced Recipe Control Register

Enhanced Recipe Control Register 《Table 4-1-10》Control Block – Enhanced Recipe Control Register	
	
b0 – Enhanced Recipe Group Change Flag	➢ It is for enhanced recipe. ➢ There are two ways to call or change an enhanced recipe group: (1) Change directly from ENRCPNO of HMI's internal register.  (2) Change with the enhanced recipe group change flag. ➢ If the user desires to change HMI's enhanced recipe group number with this flag, please write the enhanced recipe group to be changed into recipe group control register first. (Table 4-1-11 Enhanced recipe group control register). Then, trigger the enhanced recipe group change flag. ➢ When the enhanced recipe group change flag is On, the enhanced recipe group number will be changed according to the number defined in enhanced recipe group control register. Also, the ENRCPNO number in internal register will be changed automatically. To use this function again, please turn the flag off and activate it again.
b1 – Enhanced Recipe Read Flag (PLC →HMI)	➢ When the enhanced recipe read flag is On, the HMI will read the enhanced recipe data in controller and write it to the specified enhanced recipe data

Enhanced Recipe Control Register 《Table 4-1-10》Control Block – Enhanced Recipe Control Register	
	register. To use this function again, please turn the flag off and activate it again.
b2 – Enhanced Recipe Write Flag (HMI → PLC)	➢ When t the enhanced recipe write flag is On, the HMI will write the specified enhanced recipe data into the controller register. To use this function again, please turn the flag off and activate it again.
b3 – Enhanced Recipe Group Change Flag	➢ It is for enhanced recipe. ➢ There are two ways to call or change an enhanced recipe group: (1) Change directly from ENRCPG of HMI's internal register.  (2) Change with the enhanced recipe group change flag. ➢ When the enhanced recipe group change flag is On, the enhanced recipe group number will be changed according to the number defined in enhanced recipe group number (b8 ~ b15). Also, the ENRCPG number in internal register will be changed automatically. To use this function again, please turn the flag off and activate it again.
b8 ~ b15 – Define the Number of Enhanced Recipe Group to be Changed	➢ Users can define the number of enhanced recipe group that is going to be changed with the high bit groups Bit 8 ~ 15 from the enhanced recipe control register. When activating this flag, HMI will change the ENRCPG number in internal register, which means to change the enhanced recipe group.

◆ Enhanced Recipe Group Control Register

Enhanced Recipe Group Control Register 《Table 4-1-11》Control Block - Enhanced Recipe Group Control Register	
	
b0 ~ b15 – Define Enhanced Recipe Group	➢ Users can define the number of enhanced recipe group that is going to be changed via enhanced recipe group control register. When activating enhanced recipe group change flag (Table 4-1-10 Enhanced Recipe Control Register b0), the HMI will automatically change the ENRCPNO number in internal register, which means to change the enhanced recipe group.

Status Block

The status block planned for the HMI allows users to define the address of the controllers or internal registers of the HMI. By configuring the status block, users can view the present status of the HMI, such as present screen number, present user security level, curves and history status, and the status of recipe control, multi-language, printing, etc. The status block is also a world-based continuous data block.

NOTE:
- ✓ If no control block is configured, the status block will be inactive. Also, the addresses in the control block and the status block cannot be the same.

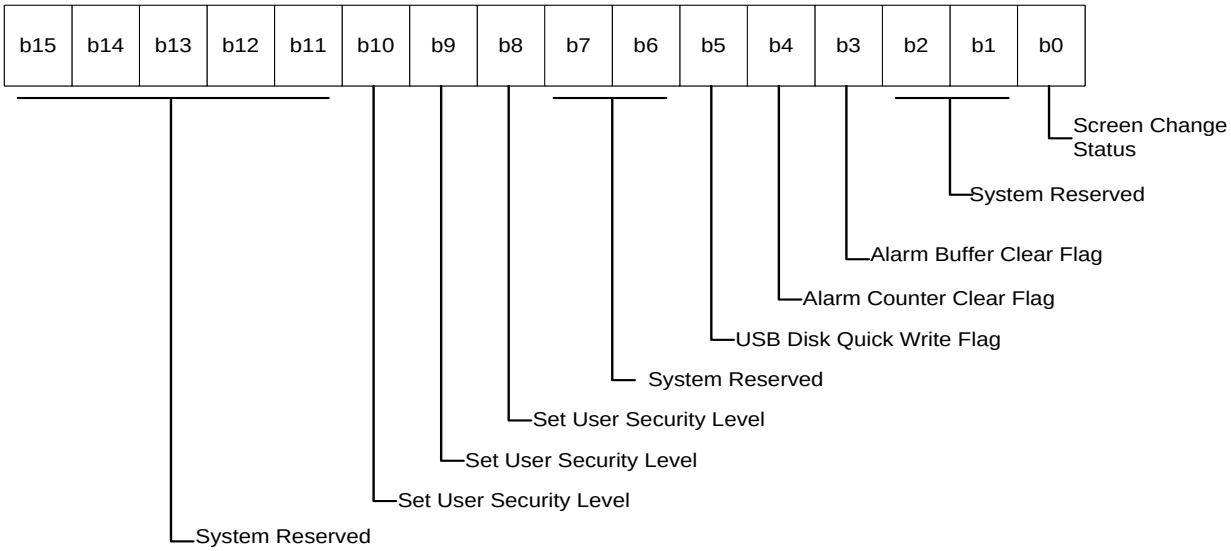
Status Block Register Types	Controller Register		Internal Memory	
	Register (D)	Demo Address	Register ($)	Demo Address
General Control Status	**D**n	**D**10	**$**n	**$**25
Screen Number Status	**D**n+1	**D**11	**$**n+1	**$**26
Curve Control Status	**D**n+2	**D**12	**$**n+2	**$**27
History Sampling Status	**D**n+3	**D**13	**$**n+3	**$**28
History Clearing Status	**D**n+4	**D**14	**$**n+4	**$**29
Recipe Control Status	**D**n+5	**D**15	**$**n+5	**$**30
Recipe Group Control Status	**D**n+6	**D**16	**$**n+6	**$**31
System Control Status	**D**n+7	**D**17	**$**n+7	**$**32
Enhanced Recipe Control Status	**D**n+8	**D**18	**$**n+8	**$**33
Enhanced Recipe Group Number Status	**D**n+9	**D**19	**$**n+9	**$**34

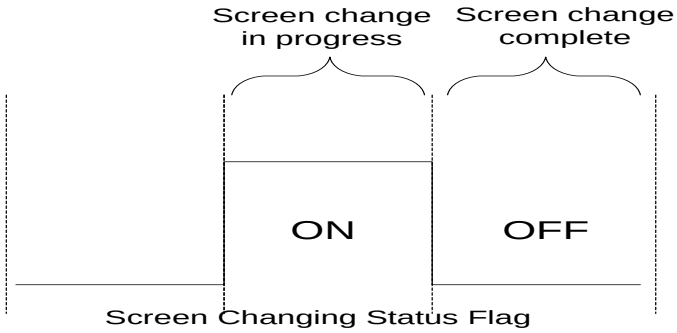
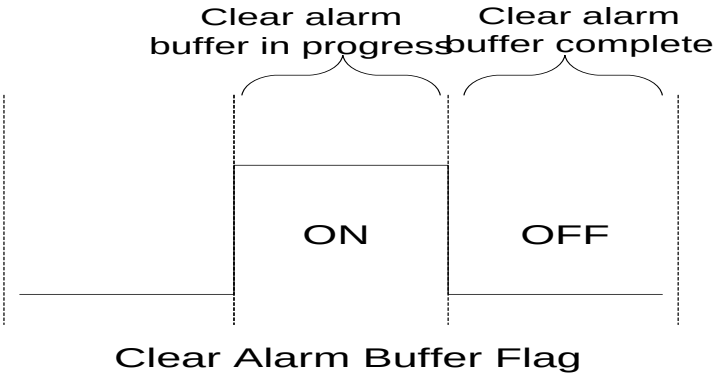
Table F4-2-1 Status Block Register Types

◆ General Control Status Register

General Control Status Register

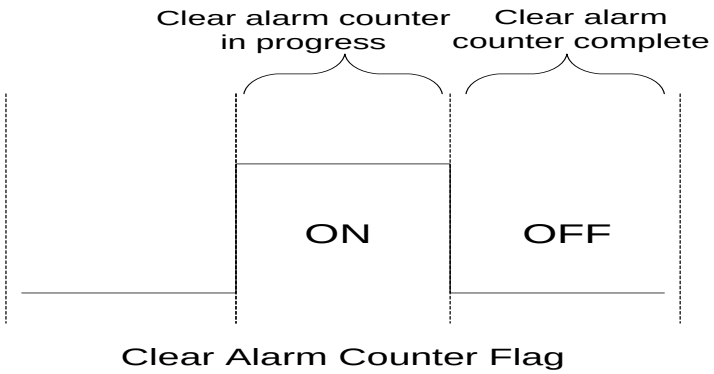
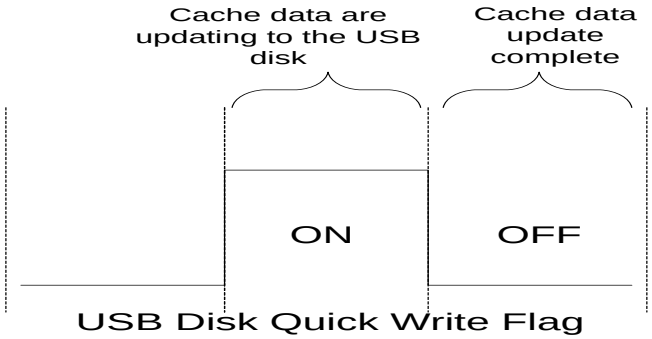
Table 4-2-2 Status Block—General Control Status Registers



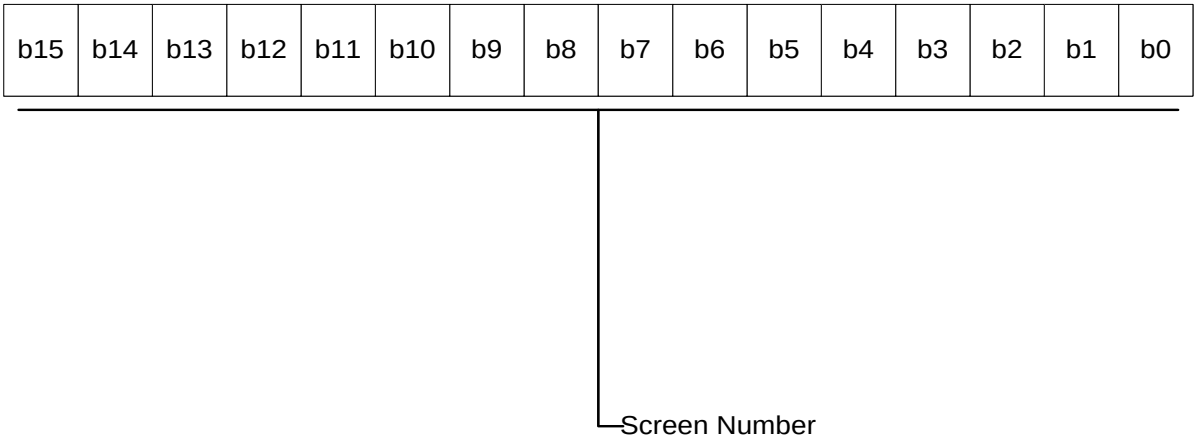
b0 – Screen Changing Status	➢ This flag is ON when screen change is in progress. ➢ This flag is OFF when screen change is completed. 
b3 – Clear Alarm Buffer	➢ This flag is ON when clear alarm buffer is in progress. ➢ This flag is OFF when clear alarm buffer is completed. 
b4 – Clear Alarm Counter	➢ This flag is ON when clear alarm counter is in progress. ➢ This flag is OFF when clear alarm counter is completed.

General Control Status Register

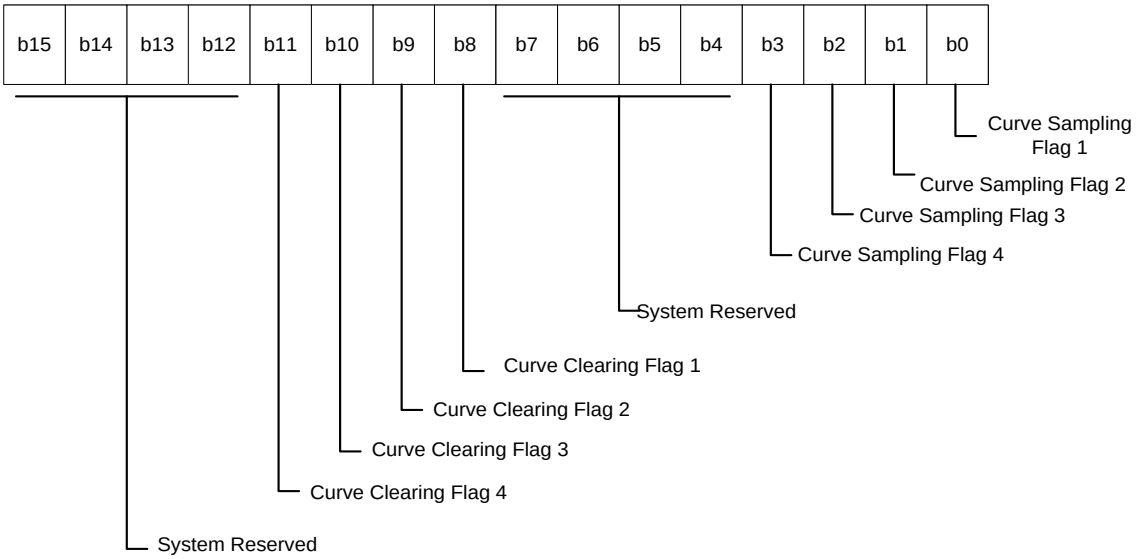
Table 4-2-2 Status Block—General Control Status Registers

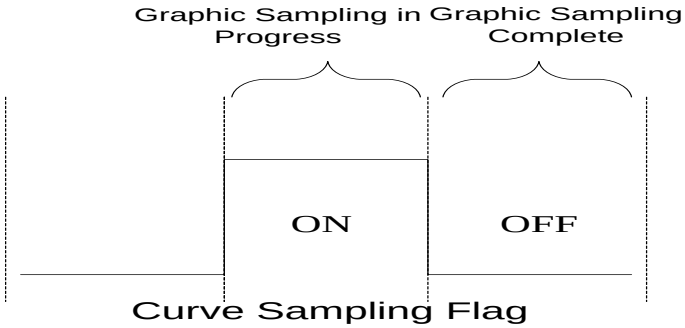
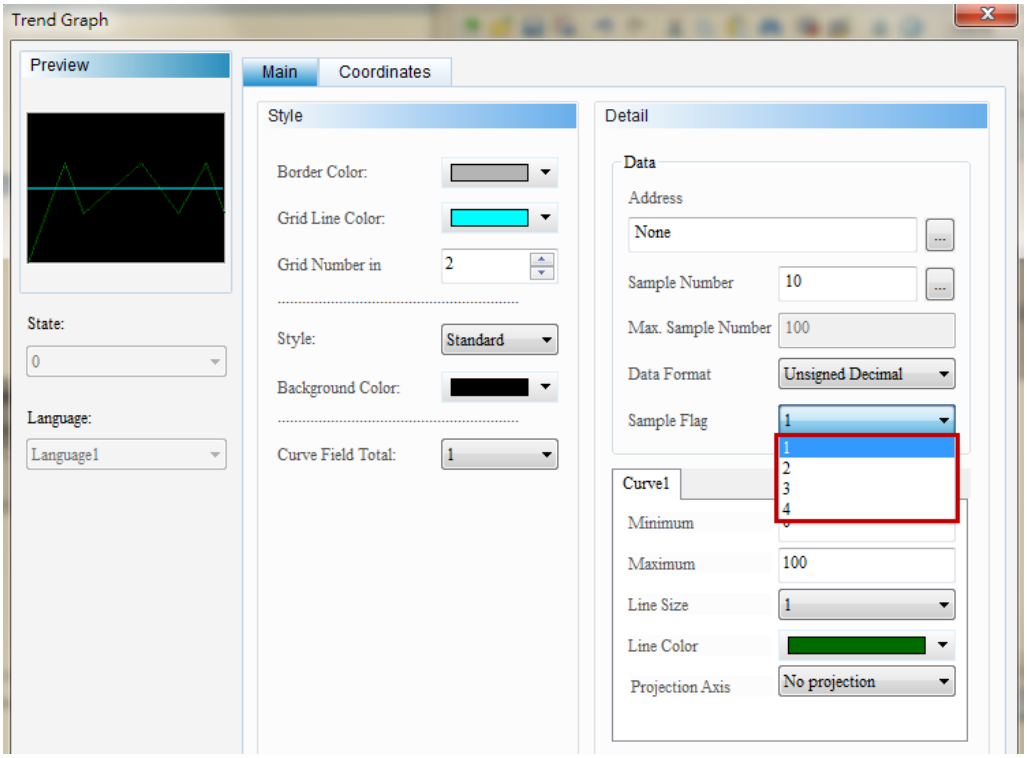
<table>
<tr><td></td><td> 
</td></tr>
<tr><td>b5 – USB Disk Quick Write</td><td>➢ This flag is ON when HMI cache data are updating to the USB disk.
➢ This flag is OFF when data update is completed.
 
</td></tr>
<tr><td>b8 ~ b10 – Set User Security Level</td><td>➢ From Bits 8-10, we can find out the security level of present HMI operators.
<table>
<tr><th rowspan="2">Security Level</th><th colspan="3">Flag Control</th></tr>
<tr><th>Bit 10</th><th>Bit 9</th><th>Bit 8</th></tr>
<tr><td>Security Level 0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Security Level 1</td><td>0</td><td>0</td><td>1</td></tr>
<tr><td>Security Level 2</td><td>0</td><td>1</td><td>0</td></tr>
<tr><td>Security Level 3</td><td>0</td><td>1</td><td>1</td></tr>
<tr><td>Security Level 4</td><td>1</td><td>0</td><td>0</td></tr>
<tr><td>Security Level 5</td><td>1</td><td>0</td><td>1</td></tr>
<tr><td>Security Level 6</td><td>1</td><td>1</td><td>0</td></tr>
<tr><td>Security Level 7</td><td>1</td><td>1</td><td>1</td></tr>
</table></td></tr>
</table>

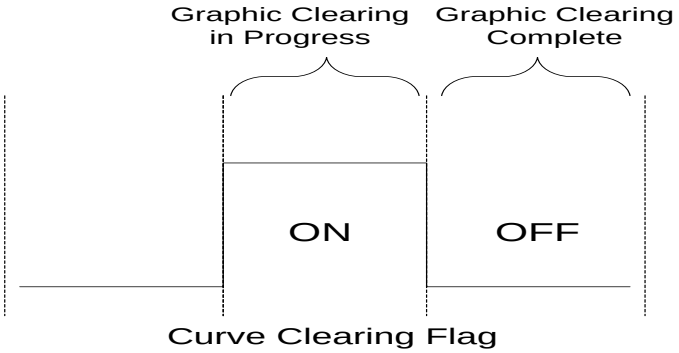
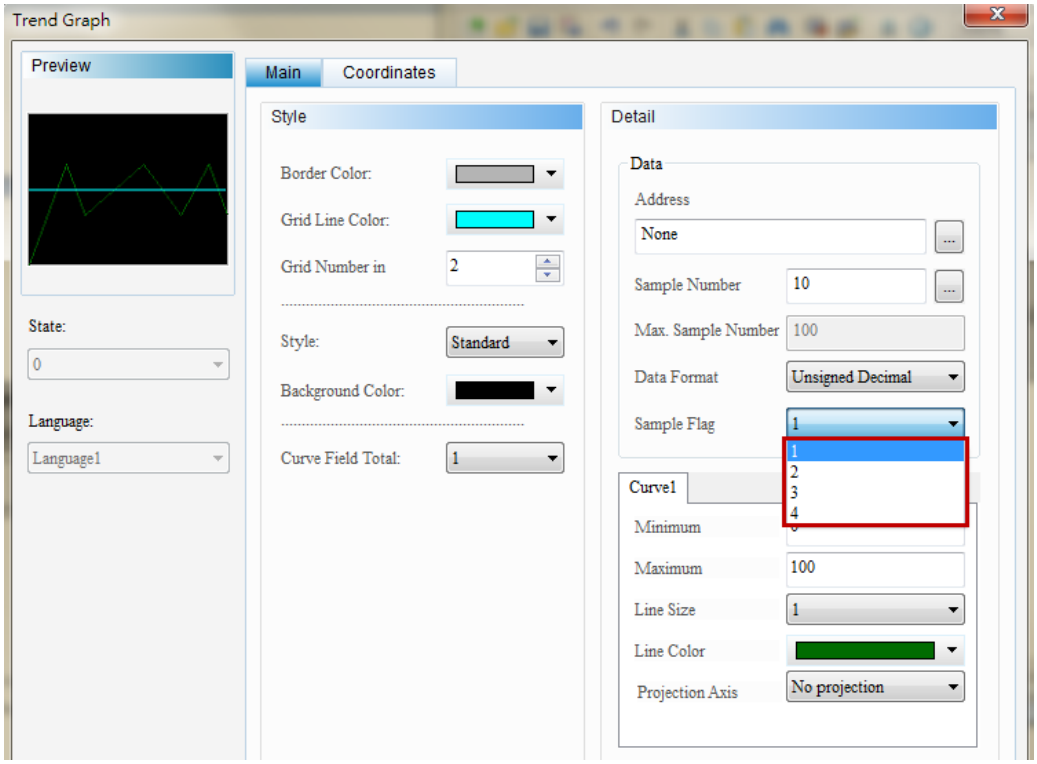
◆ Screen Number Status Register

Screen Number Status Register Table 4-2-3 Status Block—Screen Number Status Register	
	
b0 ~ b15 – Screen Number Status	➢ Users can check the number of the last opened screen with this status register.

◆ Curve Control Status Stratus

Curve Control Status Stratus Table 4-2-4 Status Block-- Curve Control Status Stratus	
	
b0 ~ b3 – Curve Sampling Status Flags (1~4)	➢ The corresponding curve sampling status flag is ON when the element of general or X-Y curves samples data. The flag is OFF immediately after data sampling.

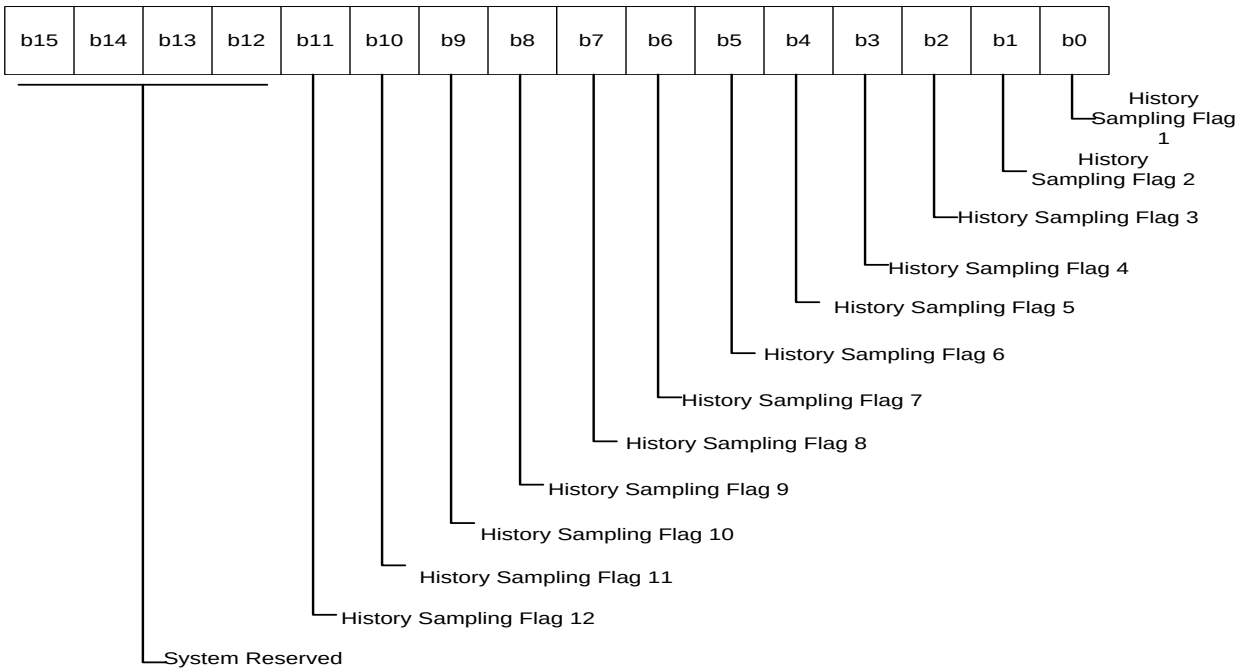
Curve Control Status Stratus Table 4-2-4 Status Block-- Curve Control Status Stratus	
	 ➢ The sampling flag 1 of the curve element should correspond to the curve sampling flag 1, sampling flag 2 of the curve element to the curve sampling flag 2, etc. 
b8 ~ b11 – Curve Clearing Status Flags (1~4)	➢ When the element of general or X-Y curves clears data, the corresponding curve sampling status flag is ON. The flag is OFF immediately after data clearing.

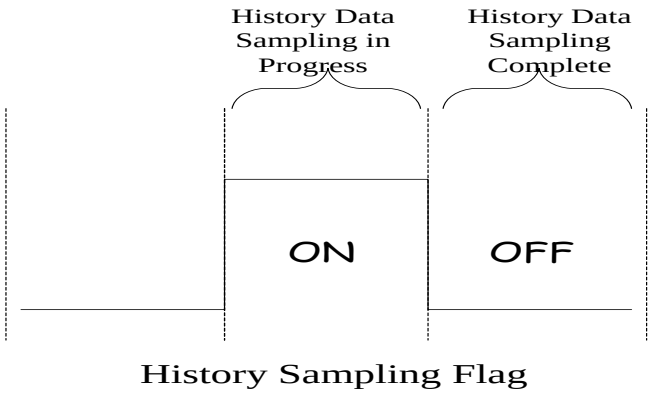
Curve Control Status Stratus Table 4-2-4 Status Block-- Curve Control Status Stratus	
	 ➢ The clearing flag 1 of the curve element should correspond to the curve clearing flag 1, clearing flag 2 of the curve element to the curve clearing flag 2, etc. 

◆ History Sampling Status Register

History Sampling Status Register

Table 4-2-5 Status Block—History Sampling Status Register

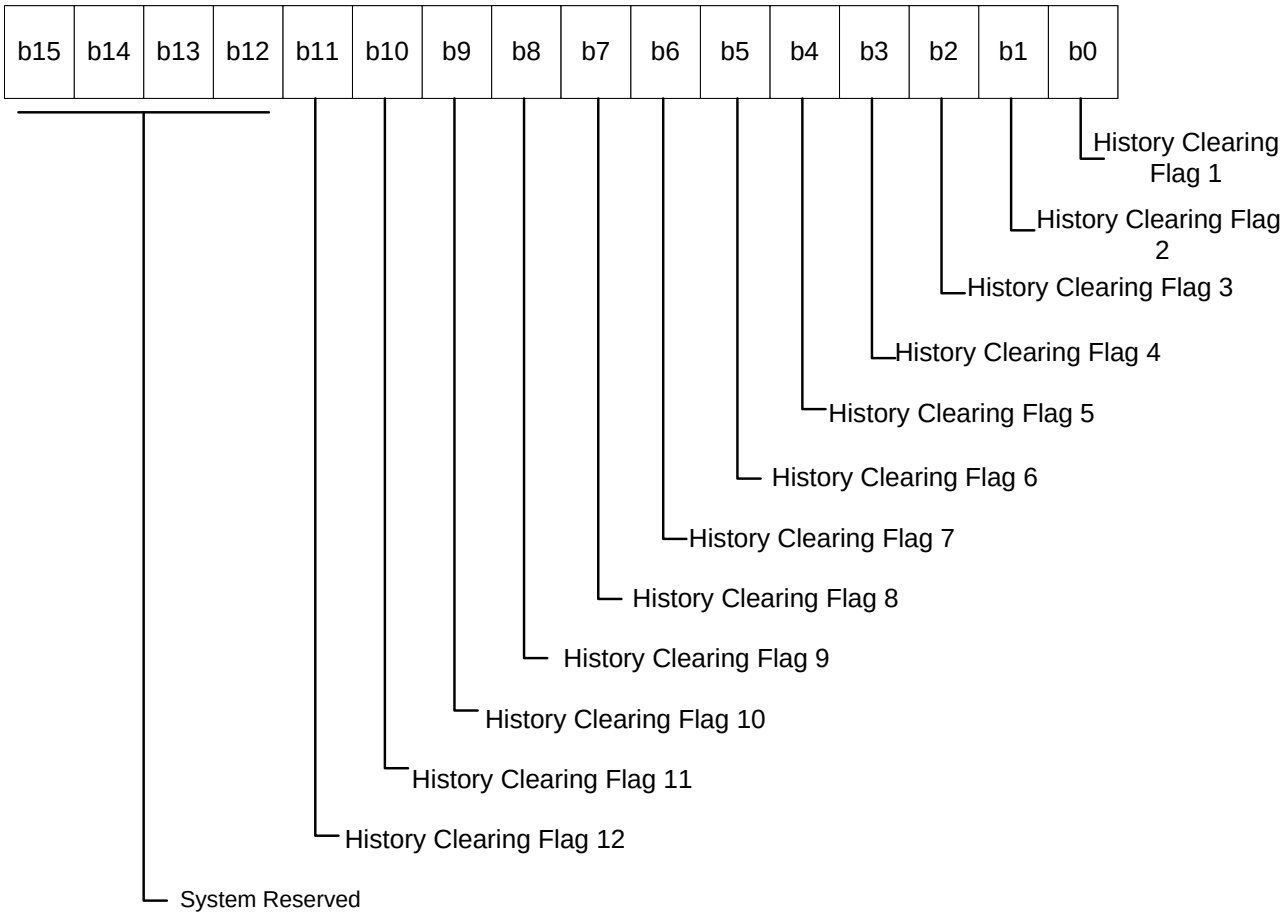


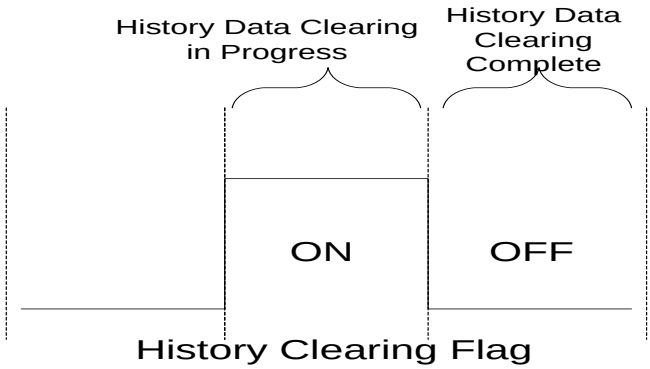
b0 ~ b11 – History Sampling Status Flags (1 ~ 12)	➢ When history sampling is in progress, the corresponding history sampling status flag is ON. The flag is OFF immediately after history sampling is completed. 

◆ Clear History State Register

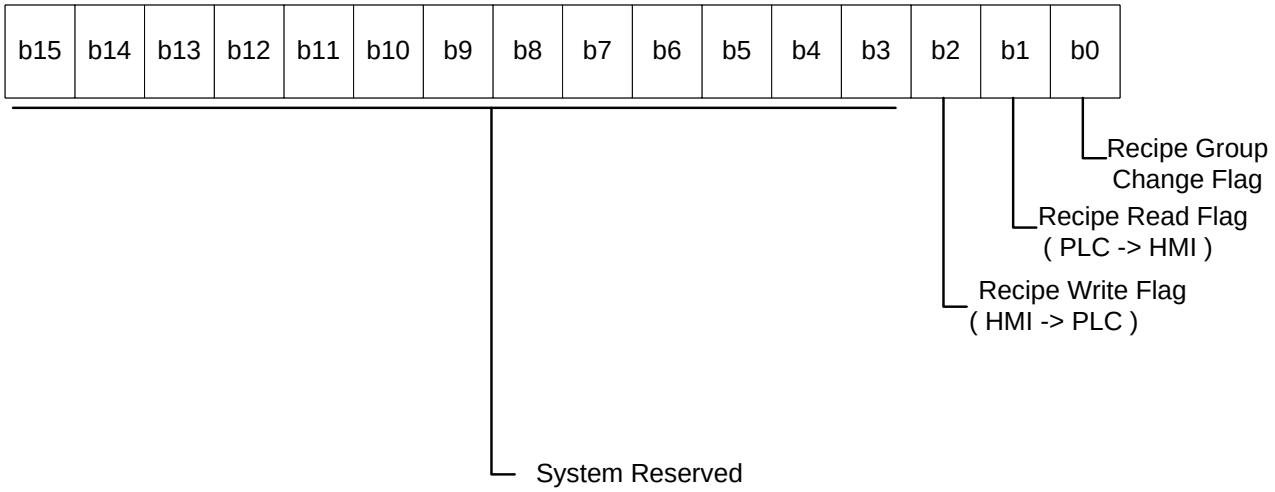
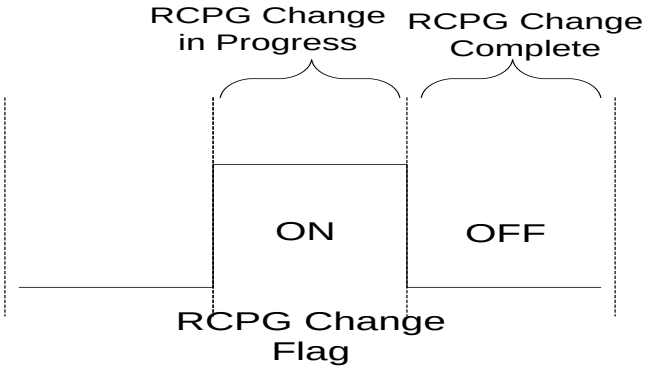
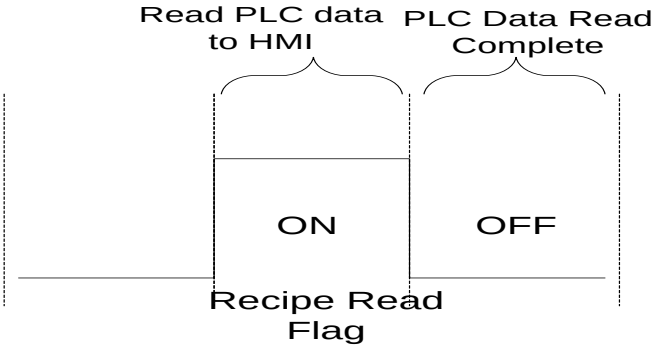
Clear History State Register

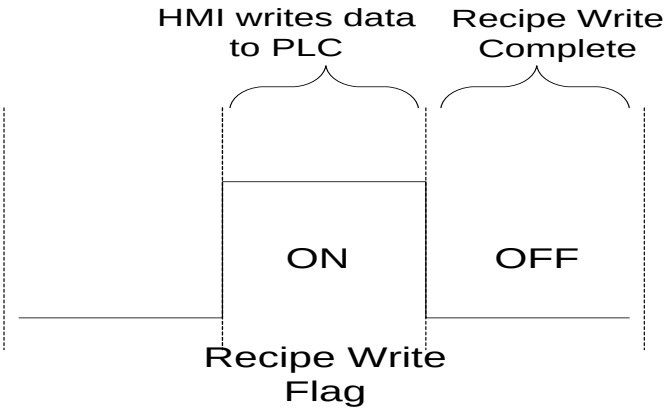
Table 4-2-6 Clear History State Register



b0 ~ b11 –History Clearing Status Flags (1 ~ 12)	➢ When history clearing is in progress, the corresponding history clearing status flag is ON. The flag is OFF immediately after history clearing is completed. 

◆ Recipe Control Status Register

Recipe Control Status Register Table 4-2-7 Status Block—Recipe Control Status Register	
	
b0 – Recipe Number Change Status Flag	➢ When the control recipe group in the status block changes, the recipe group change status flag is ON. The flag is immediately OFF after changing the recipe group and updating the RCPNO. 
b1 – Recipe Read Status Flag	➢ When the HMI reads the data of a recipe group from the control block, the recipe read status flag is ON. The flag is OFF immediately after the data are read and saved. 
b2 – Recipe	➢ When the HMI sends the data of a recipe group to the control block,

Write Status Flag	the recipe write status flag is ON. The flag is OFF immediately after data are written to the control block. 

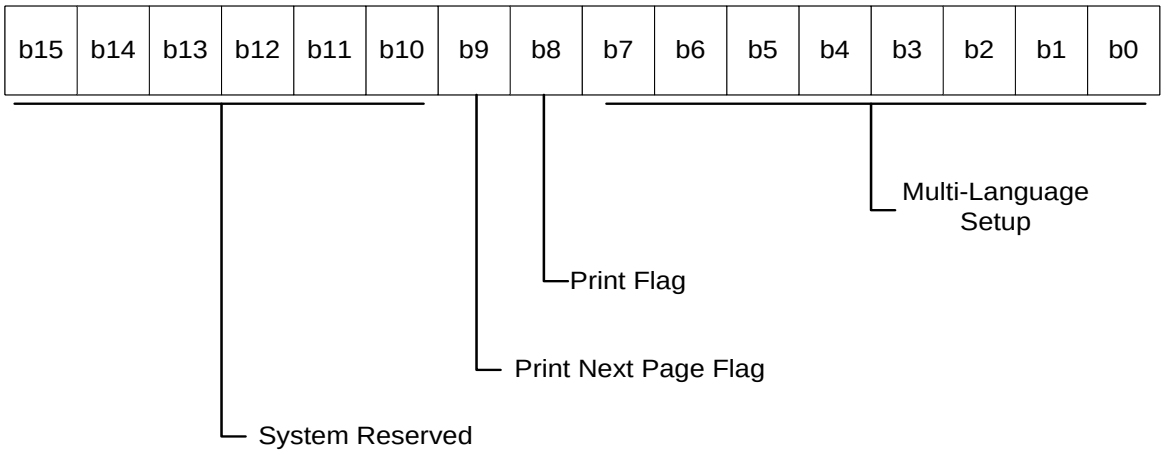
◆ Recipe Number Control Status Register

Recipe Number Control Status Register Table 4-2-8 Status Block—Recipe Number Control Status Register	
b15 b14 b13 b12 b11 b10 b9 b8 b7 b6 b5 b4 b3 b2 b1 b0 └ Define Recipe Number	
b0 ~ b15 – Recipe Number Definition Status	➢ Whether it is changing the value of the recipe number (RCPNO) register from the control block or HMI, as long as the value is changed, the value in the RCPNO register is updated to enable the control block to obtain the up-to-date recipe number from this register. ➢ This RCPNO definition flag must be used along with the RCPNO change flag. Please refer to Table 4-2-7 Recipe Control Stratus Register b0.

◆ System Control Status Register

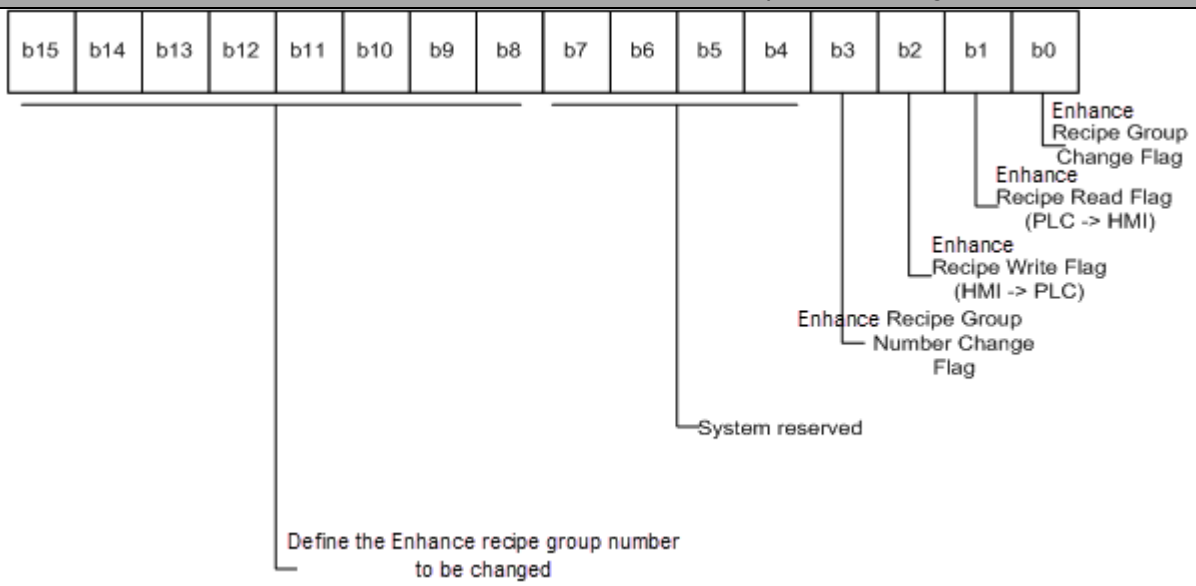
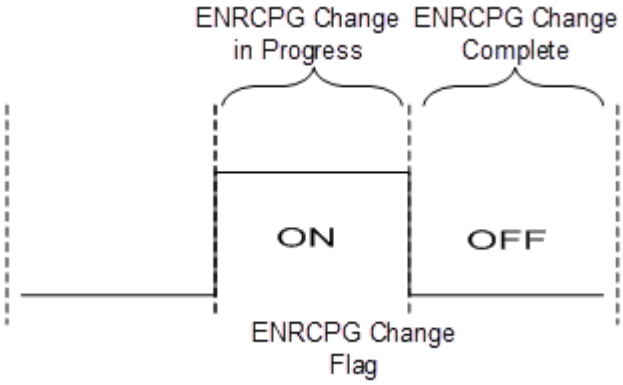
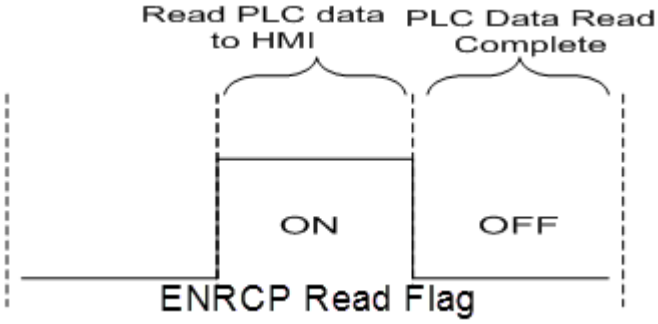
System Control Status Register

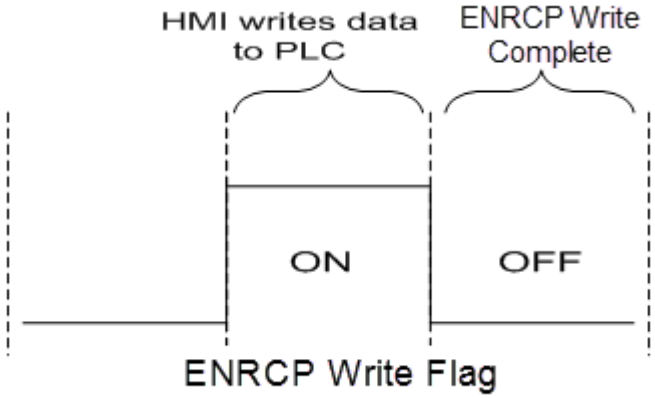
Table 4-2-9 Status Block-- System Control Status Register



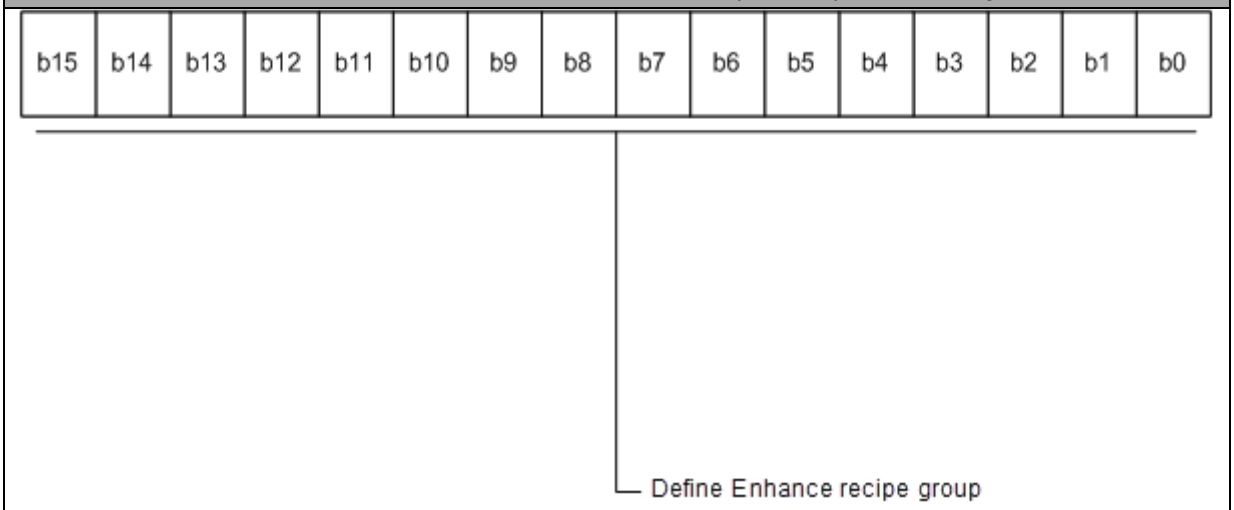
b0 ~ b7 – Multi-Language Setup	➢ Displays the corresponding status of the language in use.
b8 – Print Status Flag	➢ When the flag is ON, the printer is printing the display screen or edited screen of the HMI. When the flag is OFF, the printer is idled.
b9 – Print Next Page Status Flag	➢ When the flag is ON, the printer is ejecting paper to turn to the next page. When the flag is OFF, the printer is idled.

◆ Enhanced Recipe Control Status Register

Enhanced Recipe Control Status Register 《Table 4-2-10》Status Block-Enhanced Recipe Control Register	
	
b0 – Enhanced Recipe Group Change Status Flag	➢ When the enhanced recipe group in control block changes, the enhanced recipe group change status flag is On. Then, the flag will be Off right away when HMI changes the group and updates the RCPNO number. 
b1 – Enhanced Recipe Read Status Flag	➢ When HMI reads the recipe data from control block, the enhanced recipe read status flag is On. Then, this flag will be Off as soon as the enhanced recipe data area read and saved. 
b2 – Enhanced Recipe Write	➢ When HMI sends the enhanced recipe data to control block,

Status Flag	the enhanced recipe write status flag is On. And the flag will be Off as soon as the enhanced recipe is written to the control block. 

◆ Enhanced Recipe Group Control Status Register

Enhanced Recipe Group Control Status Register 《Table 4-2-11》Status Block - Enhanced Recipe Group Control Register	
	
b0 ~ b15 – Enhanced Recipe Group Definition Status	➢ No matter the value of enhanced recipe group definition register (ENRCPNO) is changed from control block or HMI, as long as the value is changed, the value in ENRCPNO register is updated. This enables the control block to obtain the current recipe number from this register. ➢ This flag shall work with the enhanced recipe group change flag. Please refer to Table 4-2-10 Enhanced Recipe Control Status Register b0.

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Chapter 5 Buttons

This chapter mainly describes the button meter elements provided in the DOPSoft and how they are operated and configured.

◆ Button Element Classification

Button		Set
		Reset
		Momentary
		Maintained
		Multistate
		Set Value
		Set Constant
		Increment
		Decrement
		Goto Screen
		Previous Page
		System Date Time
		Password Table Setup
		Enter Password
		Contrast Brightness
		Low Security
		System Menu
		Report List
		Screen Capture
		Remove Storage
		Import/Export Recipe
		Calibration
		Language Change
		Import / Export FileSlot

Table 5-1-1 Button Element Classification

◆ Button Element Shared Properties

Button Element	Macro	Read Memory	Write Memory	Read Offset Memory	Write Offset Memory	Invisible Address	Interlock Address	Picture (Picture Bank Name/Picture Name/Transparent Effect/Transparent Color)	Text (Input Text/ Font/ Size/ Color)	Interlock State	Blink
Set	ON Before execute After execute	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
Reset	OFF Before execute After execute	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
Momentary	ON OFF Before execute After execute	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
Maintained	ON OFF Before execute After execute	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
Multistate	Before execute After execute	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
Set Value	Before execute After execute		◎		◎	◎	◎	◎	◎	◎	
Set Constant	Before execute After execute		◎		◎	◎	◎	◎	◎	◎	
Increment	Before execute After execute	◎	◎	◎	◎	◎	◎	◎	◎	◎	
Decrement	Before execute After	◎	◎	◎	◎	◎	◎	◎	◎	◎	

Button Element	Macro	Read Memory	Write Memory	Read Offset Memory	Write Offset Memory	Invisible Address	Interlock Address	Picture (Picture Bank Name/Picture Name/Transparent Effect/Transparent Color)	Text (Input Text/ Font/ Size/ Color)	Interlock State	Blink
	execute										
Goto Screen	Before execute					◎	◎	◎	◎	◎	
	After execute										
Previous Page	Before execute					◎	◎	◎	◎	◎	
	After execute										
System Date Time	Before execute					◎	◎	◎	◎	◎	
	After execute										
Password Table Setup	Before execute					◎	◎	◎	◎	◎	
	After execute										
Enter Password	Before execute					◎	◎	◎	◎	◎	
	After execute										
Contrast Brightness	Before execute					◎	◎	◎	◎	◎	
	After execute										
Low Security	Before execute					◎	◎	◎	◎	◎	
	After execute										
System Menu	Before execute					◎	◎	◎	◎	◎	
	After execute										
Report List	Before execute					◎	◎	◎	◎	◎	
	After execute										
Screen Capture	Before execute					◎	◎	◎	◎	◎	
	After execute										
Remove	Before					◎	◎	◎	◎	◎	

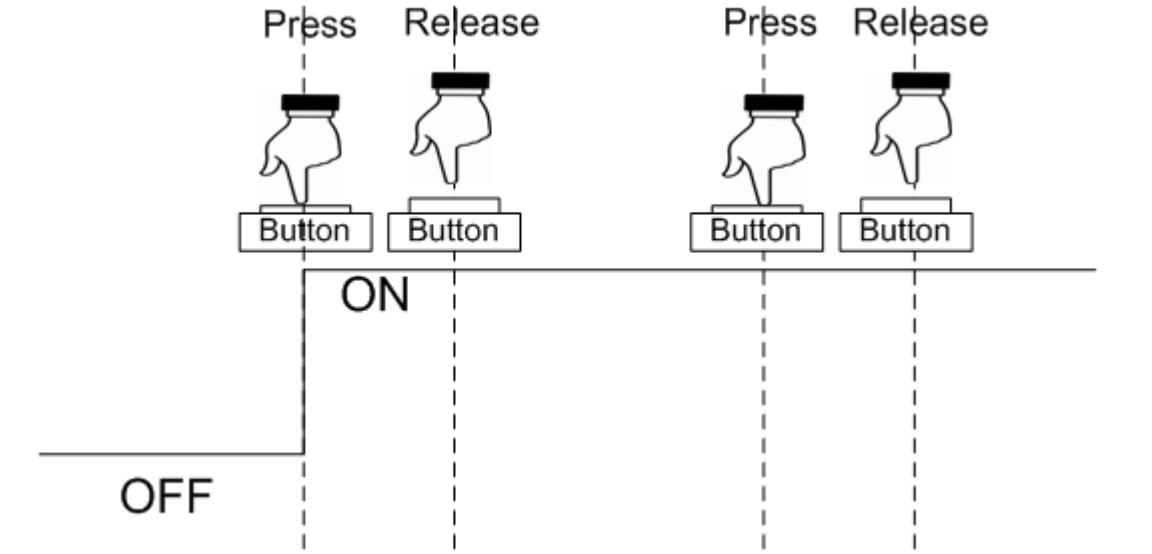
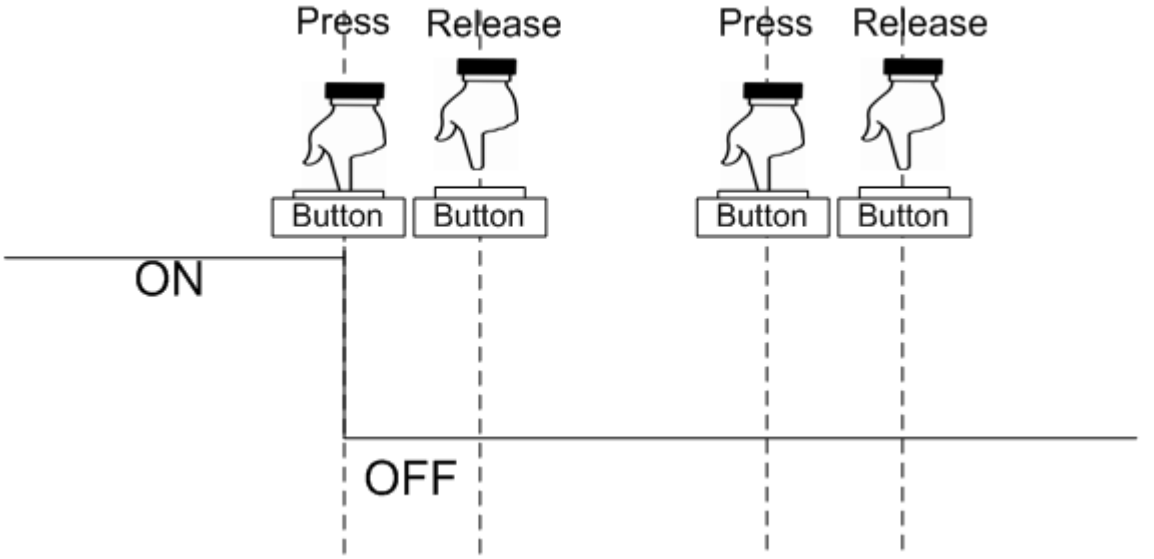
Button Element	Macro	Read Memory	Write Memory	Read Offset Memory	Write Offset Memory	Invisible Address	Interlock Address	Picture (Picture Bank Name/Picture Name/Transparent Effect/Transparent Color)	Text (Input Text/ Font/ Size/ Color)	Interlock State	Blink
Storage	execute										
	After execute										
Import/Export Recipe	Before execute					◎	◎	◎	◎	◎	
	After execute										
Calibration	Before execute					◎	◎	◎	◎	◎	
	After execute										
Language Change	Before execute					◎	◎	◎	◎	◎	
	After execute										
Import/Export FileSlot	Before execute					◎	◎	◎	◎	◎	
	After execute										

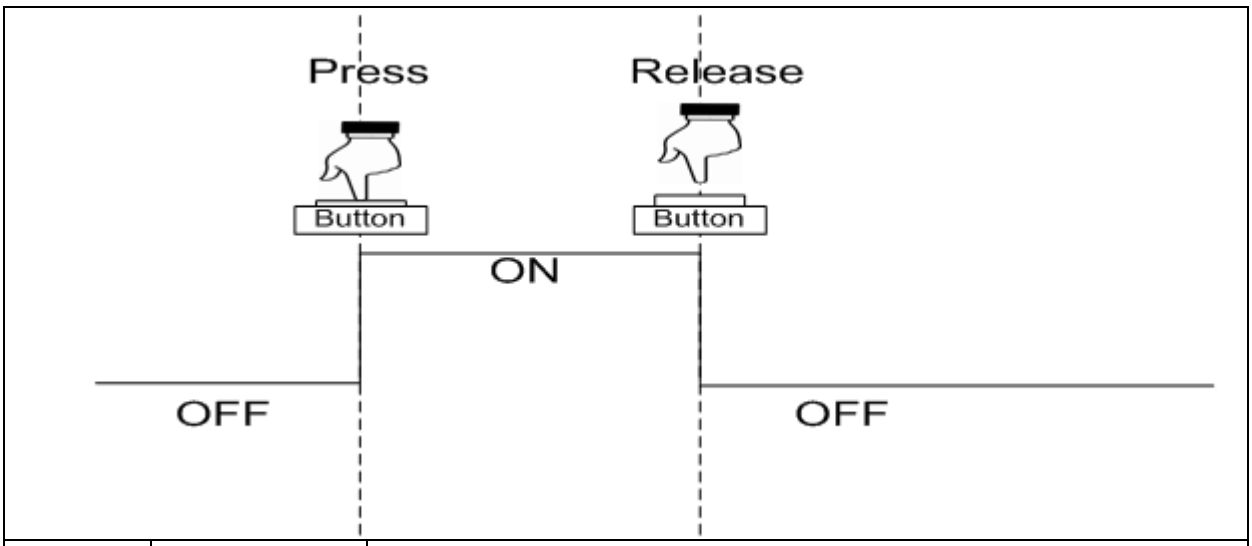
Table 5-1-2 Button Element Shared Properties

5-1 Set / Reset / Momentary / Maintained

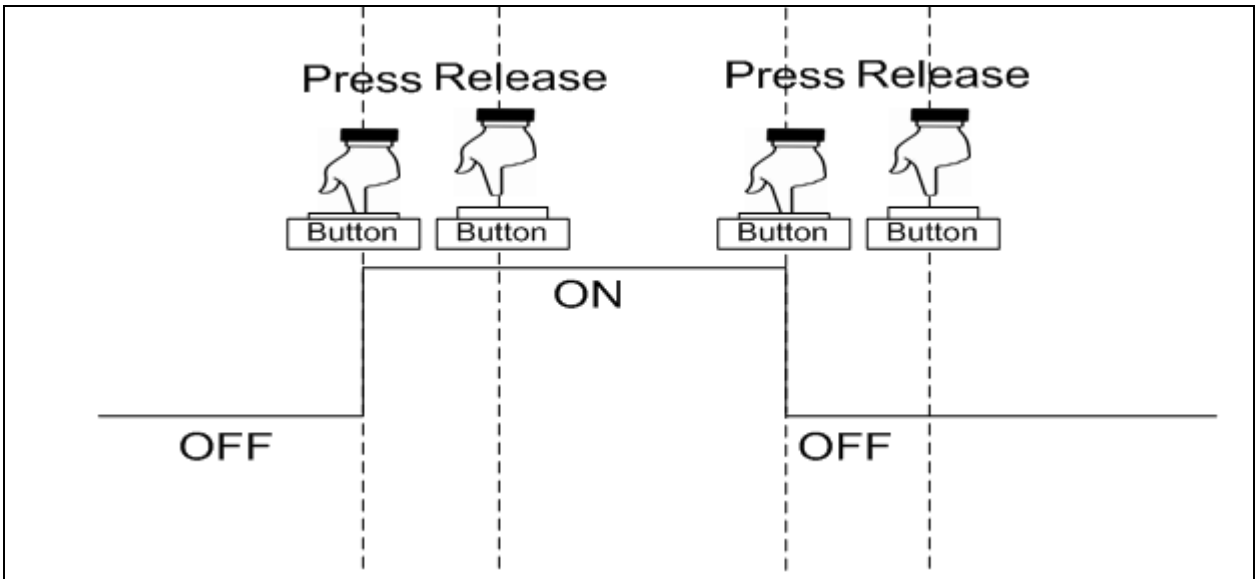
Set /Reset / Momentary / Maintained elements set or reset the communication addresses selected by touching the corresponding buttons or macros.

Users can create Set and Reset elements from [Element]→[Button], the button icons provided in the element toolbar, or by right-clicking the screen and select [Button] to create these elements.

		
	Set	➢ The Set button allows users to set the corresponding communication address to ON by touching the button. Users cannot set the state to OFF by touching the Set button again.
		
	Reset	➢ The Reset button allows users to set the corresponding communication address to OFF by touching the button. Users cannot set the state to ON by touching the Set button again.



	Momentary	➢ The Momentary button allows users to reverse the value of the selected communication address by touching the button. When users release the button, the original communication address is recovered. Users must touch the button continuously, in order to reverse the value of the communication address continuously.



	Maintained	➢ The Maintained button allows users to reverse the value of the selected communication address by touching the button. It is different from the Momentary button in a way that the communication address will continue to run reversely after it is released. Users need to touch the button again to recover the original value of the communication address.

Table 5-1-3 Differences among Set/Reset/Maintained/Momentary buttons

The DOPSoft also provides convenient composing tools for users to edit the properties of all elements by double-clicking the element, in order to easily edit the application screens.

Double-click the Set / Reset / Momentary / Maintained to call out the Set / Reset / Momentary / Maintained Properties screen as shown below.

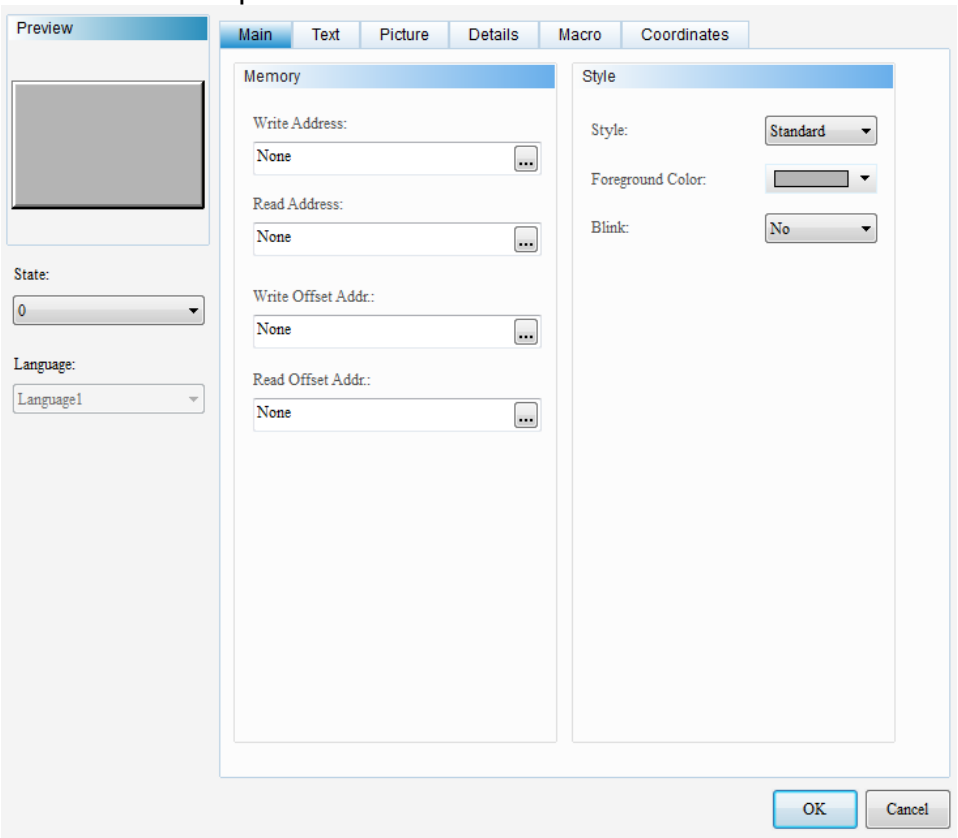


Figure 5-1-3 Set / Reset /Momentary/Maintained Properties

Set / Reset / Momentary / Maintained	
Function Page	**Content Description**
Preview	Views State 0 and State 1 and supports Multi-Language data display.
Main	Sets Write Address, Read Address, Write Offset Address, Read Offset Address, Style, Foreground Color, and Blink.
Text	Sets the content, font, font size, font color, bold/italic/underline of font, scaling, and alignment of the text to be displayed.
Picture	Sets Picture Bank Name, Alignment, Picture Stretch Mode, and Transparent Color.
Details	**Set / Reset / Maintained**
	Sets Interlock Address, Interlock State, Invisible Address, User Security Level, Set Low Security, Push Time, and Enable Confirmation Box.
	Momentary
	Sets Interlock Address, Interlock State, Invisible Address, User Security Level, Set Low Security, Push Time, Enable Confirmation Box, and Enable OFF Prompt Tone.
Macro	Sets Edit Set (ON) Macro, Edit Reset (OFF) Macro, Before execute Macro, and After execute Macro.
Coordinates	Sets the X-Y coordinate, width, and height of elements.

Table 5-1-4 Set/Reset/Momentary/Maintained Function Page

◆ Main

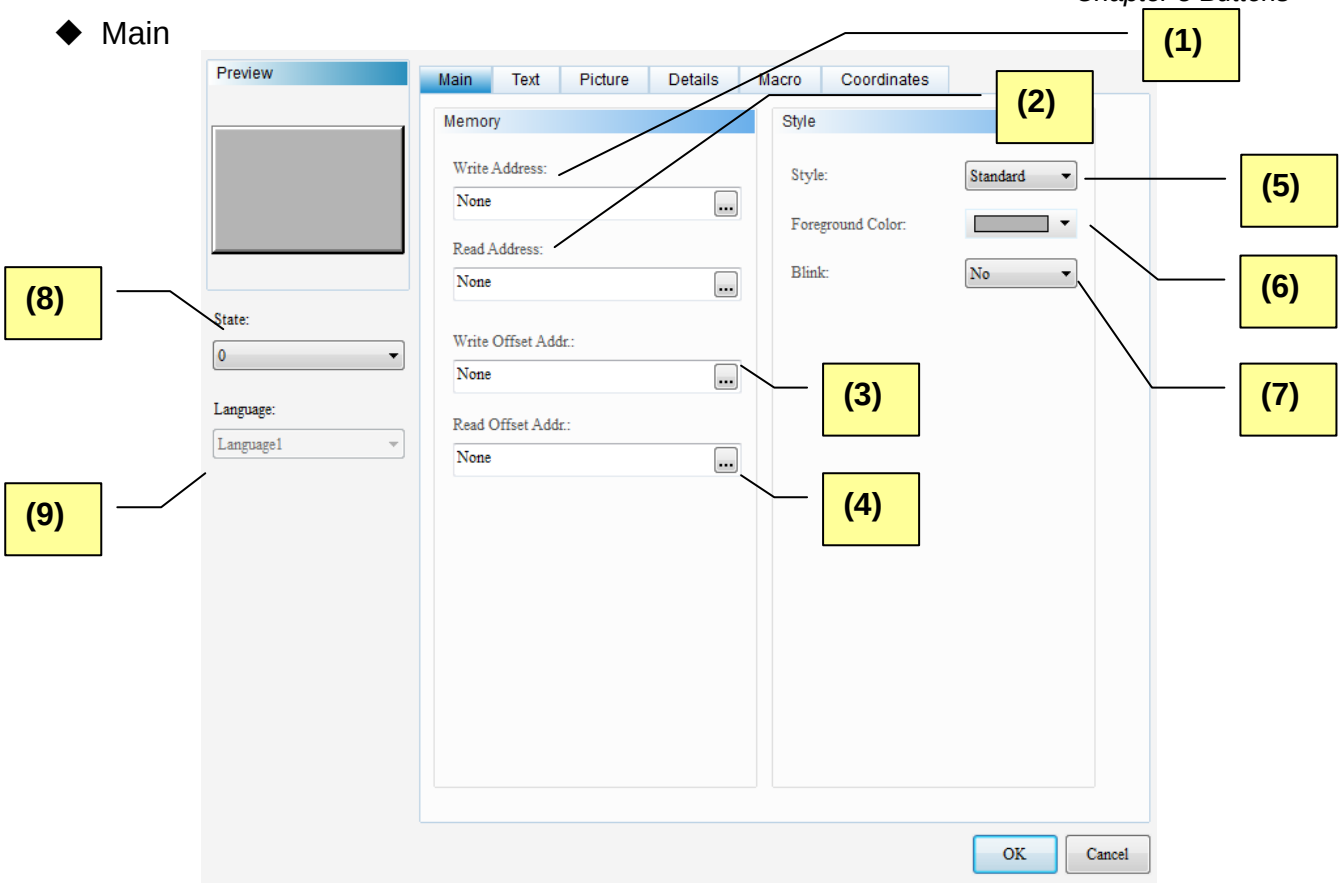
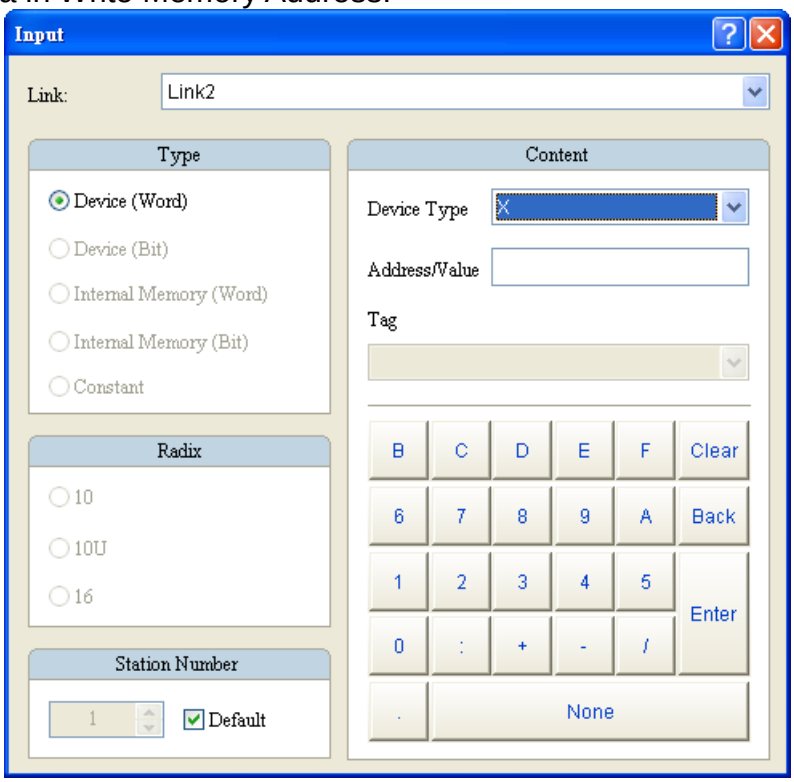
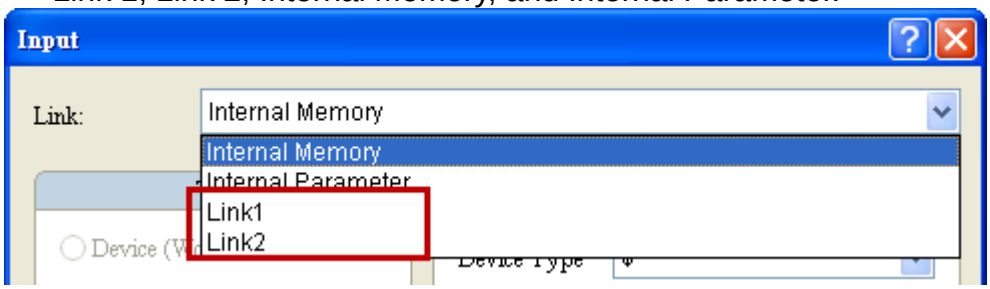
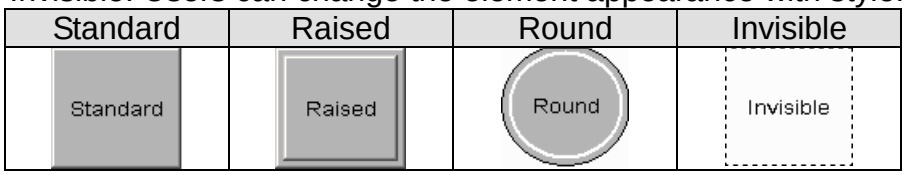
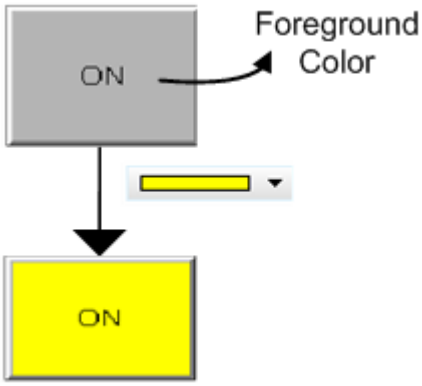
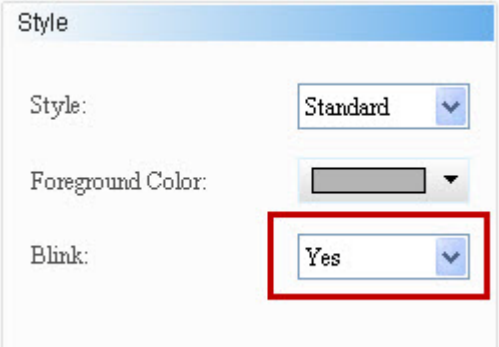
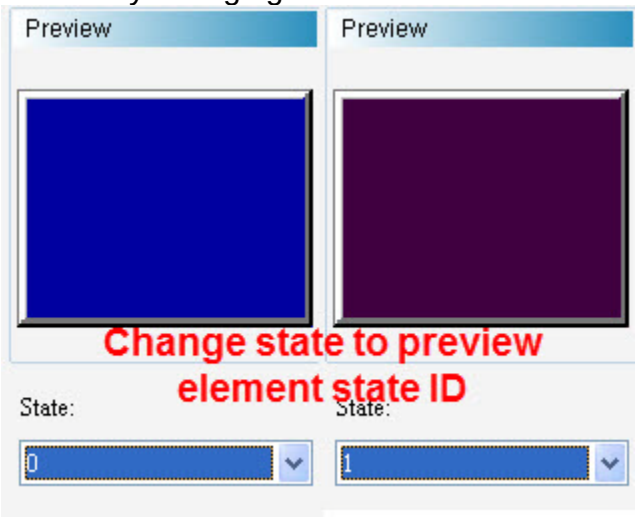
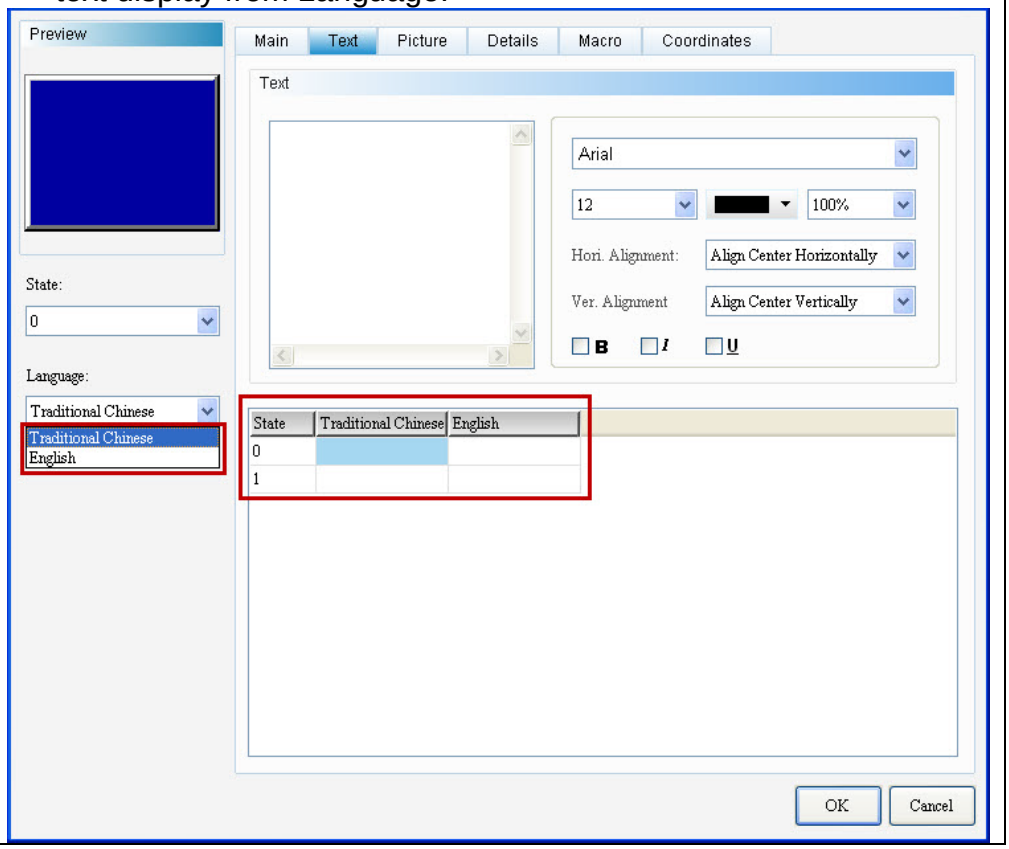


Figure 5-1-4 Set/Reset/Momentary/Maintained Element Main Properties Page

No.	Property	Function
(1)	Write Address	➢ Users can select the address of internal memory or controller register. If only Write Memory Address is selected and Read Memory Address is not selected, HMI will automatically read the data in Write Memory Address.  ➢ Users can select the link for different communication devices from Link Name. The quantity of the selected links will be displayed in this item. If there are many connection devices, users can select the required links from the pull-down. As shown below, there are Link 1, Link 2, Internal Memory, and Internal Parameter.  ➢ After selecting links and style and inputting the correct addresses, press the OK button, and the corresponding data will be recorded in the selected elements.
(2)	Read Address	➢ Users can select the address of internal memory or controller register. Others are the same as the Write Memory Address.
(3)	Write Offset Address	➢ Please refer to Appendix D Write and Read Offset Address.
(4)	Read Offset Address	

No.	Property	Function
(5)	Style	➢ There are four style, including Standard, Raised, Round, and Invisible. Users can change the element appearance with style. 
(6)	Foreground Color	➢ Sets foreground color of elements. ➢ When Style is “Invisible”, Foreground Color is disabled. 
(7)	Blink	➢ Uses can set blink prompt of elements when setting state change of buttons. The blink color is the opposite color of the foreground color. 
(8)	State	➢ Users can preview or change the parameters of the states of button elements by changing their states. 

No.	Property	Function
(9)	Language	➢ When language data are defined, users can edit the properties of text display from Language. 

◆ Text

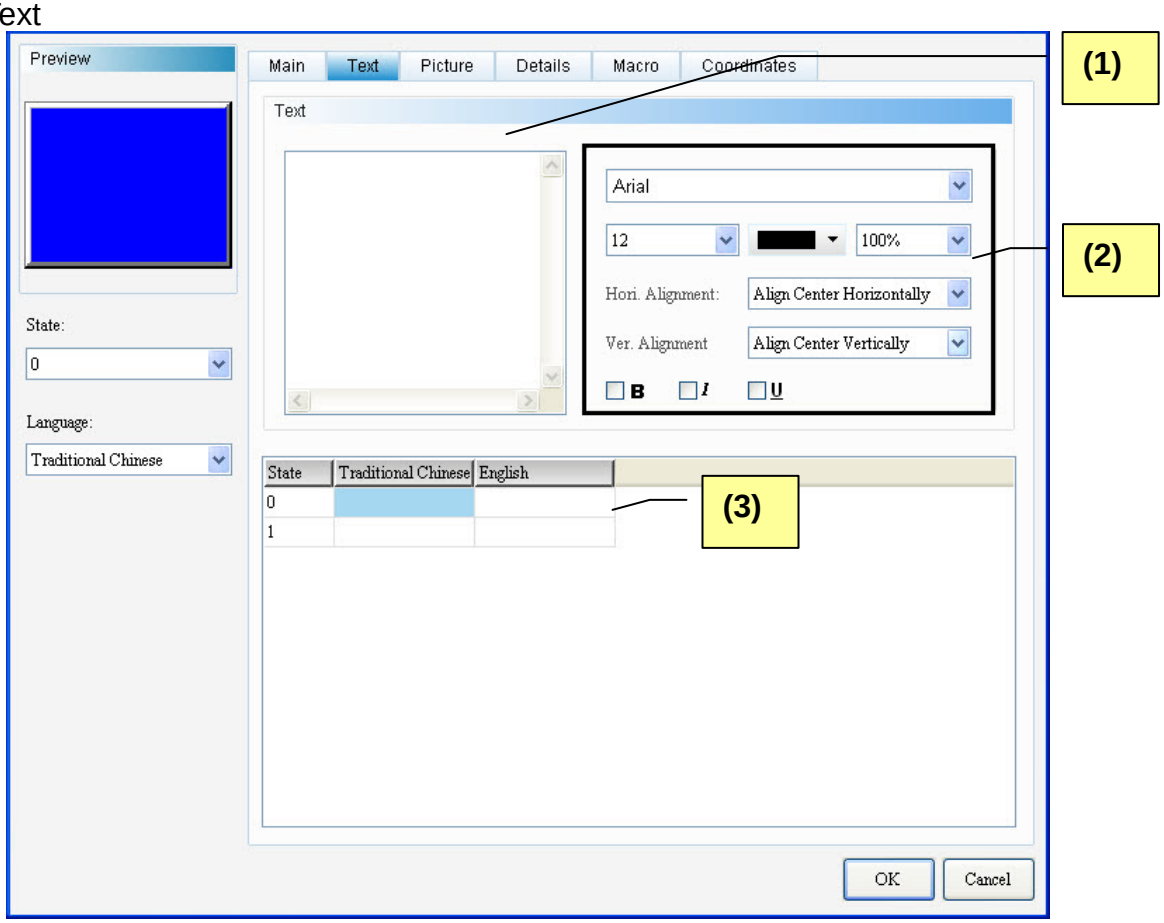
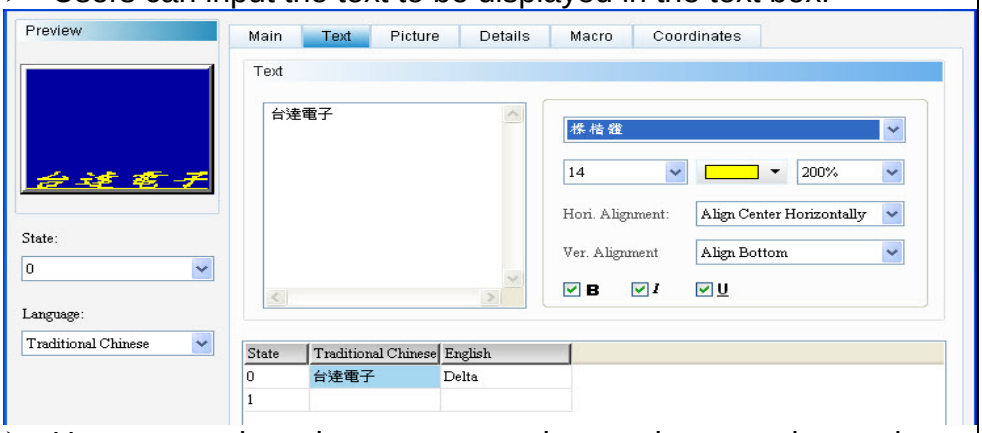


Figure 5-1-5 Set/Reset/Momentary/Maintained Element Text Properties Page

No.	Property	Function
(1)	Text	➢ Users can input the text to be displayed in the text box.  ➢ Users can select elements supporting text input as shown above and press the SPACE bar on the keyboard to edit text.
(2)	Text Properties	➢ Sets text properties, including font type, font size, font color, scaling, text alignment, and bold/italic/underline of font. Please refer to the above figure for details about the results of text properties.
(3)	Multi-Language Text Data	➢ Users can add Multi-Language text data from the Multi-Language Text Page. As shown in the Text Properties Figure, users can input English text in the English field.

◆ Picture

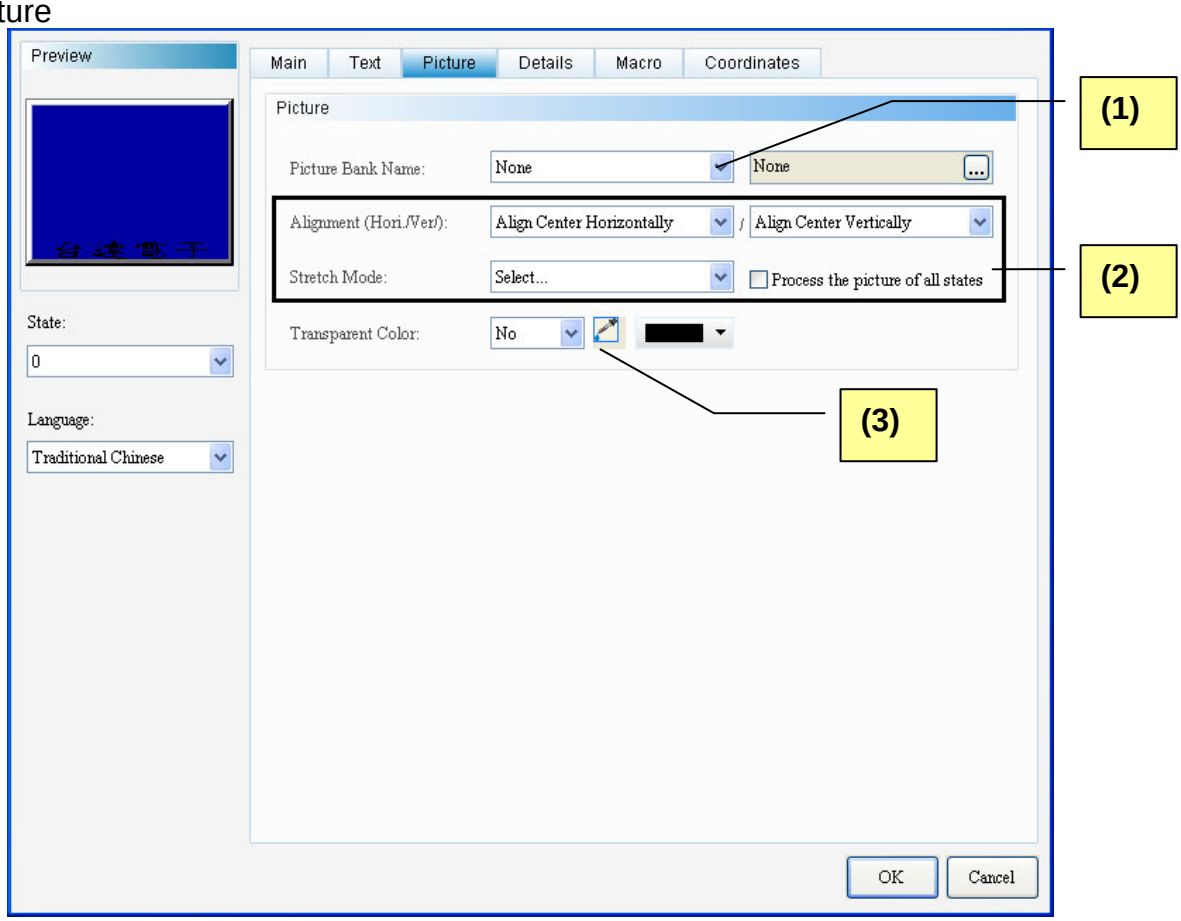
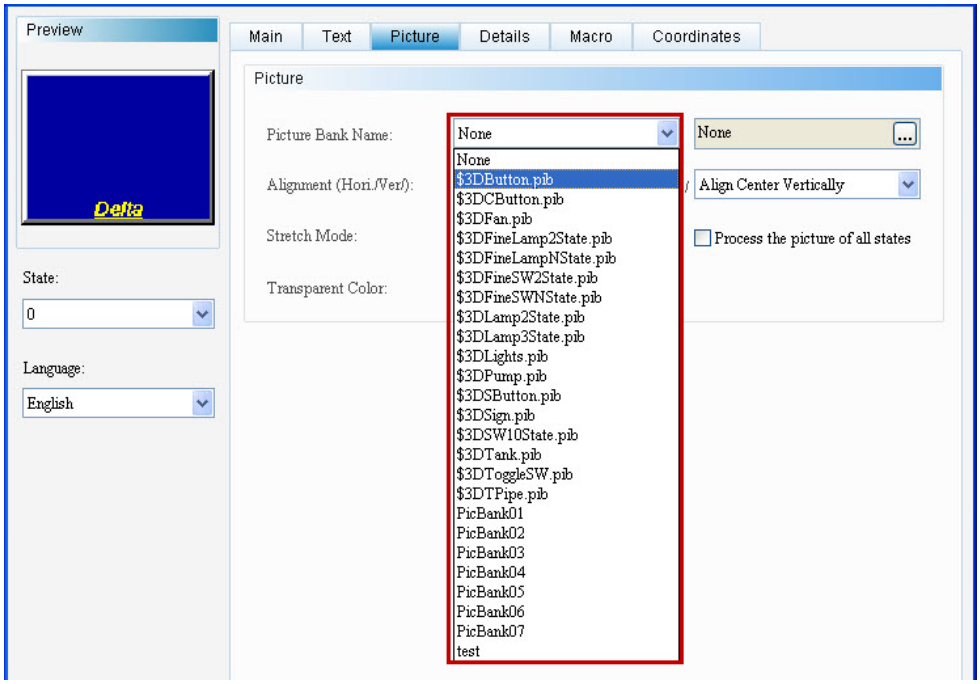
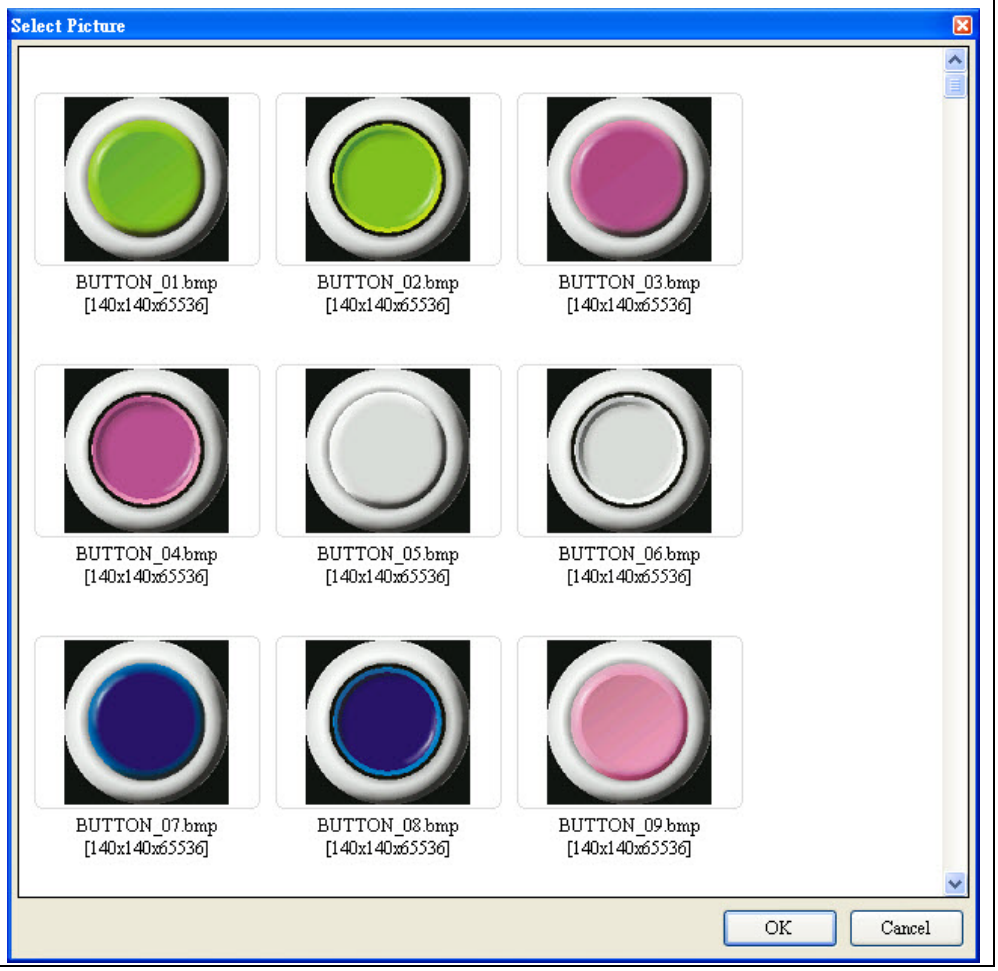
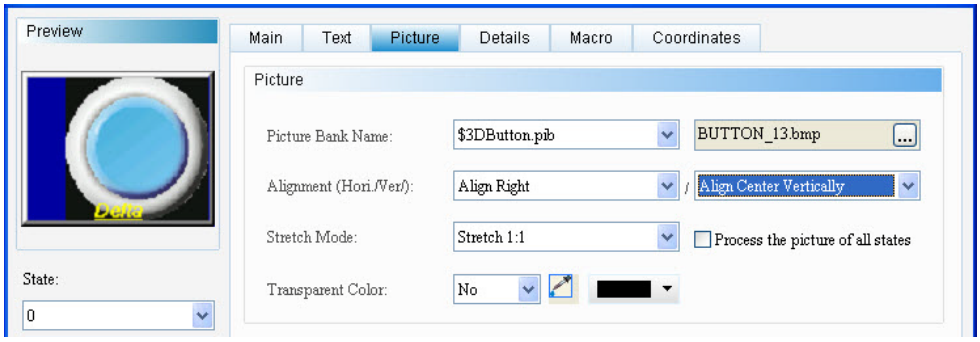
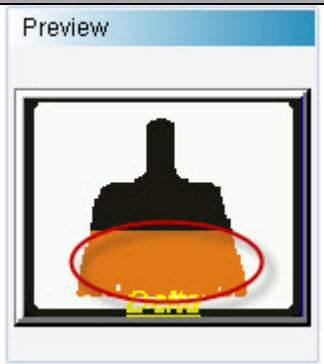
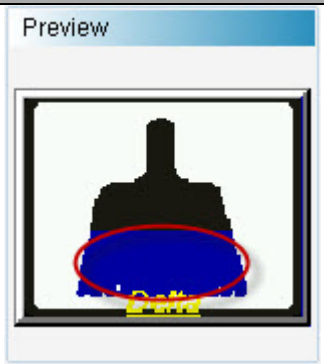


Figure 5-1-6 Set/Reset/Momentary/Maintained Element Picture Properties Page

No.	Property	Function
(1)	Picture Bank Name	➢ The default value for Picture Bank Name is “None”. Users wishing to select a display picture can select the desired picture in the built-in picture bank from the pull-down menu.  

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td rowspan="2">(2)</td><td>Alignment</td><td>➢ Users can align pictures alignment with the alignment options.
 
</td></tr>
<tr><td>Stretch Mode</td><td>➢ Stretch modes include: Fill, Keep Aspect Ratio, and Actual Size.
<table>
<tr><th>Fill</th><th>Keep Aspect Ratio</th><th>Actual Size</th></tr>
<tr><td>In the “Fill” mode, the selected picture will fill up the entire display area.</td><td>In the “Keep Aspect Ratio” mode, the selected picture will fit in the display area proportionally according to the picture ratio.</td><td>In the “Actual Size” mode, the picture will be displayed in its original size in the display area.</td></tr>
<tr><td> </td><td> </td><td> </td></tr>
</table>
➢ If “Process all state pictures” is selected, the system assumes that each element has multiple entries of state data, and some pictures may be unable to fill the entire display area. By selecting this item, users will not need to set individual pictures to save time editing.
</td></tr>
<tr><td>(3)</td><td>Transparent Color</td><td>➢ Users can set a color in the picture to transparent. In this case, by clicking the Transparent Color icon and then the orange part of the loom, the DOPSoft will omit all orange parts in the picture and turn them into transparent; thus turning the foreground color transparent.
</td></tr>
</table>

No.	Property	Function
		 

◆ Details

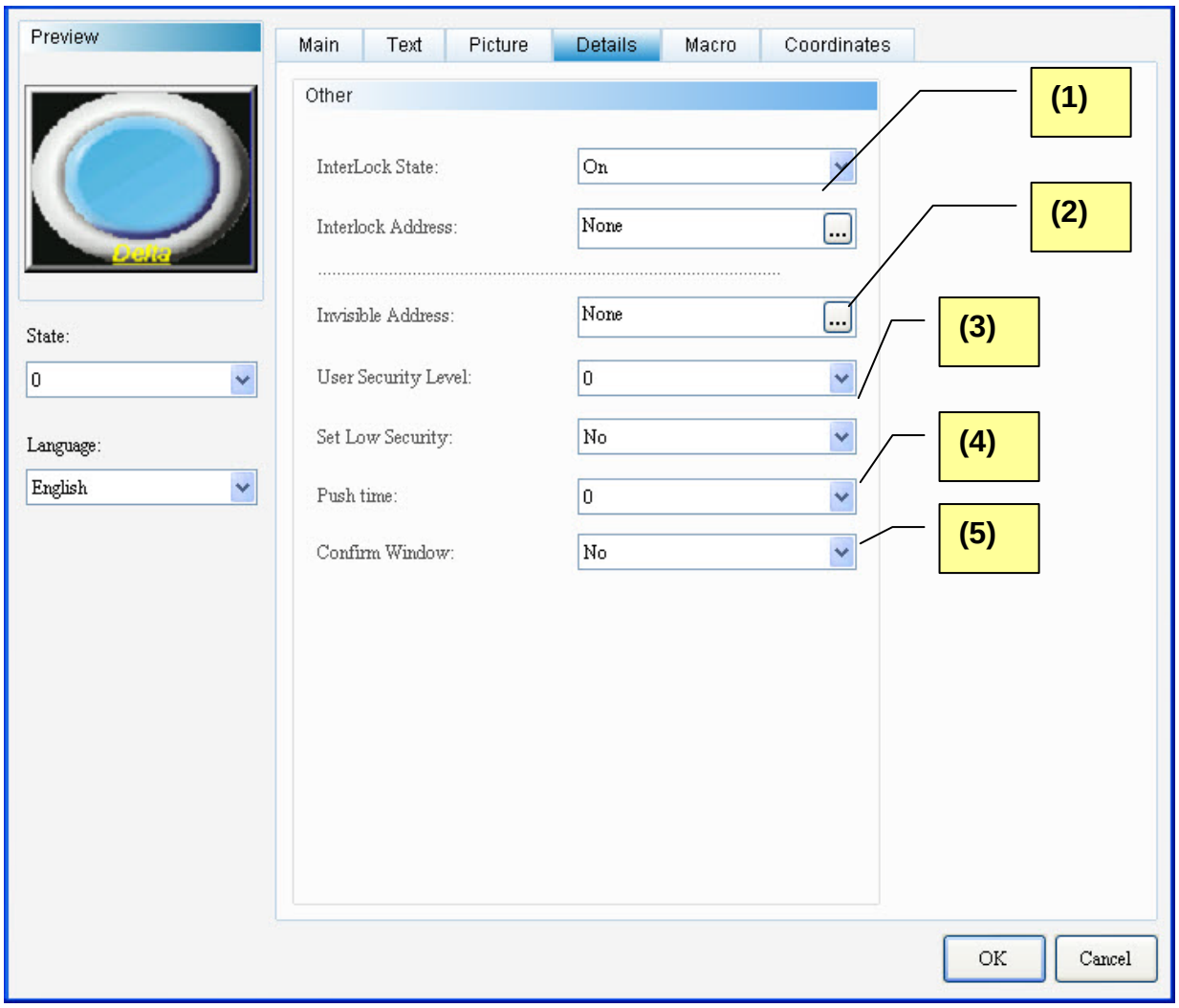
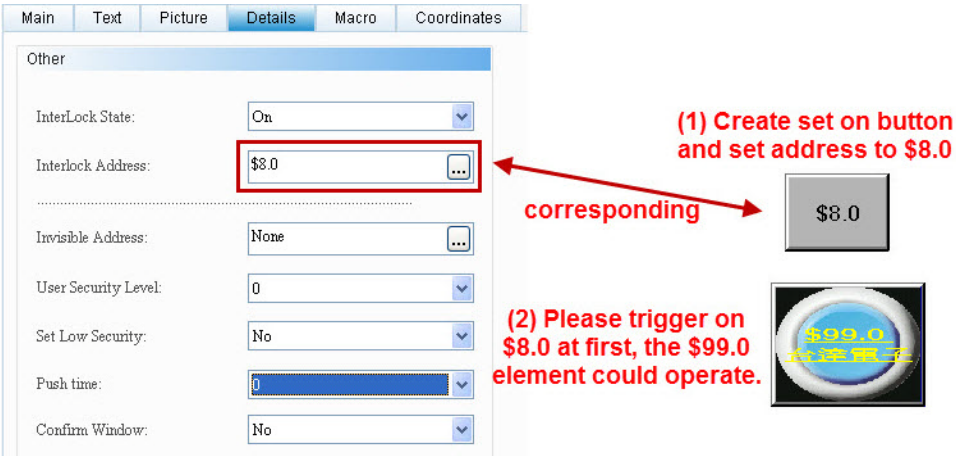
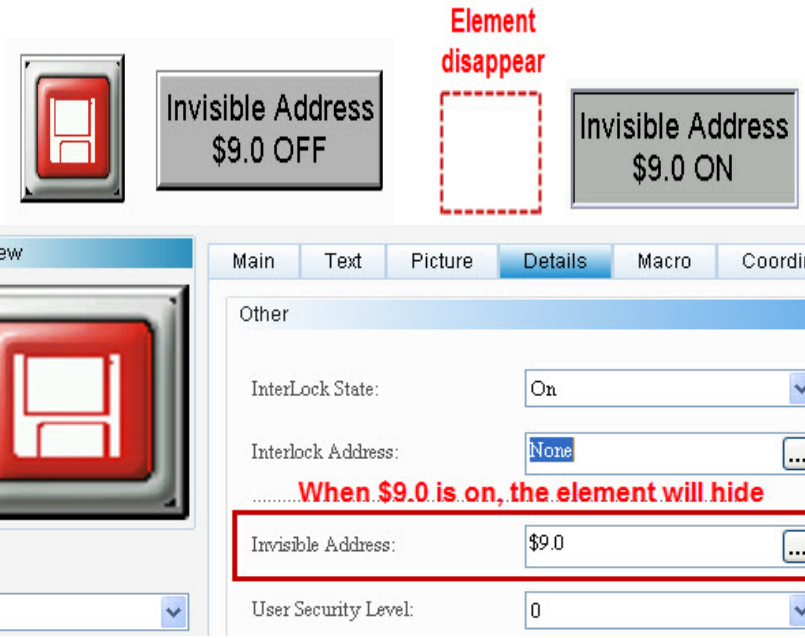
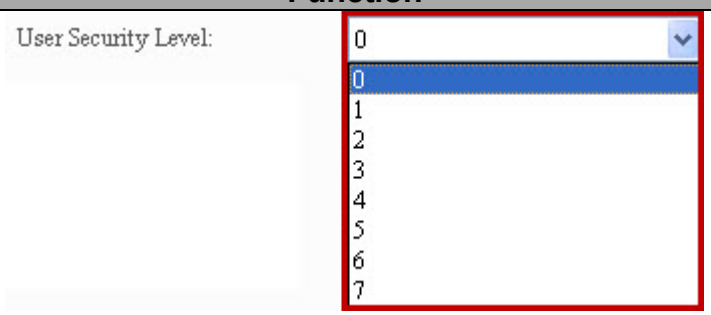
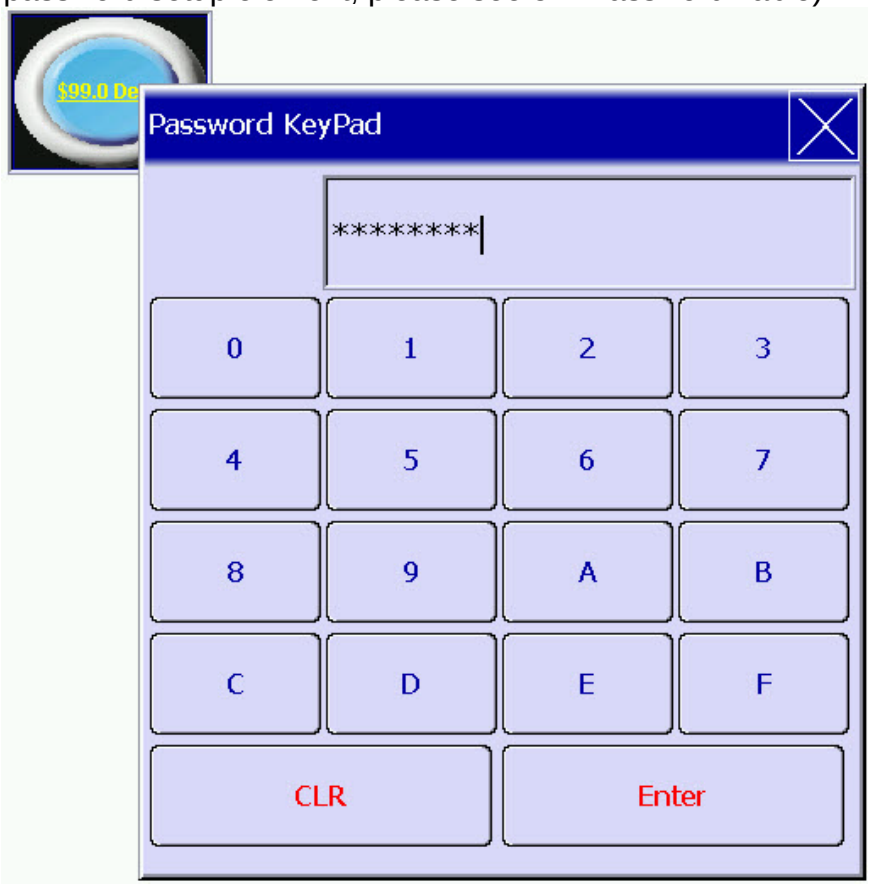
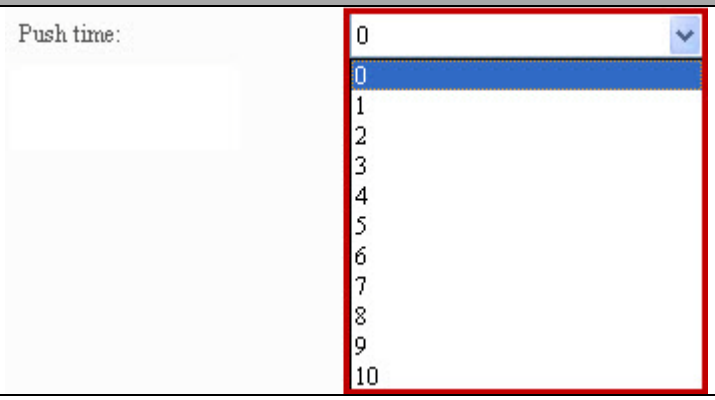
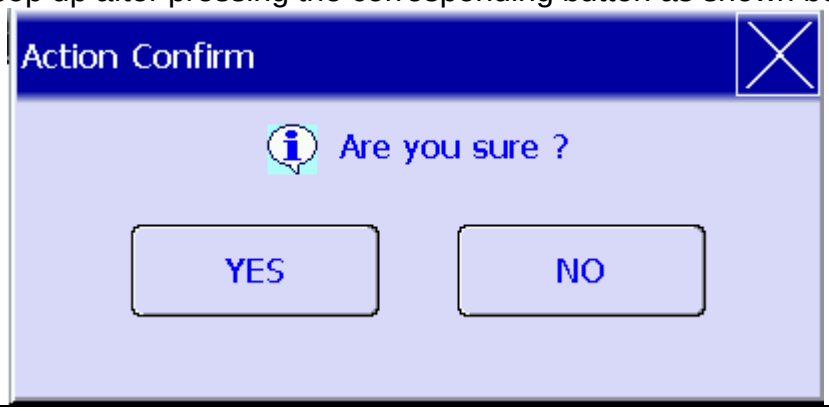


Figure 5-1-7 Set/Reset/Momentary/Maintained Element Details Properties Page

No.	Property	Function
(1)	Interlock State	➢ Interlock Address allows users to operate an element from this particular address. It must be used along with Interlock State. If Interlock State is “OFF”, this means the interlock address is operable when the interlock state is “OFF”. In contrast, when Interlock State is “ON”, this means the interlock address is operable when the interlock state is “ON”. ➢ Examples of interlock address application are as follows: 1. First, create a button and set its address as “$8.0”. Next, set the original interlock address ($99.0) to “$8.0”. 2. To make Button $99.0 operable, users must press Button $8.0 first.
	Interlock Address	
(2)	Invisible Address	➢ When Invisible Address is “ON”, the button element is hidden, and the corresponding function is disabled. 

No.	Property	Function
(3)	User Security Level	 ➢ Sets the user security level of element activities. Only users with equal or higher security level corresponding to the element can activate the element. ➢ After setting the user security level, when users activate the element, the password box will pop up and request users to input the password (the password can be changed from the password setup element, please see 5-7 Password Table).
	Set Low Security	 ➢ If “YES” is selected for Set Low Security, HMI automatically sets the security level to the lowest every time users input the password. When users activate the element again, they will be requested to input again the password corresponding to the element.
(4)	Push Time	➢ Sets the lapse time from button pushing to element activation. That is to say, users must press the button until the push time is out to activate the corresponding element, in order to avoid accidentally activating any actions. The range is 0-10 seconds.

No.	Property	Function
		
(5)	Enable Confirmation Box	If Enable Confirmation Box is set to “YES”, the following dialog box will pop up after pressing the corresponding button as shown below: 

◆ Coordinates

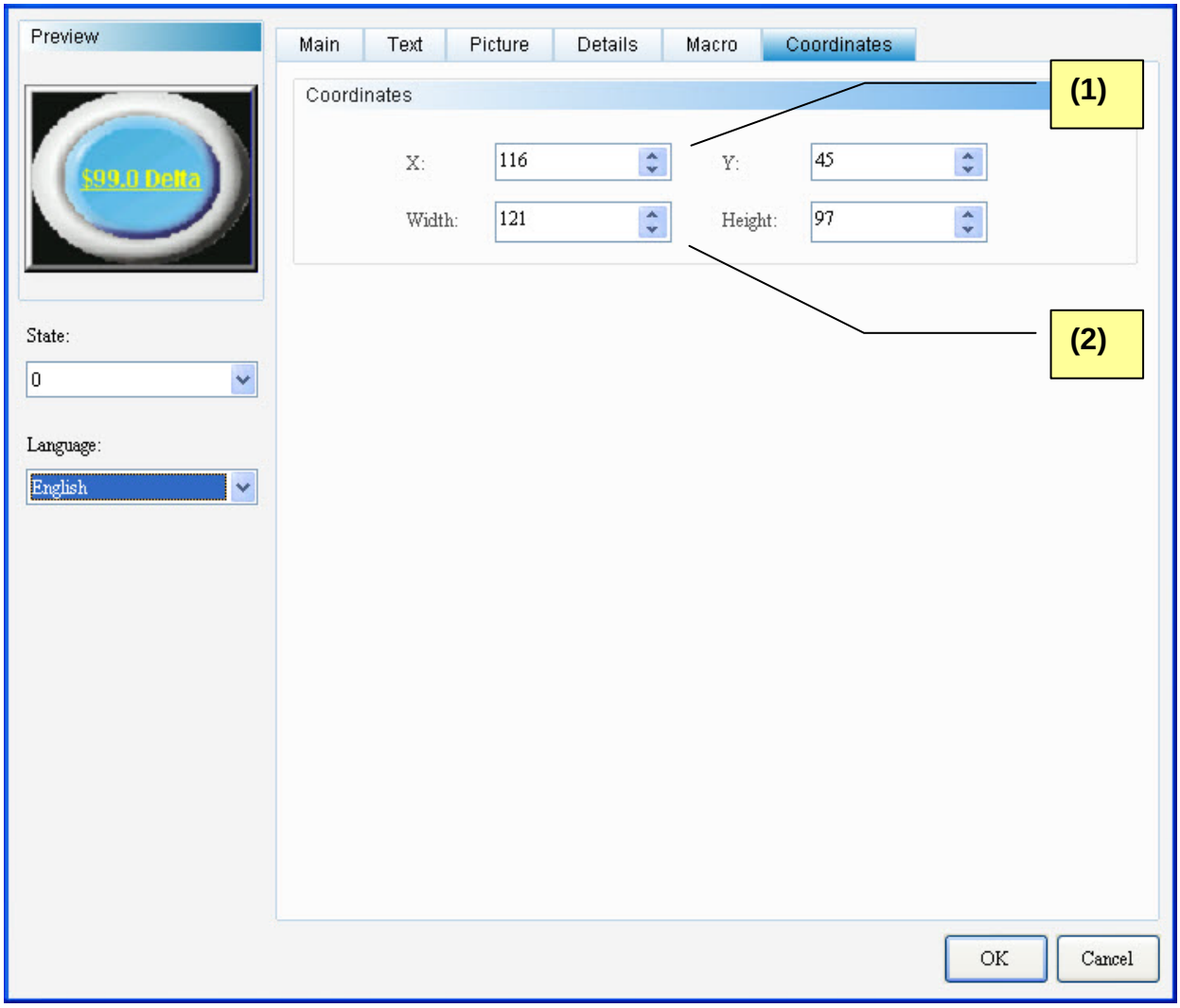


Figure 5-1-8 Set/Reset/Momentary/Maintained Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

◆ Macro

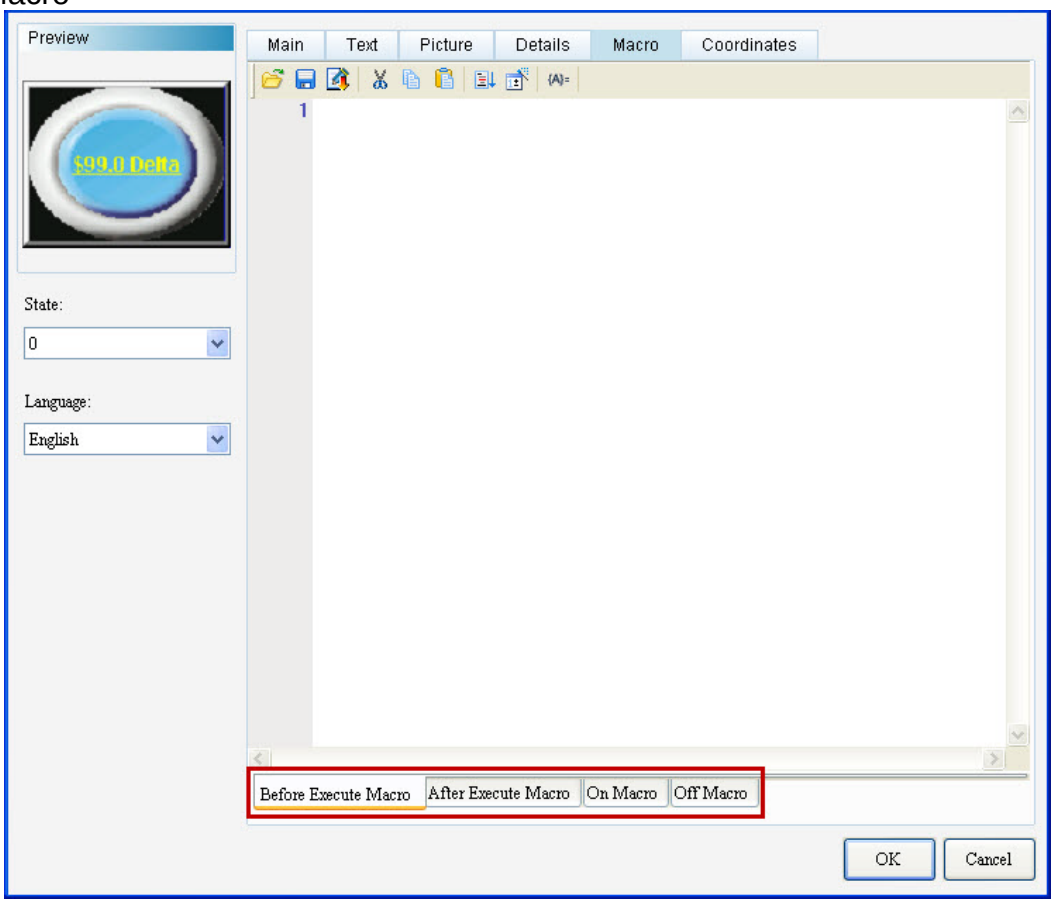
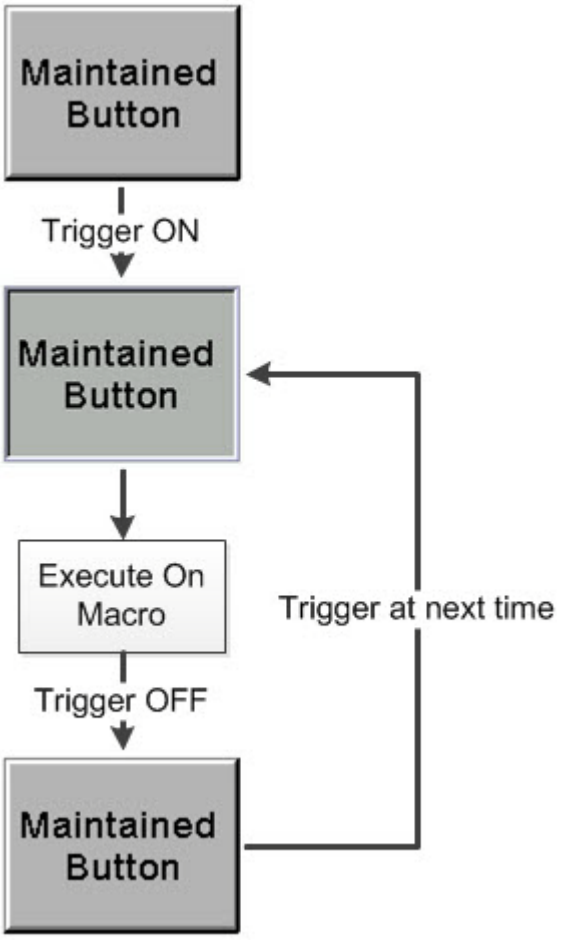
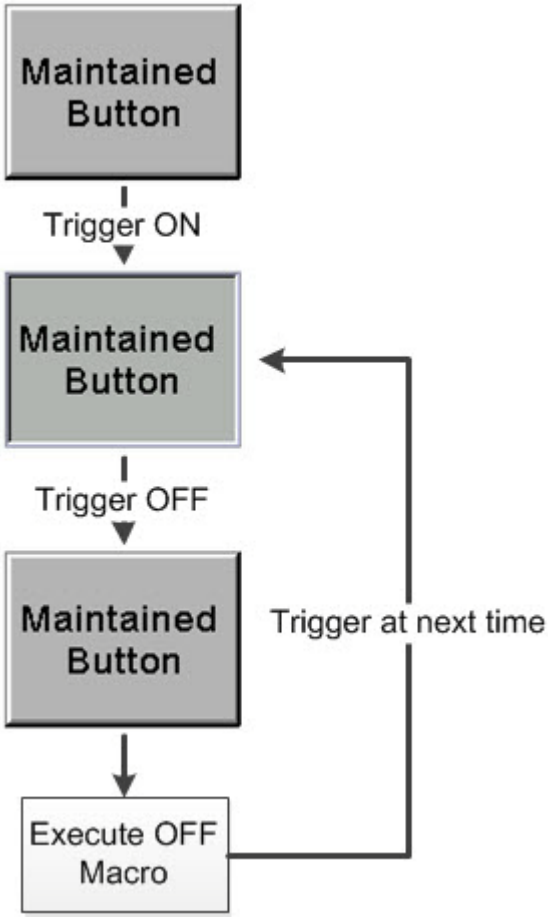
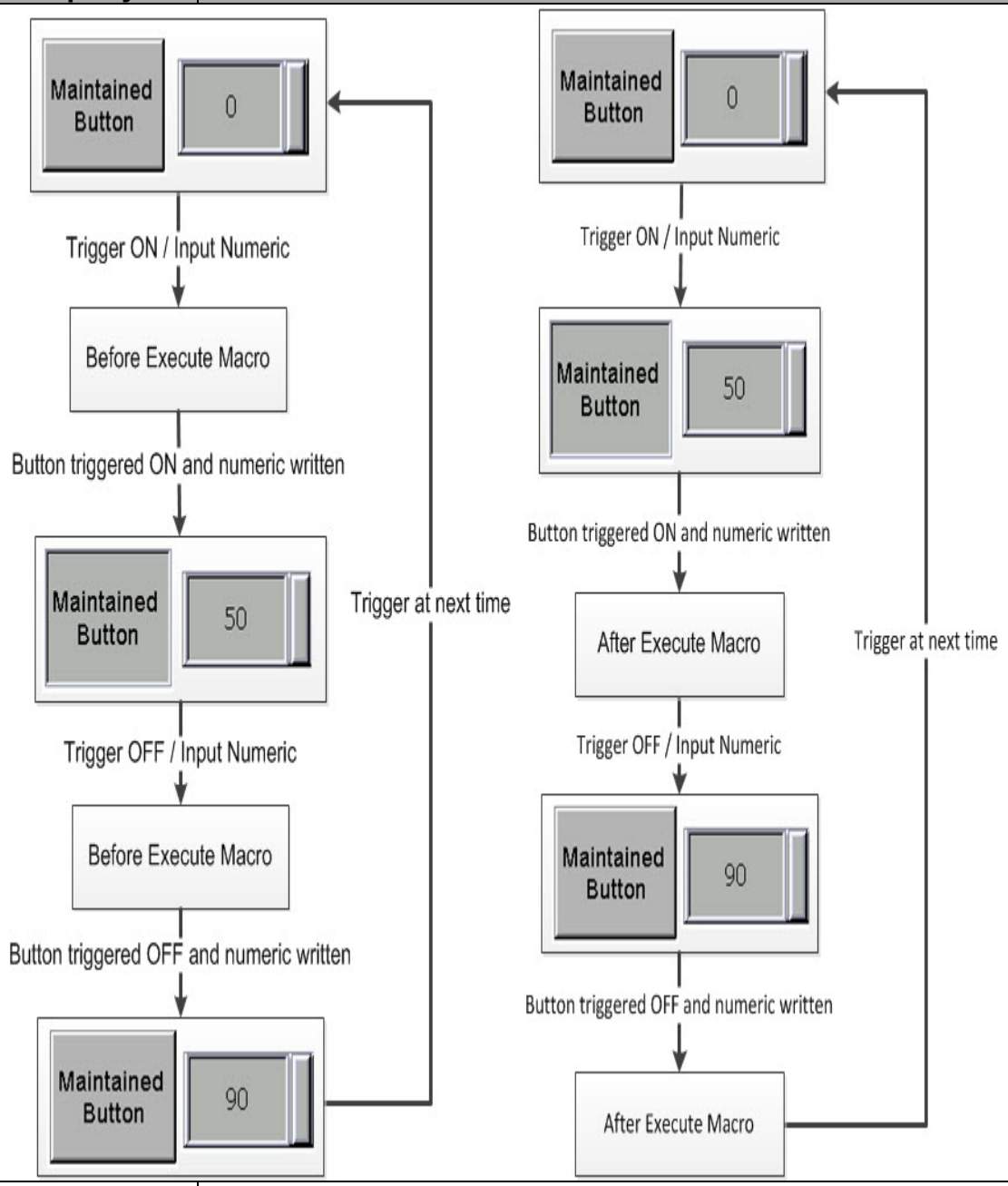


Figure 5-1-9 Set/Reset/Momentary/Maintained Element Macro Properties Page

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td rowspan="3">(1)</td><td colspan="2">➢ ON Macro Process
 

OFF Macro Propcess
 
</td></tr>
<tr><td>ON Macro</td><td rowspan="2">➢ When users touch the button to change the state to “ON”, HMI will run the commands in ON Macro. When users touch the button to change the state to “OFF”, HMI will run the commands in OFF Macro. If the button state is not changed by means of touching button (using external controller commands or other macros), HMI will not run the commands in both macros.
➢ Every time when users activate the ON and OFF states, HMI will run the commands in the respective macro once, without repeating these commands.</td></tr>
<tr><td>OFF Macro</td></tr>
<tr><td>(2)</td><td colspan="2">➢ The before execute macro and after execute macro processes are diagrammed below:</td></tr>
</table>

No.	Property	Function
		
	Before execute Macro	➢ When users touch the button element, HMI will first run the commands in the corresponding macro pre-action of the button action. If the button state is not changed by means of touching button (using external controller commands or other macros), HMI will not run the corresponding macro commands.
	After execute Macro	➢ After users touch the button element, HMI will first run the button action pre-action the commands in the corresponding macro. If the button state is not changed by means of touching button (using external controller commands or other macros), HMI will not run the corresponding macro commands.

5-2 Multistate

	Multistate

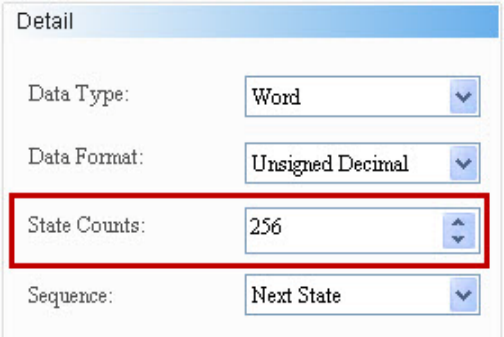
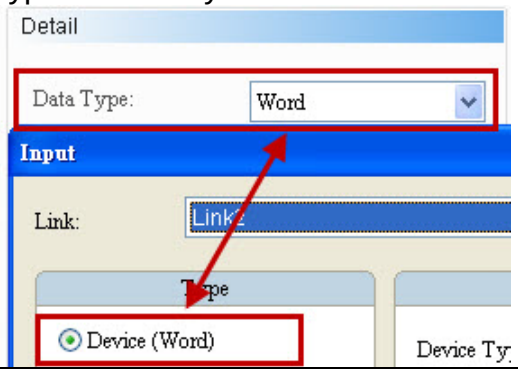
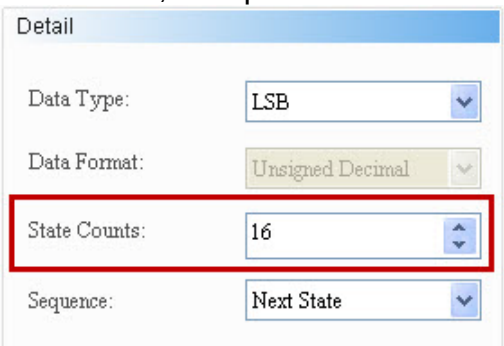
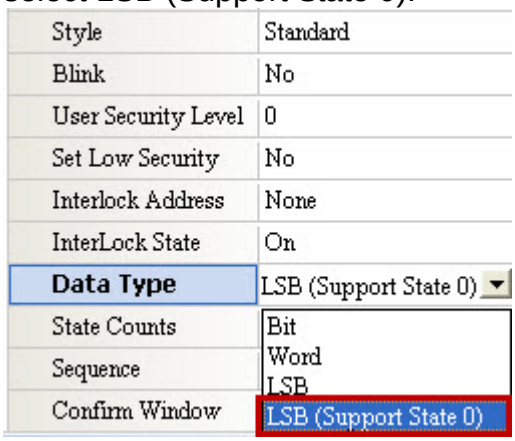
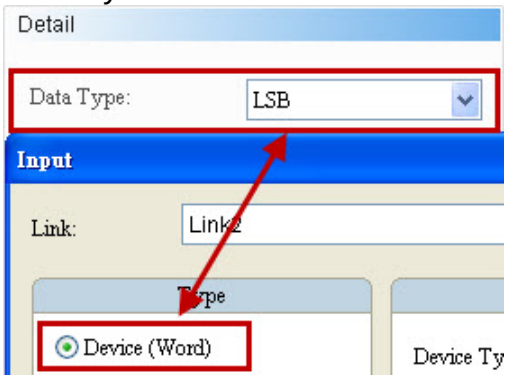
Multistate can be used to display different state pictures or state values. By setting the memory address of Multistate as “D100”, Data Type as “Word”, Total State Count as “4”, HMI will change states according to the sequence defined by users. Please refer to Table 5-2-1 Example of Multistate below.

Example of Multistate Table 5-2-1 Example of Multistate	
Write Memory Address	D100
Data Type	Word
Change Sequence	Next Sequence
State Counts	4
Execution Results	**D100.1 ON D100.2 ON D100.4 ON D100.8 ON** **State 1 State 2 State 3 State 4**

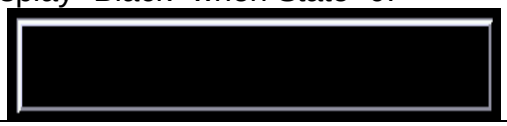
The Multistate Button Element supports four data types as shown in Table 5-2-2 below. Users wishing to add or remove total state count simply need to add or reduce state counts from State Counts in properties.

Multistate Button

Table 5-2-2 Example of Multistate Data Type

Data Type	State Counts	Memory Address
Word	If data type is “Word”, users can select 1-256 states. 	If data type is “Word”, “Word” is data type of memory address. 
LSB / LSB (Support 0 State)	If data type is “LSB”, the data in the register are first converted into binary data. Next, the present object state is determined according to the element with the lowest non-zero bit. If data type is “LSB”, users can select 1-16 states, except “State 0”.  If users wish to display “State 0”, please select LSB (Support State 0). 	If data type is “LSB” or LSB (Support State 0), “Word” is also data type of memory address. 

If users select “LSB”, the element will display “Black” when State=0.

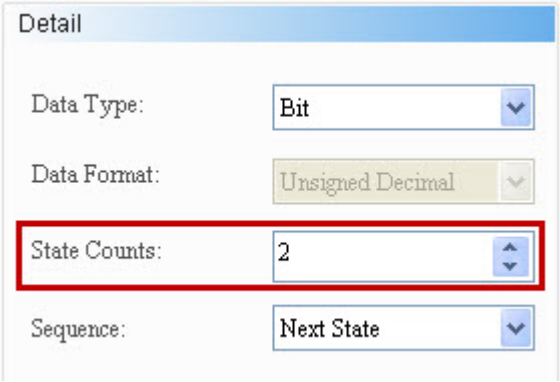


The examples in the following table show how state value is determined with the lowest non-zero element after converting from a decimal value into a binary value. There are also examples demonstrating how the DOPSoft determines the state value displayed with the lowest bit when the decimal values are 3 and 7.

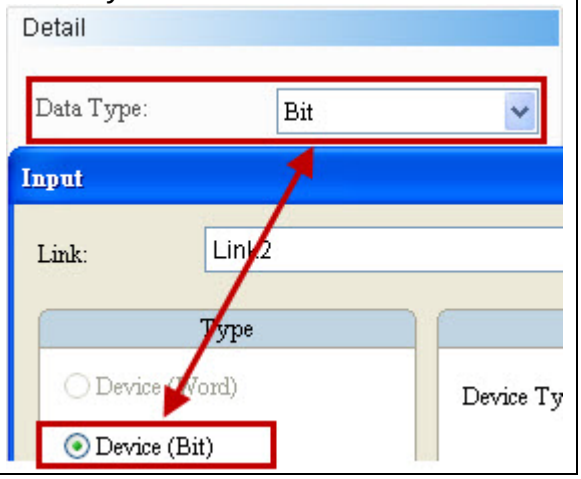
Decimal	Binary	State Value
0	**0000000000000000**	**State=0 when all bits are “0” [LSB (Support State 0) must be selected]**
1	0000000000000001	The lowest non-zero bit is bit 0, State=1
2	0000000000000010	The lowest non-zero bit is bit 1, State=2
3	**0000000000000011**	**The lowest non-zero bit is bit 0, State=1**
4	0000000000000100	The lowest non-zero bit is bit 2, State=3
7	**0000000000000111**	**The lowest non-zero bit is bit 0, State=1**
8	0000000000001000	The lowest non-zero bit is bit 3, State=4
16	0000000000010000	The lowest non-zero bit is bit 4, State=5
32	0000000000100000	The lowest non-zero bit is bit 5, State=6
64	0000000001000000	The lowest non-zero bit is bit 6, State=7
128	0000000010000000	The lowest non-zero bit is bit 7, State=8
256	0000000100000000	The lowest non-zero bit is bit 8, State=9
512	0000001000000000	The lowest non-zero bit is bit 9, State=10
1024	0000010000000000	The lowest non-zero bit is bit 10, State=11
2048	0000100000000000	The lowest non-zero bit is bit 11, State=12
4096	0001000000000000	The lowest non-zero bit is bit 12, State=13
8192	0010000000000000	The lowest non-zero bit is bit 13, State=14
16384	0100000000000000	The lowest non-zero bit is bit 14, State=15
32768	1000000000000000	The lowest non-zero bit is bit 15, State=16

Bit

If data type is “Bit”, only 2 states are available.



If data type is “Bit”, “Bit” is data type of memory address.



Double-click Multistate to call up the Multistate Properties screen as shown below.

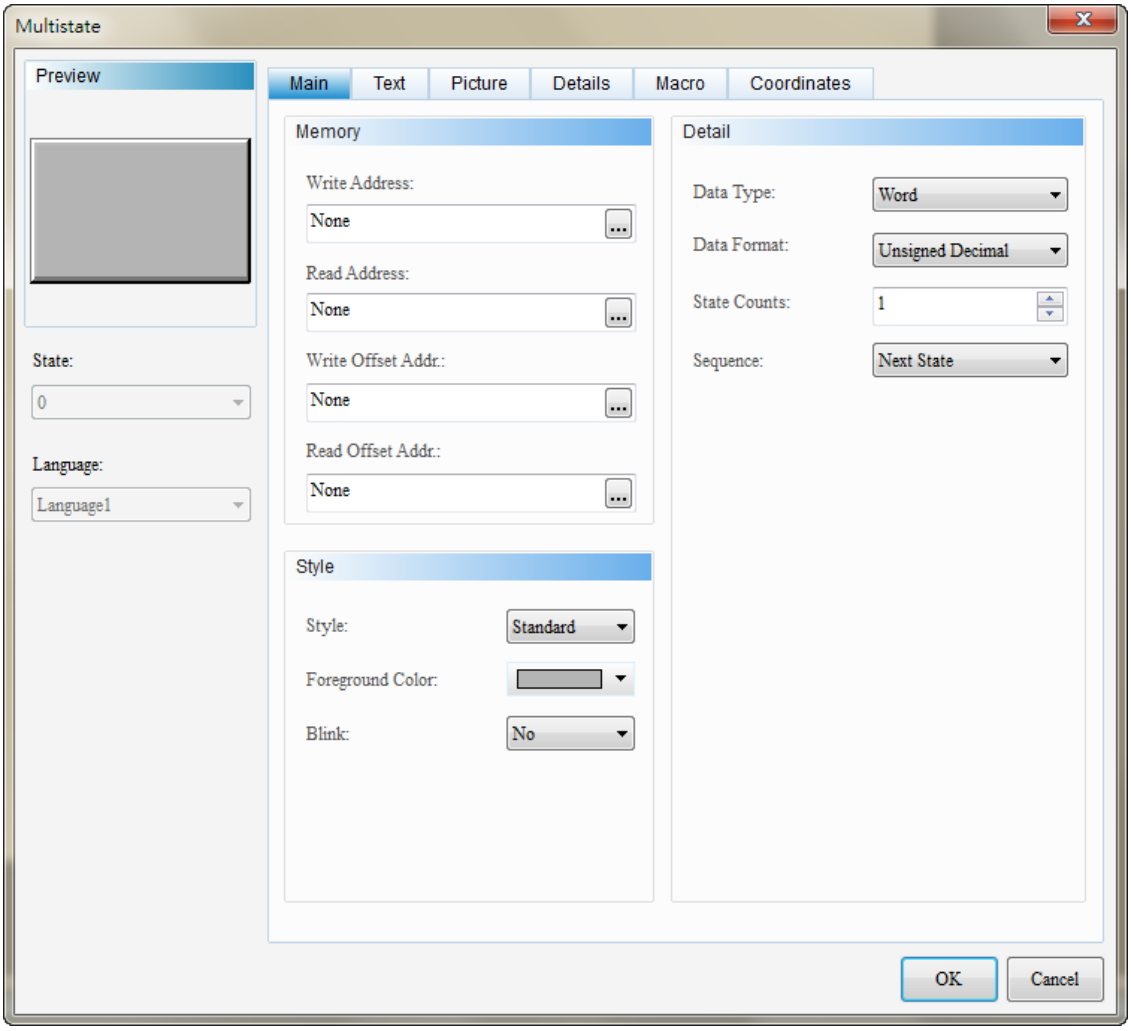


Figure 5-2-1 Multistate Element Properties

Multistate	
Function Page	**Content Description**
Preview	Views multistate data and Multi-Language data.
Main	Sets Write Address, Read Address, Write Offset Address, Read Offset Address, Style, Foreground Color, and Blink. Sets the Data Type, Data Format, State Counts, and Change Sequence of Multistate.
Text	Sets the content, font, font size, font color, bold/italic/underline of font, scaling, and alignment of the text to be displayed.
Picture	Sets Picture Bank Name, Alignment, Picture Stretch Mode, and Transparent Color.
Details	Sets Interlock Address, Interlock State, Invisible Address, User Security Level, Set Low Security, and Enable Confirmation Box.
Macro	Sets Before Execute Macro and After Execute Macro.
Coordinates	Sets the X-Y coordinate, width, and height of elements.

Table 5-2-3 Multistate Function Page

◆ Main

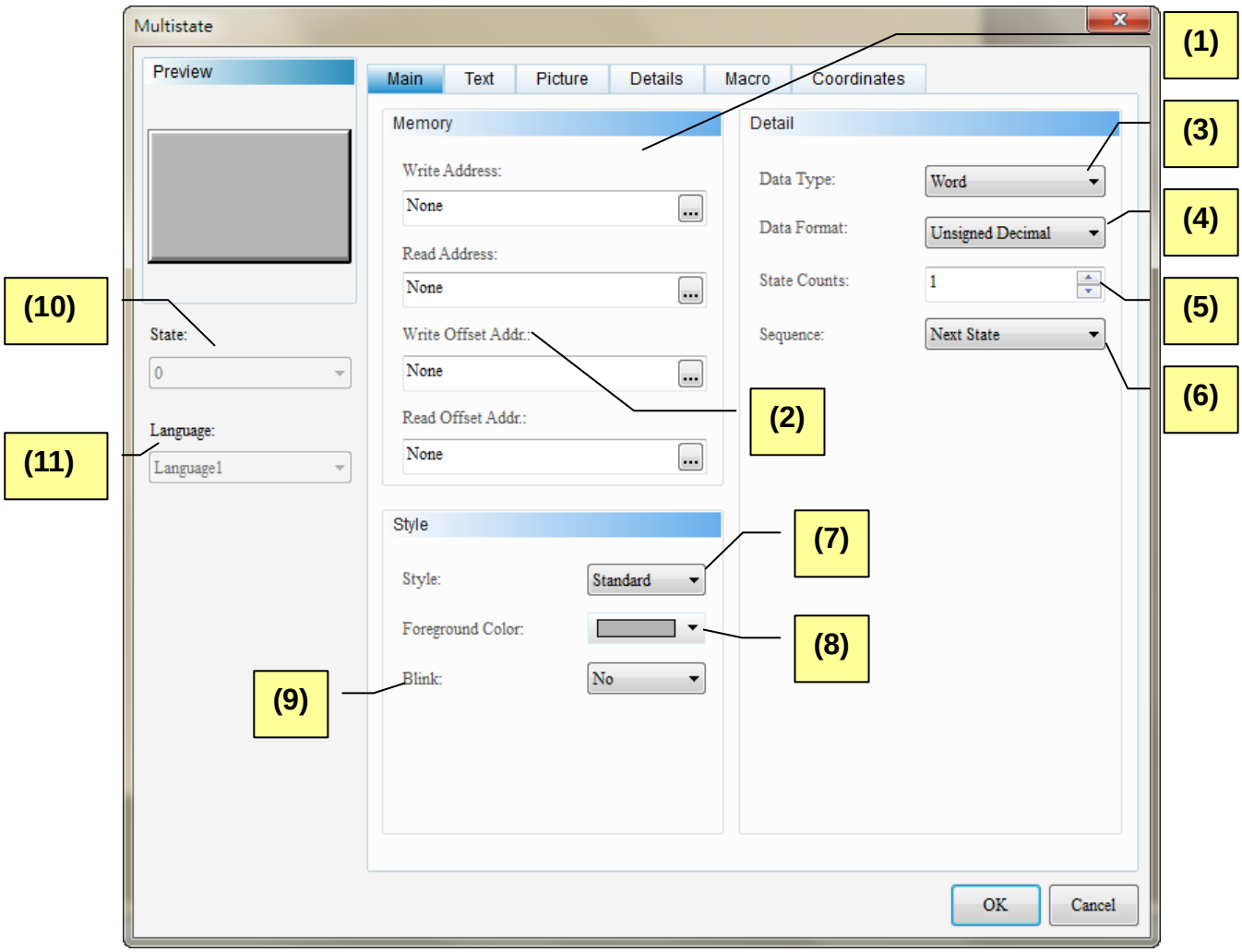
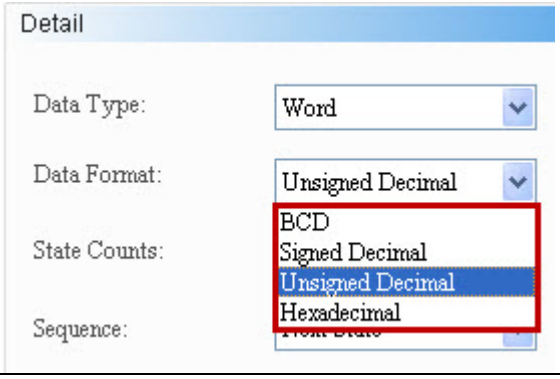
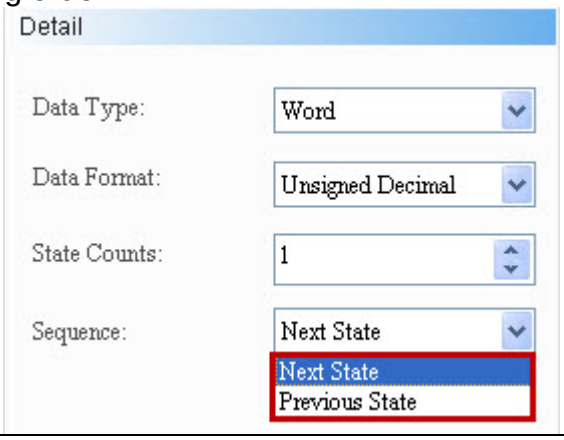
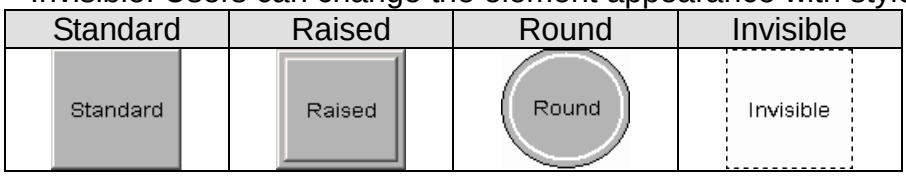
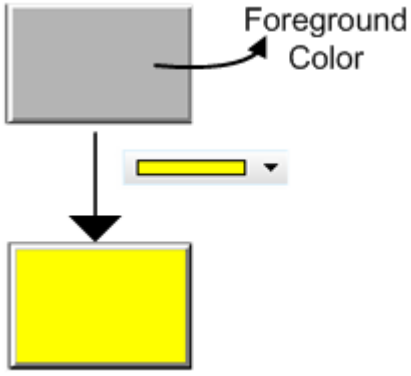
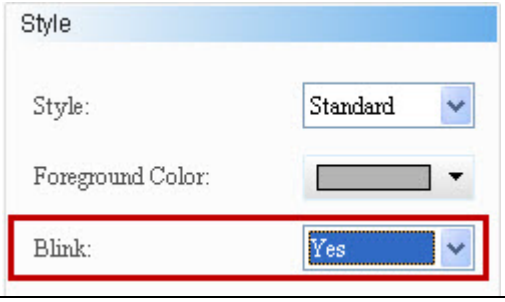
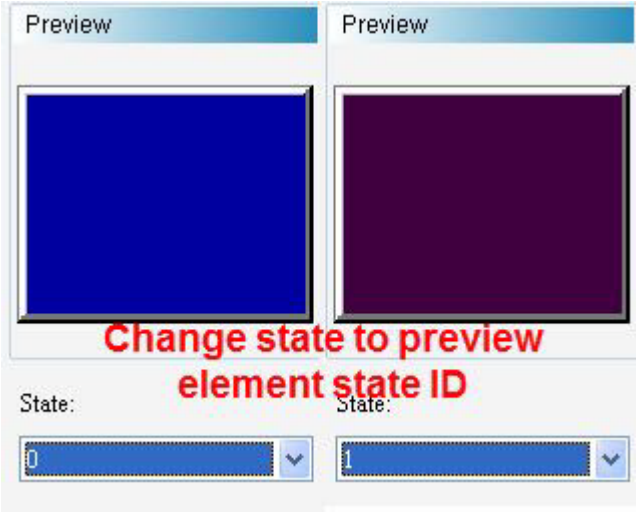
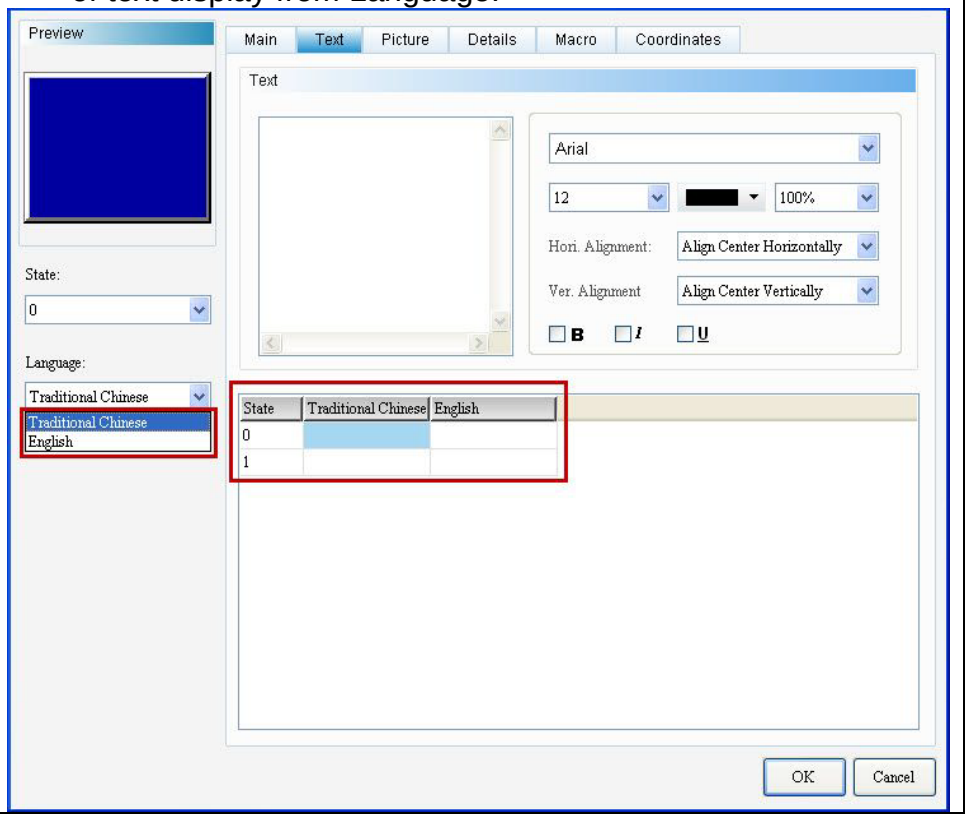


Figure 5-2-2 Multistate Element Main Properties Page

No.	Property	Function
(1)	Write Address Read Address	➢ Selects the address of internal memory or controller register. Memory type change is subject to the selected data type, including Word, LSB, and Bit, as shown in Table 5-2-2. If Write Memory Address is selected without selecting Read Memory Address, HMI will automatically read the data in the Write Memory Address. ➢ Selects link name or style. Please refer to 5-1 Buttons of Chapter 05 for details.
(2)	Write Offset Address Read Offset Address	➢ Please refer to Appendix D Write and Read Offset Address.
(3)	Data Type	➢ Four options: Bit, Word, LSB, and LSB (Support State 0). Please refer to Table 5-2-2 for details.

No.	Property	Function
(4)	Data Format	➢ Data format can only be selected when data type is “Word”. ➢ These formats include BCD, Signed Decimal, Unsigned Decimal, and Hexadecimal. 
(5)	State Counts	➢ Sets the state counts of Multistate Button elements. If data type is “Word”, users can select 1-256 states; if data type is “LSB”, users can select 16 states; if data type is “LSB (Support State 0)”, users can select 17 states; and if data type is “Bit”, users can select 2 states. Please refer to Table 5-2-2 for details.
(6)	Sequence	➢ Sets the change sequence of multistate button elements, including Next State and Previous State. ➢ Next State: When changing states, HMI change states in ascending order. ➢ Previous State: When changing states, HMI change states in descending order. 
(7)	Style	➢ There are four style, including Standard, Raised, Round, and Invisible. Users can change the element appearance with style. 
(8)	Foreground Color	➢ Sets foreground color of elements. ➢ When Style is “Invisible”, Foreground Color is disabled.

No.	Property	Function
		
(9)	Blink	➢ Uses can set blink prompt of elements when setting state change of buttons. The blink color is the opposite color of the foreground color. 
(10)	State	➢ The multistate element determines the state count according to the total state count defined by users. Users can view multisite with this. 

No.	Property	Function
(11)	Language	➢ When language data are defined, users can edit the properties of text display from Language. 

◆ Text

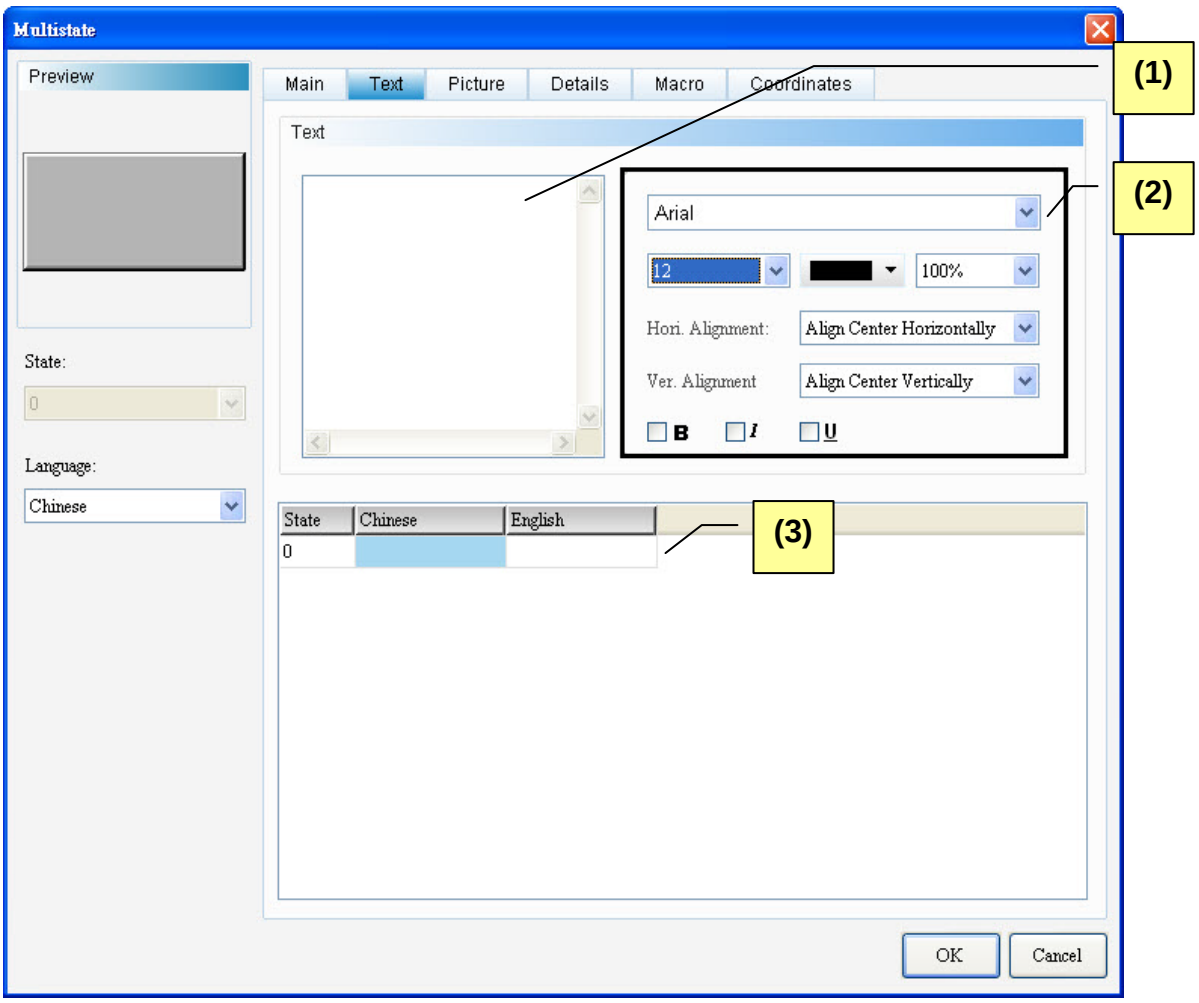
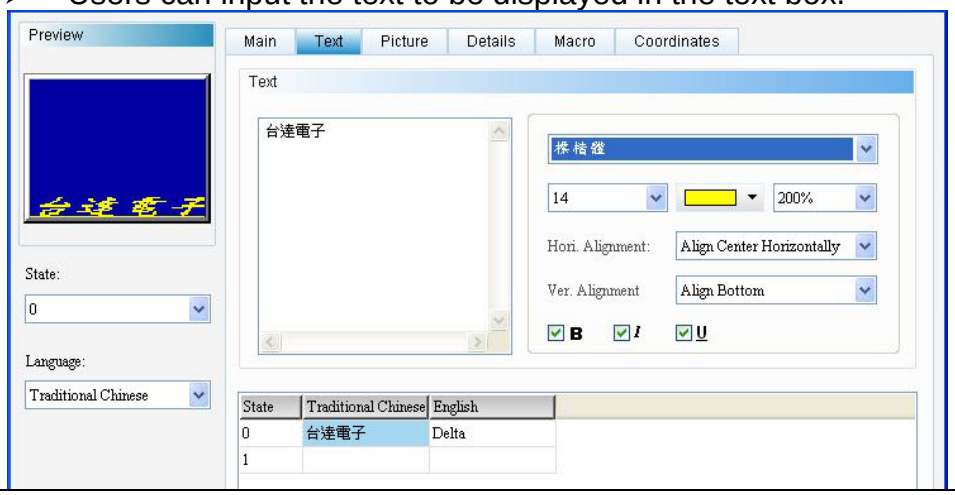


Figure 5-2-3 Multistate Element Text Properties Page

No.	Property	Function
(1)	Text	➢ Users can input the text to be displayed in the text box. 
(2)	Text Properties	➢ Sets text properties, including font type, font size, font color, scaling, text alignment, and bold/italic/underline of font. Please refer to the above figure for details about the results of text properties.
(3)	Multi-Language Text Data	➢ Users can add Multi-Language text data from the Multi-Language Text Page. As shown in the Text Properties Figure, users can input English text in the English field.

◆ Picture

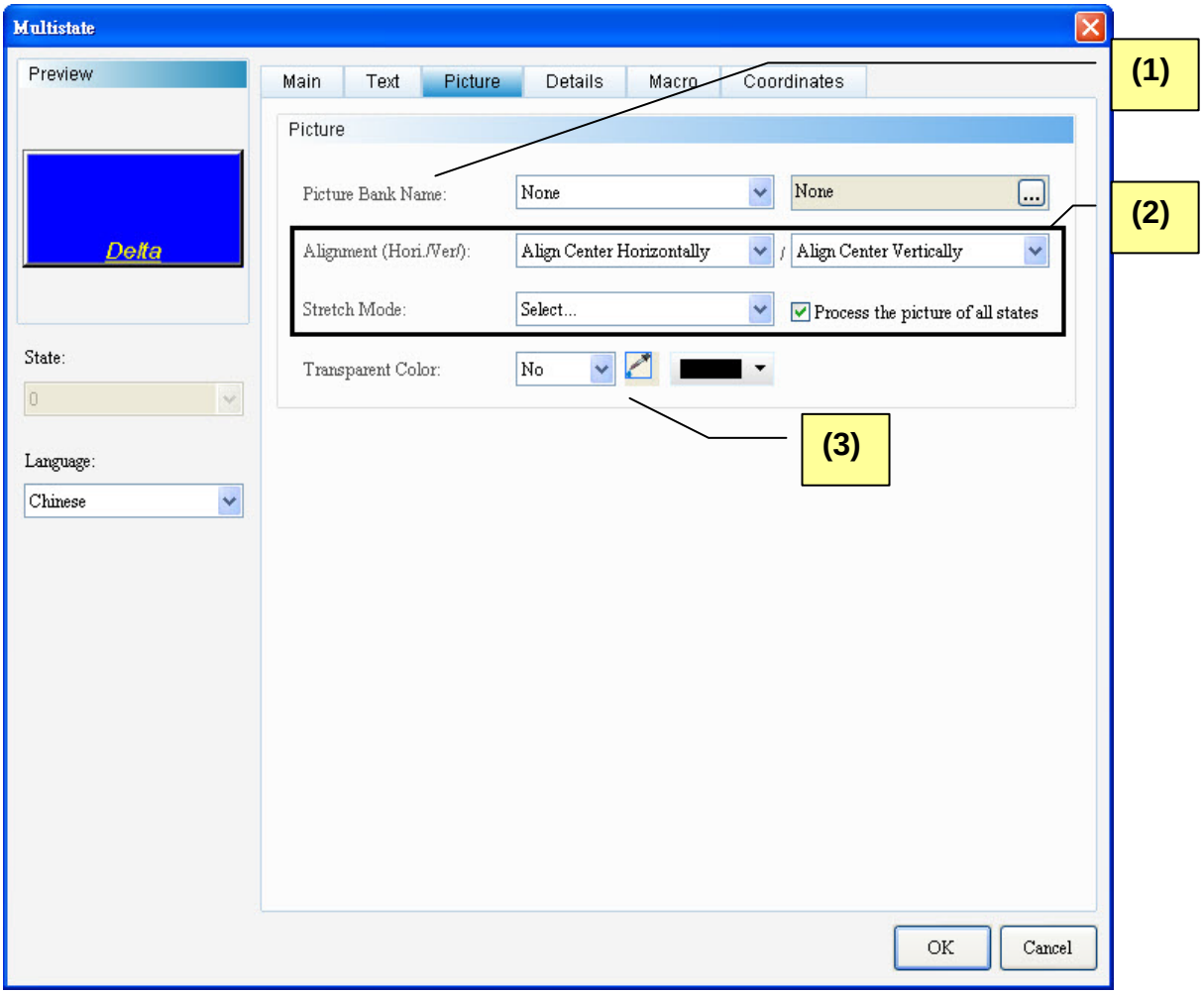
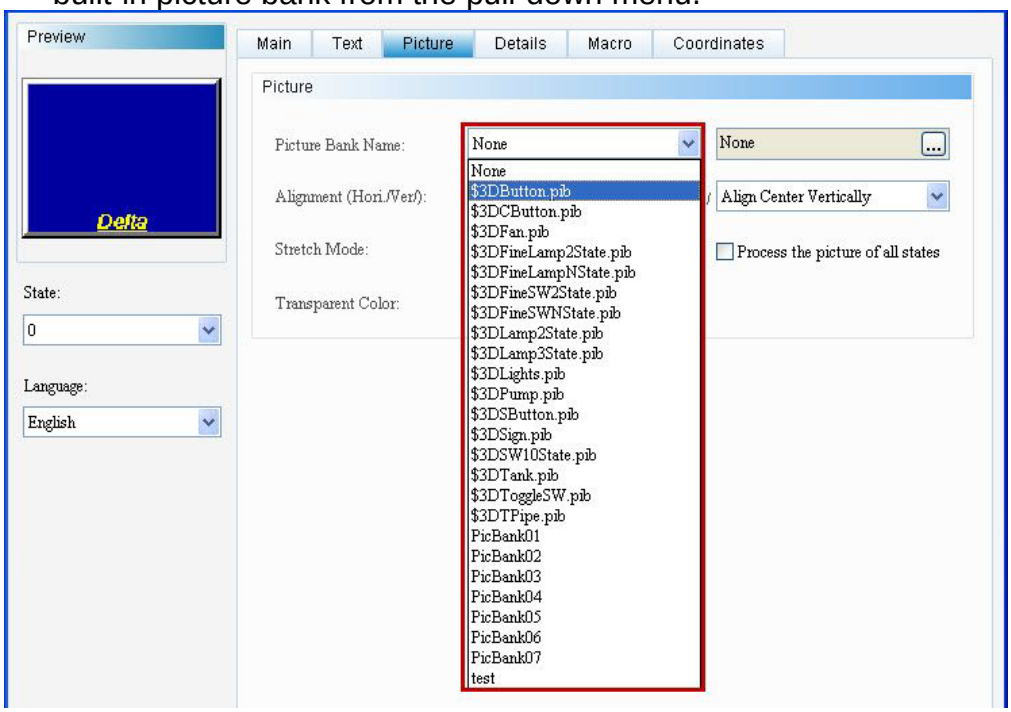
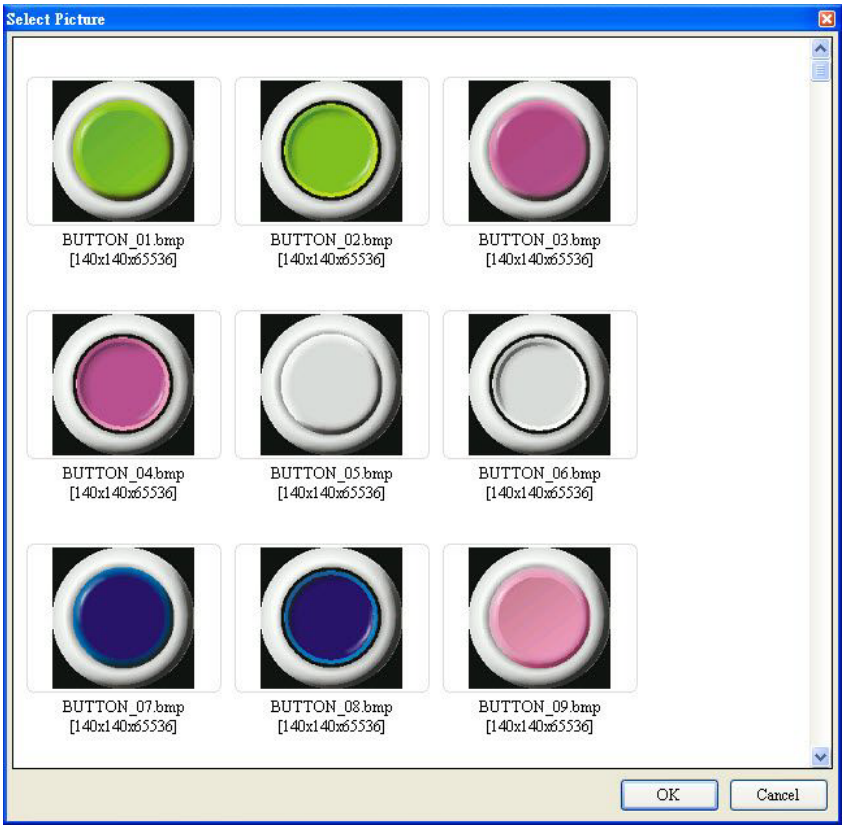
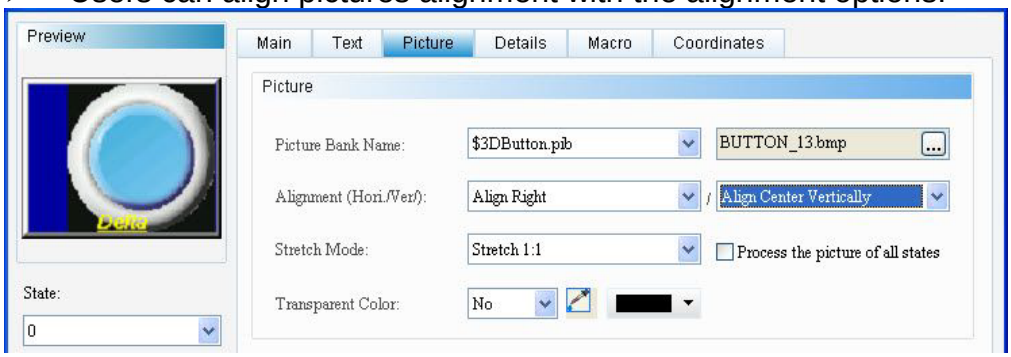
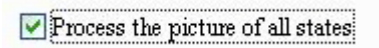
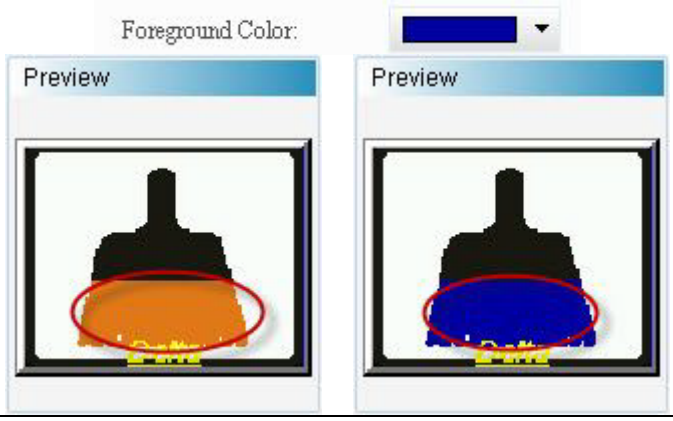


Figure 5-2-4 Multistate Element Picture Properties Page

No.	Property	Function
(1)	Picture Bank Name	➢ The default value for Picture Bank Name is “None”. Users wishing to select a display picture can select the desired picture in the built-in picture bank from the pull-down menu.  

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td rowspan="2">(2)</td><td>Alignment</td><td>➢ Users can align pictures alignment with the alignment options.
 
</td></tr>
<tr><td>Stretch Mode</td><td>➢ Stretch modes include: Fill, Keep Aspect Ratio, and Actual Size.
<table>
<tr><th>Fill</th><th>Keep Aspect Ratio</th><th>Actual Size</th></tr>
<tr><td>In the “Fill” mode, the selected picture will fill up the entire display area.</td><td>In the “Keep Aspect Ratio” mode, the selected picture will fit in the display area proportionally according to the picture ratio.</td><td>In the “Actual Size” mode, the picture will be displayed in its original size in the display area.</td></tr>
<tr><td> </td><td> </td><td> </td></tr>
</table>
➢ If “Process all state pictures” is selected, the system assumes that each element has multiple entries of state data, and some pictures may be unable to fill the entire display area. By selecting this item, users will not need to set individual pictures to save time editing.
 
</td></tr>
<tr><td>(3)</td><td>Transparent Color</td><td>➢ Users can set a color in the picture to transparent. In this case, by clicking the Transparent Color icon and then the orange part of the loom, the DOPSoft will omit all orange parts in the picture and turn them transparent; thus turning the foreground color transparent.
 
</td></tr>
</table>

◆ Details

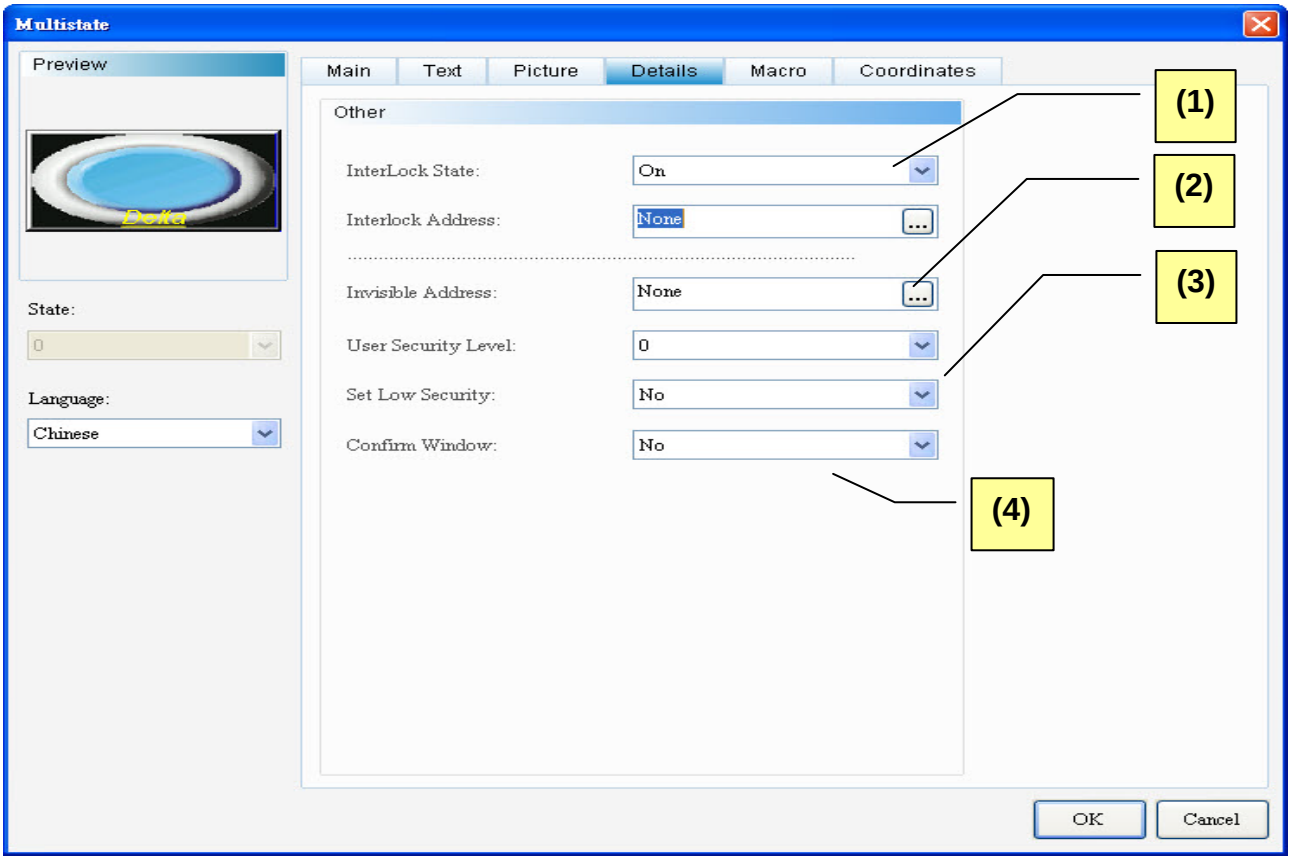
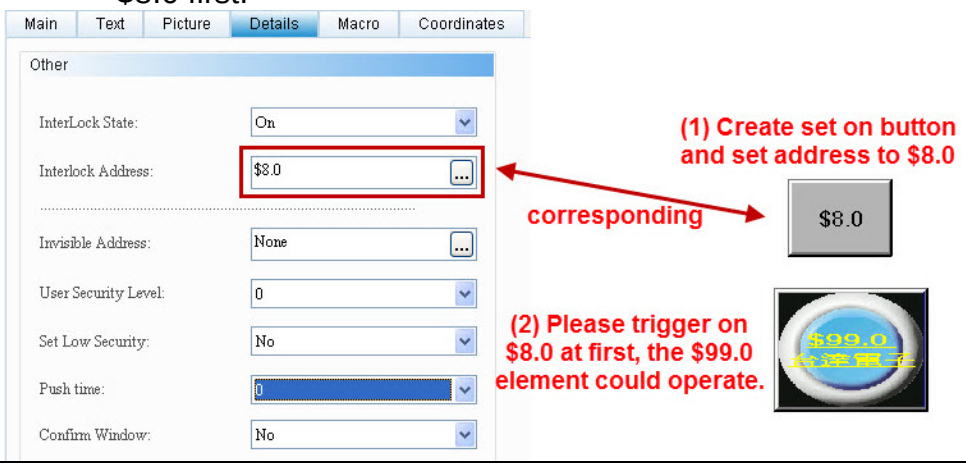
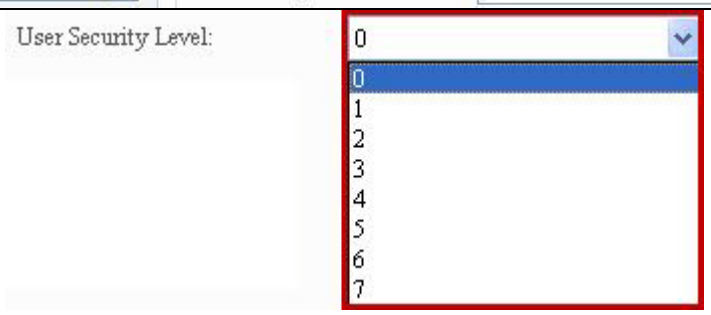
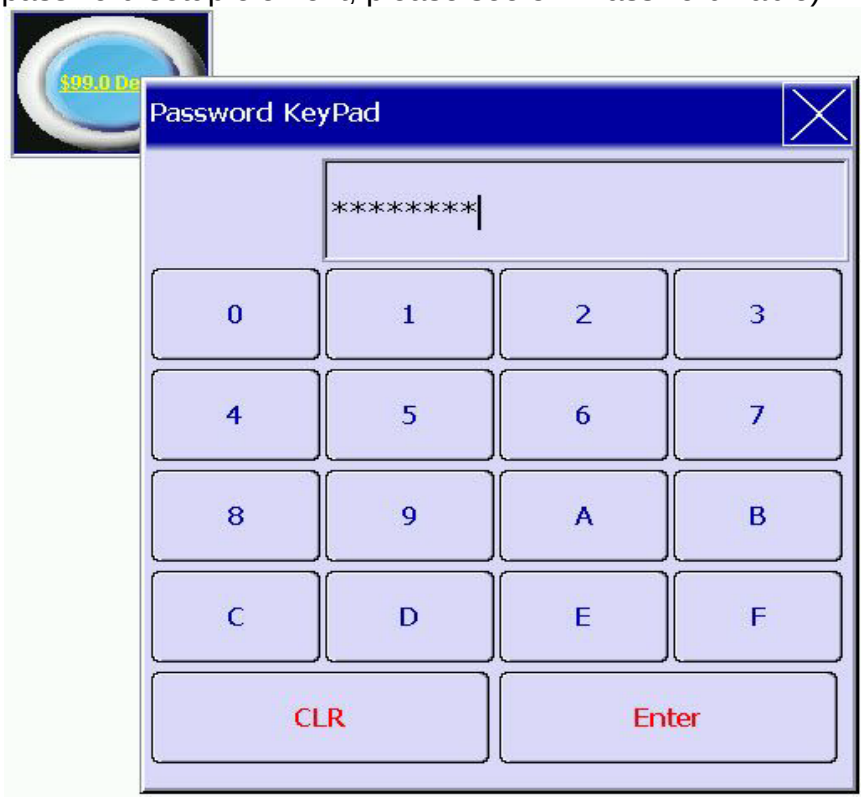
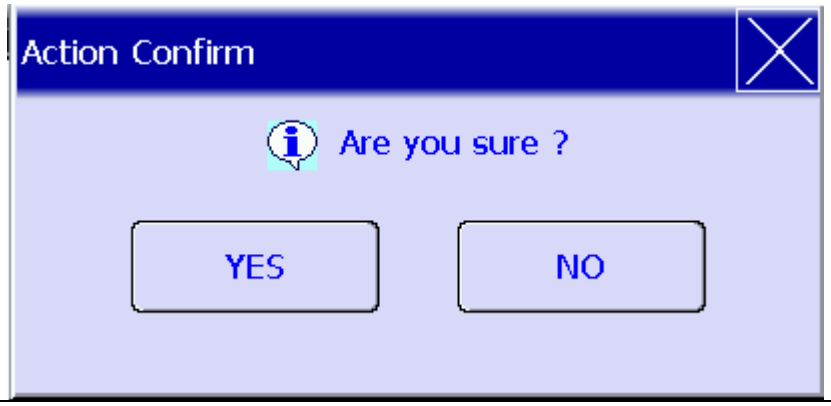


Figure 5-2-5 Multistate Element Details Properties Page

No.	Property	Function
(1)	Interlock State	➢ Interlock Address allows users to operate an element from this particular address. It must be used along with Interlock State. If Interlock State is "OFF", this means the interlock address is operable when the interlock state is "OFF". In contrast, when Interlock State is "ON", this means the interlock address is operable when the interlock state is "ON".
	Interlock Address	➢ Examples of the interlock address application are as follows: 1. First, create a button and set its address as "$8.0". Next, set the original interlock address ($99.0) to "$8.0". 2. To make Button $99.0 operable, users must press Button $8.0 first. 

No.	Property	Function
(2)	Invisible Address	➢ When Invisible Address is “ON”, the button element is hidden, and the corresponding function is disabled.
(3)	User Security Level	 ➢ Sets the user security level of element activities. Only users with equal or higher security level corresponding to the element can activate the element. ➢ After setting the user security level, when users activate the element, the password box will pop up and request users to input the password (the password can be changed from the

No.	Property	Function
	Set Low Security	password setup element, please see 5-7 Password Table).  ➢ If "YES" is selected for Set Low Security, HMI automatically sets the security level to the lowest every time users input the password. When users activate the element again, they will be requested to input again the password corresponding to the element.
(4)	Enable Confirmation Box	➢ If Enable Confirmation Box is set to "YES", the following dialog box will pop up after pressing the corresponding button as shown below: 

◆ Coordiates

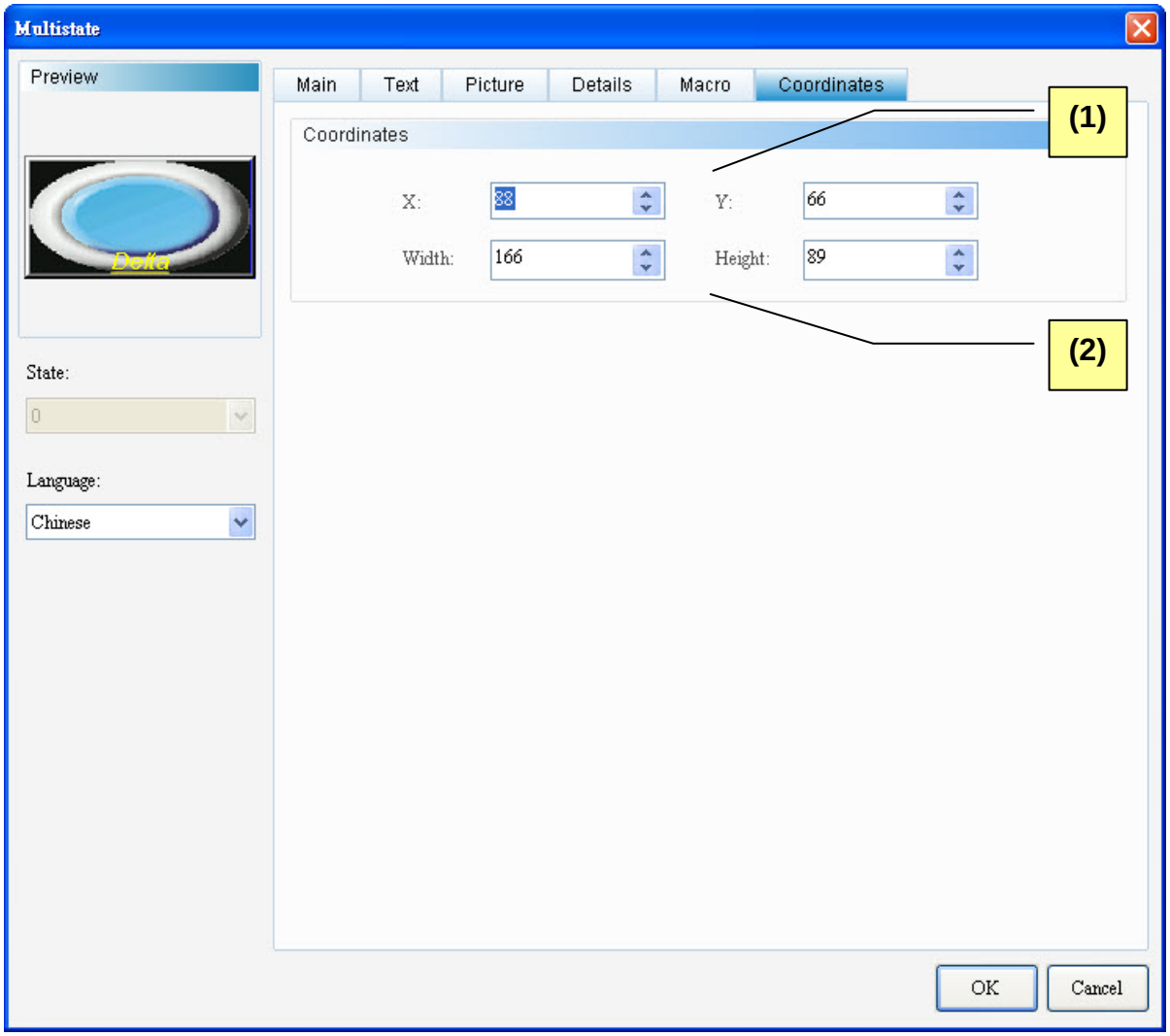


Figure 5-2-6 Multistate Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

◆ Macro

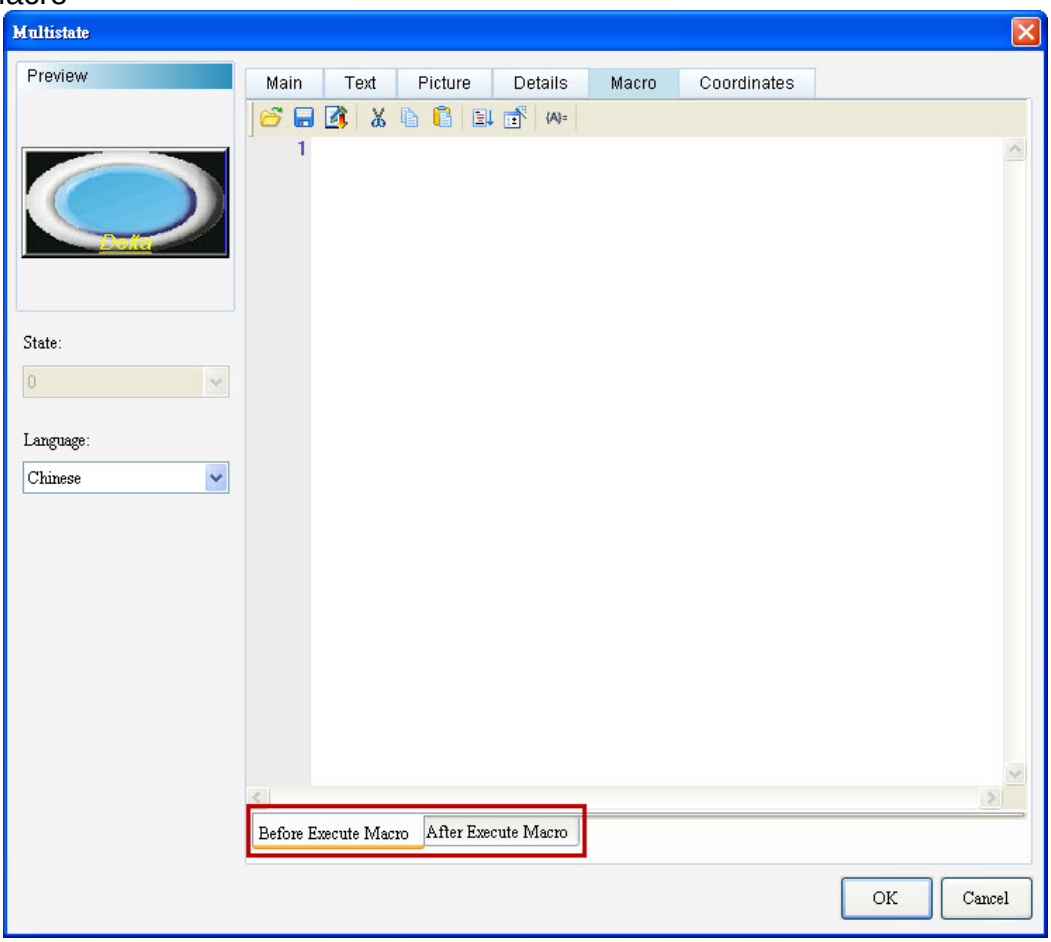
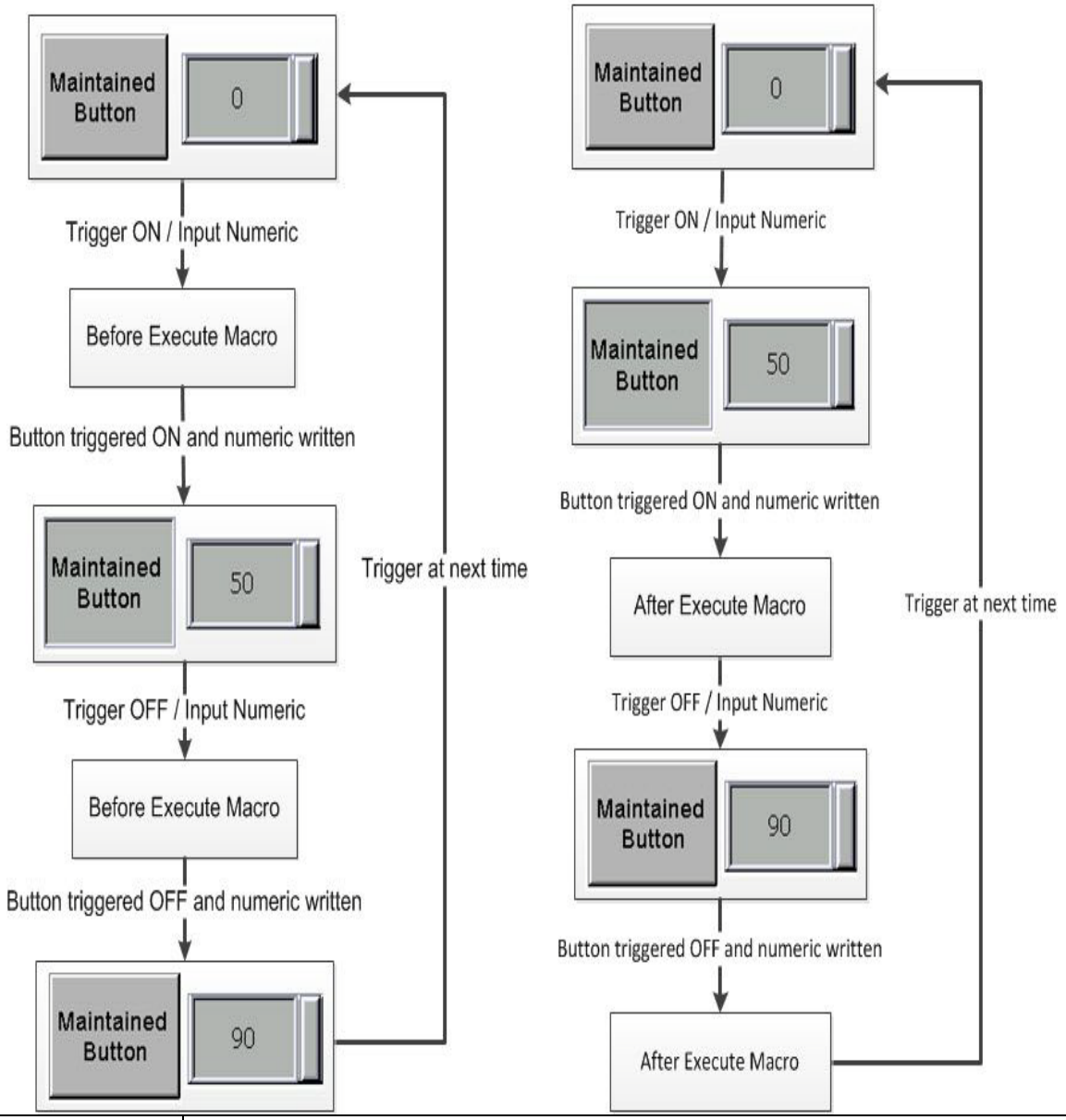


Figure 5-2-7 Multistate Element Macro Properties Page

No.	Property	Function
(1)		➢ The before execute macro and after execute macro processes are diagrammed below:
	Before execute Macro	➢ When users touch the button element, HMI will first run the commands in the corresponding macro pre-action of the button action. If the button state is not changed by means of touching button (using external controller commands or other macros), HMI will not run the corresponding macro commands.
	After execute Macro	➢ After users touch the button element, HMI will first run the button action pre-action the commands in the corresponding macro. If the button state is not changed by means of touching button (using external controller commands or other macros), HMI will not run the corresponding macro commands.



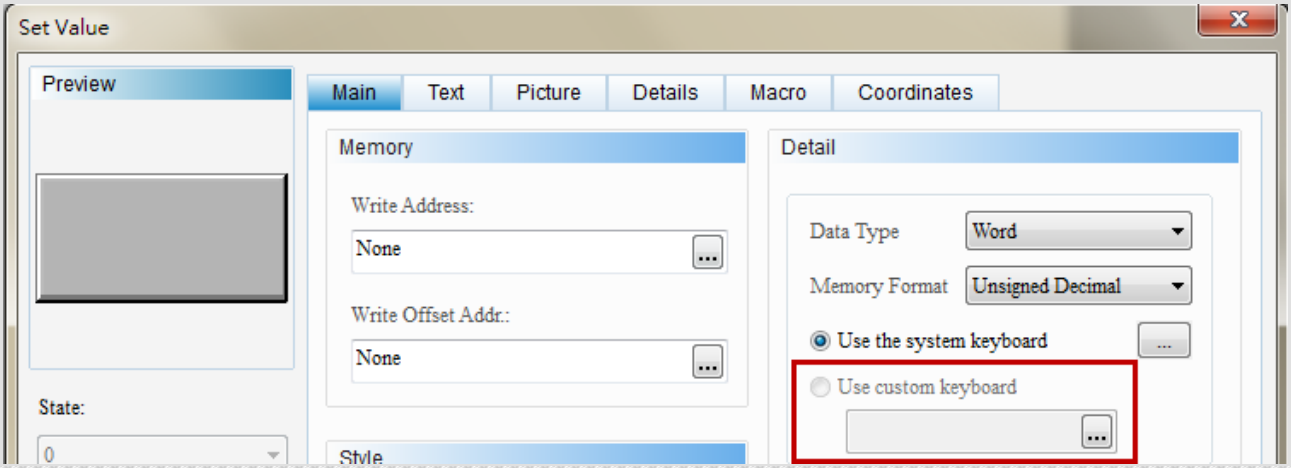
5-3 Set Value

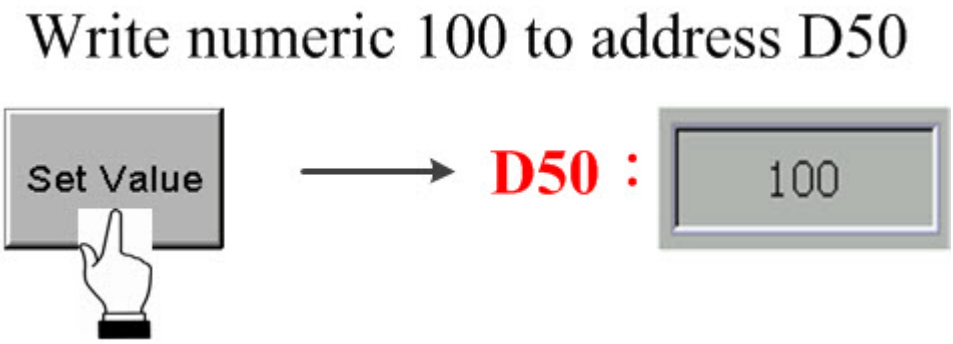
	Set Value

After touching this button on HMI, the built-in Numeric Keypad will pop up for users to input values. Press the ENTER key and HMI will send the input values to the corresponding registers. Users can define the maximum and minimum limits of values. Users can also program how to activate the register addresses to activate the selected controller Bit addresses; i.e. pre-action or post-action. Please refer to Table 5-3-1 Example Set Value below.

NOTE：

✓ DOP-B series does not support custom keyboard of Set Value.



Example of Set Value Table 5-3-1 Example of Set Value	
Write Address	**Write Address of Set Value Element**: D50 **Read Address of Numeric Display Value**: D50
Execution Results	

Double-click Set Value to call out the Set Value Properties screen as shown below.

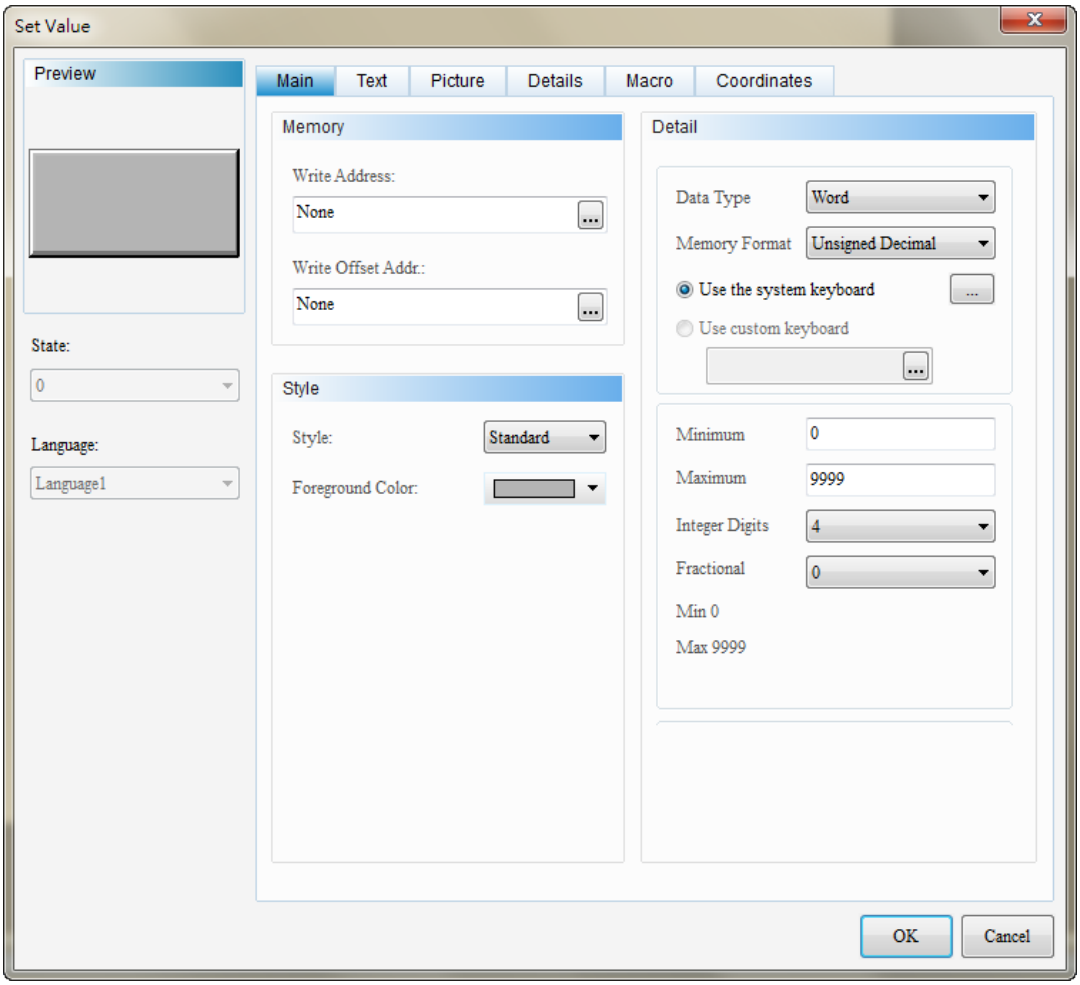


Figure 5-3-1 Set Value Element Properties

Set Value	
Function Page	**Content Description**
Preview	Views Multi-Language data and does not support multistate data.
Main	Sets Write Address, Write Offset Address, Style, and Foreground Color. Sets the Data Type and Data Format of Set Value elements; Keyboard Style, Maximum / Minimum Values, Integer Digit, and Decimal Place.
Text	Sets the content, font, font size, font color, bold/italic/underline of font, scaling, and alignment of the text to be displayed.
Picture	Sets Picture Bank Name, Alignment, Picture Stretch Mode, and Transparent Color.
Details	Sets Interlock Address, Interlock State, Activation Methods, Activation, Invisible Address, User Security Level, Set Low Security, Hide Character, Enable Confirmation Box, and Exceed Limit Reminder.
Macro	Sets Before execute Macro and After execute Macro.
Coordinates	Sets the X-Y coordinate, width, and height of elements.

Table 5-3-2 Set Value Function Page

◆ Main

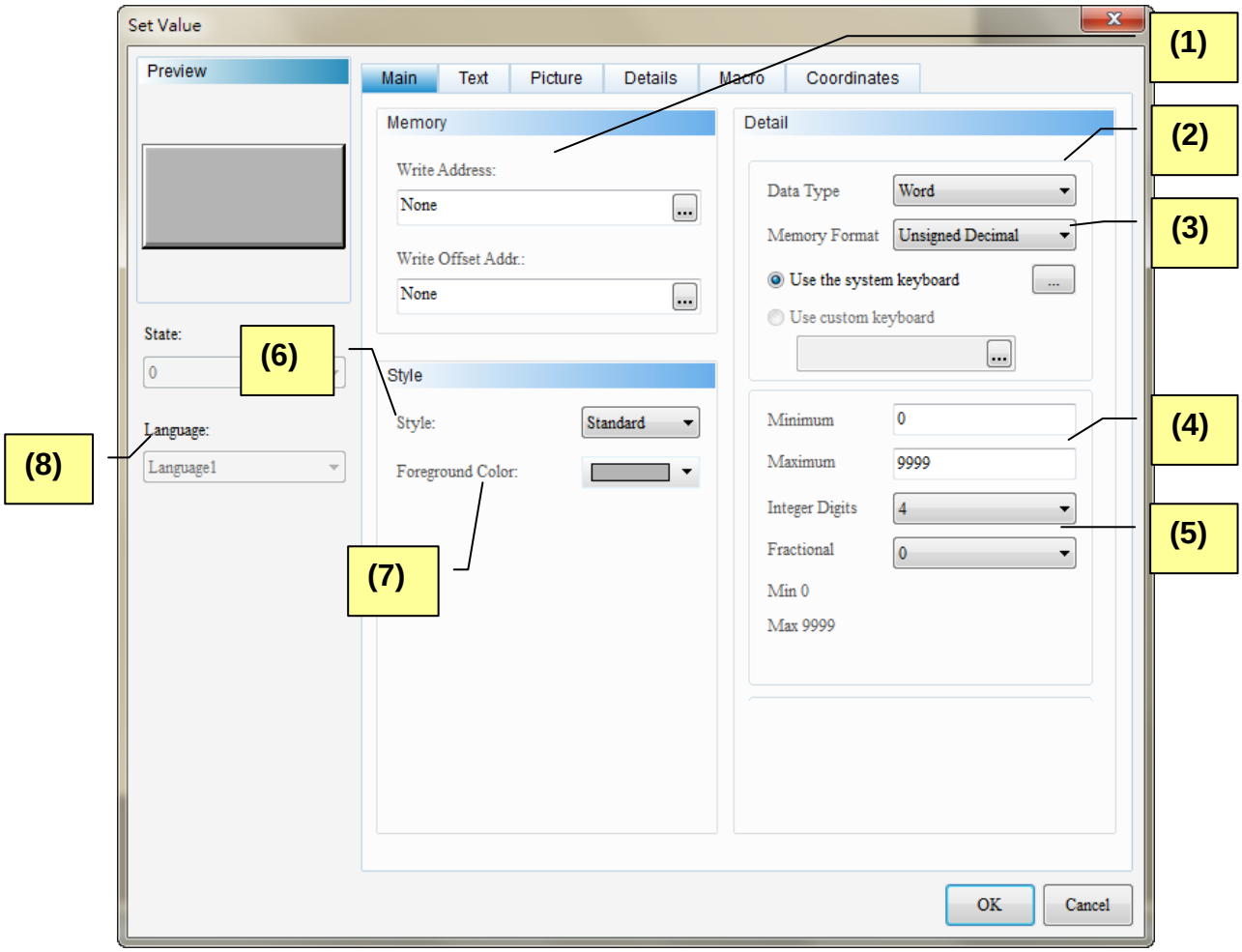
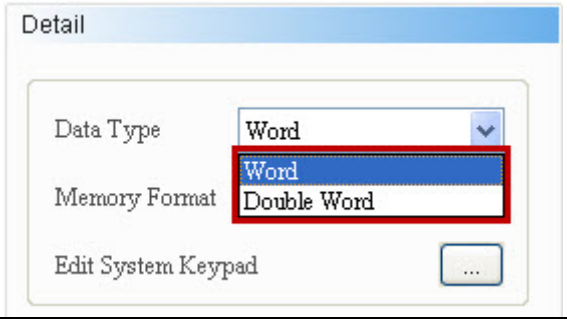
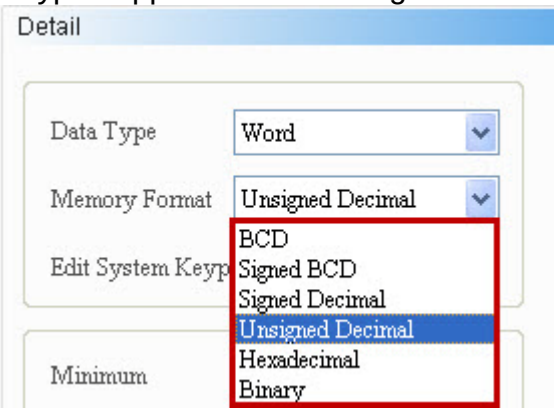
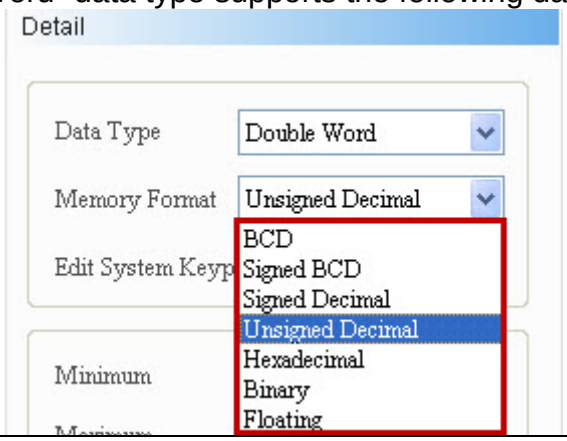
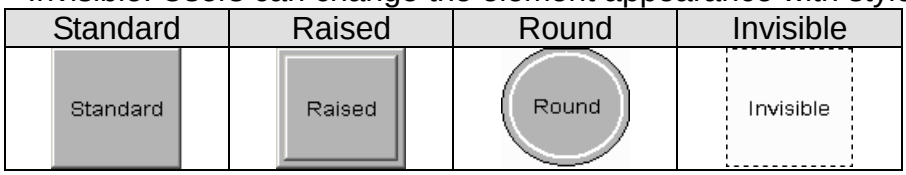
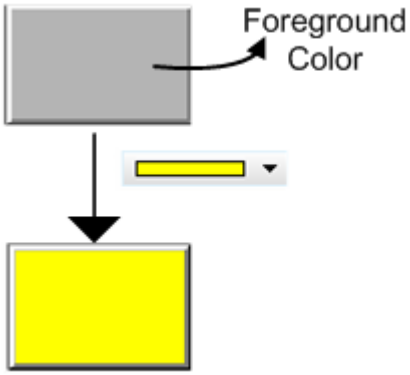
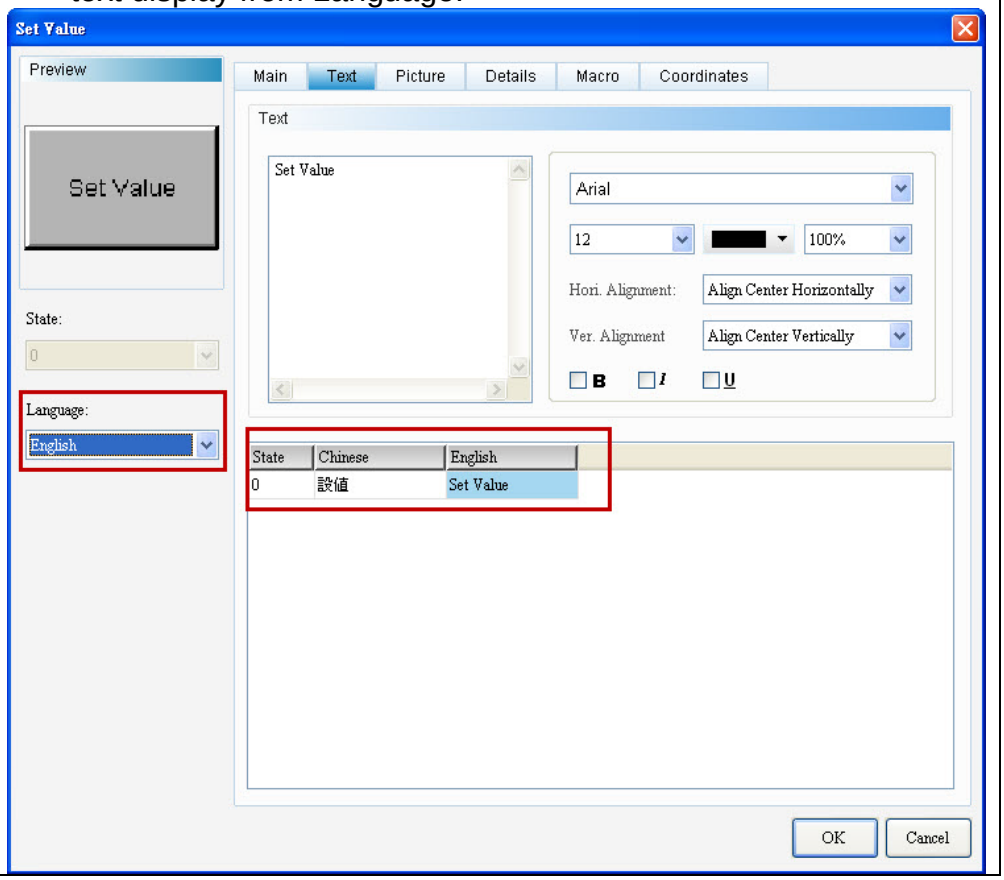


Figure 5-3-2 Set Value Element Main Properties Page

No.	Property	Function
(1)	Write Address	➢ Selects the address of internal memory or controller register. Addresses must be in “Word” format. ➢ Selects link name or style. Please refer to 5-1 Buttons of Chapter 05 for details.
	Write Offset Address	➢ Please refer to Appendix D Write and Read Offset address.
(2)	Data Type	➢ Data types include “Word” and “Double Word”. 

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td>(3)</td><td>Data Format</td><td>➢ “Word” data type supports the following data formats:
 

➢ “Double Word” data type supports the following data formats:
 
</td></tr>
<tr><td>(4)</td><td>Minimum / Maximum</td><td>➢ The data valid range of minimum numeric entry and maximum numeric entry is subject to the data type and data format.
<table>
<tr><th>Data Type</th><th>Data Format</th><th>Data Valid Range</th></tr>
<tr><td rowspan="6">Word</td><td>BCD</td><td>0~9999</td></tr>
<tr><td>Signed BCD</td><td>-999 ~ 9999</td></tr>
<tr><td>Signed Decimal</td><td>-32768~32767</td></tr>
<tr><td>Unsigned Decimal</td><td>0~65535</td></tr>
<tr><td>Hex</td><td>0~0xFFFF</td></tr>
<tr><td>Binary</td><td>0~0xFFFF</td></tr>
<tr><td rowspan="7">Double Word</td><td>BCD</td><td>0~99999999</td></tr>
<tr><td>Signed BCD</td><td>-9999999 ~ 99999999</td></tr>
<tr><td>Signed Decimal</td><td>-2147483648~2147483647</td></tr>
<tr><td>Unsigned Decimal</td><td>0~4294967295</td></tr>
<tr><td>Hex</td><td>0~0xFFFFFFFF</td></tr>
<tr><td>Binary</td><td>0~0xFFFFFFFF</td></tr>
<tr><td>Floating</td><td>0~9999999</td></tr>
</table></td></tr>
<tr><td>(5)</td><td>Integer Digit / Fractional</td><td>➢ Users can define the integer digits and decimal places to be displayed.</td></tr>
</table>

No.	Property	Function
(6)	Style	➢ There are four Styles, including Standard, Raised, Round, and Invisible. Users can change the element appearance with style. 
(7)	Foreground Color	➢ Sets foreground color of elements. ➢ When Style is “Invisible”, foreground color is disabled. 
(8)	Language	➢ When language data are defined, users can edit the properties of text display from Language. 

◆ Text

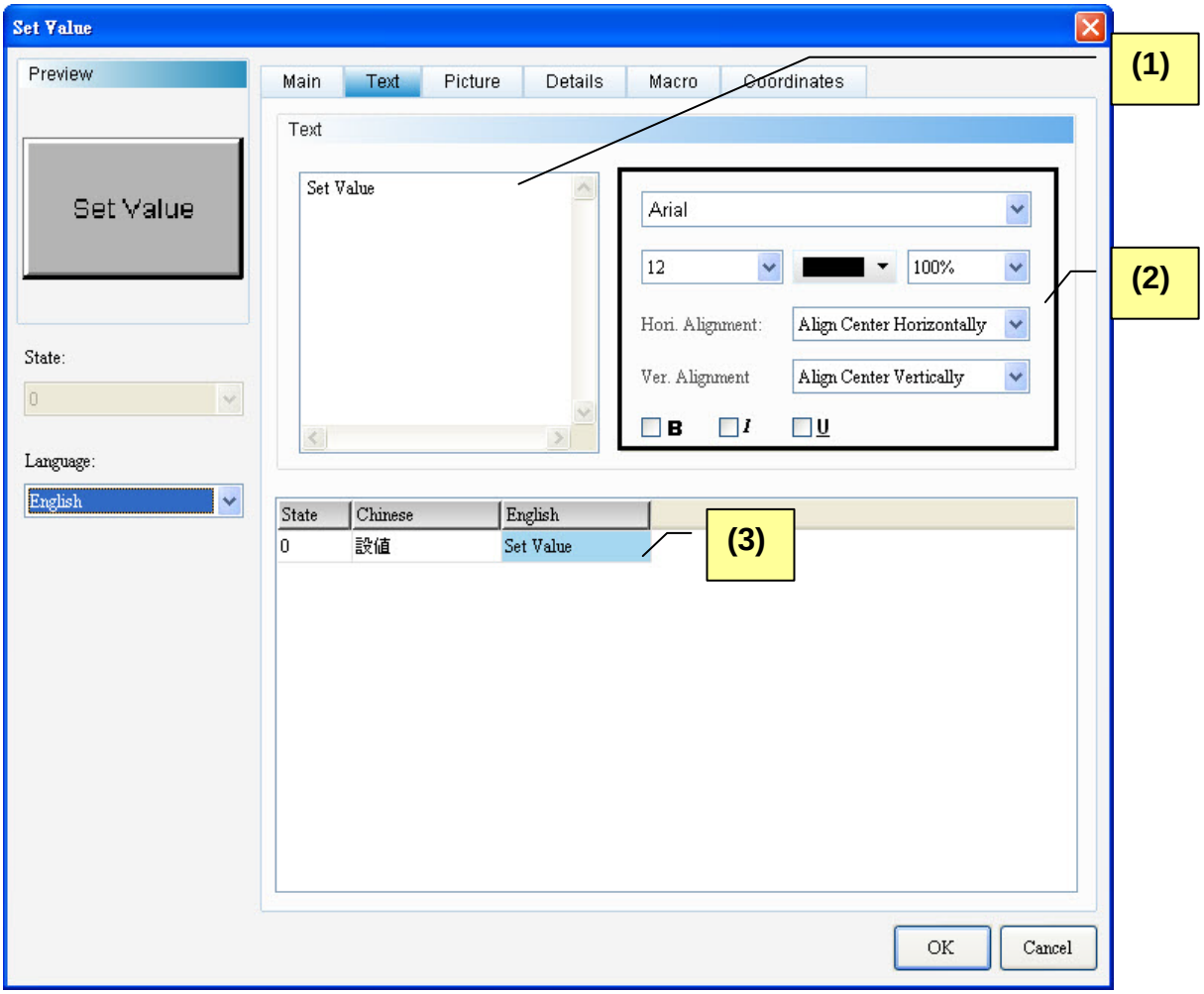
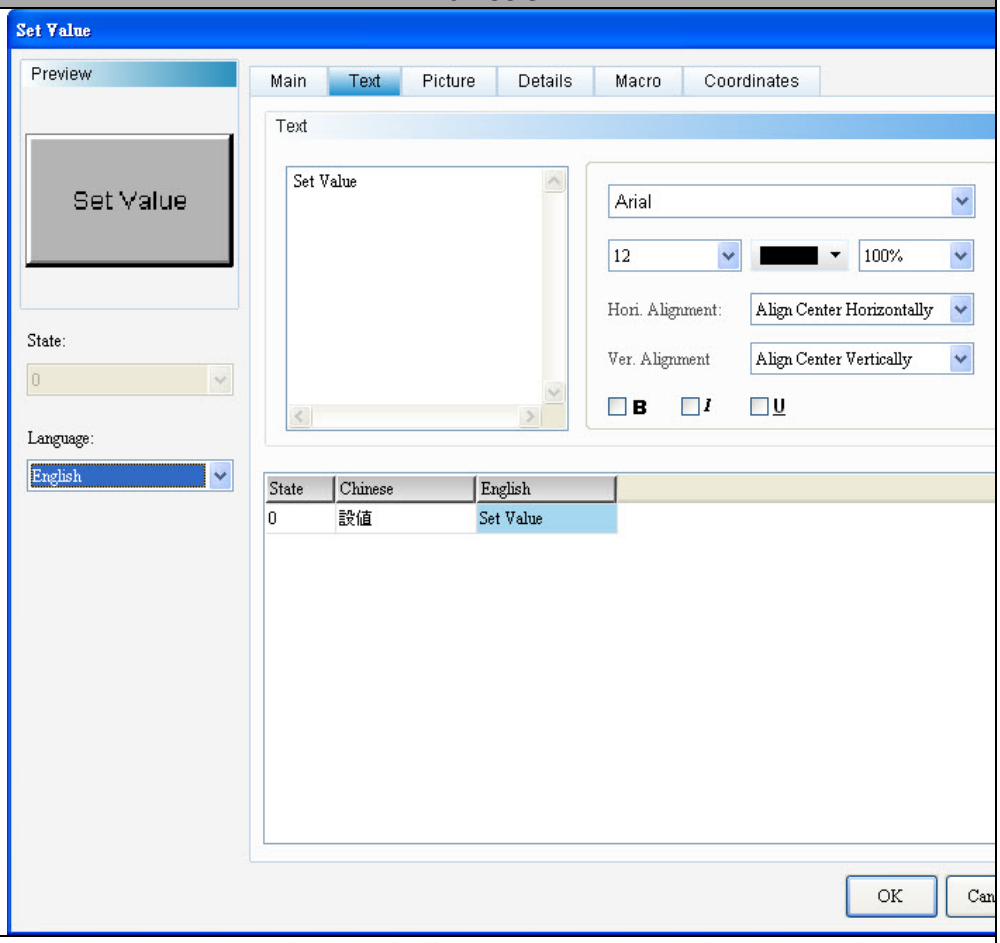


Figure 5-3-3 Set Value Element Text Properties Page

No.	Property	Function
(1)	Text	➢ Users can input the text to be displayed in the text box.

No.	Property	Function
		
(2)	Text Properties	➢ Sets text properties, including font type, font size, font color, scaling, text alignment, and bold/italic/underline of font. Please refer to the above figure for details about the results of text properties.
(3)	Multi-Language Text Data	➢ Users can add Multi-Language text data from the Multi-Language Text Page. As shown in the Text Properties Figure, users can input English text in the English field.

◆ Picture

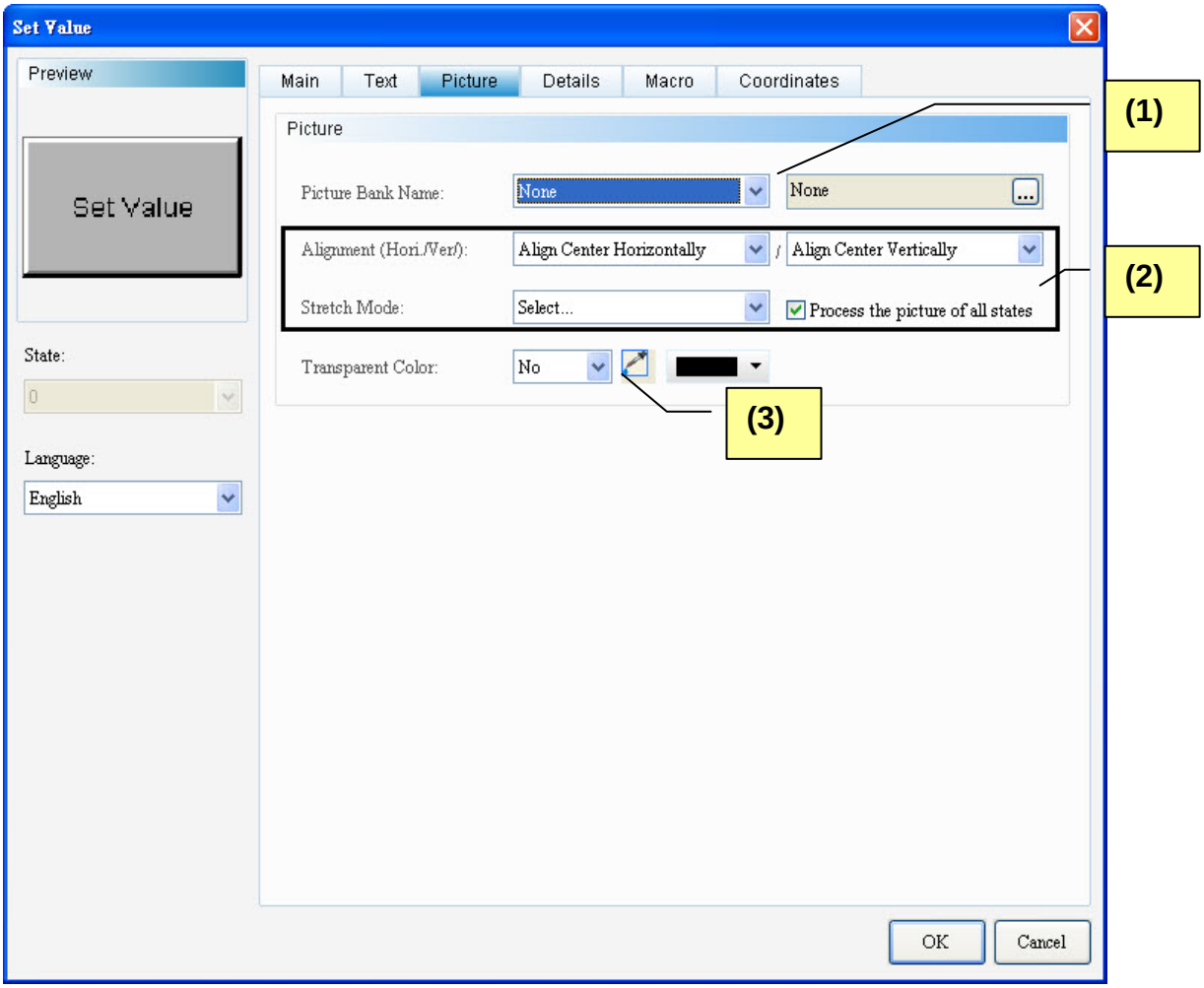
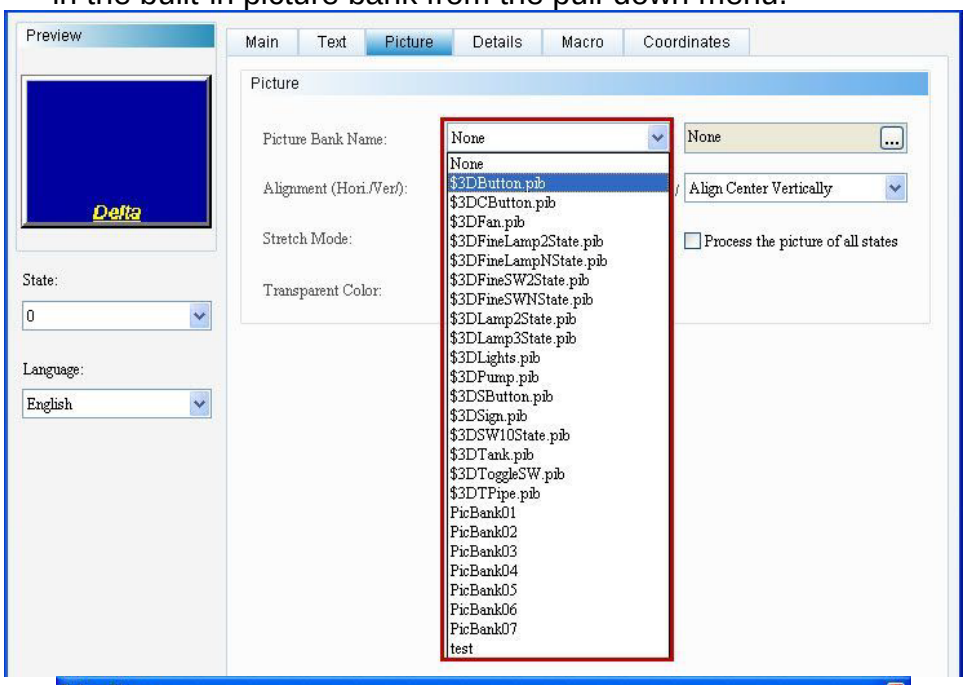
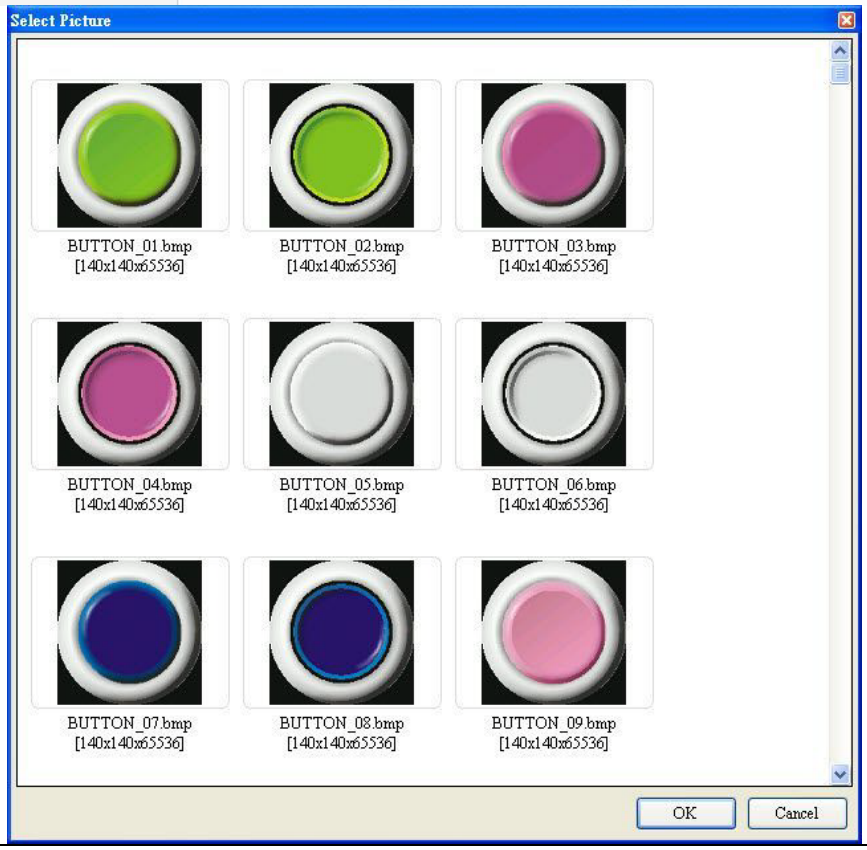
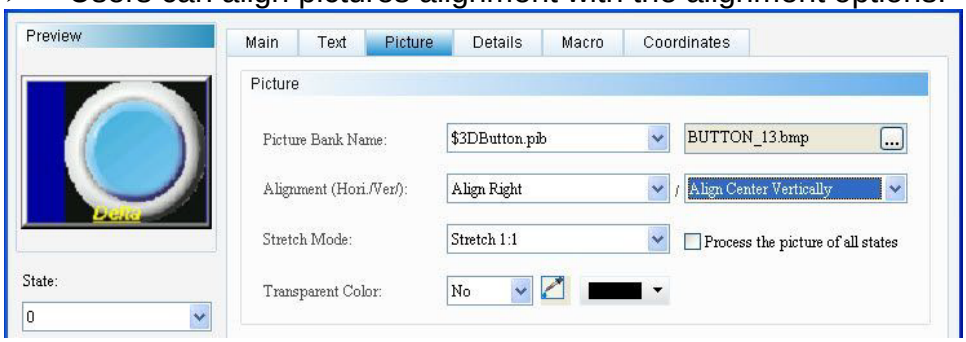
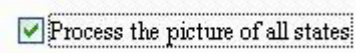
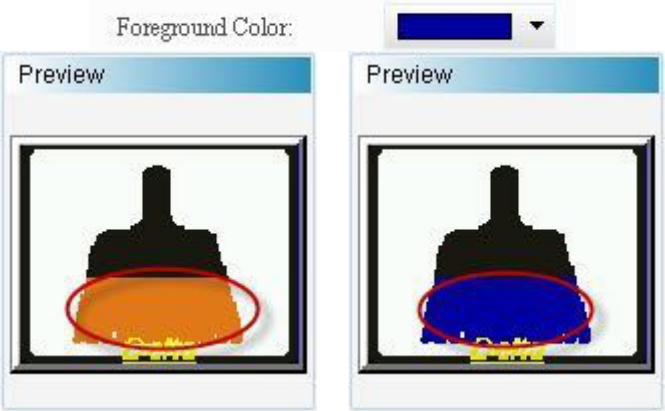


Figure 5-3-4 Set Value Element Picture Properties Page

No.	Property	Function
(1)	Picture Bank Name	➢ The default value for Picture Bank Name is “None”. Users wishing to select a display picture can select the desired picture in the built-in picture bank from the pull-down menu.  

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td rowspan="2">(2)</td><td>Alignment</td><td>➢ Users can align pictures alignment with the alignment options.
 
</td></tr>
<tr><td>Stretch Mode</td><td>➢ Stretch modes include: Fill, Keep Aspect Ratio, and Actual Size.
<table>
<tr><th>Fill</th><th>Keep Aspect Ratio</th><th>Actual Size</th></tr>
<tr><td>In the “Fill” mode, the selected picture will fill up the entire display area.</td><td>In the “Keep Aspect Ratio” mode, the selected picture will fit in the display area proportionally according to the picture ratio.</td><td>In the “Actual Size” mode, the picture will be displayed in its original size in the display area.</td></tr>
<tr><td> </td><td> </td><td> </td></tr>
</table>
➢ If “Process all state pictures” is selected, the system assumes that each element has multiple entries of state data, and some pictures may be unable to fill the entire display area. By selecting this item, users will not need to set individual pictures to save time from editing.
 
</td></tr>
<tr><td>(3)</td><td>Transparent Color</td><td>➢ Users can set a color in the picture to transparent. In this case, by clicking the Transparent Color icon and then the orange part of the loom, the DOPSoft will omit all orange parts in the picture and turn them into transparent; thus turning the foreground color transparent.
 
</td></tr>
</table>

◆ Details

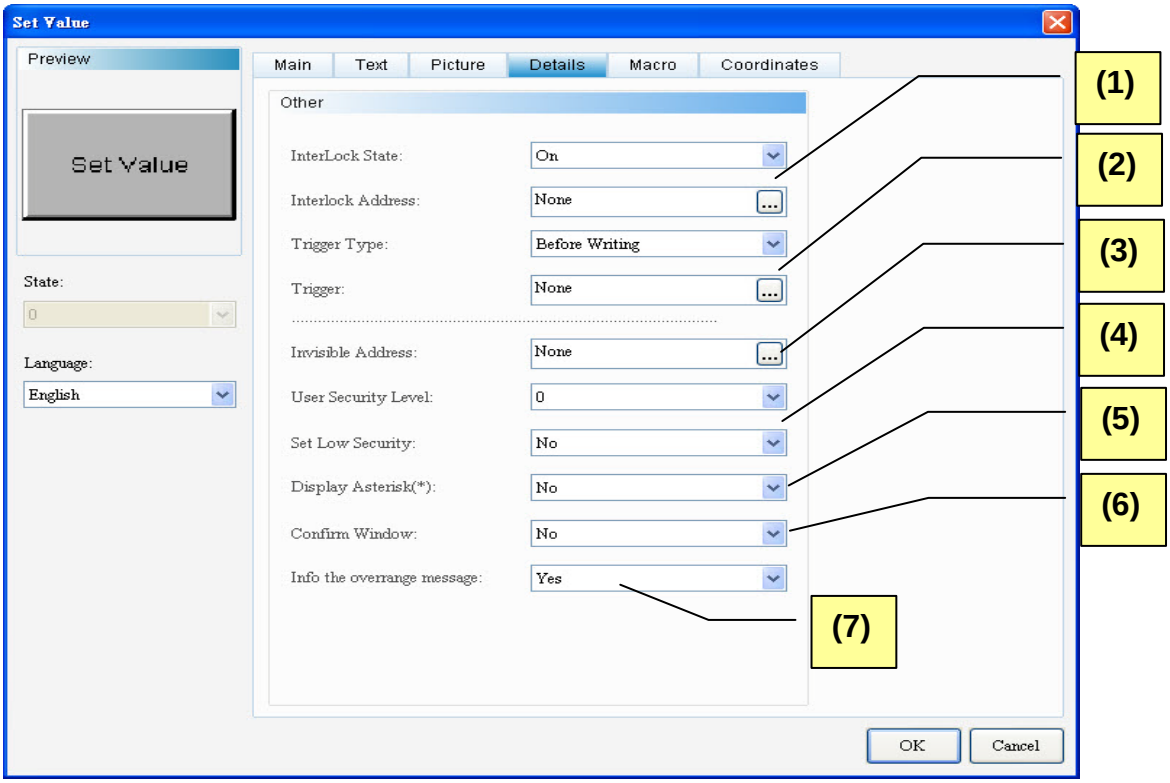
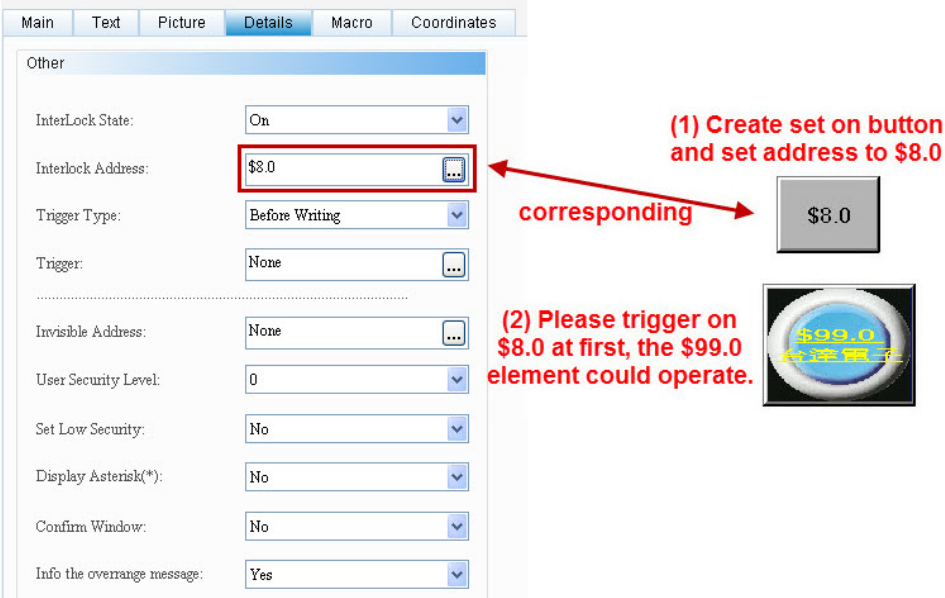
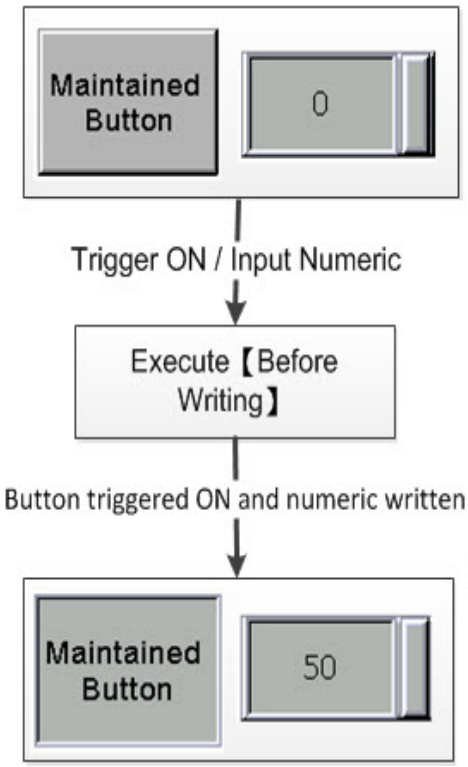
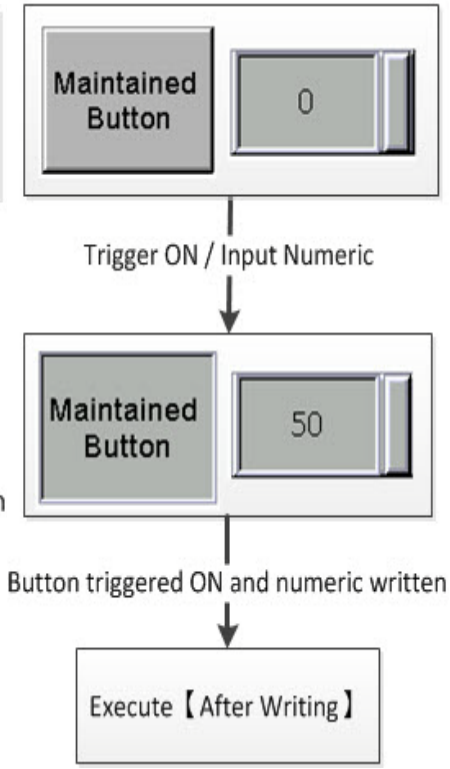


Figure 5-3-5 Set Value Element Details Properties Page

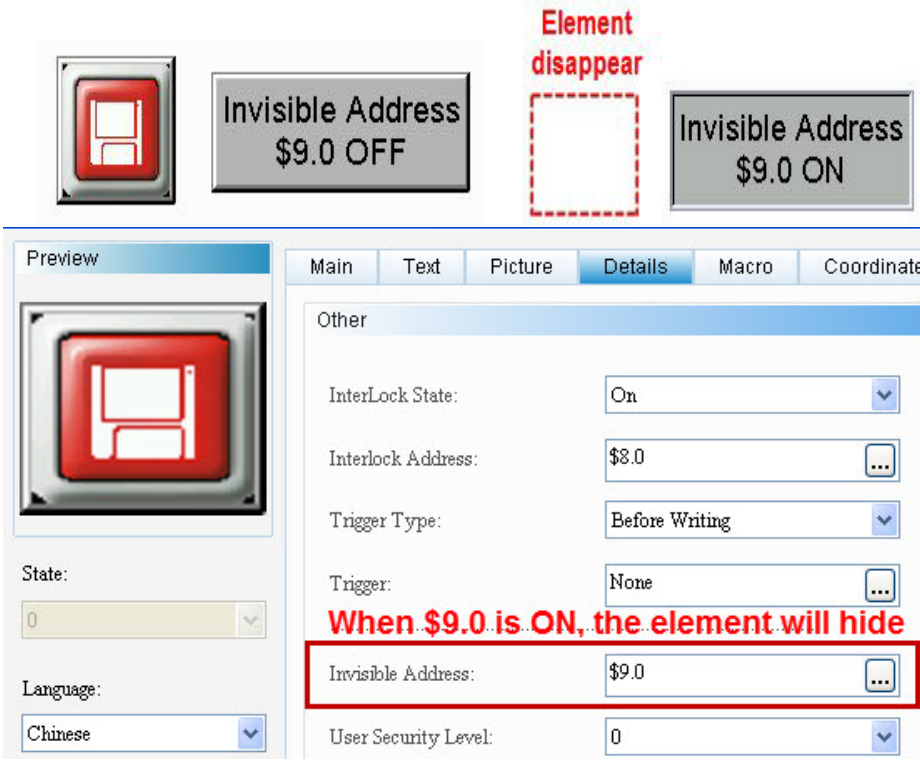
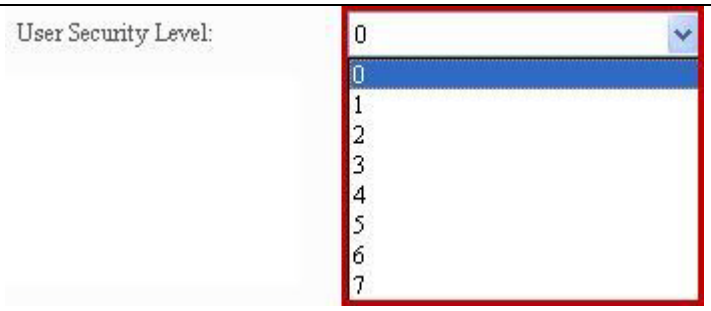
No.	Property	Function
(1)	Interlock State	➢ Interlock Address allows users to operate an element from this particular address. It must be used along with Interlock State. If Interlock State is “OFF”, this means the interlock address is operable when the interlock state is “OFF”. In contrast, when Interlock State is “ON”, this means the interlock address is operable when the interlock state is “ON”. ➢ Examples of the interlock address application are as follows: 1. First, create a button and set its address to “$8.0”. Next, set the original interlock address ($99.0) to “$8.0”. 2. To make Button $99.0 operable, users must press Button $8.0 first.
	Interlock Address	

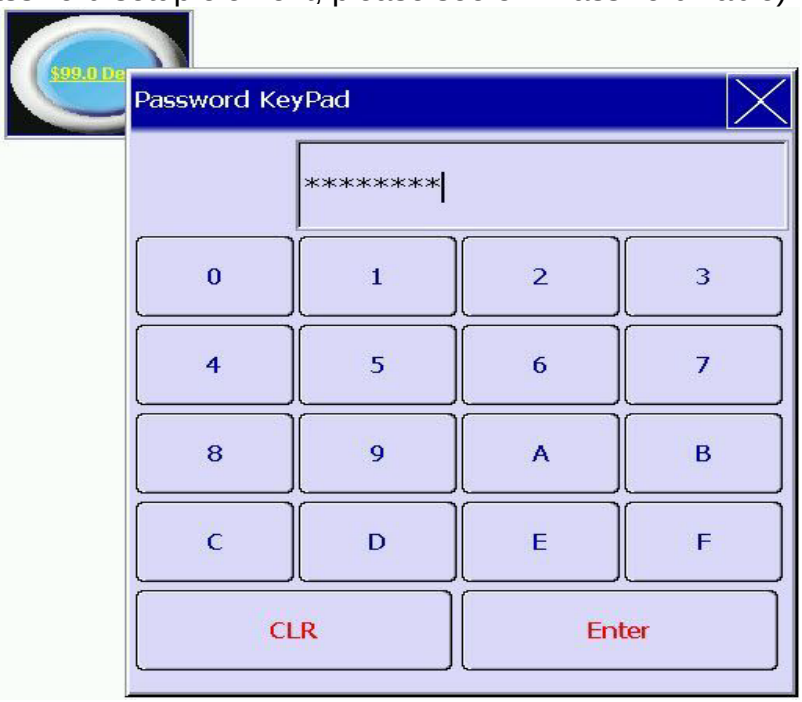
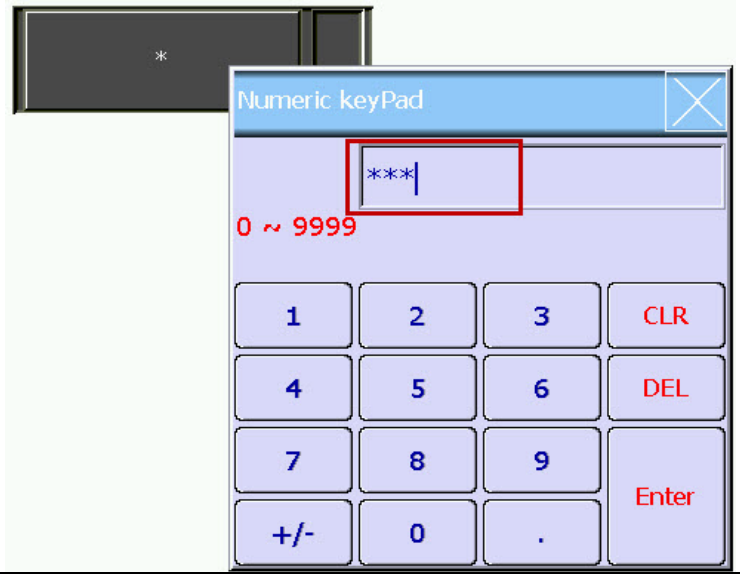
<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td></td><td></td><td>


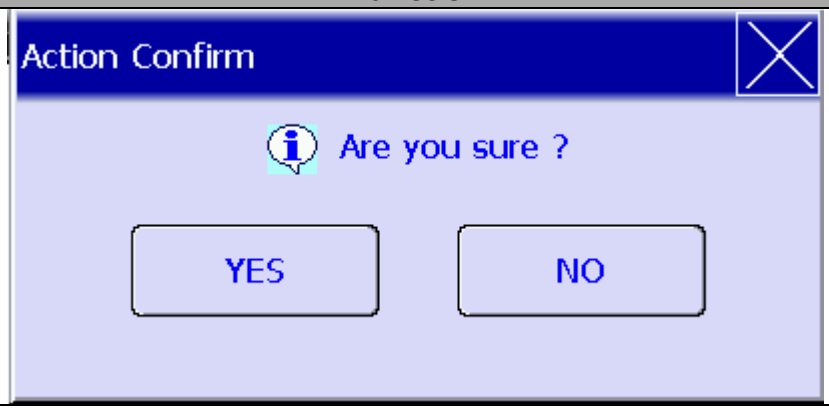
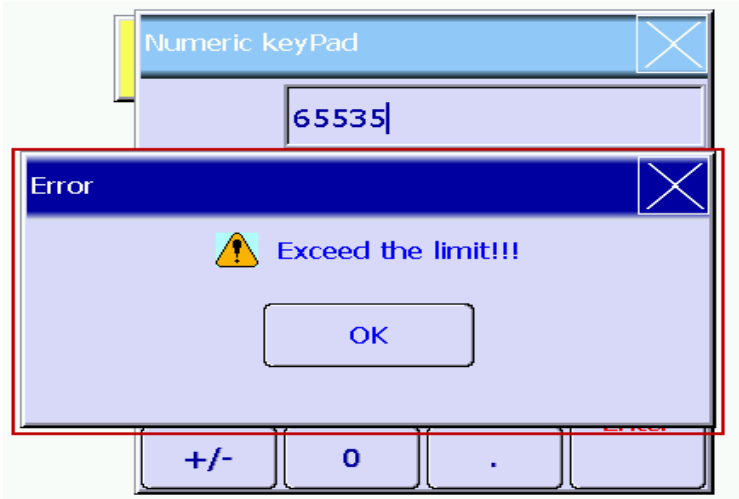
</td></tr>
<tr><td rowspan="2">(2)</td><td>Trigger type</td><td>➢ Trigger type include before writing and after writing.
<table>
<tr><th rowspan="2">Trigger type</th><th>Before writing</th><th>After writing</th></tr>
<tr><td>The activation bit is ON before changing values.</td><td>Values are changed before the activation bit is ON.</td></tr>
</table>
➢ As the activation function only sets the activation address to ON, users must set the activation address of OFF before re-activation.</td></tr>
<tr><td>Trigger</td><td>➢ Before Writing:


After Writing:


</td></tr>
</table>

No.	Property	Function
(3)	Invisible Address	➢ When Invisible Address is “ON”, the button element is hidden, and the corresponding function is disabled. 
(4)	User Security Level	 ➢ Sets the user security level of element activities. Only users with equal or higher security level corresponding to the element can activate the element. ➢ After setting the user security level, when users activate the element, the password box will pop up and request users to input the password (the password can be changed from the

No.	Property	Function
	Set Low Security	password setup element, please see 5-7 Password Table).  ➢ If "YES" is selected for Set Low Security, HMI automatically sets the security level to the lowest every time users input the password. When users activate the element again, they will be requested to input again the password corresponding to the element.
(5)	Display Asterisk	➢ If "YES" is selected for Hide Character, all numbers input from the numeric keypad will be displayed as "***", i.e. characters are hidden, as shown below: 
(6)	Enable Confirmation Box	➢ If Enable Confirmation Box is set to "YES", the following dialog box will pop up after pressing the corresponding button as shown below:

No.	Property	Function
		
(7)	Exceed Limit Reminder	➢ If "YES" is selected for Exceed Limit Reminder, when the input value exceeds this range defined, an error message will pop up to remind users as shown below: 

◆ Coordinates

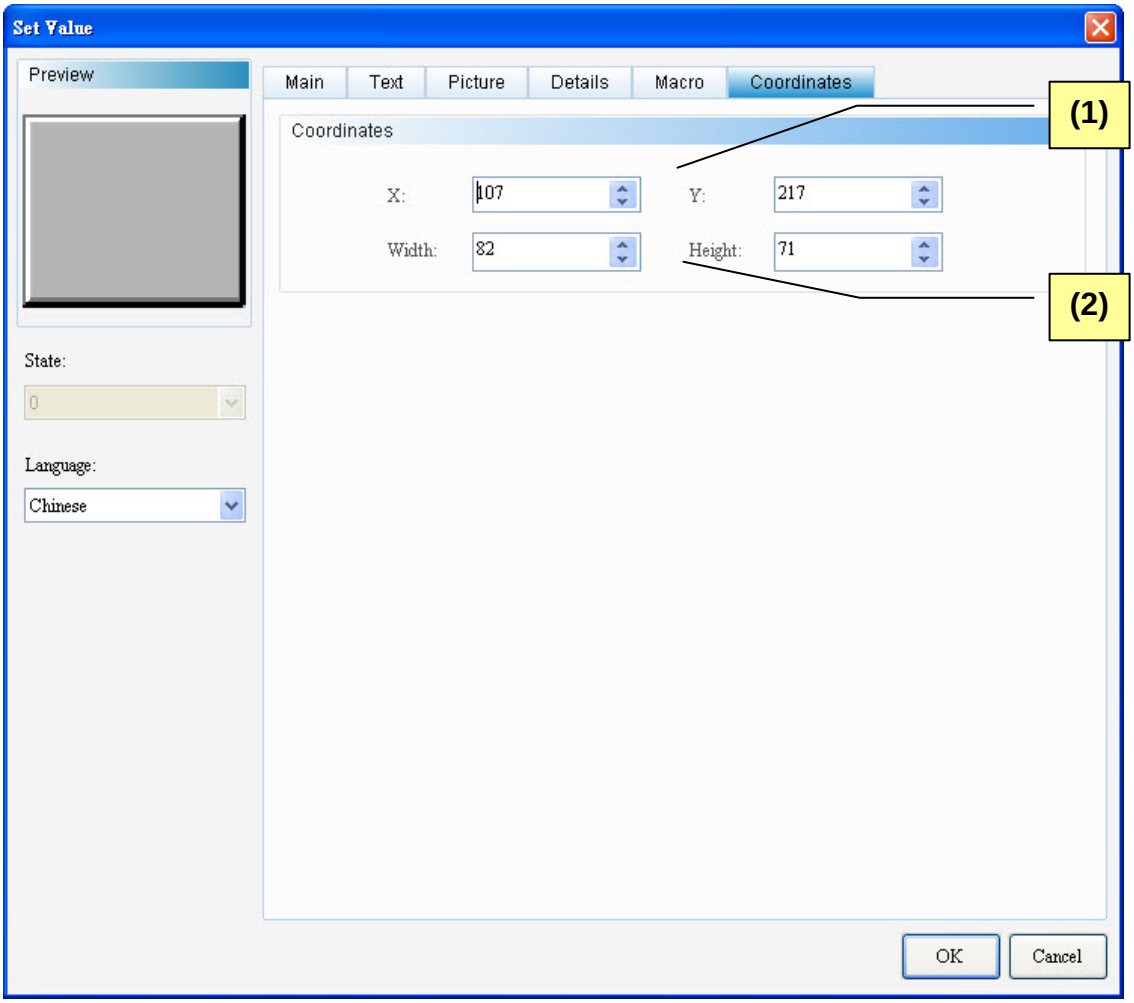


Figure 5-3-6 Set Value Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

◆ Macro

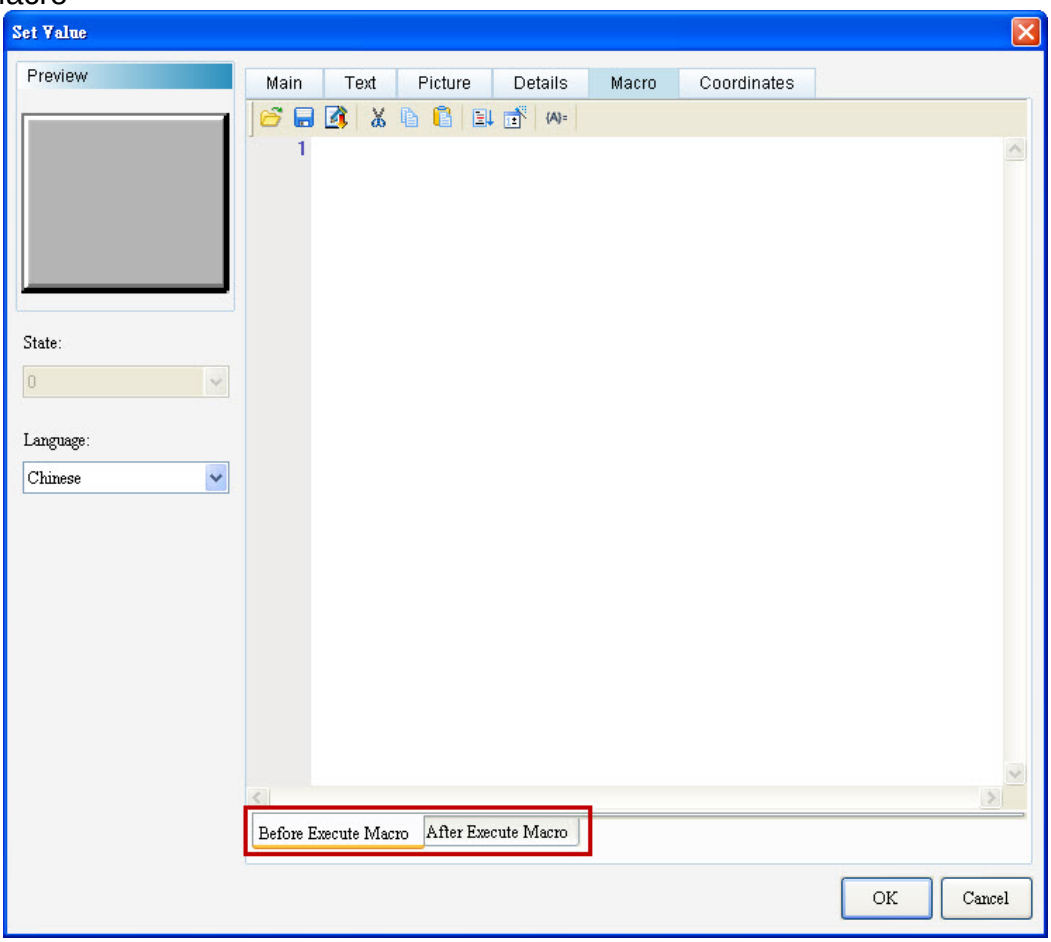
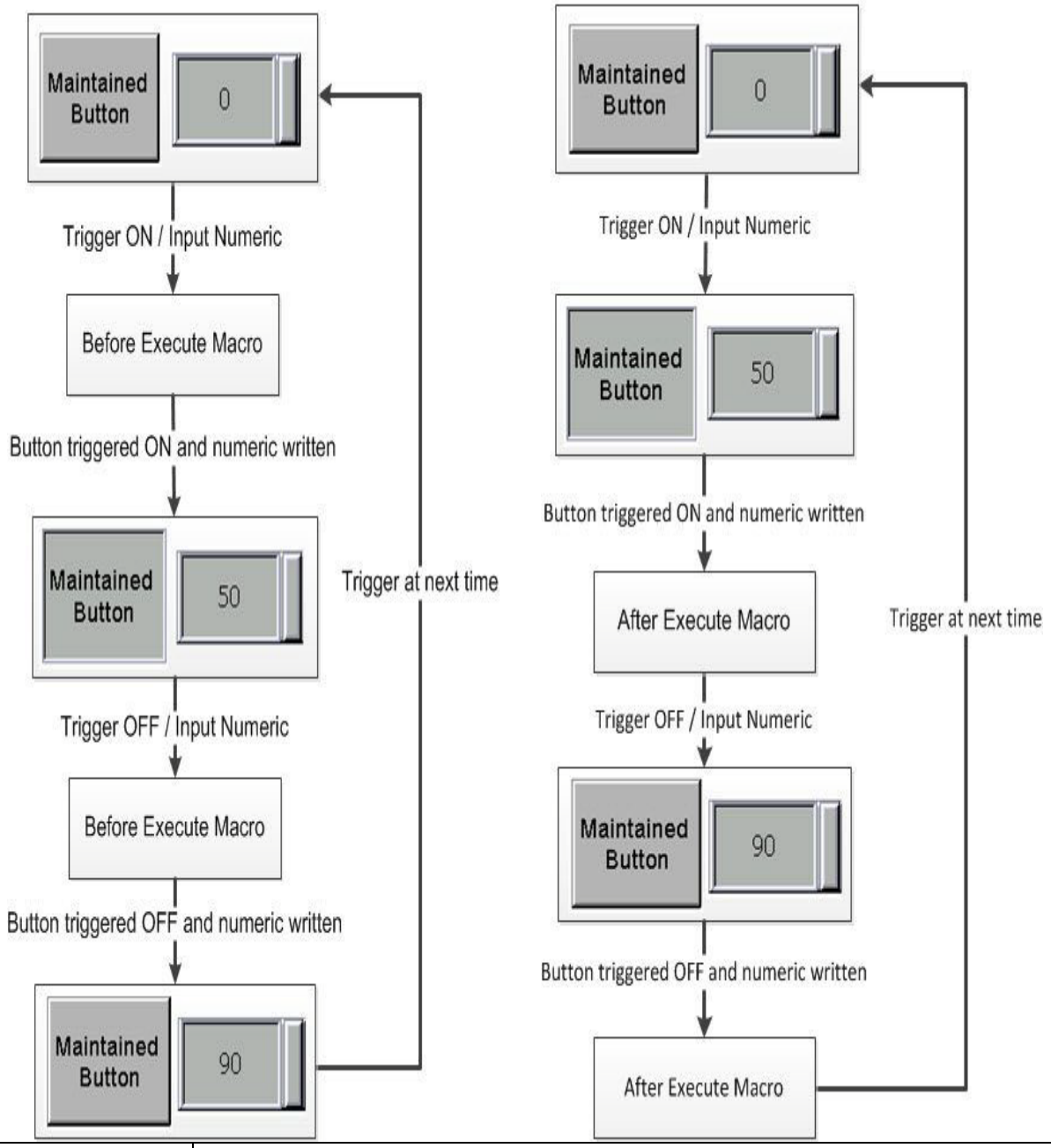


Figure 5-3-7 Set Value Element Macro Properties Page

No.	Property	Function
(1)		➢ The before execute macro and after execute macro processes are diagrammed below:
	Before Execute Macro	➢ When users touch the button element, HMI will first run the commands in the corresponding macro pre-action of the button action. If the button state is not changed by means of touching button (using external controller commands or other macros), HMI will not run the corresponding macro commands.
	After Execute Macro	➢ After users touch the button element, HMI will first run the button action pre-action the commands in the corresponding macro. If the button state is not changed by means of touching button (using external controller commands or other macros), HMI will not run the corresponding macro commands.



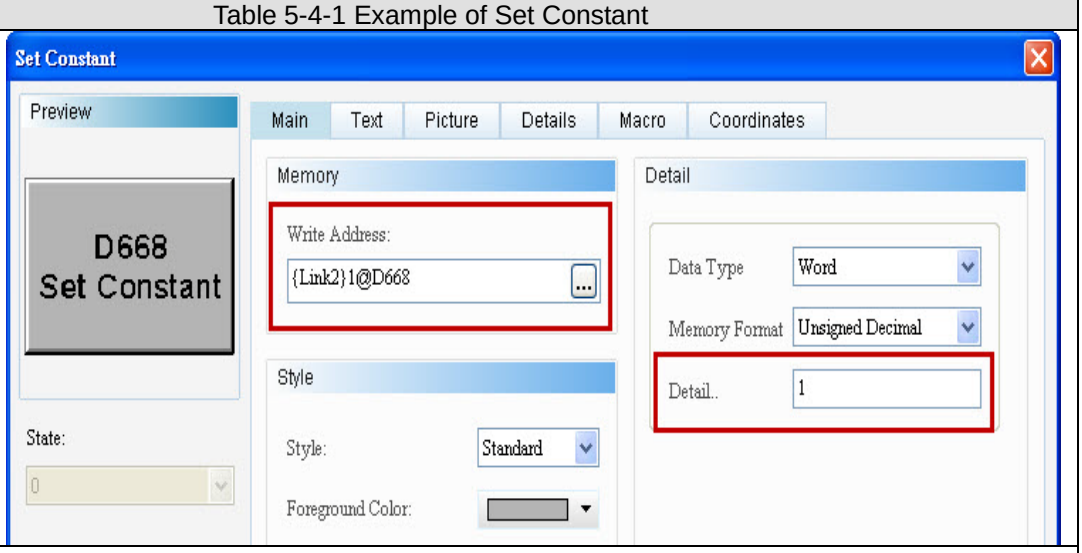
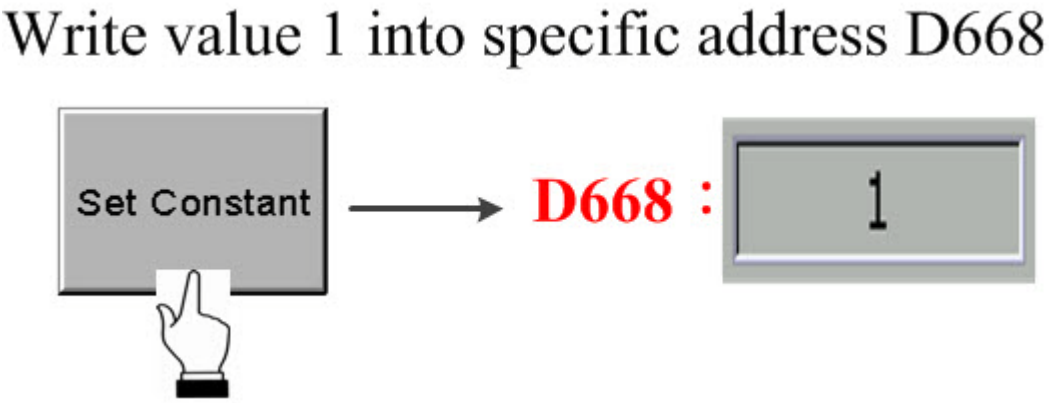
5-4 Set Constant

	Set Constant

After touching this button on HMI, HMI will change the register value into the selected constant. Please refer to Table 5-4-1 Example Set Constant below.

Example of Set Constant

Table 5-4-1 Example of Set Constant

Set Constant Element Address Value of Set Constant Element	
Memory Address of Numeric Display Element	Create Numeric Display element and set address to D668.
Data Type	Word
Execution Results	

Double-click Set Constant to call out the Set Constant Properties screen as shown below.

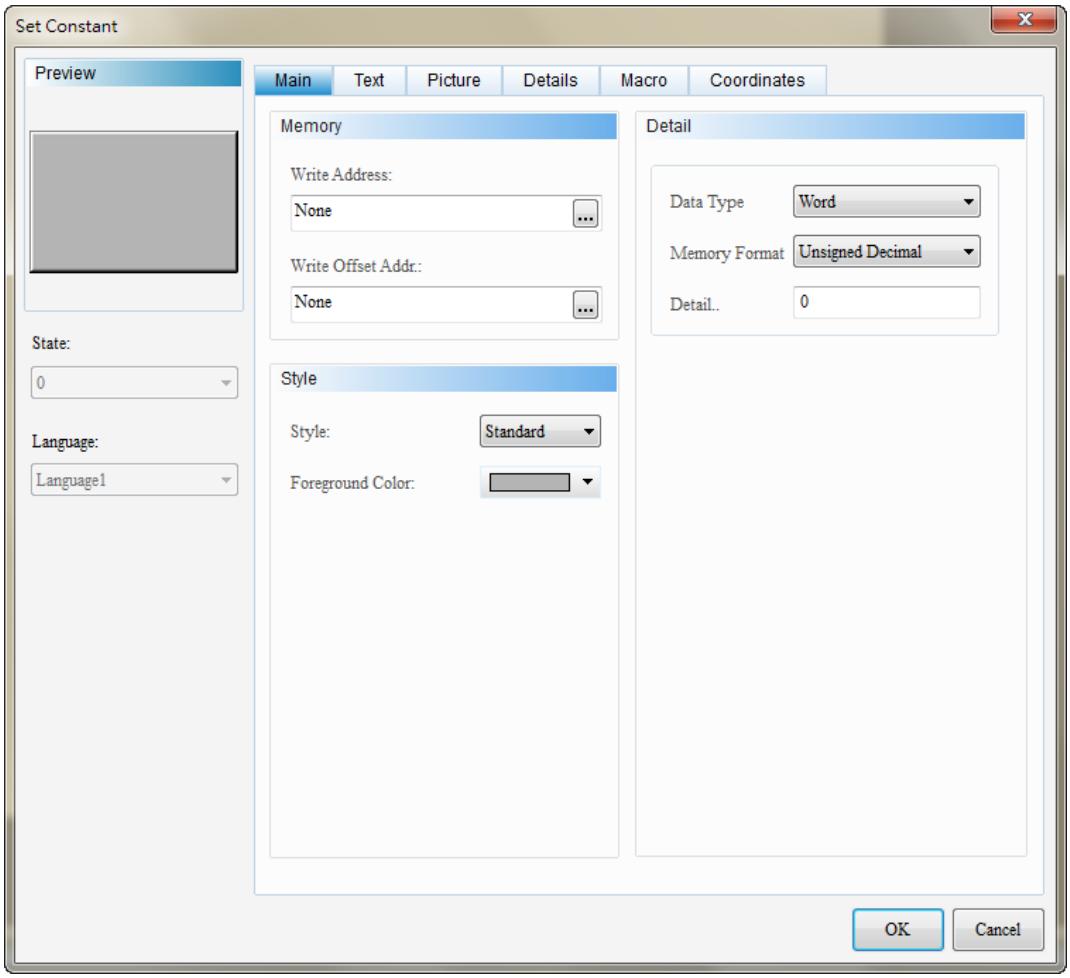


Figure 5-4-1 Set Constant Element Properties

Set Constant	
Function Page	**Content Description**
Preview	Views Multi-Language data and does not support multistate data.
Main	Sets Write Address, Write Offset Address, Style, and Foreground Color. Sets the Data Type, Data Format, and Value of Set Constant elements.
Text	Sets the content, font, font size, font color, bold/italic/underline of font, scaling, and alignment of the text to be displayed.
Picture	Sets Picture Bank Name, Alignment, Picture Stretch Mode, and Transparent Color.
Details	Sets Interlock Address, Interlock State, Activation Methods, Activation, Invisible Address, User Security Level, Set Low Security, and Enable Confirmation Box.
Macro	Sets Before execute Macro and After execute Macro.
Coordinates	Sets the X-Y coordinate, width, and height of button elements.

Table 5-4-2 Set Constant Function Page

◆ Main

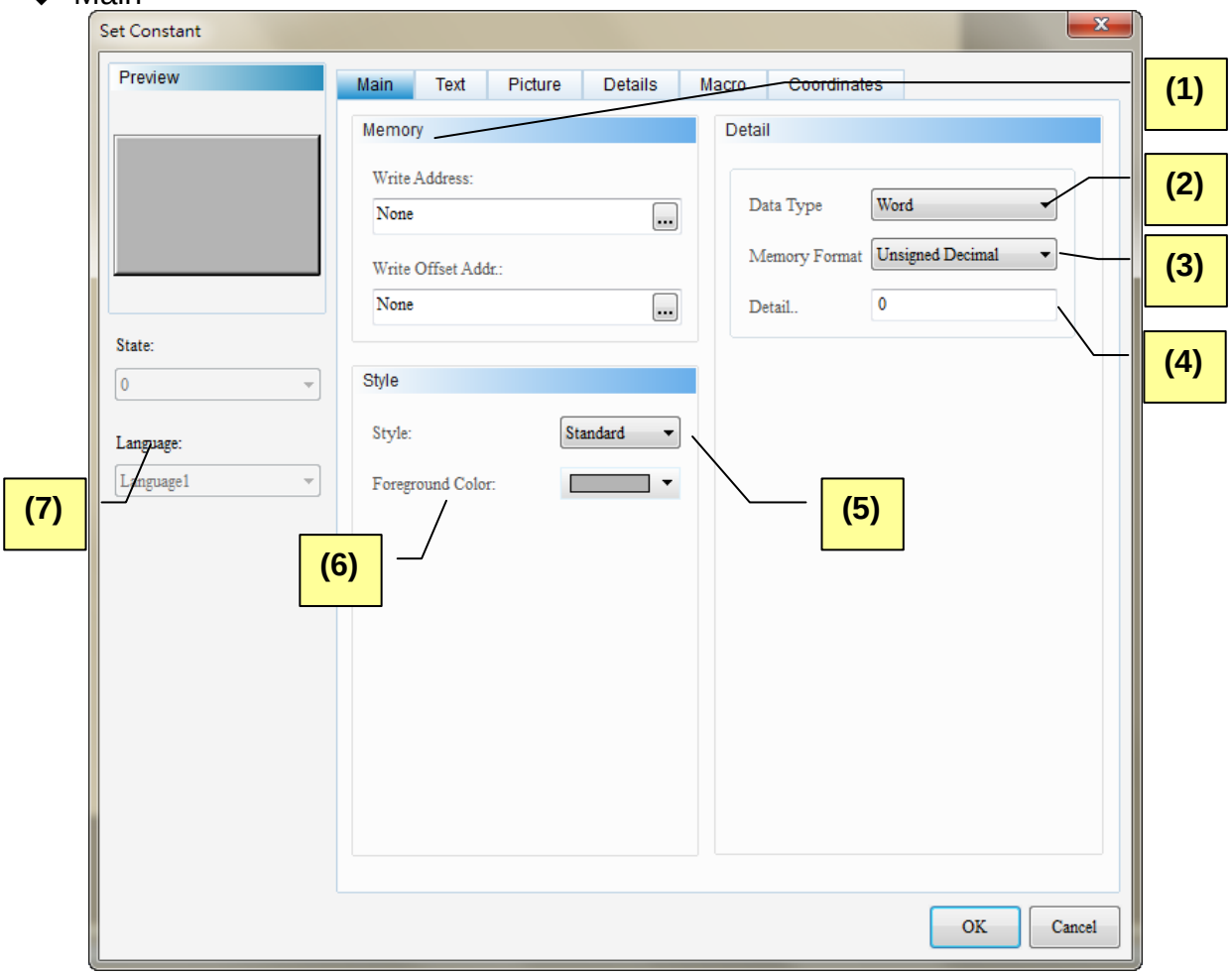
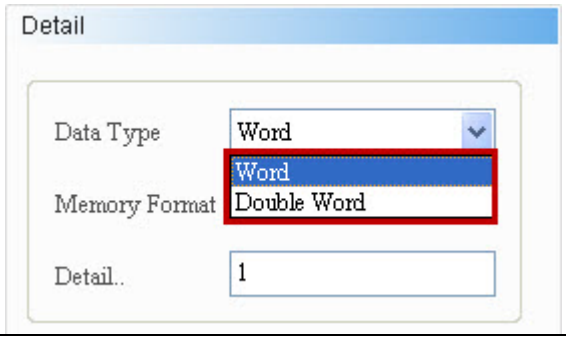
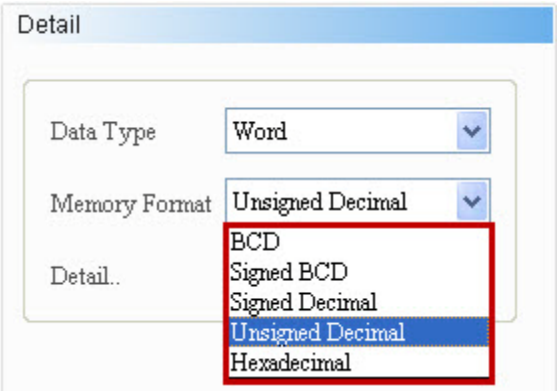
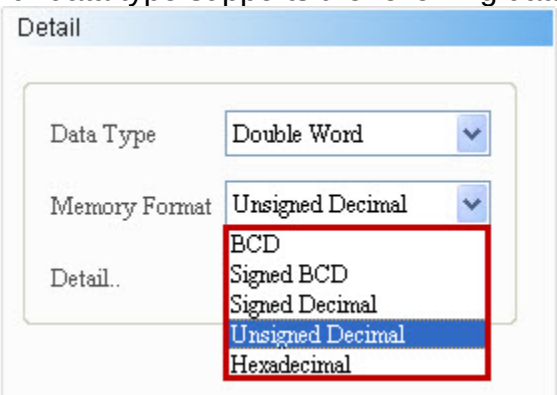
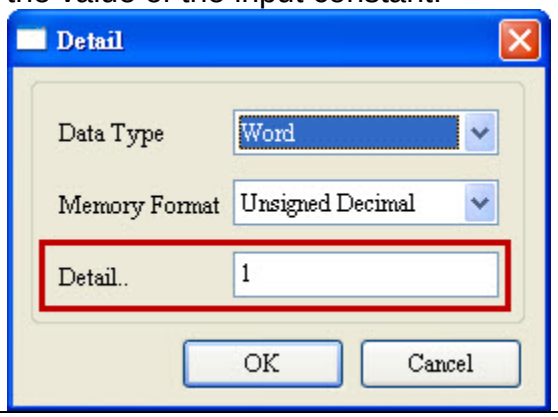
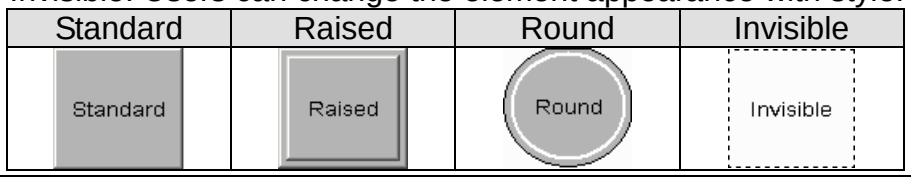
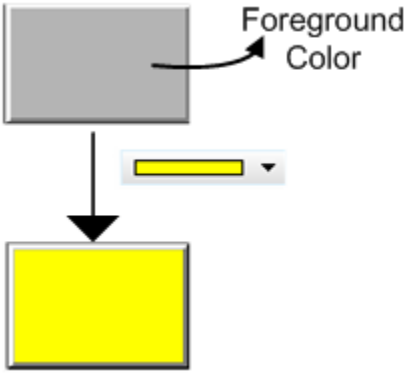
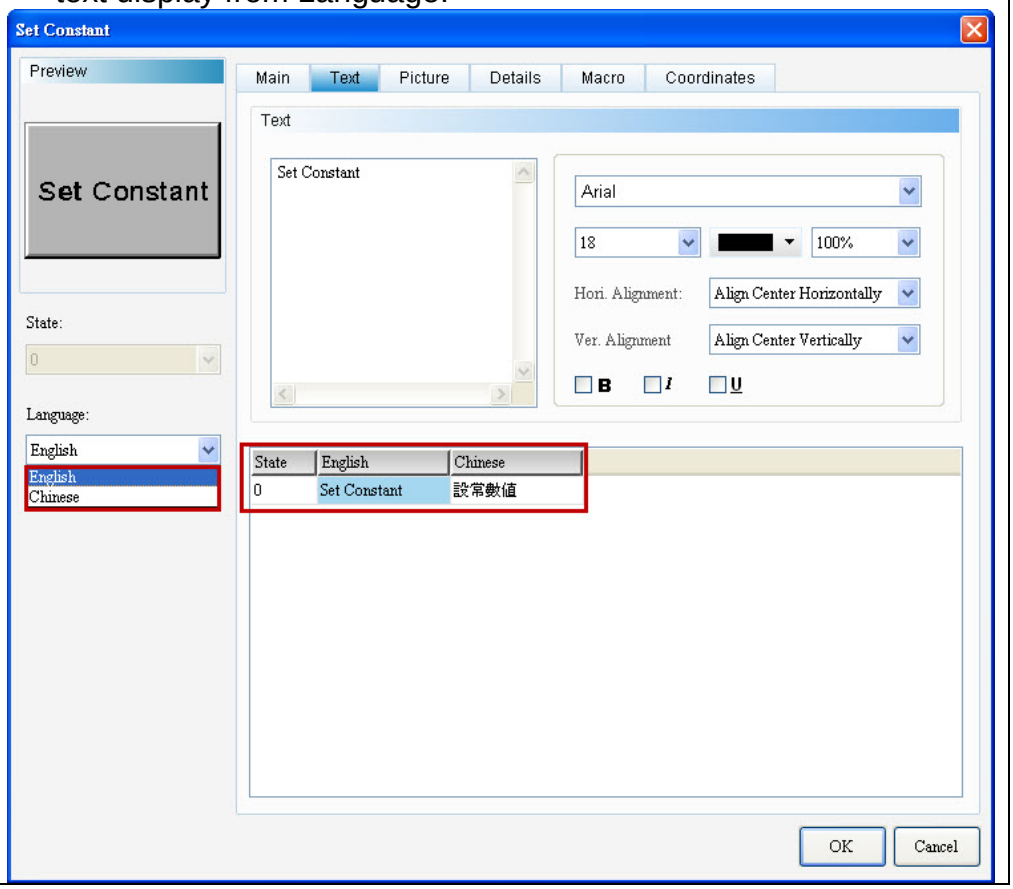


Figure 5-4-2 Set Constant Element Main Properties Page

No.	Property	Function
(1)	Write Address	➢ Selects the address of internal memory or controller register. Addresses must be in “Word” format. ➢ Selects link name or style. Please refer to 5-1 Buttons of Chapter 05 for details.
	Write Offset Address	➢ Please refer to Appendix D Write and Read Offset Address.
(2)	Data Type	➢ Data types include “Word” and “Double Word”. 

(3)	Data Format	➢ "Word" data type supports the following data formats:  ➢ "Double Word" data type supports the following data formats: 
(4)	Detail	➢ Determines the value of the input constant. 
(5)	Style	➢ There are four Styles, including Standard, Raised, Round, and Invisible. Users can change the element appearance with style. 
(6)	Foreground Color	➢ Sets foreground color of elements. ➢ When Style is "Invisible", foreground color is disabled.

		
(7)	Language	➢ When language data are defined, users can edit the properties of text display from Language. 

◆ Text

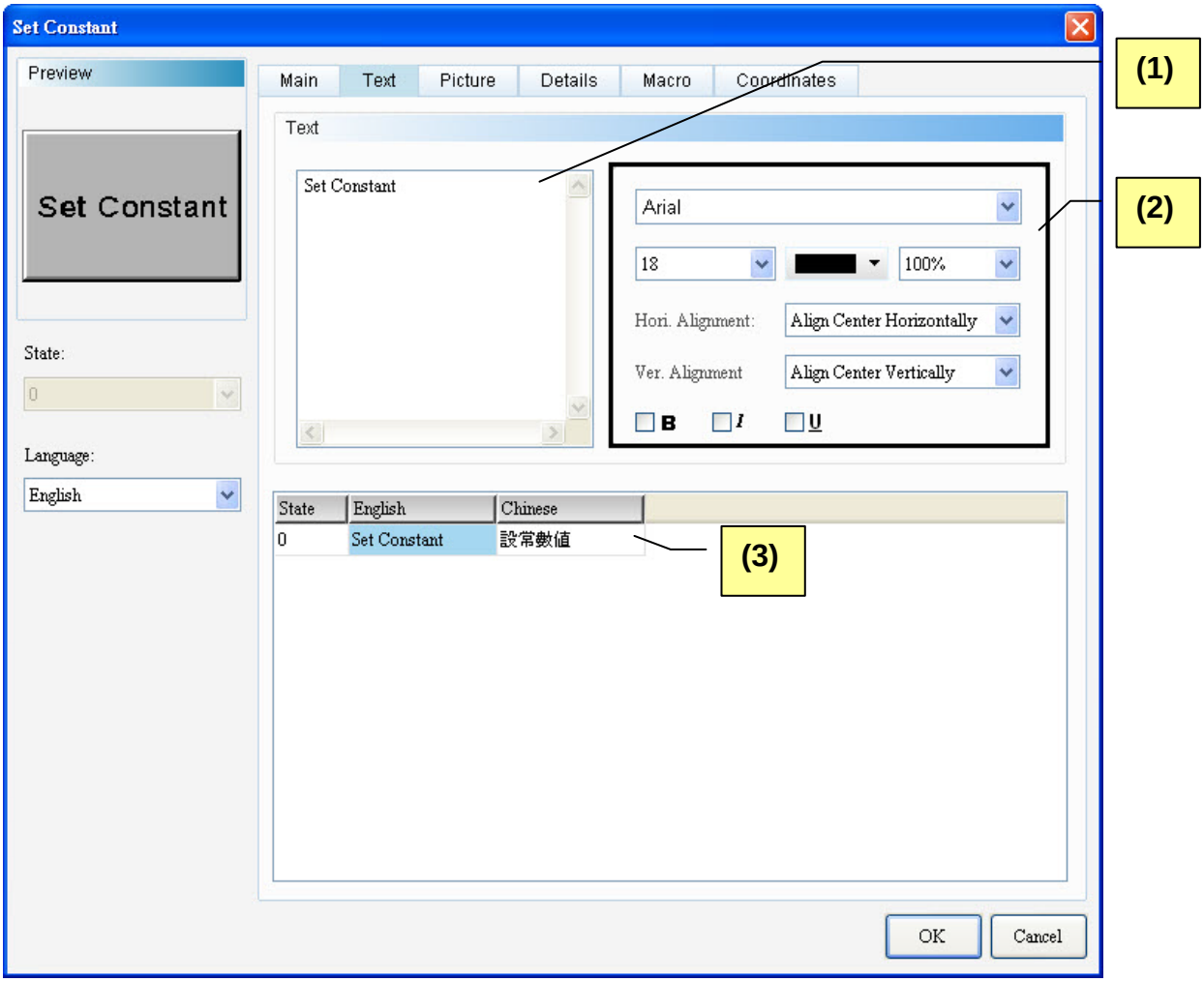
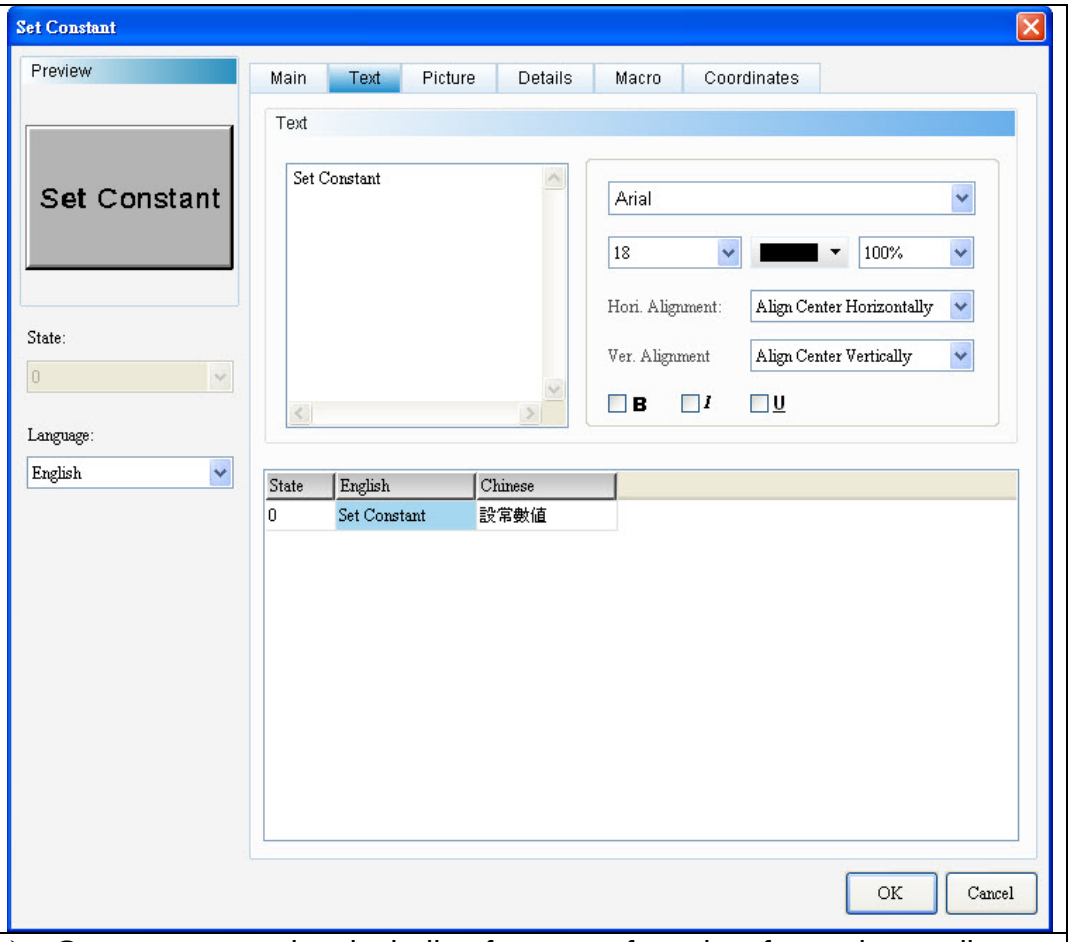


Figure 5-4-3 Set Constant Element Text Properties Page

No.	Property	Function
(1)	Text	➢ Users can input the text to be displayed in the text box.

		
(2)	Text Properties	➢ Sets text properties, including font type, font size, font color, scaling, text alignment, and bold/italic/underline of font. Please refer to the above figure for details about the results of text properties.
(3)	Multi-Language Text Data	➢ Users can add Multi-Language text data from the Multi-Language Text Page. As shown in the Text Properties Figure, users can input English text in the English field.

◆ Picture

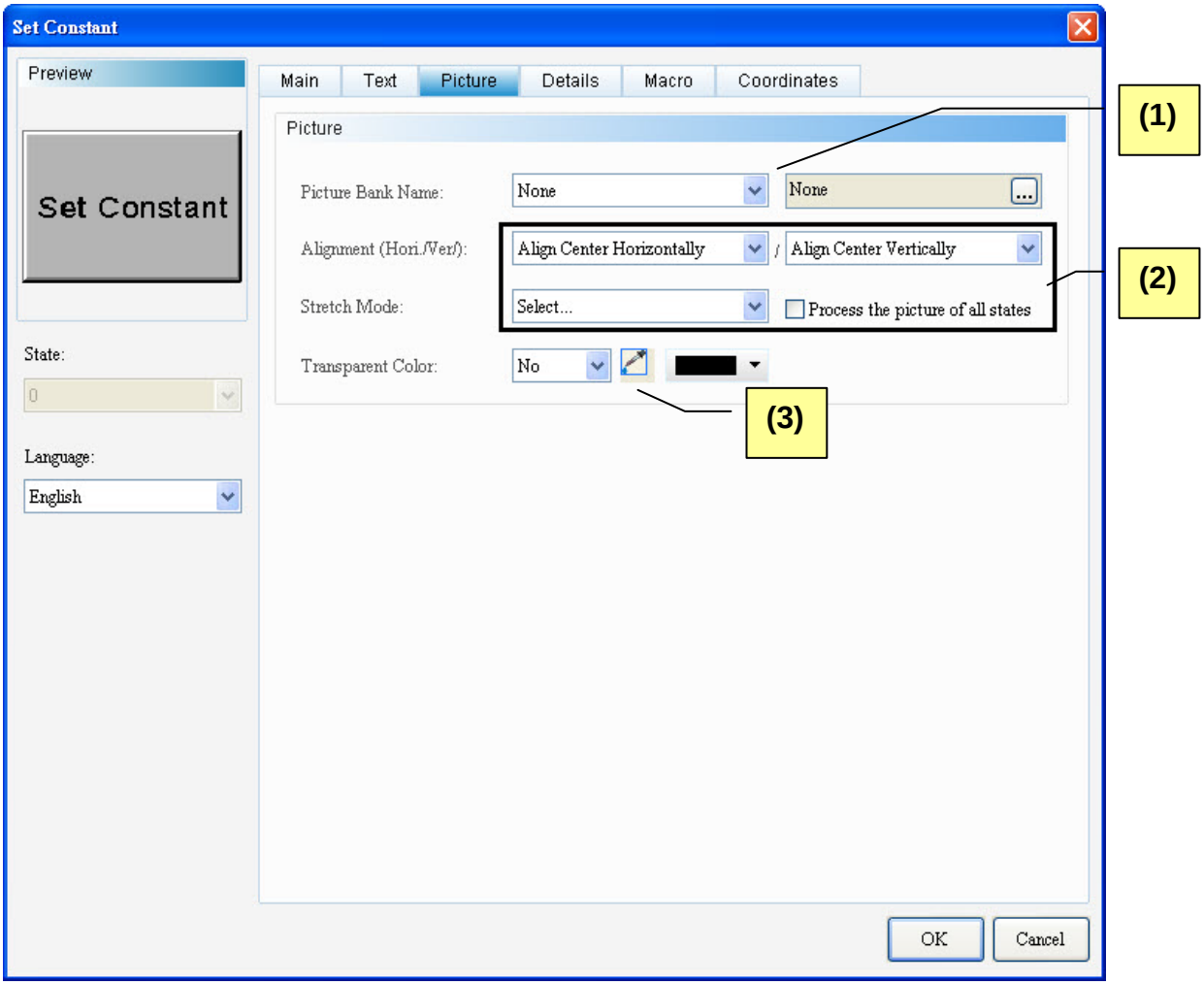
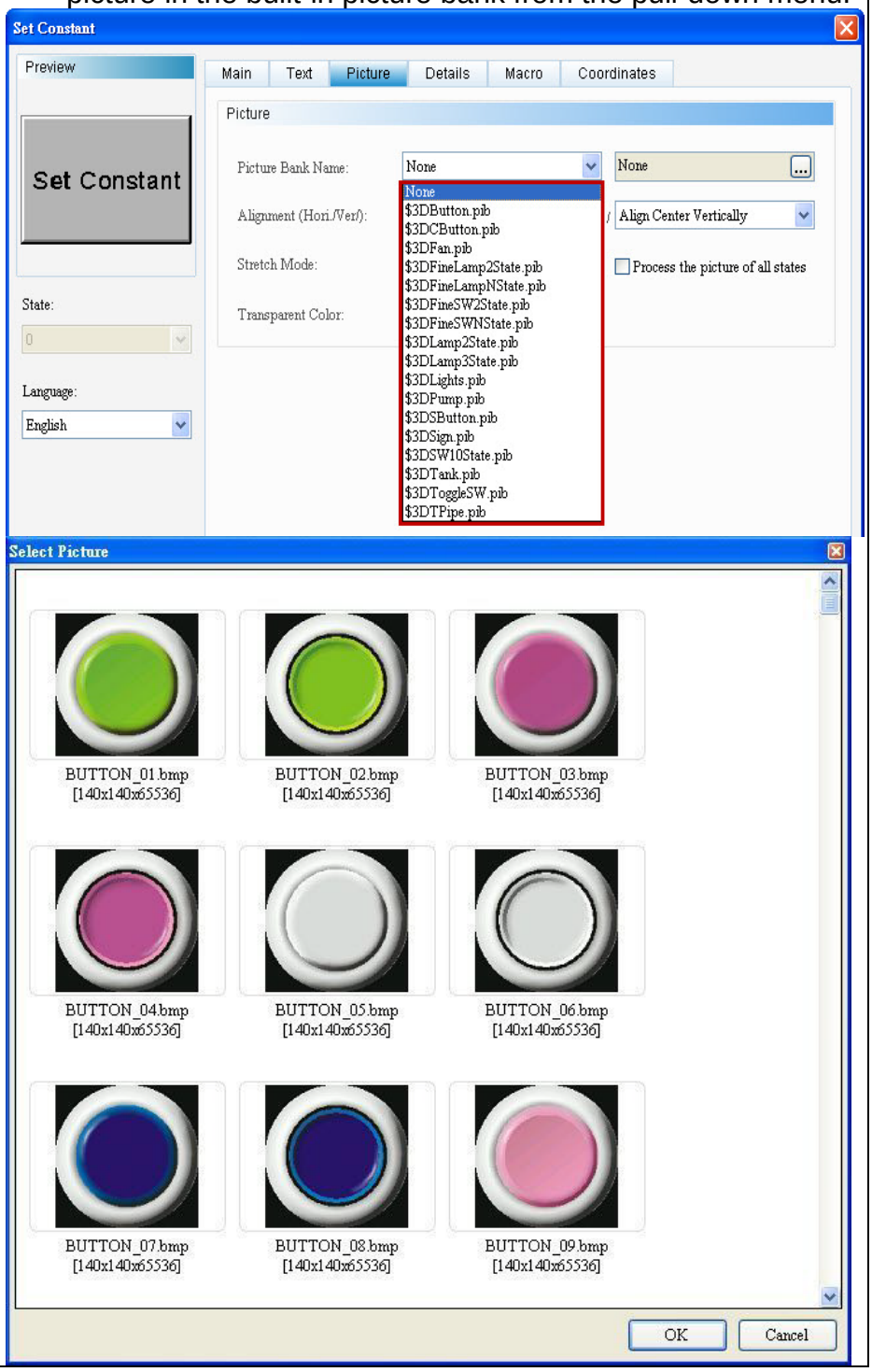
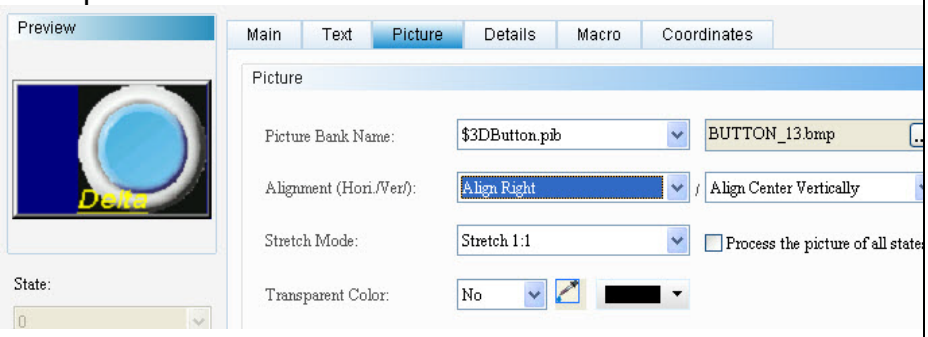
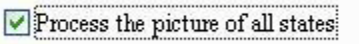
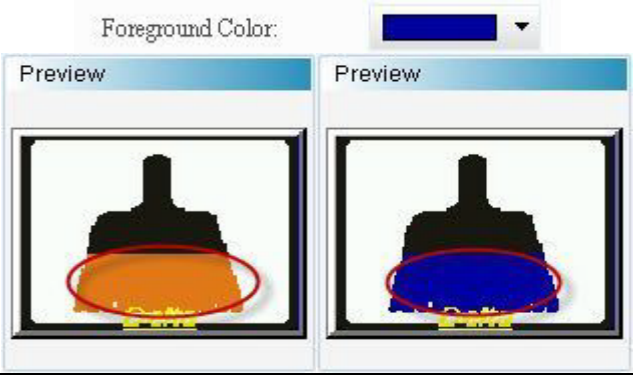


Figure 5-4-4 Set Constant Element Picture Properties Page

No.	Property	Function
(1)	Picture Bank Name	➢ The default value for Picture Bank Name is “None”. Users wishing to select a display picture can select the desired picture in the built-in picture bank from the pull-down menu. 

<table>
<tr><td rowspan="2">(2)</td><td>Alignment</td><td>➢ Users can align pictures alignment with the alignment options.
 
</td></tr>
<tr><td>Stretch Mode</td><td>➢ Stretch modes include: Fill, Keep Aspect Ratio, and Actual Size.
<table>
<tr><th>Fill</th><th>Keep Aspect Ratio</th><th>Actual Size</th></tr>
<tr><td>In the “Fill” mode, the selected picture will fill up the entire display area.</td><td>In the “Keep Aspect Ratio” mode, the selected picture will fit in the display area proportionally according to the picture ratio.</td><td>In the “Actual Size” mode, the picture will be displayed in its original size in the display area.</td></tr>
<tr><td> </td><td> </td><td> </td></tr>
</table>
➢ If “Process all state pictures” is selected, the system assumes that each element has multiple entries of state data, and some pictures may be unable to fill the entire display area. By selecting this item, users will not need to set individual pictures to save time editing.
 
</td></tr>
<tr><td>(3)</td><td>Transparent Color</td><td>➢ Users can set a color in the picture to transparent. In this case, by clicking the Transparent Color icon and then the orange part of the loom, the DOPSoft will omit all orange parts in the picture and turn them transparent; thus turning the foreground color transparent.
 
</td></tr>
</table>

◆ Details

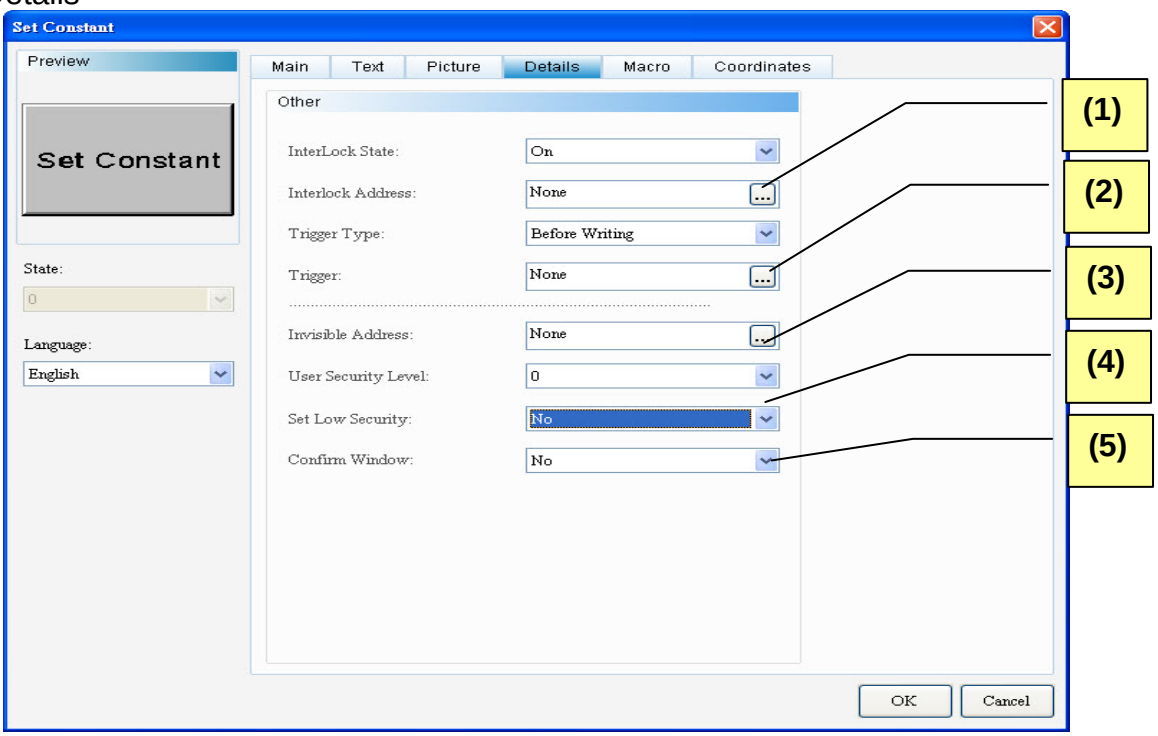
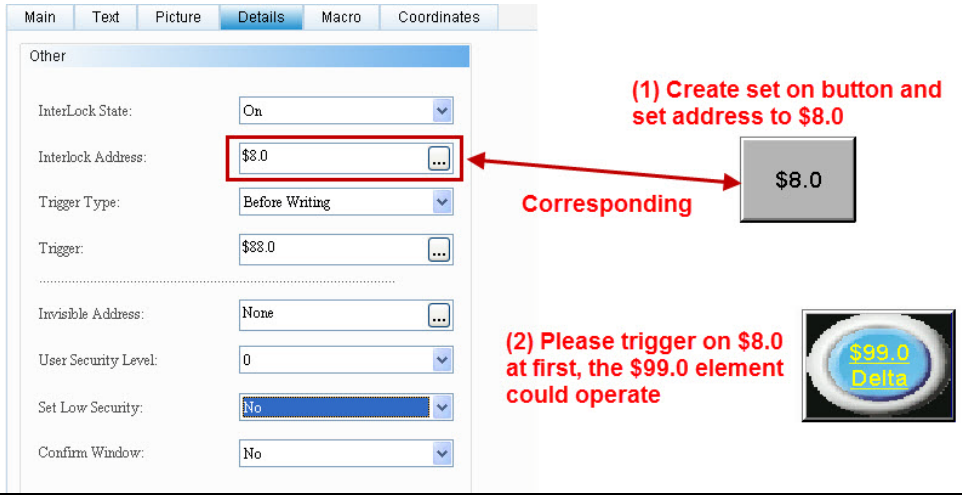
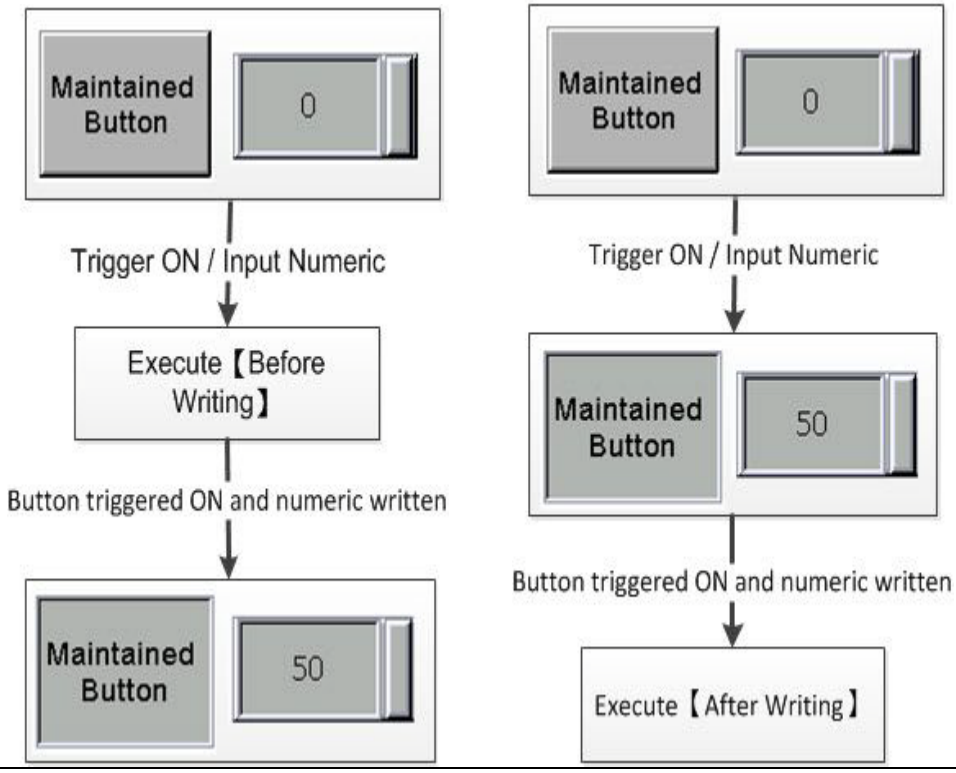


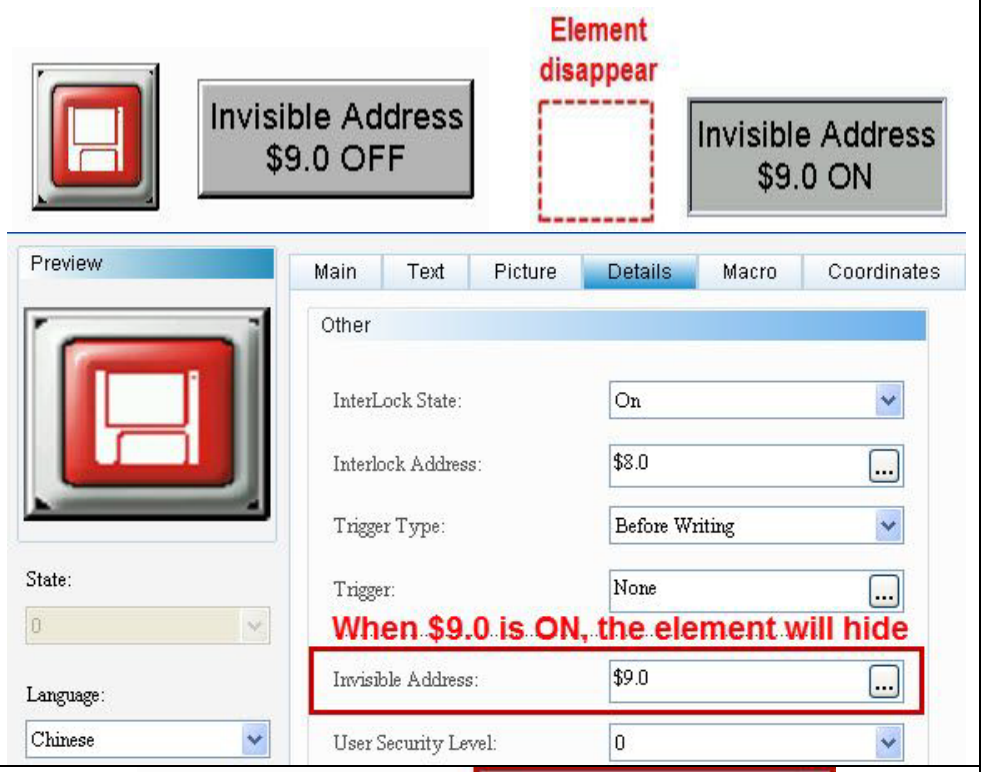
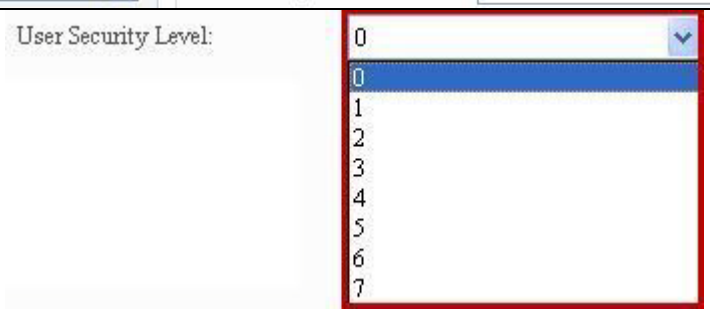
Figure 5-4-5 Set Constant Element Details Properties Page

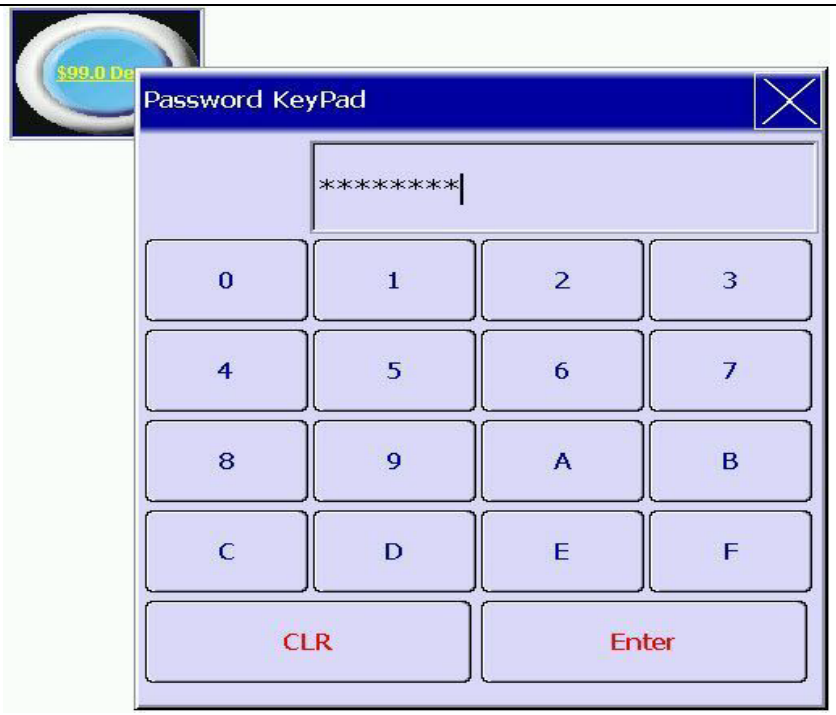
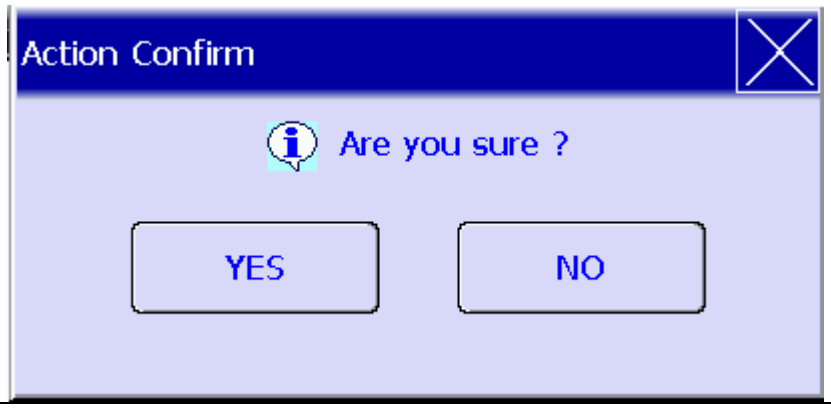
No.	Property	Function
(1)	Interlock State	➢ Interlock Address allows users to operate an element from this particular address. It must be used along with Interlock State. If Interlock State is "OFF", this means the interlock address is operable when the interlock state is "OFF". In contrast, when Interlock State is "ON", this means the interlock address is operable when the interlock state is "ON". ➢ Examples of interlock address application are as follows: 1. First, create a button and set its address as "$8.0". Next, set the original interlock address ($99.0) to "$8.0". 2. To make Button $99.0 operable, users must press Button $8.0 first.
	Interlock Address	
(2)	Trigger type Trigger	➢ Trigger type include before writing and after writing. Trigger type: **Before writing** — The activation bit is ON; **After writing** — Values are changed

	before changing values.	before the activation bit is ON.

- Users can create a button element, set its memory address, select Write Before Act or Write After Act to activate the controller Bit address to ON.
- As the activation function only sets the activation address to ON, users must set the activation address of OFF before re-activation.
- Before writing: After writing:



(3)	Invisible Address	➢ When Invisible Address is “ON”, the button element is hidden, and the corresponding function is disabled. 
(4)	User Security Level Set Low Security	 ➢ Sets the user security level of element activities. Only users with equal or higher security level corresponding to the element can activate the element. ➢ After setting the user security level, when users activate the element, the password box will pop up and request users to input the password (the password can be changed from the password setup element, please see 5-7 Password Table).

		 ➢ If “YES” is selected for Set Low Security, HMI automatically sets the security level to the lowest every time users input the password. When users activate the element again, they will be requested to again input the password corresponding to the element.
(5)	Enable Confirmation Box	➢ If Enable Confirmation Box is set to “YES”, the following dialog box will pop up after pressing the corresponding button as shown below: 

◆ Coordinates

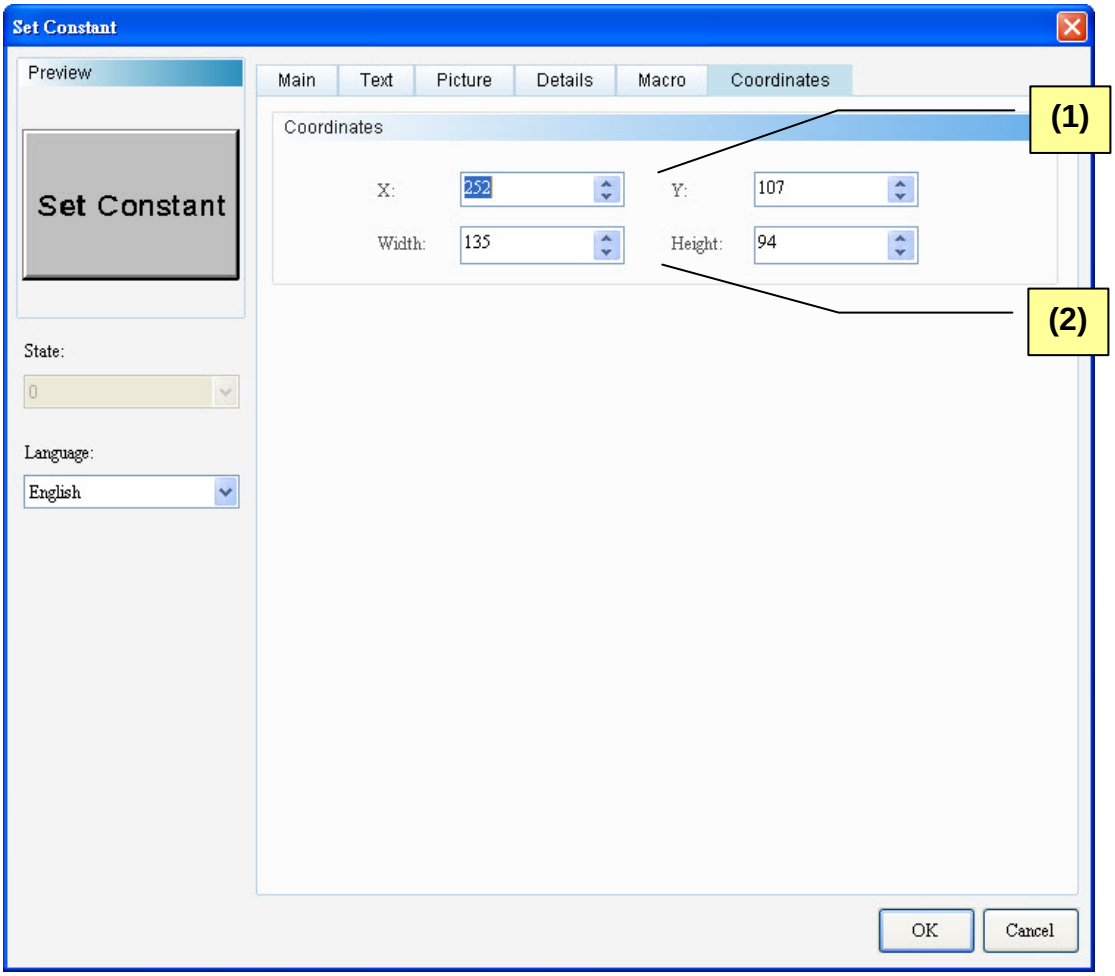


Figure 5-4-6 Set Constant Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

◆ Macro

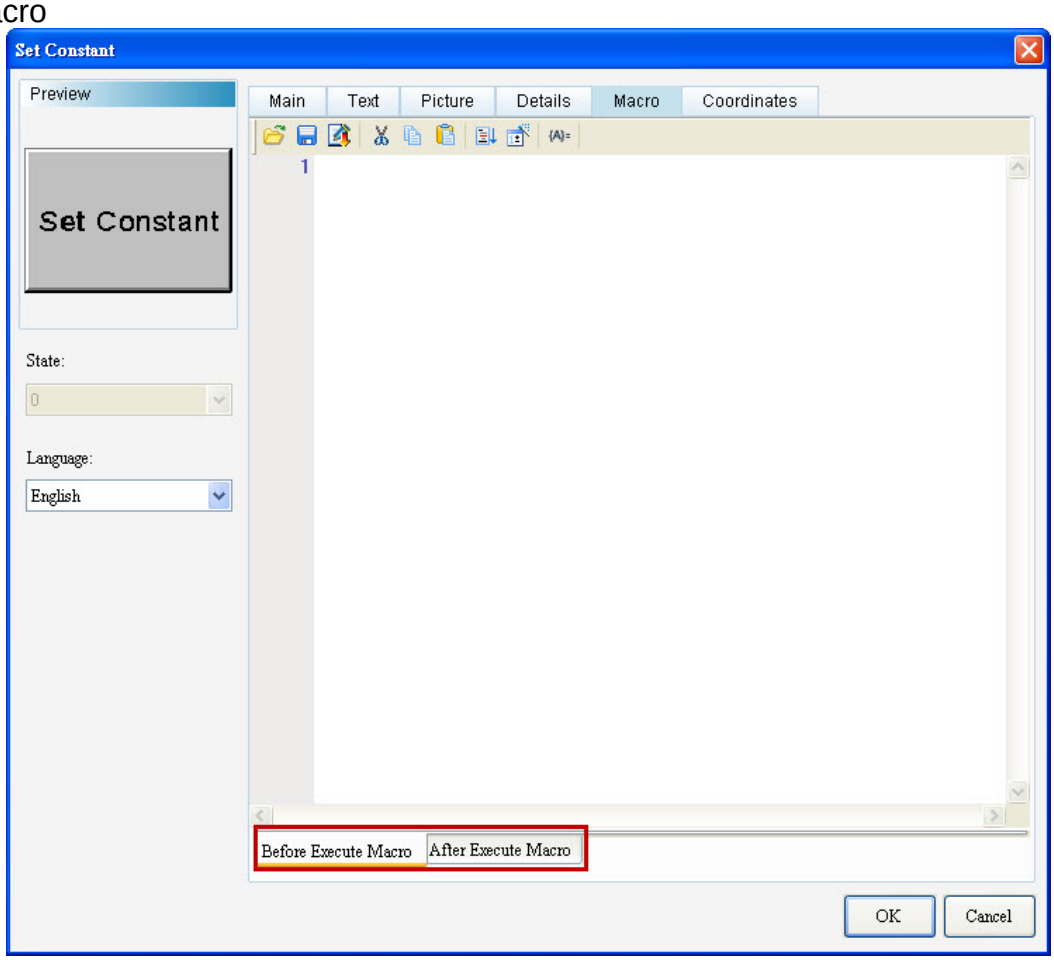
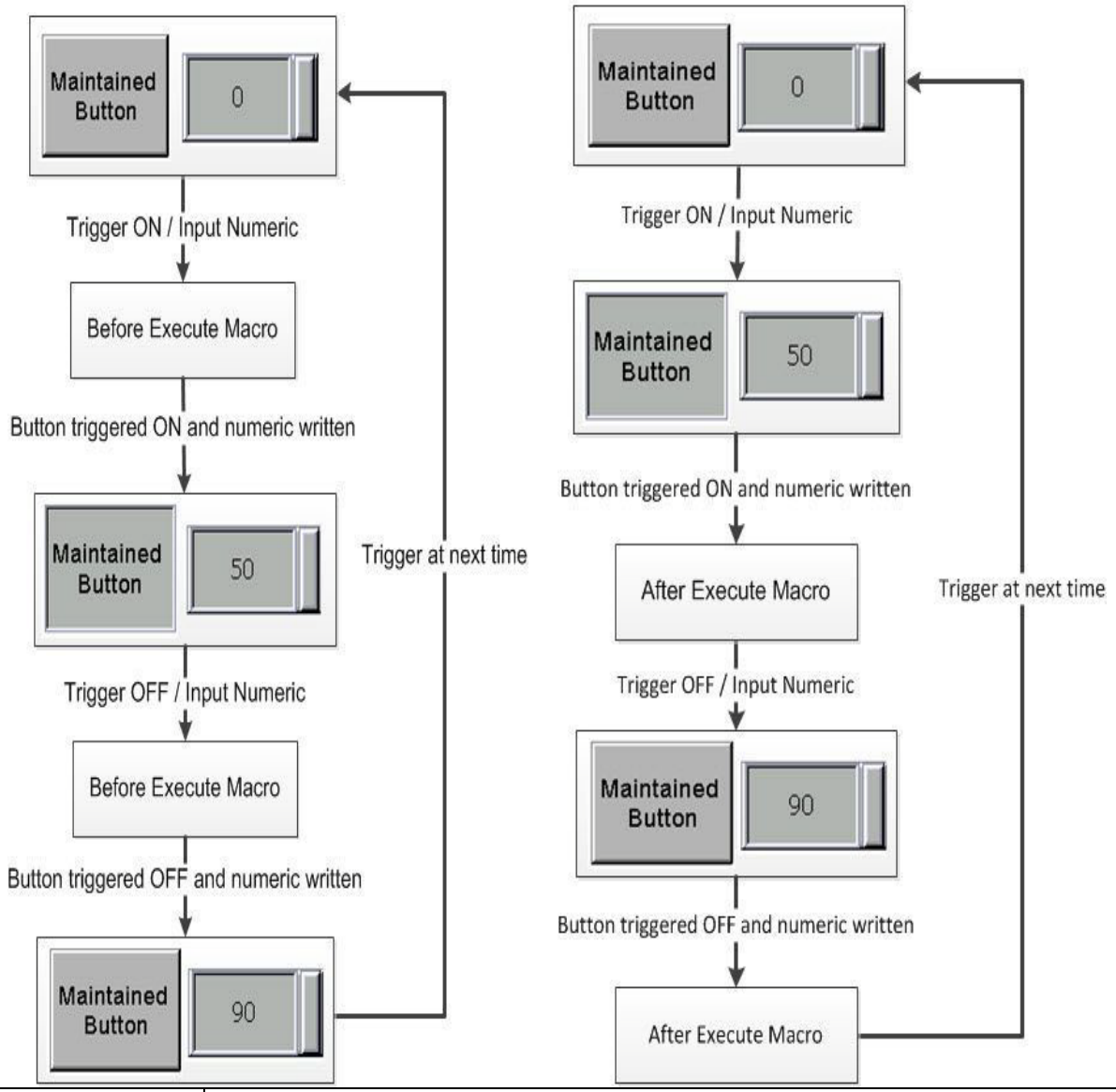


Figure 5-4-7 Set Constant Element Macro Properties Page

No.	Property	Function
(1)		➢ The before execute macro and after execute macro processes are diagrammed below:  	
	Before Execute Macro	➢ When users touch the button element, HMI will first run the commands in the corresponding macro pre-action of the button action. If the button state is not changed by means of touching button (using external controller commands or other macros), HMI will not run the corresponding macro commands.
	After Execute Macro	➢ After users touch the button element, HMI will first run the button action to pre-action the commands in the corresponding macro. If the button state is not changed by means of touching button (using external controller commands or other macros), HMI will not run the corresponding macro commands.

5-5 Increment / Decrement

	Increment
	Decrement

After touching the Increment or Decrement button on HMI, HMI will first read the register value into and increment or decrement the selected value. Finally, HMI will write the results to the corresponding register. If the value increased or decreased exceeds the set upper or lower limit, the Increment or Decrement button will maintain the upper or lower limit value in the corresponding register.

Example of Increment / Decrement

Table 5-5-1 Example of Increment / Decrement

Memory Address

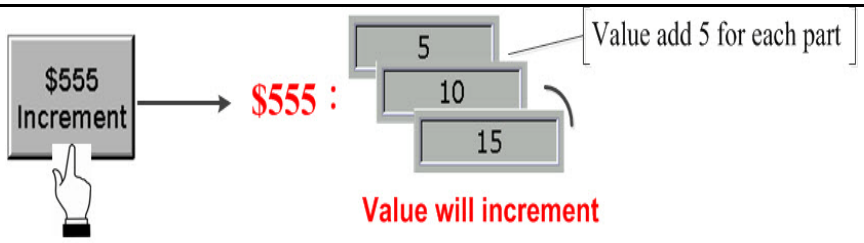
Write Address of Increment	Write Address of Decrement	Read Address of Numeric Display
$555	$555	$555

Increment / Decrement Values

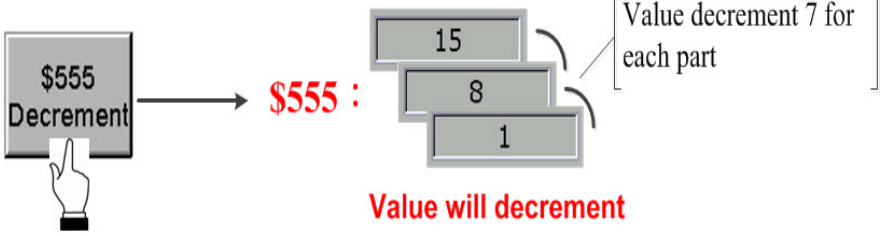
Increment	Decrement
Detail	Detail
Data Type: Word	Data Type: Word
Memory Format: Signed Decimal	Memory Format: Signed Decimal
Increase/Decrease: 5	Increase/Decrease: 7
Limit: 500	Limit: -100

Execution Results

Increment



Decrement



Double-click Increment / Decrement to call out the Increment / Decrement Properties screen as shown below.

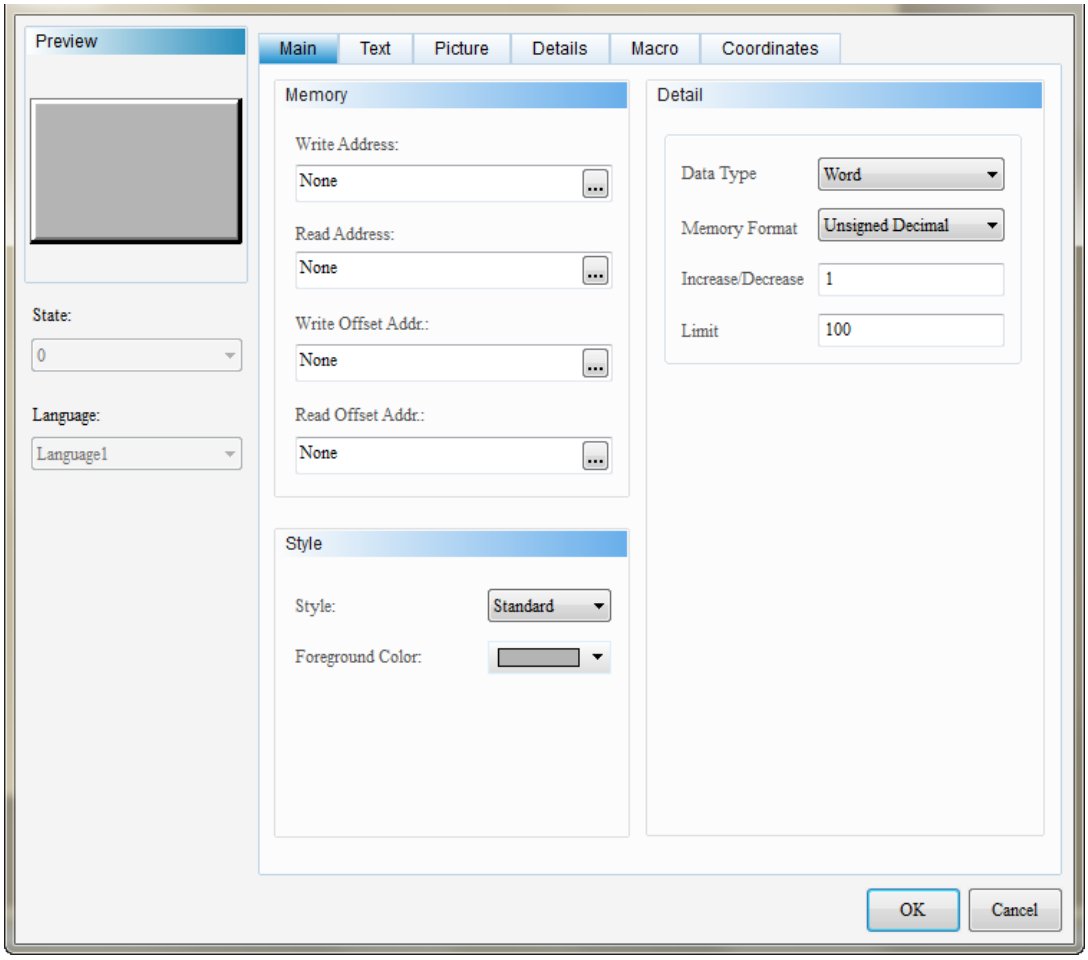


Figure 5-5-1 Increment / Decrement Element Properties

Increment / Decrement	
Function Page	**Content Description**
Preview	Views Multi-Language data and does not support multistate data.
Main	Sets Write Address, Read Address, Write Offset Address, Read Offset Address, Style, and Foreground Color. Sets the Data Type, Data Format, Increment / Decrement Value, and Upper/Lower Exceed Limit of Momentary / Decrement elements.
Text	Sets the content, font, font size, font color, bold/italic/underline of font, scaling, and alignment of the text to be displayed.
Picture	Sets Picture Bank Name, Alignment, Picture Stretch Mode, and Transparent.
Details	Sets Interlock Address, Interlock State, Activation Methods, Activation, Invisible Address, User Security Level, Set Low Security, and Enable Confirmation Box.
Macro	Sets Before execute Macro and After execute Macro.
Coordinates	Sets the X-Y coordinate, width, and height of button elements.

Table 5-5-2 Set Constant Function Page

◆ Main

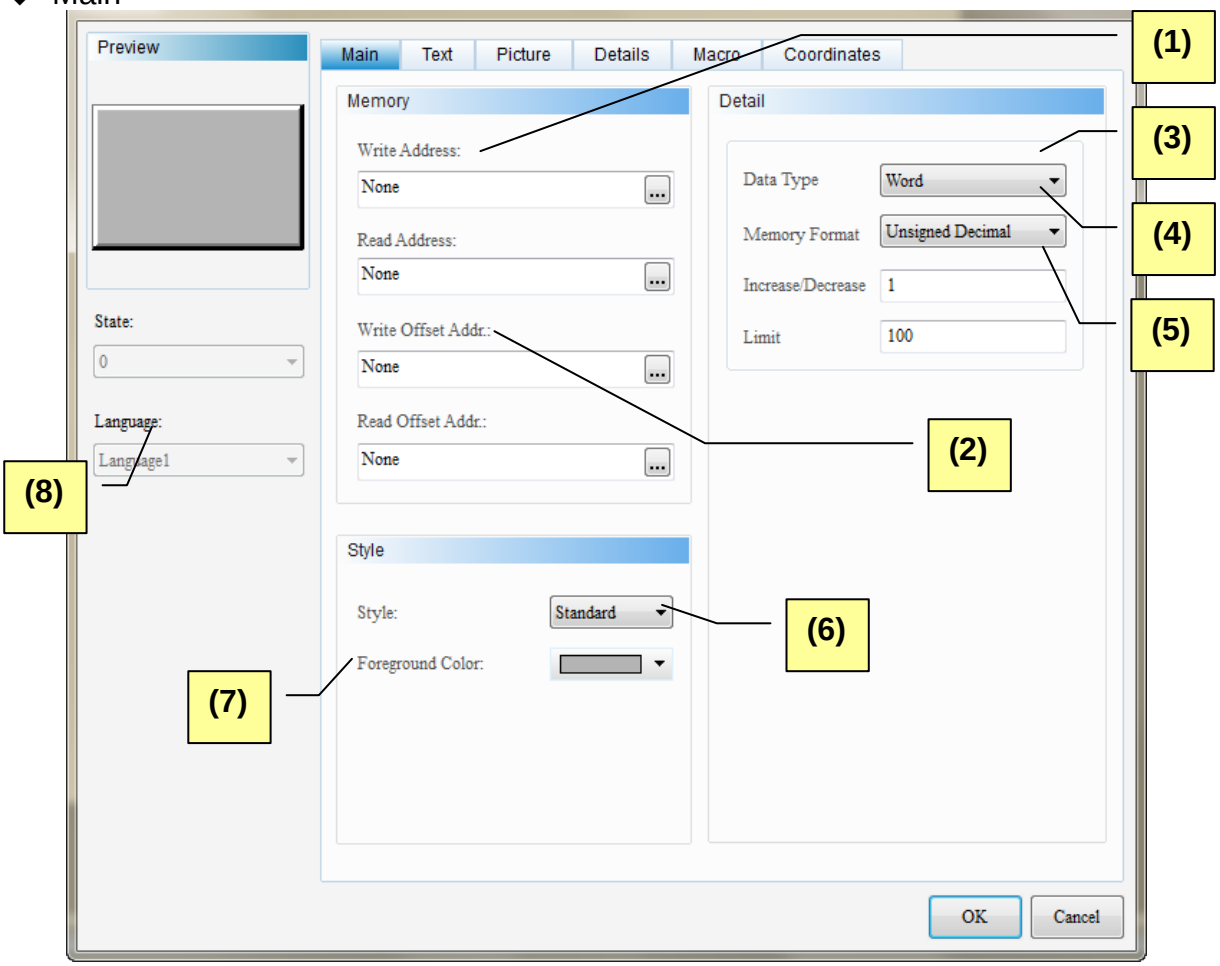
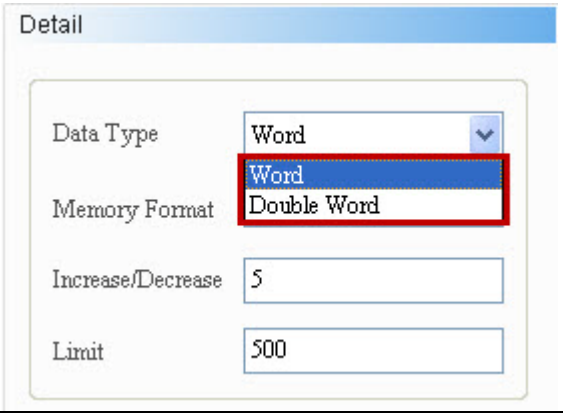
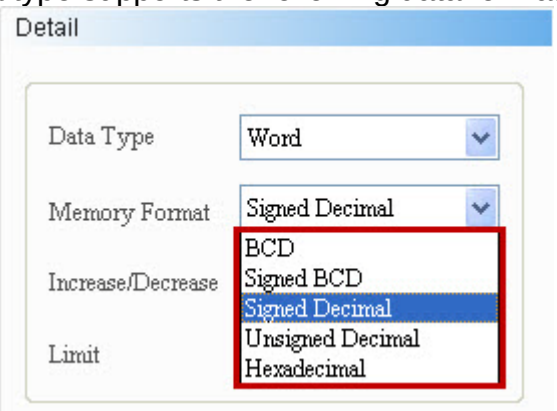
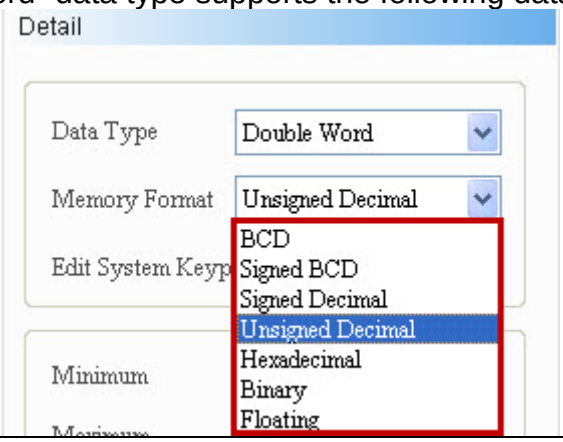
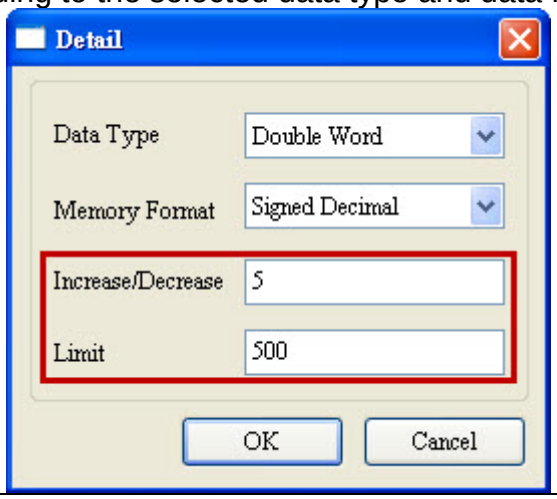
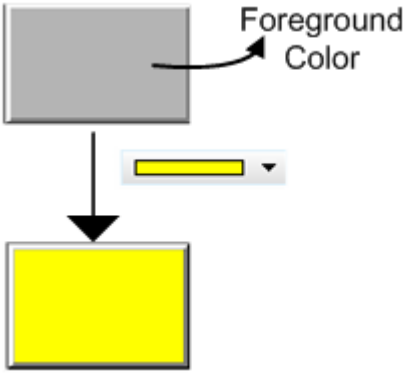
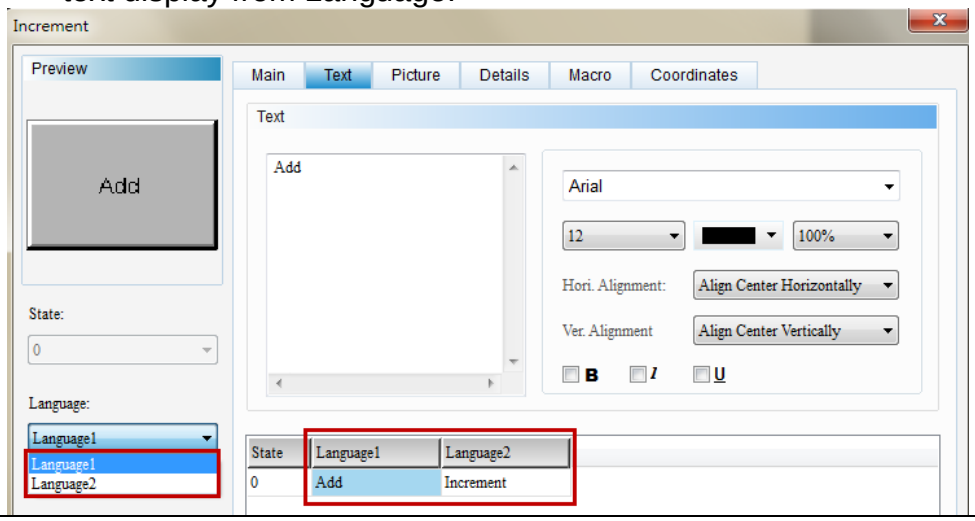


Figure 5-5-2 Increment / Decrement Element Main Properties Page

No.	Property	Function
(1)	Write Address Read Address	➢ Selects the address of internal memory or controller register. Addresses must be in “Word” format. ➢ Selects link name or style. Please refer to 5-1 Buttons of Chapter 05 for details.
(2)	Write Address Read Address	➢ Please refer to Appendix D Write and Read Offset Address.
(3)	Data Type	➢ Data types include “Word” and “Double Word”. 
(4)	Data Format	➢ “Word” data type supports the following data formats:  ➢ “Double Word” data type supports the following data formats: 

<table>
<tr><td rowspan="2">(5)</td><td>Increment / Decrement Value</td><td rowspan="2">➢ Increment / Decrement Value means the value increased or decreased when touching the Increment or Decrement button.
➢ Upper/Lower Limit means the range of the value increased or decreased. After pressing the OK button, the DOPSoft will check the range of input Increment / decrement value and upper/lower Limit according to the selected data type and data format.
 
</td></tr>
<tr><td>Upper/Lower Limit</td></tr>
<tr><td>(6)</td><td>Style</td><td>➢ There are four Styles, including Standard, Raised, Roundg, and Invisible. Users can change the element appearance with style.
<table>
<tr><th>Standard</th><th>Raised</th><th>Round</th><th>Invisible</th></tr>
<tr><td>
</td><td>
</td><td>
</td><td>
</td></tr>
</table></td></tr>
<tr><td>(7)</td><td>Foreground Color</td><td>➢ Sets foreground color of elements.
➢ When Style is “Invisible”, foreground color is disabled.
 
</td></tr>
</table>

(8)	Language	➢ When language data are defined, users can edit the properties of text display from Language. 

◆ Text

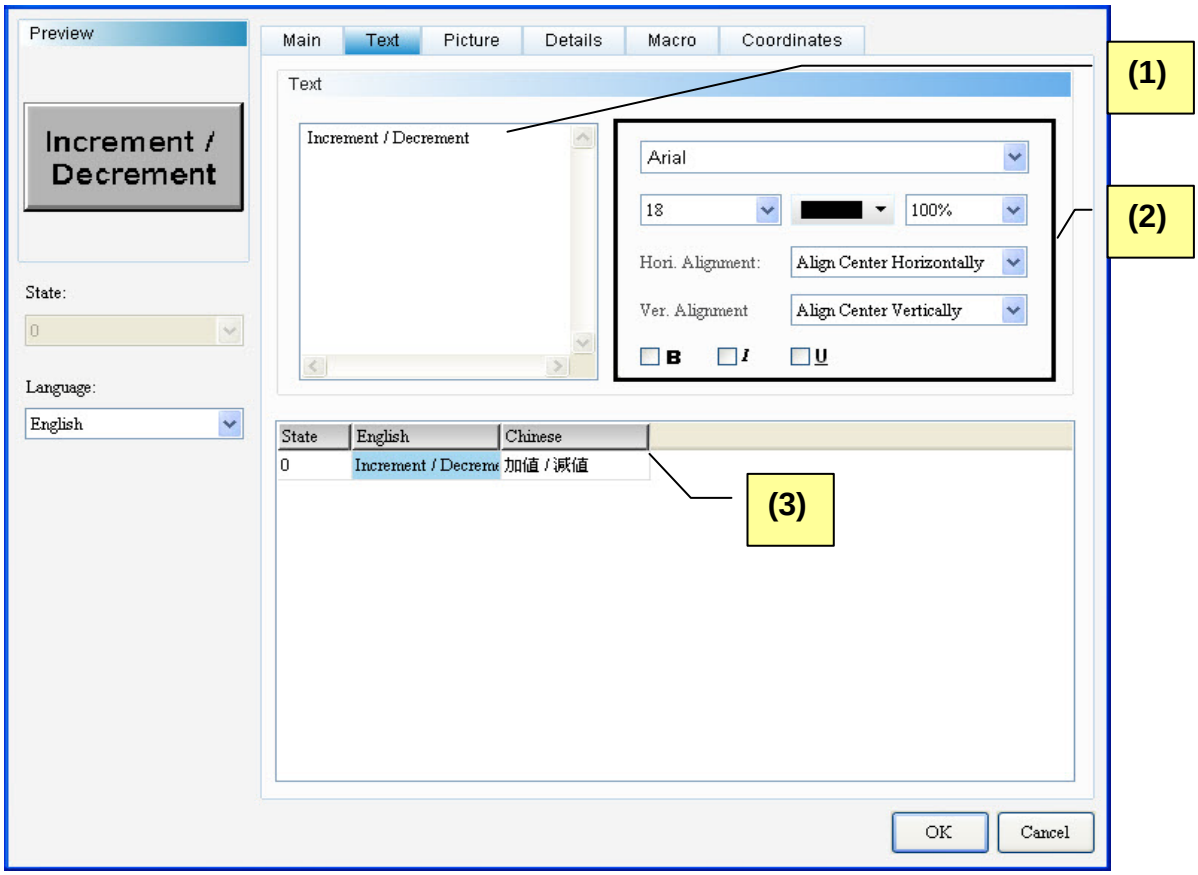
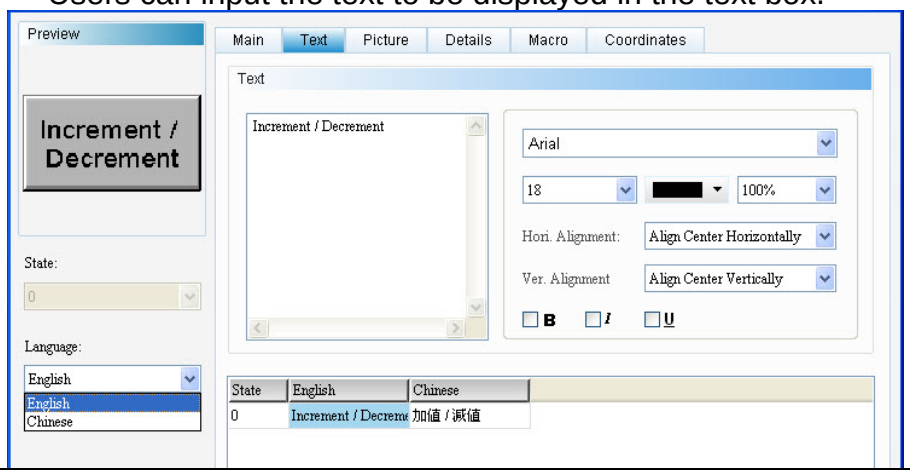


Figure 5-5-3 Increment / Decrement Element Text Properties Page

No.	Property	Function
(1)	Text	➢ Users can input the text to be displayed in the text box. 
(2)	Text Properties	➢ Sets text properties, including font type, font size, font color, scaling, text alignment, and bold/italic/underline of font. Please refer to the above figure for details about the results of text properties.
(3)	Multi-Language Text Data	➢ Users can add Multi-Language text data from the Multi-Language Text Page. As shown in the Text Properties Figure, users can input English text in the English field.

◆ Picture

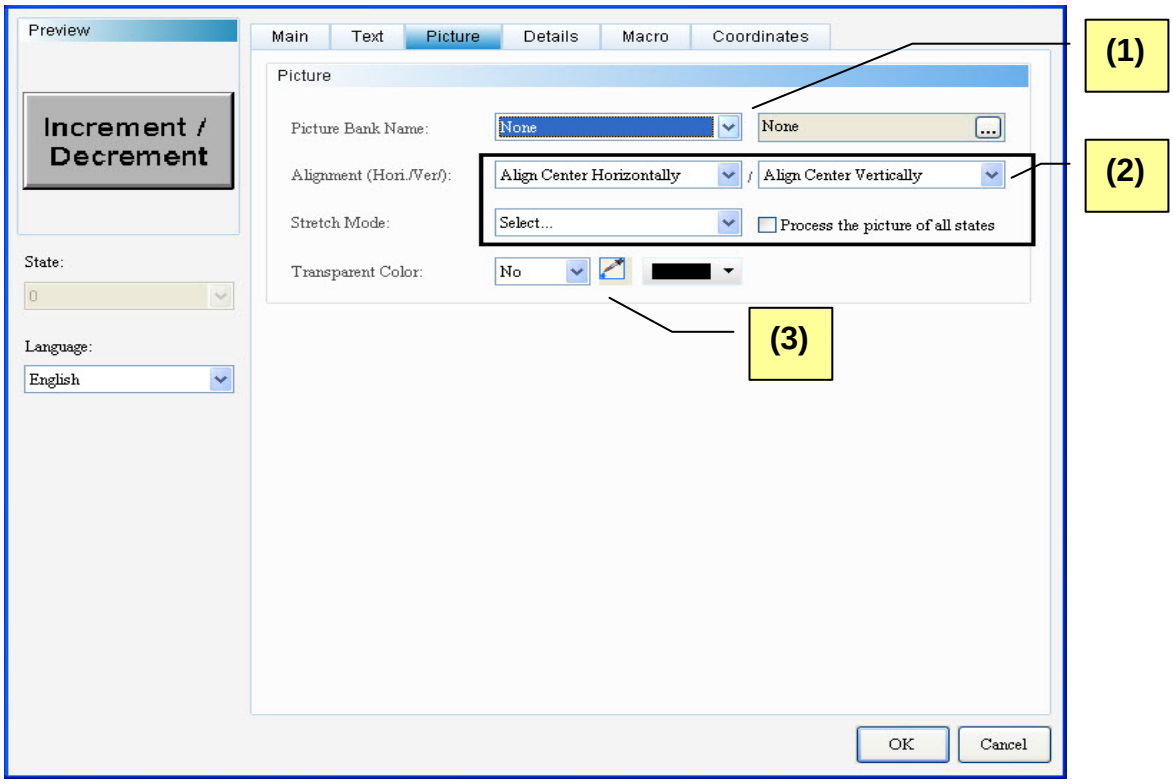
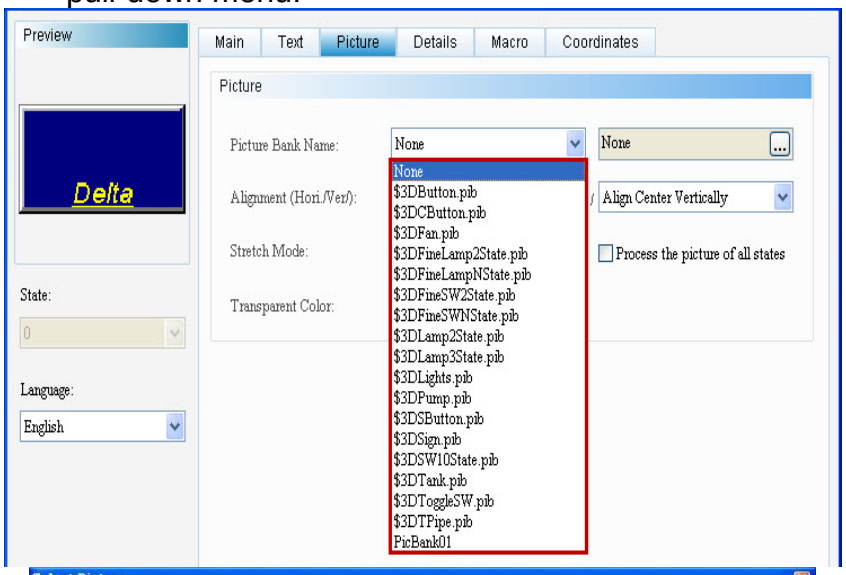
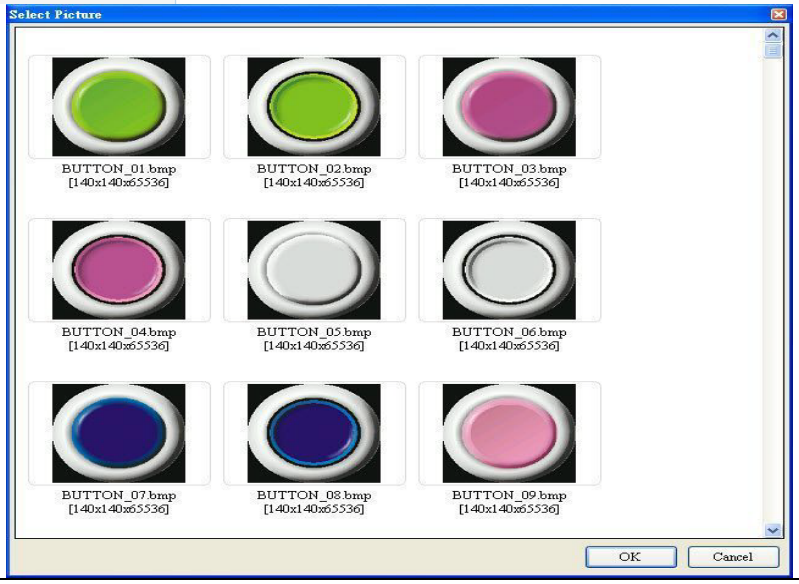
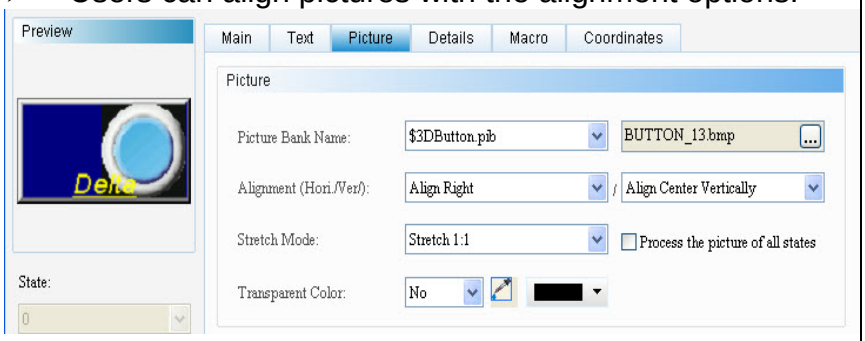
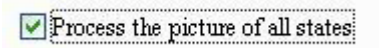
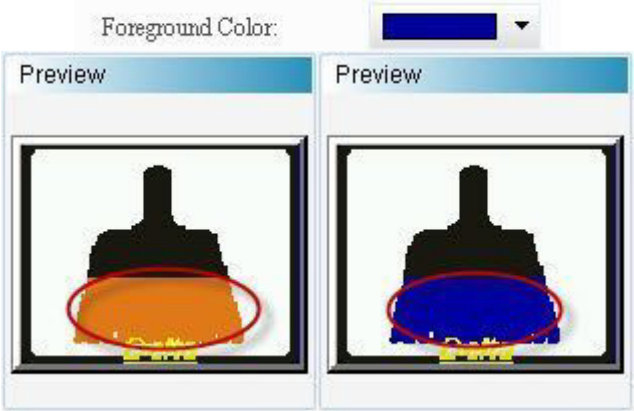


Figure 5-5-4 Increment / Decrement Element Picture Properties Page

No.	Property	Function
(1)	Picture Bank Name	➢ The default value for Picture Bank Name is “None”. Users wishing to select a display picture can select the desired picture in the built-in picture bank from the pull-down menu.  
(2)	Alignment	➢ Users can align pictures with the alignment options.  ➢ Stretch modes include: Fill, Keep Aspect Ratio, and Actual Size.

<table>
<tr><td rowspan="3"></td><td rowspan="3">Stretch Mode</td><td>Fill</td><td>Keep Aspect Ratio</td><td>Actual Size</td></tr>
<tr><td>In the “Fill” mode, the selected picture will fill up the entire display area.</td><td>In the “Keep Aspect Ratio” mode, the selected picture will fit in the display area proportionally according to the picture ratio.</td><td>In the “Actual Size” mode, the picture will be displayed in its original size in the display area.</td></tr>
<tr><td> </td><td> </td><td> </td></tr>
<tr><td colspan="5">➢ If “Process all state pictures” is selected, the system assumes that each element has multiple entries of state data, and some pictures may be unable to fill the entire display area. By selecting this item, users will not need to set individual pictures to save time editing.
  </td></tr>
<tr><td>(3)</td><td>Transparent Color</td><td colspan="3">➢ Users can set a color in the picture to transparent. In this case, by clicking the Transparent Color icon and then the orange part of the loom, the DOPSoft will omit all orange parts in the picture and turn them into transparent; thus turning the foreground color transparent.
  </td></tr>
</table>

◆ Details

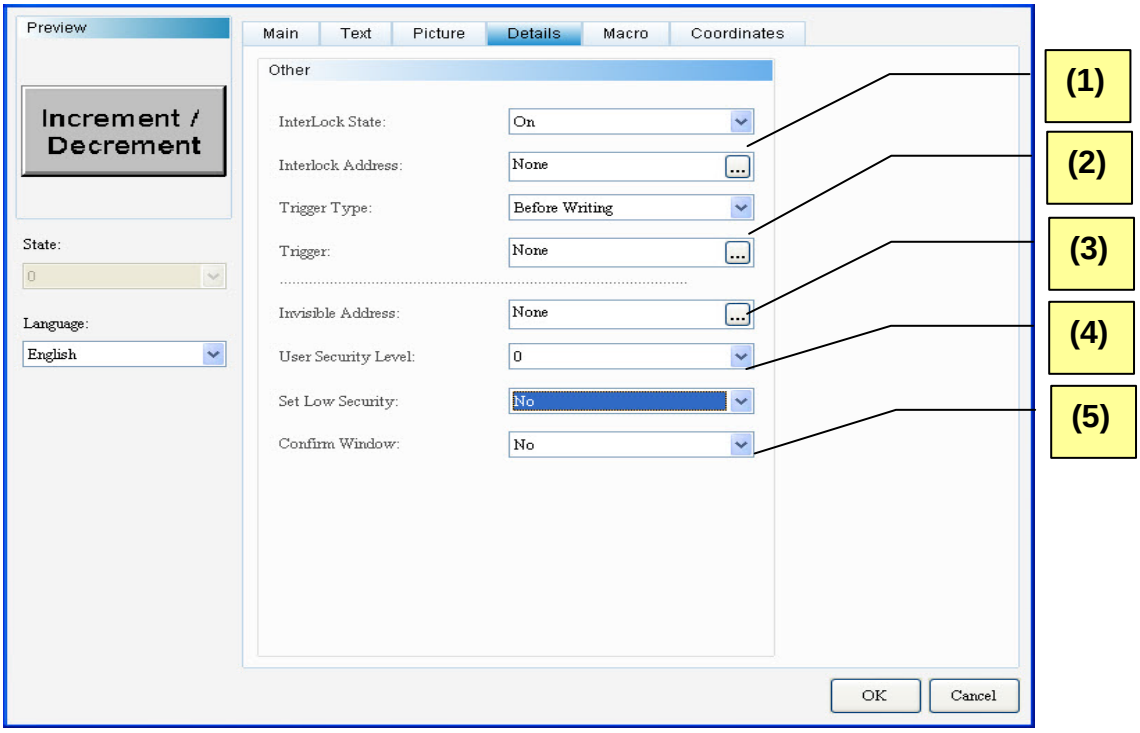
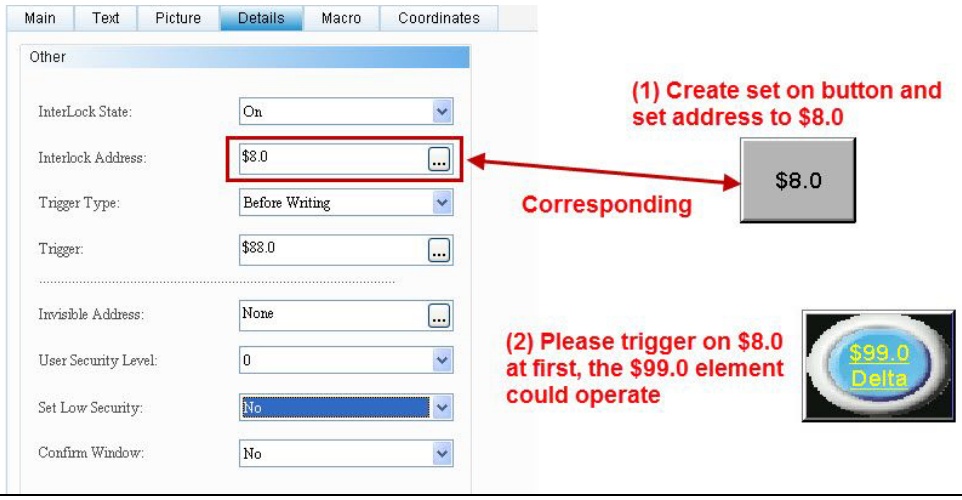


Figure 5-5-5 Increment / Decrement Element Details Properties Page

No.	Property	Function Description
(1)	Interlock State	➢ Interlock Address allows users to operate an element from this particular address. It m ➢ Ust be used along with Interlock State. If Interlock State is “OFF”, this means the interlock address is operable when the interlock state is “OFF”. In contrast, when Interlock State is “ON”, this means the interlock address is operable when the interlock state is “ON”. ➢ Examples of interlock address application are as follows: 1. First, create a button and set its address as “$8.0”. Next, set the original interlock address ($99.0) to “$8.0”. 2. To make Button $99.0 operable, users must press Button $8.0 first.
	Interlock Address	

(2)

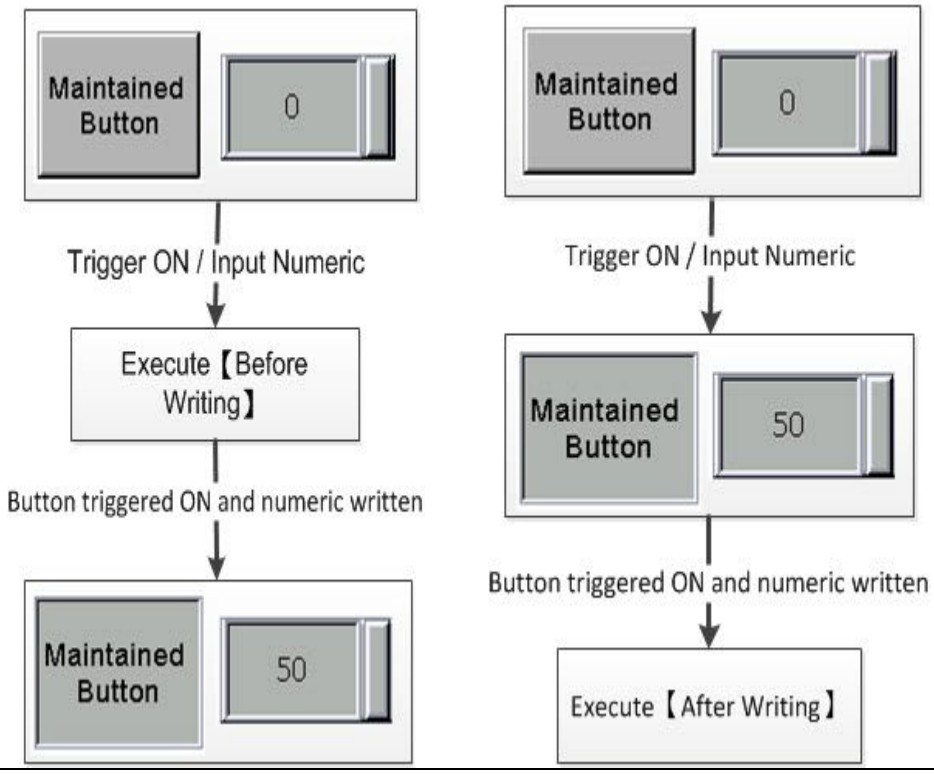
Trigger type

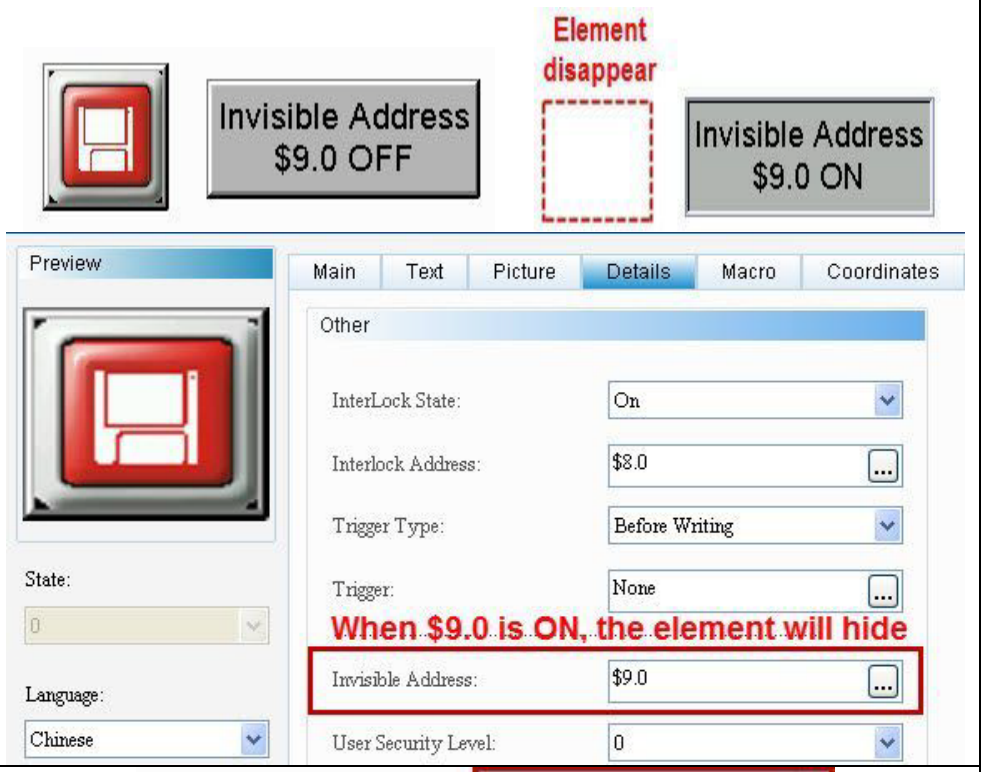
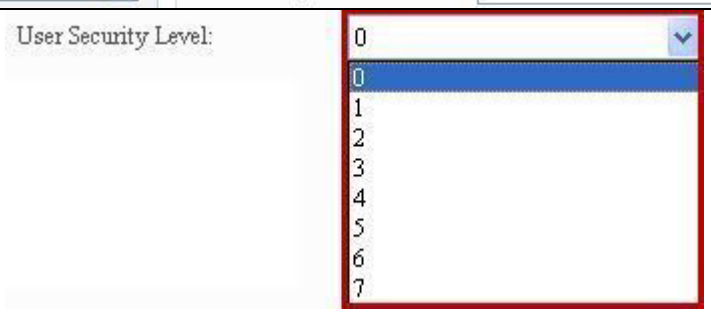
- Trigger type include before writing and after writing.

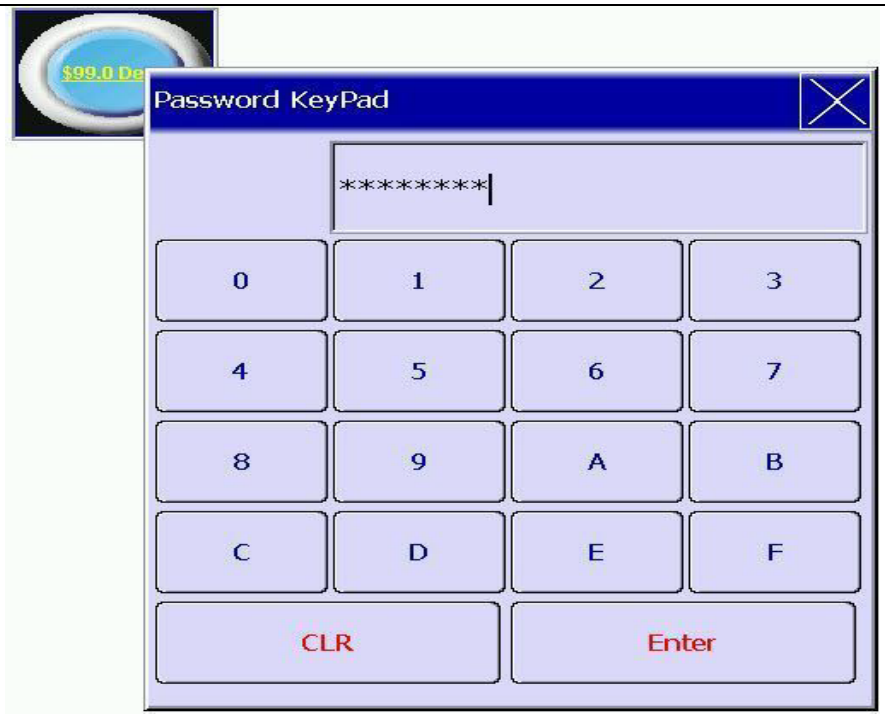
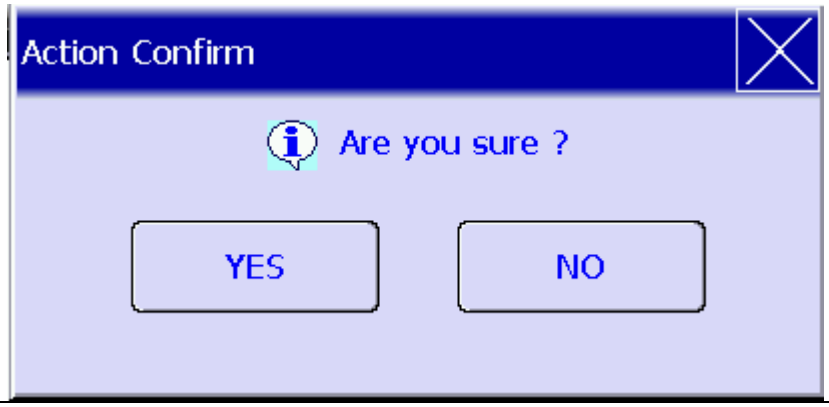
Trigger type	Before writing	After writing
	The activation bit is ON before changing values.	Values are changed before the activation bit is ON.

- Users can create a button element, set its memory address, and select Pre-writing activation or Post-writing activation to activate the controller Bit address to ON.
- As the activation function only sets the activation address to ON, users must set the activation address of OFF before re-activation.
- Before writing: After writing:

Trigger



(3)	Invisible Address	➢ When Invisible Address is “ON”, the button element is hidden, and the corresponding function is disabled. 
(4)	User Security Level Set Low Security	 ➢ Sets the user security level of element activities. Only users with equal or higher security level corresponding to the element can activate the element. ➢ After setting the user security level, when users activate the element, the password box will pop up and request users to input the password (the password can be changed from the password setup element, please see 5-7 Password Table).

		 ➢ If "YES" is selected for Set Low Security, HMI automatically sets the security level to the lowest every time users input the password. When users activate the element again, they will be requested to input again the password corresponding to the element.
(5)	Enable Confirmation Box	➢ If Enable Confirmation Box is set to "YES", the following dialog box will pop up after pressing the corresponding button as shown below: 

◆ Coordinates

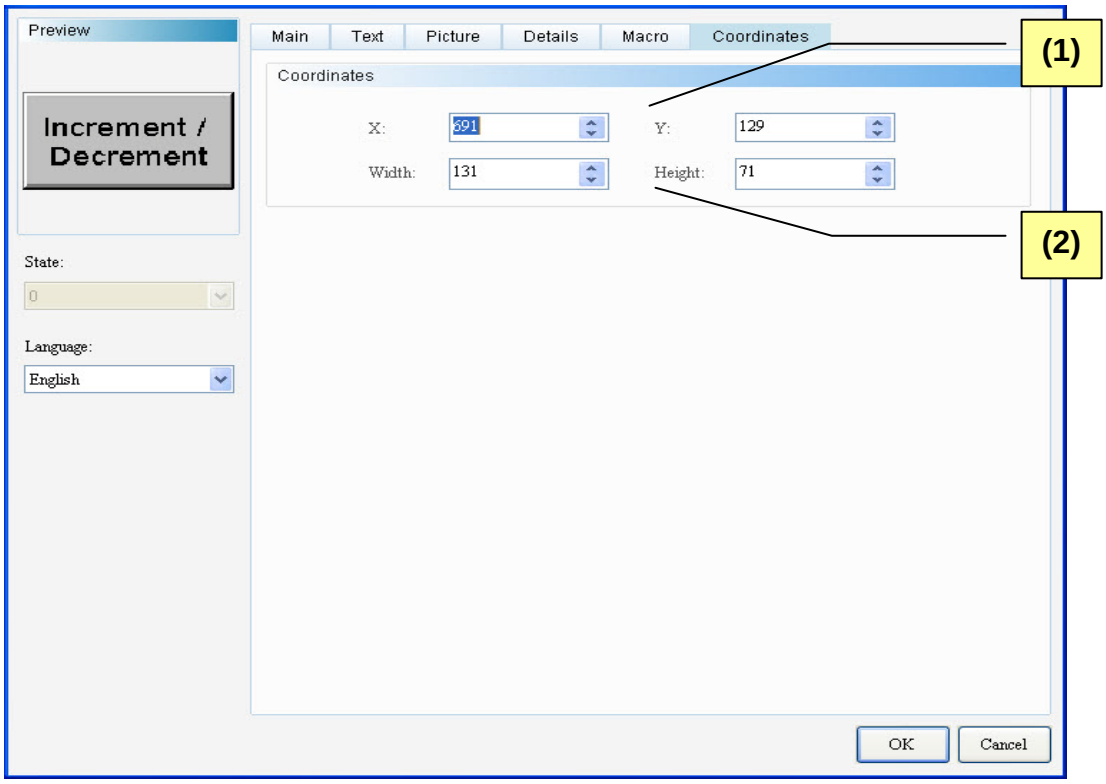


Figure 5-5-6 Increment / Decrement Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

◆ Macro

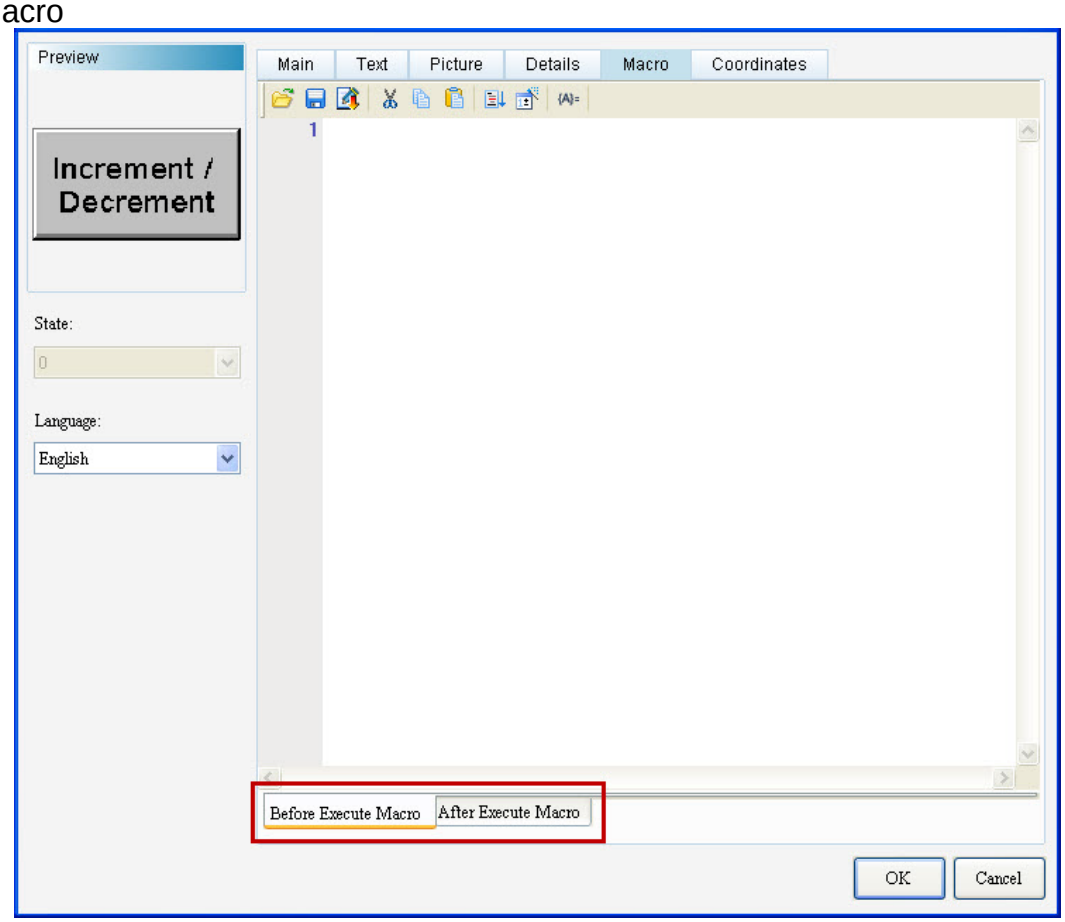
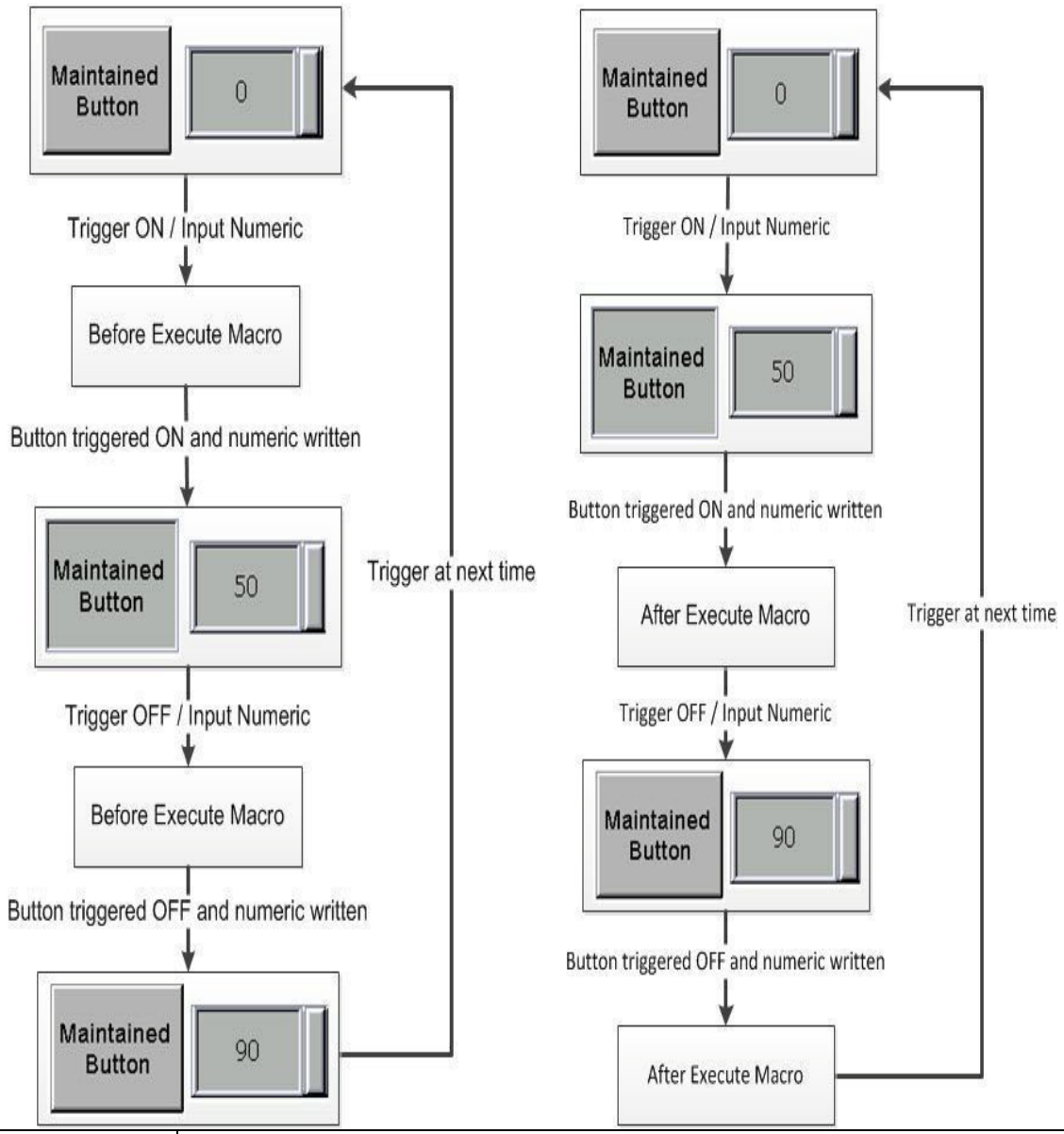


Figure 5-5-7 Increment / Decrement Element Macro Properties Page

No.	Property	Function
(1)		➢ The before execute macro and after execute macro processes are diagrammed below: 
	Before Execute Macro	➢ When users touch the button element, HMI will first run the commands in the corresponding macro pre-action of the button action. If the button state is not changed by means of touching button (using external controller commands or other macros), HMI will not run the corresponding macro commands.
	After Execute Macro	➢ After users touch the button element, HMI will first run the button action pre-action for the commands in the corresponding macro. If the button state is not changed by means of touching button (using external controller commands or other macros), HMI will not run the corresponding macro commands.

5-6 Goto Screen / Previous Page

	Goto Screen
	Previous Page

The DOPSoft provides two types of Goto Screen buttons as shown below:

- Goto Screen: When users touch the Goto Screen button on HMI, HMI will go to the selected screen.
- Previous Page: When users touch the Previous Page button on HMI, HMI will go to the previous screen.
- Back: When users touch the Back button on HMI, HMI will record the previous Goto Screen sequence, such as Screen 1→ Screen 3→ Screen 2. Next, HMI will run the Back button function. In this case, the screen change sequence is Screen 2→ Screen 3→ Screen 1.

The [Back] button options are found in the Goto Screen and Previous Page properties pages. Users can select [Goto Screen], [Previous Page], and [Back] in the properties page.

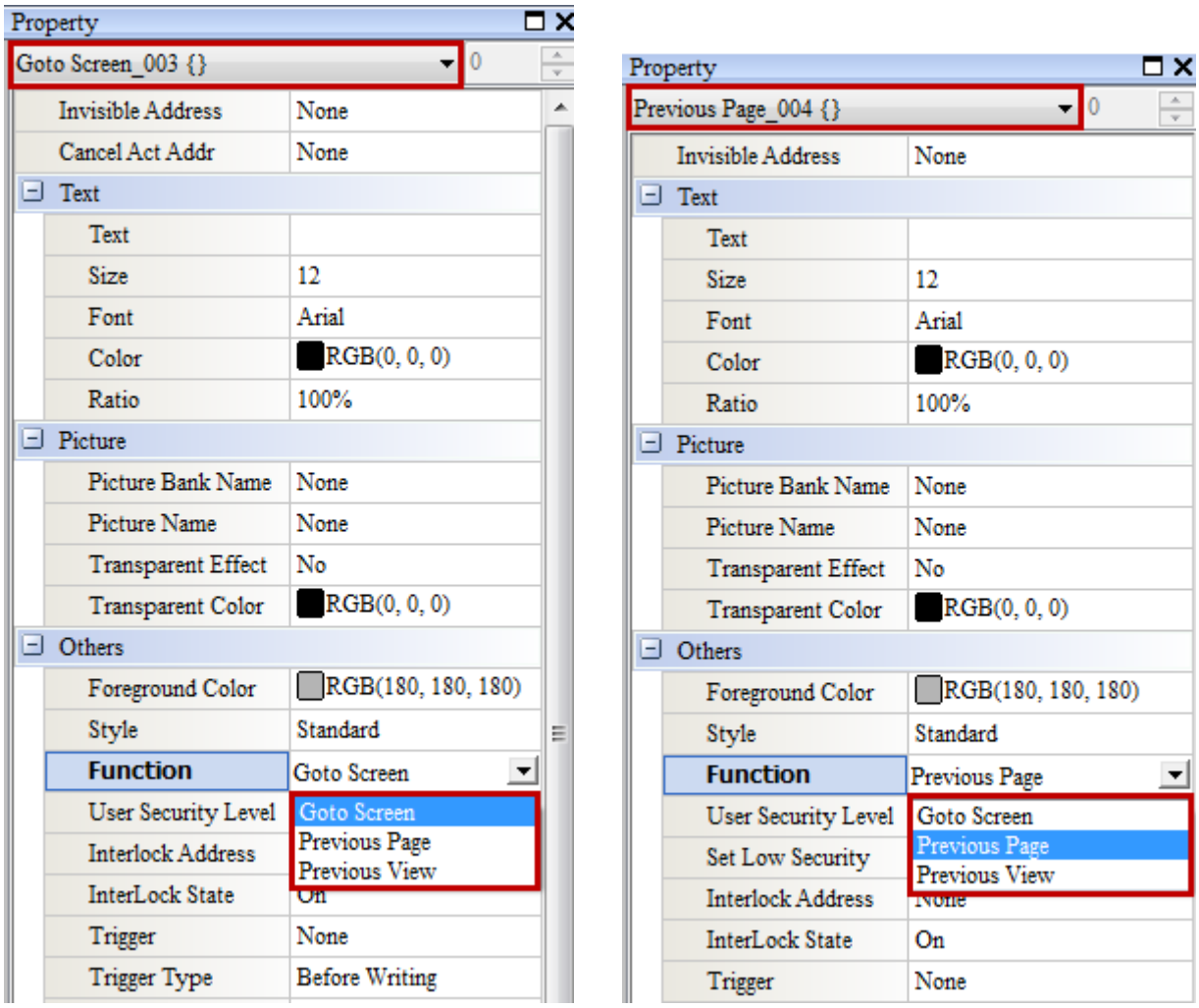
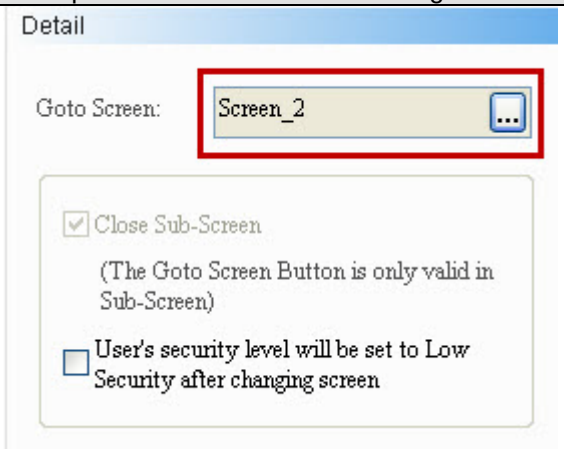
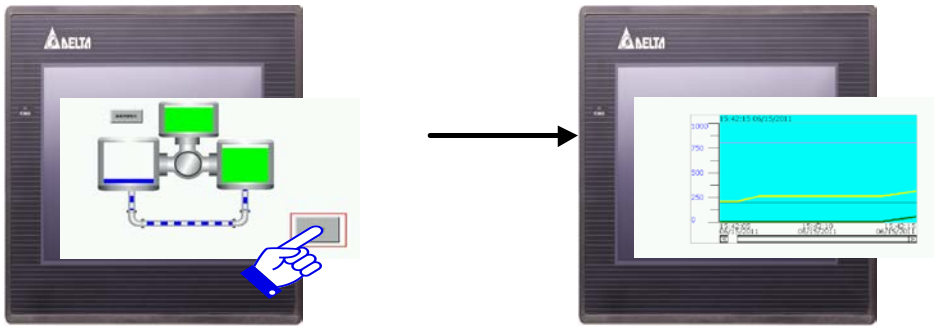
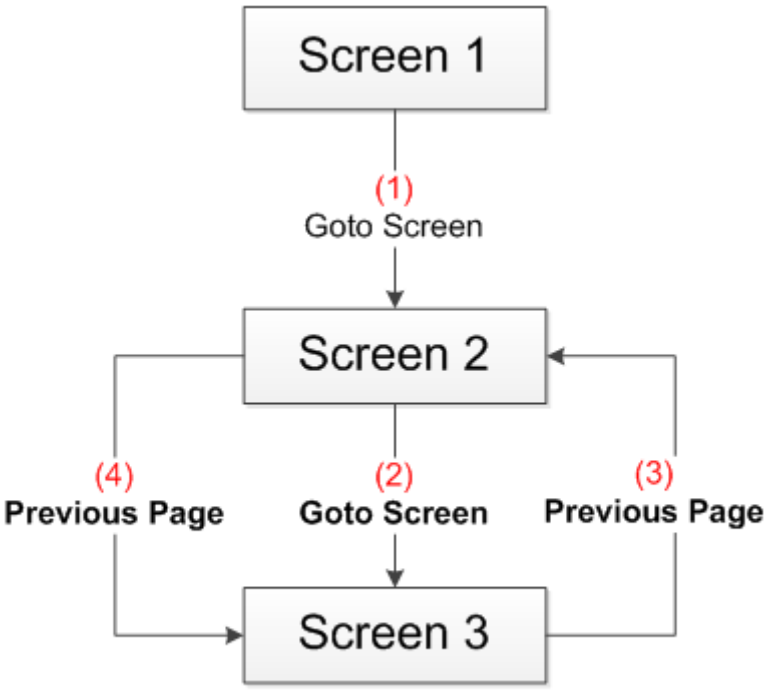
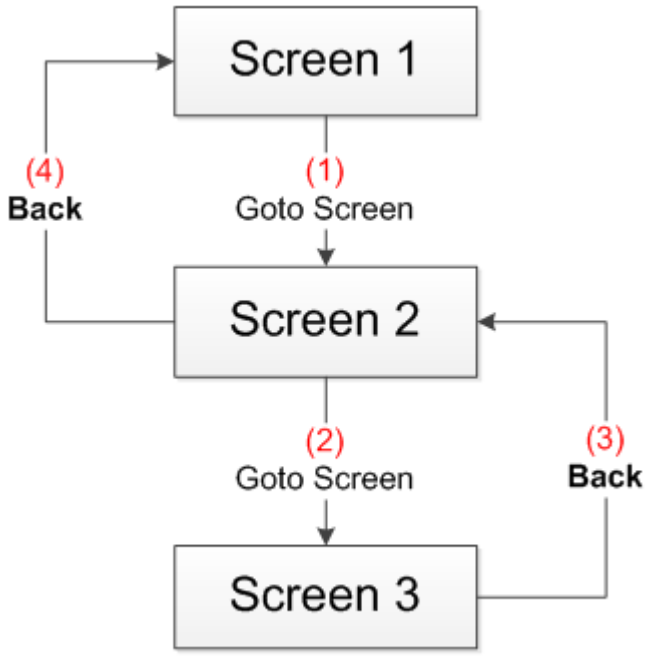


Figure 5-6-1 Goto Screen / Previous Page Element Properties

Example of Goto Screen / Previous Page

Table 5-6-1 Example Goto Screen / Previous Page

The Goto Screen item in the Goto Screen element	
Execution Results	➢ Touch the Goto Screen button to go to the selected screen. 
	➢ Touch the Previous Page button to change to the previous screen displayed on HMI. 

	➢ When activating the Back button, HMI will record the previous Goto Screen sequence, such as Screen 1→ Screen 2→ Screen 3. Next, HMI will run the Back button function. In this case, the screen change sequence is Screen 3→ Screen 2→ Screen 1 

Double-click Goto Screen / Previous Page to call out the Goto Screen / Previous Page Properties screen as shown below.

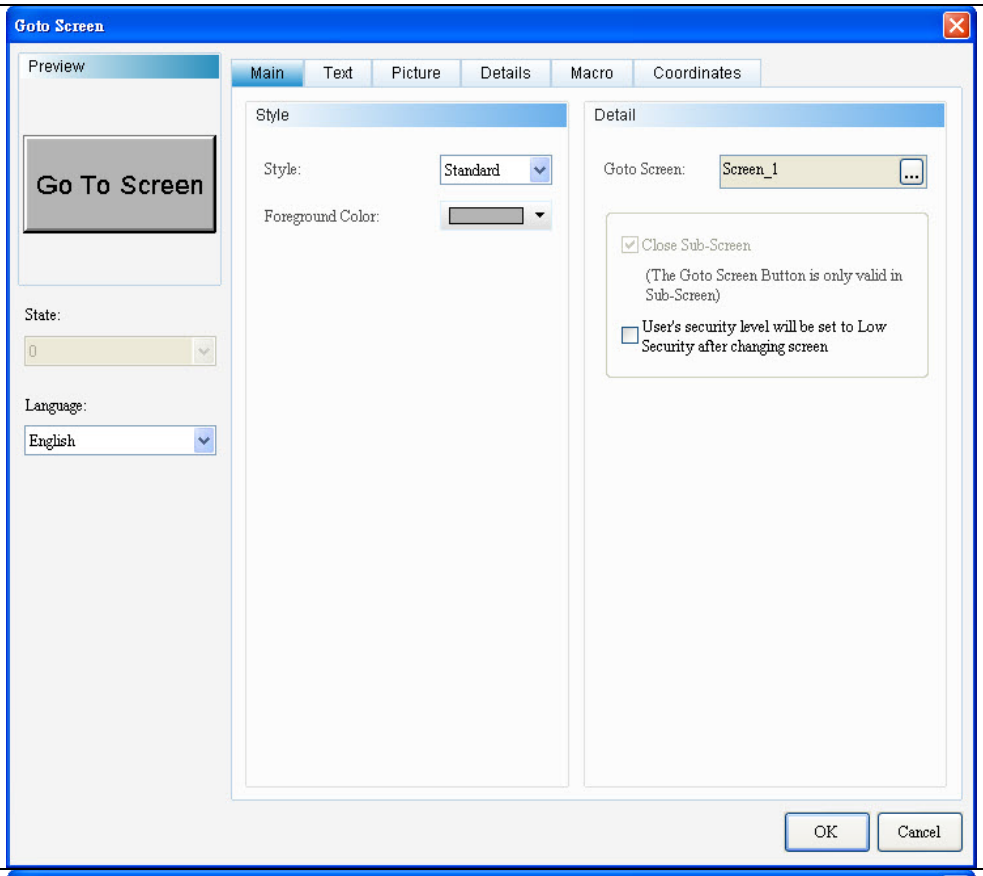
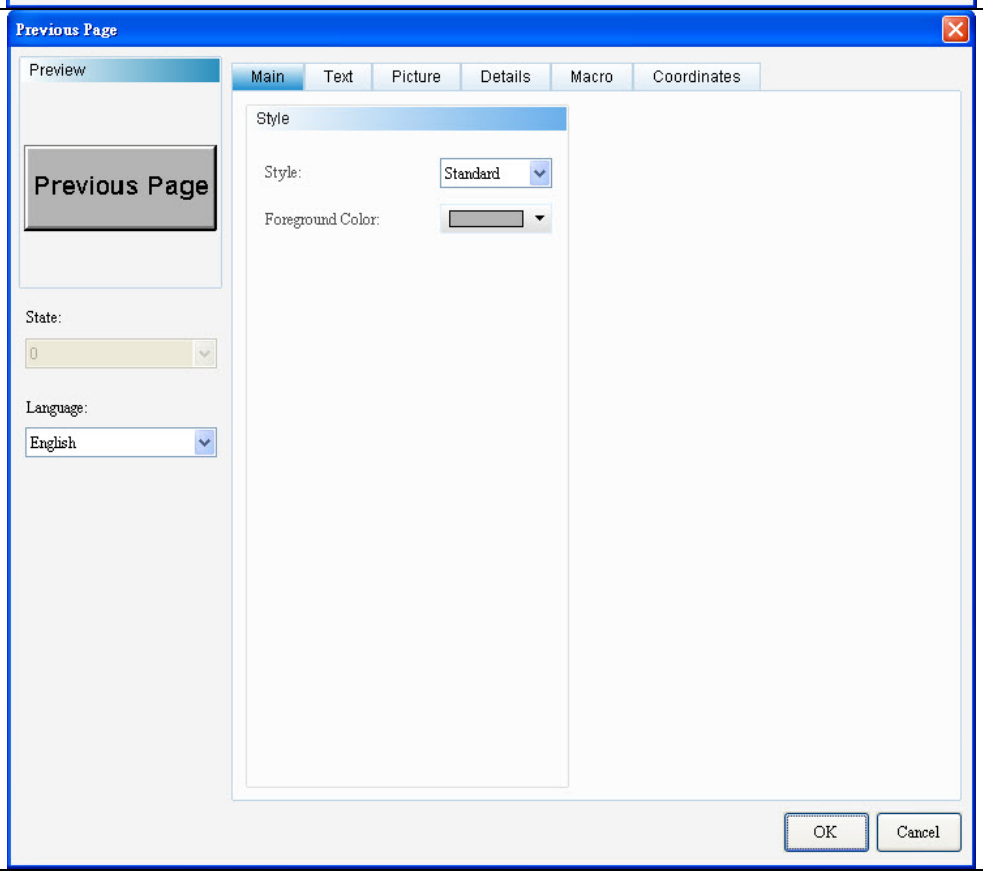
Goto Screen	
Previous Page	

Figure 5-6-2 Goto Screen / Previous Page Element Properties

Goto Screen / Previous Page	
Function Page	**Content Description**
Preview	Views Multi-Language data and does not support multistate data.
Main	Set Style and Foreground Color. Sets the Change Screen, Close Window, and Low Security after Goto Screen features of Goto Screen elements.
Text	Sets the content, font, font size, font color, bold/italic/underline of font, scaling, and alignment of the text to be displayed.
Picture	Sets Picture Bank Name, Alignment, Picture Stretch Mode, and Transparent Color.
Details	**Goto Screen**
	Sets Interlock Address, Interlock State, Activation Methods, Activation, Invisible Address, User Security Level, Confirm Window and Cancel Action Address.
	Previous Page
	Sets Interlock Address, Interlock State, Activation Methods, Activation, Invisible Address, User Security Level, Set Low Security, and Confirm Window.
Macro	Sets Before execute Macro and After execute Macro.
Coordinates	Sets the X-Y coordinate, width, and height of button elements.

Table 5-6-2 Goto Screen / Previous Page Function Page

◆ Main

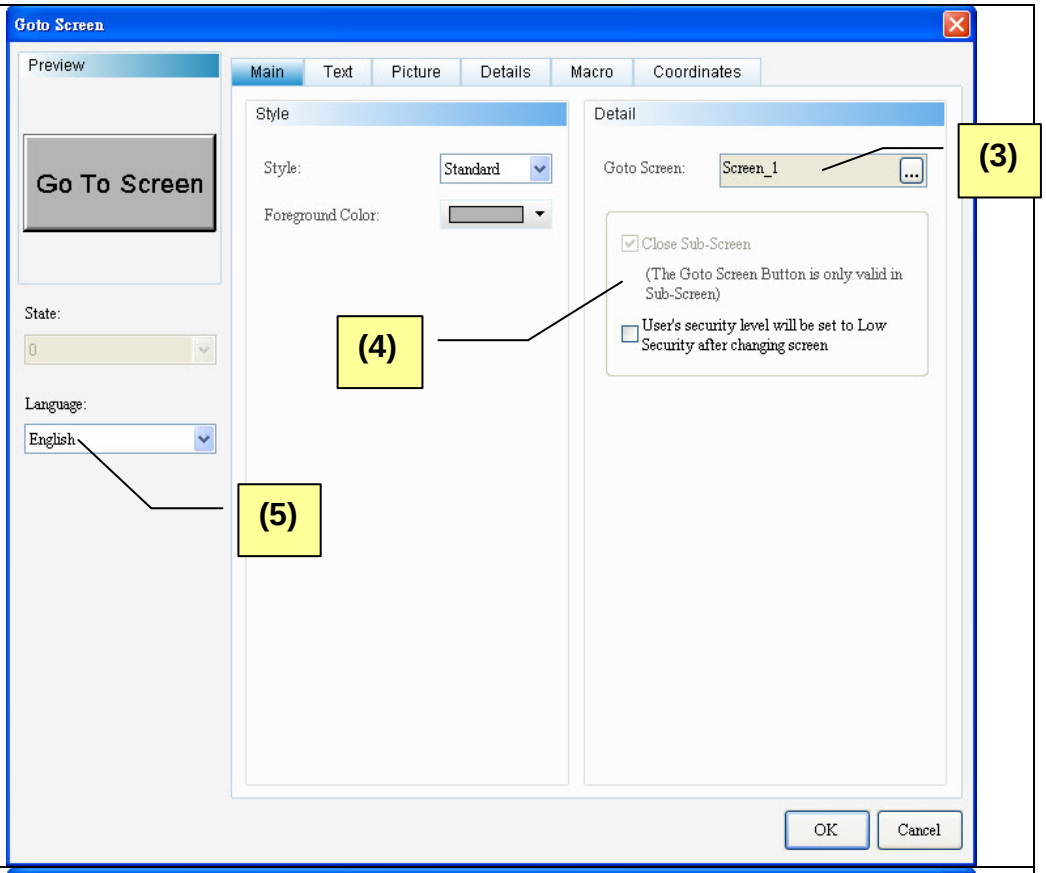
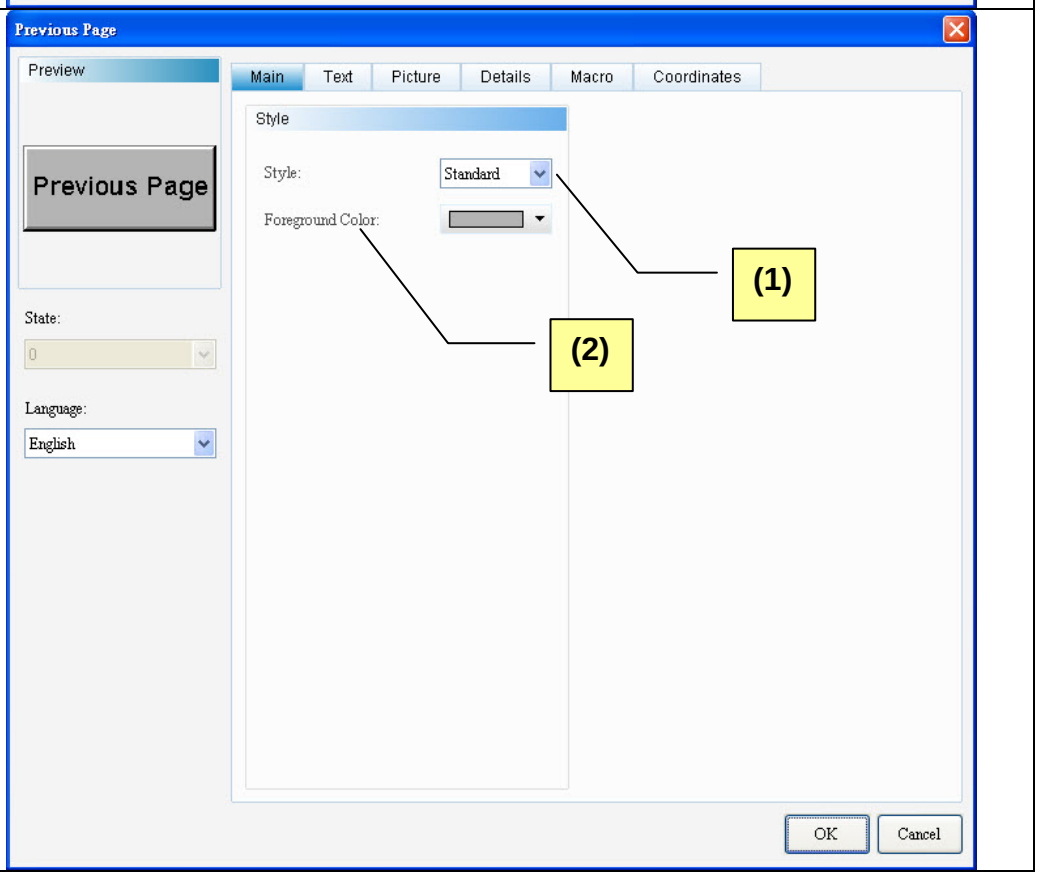
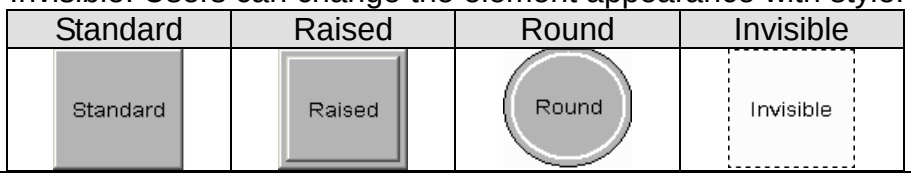
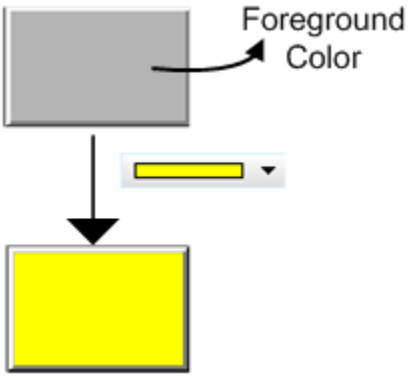
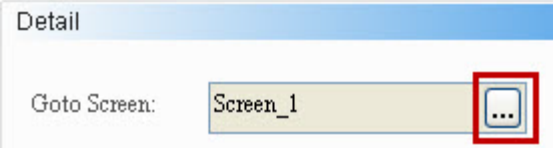
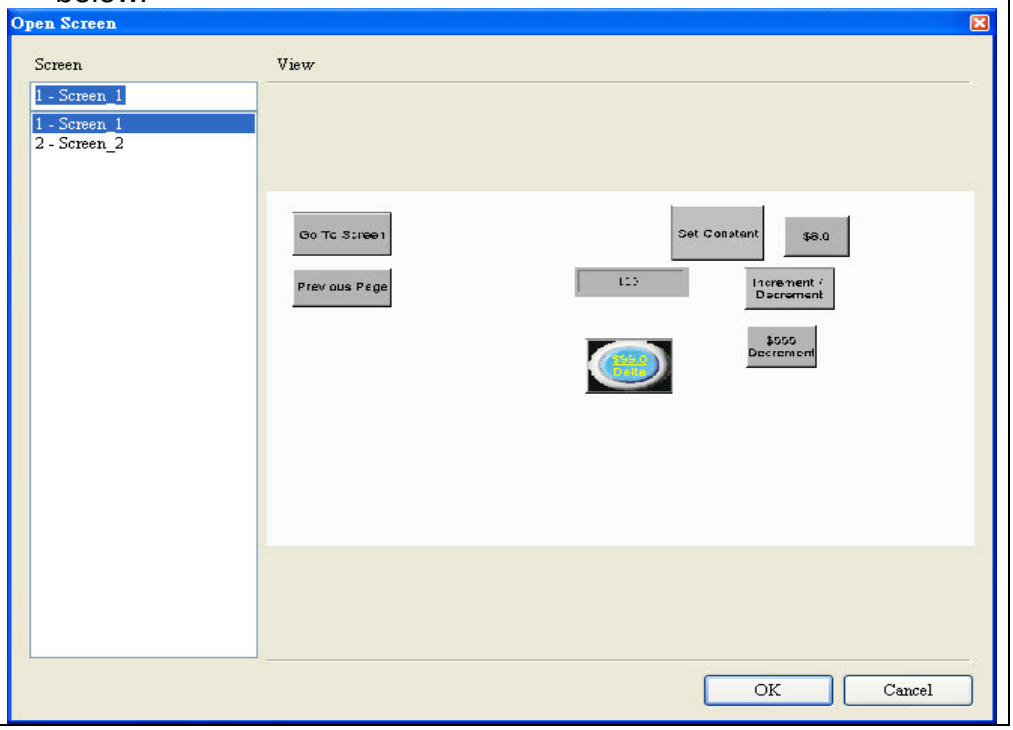
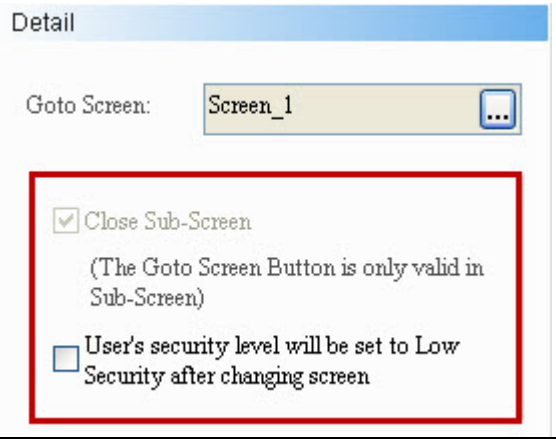
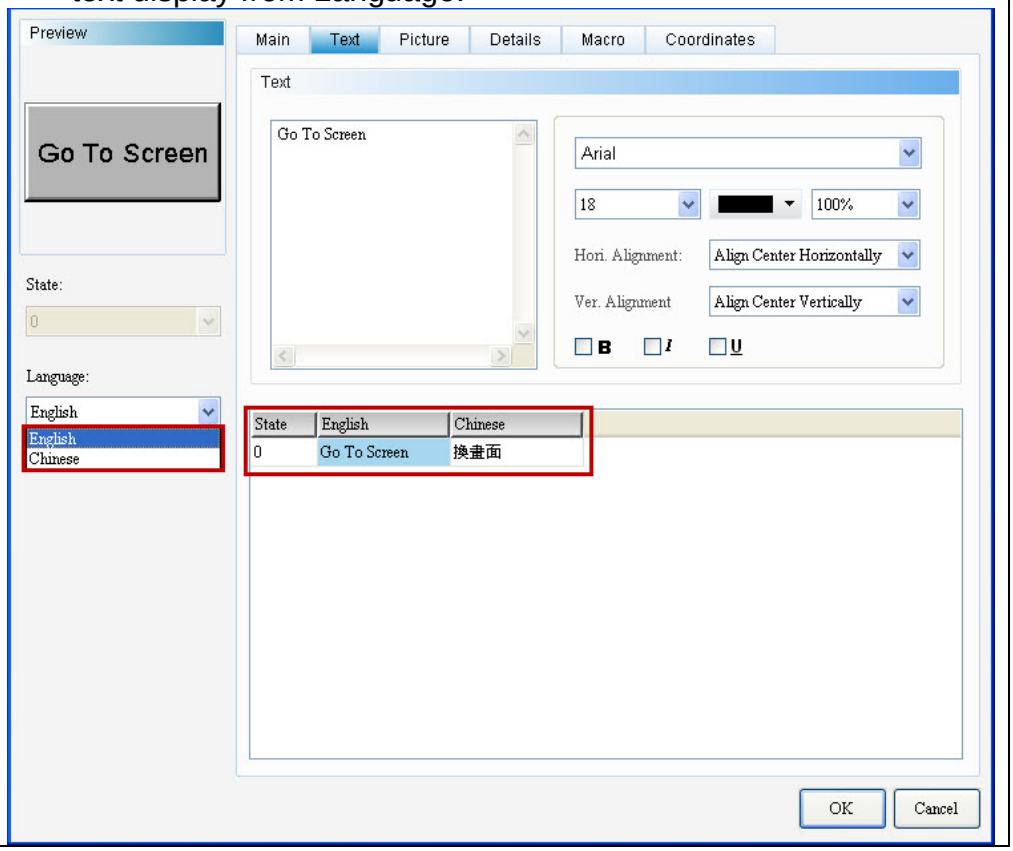
Goto Screen	
Previous Page	

Figure 5-6-3 Goto Screen / Previous Page Element Main Properties Page

No.	Property	Function
(1)	Style	➢ There are four Styles, including Standard, Raised, Round, and Invisible. Users can change the element appearance with style. 
(2)	Foreground Color	➢ Sets foreground color of elements. ➢ When Style is “Invisible”, foreground color is disabled. 
(3)	Change Screen	 ➢ Click the button shown in the above red frame. The Select Screen window will pop up. Select the screen to be changed as shown below: 

(4)	Close Window	➢ The Close Window item will only be enabled after a Goto Screen button is created for a window. When the Goto Screen button is activated, the screen will be changed and the present window will be closed. ➢ Forces to set user security level to the lowest after pressing the button to prevent the unintended uses of buttons. 
	Goto Screen after Low Security	
(5)	Language	➢ When language data are defined, users can edit the properties of text display from Language. 

◆ Text

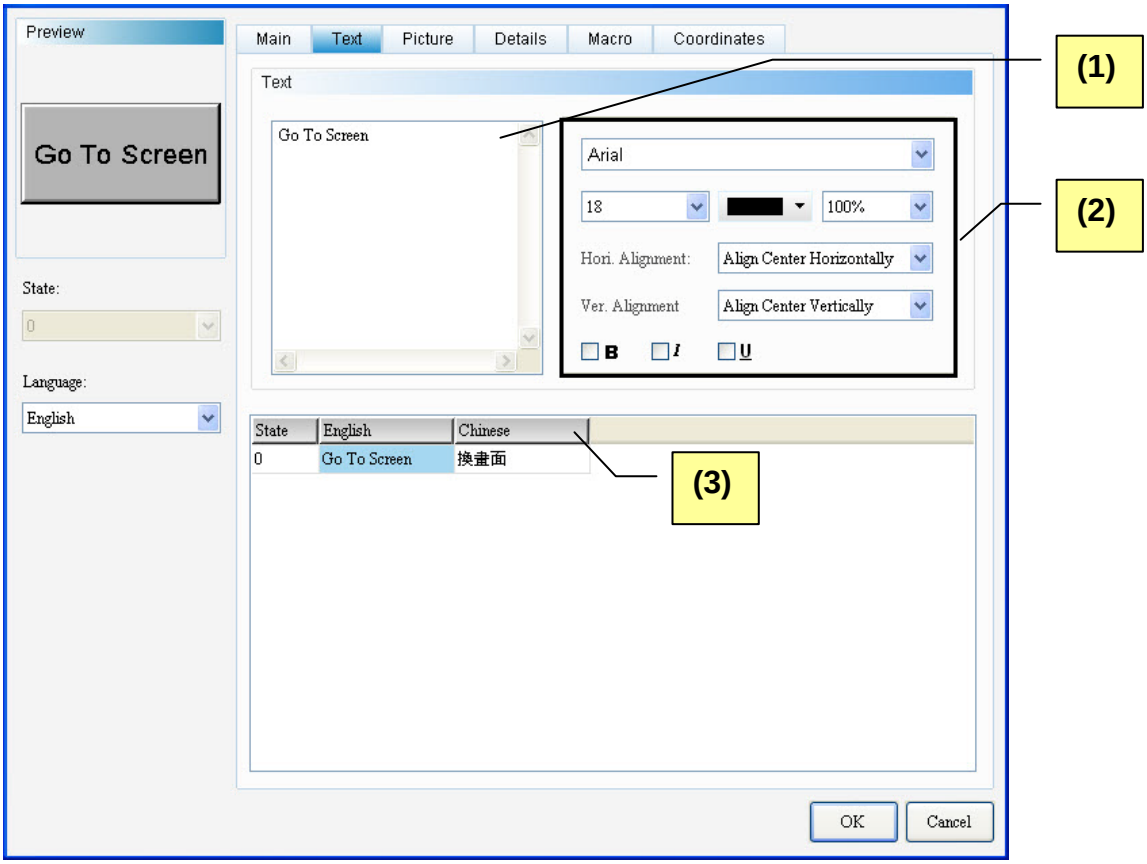
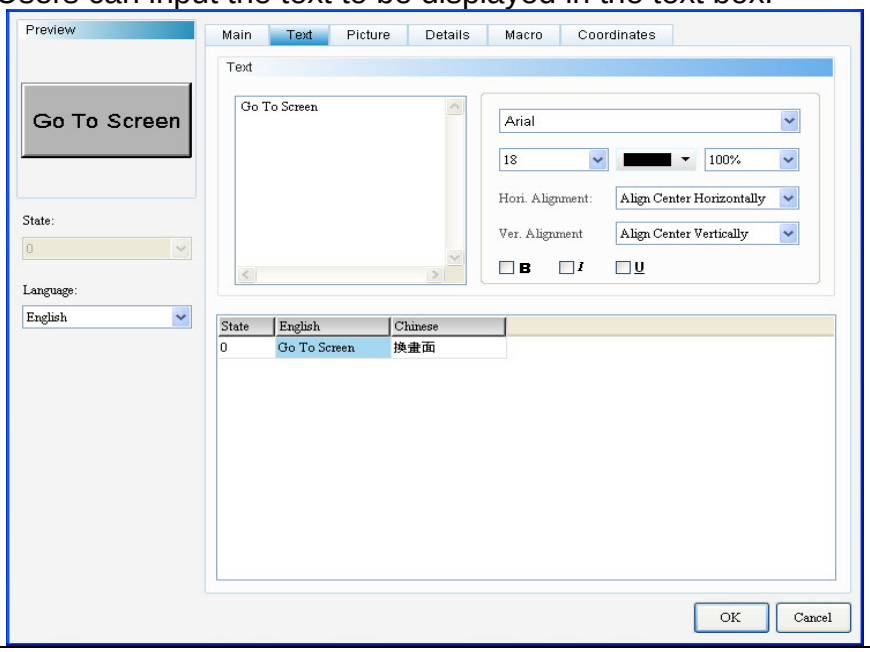


Figure 5-6-4 Goto Screen / Previous Page Element Text Properties Page

No.	Property	Function
(1)	Text	➢ Users can input the text to be displayed in the text box. 
(2)	Text Properties	➢ Sets text properties, including font type, font size, font color, scaling, text alignment, and bold/italic/underline of font. Please refer to the above figure for details about the results of text properties.
(3)	Multi-Language Text Data	➢ Users can add Multi-Language text data from the Multi-Language Text Page. As shown in the Text Properties Figure, users can input English text in the English field.

◆ Picture

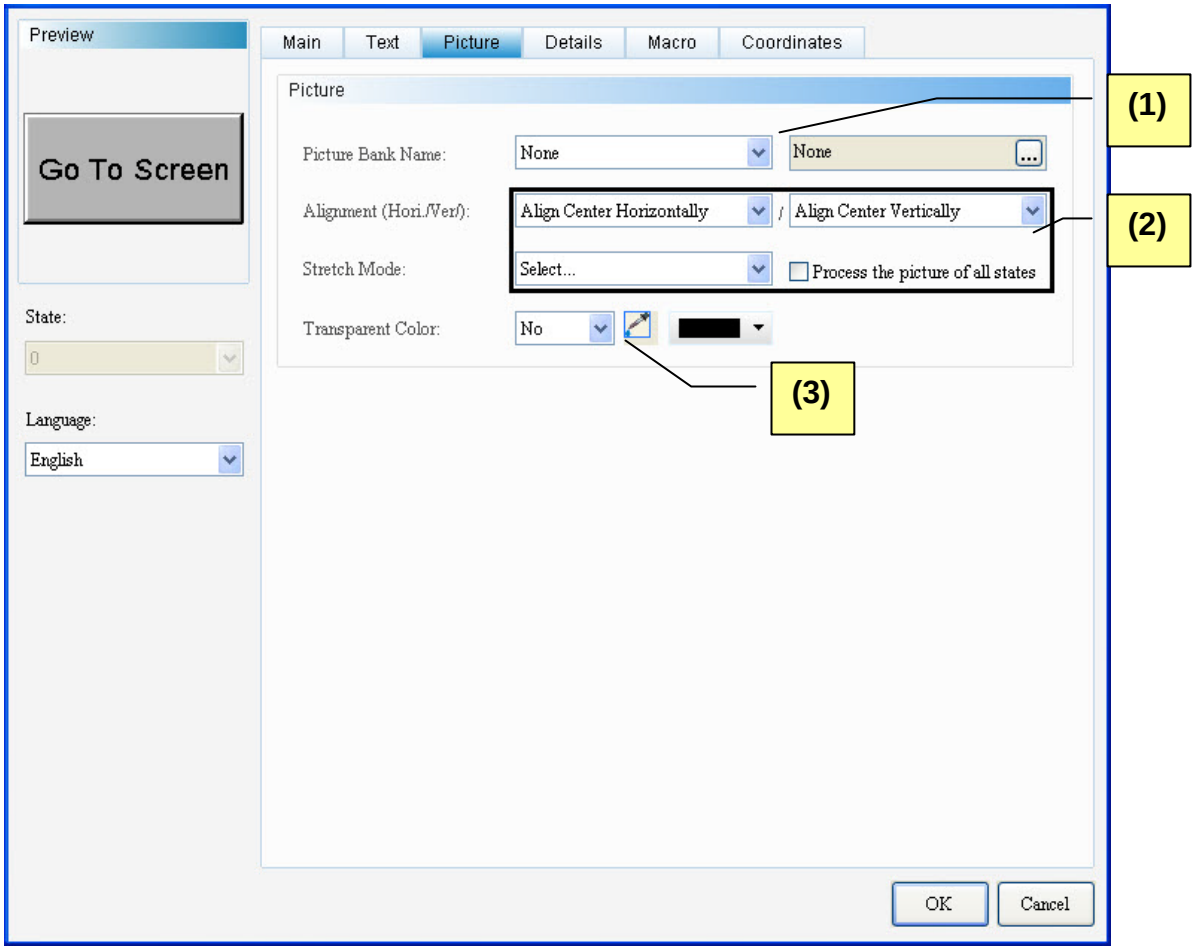
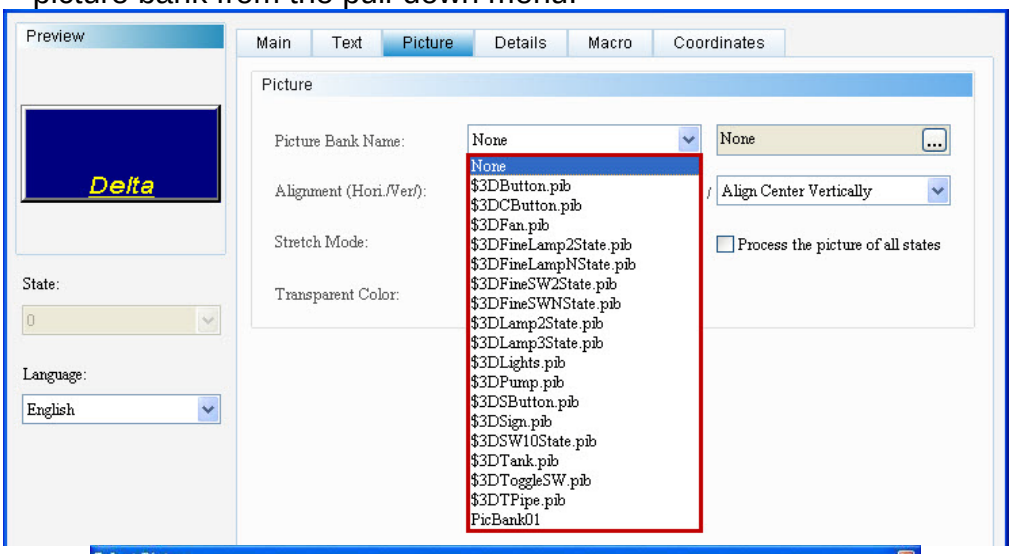
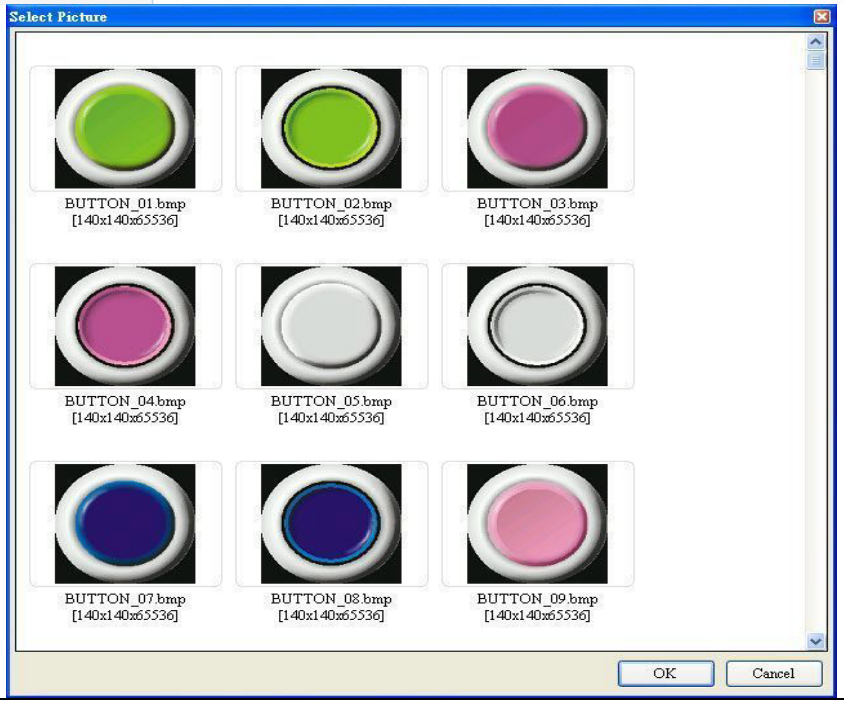
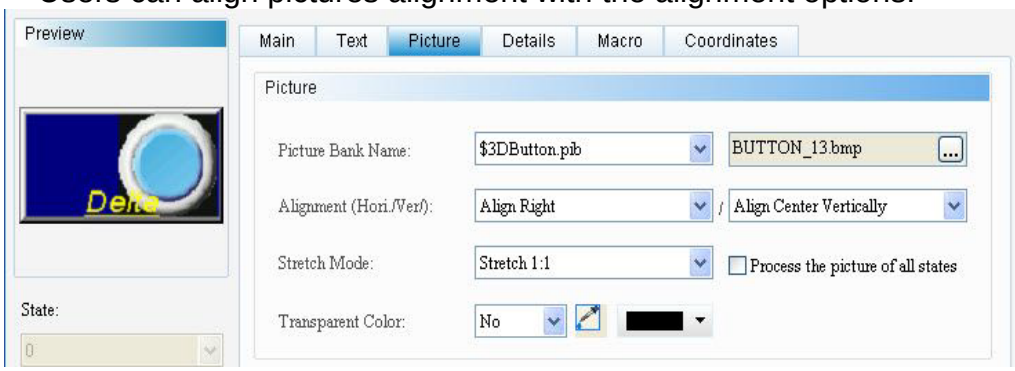
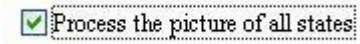
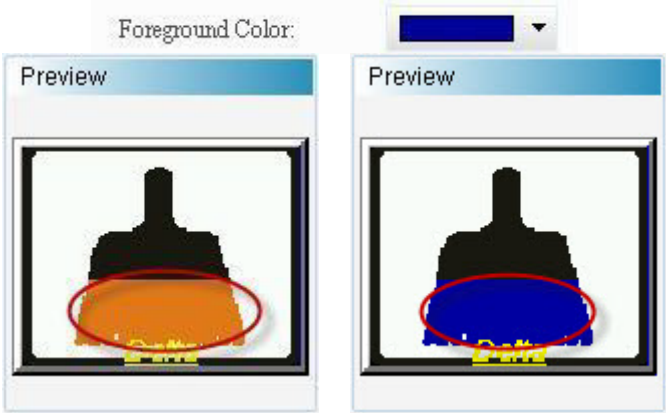


Figure 5-6-5 Goto Screen / Previous Page Element Picture Properties Page

No.	Property	Function
(1)	Picture Bank Name	➢ The default value for Picture Bank Name is “None”. Users wishing to select a display picture can select the desired picture in the built-in picture bank from the pull-down menu.  

<table>
<tr><td rowspan="2">(2)</td><td>Alignment</td><td>➢ Users can align pictures alignment with the alignment options.
 
</td></tr>
<tr><td>Stretch Mode</td><td>➢ Stretch modes include: Fill, Keep Aspect Ratio, and Actual Size.
<table>
<tr><th>Fill</th><th>Keep Aspect Ratio</th><th>Actual Size</th></tr>
<tr><td>In the “Fill” mode, the selected picture will fill up the entire display area.</td><td>In the “Keep Aspect Ratio” mode, the selected picture will fit in the display area proportionally according to the picture ratio.</td><td>In the “Actual Size” mode, the picture will be displayed in its original size in the display area.</td></tr>
<tr><td> </td><td> </td><td> </td></tr>
</table>
➢ If “Process all state pictures” is selected, the system assumes that each element has multiple entries of state data, and some pictures may be unable to fill the entire display area. By selecting this item, users will not need to set individual pictures to save time from editing.
 
</td></tr>
<tr><td>(3)</td><td>Transparent Color</td><td>➢ Users can set a color in the picture to transparent. In this case, by clicking the Transparent Color icon and then the orange part of the loom, the DOPSoft will omit all orange parts in the picture and turn them into transparent; thus turning the foreground color transparent.
 
</td></tr>
</table>

◆ Details

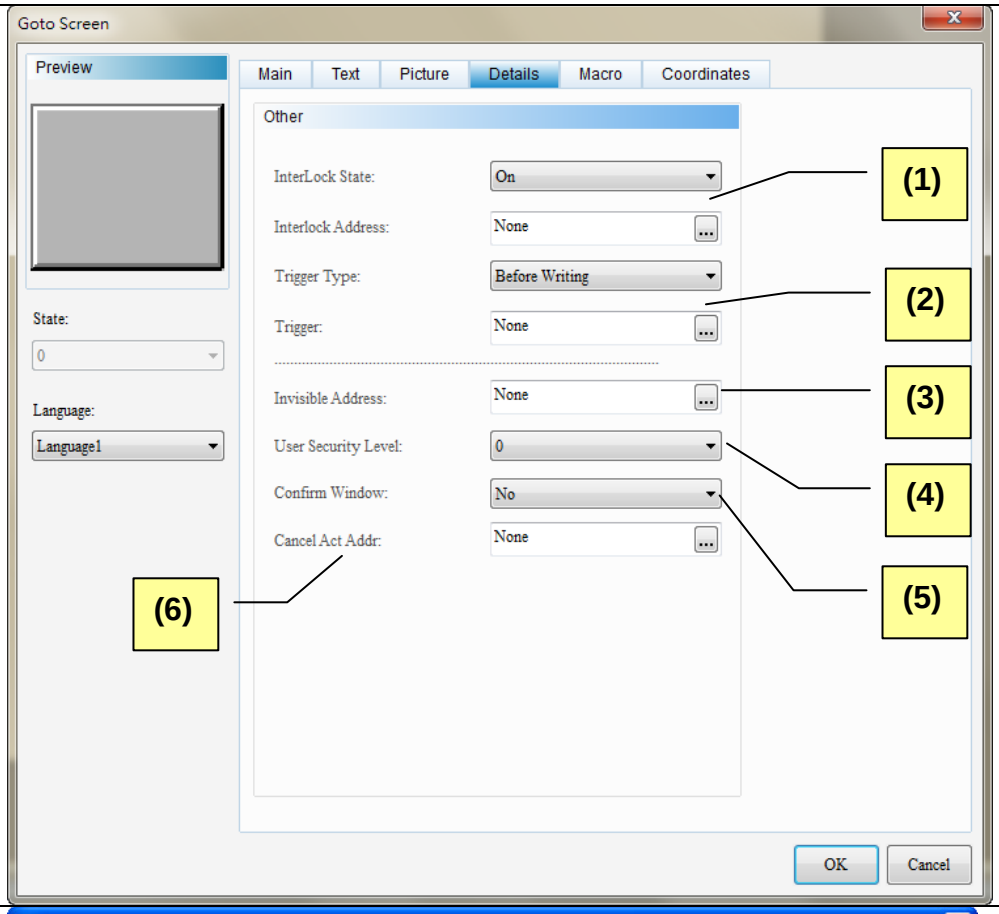
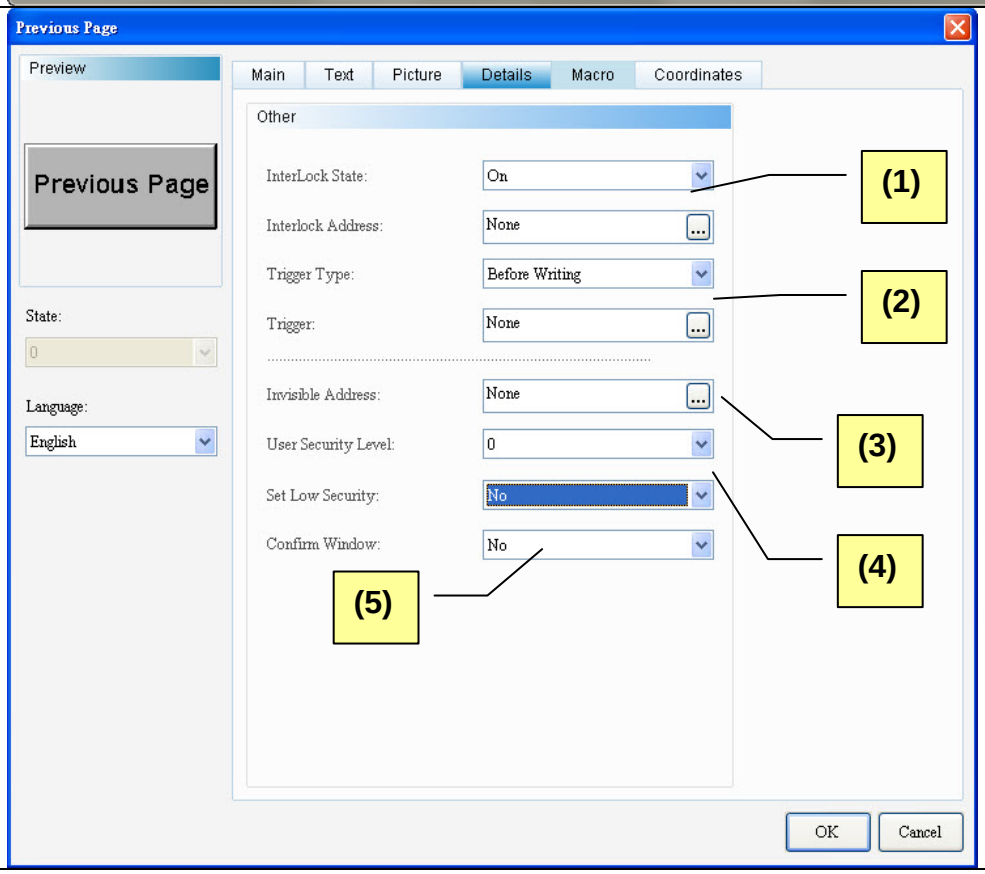
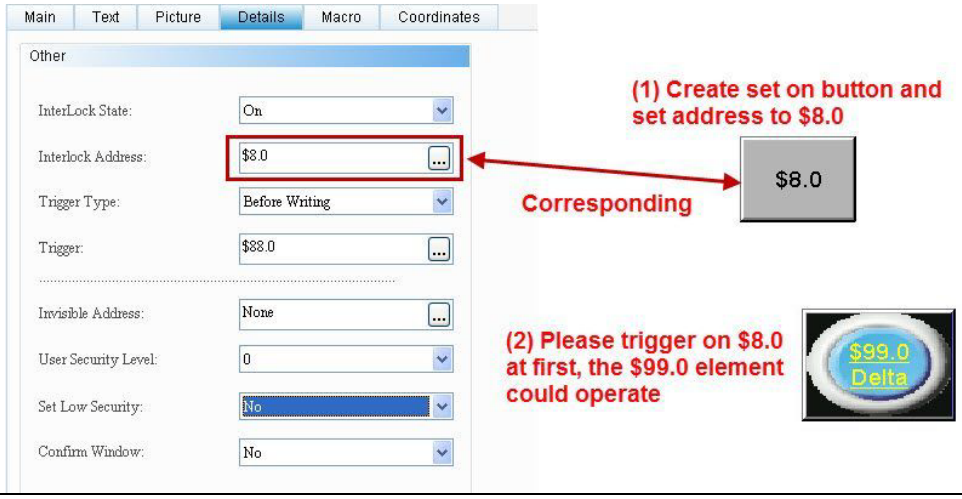
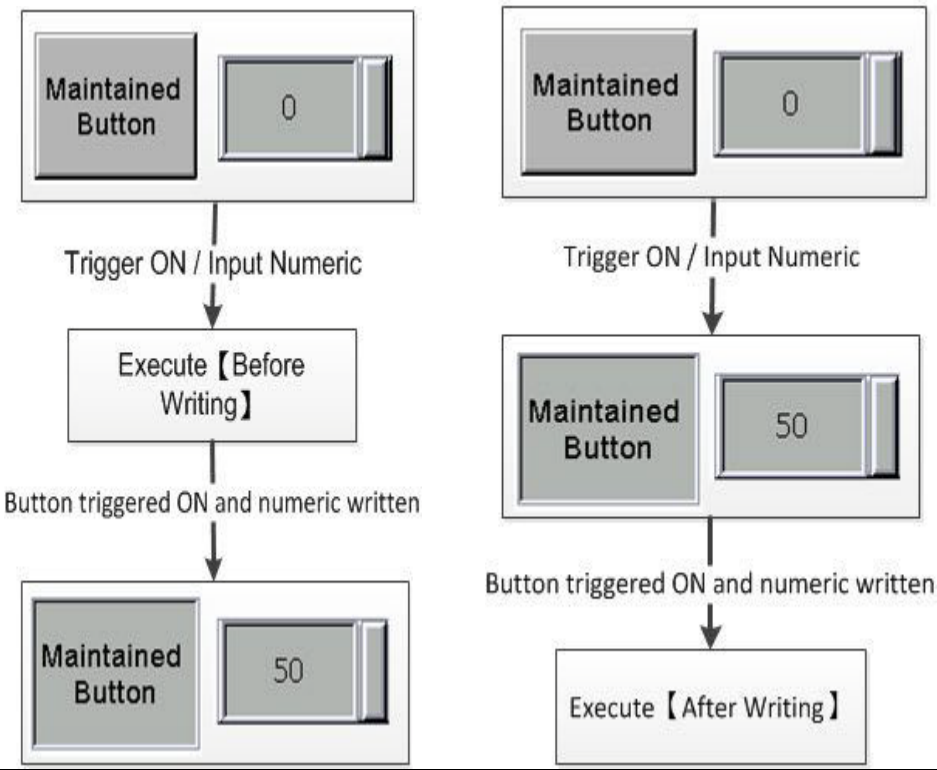
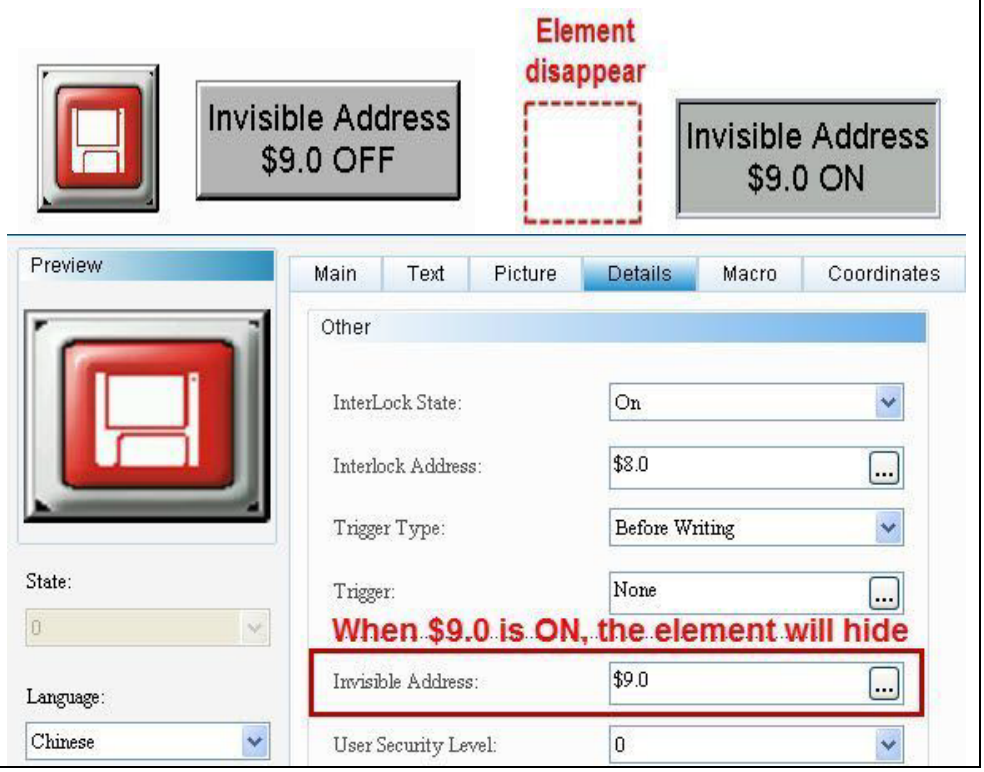
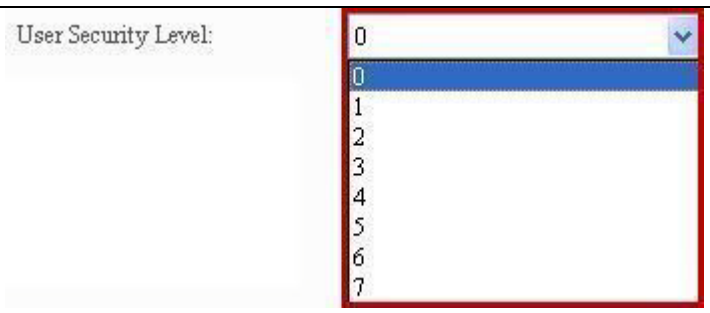
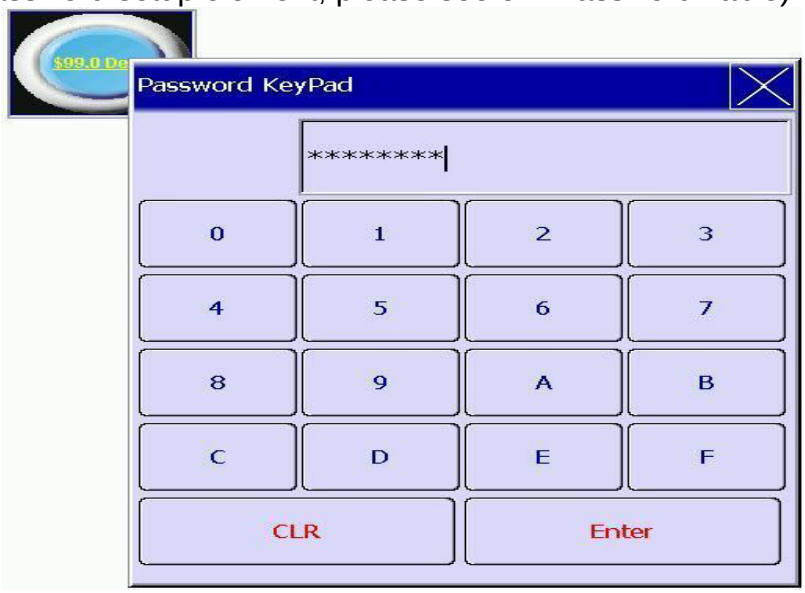
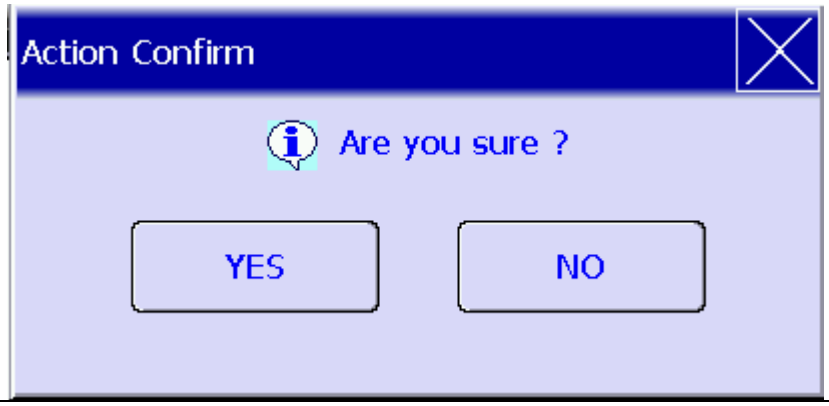
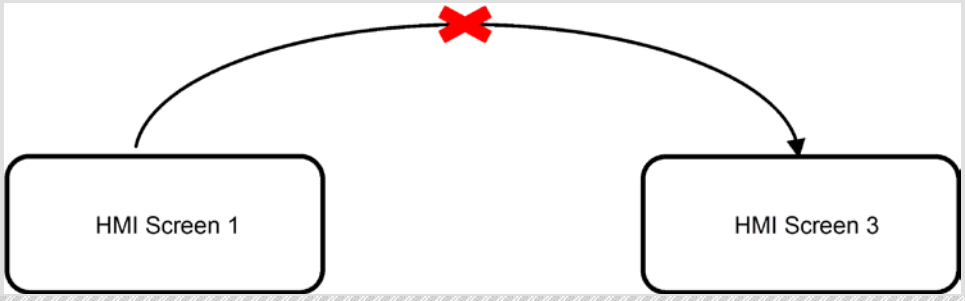
Goto Screen	
Previous Page	

Figure 5-6-6 Goto Screen / Previous Page Element Details Properties Page

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td rowspan="2">(1)</td><td>Interlock State</td><td rowspan="2">➢ Interlock Address allows users to operate an element from this particular address. It must be used along with Interlock State. If Interlock State is “OFF”, this means the interlock address is operable when the interlock state is “OFF”. In contrast, when Interlock State is “ON”, this means the interlock address is operable when the interlock state is “ON”.
➢ Examples of interlock address application are as follows:
1. First, create a button and set its address as “$8.0”. Next, set the original interlock address ($99.0) to “$8.0”.
2. To make Button $99.0 operable, users must press Button $8.0 first.
 
</td></tr>
<tr><td>Interlock Address</td></tr>
<tr><td rowspan="2">(2)</td><td>Trigger type</td><td rowspan="2">➢ Trigger type include before writing and after writing.
<table>
<tr><th rowspan="2">Trigger type</th><th>Before writing</th><th>After writing</th></tr>
<tr><td>The activation bit is ON before changing values.</td><td>Values are changed before the activation bit is ON.</td></tr>
</table>
➢ Users can create a button element, set its memory address, and select Pre-writing activation or Post-writing activation to activate the controller Bit address to ON.
➢ As the activation function only sets the activation address to ON, users must set the activation address of OFF before re-activation.
➢ Before writing: After writing:</td></tr>
<tr><td>Trigger</td></tr>
</table>

		
(3)	Invisible Address	➢ When Invisible Address is "ON", the button element is hidden, and the corresponding function is disabled. 

(4)	User Security Level	 ➢ Sets the user security level of element activities. Only users with equal or higher security level corresponding to the element can activate the element. ➢ After setting the user security level, when users activate the element, the password box will pop up and request users to input the password (the password can be changed from the password setup element, please see 5-7 Password Table).
	Set Low Security	 ➢ If "YES" is selected for Set Low Security, HMI automatically sets the security level to the lowest every time users input the password. When users activate the element again, they will be requested to input again the password corresponding to the element.
(5)	Confirm Window	➢ If Enable Confirmation Box is set to "YES", the following dialog box will pop up after pressing the corresponding button as shown below: 
(6)	Cancel Act. Address	➢ Applying Cancel Act. Address allows users to pause or cancel

		the command of Go to Screen. ➢ When Cancel Act. Address is on, function of Go to Screen is invalid. However, if it is off, then it means users can change the screen. NOTE： ✓ Function of Go to Screen is only available when Interlock Address is actiavated. Cancel Act. Address allows users to cacnel the action. If Cancel Act. Address is on, users will be unable to change the screen even when the Interlock Address is on. 

◆ Coordinates

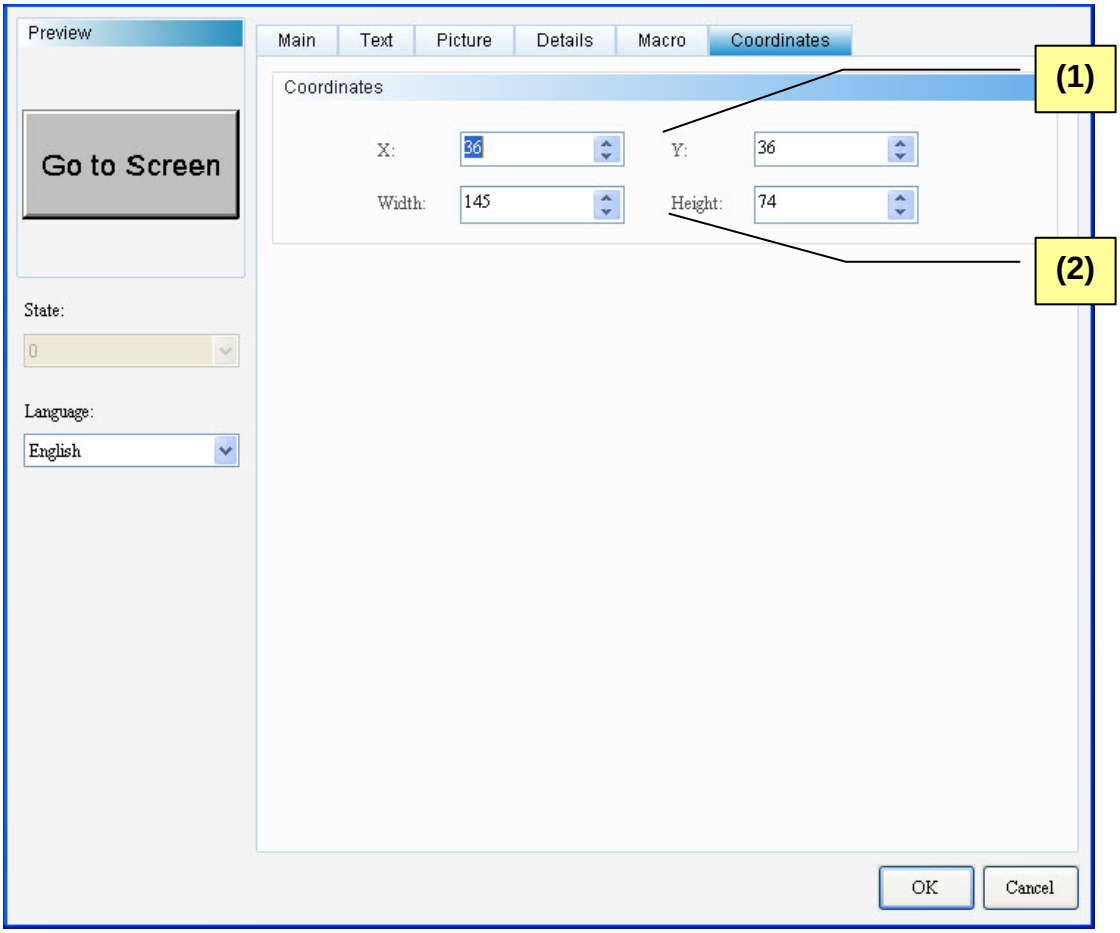


Figure 5-6-7 Goto Screen / Previous Page Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

◆ Macro

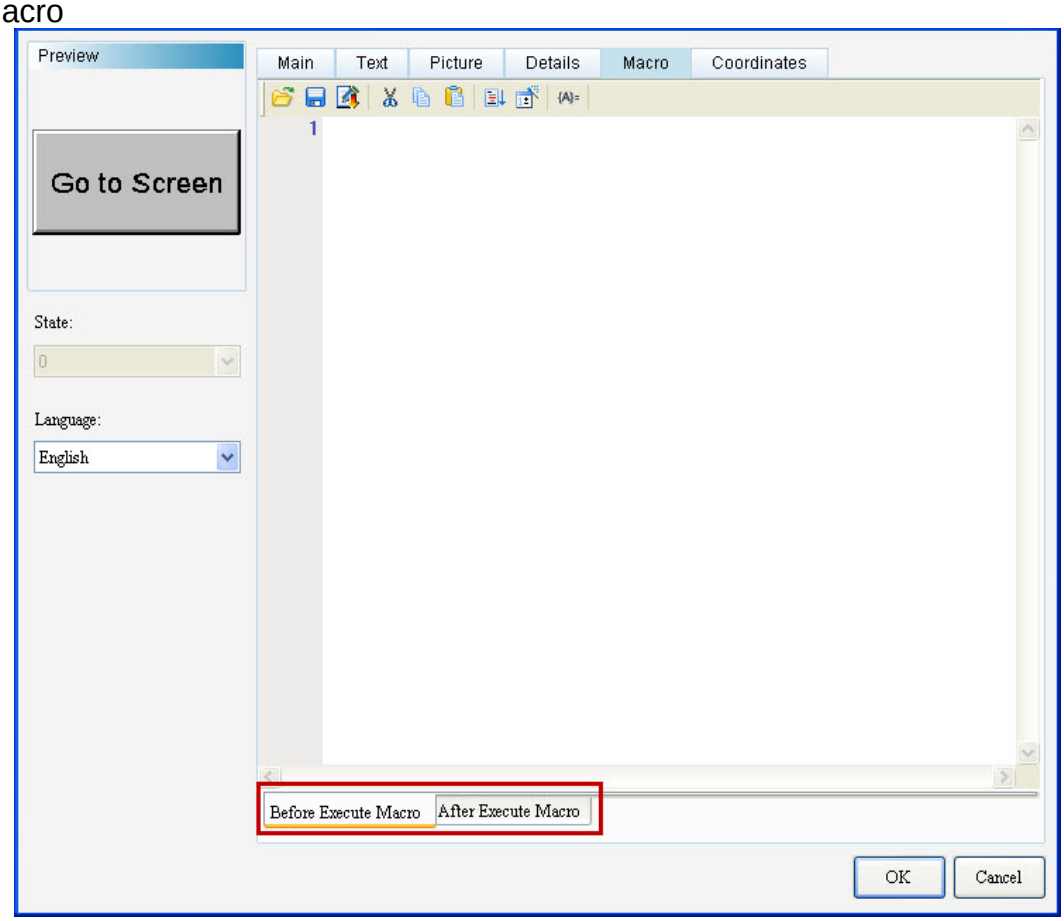
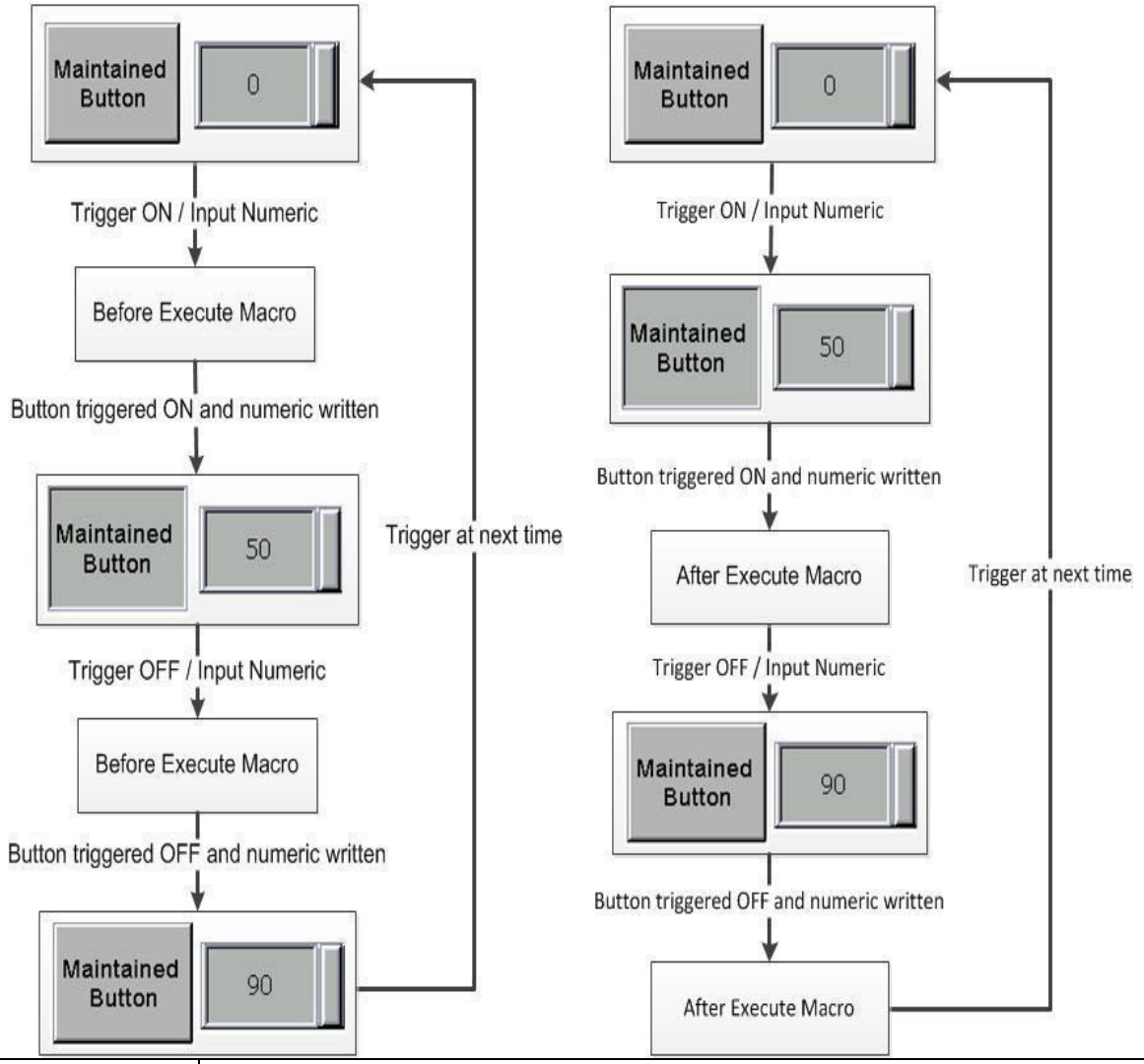


Figure 5-6-8 Goto Screen / Previous Page Element Macro Properties Page

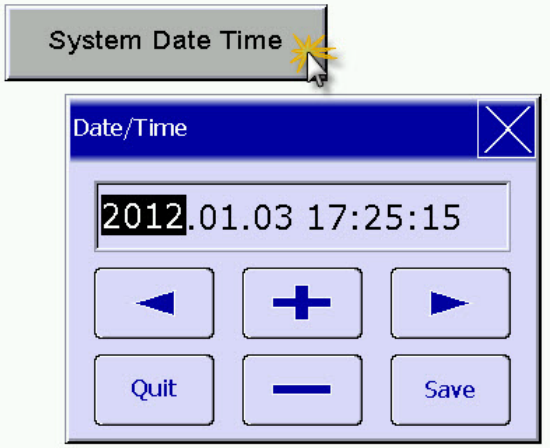
No.	Property	Function
(1)		➢ The before execute macro and after execute macro processes are diagrammed below:
	Before Execute Macro	➢ When users touch the button element, HMI will first run the commands in the corresponding macro pre-action the button action. If the button state is not changed by means of touching button (using external controller commands or other macros), HMI will not run the corresponding macro commands.
	After Execute Macro	➢ After users touch the button element, HMI will first run the button action pre-action the commands in the corresponding macro. If the button state is not changed by means of touching button (using external controller commands or other macros), HMI will not run the corresponding macro commands.



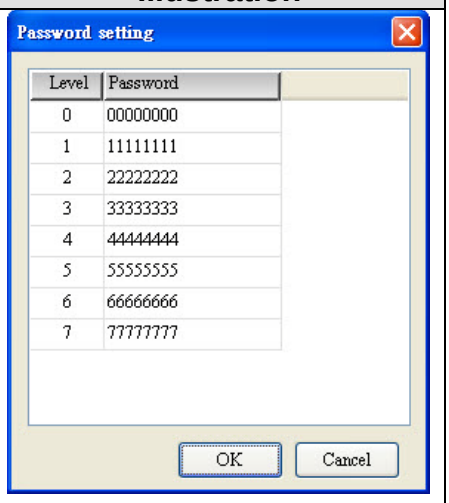
5-7 Other Elements

There are 13 other button elements including System Date Time, Password Table Setup, Enter Password, Contrast Brightness, Low Security, System Menu, Report List, Screen Capture, Remove USB, Import/Export Recipe, Import/Export FileSlot, Calibration, and Language Change. The properties of these elements are described below.

5-7-1 System Date Time

Icon	Name	Properties	Illustration
	System Date Time	➢ Users can touch the System Date Time button on HMI to directly set the system date and time. ➢ This function is the same as that of the Set Data / Time on the HMI screen.	

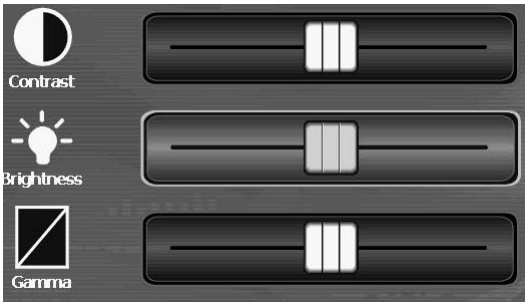
5-7-2 Password Table Setup

Icon	Name	Properties	Illustration
	Password Table Setup	➢ Users can select the Password Table under [Options]→ Password Table button. The password of all security levels can be set from this table. After setting passwords, download them to HMI. ➢ Users wishing to change the password on a running HMI can press the Password Table Setup button. The system will open the Password Table according to the security level defined in the User Security Level in Password Table Setup. ➢ Users with a security level lower than the set security level are unable to open the Password Table, and the Enter Password will pop up. ➢ The security level of the input password determines if users can run Password Table Setup. Simply speaking, only passwords with a security level higher than the security defined in the User Security Level can run Password Table Setup. After opening Password Table Setup, users can only change passwords with a security level equivalent to or lower than the present password.	 Superior Password Security Level = 4.

5-7-3 Enter Password

Icon	Name	Properties	Illustration
	Enter Password	➢ Enter Password button is an interface for users to enter the password in HMI.	

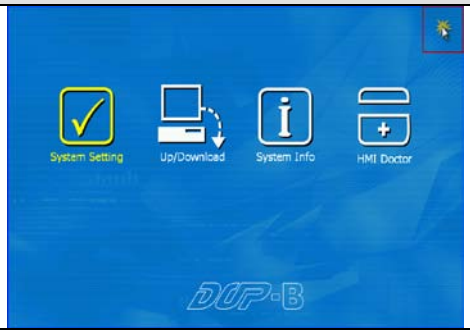
5-7-4 Contrast Brightness

Icon	Name	Properties	Illustration
	Contrast Brightness	➢ Changes HMI contrast and brightness. Touch the Contrast Brightness button, the “LCD Modulate” window will pop up for users to adjust HMI contrast and brightness. ➢ B05S100 / B05S101 / B07S201 / B07S211 support Gamma Adjust and Brightness Adjust. In later models, such as B07S(E)415 / B07S(E)515 / B08S(E)515 / B10S(E)615, users can only adjust brightness.	

5-7-5 Low Security

Icon	Name	Properties	Illustration
	Low Security	➢ Touch the Low Security button will set the User Security Level to the lowest. Users can set User Security Level in all software elements, in order to prevent system parameters from interpolation or random access, which will result in system errors.	

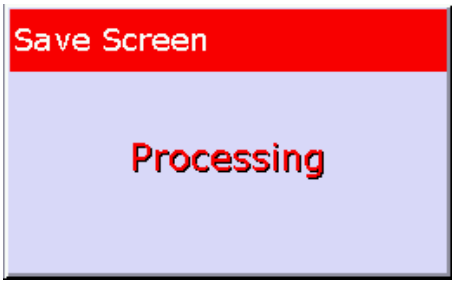
5-7-6 System Menu

Icon	Name	Properties	Illustration
	System Menu	➢ Touch the System Menu button, HMI will go to the System Menu screen as shown on the right. Touch the upper right corner of the System Menu screen or hold the HMI System button for 3 seconds to return to the normal HMI screen.	

5-7-7 Report List

Icon	Name	Properties	Illustration
	Report List	➢ The Report List button provides 3 storage options: USB Disk, Printer, and SD. ➢ Users can select the device according to the desired storage. Touch the Report List button to output data to the selected storage.	

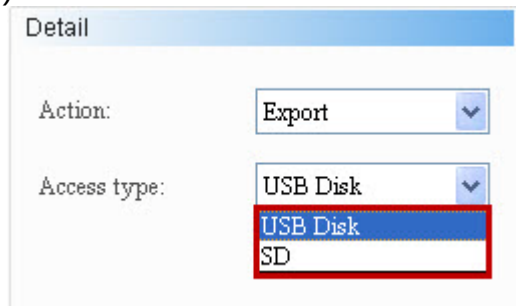
5-7-8 Screen Capture

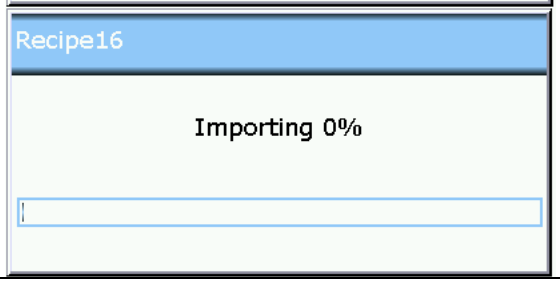
Icon	Name	Properties	Illustration
	Screen Capture	➢ Screen Capture allows users to capture and store the present HMI screen to an external storage device. Storage types include USB Disk and SD as shown in Figure (1) on the right. ➢ Touch the Screen Capture button. The Save Screen message box will pop up, informing users screen capture data are saved in the selected storage as shown in Figure (2) on the right. ➢ After storing the captured screens in the selected storage, users can check the corresponding files from the external storage. File folders are named by date and files are named by the time (HH:mm:ss) when the files are saved. ➢ Files are output in .bmp format as shown in Figure (4) on the right.	(1) (2)  (3) (4)

5-7-9 Remove Storage

Icon	Name	Properties	Illustration
	Remove Storage	➢ **<u>Prevents the loss of data of storage connected to HMI. Run Remove Storage before shutting down HMI, replacing or removing storage.</u>** ➢ Touch the Remove Storage button. A message box informing users that the storage has been removed will pop up as shown in Figure (1) on the right. ➢ Supports two types of storage: USB Disk and SD, as shown in Figure (2) on the right.	(1) (2)

5-7-10 Import/Export Recipe

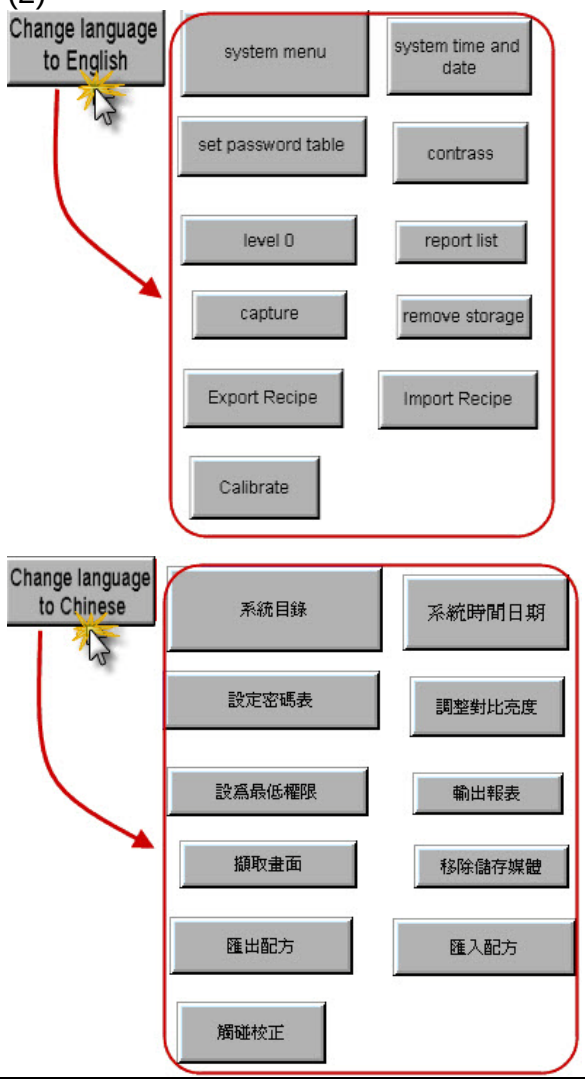
Icon	Name	Properties	Illustration
	Import/ Export Recipe	➢ Users must first edit and open a recipe before running Import/Export Recipe. Otherwise, the button is disabled. ➢ Users can define the function of the Import/Export Recipe to import or export as shown in Figure (1) on the right. ➢ Users can also define the media type, including USB Disk and SD as shown in Figure (2) on the right. ➢ Touch the Import/Export	(1) (2)  (3)

		Recipe button, a message box informing users that import or export is in progress will pop up as shown in Figure (3) on the right. ➢ All recipes are exported in CSV files and stored in default folder HMI-000 in HMI.	 

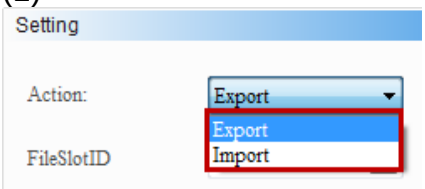
5-7-11 Calibration

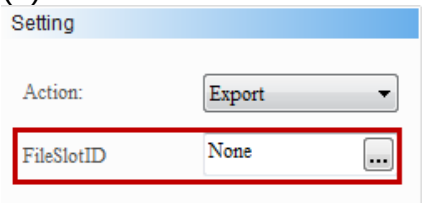
Icon	Name	Properties	Illustration
	Calibration	➢ Calibration allows users to calibrate the touch action. ➢ As shown on the right, click the Calibration button, HMI will go to the calibration screen.	

5-7-12 Language Change

Icon	Name	Properties	Illustration
	Language Change	➢ Language Change allows users to quickly change the display language. ➢ As shown in Figure (2) on the right, when English is selected after touching the Language Change button, HMI data will be displayed in English. ➢ Users must first enable the Multi-Language function before using the Language Change button. Please refer to Chpater 25 Multi-Language for details.	(1) (2) 

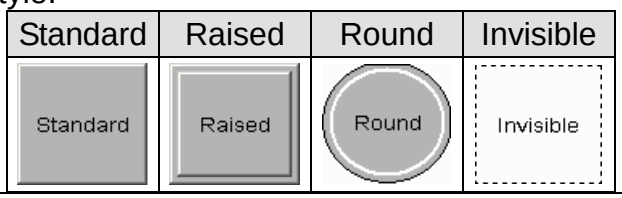
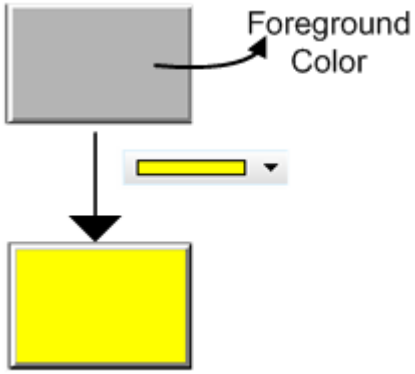
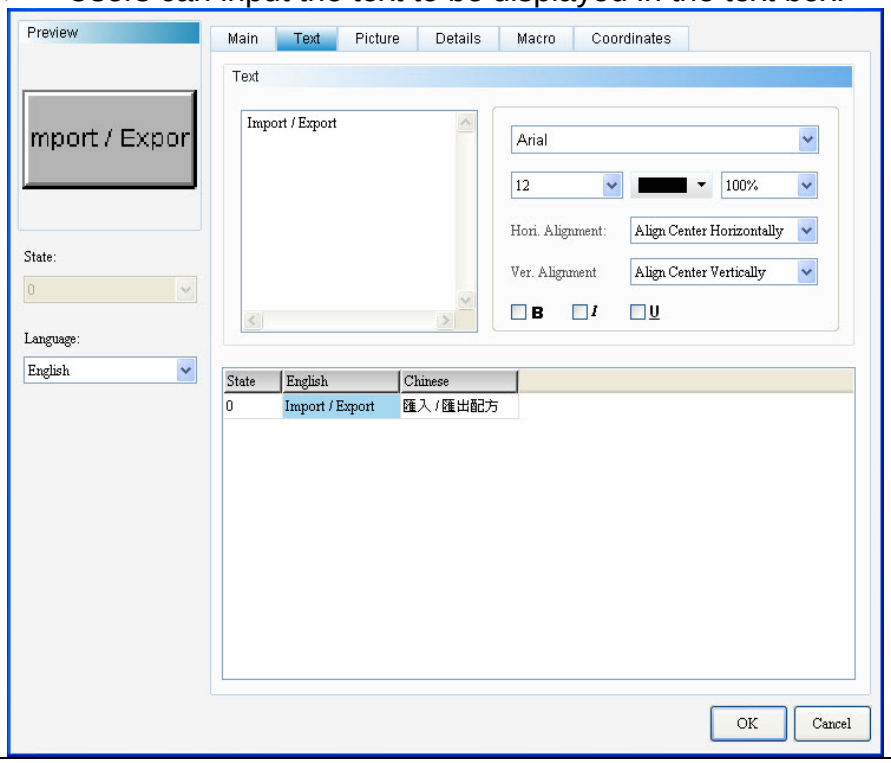
5-7-13 Import / Export FileSlot

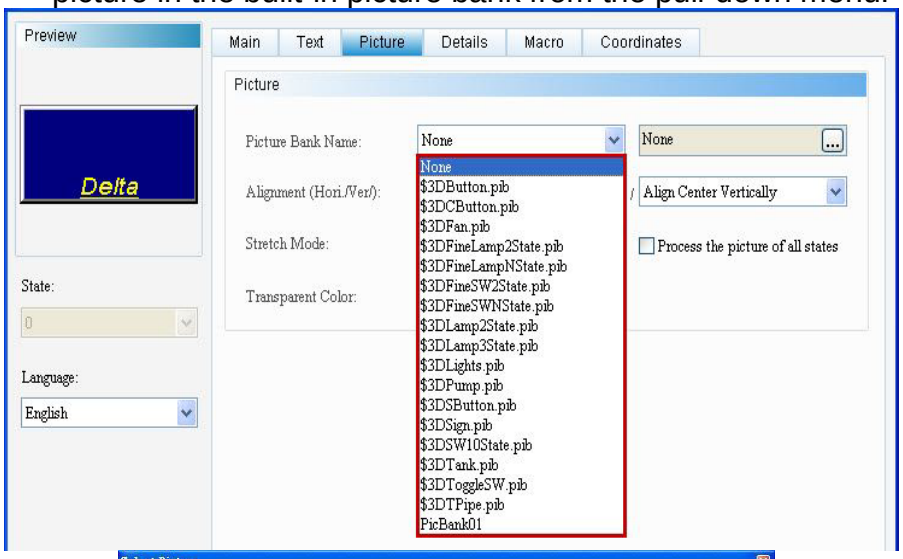
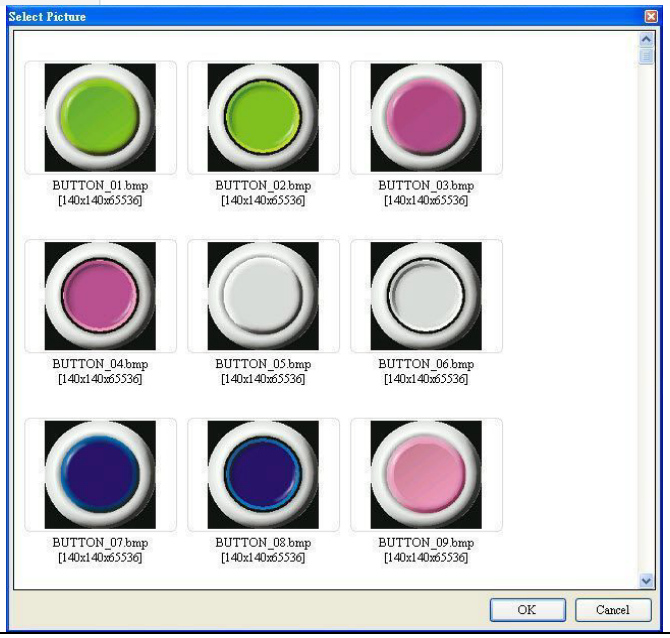
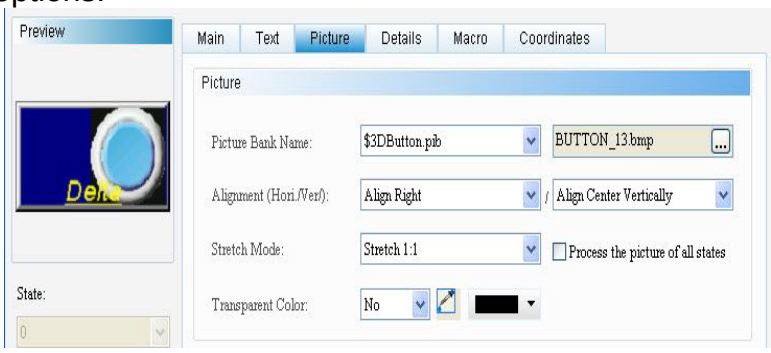
<table>
<tr><th>Icon</th><th>Name</th><th>Properties</th><th>Illustration</th></tr>
<tr>
<td></td>
<td>Import / Export FileSlot</td>
<td>
➢ If desire to use the button of Import/Export FileSlot, users have to set up the number and size of FileSlot first to make it valid.
➢ The import/Export FileSlot button can be set as Import or Export when you press the button. See figure (1) on the right.
➢ Users have to specify FileSlot ID when setting the import/Export FileSlot button. See figure (2) on the right. FileSlot ID can be a memory address or a constant value.
<table>
<tr><th colspan="4">Memory Usage</th></tr>
<tr><th>Variable</th><th>Internal Memory</th><th>PLC Register</th><th>Const ant</th></tr>
<tr><td>FileSlot ID</td><td>◎</td><td>◎</td><td>◎</td></tr>
</table>
➢ When pressing the button to import or export FileSlot, a screen of file manager will pop up. Users can select the location that the file is going to be imported or exported. See figure (3) on the right. Users also can directly enter the filename where the arrow points at.
➢ After importing FileSlot, users need to use Macro FileSlotRead to access the file and save in register.
</td>
<td>
(1)


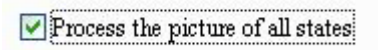
(2)


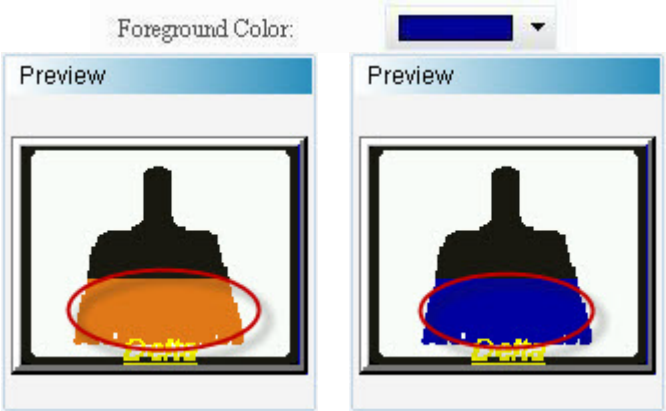
(3)

</td>
</tr>
</table>

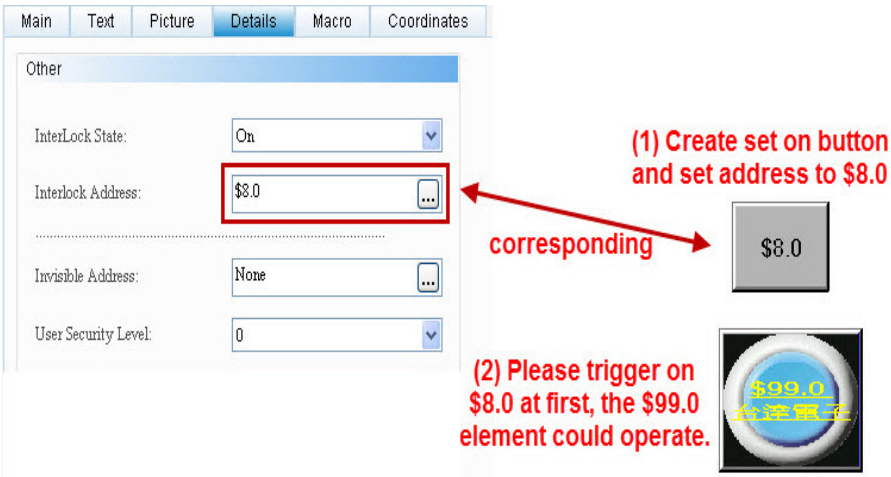
Example of Other Element Shared Properties Table 5-7-1 Example of Other Element Shared Properties		
Function Page	**Property**	**Function**
Main	Style	➢ There are four Styles, including Standard, Raised, Round, and Invisible. Users can change the element appearance with style. 
	Foreground Color	➢ Sets foreground color of elements. ➢ When Style is “Invisible”, foreground color is disabled. 
Text	Text	➢ Users can input the text to be displayed in the text box. 
	Text Properties	➢ Users can set text properties, including font type, font size, and font color, scaling, text alignment, and bold/italic/underline of font.
	Multi-Language Text Data	➢ Users can add Multi-Language text data from the Multi-Language Text Page. As shown in the Text Properties

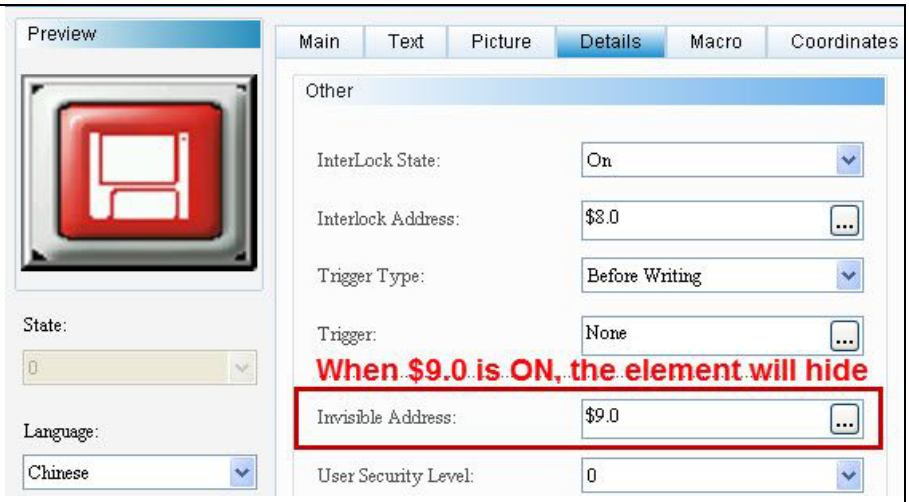
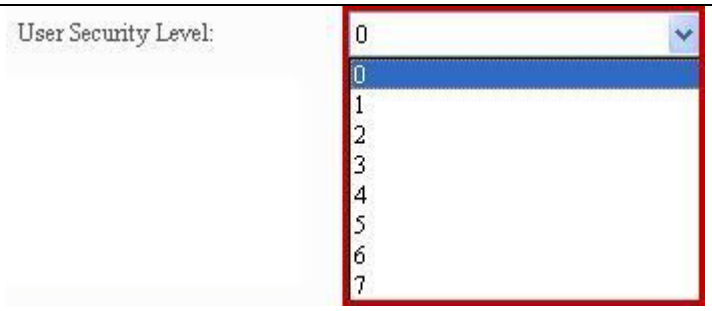
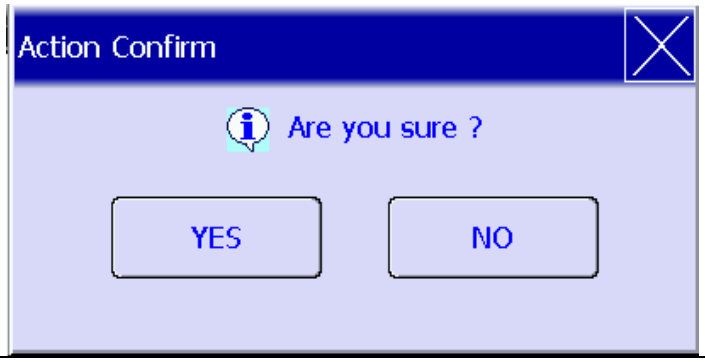
		Figure, users can input English text in the English field.
Picture	Picture Bank Name	➢ The default value for Picture Bank Name is “None”. Users wishing to select a display picture can select the desired picture in the built-in picture bank from the pull-down menu.  
	Alignment	➢ Users can align pictures alignment with the alignment options. 

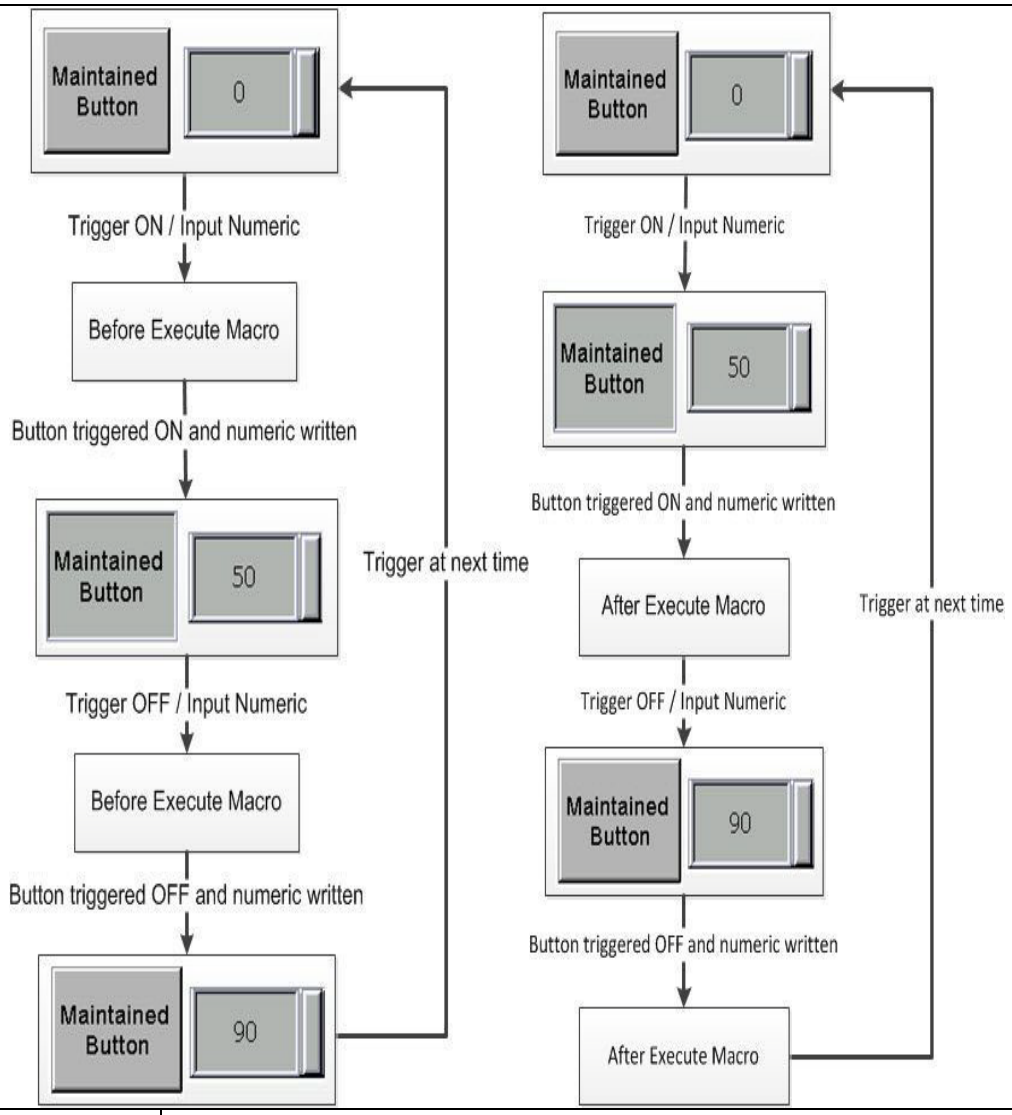
<table>
<tr>
<td></td>
<td>Stretch Mode</td>
<td>
➢ Stretch modes include: Fill, Keep Aspect Ratio, and Actual Size.
<table>
<tr><th>Fill</th><th>Keep Aspect Ratio</th><th>Actual Size</th></tr>
<tr><td>In the “Fill” mode, the selected picture will fill up the entire display area.</td><td>In the “Keep Aspect Ratio” mode, the selected picture will fit in the display area proportionally according to the picture ratio.</td><td>In the “Actual Size” mode, the picture will be displayed in its original size in the display area.</td></tr>
<tr><td> </td><td> </td><td> </td></tr>
</table>
➢ If “Process all state pictures” is selected, the system assumes that each element has multiple entries of state data, and some pictures may be unable to fill the entire display area. By selecting this item, users will not need to set individual pictures to save time from editing.


</td>
</tr>
<tr>
<td></td>
<td>Transparent Color</td>
<td>
➢ Users can set a color in the picture to transparent. In this case, by clicking the Transparent Color icon and then the orange part of the loom, the DOPSoft will omit all orange parts in the picture and turn them transparent; thus turning the foreground color transparent.


</td>
</tr>
</table>

<table>
<tr><td rowspan="3">Details</td><td>Interlock State</td><td rowspan="2">➢ Interlock Address allows users to operate an element from this particular address. It must be used along with Interlock State. If Interlock State is “OFF”, this means the interlock address is operable when the interlock state is “OFF”. In contrast, when Interlock State is “ON”, this means the interlock address is operable when the interlock state is “ON”.
➢ Examples of interlock address application are as follows:
1. First, create a button and set its address as “$8.0”. Next, set the original interlock address ($99.0) to “$8.0”.
2. To make Button $99.0 operable, users must press Button $8.0 first.</td></tr>
<tr><td>Interlock Address</td><td> 
</td></tr>
<tr><td>Invisible Address</td><td>➢ When Invisible Address is “ON”, the button element is hidden, and the corresponding function is disabled.
</td></tr>
</table>

		
	User Security Level	 ➢ Sets the user security level of element activities. Only users with equal or higher security level corresponding to the element can activate the element. ➢ After setting the user security level, when users activate the element, the password box will pop up and request users to input the password (the password can be changed from the password setup element, please see 5-7 Password Table).
	Enable Confirmation Box	➢ If Enable Confirmation Box is set to “YES”, the following dialog box will pop up after pressing the corresponding button as shown below: 
Coordinates	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
	Width and Height	➢ Sets element width and height.
Macro	➢ The before execute macro and after execute macro processes are diagrammed below:	



Before Execute Macro	➢ When users touch the button element, HMI will first run the commands in the corresponding macro pre-action of the button action. If the button state is not changed by means of touching button (using external controller commands or other macros), HMI will not run the corresponding macro commands.
After Execute Macro	➢ After users touch the button element, HMI will first run the button action pre-action the commands in the corresponding macro. If the button state is not changed by means of touching button (using external controller commands or other macros), HMI will not run the corresponding macro commands.

Contents

6-1 Meter (1) / Meter (2) / Meter (3).....3

Chapter 06 Meter

This chapter mainly describes the meter elements provided in the DOPSoft and how they are operated and configured.

◆ Meter Element Classification:

Meter		Meter (1)
		Meter (2)
		Meter (3)

Table 6-1-1 Meter Element Classification

◆ Meter Element Shared Properties

Meter Element	Read Address	Read Offset Address	Write Address	Target Value	Enable Range Numeric Entry	Target Value and Higher/Lower Limits as Variable	Style (Mark Count/Secondary Mark Count/Hand Color/Mark Color/ Scale Color/Border Color/ Lower Limit range Color/ Higher Limit range Color/ Style/ Foreground Color/ Background Color)	Settings (Data Type/Data Format/ Minimum Value Entry / Maximum Value Entry)
Meter (1)	◎	◎		◎	◎	◎	◎	◎
Meter (2)	◎	◎		◎	◎	◎	◎	◎
Meter (3)	◎	◎		◎	◎	◎	◎	◎

Table 6-1-2 Meter Element Shared Properties

6-1 Meter (1) / Meter (2) / Meter (3)

	Meter (1)
	Meter (2)
	Meter (3)

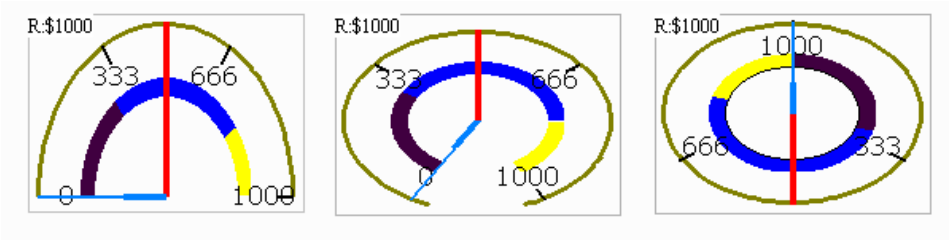
The DOPSoft provides users with 3 types of meters to display the quantitative value of the memory addresses they have configured, and if these values exceed the upper and lower limits. Users can define the memory address of the target value, higher limit value, and lower limit value of the meter, in order to enhance the flexibility of meter functions and meet user demands. Users can also define different colors for the lower limit, higher limit and target values, in order to clearly identity these values in the meter. Please refer to the example in Table 6-1-3 for details.

Examples of Meter (1) / Meter (2) / Meter (3)

Table 6-1-3 Examples of Meter Element Properties

Read Address

$1000



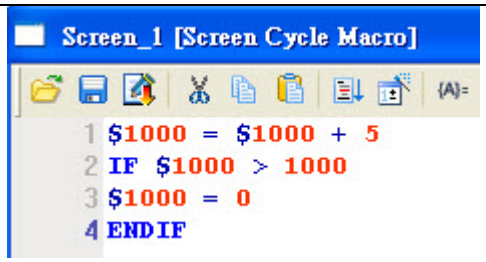
Properties

Data Type	Data Format	Minimum	Maximum
Word	Unsigned Decimal	0	1000

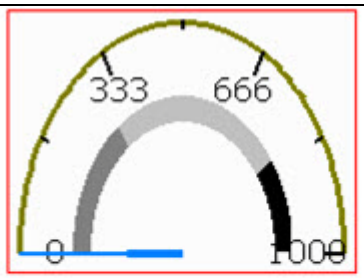
Enable Range Numeric Entry

Lower Limit Attribute		Higher Limit Attribute	
Lower Limit range Color	Lower Limit range Value	Higher Limit range Color	Higher Limit range Value
	300		800

Screen Cycle Macro



Meter Element Legend



Low Region Color | Foreground Color | High Region Color

Execution Results

By downloading the edited screen to the HMI, the HMI will run the programs in the screen cycle macro and display the results in the corresponding memory addresses defined in the meter elements in the accumulation process.

Double-click the Meter Element item to call out the following Element Properties page.

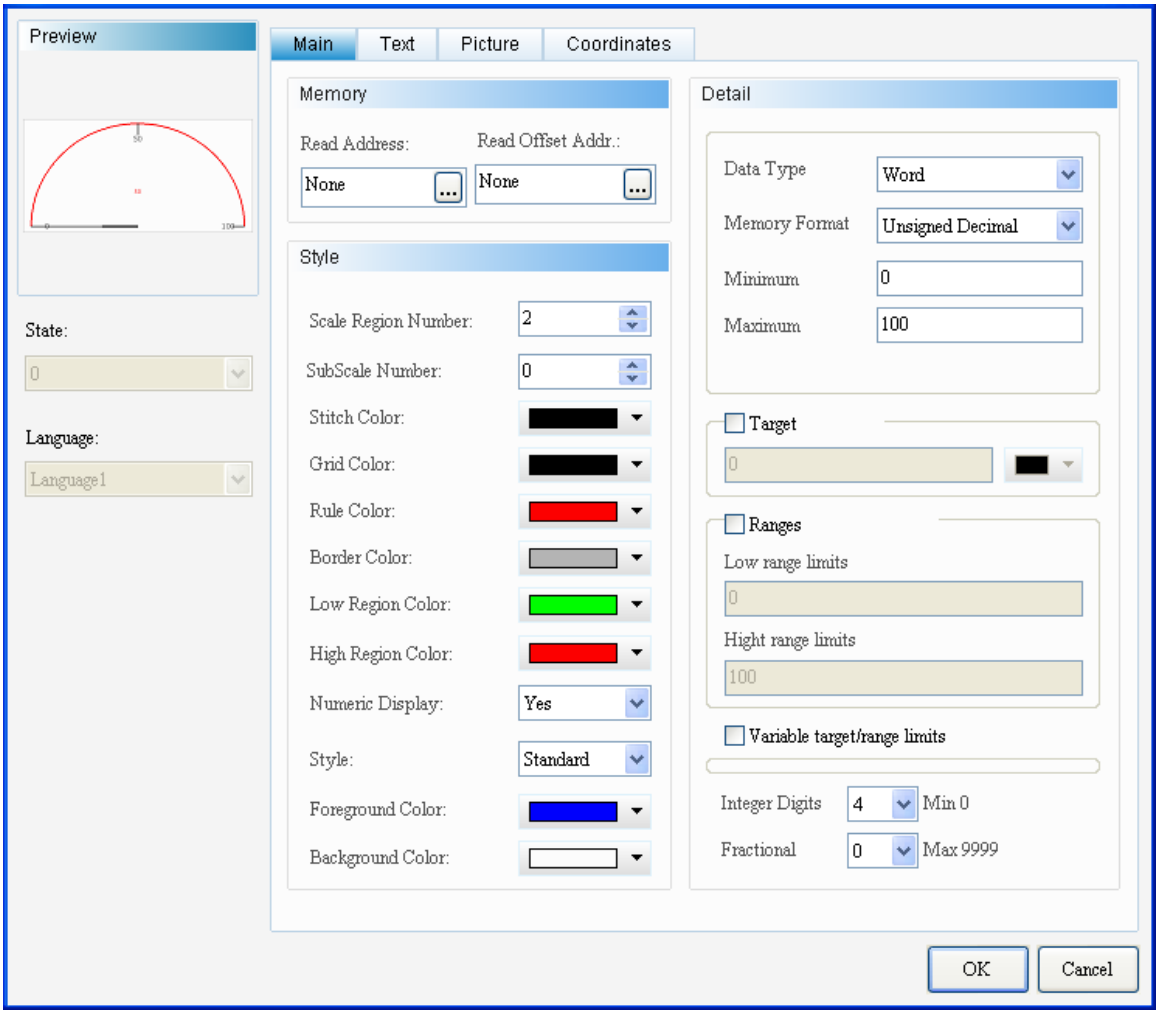


Figure 6-1-1 Meter Element Properties Page

Meter(1) / Meter(2) / Meter(3)	
Function Page	**Content Description**
Preview	Supports only multi-language display of data and does not support multi-state display.
Main	Sets read memory address, Style, foreground color, and background color. Sets mark count, secondary mark count, hand color, mark color, scale color, border color, lower limit range color, and higher limit range color. Sets element Data Type, Data Format, Minimum Value Entry, and Maximum Value Entry. Sets show/hide target value and target value color; enables range Numeric Entry, target value and higher/lower values as variable, integer digits, and decimal places.
Text	Sets text content to be displayed and text properties, including font type, font size, font color, display format, scaling, text alignment, and bold/italic/underline of font.
Coordinates	Sets the X-Y coordinate, width, and height of button elements.

Figure 6-1-4 Meter Function Page

◆ Main

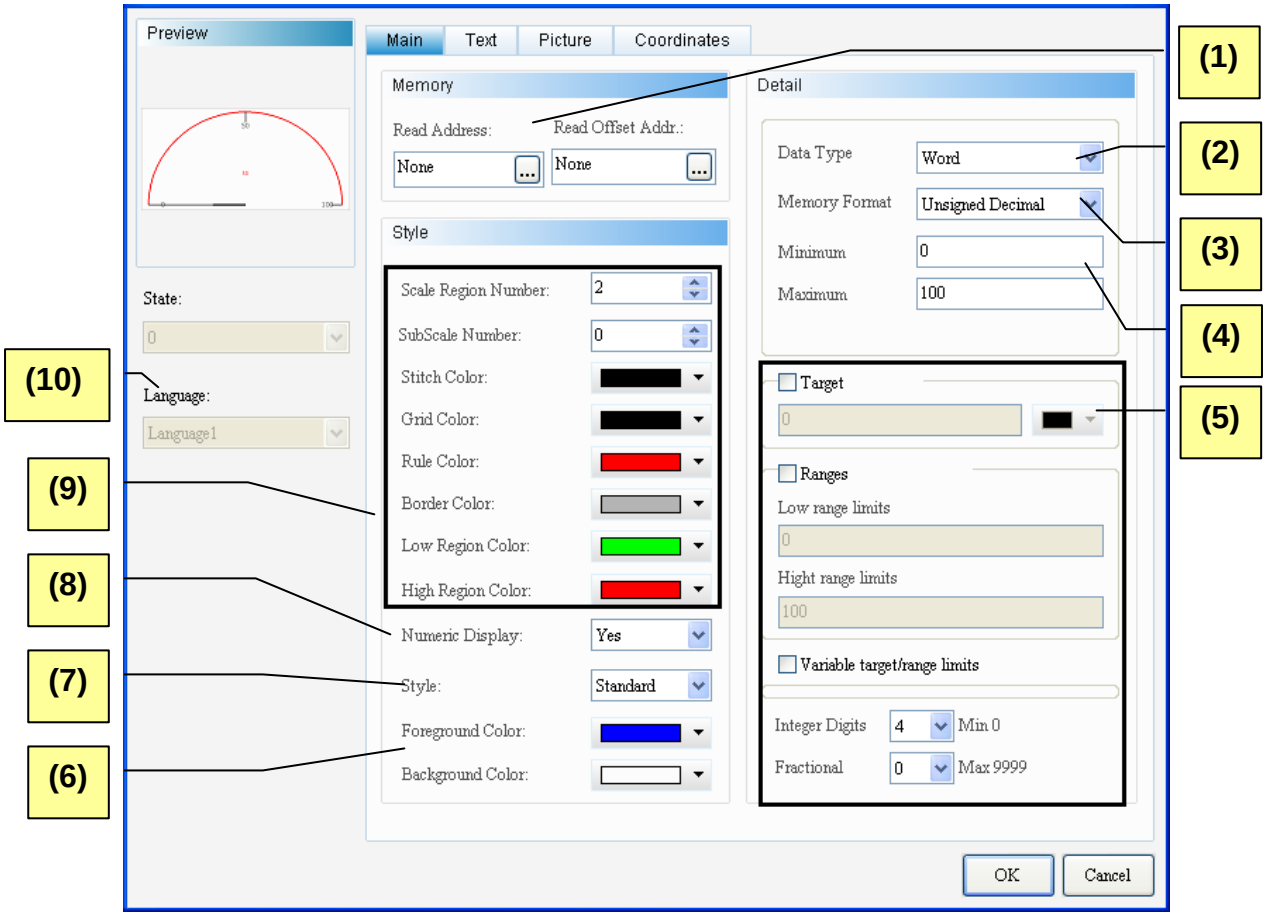
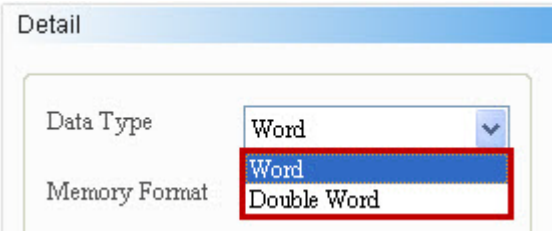
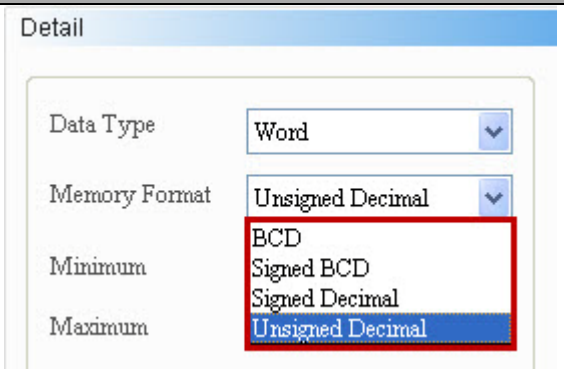
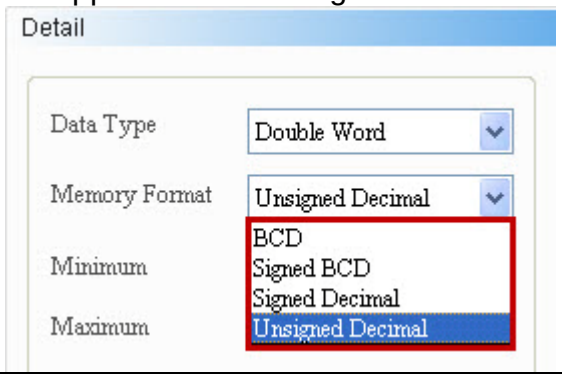


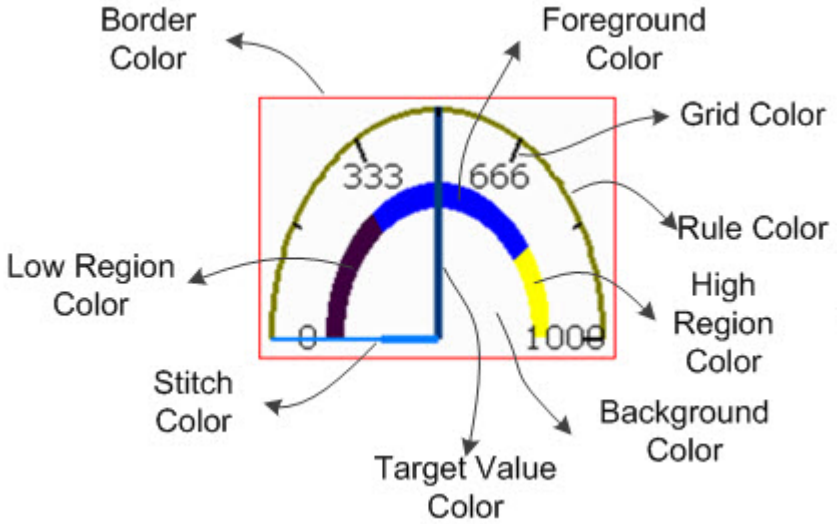
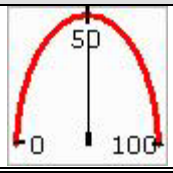
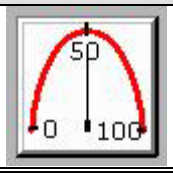
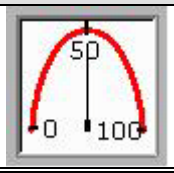
Figure 6-1-2 Meter Element Main Properties Page

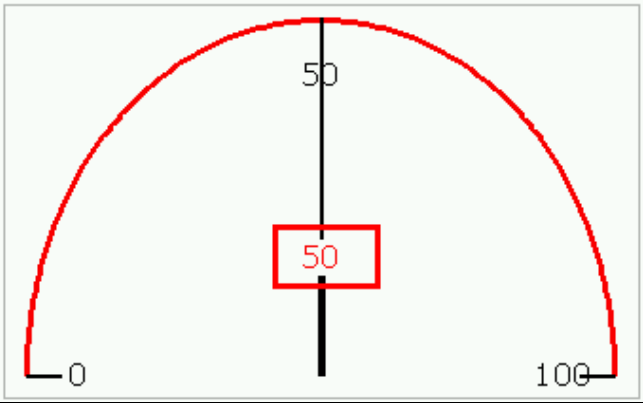
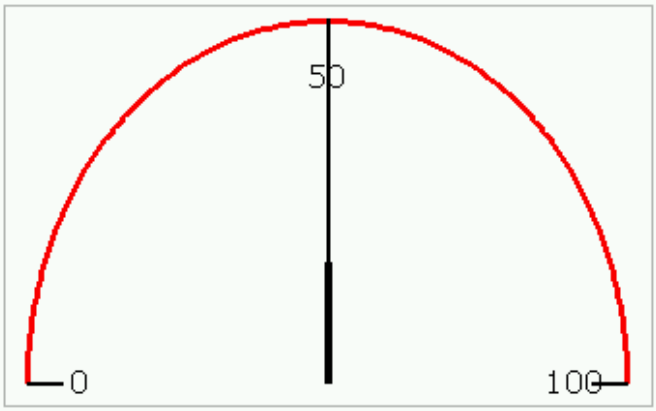
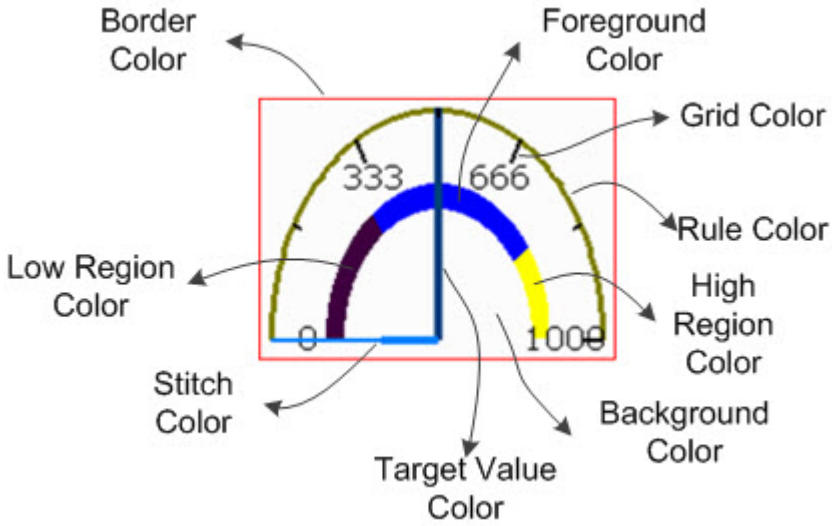
No.	Property	Function
(1)	Read Address	➢ Selects the address of internal memory or controller register. The memory type should be Word only. ➢ Selects Link Name or Style. Please refer to 5-1 Button of Chapter 05 for details.
	Read Offset Address	➢ Please refer to Appendix D Write and Read Offset Address.
(2)	Data Type	➢ Two options: Word and Double Word. 
(3)	Data Format	➢ "Word" supports the following Data Formats:

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td></td><td></td><td>


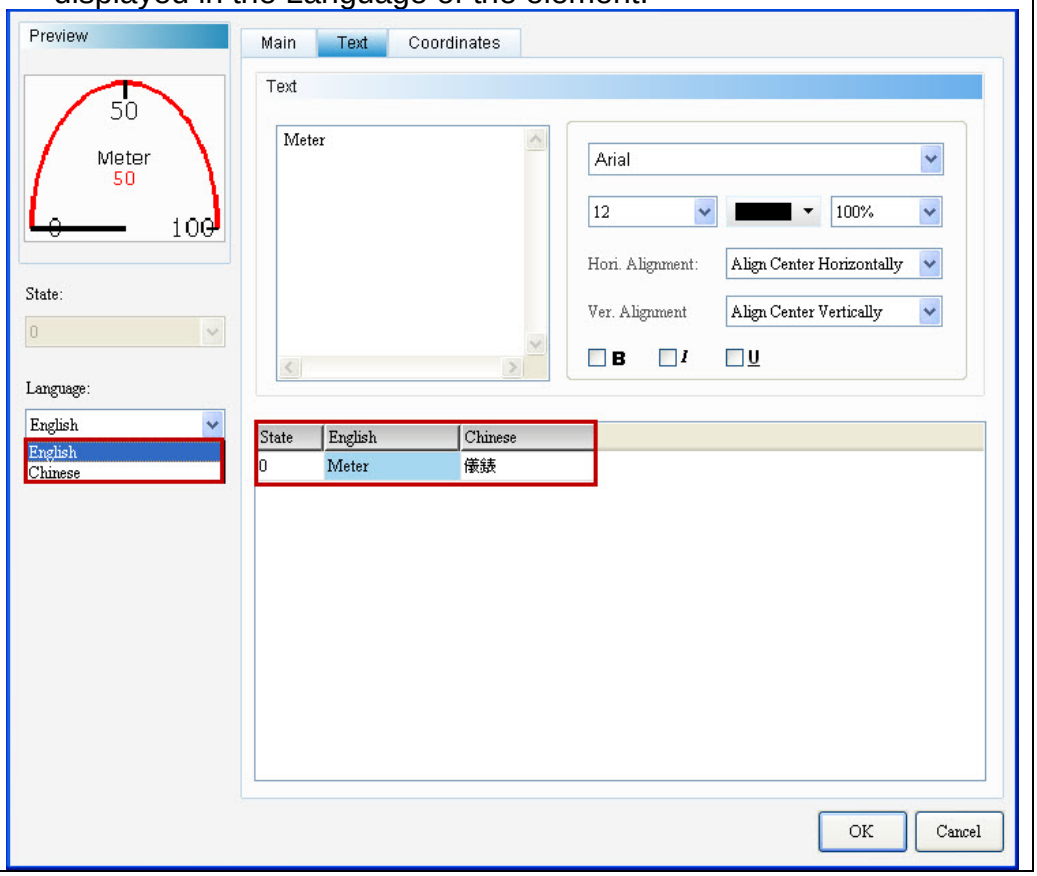
➢ “Double Word” supports the following Data Formats:


</td></tr>
<tr><td>(4)</td><td>Minimum/Maximum</td><td>
➢ The valid range of the Minimum and Maximum Value changes according to the Data Type and Data Format selected as shown in the following table:
<table>
<tr><th>Data Type</th><th>Data Format</th><th>Value Valid Range</th></tr>
<tr><td rowspan="4">Word</td><td>BCD</td><td>0~9999</td></tr>
<tr><td>Signed BCD</td><td>-999 ~ 9999</td></tr>
<tr><td>Signed Decimal</td><td>-32768~32767</td></tr>
<tr><td>Unsigned Decimal</td><td>0~65535</td></tr>
<tr><td rowspan="4">Double Word</td><td>BCD</td><td>0~99999999</td></tr>
<tr><td>Signed BCD</td><td>-9999999 ~ 99999999</td></tr>
<tr><td>Signed Decimal</td><td>-2147483648~2147483647</td></tr>
<tr><td>Unsigned Decimal</td><td>0~4294967295</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td rowspan="5">(5)</td><td rowspan="5">Display Format</td><td>
<table>
<tr><td>Target Display</td><td>If the “Target Value and Higher/Lower Limit Values as Variable” item is not selected, users can only input a constant value to restrict the target display value of meters. Users can also set the display color.</td></tr>
<tr><td>Enable Range Numeric Entry</td><td>“Enable Range Numeric Entry” includes the value of the lower and higher limits. Like the case in Target Display, if the “Target Value and Higher/Lower Limit Values as Variable” item is not selected, users can only input a constant value in the lower and higher limits to restrict the value of the lower and higher limits of meters.</td></tr>
<tr><td>Target Value and Higher/Lower Limit Values as Variable</td><td>By selecting this item, users can define the display value of the target value, lower higher limit value, and higher limit value dynamically controlled by memory address.</td></tr>
<tr><td>Integer Digits</td><td rowspan="2">Users can define the number of digits for integers and the places of decimals to be displayed in meters.</td></tr>
<tr><td>Decimal Places</td></tr>
</table>
</td></tr>
<tr><td>(6)</td><td>Foreground and Background Colors</td><td>➢ Sets the foreground and background colors of elements.
 
</td></tr>
<tr><td>(7)</td><td>Style</td><td>➢ Styles include Standard, Raised, and Sunken. Users can change the appearance display of elements.
<table>
<tr><th>Standard</th><th>Raised</th><th>Sunken</th></tr>
<tr><td> 
</td><td> 
</td><td> 
</td></tr>
</table>
</td></tr>
<tr><td>(8)</td><td>Numeric Display</td><td>➢ This function display current value of meter.</td></tr>
</table>

No.	Property	Function
		Set Numeric Display to Yes 
		Set Numeric Display to No 
		➢
(9)	Type	

Mark Count	From 1 to 10 marks.
Secondary Mark Count	From 0 to 99 marks.
Hand Color	Users can define the color of the hand.
Mark Color	Users can define the color of the mark.
Scale Color	Users can define the color of the scale.
Border Color	Users can define the color of the border.
Lower Limit Range Color	Users can define the color of the lower limit range.
Higher Limit Range Color	Users can define the color of the higher limit range.

No.	Property	Function
(10)	Language	➢ When text data are defined, users can edit the text properties to be displayed in the Language of the element. 

◆ Text

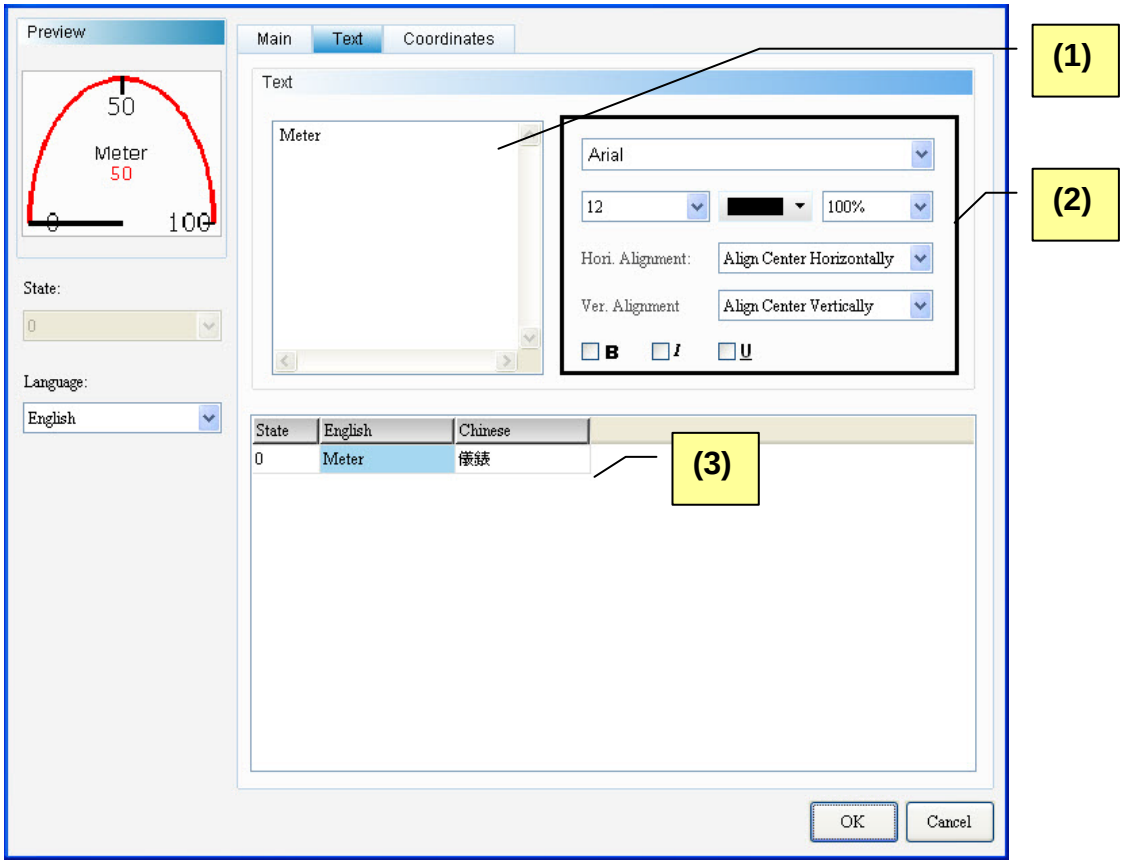
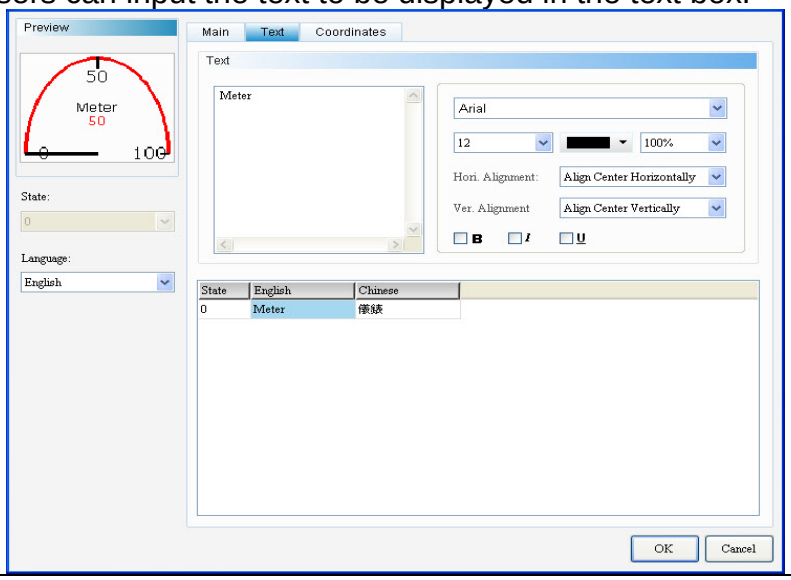


Figure 6-1-3 Meter Element Text Properties Page

No.	Property	Functions
(1)	Text	➢ Users can input the text to be displayed in the text box. 
(2)	Text Properties	➢ Sets text properties, including font type, font size, font color, scaling, text alignment, and bold/italic/underline of font. Please refer to the above figure for details about the results of text properties.
(3)	Multi-Language Text Data	➢ Users can add Multi-Language text data from the Multi-Language Text Page. As shown in the Text Properties Figure, users can input English text in the English field.

◆ Coordinates

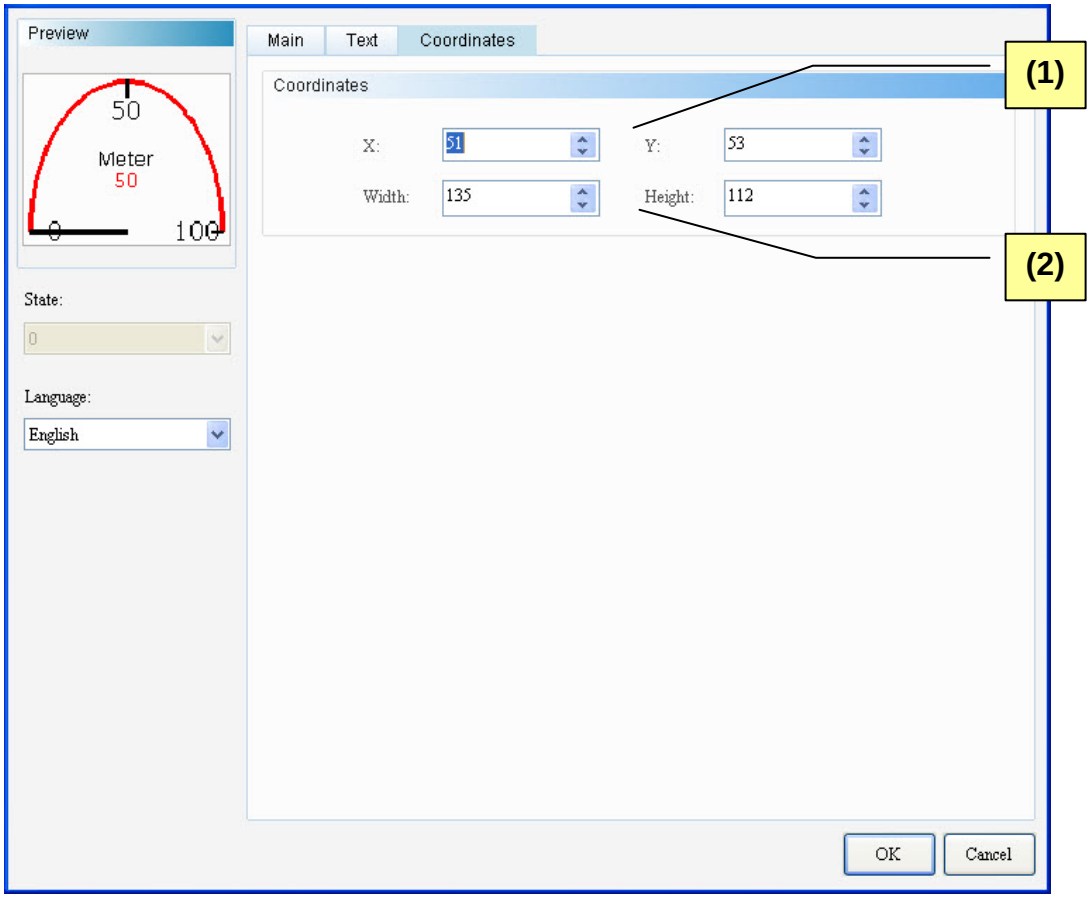


Table 6-1-4 Meter Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

Contents

7-1 Normal 3
7-2 Differential 15

Chapter 07 Bar

This chapter mainly describes the Bar elements provided in the DOPSoft and how they are operated and configured.

◆ Bar Element Classification

Bar		Normal
		Differential

Table 7-1-1 Bar Element Classification

◆ Bar Element Shared Properties

Bar Element	Read Address	Read Offset Address	Write Address	Target Value	Enable Range Numeric Entry	Target Value and Higher/Lower Limits (deviations) as Variable	Display Deviation	Style (Display Format/ Border Color/ Lower Limit Range Color/ Higher Limit Range Color/ Style/ Foreground Color/ Background Color)	Settings (Data Type/Data Format/ Minimum/ Maximum)
Normal	◎	◎		◎	◎	◎		◎	◎
Differential	◎	◎		◎		◎	◎	◎ (No lower/higher limit range colors	◎

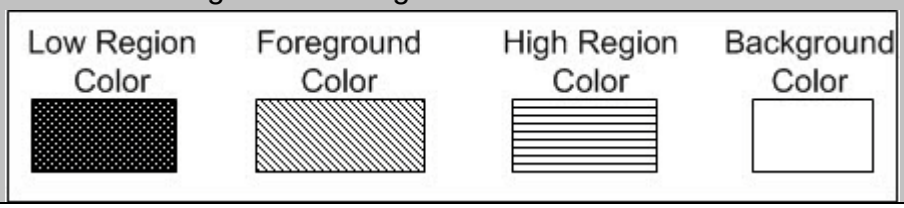
Table 7-1-2 Bar Element Shared Properties

7-1 Normal

	Normal

Normal display on the HMI the register values of the corresponding read memory addresses in ascending order. Like the meter elements, users can define the memory address of the target value, higher limit value, and lower limit value in the Normal, in order to enhance the flexibility of Normal functions and meet user demands. Users can also define different colors for the lower limit, higher limit and target values, in order to clearly identify these values in the Normal. Please refer to Table 7-1-3 below for details.

➢ Identify the lower and higher limit ranges of a Normal with different colors.



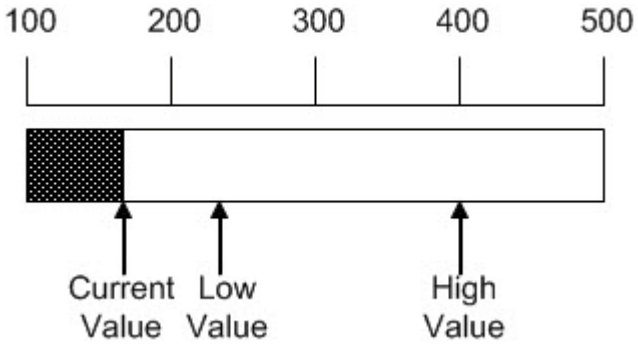
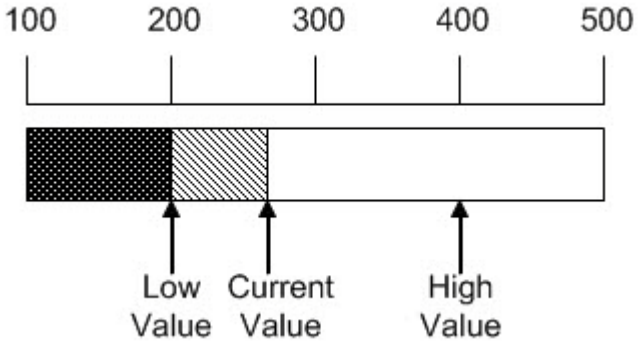
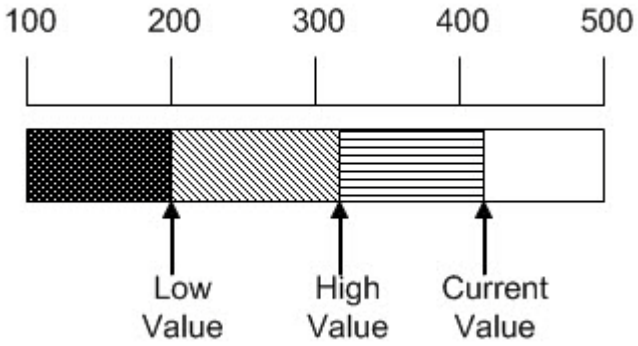
(1)	
(2)	
(3)	

Table 7-1-3 Normal Identification of Low/High Limit Ranges by Color

Examples of Normal

Table 7-1-4 Normal Element Examples

Read Address	$1000
Properties	

Data Type	Data Format	Minimum	Maximum
Word	Unsigned Decimal	0	1000

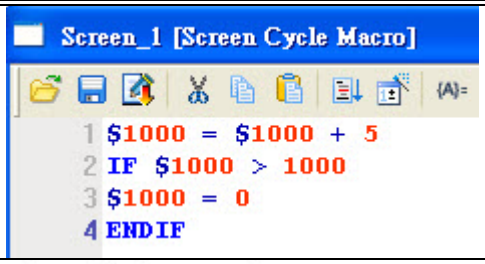
Target Numeric Display

Target Value Color	Target Value
	500

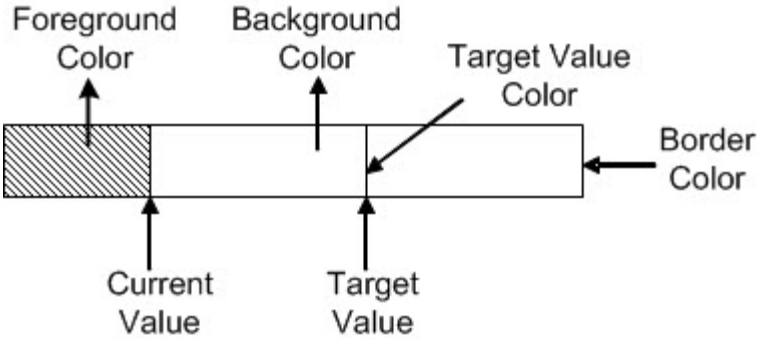
Enable Range Numeric Entry

Lower Limit Range Properties		Higher Limit Range Properties	
Lower Limit Range Color	Lower Limit Range Value	Higher Limit Range Color	Higher Limit Range Value
	300		800

Screen Cycle Macro

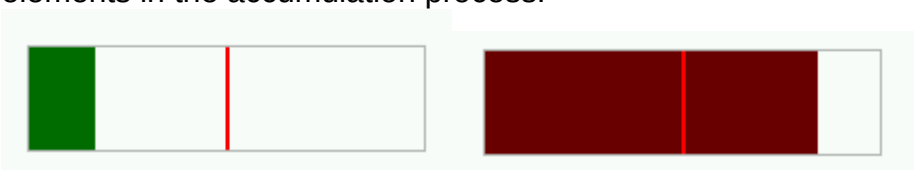


Legend of Normal Charge Elements



Execution Results

By downloading the edited screen to the HMI, the HMI will run the programs in the screen cycle macro and display the results in the corresponding memory addresses defined in the Normal elements in the accumulation process.



Green when value <300 Brown when value >800

Double-click the Normal Element item to call out the following Normal Element Properties page.

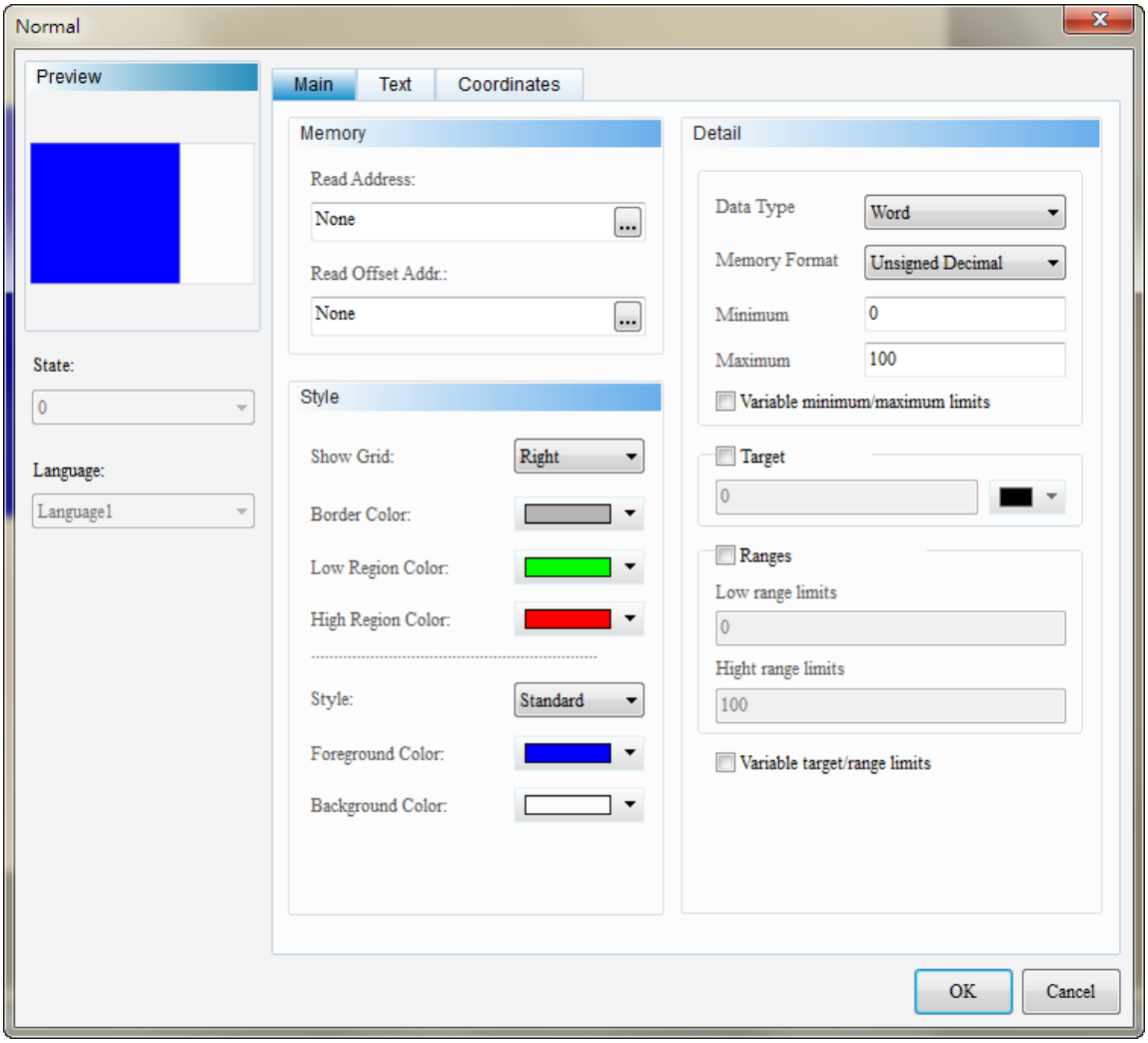


Figure 7-1-1 Normal Element Properties Page

Normal	
Function page	**Content Description**
Preview	Supports only Multi-Language display of data and does not support multi-state display.
Main	Sets read address, read offset address, Style, foreground color, and background color. Sets display format, frame color, lower limit range color, and higher limit range color. Sets element Data Type, Data Format, Minimum Value Entry, Maximum Value Entry and variable minimum and maximum limits. Sets show/hide target value and target value color; enables range Numeric Entry; and enables target value and higher/lower limit values as variables.
Text	Sets text content to be displayed and text properties, including font type, font size, font color, bold/italic/underline of font, scaling, and text alignment.
Coordinates	Sets the X-Y coordinate, width, and height of button elements.

Table 7-1-5 Normal Function Page

◆ Main

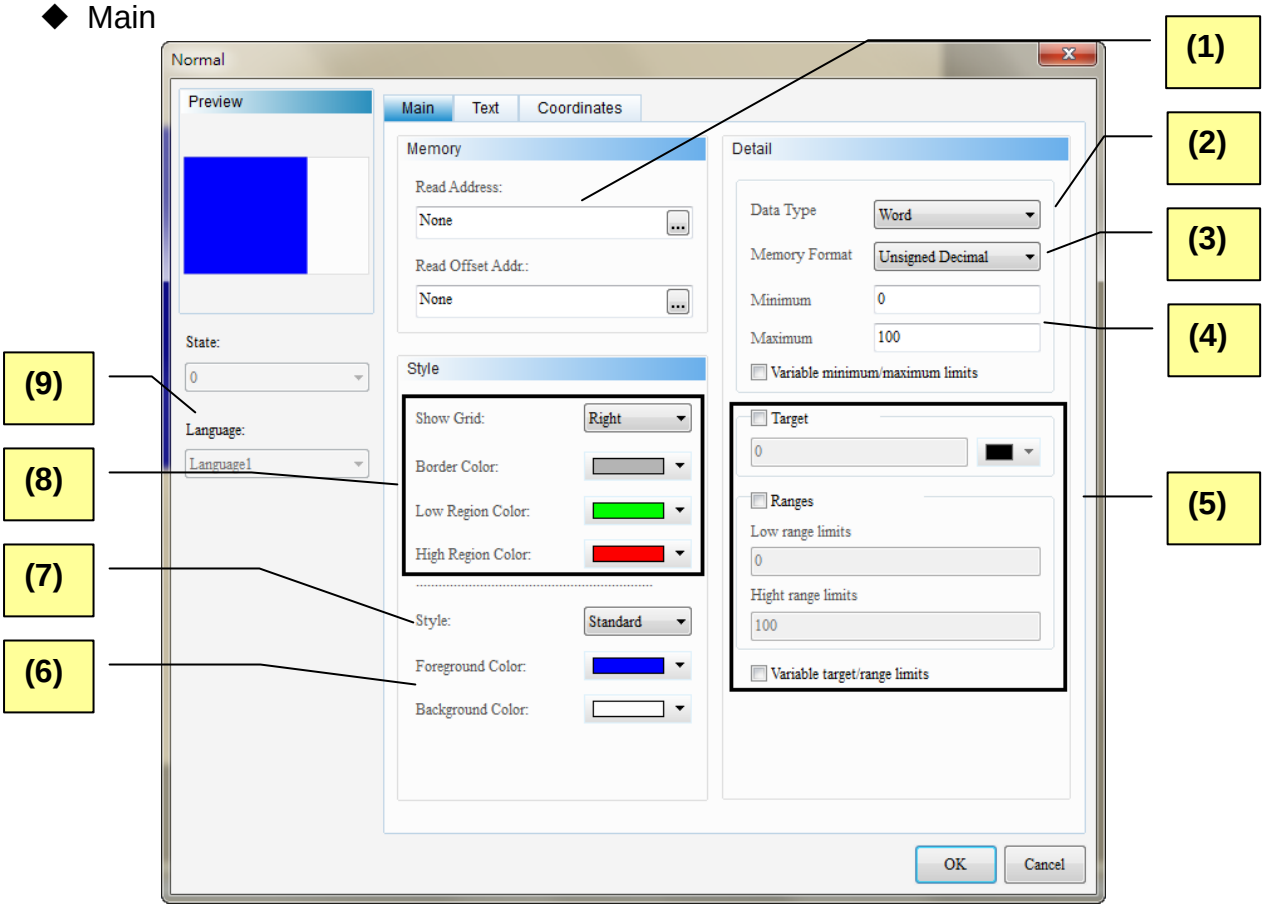
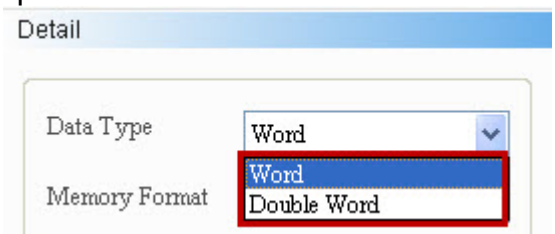
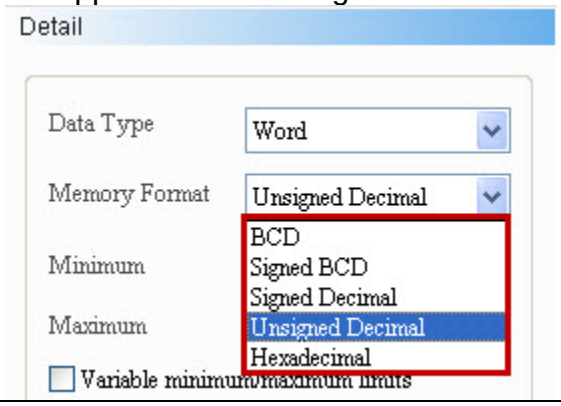
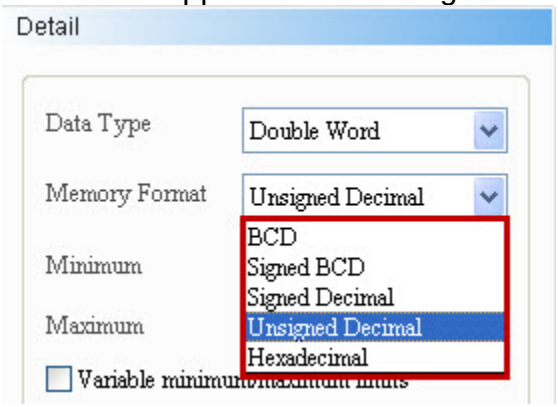
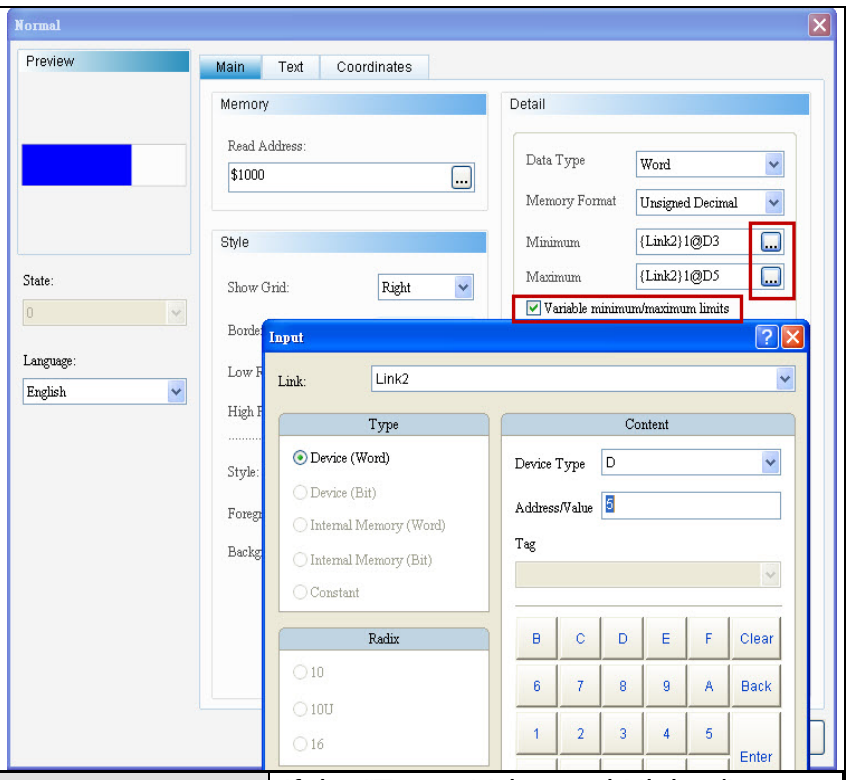
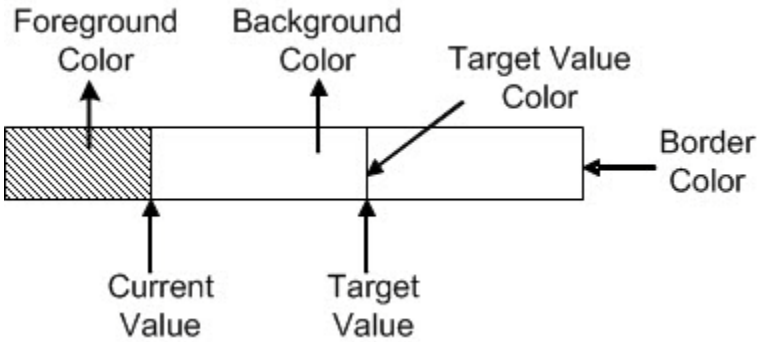
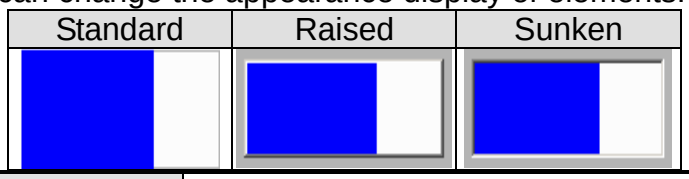
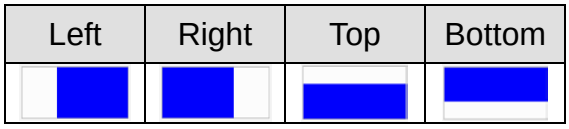
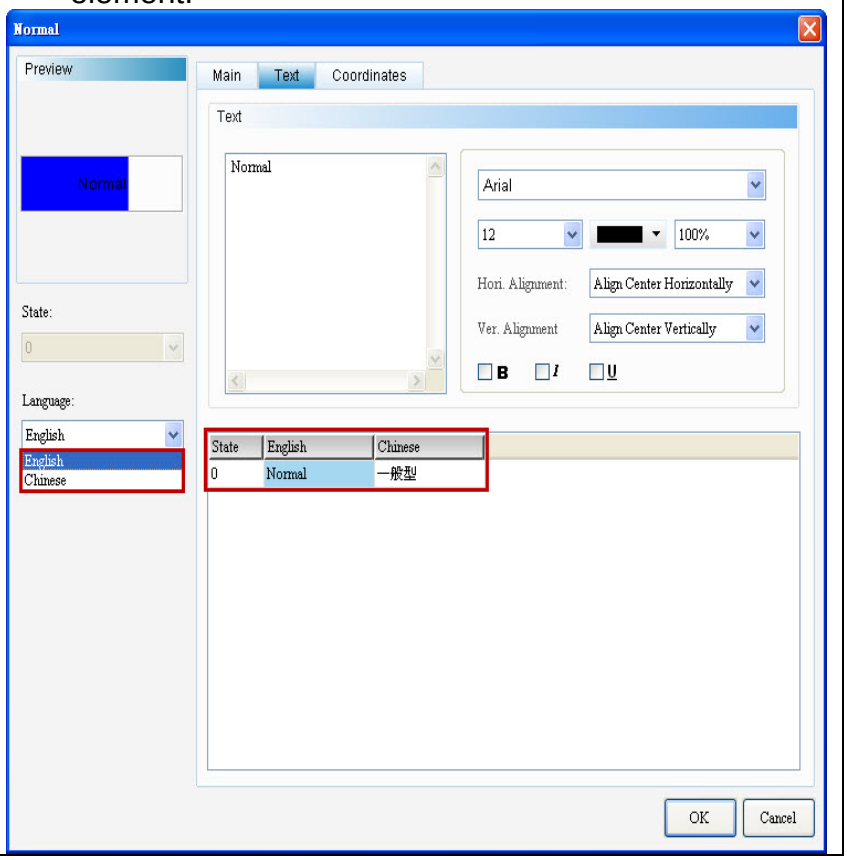


Figure 7-1-2 Normal Element General Properties Page

No.	Property	Function
(1)	Read Address	➢ Selects the address of internal memory or controller register. The memory type should be Word only.
	Read Offset Address	➢ Please refer to Appendix D Write and Read Offset Address.
(2)	Data Type	➢ Two options: Word and Double Word. 
(3)	Data Format	➢ "Word" supports the following Data Formats: 

<table>
<tr><td></td><td></td><td>➢ “Double Word” supports the following Data Formats:
 
</td></tr>
<tr><td rowspan="2">(4)</td><td>Minimum/ Maximum</td><td>➢ The valid range of the minimum and maximum Numeric Entry changes according to the Data Type and Data Format selected as shown in the following table:
<table>
<tr><th>Data Type</th><th>Data Format</th><th>Value Valid Range</th></tr>
<tr><td rowspan="5">Word</td><td>BCD</td><td>0~9999</td></tr>
<tr><td>Signed BCD</td><td>-999 ~ 9999</td></tr>
<tr><td>Signed Decimal</td><td>-32768~32767</td></tr>
<tr><td>Unsigned Decimal</td><td>0~65535</td></tr>
<tr><td>Hexadecimal</td><td>0~0xFFFF</td></tr>
<tr><td rowspan="5">Double Word</td><td>BCD</td><td>0~99999999</td></tr>
<tr><td>Signed BCD</td><td>-9999999 ~ 99999999</td></tr>
<tr><td>Signed Decimal</td><td>-2147483648~2147483647</td></tr>
<tr><td>Unsigned Decimal</td><td>0~4294697295</td></tr>
<tr><td>Hexadecimal</td><td>0~0xFFFFFFFF</td></tr>
</table></td></tr>
<tr><td>Variable Minimum/Maximum limits</td><td>➢ Enable this option then user could custom the minimum and maximum address and input wanted value to decide the minimum and maximum value.</td></tr>
</table>

<table>
<tr><td></td><td></td><td> 
</td></tr>
<tr><td>(5)</td><td>Display Format</td><td><table>
<tr><td>Target Display</td><td>If the “Target Value and Higher/Lower Limit Values as Variable” item is not selected, users can only input a constant to restrict the target display value of Normal. Users can also set the display color.</td></tr>
<tr><td>Enable Range Numeric Entry</td><td>“Enable Range Numeric Entry” includes the value of the lower and higher limits. Like the case in Target Display, if the “Target Value and Higher/Lower Limit Values as Variable” item is not selected, users can only input a constant in the lower and higher limits to restrict the value of the lower and higher limits of Normal.</td></tr>
<tr><td>Target Value and Higher/Lower Limit Values as Variable</td><td>By selecting this item, users can define the display value of the target value, lower higher limit value, and higher limit value dynamically controlled by memory address.</td></tr>
</table></td></tr>
<tr><td>(6)</td><td>Foreground and Background Colors</td><td>➢ Sets the foreground and background colors of elements.</td></tr>
</table>

		
(7)	Style	➢ Styles include Standard, Raised, and Sunken. Users can change the appearance display of elements. 
(8)	Style	Display Format:  Border Color: Users can define the color of the border. Lower Limit Range Color: Users can define the color of the lower limit range. Higher Limit Range Color: Users can define the color of the higher limit range.
(9)	Language	➢ When text data are defined, users can edit the text properties to be displayed in the Language of the element. 

◆ Text

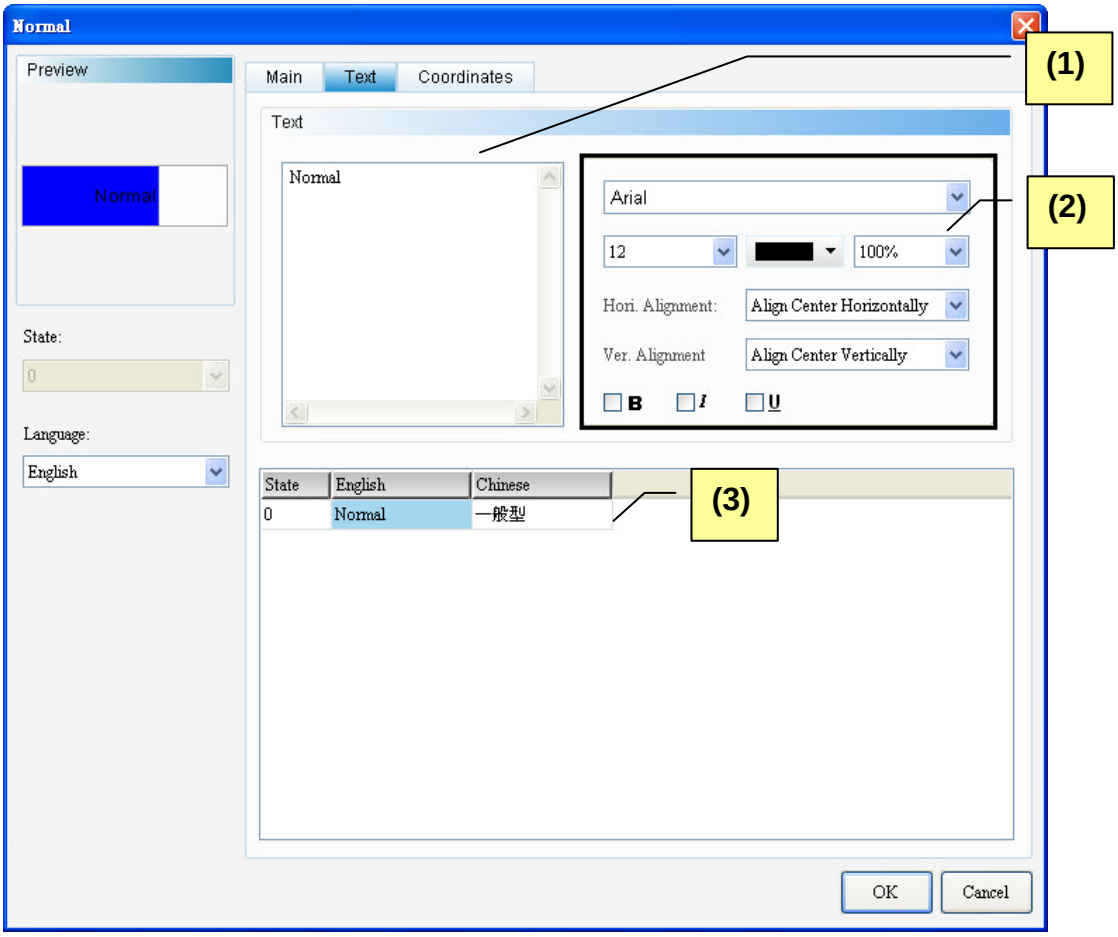
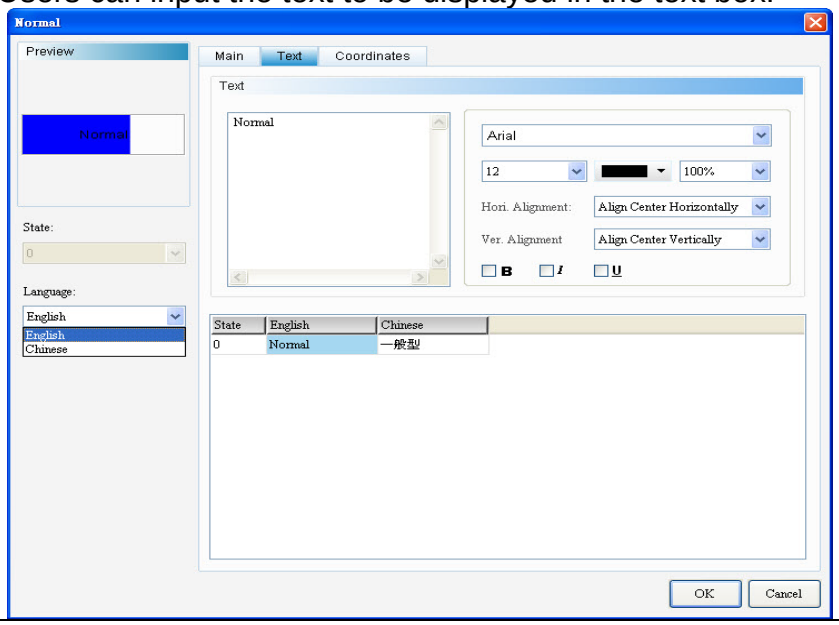


Figure 7-1-3 Normal Element Text Properties Page

No.	Property	Function
(1)	Text	➢ Users can input the text to be displayed in the text box. 
(2)	Text Properties	➢ Sets text properties, including font type, font size, font color, scaling, text alignment, and bold/italic/underline of font. Please refer to the above figure for details about the results of text

No.	Property	Function
		properties.
(3)	Multi-Language Text Data	➢ Users can add Multi-Language text data from the Multi-Language Text Page. As shown in the Text Properties Figure, users can input English text in the English field.

◆ Coordinates

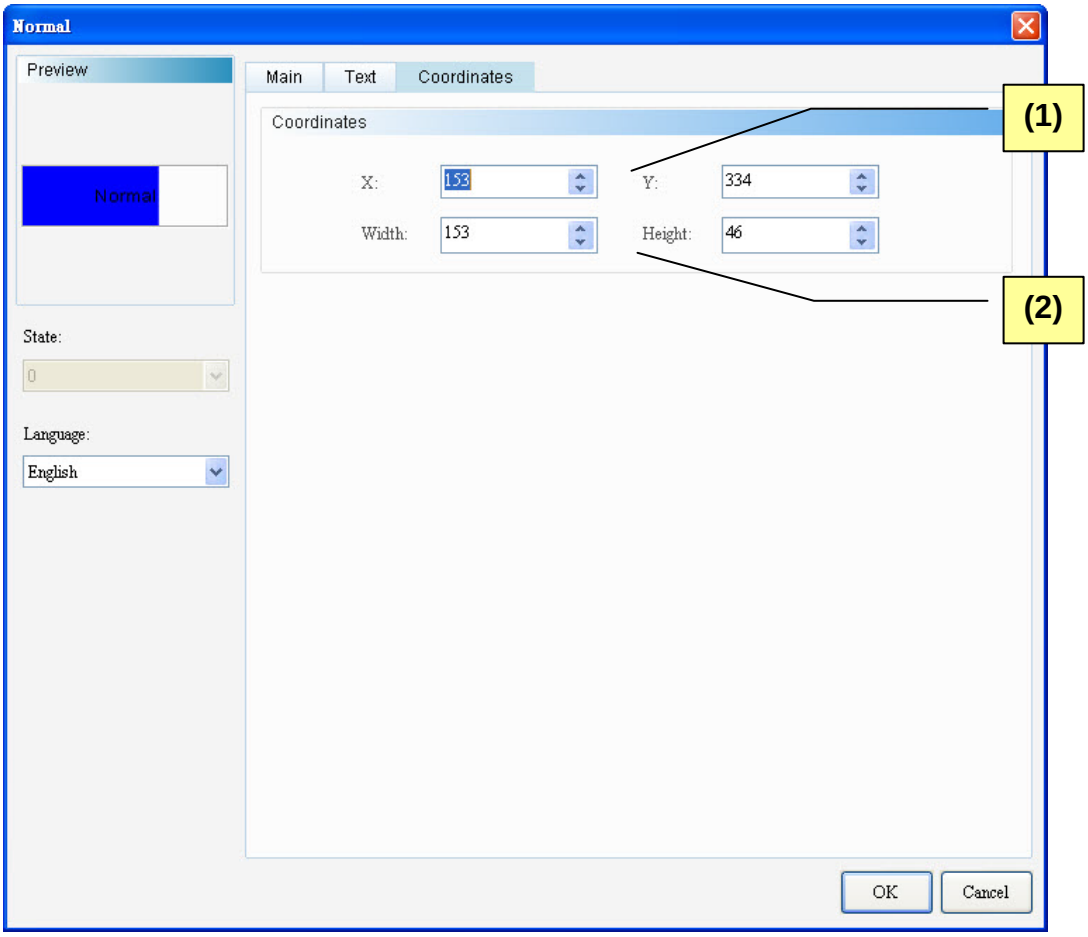


Figure 7-1-4 Normal Element Coordinates Properties Page

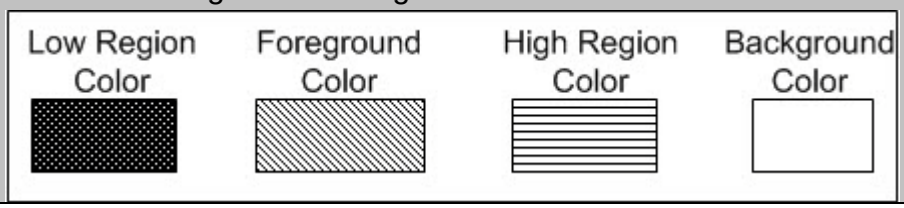
No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

7-2 Differential

	Differential

Differential display on the HMI the deviation value obtained by subtracting the values in the read memory address and the target value defined. Like the case of Normal elements, users can define the memory address of the target value, higher limit value, and lower limit value, in order to enhance the flexibility of Differential functions and meet the user demands as shown in Table 7-2-1 below.

➢ Identify the lower and higher limit ranges of a Differential with different colors.



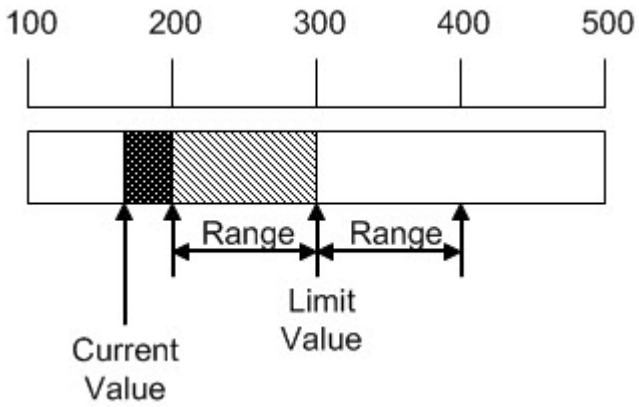
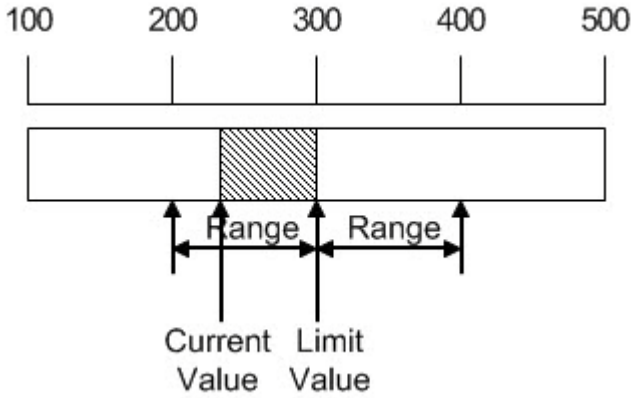
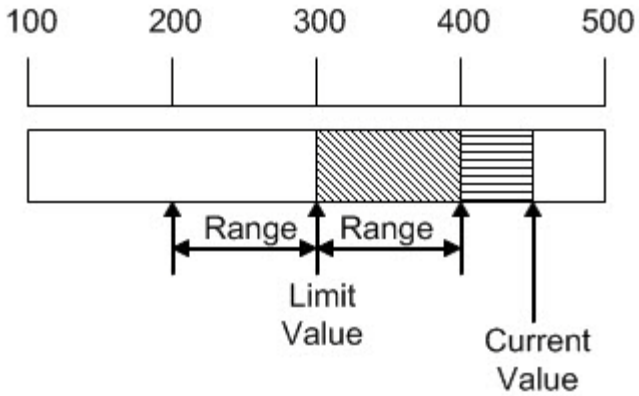
(1)	
(2)	
(3)	

Table 7-2-1 Differential Identification of Low/High Limit Ranges by Color

Element Examples of Differential

Figure 7-2-2 Differential Element Examples

Read Address

Differential Element		Numeric Entry Element	
Read Address	$444	Write Address	$444

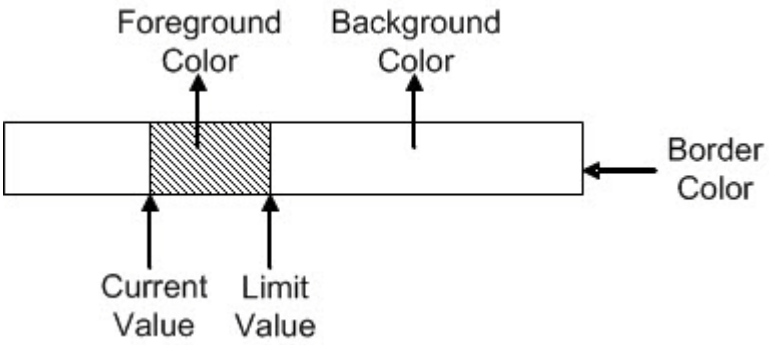
Properties

Data Type	Data Format	Minimum	Maximum
Word	Unsigned Decimal	0	100

Target Display

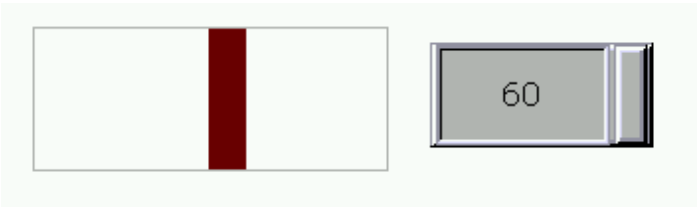
Deviation Color	Deviation Value	Target Value
	25	50

Legend of Differential



Execution Results

By downloading the edited screen to the HMI, run the Numeric Entry element. After inputting the values, the deviation will be displayed according to the Numeric Entry.

Brown red when the deviation is ±25.	
The foreground is blue when the deviation outranges ±25.	

Double-click the Differential Element item to call out the following Differential Element Properties page.

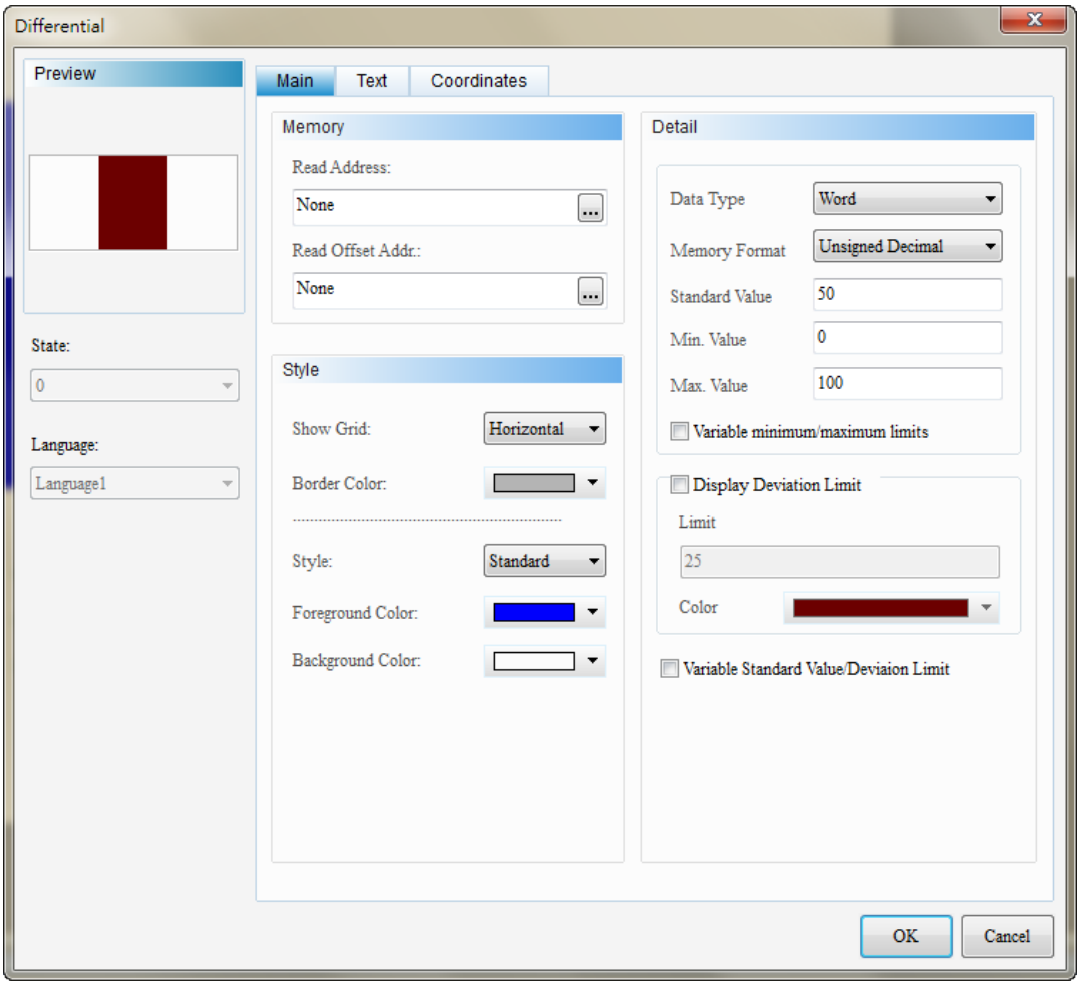


Table 7-2-1 Differential Element Properties

Differential	
Function page	**Content Description**
Preview	Supports only Multi-Language display of data and does not support multi-state display.
Main	Sets read memory address, read offset address, Style, foreground color, and background color. Sets display format and border color. Sets element Data Type, Data Format, Target Value, Minimum Value Entry, Maximum Value Entry and variable minimum and maximum limits. Sets show/hide deviation and deviation color; and enables target value and higher/lower limit values as variable.
Text	Sets text content to be displayed and text properties, including font type, font size, font color, bold/italic/underline of font, scaling, and text alignment.
Coordinates	Sets the X-Y coordinate, width, and height of button elements.

Table 7-2-3 Differential Function Page

◆ Main

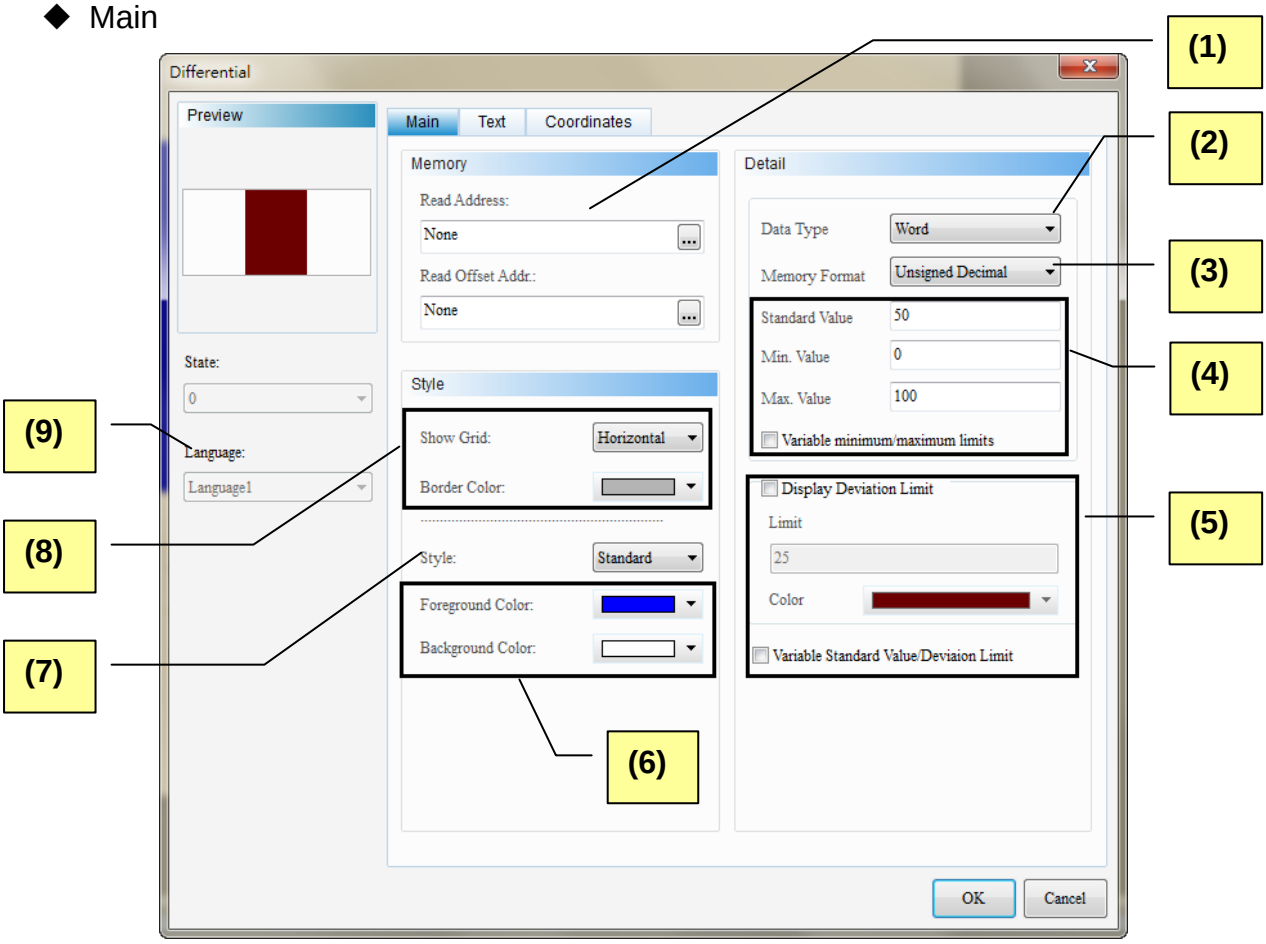
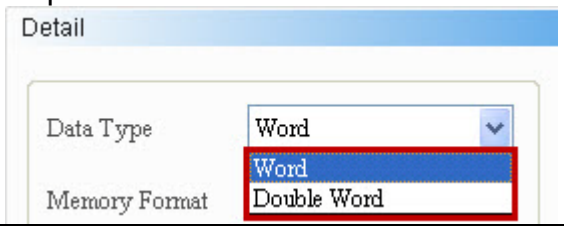
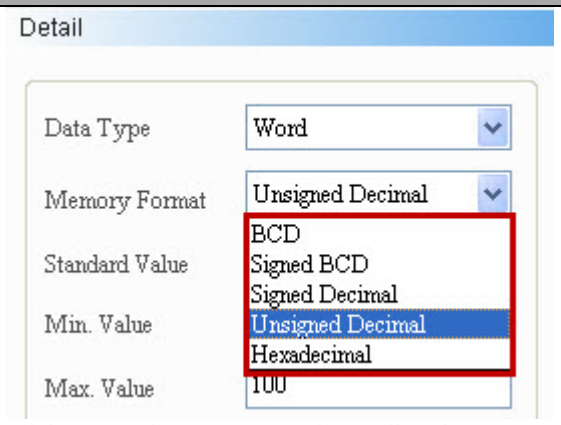
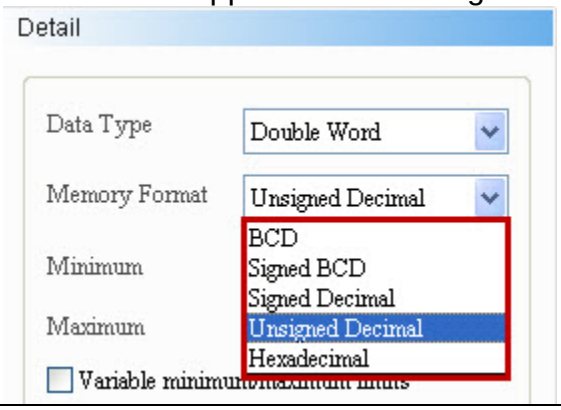


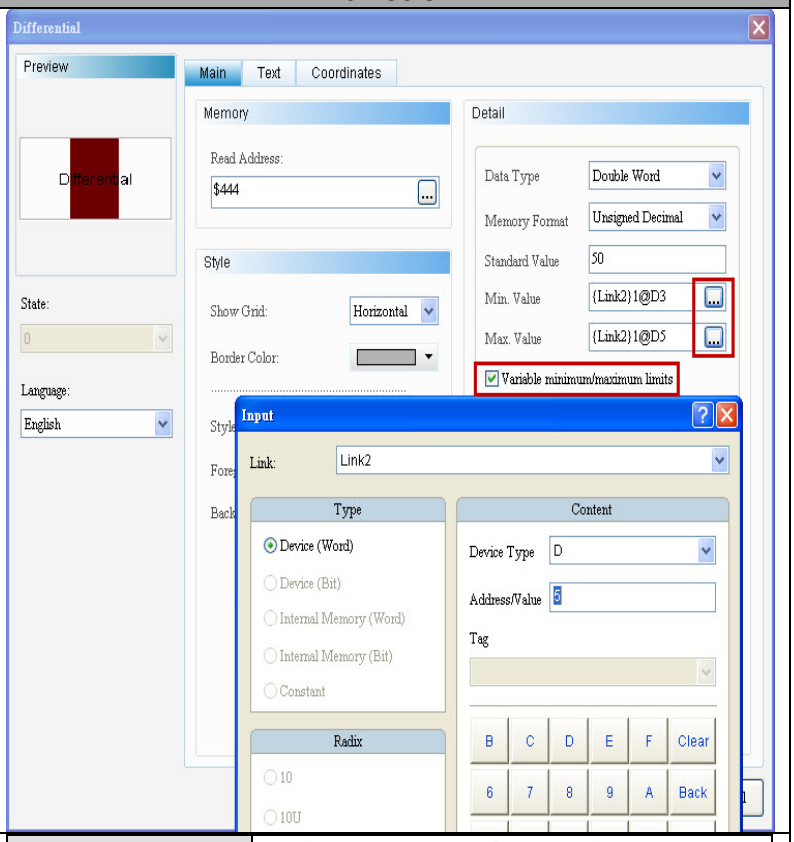
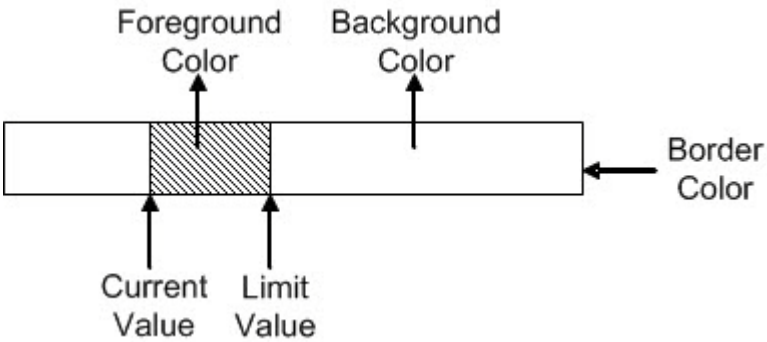
Figure 7-2-2 Differential Element Main Properties Page

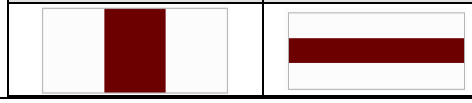
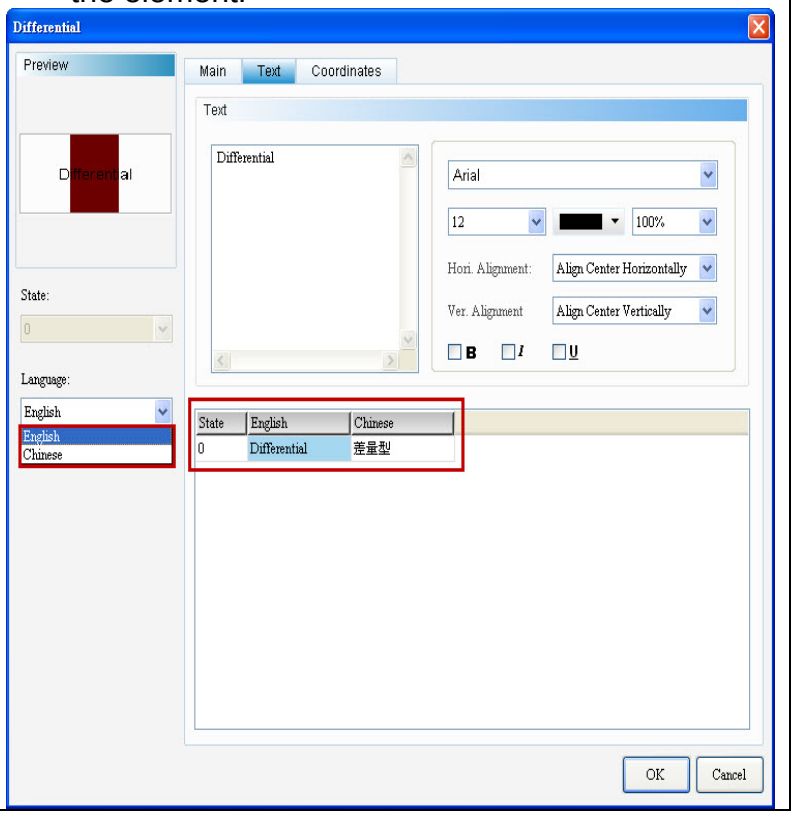
No.	Property	Function
(1)	Read Address	➢ Selects the address of internal memory or controller register. The memory type should be Word only.
	Read Offset Address	➢ Please refer to Appendix D Write and Read Offset Address.
(2)	Data Type	➢ Two options: Word and Double Word. 
(3)	Data Format	➢ "Word" supports the following formats:

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td></td><td></td><td>


➢ “Double Word” supports the following formats:


</td></tr>
<tr><td>(4)</td><td>Target Value, Minimum/ Maximum</td><td>
➢ If the “Target Value and Higher/Lower Limit Values as Variable” item is not selected, users can only input a constant to restrict the target value of the Differential.
➢ The valid range of the minimum and maximum Numeric Entry changes according to the Data Type and Data Format selected as shown in the following table:
<table>
<tr><th>Data Type</th><th>Data Format</th><th>Value Valid Range</th></tr>
<tr><td rowspan="5">Word</td><td>BCD</td><td>0~9999</td></tr>
<tr><td>Signed BCD</td><td>-999 ~ 9999</td></tr>
<tr><td>Signed Decimal</td><td>-3278~32767</td></tr>
<tr><td>Unsigned Decimal</td><td>0~65535</td></tr>
<tr><td>Hexadecimal</td><td>0~0xFFFF</td></tr>
<tr><td rowspan="5">Double Word</td><td>BCD</td><td>0~99999999</td></tr>
<tr><td>Signed BCD</td><td>-9999999 ~ 99999999</td></tr>
<tr><td>Signed Decimal</td><td>-2147483648~2147483647</td></tr>
<tr><td>Unsigned Decimal</td><td>0~4294697295</td></tr>
<tr><td>Hexadecimal</td><td>0~0xFFFFFFFF</td></tr>
</table>
</td></tr>
<tr><td></td><td>Variable Minimum/Maximum limits</td><td>➢ Enable this option then user could custom the minimum and maximum address and input wanted value to decide the minimum and maximum value.</td></tr>
</table>

No.	Property	Function
		
(5)	Display Deviation	**Deviation**: If the "Target Value and Higher/Lower Limit Values as Variable" item is not selected, users can only input a constant to restrict the deviation of the Differential. Alternatively, users can indicate the deviation by color. **Target Value and Higher/Lower Limit Values as Variable**: By selecting this item, users can define the display value of the target value, lower higher limit value, and higher limit value dynamically controlled by memory address.
(6)	Foreground and Background Colors	➢ Sets the foreground and background colors of elements. 
(7)	Style	➢ Styles include Standard, Raised, and Sunken. Users can change the appearance display of elements.

No.	Property	Function
		Standard / Raised / Sunken
(8)	Style	Display Format: Horizontal / Vertical  Border Color: Users can define the border color.
(9)	Language	➢ When text data are defined, users can edit the text properties to be displayed in the Language of the element. 

◆ Text

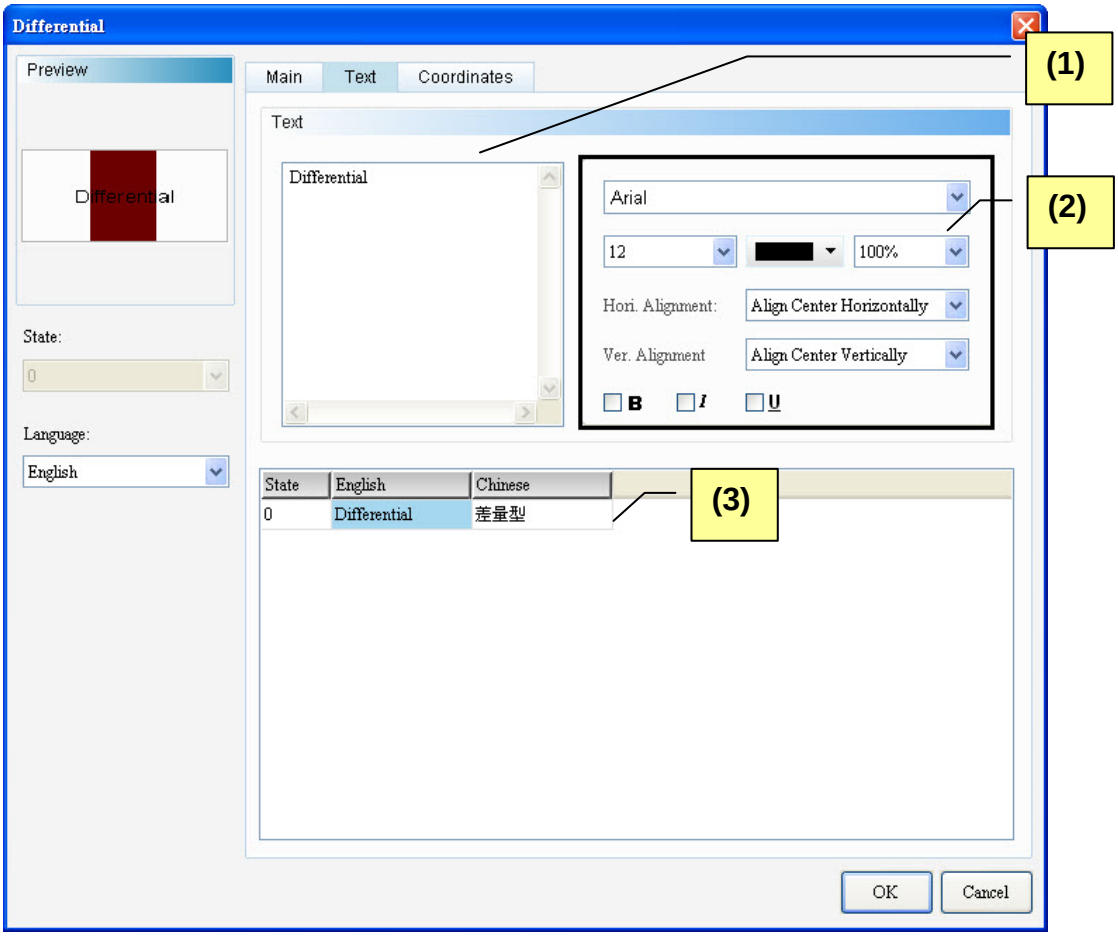
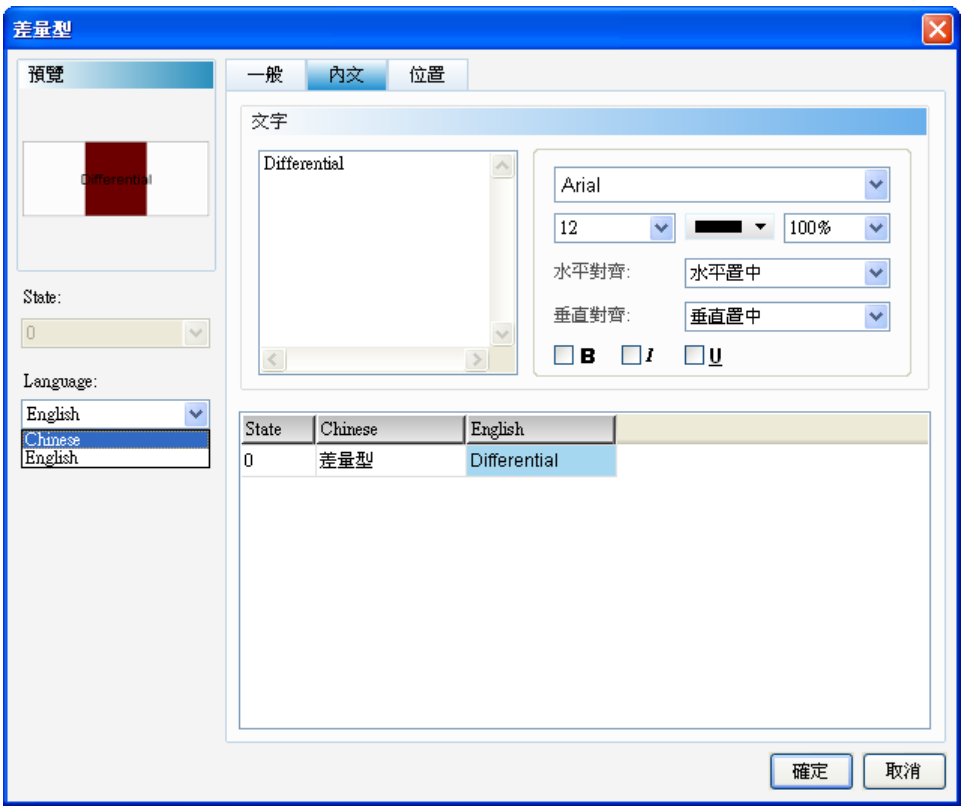


Figure 7-2-3 Differential Element Text Properties Page

No.	Property	Function
(1)	Text	➢ Users can input the text to be displayed in the text box. 
(2)	Text Properties	➢ Sets text properties, including font type, font size, font color, scaling, text alignment, and bold/italic/underline of font. Please refer to the above figure for details about the results of text properties.
(3)	Multi-Language Text Data	➢ Users can add Multi-Language text data from the Multi-Language Text Page. As shown in the Text Properties Figure, users can input English text in the English field.

◆ Coordinates

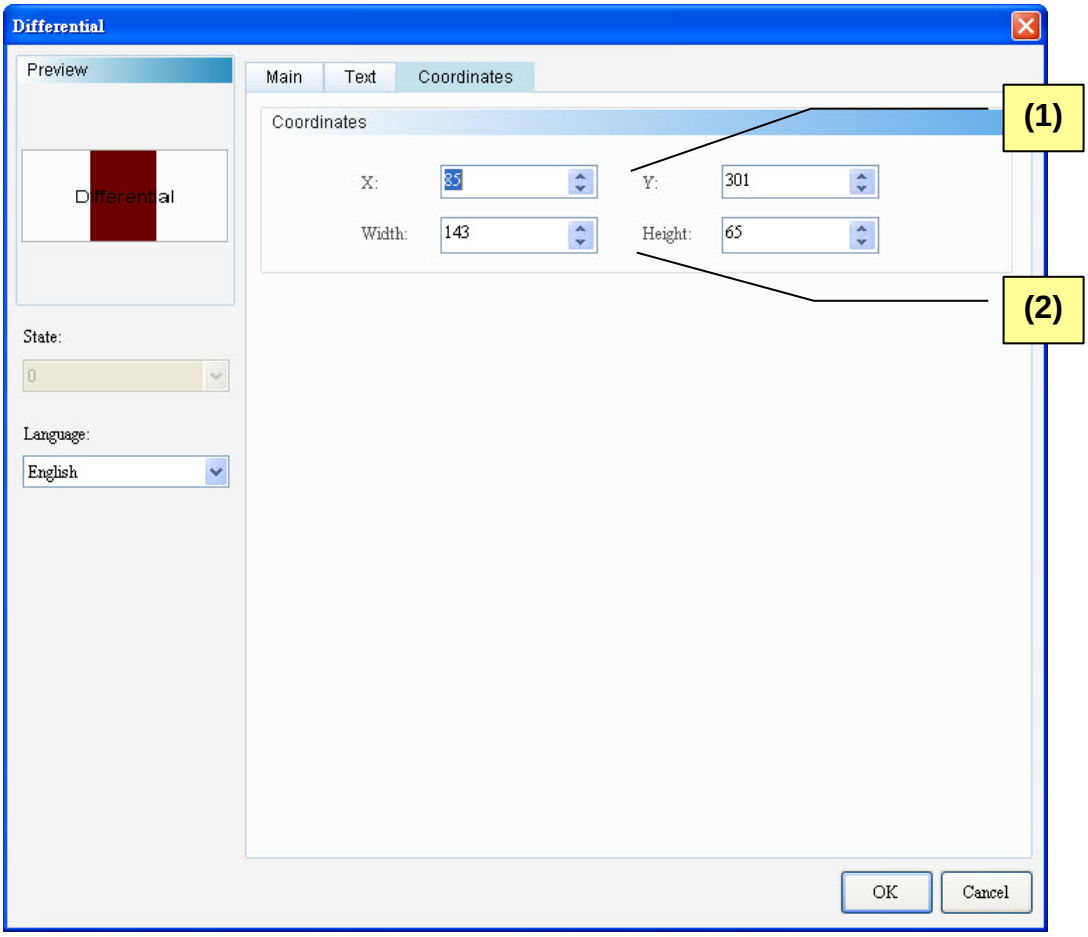


Figure 7-2-4 Differential Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

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Chapter 08 Pipe

This chapter mainly describes the Pipe elements provided in the DOPSoft and how they are operated and configured.

◆ Pipe Element Classification

Pipe		Pipe (1)
		Pipe (2)
		Pipe (3)
		Pipe (4)
		Pipe (5)
		Pipe (6)
		Pipe (7)

Table 8-1-1 Pipe Element Classification

◆ Pipe Element Shared Properties

Pipe Element	Read Address	Read Offset Address	Write Address	Target Value	Enable Range Numeric Entry	Target Value and Higher/ Lower Limits as Variable	Target Display	Style (Level Color/Cylinder Color/Lower Limit Range Color/ Higher Limit Range Color/ Element Type)	Settings (Data Type/Data Format/ Minimum Numeric Entry/ Maximum Numeric Entry)	Pipe Diameter	Variable Color	Flowing Cursor Color
Pipe (1)	◎	◎		◎	◎	◎	◎	◎	◎			
Pipe (2)	◎	◎		◎	◎	◎	◎	◎	◎			
Pipe (3)										◎		
Pipe (4)								◎ (Element Type Only)		◎		
Pipe (5)								◎ (Element Type Only)		◎		
Pipe (6)	◎	◎								◎	◎	◎
Pipe (7)	◎	◎								◎	◎	◎

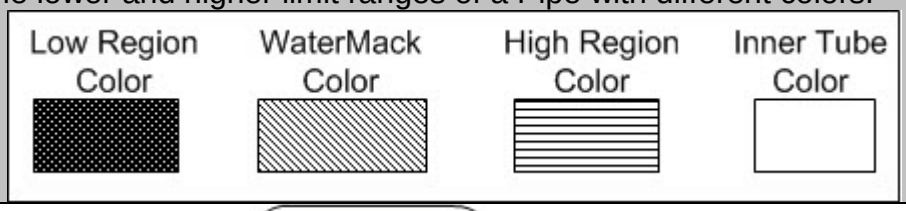
Table 8-1-2 Pipe Element Shared Properties

8-1 Pipe (1) / Pipe (2)

	Pipe (1)
	Pipe (2)

Shape is the only difference between Pipe (1) and Pipe (2), and all other functions are the same. The following introduces Pipe (1). The value of the register corresponding to the read memory of the Pipe will be displayed on the Pipe according to the target value, lower limit value and higher limit value defined by users. The elements of Pipe (1) are the same as that of the bar chart. Users can define the memory address of the target value, higher limit value, and lower limit value of the Pipe, in order to enhance the flexibility of Pipe functions and meet user demands as shown in Table 8-1-3 below. Users can also define different colors for the lower limit, higher limit and target values, in order to clearly identity these values in the Pipe.

➢ Identify the lower and higher limit ranges of a Pipe with different colors.



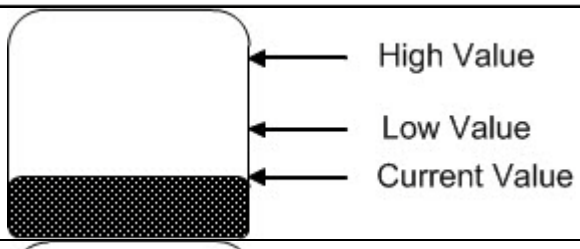
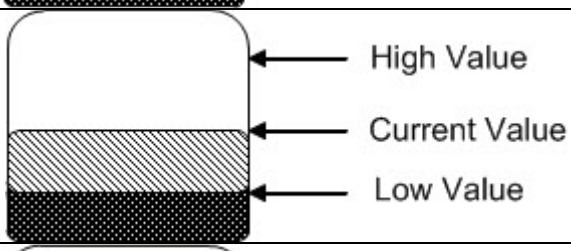
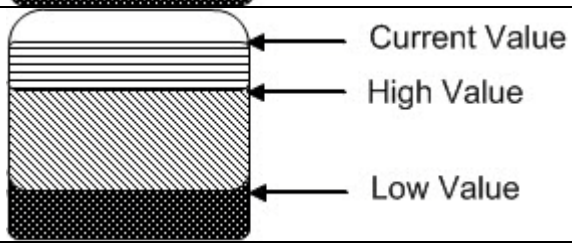
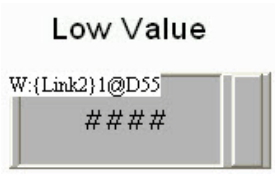
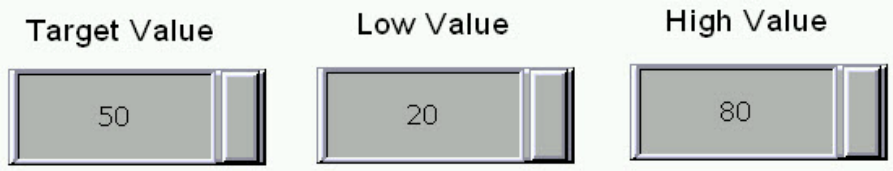
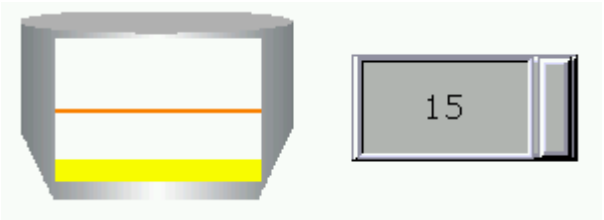
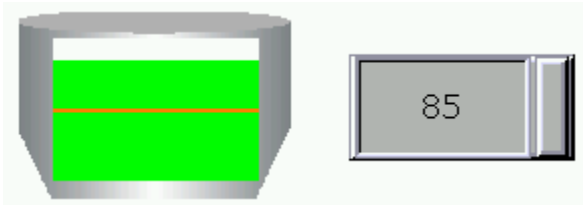
(1)	
(2)	
(3)	

Table 8-1-3 Pipe (1)/Pipe (2) Identification of Low/High Limit Ranges by Color

Examples of Pipe (1)

Table 8-1-3 Pipe (1) Element Examples

Read Address	**Pipe (1) Element**		**Numeric Entry Element**	
	Read Address	$444	Write Address	$444
Properties	**Data Type**	**Data Format**	**Minimum**	**Maximum**
	Word	Unsigned Decimal	0	100
Target Value and Higher/Lower Limit Values as Variable	**Numeric Entry Element**		**Numeric Entry Element**		**Numeric Entry Element**	
	Write Memory Address	{Link2}1 @D50	Write Memory Address	{Link2}1 @D55	Write Memory Address	{Link2}1 @D65
						
Target Numeric Display	**Target Value Color**		**Target Value**			
			{Link2}1@D50			
Enable Range Numeric Entry	**Lower Limit Value Properties**		**Higher Limit Value Properties**	
	Lower Limit Range Color	Lower Limit Range Value	Higher Limit Range Color	Higher Limit Range Value
		{Link2}1@D55		{Link2}1@D65
Execution Results	Target Value	Low Limit Value	High Limit Value	
				
	Target Value	➢ Input “50” as the target value, and select “Orange” as the target value color. 		

Examples of Pipe (1) Table 8-1-3 Pipe (1) Element Examples		
	Low Limit Value	➢ Numeric Entry “15”, smaller than the lower limit value of “20”, and select “Yellow” as the lower limit value color. 
	High Limit Value	➢ Numeric Entry “85”, greater than the upper limit value of “80”, and select “Green” as the upper limit value color. 

Double-click the Pipe (1) Element item to call out the following Pipe (1) Element Properties page.

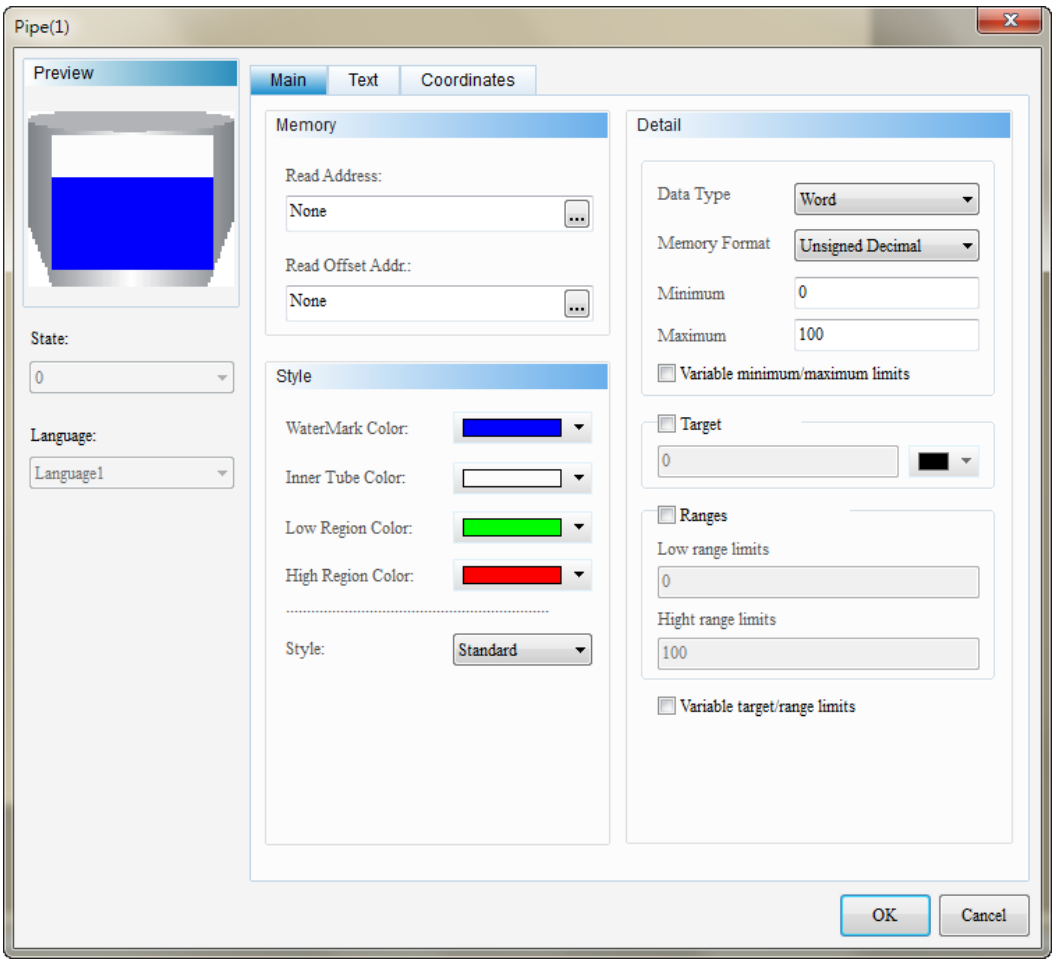


Figure 8-1-1 Pipe (1) Element Properties

Pipe (1)	
Function Page	**Content Description**
Preview	Supports only multilingual display of data and does not support multi-state display.
Main	Sets read address, read offset address and element type. Sets level color, cylinder color, lower limit range color, and higher limit range color. Sets element Data Type, Data Format, minimum Numeric Entry, maximum Numeric Entry and variable minimum and maximum limits. Sets show/hide target value and target value color; enables the range Numeric Entry; and enables target value and higher/lower limit values as variable.
Text	Sets text content to be displayed and text properties, including font type, font size, font color, bold/italic/underline of font, scaling, and text alignment.
Coordinates	Sets the X-Y coordinate, width, and height of elements.

Table 8-1-4 Pipe (1) Function Page

◆ Main

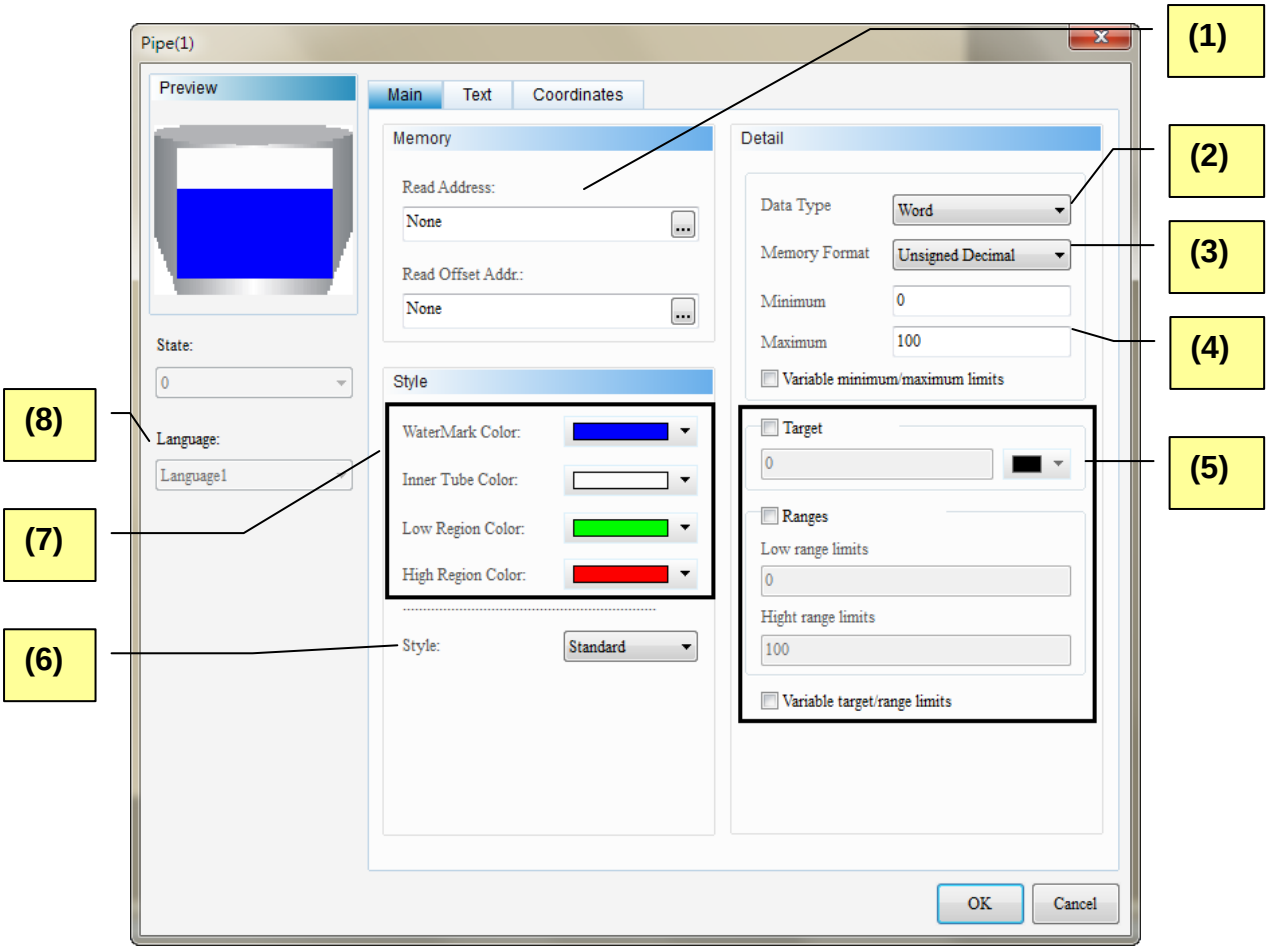
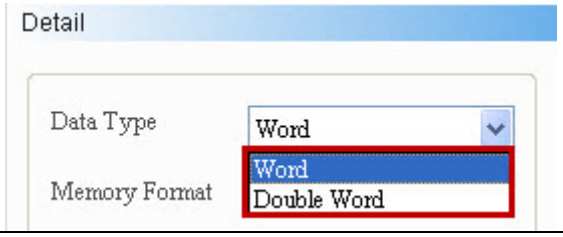
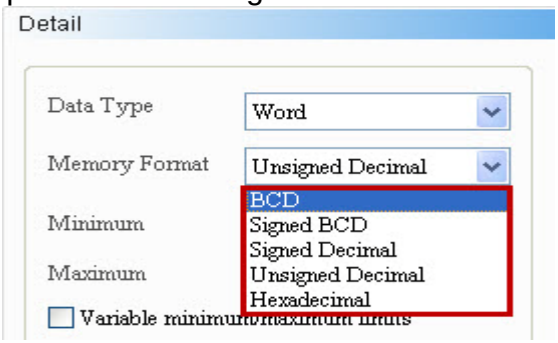
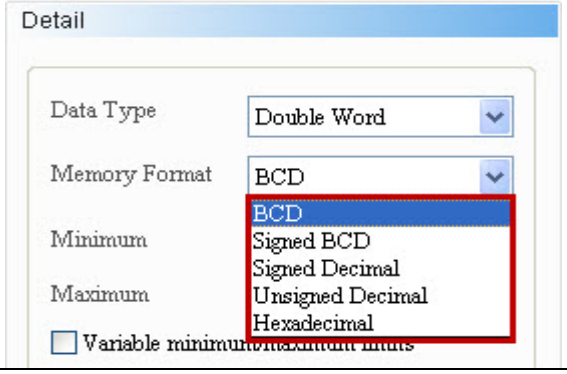
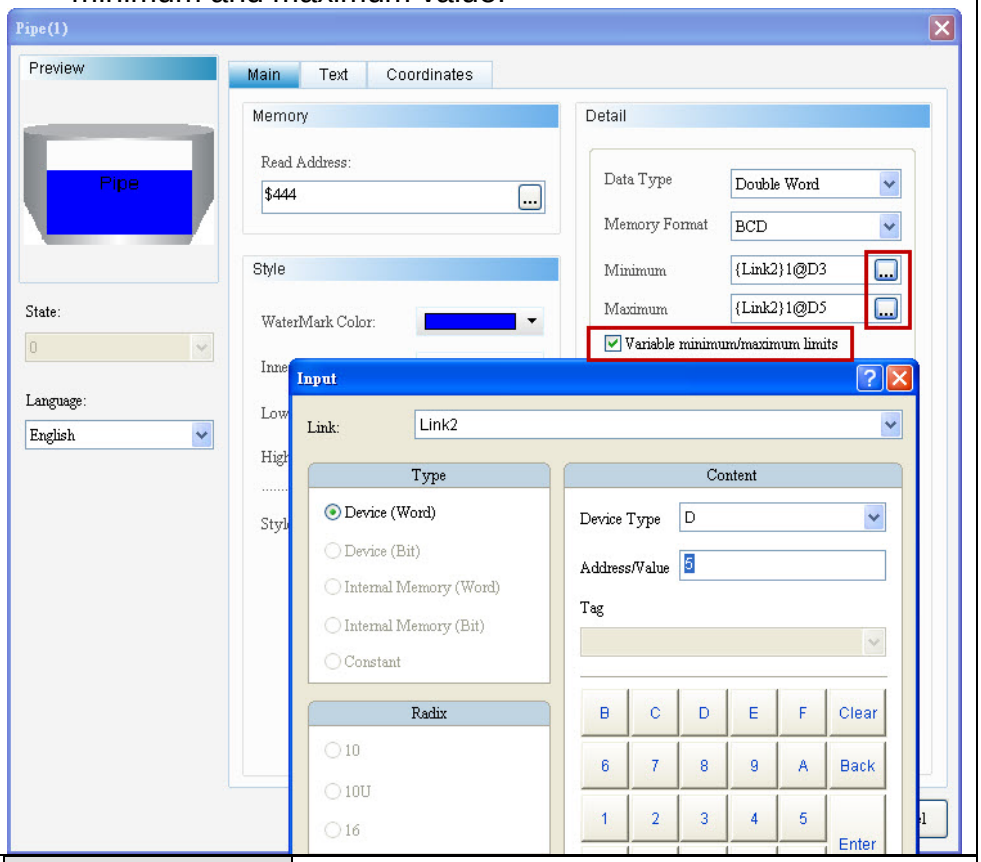
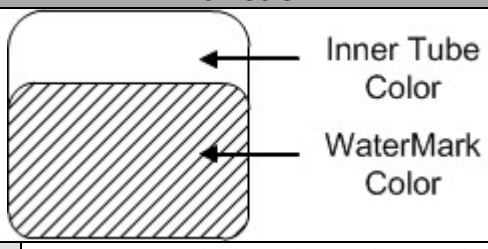


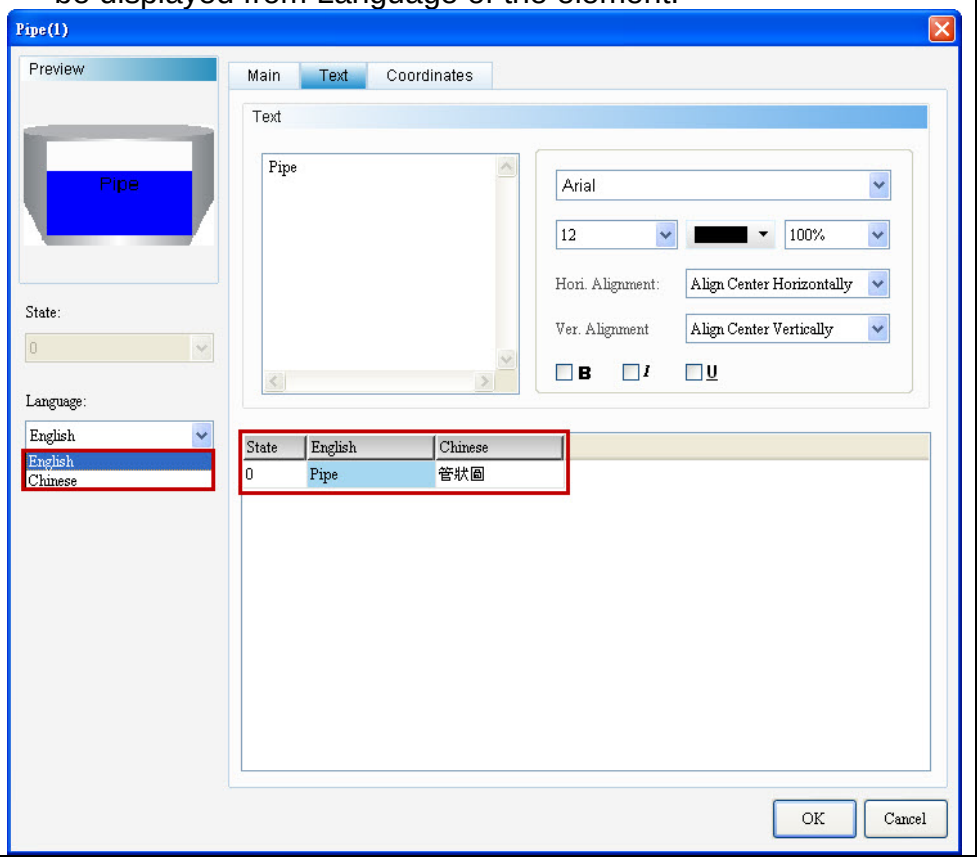
Figure 8-1-2 Pipe (1) Element Main Properties Page

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td rowspan="2">(1)</td><td>Read Address</td><td>➢ Selects the address of internal memory or controller register. The memory type should be Word only.</td></tr>
<tr><td>Read Offset Address</td><td>➢ Please refer to Appendix D Write and Read Offset Address.</td></tr>
<tr><td>(2)</td><td>Data Type</td><td>➢ Two options: Word and Double Word.
 
</td></tr>
<tr><td>(3)</td><td>Data Format</td><td>➢ “Word” supports the following Data Formats:
 

➢ “Double Word” supports the following Data Formats:
 
</td></tr>
<tr><td>(4)</td><td>Minimum/ Maximum</td><td>➢ The valid range of the minimum and maximum Numeric Entry changes according to the Data Type and Data Format selected as shown in the following table:
<table>
<tr><th>Data Type</th><th>Data Format</th><th>Value Valid Range</th></tr>
<tr><td rowspan="5">Word</td><td>BCD</td><td>0~9999</td></tr>
<tr><td>Signed BCD</td><td>-999 ~ 9999</td></tr>
<tr><td>Signed Decimal</td><td>-32768~32767</td></tr>
<tr><td>Unsigned Decimal</td><td>0~65535</td></tr>
<tr><td>Hexadecimal</td><td>0~0xFFFF</td></tr>
<tr><td rowspan="5">Double Word</td><td>BCD</td><td>0~99999999</td></tr>
<tr><td>Signed BCD</td><td>-9999999 ~ 99999999</td></tr>
<tr><td>Signed Decimal</td><td>-2147483648~2147483647</td></tr>
<tr><td>Unsigned Decimal</td><td>0~4294967295</td></tr>
<tr><td>Hexadecimal</td><td>0~0xFFFFFFFF</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td></td><td>Variable Minimum/Maximum limits</td><td>➢ Enable this option then user could custom the minimum and maximum address and input wanted value to decide the minimum and maximum value.
 
</td></tr>
<tr><td>(5)</td><td>Display Format</td><td><table>
<tr><td>Target Display</td><td>If the “Target Value and Higher/Lower Limit Values as Variable” item is not selected, users can only input a constant to restrict the target display value of the Pipe. Users can also set the display color.</td></tr>
<tr><td>Enable Range Numeric Entry</td><td>“Enable Range Numeric Entry” includes the value of the lower and higher limits. Like the case in Target Display, if the “Target Value and Higher/Lower Limit Values as Variable” item is not selected, users can only input a constant in the lower and higher limits to restrict the value of the lower and higher limits of the Pipe.</td></tr>
<tr><td>Target Value and Higher/Lower Limit Values as Variable</td><td>By selecting this item, users can define the display value of the target value, lower higher limit value, and higher limit value dynamically controlled by memory address.</td></tr>
</table></td></tr>
<tr><td>(6)</td><td>Element Type</td><td>➢ Element types include Standard and Rotation 180. Users can change the appearance display of elements.
<table>
<tr><th>Standard</th><th>Rotation 180</th></tr>
<tr><td> </td><td> </td></tr>
</table></td></tr>
</table>

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td>(7)</td><td>Style</td><td>


<table>
<tr><td>Level Color</td><td>Users can define the color of the water level.</td></tr>
<tr><td>Cylinder Color</td><td>Users can define the color of the cylinder’s outer frame.</td></tr>
<tr><td>Lower Limit Range Color</td><td>Users can define the color of the lower limit range. See Table 8-1-3 for more.</td></tr>
<tr><td>Higher Limit Range Color</td><td>Users can define the color of the higher limit range. See Table 8-1-3 for more.</td></tr>
</table>
</td></tr>
<tr><td>(8)</td><td>Language</td><td>
➢ When text data are defined, users can edit the text properties to be displayed from Language of the element.


</td></tr>
</table>

◆ Text

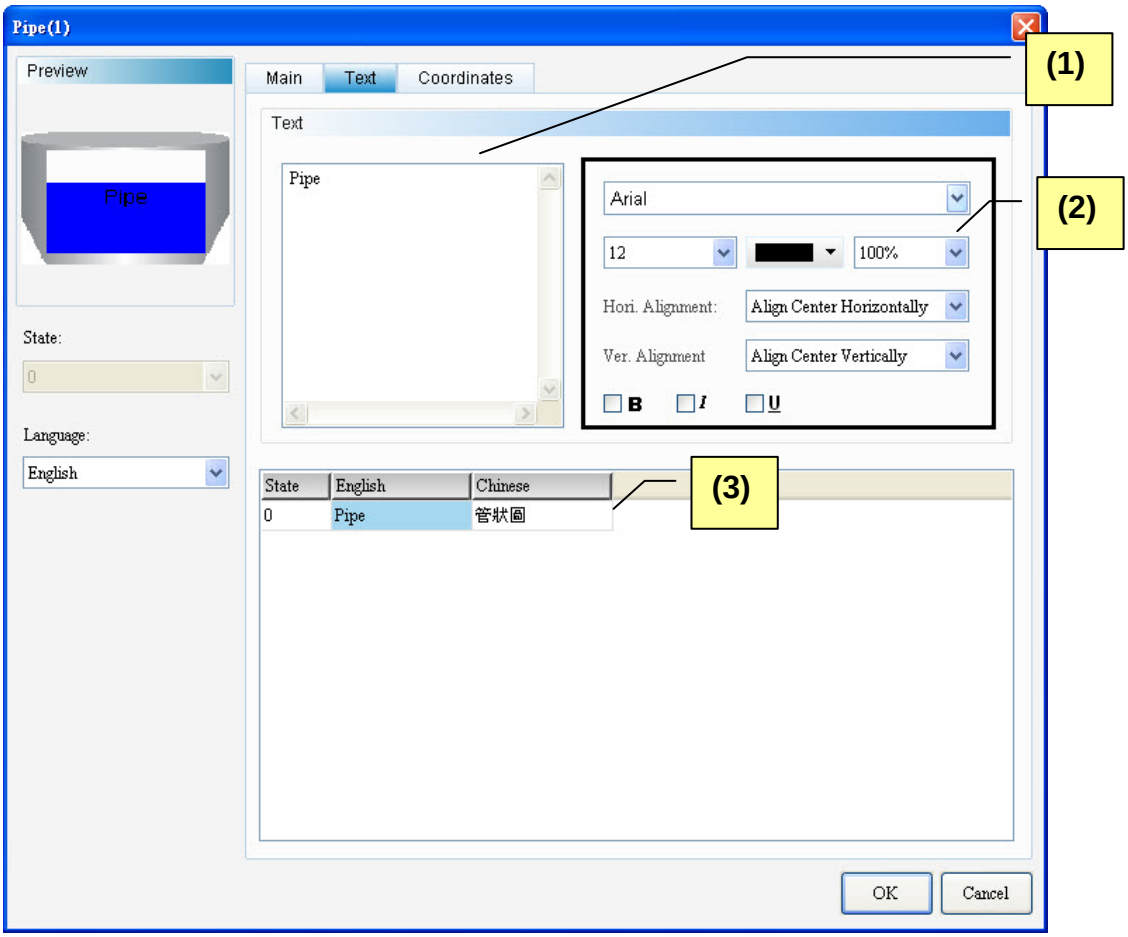
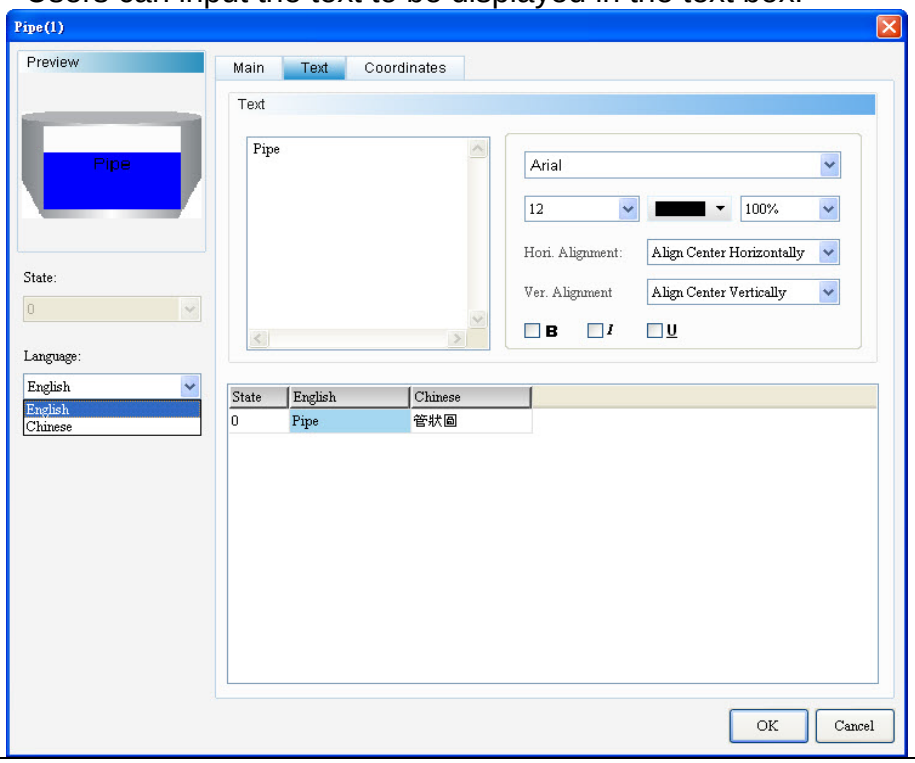


Figure 8-1-3 Pipe (1) Element Text Properties Page

No.	Property	Functions
(1)	Text	➢ Users can input the text to be displayed in the text box. 

No.	Property	Functions
(2)	Text Properties	➢ Sets text properties, including font type, font size, font color, scaling, text alignment, and bold/italic/underline of font. Please refer to the above figure for details about the results of the text properties.
(3)	Edit Multilingual Text Data	➢ Allows users to add multilingual text data. As shown in the Text Properties Figure, users can input English text in the English field.

◆ Coordinates

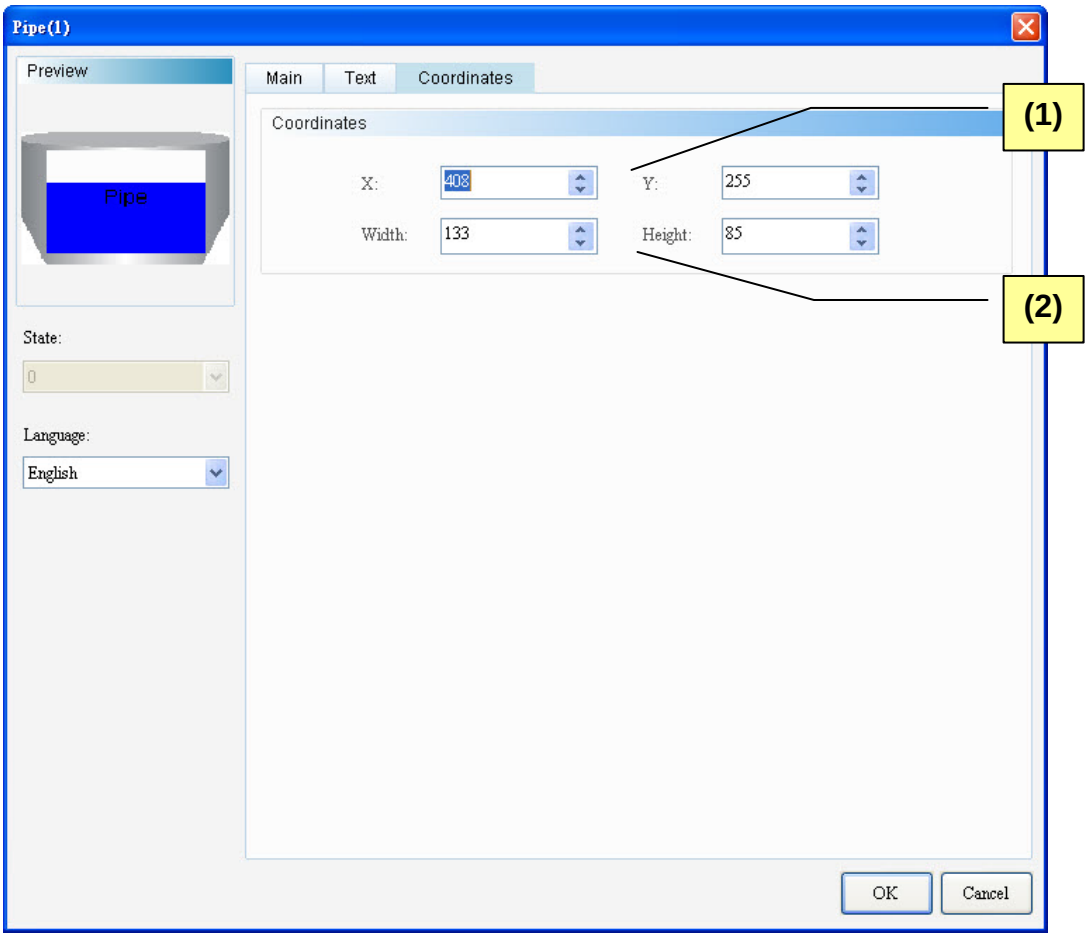


Figure 8-1-4 Pipe (1) Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

8-2 Pipe (3) / Pipe (4) / Pipe (5)

	Pipe (3)
	Pipe (4)
	Pipe (5)

Pipe (3) / Pipe (4) / Pipe (5) are for connecting with Pipe (1) / Pipe (2) / Pipe (6) / Pipe (7). Therefore, these three Pipes do not have parameters including write/read memory addresses and values. Users can only define their pipe diameter and turning angle.

Pipe (3) / Pipe (4) / Pipe (5)	
Function page	**Content Description**
Preview	These three Pipes are for connecting with other Pipes and do not support multi-state or multilingual data editing.
Main	Sets pipe diameter and element type.
Coordinates	Sets the X-Y coordinate of elements.

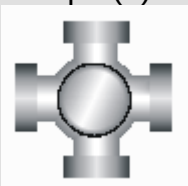
Table 8-2-1 Pipe (3) /Pipe (4) /Pipe (5) Function Page

◆ Main

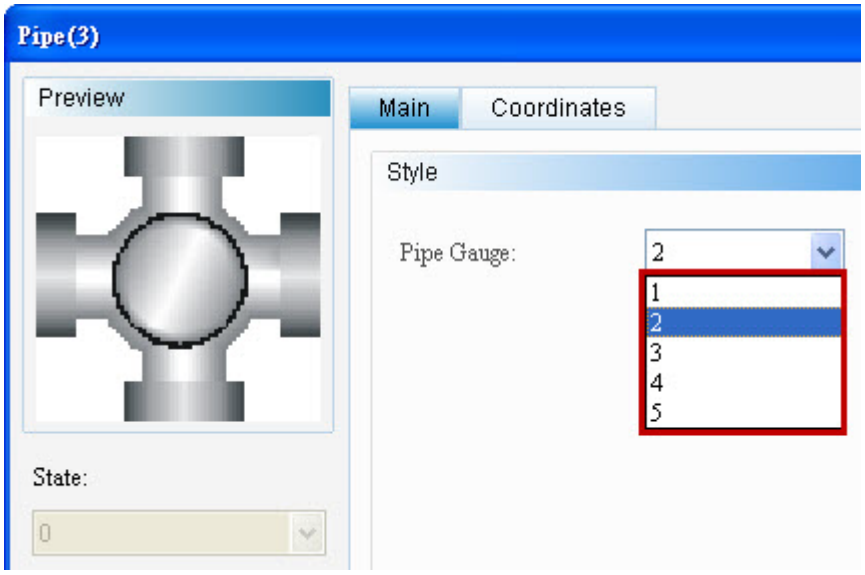
Pipe (3) / Pipe (4) / Pipe (5) Main Properties Page

Table 8-2-2 Pipe (3) / Pipe (4) / Pipe (5) Display Style

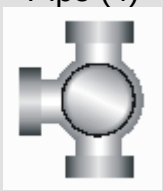
Pipe (3)



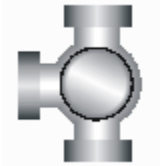
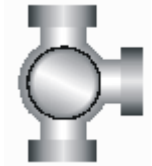
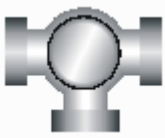
- Pipe diameter ranges from 1~5.

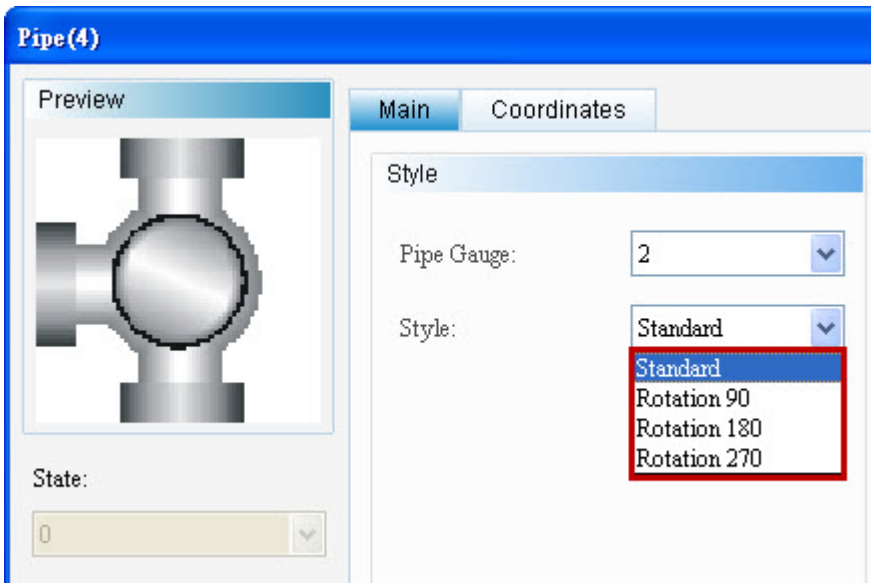


Pipe (4)



- Pipe diameter ranges from 1~5.
- Element types include Standard, Rotation 90, Rotation 180, and Rotation 270. Users can change the appearance display of elements.

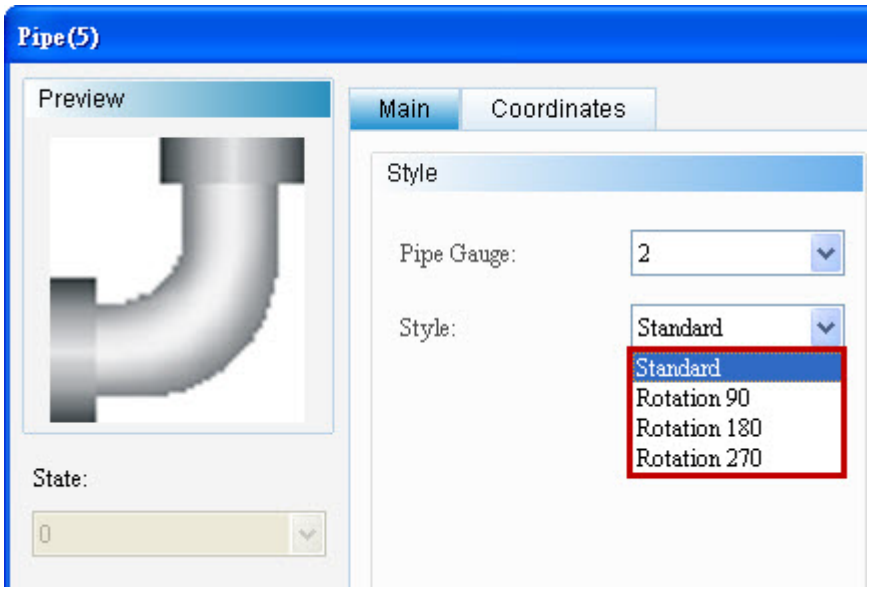
Standard	Rotation 90	Rotation 180	Rotation 270
			



Pipe (5)

- Pipe diameter ranges from 1~5.
- Element types include Standard, Rotation 90, Rotation 180, and Rotation 270. Users can change the appearance display of elements.

Standard	Rotation 90	Rotation 180	Rotation 270



◆ Coordinates

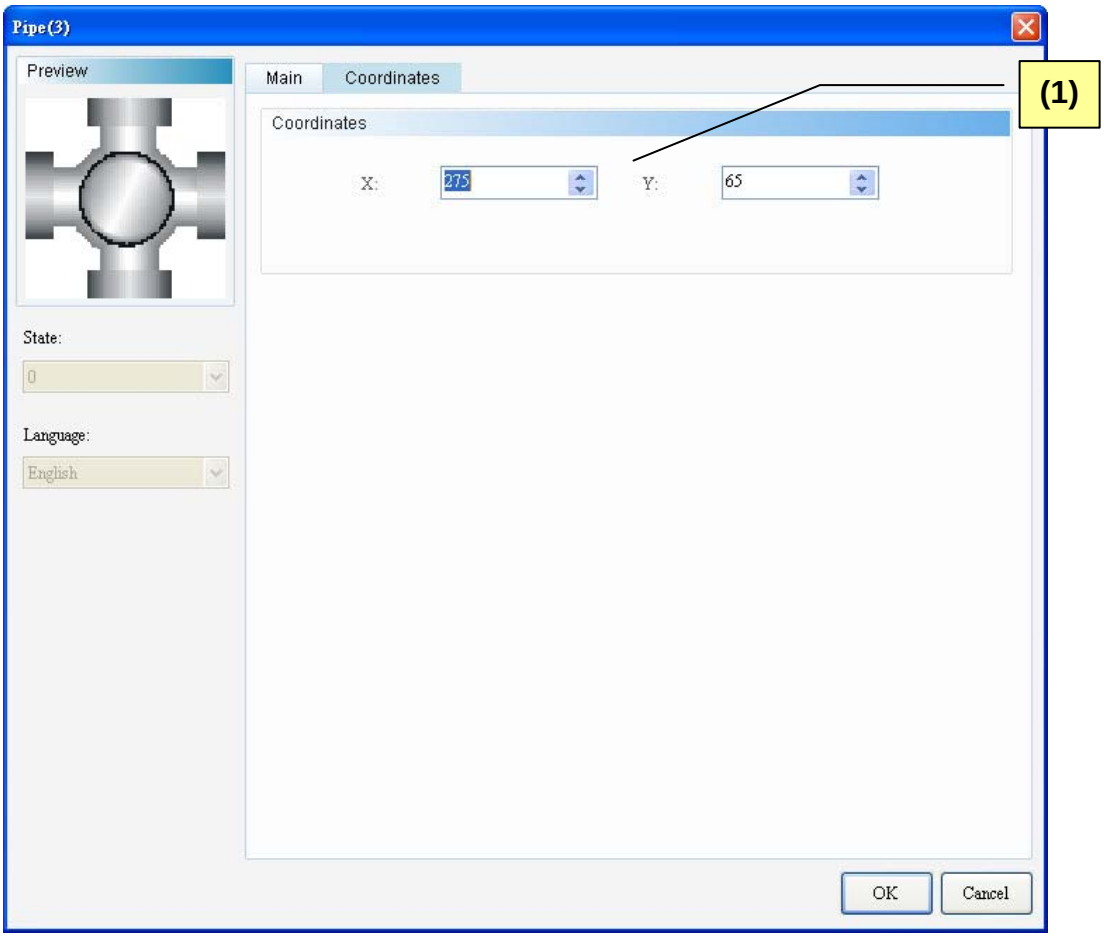


Figure 8-2-1 Pipe (3) /Pipe (4) /Pipe (5) Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.

8-3 Pipe (6) / Pipe (7)

	Pipe (6)
	Pipe (7)

Pipe (6) and Pipe (7) are Pipe icons and can show water flow. Users can define the flow direction and color of these Pipes. Therefore, their read memory addresses can be defined.

Pipe (6) / Pipe (7)	
Function page	**Content Description**
Preview	Pipe (6) and Pipe (7) are for controlling water flow direction and do not support multi-state or multilingual data editing.
Main	Sets read memory address, pipe diameter, variable color and flow cursor color.
Coordinates	Sets the X-Y coordinate of elements.

Table 8-3-1 Pipe (6) / Pipe (7) Function Page

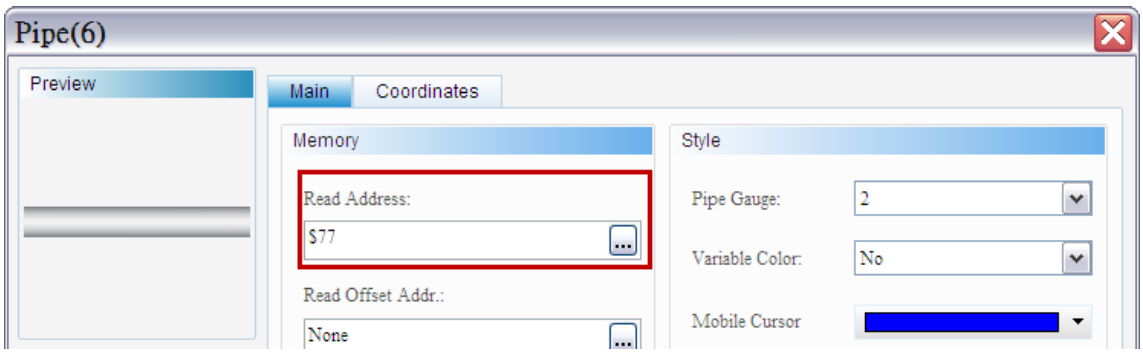
◆ Main

Pipe(6) / Pipe(7) Main Properties Page

Table 8-3-2 Pipe (6) / Pipe (7) Display Style

Pipe (6) Pipe(7)

◆ Sets read memory address for defining water flow effect and direction.



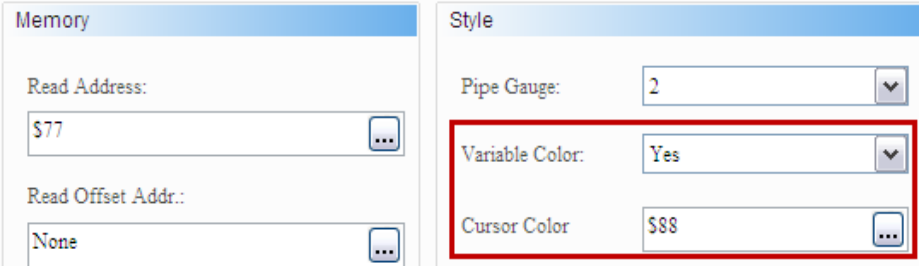
Pipe (6)		
Flow Direction	Right → Left	Read Memory Address = 1
	Left → Right	Read Memory Address = 2

Pipe(7)		
Flow Direction	Top → Down	Read Memory Address = 2
	Bottom → Up	Read Memory Address = 1

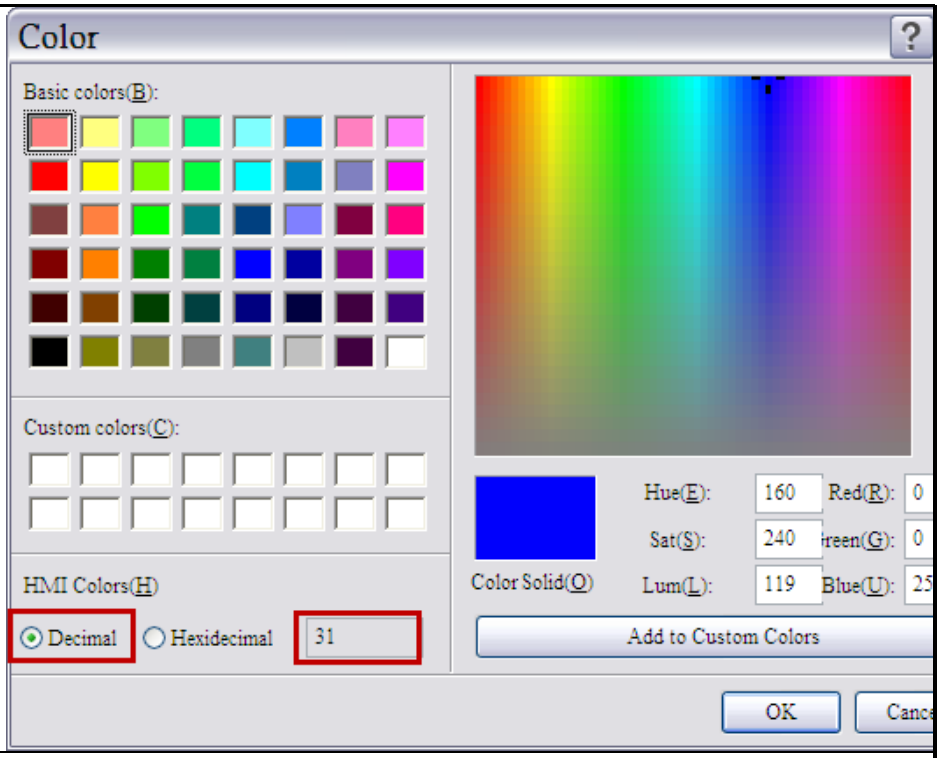
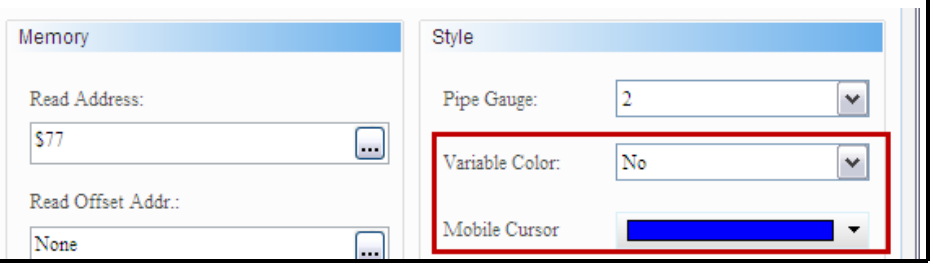
◆ Pipe diameter ranges from 1~5.
◆ Users can define the cursor color of water flow to be displayed.
◆ When "YES" is selected for Variable Color, users can define the color of flow cursor.

Variable Color: YES

➢ When you set YES, the address of cursor color is variable and can be changed dynamically.



➢ Please refer to the following figure for the corresponding color.

			
		Variable Color: NO	➢ When you set NO, then it is unable to change the address of cursor color. 

◆ Coordinates

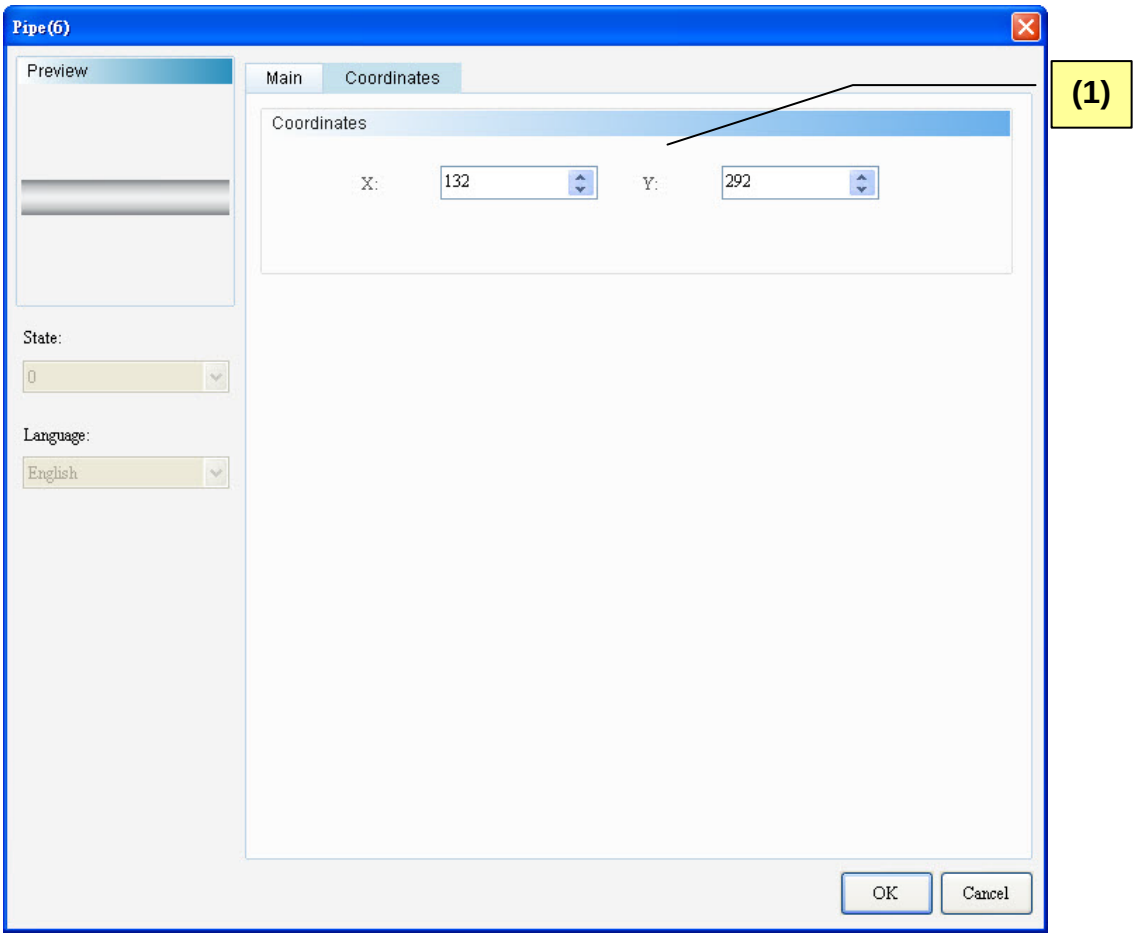


Figure 8-3-1 Pipe (6) / Pipe (7) Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.

Contents

9-1 Pie (1) / Pie (2) / Pie (3) / Pie (4) 3

Chapter 09 Pie

This chapter mainly describes the pie elements provided in the DOPSoft and how they are operated and configured.

◆ Pie Element Classification

Pie		Pie (1)
		Pie (2)
		Pie (3)
		Pie (4)

Table 9-1-1 Pie Element Classification

◆ Pie Element Shared Properties

Pie Element	Read Address	Write Address	Read offset Address	Target Value	Enable Range Numeric Entry	Target Value and Higher/ Lower Limits as Variable	Target Display	Style (Frame Color/ Low Limit Range Color/ High Limit Range Color/ Style/ Foreground Color/ Background Color)	Settings (Data Type/ Data Format/ Minimum Numeric Entry/ Maximum Numeric Entry)
Pie (1)	◎		◎	◎	◎	◎	◎	◎	◎
Pie (2)	◎		◎	◎	◎	◎	◎	◎	◎
Pie (3)	◎		◎	◎	◎	◎	◎	◎	◎
Pie (4)	◎		◎	◎	◎	◎	◎	◎	◎

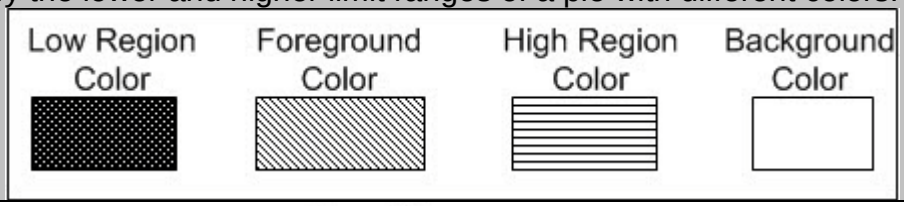
Table 9-1-2 Pie—Element Shared Properties

9-1 Pie (1) / Pie (2) / Pie (3) / Pie (4)

	Pie (1)
	Pie (2)
	Pie (3)
	Pie (4)

Shape is the only difference among Pie (1), Pie (2), Pie (3) and Pie (4), and all other functions are the same. The following introduces the elements of Pie (1). The value of the register corresponding to the read memory of the pie will be displayed on the pie according to the target value, lower limit value and higher limit value defined by users. The elements of Pie (1) are the same as that of the meter. Users can define the memory address of the target value, higher limit value, and lower limit value of the pie, in order to enhance the flexibility of pie functions and meet user demands. Users can also define different colors for the lower limit, higher limit and target values, in order to clearly identity these values in the pie as shown in Table 9-1-3 below.

➢ Identify the lower and higher limit ranges of a pie with different colors.



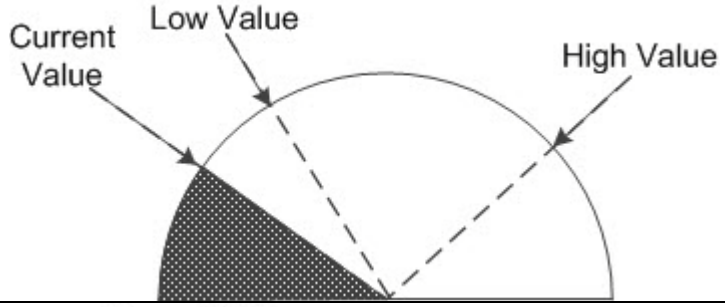
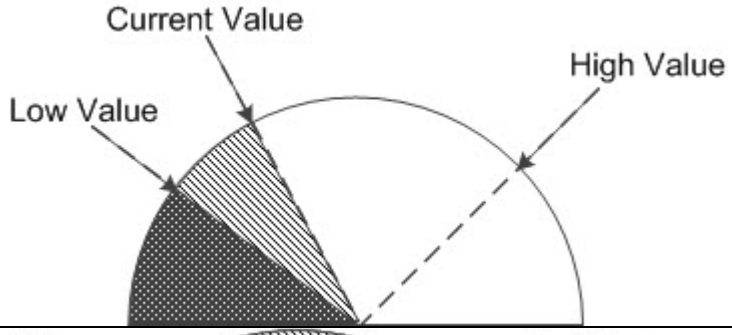
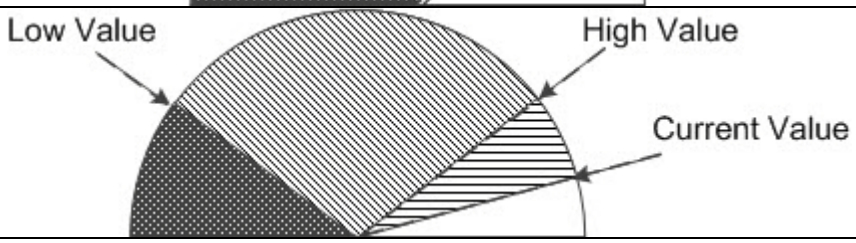
(1)	
(2)	
(3)	

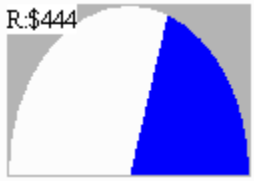
Table 9-1-3 Pie (1) —Identification of Low/High Limit Ranges by Color

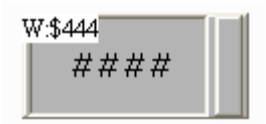
Examples of Pie (1)

Table 9-1-4 Pie (1)—Element Examples

Read Address

Pie (1) Element		Numeric Entry Element	
Read Address	$444	Write Address	$444





Properties

Data Type	Data Format	Minimum	Maximum
Word	Unsigned Decimal	0	100

Target Value and Higher/Lower Limit Values as Variable

Numeric Entry Element		Numeric Entry Element		Numeric Entry Element	
Write Memory Address	{Link2} 1@D50	Write Memory Address	{Link2} 1@D55	Write Memory Address	{Link2} 1@D65

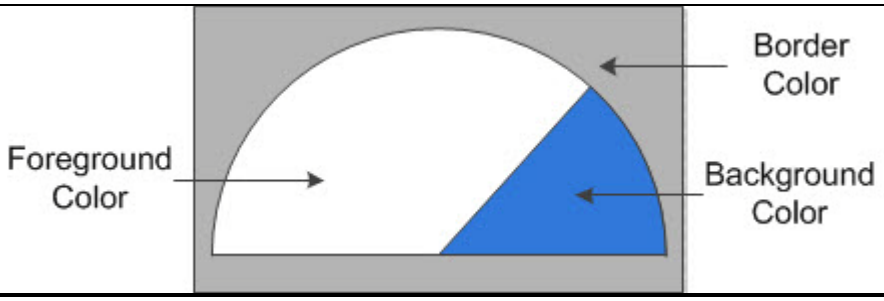
Target Display

Target Value Color	Target Value
	{Link2}1@D50

Enable Range Numeric Entry

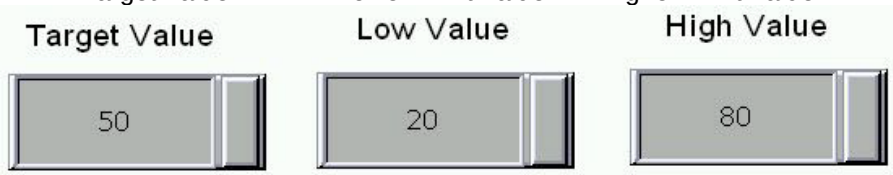
Lower Limit Value Properties		Higher Limit Value Properties	
Lower Limit Range Color	Lower Limit Range Value	Higher Limit Range Color	Higher Limit Range Value
	{Link2}1@D55		{Link2}1@D65

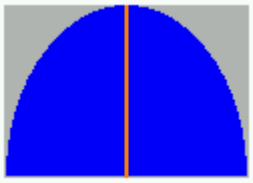
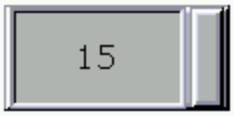
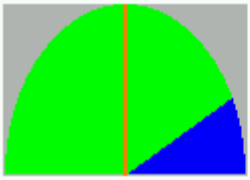
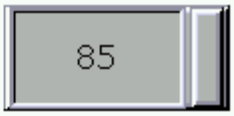
Legend of Pie (1) Elements



Execution Results

Target Value | Lower Limit Value | Higher Limit Value



Examples of Pie (1) Table 9-1-4 Pie (1)—Element Examples		
	Target Value	➢ Input “50” as the target value, and select ➢ “Orange” as the target value color. 
	Lower Limit Value	➢ Numeric Entry “15”, smaller than the lower limit value of “20”, and select “Yellow” as the lower limit value color. 
	Higher Limit Value	➢ Numeric Entry “85”, greater than the upper limit value of “80”, and select “Green” as the upper limit value color.  

Double-click the Pie (1) Element item to call out the following Pie (1) Element Properties page.

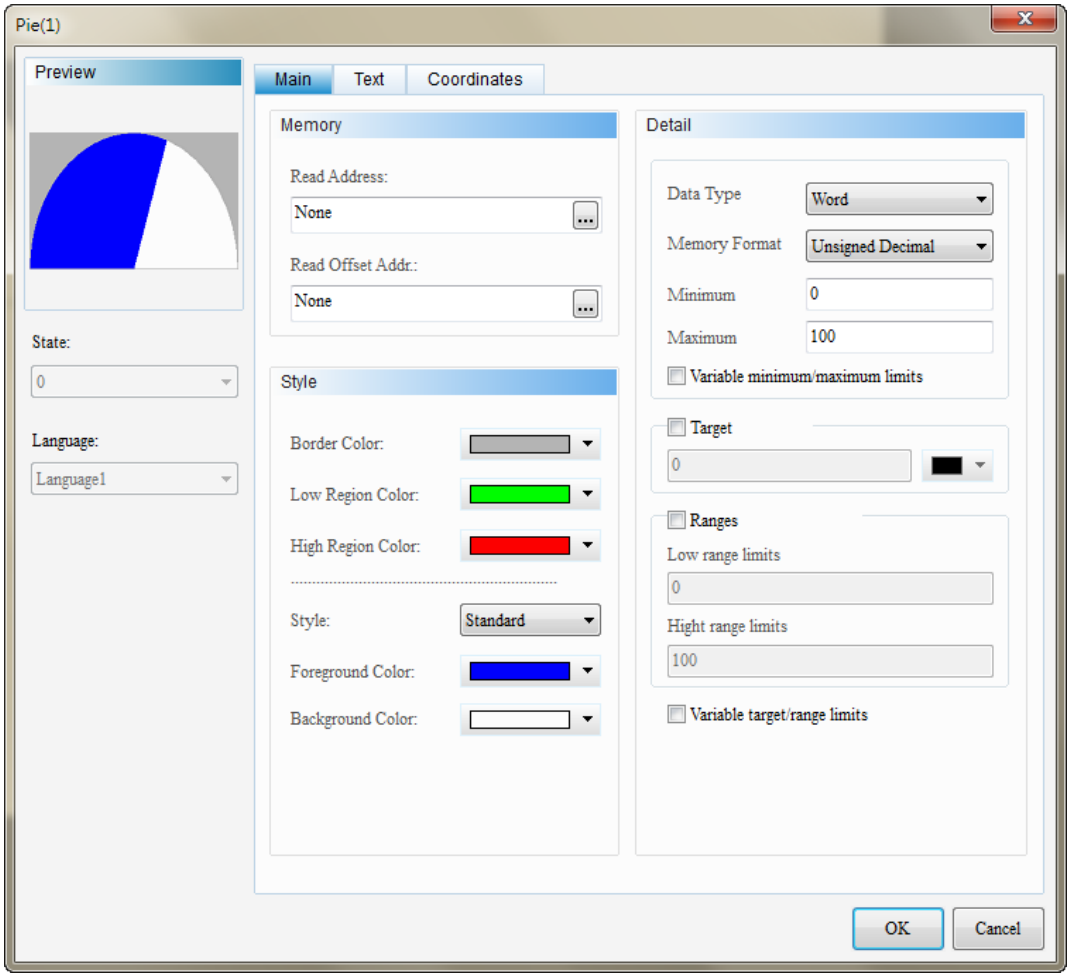


Figure 9-1-1 Pie (1) Element Properties

Pie (1)	
Function Page	**Content Description**
Preview	Supports only multilingual display of data and does not support multi-state display.
Main	Sets read memory address, read offset address, Style, Foreground color, and Background color. Sets border color, lower limit range color, and higher limit range color. Sets element Data Type, Memory Format, Minimum Value Entry, Maximum Value Entry and variable minimum and maximum limits. Sets show/hide target value and target value color; enables range Numeric Entry; and enables target value and higher/lower limit values as variable.
Text	Sets text content to be displayed and text properties, including font type, font size, font color, bold/italic/underline of font, scaling, and text alignment.
Coordinates	Sets the X-Y coordinate, width, and height of elements.

Table 9-1-5 Pie (1) Function Page

◆ Main

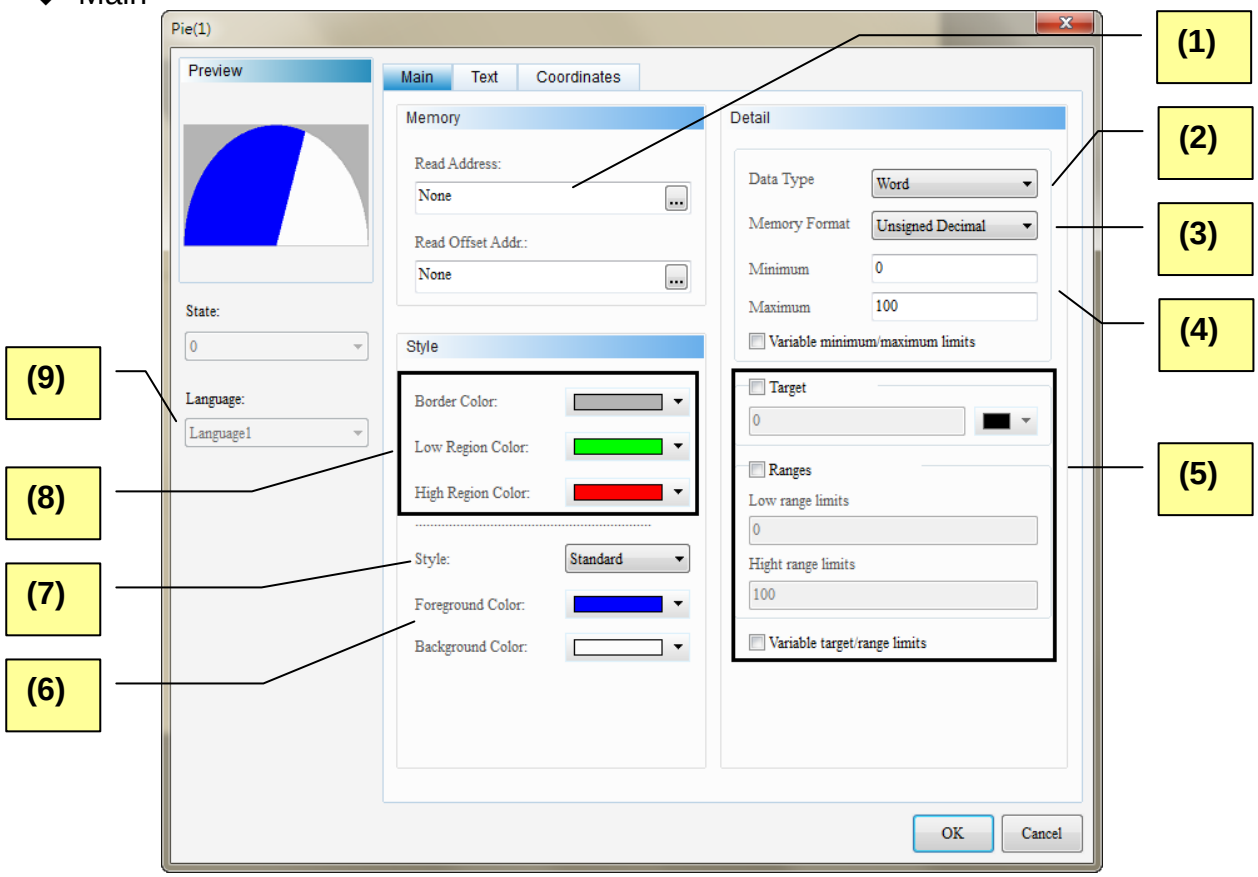
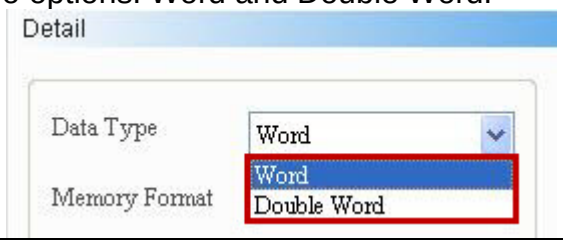
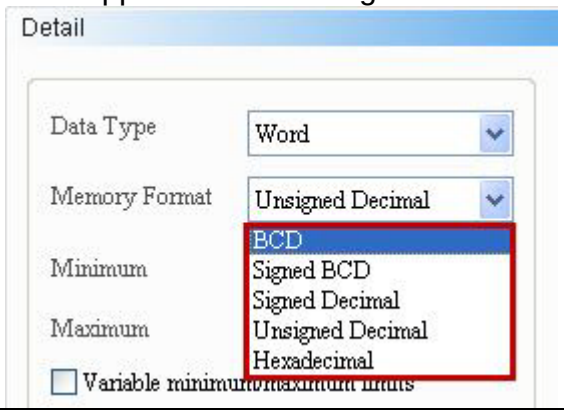
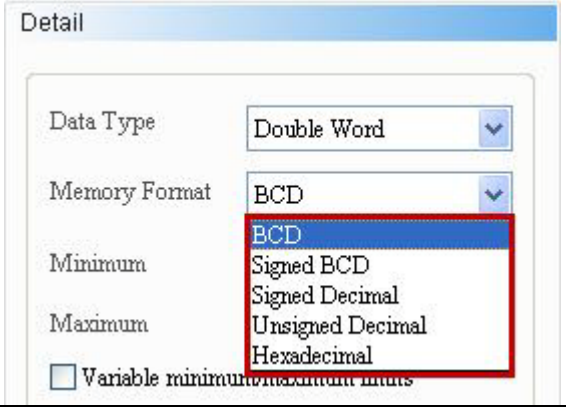
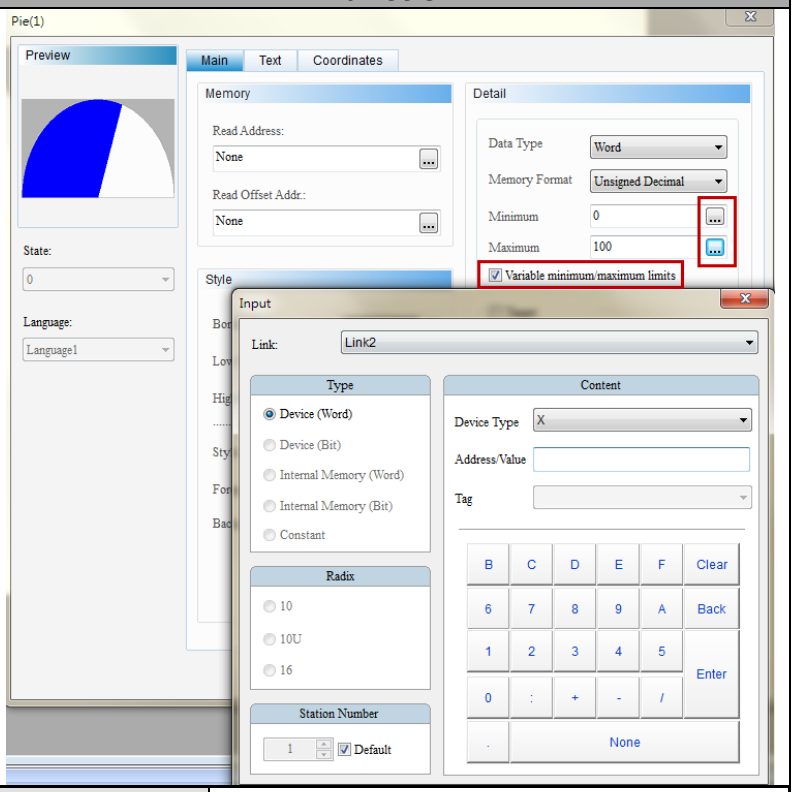
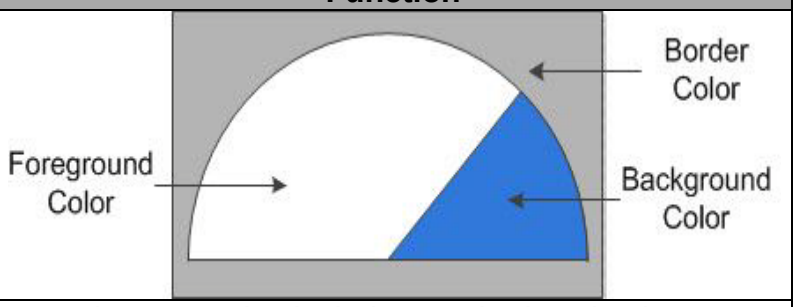
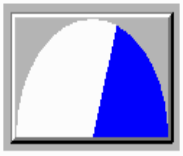
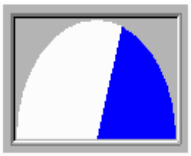
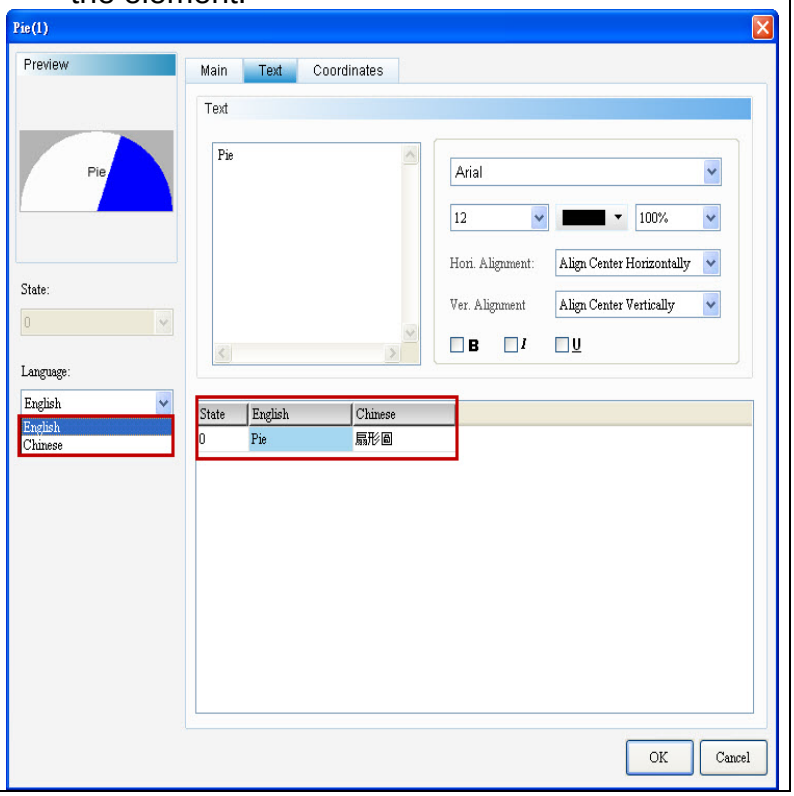


Figure 9-1-2 Pie (1) Element Main Properties Page

No.	Property	Function
(1)	Read Address	➢ Selects the address of internal memory or controller register. The memory type should be Word only.
	Read Offset Address	➢ Please refer to Appendix D Write and Read Offset Address.
(2)	Data Type	➢ Two options: Word and Double Word. 
(3)	Memory Format	➢ "Word" supports the following Data Formats: 

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td></td><td></td><td>➢ “Double Word” supports the following Data Formats:
 
</td></tr>
<tr><td>(4)</td><td>Minimum/ Maximum</td><td>➢ The valid range of the Minimum and Maximum Value Entry changes according to the Data Type and Data Format selected as shown in the following table:
<table>
<tr><th>Data Type</th><th>Data Format</th><th>Value Valid Range</th></tr>
<tr><td rowspan="5">Word</td><td>BCD</td><td>0~9999</td></tr>
<tr><td>Signed BCD</td><td>-999 ~ 9999</td></tr>
<tr><td>Signed Decimal</td><td>-32768~32767</td></tr>
<tr><td>Unsigned Decimal</td><td>0~65535</td></tr>
<tr><td>Hexadecimal</td><td>0~0xFFFF</td></tr>
<tr><td rowspan="5">Double Word</td><td>BCD</td><td>0~99999999</td></tr>
<tr><td>Signed BCD</td><td>-9999999 ~ 99999999</td></tr>
<tr><td>Signed Decimal</td><td>-2147483648~2147483647</td></tr>
<tr><td>Unsigned Decimal</td><td>0~4294967295</td></tr>
<tr><td>Hexadecimal</td><td>0~0xFFFFFFFF</td></tr>
</table></td></tr>
<tr><td></td><td>Variable Minimum/Maximum limits</td><td>➢ Enable this option then user could custom the minimum and maximum address and input wanted value to decide the minimum and maximum value.</td></tr>
</table>

No.	Property	Function	
			
(5)	Display Format	Target Display	If the “Target Value and Higher/Lower Limit Values as Variable” item is not selected, users can only input a constant to restrict the target display value of the pie. Users can also set the display color.
		Enable Range Numeric Entry	“Enable Range Numeric Entry” includes the value of the lower and higher limits. Like the case in Target Display, if the “Target Value and Higher/Lower Limit Values as Variable” item is not selected, users can only input a constant in the lower and higher limits to restrict the value of the lower and higher limits of the pie.
		Target Value and Higher/Lower Limit Values as Variable	By selecting this item, users can define the display value of the target value, lower higher limit value, and higher limit value dynamically controlled by memory address.
(6)	Foreground Color and Background Color	➢ Sets the foreground and background colors of elements.	

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td></td><td></td><td> 
</td></tr>
<tr><td>(7)</td><td>Style of Element</td><td>➢ Element Styles include Standard, Raised, Sunken, and Transparent. Users can change the appearance display of elements.
<table>
<tr><th>Standard</th><th>Raised</th><th>Sunken</th><th>Transparent</th></tr>
<tr><td> </td><td>  </td><td>  </td><td> </td></tr>
</table></td></tr>
<tr><td>(8)</td><td>Style</td><td>
<table>
<tr><td>Border Color</td><td>Users can define the frame color. Please refer to the foreground and background colors for more.</td></tr>
<tr><td>Lower Limit Range Color</td><td>Users can define the color of the lower limit range. See Table 9-1-3 for more.</td></tr>
<tr><td>Higher Limit Range Color</td><td>Users can define the color of the higher limit range. See Table 9-1-3 for more.</td></tr>
</table></td></tr>
<tr><td>(9)</td><td>Language</td><td>➢ When text data are defined, users can edit the text properties to be displayed in the Language of the element.

</td></tr>
</table>

◆ Text

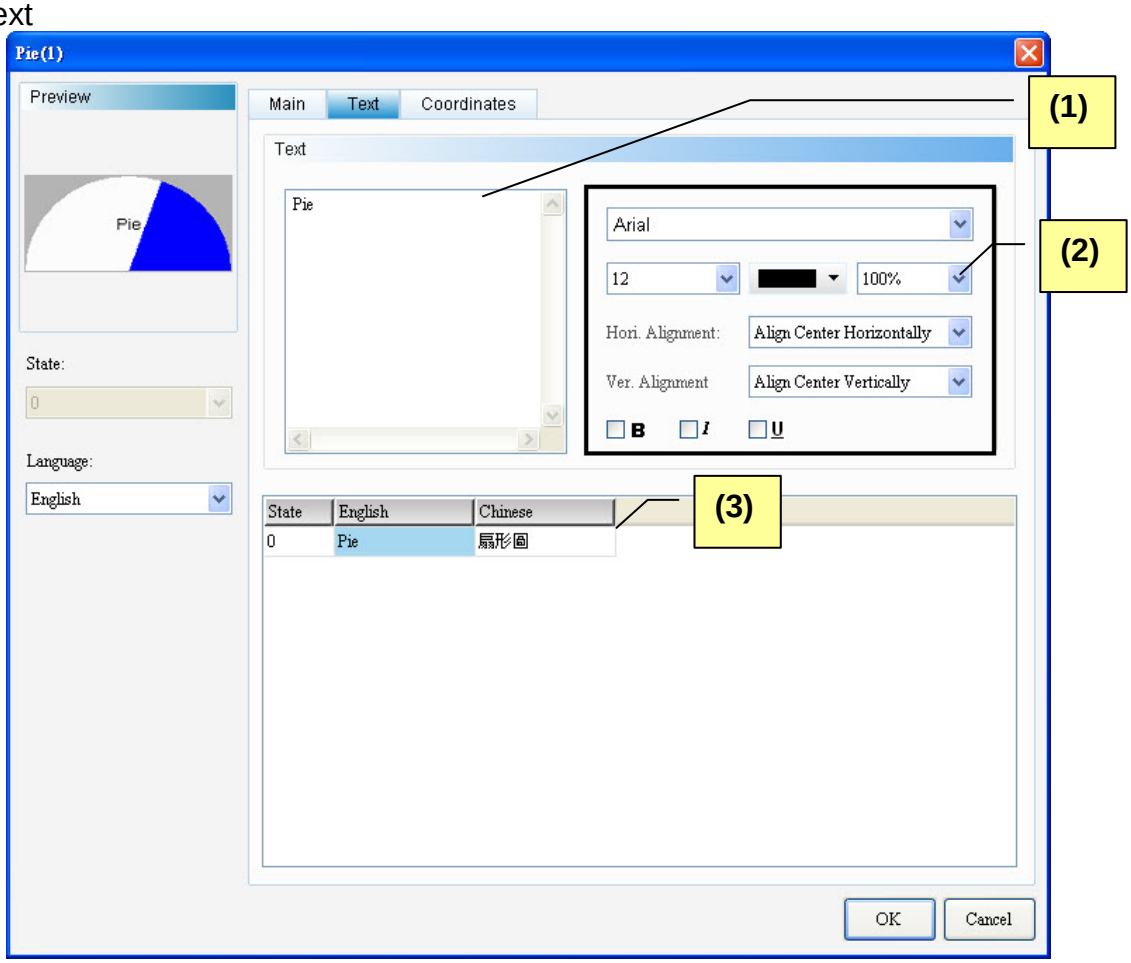
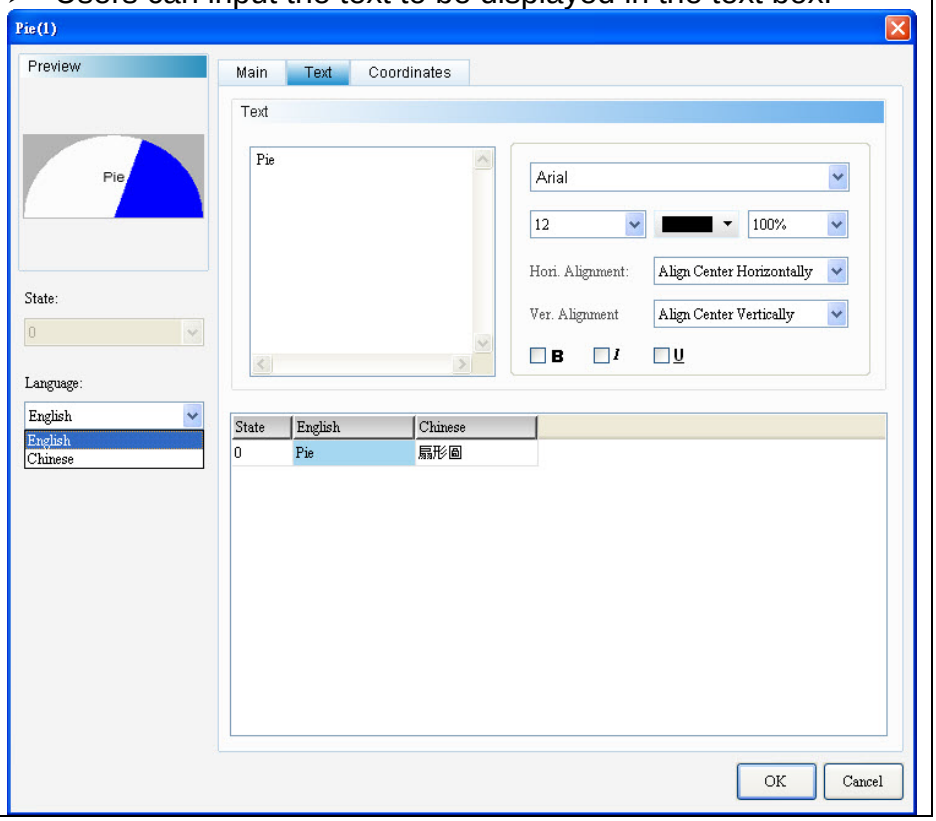


Figure 9-1-3 Pie (1) Element Text Properties Page

No.	Property	Function
(1)	Text	➢ Users can input the text to be displayed in the text box. 

No.	Property	Function
(2)	Text Properties	➢ Sets text properties, including font type, font size, font color, scaling, text alignment, and bold/italic/underline of font. Please refer to the above figure for details about the results of text properties.
(3)	Edit Multi-Language Text Data	➢ Allows users to add Multi-Language text data. As shown in the Text Properties Figure, users can input English text in the English field.

◆ Coordinates

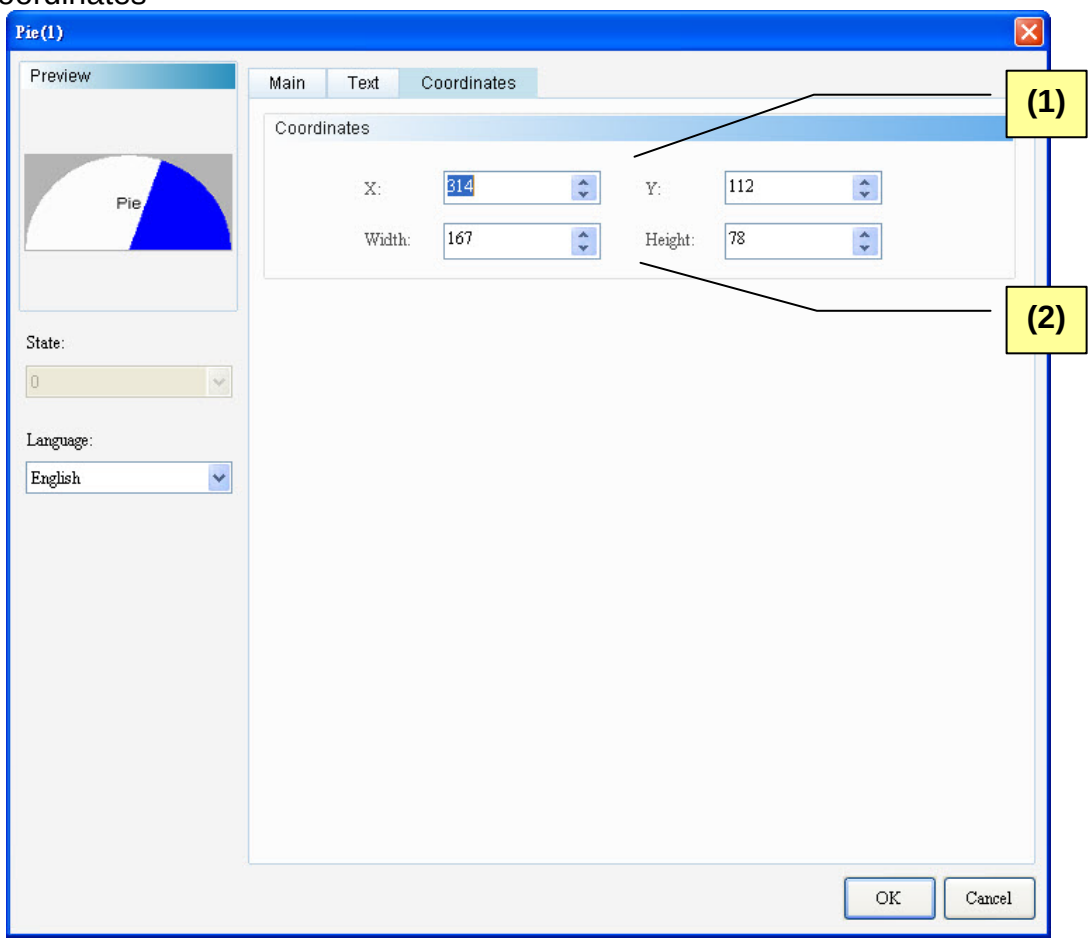


Figure 9-1-4 Pie (1) Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

Contents

10-1 Multistate Indicators 3
10-2 Range Indicators 20
10-3 Simple Indicators.....34

Chapter 10 Indicators

This chapter mainly describes the indicator elements provided in the DOPSoft and how they are operated and configured.

◆ Indicator Element Classification:

Indicators		Multistate Indicator
		Value Range Indicator
		Simple Indicator

Table 10-1-1 Indicator Element Classification

◆ Indicator Element Shared Properties

Indicator Element	Read Address	Read Offset Address	Write Address	Invisible Address	XOR Color	Range (Constant and Variable)	Redraw	Style (Element Type/ Foreground Color/Blink)	Settings (Data Type/ Data Format/ State Counts)
Multistate Indicator.	◎	◎		◎				◎	◎
Value Range Indicator	◎	◎				◎		◎	◎
Simple Indicator	◎	◎			◎		◎		

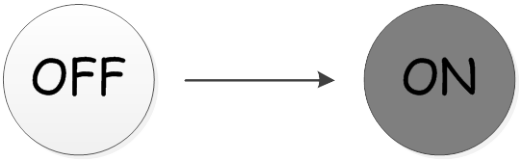
Table 10-1-2 Indicator Element Shared Properties

10-1 Multistate Indicators

	Multistate Indicator

The function of a Multistate Indicator is to indicate the state of a particular memory address. Whether the Data Type is Bit, LSB, or Word, the indicator will remind users of the state changes of its corresponding memory address when it is read. Therefore, when users wish to display an important state or important message with an indicator, they can configure the indicator to alert the state value changes and even more messages with such changes. This way, users can finish the corresponding task the first time.

Indicator display can be ON or OFF:



Pictures or colors can also be used to indicate a state change.

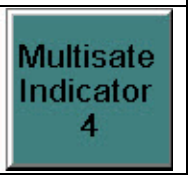
Please refer to Table 10-1-3 below for the example of Multistate Indicators.

Example of Multistate Indicators

Table 10-1-3 Example of Multistate Indicators

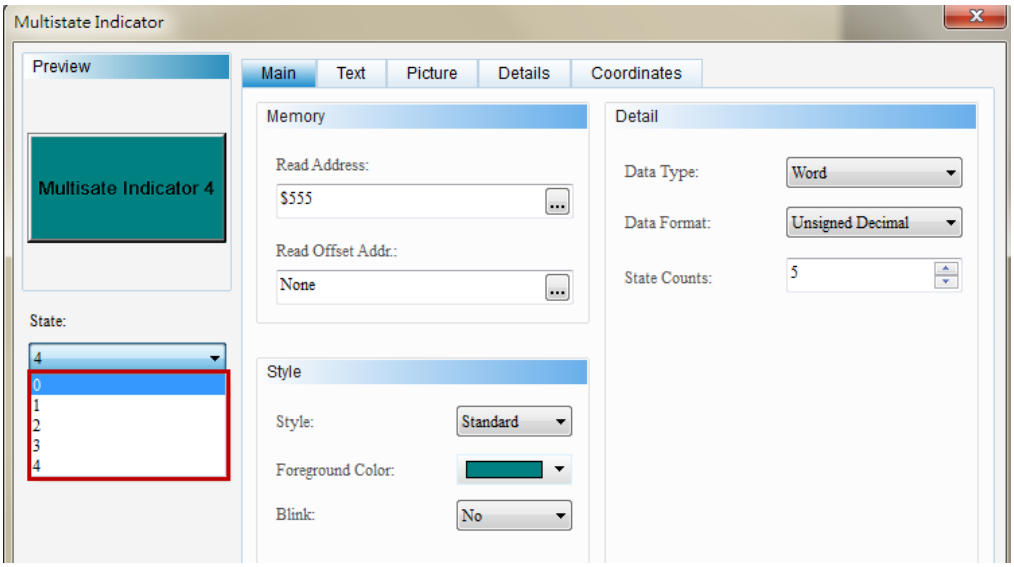
Read Address	**Multistate Indicator Element**		**Numeric Entry Element**	
	Read Address	$555	Write Address	$555
Properties				

Data Type	Data Format	State Counts
Word	Unsigned Decimal	5

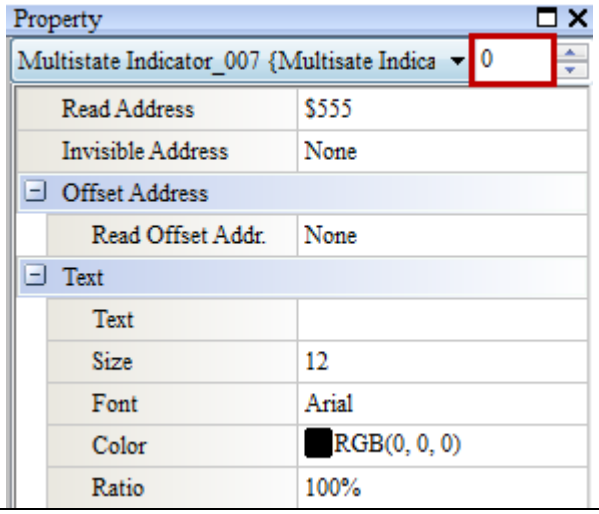
Element Foreground Color	State 0	State 1	State 2	State 3	State 4
					

Multistate Indicator Legend

- Double-click the element to view the picture of individual states. In this example, there are five states, with value ranging from 0 to 4 as shown inside the red frame below.



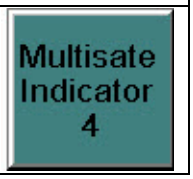
- Users can switch state from the box on the upper right corner in the Properties window of the element.



Example of Multistate Indicators

Table 10-1-3 Example of Multistate Indicators

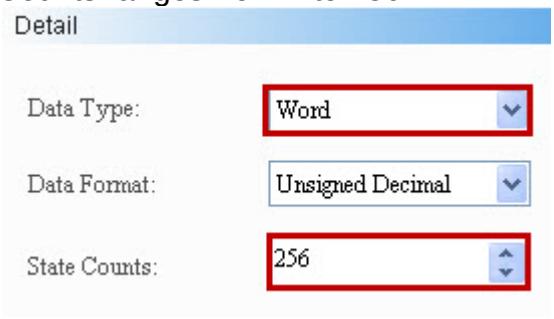
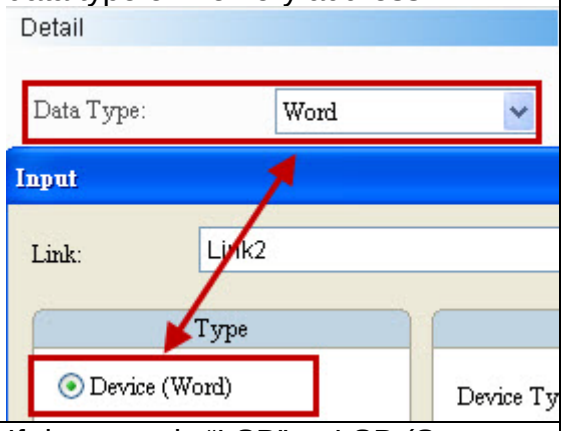
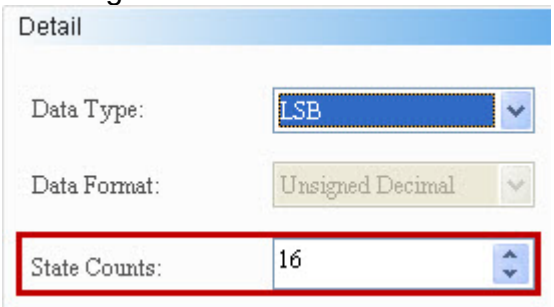
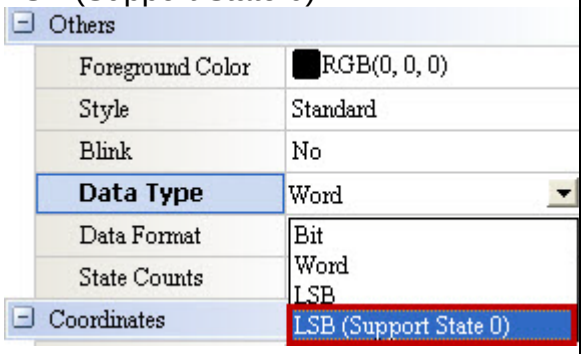
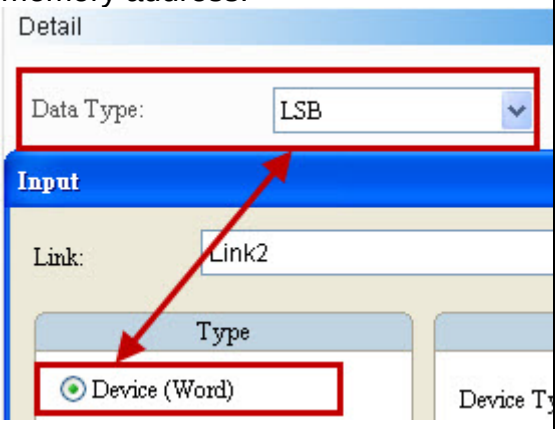
Execution Results	➢ After downloading the element, the initial value of a Multistate Indicator is “0”. Next, run the value input element. Multistate Indicator 0

Value = 0	Value = 1	Value = 2	Value = 3	Value = 4
				

The Multistate Indicator supports four types of Data Types as described in Table 10-1-4. If users wish to add or remove State Counts, simply add or reduce the State Counts value in the Properties.

Multistate Indicator

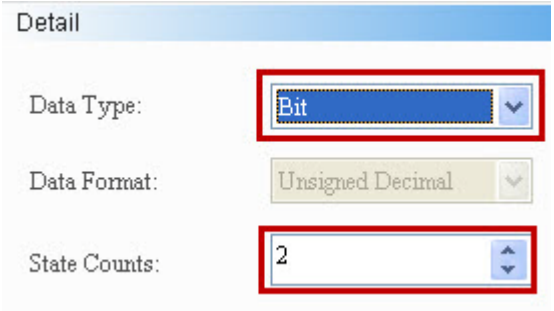
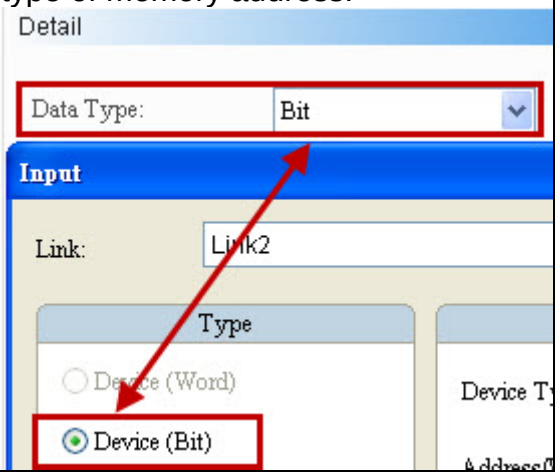
Table 10-1-4 Description of Multistate Indicator Data Types

Data Type	State Counts	Memory Address
Word	If the Data Type is “Word”, the State Counts ranges from 1 to 256.  	If the data type is “Word”, “Word is the data type of memory address. 
LSB / LSB (Support 0 State)	If the data type is “LSB”, the data in the register are first converted into binary data. Next, the object state is determined according to the element with the lowest non-zero bit. If the Data Type is “LSB”, the State Counts ranges from 1 to 16, not including “State 0”.  If users wish to use “State 0”, select LSB (Support State 0).  	If data type is “LSB” or LSB (Support State 0), “Word” is also data type of memory address. 

If users select “LSB” only, the element will display “Black” when State=0.

The examples in the following table show how the stated value is determined with the lowest non-zero bit after converting from a decimal value into a binary value. There are also examples demonstrating how the DOPSoft determines the state Numeric Displayed with the lowest bit when the decimal values are 3 and 7.

Decimal	Binary	State Value
0	**0000000000000000**	**State=0 when all bits are “0” [LSB (Support State 0) must be selected]**
1	0000000000000001	The lowest non-zero bit is bit 0, State=1.
2	0000000000000010	The lowest non-zero bit is bit 1, State=2.
3	**0000000000000011**	**The lowest non-zero bit is bit 0, State=1.**
4	0000000000000100	The lowest non-zero bit is bit 2, State=3.
7	**0000000000000111**	**The lowest non-zero bit is bit 0, State=1.**
8	0000000000001000	The lowest non-zero bit is bit 3, State=4.
16	0000000000010000	The lowest non-zero bit is bit 4, State=5.
32	0000000000100000	The lowest non-zero bit is bit 5, State=6.
64	0000000001000000	The lowest non-zero bit is bit 6, State=7.
128	0000000010000000	The lowest non-zero bit is bit 7, State=8.
256	0000000100000000	The lowest non-zero bit is bit 8, State=9.
512	0000001000000000	The lowest non-zero bit is bit 9, State=10.
1024	0000010000000000	The lowest non-zero bit is bit 10, State=11.
2048	0000100000000000	The lowest non-zero bit is bit 11, State=12.
4096	0001000000000000	The lowest non-zero bit is bit 12, State=13.
8192	0010000000000000	The lowest non-zero bit is bit 13, State=14.
16384	0100000000000000	The lowest non-zero bit is bit 14, State=15.
32768	1000000000000000	The lowest non-zero bit is bit 15, State=16.

Bit	If the Data Type is “Bit”, only 2 states are available.  	If the data type is “Bit”, “Bit” is the data type of memory address. 

Double-click the Multistate Indicator item to call out the following Multistate Indicator Properties page.

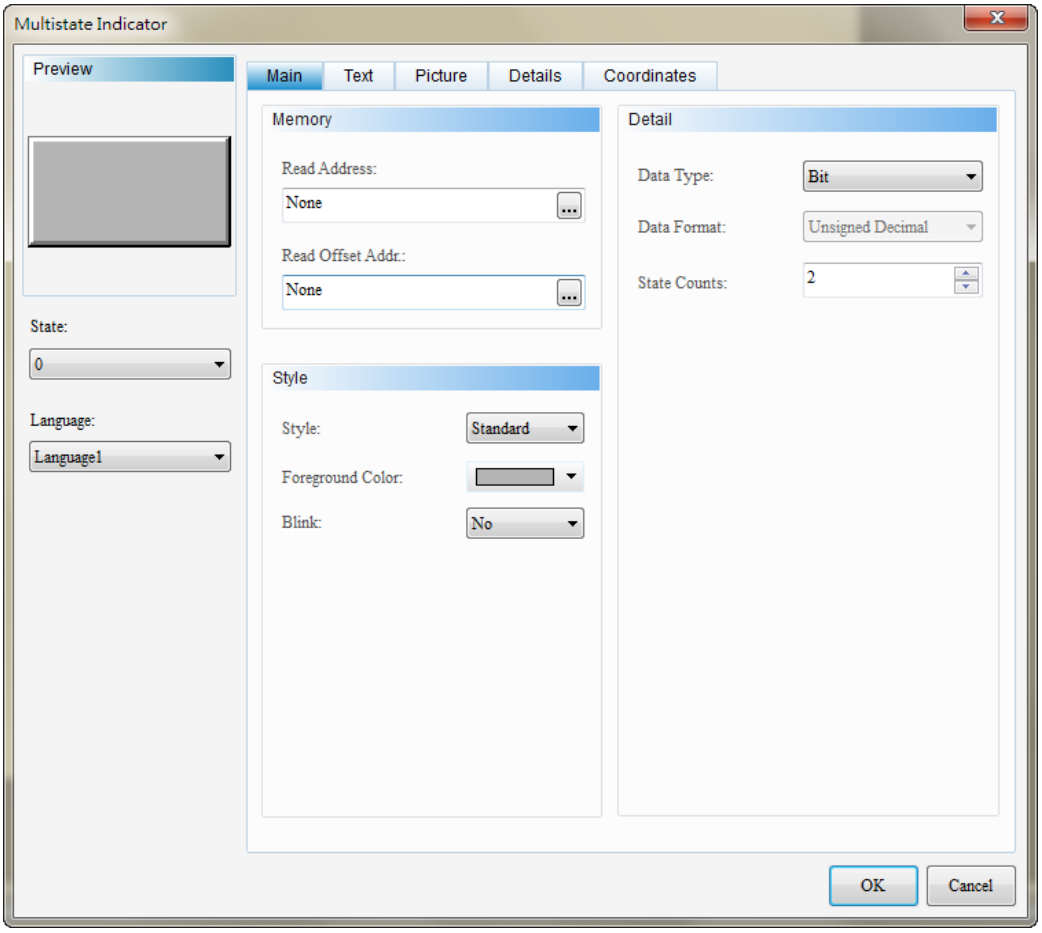


Figure 10-1-1 Multistate Indicator Properties

Multistate Indicator	
Function Page	**Content Description**
Preview	Views the multistate value and multilingual data to be indicated.
Main	Sets read address, read offset address, element type, foreground color, and blink. Sets the Data Type, Data Format and value count of Multistate Indicators.
Text	Sets text content to be displayed and text properties, including font type, font size, font color, bold/italic/underline of font, scaling, and text alignment.
Picture	Sets picture bank name, alignment, picture stretch mode, and transparent color.
Details	Sets invisible address.
Coordinates	Sets the X-Y coordinate, width, and height of the element.

Table 10-1-5 Multistate Indicator Function Page

◆ Main

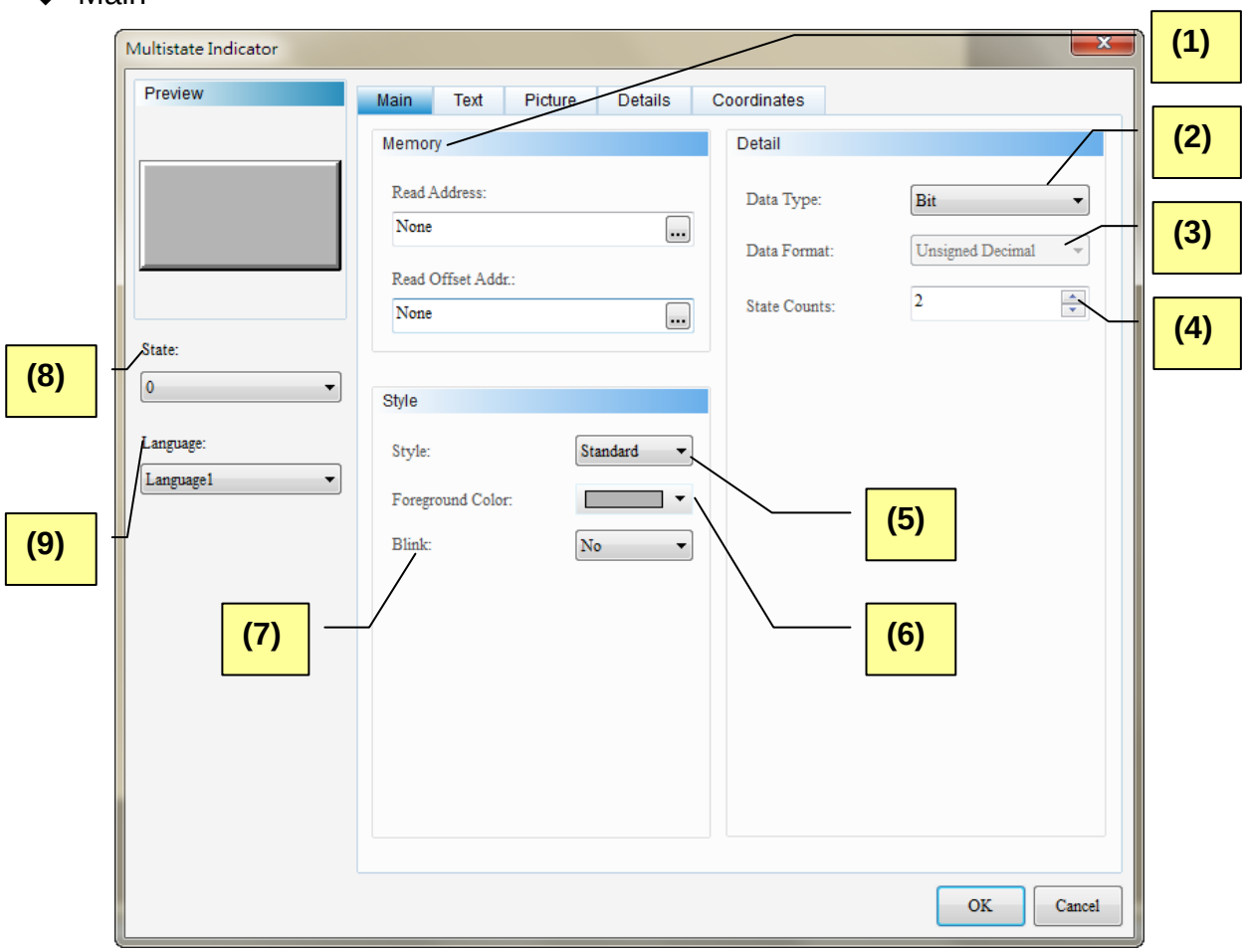
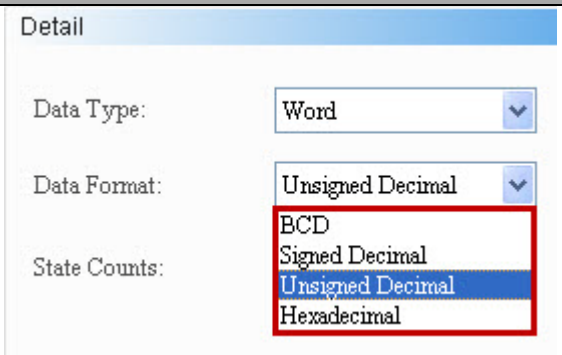
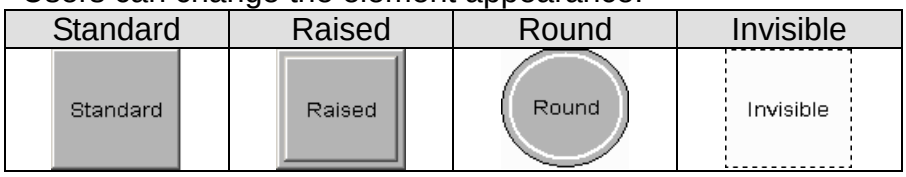
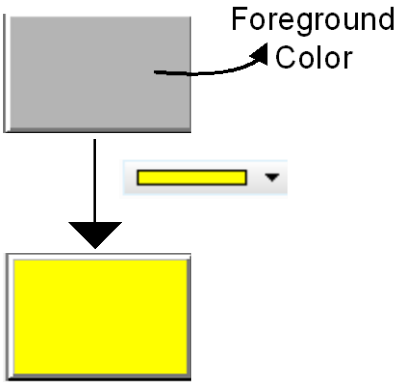
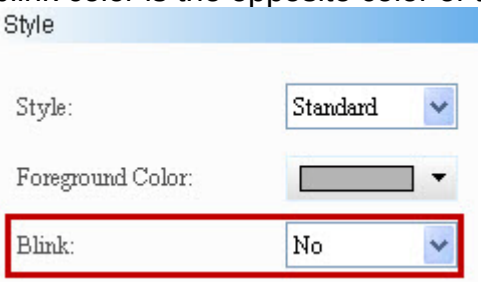
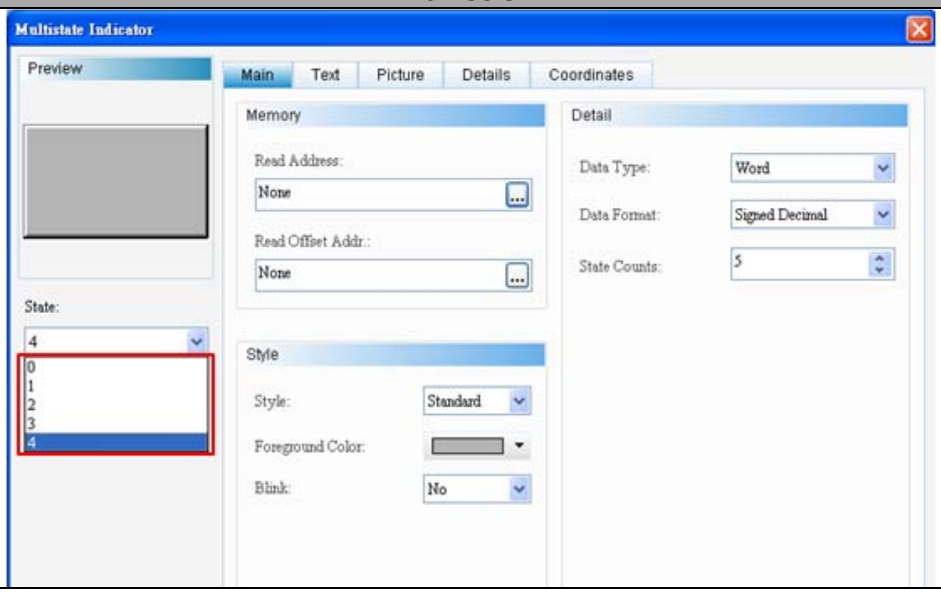
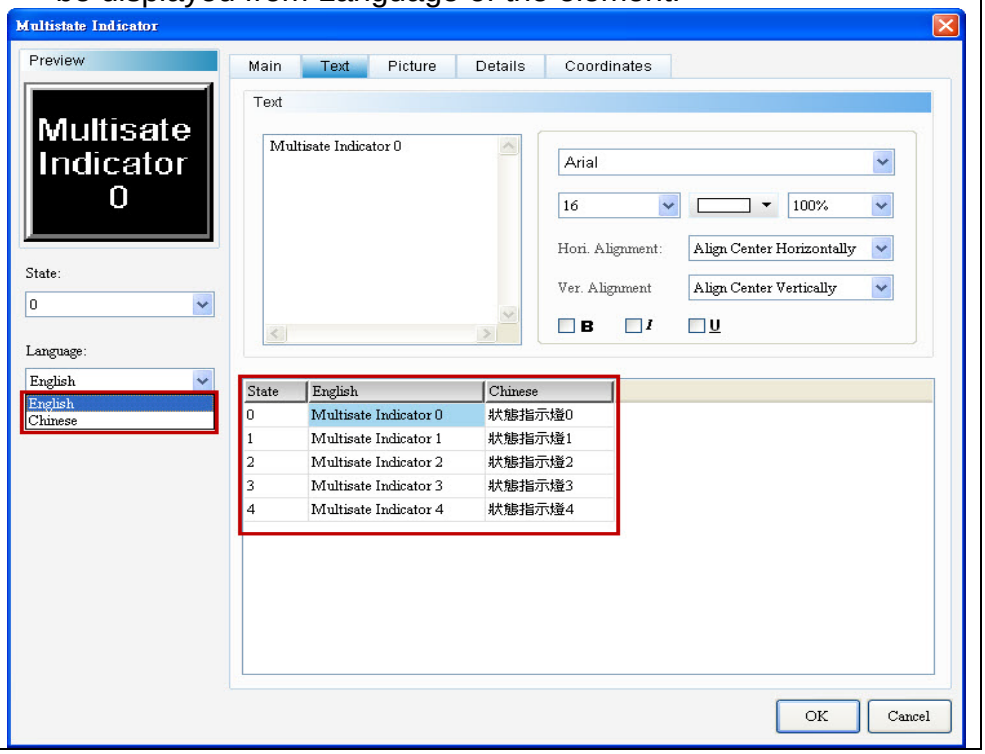


Figure 10-1-2 Multistate Indicator Element Main Properties Page

No.	Property	Function
(1)	Read Address	➢ Selects the address of internal memory or controller register. The memory type changes based on the selected Data Type, including Word, LSB and Bit, as shown in Table 10-1-4. ➢ Selects link name or element type. Please refer to 5-1 Buttons of Chapter 05 for the details.
	Read Offset Address	➢ Please refer to Appendix D Write and Read Offset Address.
(2)	Data Type	➢ Four options: Bit, Word, LSB, and LSB (Support State 0). Please refer to Table 10-1-4 for the details.
(3)	Data Format	➢ Data format can only be selected when the Data Type is “Word”. ➢ These formats include BCD, Signed Decimal, Unsigned Decimal, and Hexadecimal.

No.	Property	Function
		
(4)	State Counts	➢ Sets the total State Counts of Multistate Indicators. If the Data Type is “Word”, users can select 1-256 states; if the Data Type is “LSB”, users can select 16 states; if the Data Type is “LSB (Support State 0)”, users can select 17 states; and if the Data Type is “Bit”, users can select 2 states. Please refer to Table 10-1-4 for details.
(5)	Element Type	➢ Element types include Standard, Raised, Round, and Invisible. Users can change the element appearance. 
(6)	Element Foreground Color	➢ Sets element foreground color. ➢ If element type is “Invisible”, frame color is disabled. 
(7)	Blink	➢ Defines if indicators blink when switching from one state to another. The blink color is the opposite color of the state color. 
(8)	State	➢ Previews or changes the state parameters of button elements by switching states.

No.	Property	Function
		
(9)	Language	➢ When text data are defined, users can edit the text properties to be displayed from Language of the element. 

◆ Text

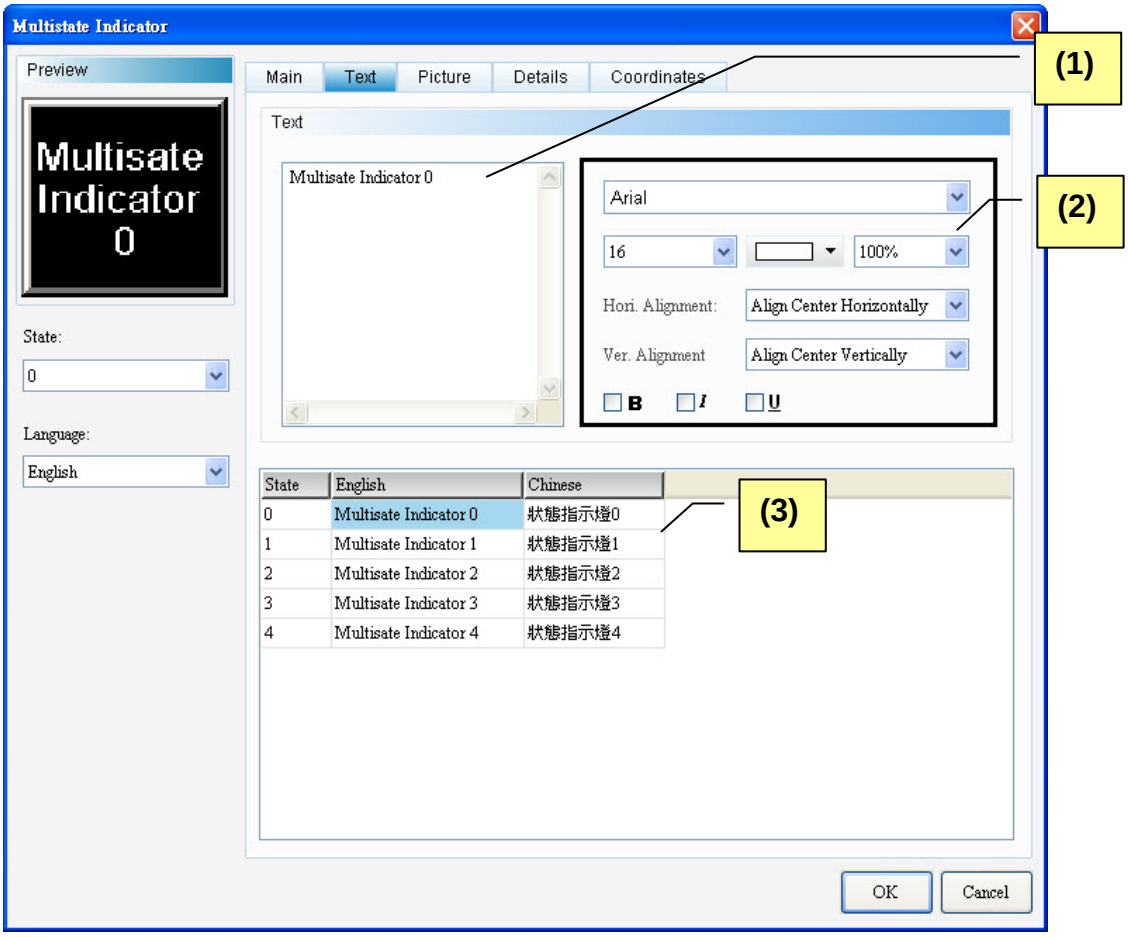
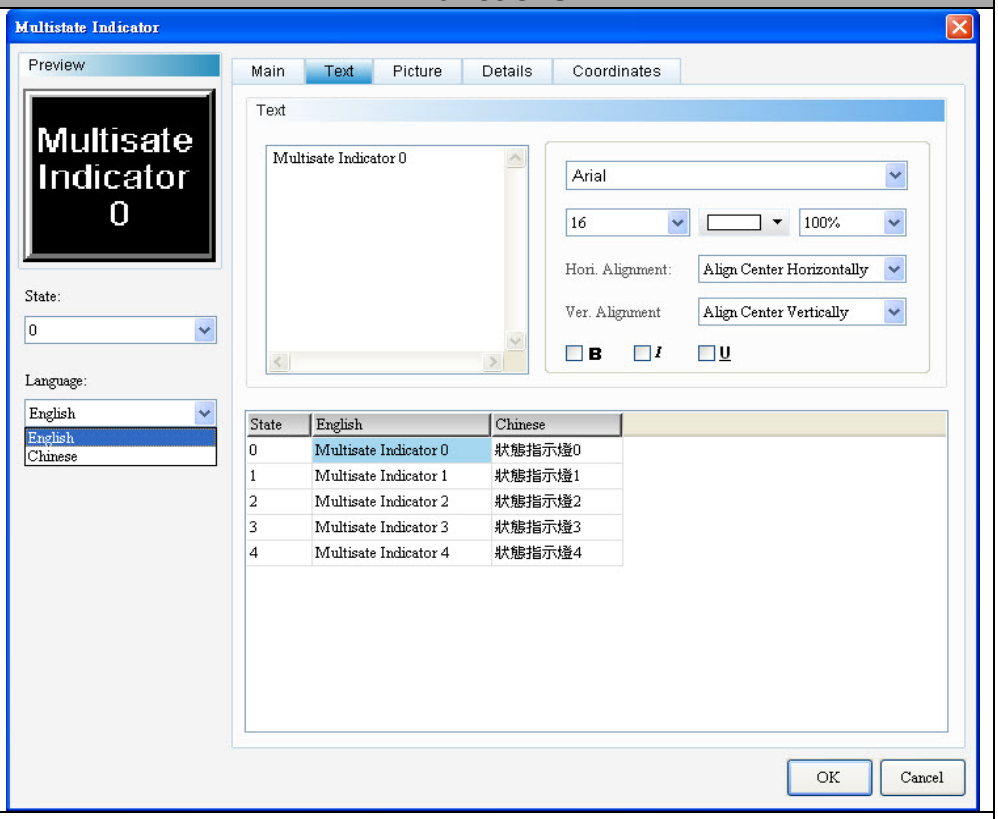


Figure 10-1-3: Multistate Indicator Element Text Properties Page

No.	Property	Functions
(1)	Text	➢ Users can input the text to be displayed in the text box.

No.	Property	Functions
		
(2)	Text Properties	➢ Sets text properties, including font type, font size, font color, scaling, text alignment, and bold/italic/underline of font. Please refer to the above figure for details about the results of text properties.
(3)	Multilingual Text Data	➢ Allows users to add multilingual text data. As shown in the Text Properties Figure, users can input English text in the English field.

◆ Picture

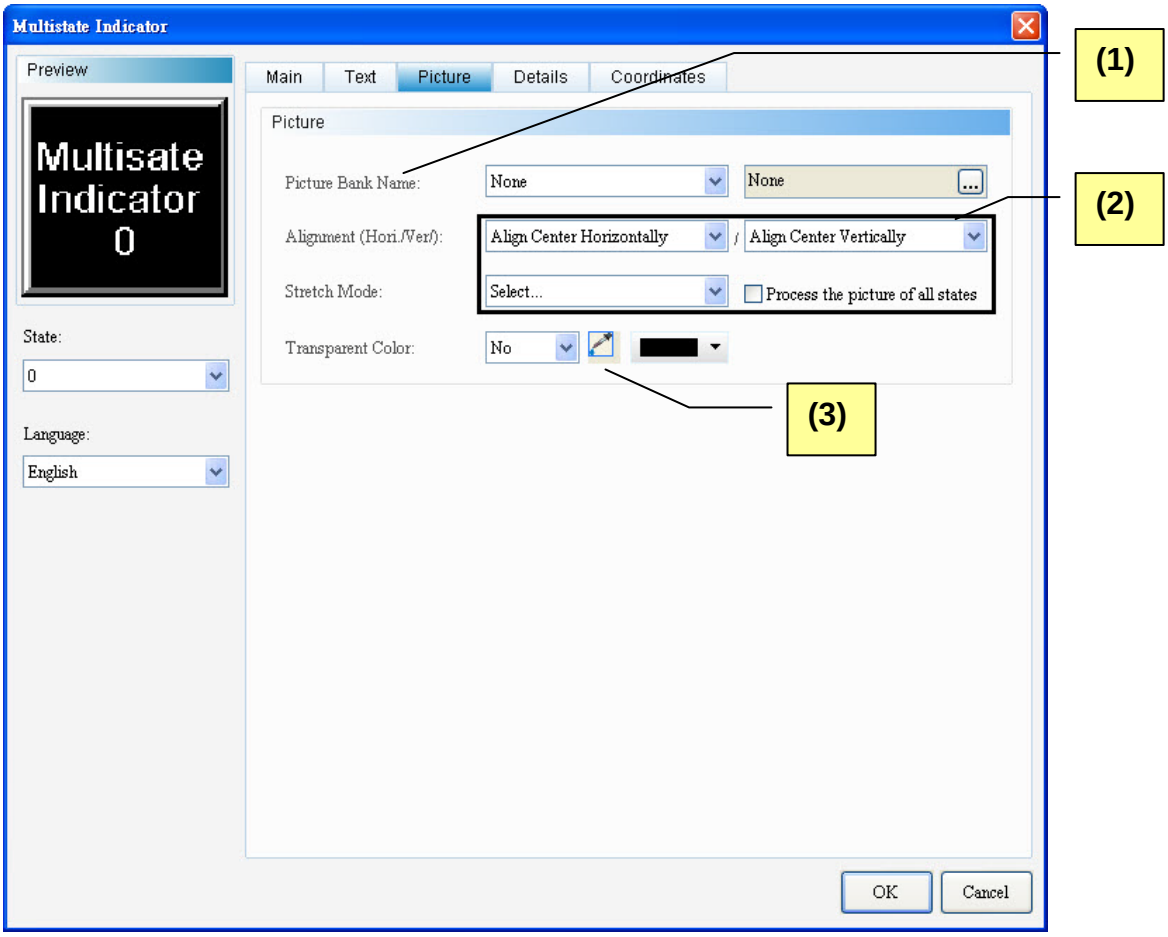
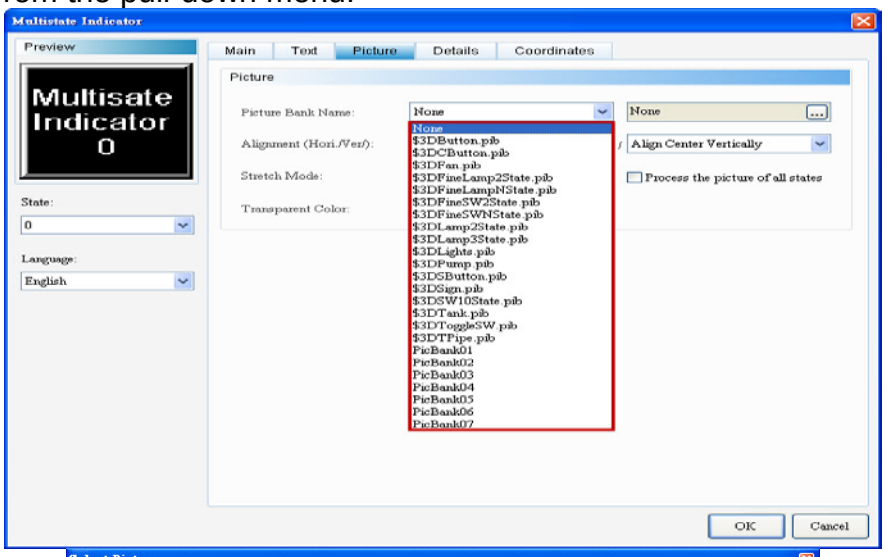
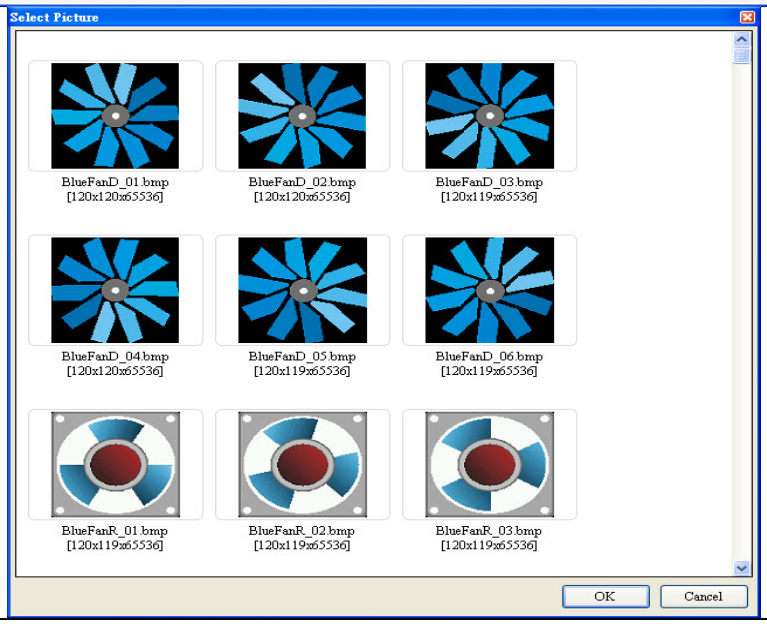
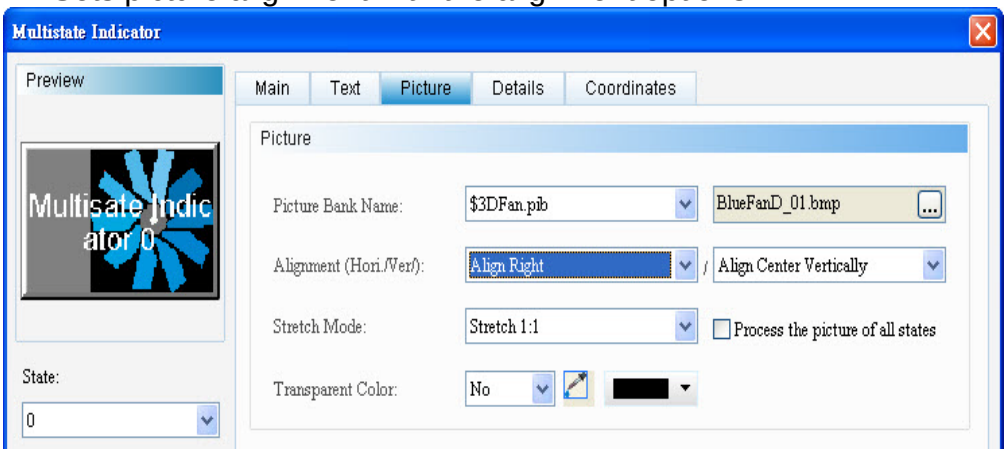
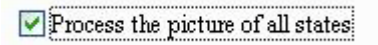
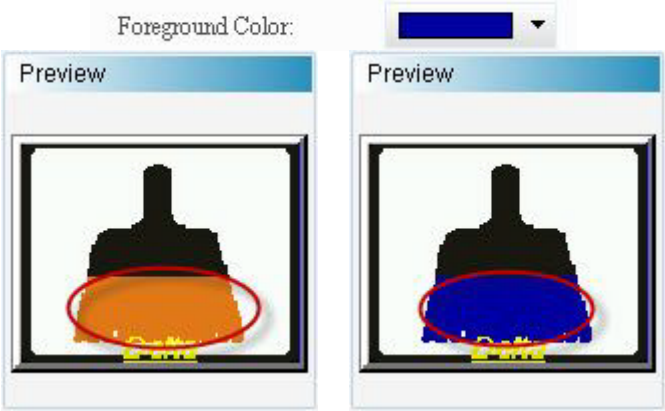


Figure 10-1-4 Multistate Indicator Element Picture Properties Page

No.	Property	Function
(1)	Picture Bank Name	➢ The default setting of the Picture Bank Name item is “None”. Users can select the picture to be displayed from the built-in picture bank from the pull-down menu.  
(2)	Alignment	➢ Sets picture alignment with the alignment options. 

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td></td><td>Stretch Mode</td><td>
➢ Stretch modes include: Fill, Keep Aspect Ratio, and Actual Size.
<table>
<tr><th>Fill</th><th>Keep Aspect Ratio</th><th>Actual Size</th></tr>
<tr><td>In the “Fill” mode, the selected picture will fill up the entire display area.</td><td>In the “Keep Aspect Ratio” mode, the selected picture will fit in the display area proportionally according to the original aspect ratio.</td><td>In the “Actual Size”, the picture will be displayed in its original size in the display area.</td></tr>
<tr><td>
</td><td>
</td><td>
</td></tr>
</table>
➢ If the “Process all state pictures” is selected, the system assumes that each element has multiple state values, and some pictures may be unable to fill the entire display area. By selecting this item, users will not need to set individual pictures to save time editing.


</td></tr>
<tr><td>(3)</td><td>Transparent Color</td><td>
➢ Sets some colors in the picture to transparent. In this case, by selecting the Transparent Color icon and clicking the orange part of the loom, the DOPSoft will omit all the orange parts in the picture and turn them transparent. This is to say, these part will be displayed in the same color of the foreground.


</td></tr>
</table>

◆ Details

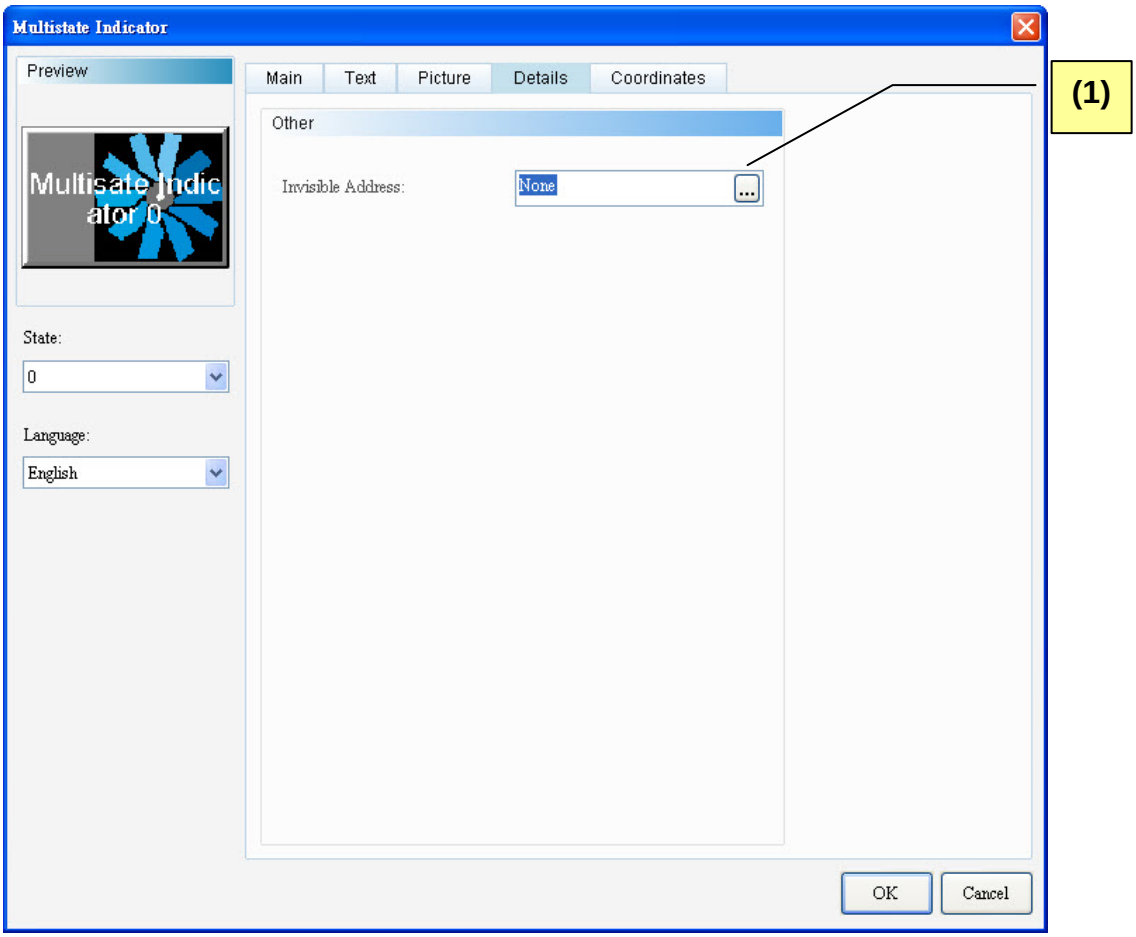
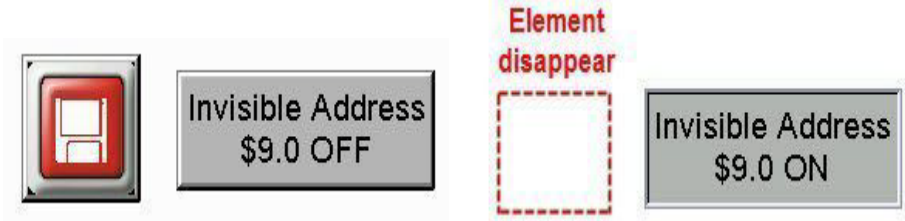
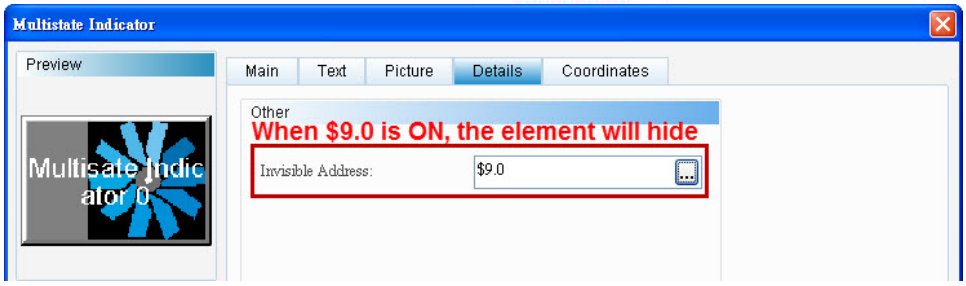


Figure 10-1-5 Multistate Indicator Element Details Properties Page

No.	Property	Function
(1)	Invisible Address	➢ When the Invisible Item is "On", button elements are hidden, and the corresponding button functions are disabled.  

◆ Coordinates

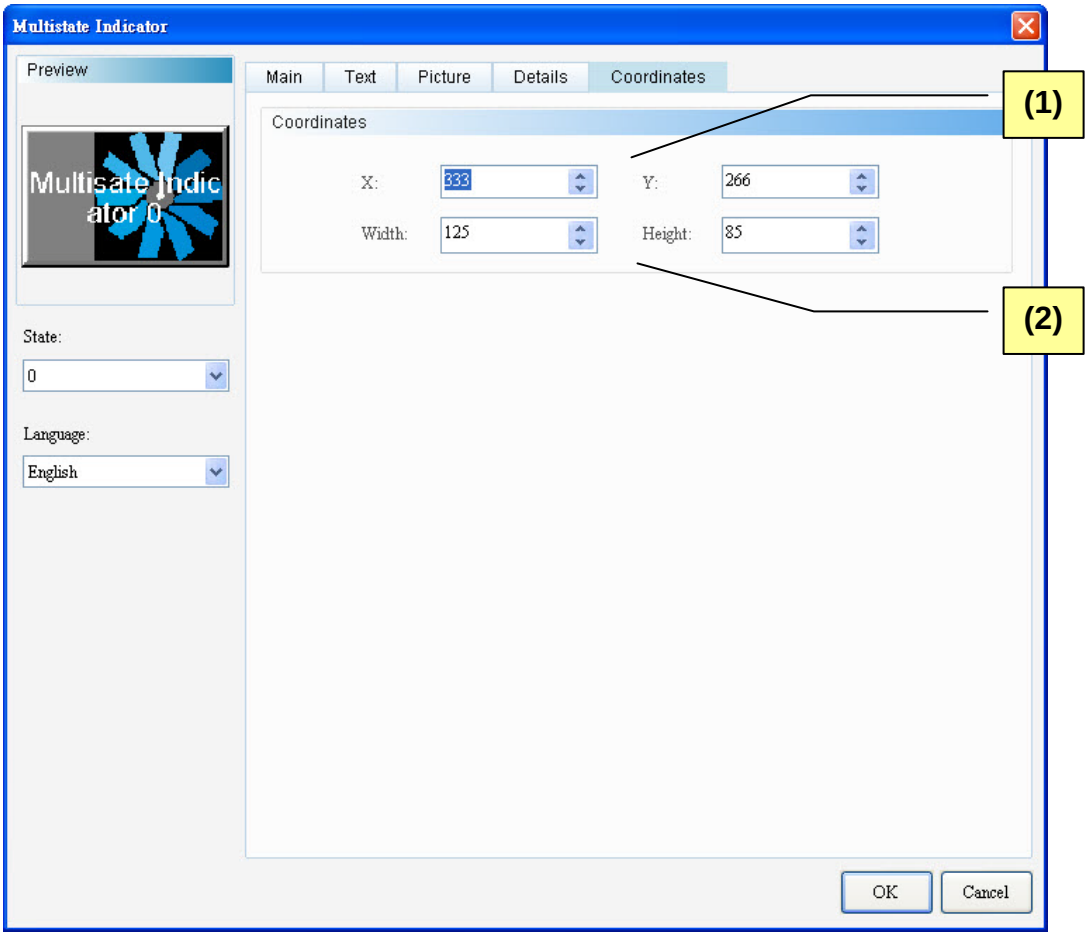


Figure 10-1-6 Multistate Indicator Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

10-2 Range Indicators

	Range Indicator

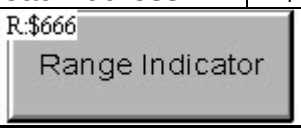
Like the case of the Multistate Indicator, the range indicator indicates the state of an address. Based on the value and its range in the read memory address, the HMI displays different states for different value ranges. Please refer to Table 10-2-1 below for the details about the range indicators.

Example of Range Indicators

Table 10-2-1 Example of Range Indicators

Read Address

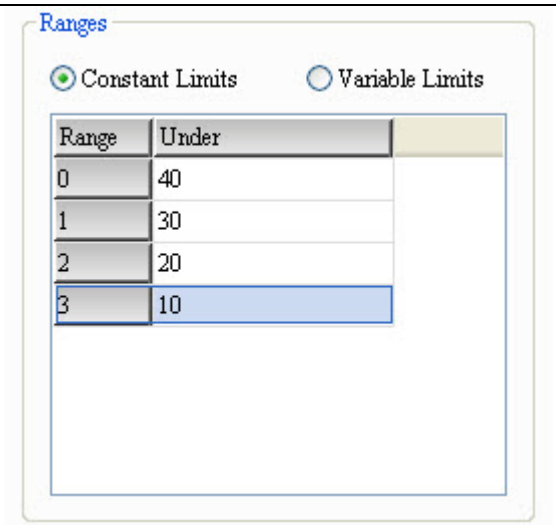
Range Indicator	
Read Address	$666



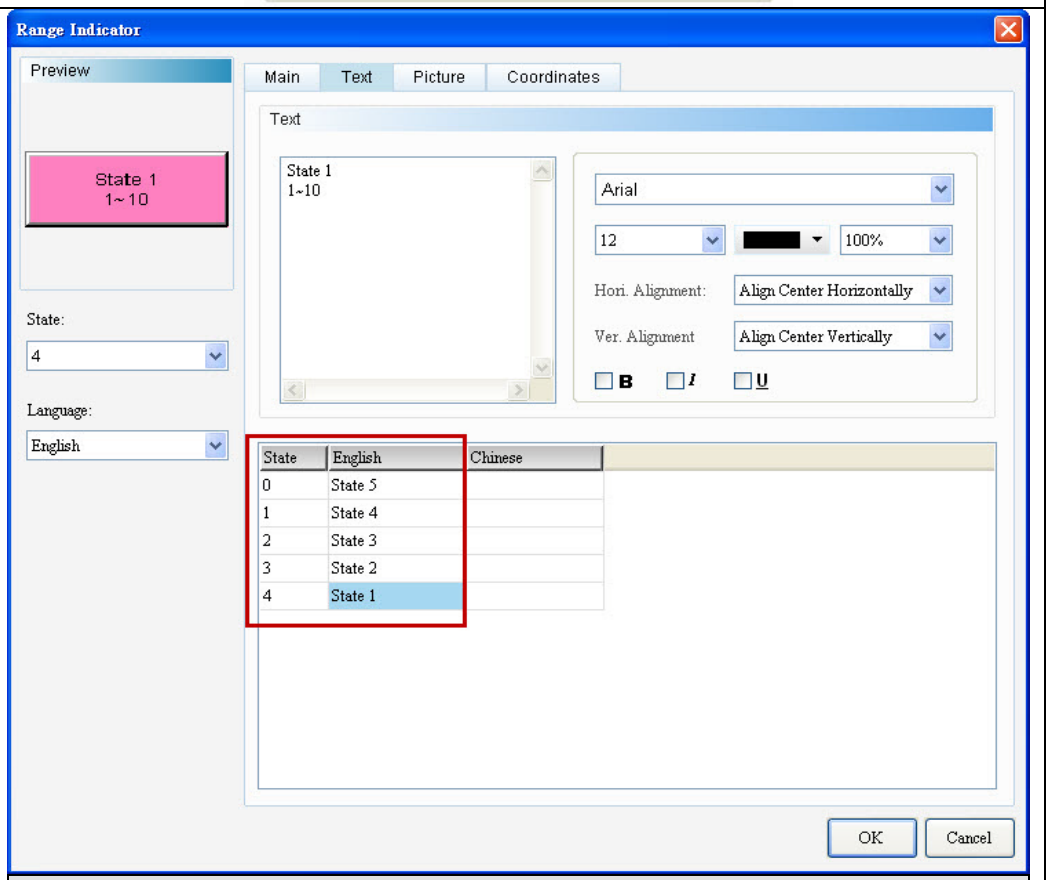
Properties

Data Type	Data Format	State Counts
Word	Unsigned Decimal	5

Range



Input Text Message

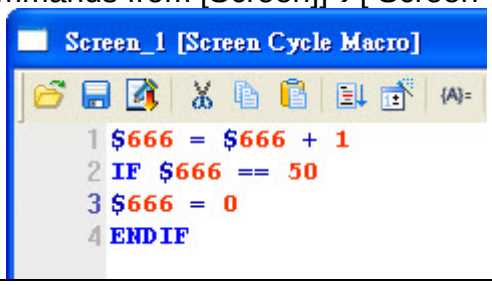


➢ **Inputs text for individual states**

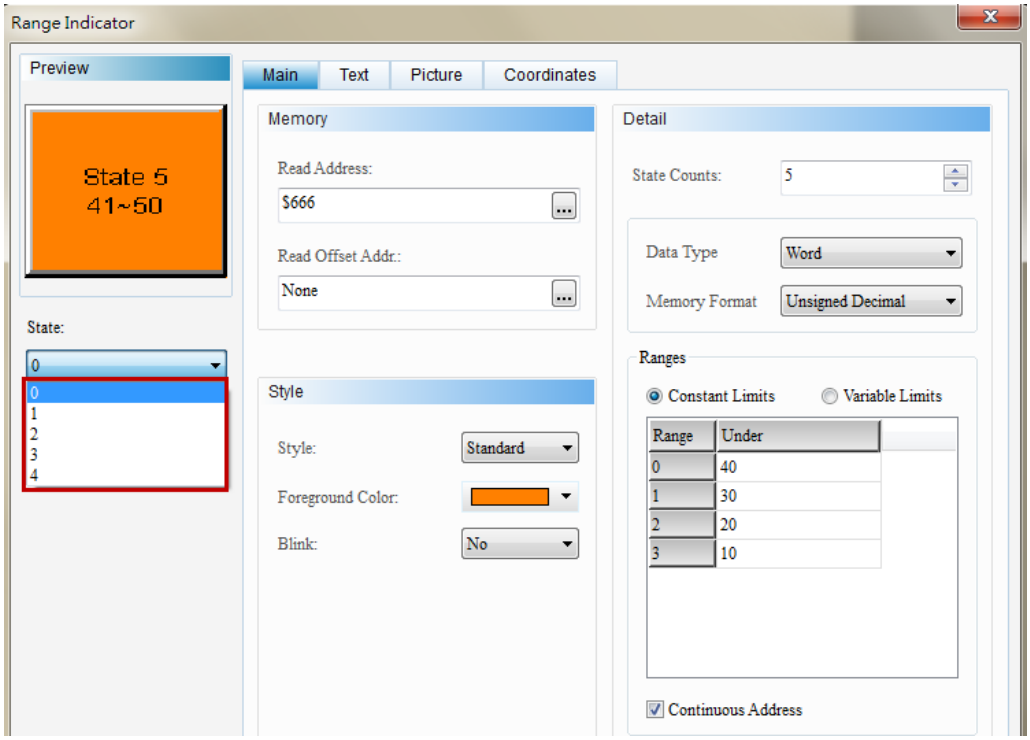
Example of Range Indicators

Table 10-2-1 Example of Range Indicators

	State 0	State 1	State 2	State 3	State 4
	State 5 41~50	State 4 31~40	State 3 21~30	State 2 11~20	State 1 1~10
Foreground Color	➢ **Sets the element foreground color of individual states.**				
	State 0	State 1	State 2	State 3	State 4
Screen Cycle Macro	➢ Input macro commands from [Screen]]→[Screen Cycle Macro]				



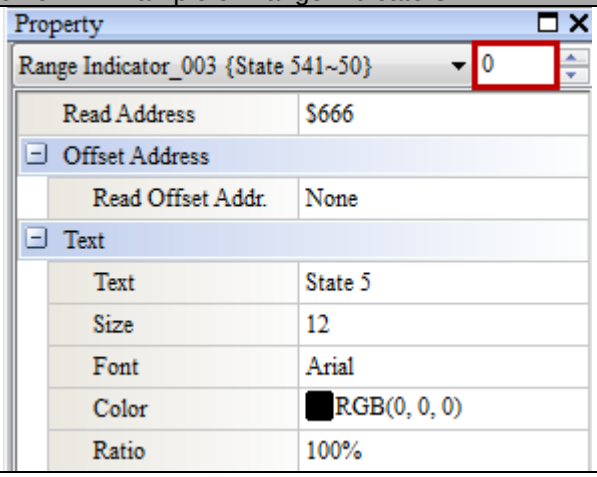
Value Range Indicator Legend	➢ Double-click the element to view the picture of individual states. In this example, there are five states, with value ranging from 0 to 4 as shown inside the red frame below.



➢ Users can switch state from the box on the upper right corner in the Properties window of the element.

Example of Range Indicators

Table 10-2-1 Example of Range Indicators



Execution Results

- Compile the screens and download them to the HMI. The range indicator will display the state value of individual states in the range indicator according to the value and range defined read from the corresponding memory address.

- **The display result of individual states after execution.**

State 0	State 1	State 2	State 3	State 4
State 5 41~50	State 4 31~40	State 3 21~30	State 2 11~20	State 1 1~10

Double-click the Range Indicator item to call out the following Range Properties page.

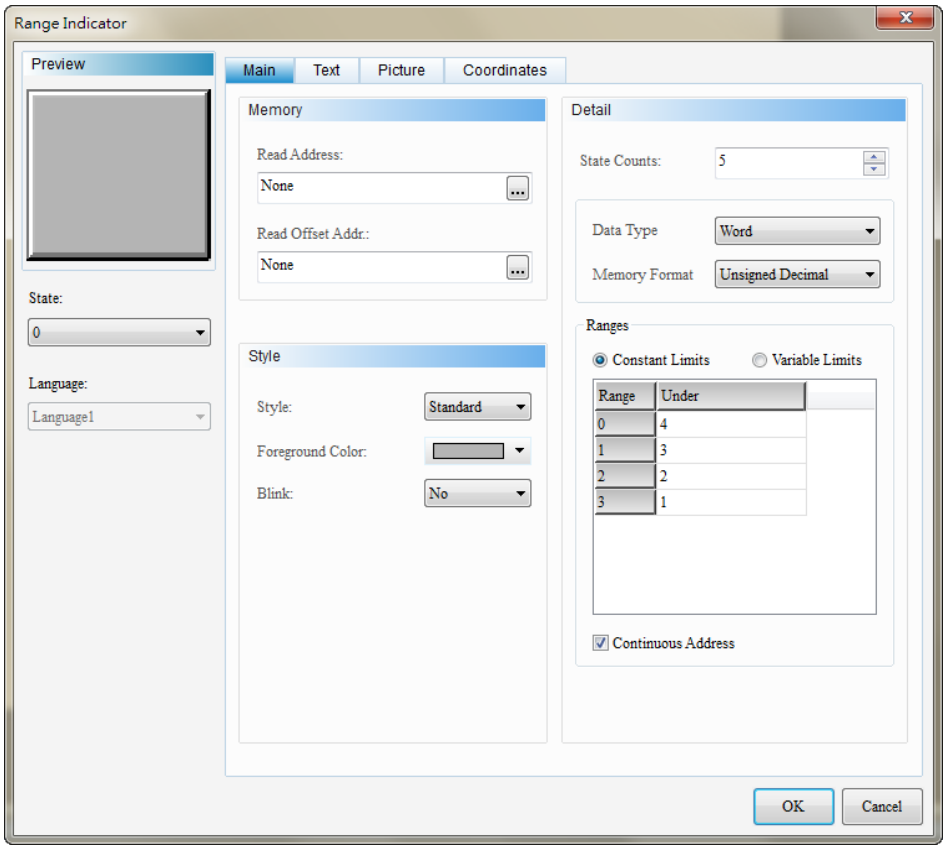


Figure 10-2-1 Range Indicator Properties

Range Indicator	
Function Page	**Content Description**
Preview	Views the multistate value and multilingual data of elements.
Main	Sets read address, read offset address, element type, foreground color, and blink. Sets the Data Type, Data Format, value count, and value range (constant and variable) of value range indicators.
Text	Sets text content to be displayed and text properties, including font type, font size, font color, bold/italic/underline of font, scaling, and text alignment.
Picture	Sets picture bank name, alignment, picture stretch mode, and transparent color.
Coordinates	Sets the X-Y coordinate, width, and height of button elements.

Table 10-2-2 Range Indictor Function Page

◆ Main

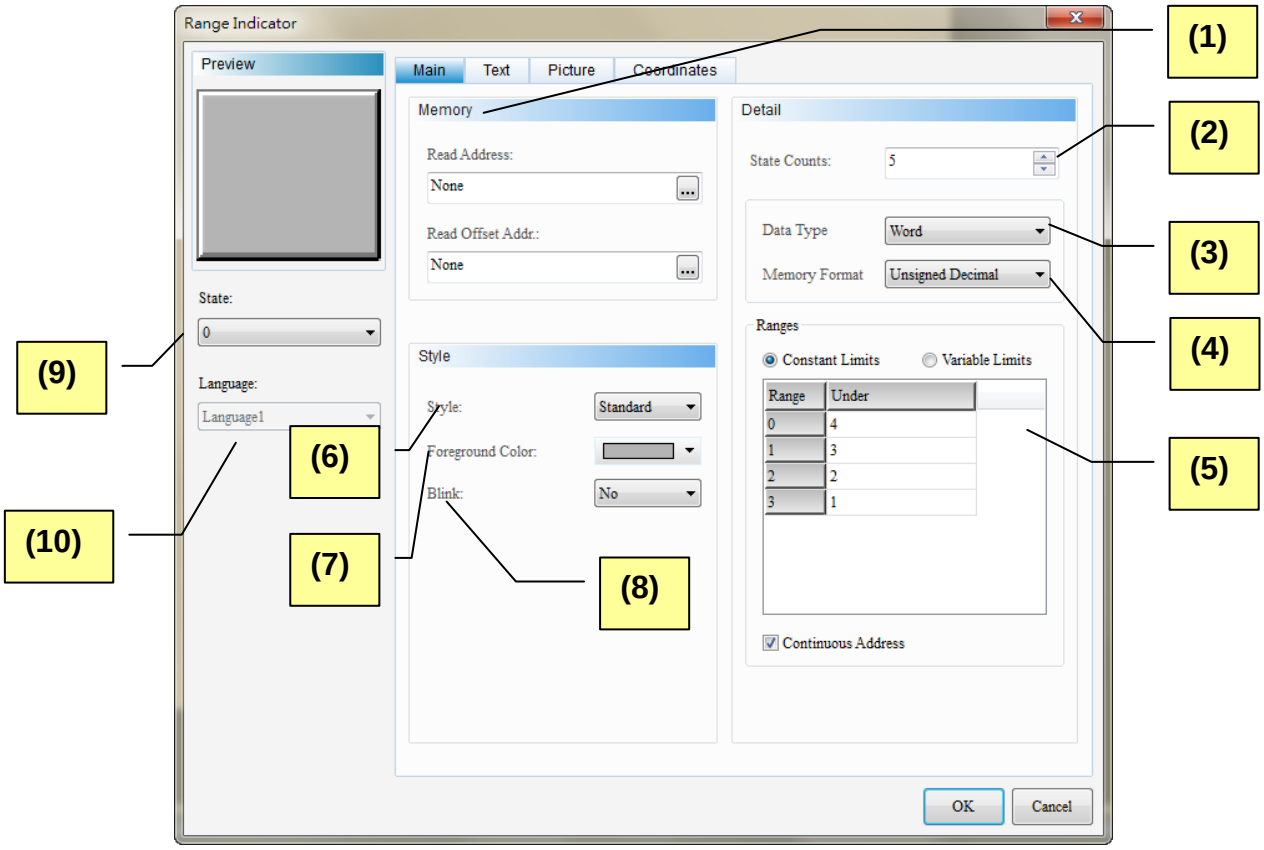
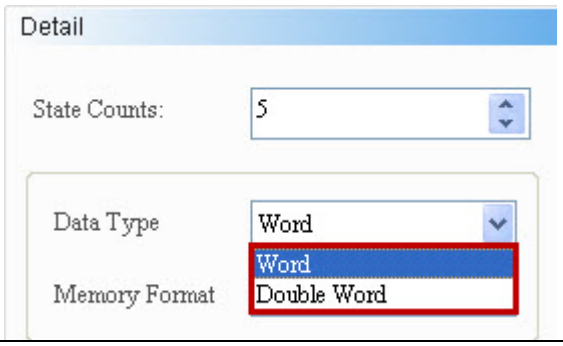
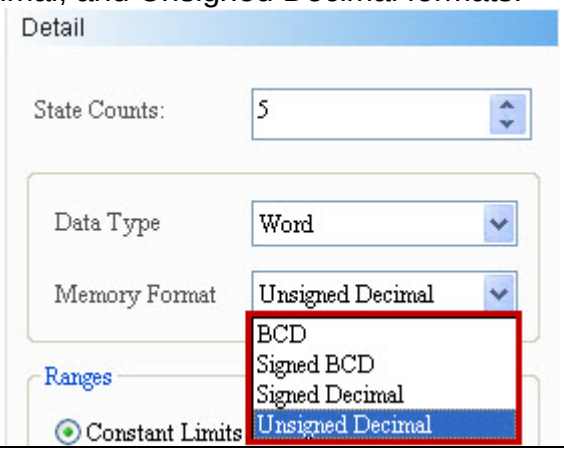
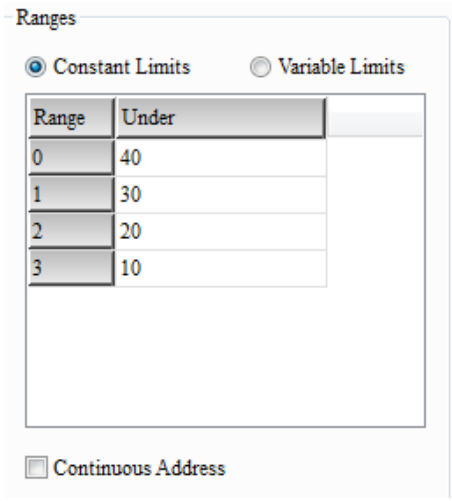
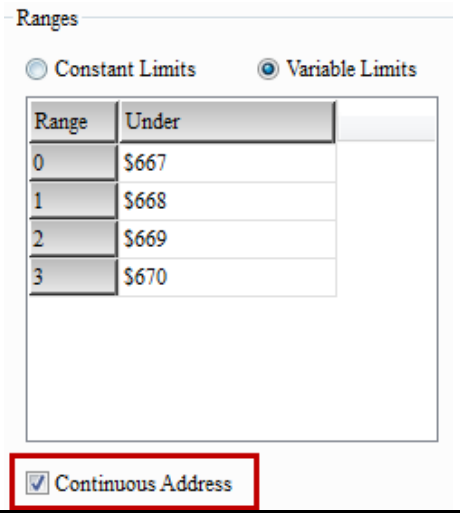
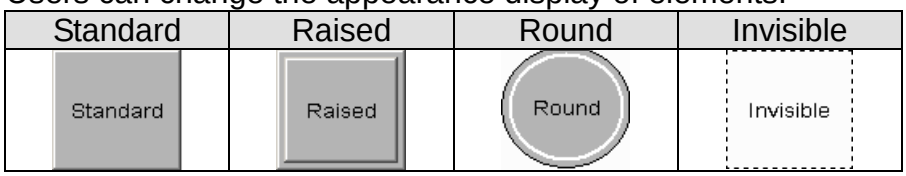
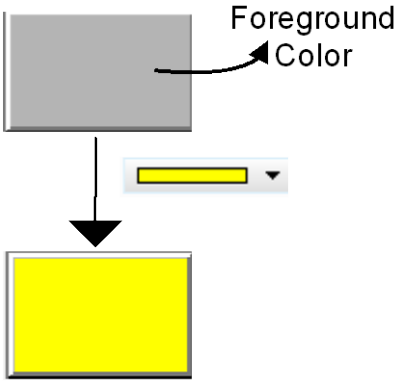
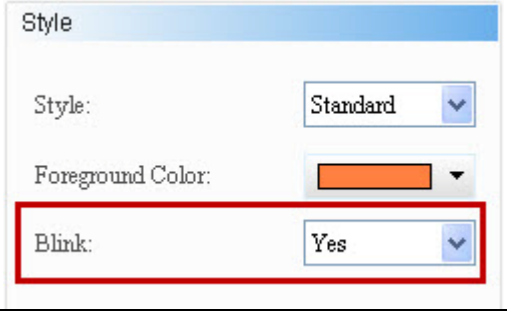
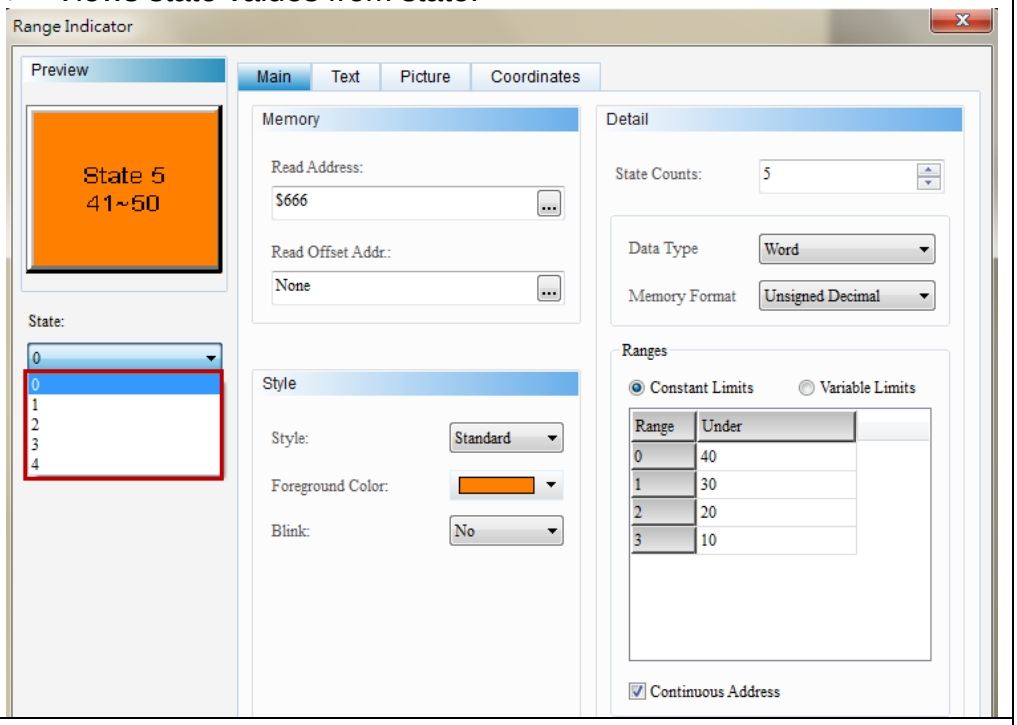
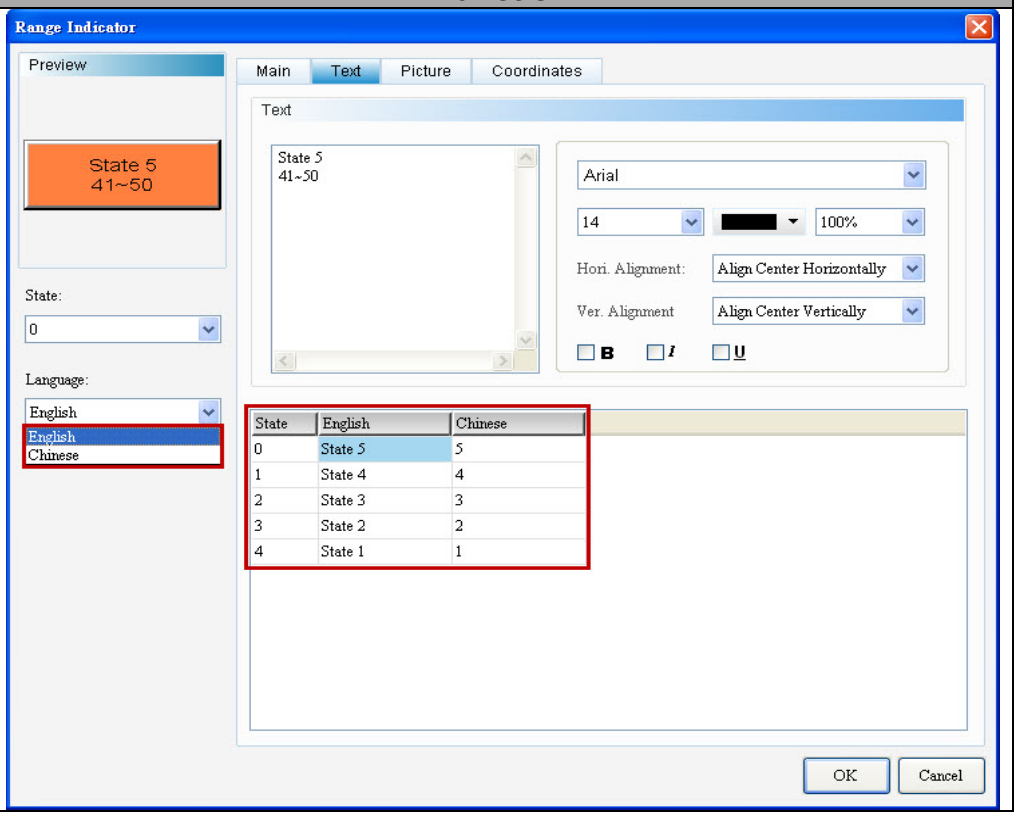


Figure 10-2-2 Range Indicator Element Main Properties Page

No.	Property	Function
(1)	Read Address	➢ Selects the address of internal memory or controller register. ➢ Selects link name or element type. Please refer to 5-1 Buttons of Chapter 05 for the details.
	Read Offset Address	➢ Please refer to Appendix D Write and Read Offset Address.
(2)	State Counts	➢ Sets the total State Counts of range indicators. If the Data Type is "Word" or "Double Word", users can set 1-256 states.
(3)	Data Type	➢ Two options: "Word" and "Double Word". 

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td>(4)</td><td>Memory Format</td><td>➢ Both “Word” and “Double Word” units include BCD, Signed BCD, Signed Decimal, and Unsigned Decimal formats.

</td></tr>
<tr><td>(5)</td><td>Range</td><td>➢ The range indicator can be “constant” and “variable”.
➢ If “constant” is selected, input “constant” for values. If “variable” is selected, the value is decided according to the memory address; provided that memory addresses should be continuous.
<table>
<tr><th>Constant</th><th>Variable</th></tr>
<tr><td>Input only constants for values in descending order from top to bottom.

</td><td>If the memory address to $666, the range will include memory addresses $666-$670.

</td></tr>
</table></td></tr>
<tr><td>(6)</td><td>Element Type</td><td>➢ Element types include Standard, Raised, Round, and Invisible. Users can change the appearance display of elements.

</td></tr>
<tr><td>(7)</td><td>Element Foreground Color</td><td>➢ Sets element foreground color.
➢ If element type is “Invisible”, frame color is disabled.</td></tr>
</table>

No.	Property	Function
		
(8)	Blink	➢ Defines if indicators blink when switching from one state to another. The blink color is the opposite color of the state color. 
(9)	State	➢ Views state values from state. 
(10)	Language	➢ When text data are defined, users can edit the text properties to be displayed from Language of the element.

No.	Property	Function
		

◆ Text

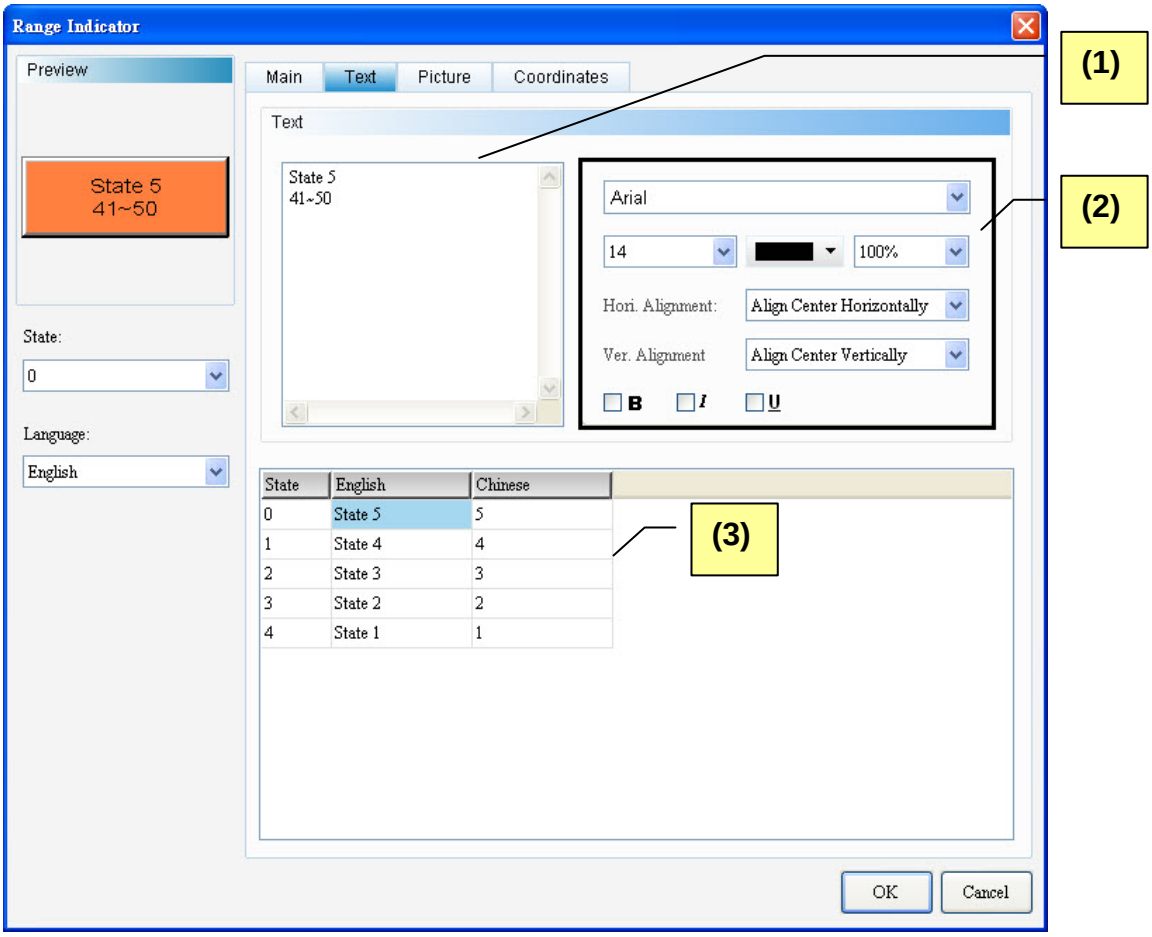
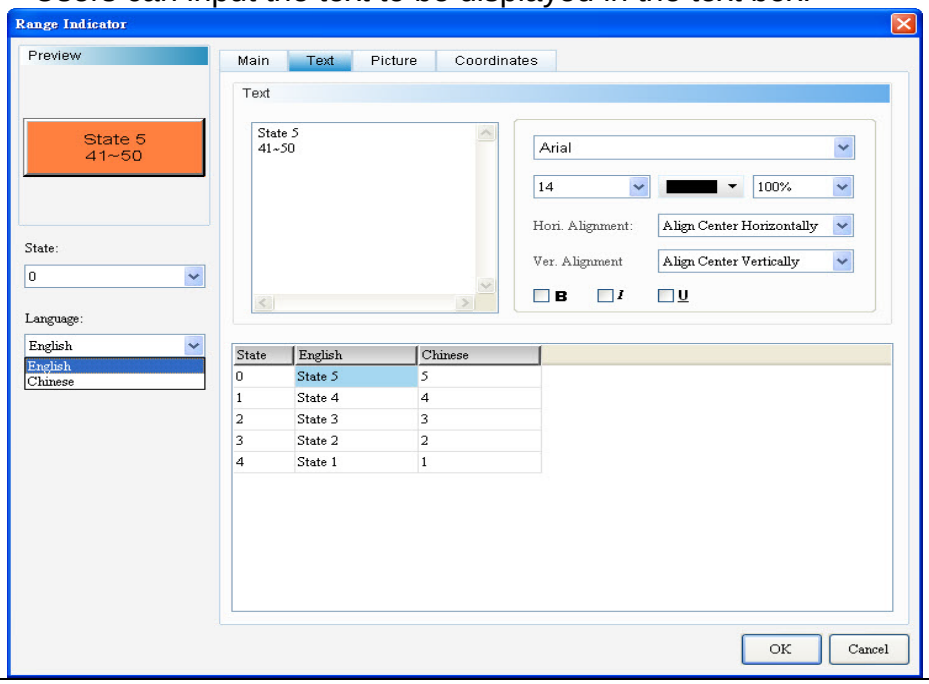


Figure 10-2-3 Range Indicator Element Text Properties Page

No.	Property	Functions
(1)	Text	➢ Users can input the text to be displayed in the text box. 

No.	Property	Functions
(2)	Text Properties	➢ Sets text properties, including font type, font size, font color, scaling, text alignment, and bold/italic/underline of font. Please refer to the above figure for details about the results of text properties.
(3)	Multilingual Text Data	➢ Allows users to add multilingual text data. As shown in the Text Properties Figure, users can input English text in the English field.

◆ Picture

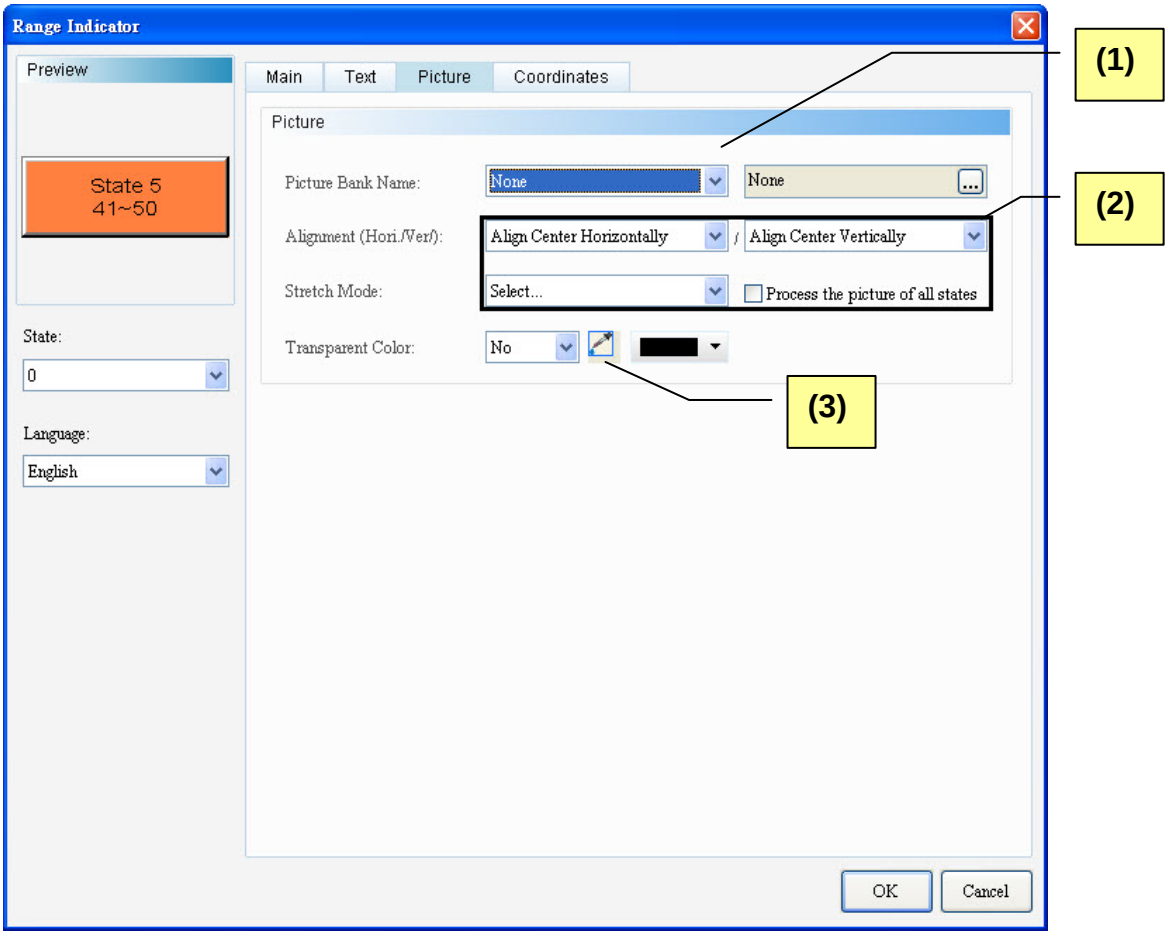
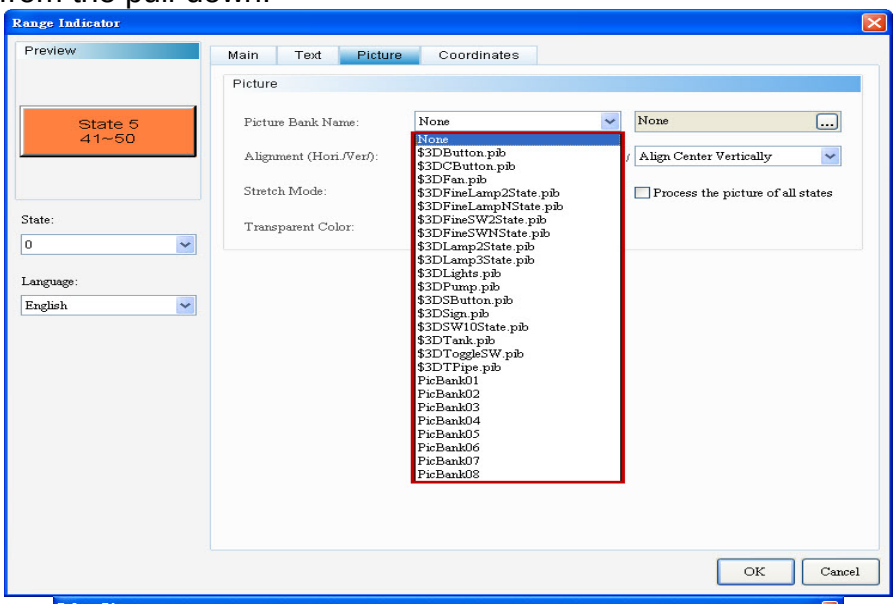
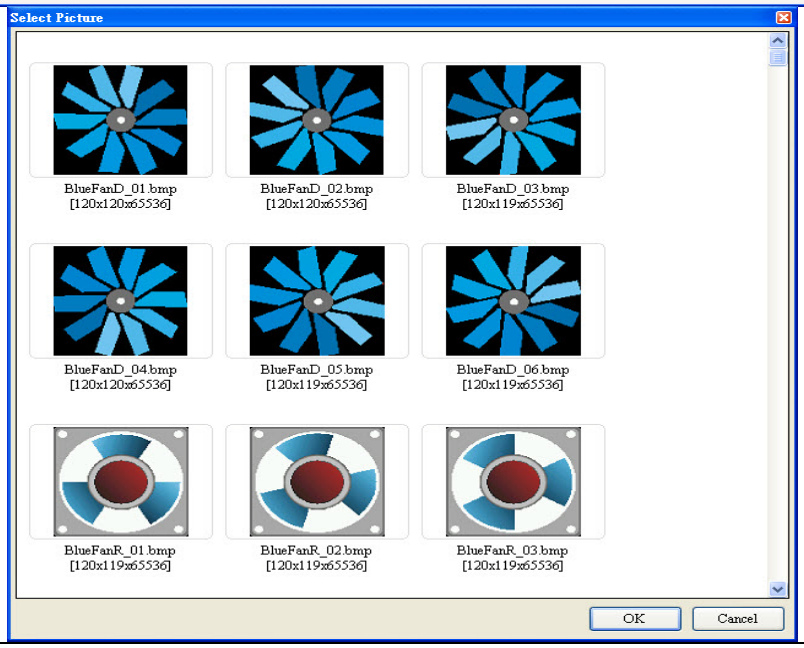
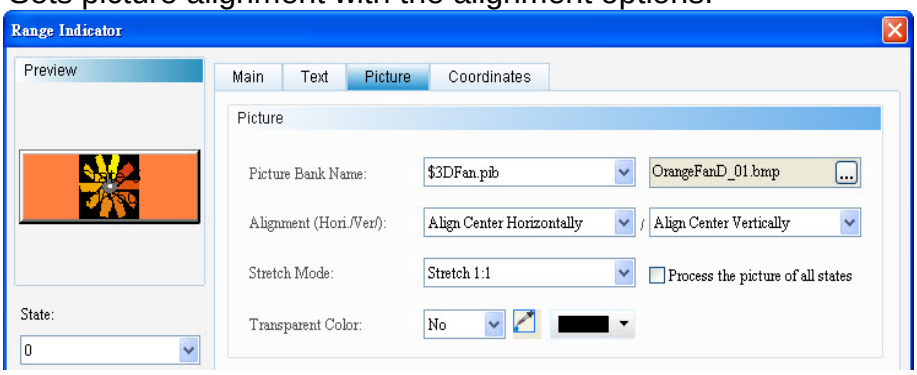
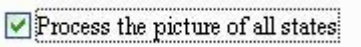
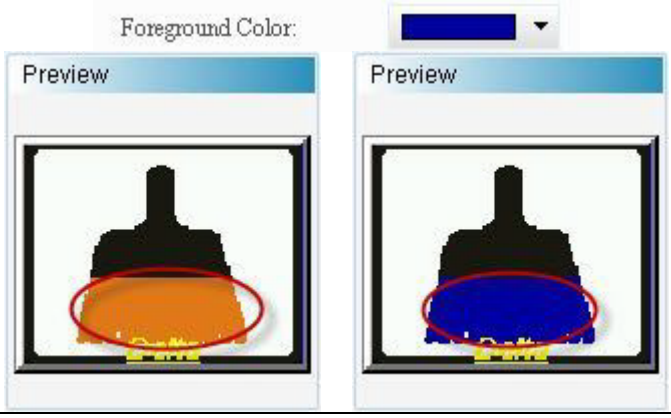


Figure 10-2-4 Range Indicator Element Picture Properties Page

No.	Property	Function
(1)	Picture Bank Name	➢ The default setting of the Picture Bank Name item is “None”. Users can select the picture to be displayed from the built-in picture bank from the pull-down.  
(2)	Alignment	➢ Sets picture alignment with the alignment options. 

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td></td><td>Stretch Mode</td><td>
➢ Stretch modes include: Fill, Keep Aspect Ratio, and Actual Size.
<table>
<tr><th>Fill</th><th>Keep Aspect Ratio</th><th>Actual Size</th></tr>
<tr><td>In the “Fill” mode, the selected picture will fill up the entire display area.</td><td>In the “Keep Aspect Ratio” mode, the selected picture will fit in the display area proportionally according to the original aspect ratio.</td><td>In the “Actual Size”, the picture will be displayed in its original size in the display area.</td></tr>
<tr><td>
</td><td>
</td><td>
</td></tr>
</table>
➢ If the “Process all state pictures” is selected, the system assumes that each element has multiple state values, and some pictures may be unable to fill the entire display area. By selecting this item, users will not need to set individual pictures to save time editing.


</td></tr>
<tr><td>(3)</td><td>Transparent Color</td><td>
➢ Sets some colors in the picture to transparent. In this case, by selecting the Transparent Color icon and clicking the orange part of the loom, the DOPSoft will omit all orange parts in the picture and turn them transparent. This is to say, these part will be displayed in the same color as the foreground.


</td></tr>
</table>

◆ Coordinates

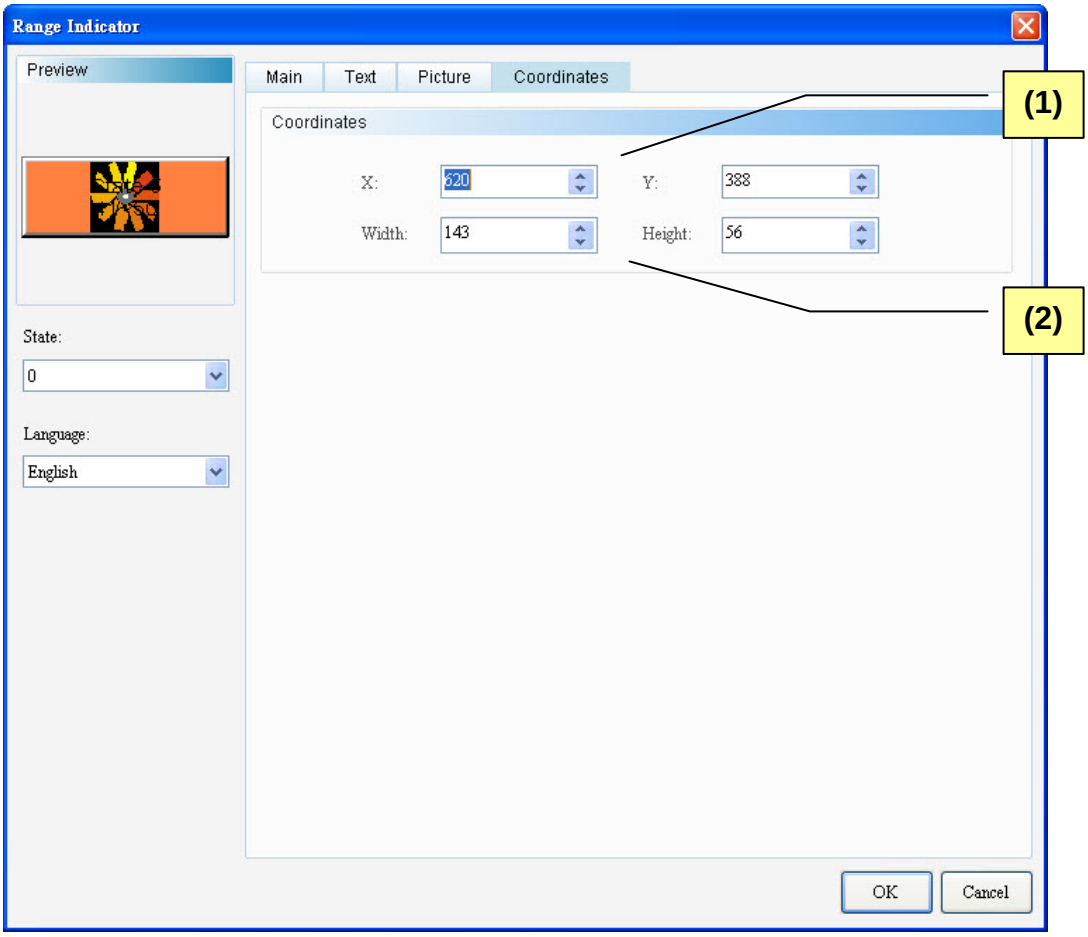


Figure 10-2-5 Range Indicator Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

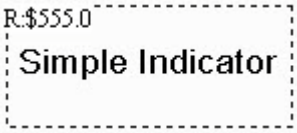
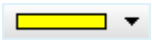
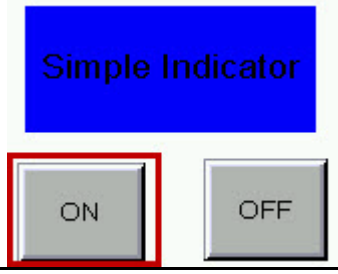
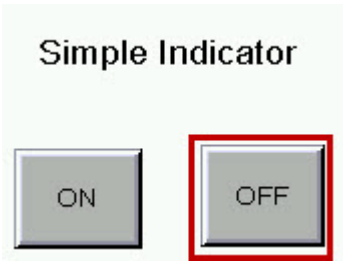
10-3 Simple Indicators

	Simple Indicator

Simple indicators provide two states, ON and OFF, for users to change the XOR colors according to the state switch. Users can use the simple indicator to indicate state switch (ON/OFF) along with the button elements and identify the state with XOR colors. Please see Table 9-3-1 below for details.

Example of Simple Indicators

Table 10-3-1 Example of Simple Indicators

Read Address	**ON/OFF Elements**		**Simple Indicator Elements**	
	Write Address	$555.0	Read Address	$555.0
				
Properties	**XOR Color**	**Redraw**		
		NO		
Execution Results	➢ Compile the screens and download them to the HMI. The simple indicator switches within ON/OFF according to the memory address read. When users press the ON button, the simple indicator will switch to State 1; when users press the OFF button, the simple indicator will switch to State 0.			
	State 0	State 1		
				

Double-click the Simple Indicator item to call out the following Simple Indicator Properties page.

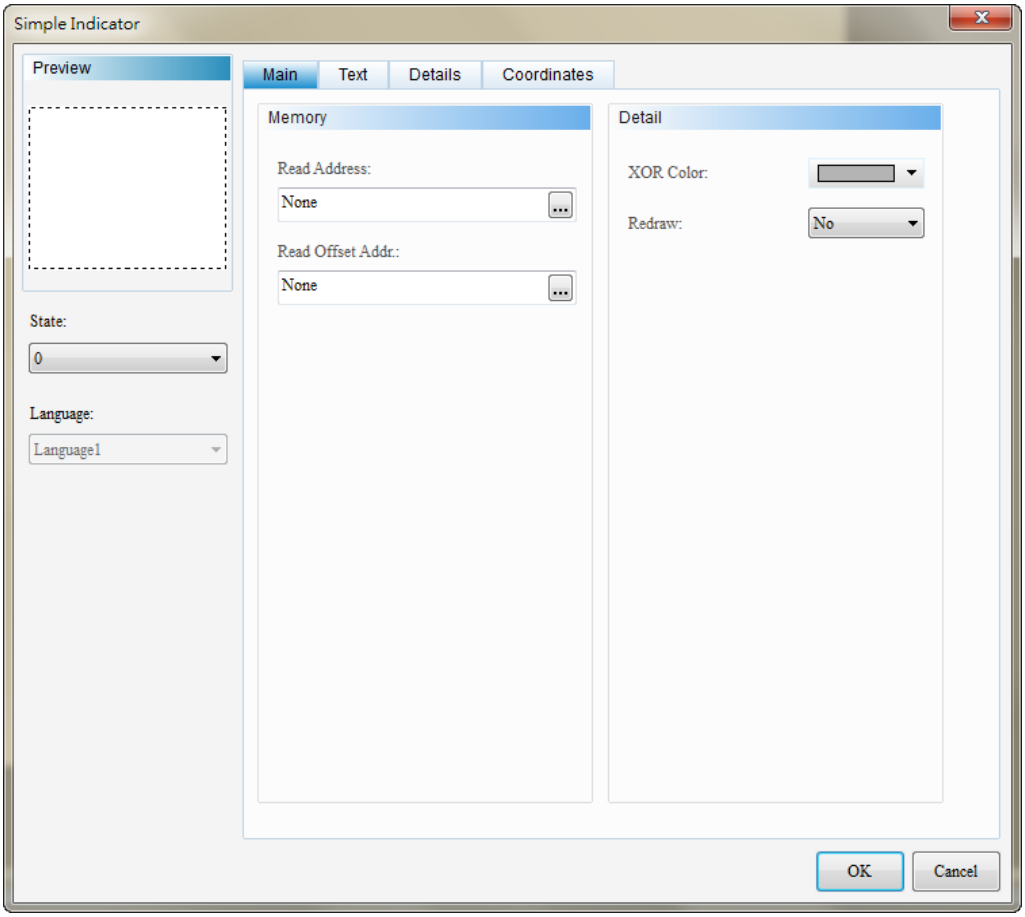


Figure 10-3-1 Simple Indicator Properties

Simple Indicator	
Function Page	**Content Description**
Preview	Views the multistate value and multilingual data of elements.
Main	Sets read address, read offset address, XOR color, and redraw.
Text	Sets text content to be displayed and text properties, including font type, font size, and font color, bold/italic/underline of font, scaling, and text alignment.
Coordinates	Sets the X-Y coordinate, width, and height of button elements.

Table 10-3-2 Simple Indicator Function Page

◆ Main

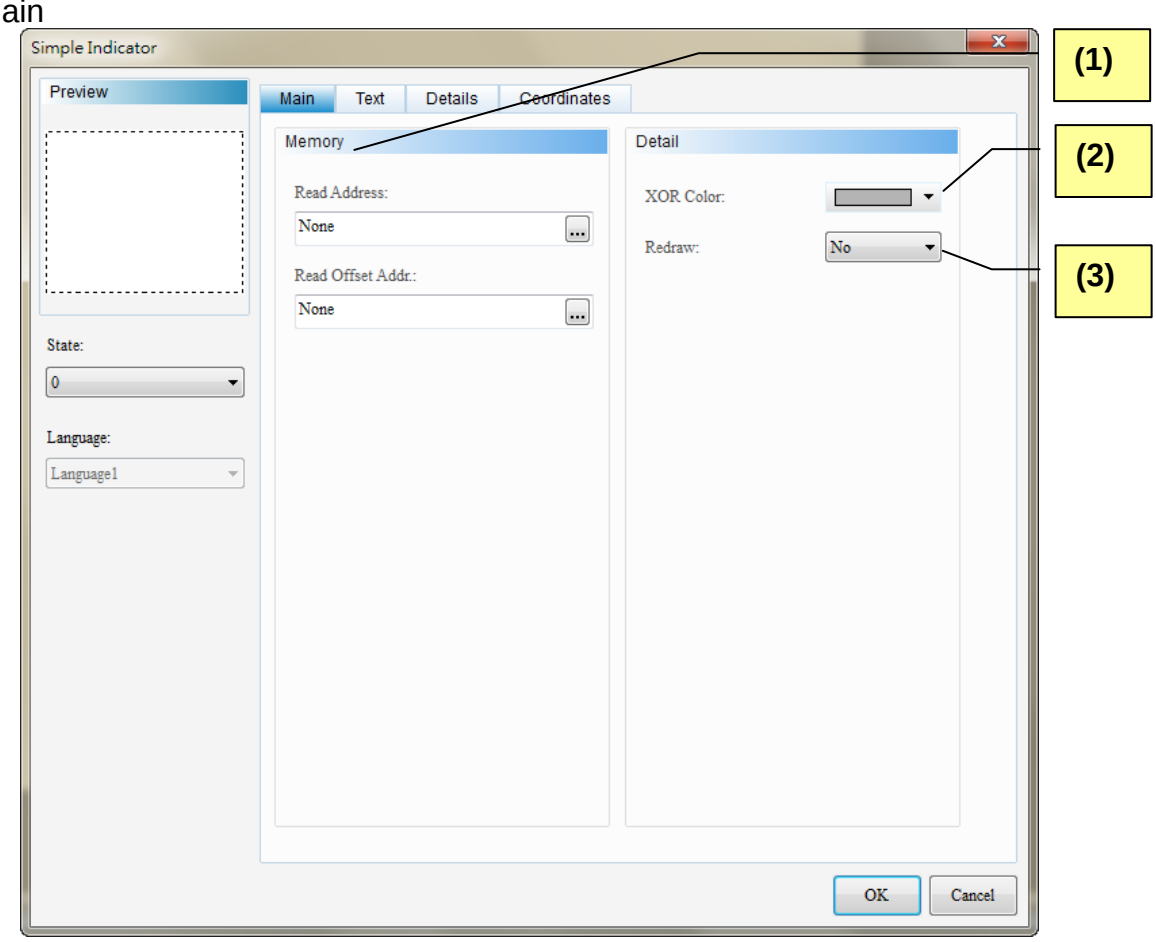
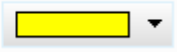


Figure 10-3-2 Simple Indicator Element Main Properties Page

No.	Property	Function
(1)	Read Address	➢ Selects the address of internal memory or controller register. Simple indicators support on the Bit Data Format. ➢ Selects link name or element type. Please refer to 5-1 Buttons of Chapter 05 for the details.
	Read Offset Address	➢ Please refer to Appendix D Write and Read Offset Address.
(2)	XOR Color	➢ Sets background XOR color. XOR Color:  **Before XOR** / **After XOR**
(3)	Redraw	➢ If “Yes” is selected, users can smoothly read the data of element dynamic changes by overlapping the element on the dynamic elements. If “No” is selected, the data of element dynamic changes are unable to read. **YES** / **NO**

No.	Property	Function

◆ Text

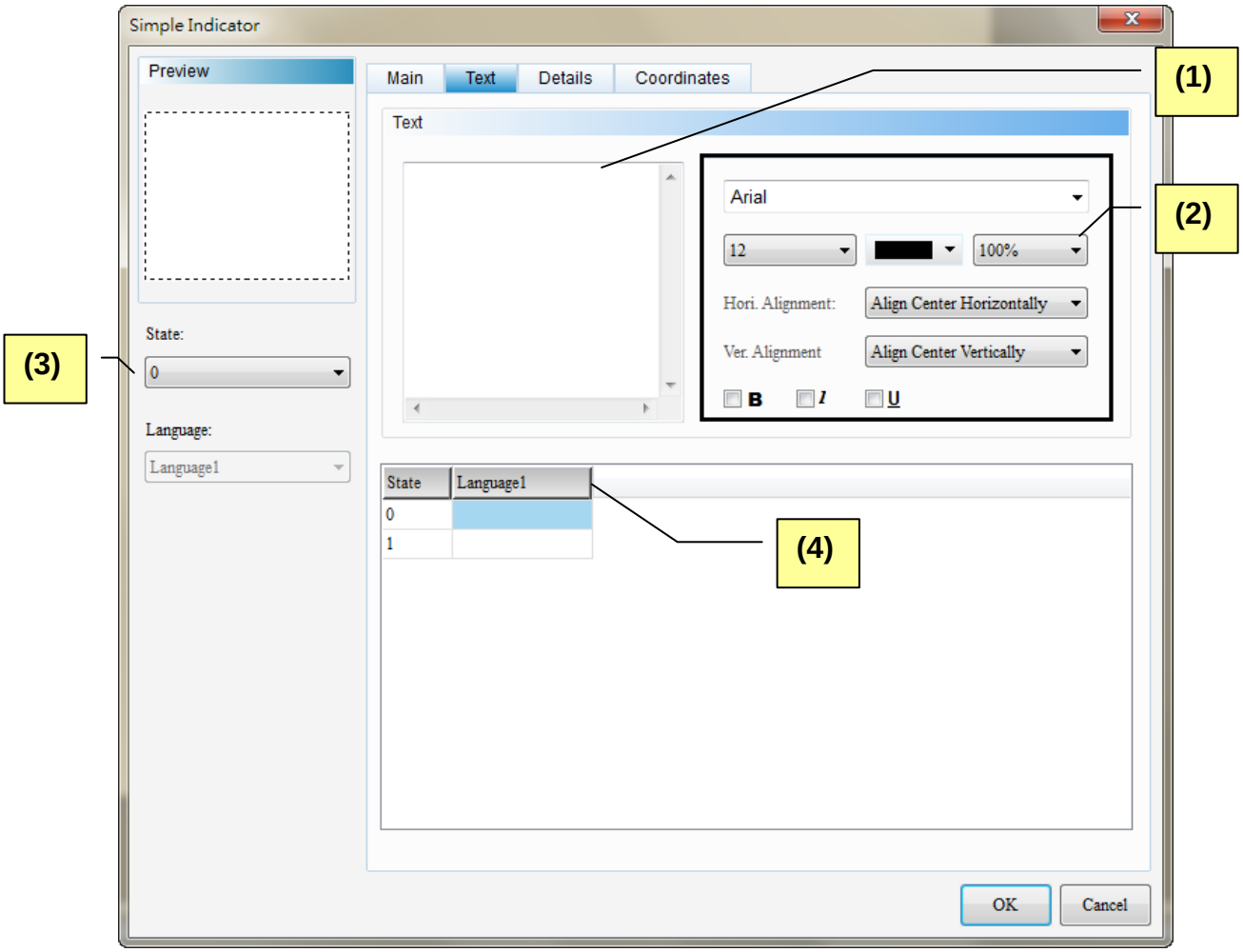
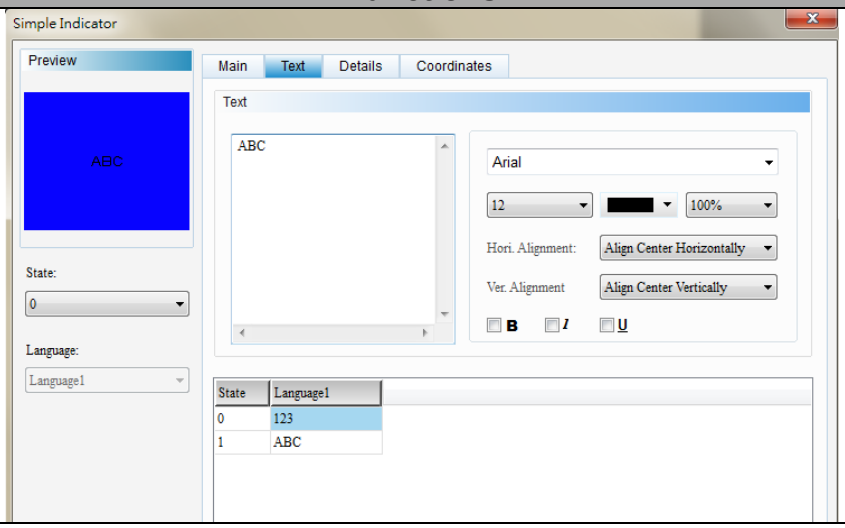


Figure 10-3-3 Simple Indicator Element Text Properties Page

No.	Property	Functions
(1)	Text	➢ Users can input the text to be displayed in the text box.

No.	Property	Functions
		
(2)	Text Properties	➢ Sets text properties, including font type, font size, font color, scaling, text alignment, and bold/italic/underline of font. Please refer to the above figure for details about the results of text properties.
(3)	Language	➢ When text data are defined, users can edit the text properties to be displayed from Language of the element.
(4)	State	➢ State 0 and State 1 provided by simple indicator are for users to enter text messages.

◆ Details

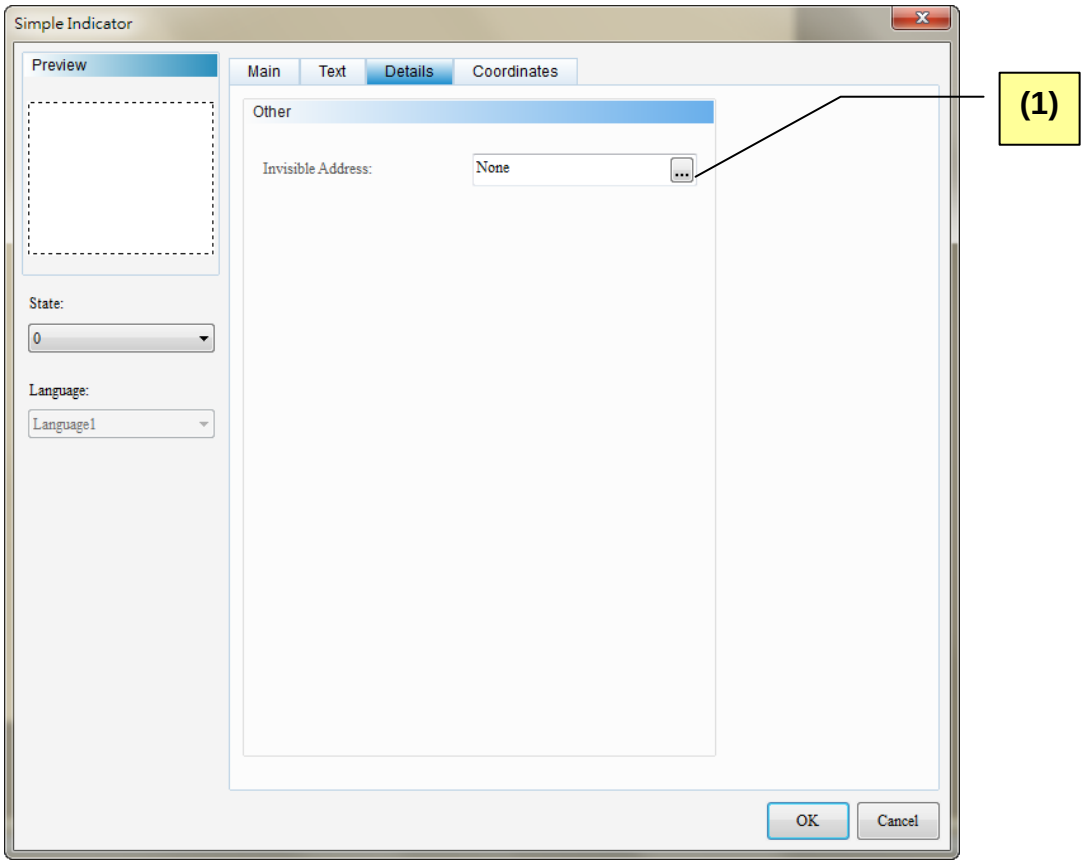
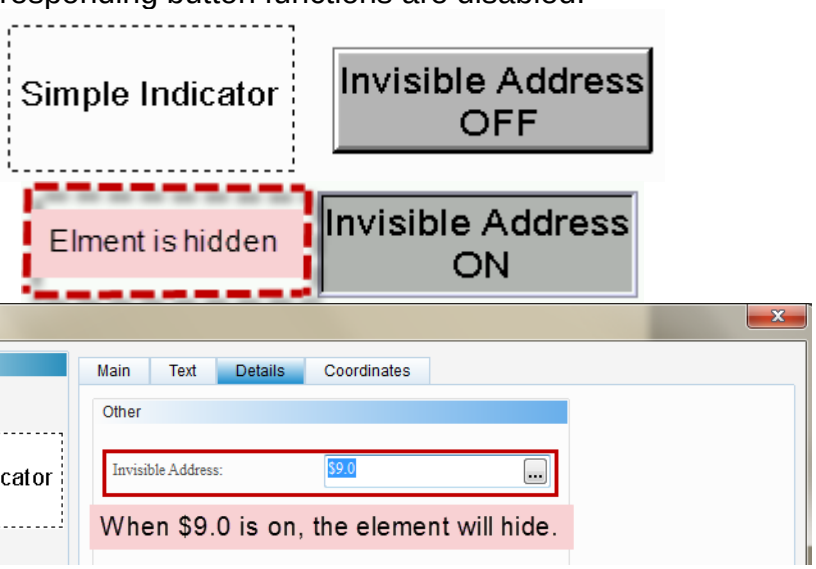


Figure 10-3-4 Simple Indicator Element Details Properties Page

No.	Property	Function
(1)	Invisible Address	➢ When the Invisible Item is "On", button elements are hidden, and the corresponding button functions are disabled. 

◆ Coordinates

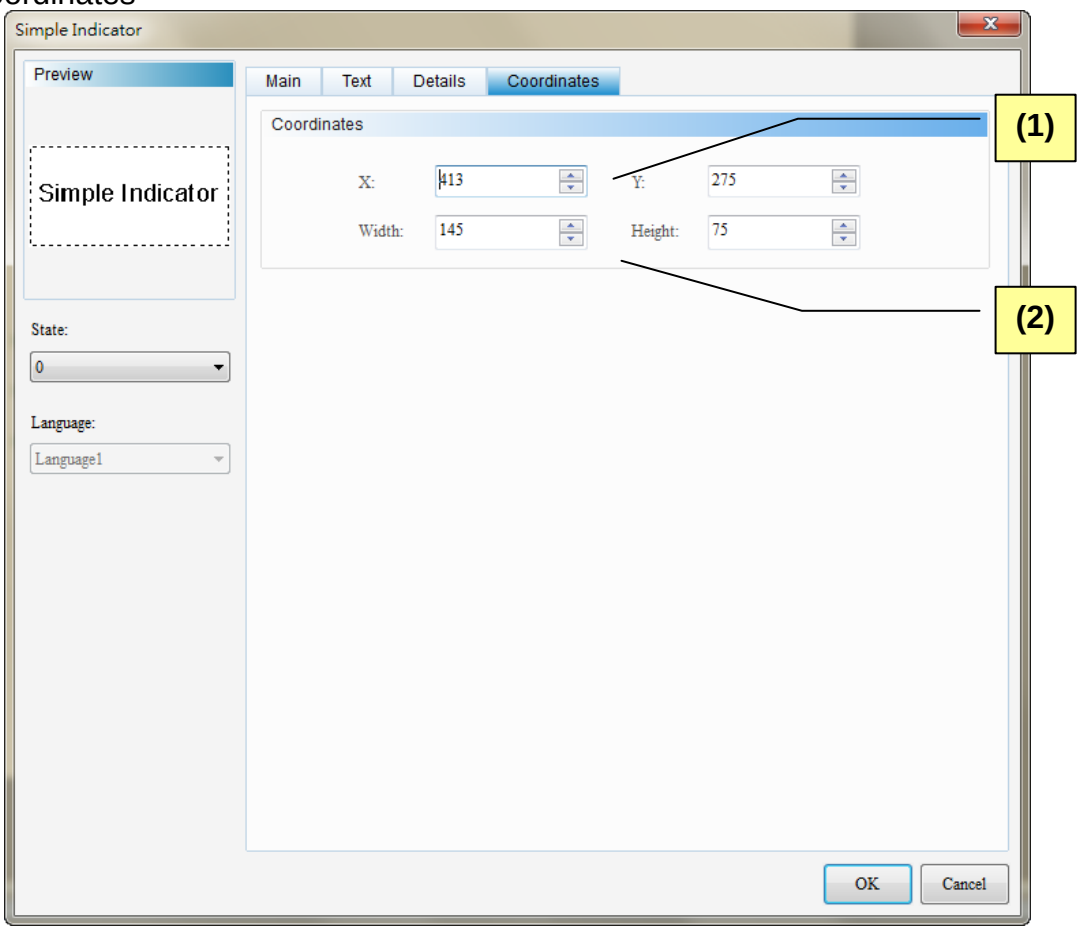


Figure 10-3-5 Simple Indicator Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

Contents

11-1 Numeric Display 3
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11-3 Date Display / Time Display / Day-of-week Display 22
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11-3-2 Time Display 28
11-3-3 Day-of-week Display 33
11-4 Prestored Message Display 40
11-5 Moving Sign 54

Chapter 11 Display

This chapter mainly describes the display elements provided in the DOPSoft and how they are operated and configured.

◆ Display Element Classification

Display		Numeric Display
		Character Display
		Date Display
		Time Display
		Day-of-week Display
		Prestored Message display
		Moving Sign

Table 11-1-1 Display Element Classification

◆ Display Element Shared Properties

Display Element	Read Address	Write Address	Read offset Address	Invisible Address	String Length	Pad Left 0	Date Format	Time Format	Gain/Offset	Support EASCII	Style (Element Type/ Element Background Color/ Border Color)	Properties (Display Direction/ Time Interval/ Moving Points)	Properties (Data Type/ Data Format/ Integer digit/ Decimal Place/ State Count)
Numeric Display	◎		◎	◎		◎			◎		◎		◎ (No state count)
Character Display	◎		◎	◎	◎					◎	◎		
Data Display							◎				◎		
Time Display								◎			◎		
Day-of week Display											◎		
Prestored Message display	◎		◎	◎							◎		◎ (No integer or decimal)
Moving Sign	◎		◎								◎	◎	◎ (No integer or decimal)

Table 11-1-2 Display Element Shared Properties

11-1 Numeric Display

123	Numeric Display

The Numeric Display reads the value content of memory address and displays the value on the element. Data Display also displays state response value of other elements, such as “0” or “1”.

Example of Numeric Display

Table 11-1-3 Example of Numeric Display

Read Address

Numeric Display Element		Numeric Entry Element	
Read Address	$555	Write Address	$555
R:$555 1234		W:$555 ####	

Properties

Numeric Display Element			
Data Type	**Data Format**	**Integer digit**	**Fractional**
Word	Unsigned Decimal	4	0

Execution Results

- After creating elements, run Compile and download them to the HMI. Next. Input “100” in Numeric Entry element and the Numeric Entry in the Numeric Entry will be displayed in the Numeric Display element.

Input value “100” and write to the chosen address ($555)

The numeric display supports two data types: [Word] and [Double Word]. The valid range of numeric display is as shown in Table 11-1-4 below.

Numeric Display

Table 11-1-4 Valid Range of Numeric Display

	Data Format	Valid Range of Numeric Display
Word	BCD	0~9999
	Signed BCD	-999 ~ 9999
	Signed Decimal	-3278~32767
	Unsigned Decimal	0~65535
	Hex	0~0xFFFF
	Binary	0~0xFFFF
Double Word	BCD	0~99999999
	Signed BCD	-9999999 ~ 99999999
	Signed Decimal	-2147483648~2147483647
	Unsigned Decimal	0~4294697295
	Hex	0~0xFFFFFFFF
	Binary	0~0xFFFFFFFF
	Floating	0~9999999

Double click the Numeric Display to call out the Numeric Display Properties screen as shown below.

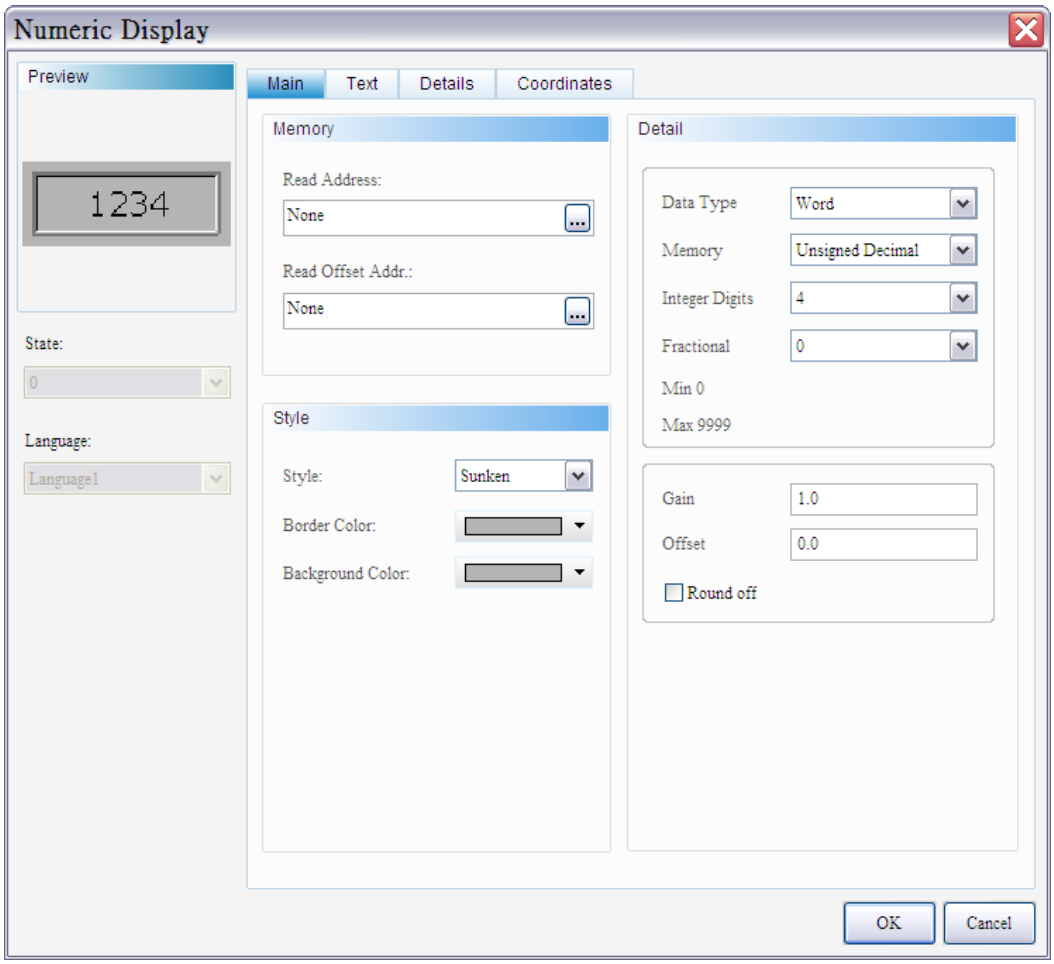


Figure 11-1-1 Numeric Display Properties

Numeric Display	
Function Page	**Content Description**
Preview	The Numeric Display element does not support multistate and multilingual data display.
Main	Sets read address, read offset address, element type, element background color, and element Border Color. Sets data type, data format, integer digit, decimal place, gain, gain, and offset.
Text	Sets the font type, font size, font color, alignment, and content of the text to be displayed.
Details	Pads left zero and invisible address.
Coordinates	Sets the X-Y coordinate, width, and height of elements.

Table 11-1-5 Numeric Display Function Page

◆ Main

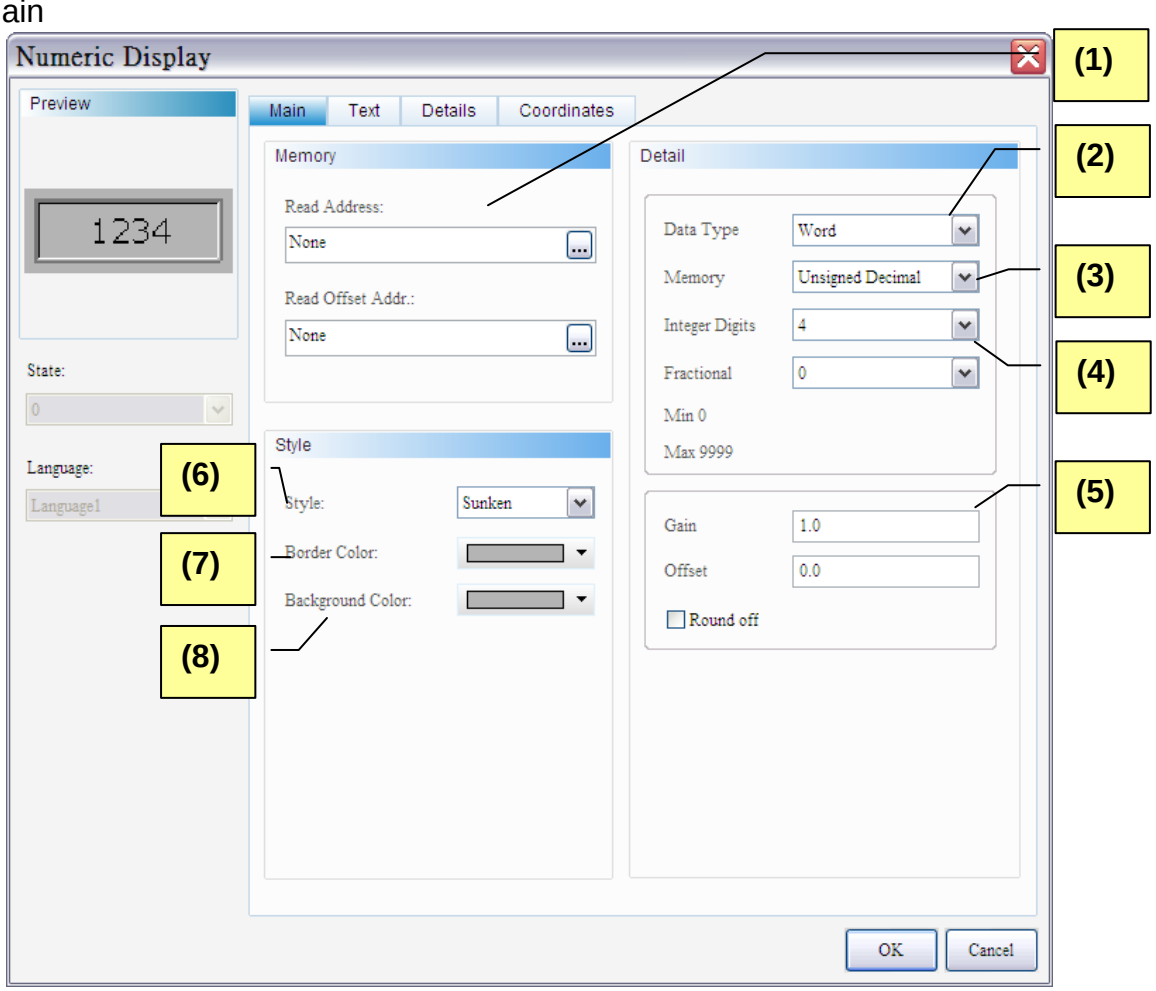
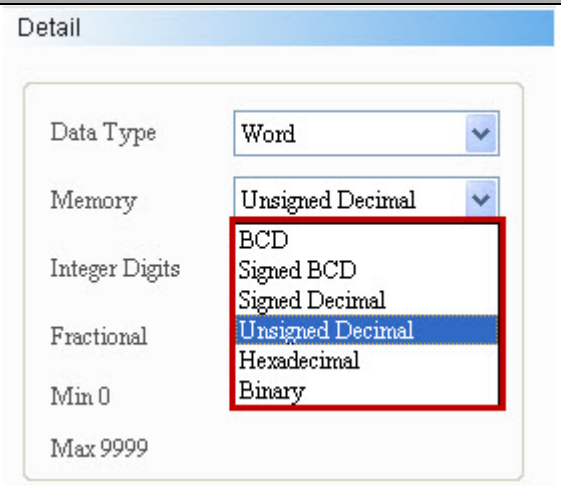
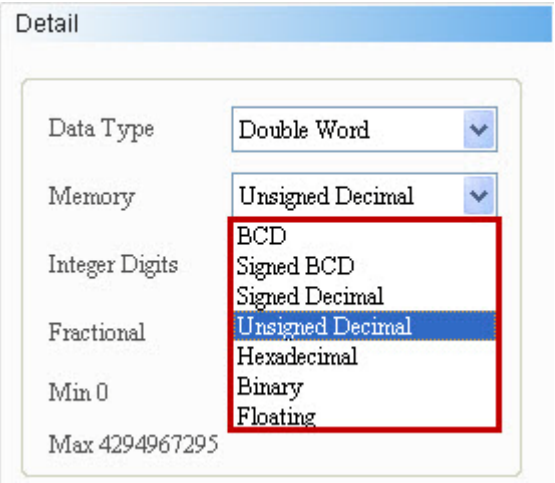


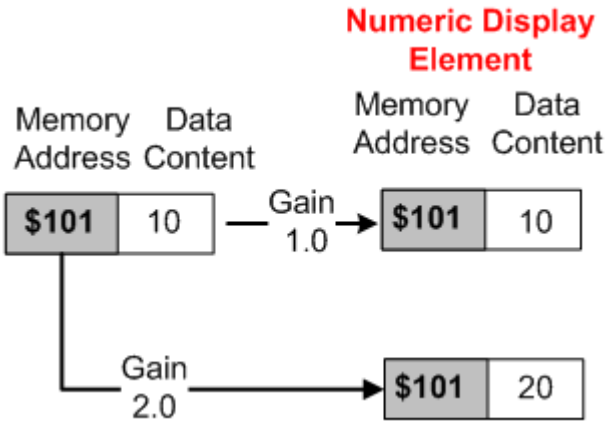
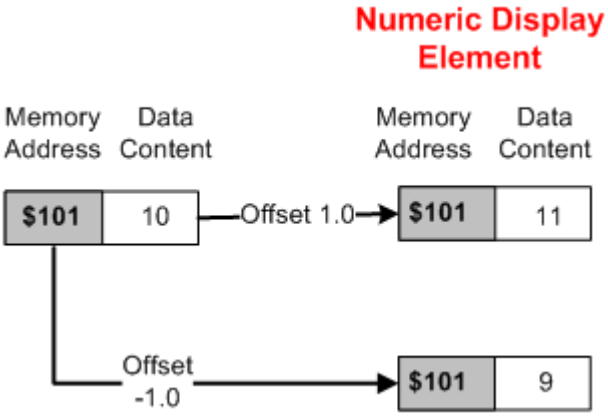
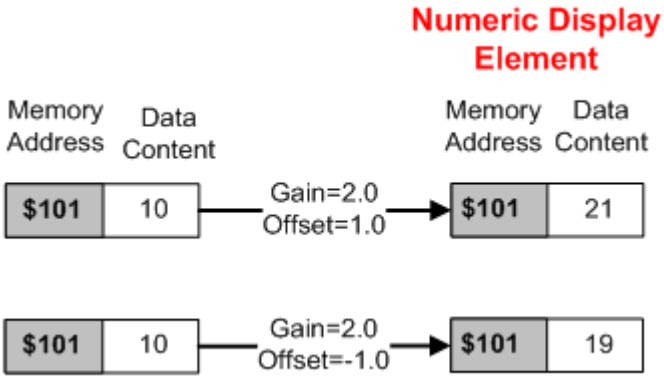
Figure 11-1-2 Numeric Display Element Main Properties Page

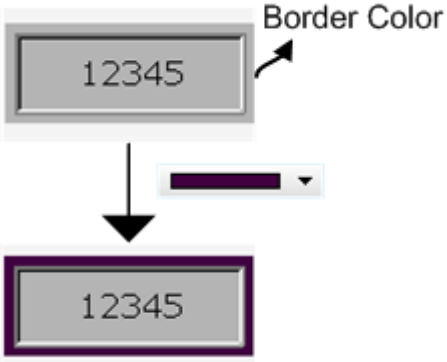
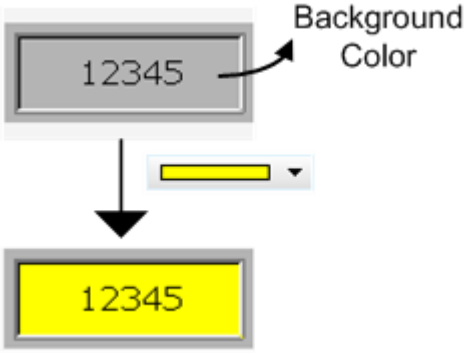
No.	Property	Function
(1)	Read Address	➢ Selects the address of internal memory or controller register. ➢ Selects link name or element type. Please refer to 5-1 Buttons of Chapter 05.
	Read Offset Address	➢ Please refer to Appendix D Write and Read Offset Address.
(2)	Data Type	➢ Two options: “Word” and “Double Word”. Please refer to Table 11-1-4 for details.
(3)	Data Format	➢ If data type is “Word”, the data formats are as follows:

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td></td><td></td><td>


➢ If data type is “Double Word”, the data formats are as follows:


</td></tr>
<tr><td>(4)</td><td>Integer Digits / Fractional</td><td>➢ Defines the digit of integers and fractional.
➢ Instead of true fractional, fractional here means the display format. True fractional can only be defined from this item after selecting “Floating” in Data Format.</td></tr>
<tr><td rowspan="2">(5)</td><td rowspan="2">Gain/ Offset</td><td>➢ Equation for calculating Gain and Offset: y = (a) x + (b).
<table>
<tr><th>y</th><th>a</th><th>x</th><th>b</th></tr>
<tr><td>Element Numeric Display</td><td>Gain Value</td><td>Register Actual Value</td><td>Offset Value</td></tr>
</table></td></tr>
<tr><td>➢ The numeric display element will multiply the actual value in the register by the gain value before displaying the product on the HMI screen. The default gain is “1.0”. If gain is “2.0”, the Numeric Displayed in the element is “20” when the register actual value is “10”.</td></tr>
</table>

No.	Property	Function
		 ➢ The numeric display element will add the offset value to the register actual value before displaying the sum on the HMI screen. The default offset is “0.0”. If offset is “1.0”, the Numeric Displayed in the element is “11” when the register actual value is “10”. By contrast, if offset is “-1.0”, the Numeric Displayed in the element is “9” when the register actual value is “10”.  ➢ The following examples show [Gain=2.0/Offset=1.0] and [Gain=2.0/Offset-1.0.]  ➢ After selecting “Round Off before Display”, values will be rounded off before displaying on the numeric display element.

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td>(6)</td><td>Element Type</td><td>➢ There are four element types, including Standard, Raised, Sunken, and Transparent. Users can change the element appearance.
<table>
<tr><th>Standard</th><th>Raised</th><th>Sunken</th><th>Transparent</th></tr>
<tr><td>12345</td><td>12345</td><td>12345</td><td>12345</td></tr>
</table></td></tr>
<tr><td>(7)</td><td>Border Color</td><td>➢ Sets element Border Color.
➢ If element type is “Transparent”, Border Color is disabled.
 
</td></tr>
<tr><td>(8)</td><td>Element Background Color</td><td>➢ Sets element background color.
➢ If element type is “Transparent”, background color is disabled.
 
</td></tr>
</table>

◆ Text

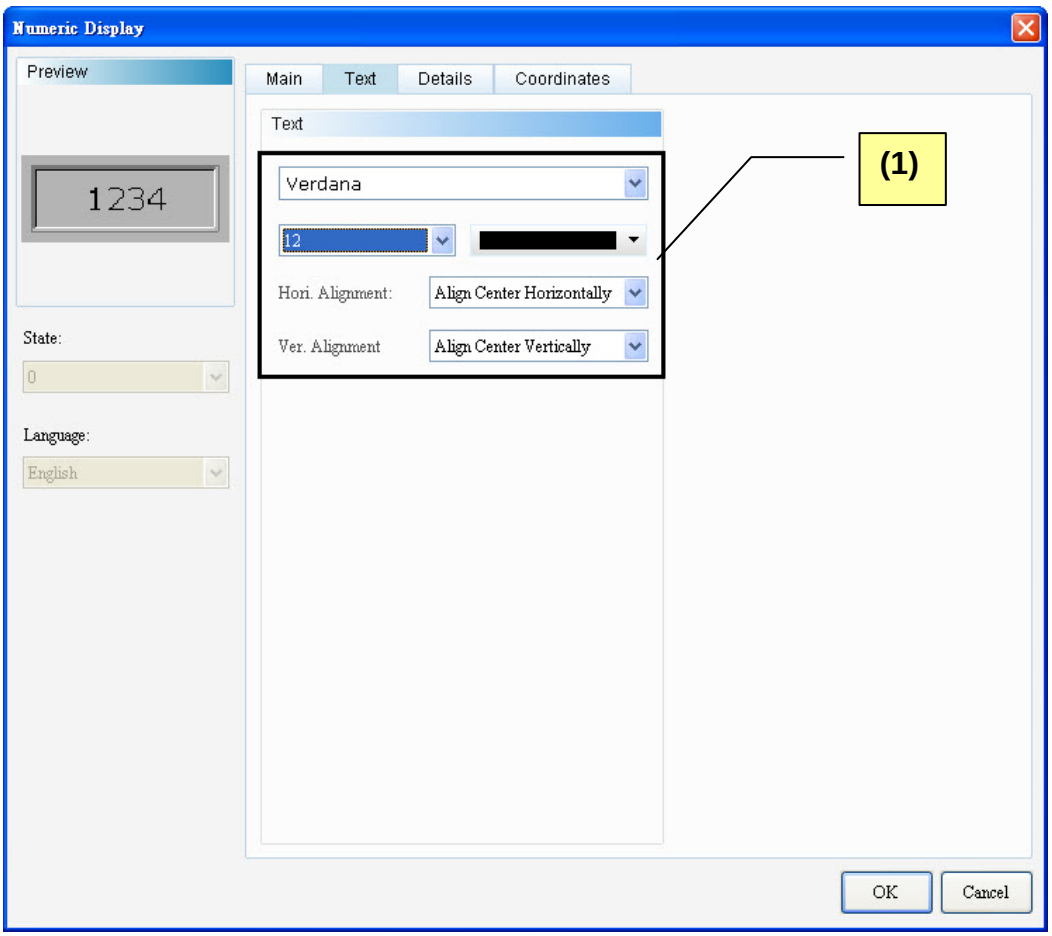


Figure 11-1-3 Numeric Display Element Text Properties Page

No.	Property	Function Description
(1)	Text Properties	Sets text properties, including font type, font size, font color, and text alignment.

◆ Details

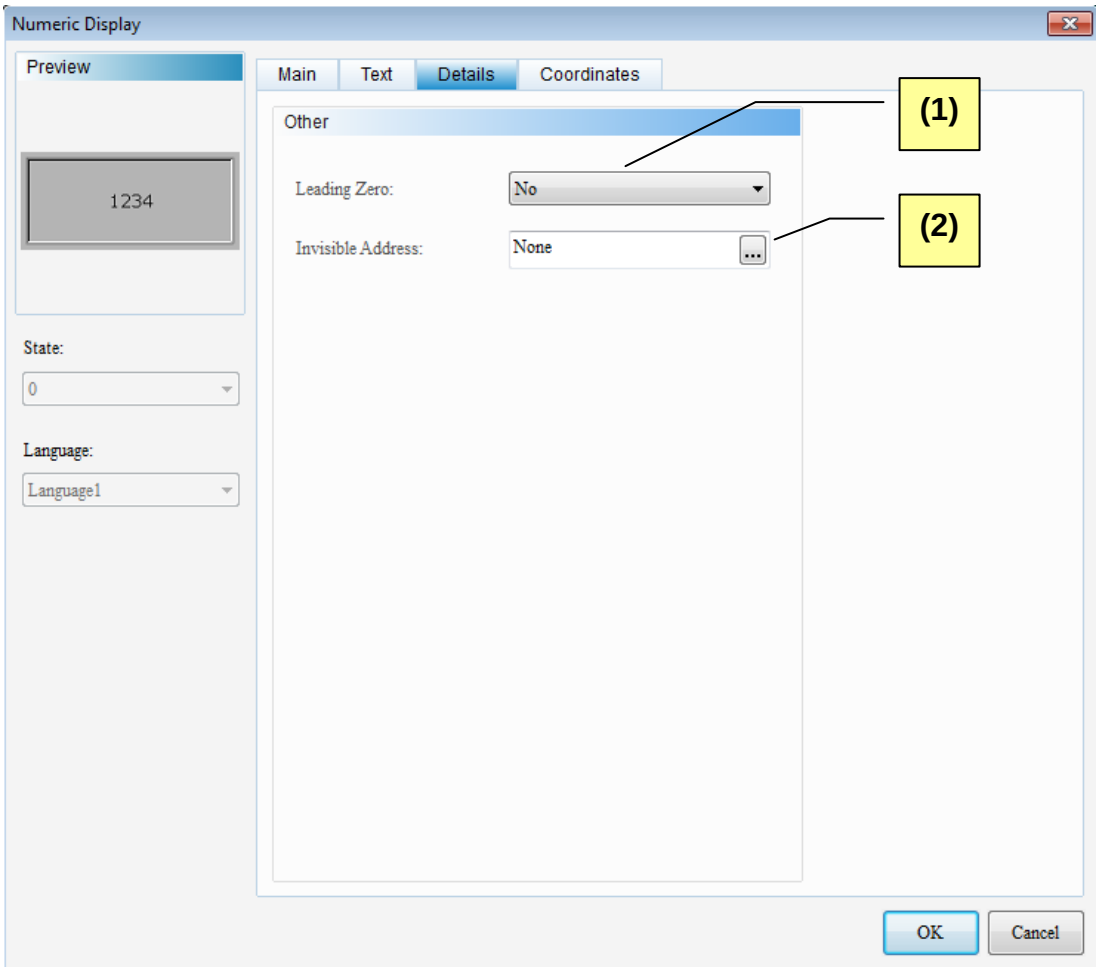


Figure 11-1-4 Numeric Display Element Details Properties Page

No.	Property	Function Description
(1)	Leading Zero	➢ Leading Zero is determined according to the number of digits of an integer as show in the example below: **Integer Digital is 5** ☑ Leading Zero ☐ Leading Zero 00050 50
(2)	Invisible Address	➢ When the invisible address is on, the numeric display element will be hidden and it will be unable to execute other functions. Invisible Address ON: Invisble Address $9.0 ON

No.	Property	Function Description
		Invisible Address OFF

◆ Coordinates

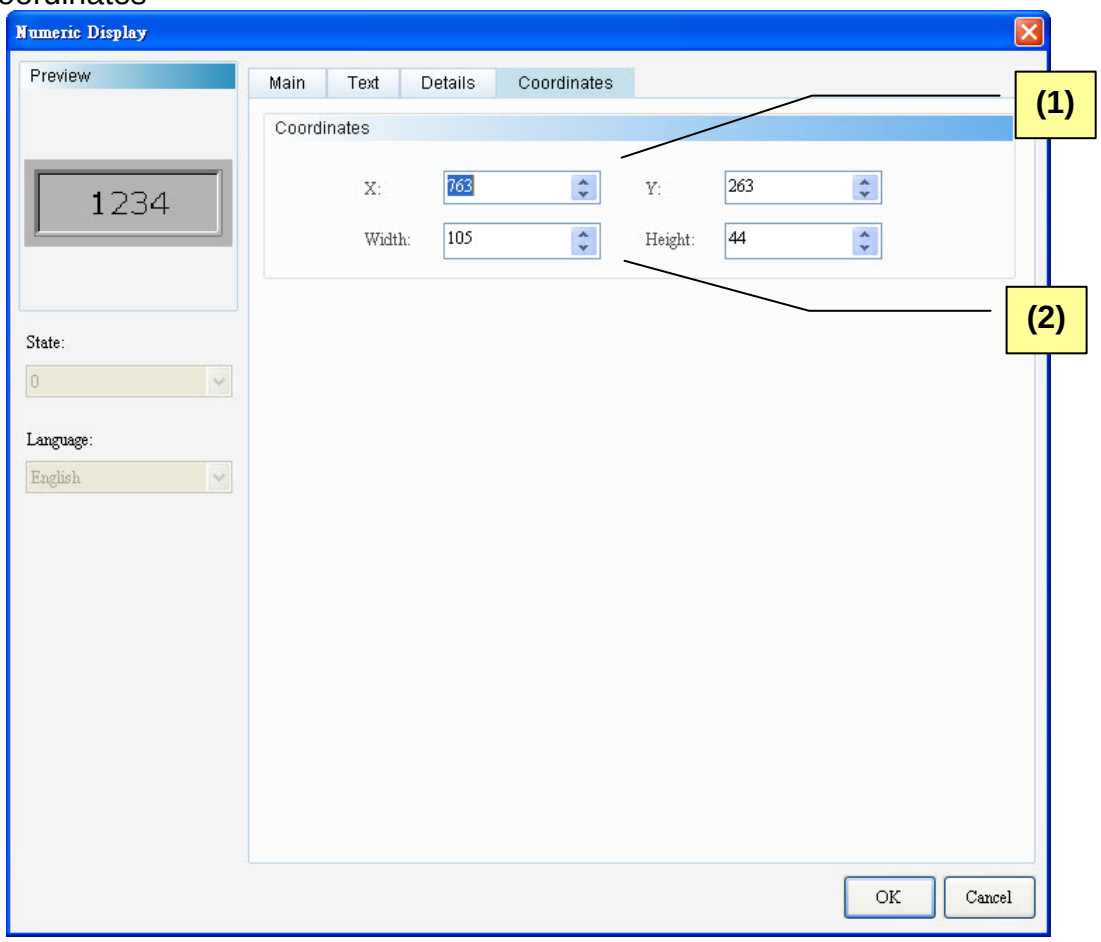


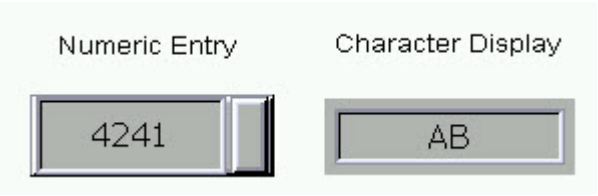
Figure 11-1-5 Numeric Display Element Coordinates Properties

No.	Property	Function Description
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

11-2 Character Display

	Character Display

The Character Display is for displaying text. Therefore, all data must be input in readable ASCII code. The DOPSoft transfers the ASCII code into characters before displaying on the Character Display. The Character Display is an element reading byte. As the default data format of the Numeric Entry element is “Word” making up of double byte, one word represents two bytes. However, it is necessary for the Character Display element to exchange the high and low bytes before reading data and displaying the actual text data. For example, if $0 is 4241 (Hex), after high/low byte exchange, it is “AB” in the Character display.



The following table is the cross reference of data format and characters. The examples below simply include A to G only, and the rest is composed according to the same theory.

Unsigned Decimal	Hexadecimal	Character
65	41	A
66	42	B
67	43	C
68	44	D
69	45	E
70	46	F
71	47	G

Table 11-2-1 ASCII Code Cross Reference Table

Please refer to Table 11-2-1 Example Character Display below.

Example of Character Display

Table 11-2-2 Example of Character Display

Read Address

Character Display Element		Numeric Entry Element	
Read Address	$555	Write Address	$555

Properties

Character Display Element	
String Length	**4**

- Characters of Character Display are displayed according to the corresponding data format as shown in 11-2-1.

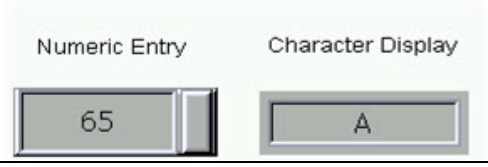
Numeric Entry Element		
Data Type	**Data Format**	**Integer digit**
Word	**Unsigned Decimal**	**4**

Numeric Entry Element		
Data Type	**Data Format**	**Integer digit**
Word	**Hexadecimal**	**4**

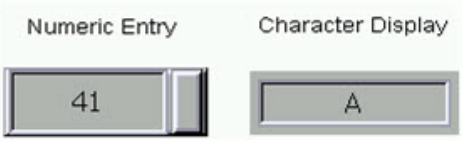
Execution Results

- Compile screens and download them to the HMI. The Character Display element will display the corresponding characters according to the data read from the memory address and the selected data format.

Unsigned Decimal



Hexadecimal



Double-click the Character Display to call out the Character Display Properties screen as shown below.

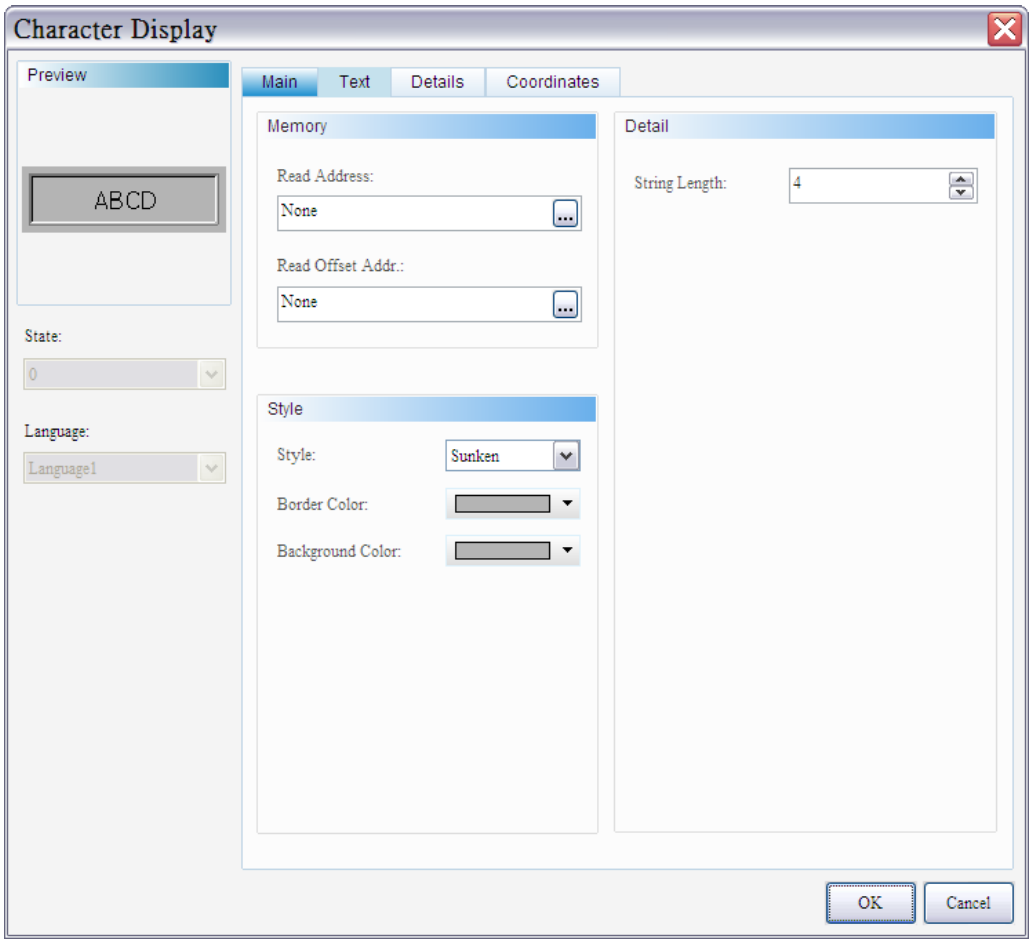


Figure 11-2-1 Character Display Properties

Character Display	
Function Page	**Content Description**
Preview	The Character Display element does not support multistate or multilingual data display.
Main	Sets read address, read offset address, element style, background color, and Border Color. Sets string length.
Text	Sets the font type, font size, font color, alignment, and content of the text to be displayed.
Details	Sets Invisible Address and Support EASCII.
Coordinates	Sets the X-Y coordinate, width, and height of elements.

Table 11-2-3 Character Display Function Page

◆ Main

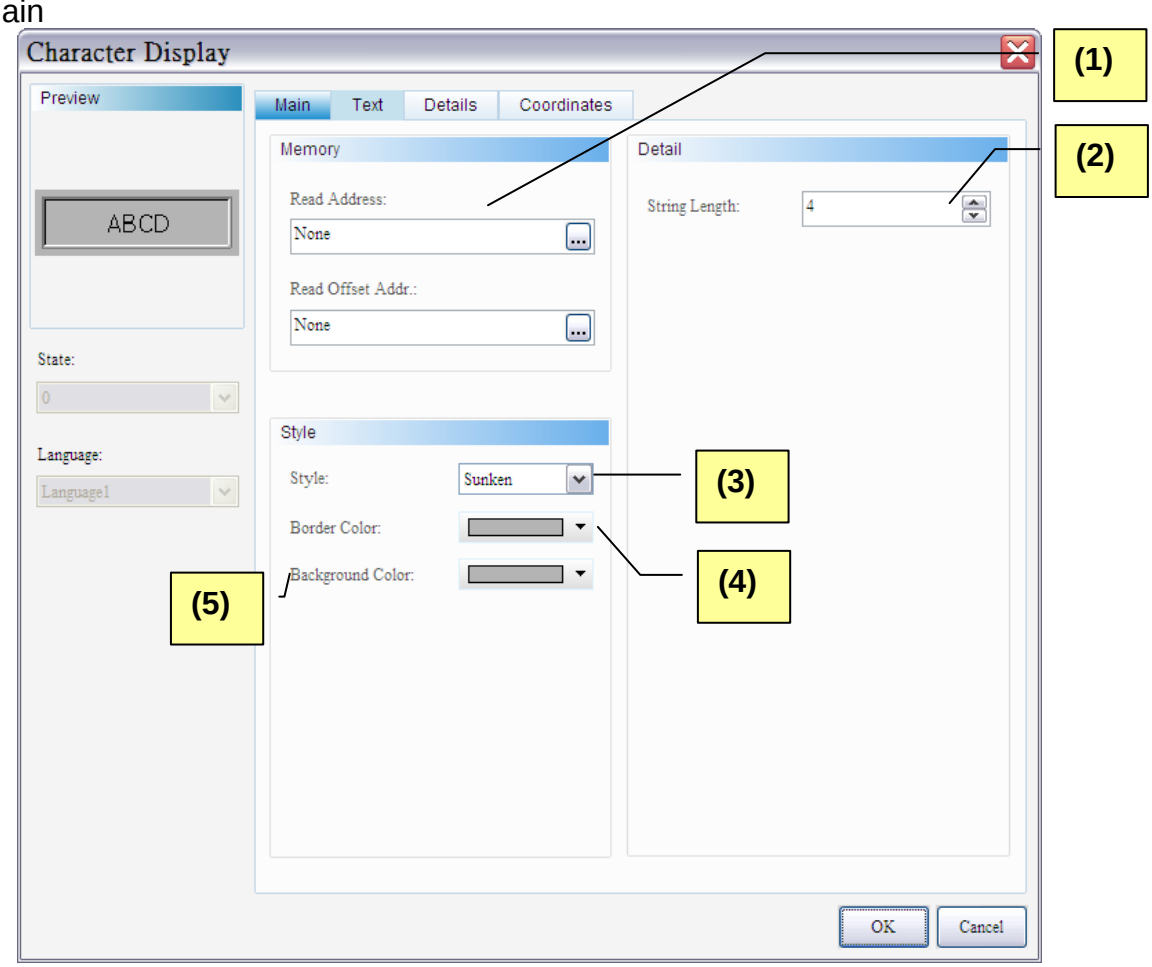
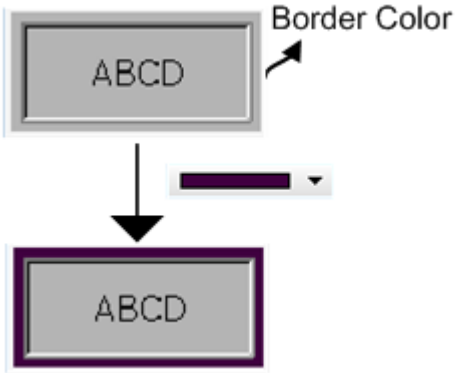
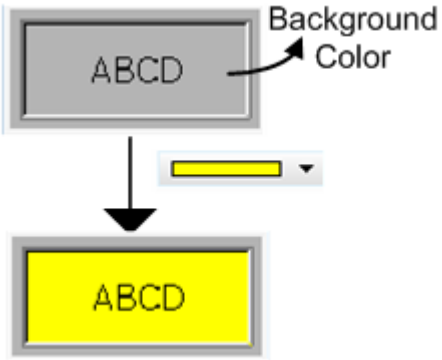


Figure 11-2-2 Character Display Element Main Properties

No.	Property	Function
(1)	Read Address	➢ Selects the address of internal memory or controller register. ➢ Selects link name or element type. Please refer to 5-1 Buttons of Chapter 05 for details.
	Read Offset Address	➢ Please refer to Appendix D Write and Read Offset Address.
(2)	String Length	➢ The range of string length is 1~256.
(3)	Element Type	➢ There are four element types, including Standard, Raised, Sunken, and Transparent. Users can change the element appearance. Standard: ABCD Raised: ABCD Sunken: ABCD Transparent: ABCD
(4)	Border Color	➢ Sets element Border Color. ➢ If element type is “Transparent”, Border Color is disabled.

No.	Property	Function
		
(5)	Element Background Color	➢ Sets element background color. ➢ If element type is “Transparent”, background color is disabled. 

◆ Text

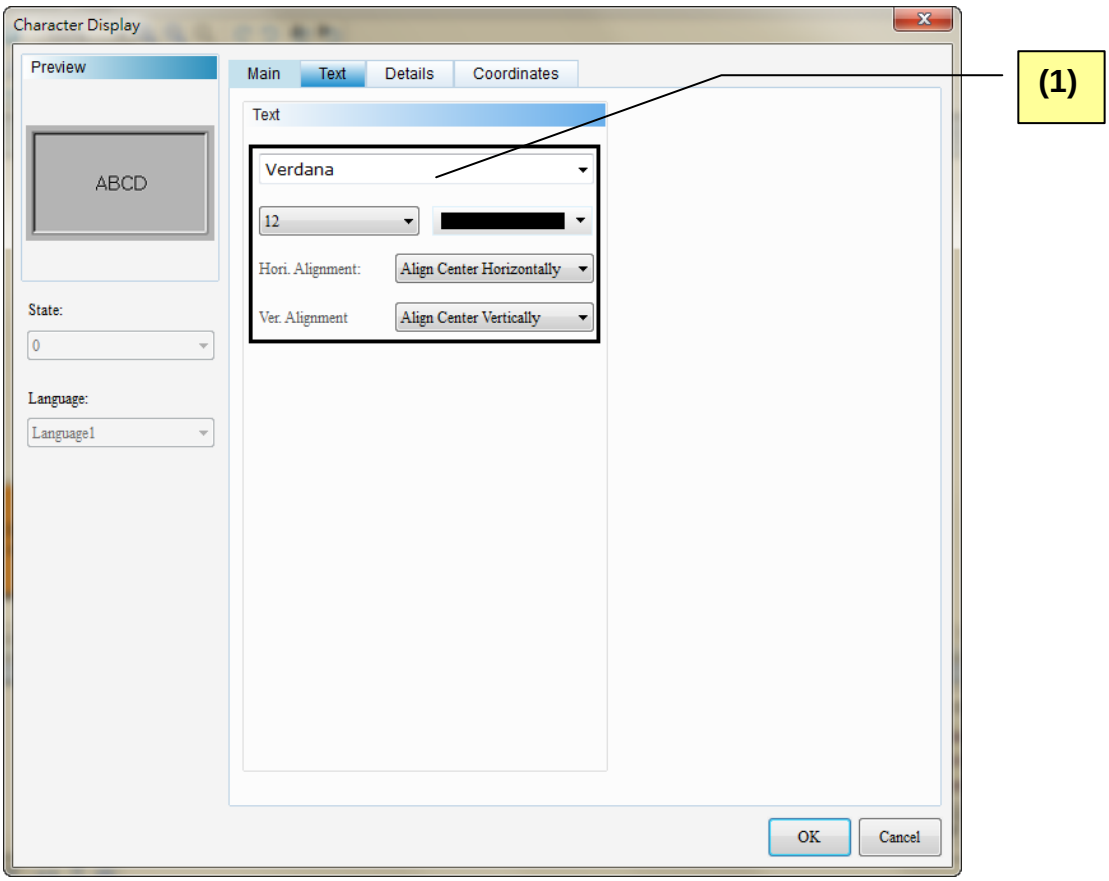


Figure 11-2-3 Character Display Element Text Properties Page

No.	Property	Function Description
(1)	Text Properties	➢ Sets text properties, including font type, font size, font color, and text alignment.

◆ Details

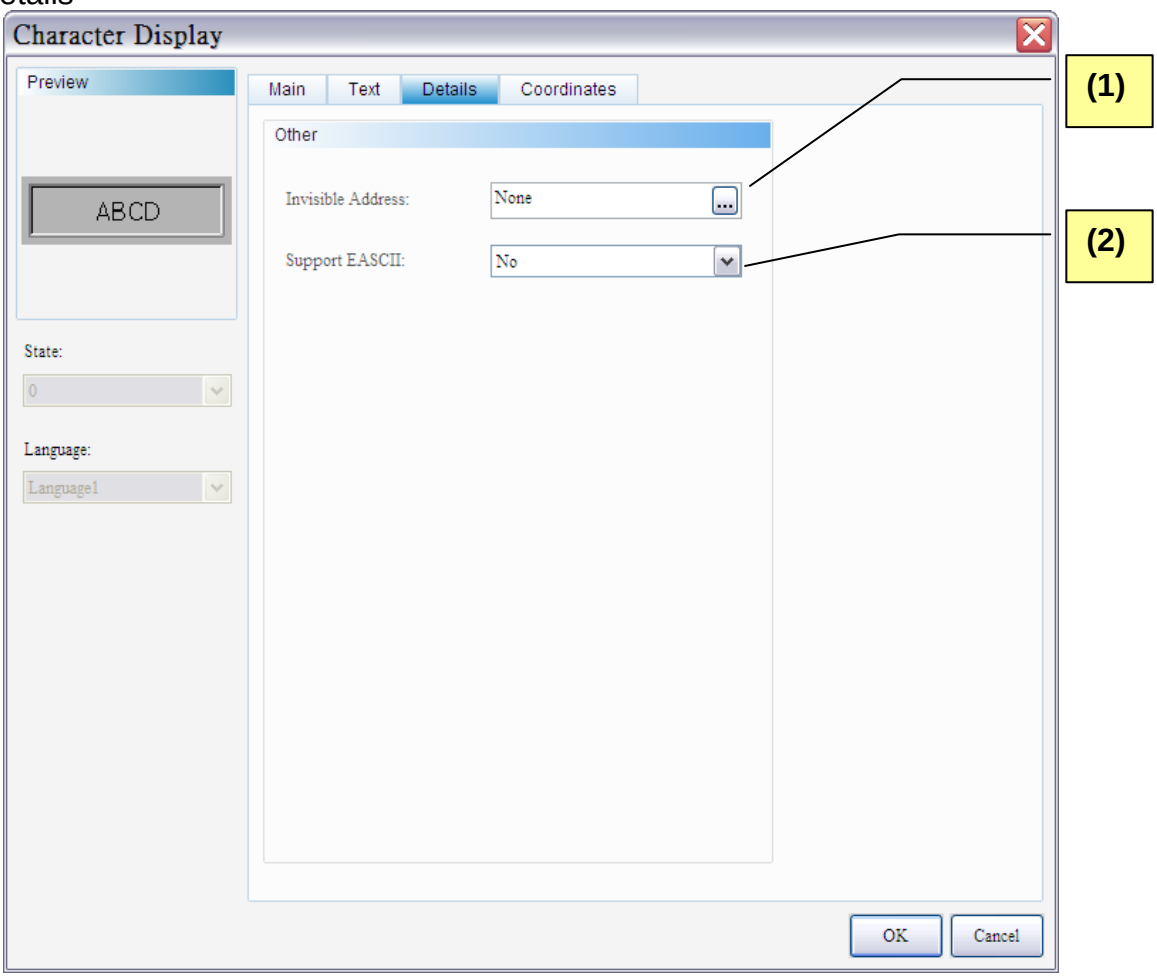
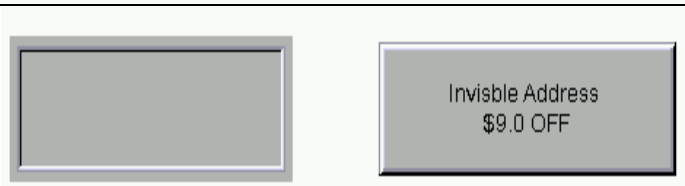


Figure 11-2-4 Character Display Element Details Properties Page

No.	Property	Function Description
(1)	Invisible Address	➢ When the invisible address is on, the character display element will be hidden and it will be unable to execute other functions. Invisible Address ON: Invisible Address OFF: 
(2)	Support EASCII	➢ Please refer to Chapter 13 Character Entry element for details.

◆ Coordinates

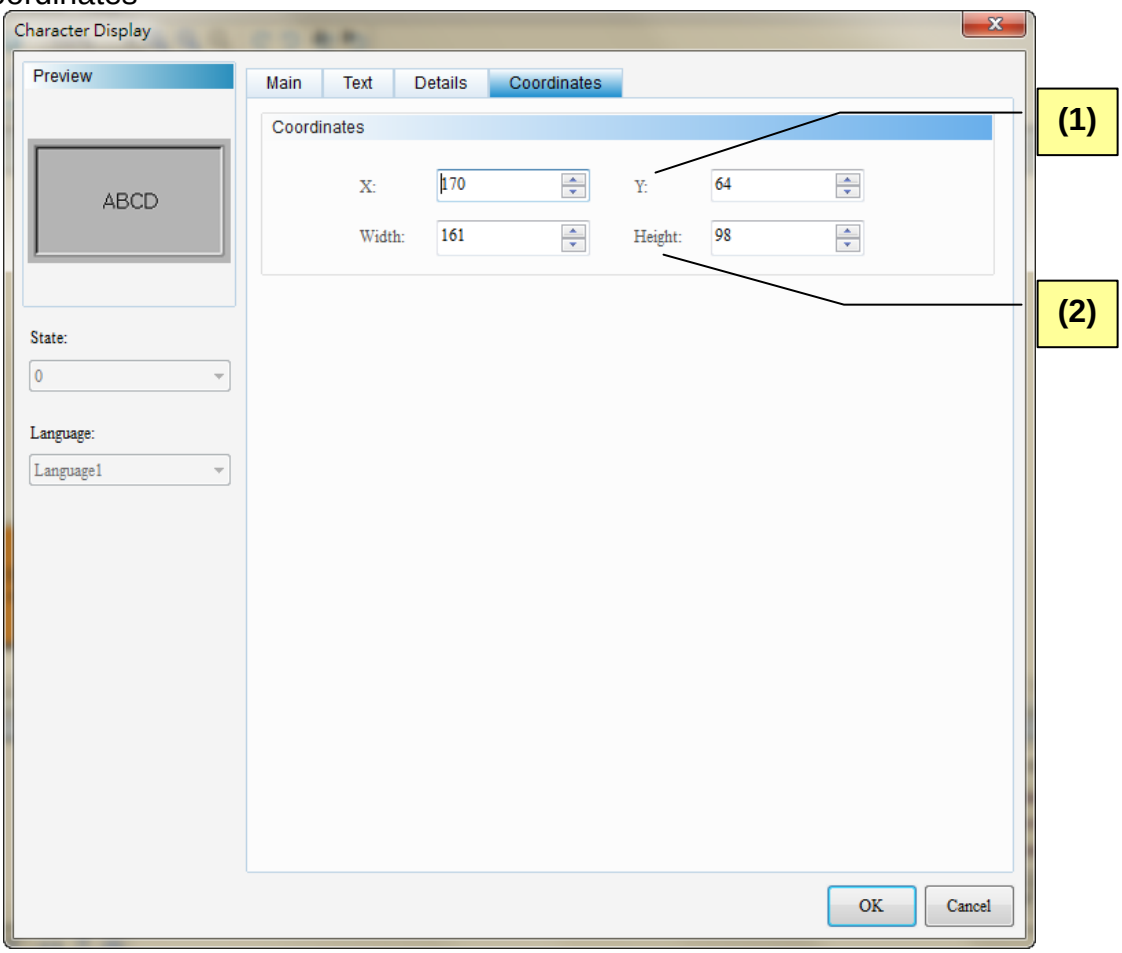


Figure 11-2-5 Character Display Element Coordinates Properties

No.	Property	Function Description
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

11-3 Date Display / Time Display / Day-of-week Display

	Date Display
	Time Display
	Day-of-week Display

The Date Display, Time Display, and Day-of-week Display show the date, time, and day of the HMI. Users can define the format of Date Display and Time Display and edit Day-of-week Display with multiple languages. Please refer to 11-3-1 Example of Date Display / Time Display / Day-of-week Display for details.

Example of Date Display / Time Display / Day-of-week Display

Table 11-3-1 Example of Date Display / Time Display / Day-of-week Display

<table>
<tr><td>Date Display</td><td>
<table>
<tr><th colspan="2">Date Display Element</th><th>Date Format Options</th></tr>
<tr><td>Date Format Properties</td><td>mm/dd/yy</td><td>mm/dd/yy
dd/mm/yy
dd.mm.yy
yy.mm.dd
yy/mm/dd
mm.dd
mm/dd</td></tr>
</table>
</td></tr>
<tr><td>Time Display</td><td>
<table>
<tr><th colspan="2">Time Display Element</th><th>Time Format Options</th></tr>
<tr><td>Time Format Properties</td><td>HH:MM:SS</td><td>HH:MM:SS
HH:MM</td></tr>
</table>
</td></tr>
<tr><td>Day-of-week Display</td><td>➢ If multi-language is established, users can edit day with multiple languages from the element.
<table>
<tr><th>State</th><th>English</th><th>Chinese</th></tr>
<tr><td>0</td><td>SUN</td><td>日</td></tr>
<tr><td>1</td><td>MON</td><td>一</td></tr>
<tr><td>2</td><td>TUE</td><td>二</td></tr>
<tr><td>3</td><td>WED</td><td>三</td></tr>
<tr><td>4</td><td>THR</td><td>四</td></tr>
<tr><td>5</td><td>FRI</td><td>五</td></tr>
<tr><td>6</td><td>SAT</td><td>六</td></tr>
</table>
</td></tr>
<tr><td>Execution Results</td><td>➢ Compile screens and download to the HMI, the display on the HMI is shown below:
<table>
<tr><th>Date Display</th><th>Time Display</th><th colspan="2">Day-of-week Display</th></tr>
<tr><td rowspan="2">06/14/2011</td><td rowspan="2">17:30:49</td><td>Chinese</td><td>English</td></tr>
<tr><td>二</td><td>TUE</td></tr>
</table>
</td></tr>
</table>

11-3-1 Date Display

Double-click the Date Display to call out the Date Display Properties screen as shown below.

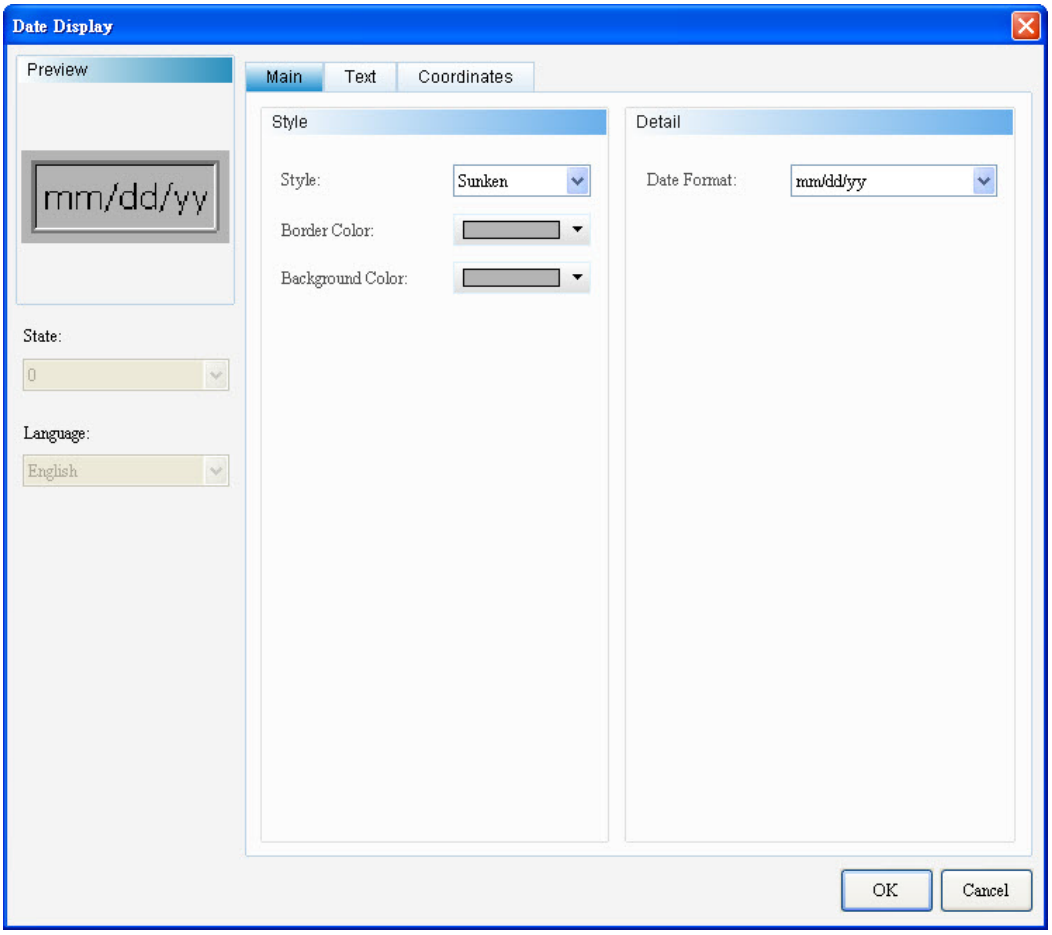


Figure 11-3-1-1 Date Display Properties

Date Display	
Function Page	**Content Description**
Preview	The Date Display displays the HMI system date and does not support multistate and multilingual data display.
Main	Sets element type, element Border Color, and element background color. Sets date display format.
Text	Sets the font type, font size, font color, alignment, and content of the text to be displayed.
Coordinates	Sets the X-Y coordinate, width, and height of elements.

Table 11-3-1-1 Date Display Function Page

◆ Main

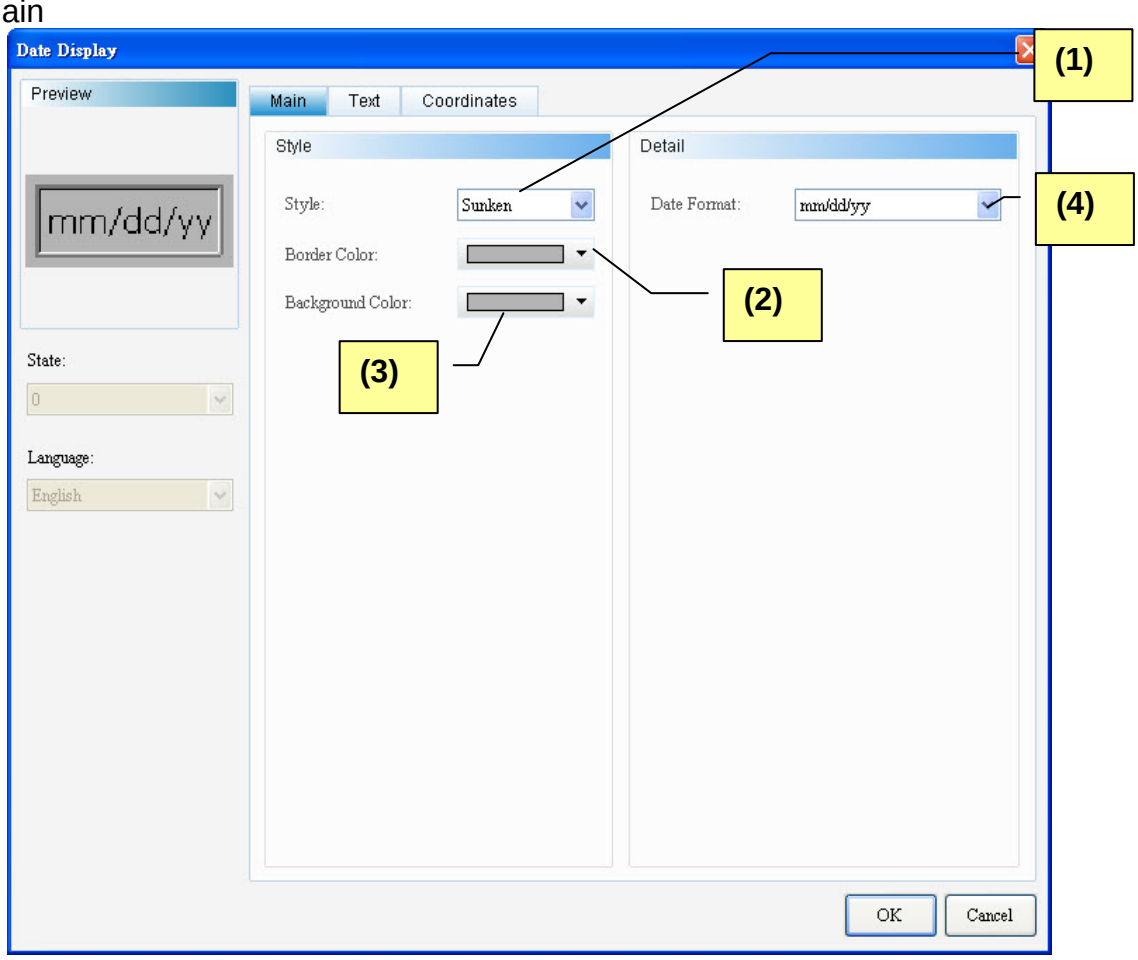
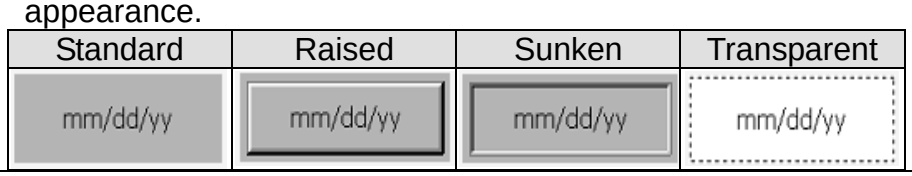
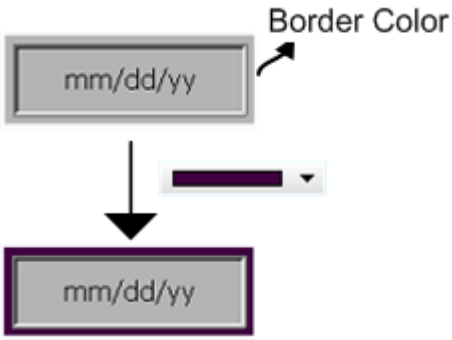
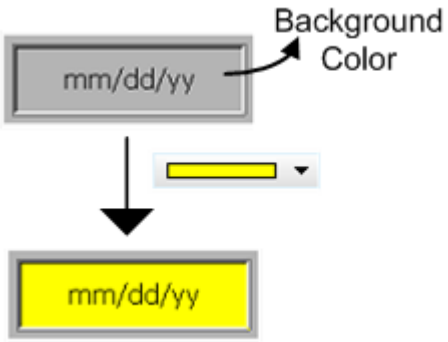
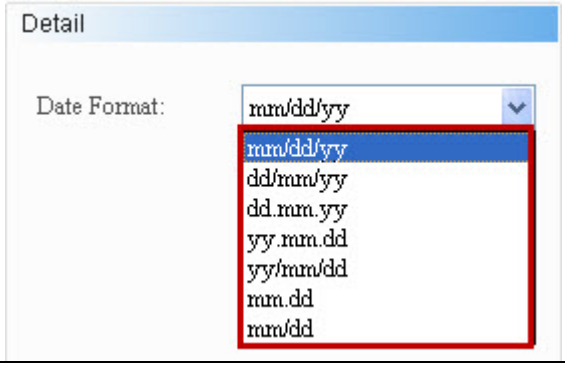


Figure 11-3-1-2 Date Display Element Main Properties Page

No.	Property	Function
(1)	Element Type	➢ There are four element types, including Standard, Raised, Sunken, and Transparent. Users can change the element appearance.  Standard: mm/dd/yy Raised: mm/dd/yy Sunken: mm/dd/yy Transparent: mm/dd/yy
(2)	Border Color	➢ Sets element Border Color. ➢ If element type is “Transparent”, Border Color is disabled. 

No.	Property	Function
(3)	Background Color	➢ Sets element background color. ➢ If element type is “Transparent”, background color is disabled. 
(4)	Date Display Format	➢ The DOPSoft provides 7 date display formats for users to select. 

◆ Text

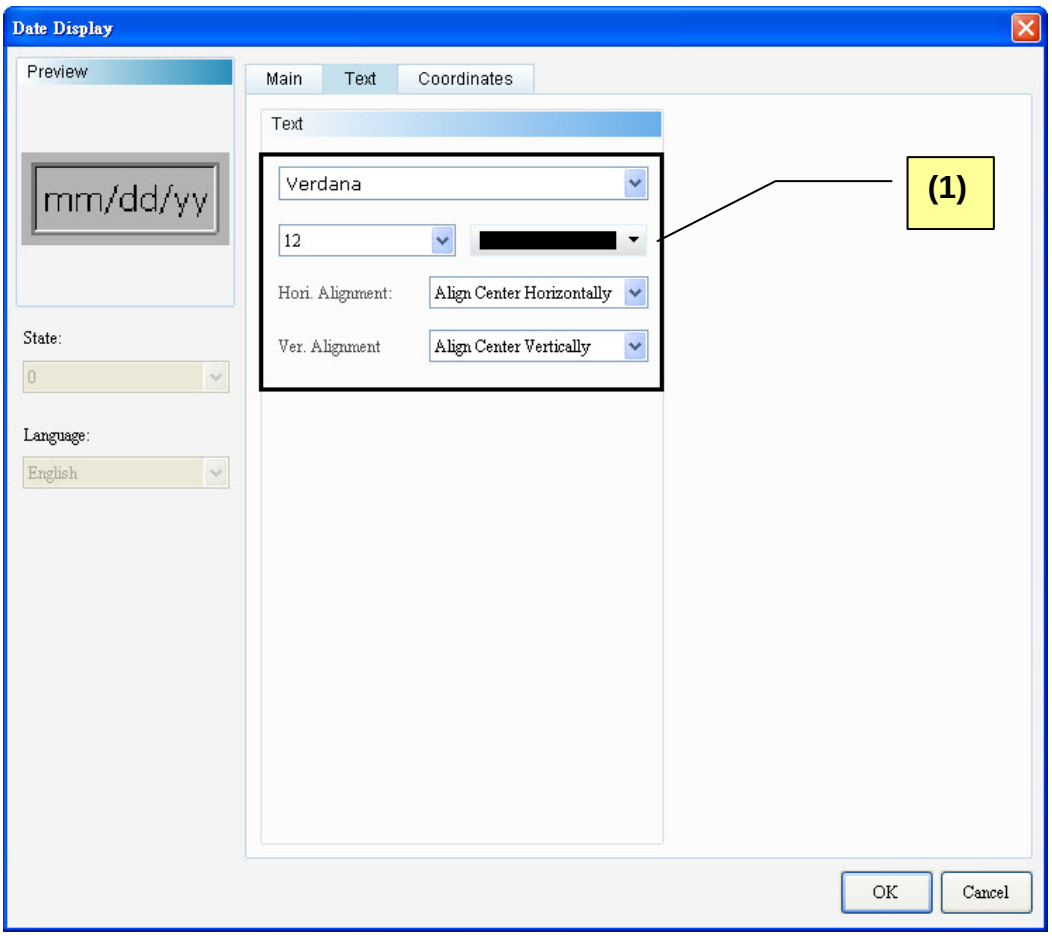


Figure 11-3-1-3 Date Display Element Text Properties Page

No.	Property	Function Description
(1)	Text Properties	➢ Sets text properties, including font type, font size, font color, and text alignment.

◆ Coordinates

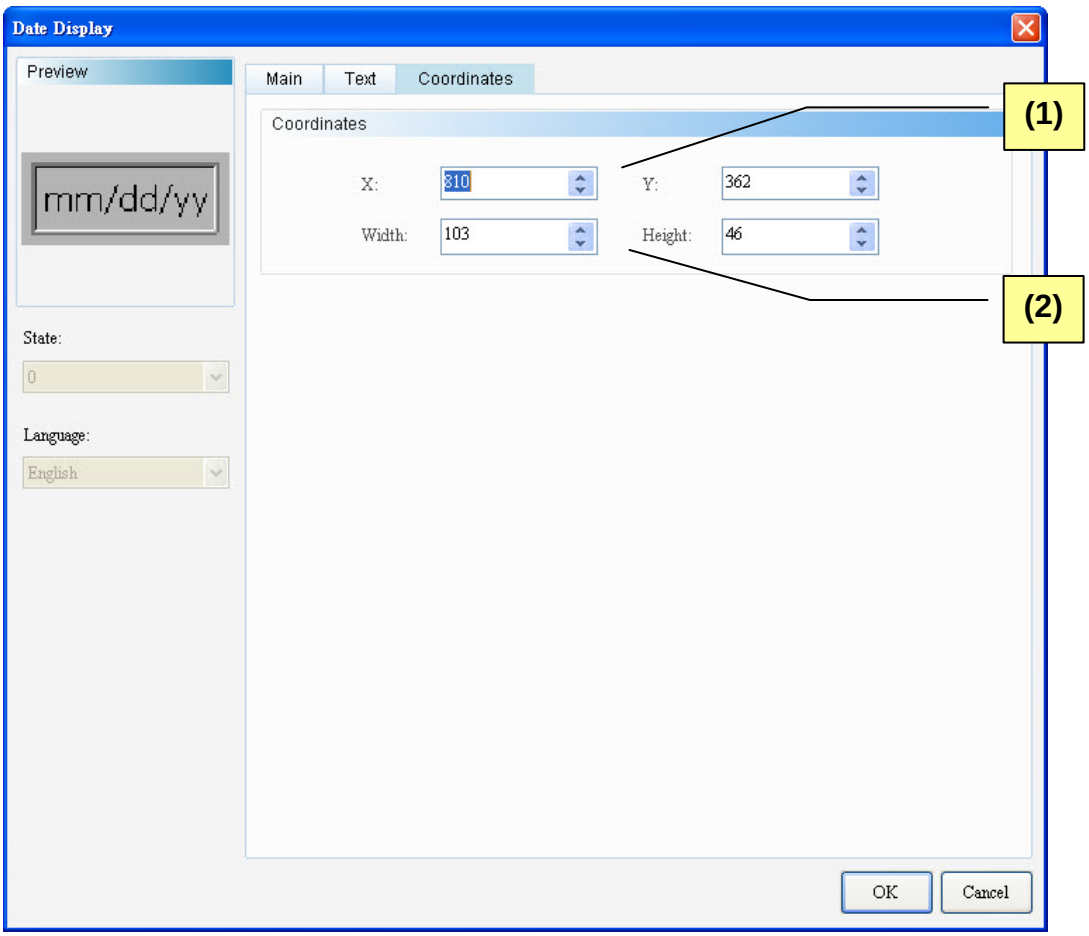


Figure 11-3-1-4 Date Display Element Coordinates Properties Page

No.	Property	Function Description
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

11-3-2 Time Display

Double-click the Time Display to call out the Time Display Properties screen as shown below.

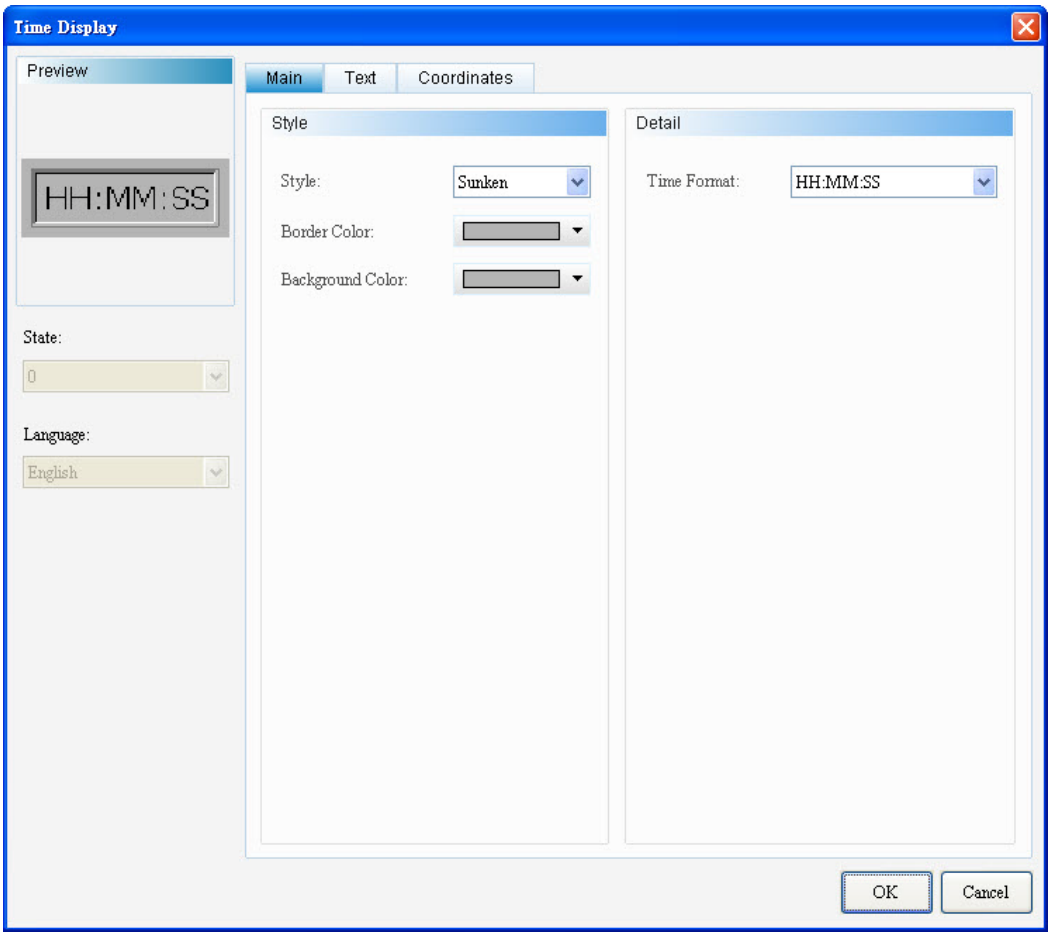


Figure 11-3-2-1 Time Display Properties

Time Display	
Function Page	**Content Description**
Preview	The Time Display displays the HMI system time and does not support multistate and multilingual data display.
Main	Sets element type, element Border Color, and element background color. Sets time display format.
Text	Sets the font type, font size, font color, alignment, and content of the text to be displayed.
Coordinates	Sets the X-Y coordinate, width, and height of elements.

Table 11-3-2-1 Time Display Function Page

◆ Main

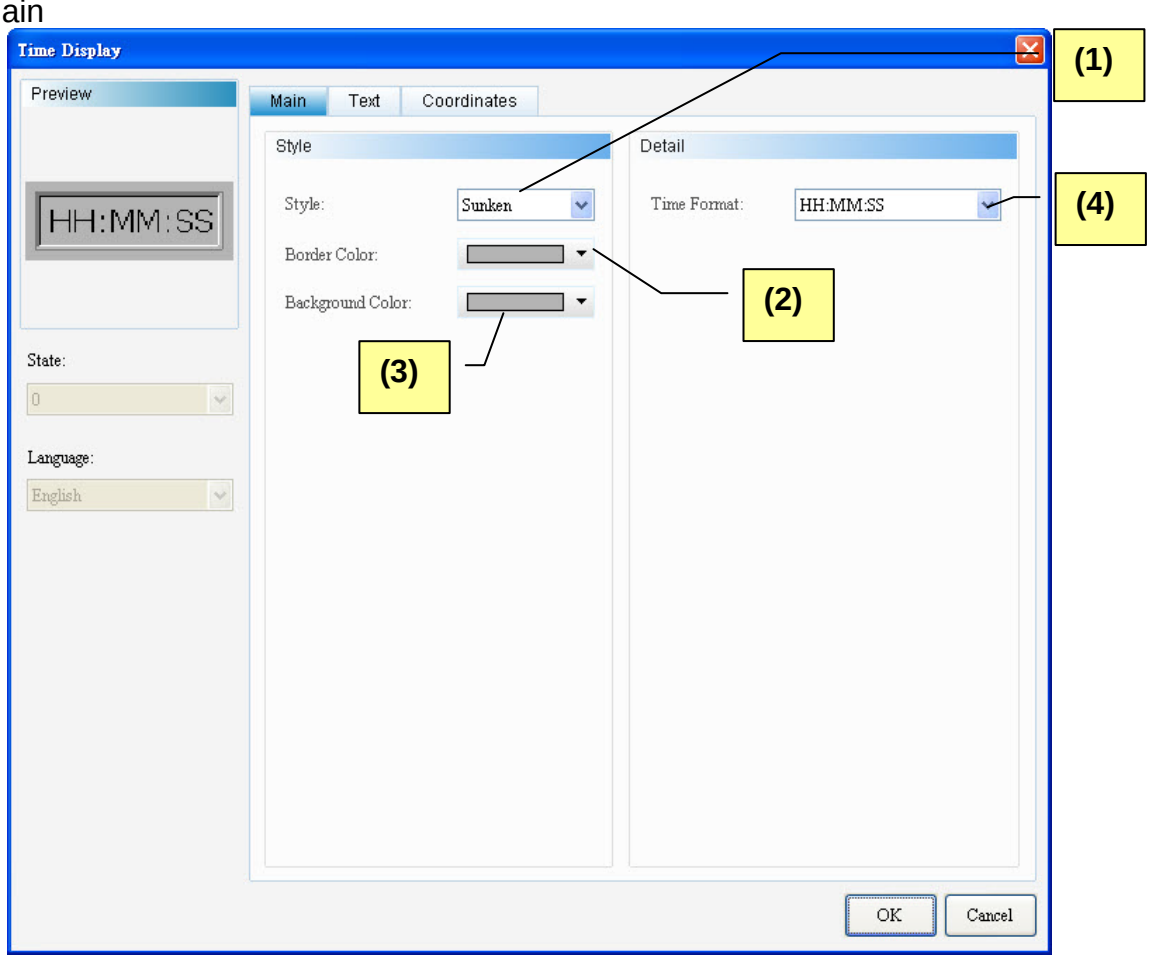
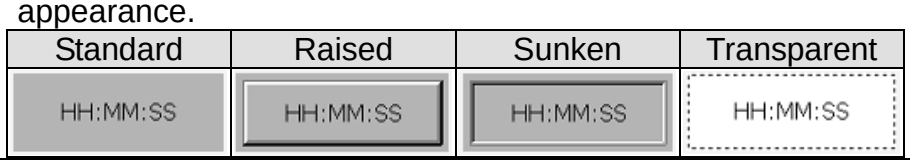
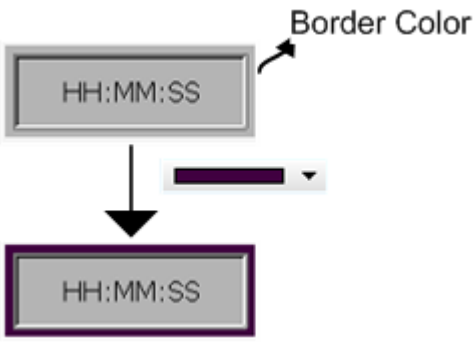
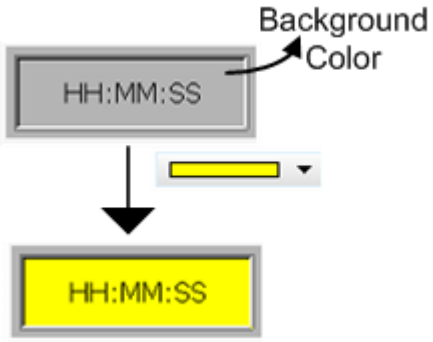
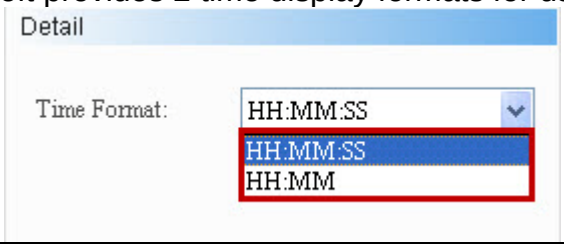


Figure 11-3-2-2 Time Display Element Main Properties Page

No.	Property	Function
(1)	Element Type	➢ There are four element types, including Standard, Raised, Sunken, and Transparent. Users can change the element appearance. 
(2)	Border Color	➢ Sets element Border Color. ➢ If element type is “Transparent”, Border Color is disabled. 

No.	Property	Function
(3)	Background Color	➢ Sets element background color. ➢ If element type is “Transparent”, background color is disabled. 
(4)	Time Display Format	➢ The DOPSoft provides 2 time display formats for users to select. 

◆ Text

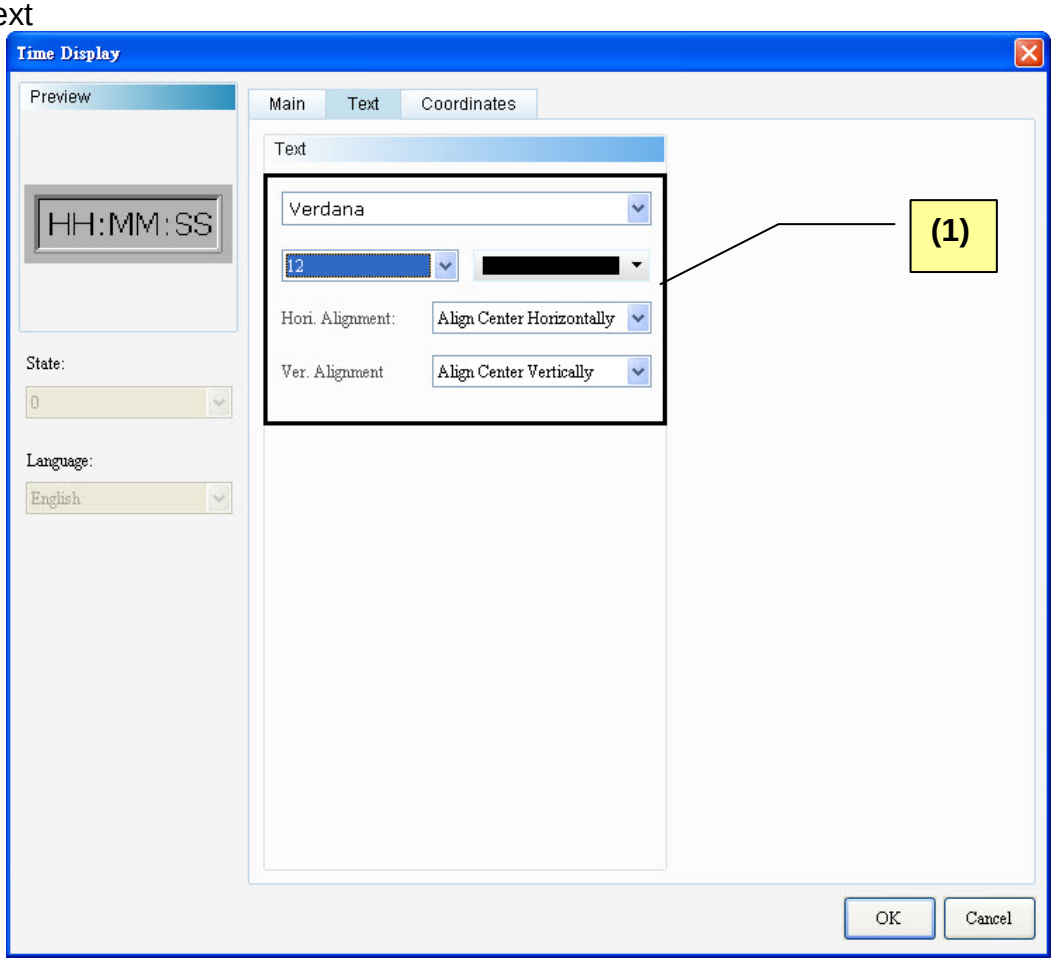


Figure 11-3-2-3 Time Display Element Text Properties Page

No.	Property	Function Description
(1)	Text Properties	➢ Sets text properties, including font type, font size, font color, and text alignment.

◆ Coordinates

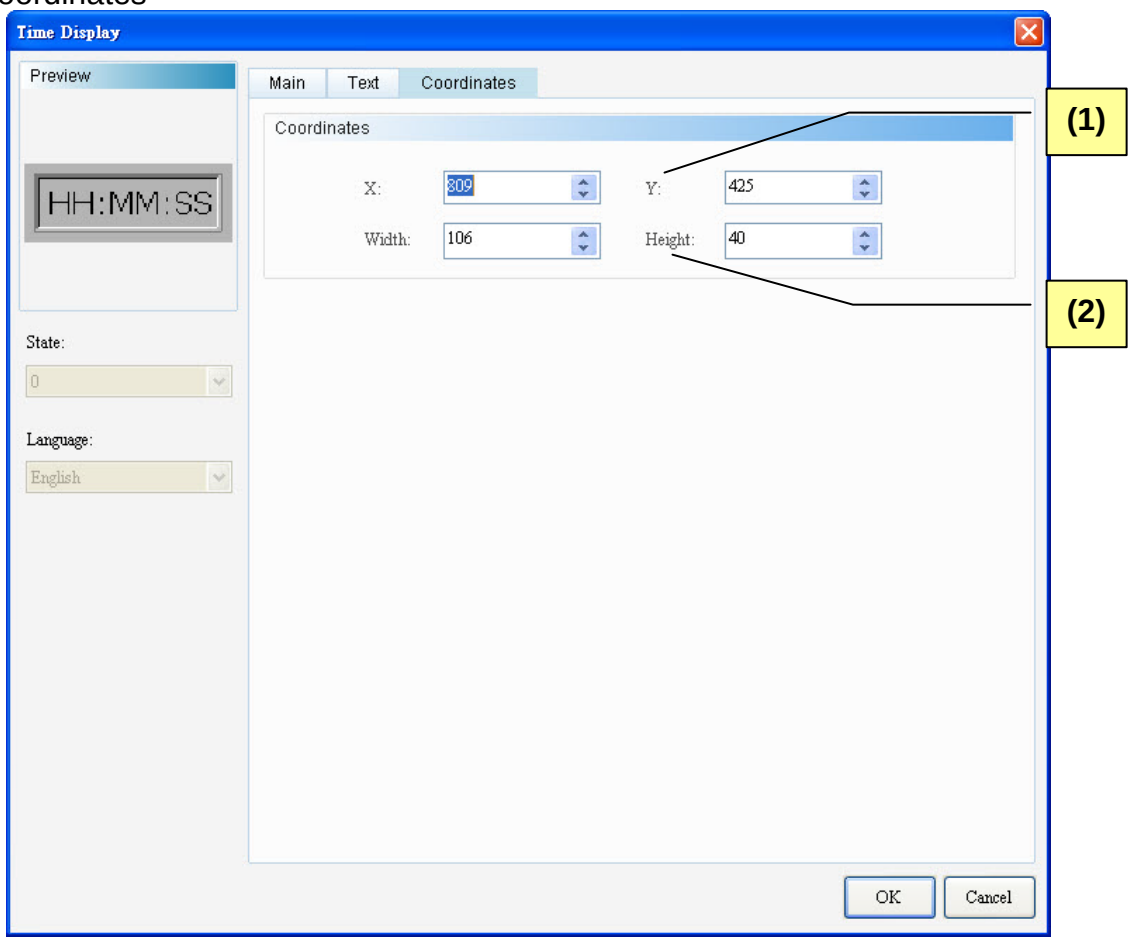


Figure 11-3-2-4 Time Display Element Coordinates Properties Page

No.	Property	Function Description
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

11-3-3 Day-of-week Display

Double-click the Day-of-week Display to call out the Day-of-week Display Properties screen as shown below.

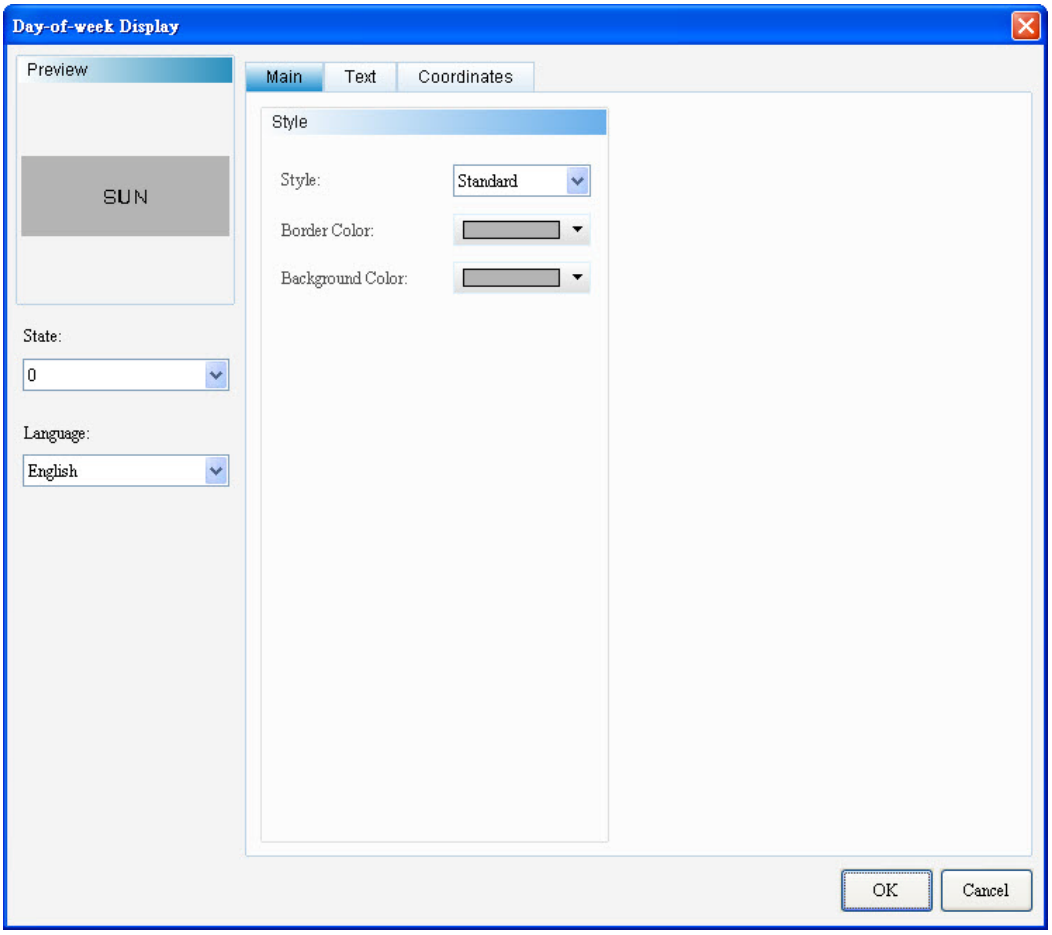


Figure 11-3-3-1 Day-of-week Display Properties

Day-of-week Display	
Function Page	**Content Description**
Preview	Besides displaying the HMI system day, Day-of-week Display also supports multistate and multilingual data display.
Main	Sets element type, element Border Color, and element background color.
Text	Sets the content, font type, font size, font color, bold/italic/underline of font, scaling, and alignment of the text to be displayed. Edits text in Day-of-week Display. If multi-language is established, users can edit the data in other languages.
Coordinates	Sets the X-Y coordinate, width, and height of elements.

Table 11-3-3-1 Day-of-week Display Function Page

◆ Main

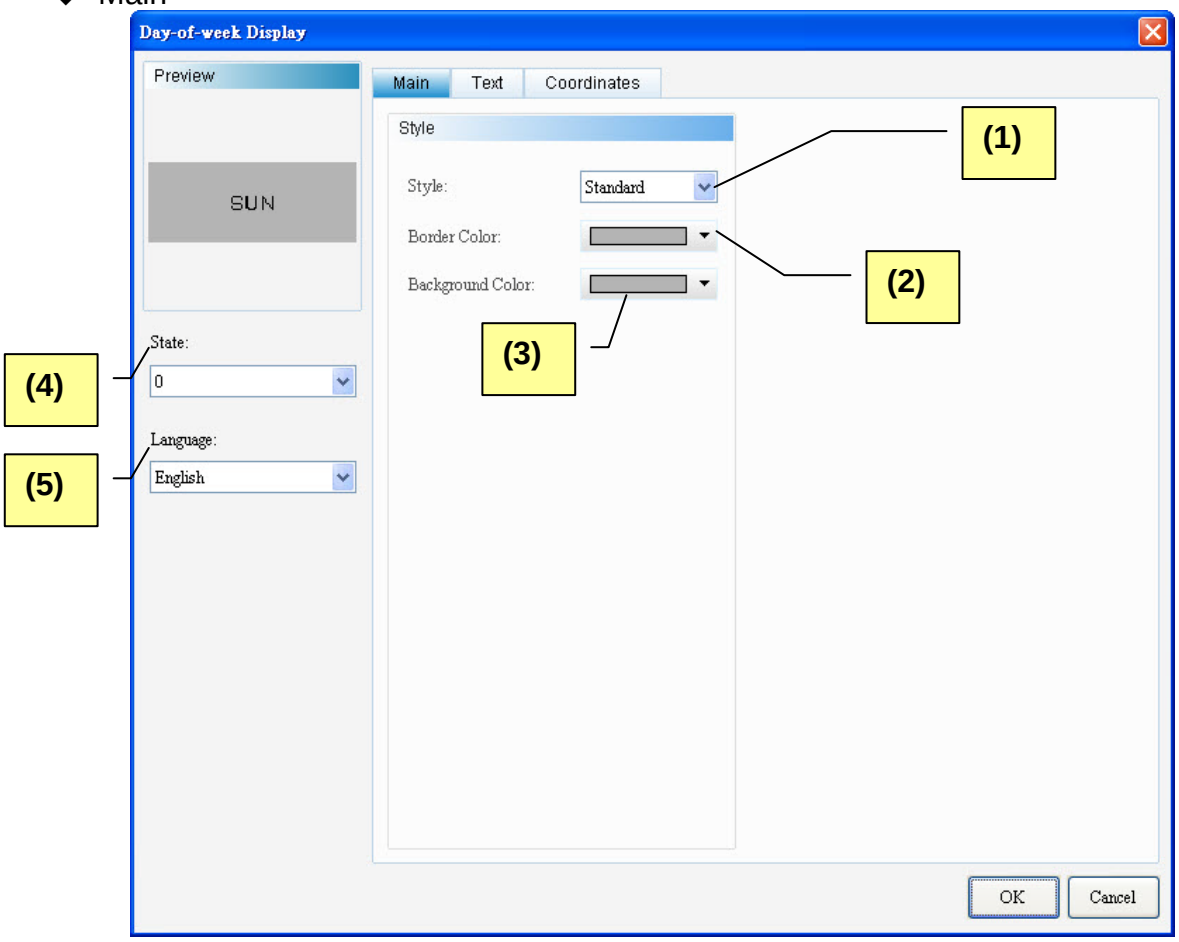
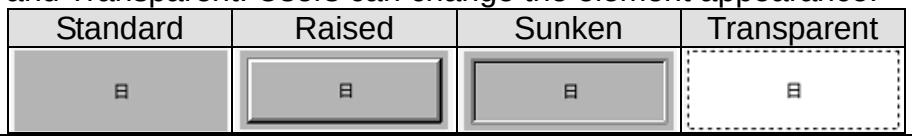
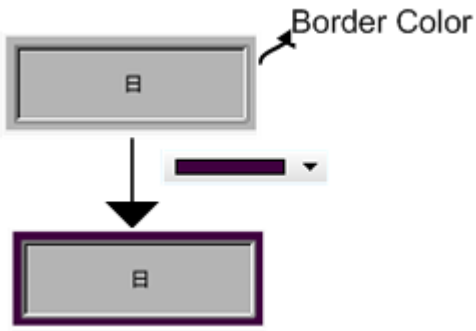
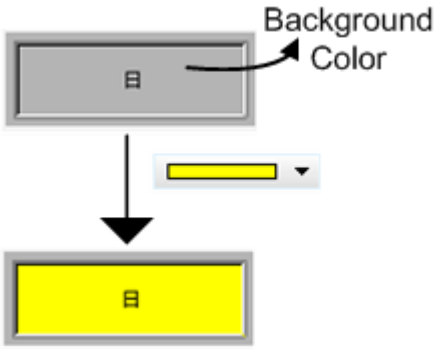
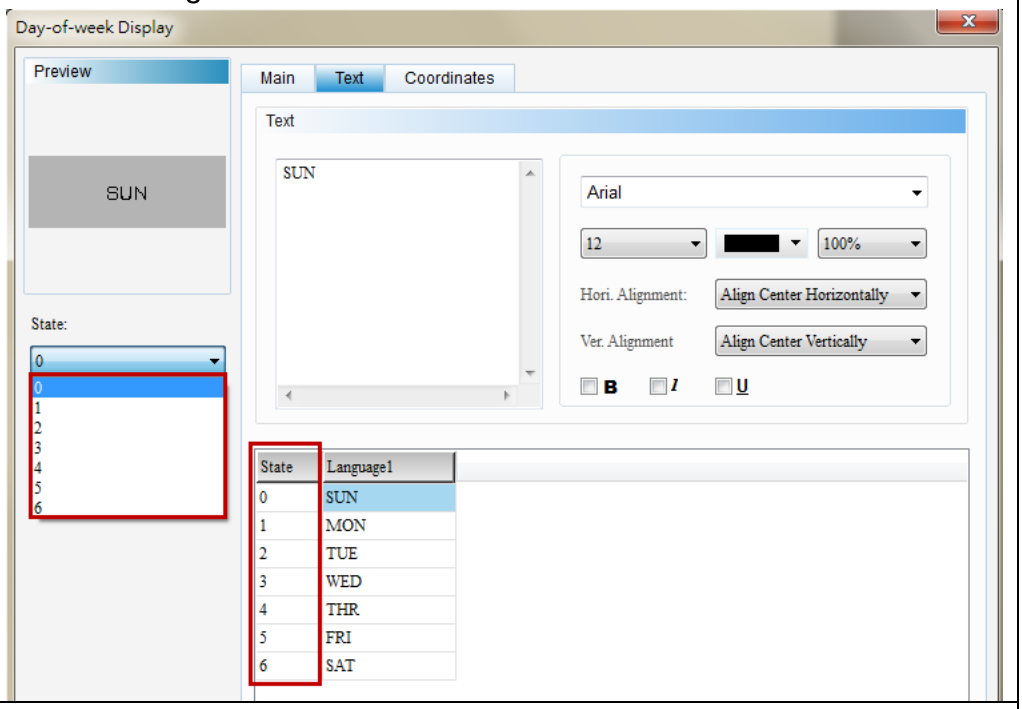
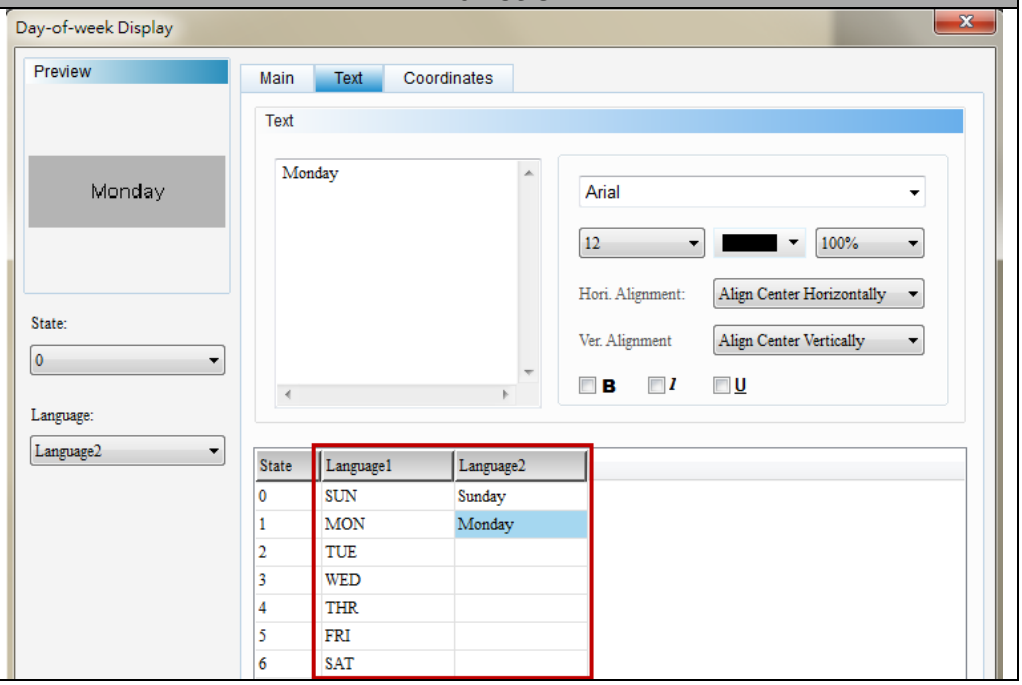


Figure 11-3-3-2 Day-of-week Display Element Main Properties Page

No.	Property	Function
(1)	Element Type	➢ There are four element types, including Standard, Raised, Sunken, and Transparent. Users can change the element appearance. 
(2)	Border Color	➢ Sets element Border Color. ➢ If element type is “Transparent”, Border Color is disabled. 

No.	Property	Function
(3)	Background Color	➢ Sets element background color. ➢ If element type is “Transparent”, background color is disabled. 
(4)	State	➢ Previews or changes the state parameters of button elements by switching states. 
(5)	Language	➢ When text data are defined, users can edit the text properties to be displayed from Language of the element.

No.	Property	Function
		

◆ Text

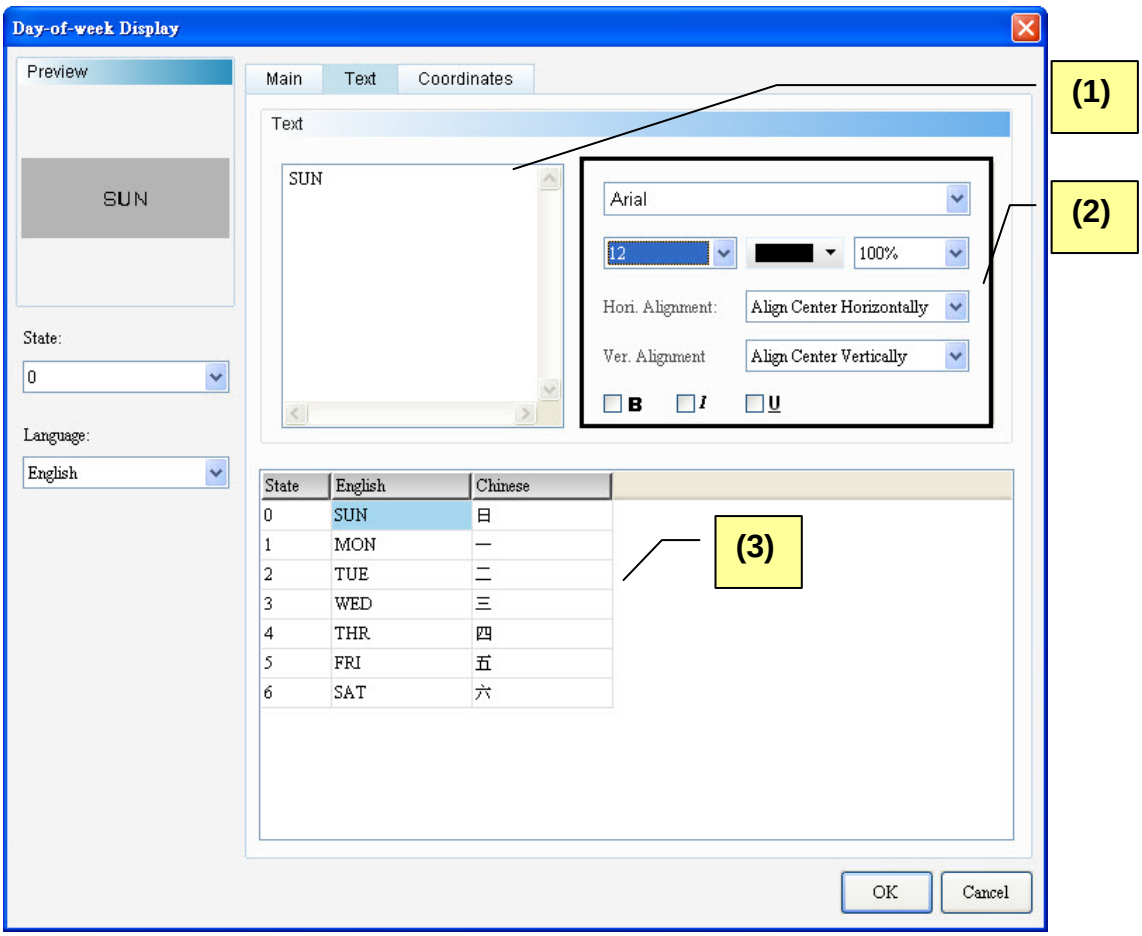
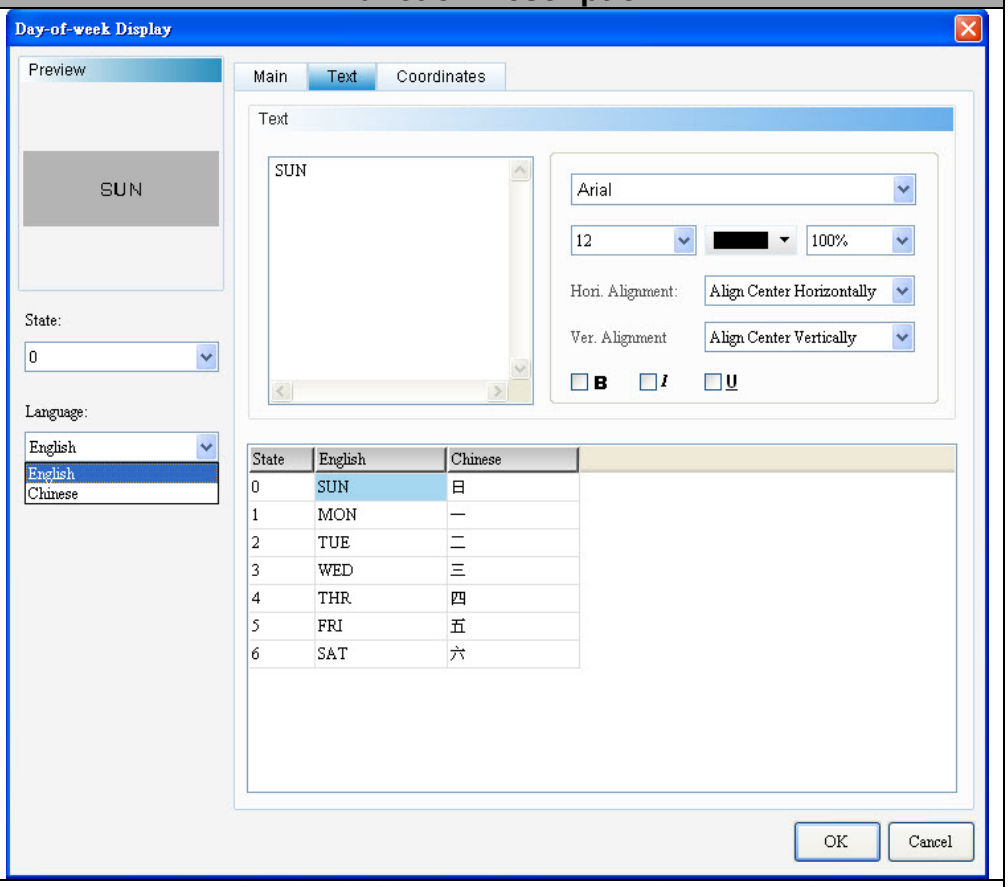


Figure 11-3-3-3 Day-of-week Display Element Text Properties Page

No.	Property	Function Description
(1)	Text	Users can input the text to be displayed in the text box.

No.	Property	Function Description
		
(2)	Text Properties	Sets text properties, including font type, font size, font color, scaling, text alignment, and bold/italic/underline of font. Please refer to the above figure for details about the results of text properties.
(3)	Edit Multilingual Text Data	If multilingual text data are created, users can edit multilingual text data here. As shown in the Text Properties Figure, users can input English text in the English field.

◆ Coordinates

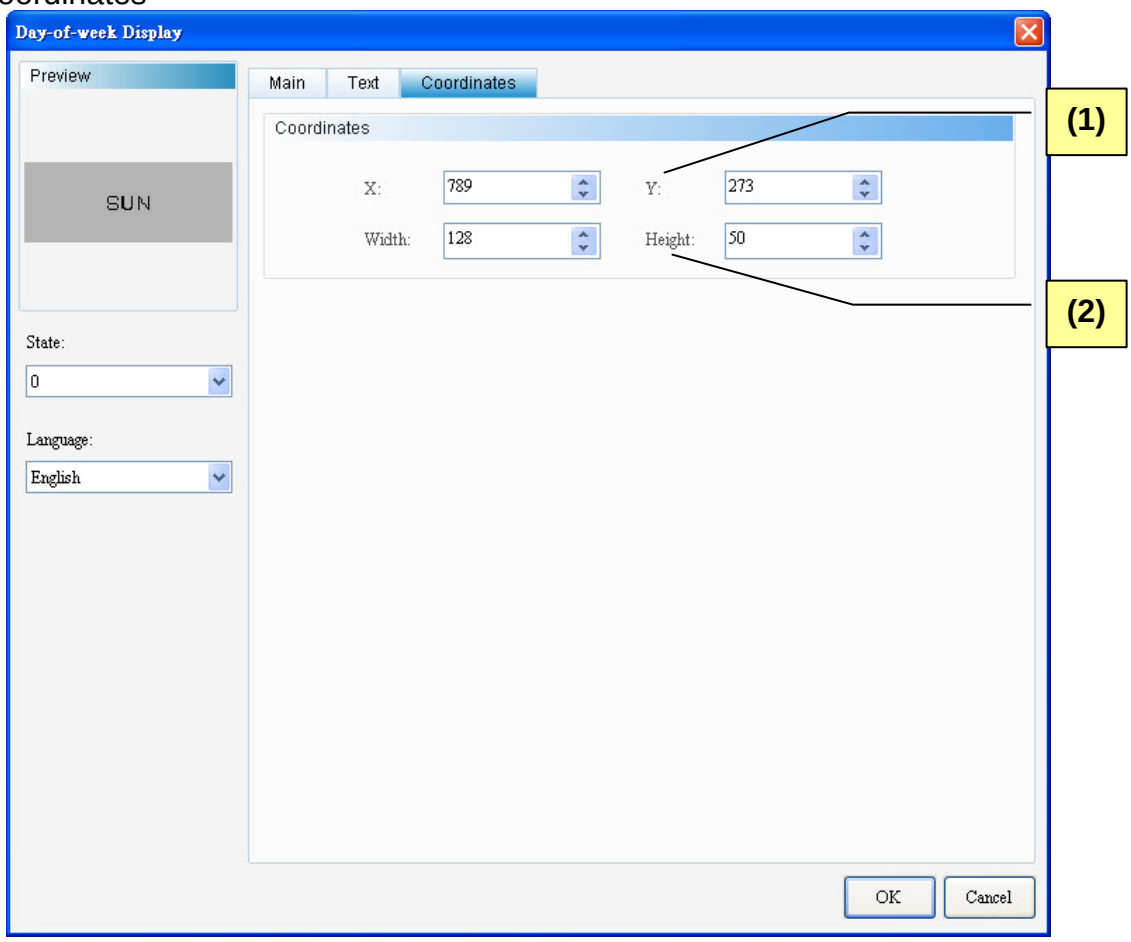


Figure 11-3-3-4 Day-of-week Display Element Coordinates Properties Page

No.	Property	Function Description
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

11-4 Prestored Message Display

	Prestored Message Display

Users can display the state text message to be switched with Prestored Message Display and read the corresponding state text with the selected memory address. Please refer to Table 11-4-1 Example of Prestored Message Display.

Example of Prestored Message Display

Table 11-4-1 Example of Prestored Message Display

Read Address	**Prestored Message Display Element**		**Numeric Entry Element**	
	Read Address	$13	Write Address	$13

Properties

Prestored Message Display Element		
Data Type	**Data Format**	**State Count**
Word	Unsigned Decimal	3

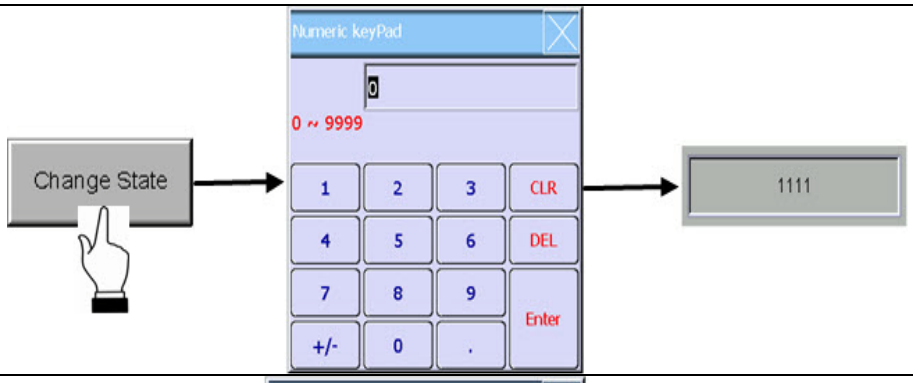
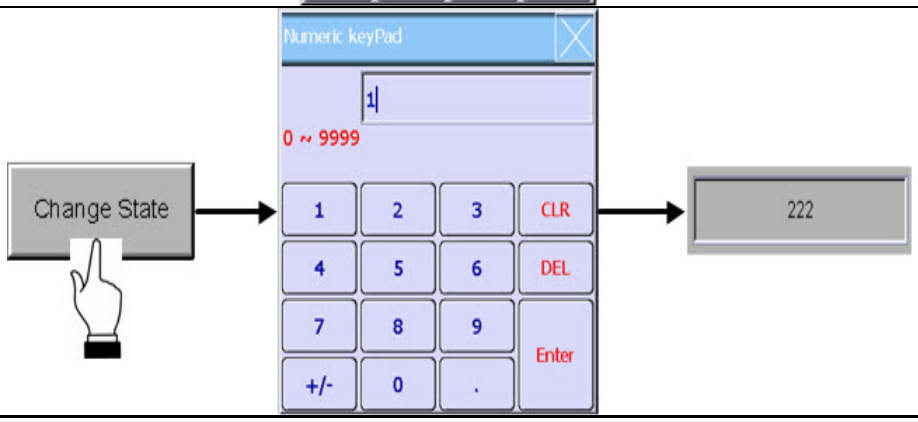
State Display Text

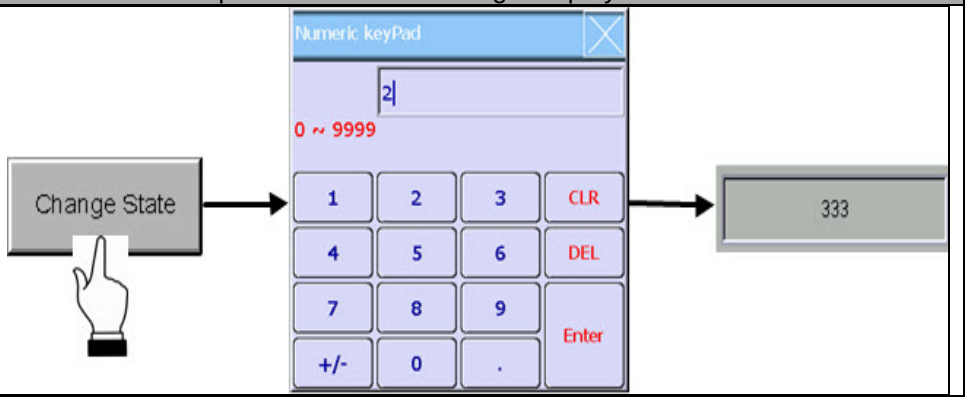
- Double-click the Prestored Message Display to enter [Text] and edit the text message to be displayed.

State	Chinese	English
0	1111	
1	222	
2	333	

Execution Results

- After creating the element, run Compile and download the element to the HMI. Next, input orderly 0, 1, and 2 with the numeric entry element. Then, the Prestored Message Display element will display the corresponding state text.

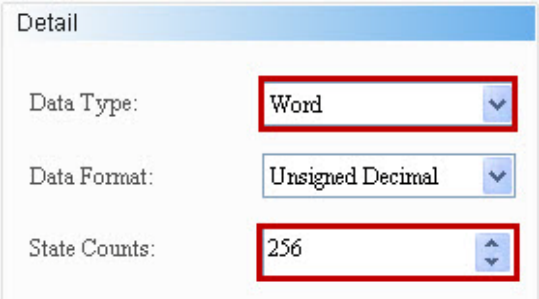
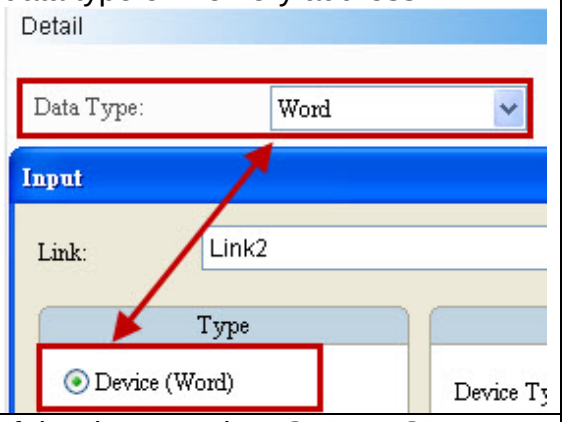
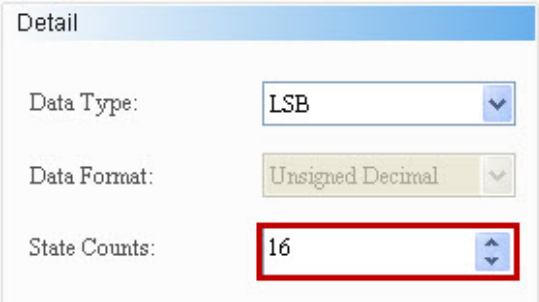
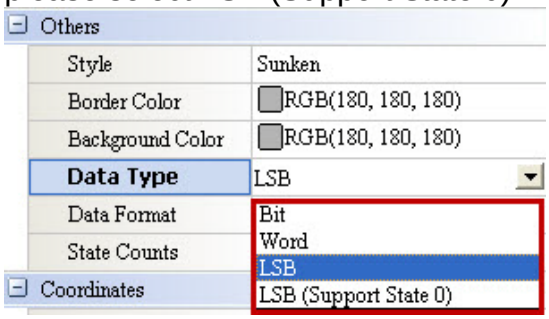
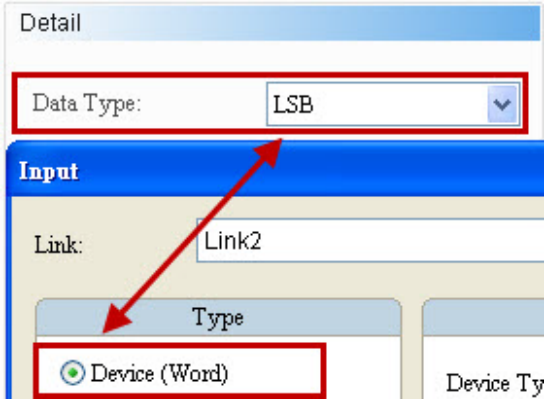
Input "0" from the numeric entry element.	
Input "1" from the numeric entry element.	

Example of Prestored Message Display Table 11-4-1 Example of Prestored Message Display			
		Input "2" from the numeric entry element .	

Prestored Message Display supports four data types as shown in Table 11-4-2 below. Users wishing to add or remove state count simply need to add or reduce the state count in the properties.

Prestored Message Display

Table 11-4-2 Prestored Message Display Data Types

Data Type	State Counts	Memory Address
Word	If data type is "Word", users can select 1-256 states.  	If data type is "Word", "Word" is the data type of memory address. 
LSB / LSB (Support State 0)	If the data type is "LSB", the data in the register are first converted into binary data. Next, the present object state is determined according to the element with the lowest non-zero bit. If the data type is "LSB", users can select 1-16 states, except "State 0".  If users wish to display "State 0", please select LSB (Support State 0).  If users select "LSB", the element will display "Black" when State=0.	If the data type is "LSB" or LSB (Support State 0), "Word" is the data type of memory address. 

Prestored Message Display

Table 11-4-2 Prestored Message Display Data Types

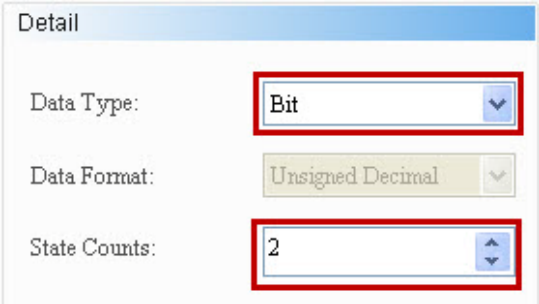
[redacted]

The examples in the following table show how state value is determined with the lowest non-zero bit after converting from a decimal value into a binary value. There are also examples demonstrating how the DOPSoft determines the state Numeric Displayed with the lowest bit when the decimal values are 3 and 7.

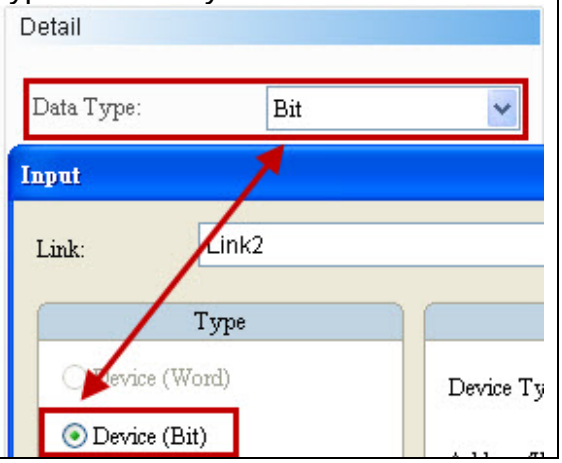
Decimal	Binary	State Value
0	**0000000000000000**	**State=0 when all bits are "0" [LSB (Support State 0) must be selected]**
1	0000000000000001	The lowest non-zero bit is bit 0, State=1.
2	0000000000000010	The lowest non-zero bit is bit 1, State=2.
3	**0000000000000011**	**The lowest non-zero bit is bit 0, State=1.**
4	0000000000000100	The lowest non-zero bit is bit 2, State=3.
7	**0000000000000111**	**The lowest non-zero bit is bit 0, State=1.**
8	0000000000001000	The lowest non-zero bit is bit 3, State=4.
16	0000000000010000	The lowest non-zero bit is bit 4, State=5.
32	0000000000100000	The lowest non-zero bit is bit 5, State=6.
64	0000000001000000	The lowest non-zero bit is bit 6, State=7.
128	0000000010000000	The lowest non-zero bit is bit 7, State=8.
256	0000000100000000	The lowest non-zero bit is bit 8, State=9.
512	0000001000000000	The lowest non-zero bit is bit 9, State=10.
1024	0000010000000000	The lowest non-zero bit is bit 10, State=11.
2048	0000100000000000	The lowest non-zero bit is bit 11, State=12.
4096	0001000000000000	The lowest non-zero bit is bit 12, State=13.
8192	0010000000000000	The lowest non-zero bit is bit 13, State=14.
16384	0100000000000000	The lowest non-zero bit is bit 14, State=15.
32768	1000000000000000	The lowest non-zero bit is bit 15, State=16.

Bit

If the data type is "Bit", only 2 states are available.



If the data type is "Bit", "Bit" is the data type of memory address.



Double-click the Prestored Message Display to call out the following Prestored Message Display Properties screen as shown below.

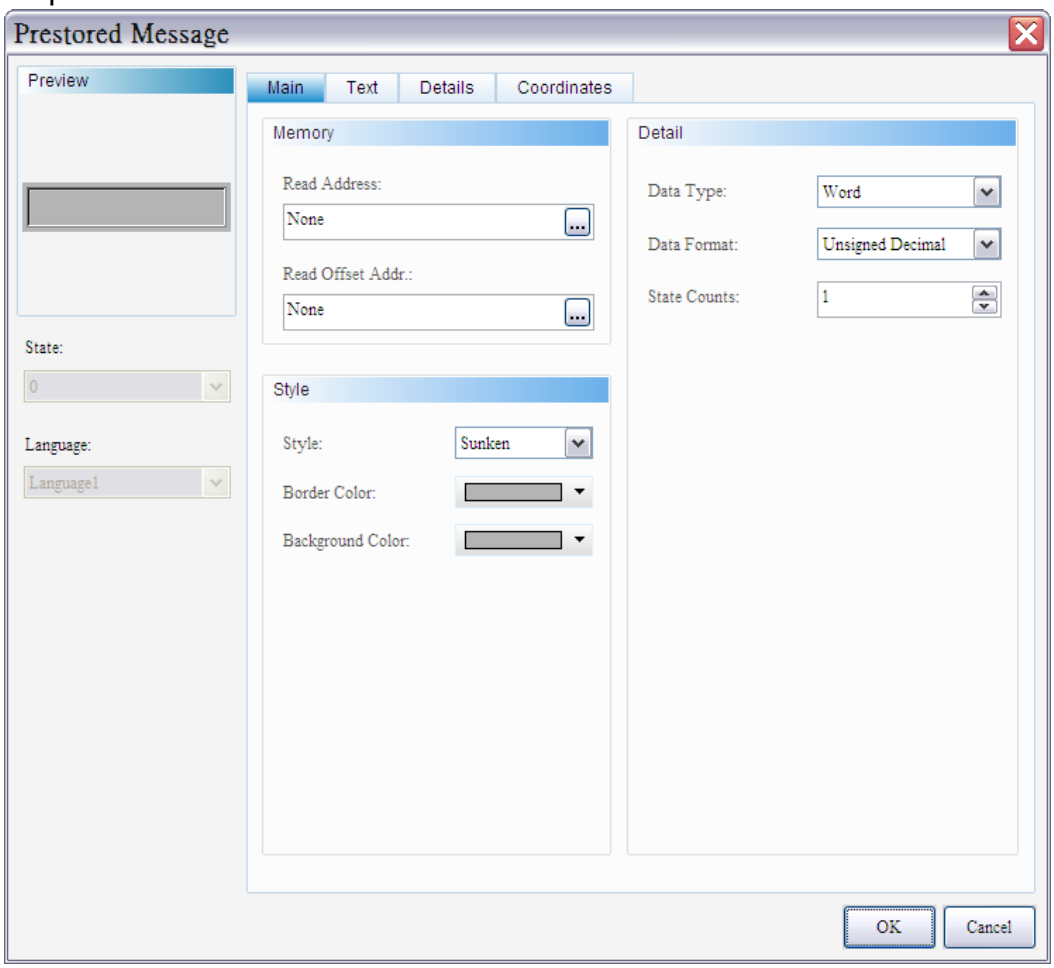


Figure 11-4-1 Prestored Message Display Properties

Prestored Message Display	
Function Page	**Content Description**
Preview	Views the multistate value and multilingual data to be displayed.
Main	Sets read address, read offset address, element type, background color, and Border Color. Sets data type, data format, and state count.
Text	Sets text content to be displayed and text properties, including font type, font size, font color, bold/italic/underline of font, scaling, and text alignment.
Details	Set invisible address.
Coordinates	Sets the X-Y coordinate, width, and height of the element.

Table 11-4-3 Prestored Message Display Function Page

◆ Main

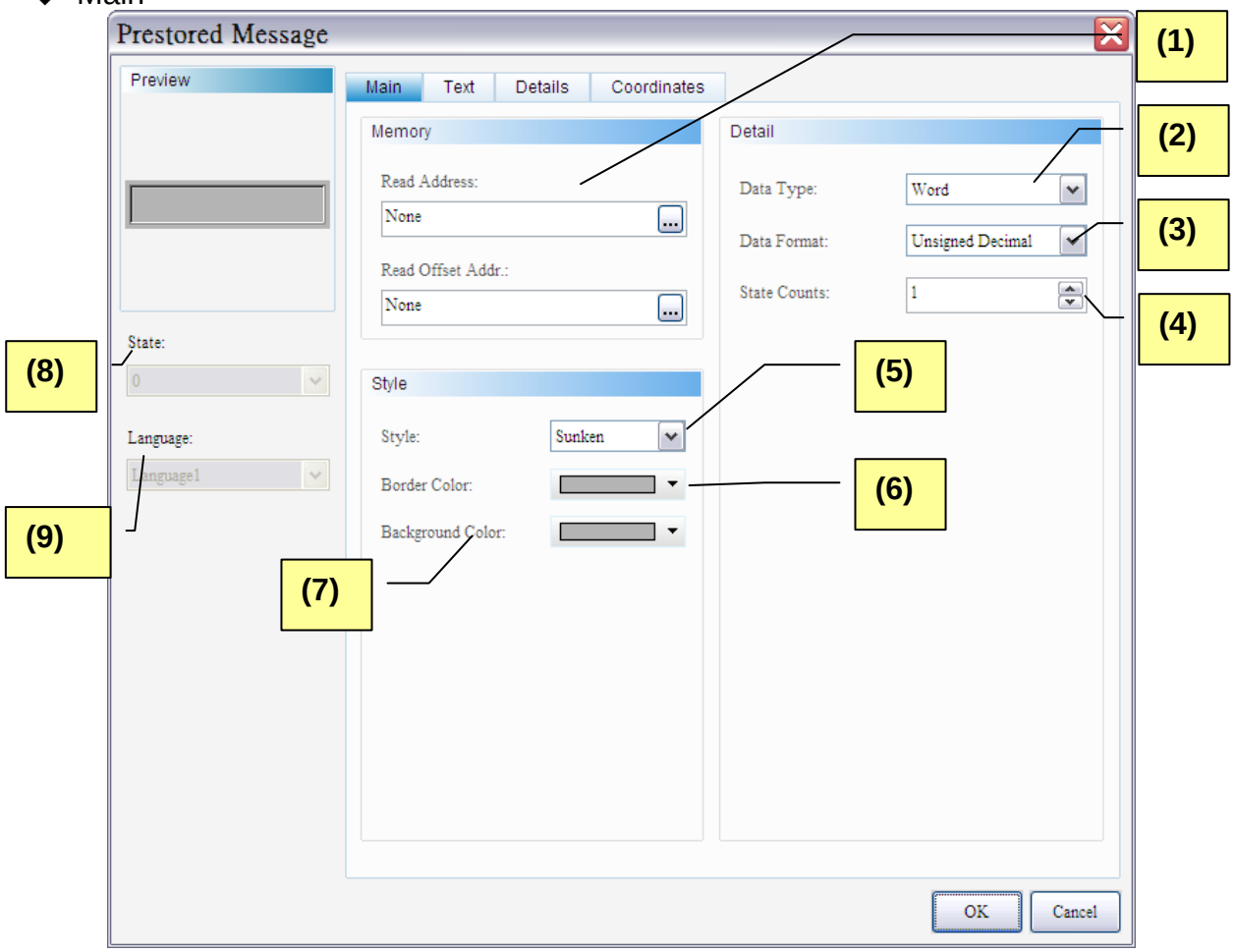
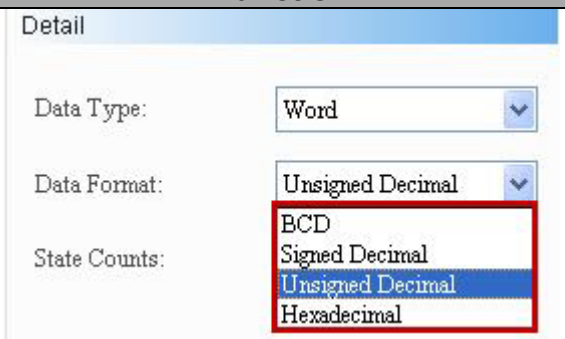
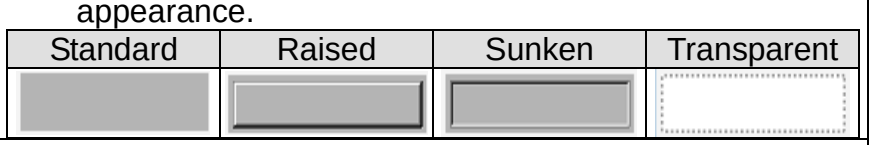
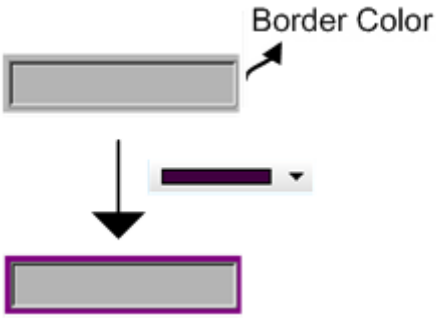
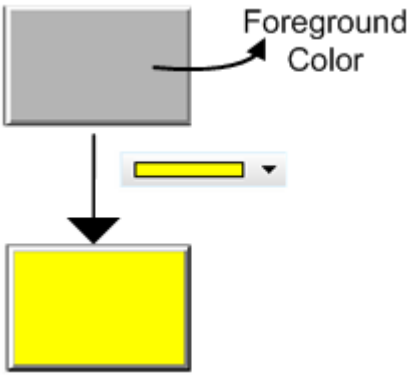
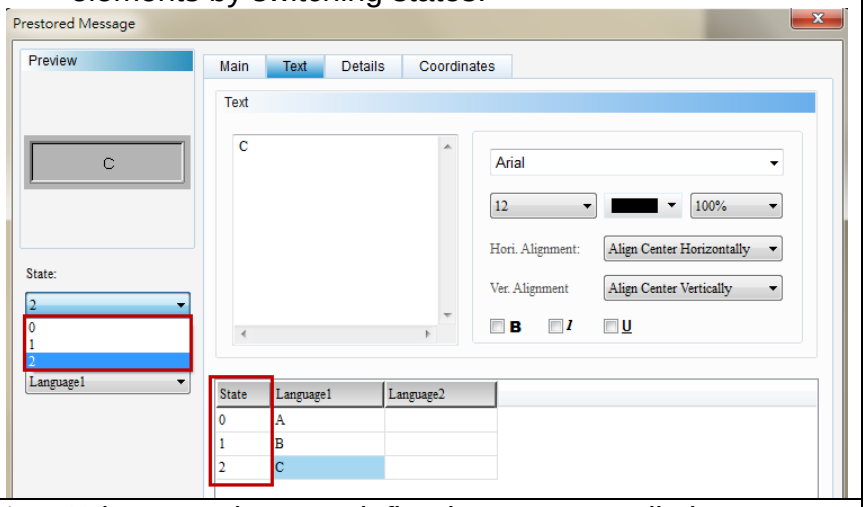
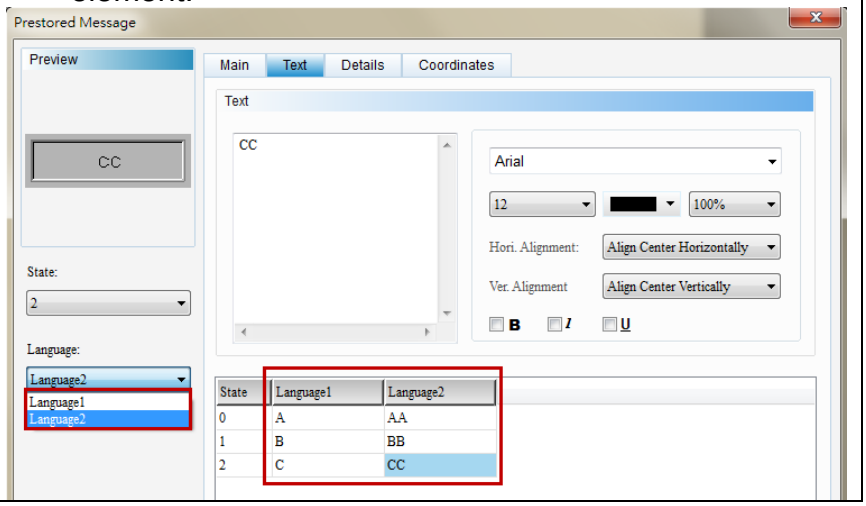


Figure 11-4-2 Prestored Message Display Element Main Properties Page

No.	Property	Function
(1)	Read Address	➢ Selects the address of internal memory or controller register. The memory type changes based on the selected data type, including Word, LSB and Bit, as shown in Table 11-4-2. ➢ Selects link name or element type. Please refer to 5-1 Buttons of Chapter 05for details.
	Read Offset Address	➢ Please refer to Appendix D Write and Read Offset Address.
(2)	Data Type	➢ Four options: Bit, Word, LSB, and LSB (Support State 0). Please refer to Table 11-4-2 for details.
(3)	Data Format	➢ Data format can only be selected when the data type is “Word”. ➢ These formats include BCD, Signed Decimal, Unsigned Decimal, and Hexadecimal.

No.	Property	Function
		
(4)	State Count	➢ Sets the total state count of Prestored Message Display. If the data type is “Word”, users can select 1-256 states; if the data type is “LSB”, users can select 16 states; if the data type is “LSB (Support State 0)”, users can select 17 states; and if the data type is “Bit”, users can select 2 states. Please refer to Table 11-4-2 for details.
(5)	Element Type	➢ Element types include Standard, Raised, Round, and Transparent. Users can change the element appearance. 
(6)	Border Color	➢ Sets element Border Color. ➢ If element type is “Transparent”, Border Color is disabled. 
(7)	Foreground Color	➢ Sets element foreground color. ➢ If element type is “Transparent”, Border Color is disabled. 

No.	Property	Function
(8)	State	➢ Previews or changes the state parameters of button elements by switching states. 
(9)	Language	➢ When text data are defined, users can edit the text properties to be displayed from the Language of the element. 

◆ Text

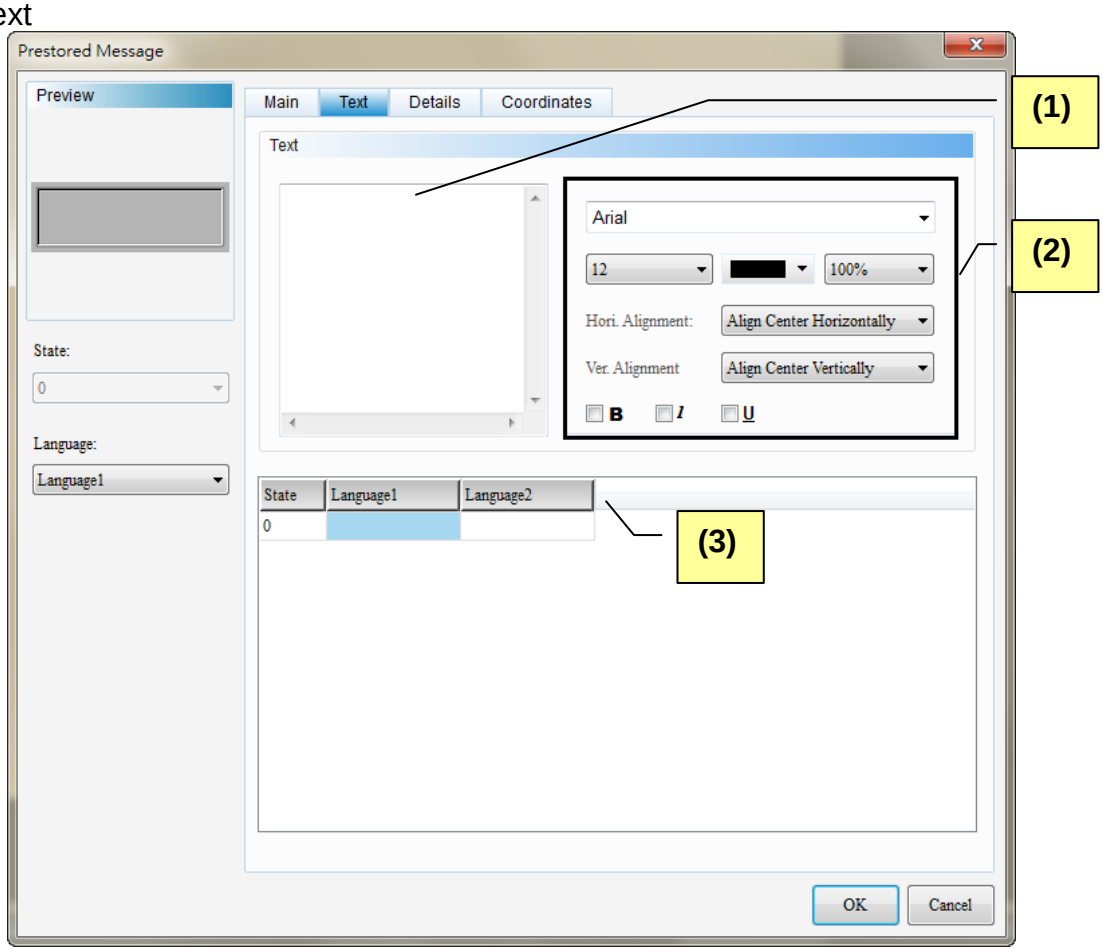
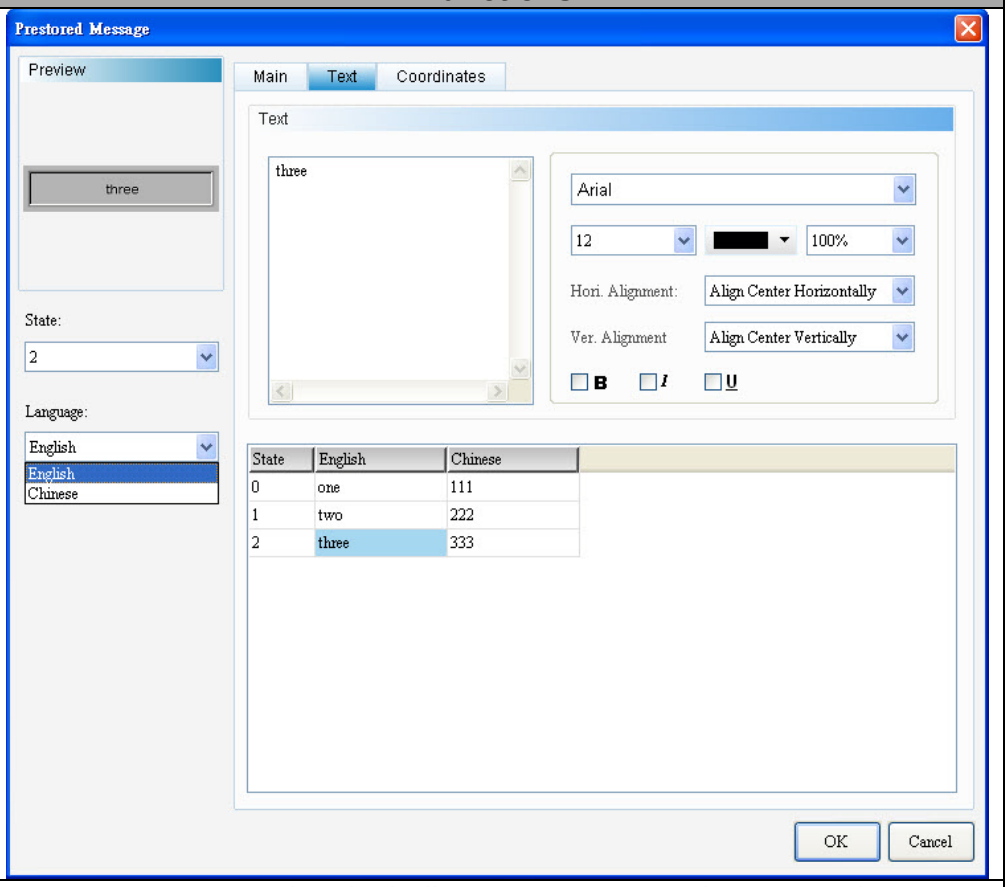


Figure 11-4-3 Prestored Message Display Element Text Properties Page

No.	Property	Functions
(1)	Text	➢ Users can input the text message to be displayed in the text box.

No.	Property	Functions
		
(2)	Text Properties	➢ Sets text properties, including font type, font size, font color, scaling, text alignment, and bold/italic/underline of font. Please refer to the above figure for details about the results of text properties.
(3)	Edit Multilingual Text Data	➢ If multilingual text data are created, users can edit multilingual text data here. As shown in the Text Properties Figure, users can input English text in the English field.

◆ Details

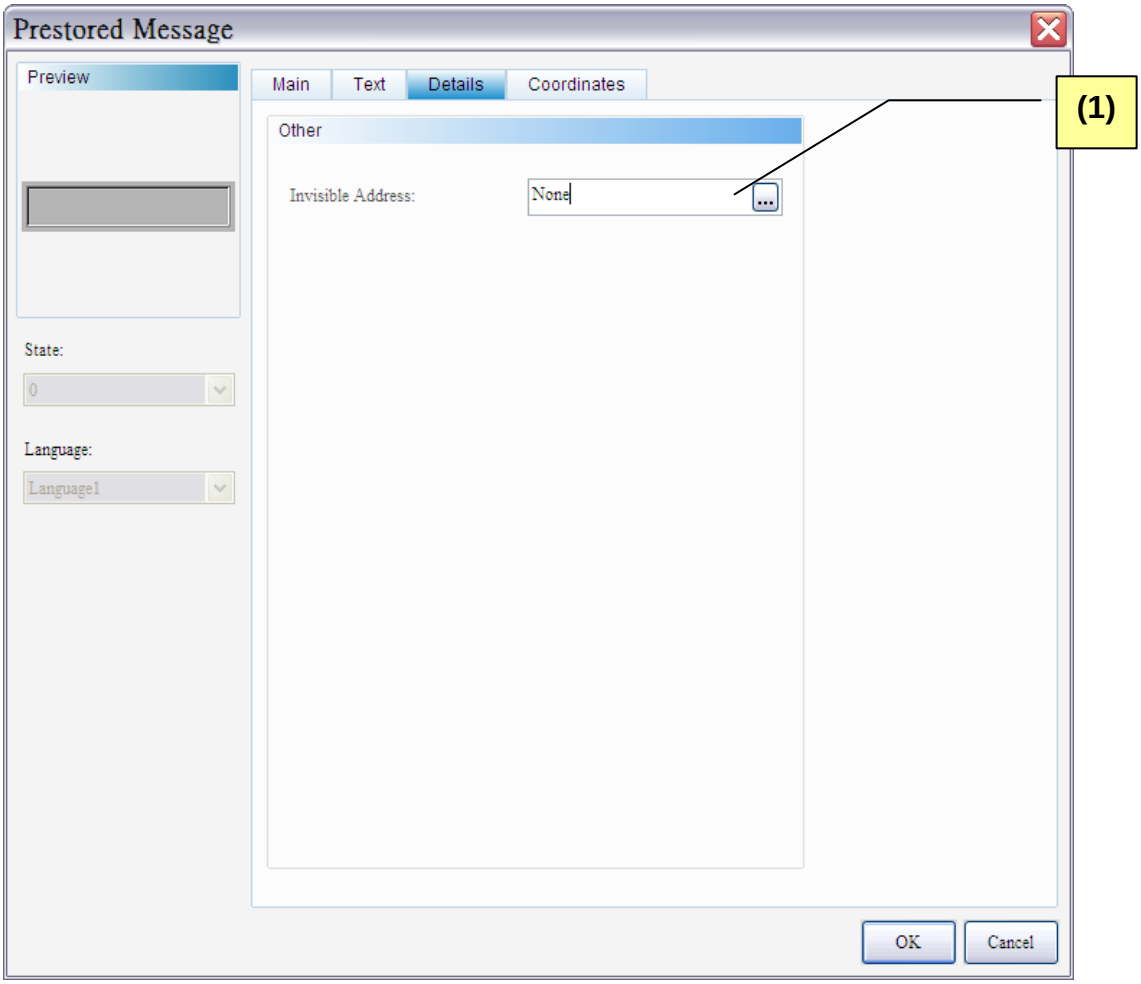
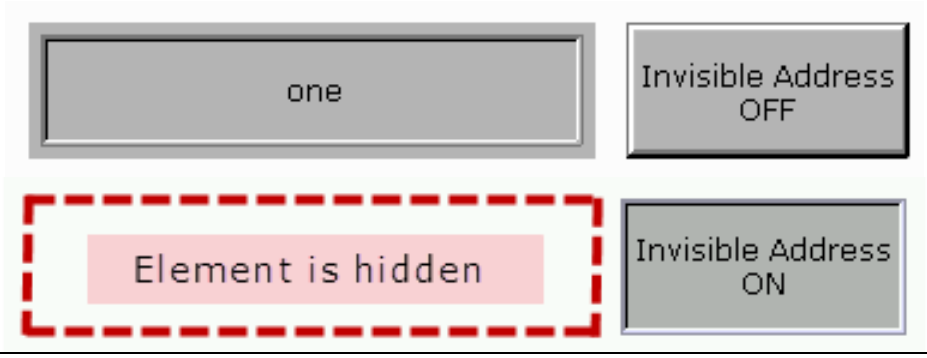
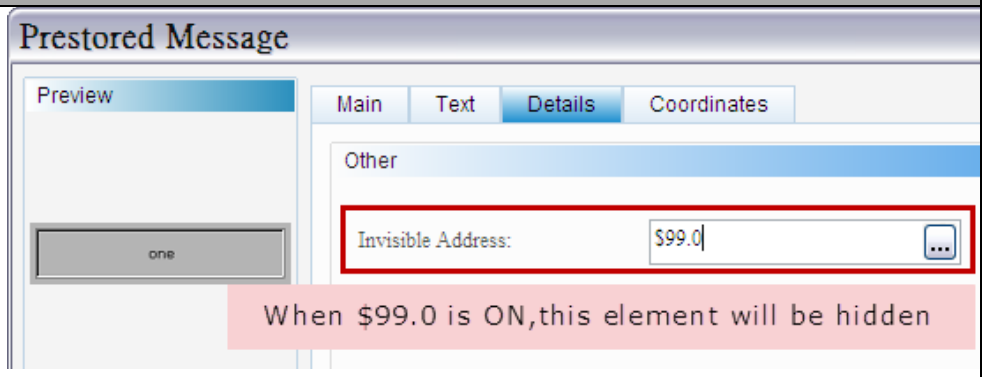


Figure 11-4-4 Prestored Message Display Element Details Properties Page

No.	Property	Function
(1)	Invisible Address	➢ When the Invisible Item is "On", button elements are hidden, and the corresponding button functions are disabled. 

No.	Property	Function
		

◆ Coordinates

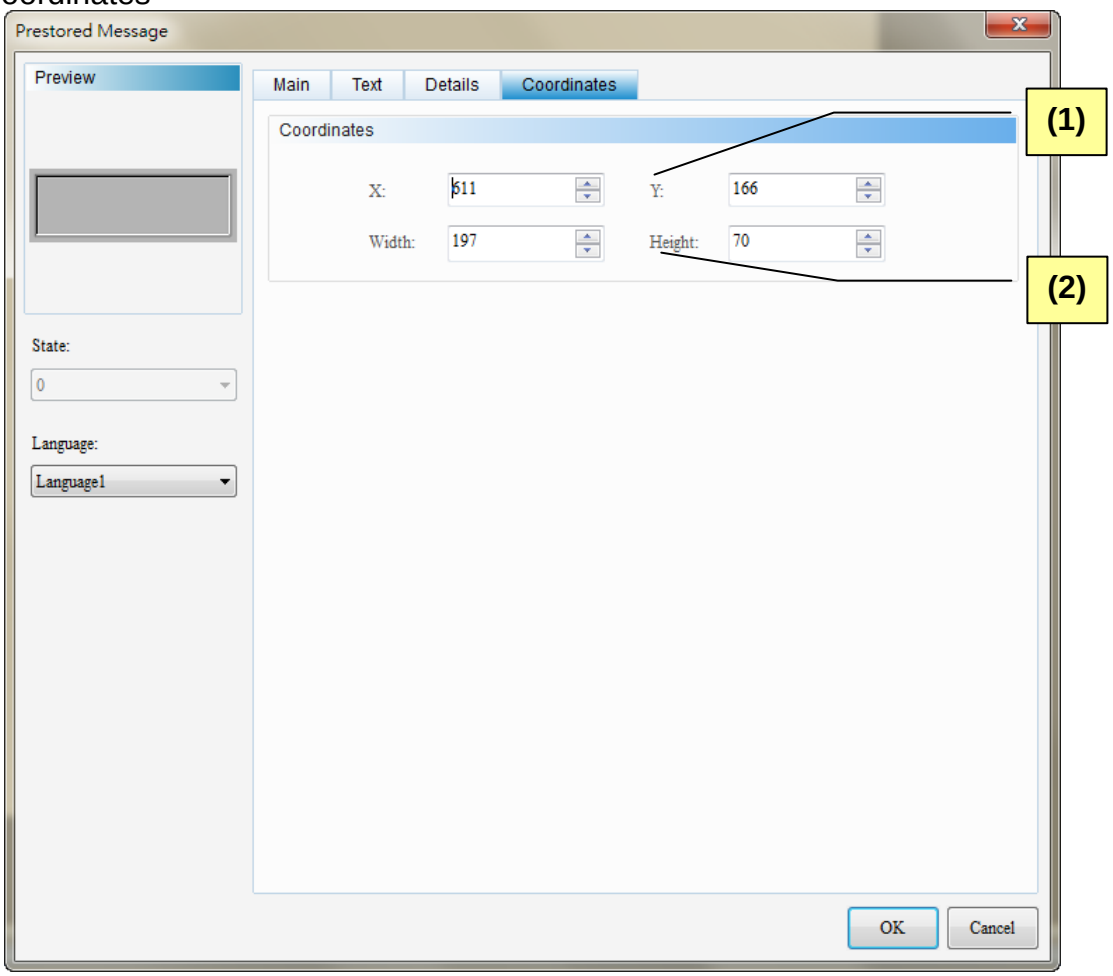


Figure 11-4-5 Prestored Message Display Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

11-5 Moving Sign

	Moving Sign

Besides displaying the text message to be switched with the Prestored Message Display, users can display text messages with the Moving Sign. Also, users can adjust the direction, moving points, and time interval of Character Display. Please refer to Table 11-5-1 Example of Moving Sign below for details.

Example of Moving Sign

Table 11-5-1 Example of Moving Sign

Read Address

Moving Sign Element		**Maintained Element**	
Read Address	$55.0	Write Address	$55.0

Properties

Moving Sign Element				
Data Type	**State Count**	**Direction**	**Moving Points**	**Time Interval**
Bit	2	Left	1	100 (ms)

State Display Text

- Double-click the Prestored Message Display to enter [Text]. Edit the text message to be displayed.

State	English	Chinese
0	Delta	
1	HMI	

Execution Results

- After creating the element, run Compile and download the element to the HMI. Next, switch “State 0” and “State 1” with the maintained element. Then, the Moving Sign element will display the corresponding state text.

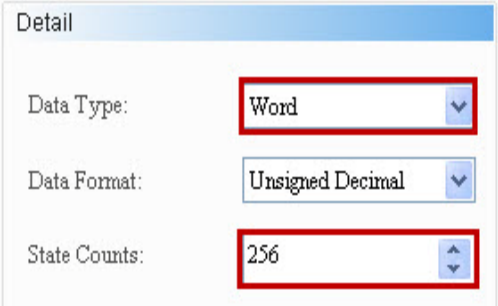
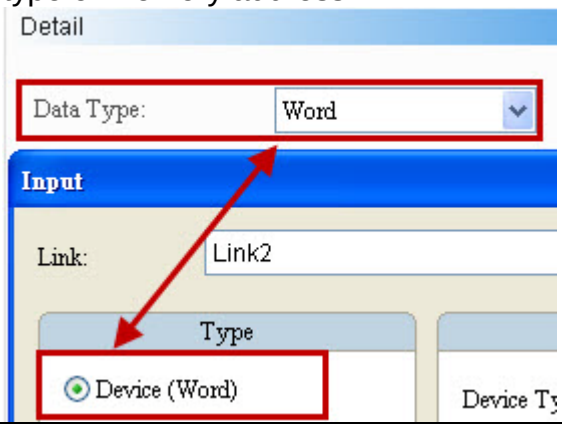
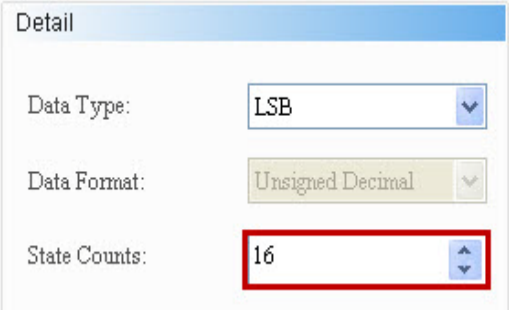
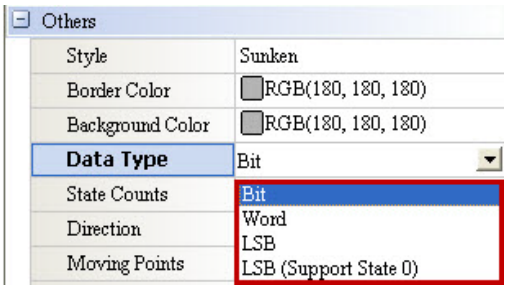
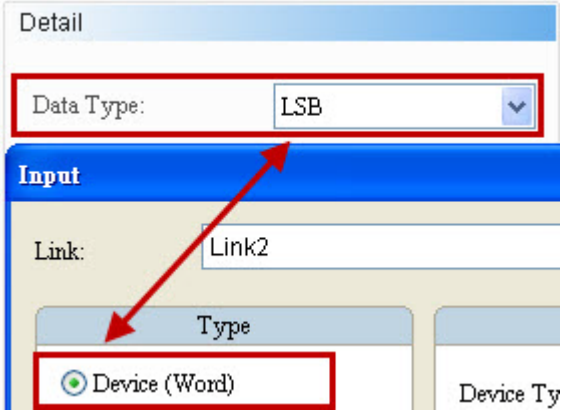
State 0

State 1

Moving Sign supports four data types as shown in Table 11-5-2. Users wishing to add or remove state count simply need to add or reduce the state count in the properties.

Moving Sign

Table 11-5-2 Description of Moving Sign Data Types

Data Type	State Count	Memory Address
Word	If data type is "Word", users can select 1-256 states.  	If data type is "Word", "Word" is the data type of memory address. 
LSB / LSB (Support State 0)	If the data type is "LSB", the data in the register are first converted into binary data. Next, the present object state is determined according to the element with the lowest non-zero bit. If the data type is "LSB", users can select 1-16 states, except "State 0".  If users wish to display "State 0", please select LSB (Support State 0).  If users select "LSB", the element will display "Black" when State=0.	If the data type is "LSB" or LSB (Support State 0), "Word" is also the data type of memory address. 

Moving Sign

Table 11-5-2 Description of Moving Sign Data Types

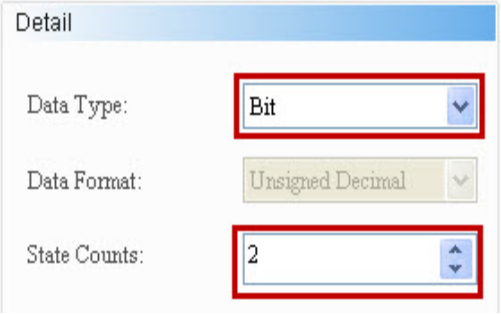
[redacted]

The examples in the following table show how state value is determined with the lowest non-zero bit after converting from a decimal value into a binary value. There are also examples demonstrating how the DOPSoft determines the state Numeric Displayed with the lowest bit when the decimal values are 3 and 7.

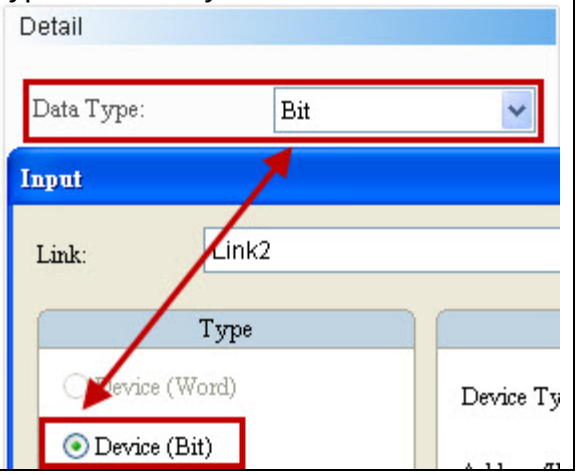
Decimal	Binary	State Value
0	**0000000000000000**	**State=0 when all bits are "0" [LSB (Support State 0) must be selected]**
1	0000000000000001	The lowest non-zero bit is bit 0, State=1.
2	0000000000000010	The lowest non-zero bit is bit 1, State=2.
3	**0000000000000011**	**The lowest non-zero bit is bit 0, State=1.**
4	0000000000000100	The lowest non-zero bit is bit 2, State=3.
7	**0000000000000111**	**The lowest non-zero bit is bit 0, State=1.**
8	0000000000001000	The lowest non-zero bit is bit 3, State=4.
16	0000000000010000	The lowest non-zero bit is bit 4, State=5.
32	0000000000100000	The lowest non-zero bit is bit 5, State=6.
64	0000000001000000	The lowest non-zero bit is bit 6, State=7.
128	0000000010000000	The lowest non-zero bit is bit 7, State=8.
256	0000000100000000	The lowest non-zero bit is bit 8, State=9.
512	0000001000000000	The lowest non-zero bit is bit 9, State=10.
1024	0000010000000000	The lowest non-zero bit is bit 10, State=11.
2048	0000100000000000	The lowest non-zero bit is bit 11, State=12.
4096	0001000000000000	The lowest non-zero bit is bit 12, State=13.
8192	0010000000000000	The lowest non-zero bit is bit 13, State=14.
16384	0100000000000000	The lowest non-zero bit is bit 14, State=15.
32768	1000000000000000	The lowest non-zero bit is bit 15, State=16.

Bit

If the data type is "Bit", only 2 states are available.



If the data type is "Bit", "Bit" is the data type of memory address.



Double-click the Moving Sign to call out the following Moving Sign Properties screen as shown below.

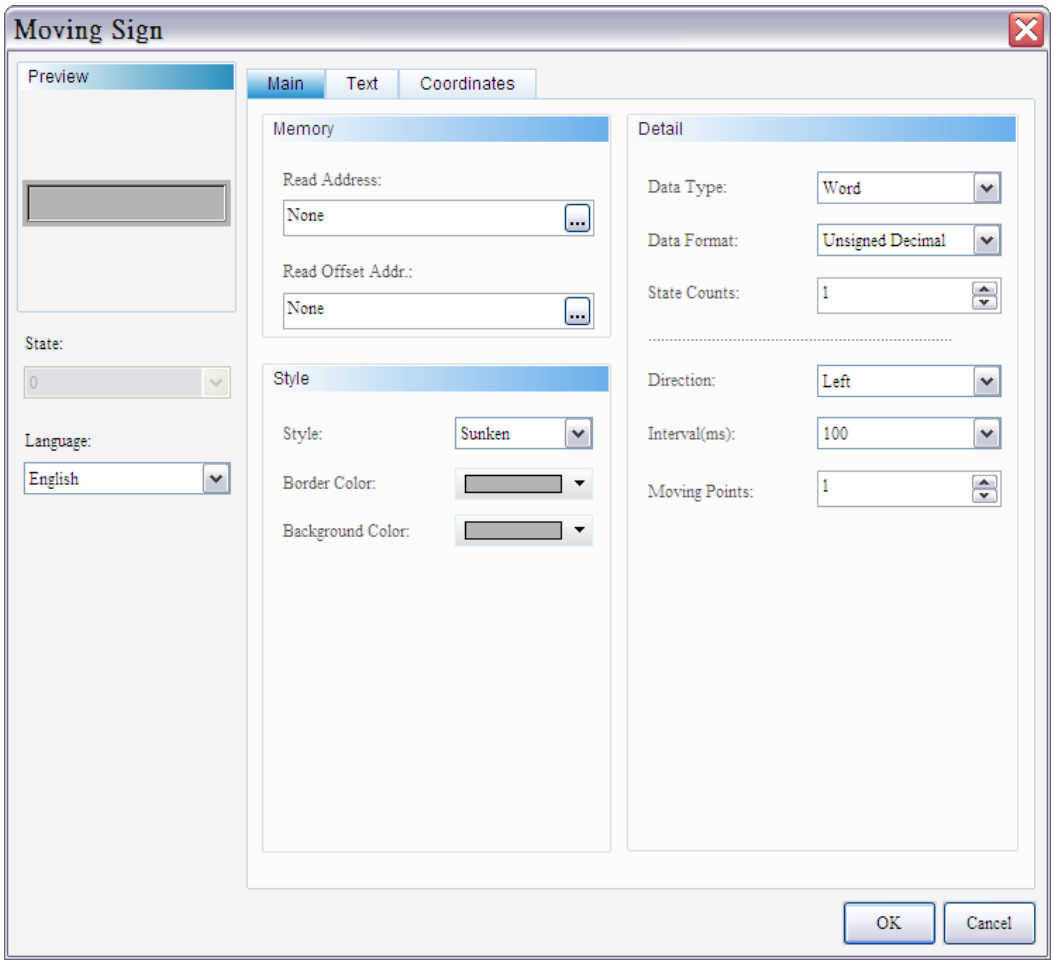


Figure 11-5-1 Moving Sign Properties

Moving Sign	
Function Page	**Content Description**
Preview	Views the multistate value and multilingual data to be displayed.
Main	Sets read address, read offset address, element type, background color, and Border Color. Sets data type, data format, state count, display direction, time interval (ms), and moving points.
Text	Sets text content to be displayed and text properties, including font type, font size, font color, bold/italic/underline of font, scaling, and text alignment.
Coordinates	Sets the X-Y coordinate, width, and height of the element.

Table 11-5-3 Moving Sign Function Page

◆ Main

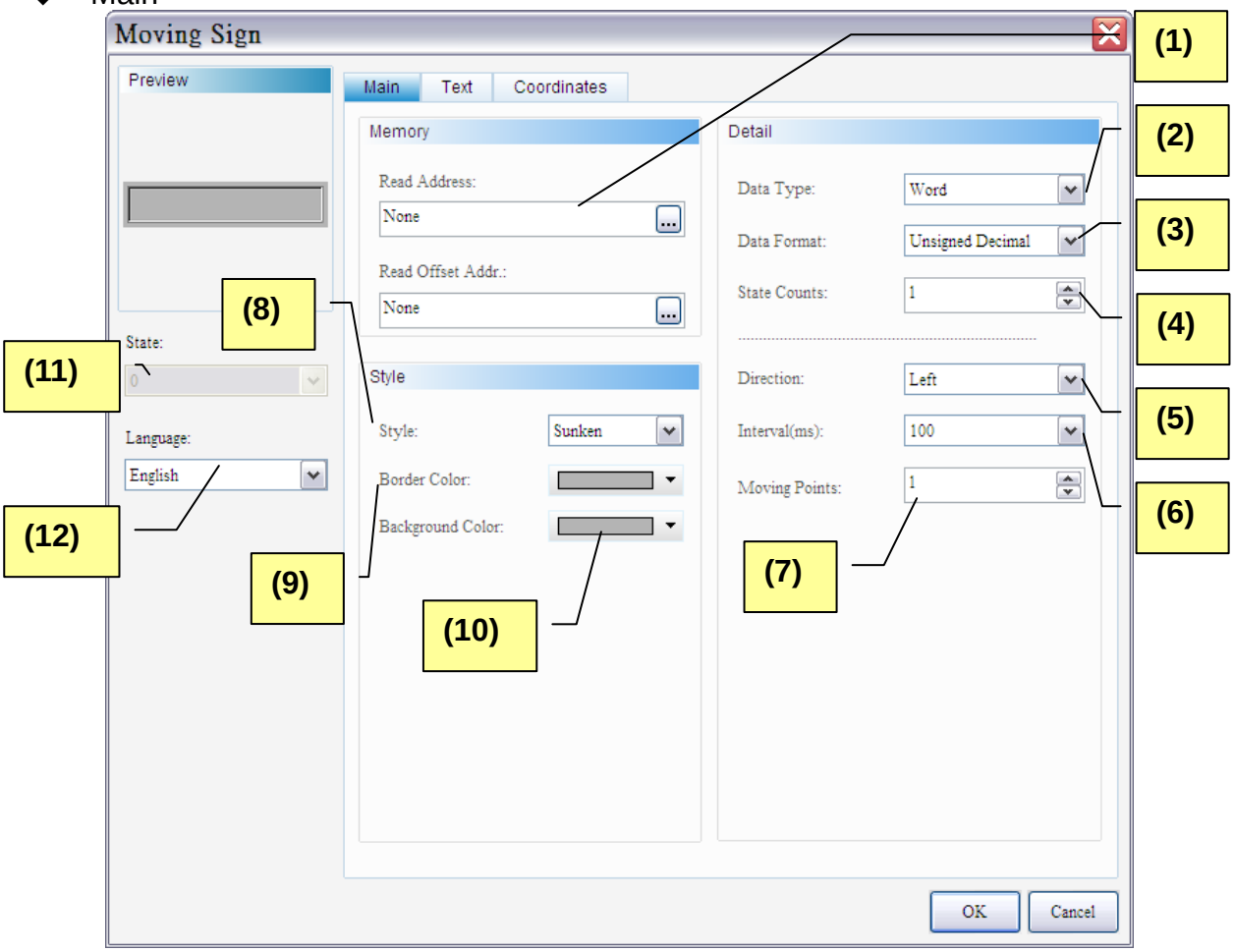
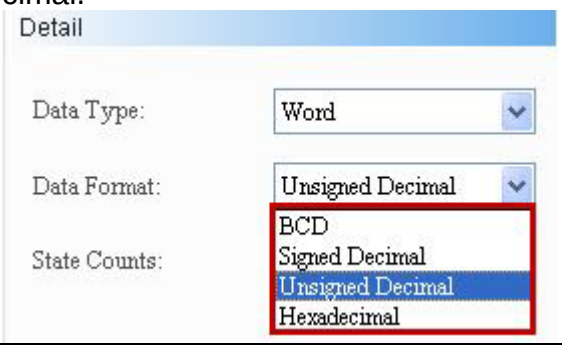
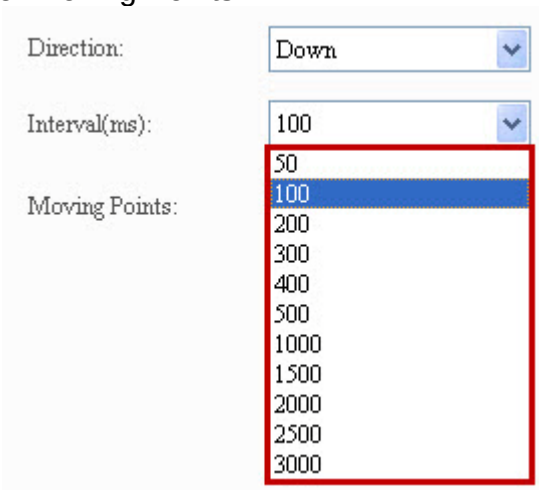
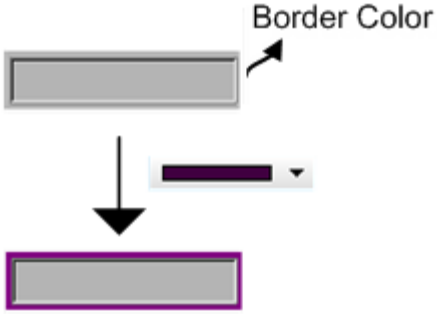
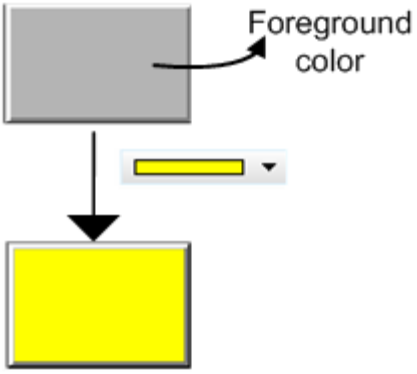
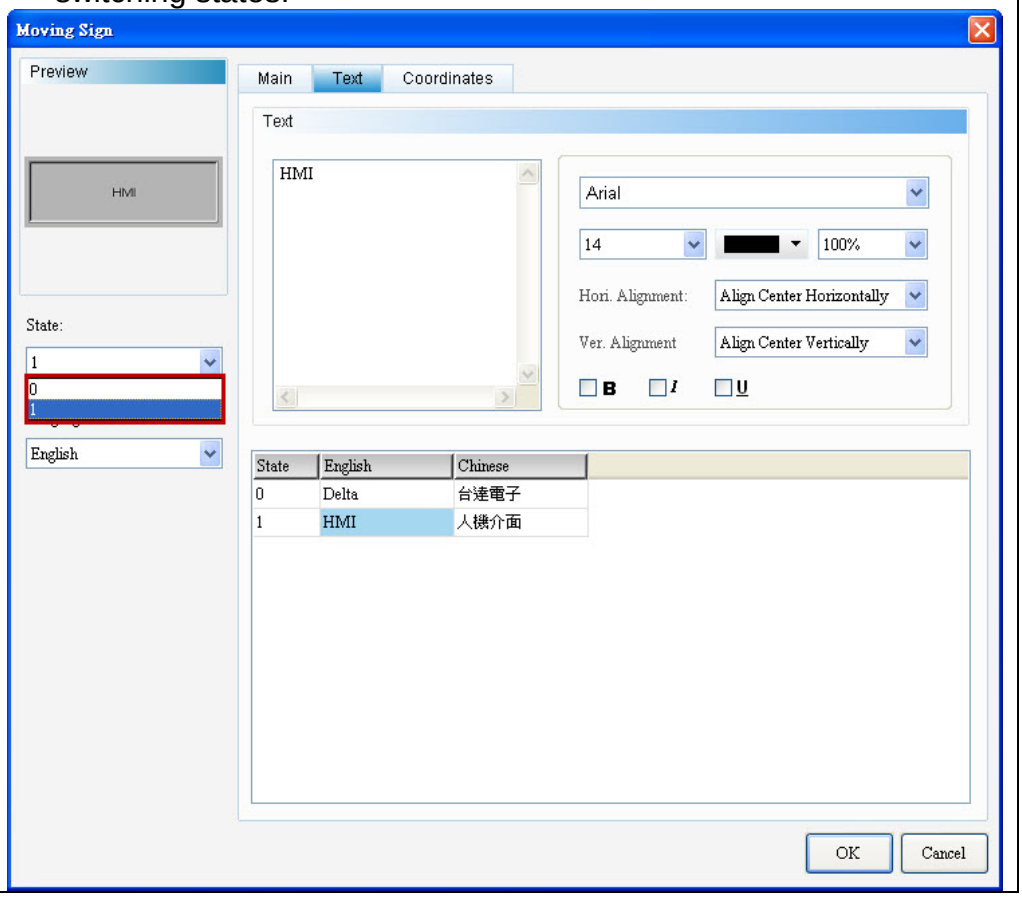
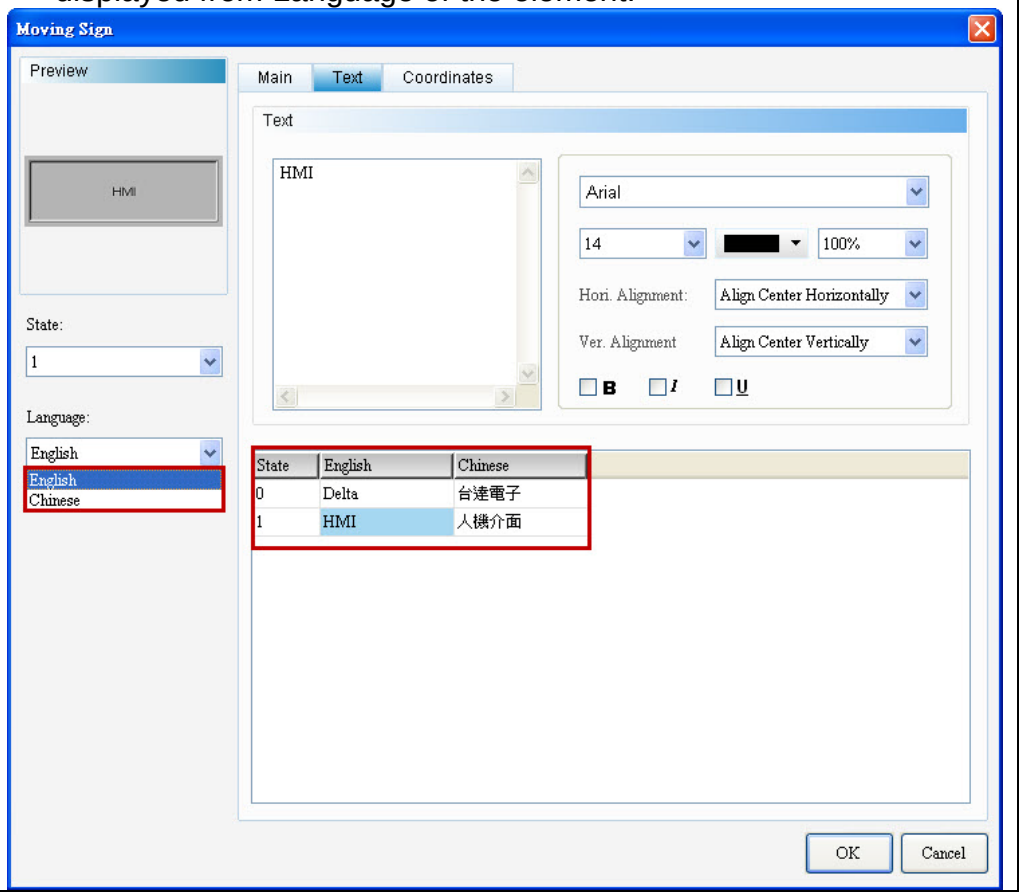


Figure 11-5-2 Moving Sign Element Main Properties Page

No.	Property	Function
(1)	Read Address	➢ Selects the address of internal memory or controller register. The memory type changes based on the selected data type, including Word, LSB and Bit, as shown in Table 11-5-2. ➢ Selects link name or element type. Please refer to 5-1 Buttons of Chapter 05 for details.
	Read Offset Address	➢ Please refer to Appendix D Write and Read Offset Address.
(2)	Data Type	➢ Four options: Bit, Word, LSB, and LSB (Support State 0). Please refer to Table 11-5-2 for details.
(3)	Data Format	➢ Data format can only be selected when the data type is “Word”. ➢ These formats include BCD, Signed Decimal, Unsigned Decimal, and Hexadecimal. 

No.	Property	Function
(4)	State Counts	➢ Sets the total state count of Moving Sign. If the data type is “Word”, users can select 1-256 states; if the data type is “LSB”, users can select 16 states; if the data type is “LSB (Support State 0)”, users can select 17 states; and if the data type is “Bit”, users can select 2 states. Please refer to Table 11-5-2 for details.
(5)	Display Direction	➢ Display directions include Left, Right, Up, and Down. Users can define the direction of the text to be displayed. **Left**: ➢ From right to left. **Right**: ➢ From left to right **Up**: ➢ From bottom up. **Down**: ➢ From top to bottom.
(6)	Time Interval (ms)	➢ Time interval refers to the interval between two movements of the same message. The unit is mS. The distance of movement is defined in the “Moving Points”. 
(7)	Moving Points	➢ The greater the value, the greater the distance of each movement. The range is 1-50, and the unit is pixel.
(8)	Element Type	➢ Element types include Standard, Raised, Round, and Transparent. Users can change the element appearance. Standard / Raised / Sunken / Transparent

No.	Property	Function
(9)	Border Color	➢ Sets element Border Color. ➢ If element type is “Transparent”, the Border Color is disabled. 
(10)	Element Foreground Color	➢ Sets element foreground color. ➢ If element type is “Transparent”, Border Color is disabled. 
(11)	State	➢ Previews or changes the state parameters of button elements by switching states. 

No.	Property	Function
(12)	Language	➢ When text data are defined, users can edit the text properties to be displayed from Language of the element. 

◆ Text

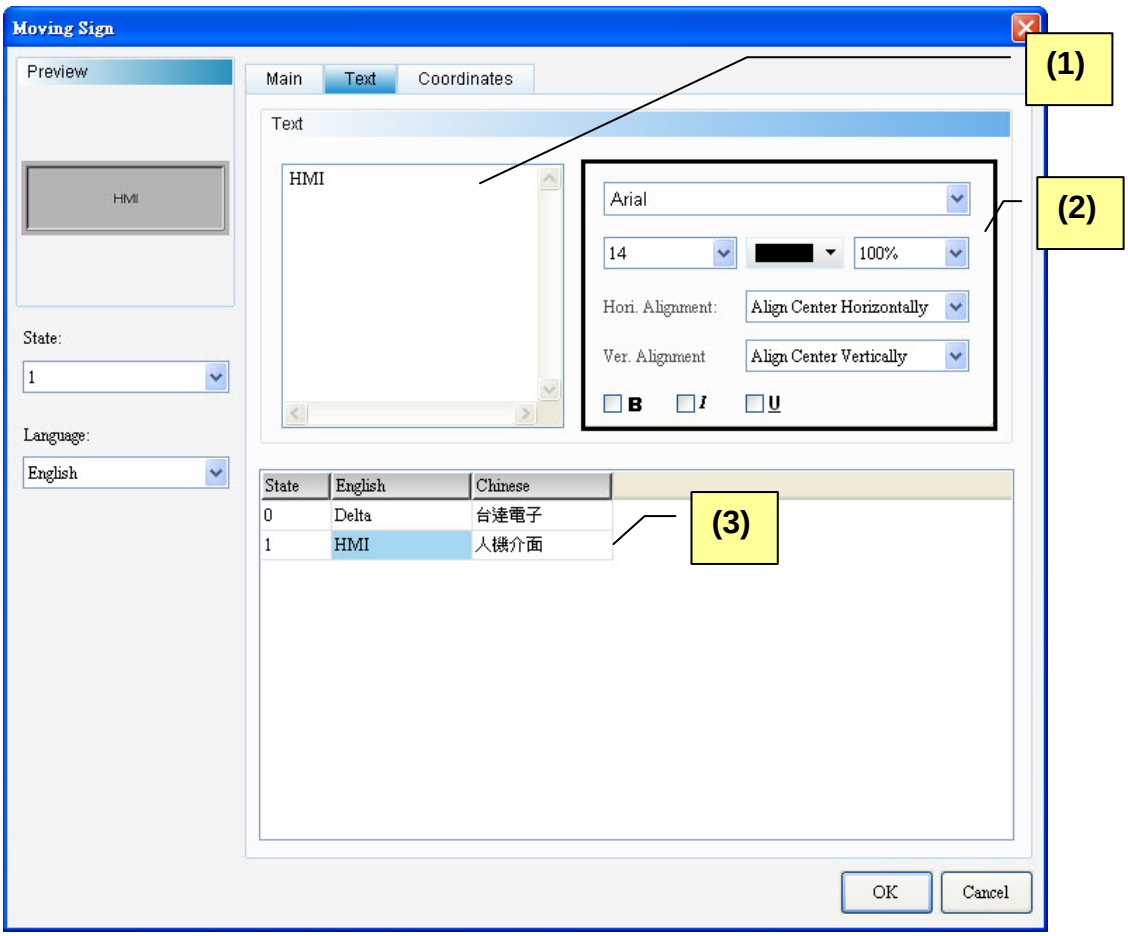
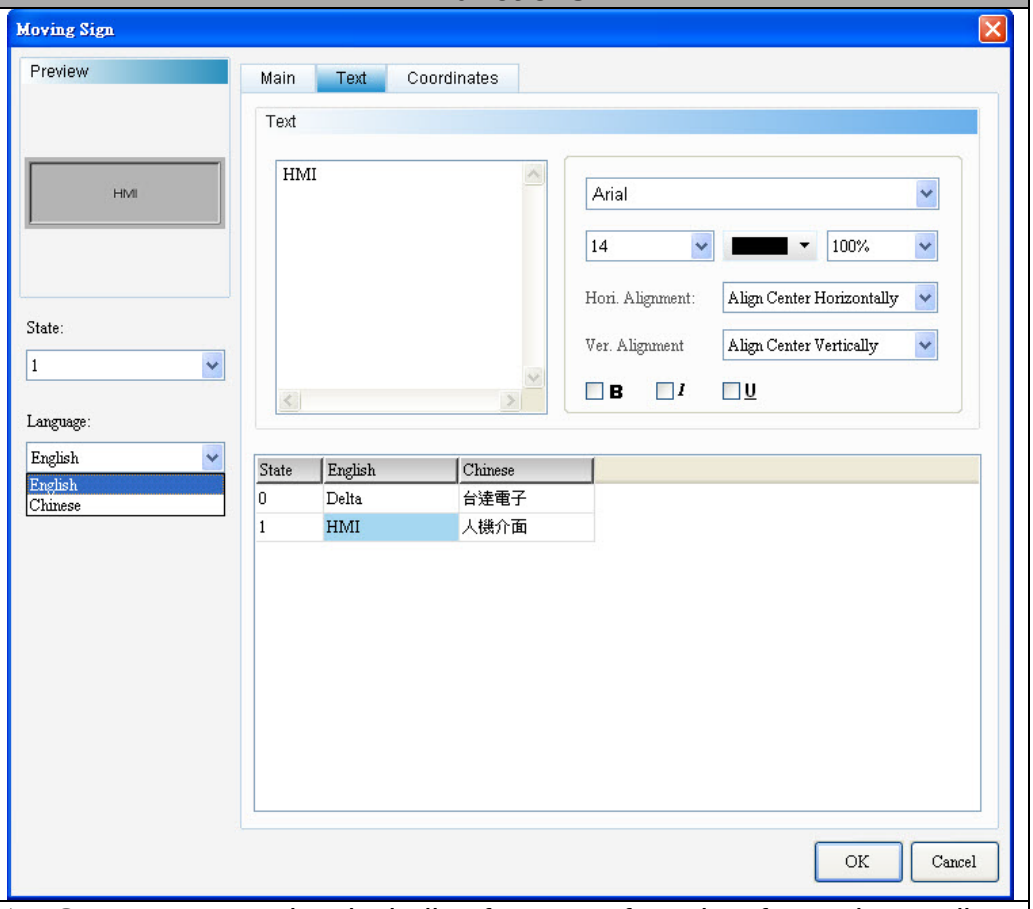


Figure 11-5-3 Moving Sign Element Text Properties Page

No.	Property	Functions
(1)	Text	➢ Users can input the text message to be displayed in the text box.

No.	Property	Functions
		
(2)	Text Properties	➢ Sets text properties, including font type, font size, font color, scaling, text alignment, and bold/italic/underline of font. Please refer to the above figure for details about the results of text properties.
(3)	Edit Multilingual Text Data	➢ If multilingual text data are created, users can edit multilingual text data here. As shown in the Text Properties Figure, users can input English text in the English field.

◆ Coordinates

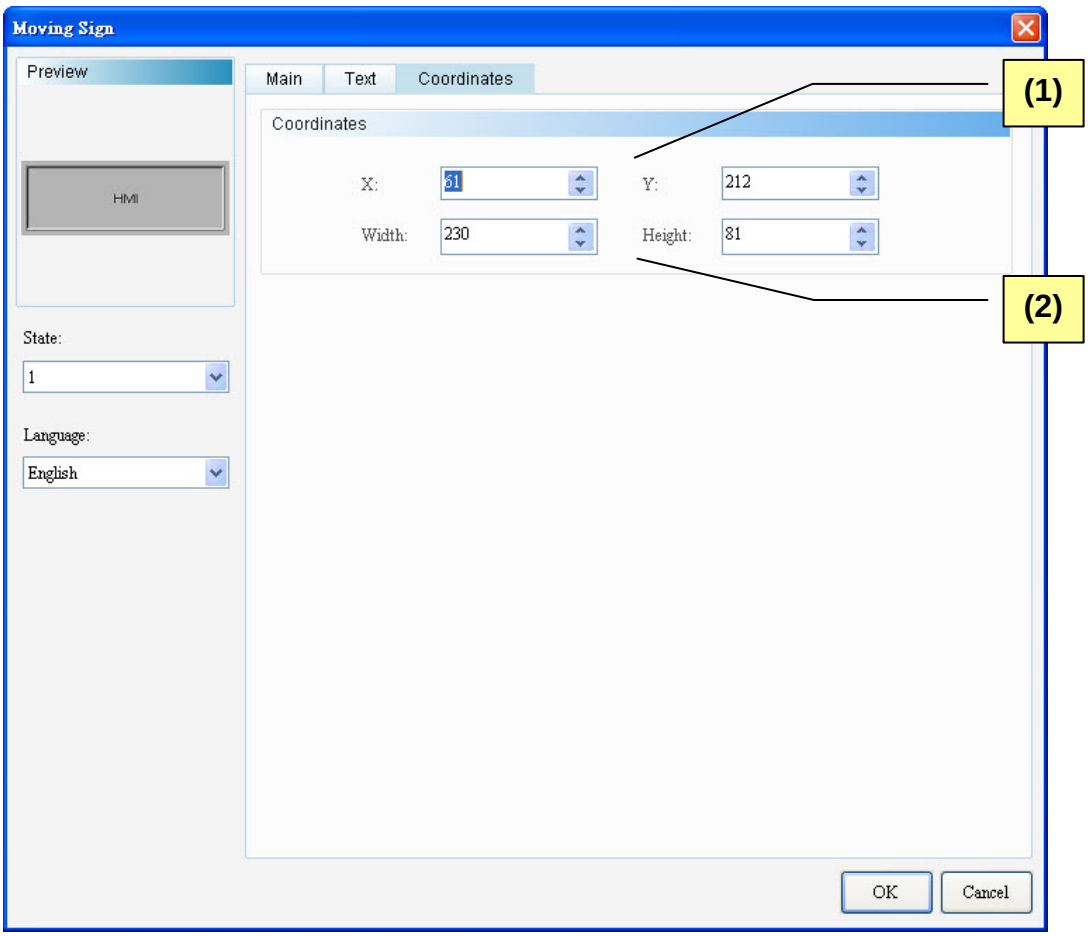


Figure 11-5-4 Moving Sign Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

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Chapter 12 Graph Display

This chapter mainly describes the graph display elements provided in the DOPSoft and how they are operated and configured.

◆ Graph Display Element Classification

Graph Display		State Graphic
		Animated Graphic
		Dynamic Line
		Dynamic Rectangle
		Dynamic Ellipse
		Real Image

Table 12-1-1 Graph Display Element Classification

◆ Graph Display Element Shared Properties

Graph Display Element	Read Address	Read Offset Address	Write Address	HMI Station/ Transmission/ Communication Port	Auto Picture Change/ Picture Change Time	Clear Picture	Style (Foreground Color/ Transparent Color/ Line Type/ Line Size/ Line Color/Blink/Round Corner Radius)	Properties (Variable Position / Variable Size /Variable Color/ Variable Central point/ Variable Radius)	Properties (Data Type/ Data Format/ State Counts)
State Graphic	◎	◎			◎		◎ (Supports only Foreground Color and Transparent Color)		◎
Animated Graphic	◎	◎				◎			◎
Dynamic Line	◎	◎					◎ (Supports only Line Type, Line Color, Line Size, and Line Blink)	◎ (Supports only Variable Position and Variable Color)	◎ (Supports only Data Format)

Graph Display Element	Read Address	Read Offset Address	Write Address	HMI Station/ Transmission/ Communication Port	Auto Picture Change/ Picture Change Time	Clear Picture	Style (Foreground Color/ Transparent Color/ Line Type/ Line Size/ Line Color/Blink/Round Corner Radius)	Properties (Variable Position / Variable Size /Variable Color/ Variable Central point/ Variable Radius)	Properties (Data Type/ Data Format/ State Counts)
Dynamic Rectangle	◎	◎					◎ (Supports only Line Color, Line Size, Round Corner Radius, Blink, Foreground Color, and Transparent Color)	◎ (Supports only Variable Position, Variable Color, and Variable Size)	◎ (Supports only Data Format)
Dynamic Ellipse	◎	◎					◎ (Supports only Line Color, Line Size, Blink, Foreground Color, and Transparent Color)	◎ (Supports only Variable Central point, Variable Color, and Variable Radius)	◎ (Supports only Data Format)
Real Image	◎			◎			◎ (Supports only Foreground Color)		

Table 12-1-2 Graph Display Element Shared Properties

12-1 State Graphic

	State Graphic

Users can create various state pictures in State Graphic to read state data from the selected address, in order to display the selected state pictures on the HMI.
Examples of the three applications are described below. Table 12-1-3 show “Auto Picture Change” is NO. Table 12-1-4 shows “Auto Graph Chang” is YES. Table 12-1-5 shows “Auto Picture Change” is Variation.

Example of State Graphic

Table 12-1-3 Example of State Graphic

Read Address

State Graphic Element		Numeric Entry Element	
Read Address	$326	Write Address	$326

Picture

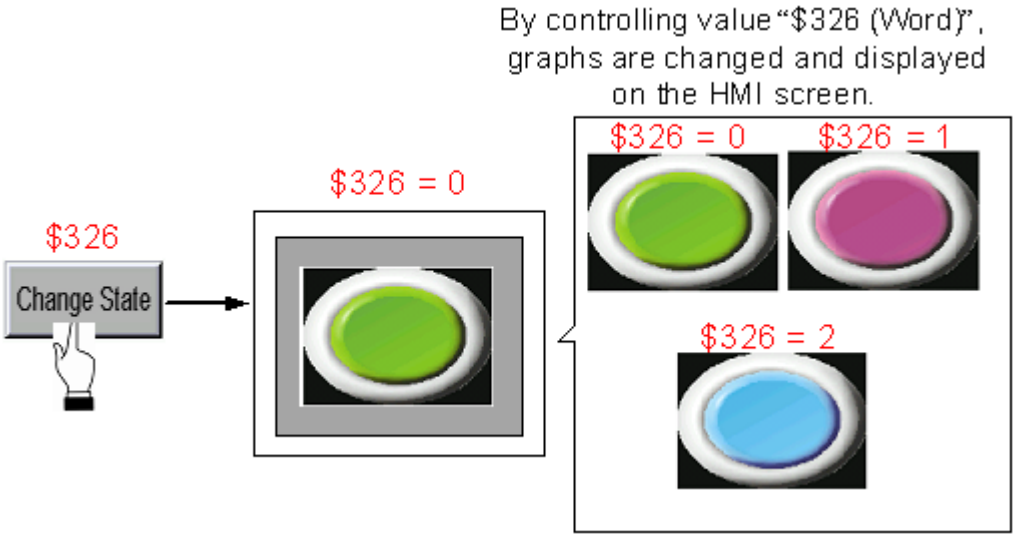
Set State Graphic		
State 0	**State 1**	**State 2**

Properties

State Graphic Element			
Data Type	**Data Format**	**State Counts**	**Auto Picture Change**
Word	Unsigned Decimal	3	**No**

Execution Results

- After creating the element, run Compile and download it to the HMI. Next, input a value in the Numeric Entry element. Then, State Graphic will display the state pictures corresponding to the input value.



Example of State Graphic

Table 12-1-4 Example of State Graphic

Read Address

State Graphic Element		Numeric Entry Element	
Read Address	$326	Write Address	$326

Picture

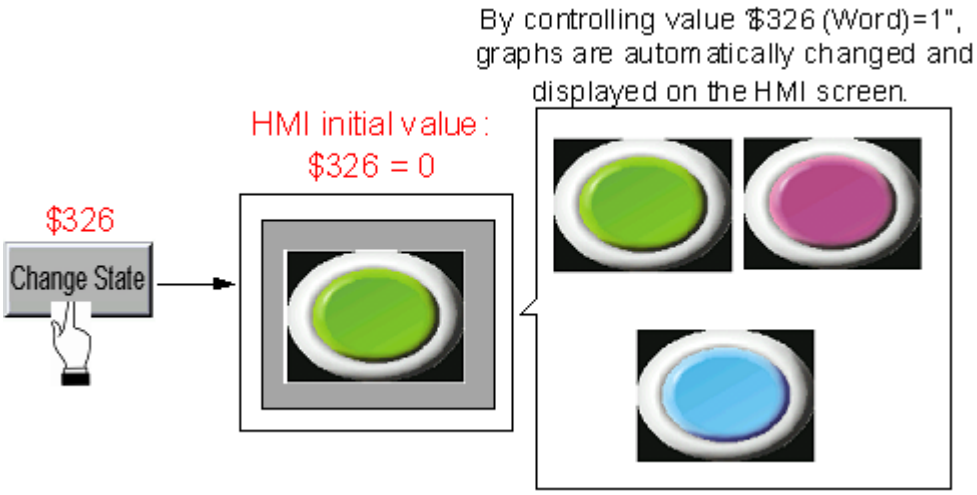
Set State Graphic		
State 0	**State 1**	**State 2**

Properties

State Graphic Element			
Data Type	**Data Format**	**State Counts**	**Auto Picture Change**
Word	Unsigned Decimal	3	**YES**

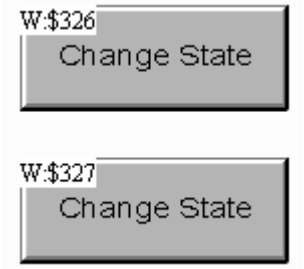
Execution Results

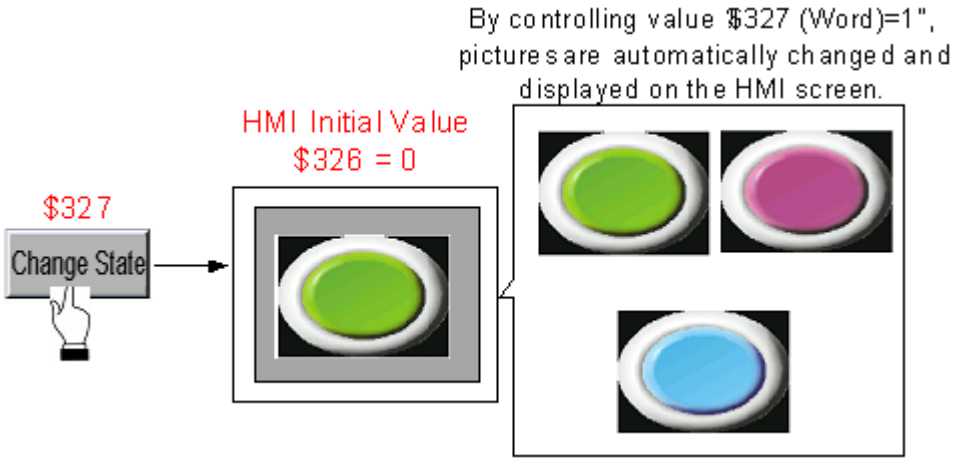
- After creating the element, run Compile and download it to the HMI. Next, input a non-zero value in the Numeric Entry element. Then, State Graphic will automatically change and display the selected pictures according to the defined picture change time. If the input value is “0”, State Graphic will reset to the initial state without executing any action.



Example of State Graphic

Table 12-1-5 Example of State Graphic

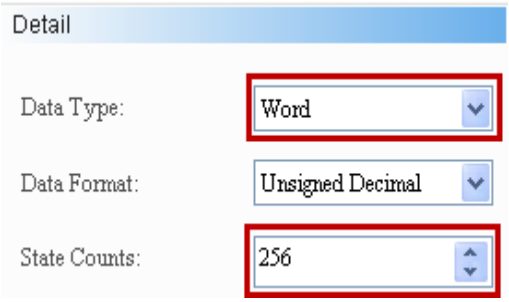
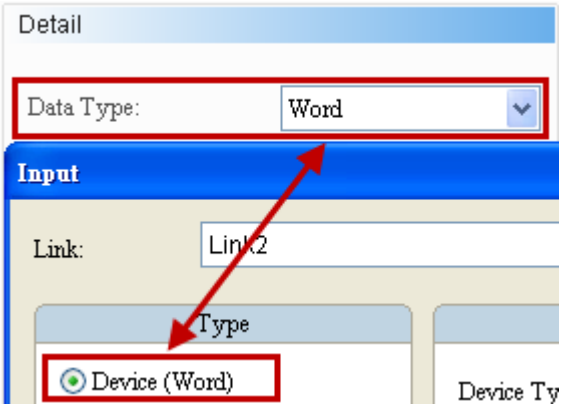
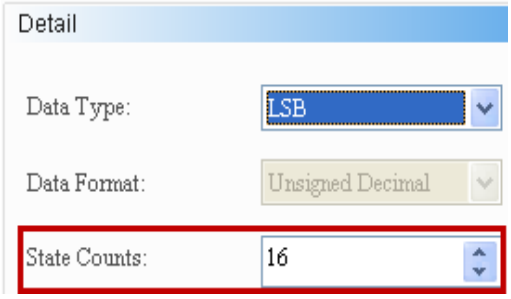
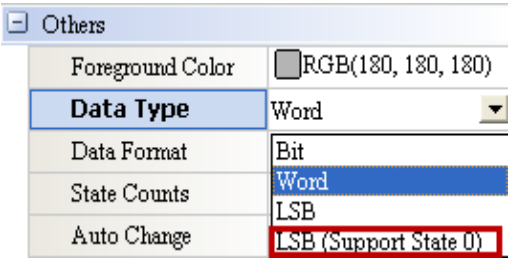
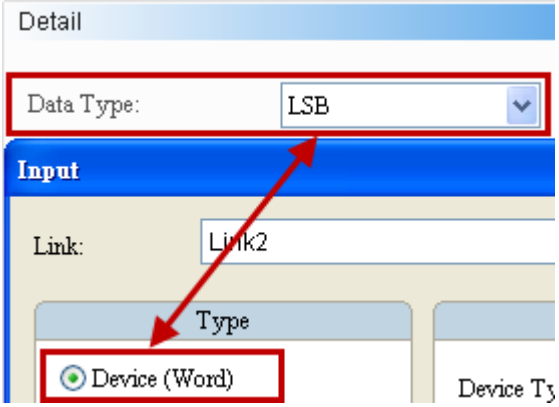
Read Address	**State Graphic Element**		**Numeric Entry Element**		**Numeric Entry Element**	
	Read Address	$326	Write Address	$326	Write Address	$327
						
Picture	**Set State Graphic**					
	State 0		**State 1**		**State 2**	
Properties	**State Graphic Element**					
	Data Type	**Data Format**	**State Counts**	**Auto Picture Change**		
	Word	Unsigned Decimal	3	**Variation**		
Execution Results	➢ The Read Address in the State Graphic element represents the register for changing state pictures. The **[Read Address+1]** allows users to access to the register for setting Auto Picture Change as Variation. ➢ After creating the element, run Compile and download it to the HMI. Next, select Numeric Entry Element {$327} and input a non-zero value in the element. Then, State Graphic will automatically change and display the selected pictures according to the defined picture change time. When selecting Numeric Entry Element {$326} and inputting the corresponding state graphic data in the element ➢ If the input data in Numeric Entry Element {$327} is “0”, State Graphic will stop Auto Picture Change.					

Example of State Graphic Table 12-1-5 Example of State Graphic	
	

State Graphic supports four data types as shown in Table 12-1-4 below. If users need to add or remove state counts, simply add or reduce state counts from the State Counts in the properties.

State Graphic

Table 12-1-4 State Graphic Data Type

Data Type	State Counts	Memory Address
Word	If data type is “Word”, users can select 1-256 states.  	If data type is “Word”, “Word” is data type of memory address. 
LSB / LSB (Support State 0)	If data type is “LSB”, the data in the register are first converted into binary data. Next, the present object state is determined according to the element with the lowest non-zero bit. If data type is “LSB”, users can select 1-16 states, except “State 0”.  If users wish to display “State 0”, please select LSB (Support State 0).  	If data type is “LSB” or LSB (Support State 0), “Word” is also data type of memory address. 

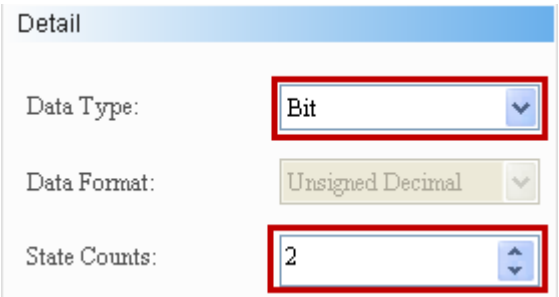
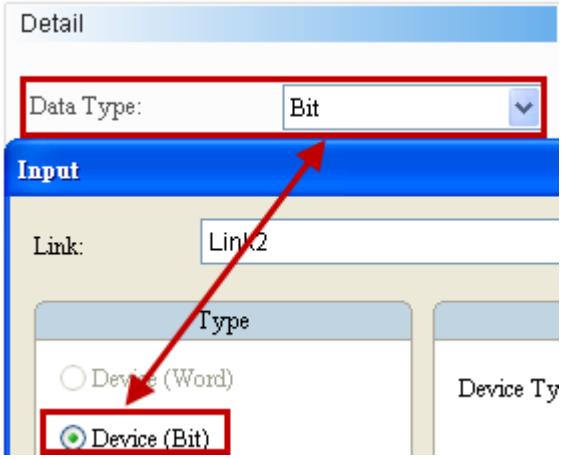
State Graphic

Table 12-1-4 State Graphic Data Type

If users select “LSB”, the element will display “black” when State=0.

The examples in the following table show how state value is determined with the lowest non-zero element after converting from a decimal value into a binary value. There are also examples demonstrating how the DOPSoft determines the state value displayed with the lowest bit when the decimal values are 3 and 7.

Decimal	Binary	State Value
0	**0000000000000000**	**State=0 when all bits are “0”** **[LSB (Support State 0) must be selected]**
1	0000000000000001	The lowest non-zero bit is bit 0, State=1.
2	0000000000000010	The lowest non-zero bit is bit 1, State=2.
3	**0000000000000011**	**The lowest non-zero bit is bit 0, State=1.**
4	0000000000000100	The lowest non-zero bit is bit 2, State=3.
7	**0000000000000111**	**The lowest non-zero bit is bit 0, State=1.**
8	0000000000001000	The lowest non-zero bit is bit 3, State=4.
16	0000000000010000	The lowest non-zero bit is bit 4, State=5.
32	0000000000100000	The lowest non-zero bit is bit 5, State=6.
64	0000000001000000	The lowest non-zero bit is bit 6, State=7.
128	0000000010000000	The lowest non-zero bit is bit 7, State=8.
256	0000000100000000	The lowest non-zero bit is bit 8, State=9.
512	0000001000000000	The lowest non-zero bit is bit 9, State=10.
1024	0000010000000000	The lowest non-zero bit is bit 10, State=11.
2048	0000100000000000	The lowest non-zero bit is bit 11, State=12.
4096	0001000000000000	The lowest non-zero bit is bit 12, State=13.
8192	0010000000000000	The lowest non-zero bit is bit 13, State=14.
16384	0100000000000000	The lowest non-zero bit is bit 14, State=15.
32768	1000000000000000	The lowest non-zero bit is bit 15, State=16.

State Graphic Table 12-1-4 State Graphic Data Type		
Bit	If data type is “Bit”, only 2 states are available.  	If data type is “Bit”, “Bit” is data type of memory address. 

Double-click State Graphic to call out the State Graphic Properties screen as shown below.

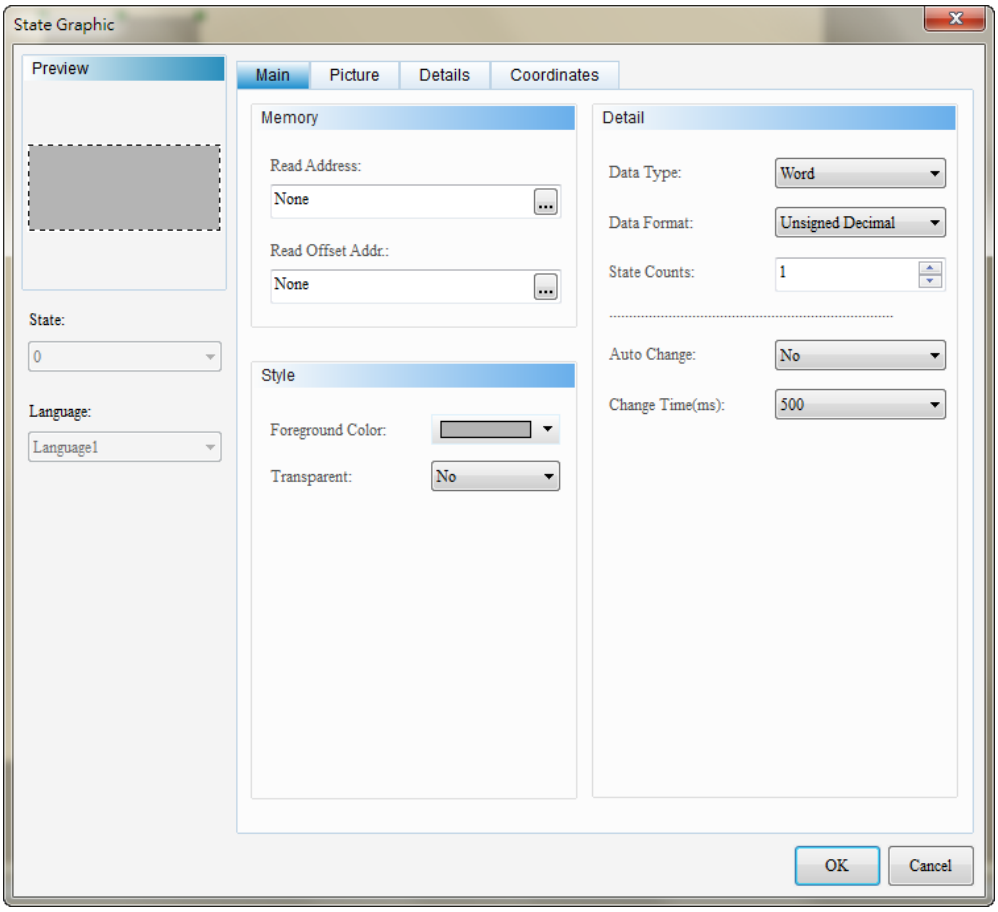


Figure 12-1-1 State Graphic Properties

State Graphic	
Function Page	**Content Description**
Preview	Views the multistate data but does not support multilingual data display.
Main	Sets Read Address, Read Offset Address, Foreground Color, and transparent color. Sets data type, data format, state counts, Auto Change, and change time.
Picture	Sets picture bank name, alignment, stretch mode, and picture transparent color.
Details	Sets Invisible address.
Coordinates	Sets the X-Y coordinate, width, and height of the element.

Table 12-1-5 State Graphic Function Page

◆ Main

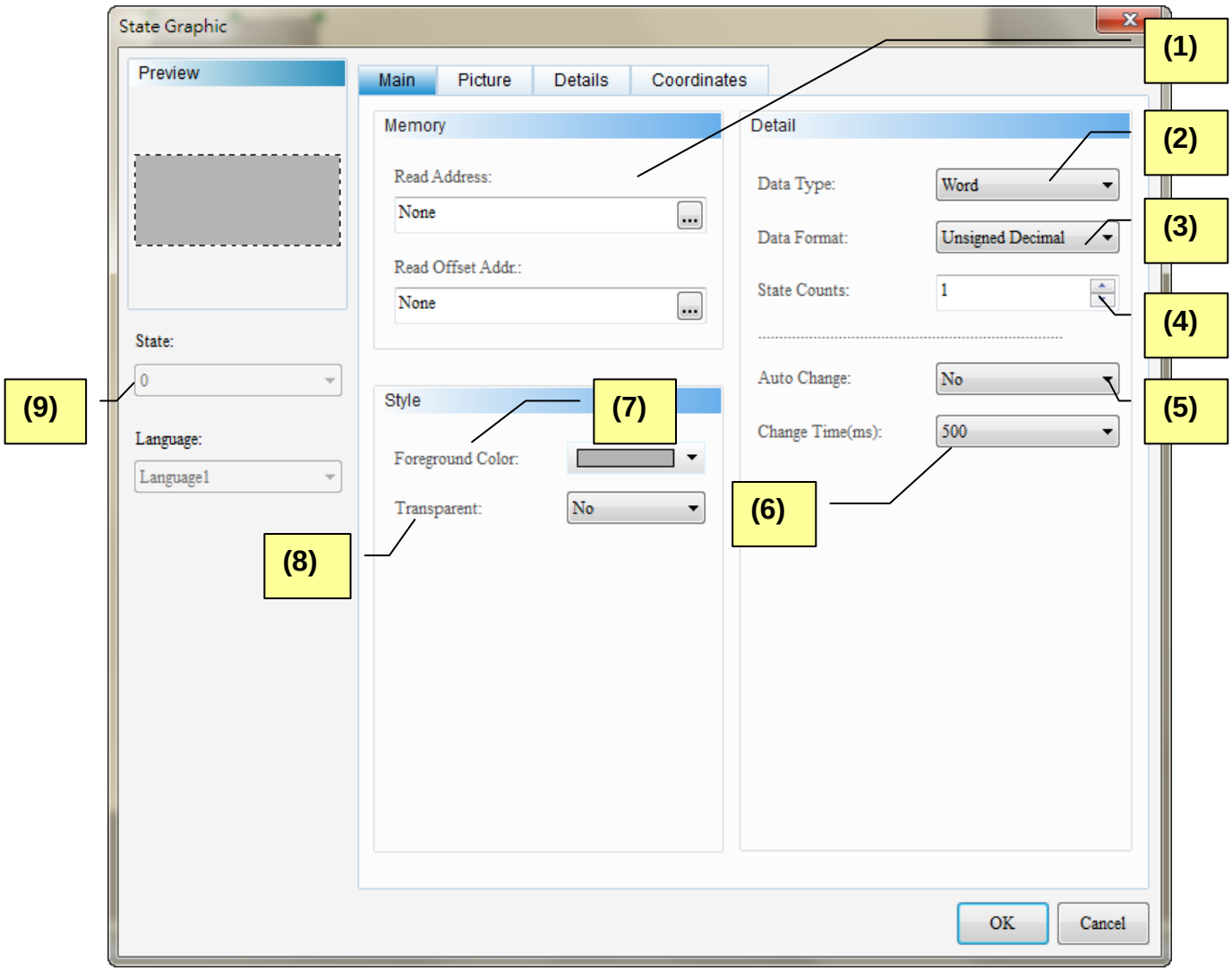
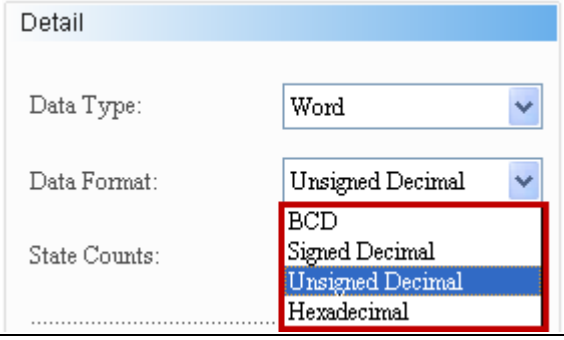
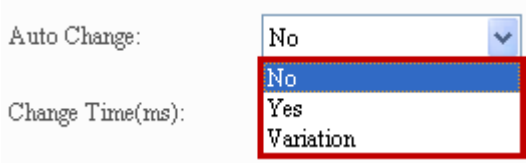
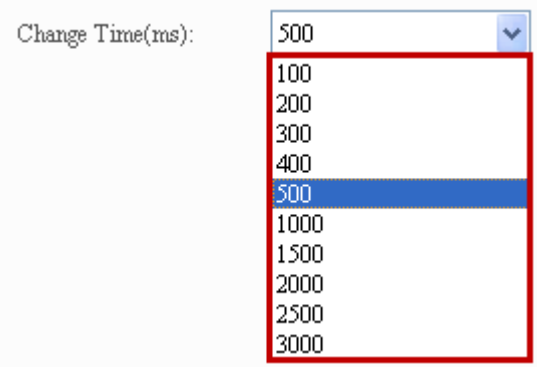
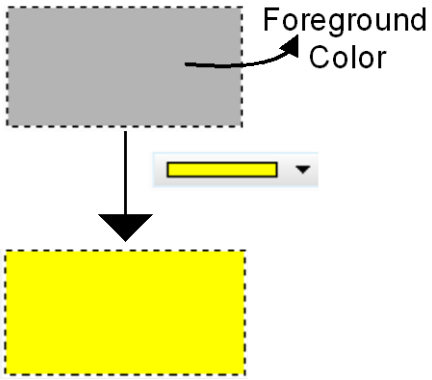
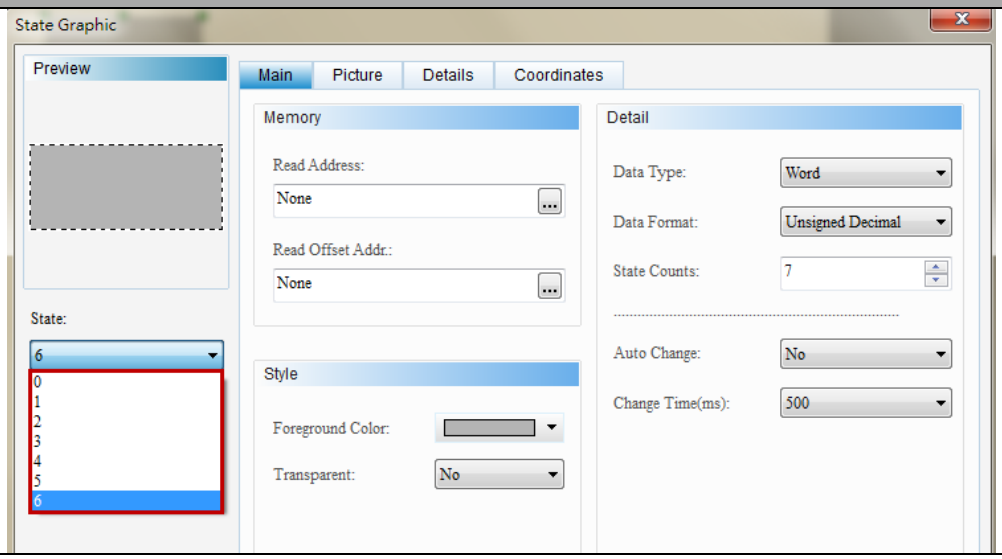


Figure 12-1-2 State Graphic Element Main Properties Page

No.	Property	Function
(1)	Read Address	➢ Selects the address of internal memory or controller register. The memory type changes based on the selected data type, including Word, LSB and Bit, as shown in Table 12-1-4. ➢ Selects link name or element type. Please refer to 5-1 Buttons of Chapter 05 for details.
	Read Offset Address	➢ Please refer to Appendix D Write and Read Offset Address.
(2)	Data Type	➢ Four options: Bit, Word, LSB, and LSB (Support State 0). Please refer to Table 12-1-4 for details.

No.	Property	Function
(3)	Data Format	➢ Data format can only be selected when data type is “Word”. ➢ These formats include BCD, Signed Decimal, Unsigned Decimal, and Hexadecimal. 
(4)	State Counts	➢ Sets the total state count of State Graphic elements. If data type is “Word”, users can select 1-256 states; if data type is “LSB”, users can select 16 states; if data type is “LSB (Support State 0)”, users can select 17 states; and if data type is “Bit”, users can select 2 states. Please refer to Table 12-1-4 for details.
(5)	Auto Change	➢ There are 3 options for Auto Picture Change: “Yes”, “No”, and “Variation”. 
(6)	Change time	➢ Picture change time ranges from 100-3000 ms. 

No.	Property	Function
(7)	Foreground Color	➢ Sets Foreground Color. ➢ If Transparent Color is “Yes”, Foreground Color is disabled. 
(8)	Transparent Color	➢ After selecting “Yes” for the Transparent Color, the result is as shown below: ➢ Users can select any color in the picture to become transparent with the Transparent Color. By clicking the Transparent Color icon and then the black button section, the DOPSoft will omit coloring the black section in the picture to make it transparent. ➢ By selecting Transparent Color for both the element and the picture, the result is as shown below:
(9)	State	➢ Users can preview or change the parameter of all button element states by changing state.

No.	Property	Function
		

◆ Picture

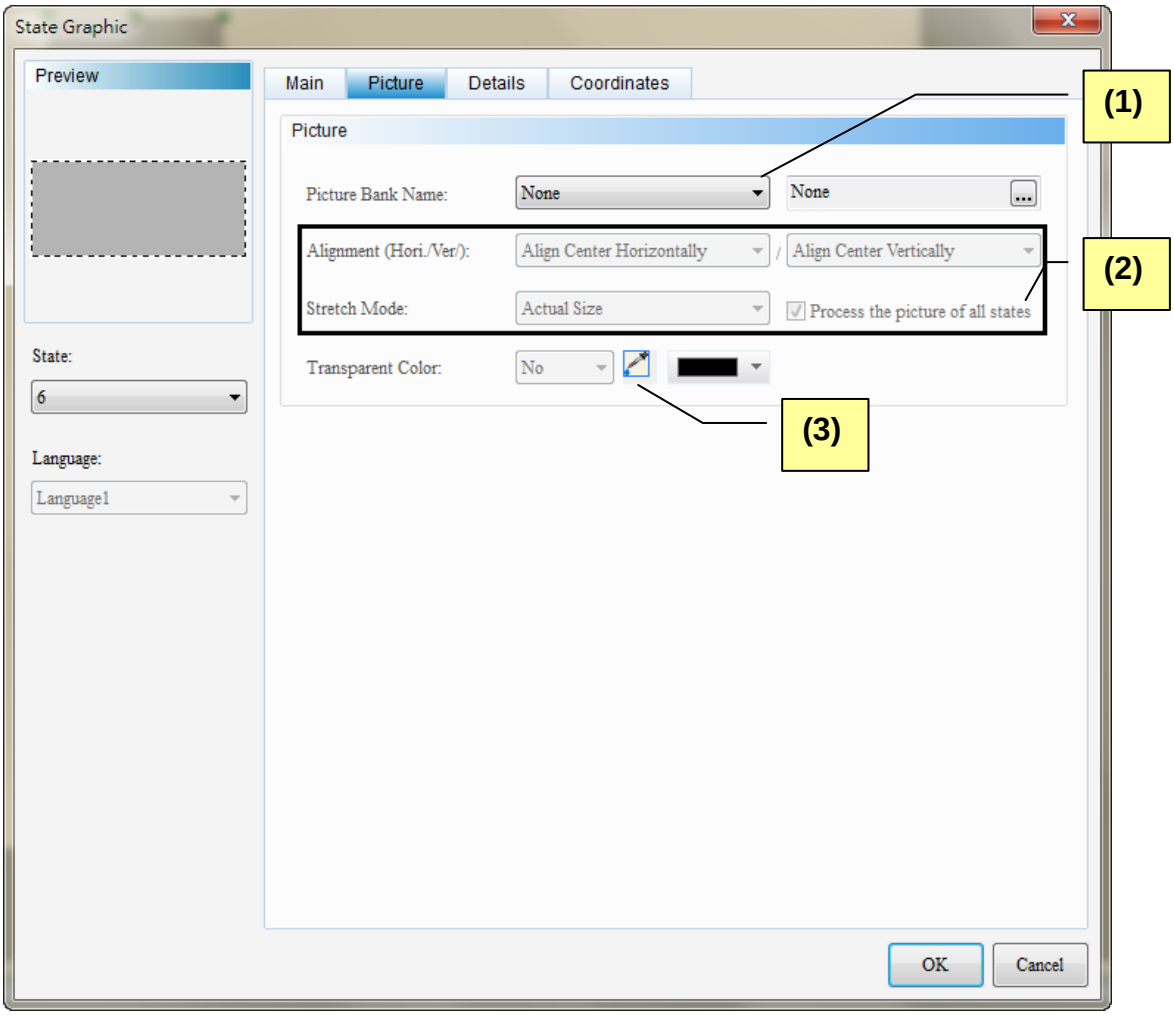
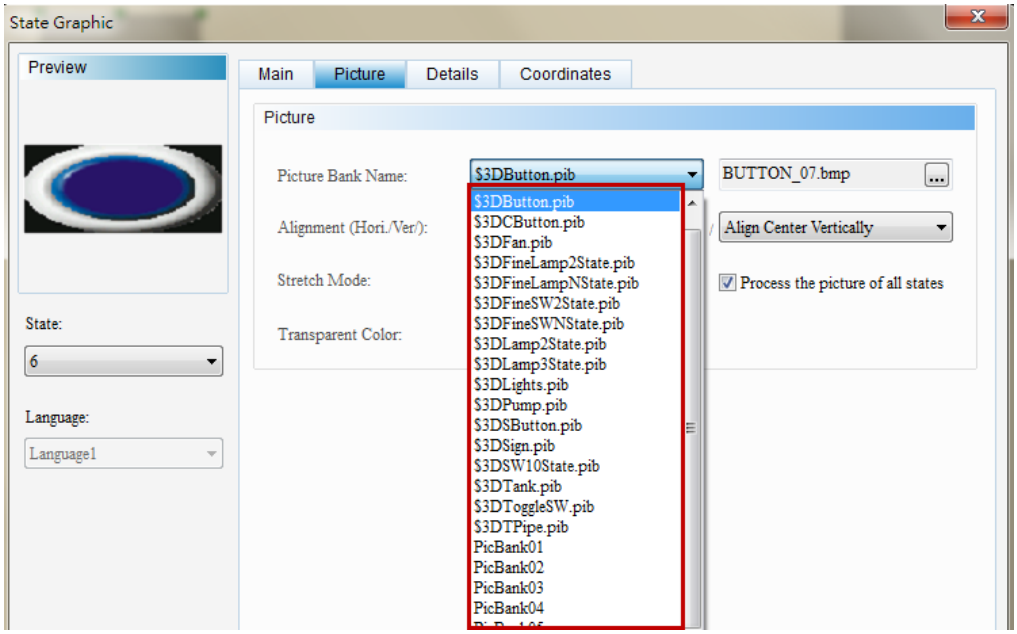
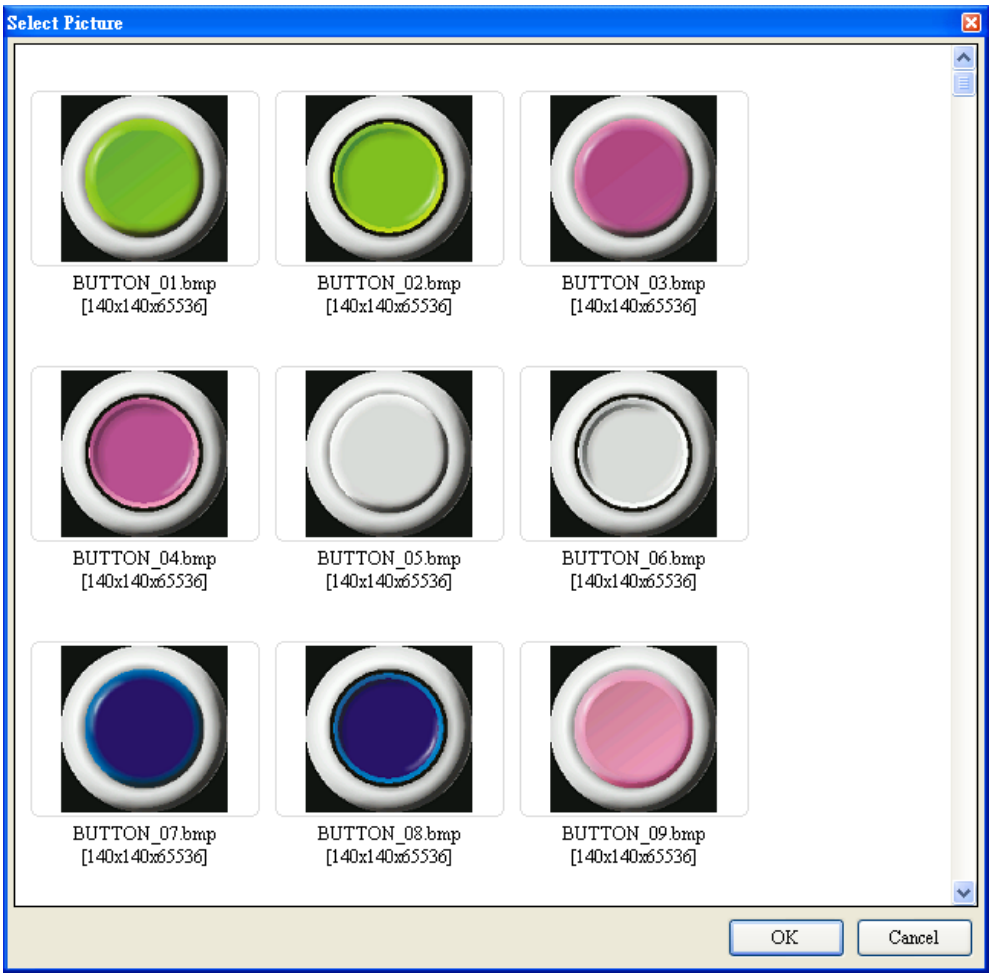
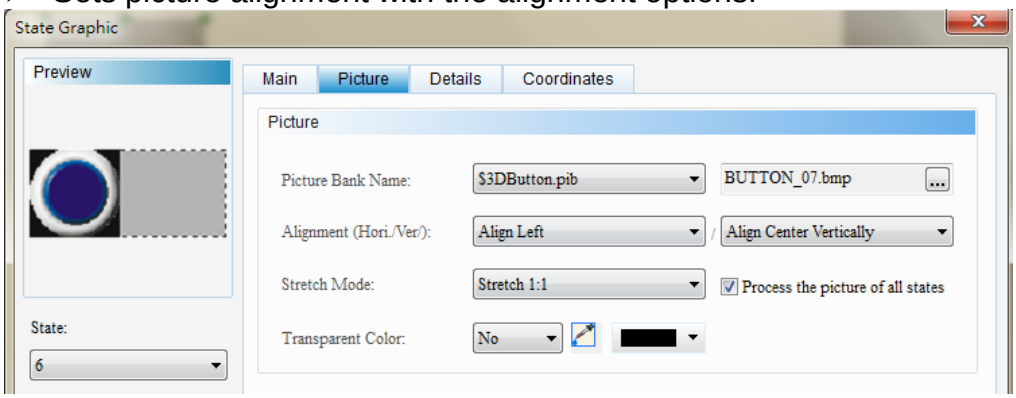
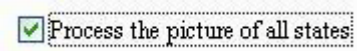


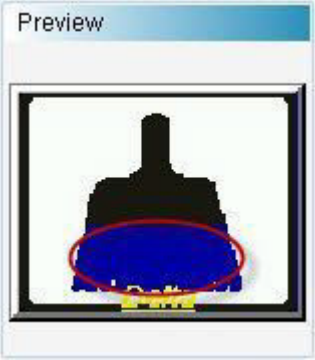
Figure 12-1-3 State Graphic Element Picture Properties Page

No.	Property	Function Description
(1)	Picture bank name	➢ The default picture bank name is “None”. Users can select in the built-in bank the picture to be displayed from the pull-down.





<table>
<tr><th>No.</th><th>Property</th><th>Function Description</th></tr>
<tr><td rowspan="2">(2)</td><td>Alignment</td><td>➢ Sets picture alignment with the alignment options.
 
</td></tr>
<tr><td>Stretch Mode</td><td>➢ Stretch modes include: Fill, Keep Aspect Ratio, and Actual Size.
<table>
<tr><th>Fill</th><th>Keep Aspect Ratio</th><th>Actual Size</th></tr>
<tr><td>In the “Fill” mode, the selected picture will fill up the entire display area.</td><td>In the “Keep Aspect Ratio” mode, the selected picture will fit in the display area proportionally according to the picture ratio</td><td>In the “Actual Size” mode, the picture will be displayed in its original size in the display area.</td></tr>
<tr><td> </td><td> </td><td> </td></tr>
</table>
➢ If “Process all state pictures” is selected, the system assumes that each element has multiple entries of state data, and some pictures may be unable to fill the entire display area. By selecting this item, users will not need to set individual pictures to save time from editing.
 
</td></tr>
<tr><td>(3)</td><td>Select Transparent Color</td><td>➢ Sets a color in the picture to transparent. In this case, by clicking the Transparent Color icon and then the orange part of the loom, the DOPSoft will omit all orange parts in the picture and turn them into transparent.
</td></tr>
</table>

No.	Property	Function Description
		

◆ Details

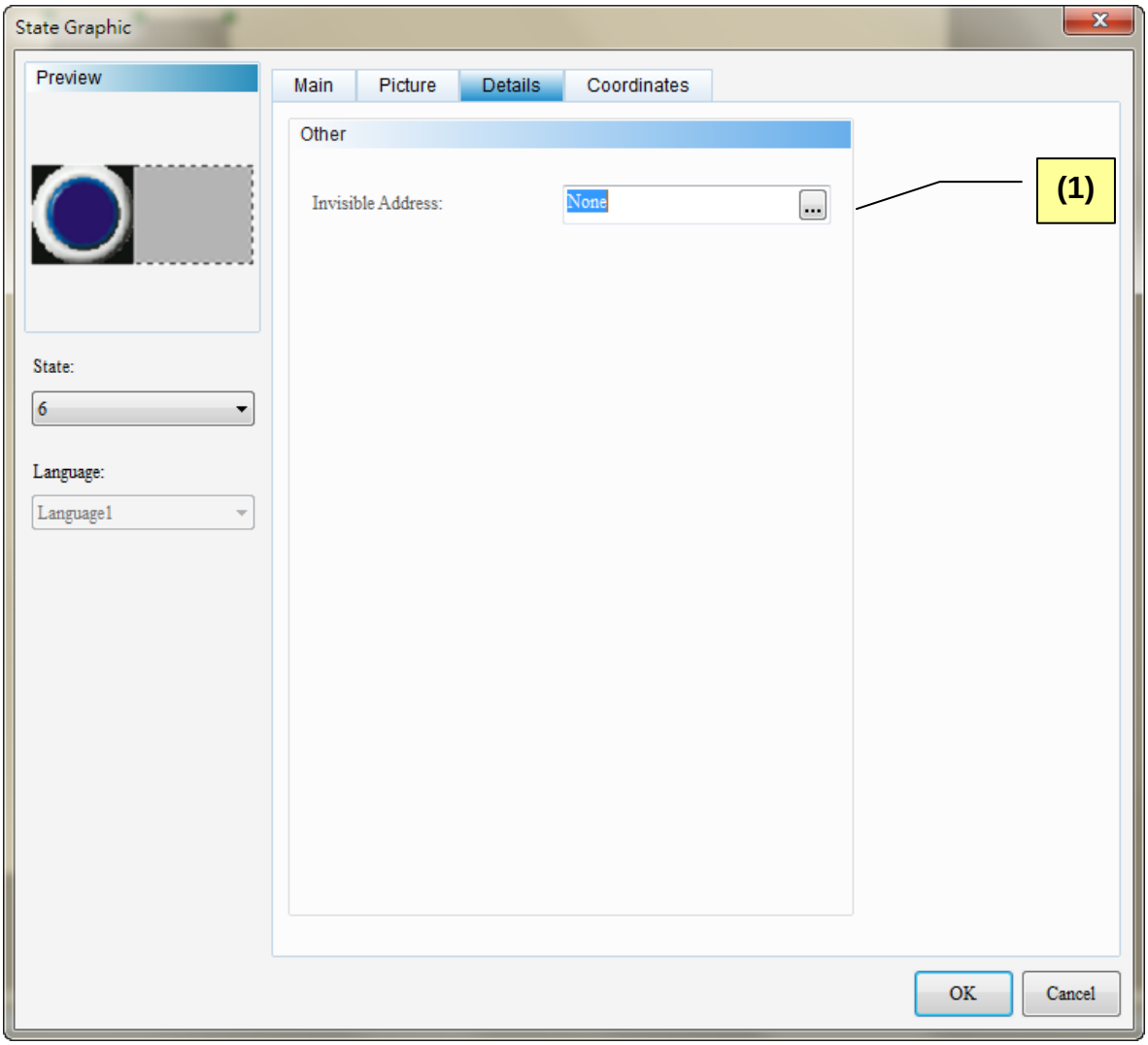
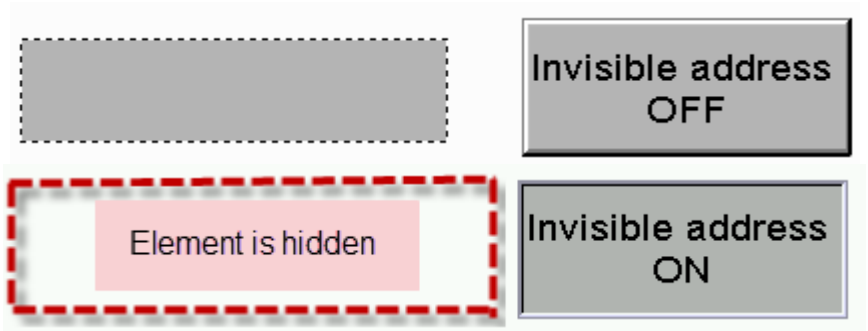
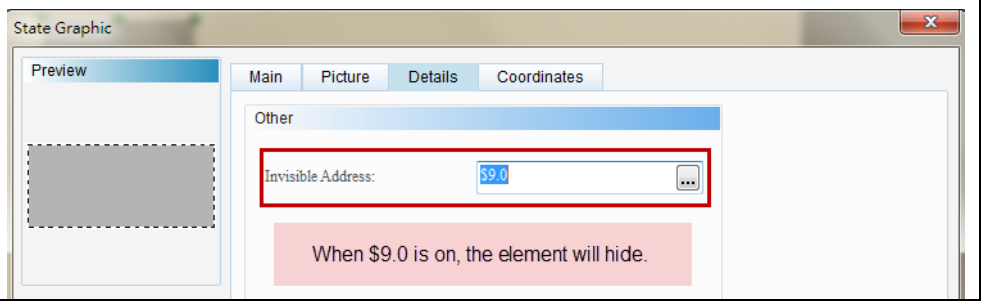


Figure 12-1-4 State Graphic Element Details Properties Page

No.	Property	Function
(1)	Invisible Address	➢ When the Invisible Item is “On”, button elements are hidden, and the corresponding button functions are disabled.  

◆ Coordinates

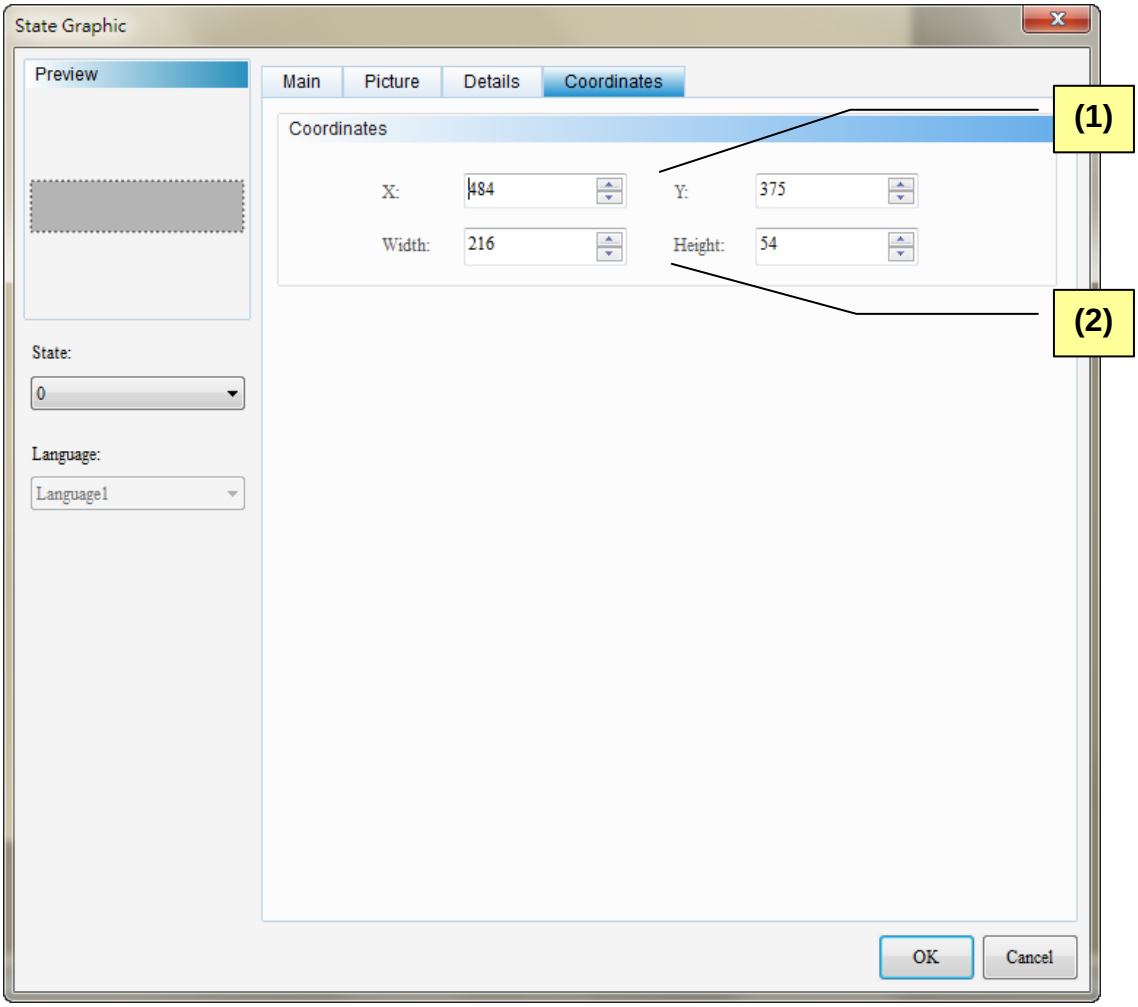


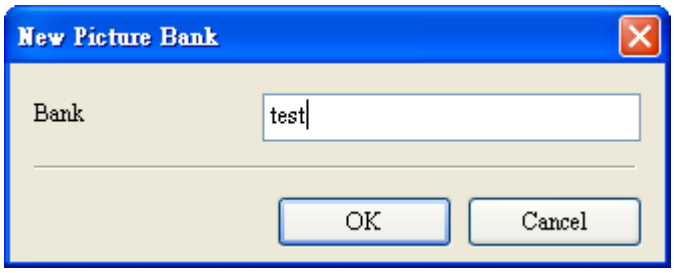
Figure 12-1-5 State Graphic Element Coordinates Properties Page

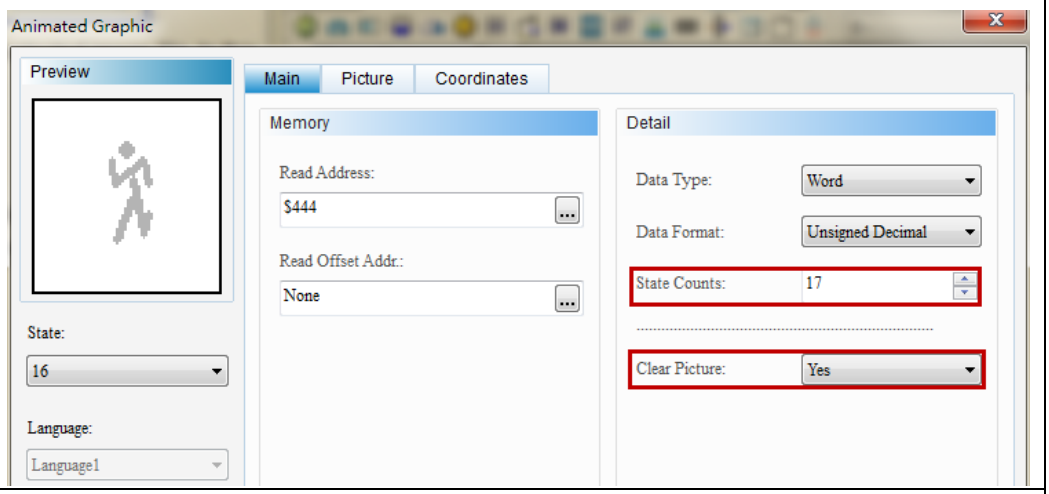
No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

12-2 Animated Graphic

	Animated Graphic

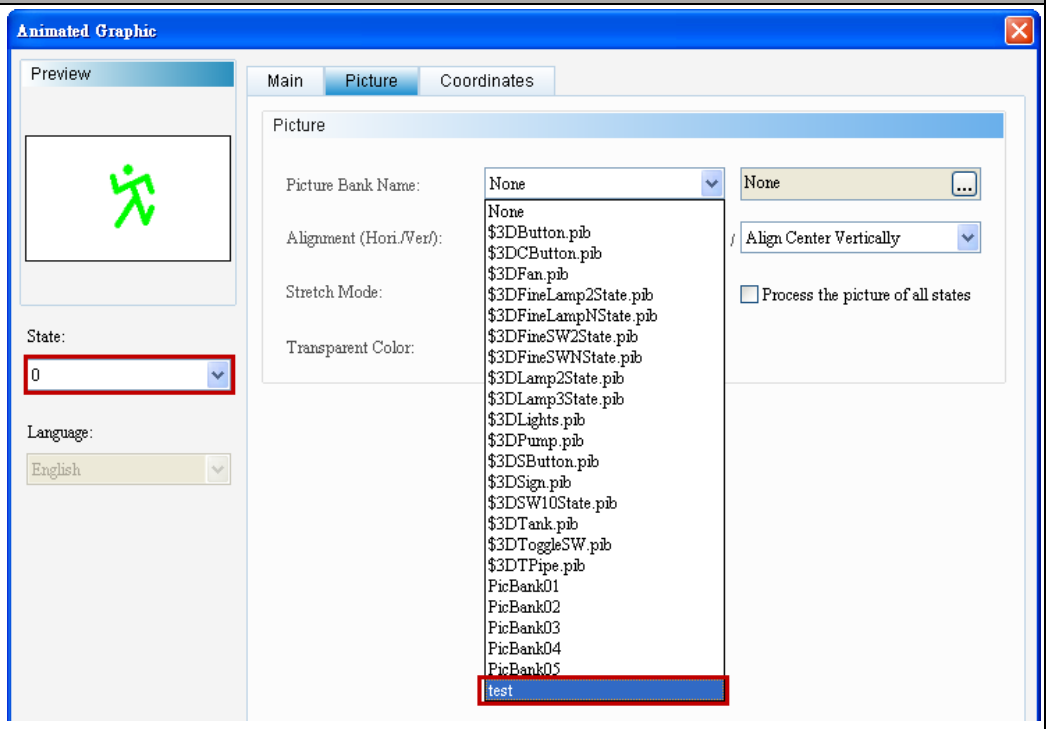
Users can create multiple state pictures or import GIF image files with Animated Graphic. The DOPSoft will automatically decompose this image file into consecutive pictures. Next, the DOPSoft will correspond to the pictures changed by the element the data read from its Read Address. Users can also control the Animated Graphic position. Please refer to Table 12-2-1 Example of Animated Graphic below.

Example of Animated Graphic Table 12-2-1 Example of Animated Graphic			
Read Address		**Animated Graphic Element** Read Address: $444 	
Create Picture Bank and Import Image files	➢ Step 1: Enter [Option]→ [Picture Bank] and click the icon to create a new picture bank and name it *test*.  ➢ Step 2: Click the icon and import the selected image file. In this example, it is a GIF file. ➢ Step 3: After importing the selected GIF file, the picture bank will decompose it into 17 pictures as shown below:		

Example of Animated Graphic Table 12-2-1 Example of Animated Graphic	
Configure Animated Graphic Properties	➢ Set [State Counts] to “17”. The 17 pictures decomposed in the picture bank will be displayed. ➢ If [Clear Picture] is “Yes”, not ghost effect of the previous picture will be displayed on the screen when changing from one picture to another. 
Select Pictures for State 0-State 16	➢ Step 1: Double-click Animated Graphic to enter the [Picture] page. Select “0” from [State] and “test” for the picture bank name.

Example of Animated Graphic

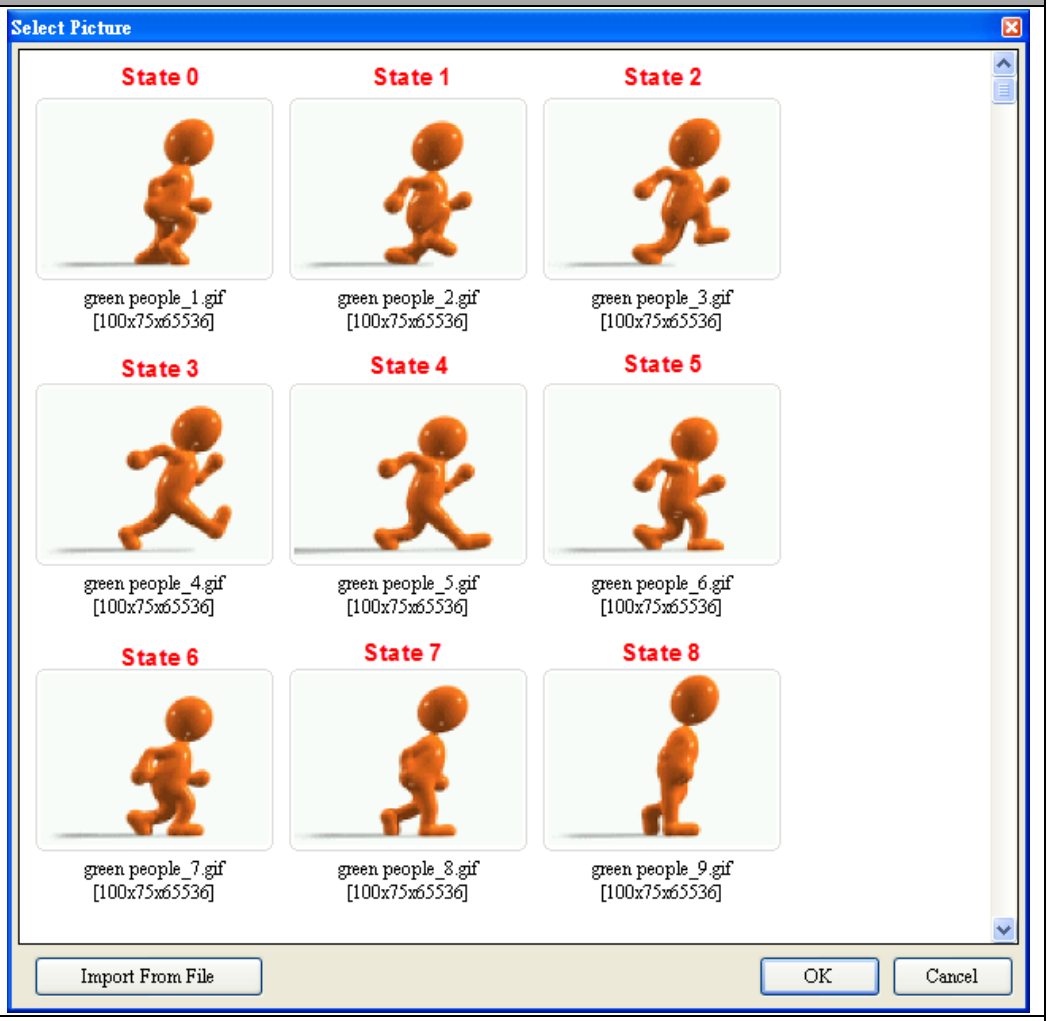
Table 12-2-1 Example of Animated Graphic



- Step 2: Open the *test* picture bank, select the first picture to be displayed in State 0, the second picture to be displayed in State 1, and so on.

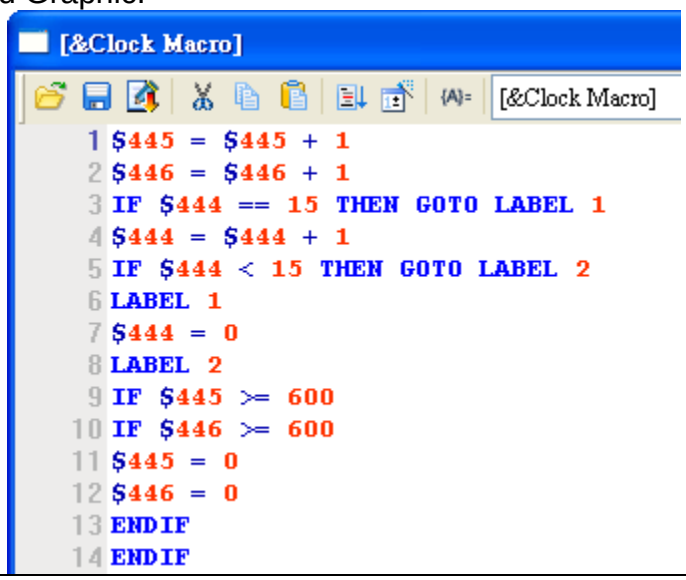
Example of Animated Graphic

Table 12-2-1 Example of Animated Graphic



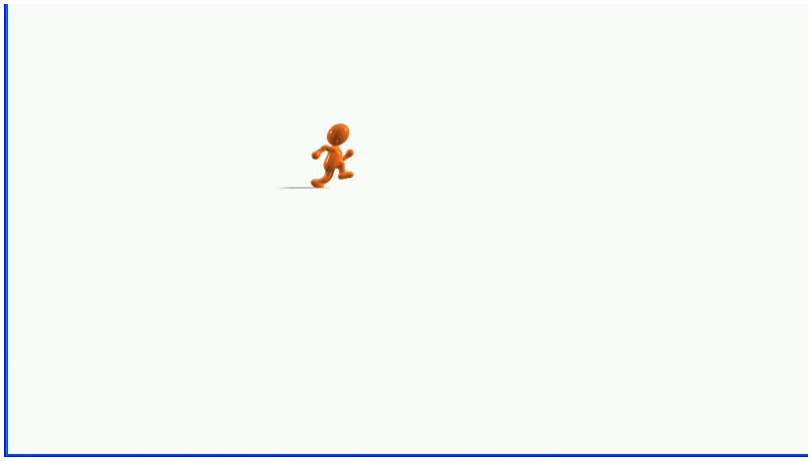
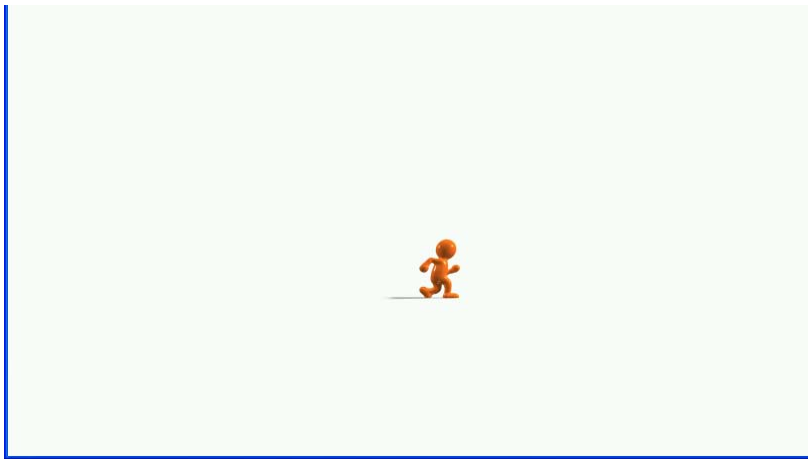
Edit Clock Macro

- Enter [Options]→ [Clock Macro] as shown below:
- "$445" represents **[Read Address +1]**, the X-position of the Animated Graphic.
- "$446" represents **[Read Address +2]**, the Y-position of the Animated Graphic.

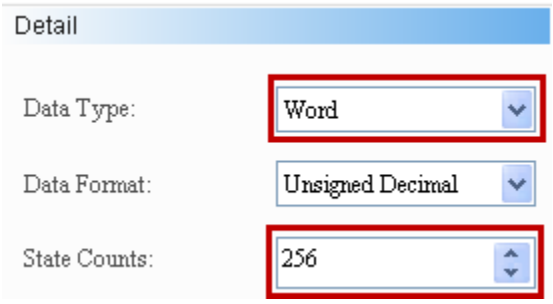
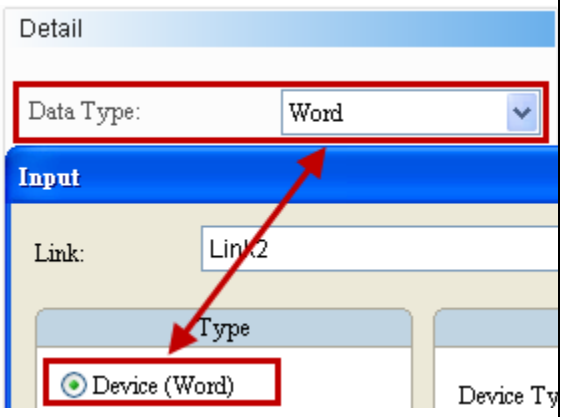
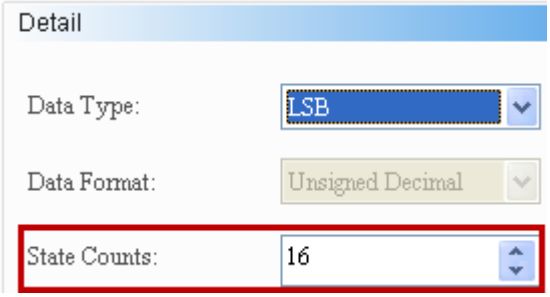
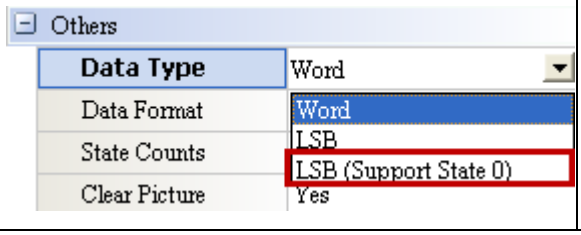
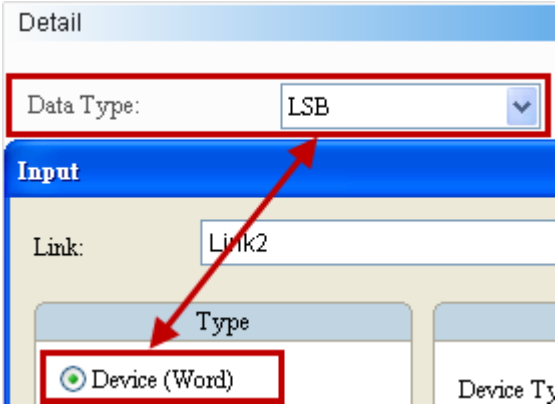


Execution

- Compile the screen and download it to the HMI. This little orange

Example of Animated Graphic Table 12-2-1 Example of Animated Graphic	
Results	person will move according to the memory addresses retrieved by the X-axis and Y-axis as shown below.  

Animated Graphic supports three data types as shown in Table 12-2-2 below. If users need to add or remove state counts, simply add or reduce state counts from the State Counts in the properties.

Animated Graphic Table 12-2-2 Example of Animated Graphic Data Type		
Data Type	**State Counts**	**Memory Address**
Word	If data type is “Word”, users can select 1-256 states.  	If data type is “Word”, “Word” is data type of memory address. 
LSB / LSB (Support State 0)	If data type is “LSB”, the data in the register are first converted into binary data. Next, the present object state is determined according to the element with the lowest non-zero bit. If data type is “LSB”, users can select 1-16 states, except “State 0”.  If users wish to display “State 0”, please select LSB (Support State 0).  	If data type is “LSB” or “LSB (Support State 0)”, “Word” is also data type of memory address. 

Animated Graphic

Table 12-2-2 Example of Animated Graphic Data Type

If users select “LSB”, the element will display “?” when State=0.

The examples in the following table show how state value is determined with the lowest non-zero element after converting from a decimal value into a binary value. There are also examples demonstrating how the DOPSoft determines the state value displayed with the lowest bit when the decimal values are 3 and 7.

Decimal	Binary	State Value
0	**0000000000000000**	**State=0 when all bits are “0” [LSB (Support State 0) must be selected]**
1	0000000000000001	The lowest non-zero bit is bit 0, State=1.
2	0000000000000010	The lowest non-zero bit is bit 1, State=2.
3	**0000000000000011**	**The lowest non-zero bit is bit 0, State=1.**
4	0000000000000100	The lowest non-zero bit is bit 2, State=3.
7	**0000000000000111**	**The lowest non-zero bit is bit 0, State=1.**
8	0000000000001000	The lowest non-zero bit is bit 3, State=4.
16	0000000000010000	The lowest non-zero bit is bit 4, State=5.
32	0000000000100000	The lowest non-zero bit is bit 5, State=6.
64	0000000001000000	The lowest non-zero bit is bit 6, State=7.
128	0000000010000000	The lowest non-zero bit is bit 7, State=8.
256	0000000100000000	The lowest non-zero bit is bit 8, State=9.
512	0000001000000000	The lowest non-zero bit is bit 9, State=10.
1024	0000010000000000	The lowest non-zero bit is bit 10, State=11.
2048	0000100000000000	The lowest non-zero bit is bit 11, State=12.
4096	0001000000000000	The lowest non-zero bit is bit 12, State=13.
8192	0010000000000000	The lowest non-zero bit is bit 13, State=14.
16384	0100000000000000	The lowest non-zero bit is bit 14, State=15.
32768	1000000000000000	The lowest non-zero bit is bit 15, State=16.

Double-click Animated Graphic to call out the Animated Graphic Properties screen as shown below.

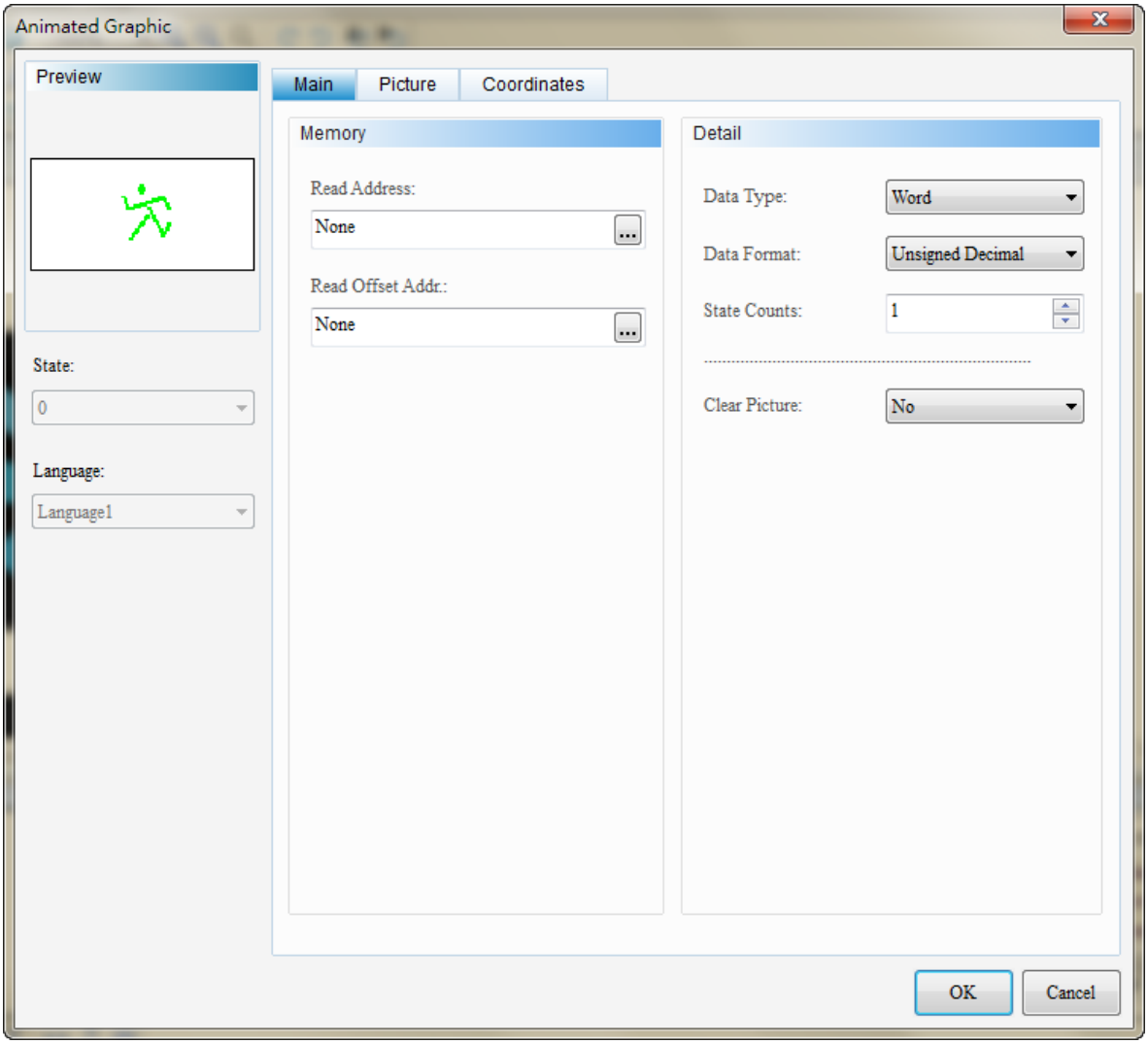


Figure 12-2-1 Animated Graphic Properties

Animated Graphic	
Function Page	**Content Description**
Preview	Views the multistate data but does not support multilingual data display.
Main	Sets Read Address, Read Offset Address, data type, data format, status counts, and clear picture.
Picture	Sets picture bank name, alignment, stretch mode, and picture transparent color.
Coordinates	Sets the X-Y coordinate, width, and height of the element.

Table 12-2-3 Animated Graphic Function Page

◆ Main

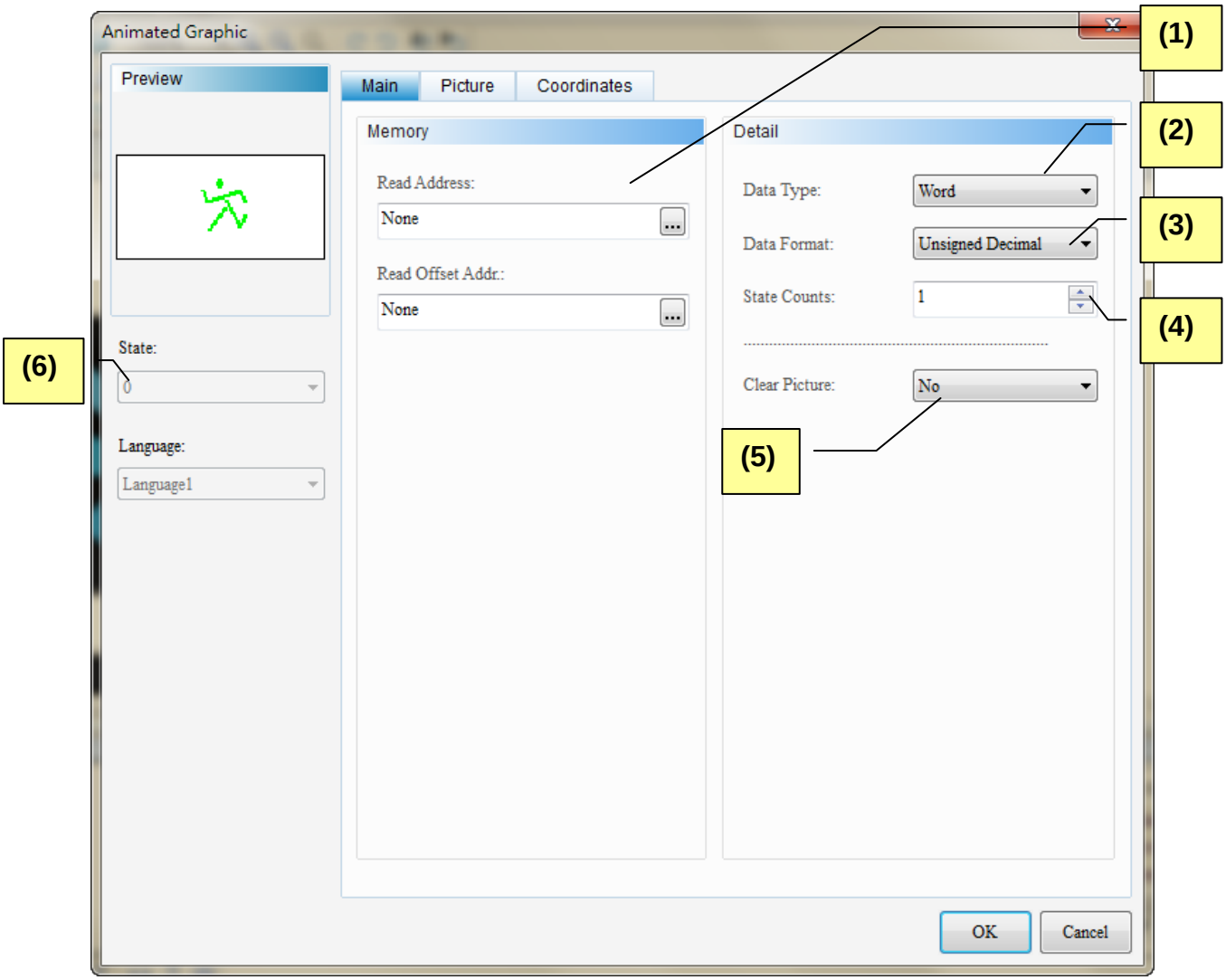
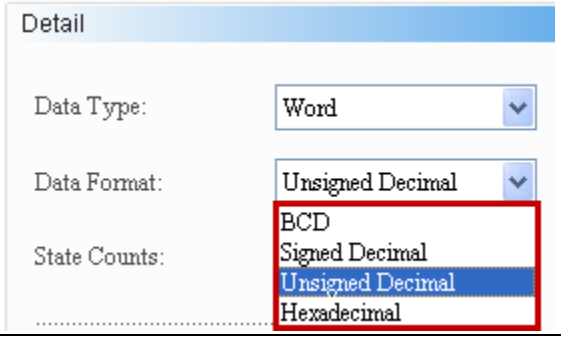
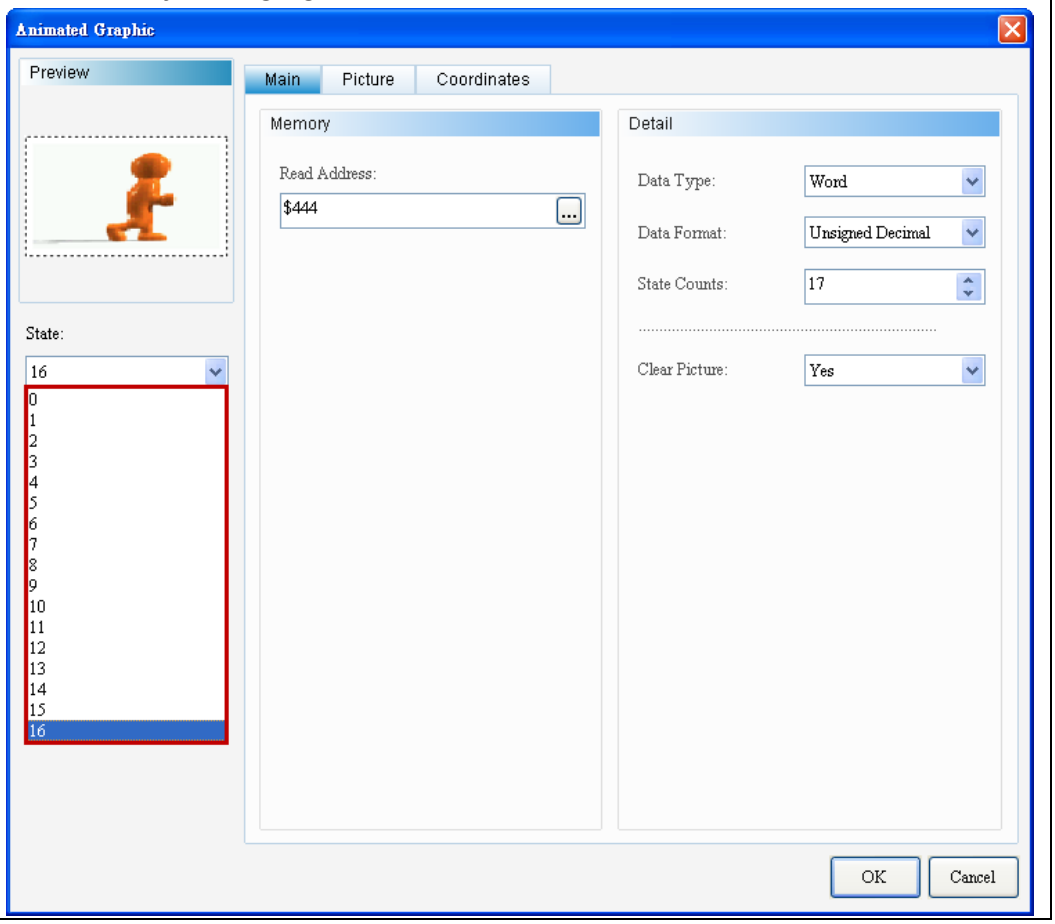


Figure 12-2-2 Animated Graphic Element Main Properties Page

No.	Property	Function
(1)	Read Address	➢ Selects the address of internal memory or controller register. ➢ The data of the Read Address are the reference for Animated Graphic change. ➢ **[Read Address+1]** is the X-position of Animated Graphic movements. ➢ **[Read Address+2]** is the Y-position of Animated Graphic movements. ➢ Selects link name or element type. Please refer to 5-1 Buttons of Chapter 05 for details.
	Read Offset Address	➢ Please refer to Appendix D Write and Read Offset Address.
(2)	Data Type	➢ Three options: Word, LSB, and LSB (Support State 0). Please refer to Table 12-2-2 for details.
(3)	Data	➢ Data format can only be selected when data type is “Word”.

No.	Property	Function
	Format	➢ These formats include BCD, Signed Decimal, Unsigned Decimal, and Hexadecimal. 
(4)	State Counts	➢ Sets the total state count of Animated Graphic elements. If data type is “Word”, users can select 1-256 states; if data type is “LSB”, users can select 16 states; and if data type is “LSB (Support State 0)”, users can select 17 states. Please refer to Table 12-2-2 for details.
(5)	Clear Picture	➢ Enables clearing a previous Animated Graphic picture in the movement or state picture change. If “No” is selected, the previous state picture is displayed on the HMI screen in Animated Graphic movements.
(6)	State	➢ Users can preview or change the parameter of all button element states by changing state. 

◆ Picture

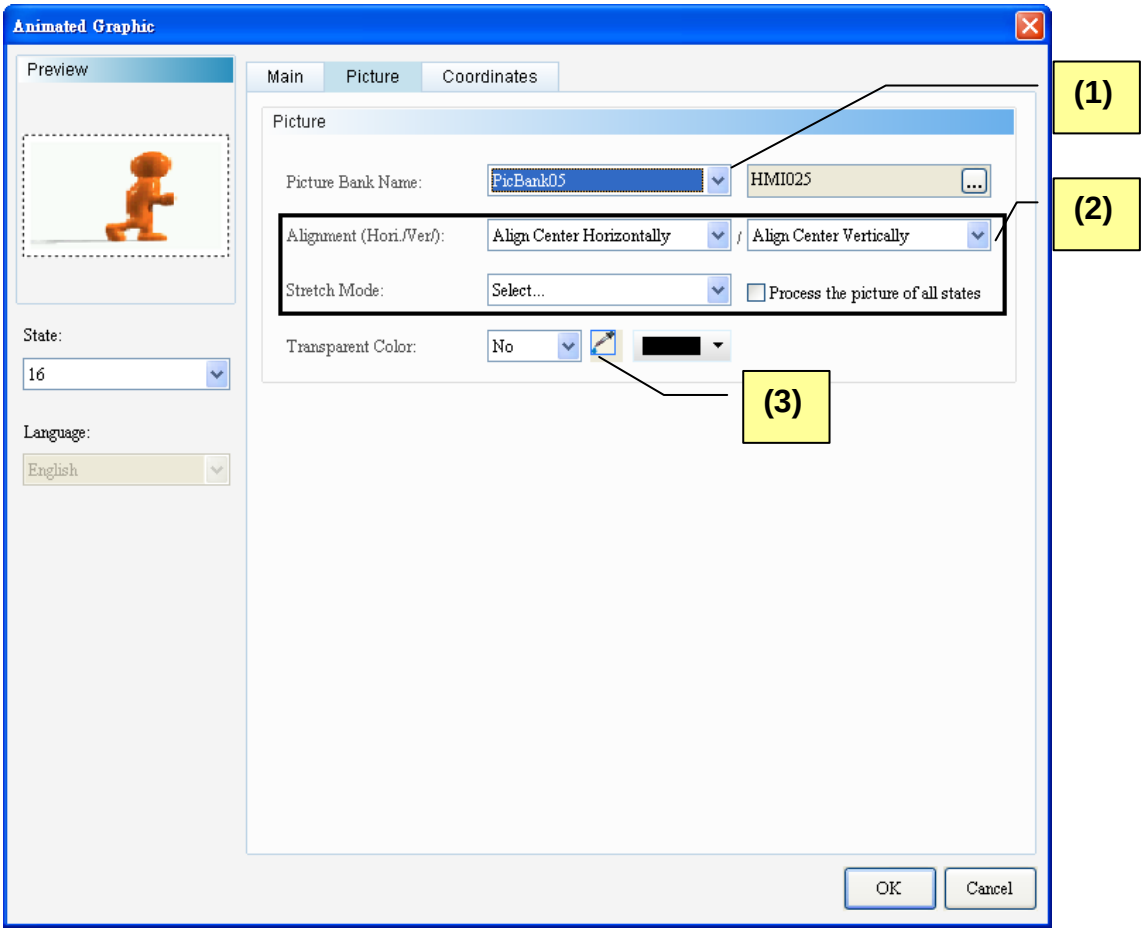
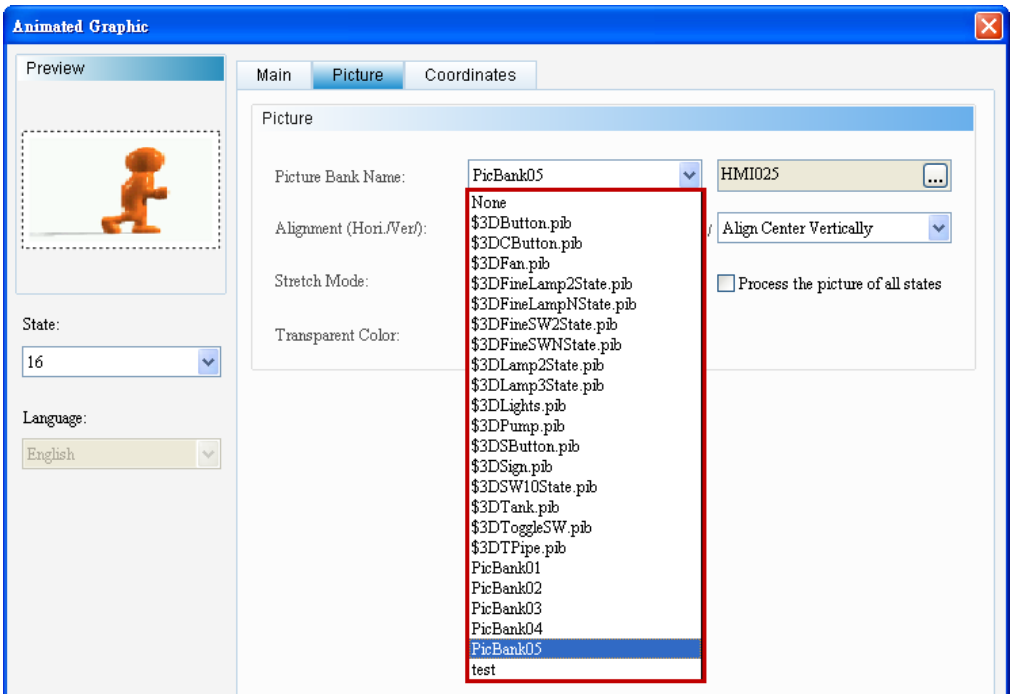
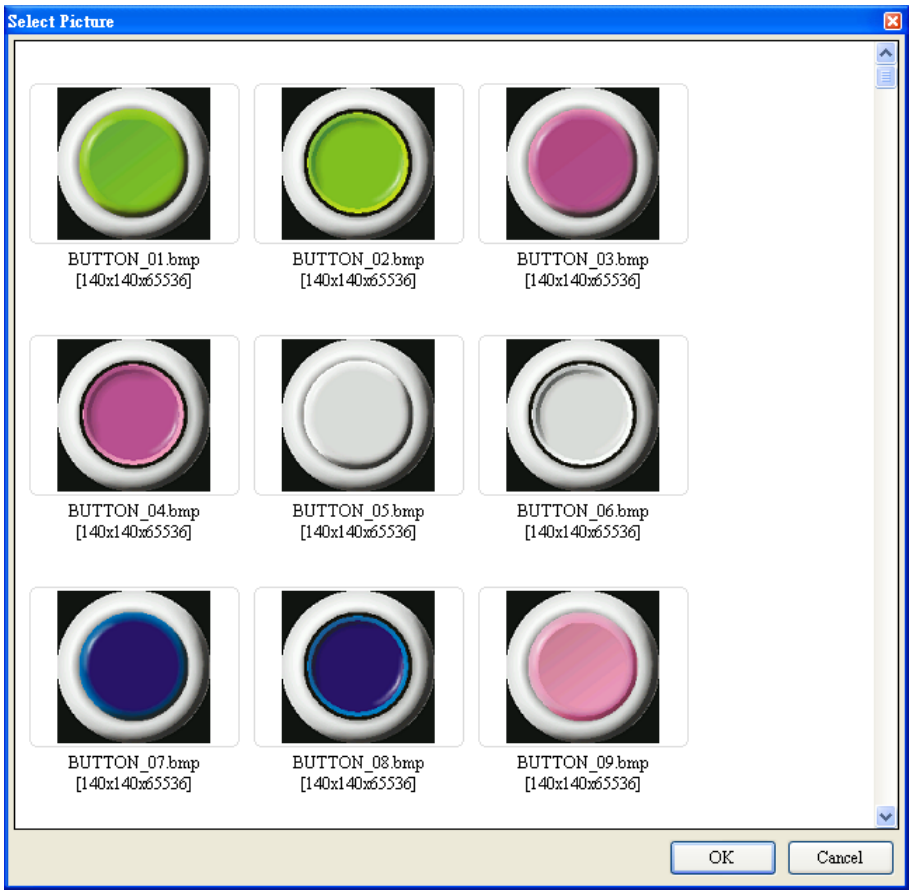
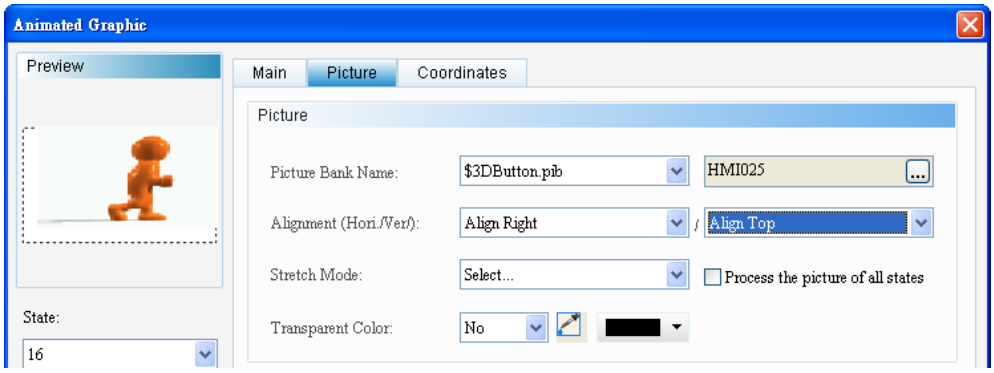
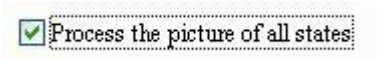


Figure 12-2-3 Animated Graphic Element Picture Properties Page

No.	Property	Function Description
(1)	Picture bank name	➢ The default picture bank name is “None”. Users can select in the built-in bank the picture to be displayed from the pull-down.  

<table>
<tr><th>No.</th><th>Property</th><th>Function Description</th></tr>
<tr><td rowspan="2">(2)</td><td>Alignment</td><td>➢ Sets picture alignment with the alignment options.
 
</td></tr>
<tr><td>Stretch Mode</td><td>➢ Stretch modes include: Fill, Keep Aspect Ratio, and Actual Size.
<table>
<tr><th>Fill</th><th>Keep Aspect Ratio</th><th>Actual Size</th></tr>
<tr><td>In the “Fill” mode, the selected picture will fill up the entire display area.</td><td>In the “Keep Aspect Ratio” mode, the selected picture will fit in the display area proportionally according to the picture ratio</td><td>In the “Actual Size” mode, the picture will be displayed in its original size in the display area.</td></tr>
<tr><td> </td><td> </td><td> </td></tr>
</table>
➢ If “Process all state pictures” is selected, the system assumes that each element has multiple entries of state data, and some pictures may be unable to fill the entire display area. By selecting this item, users will not need to set individual pictures to save time from editing.
 
</td></tr>
<tr><td>(3)</td><td>Select Transparent Color</td><td>➢ Sets a color in the picture to transparent. In this case, by clicking the Transparent Color icon and then the black part of the button, the DOPSoft will omit all black area in the picture and make it look transparent.
 </td></tr>
</table>

◆ Coordinates

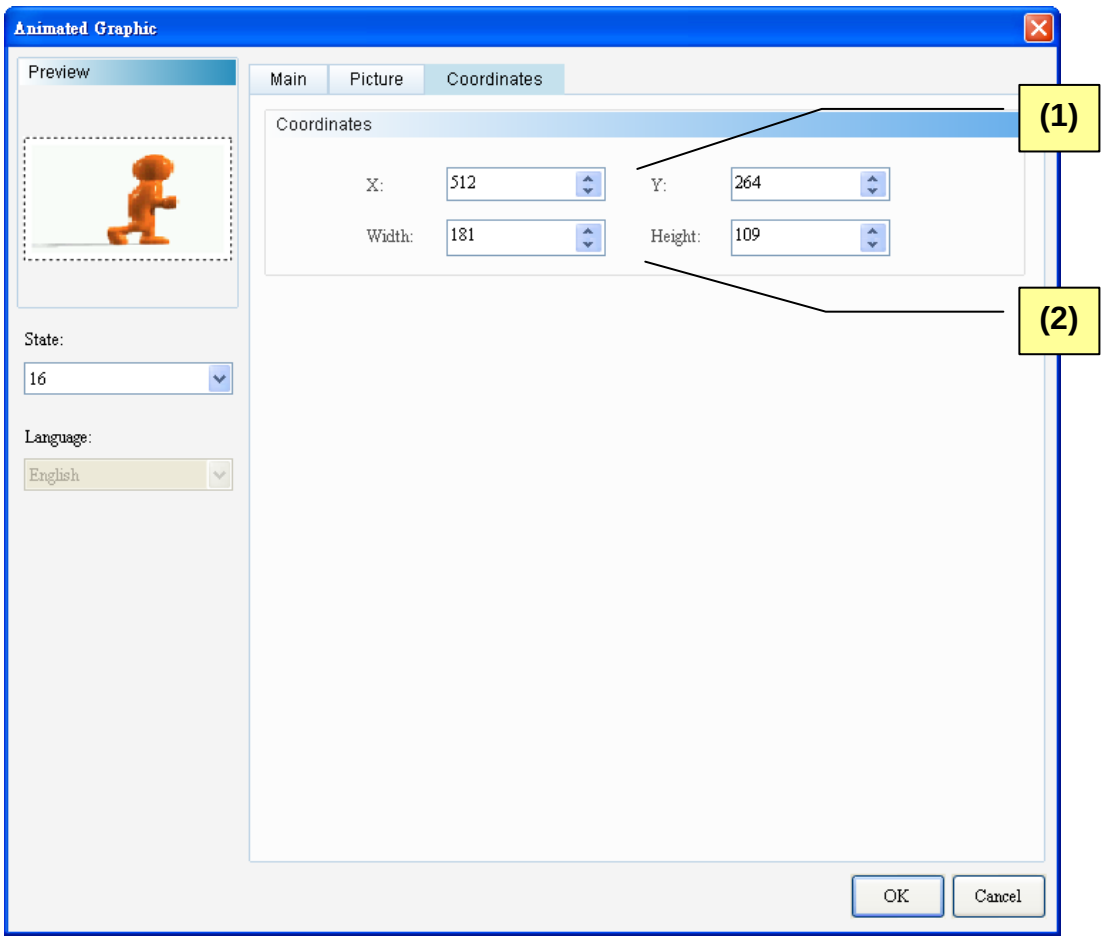


Figure 12-2-4 Animated Graphic Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

12-3 Dynamic Line

	Dynamic Line

The Dynamic Line controls the position of line movements and the color changes of lines and blink according to the Read Address defined by users. Please refer to Table 12-3-1 Example of Dynamic Line below

Example of Dynamic Line

Table 12-3-1 Example of Dynamic Line

Crate Dynamic Line Elements

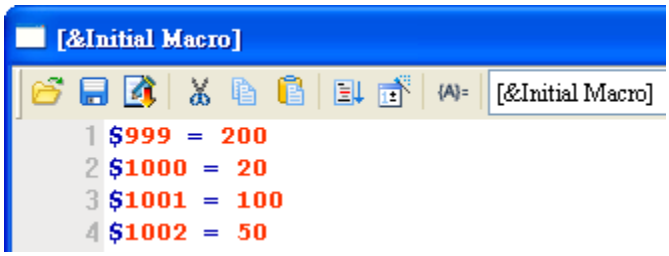
Dynamic Line		Line Type	Line Width
Read Address	$999	Line Style:	8

Properties

Position Changeability	Variable Color	Blink
Yes	Yes	Yes

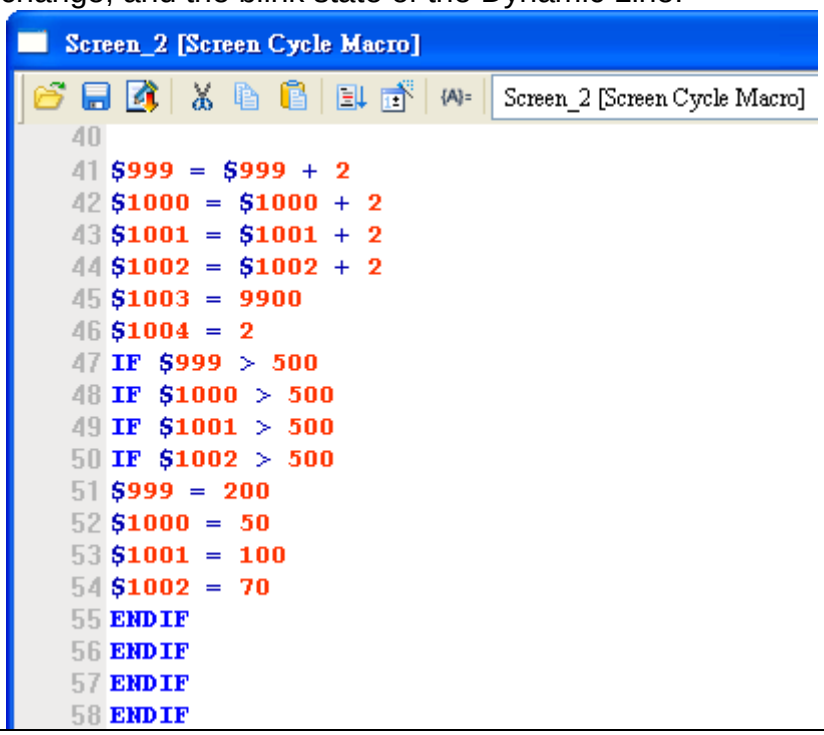
Edit Initial Macro

➢ Enter [Options]→ [Initial Macro] and edit the flowing macro commands. These commands define the initial position of the X-Y coordinate of the Dynamic Line.



Edit Screen Cycle Macro

➢ Enter [Screen]→ [Screen Cycle Macro] and edit the following macro commands. These commands define the X-Y coordinate of the path, the color change, and the blink state of the Dynamic Line.

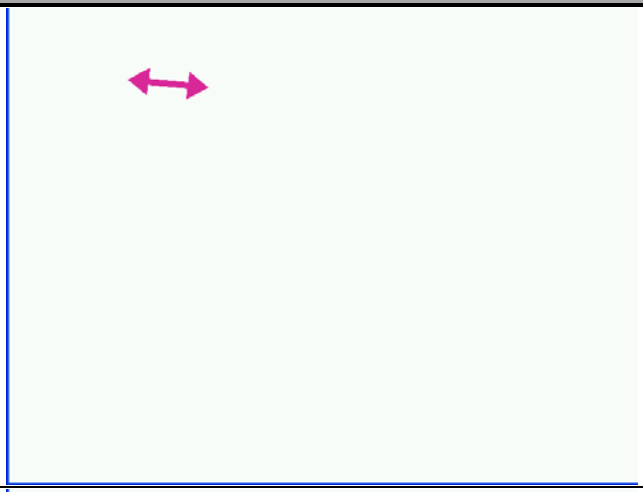


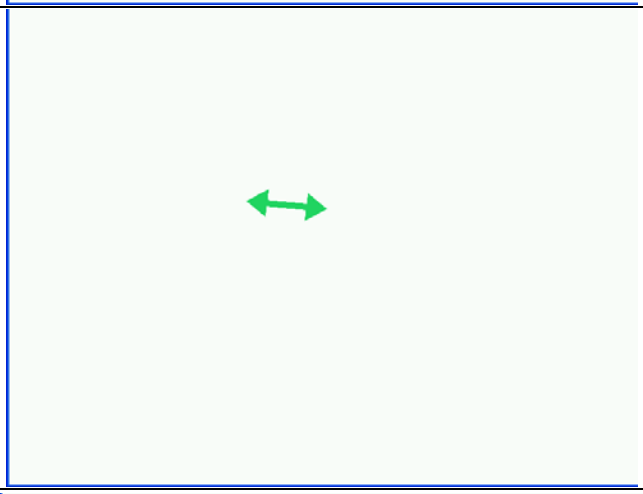
Execution Results

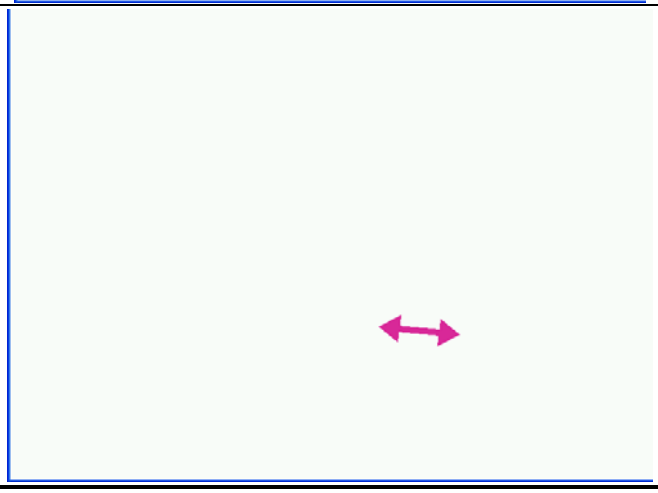
➢ Compile screens and download them to the HMI. The dynamic line will be displayed on the HMI screen according to the X-Y path, color and blink state defined in the Read Address.

Example of Dynamic Line

Table 12-3-1 Example of Dynamic Line







Double-click Dynamic Line to call out the Dynamic Line Properties screen as shown below.

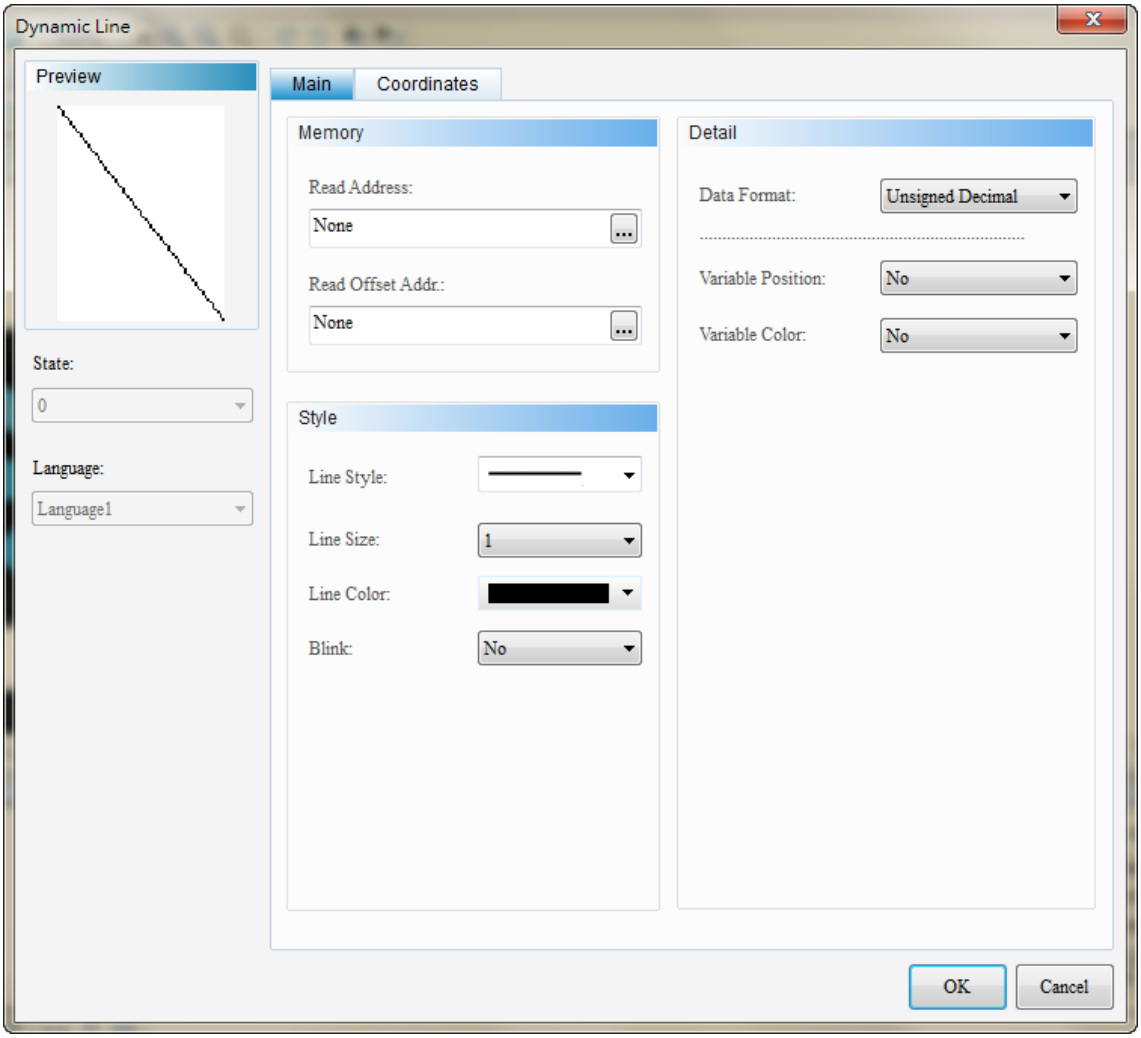


Figure 12-3-1 Dynamic Line Properties

Dynamic Line	
Function Page	**Content Description**
Preview	Neither multistate data display nor multilingual data display is supported.
Main	Sets Read Address, Read Offset Address, line style, line size, line color, and blink. Sets data format, Variable Position, and Variable Color.
Coordinates	Sets the X-Y coordinate, width, and height of the element.

Table 12-3-2 Dynamic Line Function Page

◆ Main

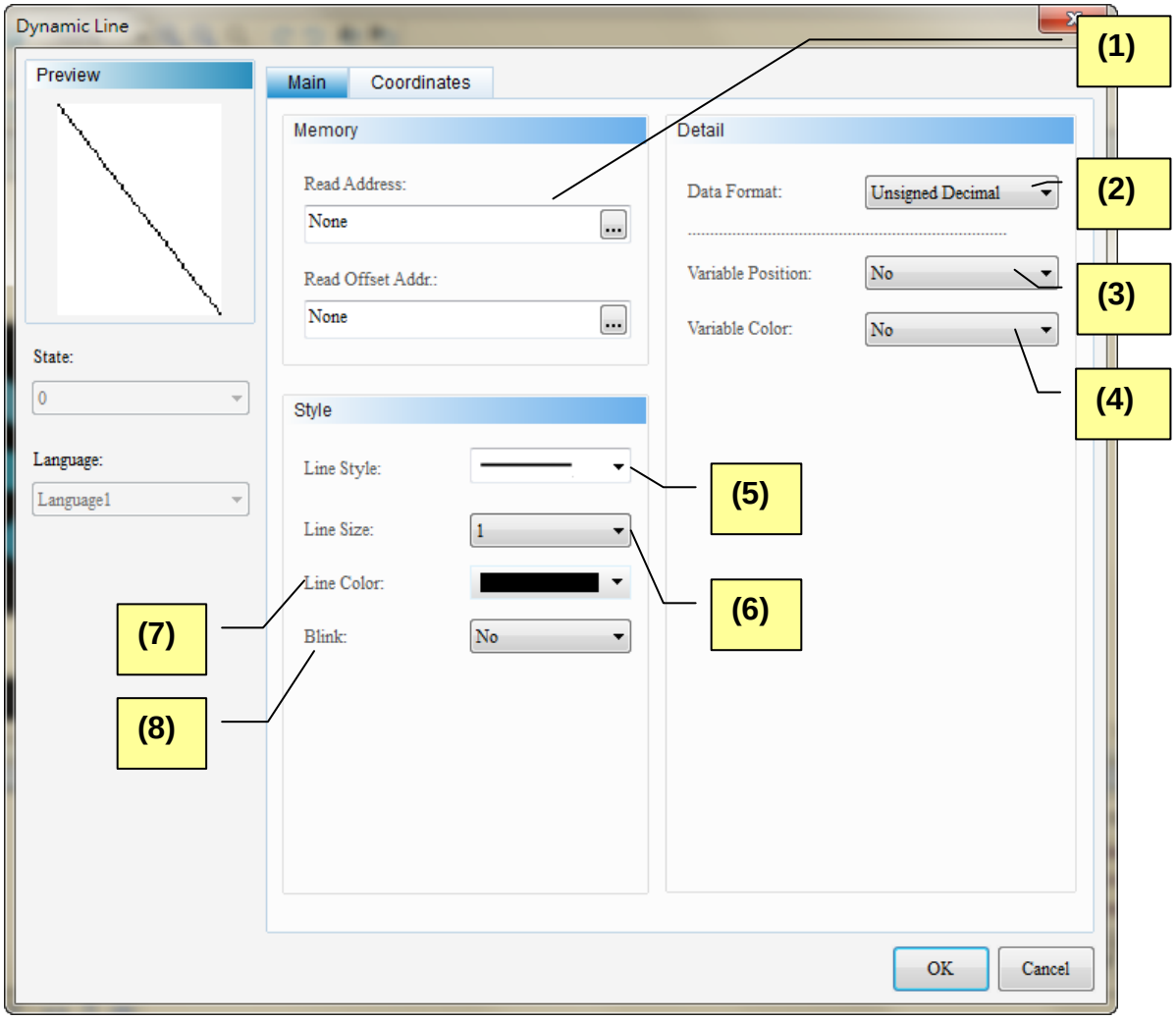
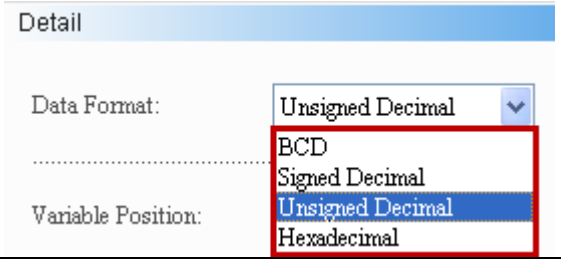
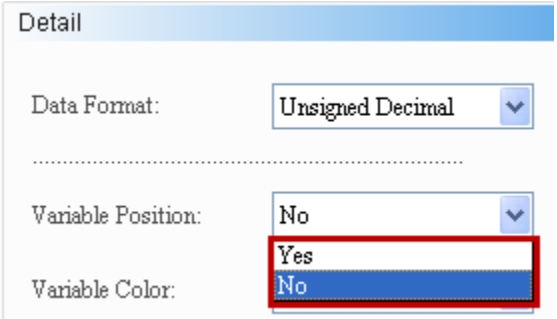
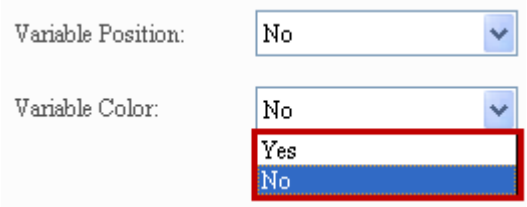
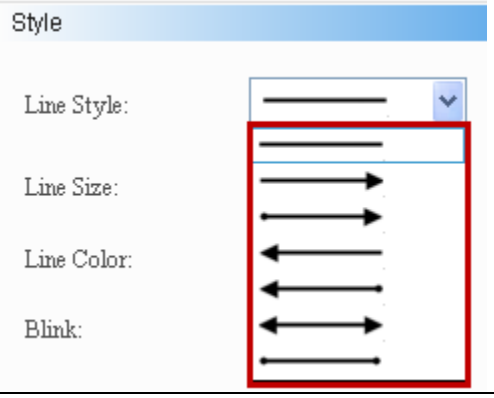
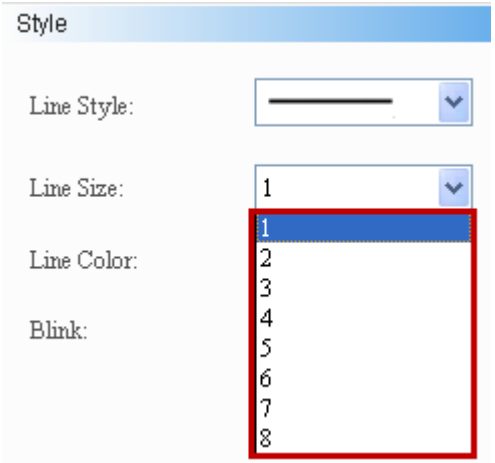
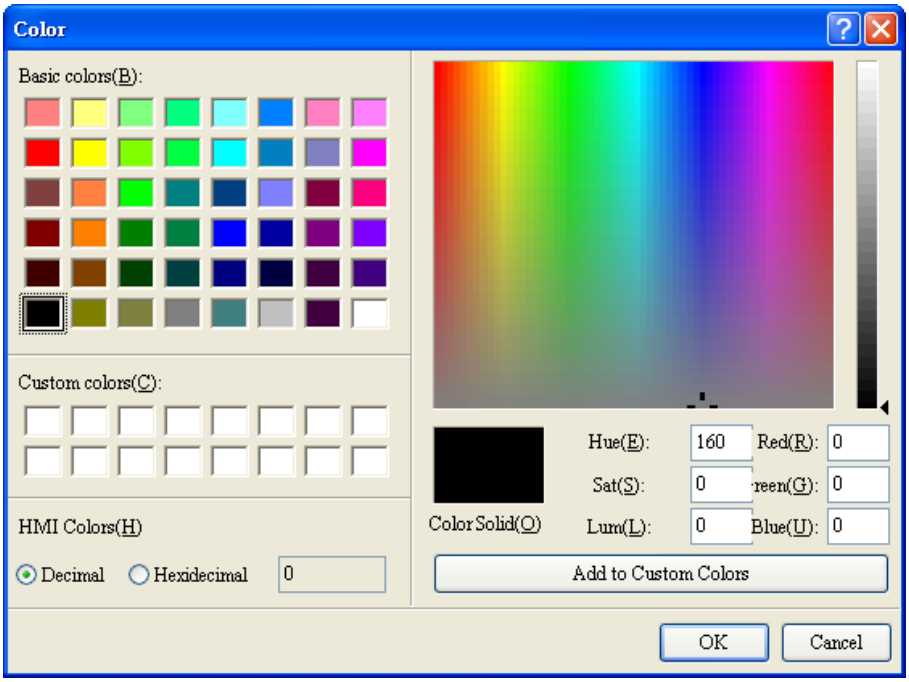
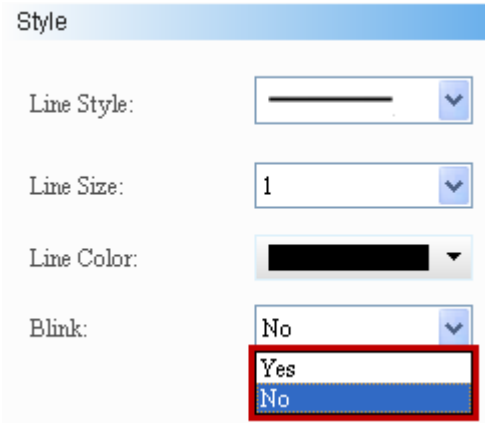


Figure 12-3-2 Dynamic Line Element Main Properties Page

No.	Property	Function
(1)	Read Address	➢ Selects the address of internal memory or controller register. ➢ If [Variable Position] is “Yes”, the data of the Read Address is the X- coordinate of the dynamic line’s start. ➢ If [Variable Position] is “Yes”, the **[Read Address+1]** is the Y-coordinate of the dynamic line’s start. ➢ If [Variable Position] is “Yes”, the **[Read Address+2]** is the X-coordinate of the dynamic line’s destination. ➢ If [Variable Position] is “Yes”, the **[Read Address+3]** is the Y-coordinate of the dynamic line’s destination. ➢ If [Variable Color] is “Yes”, **[Read Address+4]** is the color of the dynamic line, and its range is 0~65535. ➢ If [Blink] is “Yes”, **[Read Address+5]** is the blink state of the dynamic line. If the value is greater than 1, the dynamic line blinks at the blink state; if the value is “0”, the dynamic line does not

No.	Property	Function
		blink. ➢ Selects link name or element type. Please refer to 5-1 Buttons of Chapter 05 for details.
	Read Offset Address	➢ Please refer to Appendix D Write and Read Offset Address.
(2)	Data Format	➢ Four options: BBCD, Signed Decimal, Unsigned Decimal, and Hexadecimal. 
(3)	Variable Position	➢ The options for Position Changeability include “Yes” and “No”.  ➢ When “Yes” is selected, this means the dynamic line position is changeable. When “No” is selected, the dynamic line position is unchangeable.
(4)	Variable Color	➢ The options for Variable Color include “Yes” and “No”.  ➢ When “Yes” is selected, this means the dynamic line color is changeable. When “No” is selected, the dynamic line color is unchangeable. The range is 0~65535.
(5)	Line Style	➢ There seven types of line for users to select.

No.	Property	Function
		
(6)	Line Size	➢ There are eight levels of line width, ranging from 1-8. 
(7)	Line Color	➢ Users can define the color of line display. 

No.	Property	Function
(8)	Blink	➢ The options for Blink include “Yes” and “No”.  ➢ When “Yes” is selected, this means the dynamic line blinks on the screen. When “No” is selected, the dynamic line does not blink on the screen. If the value is greater than “1”, the dynamic line blinks at the blink state. If the value is “0”, the dynamic line does not blink.

◆ Coordinates

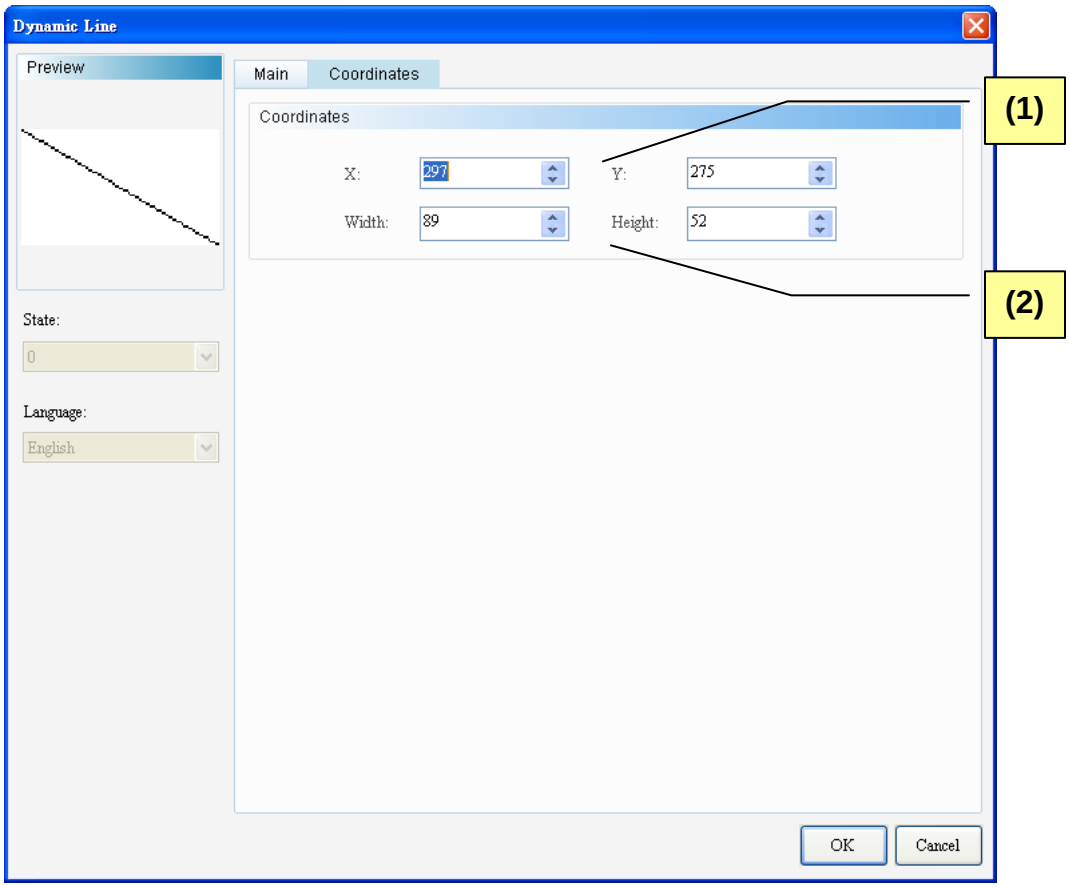


Figure 12-3-3 Dynamic Line Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

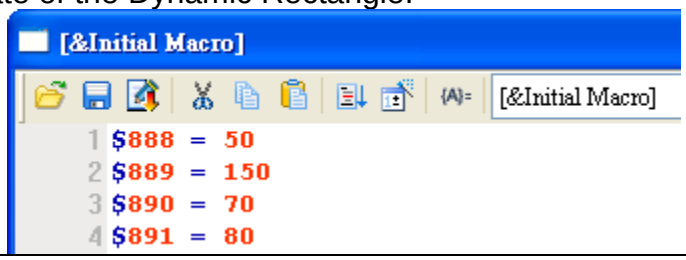
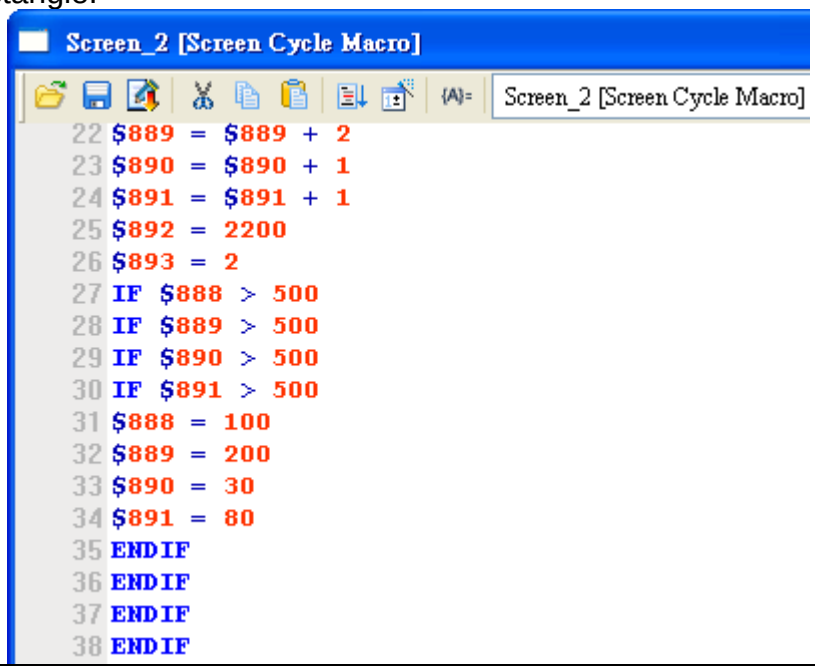
12-4 Dynamic Rectangle

	Dynamic Rectangle

The Dynamic Rectangle controls the position of rectangle movements, and the color and size change and blink of the rectangle according to the Read Address defined by users. Please refer to Table 12-4-1 Example of Dynamic Rectangle below.

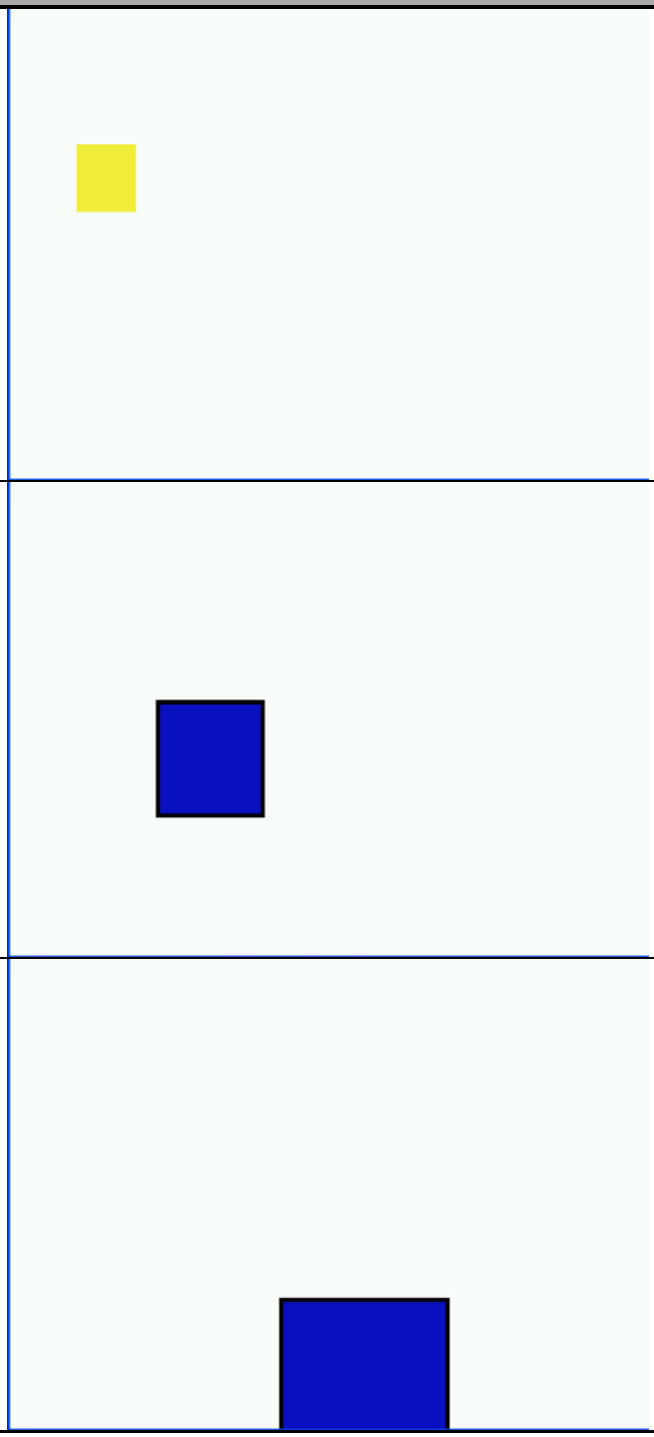
Example of Dynamic Rectangle

Table 12-4-1 Example of Dynamic Rectangle

<table>
<tr><td>Create Dynamic Rectangle Element</td><td>
<table>
<tr><th colspan="2">Dynamic Rectangle</th><th>Line Width</th></tr>
<tr><td>Read Address</td><td>$888</td><td>5</td></tr>
</table>
</td></tr>
<tr><td>Properties</td><td>
<table>
<tr><th>Variable Position</th><th>Variable Color</th><th>Variable Size</th><th>Blink</th></tr>
<tr><td>Yes</td><td>Yes</td><td>Yes</td><td>Yes</td></tr>
</table>
</td></tr>
<tr><td>Edit Initial Macro</td><td>➢ Enter [Options]→ [Initial Macro] and edit the flowing macro commands. These commands define the initial position of the X-Y coordinate of the Dynamic Rectangle.
 
</td></tr>
<tr><td>Edit Screen Cycle Macro</td><td>➢ Enter [Screen]→ [Screen Cycle Macro] and edit the following macro commands. These commands define the X-Y coordinate of the path, the color and size changes, and the blink state of the Dynamic Rectangle.
 
</td></tr>
<tr><td>Result</td><td>➢ After compile and download screen data to HMI, the dynamic rectangle will auto move and change size according to setting macro command.</td></tr>
</table>

Example of Dynamic Rectangle

Table 12-4-1 Example of Dynamic Rectangle



Double-click Dynamic rectangle to call out the Dynamic rectangle Properties screen as shown below.

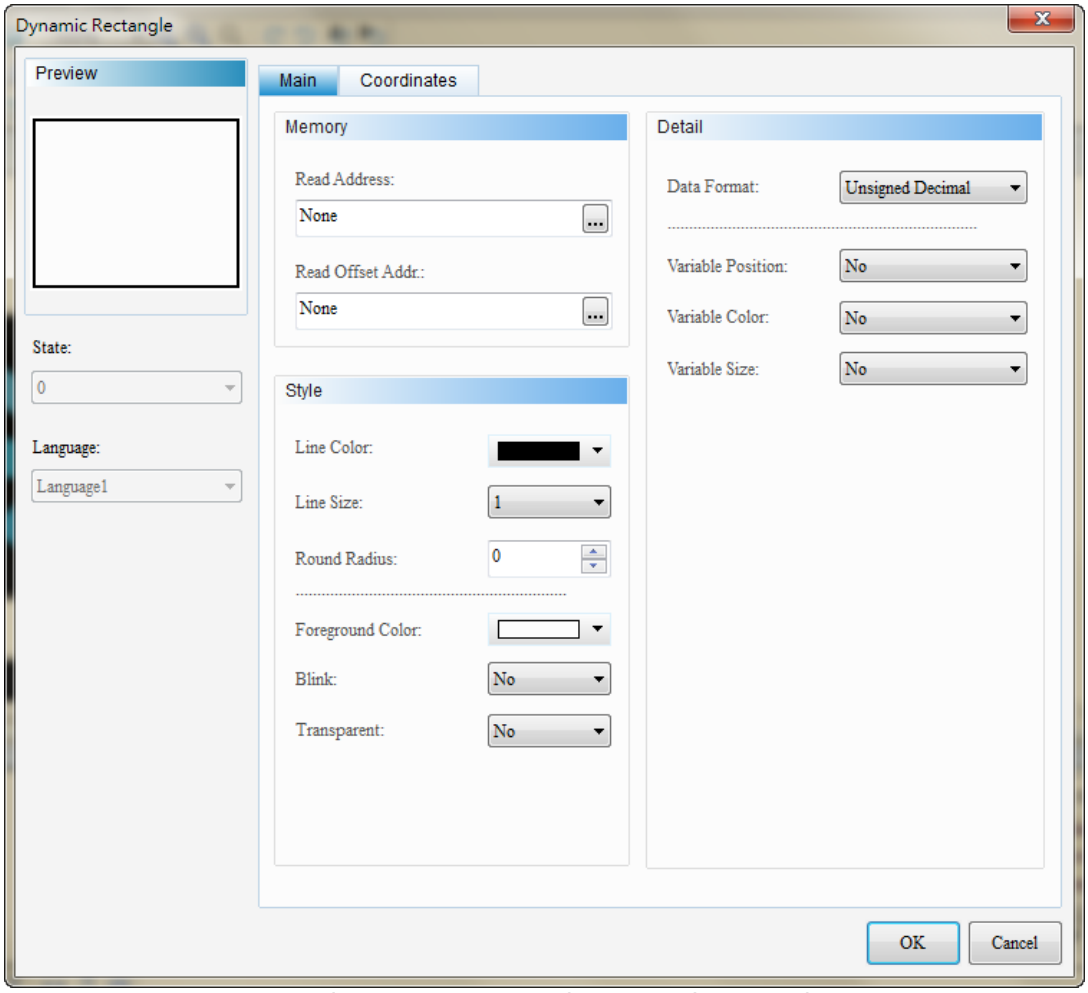


Figure 12-4-1 Dynamic Rectangle properties

Dynamic Rectangle	
Function page	**Content Description**
Preview	No multi-state and multi-language data to preview.
Main	Set Read address, Read Offset address, Line Color, Line Size, Round Radius, Foreground Color, Blink, and Transparent. Set Data format, Variable Position, Variable Color and Variable Size.
Coordinates	Sets the X-Y coordinate, width, and height of the element.

Table 12-4-2 Dynamic Rectangle function page

◆ Main

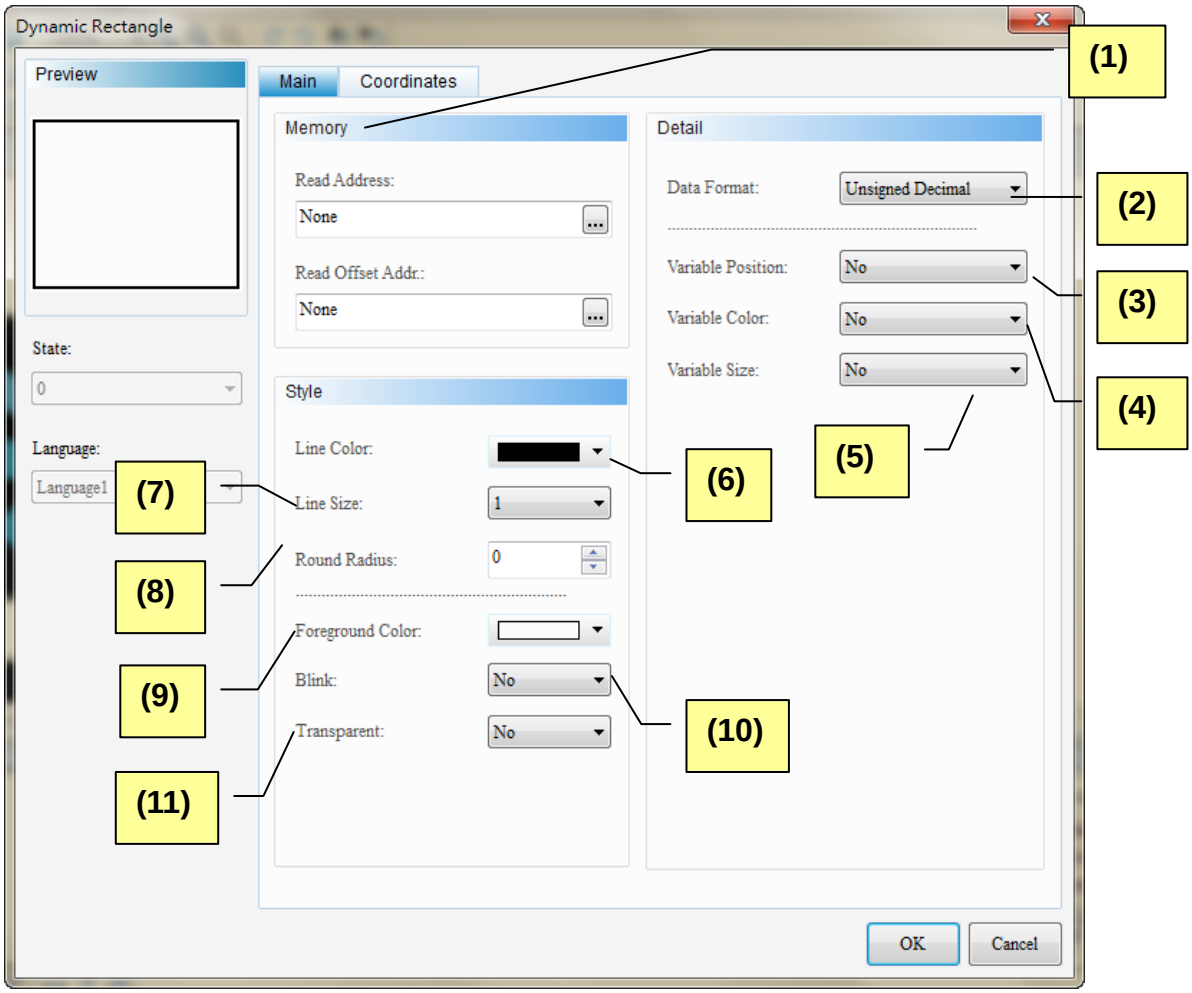
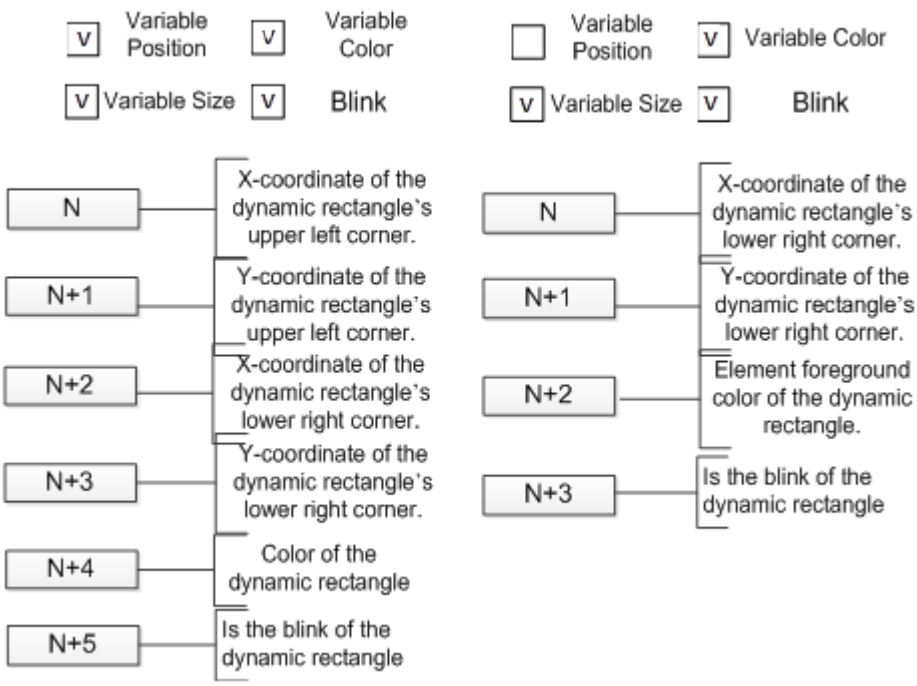
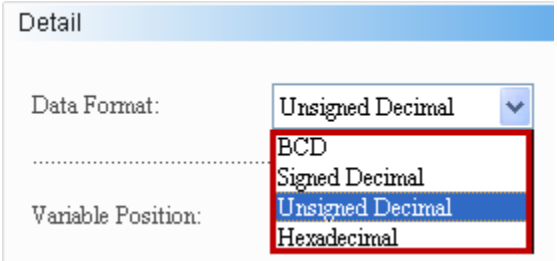
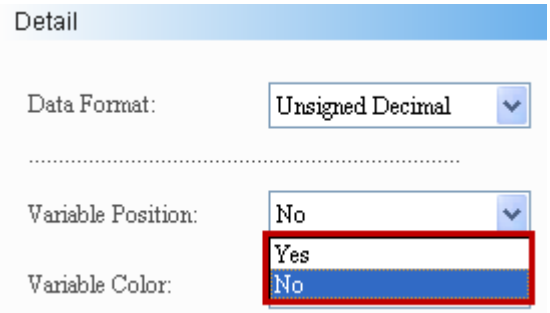
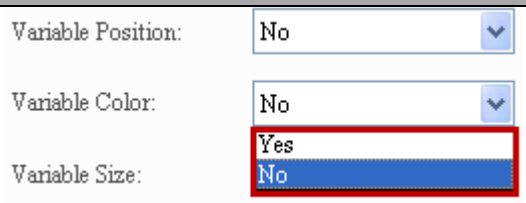
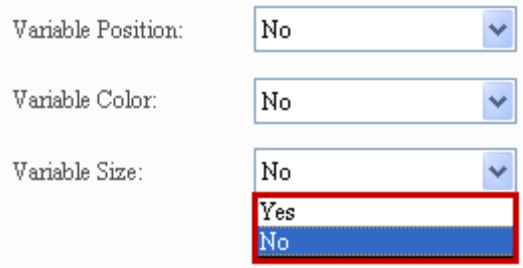
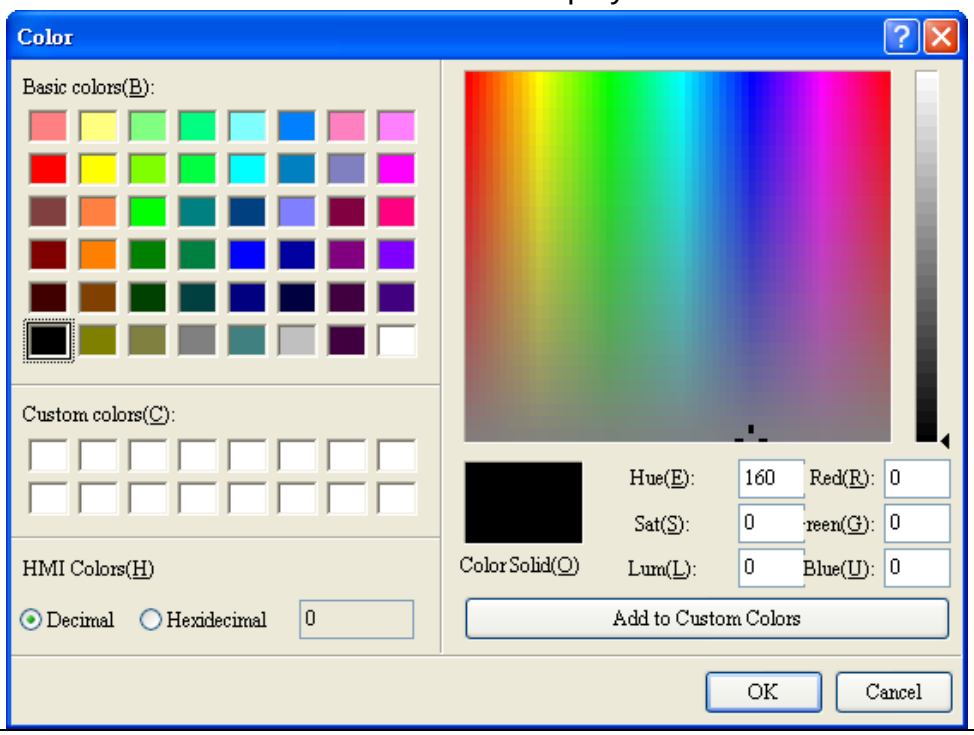
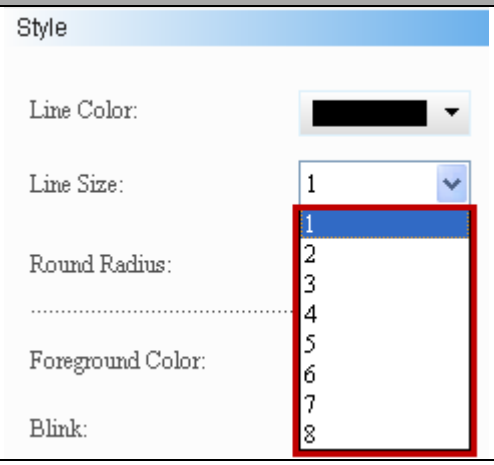
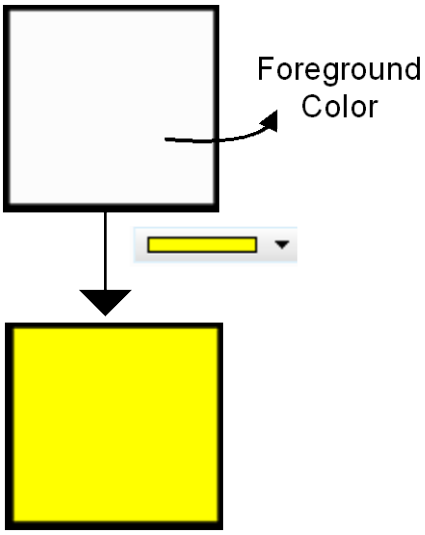
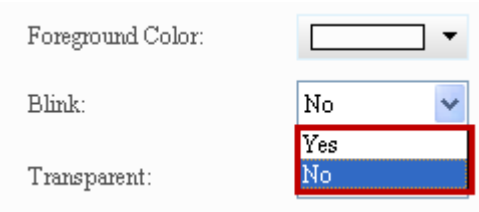


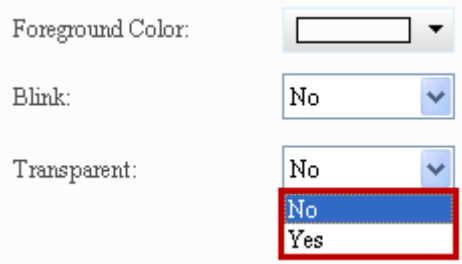
Figure 12-4-2 Dynamic Rectangle Element Main Properties Page

No.	Property	Function
(1)	Read Address	➢ Selects the address of internal memory or controller register. ➢ If [Variable Position] is “Yes”, the data of the Read Address is the X-coordinate of the dynamic rectangle’s upper left corner. ➢ If [Variable Position] is “Yes”, **[Read Address+1]** is the Y-coordinate of the dynamic rectangle’s upper left corner. ➢ If [Variable Size] is “Yes”, **[Read Address+2]** is the X-coordinate of the dynamic rectangle’s lower right corner. ➢ If [Variable Size] is “Yes”, **[Read Address+3]** is the Y-coordinate of the dynamic rectangle’s lower right corner. ➢ If [Variable Color] is “Yes”, **[Read Address+4]** is the dynamic rectangle’ color, and the range is 0-65535. ➢ If [Blink] is “Yes”, **[Read Address+5]** is the blink state of the dynamic rectangle. If the value is greater than 1, the dynamic rectangle blinks at the blink state; if the value is “0”, the dynamic rectangle does not blink. ➢ Selects link name or element type. Please refer to 5-1 Buttons of Chapter 05 for details. ➢ If [Position Changeability] is “no”, the corresponding memory address will be replaced automatically.

No.	Property	Function
		
	Read Offset Address	➢ Please refer to Appendix D Write and Read Offset Address.
(2)	Data Format	➢ Four options: BCD, Signed Decimal, Unsigned Decimal, and Hexadecimal. 
(3)	Variable Position	➢ The options for Variable Position include “Yes” and “No”.  ➢ When “Yes” is selected, this means the dynamic rectangle position is changeable. When “No” is selected, the dynamic rectangle position is unchangeable. However, the rectangle size is still changeable.
(4)	Variable Color	➢ The options for Variable Color include “Yes” and “No”.

No.	Property	Function
		 ➢ When “Yes” is selected, this means the dynamic rectangle color is changeable. When “No” is selected, the dynamic rectangle color is unchangeable. The range is 0-65535.
(5)	Variable Size	➢ The options for Variable Size include “Yes” and “No”.  ➢ When “Yes” is selected, this means users can change the rectangle size by changing the lower right corner coordinate of the dynamic rectangle. When “No” is selected, the rectangle size is unchangeable.
(6)	Line Color	➢ Users can define the color of line display. 
(7)	Line Size	➢ There are eight levels of line width, ranging from 1-8.

No.	Property	Function
		
(8)	Round Radius	➢ The length of round corner radius is determined by the rectangle's height and width. The minimum value of the rectangle element (H2, W2) is the maximum acceptable value for the round corner radius.
(9)	Foreground Color	➢ Sets the foreground color of the element. 
(10)	Blink	➢ The options for Blink include "Yes" and "No".  ➢ When "Yes" is selected, this means the dynamic rectangle blinks on the screen. When "No" is selected, the dynamic rectangle does not blink on the screen. If the value is greater than "1", the dynamic rectangle blinks at the blink state. If the value is "0", the dynamic rectangle does not blink.
(11)	Transparent Color	➢ The options for Transparent Color include "Yes" and "No".

No.	Property	Function
		 ➢ If Transparent Color is “Yes”, the Foreground Color is disabled. ➢ If Transparent Color is “Yes”, the color of the dynamic rectangle is displayed only on the rectangle’s frame, and the inside of the rectangle is transparent.

◆ Coordinates

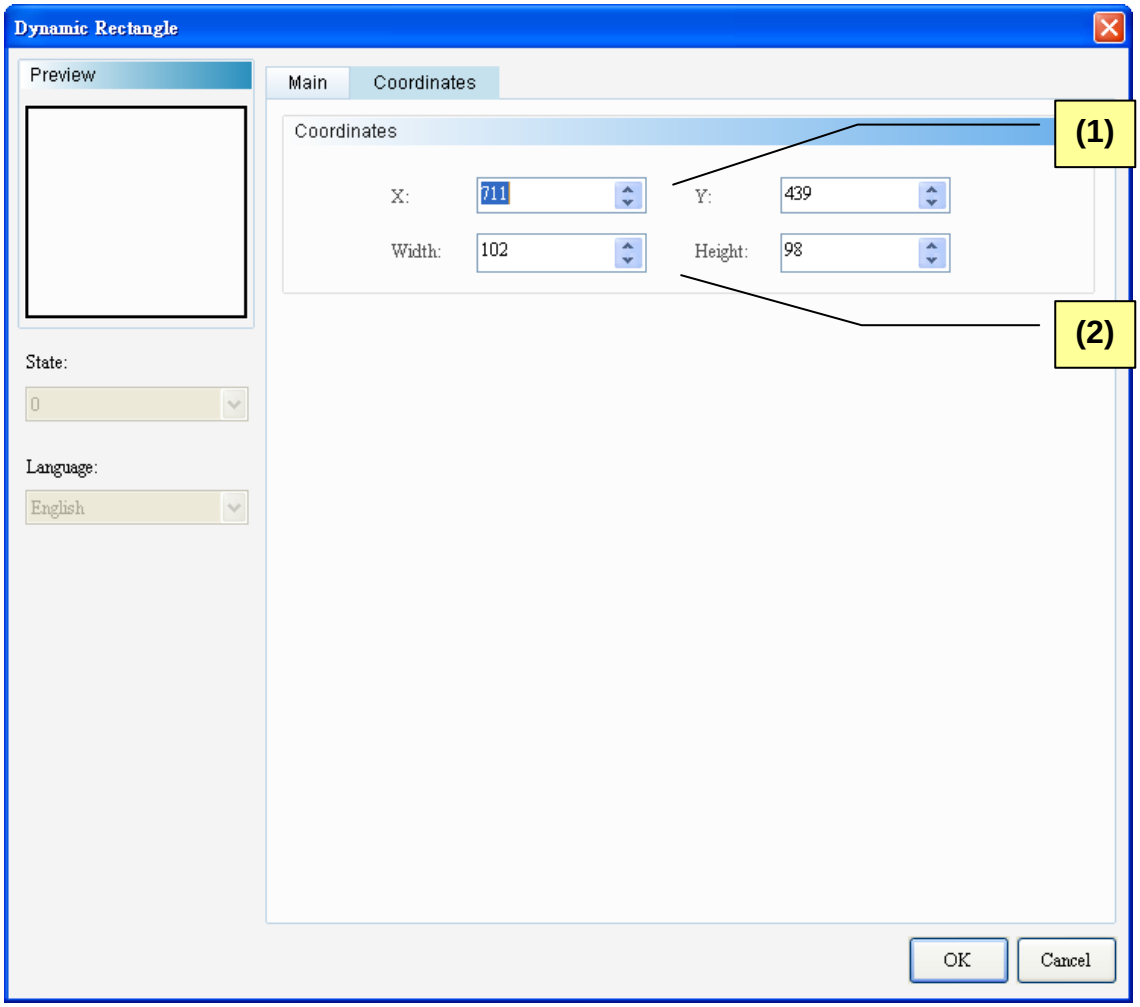


Figure 12-4-3 Dynamic Rectangle Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

12-5 Dynamic Ellipse

	Dynamic Ellipse

The Dynamic Ellipse controls the position of oval movements, and the color and size change and blink of the oval according to the Read Address defined by users. Please refer to Table 12-5-1 Example of Dynamic Ellipse below.

Example of Dynamic Ellipse

Table 12-5-1 Example Dynamic Ellipse

Create Dynamic Ellipse Element

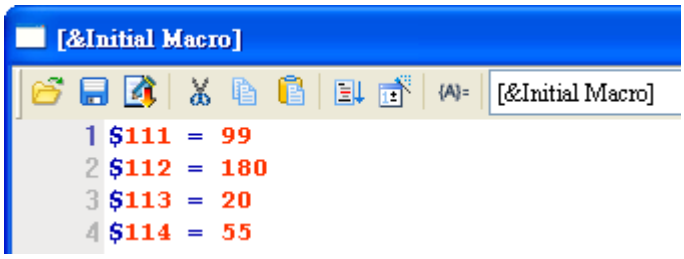
Dynamic Ellipse		Line Width
Read Address	$111	3

Properties

Variable Color	Variable Central point	Variable Radius	Blink
Yes	Yes	Yes	Yes

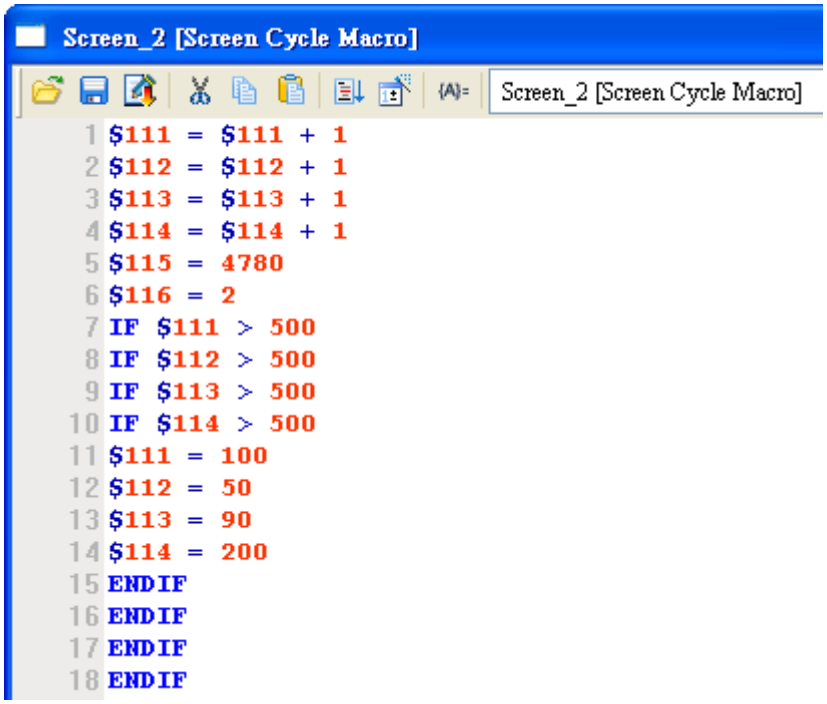
Edit Initial Macro

➢ Enter [Options]→ [Initial Macro] and edit the flowing macro commands. These commands define the initial position of the X-Y coordinate of the Dynamic Ellipse.



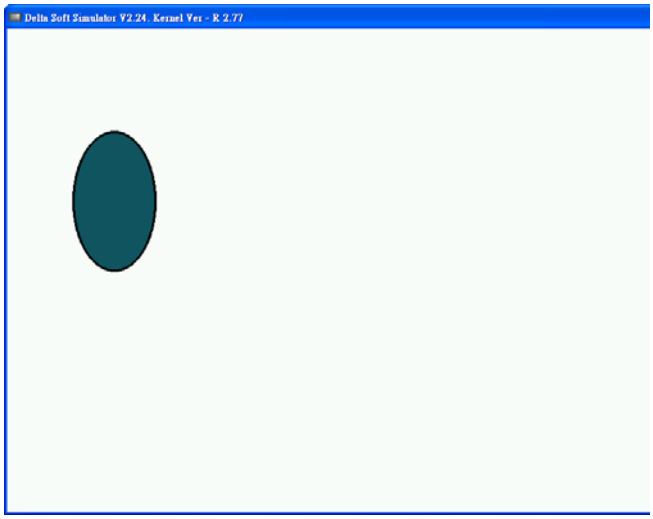
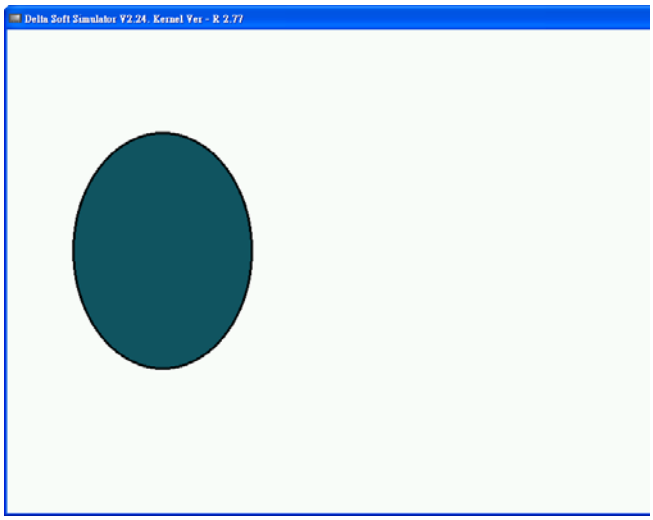
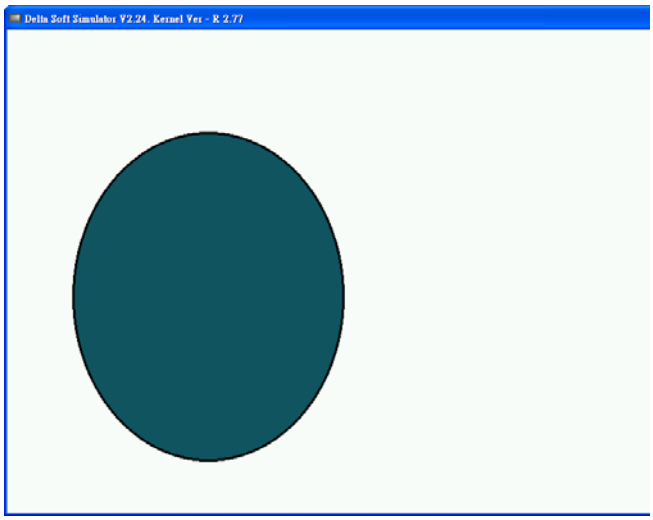
Edit Screen Cycle Macro

➢ Enter [Screen]→ [Screen Cycle Macro] and edit the following macro commands. These commands define the X-Y coordinate of the path, the color and size changes, and the blink state of the Dynamic Ellipse.



Execution

➢ Compile screens and download them to the HMI. The Dynamic Ellipse

Example of Dynamic Ellipse Table 12-5-1 Example Dynamic Ellipse	
Results	will be displayed on the HMI screen according to the X-Y path, color, size, and blink state defined in the Read Address.   

Double-click Dynamic Line to call out the Dynamic Ellipse Properties screen as shown below.

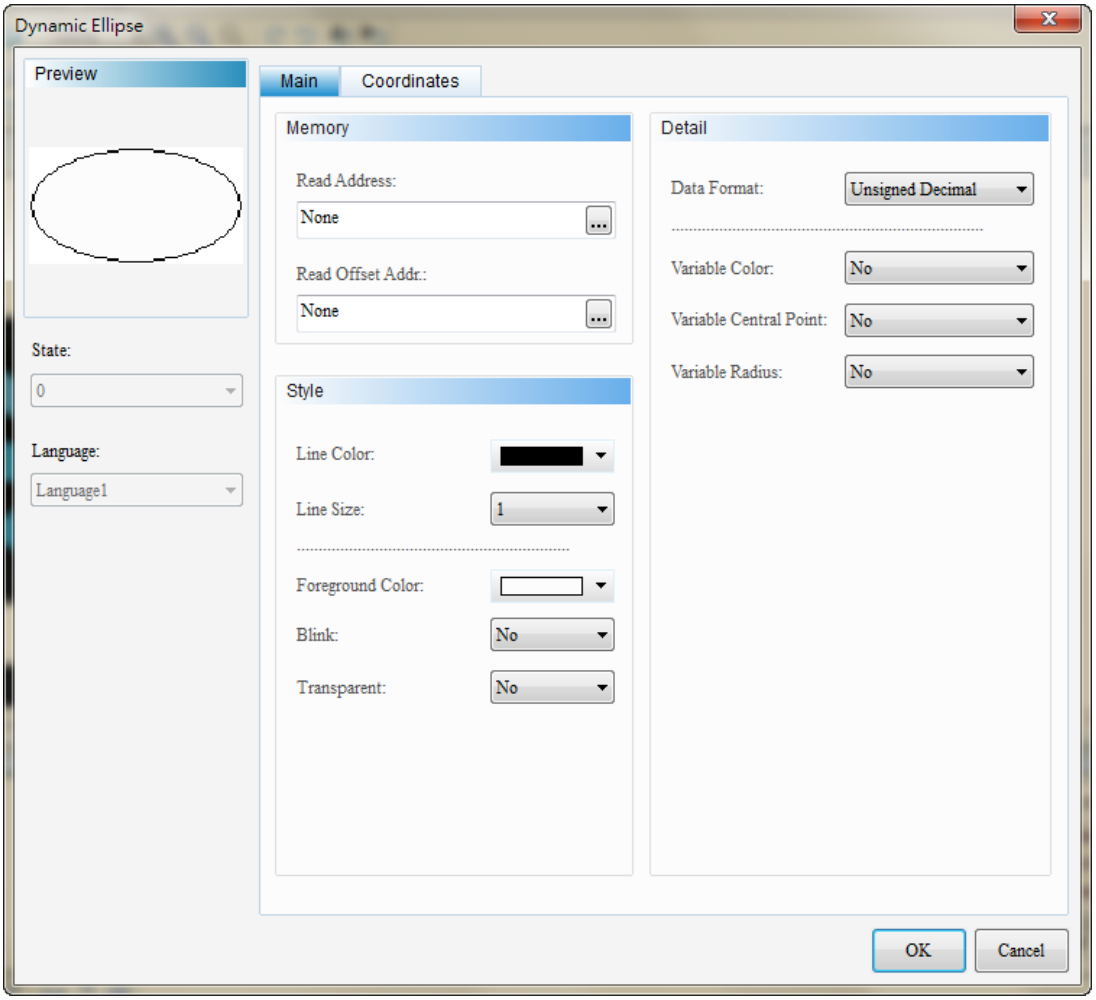


Figure 12-5-1 Dynamic Ellipse Properties

Dynamic Ellipse	
Function Page	**Content Description**
Preview	Neither multistate data display nor multilingual data display is supported.
Main	Sets Read Address, Read Offset Address, line color, line size, foreground color, blink, and transparent. Sets data format, Variable color, Variable central point, and Variable radius.
Coordinates	Sets the X-Y coordinate, width, and height of the element.

Table 12-5-2 Dynamic Ellipse Function Page

◆ Main

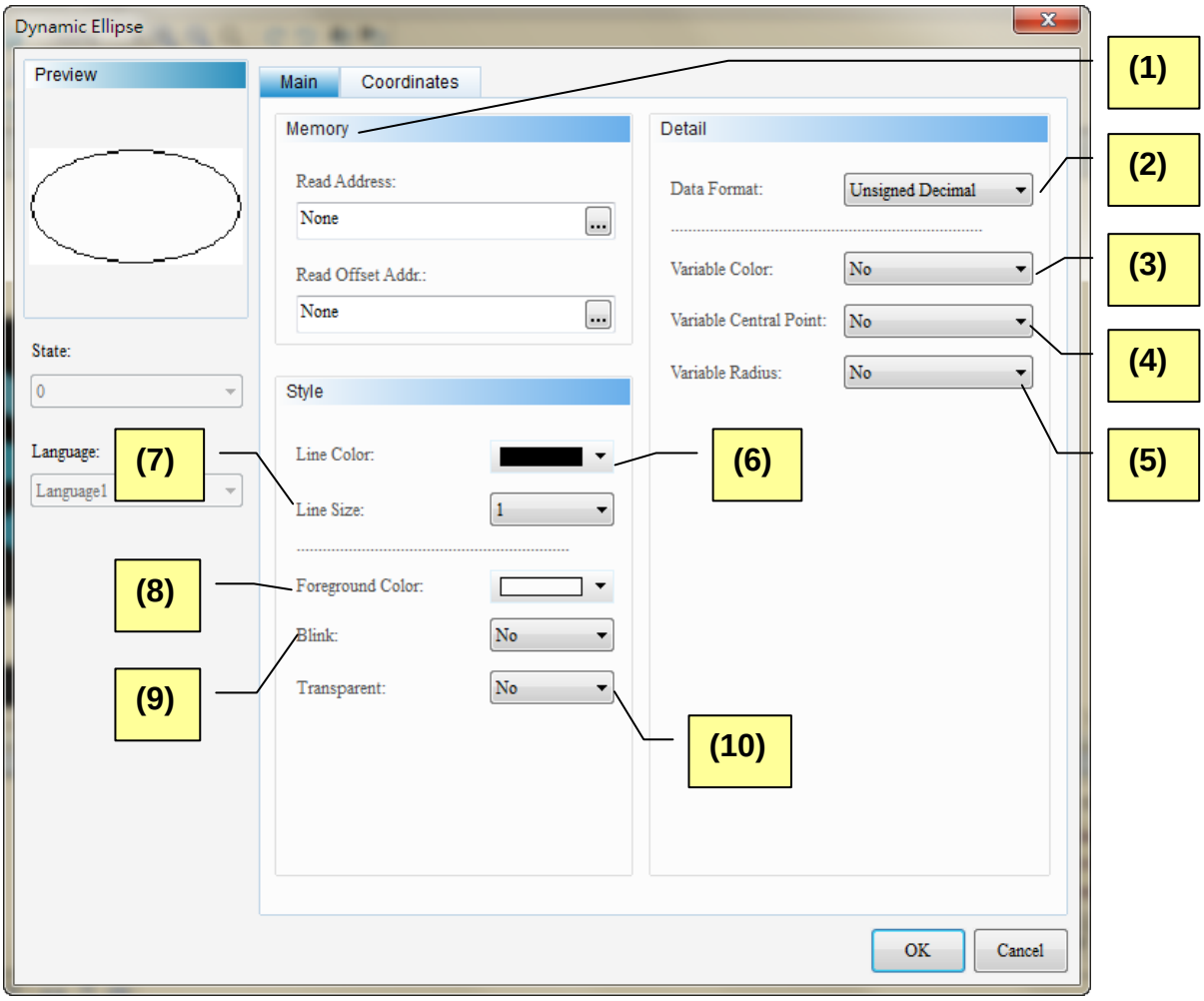
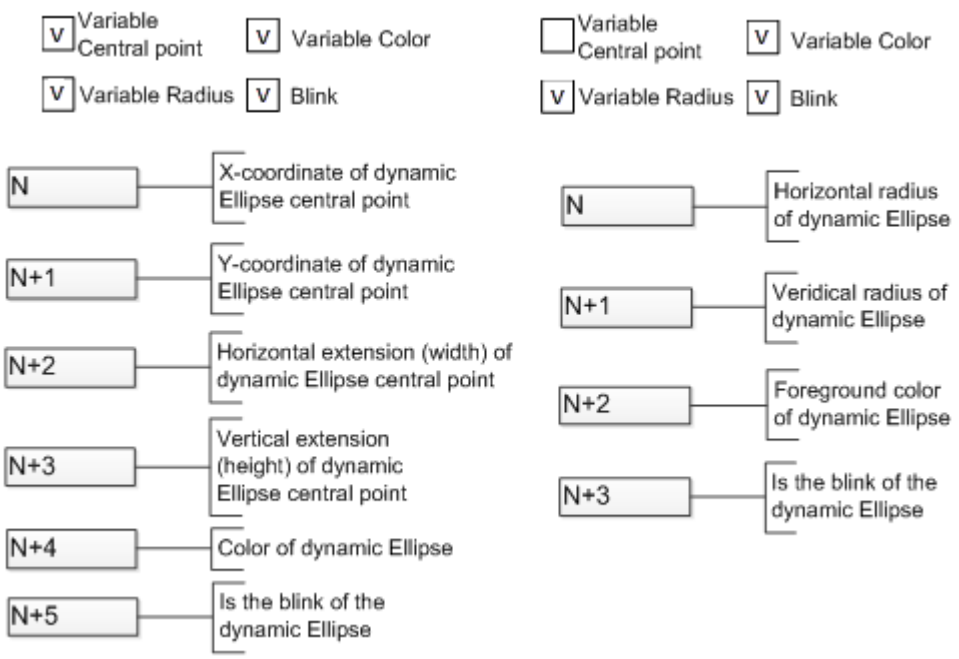
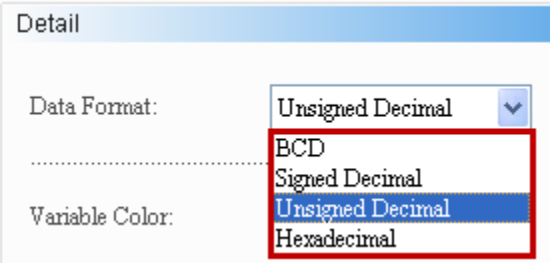
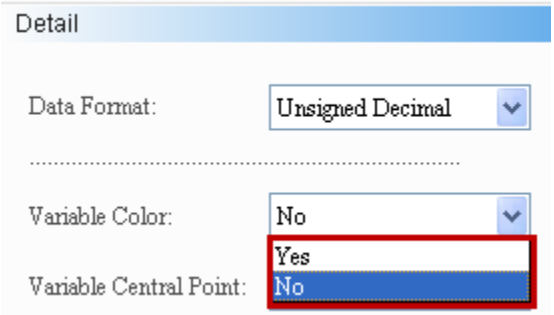
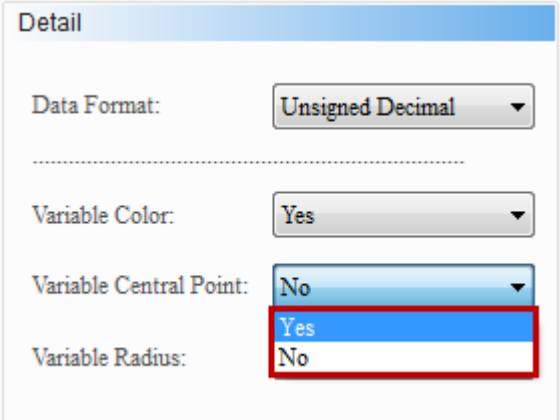
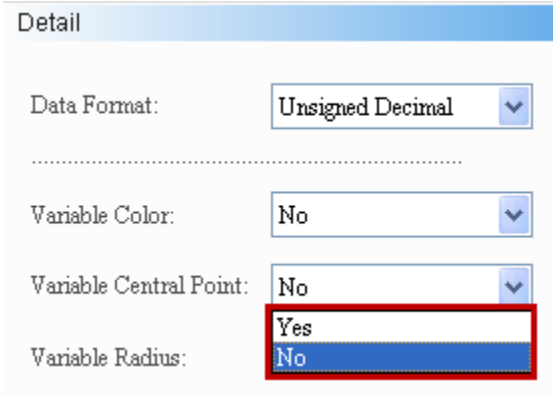
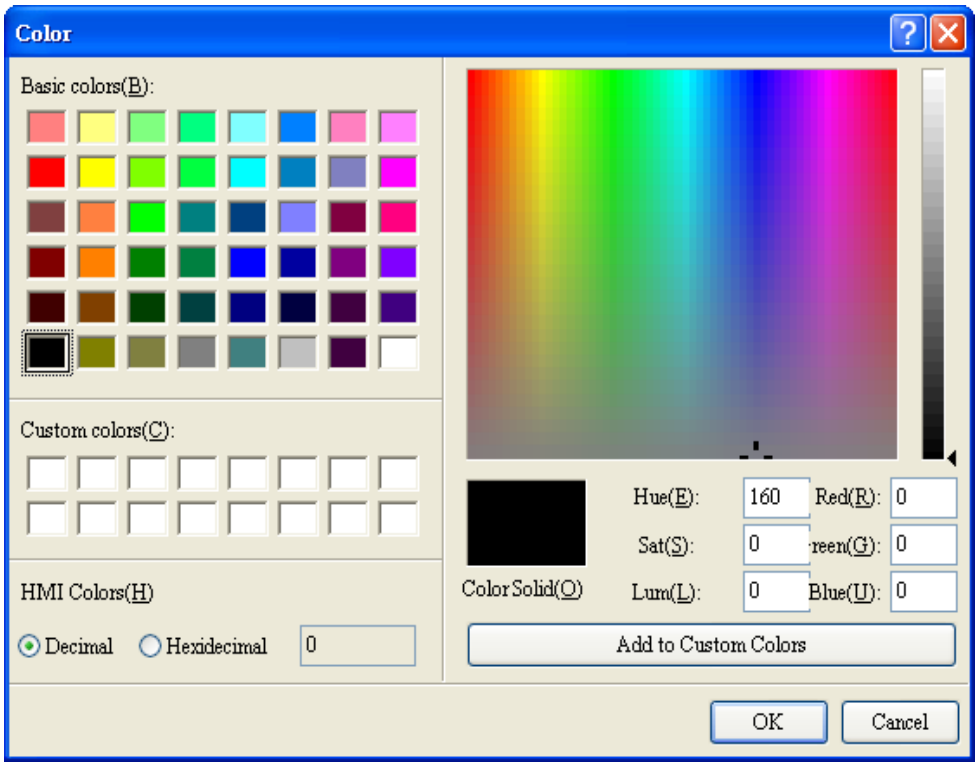
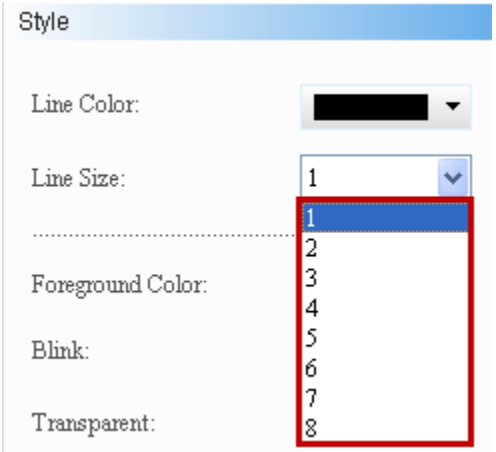
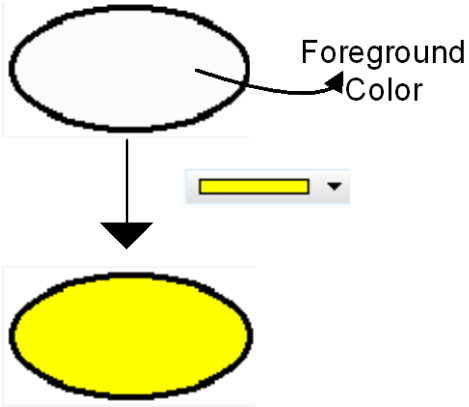


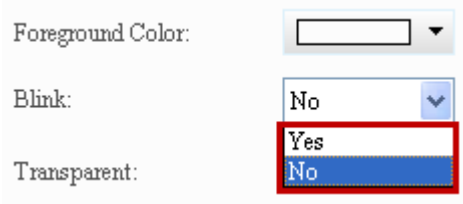
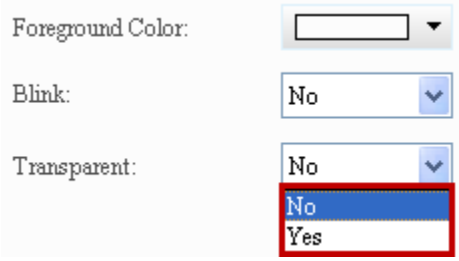
Figure 12-5-2 Dynamic Ellipse Element Main Properties Page

No.	Property	Function
(1)	Read Address	➢ Selects the address of internal memory or controller register. ➢ If [Variable Central point] is “Yes”, the data of the Read Address is the X-coordinate of the Dynamic Ellipse’s center. ➢ If [Variable Central point] is “Yes”, **[Read Address+1]** is the Y-coordinate of the Dynamic Ellipse’s center. ➢ If [Variable Radius] is “Yes”, **[Read Address+2]** is the horizontal extension, also width, of the Dynamic Ellipse. ➢ If [Variable Radius] is “Yes”, **[Read Address+3]** is the vertical extension, also height, of the Dynamic Ellipse. ➢ If [Variable Color] is “Yes”, **[Read Address+4]** is the Dynamic Ellipse’ color, and the range is 0-65535. ➢ If [Blink] is “Yes”, **[Read Address+5]** is the blink state of the Dynamic Ellipse. If the value is greater than 1, the Dynamic Ellipse blinks at the blink state; if the value is “0”, the Dynamic Ellipse does not blink. ➢ Selects link name or element type. Please refer to 5-1 Buttons of Chapter 05 for details. ➢ If [Variable Central point] is “No”, the corresponding memory address will be replaced automatically.

No.	Property	Function
		
	Read Offset Address	➢ Please refer to Appendix D Write and Read Offset Address.
(2)	Data Format	➢ Four options: BCD, Signed Decimal, Unsigned Decimal, and Hexadecimal. 
(3)	Variable Color	➢ The options for Variable Color include “Yes” and “No”.  ➢ When “Yes” is selected, this means the Dynamic Ellipse color is changeable. When “No” is selected, the Dynamic Ellipse color is unchangeable. The range is 0-65535.
(4)	Variable Central point	➢ The options for Variable Central point include “Yes” and “No”.

No.	Property	Function
		 ➢ When “Yes” is selected, this means the Dynamic Ellipse center is changeable. When “No” is selected, the Dynamic Ellipse center is unchangeable. However, the oval rectangle size is still extendable.
(5)	Variable Radius	➢ The options for Variable Radius include “Yes” and “No”.  ➢ When “Yes” is selected, this means the Dynamic Ellipse size is extendable. When “No” is selected, the Dynamic Ellipse size is non-extendable.
(6)	Line Color	➢ Users can define the color of line display.

No.	Property	Function
		
(7)	Line Size	➢ There are eight levels of line width, ranging from 1-8. 
(8)	Foreground Color	➢ Sets the foreground color of the element. 
(9)	Blink	➢ The options for Blink include “Yes” and “No”.

No.	Property	Function
		 ➢ When “Yes” is selected, this means the Dynamic Ellipse blinks on the screen. When “No” is selected, the Dynamic Ellipse does not blink on the screen. ➢ If the value is greater than “1”, the Dynamic Ellipse blinks at the blink state. If the value is “0”, the Dynamic Ellipse does not blink.
(10)	Transparent Color	➢ The options for Transparent Color include “Yes” and “No”.  ➢ If Transparent Color is “Yes”, the Foreground Color is disabled. ➢ If Transparent Color is “Yes”, the color of the Dynamic Ellipse is displayed only on the oval’s frame, and the inside of the oval is transparent.

◆ Coordinates

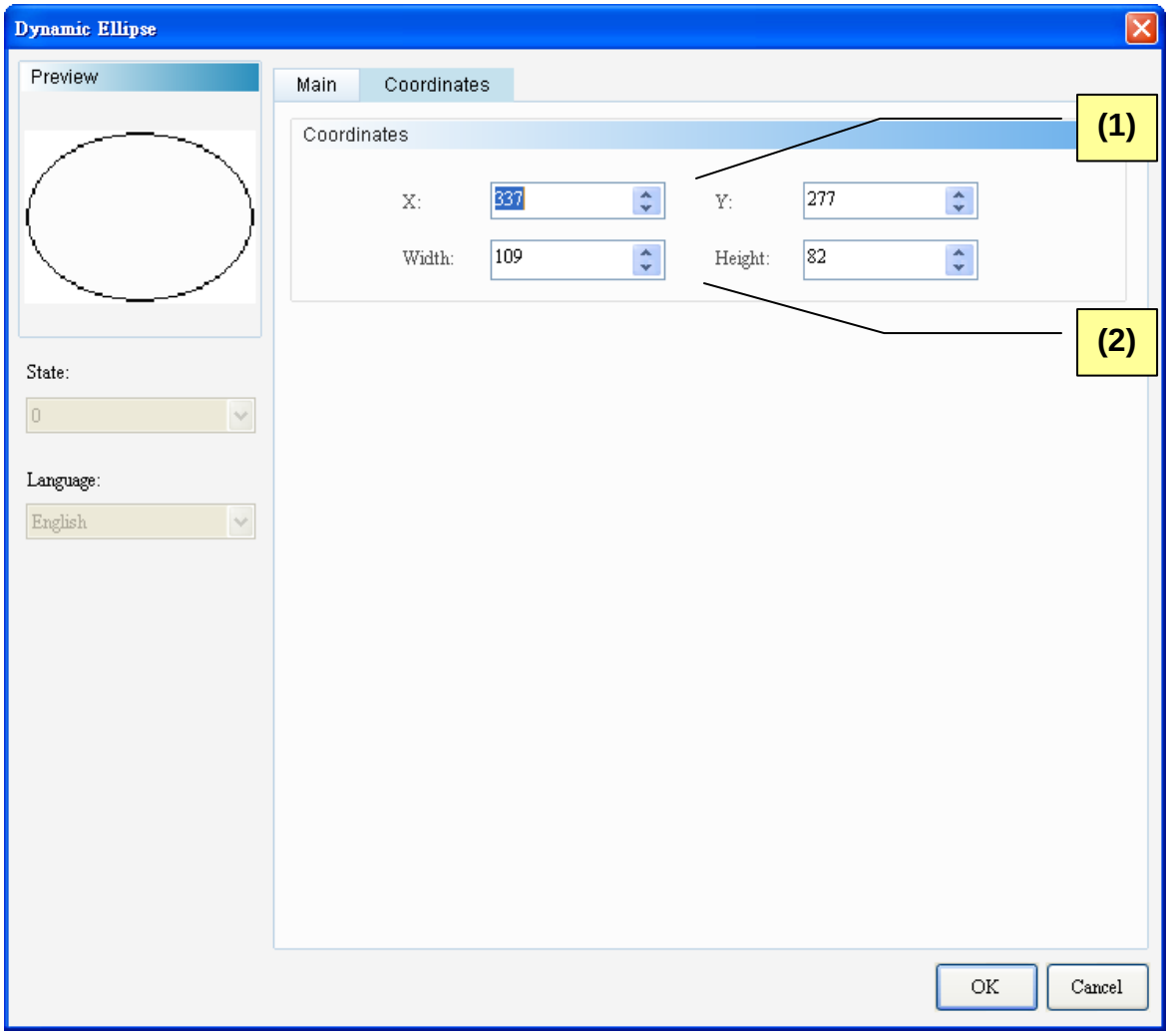


Figure 12-5-3 Dynamic Ellipse Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

12-6 Real Image

	Real Image

The Real Image allows users to program external applications with the ImgTrans.dll provided by the DOPDSoft to upload pictures to the HMI. There are many Real Image elements on the same editing screen. Software will dynamically allocate the available memory size according to the Real Image elements created and the size of pictures to be uploaded. Please refer to Table 12-6-1 Example of Real Image below.

1. Data Structure Definition:

```
typedef struct _ETHER_INFO
{
        char        szIP[32];
        WORD    IPPort;
} ETHER_INFO;
```

,szIP is a string representing the IP address for Ethernet communication.
,IPPort is the for Ethernet communication port.

```
typedef struct _COMM_INFO
{
        char                szCOM[10];
        unsigned long    dwStation
        ETHER_INFO    EtherInfo;
} COMM_INFO;
```

, szCOM is a string, the input value is COM1, COM2, COM3, …; if Ethernet is used, set string to “EHERNET”.
, without station, set dwStation to -1 (set “-1” for Ethernet); with station, set dwStation>0 function.

2. Function List:
   (1) int hmOpen(const COMM_INFO* pCommInfo);
   (2) int hmSendImageFromFile(LPCTSTR szFileName);
   (3) int hmSendImageFromFileByStation(LPCTSTR szFileName, int nStation);
   (4) HANDLE hmAsyncSendImageFromFile(LPCTSTR szFileName);
   (5) HANDLE hmAsyncSendImageFromFileByStation(LPCTSTR szFileName, int nStation);
   (6) int hmSendImage(HBITMAP hbmp);
   (7) int hmSendImageByStation(HBITMAP hbmp, int nStation);
   (8) HANDLE hmAsyncSendImage(HBITMAP hbmp);
   (9) HANDLE hmAsyncSendImageByStation(HBITMAP hbmp, int nStation);
   (10) int hmAbortAction();
   (11) int hmClose();

3. Function Description

(1) Function: int hmOpen(const COMM_INFO* pCommInfo);
Input value: COMM_INFO structure
Respond value: 1: Success, 0: Failure
Description: When starting HMI communication, input COM Port string, e.g. COM1, COM2, etc.

(2) Function: int SendImageFromFile(LPCTSTR szFileName);
Input value: Name of image files
Respond value: 1: Success, 0: Failure
Description: After converting the input graphic format into the element width, element height and element bit of the HMI, start transmitting graphic data to the HMI. This is a synchronous function which will only return after data transmission is completed.

(3) Function: int SendImageFromFileByStation(LPCTSTR szFileName, int nStation);
Input value: Name of image files, HMI Station (must be >0)
Respond value: 1: Success, 0: Failure
Description: After converting the input graphic format into the element width, element height and element bit of the HMI, start transmitting graphic data to the selected HMI station. This is a synchronous function which will only return after data transmission is completed.

(4) Function: HANDLE hmAsyncSendImageFromFile(LPCTSTR szFileName);
Input value: Name of image files
Respond value: 0: Failure, not 0 is thread handle
Description: After converting the input graphic format into the element width, element height and element bit of the HMI, start transmitting graphic data to the HMI. This is an asynchronous function. Users can obtain the thread handle of the graphic data being transmitted to run the relevant computing.

(5) Function: HANDLE hmAsyncSendImageFromFileByStation(LPCTSTR szFileName, int nStation);
Input value: Name of image files, HMI Station (must be >0)
Respond value: 0: Failure, not 0 is thread handle
Description: After converting the input graphic format into the element width, element height and element bit of the HMI, start transmitting graphic data to the selected HMI station. This is an asynchronous function. Users can obtain the thread handle of the graphic data being

transmitted to run the relevant computing.

(6) Function: int hmSendImage(HBITMAP hbmp);
Input value: Window HBITMAP Handle
Respond value: 1: Success, 0: Failure
Description: After converting the input graphic format into the element width, element height and element bit of the HMI, start transmitting graphic data to the HMI. This is a synchronous function which will only return after data transmission is completed.

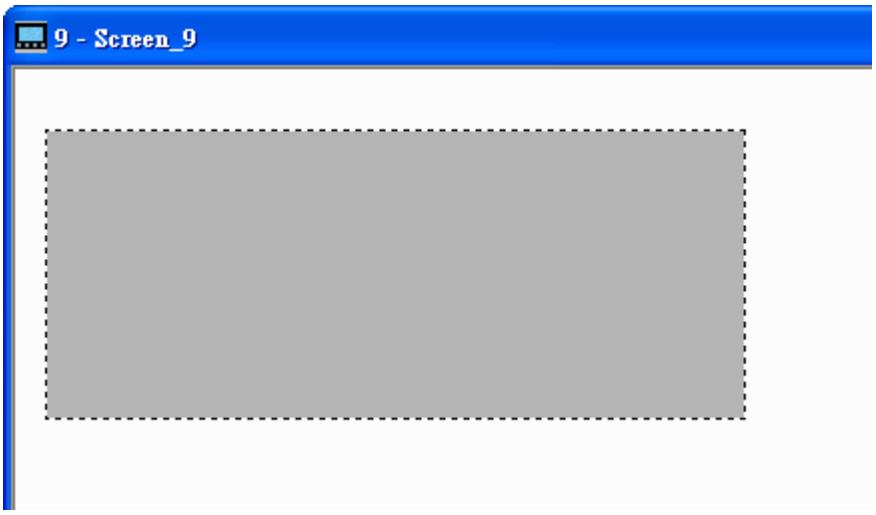
(7) Function: int hmSendImageByStation(HBITMAP hbmp, int nStation);
Input value: Window HBITMAP Handle, HMI Station (must be >0)
Respond value: 1: Success, 0: Failure
Description: After converting the input graphic format into the element width, element height and element bit of the HMI, start transmitting graphic data to the selected HMI station. This is a synchronous function which will only return after data transmission is completed.

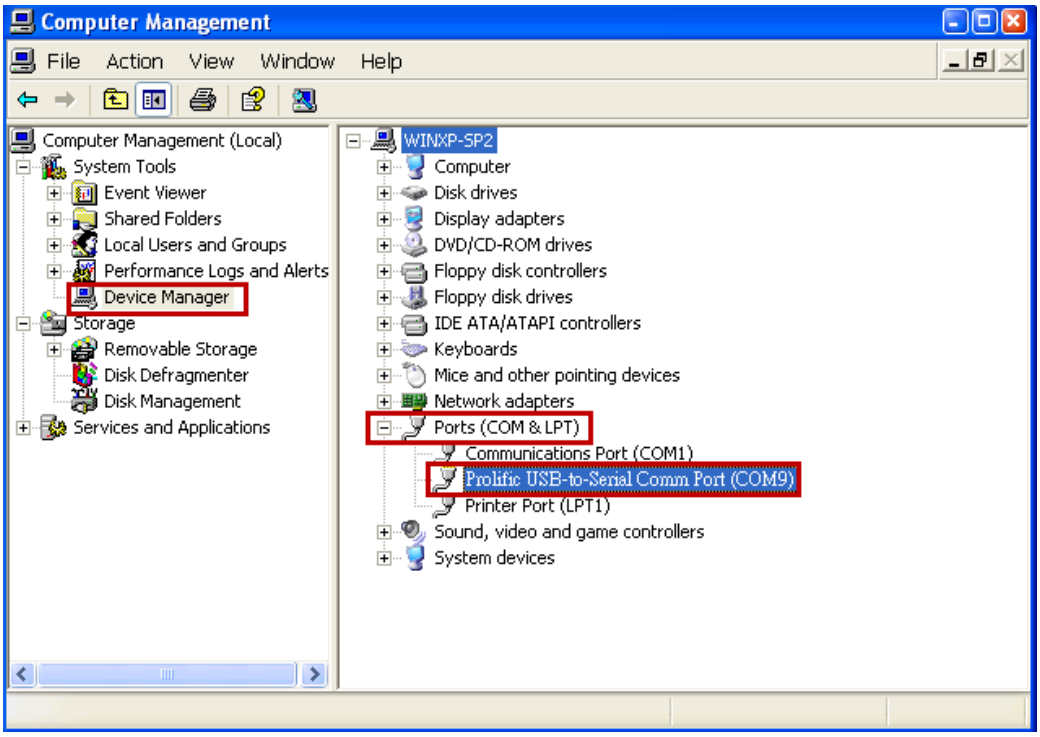
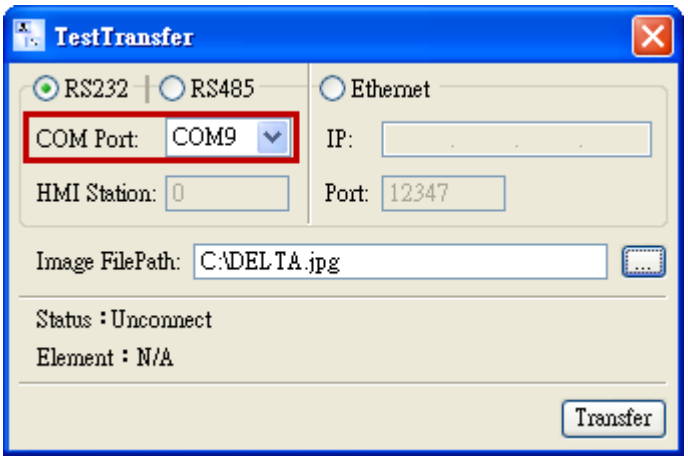
(8) Function: HANDLE hmAsyncSendImage(HBITMAP hbmp);
Input value: Window HBITMAP Handle
Respond value: 0: Failure, not 0 is thread handle
Description: After converting the input graphic format into the element width, element height and element bit of the HMI, start transmitting graphic data to the HMI. This is an asynchronous function. Users can obtain the thread handle of the graphic data being transmitted to run the relevant computing.

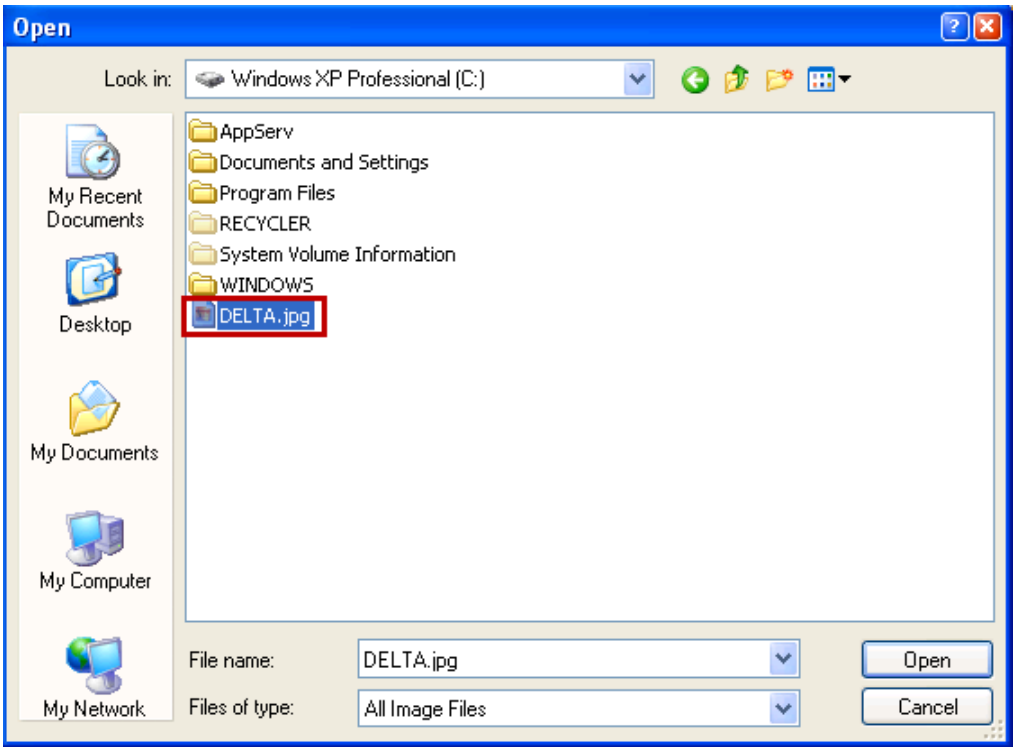
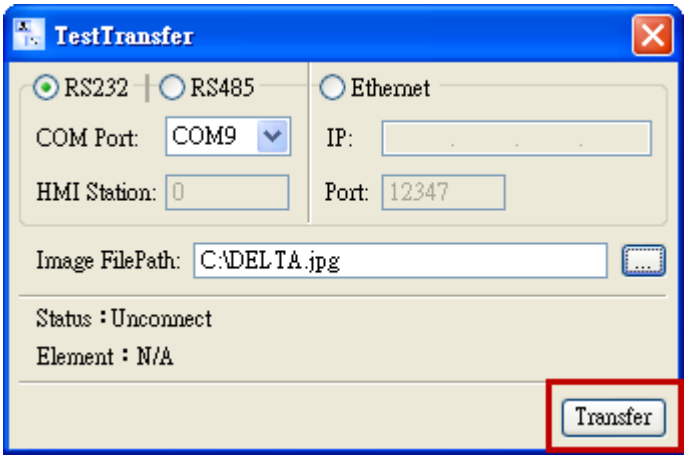
(9) Function: HANDLE hmAsyncSendImage(HBITMAP hbmp, int nStation);
Input value: Window HBITMAP Handle, HMI Station (must be >0)
Respond value: 0: Failure, not 0 is thread handle
Description: After converting the input graphic format into the element width, element height and element bit of the HMI, start transmitting graphic data to the selected HMI station. This is an asynchronous function. Users can obtain the thread handle of the graphic data being transmitted to run the relevant computing.

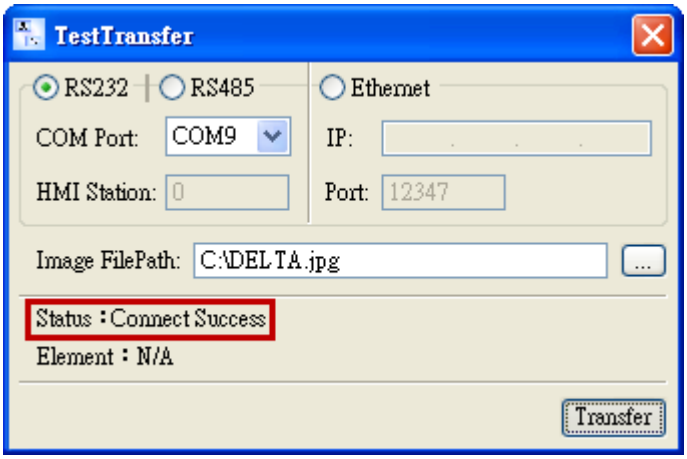
(10) Function: int hmAbortAction();
Input value: None
Respond value: 0: Failure, 1: Succes
Description: Interrupt graphic data transmission in asynchronous functions.

(11) Function: int hmClose();
Input value: None
Respond value: 1: Success, 0: Failure
Description: Shut down HMI communication (When Dll ends, this function will be wakened automatically.)

<table>
<tr><th colspan="2">Example of Real Image
Table 12-6-1 Example of Real Image</th></tr>
<tr><td>Create Real Image Element</td><td>➢ Create a Real Image element in the HMI editing screen.
 
</td></tr>
<tr><td>Properties</td><td>➢ This is the communication port between the HMI and PC. Default is COM2, using RS232 interface.
<table>
<tr><th>HMI Station</th><th>Transmission</th><th>Communication Port</th></tr>
<tr><td>1</td><td>RS232</td><td>COM2</td></tr>
</table></td></tr>
<tr><td>Compile</td><td>➢ Create the real-tie graph display element and set its transmission and communication port. Then, compile and download the screen to the HMI.</td></tr>
</table>

Example of Real Image Table 12-6-1 Example of Real Image	
Open TestTransfer.exe	➢ Connect the PC with the HMI with a USB to COM cable. ➢ Click [Control Panel]→ [Administrative Tool]→ [Computer Management]→ [Device Manager]→ [Ports (Com & LPT)] to check the ports on the PC as shown below.  ➢ Open [My Computer]→ Enter the following path [C:\Program Files\Delta Industrial Automation\DopSoft 1.00.xx\Utility\ImgTrans], select [TestTransfer.exe]. Run this tool to select [COM9] as the COM Port between the PC and HMI. Next, select the image file to be uploaded. In the following example, the file is C:\DELTA.jpg as shown below. 

Example of Real Image Table 12-6-1 Example of Real Image	
	 ➢ The following shows the image in the image file DELTA.jpg:
Execution Results	➢ After selecting the image file to be uploaded, click the [Transfer] button.  ➢ If connection succeeded, the message Connect Success will be displayed in Status as shown below.

Example of Real Image Table 12-6-1 Example of Real Image	
	 ➢ Then, the Real Image element on the HMI will display the uploaded image.

Double-click Real Image to bring out the Real Image Properties screen as shown below.

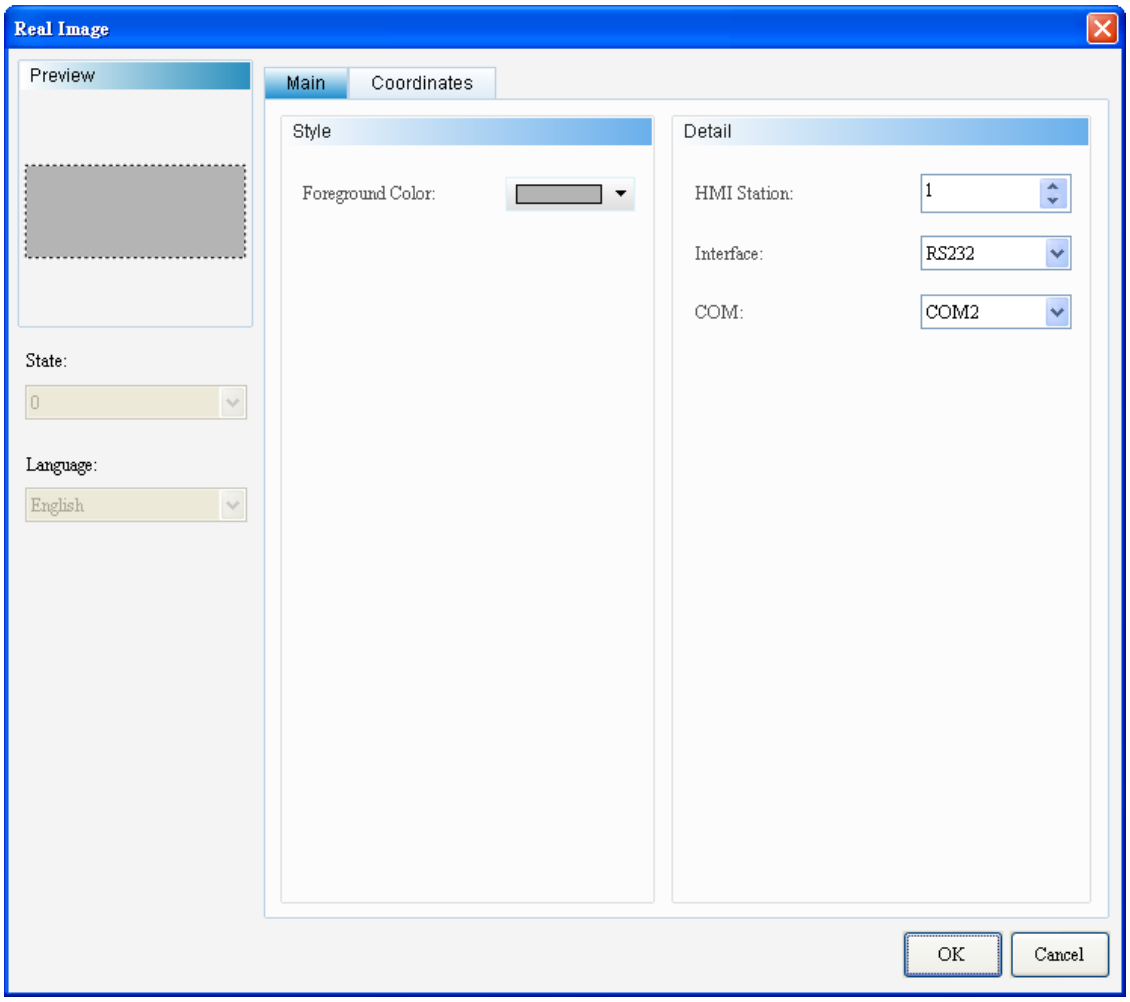


Figure 12-6-1 Real Image Properties

Real Image	
Function Page	**Content Description**
Preview	Neither multistate data display nor multilingual data display is supported.
Main	Sets Foreground Color. Sets HMI Station, Transmission, and Communication Port.
Coordinates	Sets the X-Y coordinate, width, and height of the element.

Table 12-6-2 Real Image Function Page

◆ Main

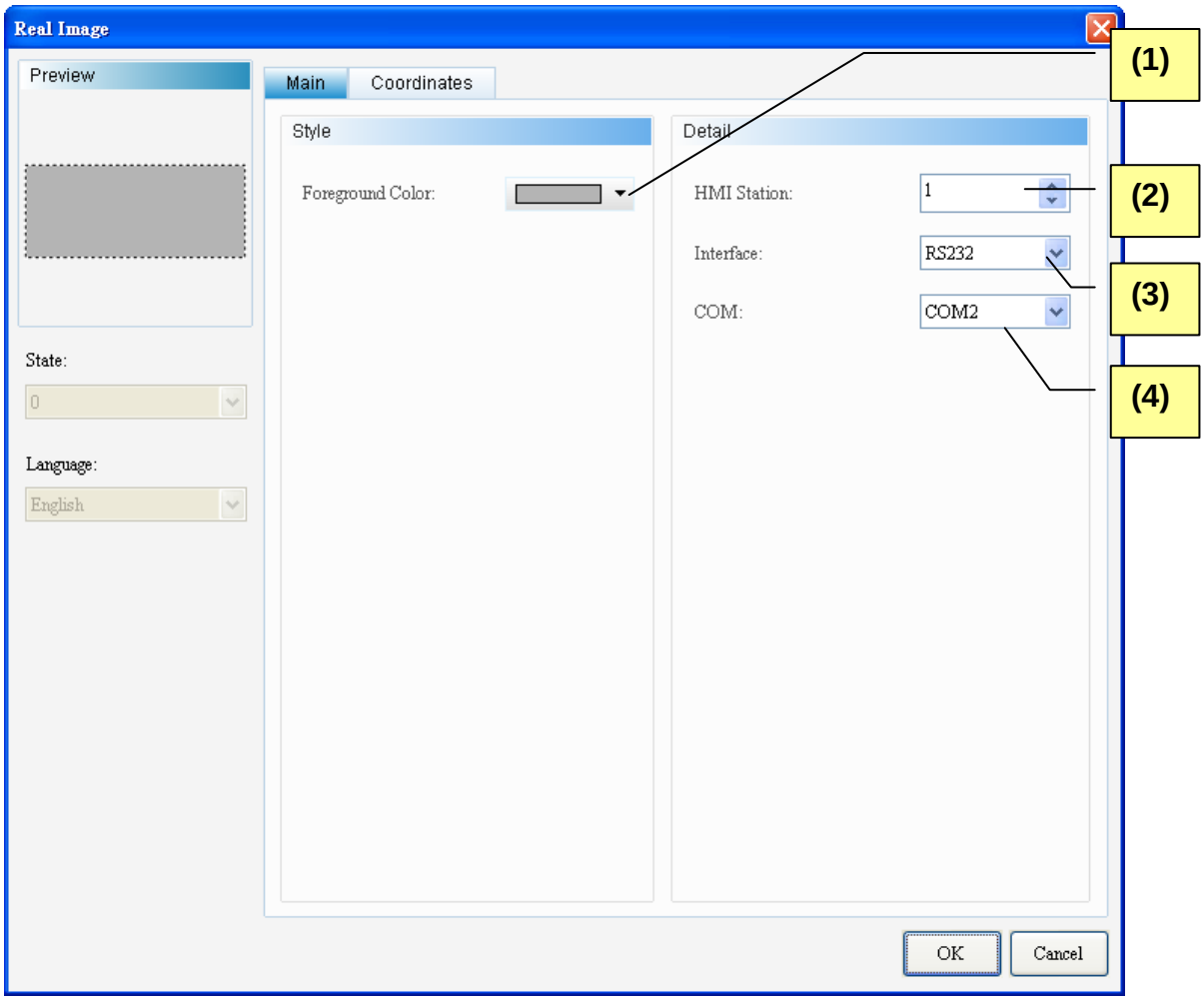
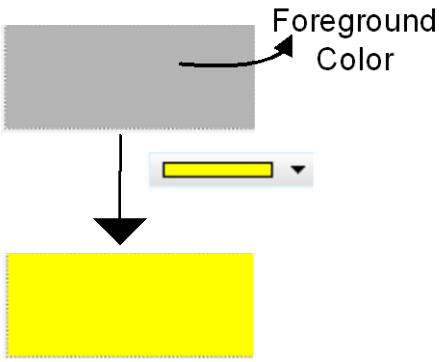
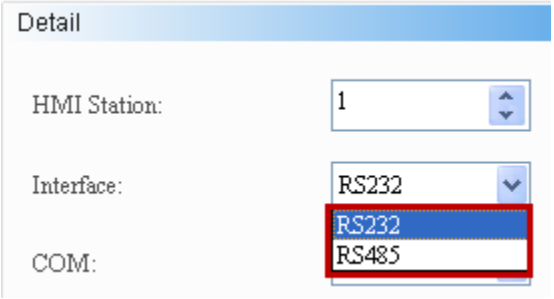
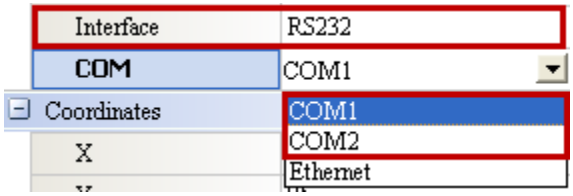
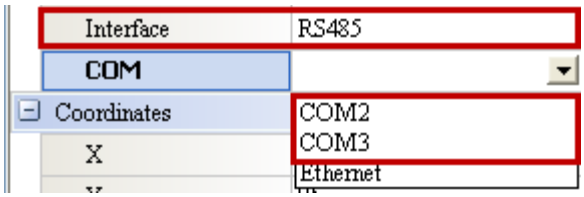
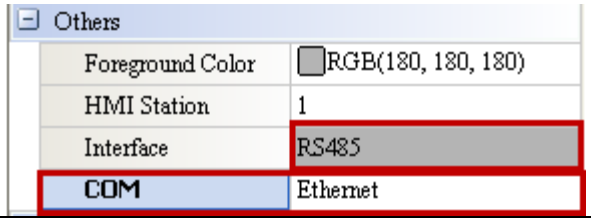


Figure 12-6-2 Real Image Element Main Properties Page

No.	Property	Function
(1)	Foreground Color	➢ Sets the foreground color of the element. 
(2)	HMI Station	➢ The HMI Station option is mainly designed for transmission over RS485. The range is 1-255, and default is “1”. Users connecting multiple HMIs with the RS485 can distinguish individual HMIs with the HMI Station option.
(3)	Transmission	➢ Transmission interfaces include RS232 and RS485.

No.	Property	Function
		 ➢ Transmission with the RS232 is over COM1 and COM2. ➢ Transmission with the RS485 is over COM2 and COM3.
(4)	Communication Port	➢ Communication ports include COM1, COM2, COM3, and Ethernet. Different devices use different communication ports for transmission.   ➢ Communication ports are the COM ports on the HMI. Do not share the same COM port with the PLC. For example, if COM1 is assigned for PLC communication, select only COM2 or COM3 for HMI communication. If COM1 is assigned for PLC communication and RS232 for PLC transmission, select only COM2. ➢ If Ethernet is selected as the communication port, the Transmission item will turn grey and be disabled. 

◆ Coordinates

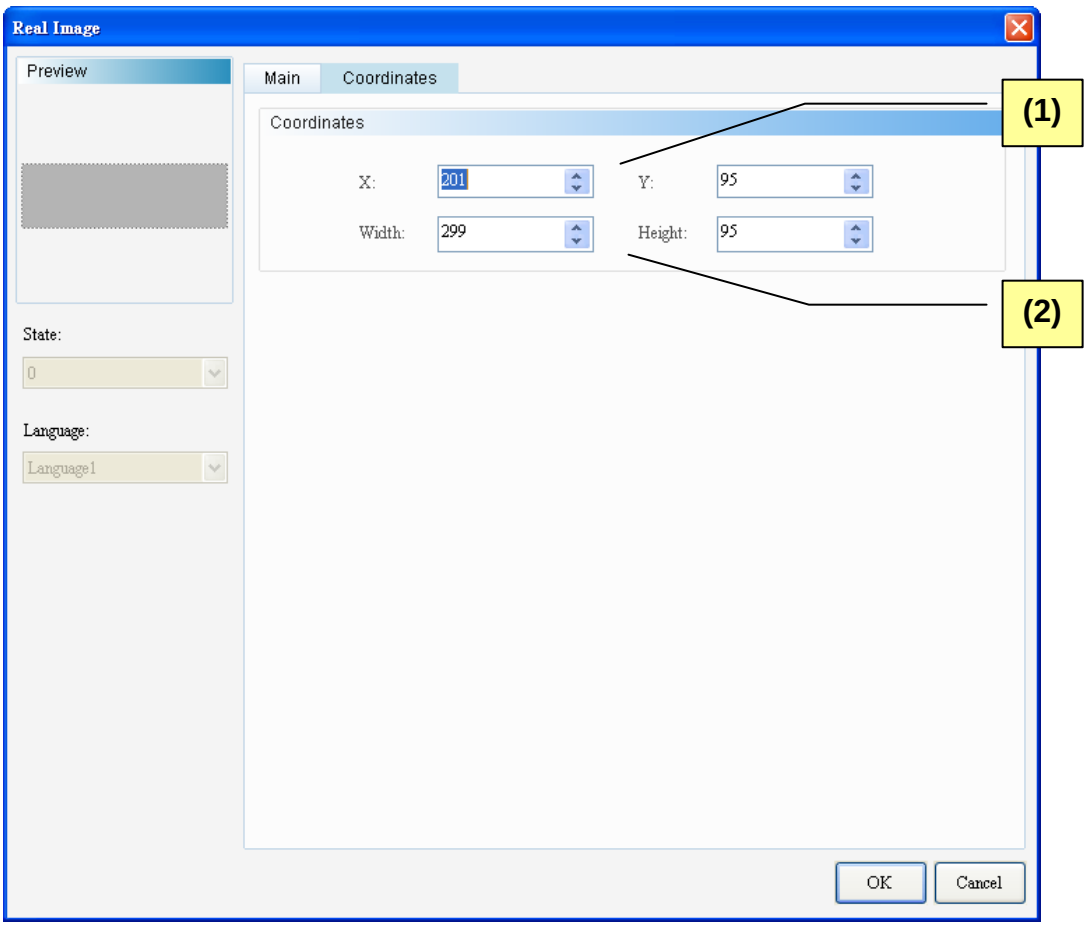


Figure 12-6-3 Real Image Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

The following describes the library path and functions

Library	
Library Path	➢ C:\Program Files\Delta Industrial Automation\DopSoft 1.00.01\Utility\ImgTrans
Library Description	➢ Load ImgTrans.dll ➢ Data Structure Definition typedef struct _COMM_INFO { char szCOM[8]; } COMM_INFO; szCOM is a string, the input value is COM1, COM2, COM3, etc. ➢ Function List (12) int hmOpen(const COMM_INFO* pCommInfo); (13) int hmSendImageFromFile(LPCTSTR szFileName); (14) HANDLE hmAsyncSendImageFromFile(LPCTSTR szFileName); (15) int hmSendImage(HBITMAP hbmp); (16) HANDLE hmAsyncSendImage(HBITMAP hbmp); (17) int hmAbortAction(); (18) int hmClose(); ➢ Function Description: (1) Function: int hmOpen(const COMM_INFO* pCommInfo) ; Input value: COMM_INFO structure Respond value: 1: Success, 0: Failure Description: When starting HMI communication, input COM Port string, e.g. COM1, COM2, etc. (2) Function: int SendImageFromFile(LPCTSTR szFileName) ; Input value: Name of image file Respond value: 1: Success, 0: Failure Description: After converting the input graphic format into the element width, element height and element bit of the HMI, start transmitting graphic data to the HMI. This is a synchronous function which will only return after data transmission is completed. (3) Function: HANDLE

Library	
	hmAsyncSendImageFromFile(LPCTSTR szFileName) ; Input value: Name of image files Respond value: 0: Failure, not 0 is thread handle Description: After converting the input graphic format into the element width, element height and element bit of the HMI, start transmitting graphic data to the HMI. This is an asynchronous function. Users can obtain the thread handle of the graphic data being transmitted to run the relevant computing. (4) Function: int hmSendImage(HBITMAP hbmp) ; Input value: Window HBITMAP Handle Respond value: 1: Success, 0: Failure Description: After converting the input graphic format into the element width, element height and element bit of the HMI, start transmitting graphic data to the HMI. This is a synchronous function which will only return after data transmission is completed. (5) Function: HANDLE hmAsyncSendImage(HBITMAP hbmp); Input value: Window HBITMAP Handle Respond value: 0: Failure, not 0 is thread handle

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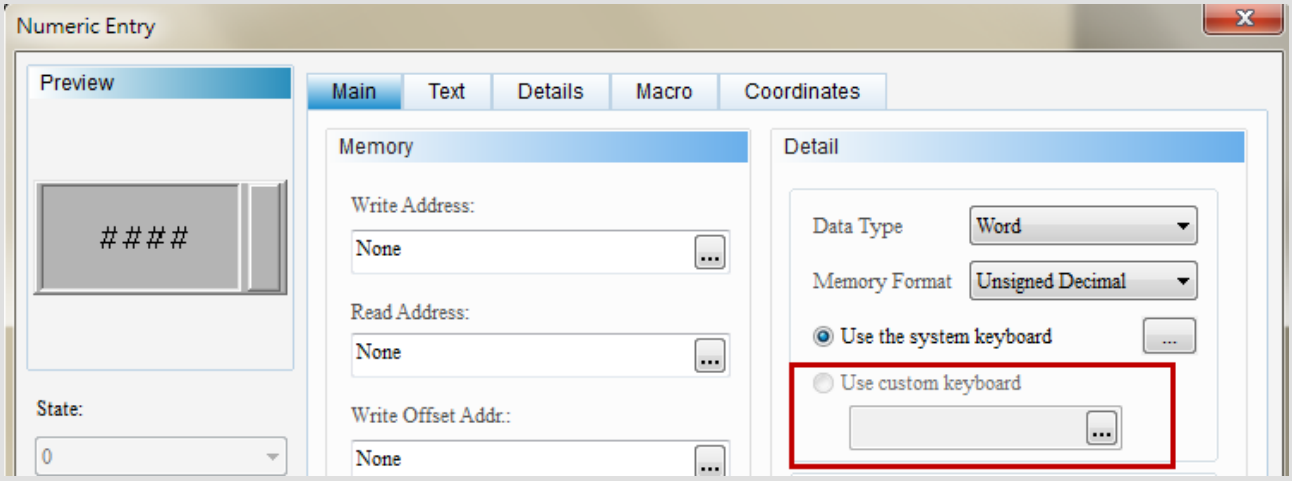
Chapter 13 Input

This chapter mainly describes the input elements provided in the DOPSoft and how they are operated and configured.

NOTE：

✓ Numeric Entry, Character Entry and Barcode elements did not support custom keyboard for DOP-B Series.



◆ Input Element Classification

Input N	N	Numeric Entry
	A	Character Entry
	B	Barcode

Table 13-1-1 Input Element Classification

◆ Input Element Shared Properties

Input Element	Read Address	Write Address	Read offset Address	Write offset Address	Invisible Address	Popup Bit	Macro (Pre-action Macro/ Post-action Macro)	Gain/ Offset	String Length	Leading Zero	Interlock Address/ Interlock State
Numeric Entry	◎	◎	◎	◎	◎		◎	◎		◎	◎
Character Entry	◎	◎	◎	◎	◎		◎		◎		◎
Barcode	◎	◎	◎	◎	◎	◎	◎		◎		◎

Input Element	Style (Style/ Background Color/Border Color)	Trigger type / Trigger Address	User Security Level/Set Low Security/Display Asterisk	Input Methods	Info the overrange message	Support EASCII	Properties (Data Type/Data Format/Integer Digit/Decimal Place/Minimum Value/Maximum)
Numeric Entry	◎	◎	◎	◎	◎		◎
Character Entry	◎	◎	◎	◎			
Barcode	◎	◎	◎	◎			

Table 13-1-2 Input Element Shared Properties

13-1 Numeric Entry

N	Numeric Entry

With the numeric keypad provided by the Numeric Entry element, users can input a value to the selected write memory address. Next, after reading this value with the element read memory, such as data display element, this value is displayed on the HMI. Please refer to Table 13-1-3 Example of Numeric Entry below.

Example of Numeric Entry

Table 13-1-3 Example of Numeric Entry

<table>
<tr><td>Read Address</td><td>
<table>
<tr><th colspan="2">Numeric Entry Element</th><th colspan="2">Data Display Element</th></tr>
<tr><td>Write Address</td><td>$555</td><td>Read Address</td><td>$555</td></tr>
<tr><td colspan="2">
</td><td colspan="2">
</td></tr>
</table>
</td></tr>
<tr><td>Properties</td><td>
<table>
<tr><th colspan="4">Numeric Entry Element</th></tr>
<tr><th>Data Type</th><th>Data Format</th><th>Integer Digit</th><th>Decimal Place</th></tr>
<tr><td>Word</td><td>Unsigned Decimal</td><td>4</td><td>0</td></tr>
</table>
</td></tr>
<tr><td>Execution Results</td><td>➢ After creating the element, compile and download it to the HMI. Next, input “100” with the Numeric Entry element, the data display element will display this value.
Input “100” and write to the selected address ($555)
</td></tr>
</table>

Numeric Entry supports two data types, “Word” and “Double Word”. The valid range of the Numeric Entry data is described in Table 13-1-4 below.

Numeric Entry

Table 13-1-4 Numeric Entry Valid Range

		Data Format	Data Valid Range	
Word		BCD	0~9999	
		Signed BCD	-999 ~ 9999	
		Signed Decimal	-32768~32767	
		Unsigned Decimal	0~65535	
		Hex	0~0xFFFF	
		Binary	0~0xFFFF	
		Data Format	**Data Valid Range**	
Double Word		BCD	0~99999999	
		Signed BCD	-9999999 ~ 99999999	
		Signed Decimal	-2147483648~2147483647	
		Unsigned Decimal	0~4294697295	
		Hex	0~0xFFFFFFFF	
		Binary	0~0xFFFFFFFF	
		Floating	0~9999999	

Double-click Numeric Entry to call out the Numeric Entry Properties screen as shown below.

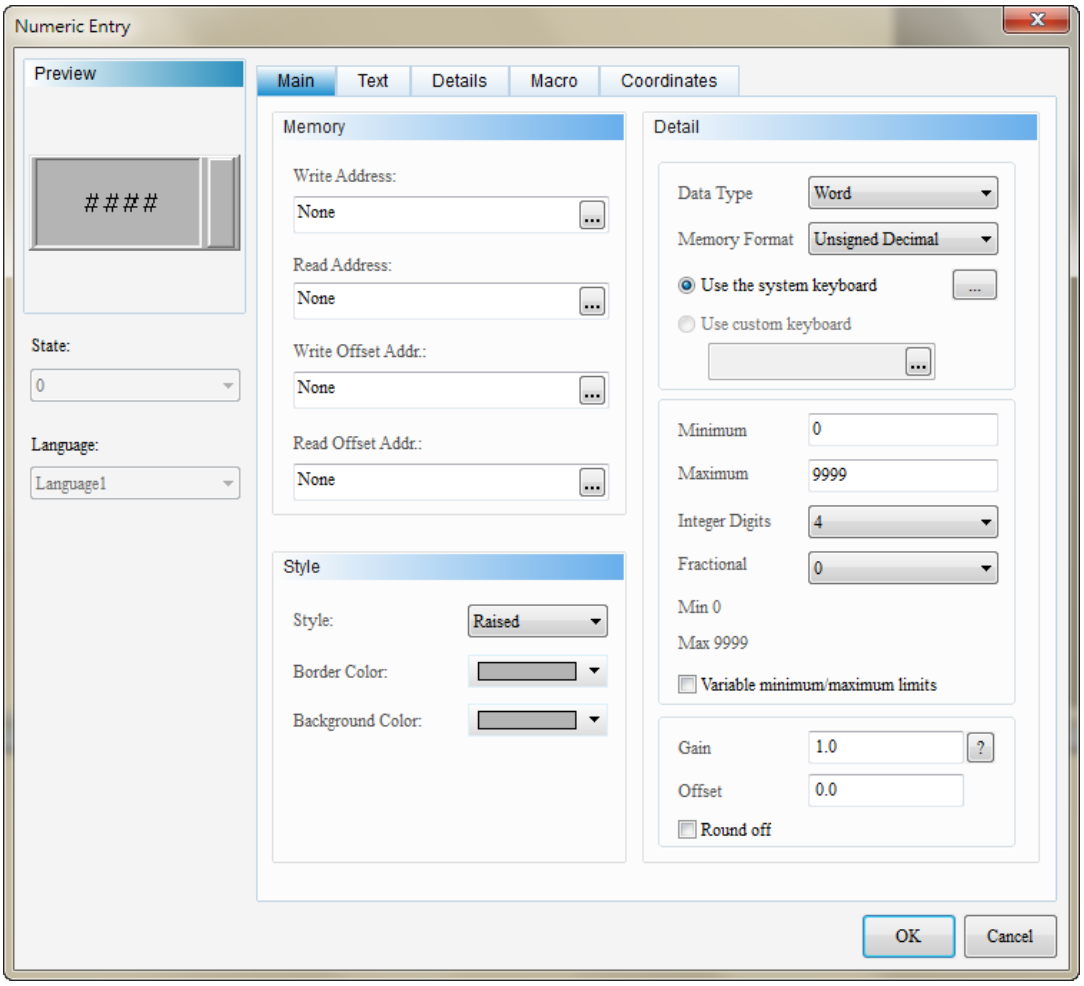


Figure 13-1-1 Numeric Entry Properties

Numeric Entry	
Function Page	**Content Description**
Preview	Supports neither multistate nor Multi-Language data display.
Main	Sets Read Address, Write Address, Read Offset Address, Write Offset Address, Style, Background Color, and Border Color. Sets Data Type, Data Format, Integer Digit, Decimal Place, Minimum Value, Maximum Value, and Gain/Offset.
Text	Sets the font type, font size, font color, and alignment of the text to be displayed.
Details	Sets Enable Input Methods, Interlock State, Interlock Address, Activation Methods, Activation Address, Invisible Address, Pad Left Zero, Exceed Limit Reminder, User Security Level, Set Low Security, and Hide Character.
Macro	Sets Edit Before execute Macro and After execute Macro.
Coordinates	Sets the X-Y coordinate, width, and height of elements.

Table 13-1-5 Numeric Entry Function Page

◆ Main

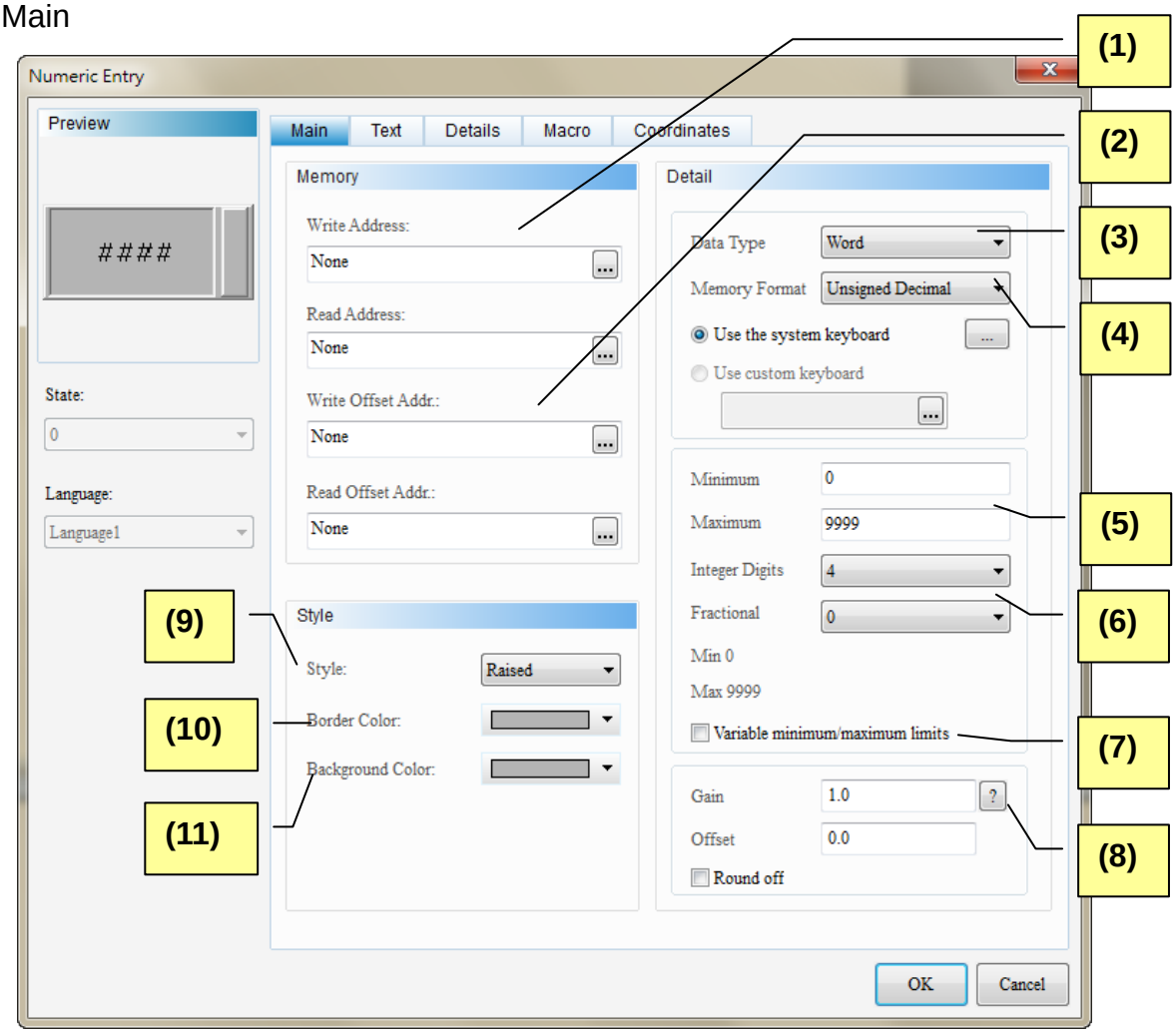
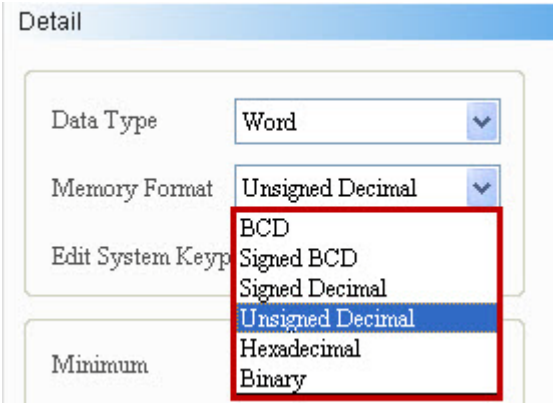
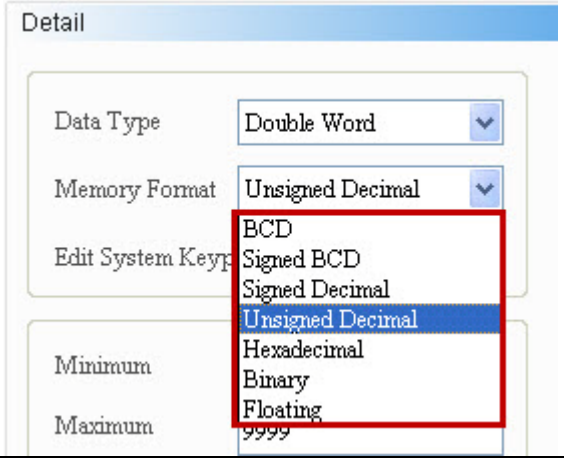
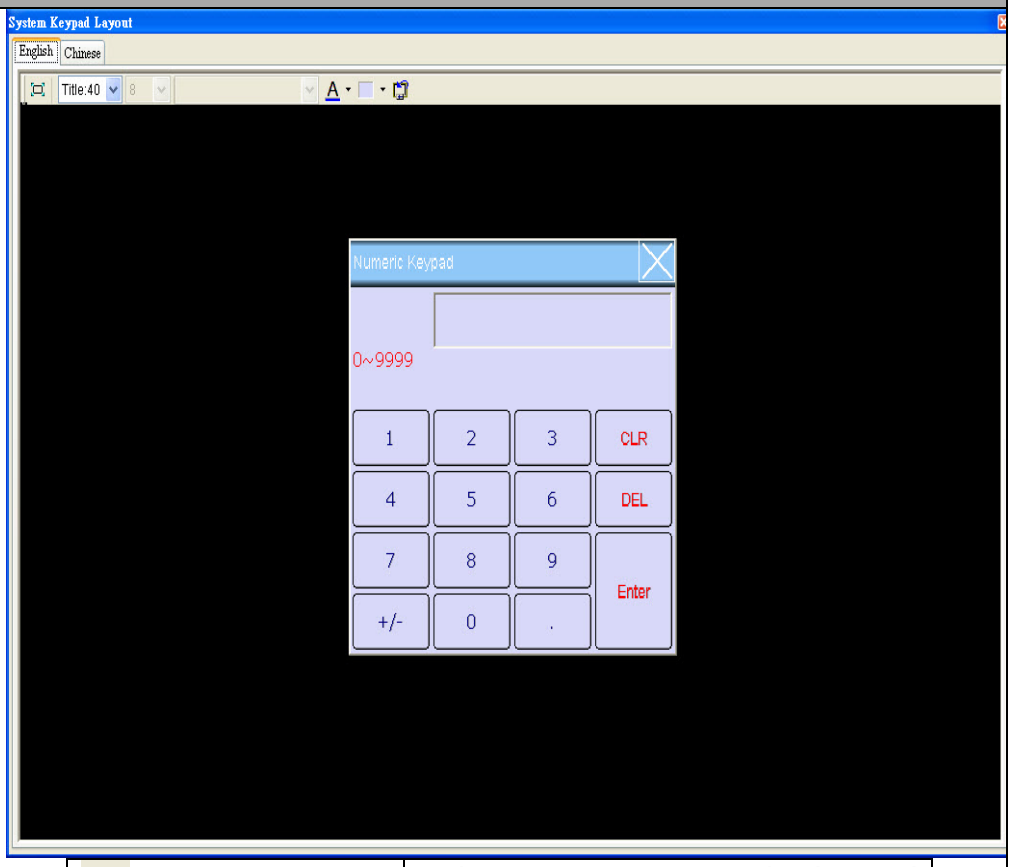


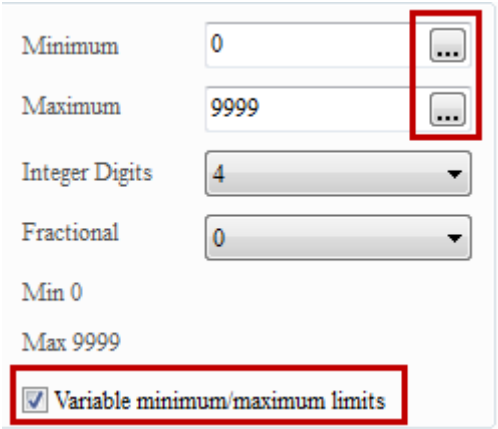
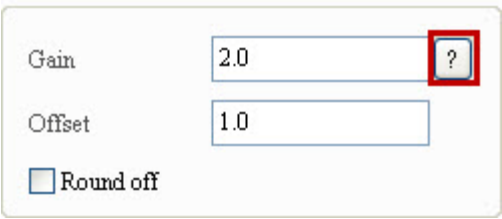
Figure 13-1-2 Numeric Entry Element Main Properties Page

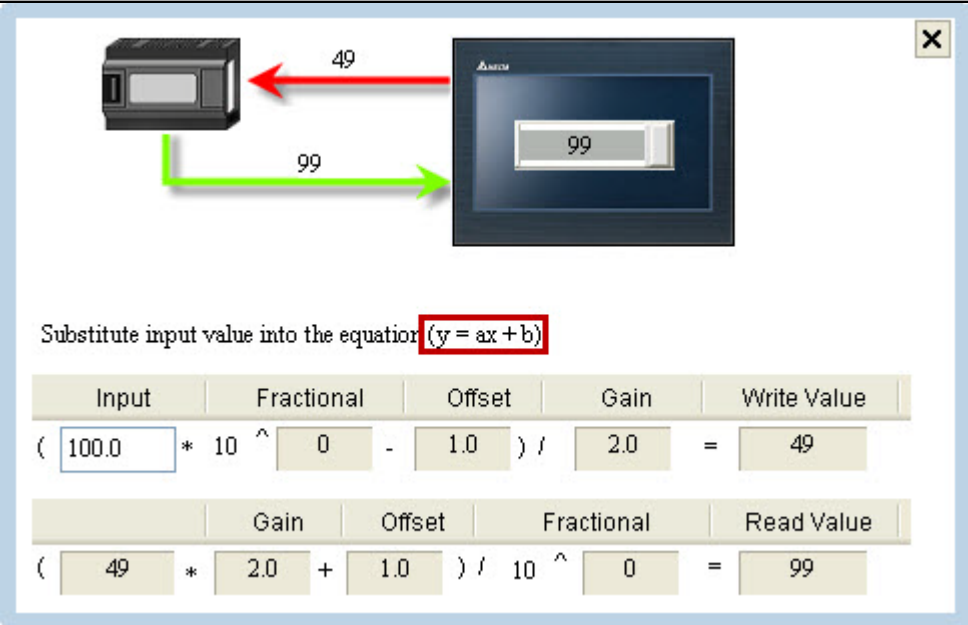
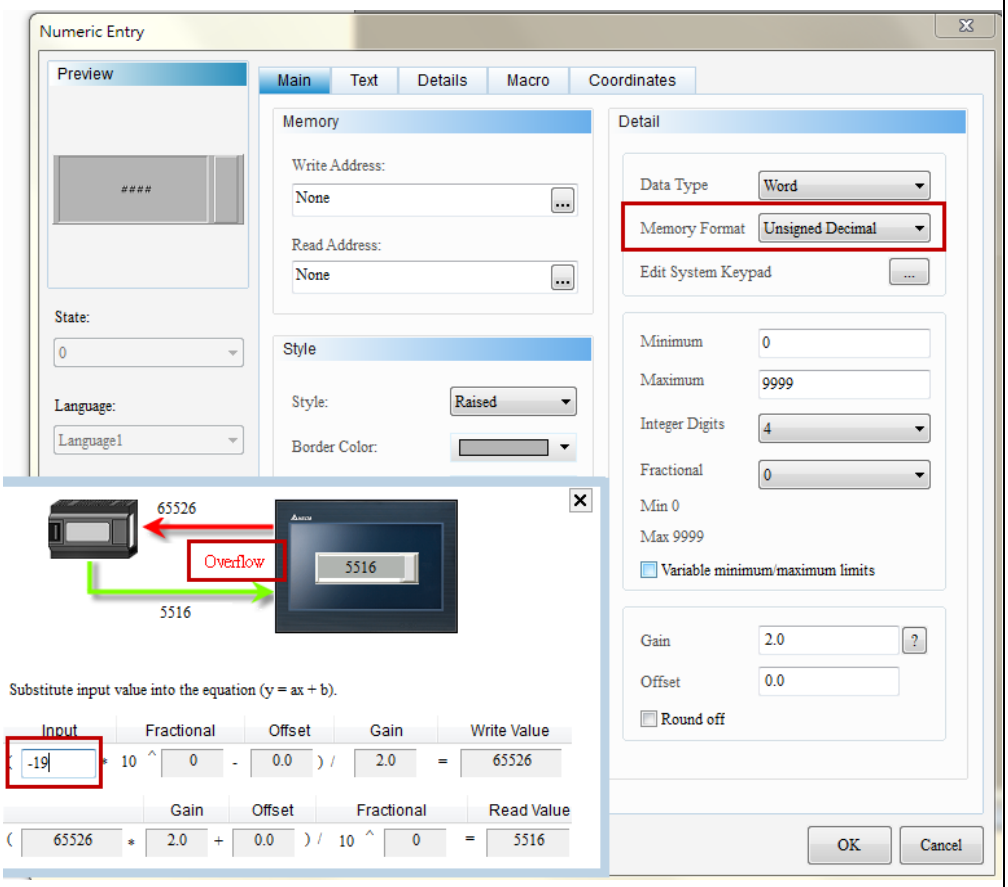
No.	Property	Function
(1)	Write Address Read Address	➢ Selects the address of internal memory or controller register. ➢ Selects link name or Style. Please refer to 5-1 Buttons of Chapter 5.
(2)	Write Offset Address Read Offset Address	➢ Please refer to Appendix D Writing and Reading Offset Address.
(3)	Data Type	➢ Two options: “Word” and “Double Word”. Please refer to Table 13-1-4 for details.
(4)	Data Format	➢ If data type is “Word”, the data formats are as follows:

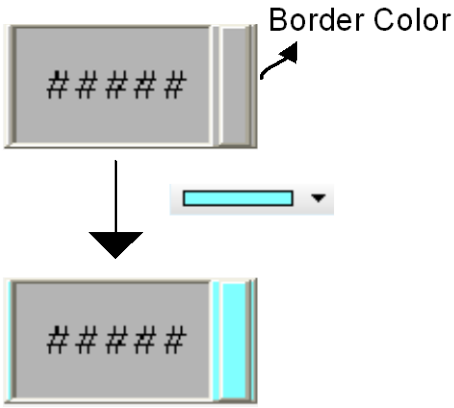
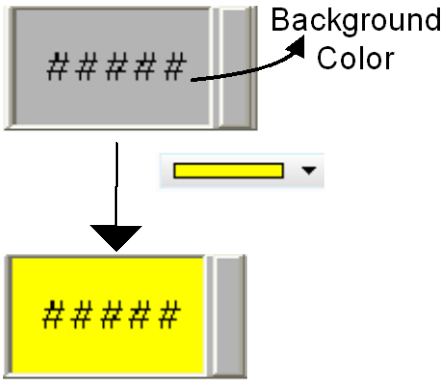
No.	Property	Function
		 ➢ If data type is “Double Word”, the data formats are as follows: 
	Edit Numeric Keypad	➢ Edit Numeric Keypad allows users to adjust the numeric keypad size; title size; the font size, font type and font color of data display; and the background color of numeric keypad window.

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td></td><td></td><td>


<table>
<tr><td></td><td>Selects system numeric keypad size</td></tr>
<tr><td>Title:40</td><td>Sets title height</td></tr>
<tr><td>10</td><td>Sets font size.</td></tr>
<tr><td>Arial</td><td>Selects font type.</td></tr>
<tr><td>A</td><td>Sets font color.</td></tr>
<tr><td></td><td>Selects background color</td></tr>
<tr><td></td><td>Default size</td></tr>
</table>
</td></tr>
<tr><td>(5)</td><td>Minimum Value / Maximum Value</td><td>➢ The data valid range of minimum value and maximum value is subject to the data type and data format.
<table>
<tr><th>Data Type</th><th>Data Format</th><th>Data Valid Range</th></tr>
<tr><td rowspan="6">Word</td><td>BCD</td><td>0~9999</td></tr>
<tr><td>Signed BCD</td><td>-999 ~ 9999</td></tr>
<tr><td>Signed Decimal</td><td>-32768~32767</td></tr>
<tr><td>Unsigned Decimal</td><td>0~65535</td></tr>
<tr><td>Hex</td><td>0~0xFFFF</td></tr>
<tr><td>Binary</td><td>0~0xFFFF</td></tr>
<tr><td rowspan="4">Double Word</td><td>BCD</td><td>0~99999999</td></tr>
<tr><td>Signed BCD</td><td>-9999999 ~ 99999999</td></tr>
<tr><td>Signed Decimal</td><td>-2147483648~2147483647</td></tr>
<tr><td>Unsigned Decimal</td><td>0~4294967295</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><td></td><td>Hex</td><td>0~0xFFFFFFFF</td></tr>
<tr><td></td><td>Binary</td><td>0~0xFFFFFFFF</td></tr>
<tr><td></td><td>Floating</td><td>0~9999999</td></tr>
</table>
</td></tr>
<tr><td>(6)</td><td>Integer Digit Decimal Place</td><td>➢ Users can define the integer digits and decimal places to be displayed.
➢ Instead of true decimal places, Decimal Place here means the display format. True decimal places can only be defined from this item after selecting “Floating” in Data Format.</td></tr>
<tr><td>(7)</td><td>Variable minimum/maximum limits</td><td>➢ Enable this function, users could custom minimum and maximum for variables.
 
</td></tr>
<tr><td>(8)</td><td>Gain Offset</td><td>➢ Equation for calculating Gain and Offset: y = (a) x + (b).
<table>
<tr><th>y</th><th>a</th><th>x</th><th>b</th></tr>
<tr><td>Calculation results</td><td>Gain value</td><td>Input Value</td><td>Offset/Gain Values</td></tr>
</table>
➢ If the Gain or Offset defined is a decimal, please select “Floating” in Data Format.
➢ Numeric Entry provides the estimation button for users to understand the gain and offset calculations more simply and clearly as shown below:
 
</td></tr>
</table>

No.	Property	Function
		 ➢ After selecting “Round Off before Display”, values will be rounded off before displaying on the numeric display element. ➢ If the numeric format is【Unsigned Decimal】, a pop-up message of【Data Overflow】will show when entering the negative value. 
(9)	Style	➢ There are four Styles, including Standard, Raised, Sunken, and

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td></td><td></td><td>Transparent. Users can change the element appearance.
<table>
<tr><th>Standard</th><th>Raised</th><th>Sunken</th><th>Transparent</th></tr>
<tr><td>#####</td><td>#####</td><td>#####</td><td>#####</td></tr>
</table></td></tr>
<tr><td>(10)</td><td>Border Color</td><td>➢ Sets border color of elements.
➢ When Style is “Transparent” or “Sunken”, the Border Color is disabled.
 
</td></tr>
<tr><td>(11)</td><td>Background Color</td><td>➢ Sets background color of elements.
➢ When Style is “Transparent”, the background color is disabled.
 
</td></tr>
</table>

◆ Text

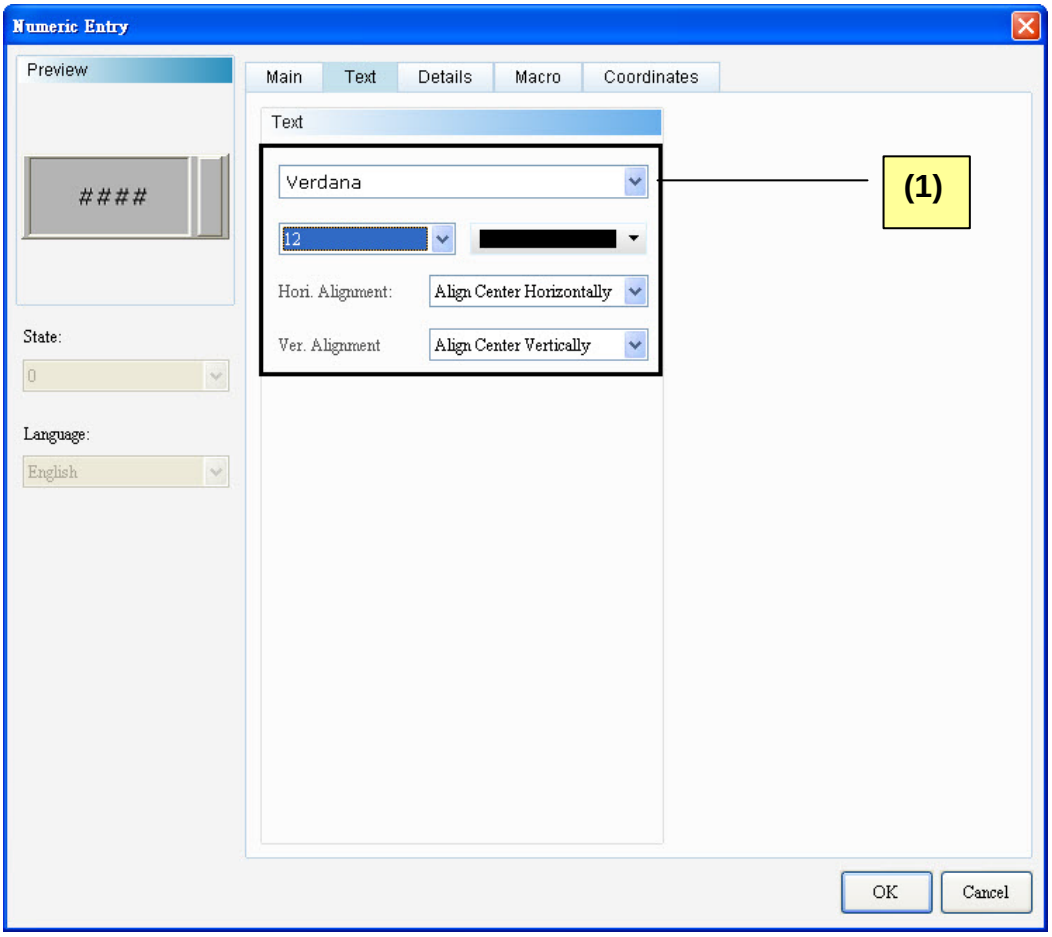


Figure 13-1-3 Numeric Entry Element Text Properties Page

No.	Property	Function
(1)	Text Properties	➢ Sets text properties, including font type, font size, font color, and text alignment.

◆ Details

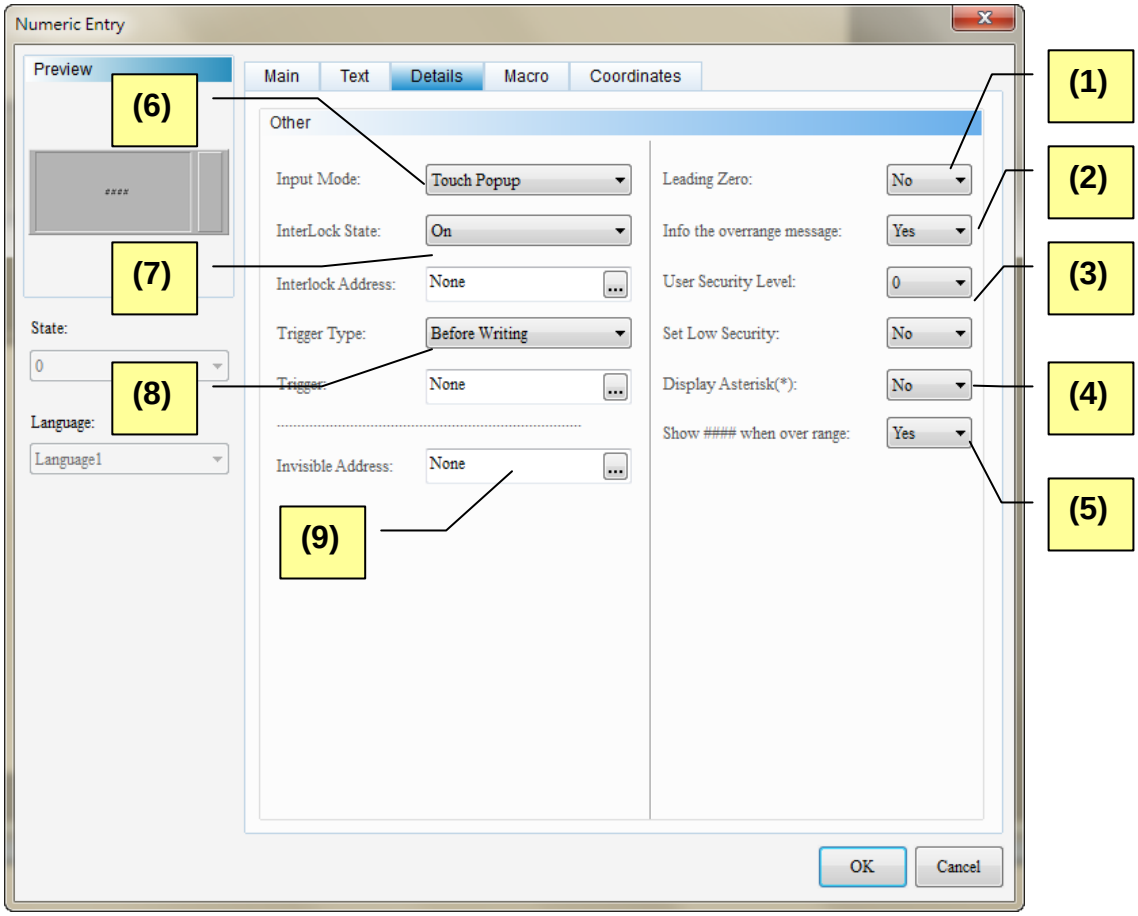
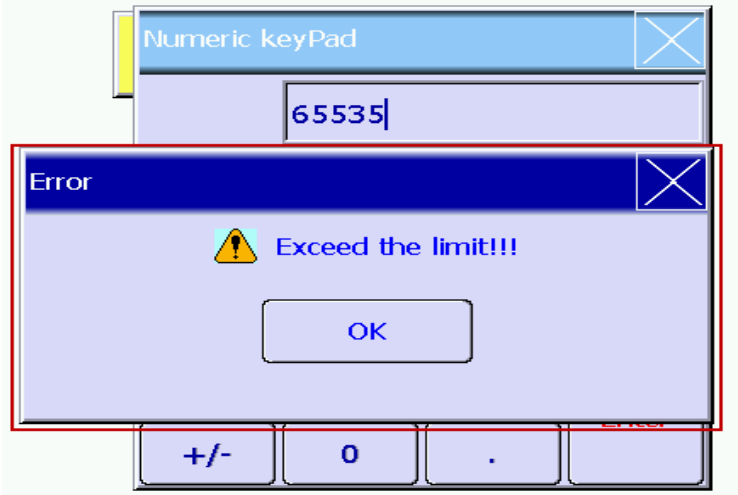
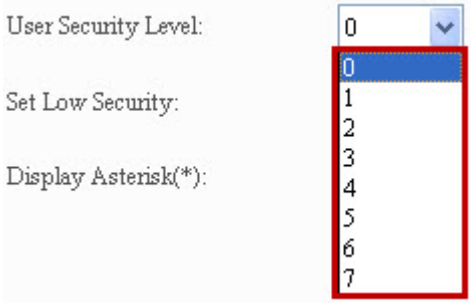
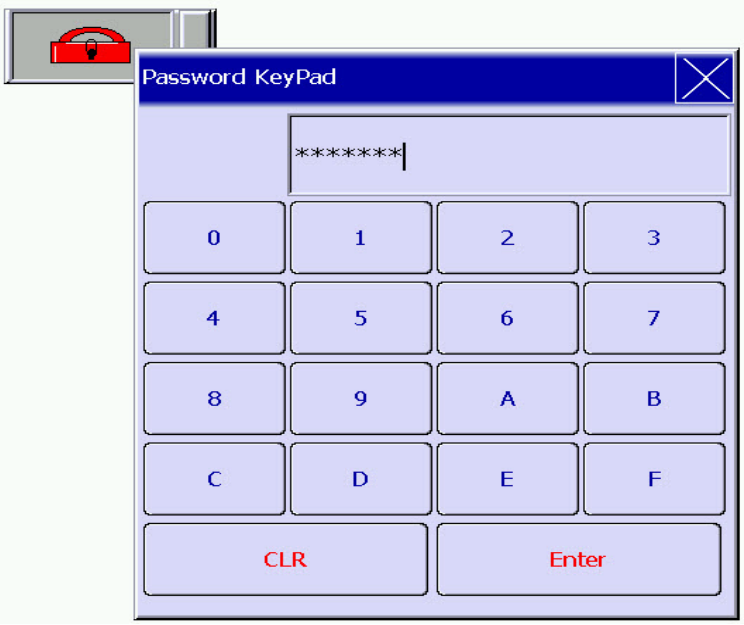
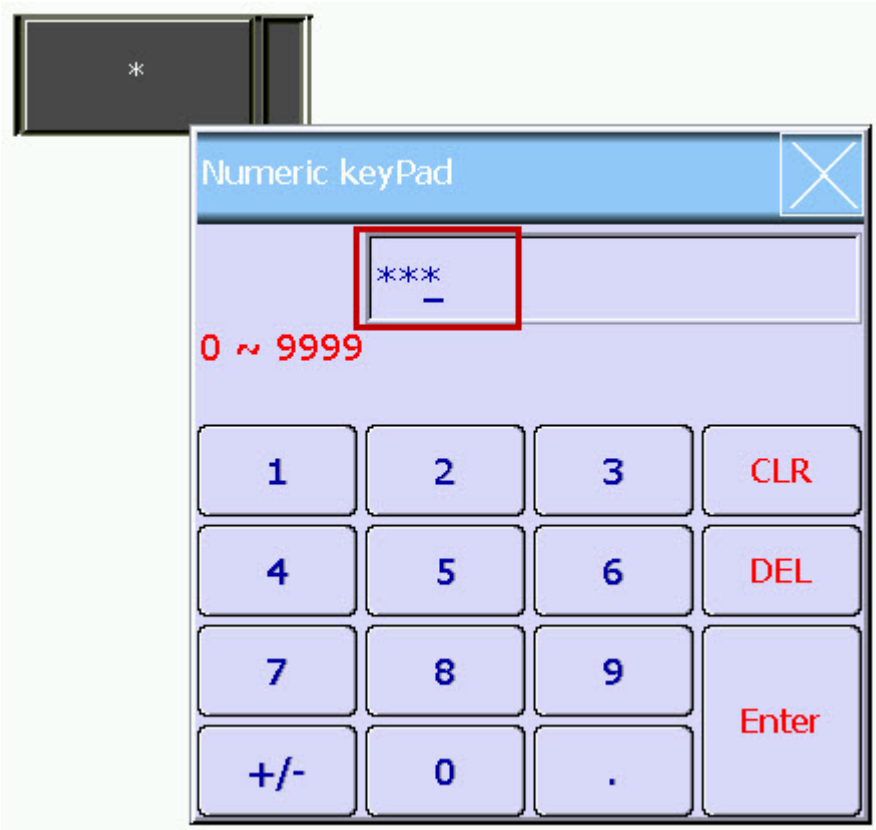
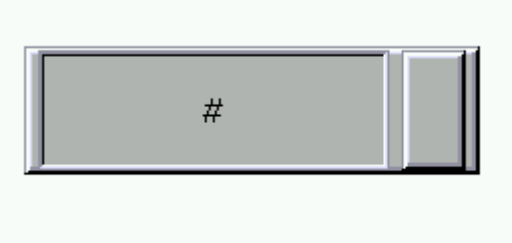
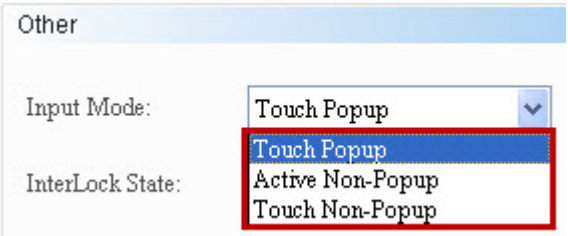
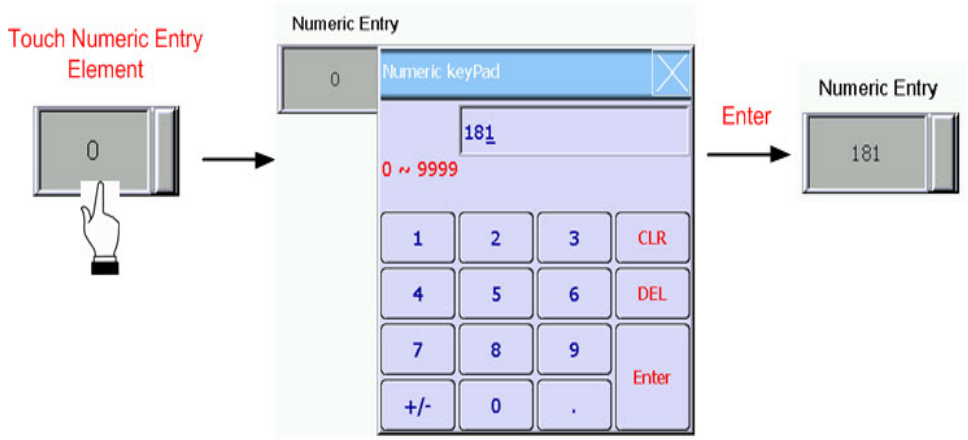
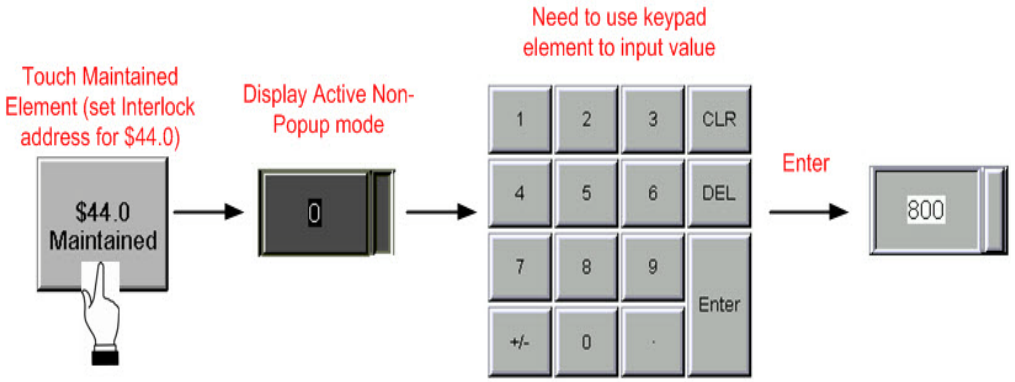
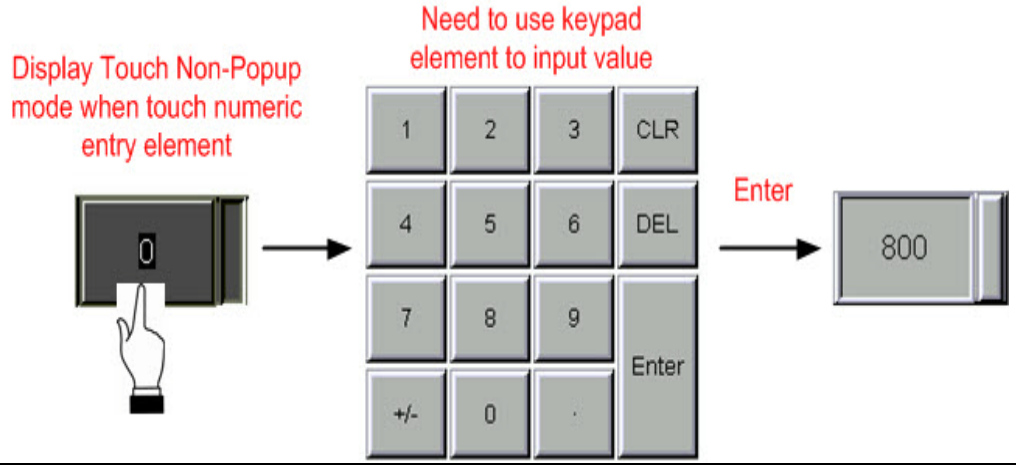


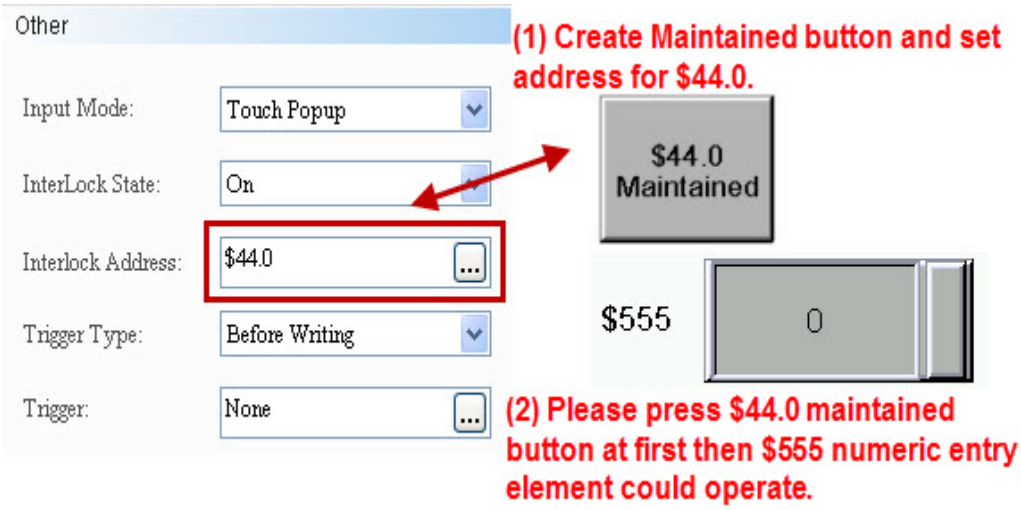
Figure 13-1-4 Numeric Entry Element Details Properties Page

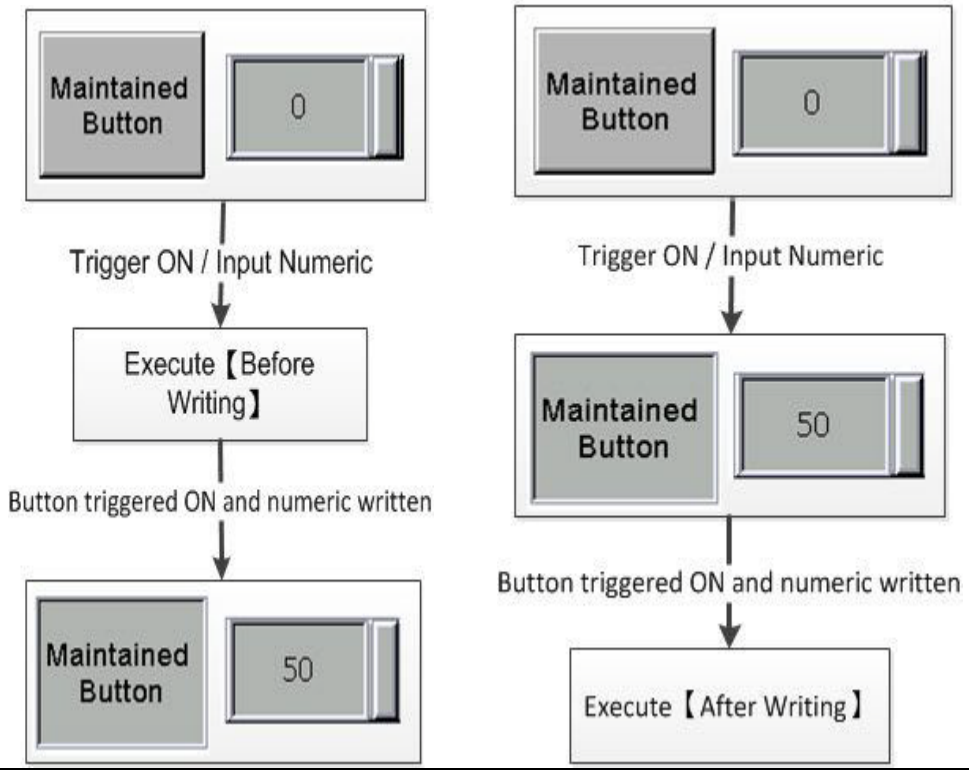
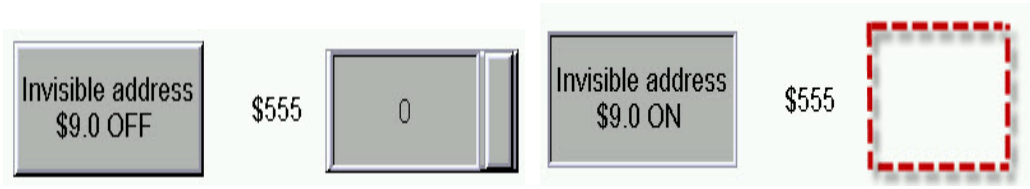
No.	Property	Function
(1)	Pad Left Zero	➢ Pad Left Zero is determined according to the number of digits of an integer as show in the example below. Integer Digits is 5 Leading Zero 00181 Leading Zero 181
(2)	Info the over range message	➢ If "YES" is selected for Info the over range message, when the input value exceeds this range defined, an error message will pop up to remind users as shown below:

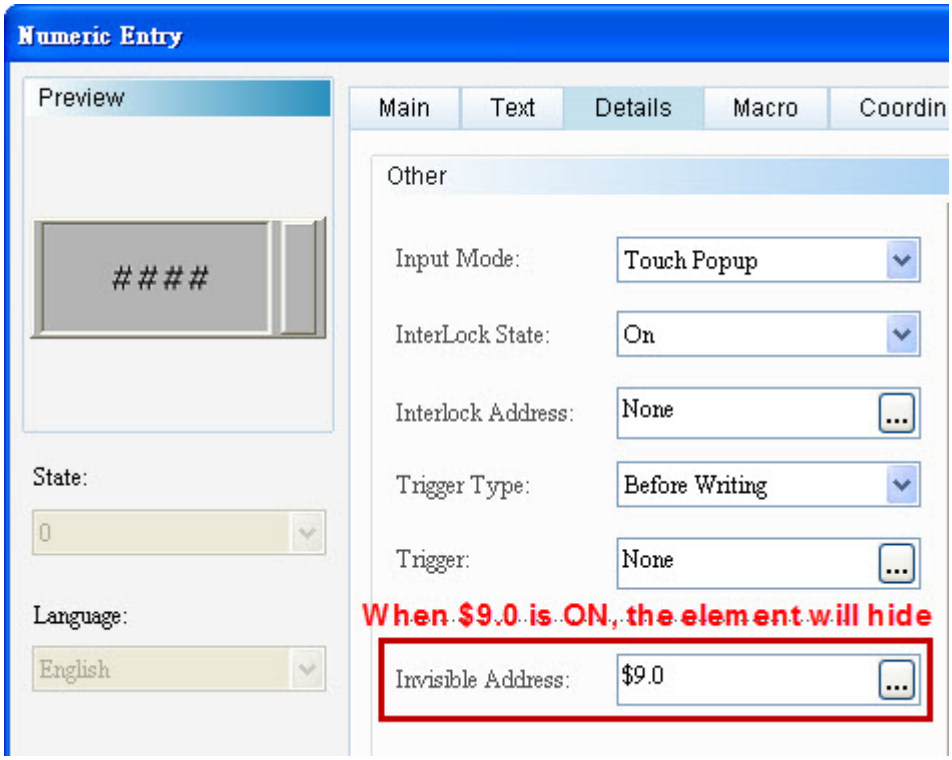
No.	Property	Function
		
(3)	User Security Level	 ➢ Sets the user security level of element activities. Only users with equal or higher security level corresponding to the element can activate the element. ➢ After setting the user security level, when users activate the element, the password box will pop up and request users to input the password (the password can be changed from the password setup element, please see 5-7 Password Table).  ➢ If “YES” is selected for Set Low Security, HMI automatically sets the security to the lowest level every time users input the password. When users activate the element again, they will be requested to input again the password corresponding to the element.
	Set Low Security	

No.	Property	Function
(4)	Display Asterisk	➢ If "YES" is selected for Hide Character, all numbers input from the numeric keypad will be displayed as "***", i.e. characters are hidden, as shown below. 
(5)	Show ### when over range	➢ When this selection is set to YES, if the value is not within the range, then it will display ###. ➢ Set the minimum value as 10 and the maximum value as 50. After executing the command, since the default value is 0 and 0 is not within the range, 10 ~ 60, it displays #. 
(6)	Input Mode	➢ Input Mode includes touch popup, active non-popup, and touch non-popup. "Touch Popup" is the default input method for Numeric Entry elements.  ➢ Touch Popup means after touching a Numeric Entry element, the numeric keypad will pop up.

No.	Property	Function
		Display Numeric keypad and input value  ➢ No numeric keypad will pop up for both Active non-Popup and Touch non-Popup. Users must create an additional keypad element to operate the HMI. ➢ Active non-Popup must be used along with Interlock Address. Set the interlock address of the Numeric Entry element as “$44.0”, and create a maintained element and set its write memory address as “$44.0”:  ➢ Like the case of Active non-Popup, no keypad will pop up in Touch non-Popup. Therefore, an additional keypad is needed to input numeric data. 

No.	Property	Function
(7)	Interlock State	➢ Interlock Address allows users to operate an element from this particular address. It must be used along with Interlock State. If Interlock State is “OFF”, this means the interlock address is operable when the interlock state is “OFF”. In contrast, when Interlock State is “ON”, this means the interlock address is operable when the interlock state is “ON”.
	Interlock Address	➢ The operations are as follows: 1. First, create a maintained button and set its write memory address as “$44.0”. Next, set its write memory as “$555” from the Numeric Entry element and the interlock address of the Character Entry element as “$44.0”. 2. To make Numeric Entry Element $555 operable, press the maintained button $44.0 to enable $555. 

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td rowspan="2">(8)</td><td>Trigger type</td><td>➢ Trigger type include before writing and after writing.
<table>
<tr><th rowspan="2">Trigger type</th><th>Before writing</th><th>After writing</th></tr>
<tr><td>The activation bit is ON before changing values.</td><td>Values are changed before the activation bit is ON.</td></tr>
</table>
➢ As the activation function only sets the trigger address to ON, users must set the trigger address of OFF before re-activation.
➢ Before writing: After writing:

</td></tr>
<tr><td>Trigger</td></tr>
<tr><td>(9)</td><td>Invisible Address</td><td>When Invisible Address is “ON”, the button element is hidden, and the corresponding function is disabled.

</td></tr>
</table>

No.	Property	Function
		

◆ Coordinates

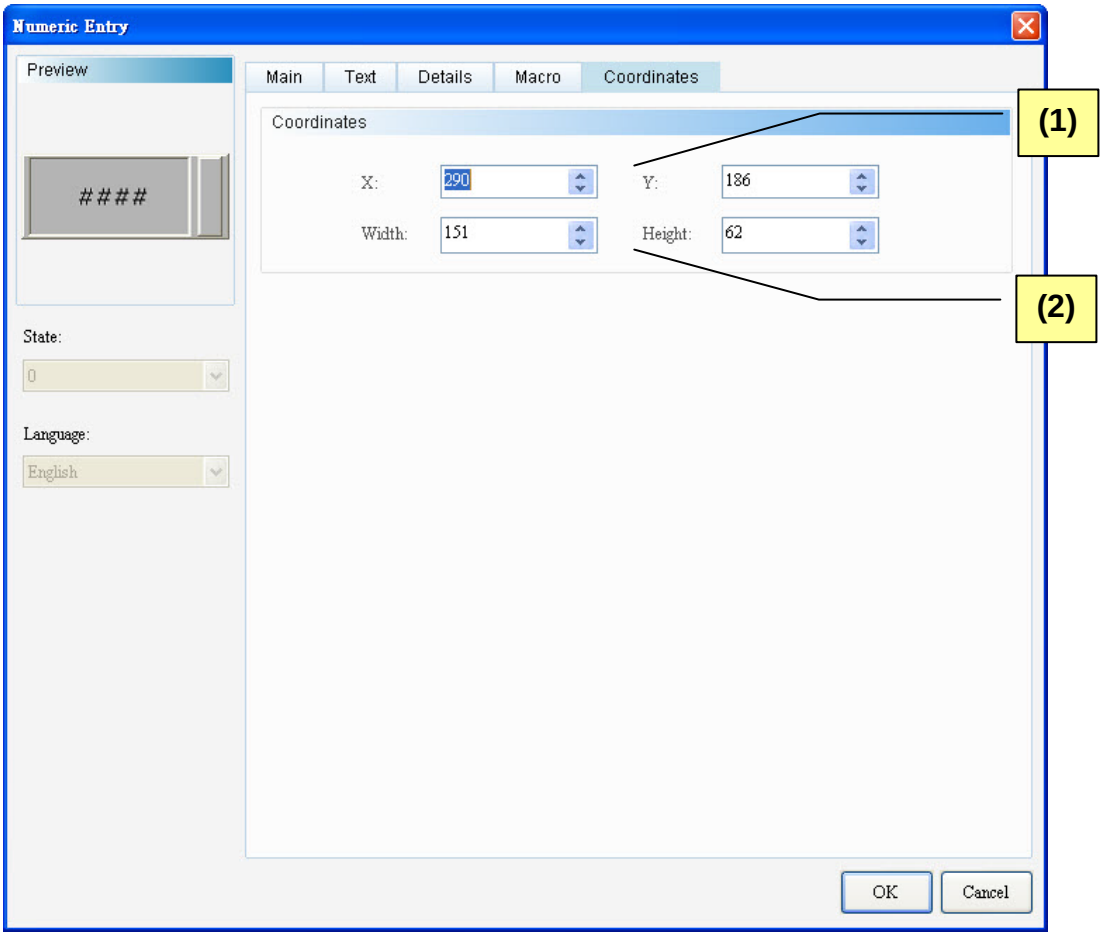


Figure 13-1-5 Numeric Entry Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

◆ Macro

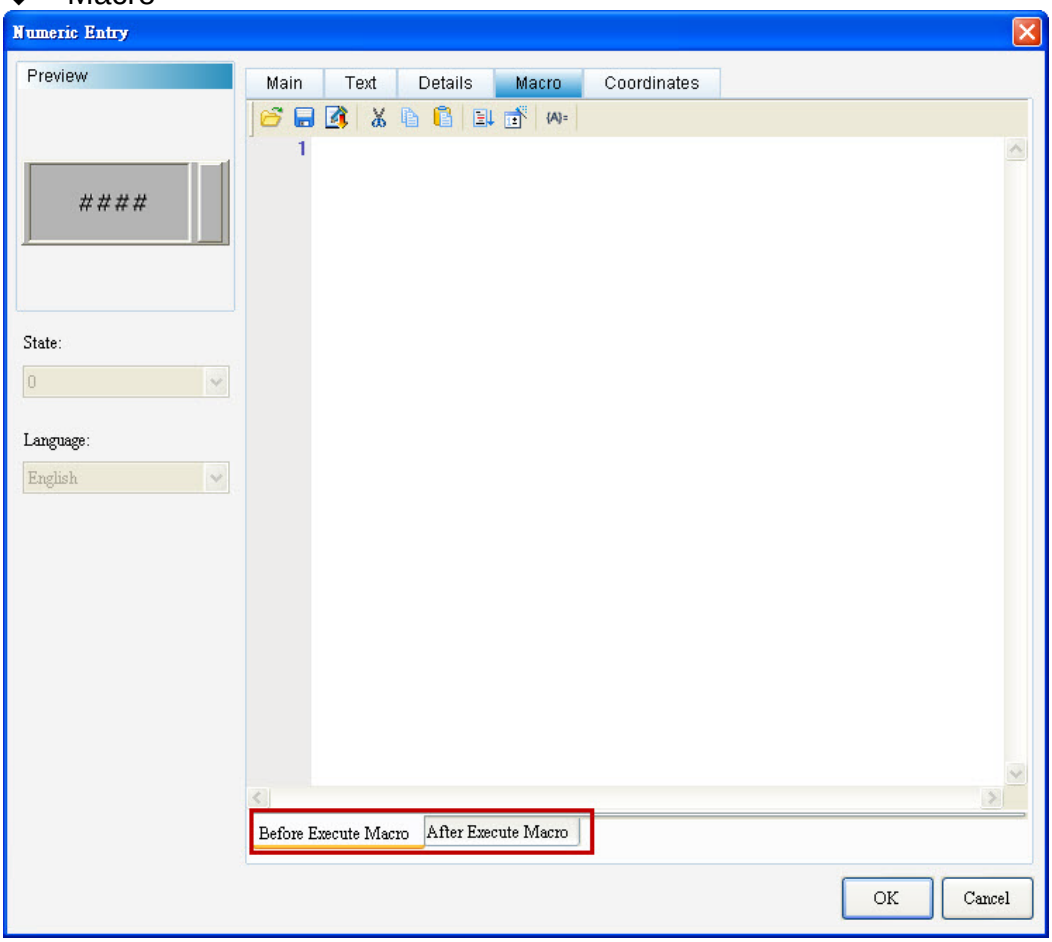
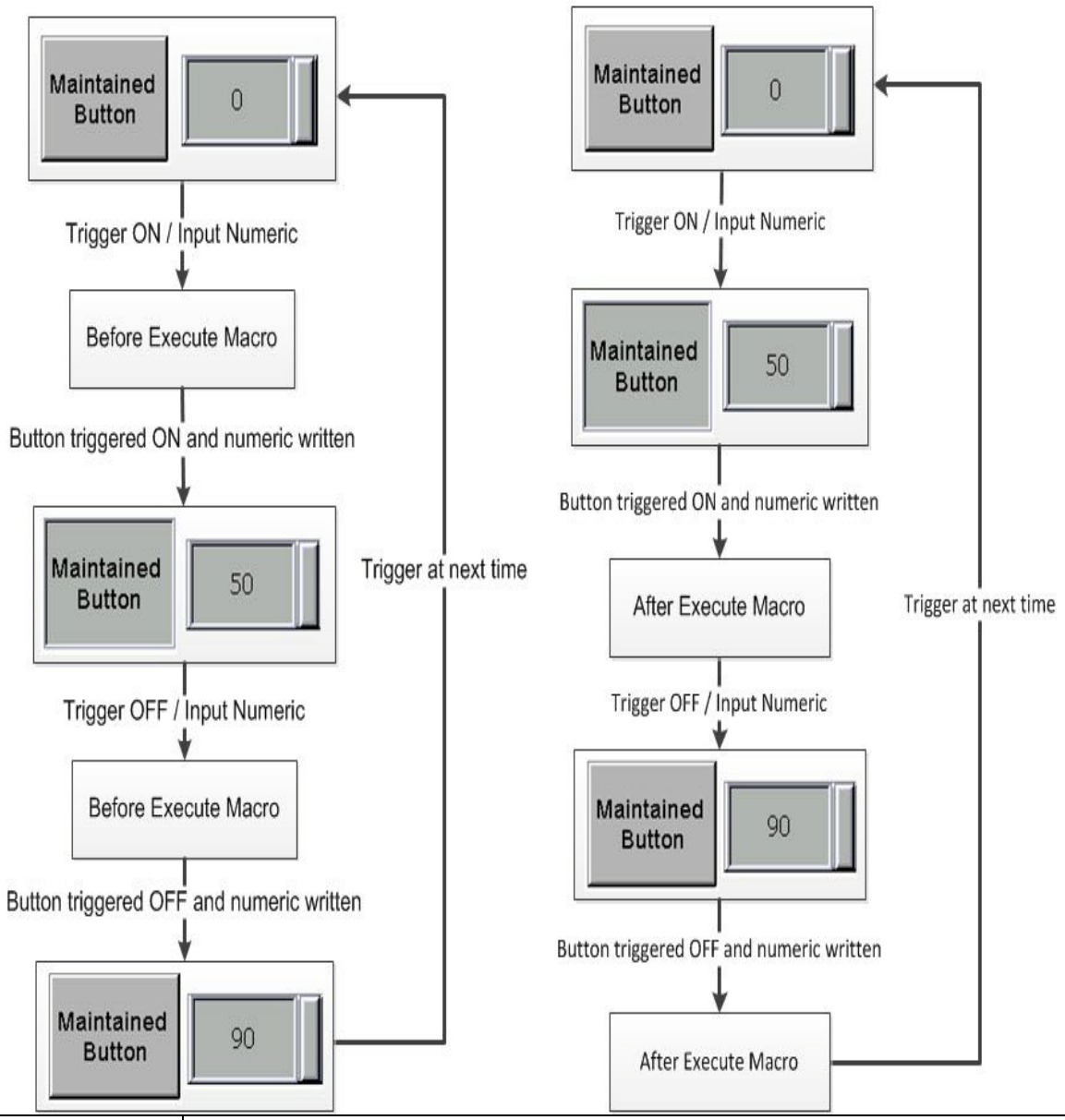


Figure 13-1-6 Numeric Entry Element Macro Properties Page

No.	Property	Function
(1)		➢ The before execute macro and after execute macro processes are diagrammed below: 
	Before execute Macro	➢ When users touch the button element, HMI will first run the commands in the corresponding macro pre-action of the button action. If the button state is not changed by means of touching button (using external controller commands or other macros), HMI will not run the corresponding macro commands.
	After execute Macro	➢ After users touch the button element, HMI will first run the button action pre-action the commands in the corresponding macro. If the button state is not changed by means of touching button (using external controller commands or other macros), HMI will not run the corresponding macro commands.

13-2 Character Entry

A	Character Entry

Character Entry supports only the ASCII code. Therefore, only characters will be accepted for both display and input. Users can switch to the ASCII input mode from the ALT key as shown below.

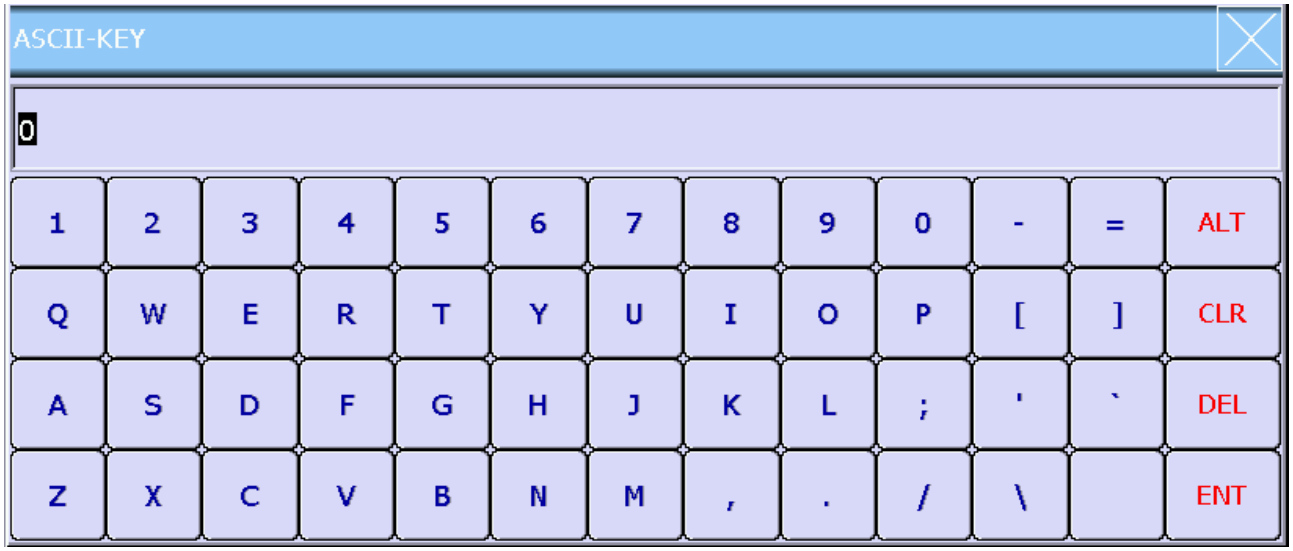


Figure 13-2-1 ASCII Keyboard

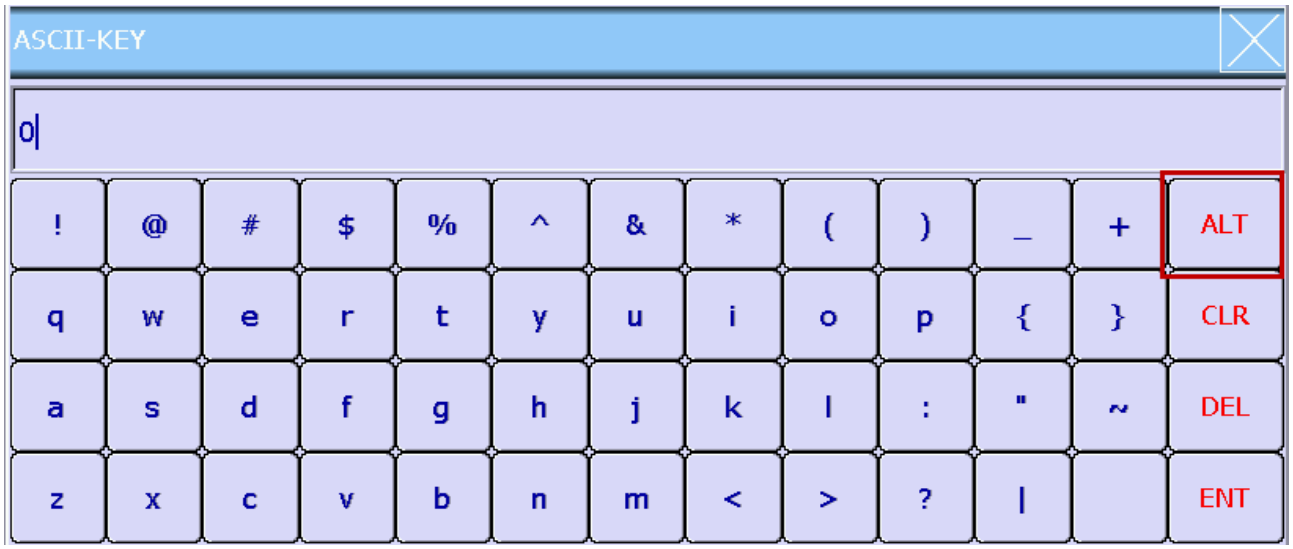


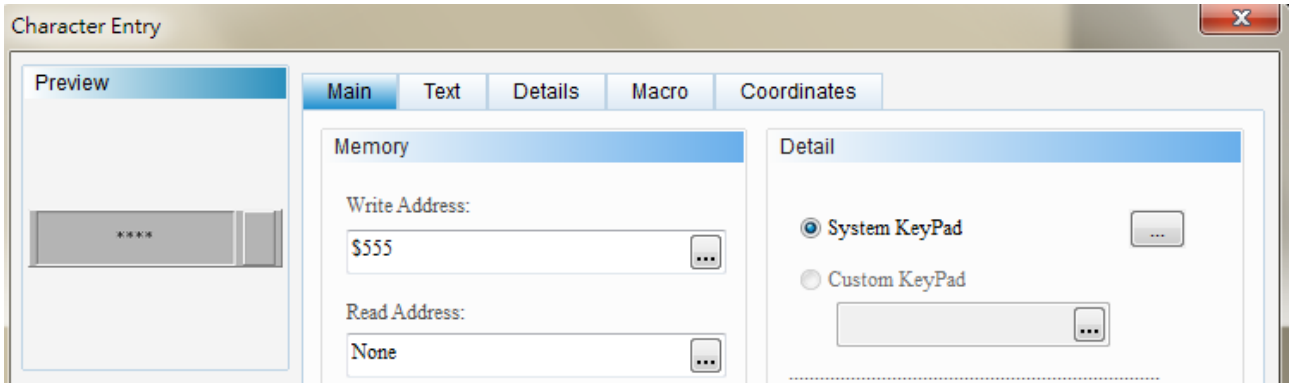
Figure 13-2-2 ASCII Keyboard

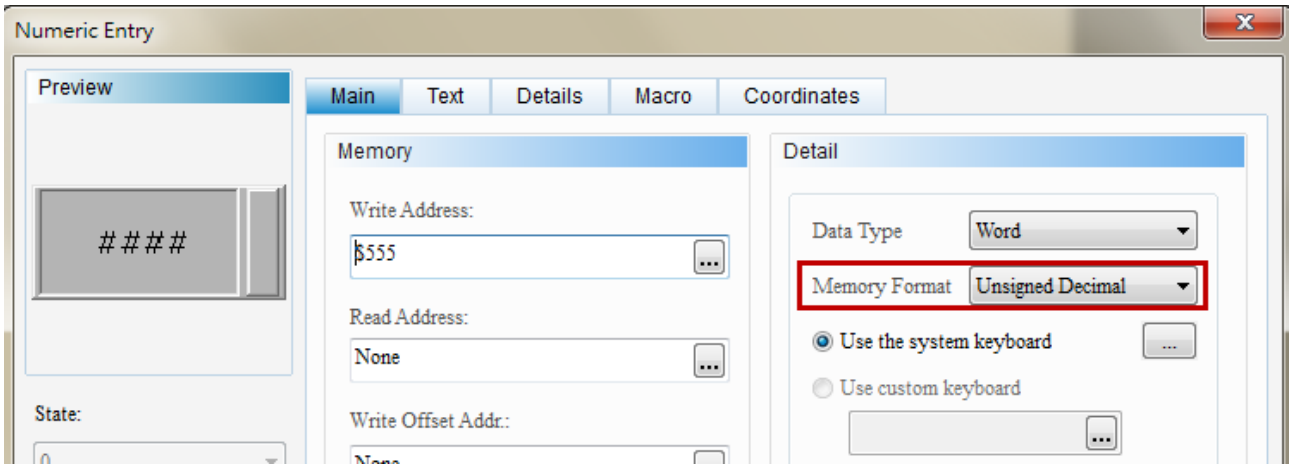
The following table shows the data format and character cross reference. The table below shows only characters from A to G, and the rest is in the same theory.

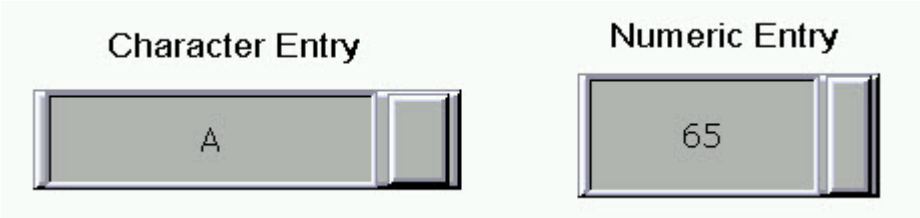
Unsigned Decimal	Hexadecimal	Character
65	41	A
66	42	B
67	43	C
68	44	D
69	45	E
70	46	F
71	47	G

Table 13-2-1 ASCII Conversion Table

As shown in Table 13-2-1, if users input the character **A** from the Character Entry element, the code **65 (Unsigned Decimal)** will be displayed on the Numeric Entry element.







Please refer to Table 13-2-2 Example of Character Entry below.

Example Character Entry

Table 13-2-2 Example of Character Entry

Read Address

Character Entry Element		Numeric Entry Element	
Write Address	$555	Write Address	$555

Properties

Character Entry Element	
String Length	10

Numeric Entry Element			
Data Type	**Data Format**	**Integer Digits**	**Fractional**
Word	Unsigned Decimal	5	0

Execution Results

- After creating the element, compile and download it to the HMI. Next, input "A" from the Character Entry element, after displaying the corresponding ASCII code (A), the value "65" (unsigned decimal) will be displayed on the Numeric Entry element.

Input "A", and the value corresponding to this ASCII code will be written in the selected address ($555) and displayed as "65".

Double-click Character Entry to call out the Character Entry Properties screen as shown below.

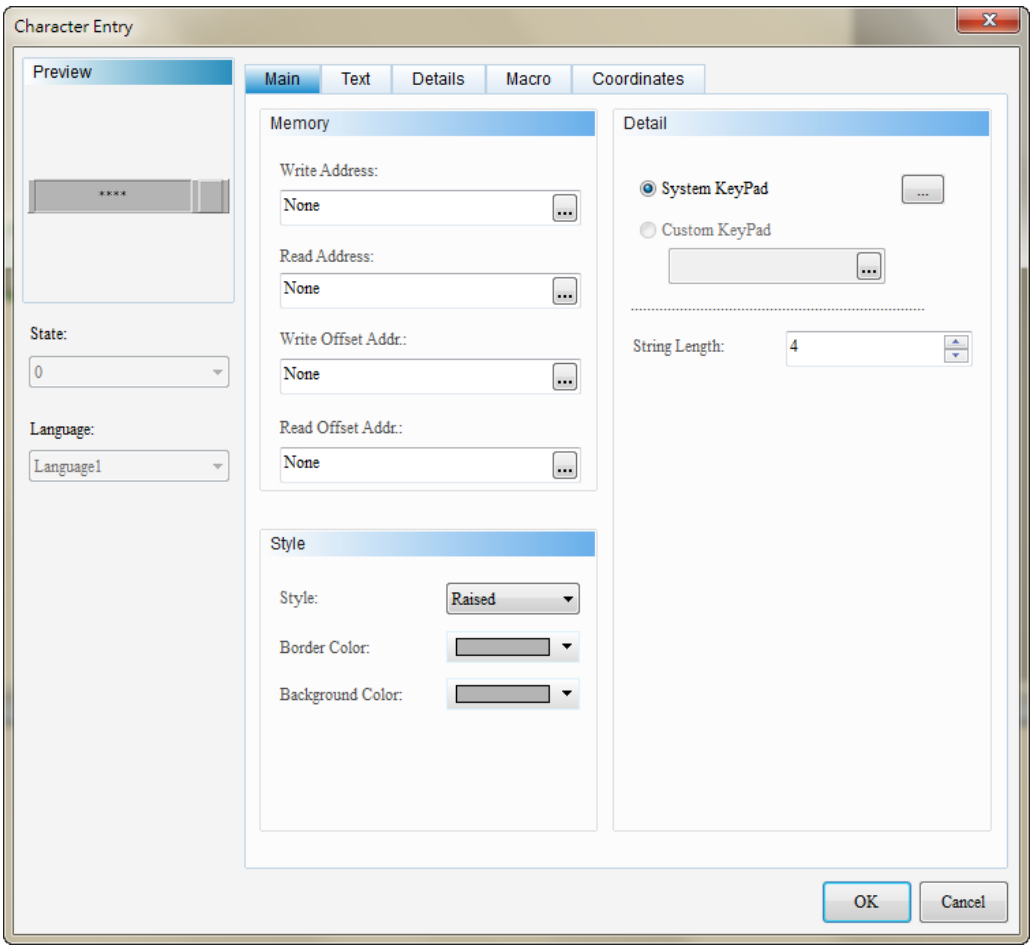


Figure 13-2-3 Character Entry Properties

Character Entry	
Function Page	**Content Description**
Preview	Supports neither multistate nor Multi-Language data display.
Main	Sets Read Address, Write Address, Read Offset Address, Write Offset Address, Style, Background Color, Border Color. Set String Length.
Text	Sets the font type, font size, font color, and alignment of the text to be displayed.
Details	Sets Enable Input Methods, Interlock State, Interlock Address, Activation Methods, Activation Address, Invisible Address, User Security Level, Low Security, and Hide Character.
Macro	Sets Edit Before execute Macro and After execute Macro.
Coordinates	Sets the X-Y coordinate, width, and height of elements.

Table 13-2-3 Character Entry Function Page

◆ Main

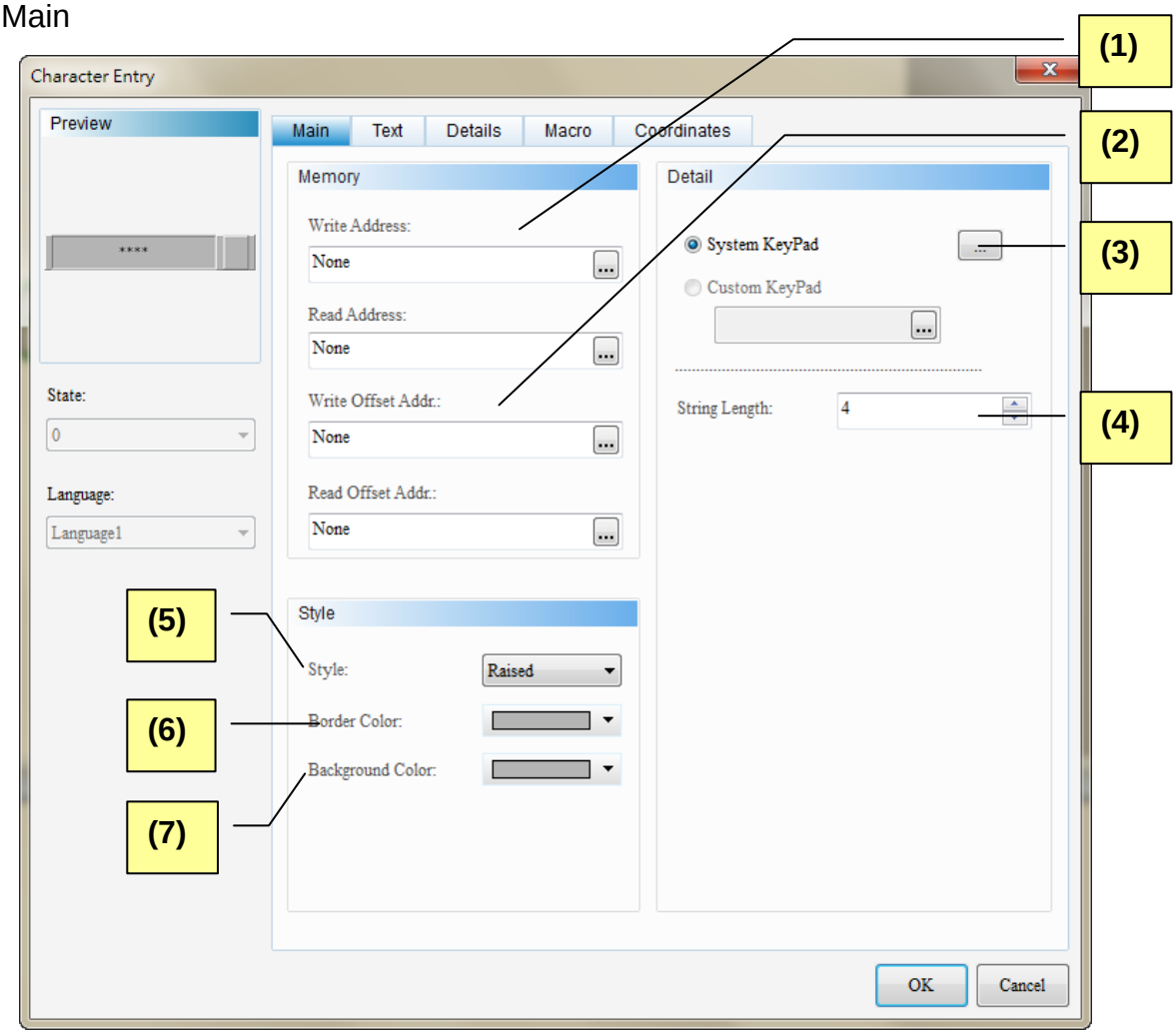
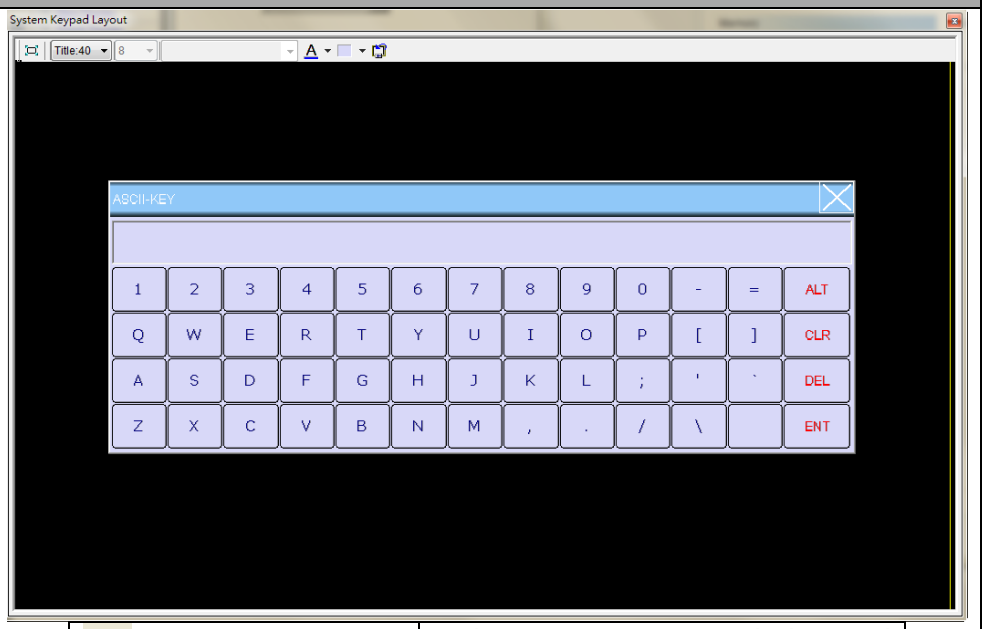
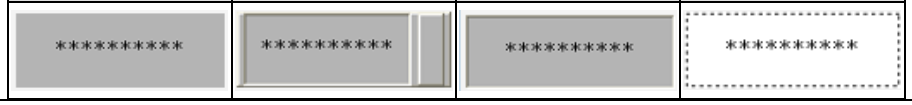
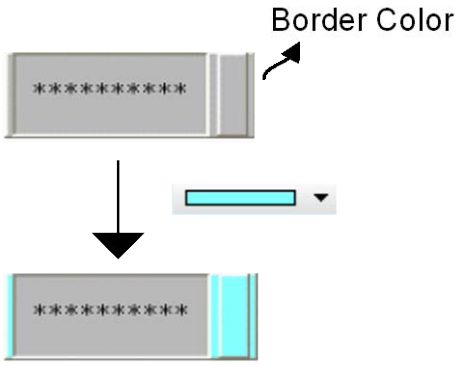
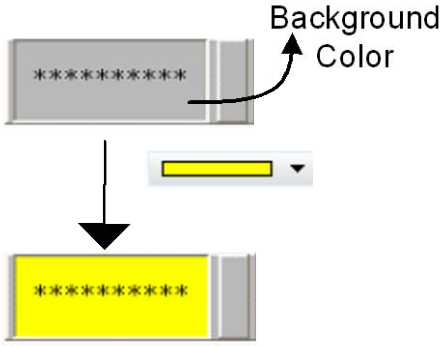


Figure 13-2-4 Character Entry Element Main Properties Page

No.	Property	Function
(1)	Write Address Read Address	➢ Selects the address of internal memory or controller register. ➢ Selects link name or Style. Please refer to 5-1 Buttons of Chapter 05.
(2)	Write Offset Address Read Offset Address	➢ Please refer to Appendix D Writing and Reading Offset Address.
(3)	System Keypad	➢ Edit Numeric Keypad allows users to adjust the numeric keypad size; title size; the font size, font type and font color of data display; and the background color of numeric keypad window.

No.	Property	Function
		 Selects system numeric keypad size Title:40 — Sets title height 10 — Sets font size. Arial — Selects font type. Sets font color. Selects background color Default size
(4)	String Length	➢ String Length: 1 to 256.
(5)	Style	➢ There are four Styles, including Standard, Raised, Sunken, and Transparent. Users can change the element appearance. Standard / Raised / Sunken / Transparent 
(6)	Border Color	➢ Sets border color of elements. ➢ When Style is “Transparent” or “Sunken”, Border Color is disabled.

No.	Property	Function
		
(7)	Background Color	➢ Sets background color of elements. ➢ When Style is “Transparent”, background color is disabled. 

◆ Text

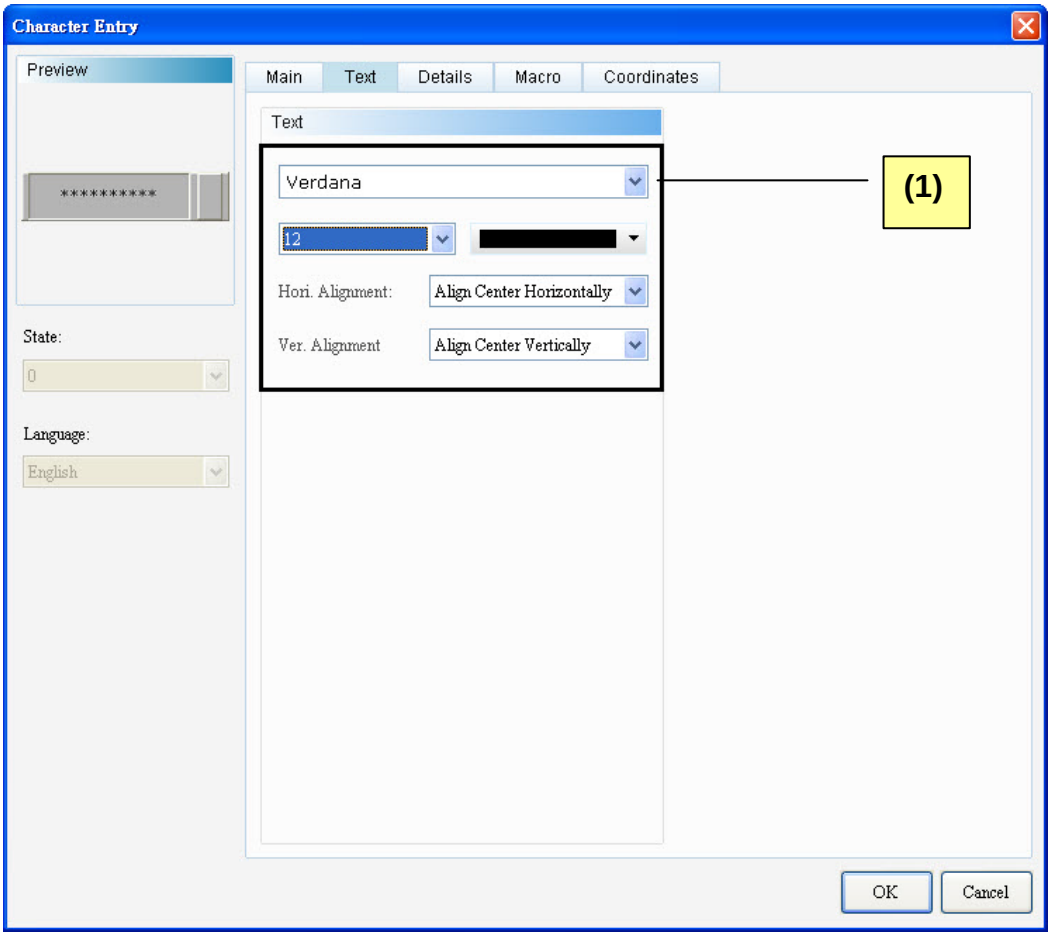


Figure 13-2-5 Character Entry Element Text Properties Page

No.	Property	Function
(1)	Text Properties	➢ Sets text properties, including font type, font size, font color, and text alignment.

◆ Details

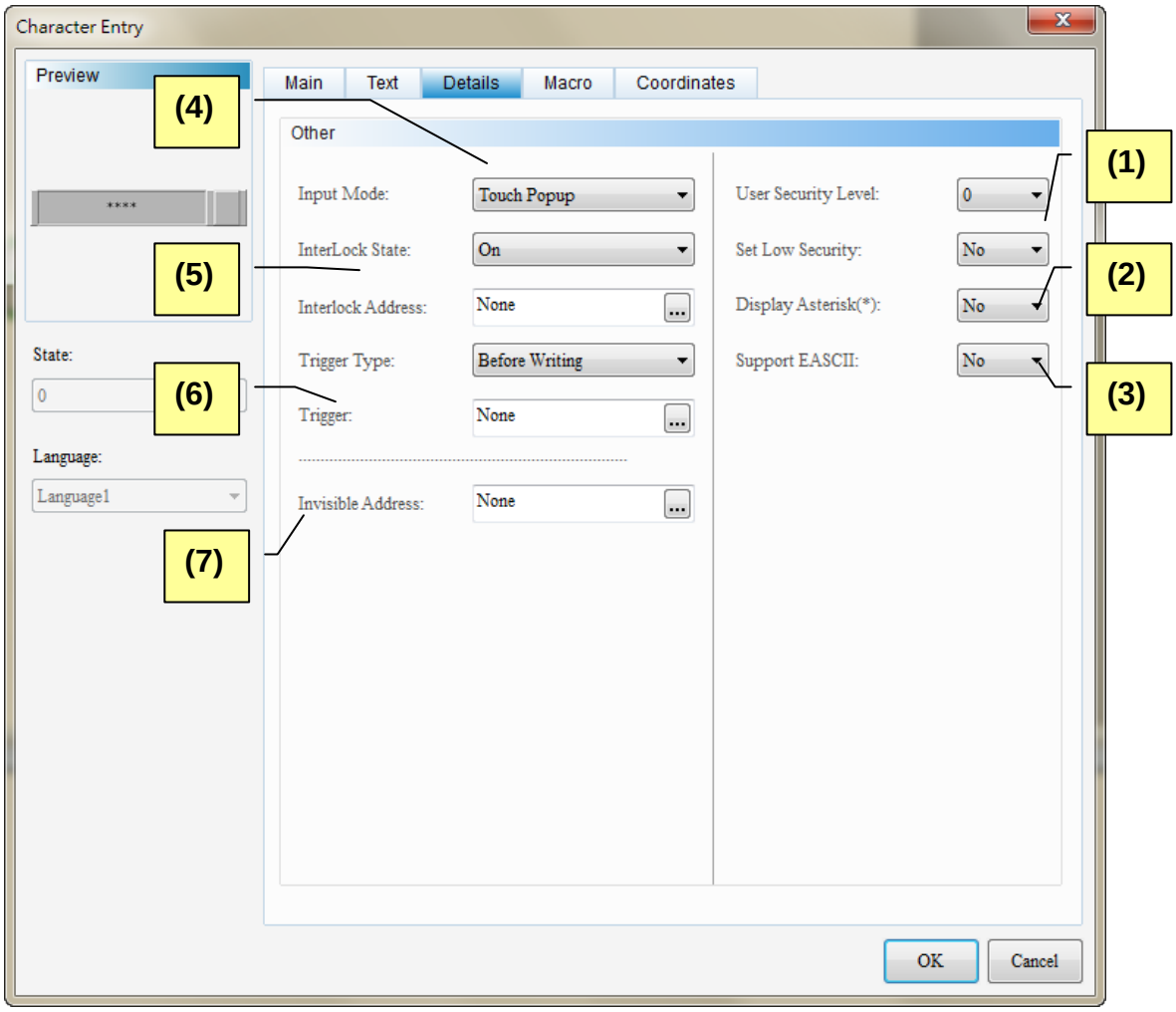
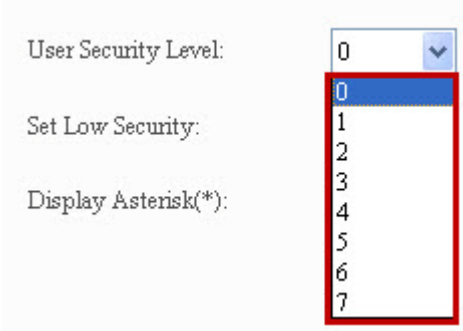
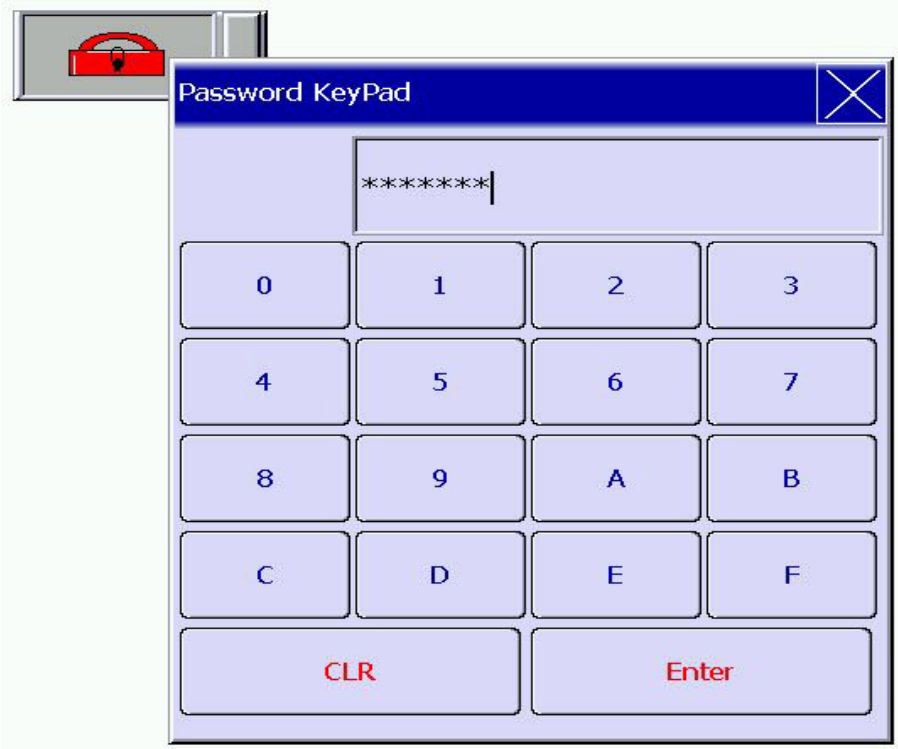
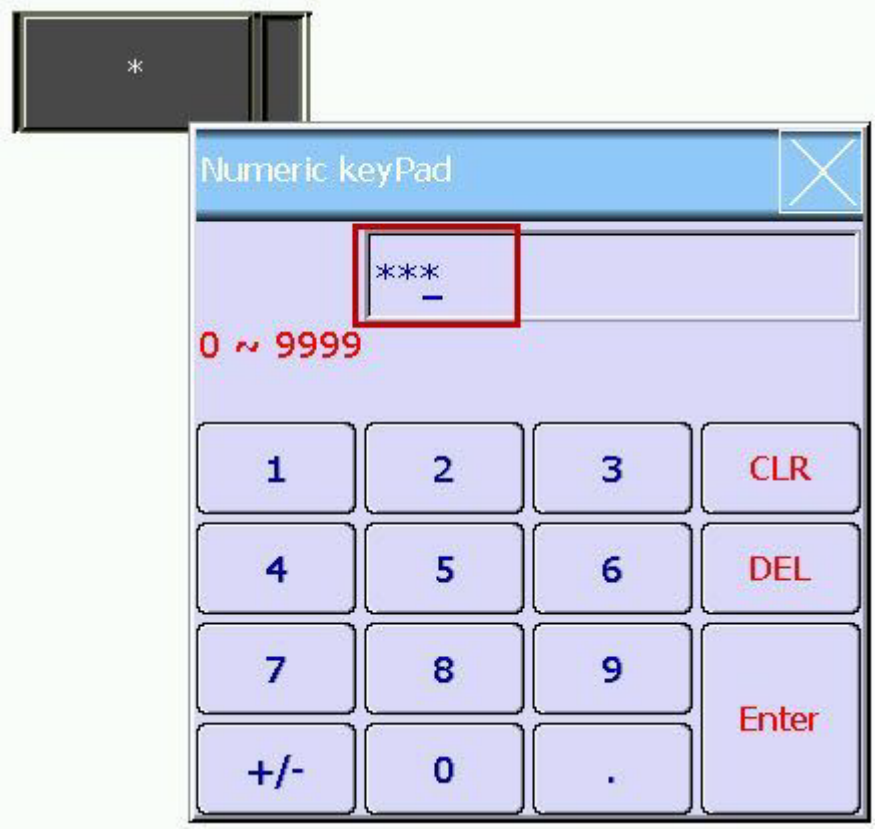


Figure 13-2-6 Character Entry Element Details Properties Page

No.	Property	Function
(1)	User Security Level	
	Set Low Security	➢ Sets the user security level of element activities. Only users with equal or higher security level corresponding to the element can activate the element. ➢ After setting the user security level, when users activate the element, the password box will pop up and request users to input the password (the password can be changed from the password setup element, please see 5-7 Password Table).

No.	Property	Function
		 ➢ If “YES” is selected for Set Low Security, HMI automatically sets the security to the lowest level every time users input the password. When users activate the element again, they will be requested to input again the password corresponding to the element.
(2)	Display Asterisk	➢ If “YES” is selected for Hide Character, all numbers input from the numeric keypad will be displayed as “***”, i.e. characters are hidden, as shown below.

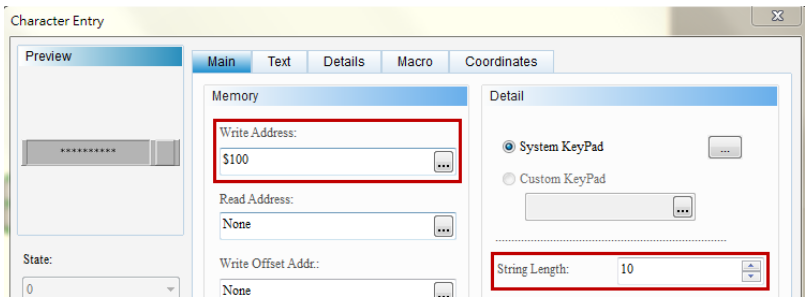
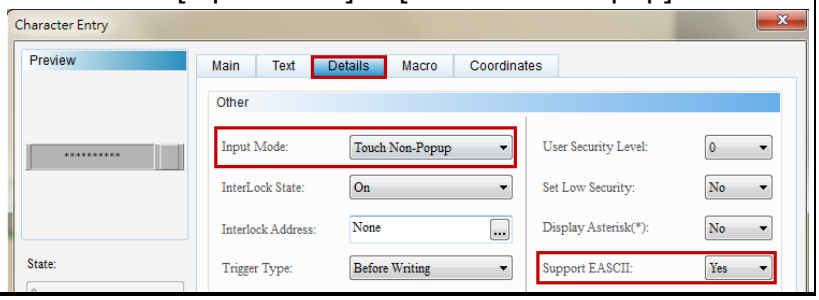
No.	Property	Function
		
(3)	Support EASCII	➢ If "Yes" is selected for Support EASCII, it means your HMI supports Swedish. ➢ EASCII Table： ✐ Extended ASCII has two types, one is defined by IBM and the other is defined by ISO/IEC 8859-1. The version of EASCII is different in each operating system. Most cases follow the rule that defined by ISO/IEC 8859-1, so do Microsoft and Delta's HMI. ✐ See the supported extended characters below:

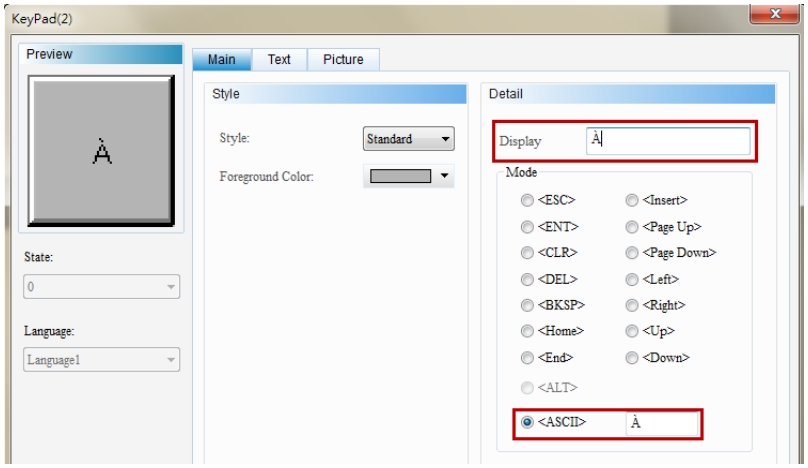
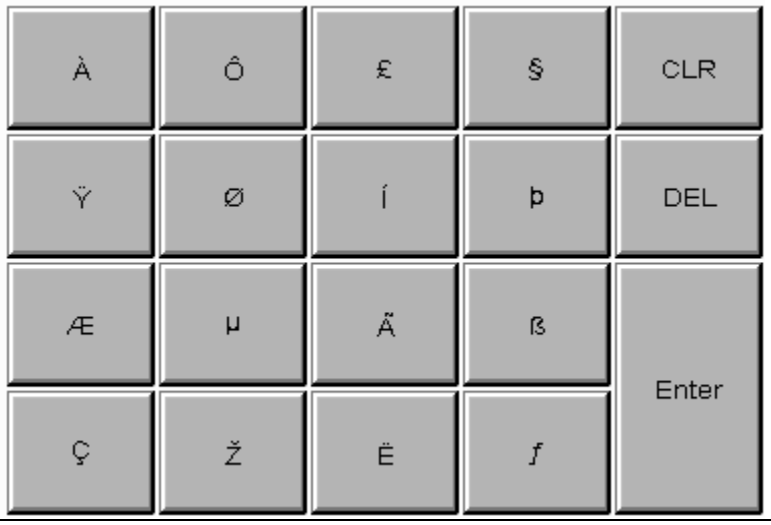
Character						
€	—	¬	¿	Ò	å	ø
‚	˜		À	Ó	□	ù
ƒ	™	®	Á	Ô	ç	ú
„	š	¯	Â	Õ	è	û
…	›	°	Ã	Ö	é	ü
†	œ	±	Ä	×	ê	ý

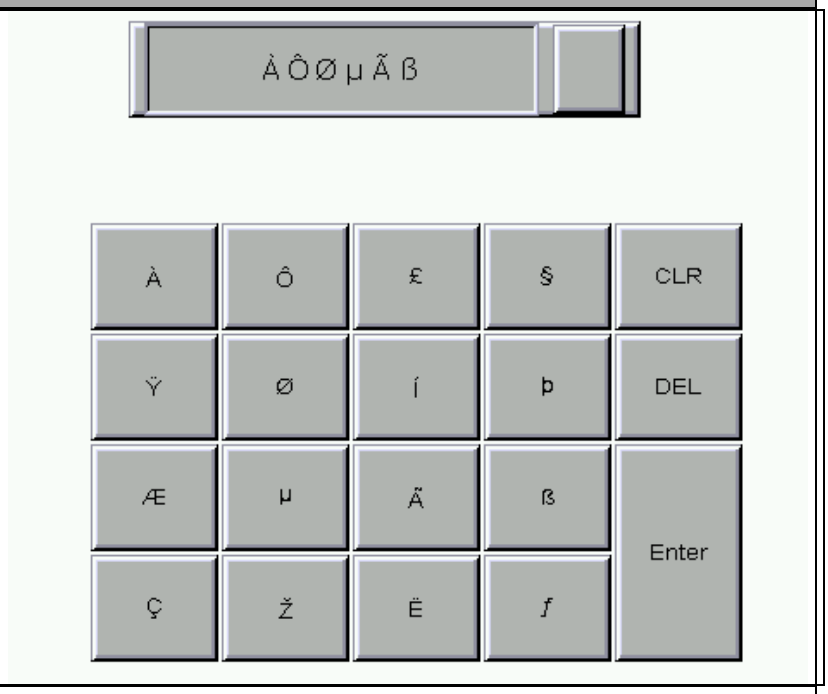
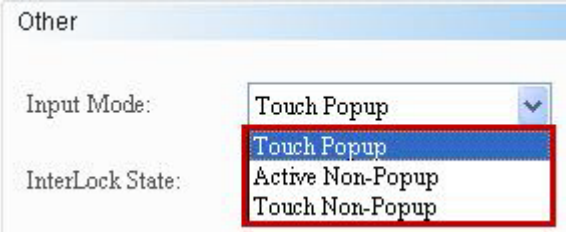
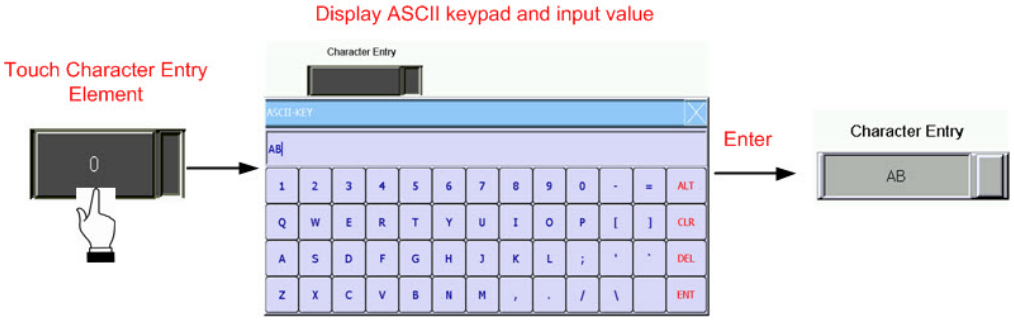
No.	Property	Function

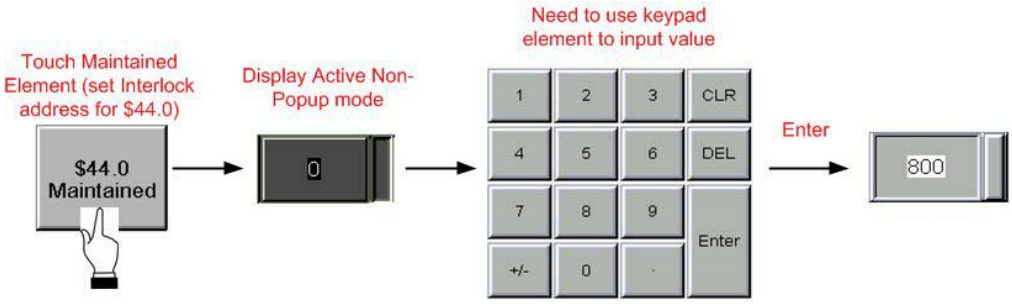
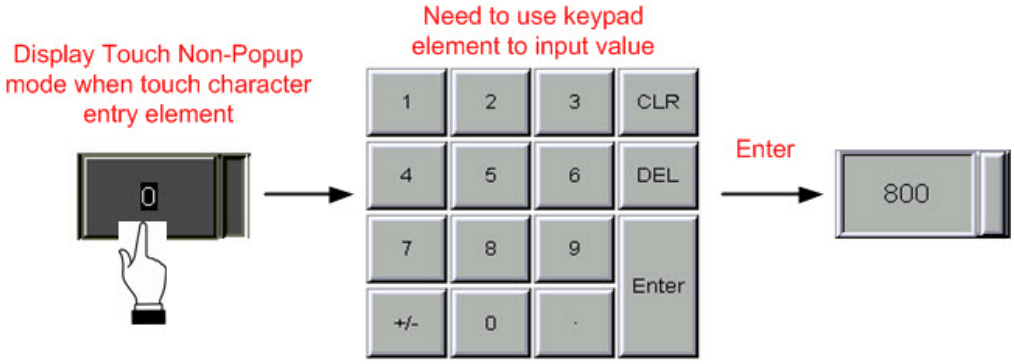
‡	ž	²	Å	Ø	ë	þ
ˆ	Ÿ	³	Æ	Ù	ì	ÿ
‰	¡	´	Ç	Ú	í	
Š	¢	µ	È	Û	î	
‹	£	¶	É	Ü	ï	
Œ	¤	·	Ê	Ý	ð	
Ž	¥	¸	Ë	Þ	ñ	
‘	¦	¹	Ì	ß	ò	
’	§	º	Í	à	ó	
“	¨	»	Î	á	ô	
”	©	¼	Ï	â	õ	
•	ª	½	Ð	ã	ö	
–	«	¾	Ñ	□	÷	

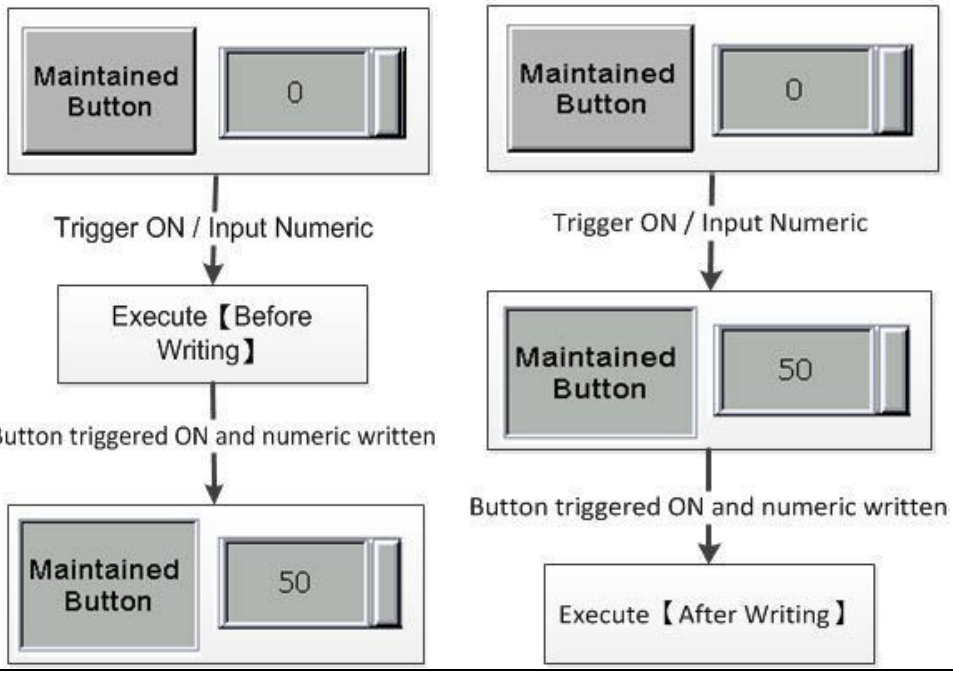
➢ If “Yes” is selected, this function can work with Keypad. See the followings for further descriptions.

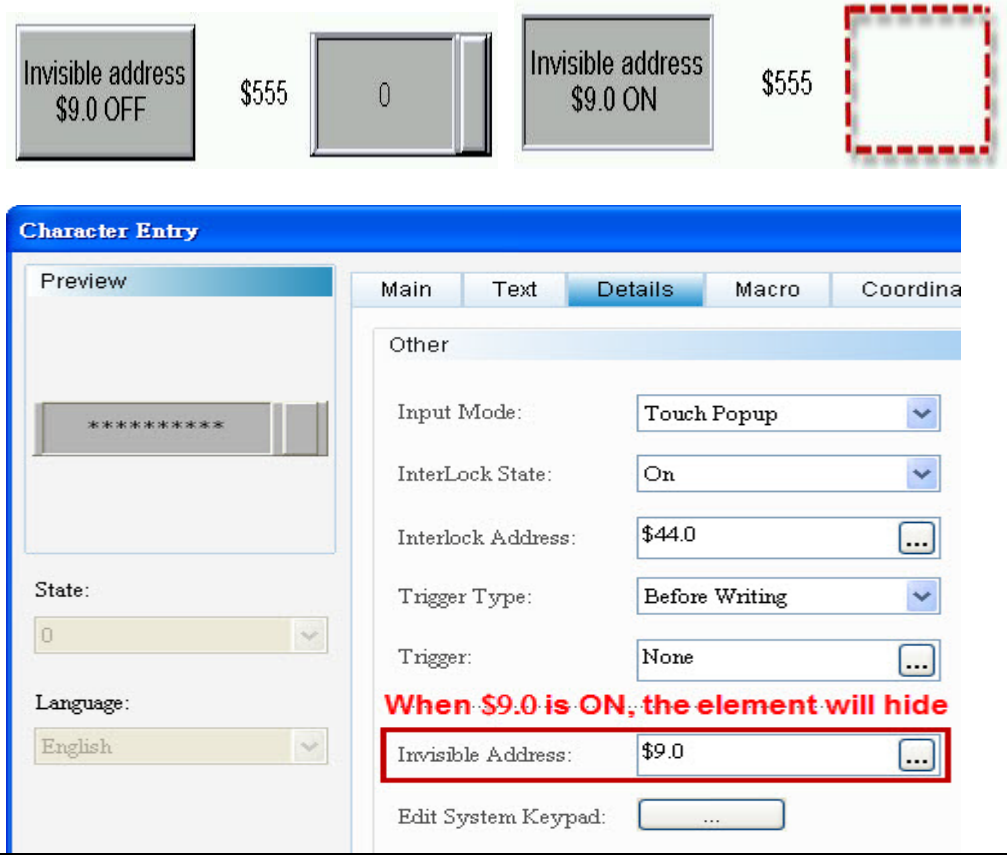
Use Keypad Element	
Create Character Entry Element	✎ Set the Write Address as $100 and string length as 10.  ✎ Go to [Details] to set [Support EASCII] to Yes. And set the [Input Mode] to [Touch Non-Popup]. 

No.	Property	Function	
		Create Keypad (2) Element	✐ Select any of the extended characters that mentioned above and input them for keypad display.  ✐ Follow the steps above and complete the setting of all characters. 
		Compile and Download the Screen to HMI	✐ When the setting is complete, please compile and download the screen to HMI. ✐ Please touch the character entry element first. Then, select the extended characters on keypad and press Enter.

No.	Property	Function
		
(4)	Input Mode	➢ Enable Input Methods include touch popup, active non-popup, and touch non-popup. “Touch Popup” is the default input method for Character Entry.  ➢ Touch Popup means after touching a Character Entry element, the keyboard will pop up.  ➢ No numeric keypad will pop up for both Active non-Popup and Touch non-Popup. Users must create an additional keypad element to operate the HMI. ➢ Active non-Popup must be used along with Interlock Address. Set the interlock address of the Character Entry element as “$44.0”, and create a maintained element and set its write memory address as “$44.0”:

No.	Property	Function
		 ➢ Like the case of Active non-Popup, no keyboard will pop up in Touch non-Popup. Therefore, an additional keyboard is needed to input text. 
(5)	Interlock State	➢ Interlock Address allows users to operate an element from this particular address. It must be used along with Interlock State. If Interlock State is “OFF”, this means the interlock address is operable when the interlock state is “OFF”. In contrast, when Interlock State is “ON”, this means the interlock address is operable when the interlock state is “ON”. ➢ The operations are as follows: 1. First, create a maintained button and set its write memory

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td></td><td>Interlock Address</td><td>address as “$44.0”. Next, set its write memory as “$555” from the Character Entry element and the interlock address of the Character Entry element as “$44.0”.
2. To make Character Entry Element $555 operable, press the maintained button $44.0 to enable $555.
</td></tr>
<tr><td rowspan="2">(6)</td><td>Trigger type</td><td>➢ Trigger type include before writing and after writing.
<table>
<tr><th rowspan="2">Trigger type</th><th>Before writing</th><th>After writing</th></tr>
<tr><td>The activation bit is ON before changing values.</td><td>Values are changed before the activation bit is ON.</td></tr>
</table></td></tr>
<tr><td>Trigger</td><td>➢ As the activation function only sets the activation address to ON, users must set the activation address of OFF before re-activation.
➢ Before writing: After writing:
 
</td></tr>
<tr><td>(7)</td><td>Invisible Address</td><td>➢ When Invisible Address is “ON”, the button element is hidden, and the corresponding function is disabled.</td></tr>
</table>

No.	Property	Function
		

◆ Coordinates

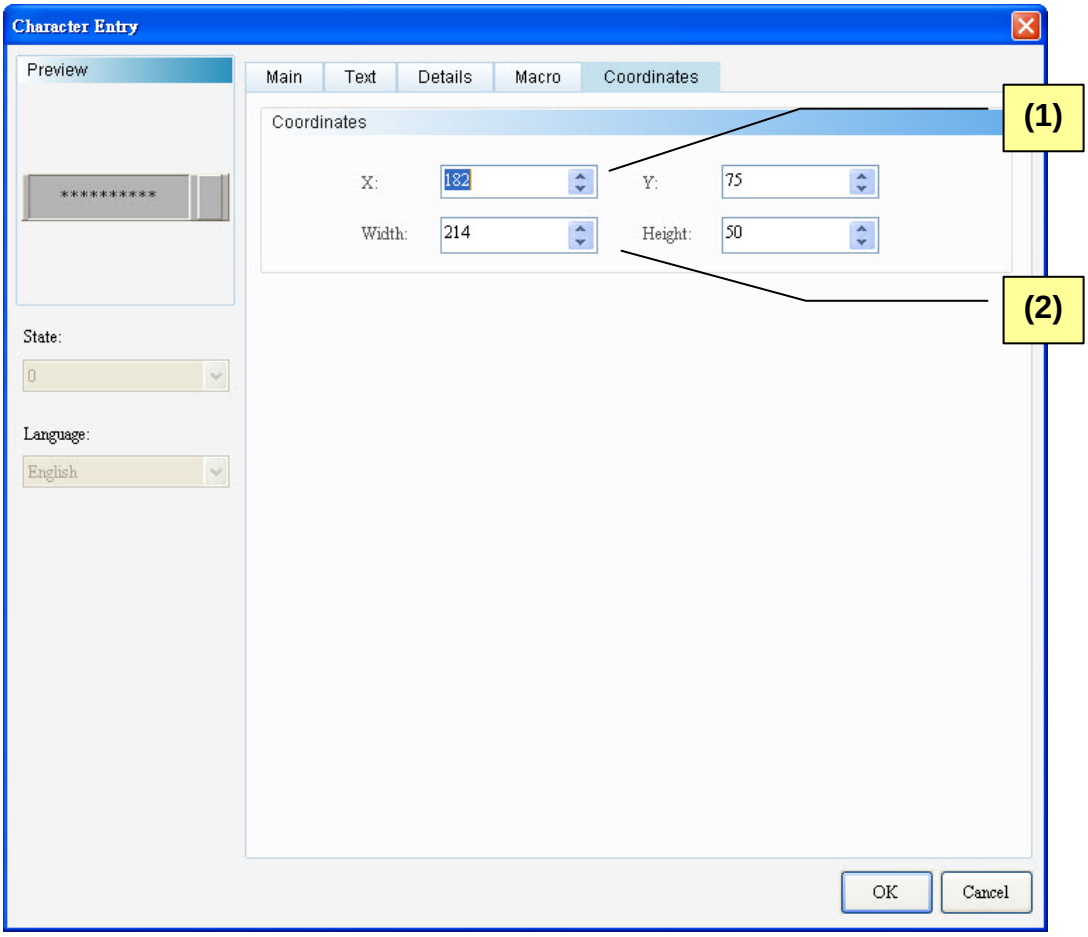


Figure 13-2-7 Character Entry Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

◆ Macro

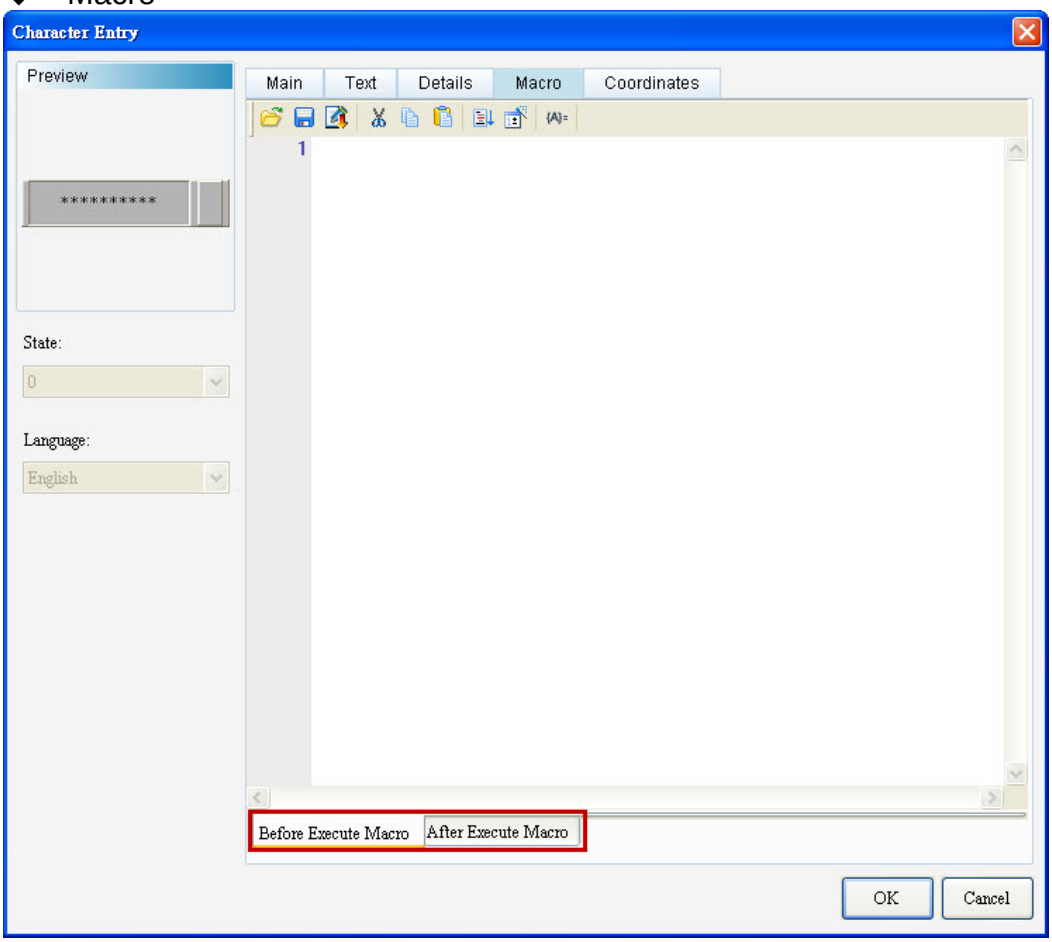
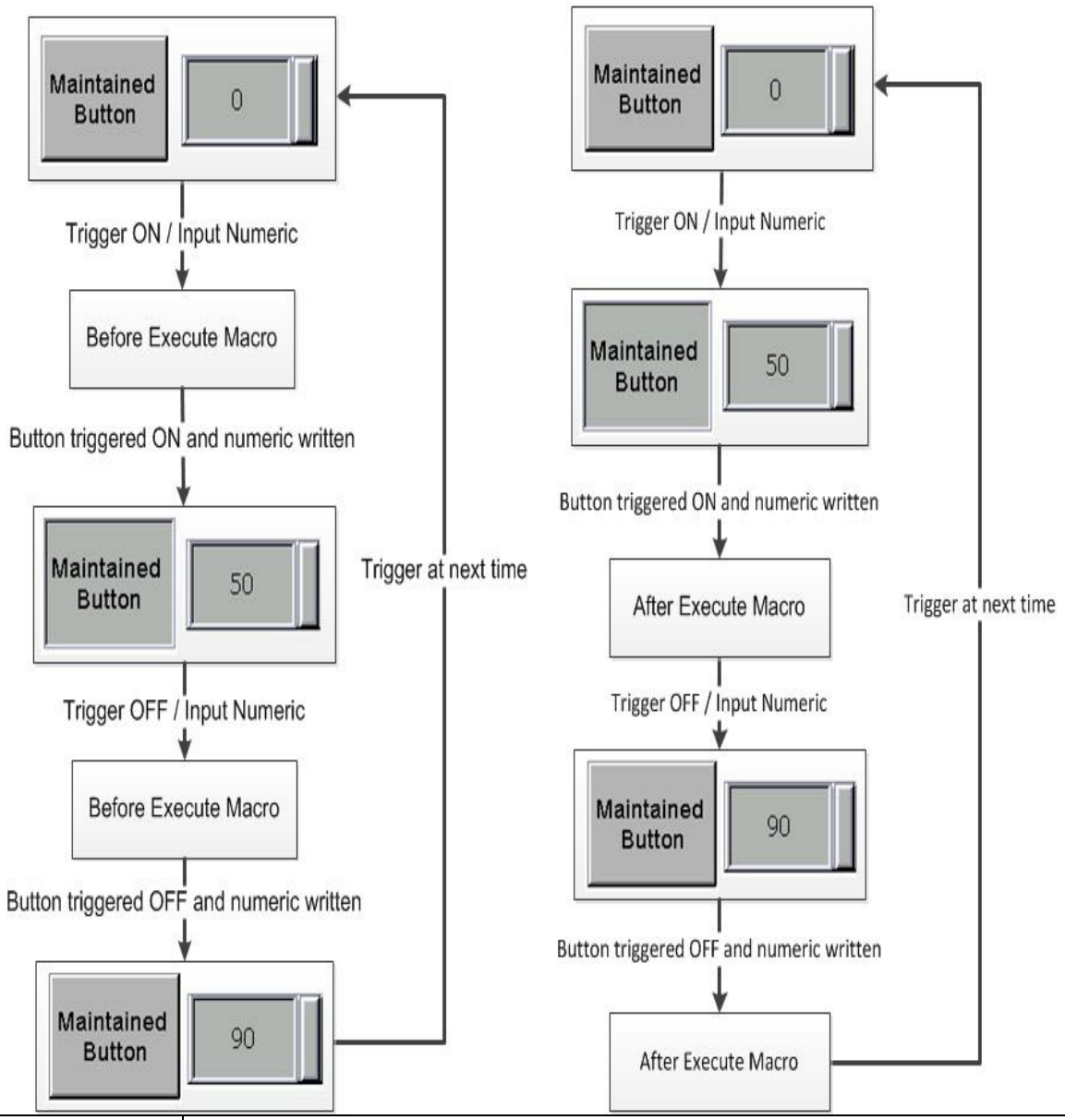


Figure 13-2-8 Character Entry Element Macro Properties Page

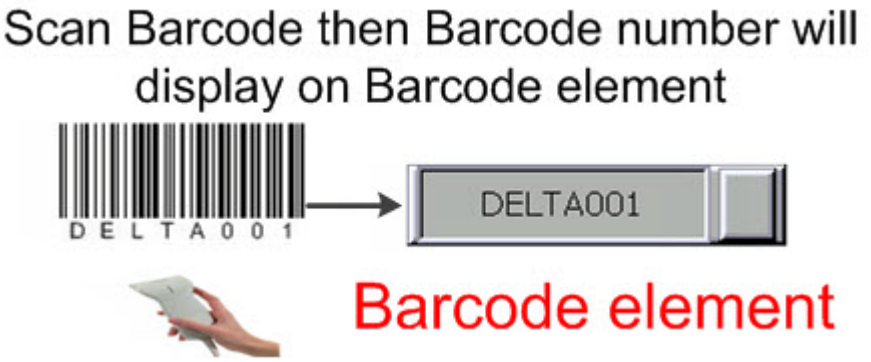
No.	Property	Function
(1)		➢ The before execute macro and after execute macro processes are diagrammed below: 
	Before execute Macro	➢ When users touch the button element, HMI will first run the commands in the corresponding macro pre-action of the button action. If the button state is not changed by means of touching button (using external controller commands or other macros), HMI will not run the corresponding macro commands.
	After execute Macro	➢ After users touch the button element, HMI will first run the button action pre-action the commands in the corresponding macro. If the button state is not changed by means of touching button (using external controller commands or other macros), HMI will not run the corresponding macro commands.

13-3 Barcode

	Barcode

Barcode supports only the ASCII 1D barcode. The display and input formats are the same as that of Character Entry. The HMI supports all barcode readers requiring no additional drivers.

Please refer to Table 13-3-1 Example of Barcode below.

Example of Barcode Table 13-3-1 Example of Barcode			
Read Address		**Barcode Element**	
		Write Address	$555
Properties		**Barcode Element**	
		String Length	10
Execution Results	➢ After creating the element, compile and download it to the HMI. Next, connect the barcode reader to HMI. HMI will beep once after identifying it. Then, touch the Barcode element, after it blink, scan the barcode, and it will appear on the Barcode Element. 		

Double-click Barcode to call out the Barcode Properties screen as shown below.

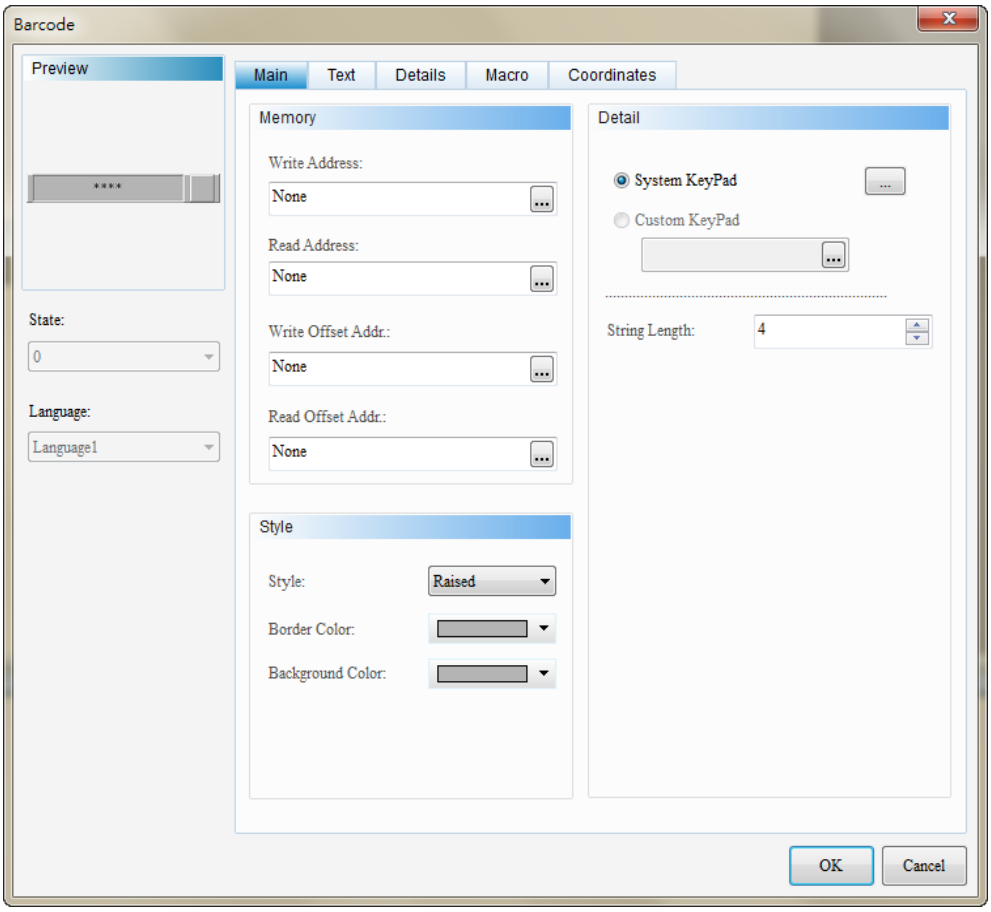


Figure 13-3-1 Barcode Properties

Barcode	
Function Page	**Content Description**
Preview	Supports neither multistate nor Multi-Language data display.
Main	Sets Read Memory Address, Write Memory Address, Style, Background Color, Border Color. Set String Length.
Text	Sets the font type, font size, font color, and alignment of the text to be displayed.
Details	Sets Enable Input Methods, Popup Enable Address, Interlock State, Interlock Address, Activation Methods, Activation Address, Invisible Address, User Security Level, Low Security, and Hide Character.
Macro	Sets Edit Before execute Macro and After execute Macro.
Coordinates	Sets the X-Y coordinate, width, and height of elements.

Table 13-3-2 Barcode Function Screen

◆ Main

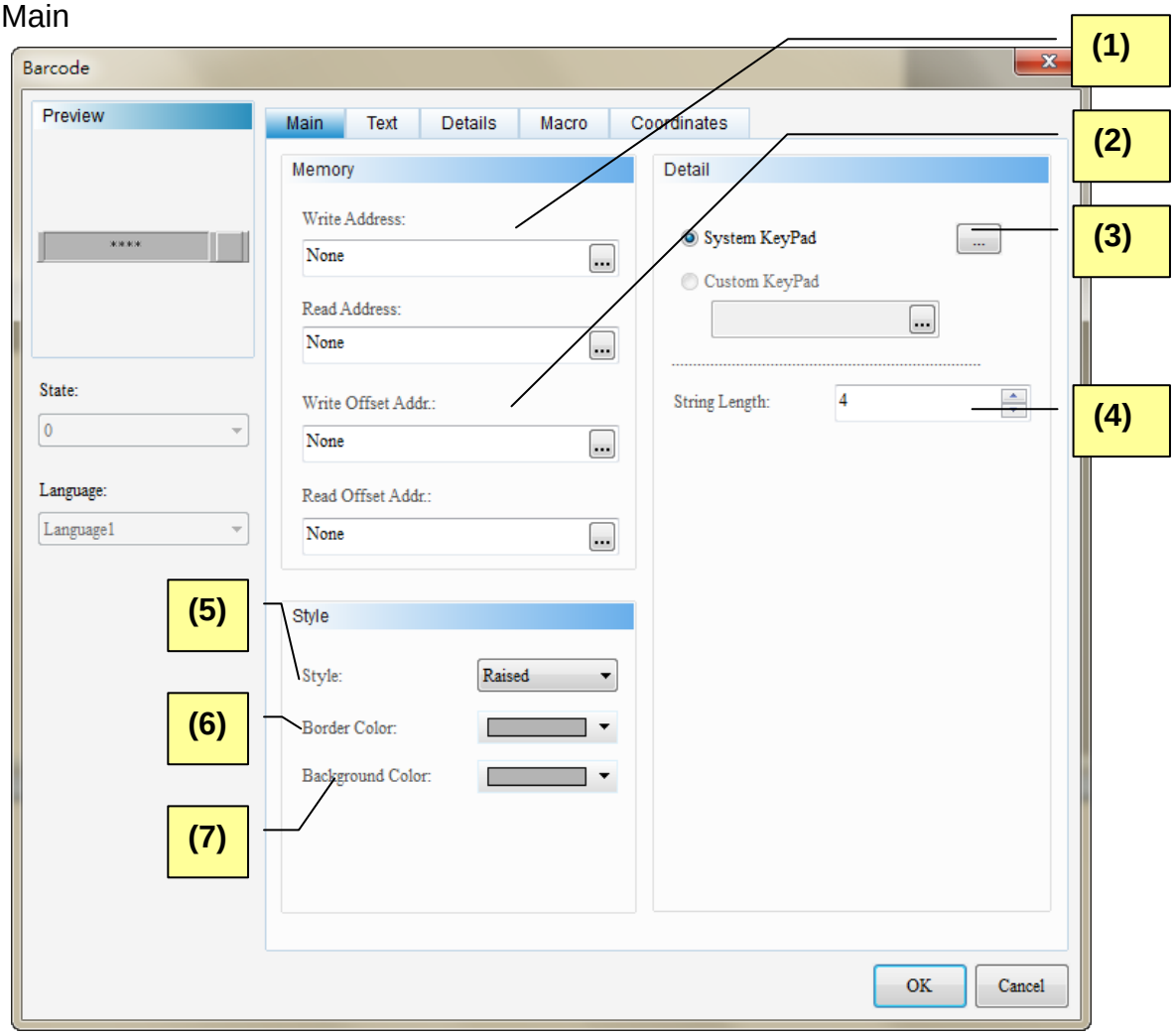
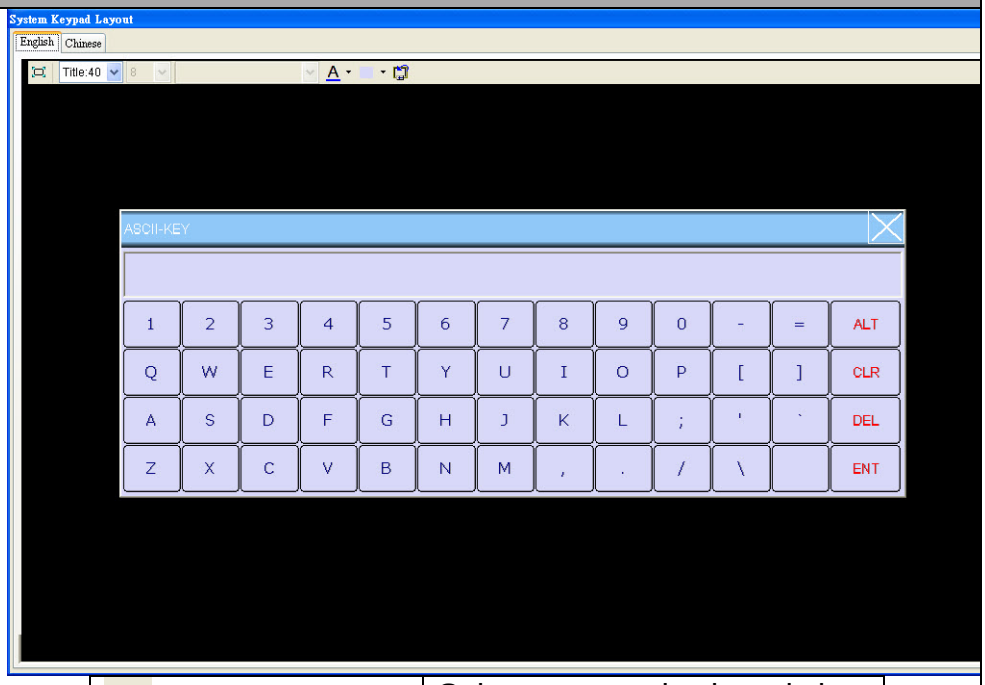
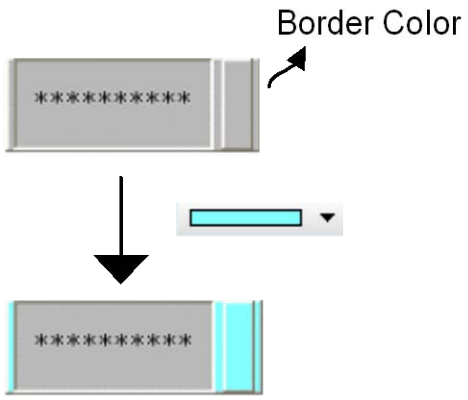
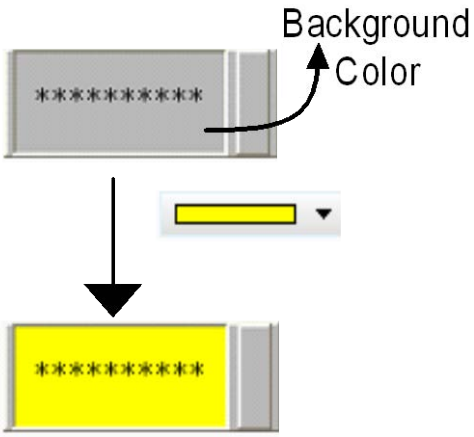


Figure 13-3-2 Barcode Element Main Properties Page

No.	Property	Function
(1)	Write Address Read Address	➢ Selects the address of internal memory or controller register. ➢ Selects link name or Style. Please refer to 5-1 Buttons of Chapter 05.
(2)	Write Offset Address Read Offset Address	➢ Please refer to Appendix D Writing and Reading Offset Address.
(3)	System Keyboard	➢ Edit System Keyboard allows users to adjust keyboard size; title size; the font size, font type and font color of data display; and the background color of text keyboard window.

No.	Property	Function
		 Selects system keyboard size Title:40 — Sets title height 10 — Sets font size Arial — Selects font type Sets font color Selects background color Default size
(4)	String Length	➢ String Length: 1 to 256.
(5)	Style	➢ There are four Styles, including Standard, Raised, Sunken, and Transparent. Users can change the element appearance. Standard: ********** Raised: ********** Sunken: ********** Transparent: **********
(6)	Border Color	➢ Sets border color. ➢ When Style is “Transparent” or “Sunken”, Border Color is disabled.

No.	Property	Function
		
(7)	Background Color	➢ Sets background color of elements. ➢ When Style is “Transparent”, background color is disabled. 

◆ Text

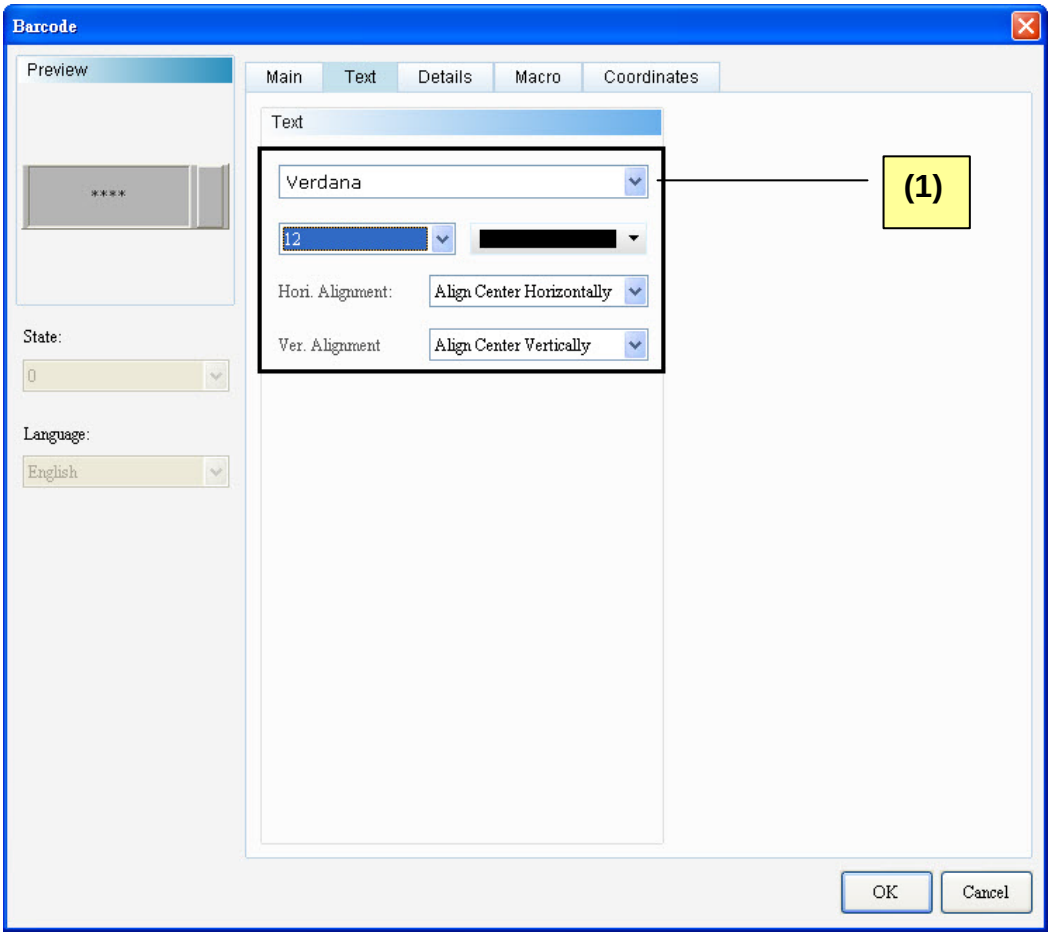


Figure 13-3-3 Barcode Element Text Properties Page

No.	Property	Function
(1)	Text Properties	➢ Sets text properties, including font type, font size, font color, and text alignment.

◆ Details

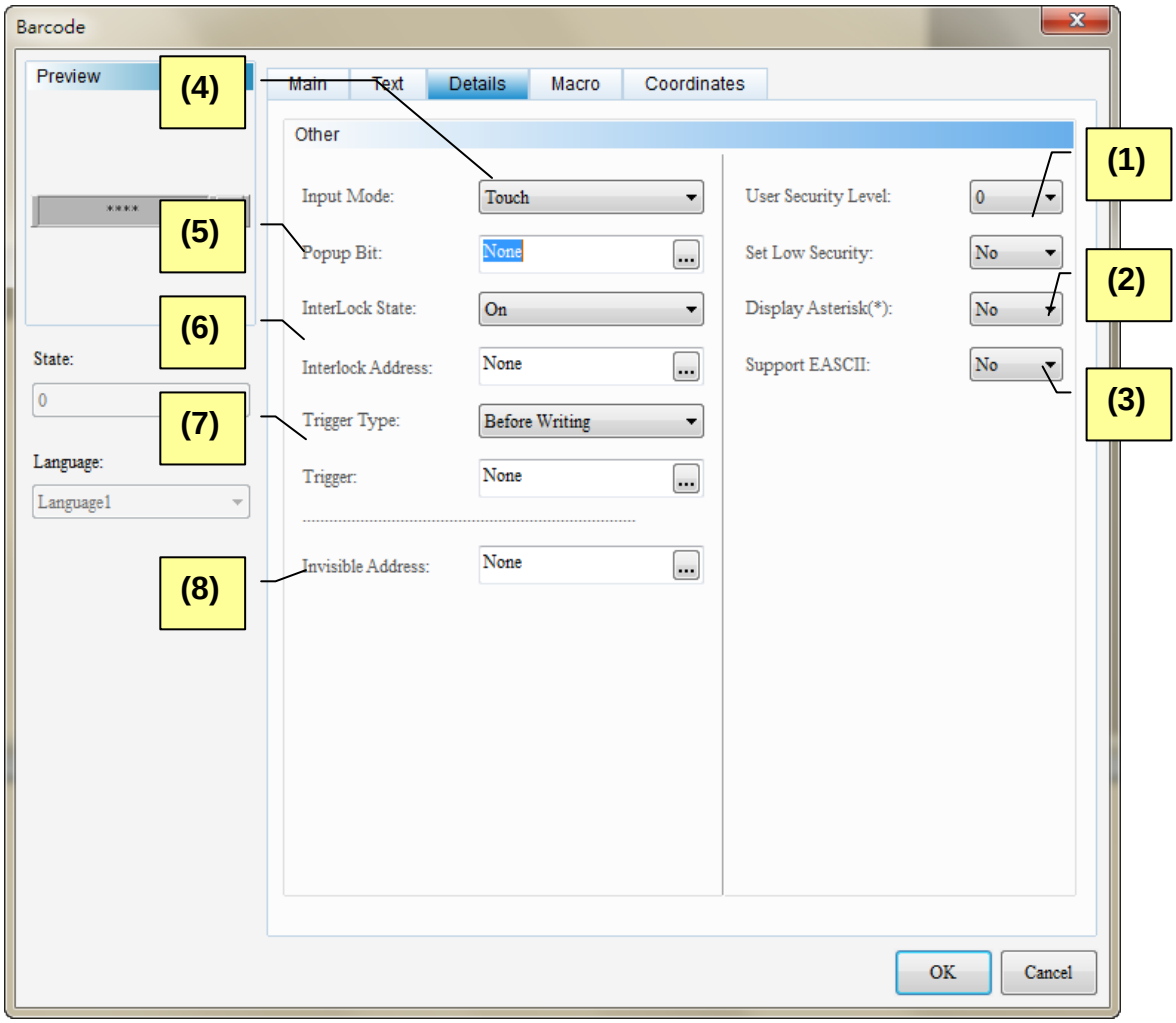
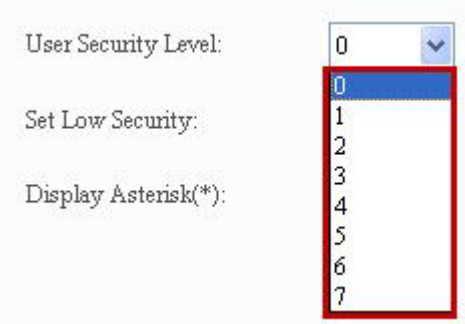
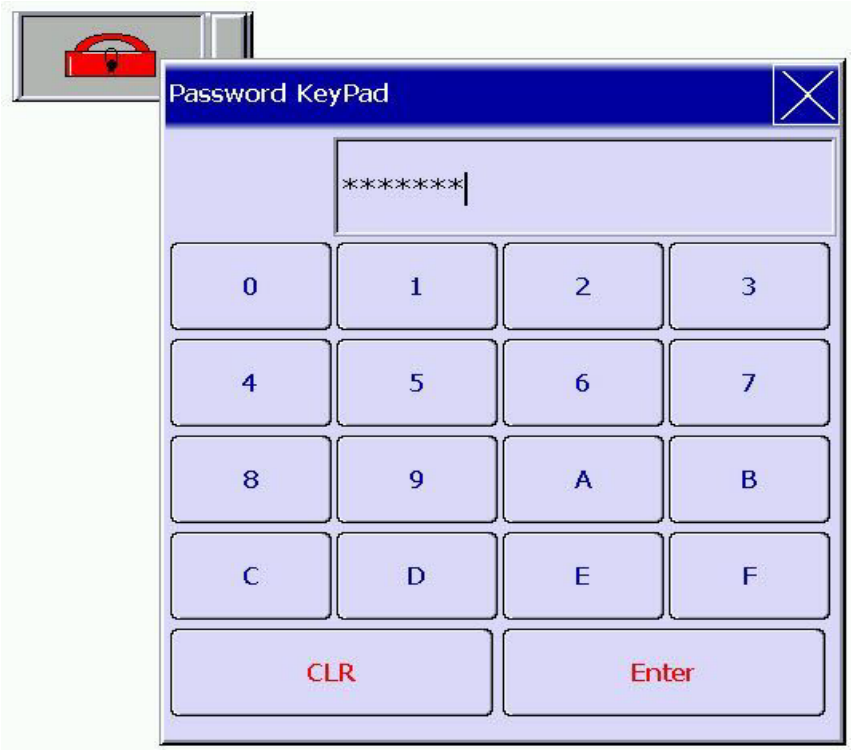
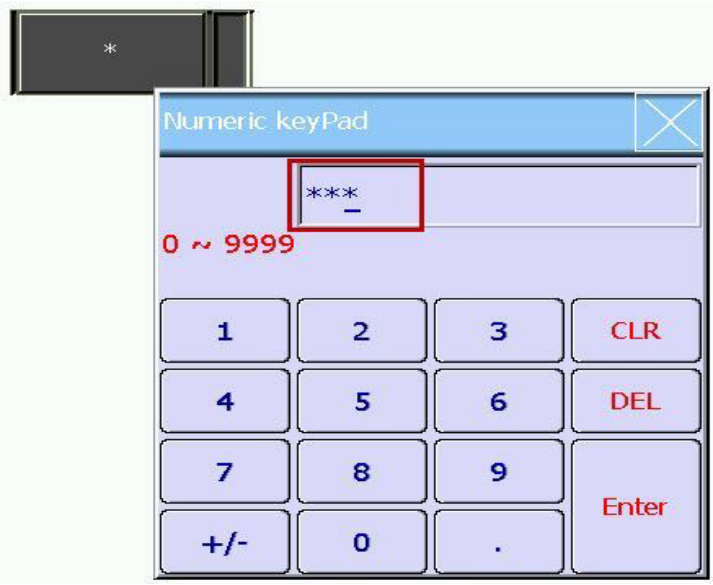


Figure 13-3-4 Barcode Element Details Properties Page

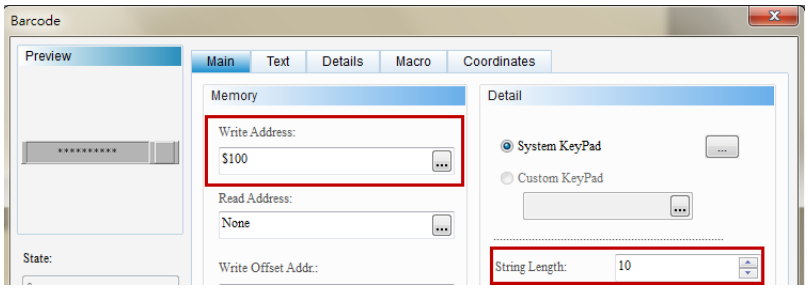
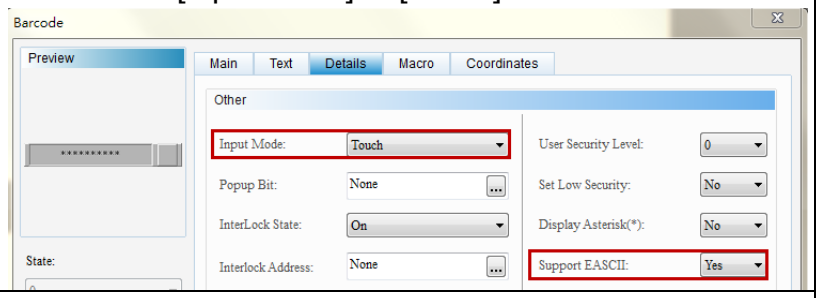
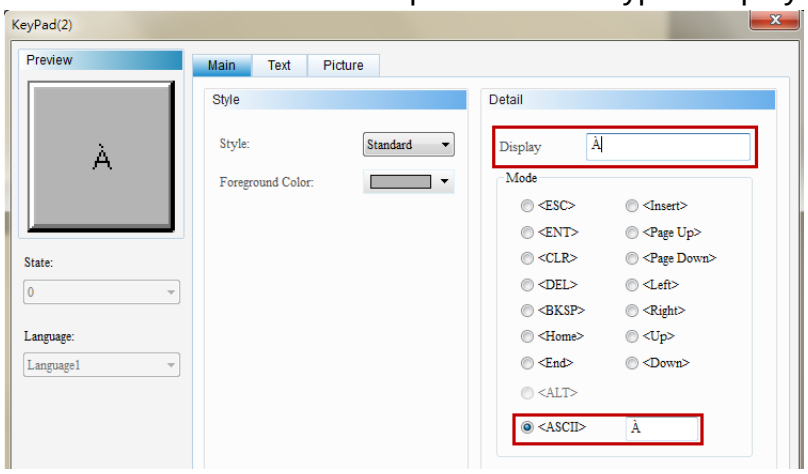
No.	Property	Function
(1)	User Security Level Set Low Security	 ➢ Sets the user security level of element activities. Only users with equal or higher security level corresponding to the element can activate the element. ➢ After setting the user security level, when users activate the element, the password box will pop up and request users to input the password (the password can be changed from the password setup element, please see 5-7 Password Table).

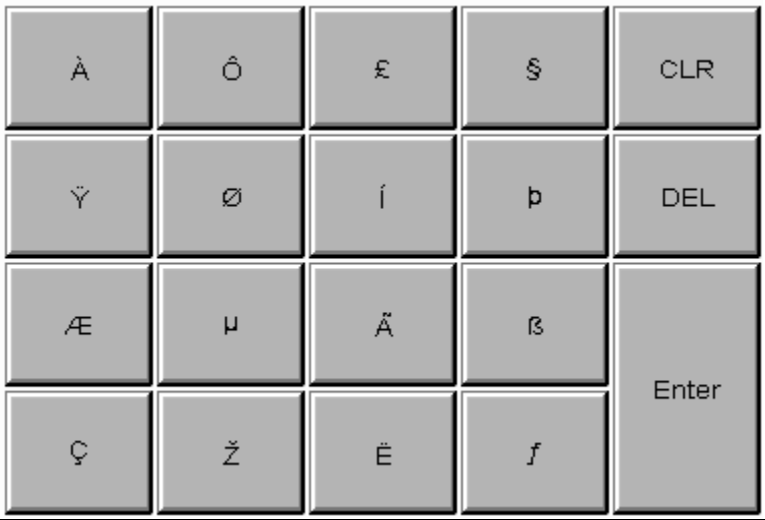
No.	Property	Function
		 ➢ If "YES" is selected for Set Low Security, HMI automatically sets the security to the lowest level every time users input the password. When users activate the element again, they will be requested to input again the password corresponding to the element.
(2)	Display Asterisk	➢ If "YES" is selected for Hide Character, all numbers input from the numeric keypad will be displayed as "***", i.e. characters are hidden, as shown below. 
(3)	Support	➢ If "Yes" is selected for Support EASCII, it means your HMI supports

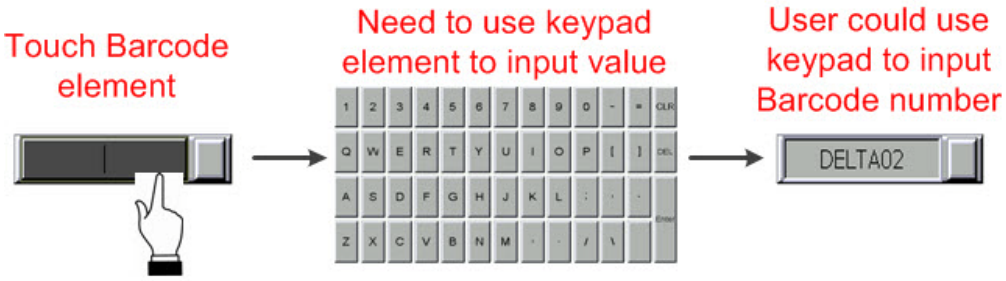
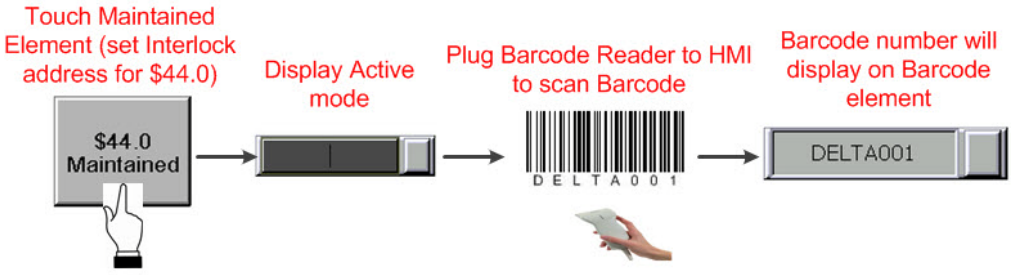
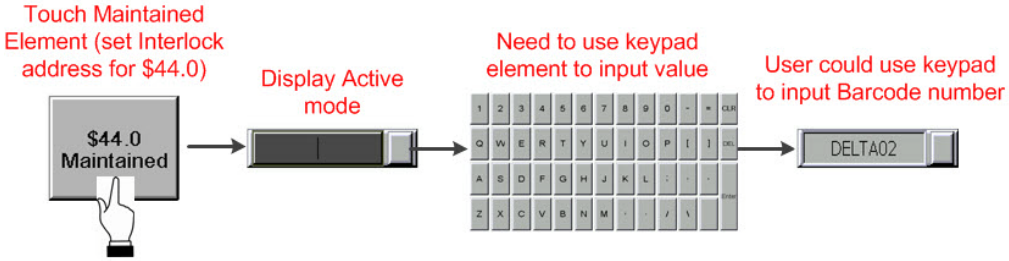
No.	Property	Function
	EASCII	Swedish. ➢ EASCII Table： ✐ Extended ASCII has two types, one is defined by IBM and the other is defined by ISO/IEC 8859-1. The version of EASCII is different in each operating system. Most cases follow the rule that defined by ISO/IEC 8859-1, so do Microsoft and Delta's HMI. ✐ See the supported extended characters below:

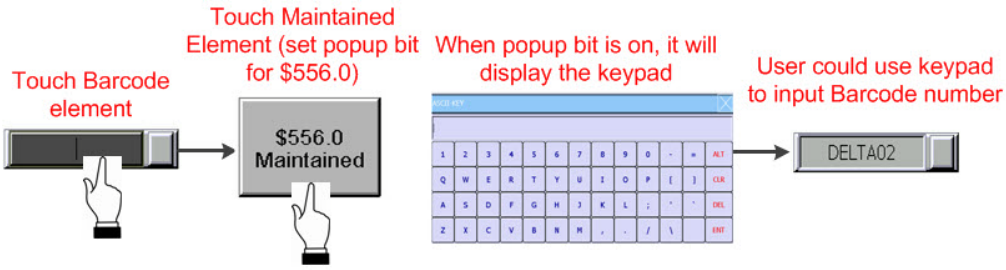
Character						
€	—	¬	¿	Ò	å	ø
‚	˜		À	Ó	□	ù
ƒ	™	®	Á	Ô	ç	ú
„	š	¯	Â	Õ	è	û
…	›	°	Ã	Ö	é	ü
†	œ	±	Ä	×	ê	ý
‡	ž	²	Å	Ø	ë	þ
ˆ	Ÿ	³	Æ	Ù	ì	ÿ
‰	¡	´	Ç	Ú	í	
Š	¢	µ	È	Û	î	
‹	£	¶	É	Ü	ï	
Œ	¤	·	Ê	Ý	ð	
Ž	¥	¸	Ë	Þ	ñ	
‘	¦	¹	Ì	ß	ò	
’	§	º	Í	à	ó	
“	¨	»	Î	á	ô	
”	©	¼	Ï	â	õ	
•	ª	½	Ð	ã	ö	
–	«	¾	Ñ	ä	÷	

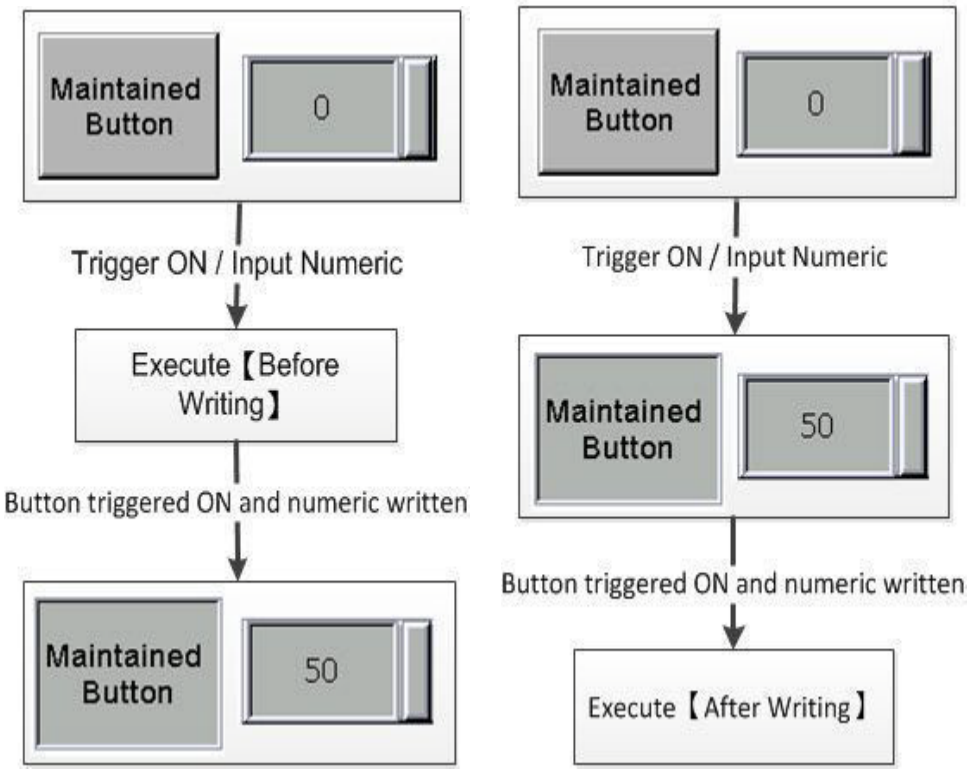
No.	Property	Function
		➢ If "Yes" is selected, this function can work with Keypad. See the followings for further descriptions.

Use Keypad Element	
Create Barcode Entry Element	✎ Set the Write Address as $100 and String Length as 10.  ✎ Go to [Details] to set [Support EASCII] to Yes. And set the [Input Mode] to [Touch]. 
Create Keypad (2) Element	✎ Select any of the extended characters that mentioned above and input them for keypad display.  ✎ Follow the steps above and complete the setting of all characters.

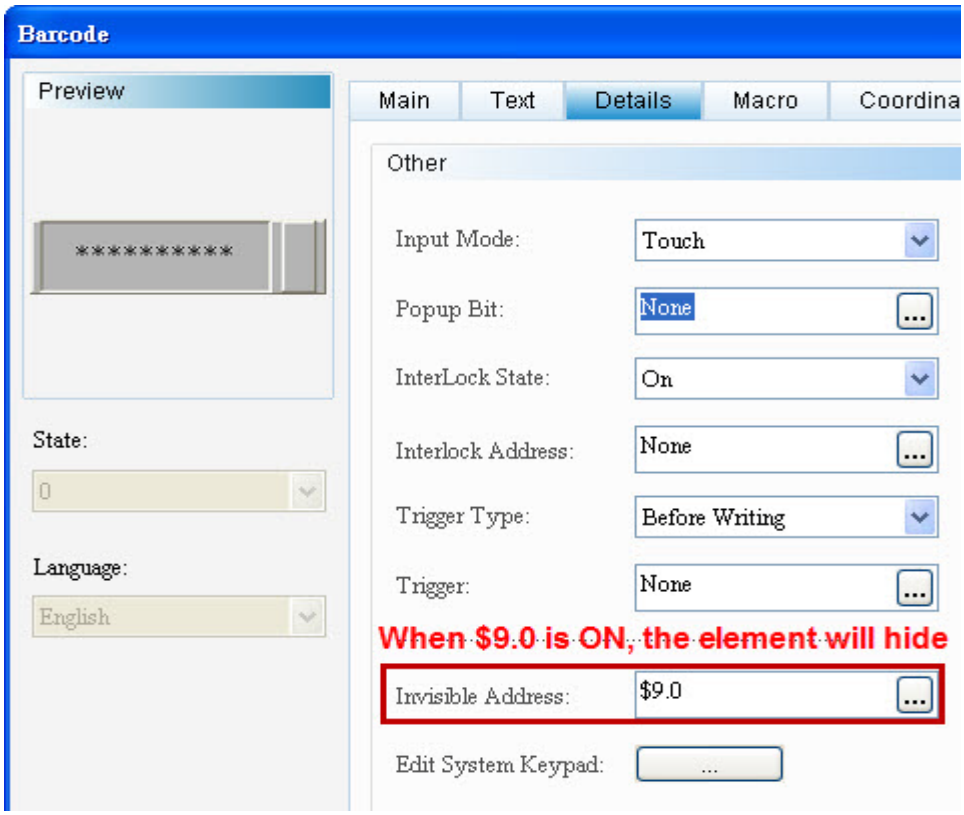
No.	Property	Function
		
		Compile and Download the Screen to HMI Screen ✐ When the setting is complete, please compile and download the screen to HMI. ✐ Please touch the Barcode entry element first. Then, select the extended characters on keypad and press Enter.
		➢
(4)	Input Mode	➢ Input Mode include touch and active. “Touch” is the default input method for Barcode elements. ➢ Touch means after touching the Barcode element, the element

No.	Property	Function
		blinks and scans the barcode or use keypad to input numeric. The element will not be displayed until a barcode is scanned.  ➢ Active must be used along with Interlock Address. Set the interlock address of the Barcode element as “$44.0”, and create a maintained element and set its write memory address as “$44.0”. Also, set Enable Input Methods to “Active” to directly input a barcode from a barcode reader or additional keyboard.  
(5)	Popup Bit	➢ Popup bit allows users to input barcodes on their own. “ON” means users can input barcodes manually; while “NO” means manual input is disabled. ➢ Popup bit can only be used when Input Mode is set to “Touch”. If Input Mode is set to “Active”, it means no keyboard will pop up, and Popup bit is disabled. ➢ Input Mode as “Touch”:

No.	Property	Function
		■ Set Popup bit of Barcode Element as $556.0. After touching the Barcode element, activate Popup bit, and the ASCII keyboard will pop up. 
(6)	Interlock State	➢ Interlock Address allows users to operate an element from this particular address. It must be used along with Interlock State. If Interlock State is “OFF”, this means the interlock address is operable when the interlock state is “OFF”. In contrast, when Interlock State is “ON”, this means the interlock address is operable when the interlock state is “ON”. ➢ The operations are as follows: 1. First, create a maintained button and set its write memory address as “$44.0”. Next, set its write memory as “$555” from the Numeric Entry element and the interlock address of the Character Entry element as “$44.0” 2. To make Barcode Element $555 operable, press the maintained button $44.0 to enable $555.
	Interlock Address	

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td rowspan="2">(7)</td><td>Trigger type</td><td>➢ Trigger type include before writing and after writing.
<table>
<tr><th rowspan="2">Trigger type</th><th>Before writing</th><th>After writing</th></tr>
<tr><td>The activation bit is ON before changing values.</td><td>Values are changed before the activation bit is ON.</td></tr>
</table>
➢ As the activation function only sets the activation address to ON, users must set the activation address of OFF before re-activation.
➢ Before writing: After writing

</td></tr>
<tr><td>Trigger</td></tr>
<tr><td>(8)</td><td>Invisible Address</td><td>➢ When Invisible Address is “ON”, the button element is hidden, and the corresponding function is disabled.

</td></tr>
</table>

No.	Property	Function
		

◆ Coordinates

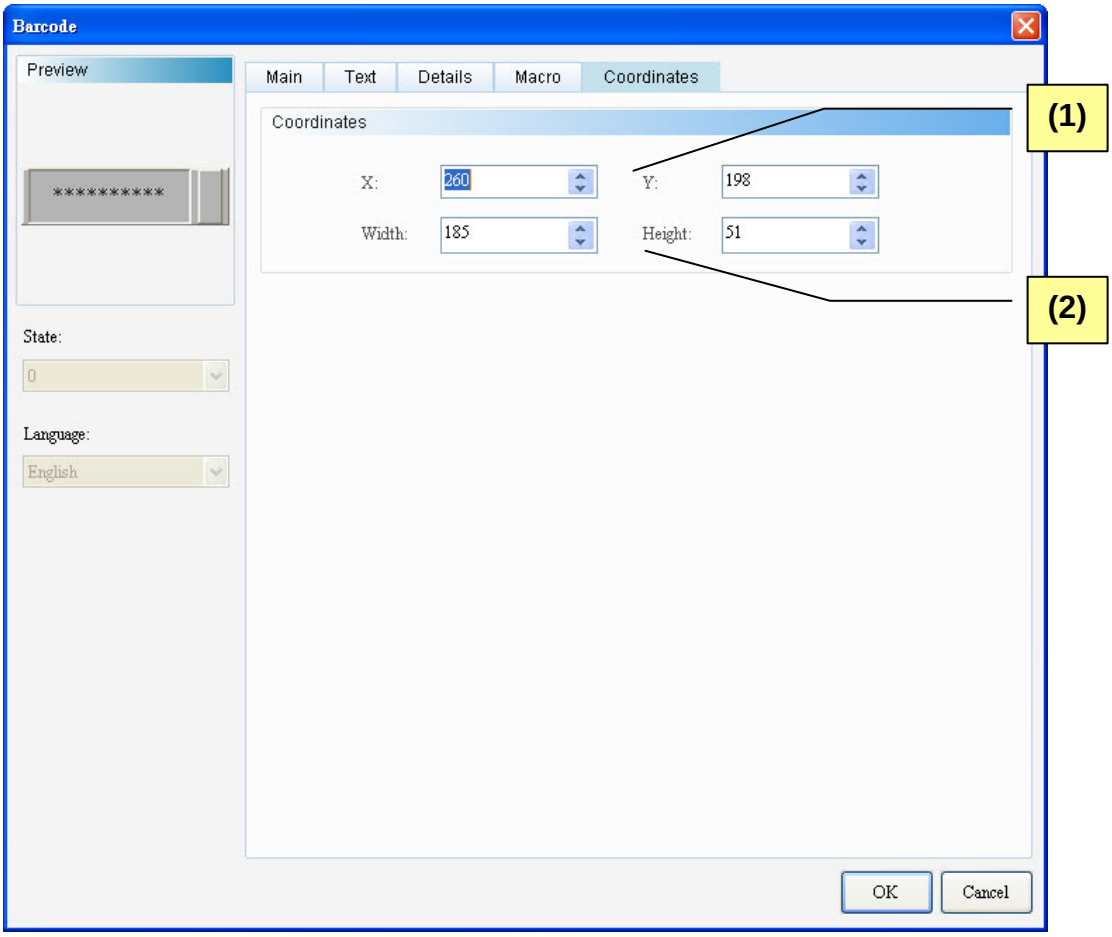


Figure 13-3-5 Barcode Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

◆ Macro

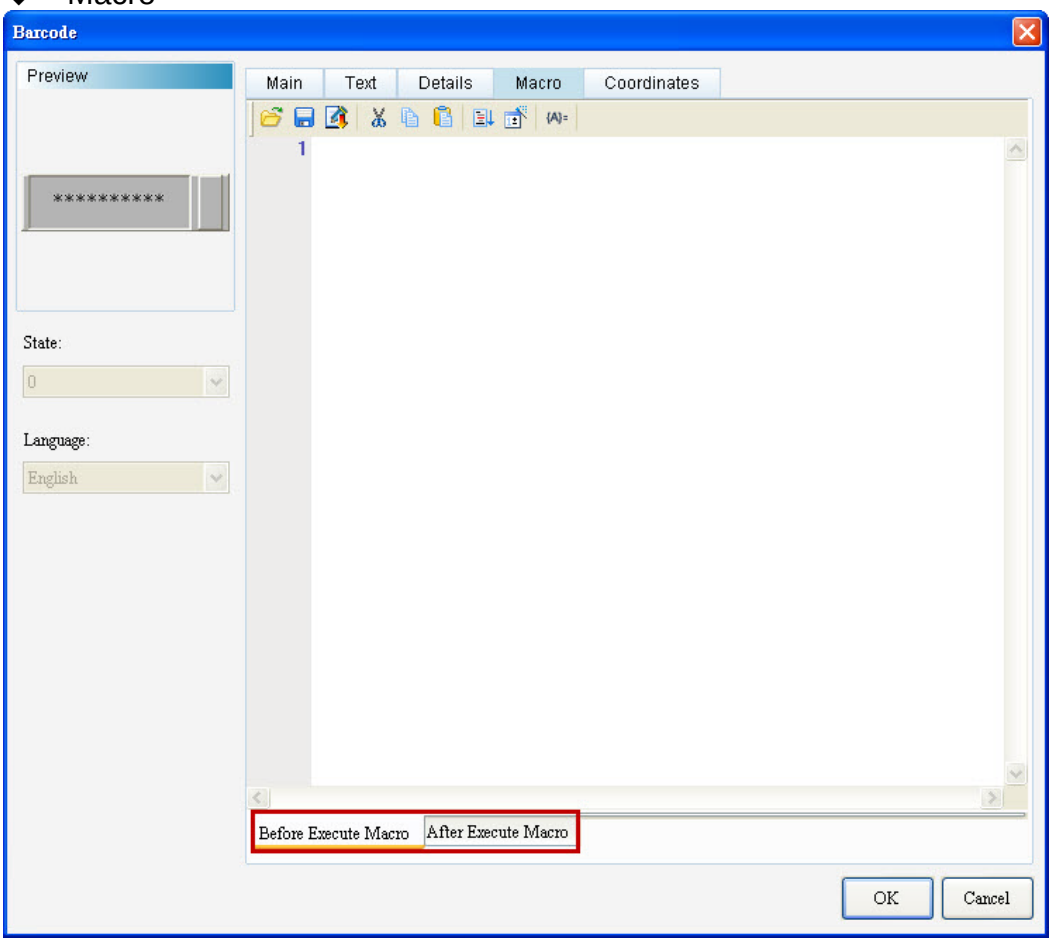
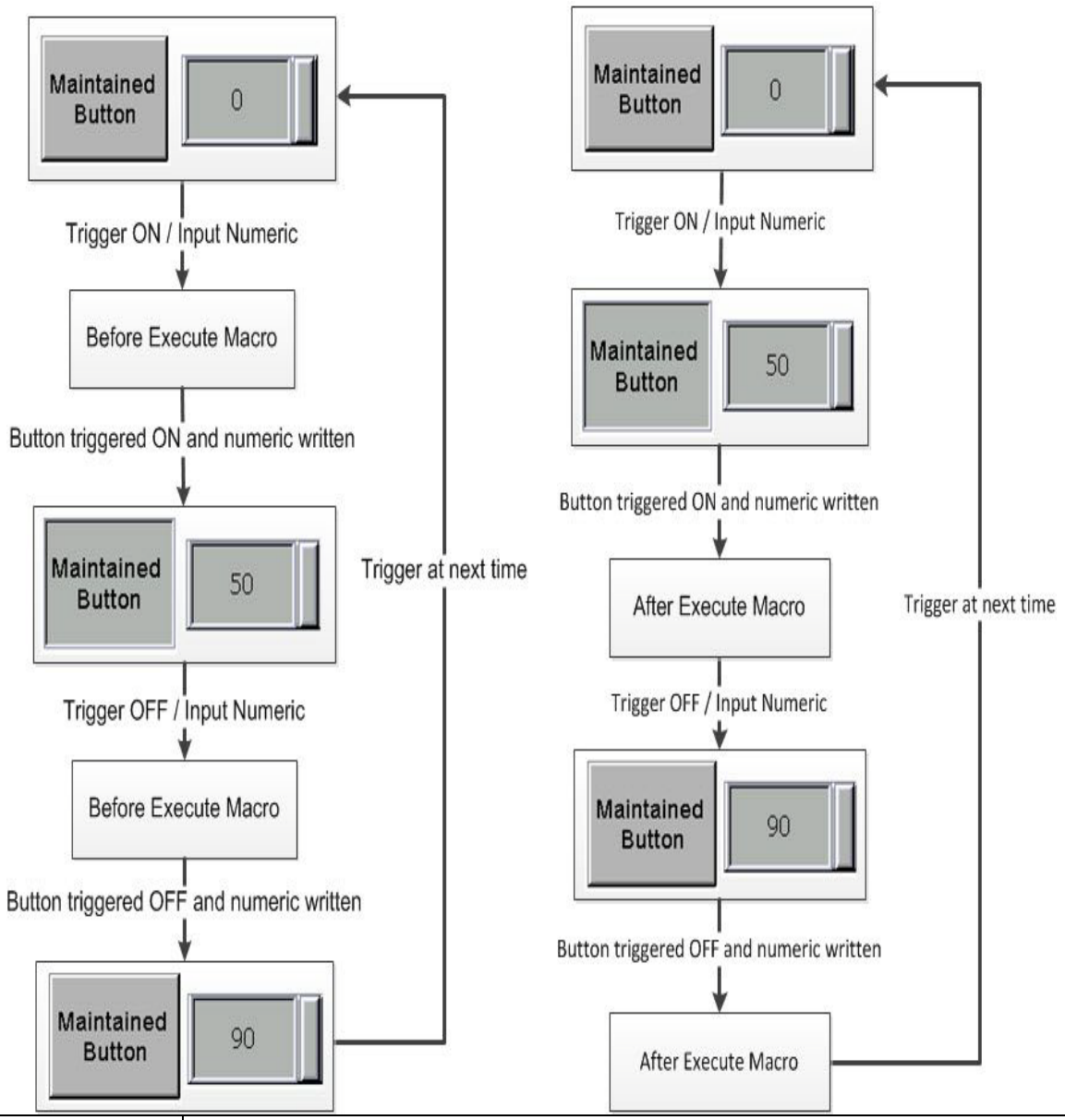


Figure 13-3-6 Barcode Element Macro Properties Page

No.	Property	Function
(1)		➢ The before execute macro and after execute macro processes are diagrammed below: 
	Before execute Macro	➢ When users touch the button element, HMI will first run the commands in the corresponding macro pre-action of the button action. If the button state is not changed by means of touching button (using external controller commands or other macros), HMI will not run the corresponding macro commands.
	After execute Macro	➢ After users touch the button element, HMI will first run the button action pre-action the commands in the corresponding macro. If the button state is not changed by means of touching button (using external controller commands or other macros), HMI will not run the corresponding macro commands.

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Chapter 14 Curve

This chapter mainly describes the curve elements provided in the DOPSoft and how they are operated and configured.

◆ Curve Element Classification

Curve		Trend Graph
		X-Y Chart
		X-Y Distribution
		Curve Input

Table 14-1-1 Curve Element Classification

◆ Curve Element Shared Properties

Curve Element	Read Address	Write Address	Style (Border Color/Grid Line Color/Grid Number in/Element Style/ Element Background Color/Curve Field Total)	Horizontal Line Number/ Vertical Line Number	Connect Two Points	Curve Type	Grid Line	Projection Axis	Minimum / Maximum / Line Size / Line Color
Trend Graph	◎		◎					◎	◎
X-Y Chart	◎		◎ (No Grid Number in)	◎	◎			◎	◎
X-Y Distribution	◎		◎ (No Grid Number in and Curve Field Total)	◎					
Curve Input	◎		◎			◎	◎		◎

Curve Element	Sample	H. Min. / H. Max. / V. Min. / V. Max.	X/Y/Color/Connection/ X-Minimum /X-Maximum / Y-Minimum /Y-Maximum	Sample Number/ Data Format	Max. Sample Number/ Sample Flag	Control Address	H. Read Address/V. Read Address	Continuous Address	Auto Clear
Trend Graph				◎	◎				
X-Y Chart		◎		◎	◎		◎		
X-Y Distribution	◎		◎			◎		◎	◎
Curve Input				◎					

Table 14-1-2 Curve Element Shared Properties

14-1 Trend Graph

	Trend Graph

The Trend Graph is drawn according to the read address selected by users. Users can also define the curve count that is displayed. A Trend Graph element supports a total of 4 curves. This element draws curves with the curve sampling flags under from [Options]→ [Configuration…]→ [Control Block]→ [Curve Control]. Curve Sampling Flags 1-4 correspond to Sampling Flag 1-4 in the Trend Graph element.

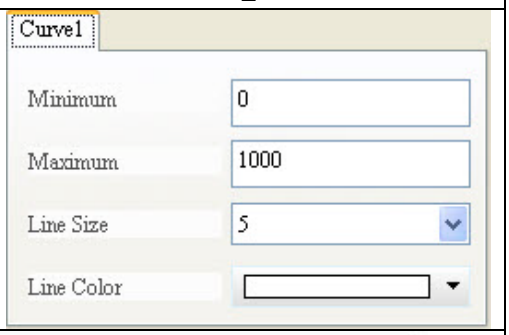
Please refer to 14-1-3 Example of Trend Graph below.

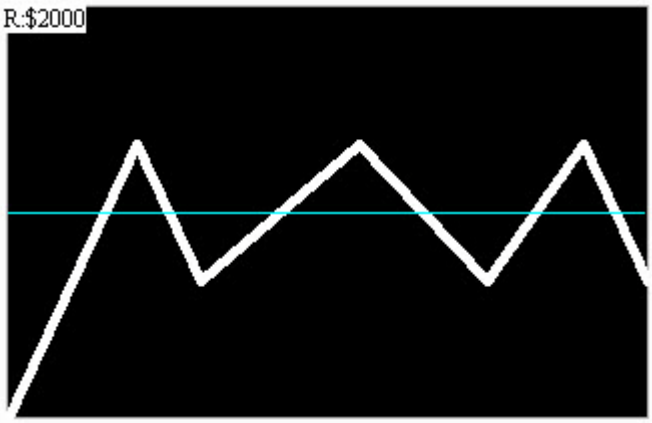
Example of Trend Graph

Table 14-1-3 Example of Trend Graph

Trend Graph Element

➢ Create a Trend Graph element and set the relevant parameters.

Trend Graph Element	
Read Address	$2000
Sample Number	5
Sample Flag	1
Curve Field Total	1
Minimum /Maximum Line Size/Line Color	



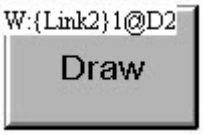
Numeric Entry Element

➢ Five numeric entry elements are created because the sampling point setting of Trend Graphs is “5”. As it needs 5 sampling points for a curve element to draw a curve, five addresses are read from Read Address $2000 defined by the Trend Graph. These addresses are: $2000, $2001, $2002, $2003, and $2004.

Numeric Entry Element					
Write Memory Address	$2000	$2001	$2002	$2003	$2004

Set Constant Element

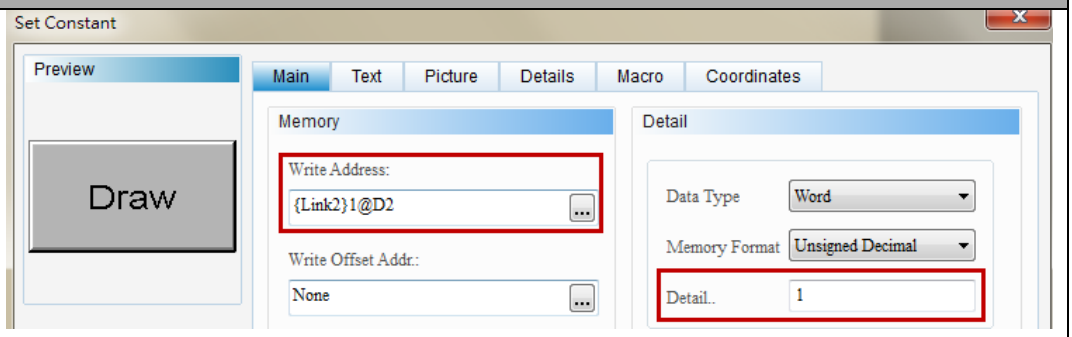
➢ Create the Set Constant Element and set its Write Memory Address as “D2”. This address (D2) is used by the curve control flag in the control block.

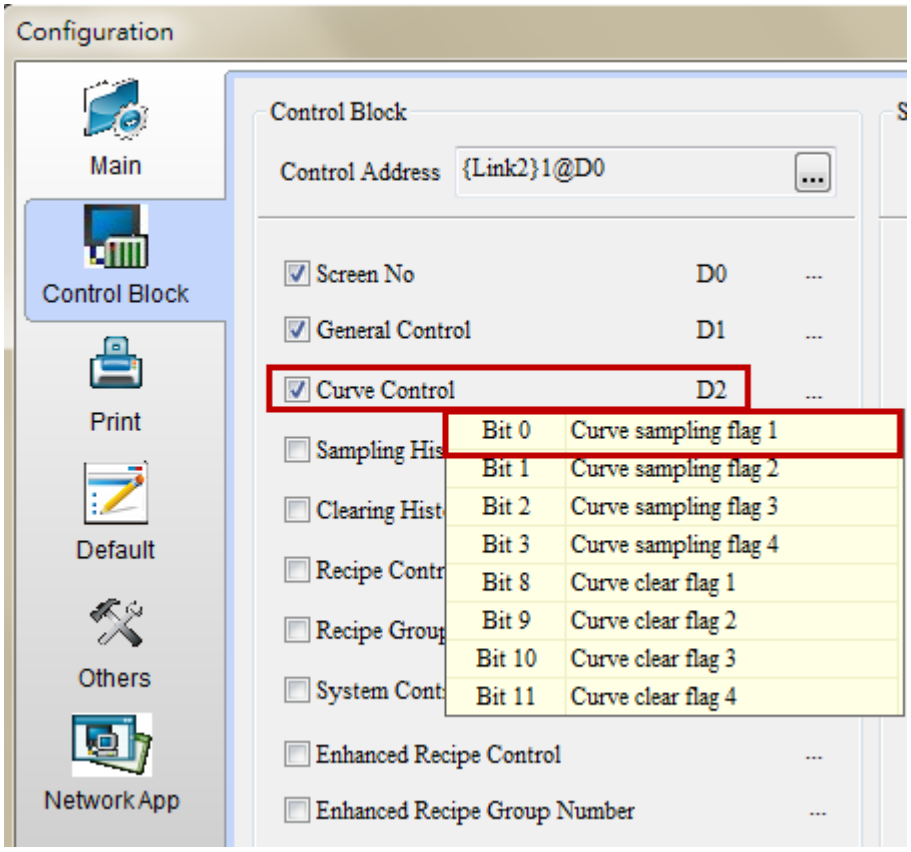


➢ Set “1” for the Set Constant Element. “1” corresponds to **Bit 0 Curve Sampling Flag 1**; “2” corresponds to **Bit 1 Curve Sampling Flag 2**; “4” corresponds to **Bit 2 Curve Sampling Flag 3**, and so on. Users will also discover that “1” is the sampling flag setting of the Trend Graph Element.

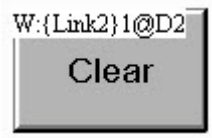
Example of Trend Graph

Table 14-1-3 Example of Trend Graph



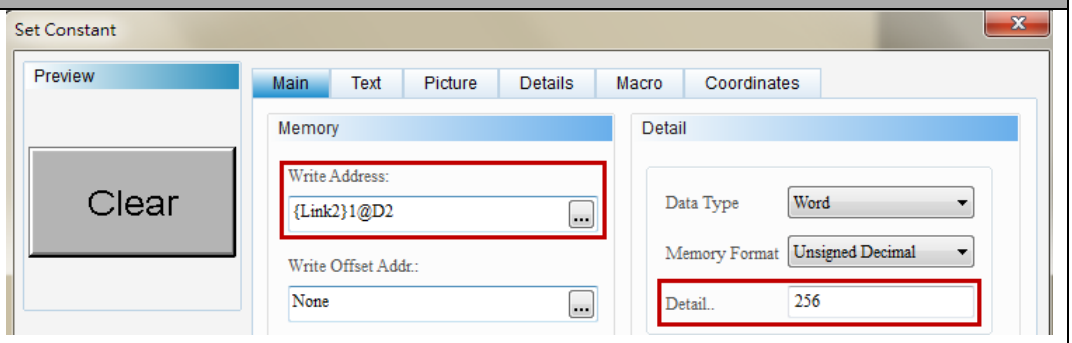


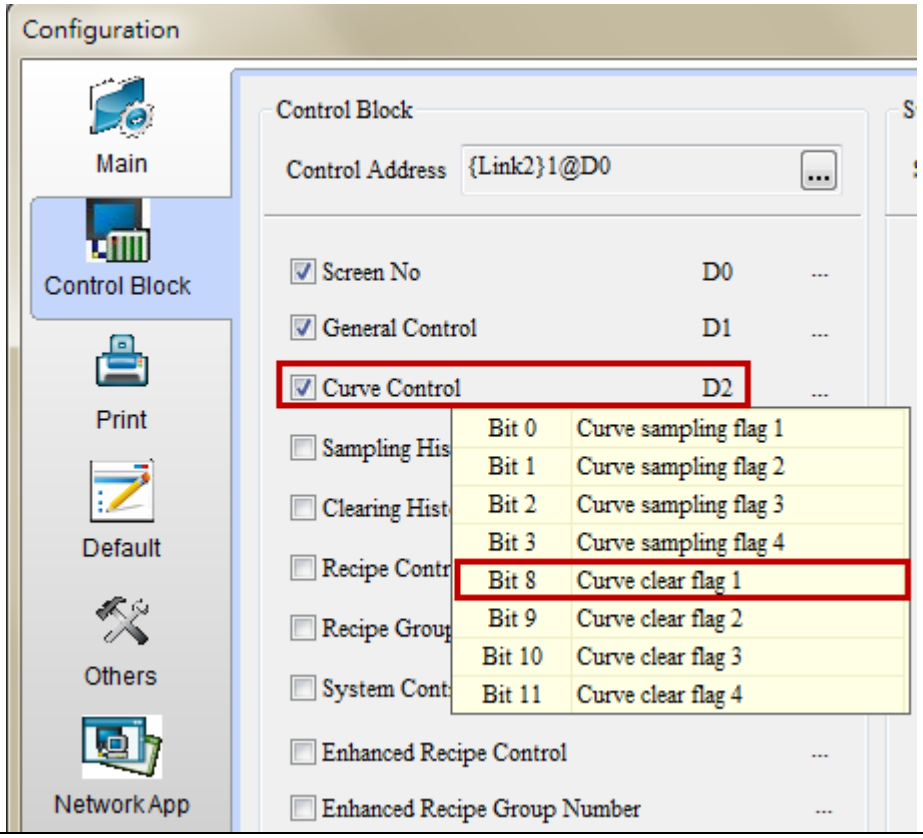
- Create another Set Constant Element. Also set “D2” as the Write Memory Address, and “256” the constant. “256” corresponds to **<u>Bit 8 Curve Clearing Flag 1</u>**



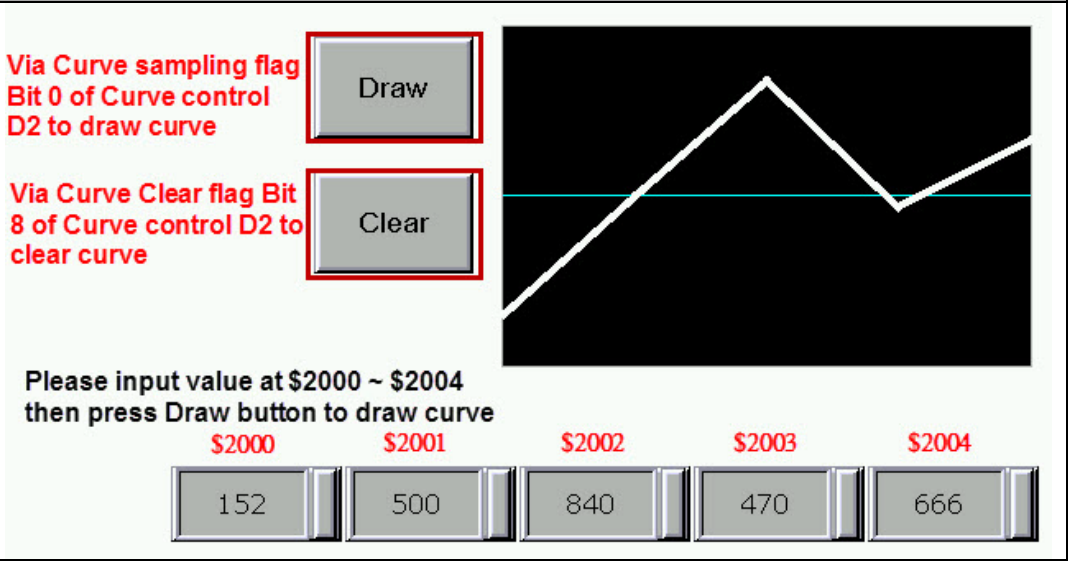
Example of Trend Graph

Table 14-1-3 Example of Trend Graph





Execution Results	➢ After creating elements, run Compile and download them to HMI. Next, input a random value from the Numeric Entry Element, the Trend Graph Element will draw curves according to this value.

Example of Trend Graph Table 14-1-3 Example of Trend Graph	
	

Double-click Trend Graph to call out the Trend Graph Properties screen as shown below.

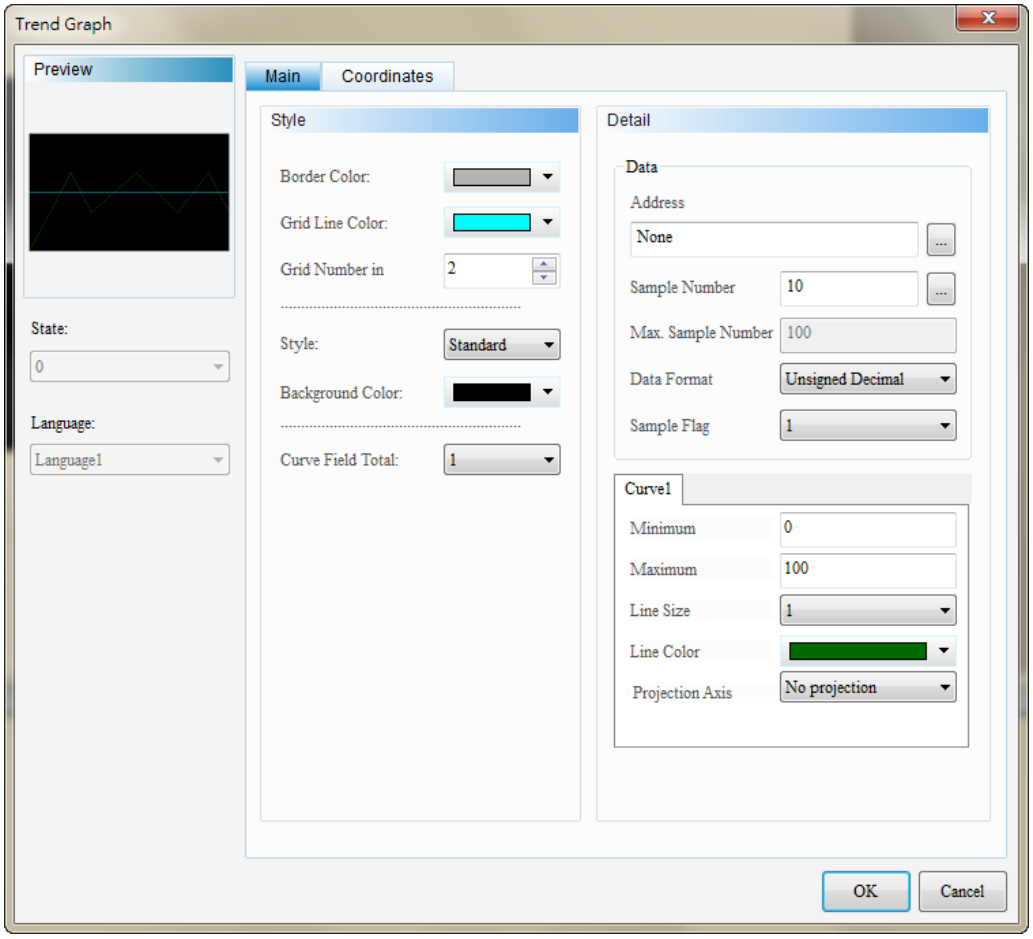


Figure 14-1-1 Trend Graph Properties

Trend Graph	
Function page	**Content Description**
Preview	Supports neither multistate data nor multilingual data display.
Main	Sets Read Address, Sample Number, Max. Sample Number, Data Format, Sample Flag, Minimum, Maximum, Line Size, Line Color and Projection Axis. Sets Border Color, Grid Line Color, Grid Number in, Element Style, Element Background Color, and Curve Field Total.
Coordinates	Sets the X-Y coordinate, width, and height of elements.

Table 14-1-4 Trend Graph Function Page

◆ Main

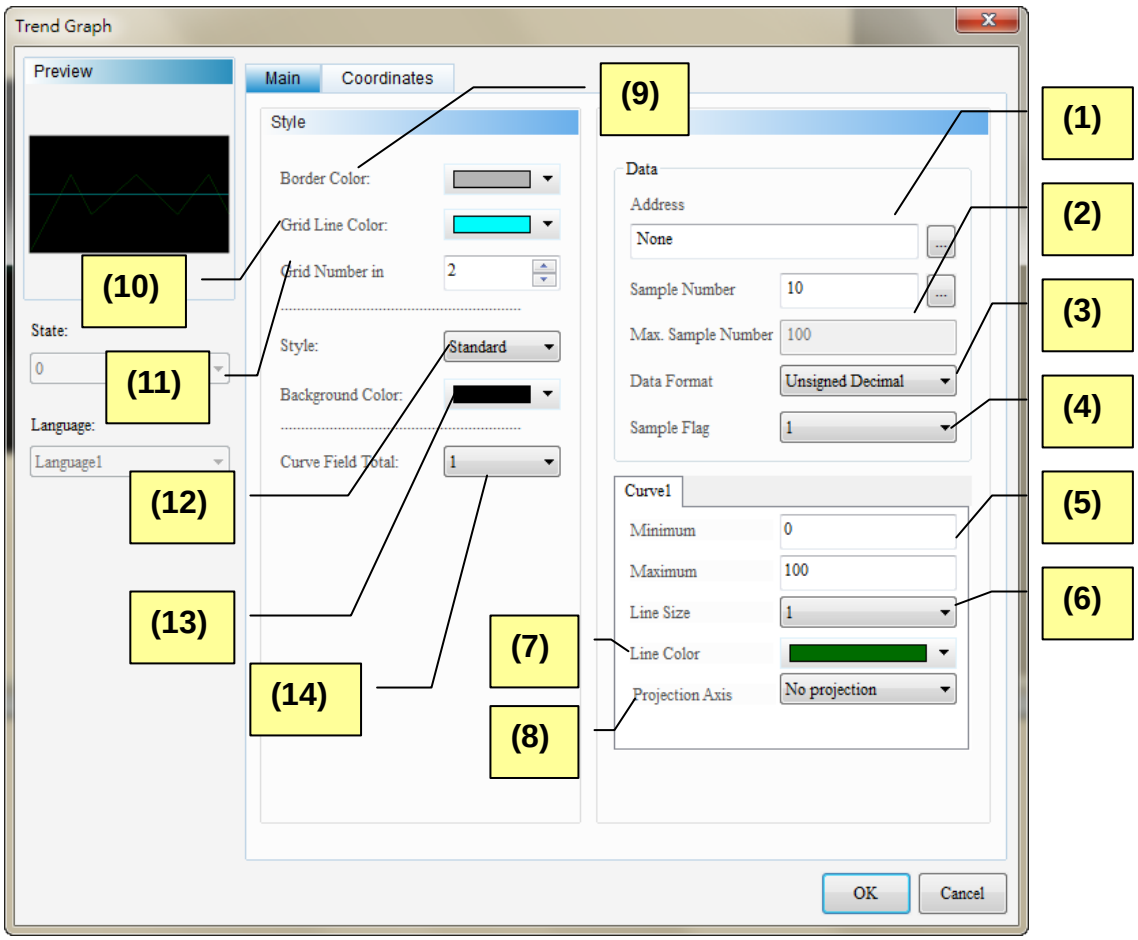
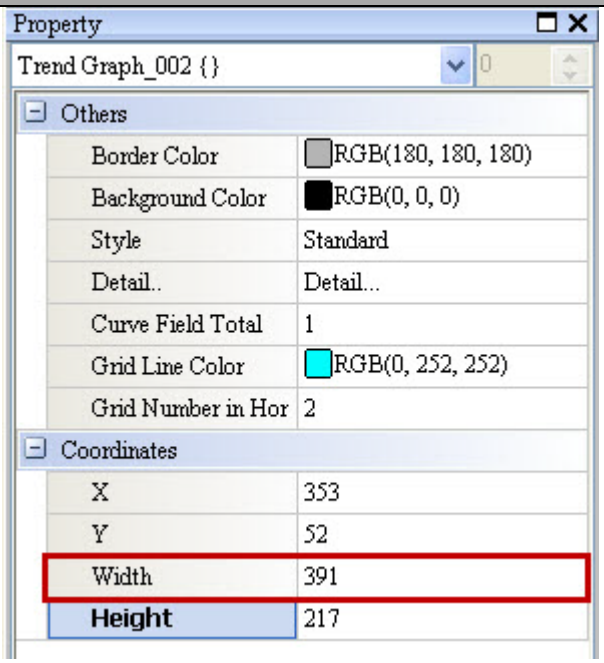
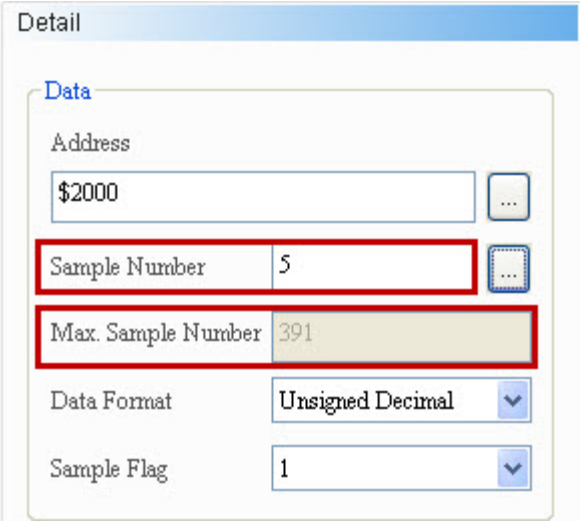
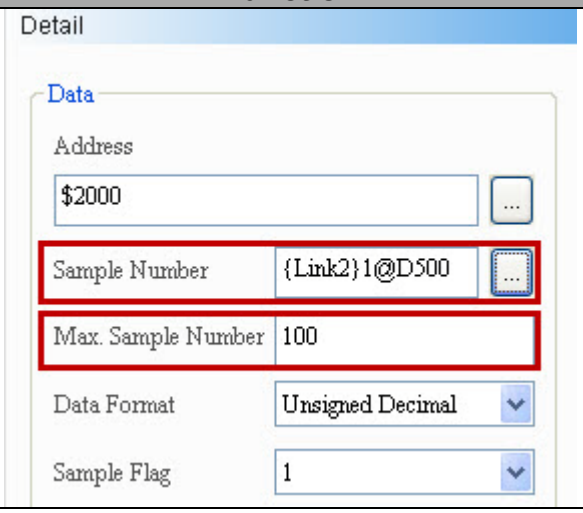
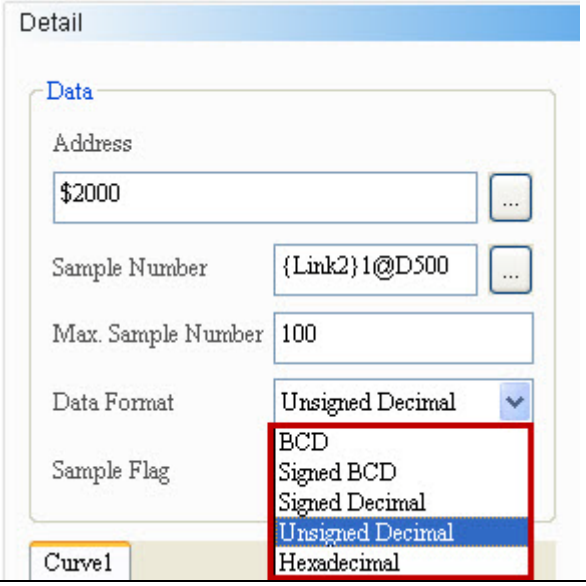
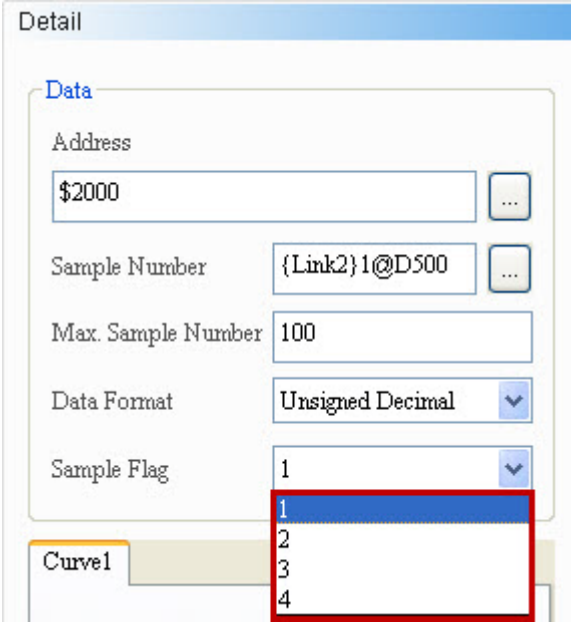
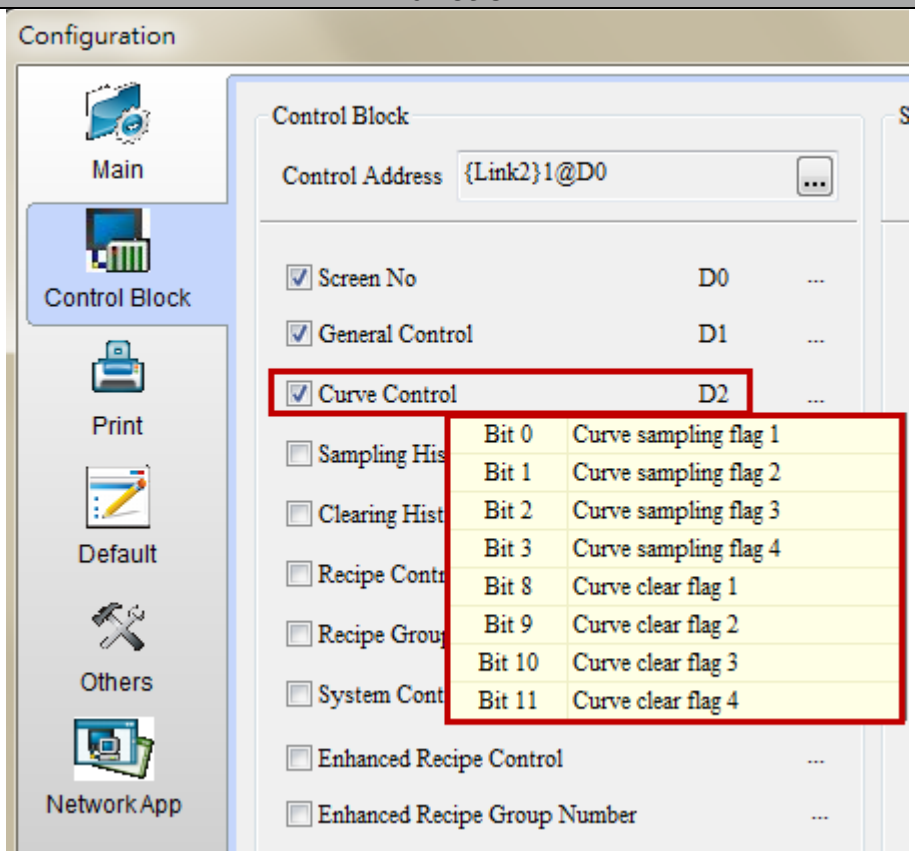
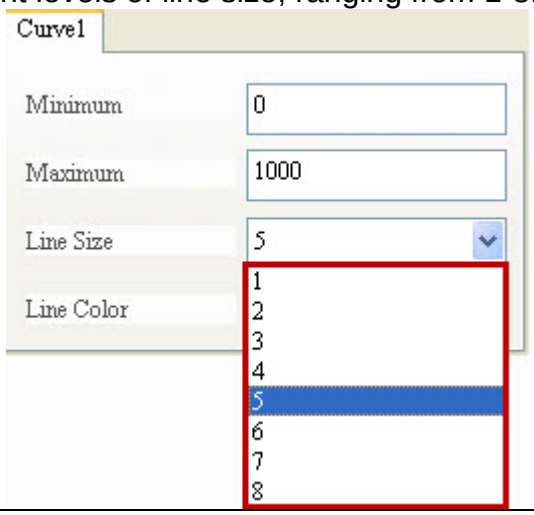


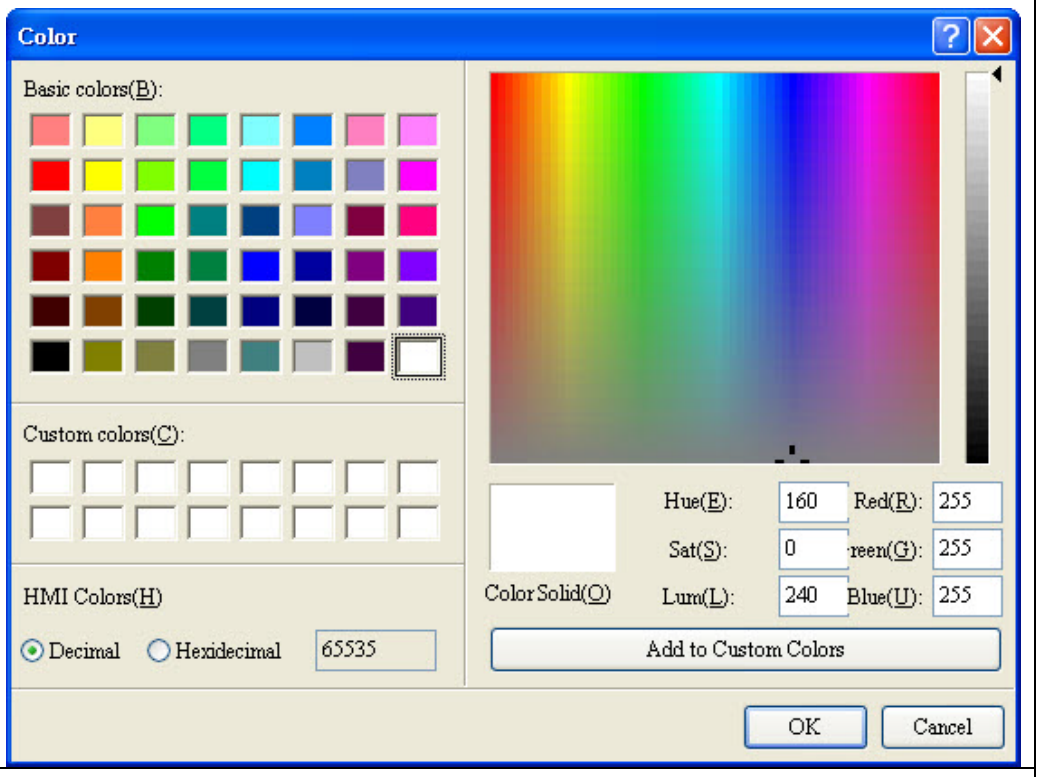
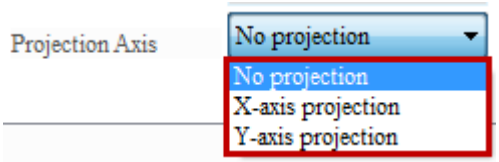
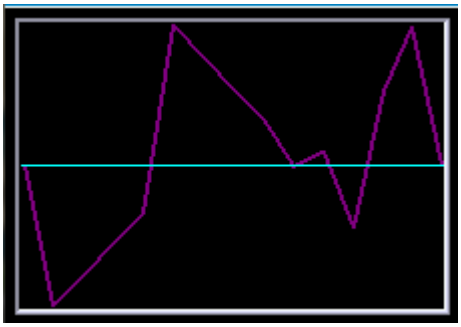
Figure 14-1-2 Trend Graph Element Main Properties Page

No.	Property	Function
(1)	Read Address	➢ Selects the address of internal memory or controller register. ➢ Selects link name or element type. Please refer to 5-1 Buttons of Chapter 05.
(2)	Sample Number/ Max. Sample Number	➢ The size of sample number is determined by element width and element type. When element type “Standard” is selected in the Trend Graph element and element width is “391”, the maximum sample numbers are “391”. When element type “Raise” or “Sunken” is selected in the Trend Graph element (Border width is 7 points) and element width is 391, the maximum sample numbers are 377 (391-(7*2)=377).

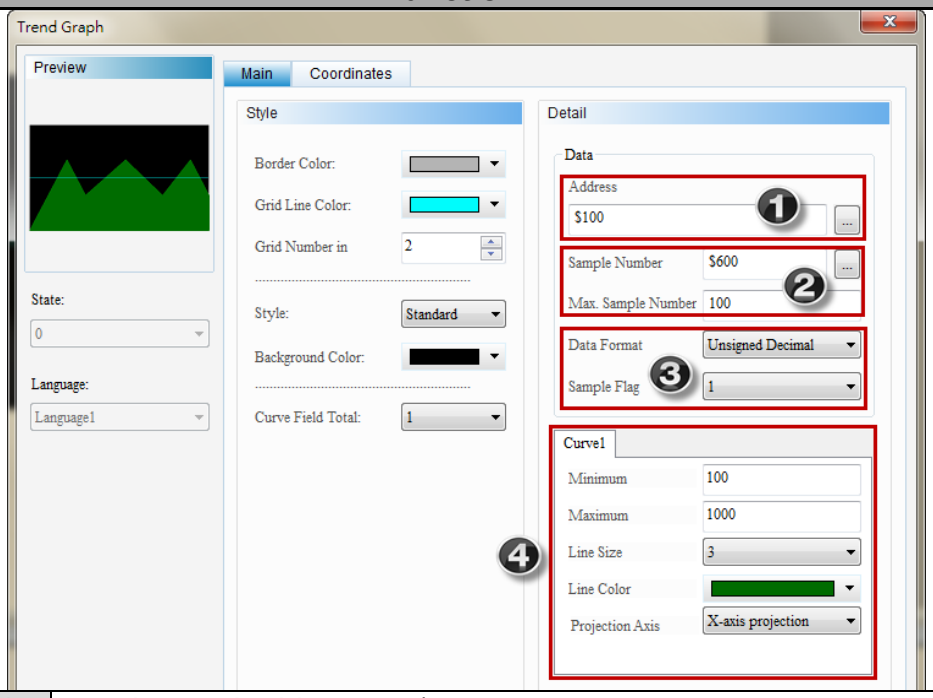
No.	Property	Function
		 ➢ "Sample Number" can be a constant or a variable. ➢ When "Sample Number" is a constant, Max. Sample Number will turn grey and is disabled.  ➢ When "Sample Number" is a variable, users can define its Read Address. Also, users must set Max. Sample Number depending on element width. If the value of "Sample Number" is greater than the value of "Max. Sample Number", the DOPSoft only samples the value of "Max. Sample Number".

No.	Property	Function
		
(3)	Data Format	➢ Trend Graph supports the following data formats: 
(4)	Sample Flag	➢ There are 4 sampling flags corresponding respectively to Curve Sampling Flag 1 to Curve Sampling Flag 4 in the control block. 

No.	Property	Function
		
(5)	Minimum / Maximum	➢ The valid range of minimum and maximum is subject to the data type and data format. **Data Type** / **Data Format** / **Data Valid Range** **Word**: BCD 0~9999; Signed BCD -999 ~ 9999; Signed Decimal -32768~32767; Unsigned Decimal 0~65535; Hex 0~0xFFFF
(6)	Line Size	➢ There are eight levels of line size, ranging from 1-8. 

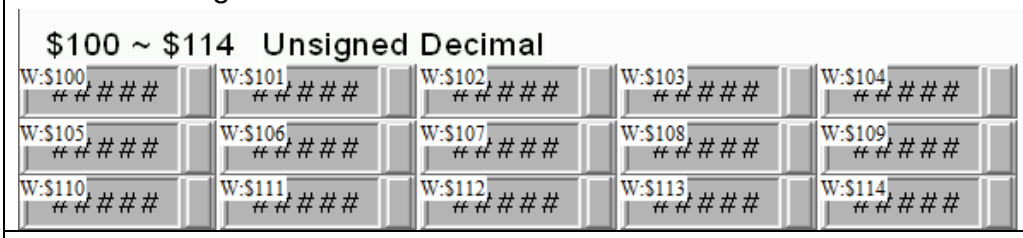
No.	Property	Function
(7)	Line Color	➢ Users can define the color of line display. 
(8)	Projection Axis	➢ The Projection Axis is divided into three kinds, No projection, X-axis projection and Y-axis projection.  ➢ When “No projection” is selected, it means the function remains and displays the curve only.  ➢ Followings provide further information about X-axis and Y-axis projection. **X-axis projection**

No.	Property	Function

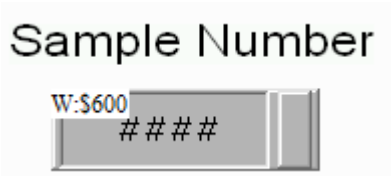


(1)	Set the read address as $100.
(2)	Set the Sample Number to $600 and 100 for the Max. Sample Number.
(3)	Set the Data Format to Unsigned Decimal and Sample Flag to 1.
(4)	Set the Minimum value to 100 and Maximum value to 1000.
	Select X-axis projection for Projection Axis.

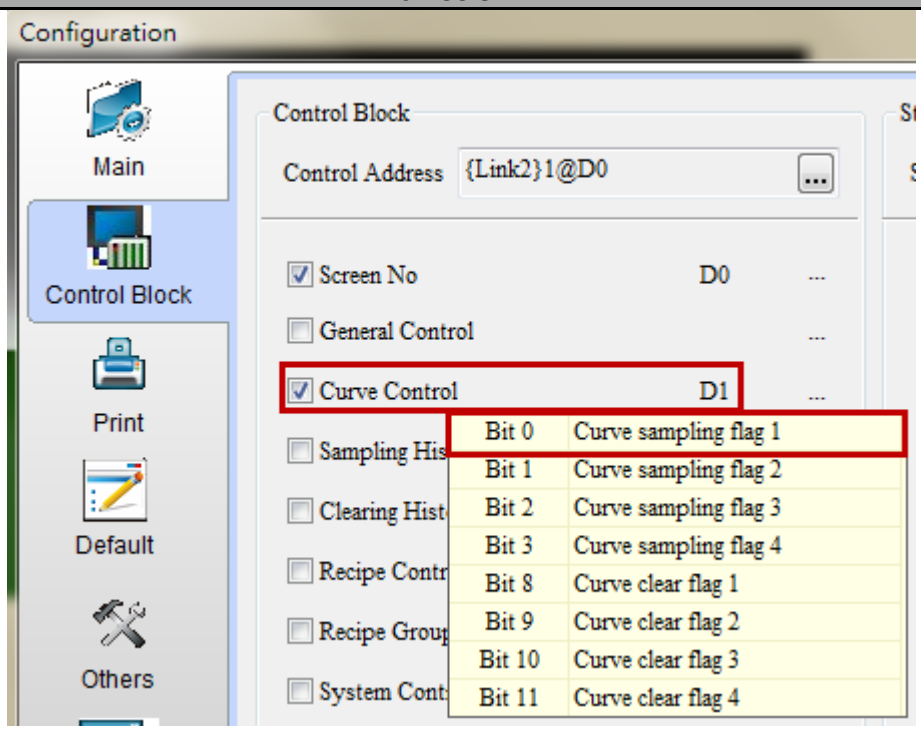
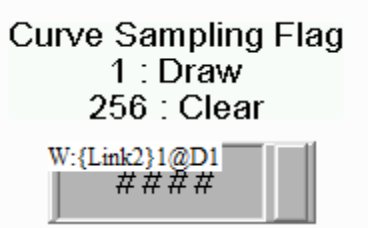
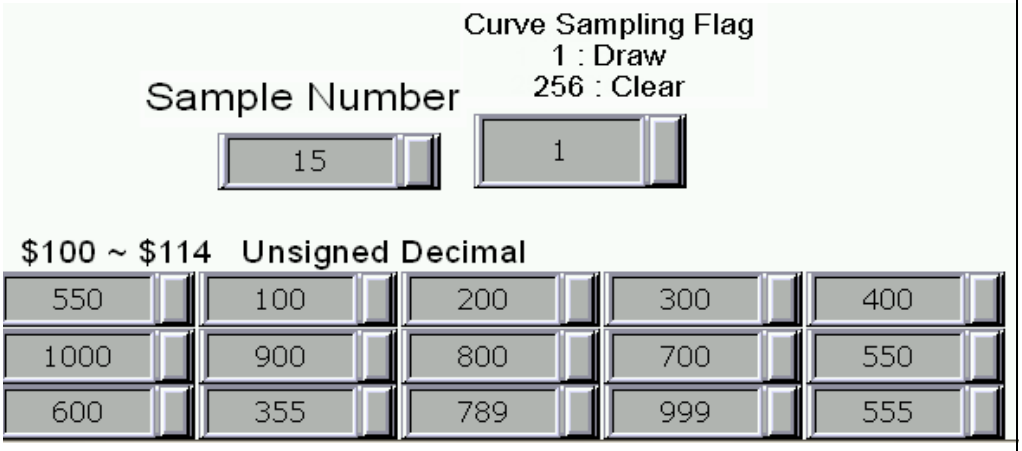
➢ Please create the numeric entry element range from $100 to $114 with Unsigned Decimal as the data format.



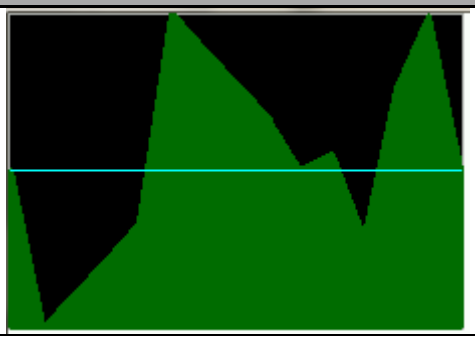
➢ Create the numeric entry element $600 for entering the Sample Number.



➢ Go to [Options] > [Configuration] > [Control Block] and check Curve Control which address is D1.

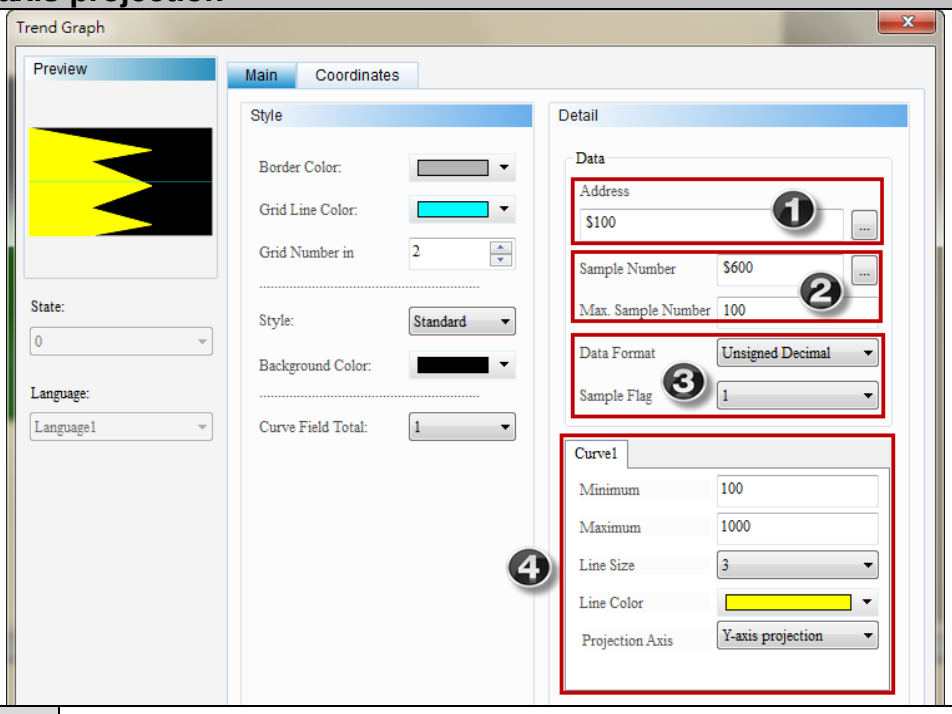
No.	Property	Function
		 ➢ Create one numeric entry element and set its address to D1. 
		➢ When you complete the setting that mentioned above, please compile and download the screen to the HMI. ➢ Enter any value from $100 to $114. Enter 15 for the Sample Number and 1 for Curve Sampling Flag.  ➢ Then, the curve will be shown as below.

No.	Property	Function



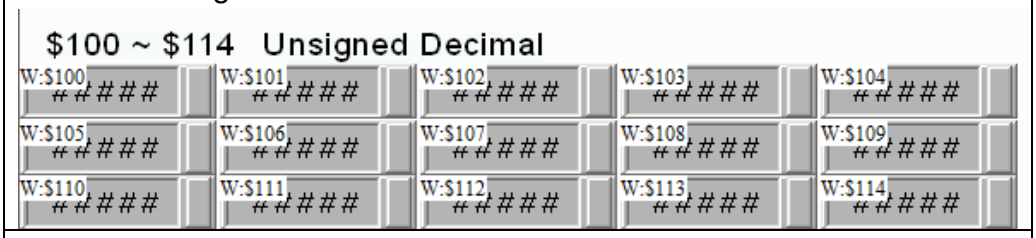
➢ Y-axis projection.

Y-axis projection

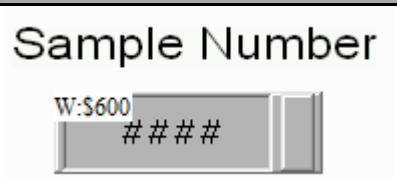
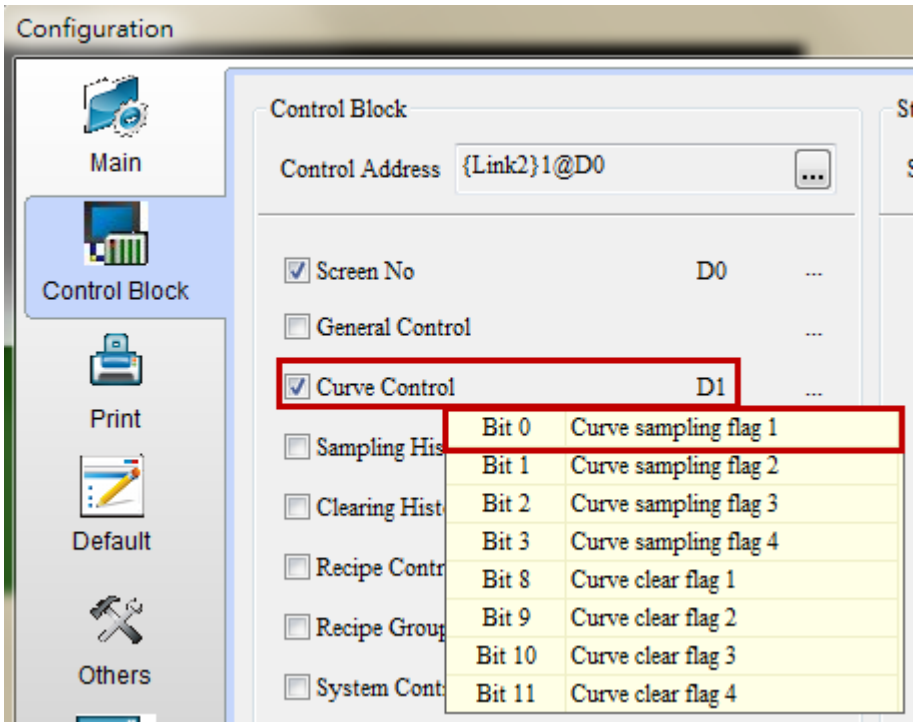
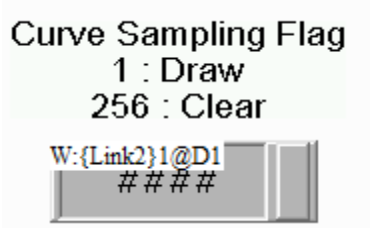


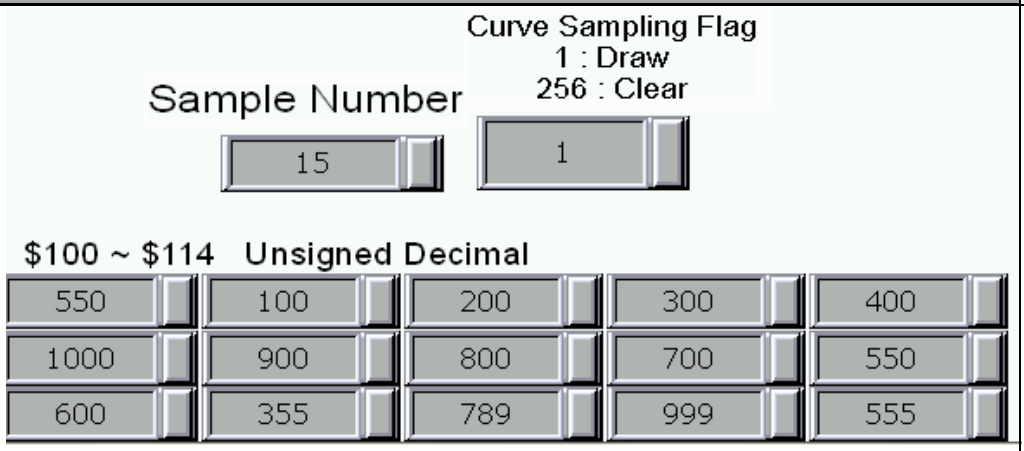
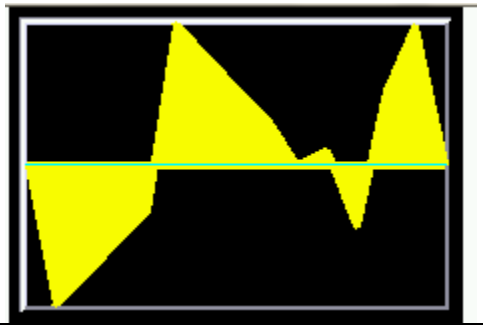
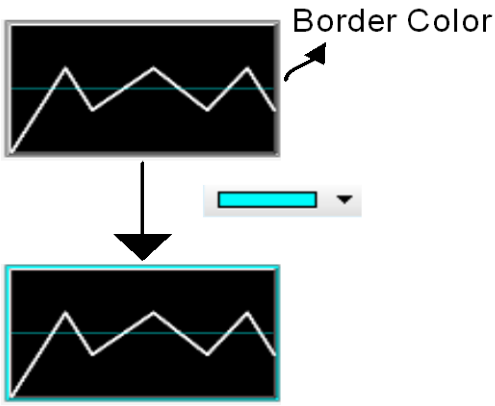
(1)	Set the read address as $100。
(2)	Set the Sample Number to $600 and 100 for the Max. Sample Number.
(3)	Set the Data Format to Unsigned Decimal and Sample Flag to 1.
(4)	Set the Minimum value to 100 and Maximum value to 1000.
	Select Y-axis projection for projection axis.

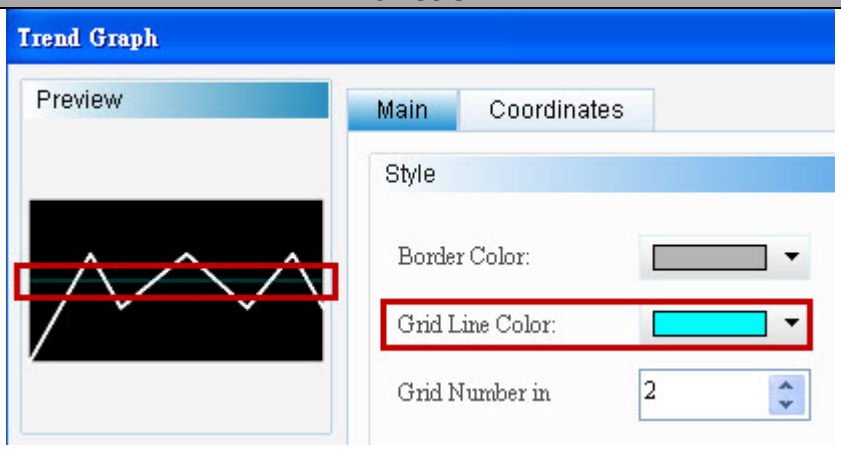
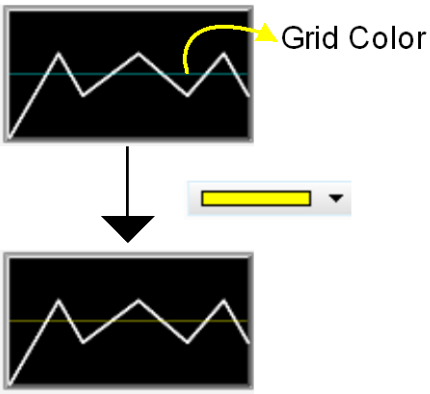
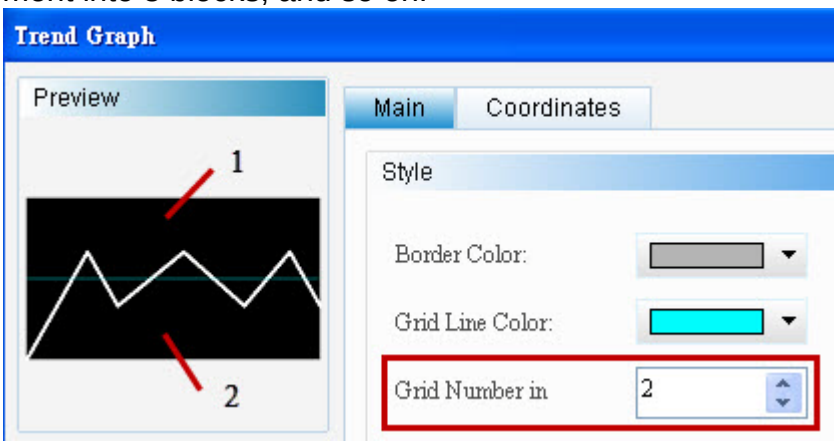
➢ Please create the numeric entry element range from $100 to $114 with Unsigned Decimal as the data format.

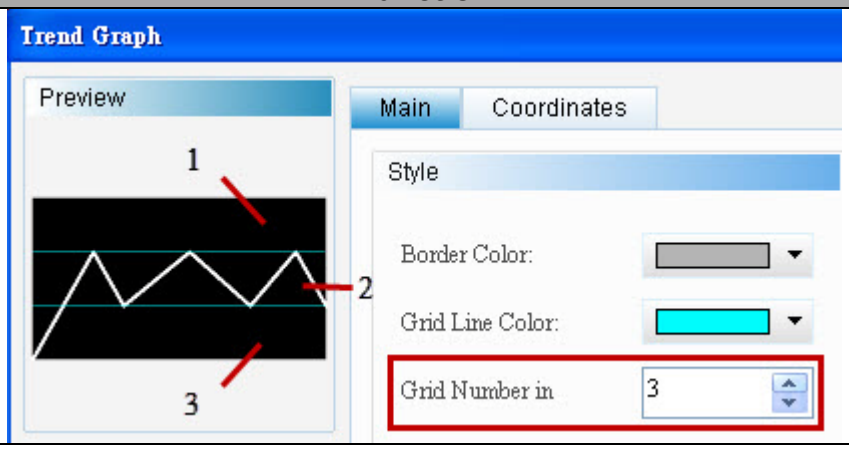
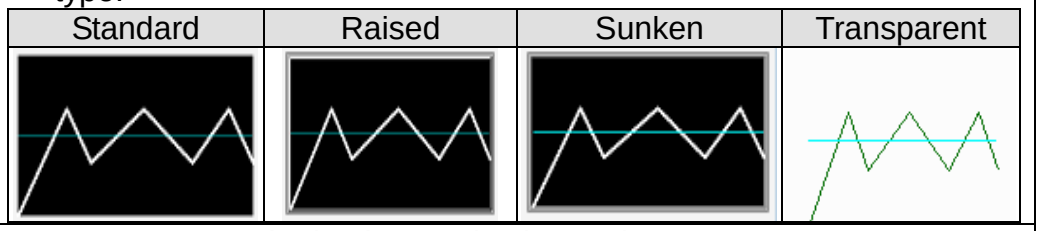
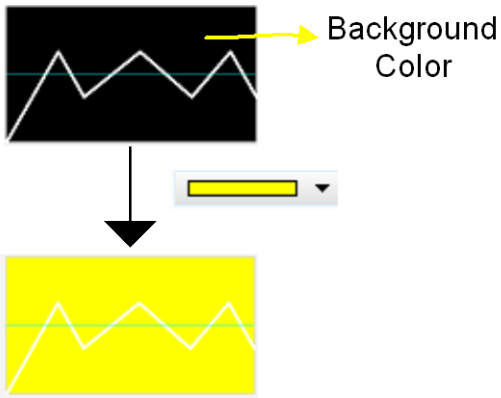
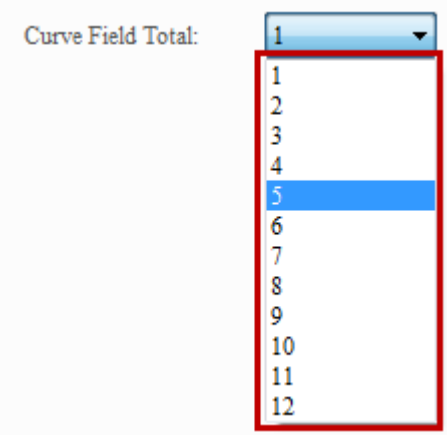


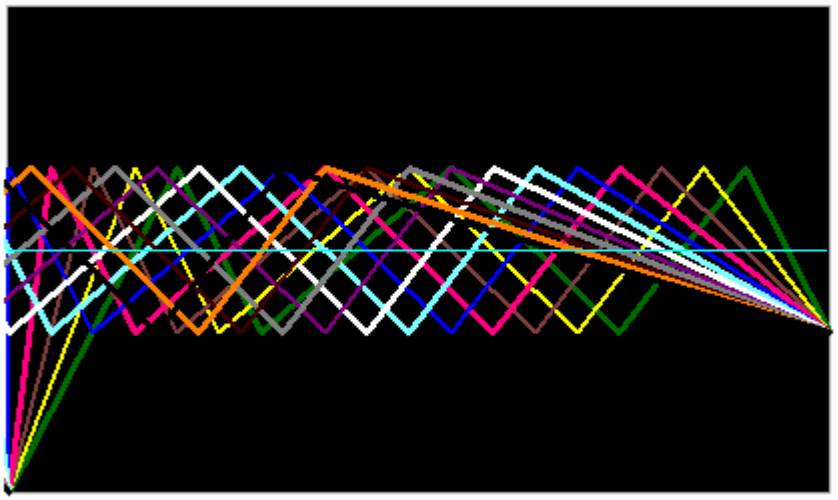
➢ Create the numeric entry element $600 for entering the Sample Number.

No.	Property	Function
		
		➢ Go to [Options] > [Configuration] > [Control Block] and check Curve Control which address is D1.  ➢ Create one numeric entry element and set its address to D1. 
		➢ When you complete the setting that mentioned above, please compile and download the screen to the HMI. ➢ Enter any value from $100 to $114. Enter 15 for the Sample Number and 1 for Curve Sampling Flag.

No.	Property	Function
		 ➢ Then, the curve will be shown as below.  NOTE: ✓ When applying projection axis and using more than one curve, the one with bigger number will cover the one with smaller number.
(9)	Border Color	➢ Users can define the Border Color of the Trend Graph element 
(10)	Grid Line Color	➢ Grid Color is the color of the grid line in the Trend Graph. The default color is .

No.	Property	Function
		 ➢ Users can change the grid color. 
(11)	Grid Number in	➢ The maximum Grid Number in is “50”. ➢ Grid Number in are used to separate the blocks in the Trend Graph element. Default count is “2”. This means there is one grid line separating the Trend Graph element into two blocks. If the Grid Number in is “3”, there are two grid lines separating the Trend Graph element into 3 blocks, and so on. 

No.	Property	Function
		
(12)	Element Style	➢ There are three element types, including Standard, Raised, and Sunken. Users can change the element appearance with element type. 
(13)	Element Background Color	➢ Users can set the background color of elements. 
(14)	Curve Field Total	➢ Trend Graph element supports a total of 12 curves.  ➢ Select 12 curves. Users can also change the width and color of the curve.

No.	Property	Function
		 ➢ If the users desire to use 12 curves, they just need to do consecutive address sampling of the setup accessing address. Assume the accessing address is **$1000**, the sampling point is **5.** Then, **60** sampling points are needed for **12** curves. Thus, the accessing address is **$1000 ~ $1059**.

◆ Coordinates

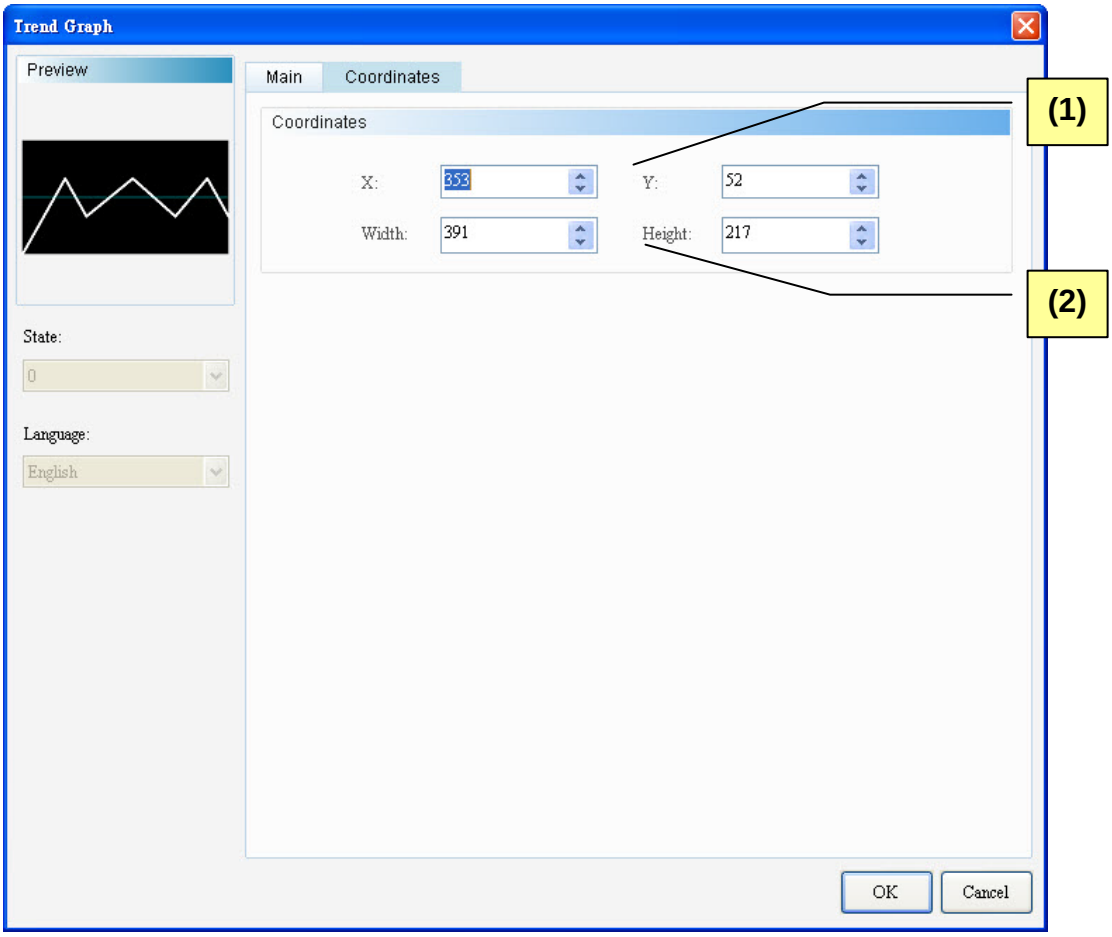


Figure 14-1-3 Trend Graph Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

14-2 X-Y Chart

	X-Y Chart

The X-Y Chart is drawn according to the H. Read Address and V. Read Address selected by users. Users can also define the curve count displayed, and if X and Y points are connected. An X-Y Chart element supports a total of 4 curves. This element draws curves with the curve sampling flags under from [Options]→ [Configuration…]→ [Control Block]→ [Curve Control]. Curve Sampling Flags 1-4 correspond to Sampling Flag 1-4 in the X-Y Chart element.

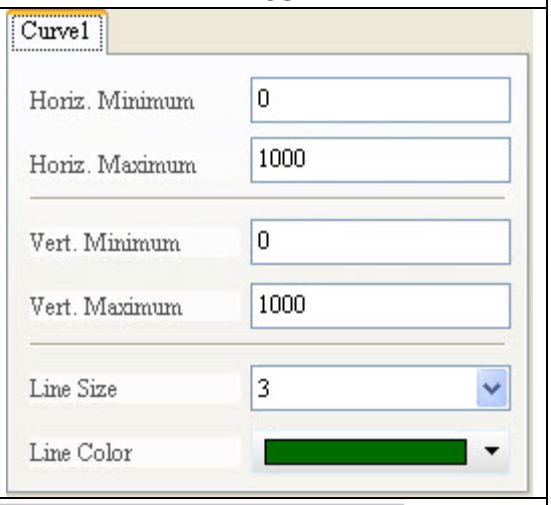
Please refer to 14-2-1 Example of X-Y Chart below.

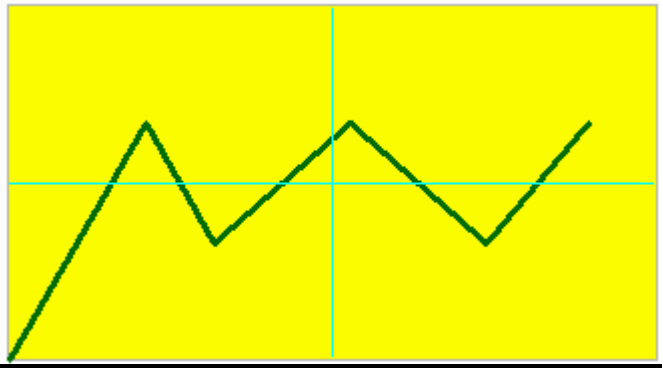
Example of X-Y Chart

Table 14-2-1 X-Y Example of X-Y Chart

X-Y Chart Element

➢ Create an X-Y Chart element and set the relevant parameters.

X-Y Chart Element	
Horizontal Read Address	$3000
Vertical Read Address	$4000
Sample Number	5
Sample Flag	1
Curve Field Total	1
Connect two Points	Yes
H. Min. Value H. Max. Value V. Min. Value V. Max. Value Line Size Line Color	



Numeric Entry Element

➢ Five numeric entry elements are created respectively according to the H. Read Address and V. Read Address because the sampling point setting of X-Y Charts is “5”. As it needs 5 sampling points to draw a curve, the X-axis and Y-axis will each sample 5 points to draw an X-Y Chart. Therefore, the X-Y Chart element will read 5 addresses from “$3000” as H. Read Address and 5 addresses from “$4000” as V. Read Address. These addresses include $3000, $3001, $3002, $3003 and $3004 as H. Read Address; and $4000, $4001, $4002, $4003 and $4004 as V. Read Address.

Numeric Entry Element					
Write Address	$3000	$3001	$3002	$3003	$3004
Write Address	$4000	$4001	$4002	$4003	$4004

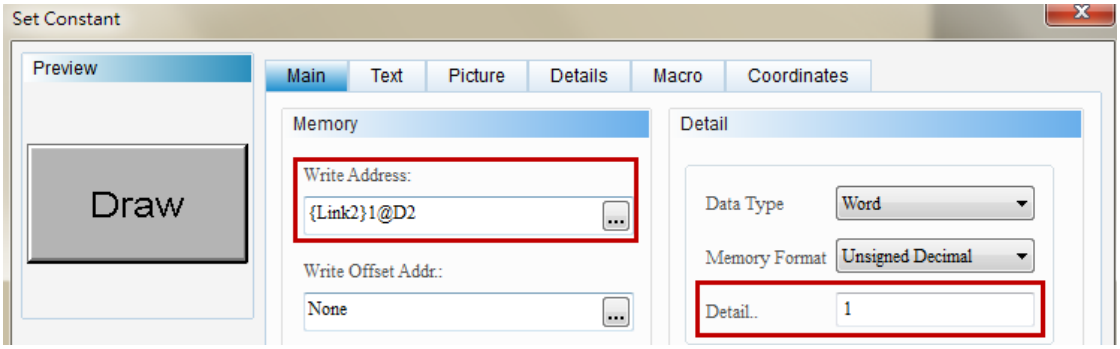
Set Constant Element

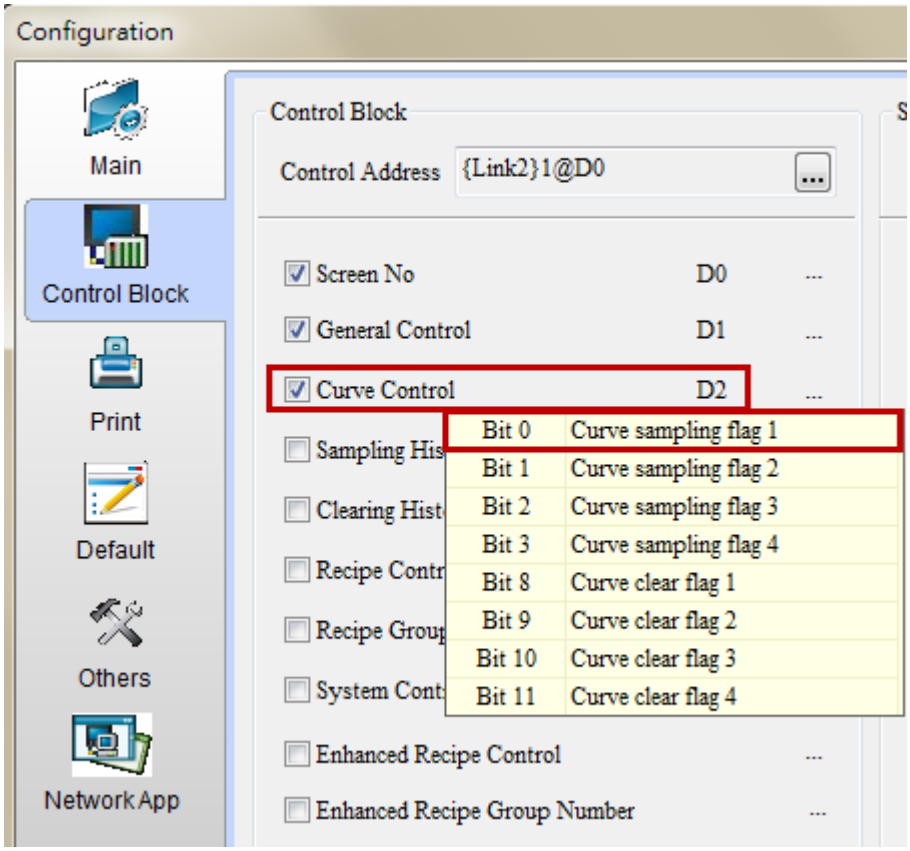
➢ Create the Set Constant Element and set its Write Memory Address as “D2”. This address (D2) is used by the curve control flag in the control block.

Example of X-Y Chart

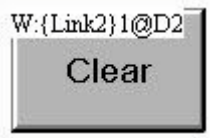
Table 14-2-1 X-Y Example of X-Y Chart

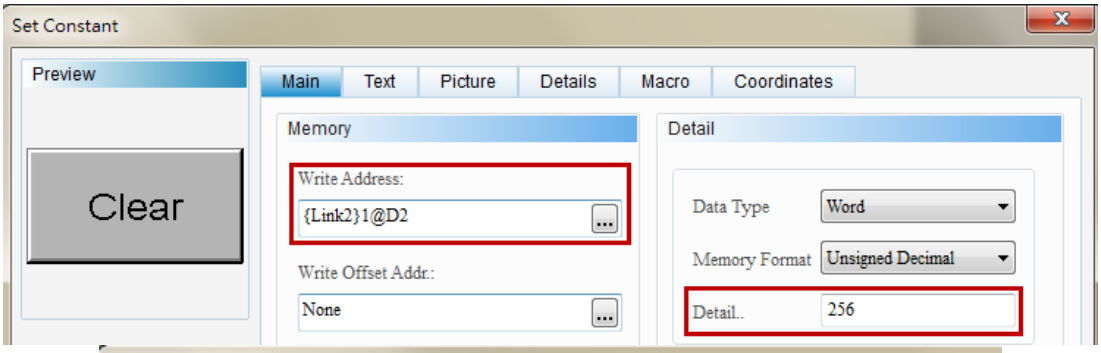
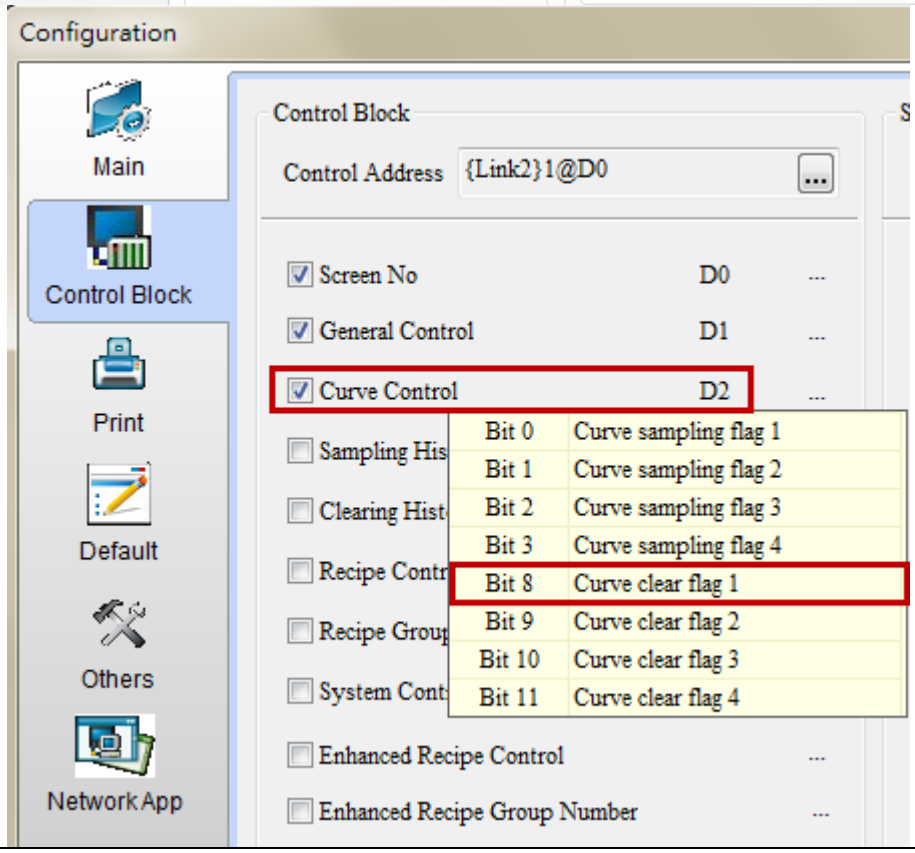
- Set "1" for the Set Constant Element. "1" corresponds to **Bit 0 Curve Sampling Flag 1**; "2" corresponds to **Bit 1 Curve Sampling Flag 2**; "4" corresponds to **Bit 2 Curve Sampling Flag 3**, and so on. Users will also discover that "1" is the sampling flag setting of the Trend Graph Element.





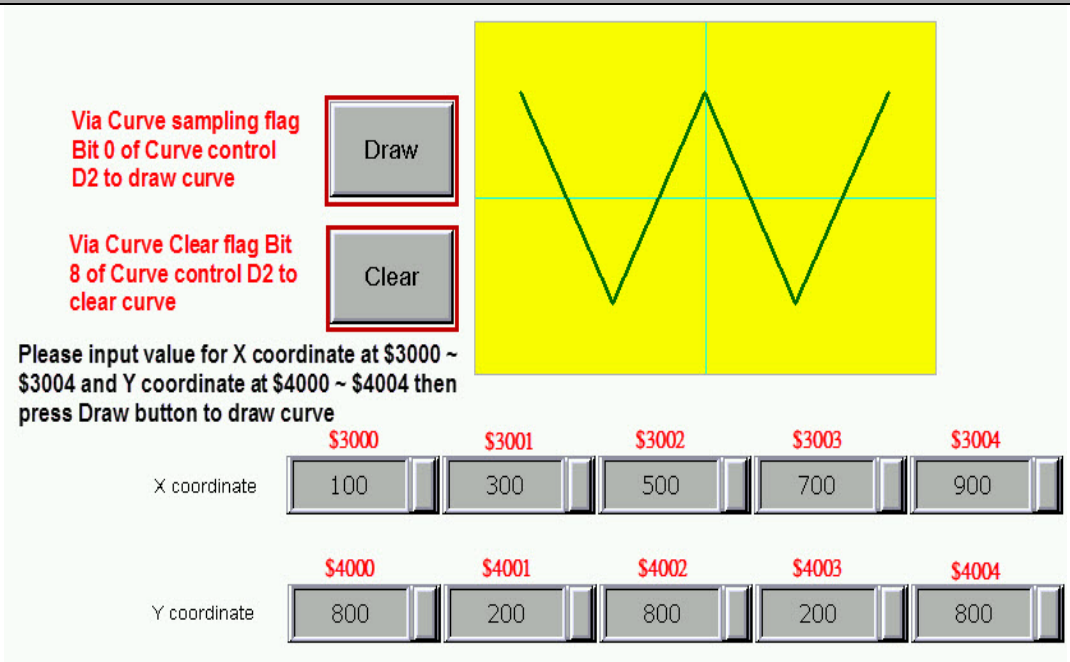
- Create another Set Constant Element. Also set "D2" as the Write Memory Address, and "256" the constant. "256" corresponds to **Bit 8 Curve Clearing Flag 1**.



Example of X-Y Chart Table 14-2-1 X-Y Example of X-Y Chart	
	 
Execution Results	➢ After creating elements, run Compile and download them to HMI. Next, input a random value for X-axis and Y-axis respectively from the Numeric Entry Element, the X-Y Chart Element will draw curves according to these values.

Example of X-Y Chart

Table 14-2-1 X-Y Example of X-Y Chart



Double-click X-Y Chart to call out the X-Y Chart Properties screen as shown below.

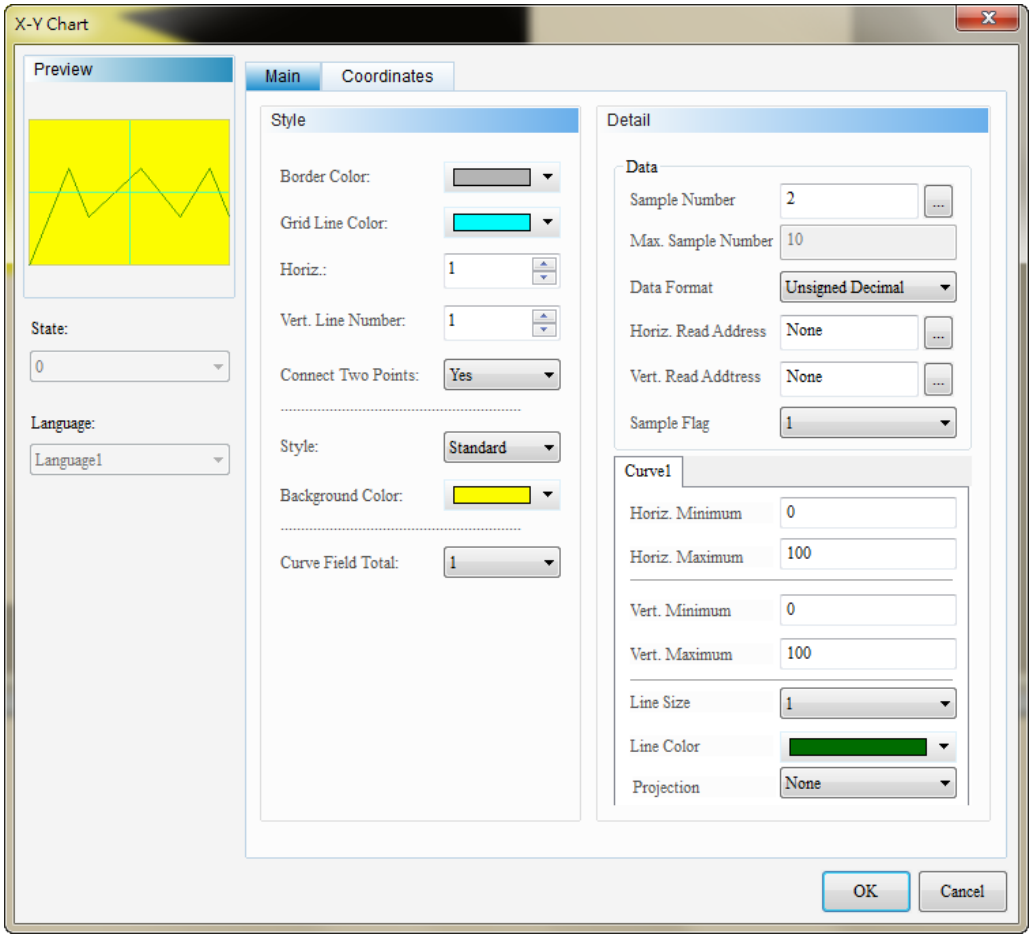


Figure 14-2-1 X-Y Chart Properties

X-Y Chart	
Function Page	**Content Description**
Preview	Supports neither multistate data nor multilingual data display.
Main	Sets Horiz. Read Address, Vert. Read Address, Sample Number, Max. Sample Number, Data Format, Sample Flag, Horiz. Min. Value, Horiz. Max., Vert. Min. Value, Vert. Max., Line Size, Line Color and Projection. Sets Border Color, Grid Line Color, Horizontal Line Number, Vertical Line Number, Connect Two Points, Element Style, Element Background Color, and Curve Field Total.
Coordinates	Sets the X-Y coordinate, width, and height of elements.

Table 14-2-2 X-Y Chart Function Page

◆ Main

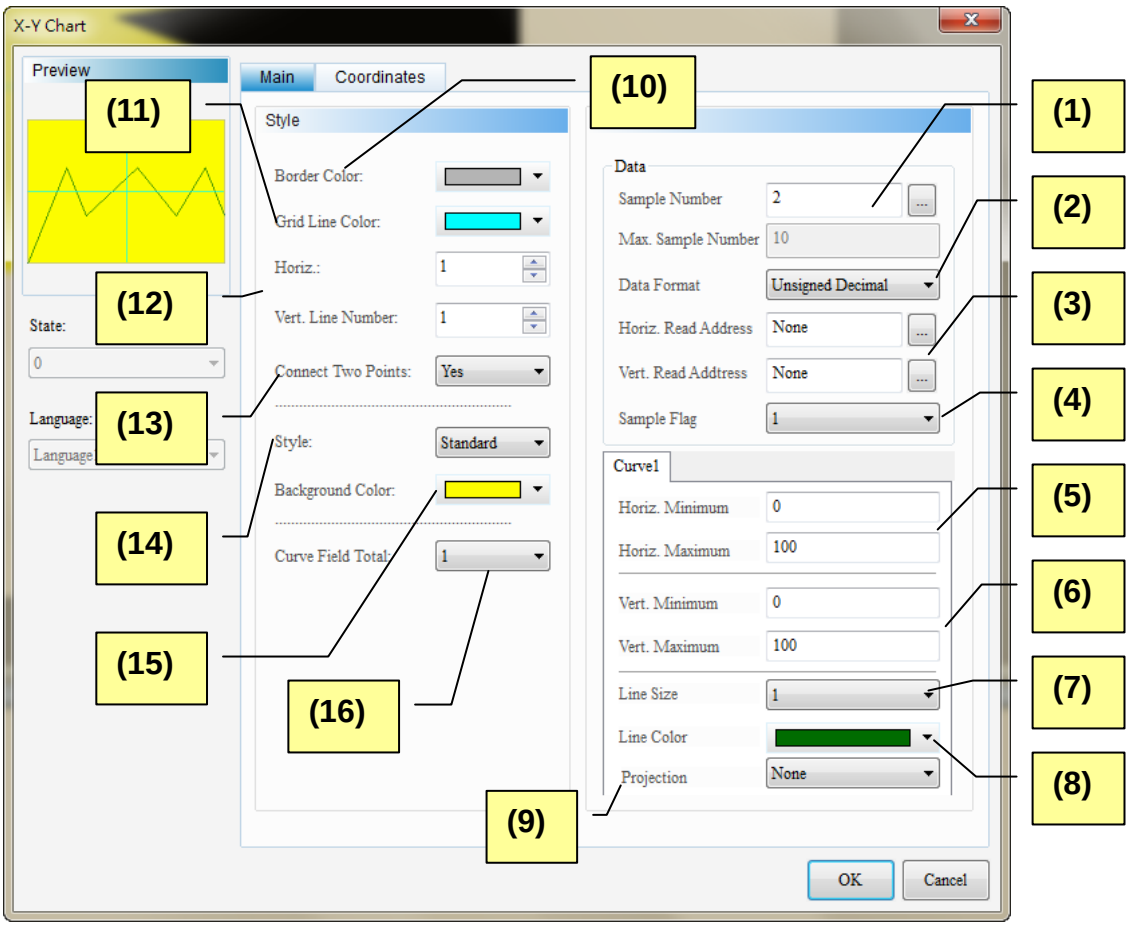
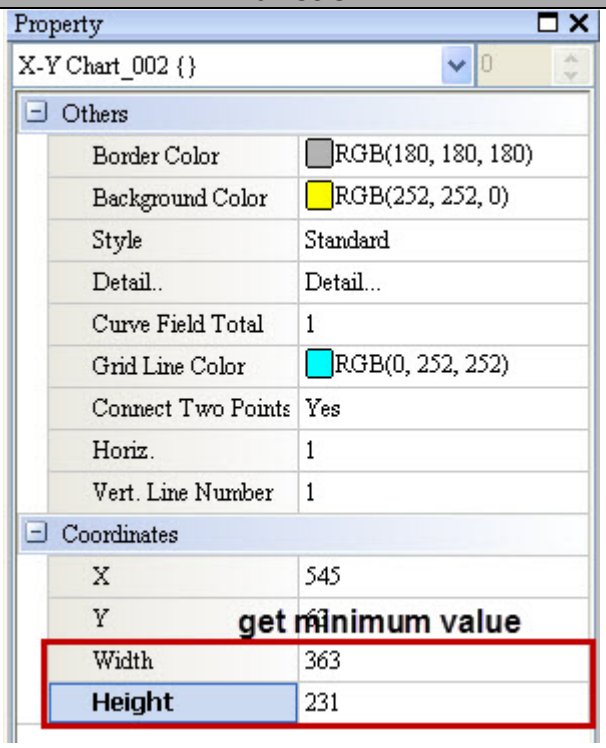
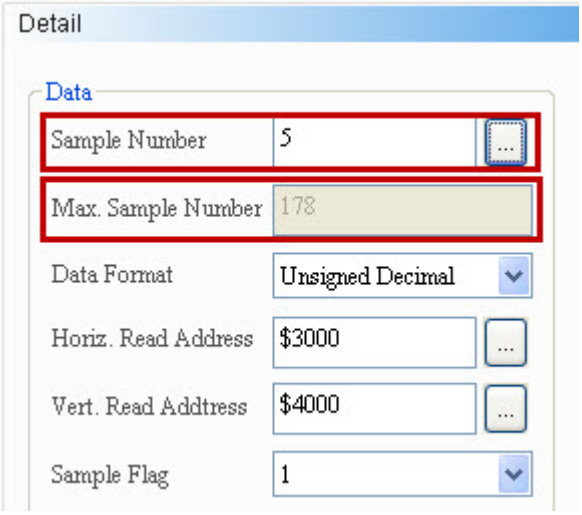
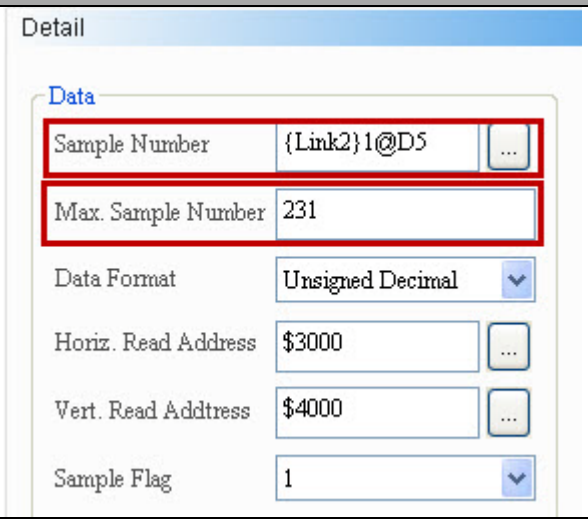
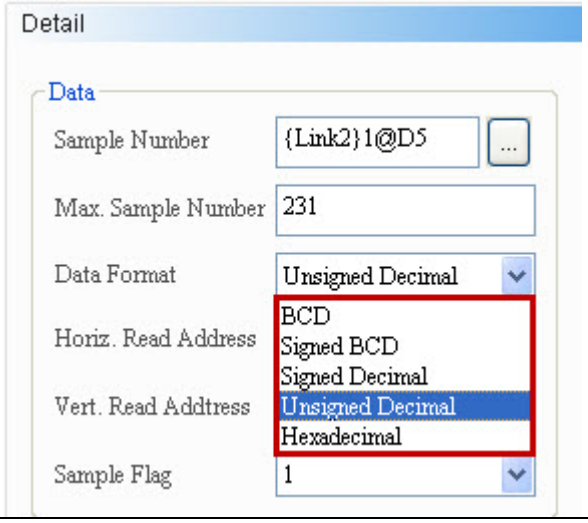
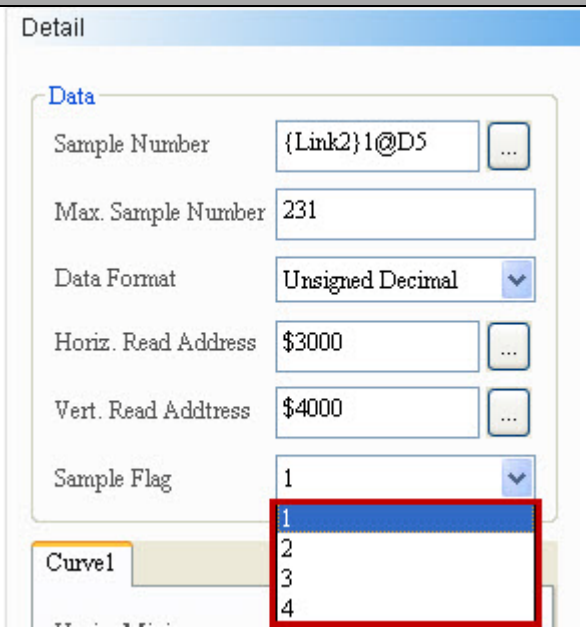
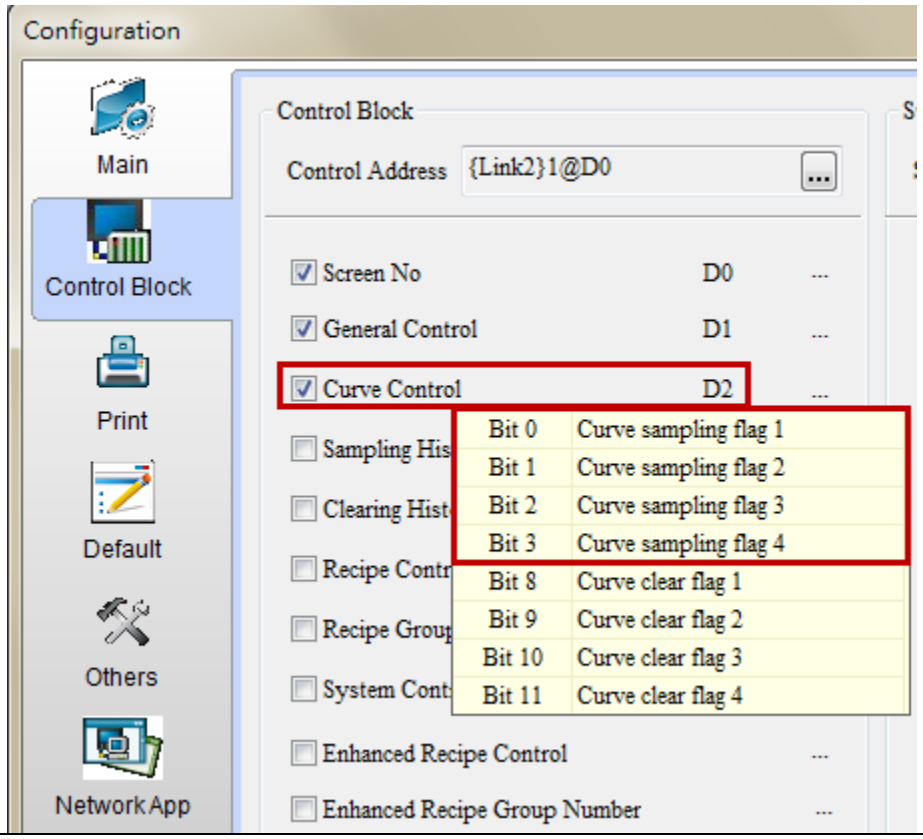


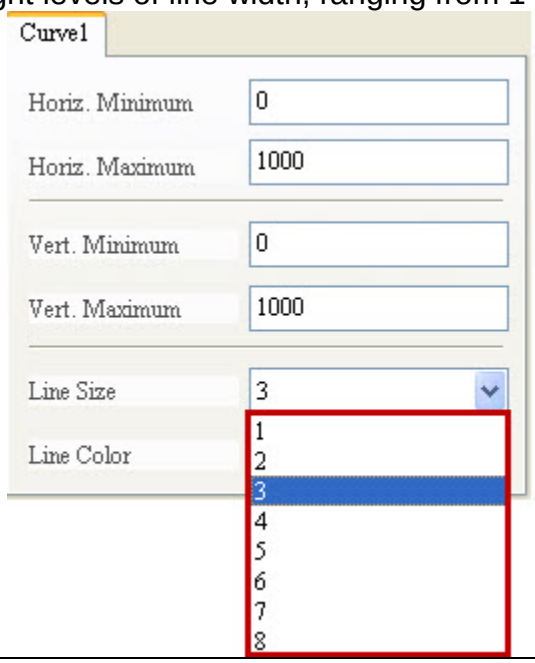
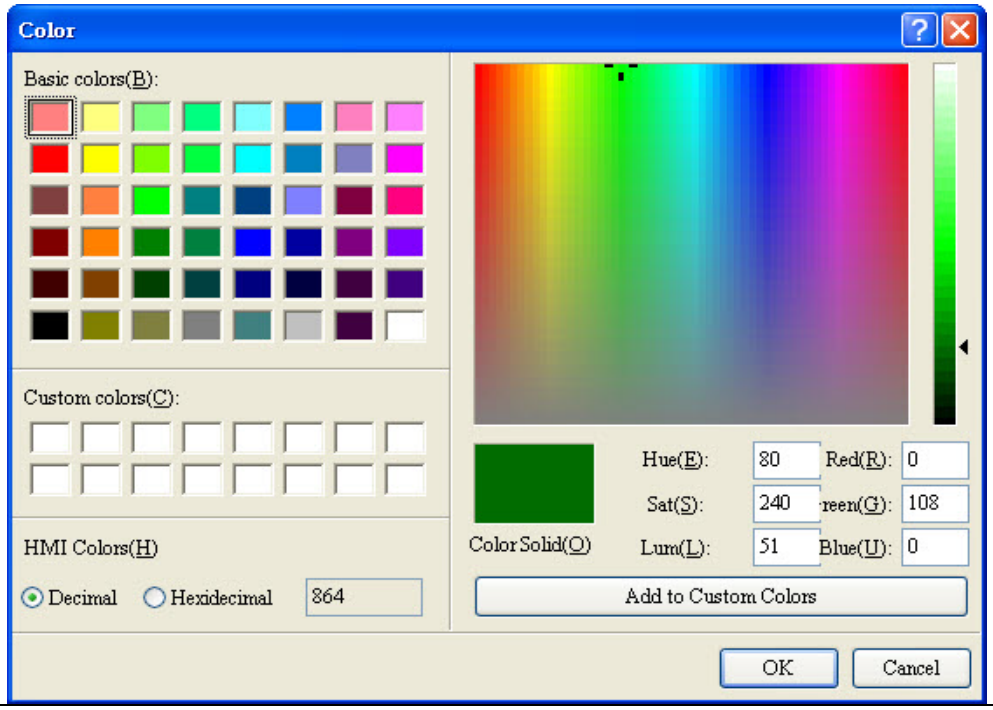
Figure 14-2-2 X-Y Chart Element Main Properties Page

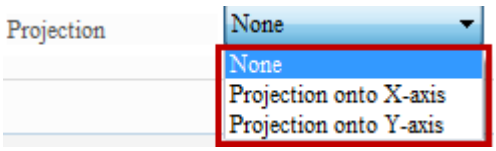
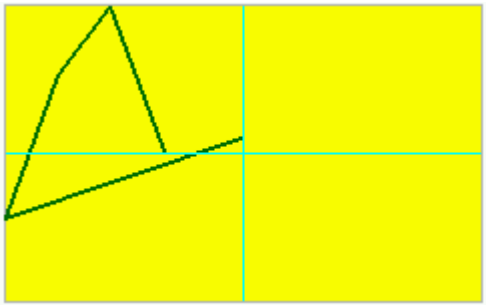
No.	Property	Function
(1)	Sample Number / Max. Sample Number	➢ The size of sampling number is determined by element width and element type. When element type “Standard” is selected in the X-Y Chart element, and element width is “363” and minimum height is “231”, the maximum sample number are “231” (based on the minimum value of element width and height). When element type “Raise” or “Sunken” is selected in the X-Y Chart element (Border width is 7 points) and element width is 231, the maximum sample number are 217 (231-(7*2)=217).

No.	Property	Function
		 ➢ "Sample Number" can be a constant or a variable. When "Sample Number" is a constant, Max. Sample Number will turn grey and is disabled.  ➢ When "Sample Number" is a variable, users can define its Read Address. Also, users must set Max. Sample Number depending on the minimum value of element width and height. If the value of "Sample Number" is greater than the value of "Max. Sample Number", the DOPSoft only sample the value of "Max. Sample Number".

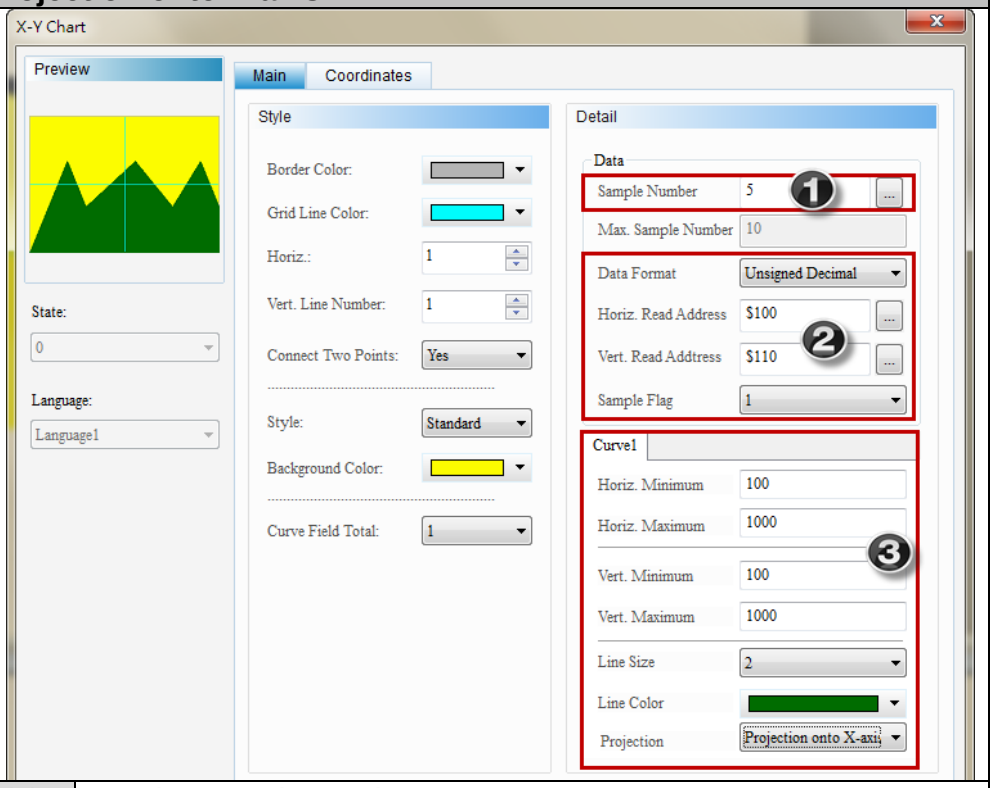
No.	Property	Function
		
(2)	Data Format	➢ X-Y Chart supports the following data formats: 
(3)	Horizontal Read Address Vertical Read Address	➢ H. Read Address represents the X-axis and V. Read Address the Y-axis. ➢ Users can select the address of the internal memory or controller register of the H. Read Address and V. Read Address. ➢ Selects link name or element type. Please refer to 5-1 Buttons of Chapter 05.
(4)	Sample Flag	➢ There are 4 sampling flags corresponding respectively to Curve Sampling Flag 1 to Curve Sampling Flag 4 in the control block.

No.	Property	Function
		 
(5)	Horiz. Min. / Horiz. Max.	➢ The valid range of minimum and maximum is subject to the data type and data format. **Data Type** / **Data Format** / **Data Valid Range** **Word**: BCD: 0~9999 Signed BCD: -999 ~ 9999 Signed Decimal: -32768~32767 Unsigned Decimal: 0~65535 Hex: 0~0xFFFF

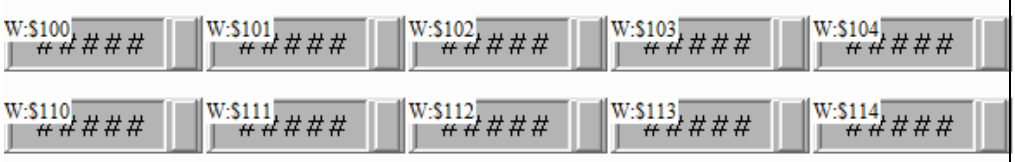
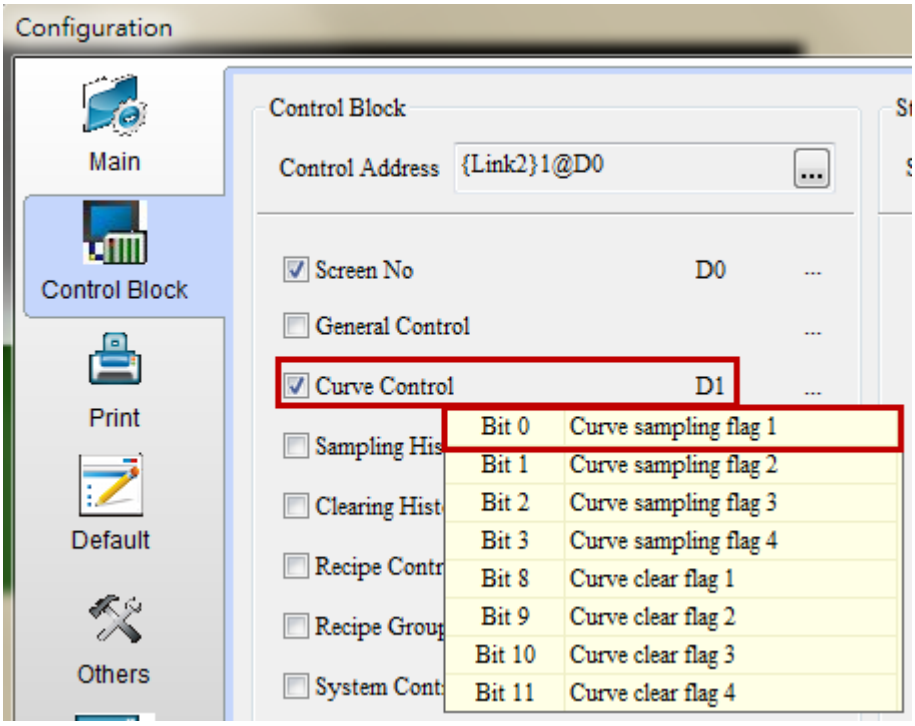
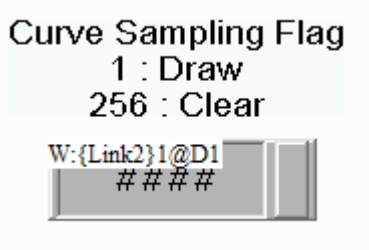
<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td>(6)</td><td>Vert. Min. / Vert. Max.</td><td>➢ The valid range of minimum and maximum is subject to the data type and data format.
<table>
<tr><th>Data Type</th><th>Data Format</th><th>Data Valid Range</th></tr>
<tr><td rowspan="5">Word</td><td>BCD</td><td>0~9999</td></tr>
<tr><td>Signed BCD</td><td>-999 ~ 9999</td></tr>
<tr><td>Signed Decimal</td><td>-32768~32767</td></tr>
<tr><td>Unsigned Decimal</td><td>0~65535</td></tr>
<tr><td>Hex</td><td>0~0xFFFF</td></tr>
</table></td></tr>
<tr><td>(7)</td><td>Line Size</td><td>➢ There are eight levels of line width, ranging from 1-8.

</td></tr>
<tr><td>(8)</td><td>Line Color</td><td>➢ Users can define the color of line display.

</td></tr>
</table>

No.	Property	Function
(9)	Projection	➢ The projection has three kinds, None, Projection onto X-axis and Projection onto Y-axis.  ➢ If "None" is selected for the projection, it means it displays the curve only.  ➢ Followings provide further information about Projection onto X-axis and Projection onto Y-axis.

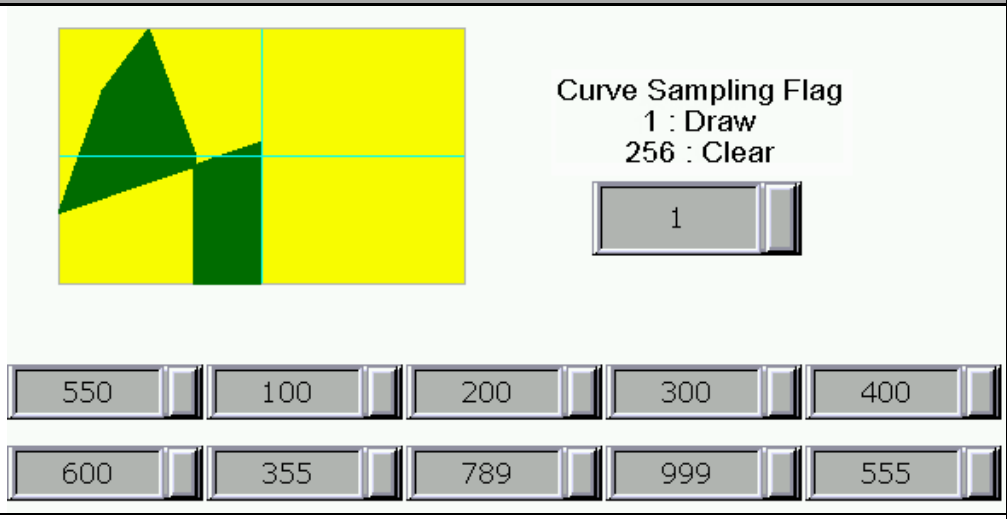
Projection onto X-axis



(1)	Set the sample number to 5.
(2)	Set Horiz. Read Address to $100. Set Vert. Read Address to $110. Select Unsigned Decimal as the data format and 1 for Sample Flag.
(3)	Set Horiz. Minimum to 100 and Horiz. Maximum to 1000. Set Vert. Minimum to 100 and Vert. Maximum to 1000.
	Select Projection on X-axis for projection.

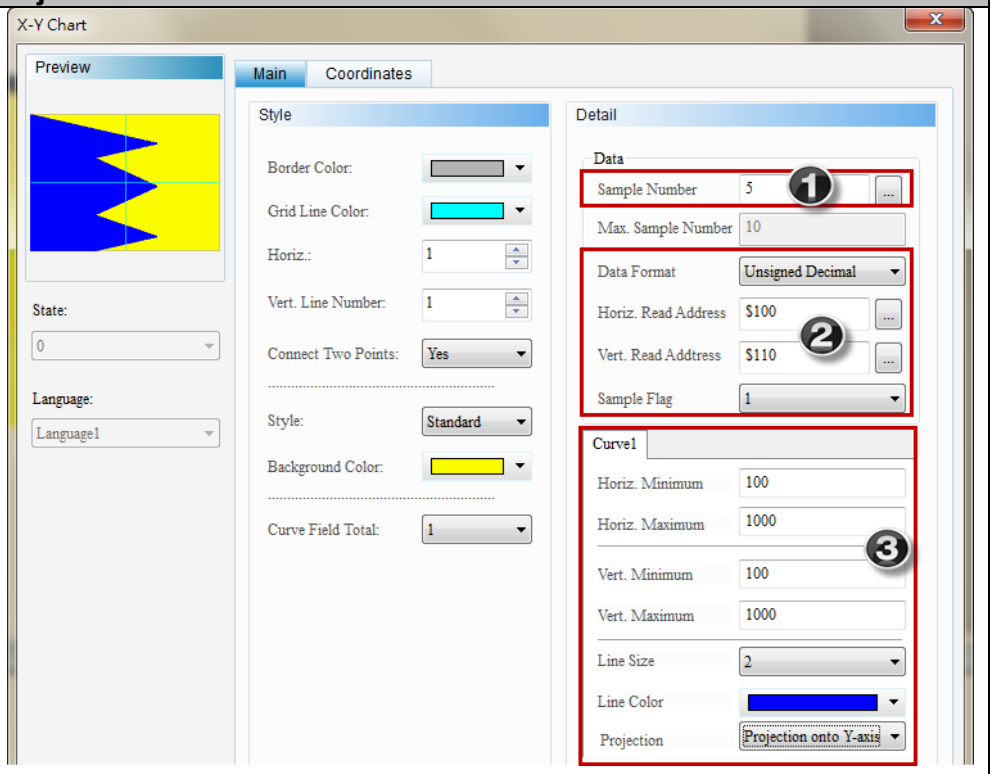
No.	Property	Function
		➢ Please create the numeric entry element range from $100 to $104 and $110 to $104 with the data format of Unsigned Decimal. 
		➢ Go to [Options] > [Configuration] > [Control Block] and check Curve Control with the address of D1.  ➢ Create one numeric entry element with the address of D1. 
		➢ When you complete the setting that mentioned above, please compile and download the screen to the HMI. ➢ Enter any value from $100 to $114 and $110 to $114. Enter 1 for Curve Sampling Flag. ➢ Then, the curve will be shown as below.

No.	Property	Function



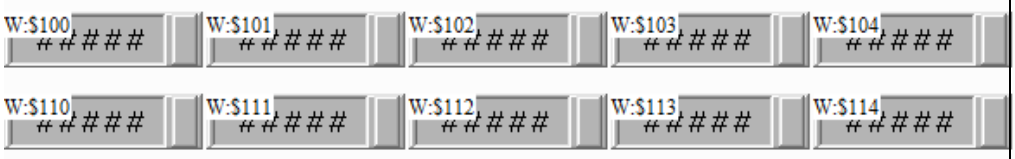
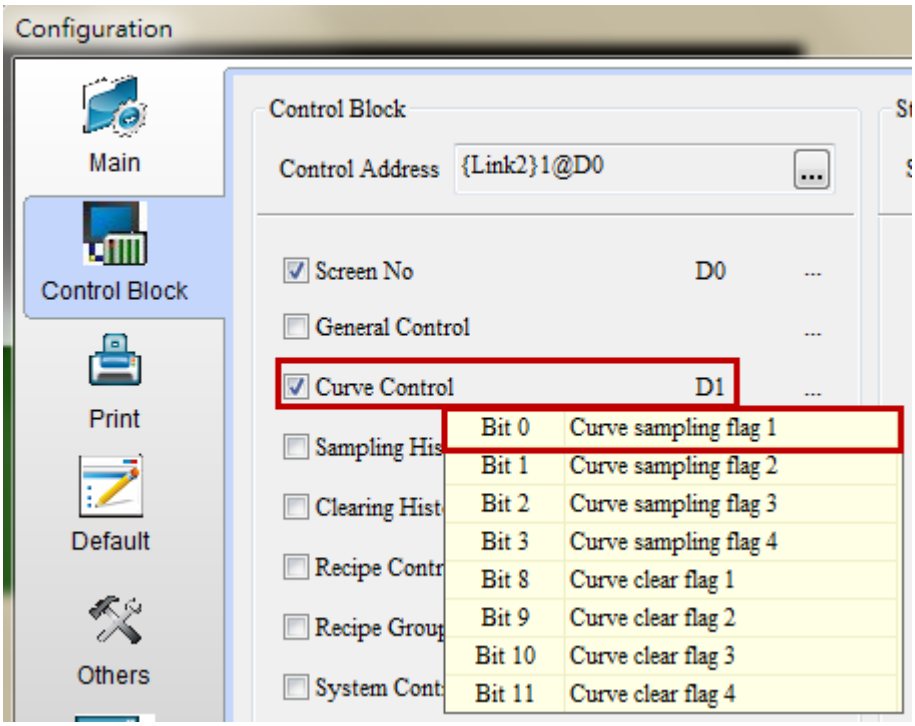
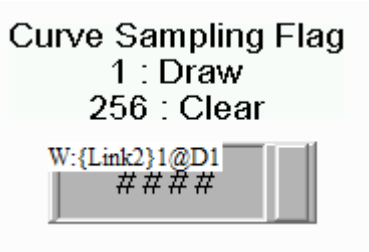
➢ Projection onto Y-axis

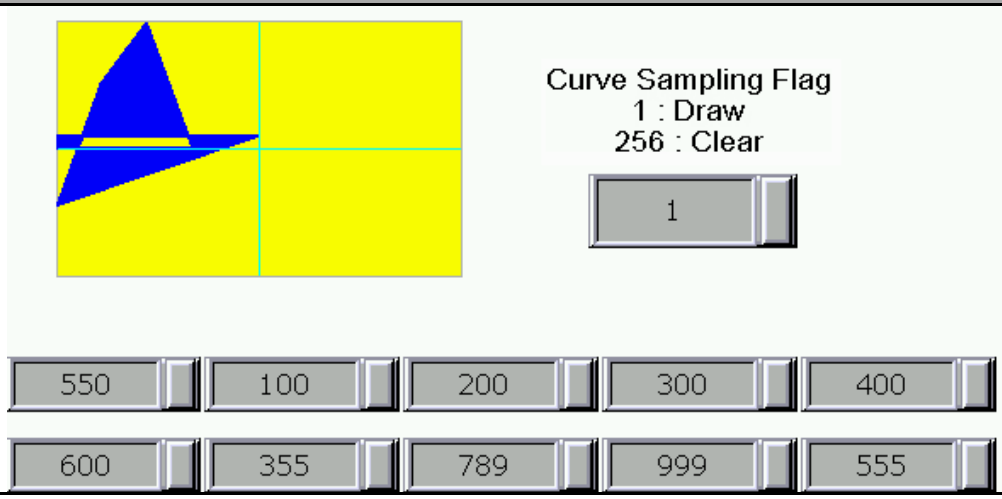
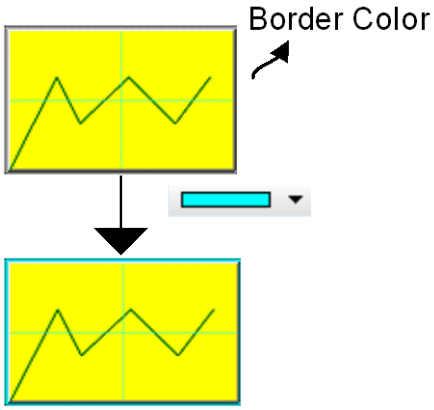
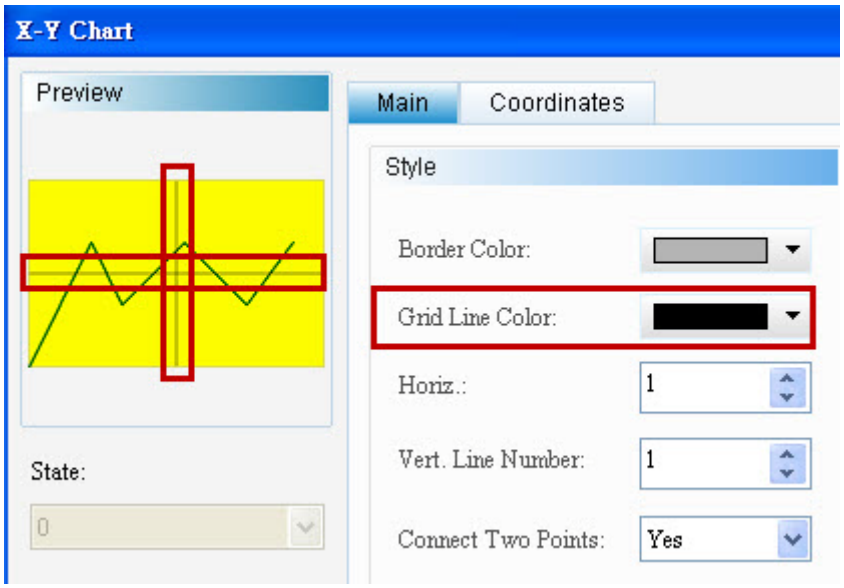
Projection onto Y-axis

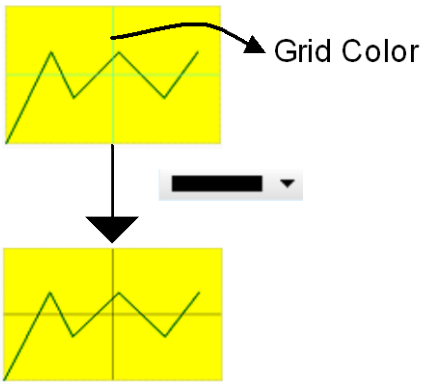
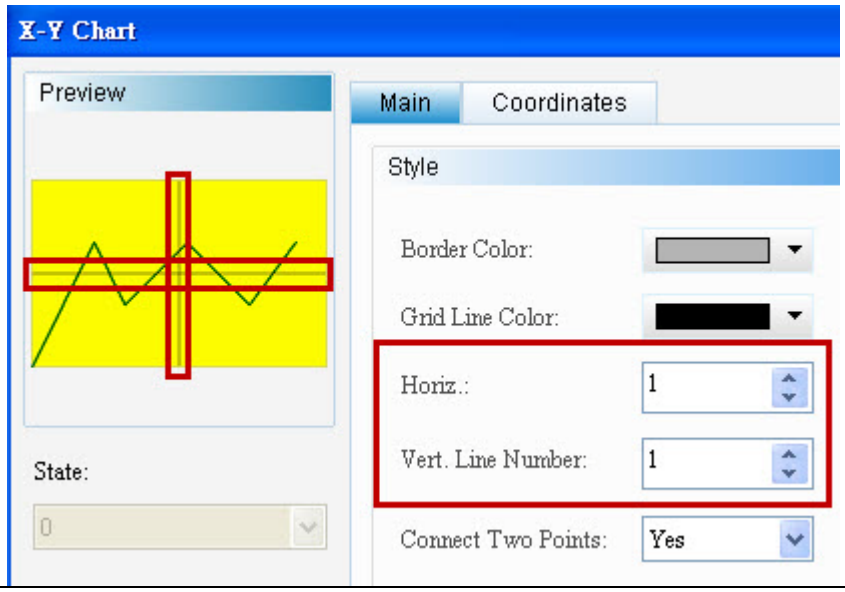
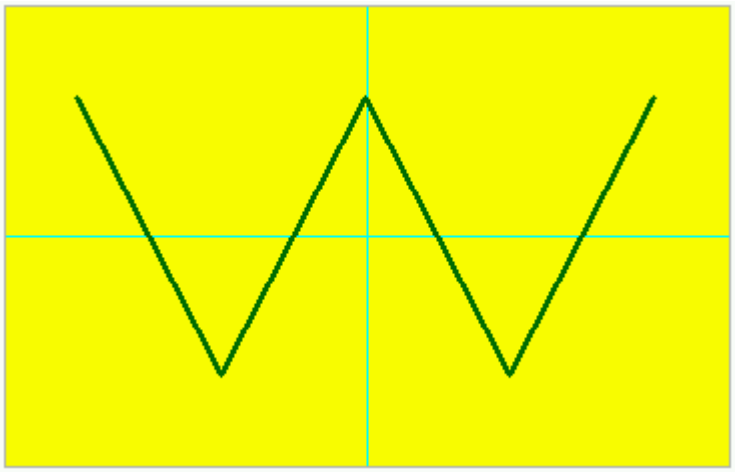


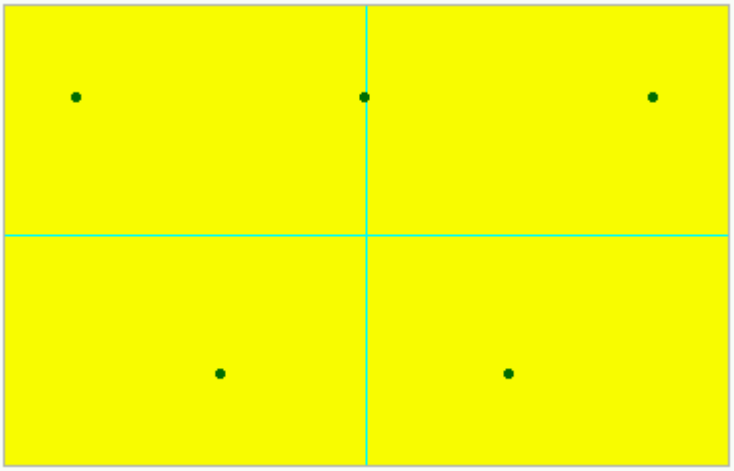
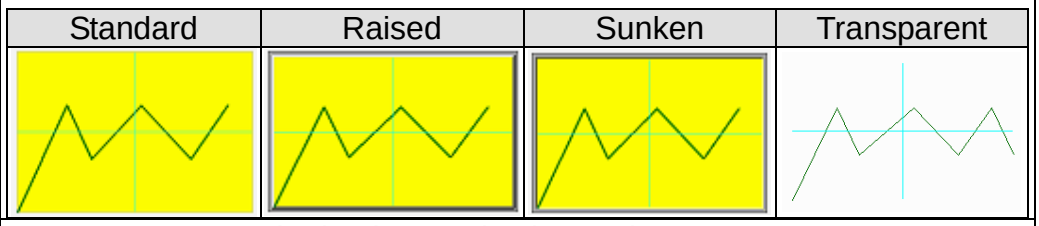
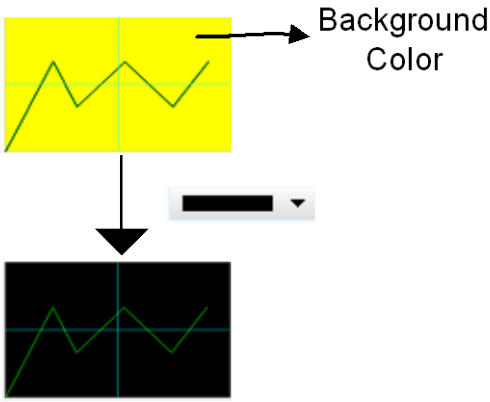
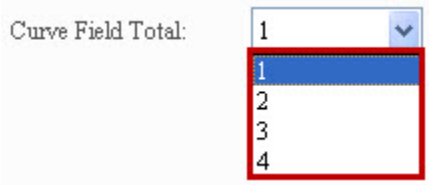
(1)	Set the Sample Number to 5.
(2)	Set Horiz. Read Address to $100. Set Vert. Read Address to $110. Select Unsigned Decimal as the data format and 1 for Sample Flag.
(3)	Set Horiz. Minimum to 100 and Horiz. Maximum to 1000. Set Vert. Minimum to 100 and Vert. Maximum to 1000.
	Select projection on Y-axis for projection.

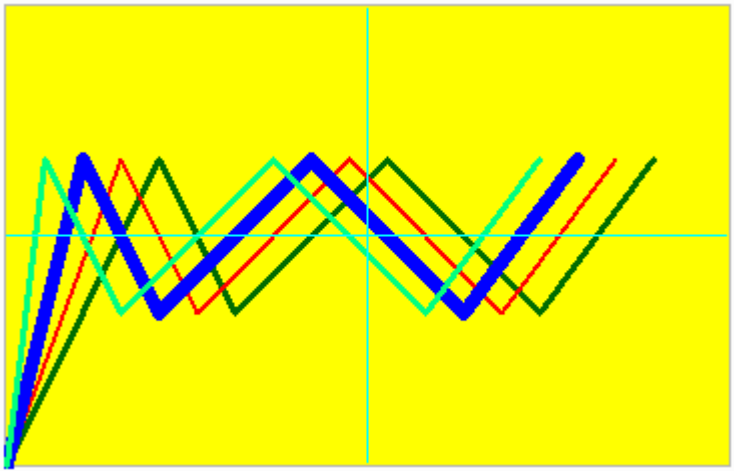
➢ Please create the numeric entry element range from $100 to $104 and $110 to $104 with the data format of Unsigned Decimal.

No.	Property	Function
		
		➢ Go to [Options] > [Configuration] > [Control Block] and check Curve Control with the address of D1.  ➢ Create one numeric entry element with the address of D1. 
		➢ When you complete the setting that mentioned above, please compile and download the screen to the HMI. ➢ Enter any value from $100 to $114 and $110 to $114. Enter 1 for Curve Sampling Flag. ➢ Then, the curve will be shown as below.

No.	Property	Function
		
(10)	Border Color	➢ Users can define the Border Color of the X-Y Chart element 
(11)	Grid Line Color	➢ Grid Color is the color of the grid line in the X-Y Chart. The default color is .  ➢ Users can change the grid color.

No.	Property	Function
		
(12)	Horizontal Line Number / Vertical Line Number	➢ Both Horizontal Line Number and Vertical Line Number support the maximum of “99”. ➢ Horizontal Line Number refers to the number of curves on the X-axis. Vertical Line Number refers to the number of curves on the Y-axis. Default is 1. 
(13)	Connect Two Points	➢ Options for Connect Two Points include “Yes” or “No”. ➢ If “Yes” is selected, the X-coordinate and the Y-coordinate will form a curve.  ➢ If “No” is selected, the coordinate of X-axis and Y-axis is displayed

No.	Property	Function
		
(14)	Element Style	➢ There are three element types, including Standard, Raised, and Sunken. Users can change the element appearance with element type. 
(15)	Element Backgroun d Color	➢ Users can set the background color of elements. 
(16)	Curve Field Total	➢ Every X-Y Chart element supports a total of 4 curves.  ➢ Select 4 curves. Users can also change the line width and line color of these curves.

No.	Property	Function
		 ➢ Users wishing to use 4 curves only need to set continuous addresses in the H. Read Address and V. Read Address. If the H. Read Address is "**$3000**", the V. Read Address is "**$4000**", and Sampling Points is "**5**", it needs **40** sampling points for **4** curves (X and Y each 20). Therefore, the Read Address should be **$3000-$3019** and **$4000-$4019**.

◆ Coordinates

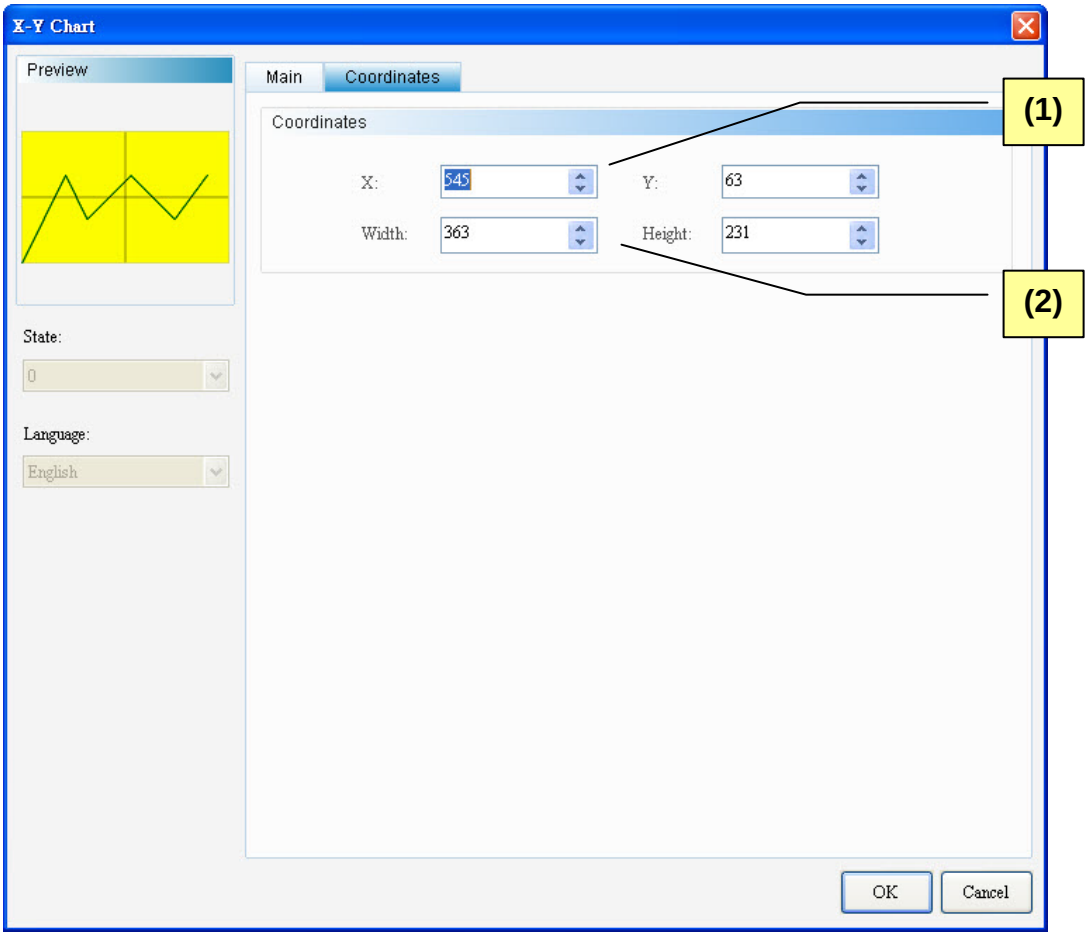


Figure 14-2-3 X-Y Chart Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

14-3 X-Y Distribution

	X-Y Distribution

The X-Y Distribution allows users to use continuous addresses as the read address and continuously sample points on the X-axis and Y-axis, and there is no upper limit for sampling points. Although the X-Y Chart also uses continuous addresses, its sampling points are determined by the element type, element width, and element height. If “Continuous Address” is not selected, users can define the read address for both X and Y. Users can also define Color and Connection as the read address or a constant. By contrast, if “Continuous Address” is selected, both X and Y are continuous addresses, and the color will automatically continue the address of X and Y. In this case, users can only change Color into a constant without changing its address.

An X-Y Distribution element can sample the maximum of 4 points. This element is different from the Trend Graph and X-Y Chart elements in a way that it does not need to draw curves with the curve sampling flags under from [Options]→ [Configuration…]→ [Control Block]→ [Curve Control]. This is because it has its own control flag where Bit 0 is sampling and Bit 1 is clearing.

Please refer to Table 14-3-1 Example of X-Y Distribution below.

Example of X-Y Distribution

Table 14-3-1 Example of X-Y Distribution

X-Y Distribution Element

➢ Create an X-Y Distribution element and set the relevant parameters.

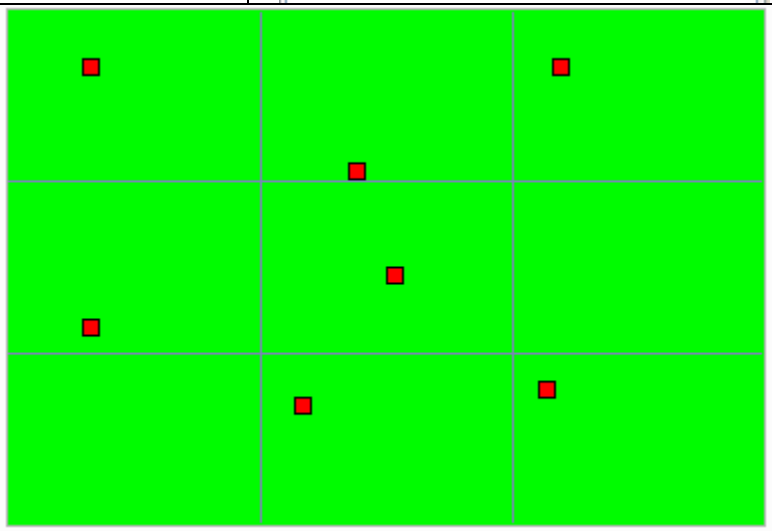
Continuous Address	☑ Continuous Address
Sample size	2
Sample Properties	Sample 0 / Sample 1

Sample 0

Name	Address
X	$20
Y	$21
Color	$22
Connection	$23
X Min.	0
X Max.	1000
Y Min.	0
Y Max.	1000

Sample 1

Name	Address
X	$30
Y	$31
Color	$32
Connection	$33
X Min.	0
X Max.	1000
Y Min.	0
Y Max.	1000



X-Y Distribution Element

Example of X-Y Distribution

Table 14-3-1 Example of X-Y Distribution

Numeric Entry Element

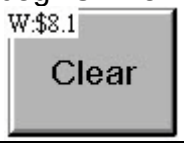
- As the sample size is “2”, there are two conditions: Sample 0 and Sample 1.
- Create numeric entry elements $20-$23 as the X, Y, color, and connection of Sample 0.
- Create numeric entry elements $30-$33 as the X, Y, color, and connection of Sample 1.

Sampling Points	X	Y	Color	Connection
Sample 0	$20	$21	$22	$23
Sample 1	$30	$31	$32	$33

Set Constant Element

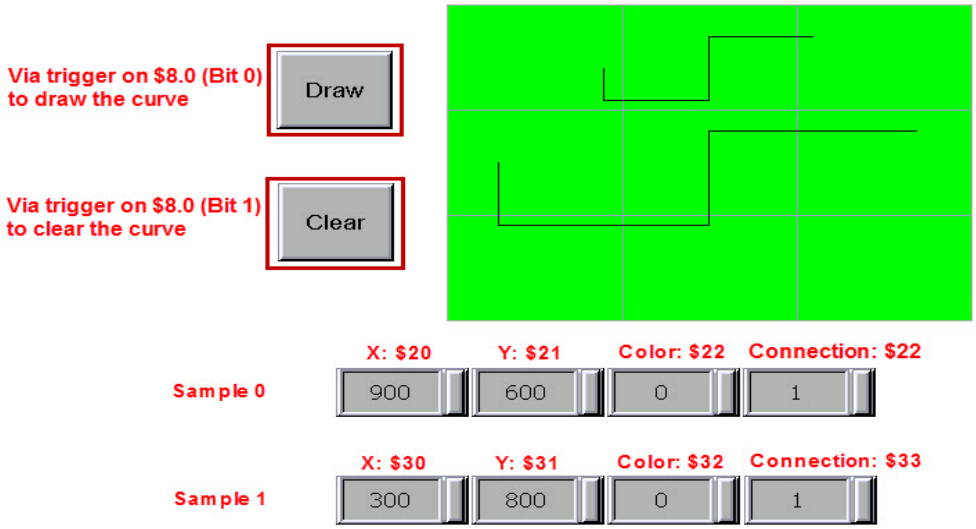
- Create a maintained button element, with Write Memory Address is “$8.0”. This means sampling begins when Bit 0 is “ON”

- Create another maintained button element, with Write Memory Address is “$8.1”. This means clearing begins when Bit 1 is “ON”



Execution Results

- After creating elements, run Compile and download them to HMI. Next, input a random value for X-axis and Y-axis respectively from the Numeric Entry Element, the X-Y Chart Element will draw curves according to these values.



Input value at sample 0 and sample from $20 ~ $22 and $30 ~ $33, if connection set to 1 means the line will connected, set to 0 means line will not connected

Double-click X-Y Distribution to call out the X-Y Distribution Properties screen as shown below.

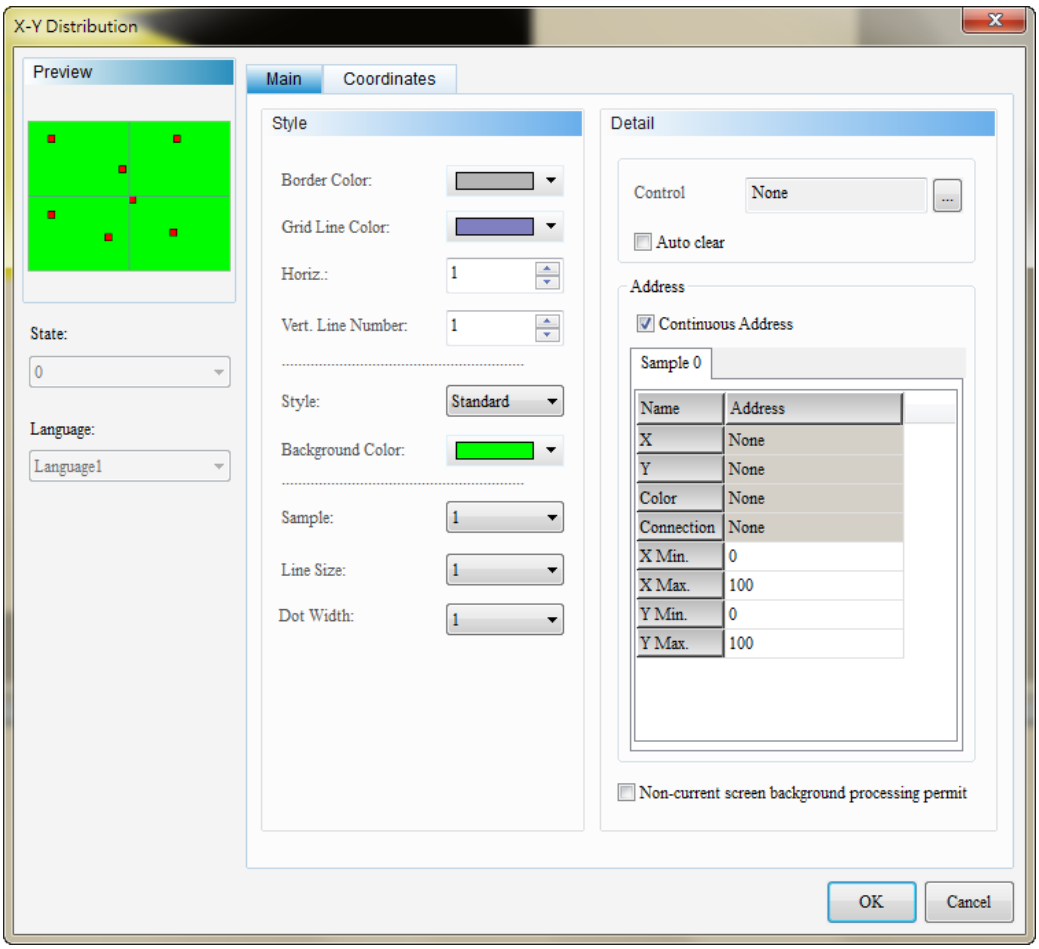


Figure 14-3-1 X-Y Distribution Properties

X-Y Distribution	
Function Page	**Content Description**
Preview	Supports neither multistate data nor multilingual data display.
General	Sets Control Address, Auto Clear, Continuous Address, X-Y Color and Connection, Read Address, X-Minimum, X-Maximum, Y-Minimum, and Y-Maximum. Sets Border Color, Grid Line Color, Horizontal Line Number, Vertical Line Number, Element Style, Element Background Color, Sample, Line Size and Dot Width.
Position	Sets the X-Y coordinate, width, and height of button elements.

Table 14-3-2 X-Y Distribution Function Page

◆ Main

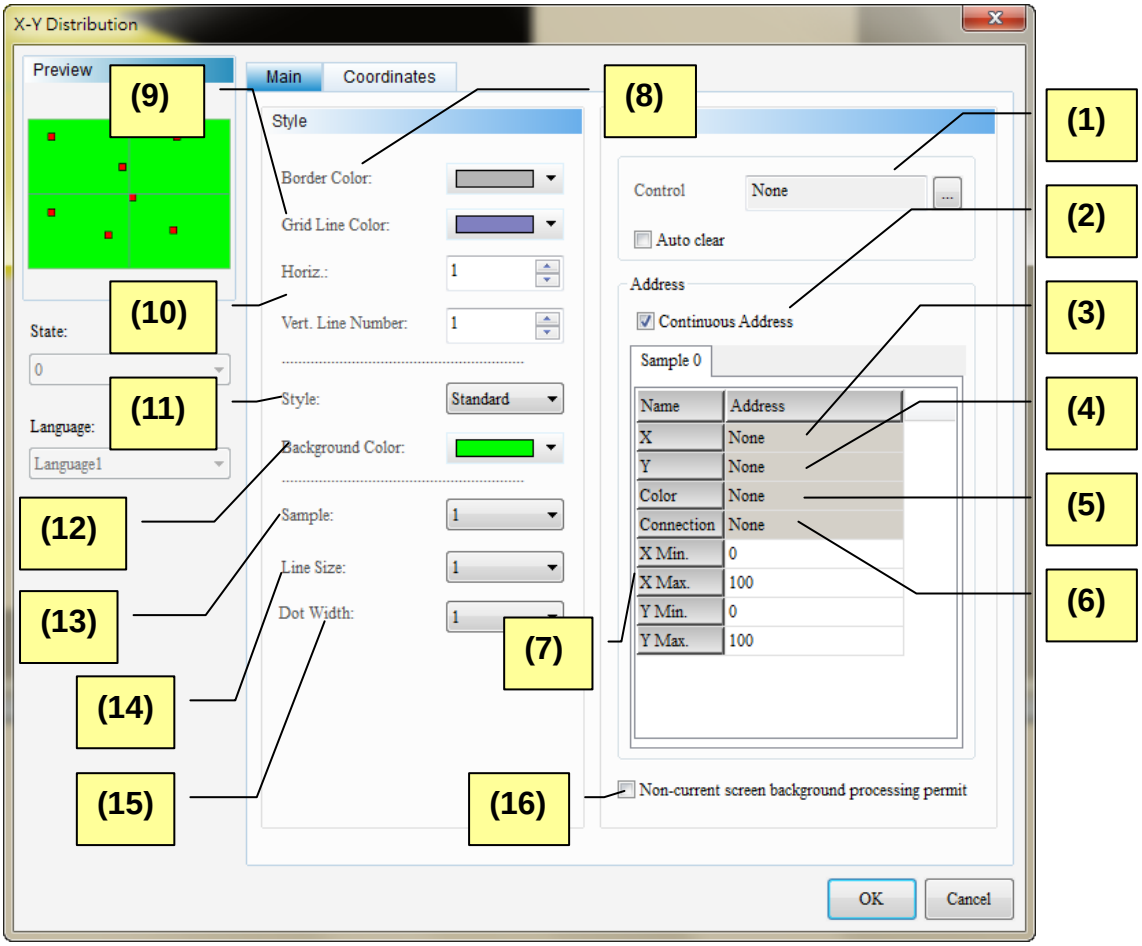
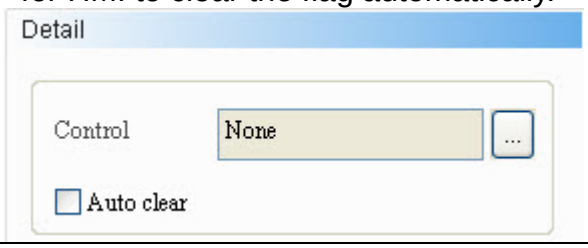
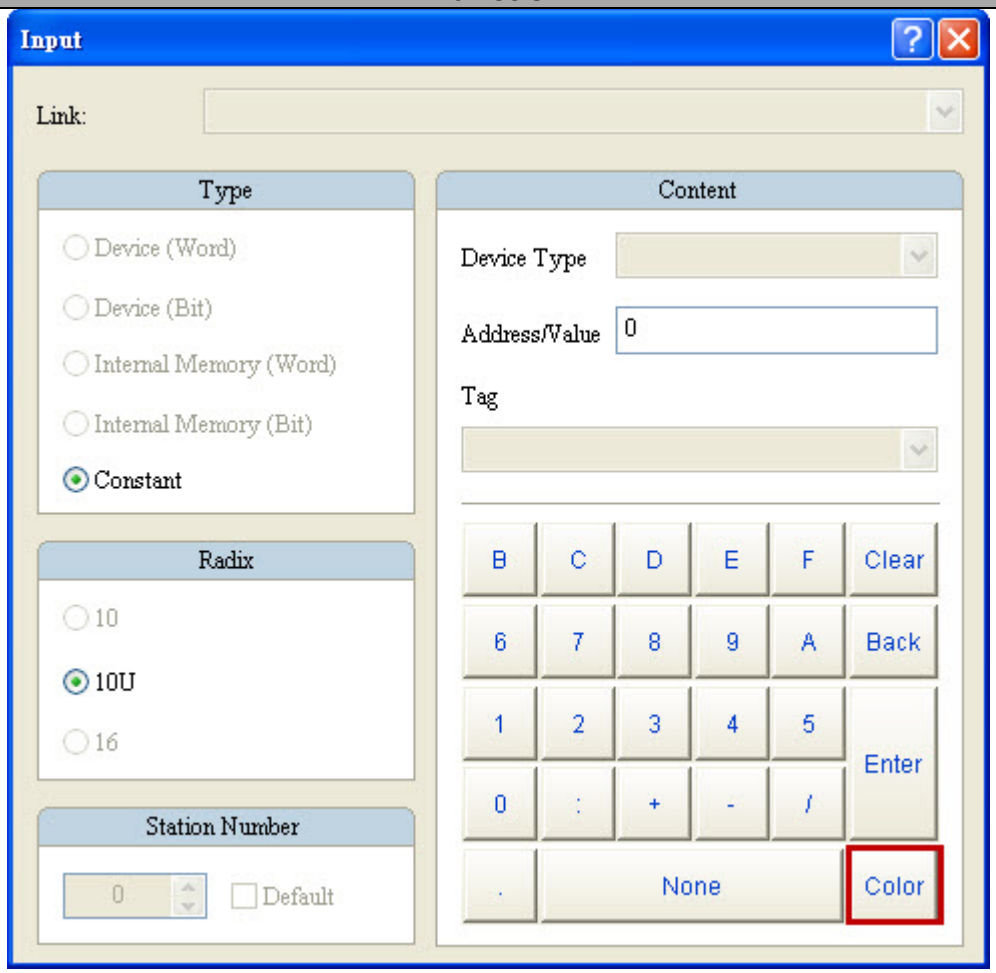
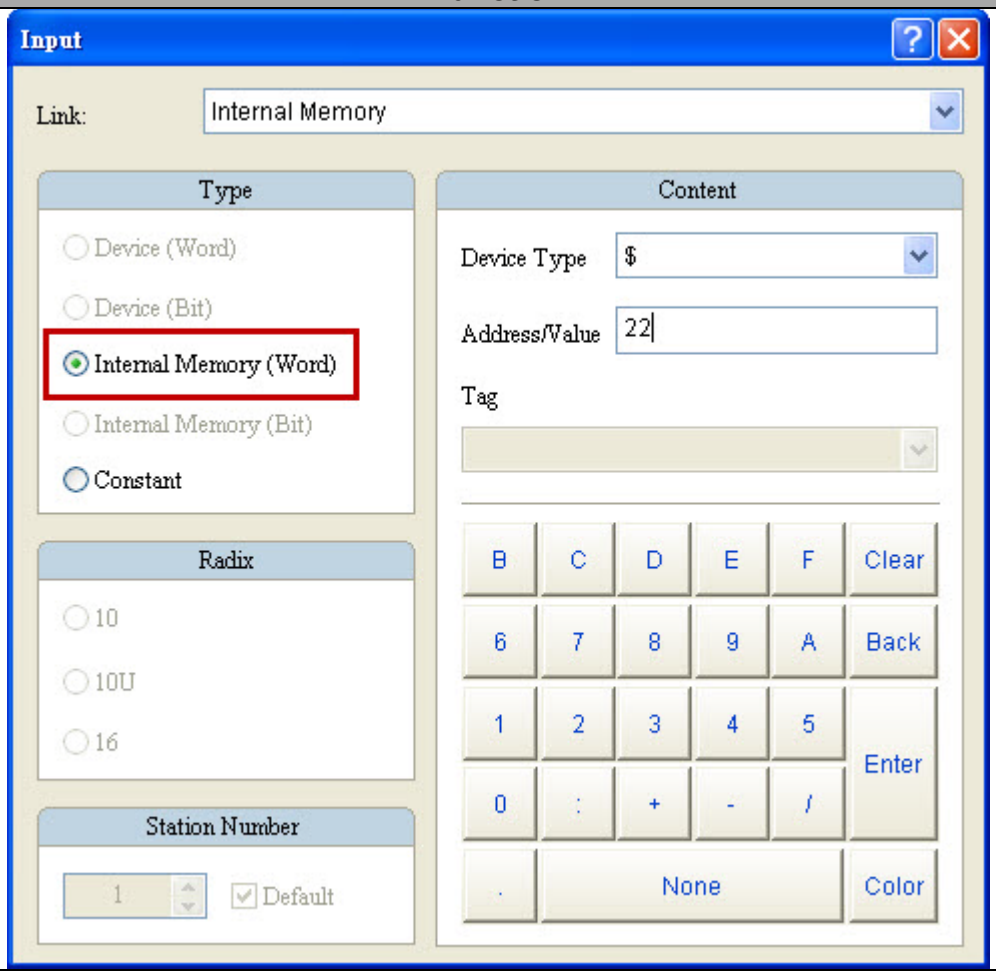


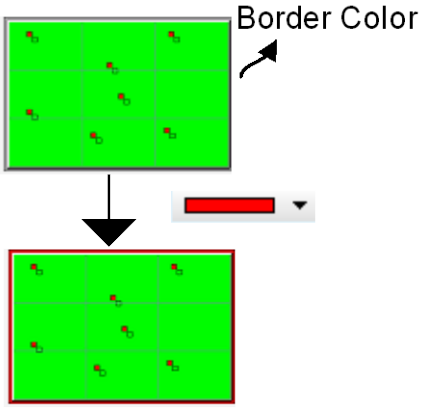
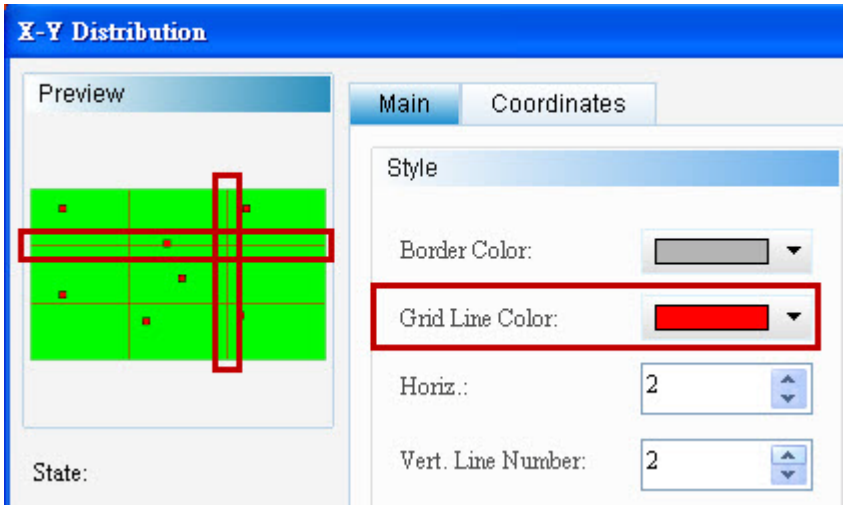
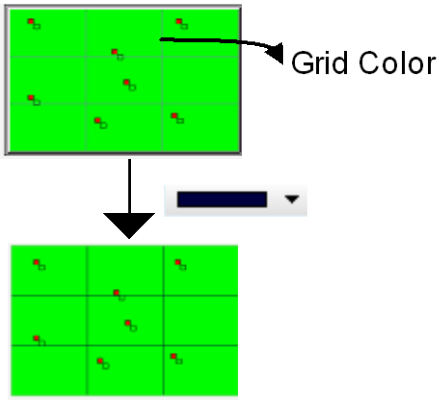
Figure 14-3-2 X-Y Distribution Element Main Properties Page

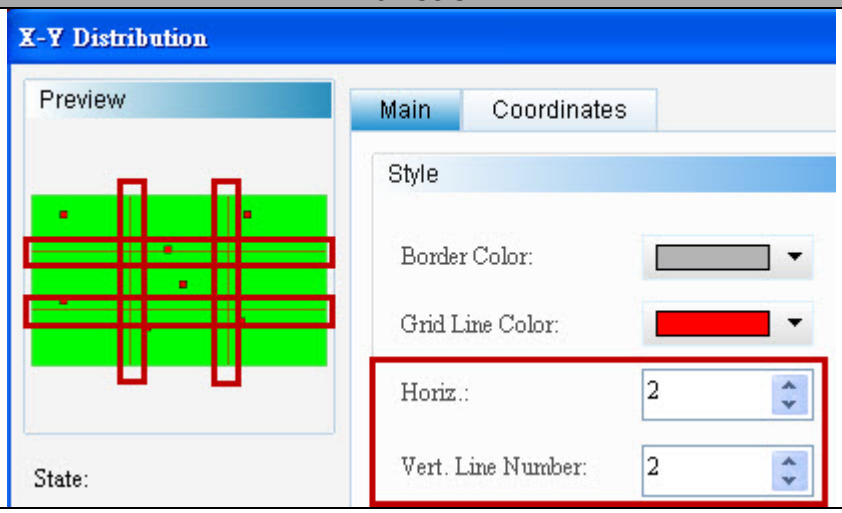
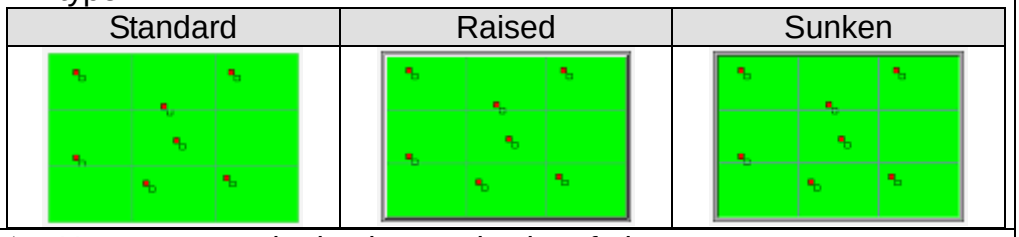
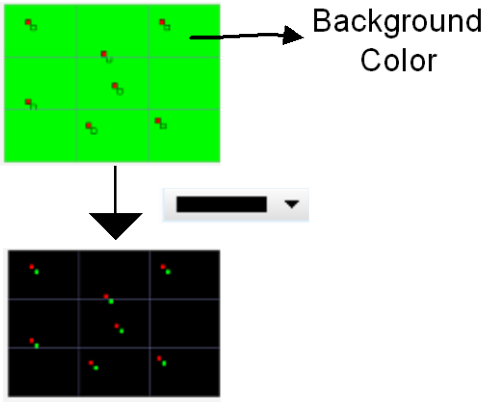
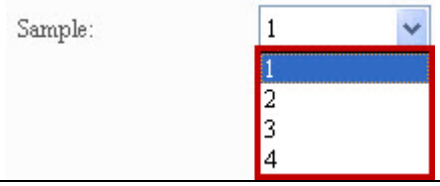
No.	Property	Function
(1)	Control Address	➢ Control Address is the independent curve control flag of the X-Y Distribution. Users will not need to sample data with the curve control flags in the control block. Users can select the internal memory or controller register of this control address. ➢ Selects link name or element type. Please refer to 5-1 Buttons of Chapter 05. ➢ Activate Bit 0 to draw the curve with sampling points and Bit 1 to clear sampling points. ➢ The curve control flag of the X-Y real-time curve draws the curve only with the data of one point in every time of activation. Users wishing to draw the curve with data of another sampling point must set the flag to OFF and reactivate the flag. Users can select the "Auto clear" for HMI to clear the flag automatically. 

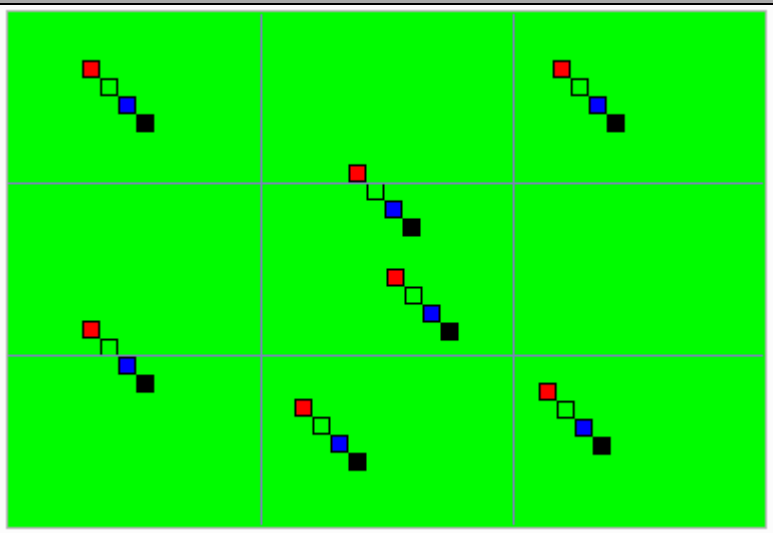
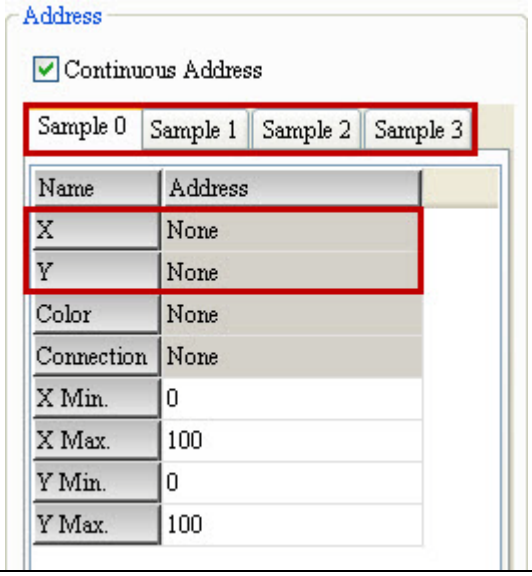
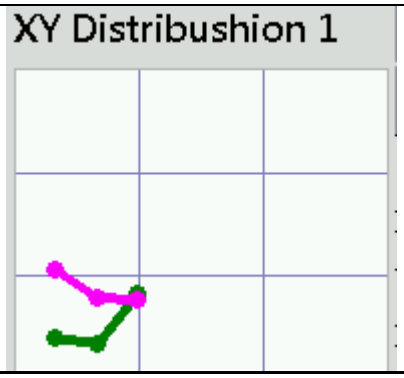
No.	Property	Function
(2)	Continuous Address	➢ If “Continuous Address” is selected, the address of Y, Color and Connection will continue the address selected for X. If X-address is “$1000”, the address of Y, Color and Connection will be $1001-$1003. Also, users wishing to change the read address of X and Y can only change the X-address. Users wishing to change the read address of Color or Connection can only change it into a constant without changing its address. ➢ If “Continuous Address” is not selected, the address of X, Y, Color, and Connection are discontinuous. Users can define their read address according to their preferences. Also, the read address of Color and Connection can be changed into a read address or a constant.
(3)	X	➢ Selects the address of the internal memory or controller register of X-coordinate. ➢ Selects link name or element type. Please refer to 5-1 Buttons of Chapter 05.
(4)	Y	➢ Selects the address of the internal memory or controller register of Y-coordinate. ➢ Selects link name or element type. Please refer to 5-1 Buttons of Chapter 05.
(5)	Color	➢ Selects the address of the internal memory or controller register or a constant of Color-coordinate. ➢ Selects link name or element type. Please refer to5-1 Buttons of Chapter 05. ➢ Selects a constant as color to directly select the sampling point color from Color.

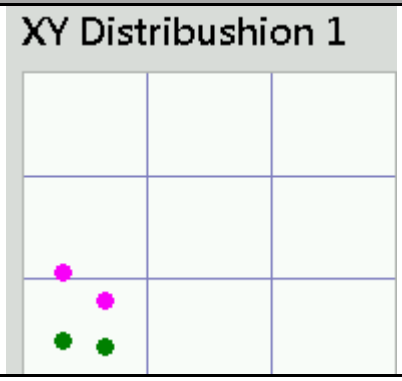
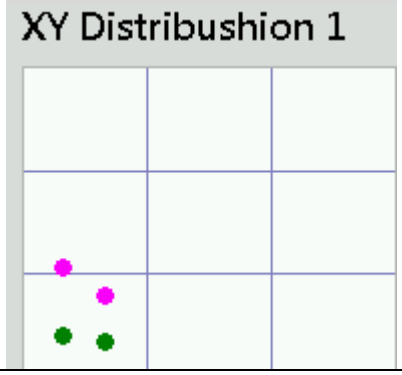
No.	Property	Function
		 ➢ Users can also input the address number, ranging from 0 to 65535.

No.	Property	Function
		
(6)	Connection	➢ Selects the address of the internal memory or controller register or a constant of Connection-coordinate. ➢ Selects link name or element type. Please refer to 5-1 Buttons of Chapter 05. ➢ Connection means if it is to connect with previous sampling point to form a curve. Set constant=1 for connection or constant=0 for no connection.
(7)	X-Minimum / X-Maximum / Y-Minimum / Y-Maximum	➢ The valid range of X/Y minimum numeric entry and X/Y maximum numeric entry is subject to the data type and data format. **Data Type** / **Data Format** / **Data Valid Range** **Word**: BCD: 0~9999 Signed BCD: -999 ~ 9999 Signed Decimal: -32768~32767 Unsigned Decimal: 0~65535 Hex: 0~0xFFFF
(8)	Border Color	➢ Users can define the Border Color of the X-Y Distribution element.

No.	Property	Function
		
(9)	Grid Line Color	➢ Grid Line Color is the color of the grid line in the X-Y Distribution. The default color is .  ➢ Users can change the grid color. 
(10)	Horizontal Line Number / Vertical Line Number	➢ Both Horizontal Line Number and Vertical Line Number support the maximum of “99”. ➢ Horizontal Line Number refers to the number of curves on the X-axis. Vertical Line Number refers to the number of curves on the Y-axis. Default is 2.

No.	Property	Function
		
(11)	Element Style	➢ There are three element types, including Standard, Raised, and Sunken. Users can change the element appearance with element type. 
(12)	Element Background Color	➢ Users can set the background color of elements. 
(13)	Sample size	➢ An X-Y Distribution element supports a maximum of 4 sets of samples. 

No.	Property	Function
		 ➢ User wishing to use 4 sets of samples only need to set the X and Y read addresses of Sample 0, Sample 1, Sample 2, and Sample 3 to run sampling. 
(14)	Line Size	➢ Line size can be set between 1 and 8. The setting value cannot be less than 1, or it will not show any line in the graph. Line size is set to 1 

No.	Property	Function
		Line size is set to 0 
(15)	Dot Width	➢ Dot width can be set from 1 to 8. When the dot width is set to 5, the figure will be shown as below. 
(16)	Non-current screen background processing permit	➢ If you activate this function, it means X-Y Distribution can do sampling in other screens. ➢ For example, if X-Y distribution is in screen 1 but not screen 2, when you activate this function, you also can do sampling in screen 2. NOTE: ✓ If [Auto Rest Flag] is not checked, please make sure to turn the sampling flag off after the sampling is complete.

◆ Coordinates

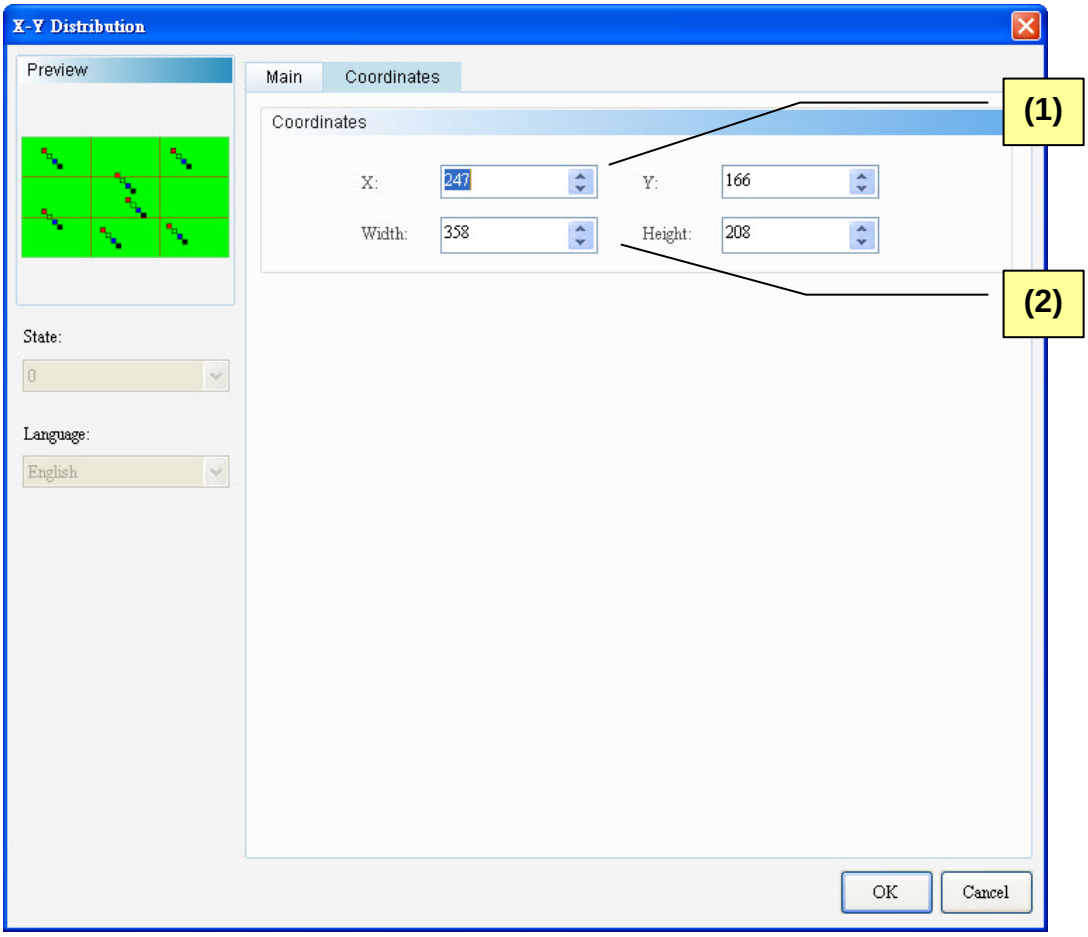


Figure 14-3-3 X-Y Distribution Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

14-4 Curve Input

	Curve Input

Curve Input takes sample from continuous addresses and draw curves based on the read address selected by users. Users can also touch the Curve Input element to move the curve to the desired display position. Curve Input provides two types of graphs, broken line and block graphs, each has different effects.

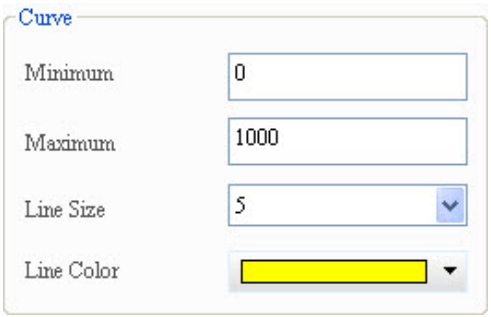
Please refer to Table 14-4-1 Example of Curve Input below.

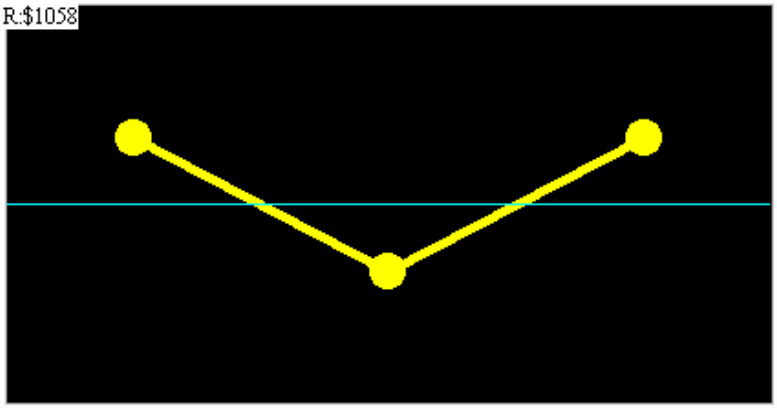
Example of Curve Input

Table 14-4-1 Example of Curve Input

Curve Input Element

➢ Create a Curve Input element and set the relevant parameters.

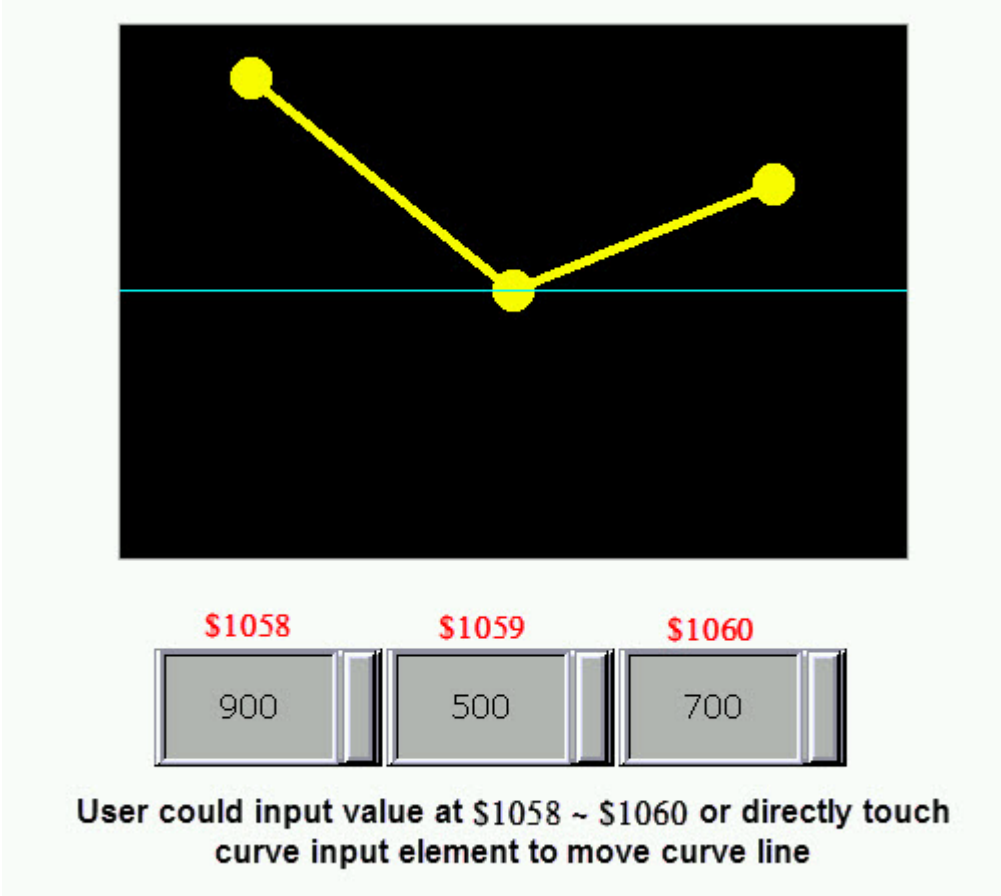
Curve Input Element	
Read Address	$1058
Sampling Points	3
Graph Type	Broken Line
Minimum Value Maximum Value Line Size Line Color	



Numeric Entry Element

➢ Three numeric entry elements are created because the sampling point setting is “3”. As it needs 3 sampling points to draw a curve, 3 addresses are read orderly from Read Address $1058 defined by Curve Input. These addresses are $1058, $1059, and $1060.

Numeric Entry Element			
Write Memory Address	$1058	$1059	$1060

Example of Curve Input Table 14-4-1 Example of Curve Input	
Execution Results	➢ After creating elements, run Compile and download them to HMI. Next, input a random value from the Numeric Entry Element, Curve Input will draw curves according to these values. Users can also touch the Curve Input element to move the curve to the desired display location. 

Double-click Curve Input to call out the Curve Input Properties screen as shown below.

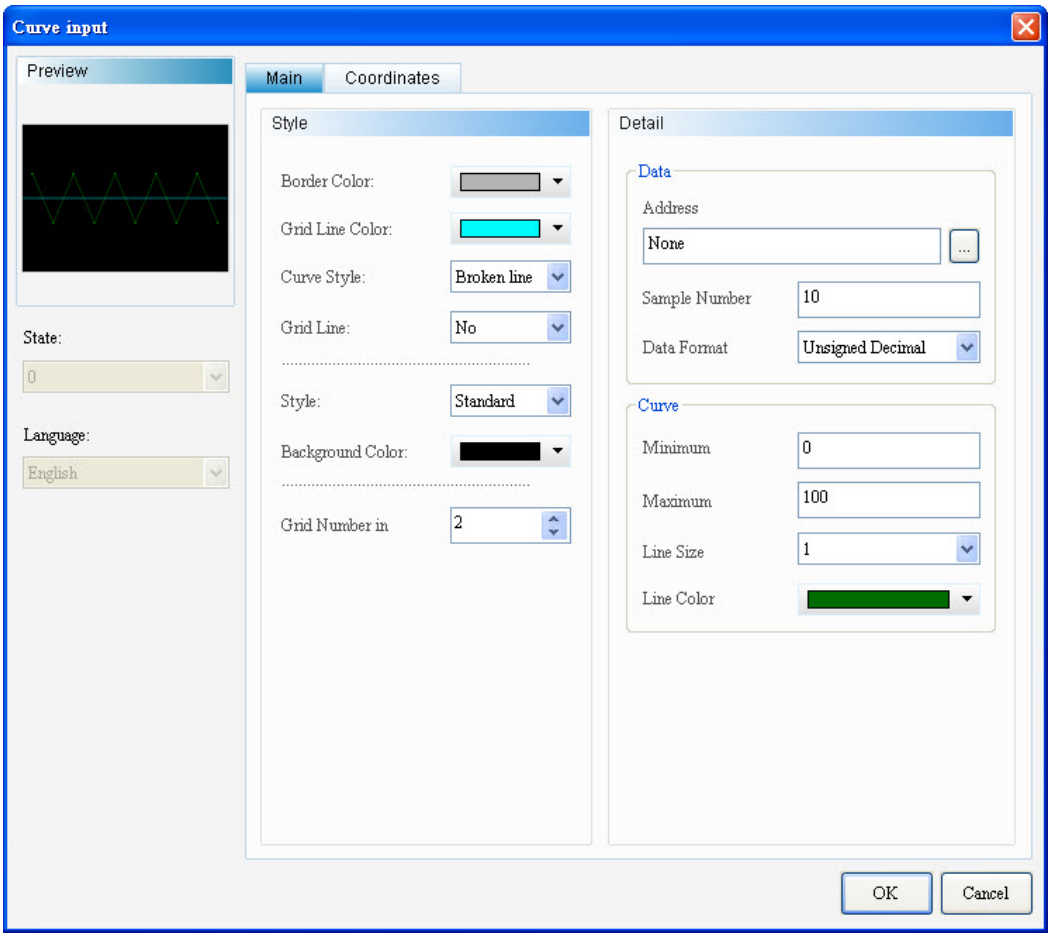


Figure 14-4-1 Curve Input Properties

Curve Input	
Function Page	**Content Description**
Preview	Supports neither multistate data nor multilingual data display.
Main	Sets Read Address, Sample Number, Data Format, Minimum, Maximum, Line Size, and Line Color. Sets Border Color, Grid Line Color, Curve Type, Grid Line, Element Style, Element Background Color, and Grid Number in.
Position	Sets the X-Y coordinate, width, and height of elements.

Table 14-4-2 Curve Input Function Page

◆ Main

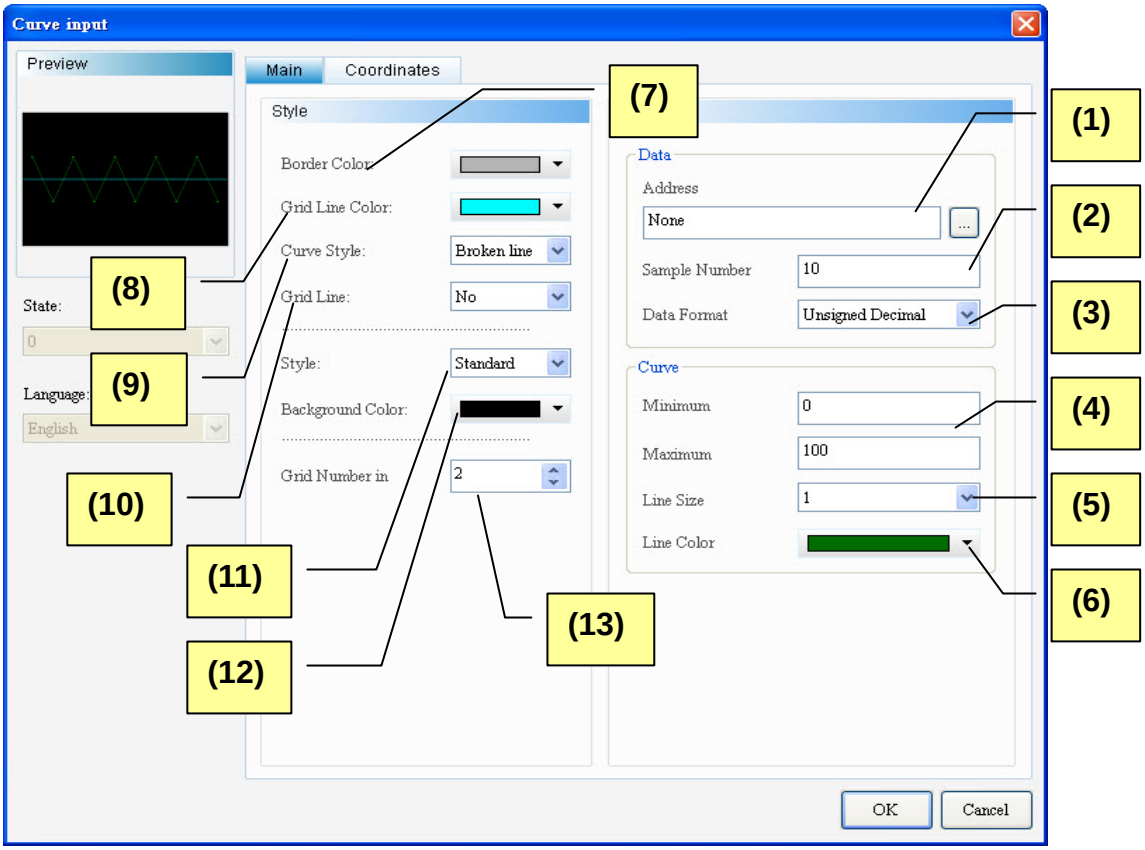
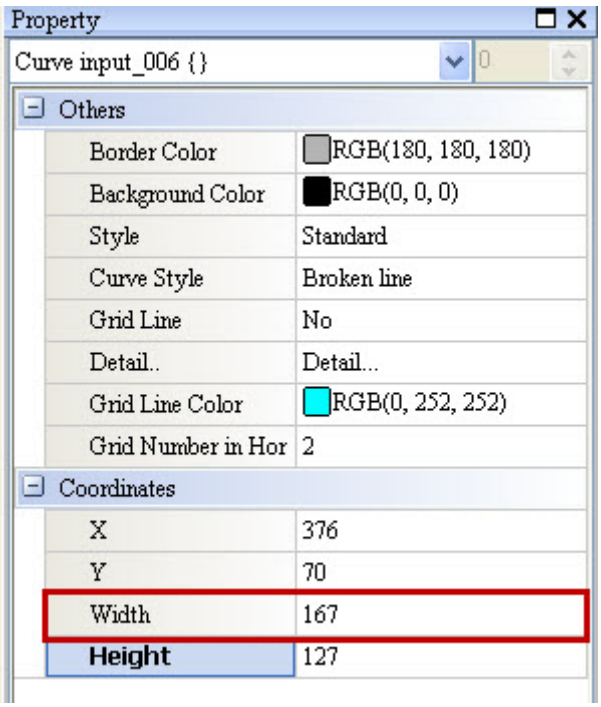
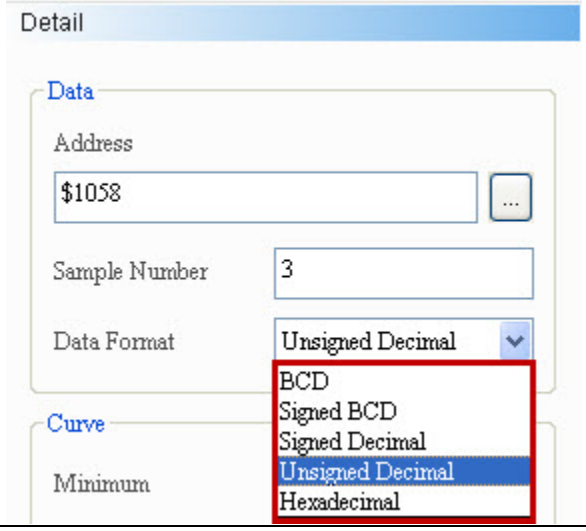
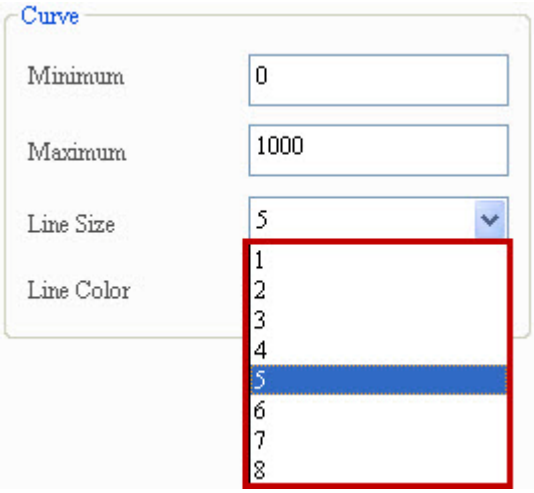
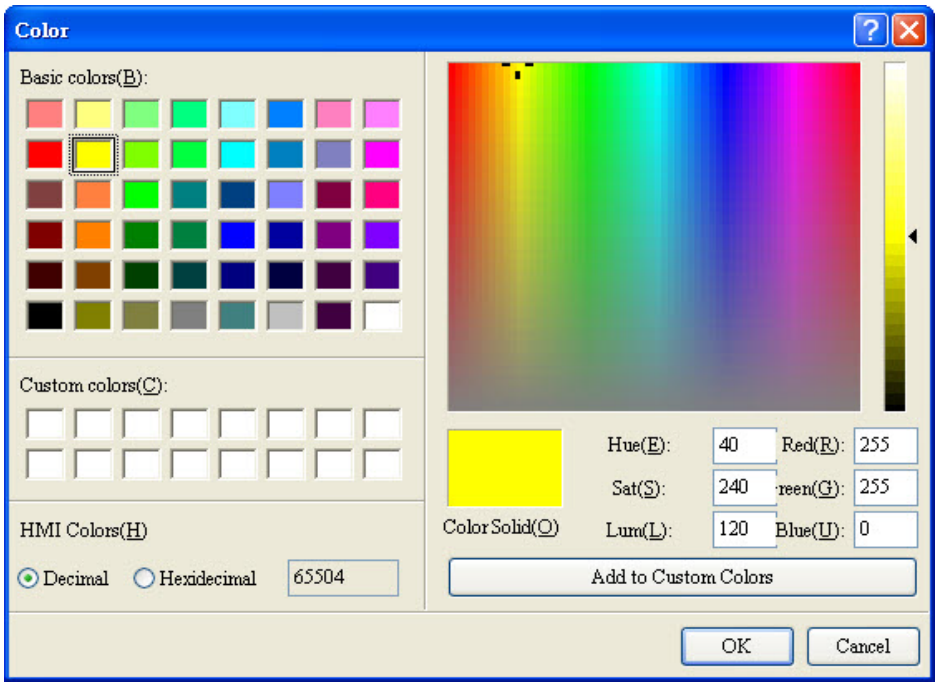
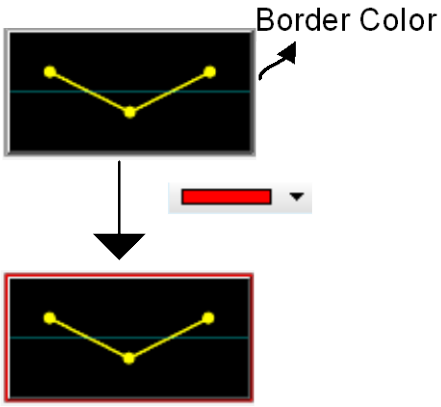
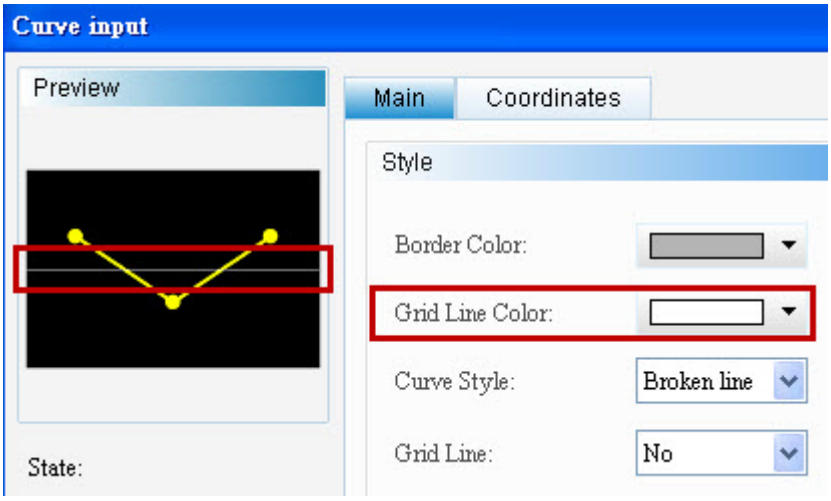
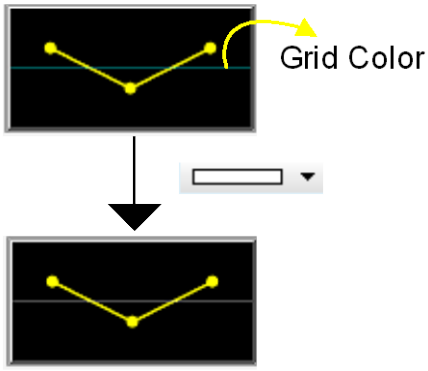
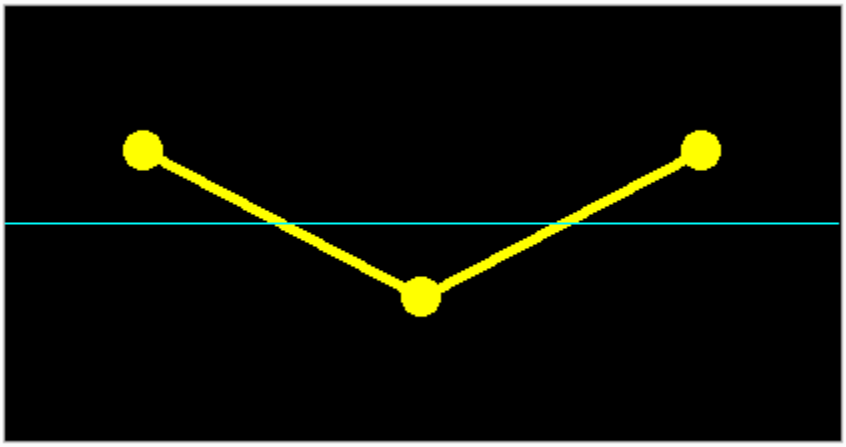


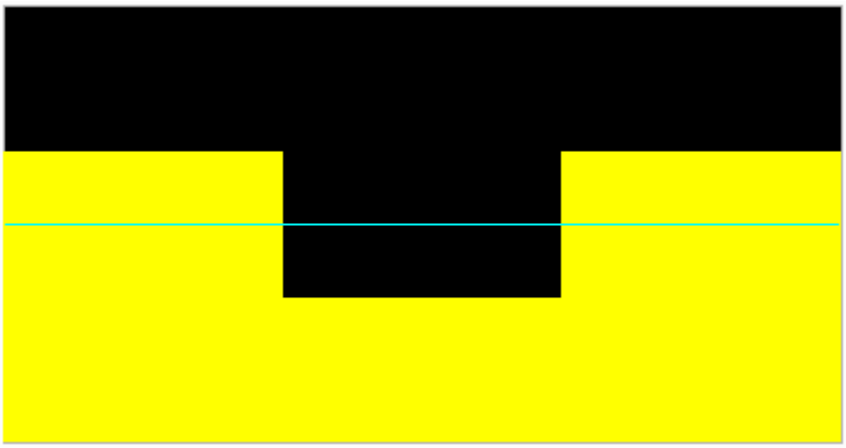
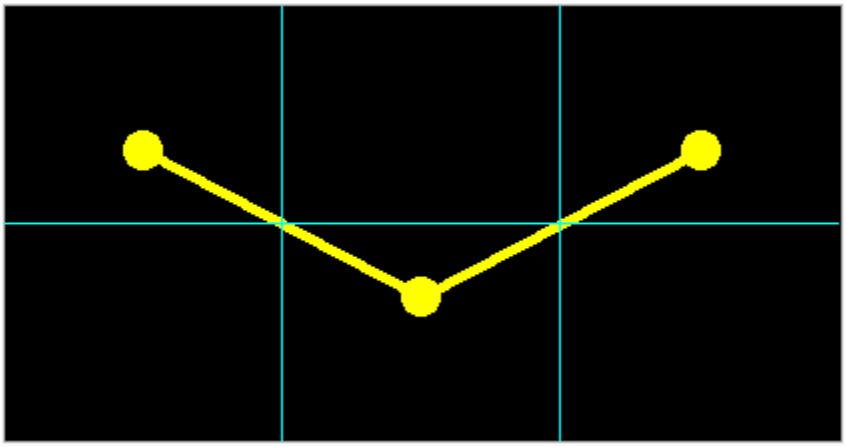
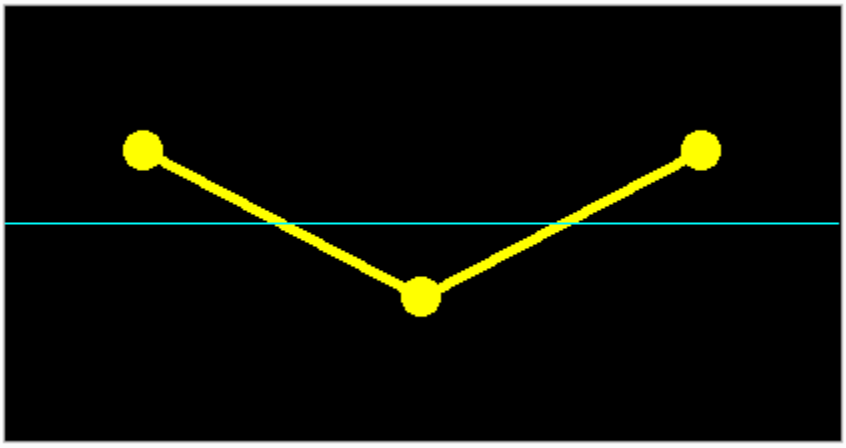
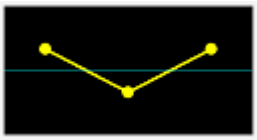
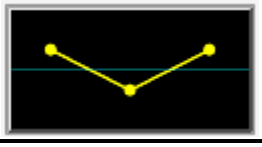
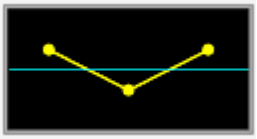
Figure 14-4-2 Curve Input Element Main Properties Page

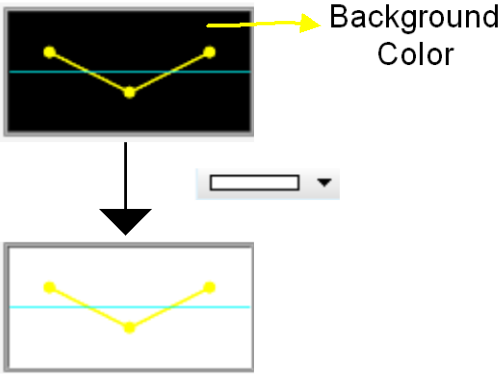
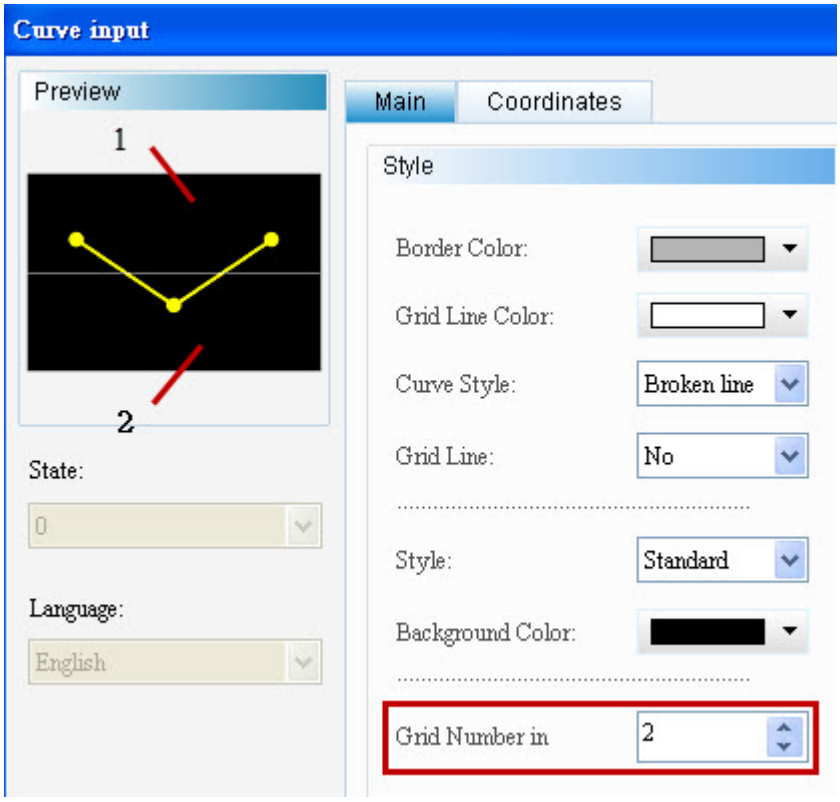
No.	Property	Function
(1)	Address	➢ Selects the address of internal memory or controller register. ➢ Selects link name or element type. Please refer to 5-1 Buttons of Chapter 05.
(2)	Sample Number	➢ The value of Sample Number must be a constant. ➢ The size of Sample Number is determined by element width and element type. When element type “Standard” is selected in the Curve Input element, and element width is “167”, the maximum Sample Number is “167”. When element type “Raise” or “Sunken” is selected in the Curve Input element (Border width is 7 points) and element width is 167, the maximum Sample Number are 153 (167-(7*2)=153).

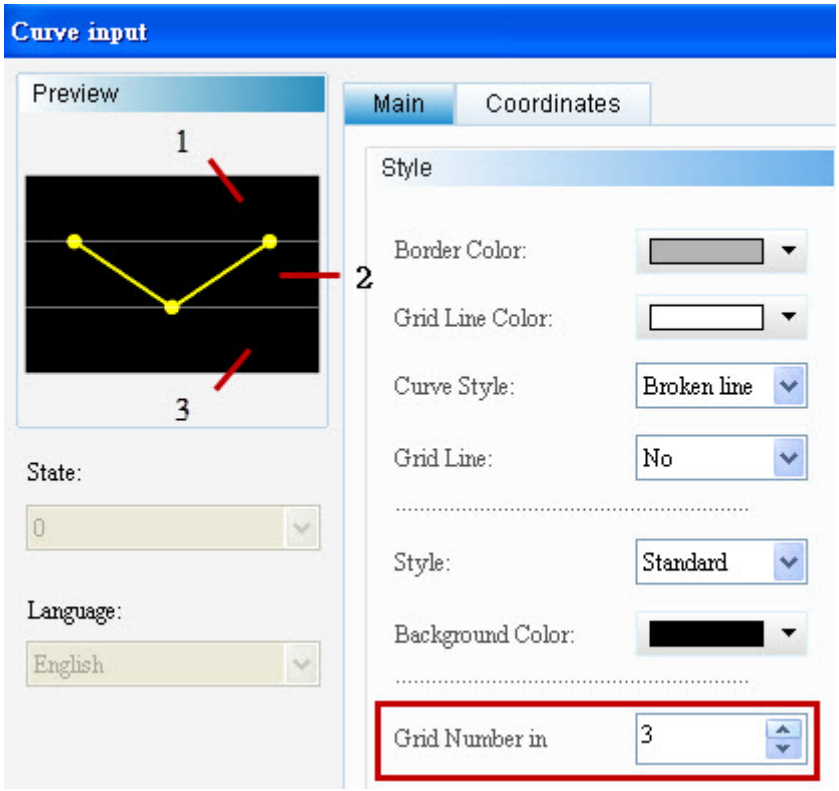
<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td></td><td></td><td> 
</td></tr>
<tr><td>(3)</td><td>Data Format</td><td>➢ Curve Input supports the following data formats:
 
</td></tr>
<tr><td>(4)</td><td>Minimum / Maximum</td><td>➢ The valid range of minimum numeric entry and maximum numeric entry is subject to the data type and data format.
<table>
<tr><th>Data Type</th><th>Data Format</th><th>Data Valid Range</th></tr>
<tr><td rowspan="5">Word</td><td>BCD</td><td>0~9999</td></tr>
<tr><td>Signed BCD</td><td>-999 ~ 9999</td></tr>
<tr><td>Signed Decimal</td><td>-32768~32767</td></tr>
<tr><td>Unsigned Decimal</td><td>0~65535</td></tr>
<tr><td>Hex</td><td>0~0xFFFF</td></tr>
</table></td></tr>
</table>

No.	Property	Function
(5)	Line Size	➢ There are eight levels of line width, ranging from 1-8. 
(6)	Line Color	➢ Users can define the color of line display. 
(7)	Border Color	➢ Users can define the Border Color of the Curve Input element. 

No.	Property	Function
(8)	Grid Line Color	➢ Grid Color is the color of the grid line in the Curve Input. The default color is .  ➢ Users can change the grid color. 
(9)	Curve Type	➢ There two graph types: broken line and block graphs. **Broken line** 

No.	Property	Function
		Block graphs 
(10)	Grid Line	➢ Options for Show Grid Line: Yes or No. **Yes**  **No** 
(11)	Element Style	➢ There are three element types, including Standard, Raised, and Sunken. Users can change the element appearance with element style. Standard  Raised  Sunken 

No.	Property	Function
(12)	Element Background Color	➢ Users can set the background color of elements. 
(13)	Grid Number in	➢ The maximum Grid Number in is “50”. ➢ Grid Number in are used to separate the blocks in the Curve Input element. Default count is “2”. This means there is one grid line separating the Curve Input element into two blocks. If the maximum horizontal grid count is “3”, there are two grid lines separating the Trend Graph element into 3 blocks, and so on. 

No.	Property	Function
		

◆ Coordinates

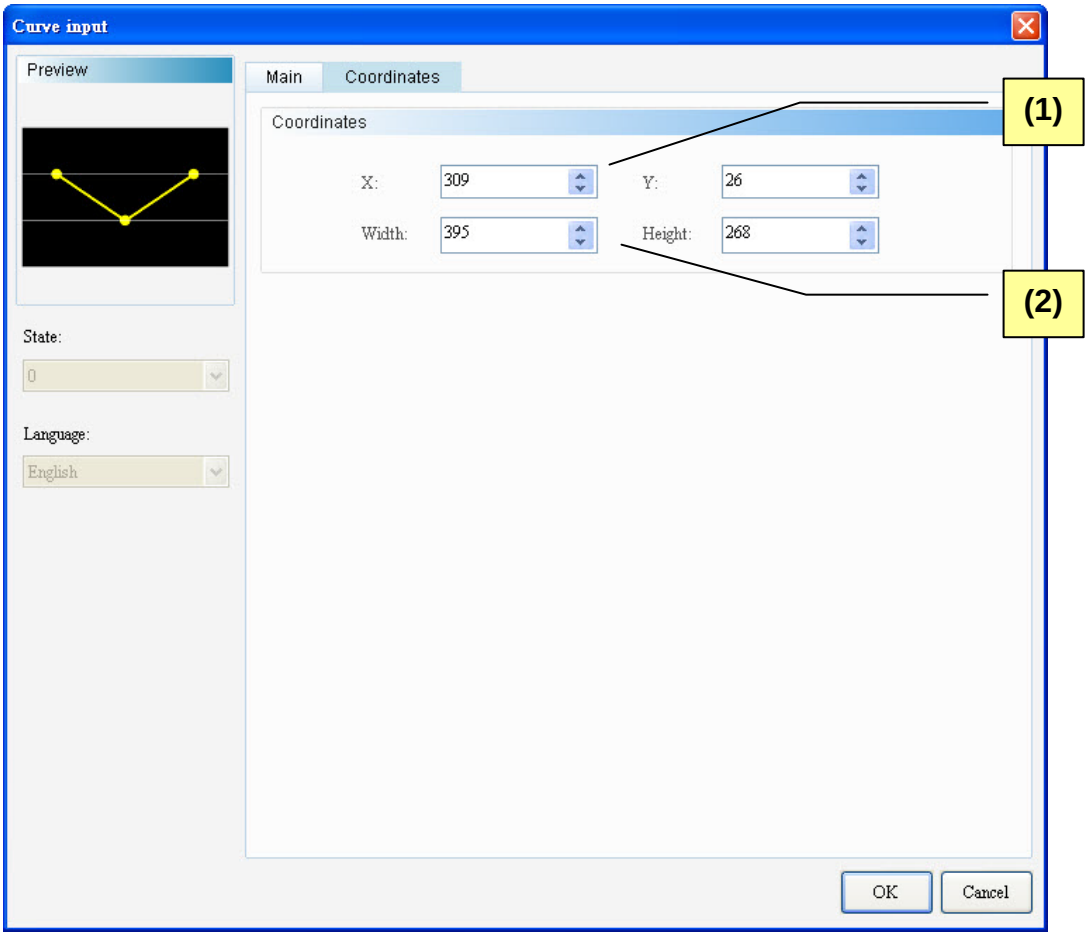


Figure 14-4-3 Curve Input Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

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15-3 Historical Data Table 76
15-4 Historical Event Table 94
15-5 Historical Overview Table 106

Chapter 15 Sampling

This chapter describes the sampling components that the DOPSoft software provides and how to operate History Setup.

◆ Classification of sampling components:

Sampling		Historical Trend Graph
		Historical Data Table
		Historical Event Table
		Historical Overview Table

Table 15-1-1 Classification of sampling components

◆ Common properties of sampling components

History Elements	Read Address	Write Address	Style (Border Color/ Grid Color/ Grid number in Horizontal/ Foreground Color/ Background Color/ Curve Field)	Buffer Number	Time Format/ Date Format/ Show Color	Display Time/Date Labels	Global Range	Data No./ Min. Value/ Max. Value/ Line Size/ Line Color
Historical Trend Graph	◎		◎	◎	◎	◎	◎	◎
Historical Data Table	◎		◎ (Only border and Background Colors)	◎	◎			◎ (Only data no.)
Historical Event Table	◎		◎ (Only border and Background Colors)	◎	◎			◎ (Only data no.)
Historical Overview Table	◎		◎ (Only Background Color of TreeView and Background Color of View)	◎	◎	◎	◎	◎

History Elements	History Buffer Setup	Set Scale	Min. Value/ Max. Value	Data Type/ Data Format	Integer Digits/ Fractional Digits	Display High value/Display Low value	Column Counts/ Column Width/ Leading Zero	State
Historical Trend Graph	◎	◎	◎	◎	◎	◎		
Historical Data Table	◎			◎	◎		◎	
Historical Event Table	◎			◎				◎
Historical Overview Table	◎	◎	◎	◎	◎	◎		

Table 15-1-2 Common properties of sampling components

15-1 History Setup

We will explain how to use the History Setup function before describing the sampling components. The History Setup is used to set the properties such as address, length of the data type, sampling points, trigger source, whether to record the time and date, whether to store the data in an external device or output a file to the CSV file. The History data that the user edited will be run using the formula provided by the software. The size data calculated will be stored in the preset retained area. If the data are stored in HMI, the size of the History varies depending on the HMI model. For more information, refer to the Hardware Specifications in the HMI Installation Manuel for the description of the non-volatile internal memory. If the data are stored in an external device (such as USB Disk, SD Card), the size of that device prevails.

Two log files are generated when history data are downloaded to HMI: DAT and CSV.

1. DAT file formulas

Each history data is stored as a Hxxxx.dat file. xxxx is the ordinal number of the history data record. Each.dat file has the following capacity.

$$\frac{\{[6Bytes(a)+2Bytes(b)]\times N(c)\}}{1024\times 1024}=\text{Actual file size } MBytes$$

a	Time/date data
b	Data type
c	Sample number

Additional history data will occupy extra header size.

$$\{[8\text{Bytes(a)}]\times \text{N(b)}\}=\text{Actual file size Bytes}$$

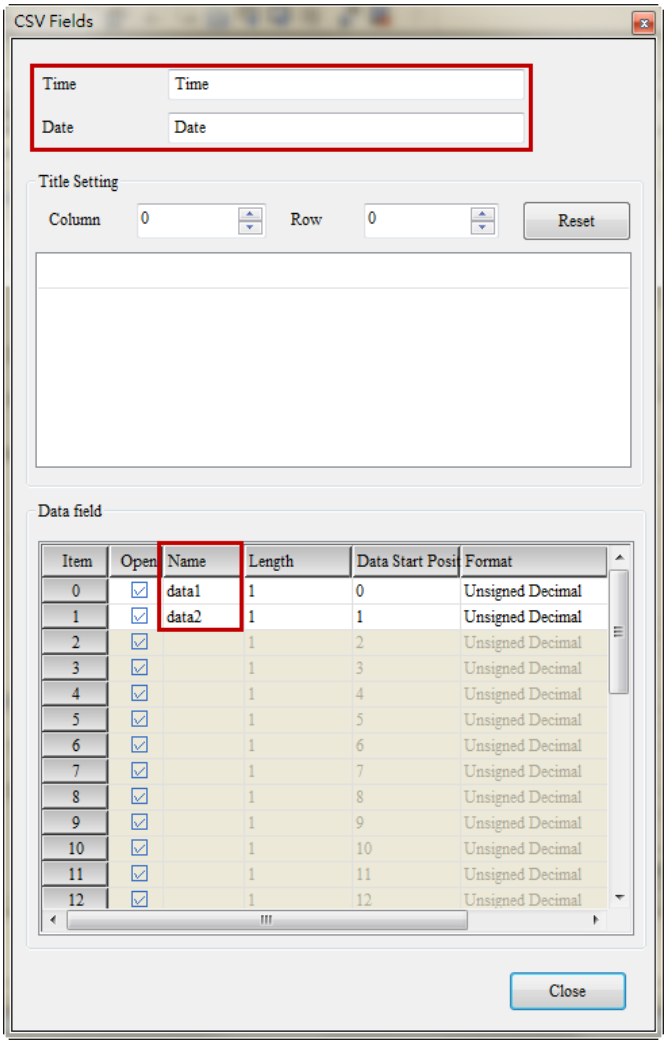
a	Header of each history data
b	Sample number

2. CSV file formulas

CSV file formulas are allocated by dynamic. According to every word is 2 byte, and every item have to separate by “，” then it also calculate 2 byte. Every rows ends also need 0x0D and 0x0A command that it calculate 4 byte.

As below will illustration how to calculate CSV file size.

■ Topic rows



For example illustrate how to calculate topic raw data size.

➢ Every word occupied 2 bytes (Word * 2 bytes)

Header	**Time Name (Time)**	**,**	**Date Name (Date)**	**,**	**Data field Name (Data1)**	**Ends**
2 Bytes	8 Bytes	2 Bytes	8 Bytes	2 Bytes	10 Bytes	4 Bytes
Total 36 Bytes						

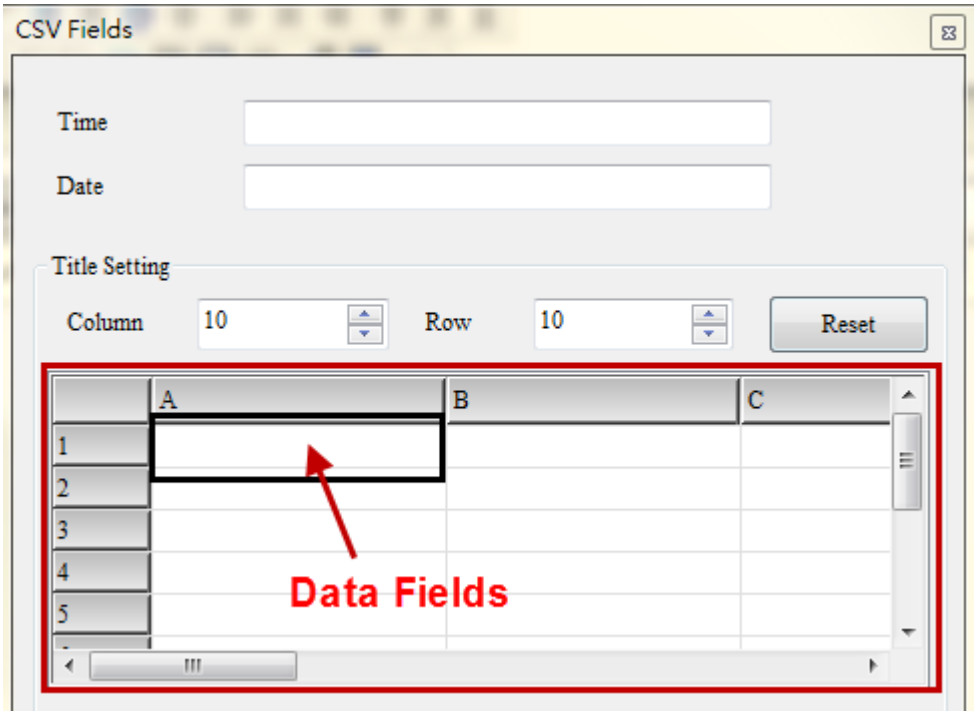
➢ Every word occupied 2 bytes (Word * 2 bytes)

Header	**Time Name (Time)**	**,**	**Date Name (Date)**	**,**	**Data field Name (資料 1)**	**Ends**
2 Bytes	4 Bytes	2 Bytes	4 Bytes	2 Bytes	6 Bytes	4 Bytes
Total 24 Bytes						

- Every word occupied 2 bytes (Word * 2 bytes)

Header	**Time Name (Time)**	**,**	**Date Name (Date)**	**,**	**Data field Name (Data 1)**	**Data field Name (Data 2)**	**Ends**
2 Bytes	4 Bytes	2 Bytes	4 Bytes	2 Bytes	6 Bytes	6 Bytes	4 Bytes
Total 30 Bytes							

■ Data Fields



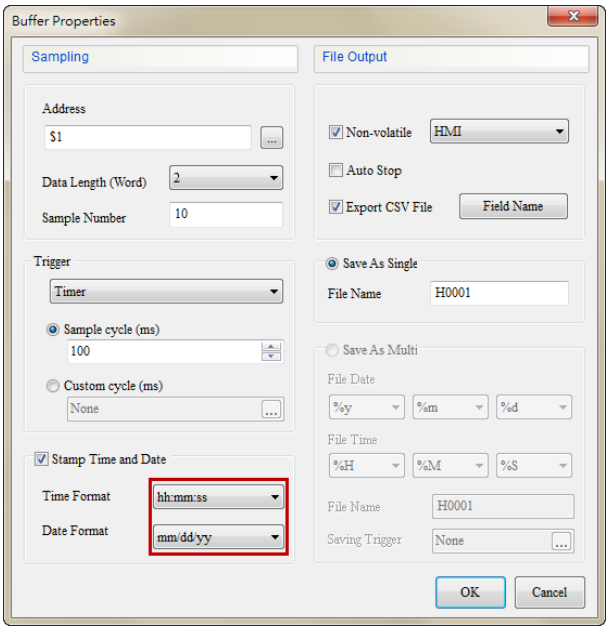
CSV fields supports up to 10* columns and 10* rows.

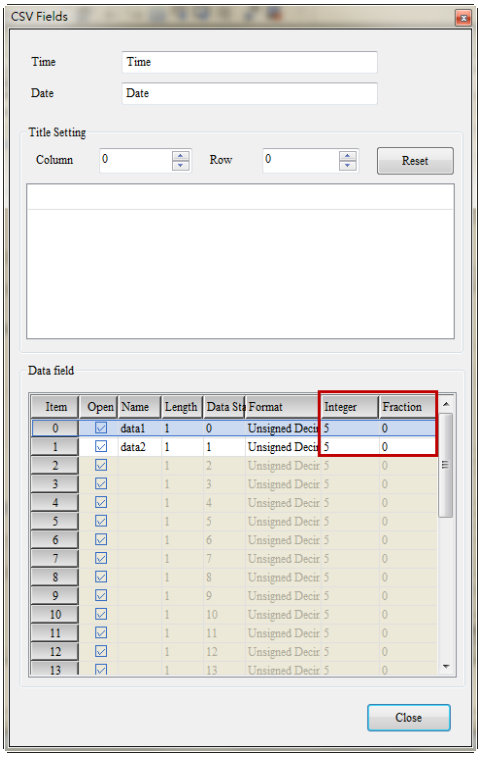
Each data field supports 128 Bytes and each word occupies 2 Bytes.

- Calculating method: each word occupies 2 Bytes (word count* 2 Bytes).
- Column* row = 2*2

A1 Setting value	CSV Separator	B1 Setting value	CSV Separator	A2 Setting value	CSV Separator	B2 Setting value	New line
123	**,**	**Delta**	**,**	**abc**	**,**	**QWE**	
6 Bytes	2 Bytes	8 Bytes	2 Bytes	6Bytes	2 Bytes	6 Bytes	4 Bytes
36 Bytes in total							

■ Data rows





➢ Every word occupied 2 bytes (Word * 2 bytes)

Time Format (hh:mm:ss)	,	Date Format (mm/dd/yyyy)	,	Integer (5)	Fraction (0)	Ends
16 Bytes	2 Bytes	20 Bytes	2 Bytes	10 Bytes	0 Bytes	4 Bytes
Total 54 Bytes						

➢ Every word occupied 2 bytes (Word * 2 bytes)

Time Format (hh:mm)	,	Date Format (mm.dd)	,	Integer (4)	Fraction (1)	Ends
10 Bytes	2 Bytes	10 Bytes	2 Bytes	8 Bytes	2 Bytes	4 Bytes
Total 38 Bytes						

➢ Every word occupied 2 bytes (Word * 2 bytes)

Time Format (N/A)	,	Date Format (N/A)	,	Data1		Data2		Ends
				Integer (4)	Fraction (1)	Integer (3)	Fraction (2)	
0 Bytes	2 Bytes	0 Bytes	2 Bytes	8 Bytes	8 Bytes	6 Bytes	4 Bytes	4 Bytes
Total 34 Bytes								

Every data rows data size have to multiplied by sample number N(a).

The CSV file size is equal to topic rows plus data rows multiplied by sample number.

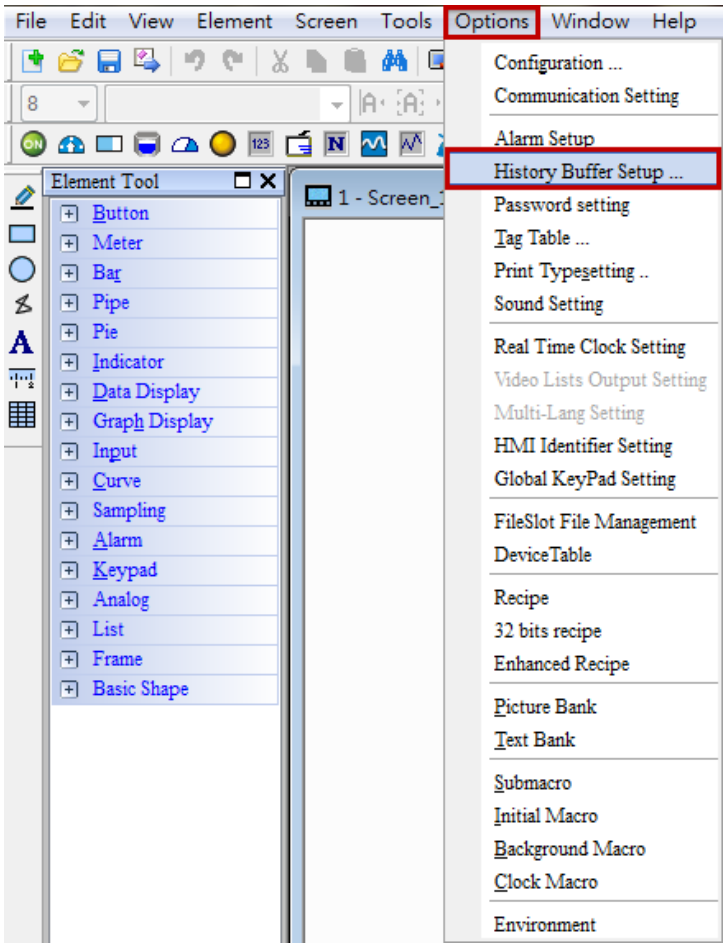
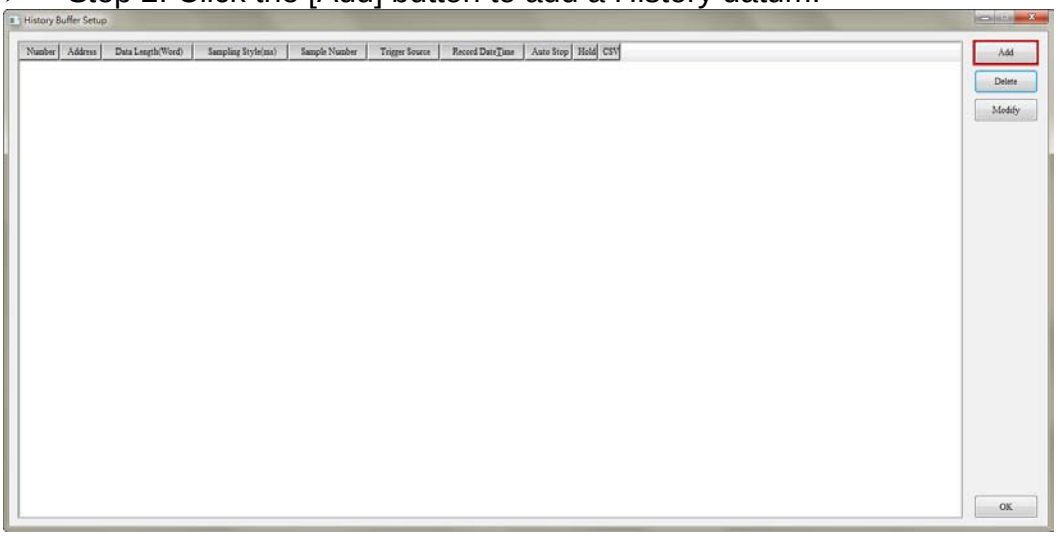
The formula is as below：

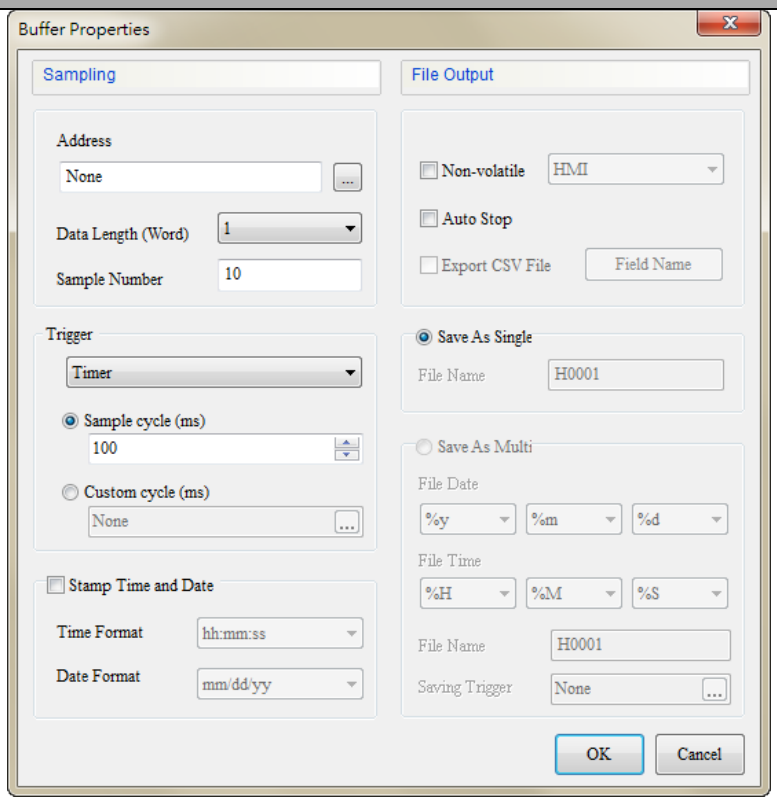
$$\frac{(Topic\ row\ size\ \text{Bytes} + Data\ row\ size\ \text{Bytes} + Data\ field\ \text{Bytes}) \times N(a)}{1024 \times 1024} = CSV\ \ file\ size\ MBytes$$

a	Sample number

This chapter will introduce all history elements used function; it includes History buffer setup, Historical Trend Graph, Historical data table, Historical Event table.

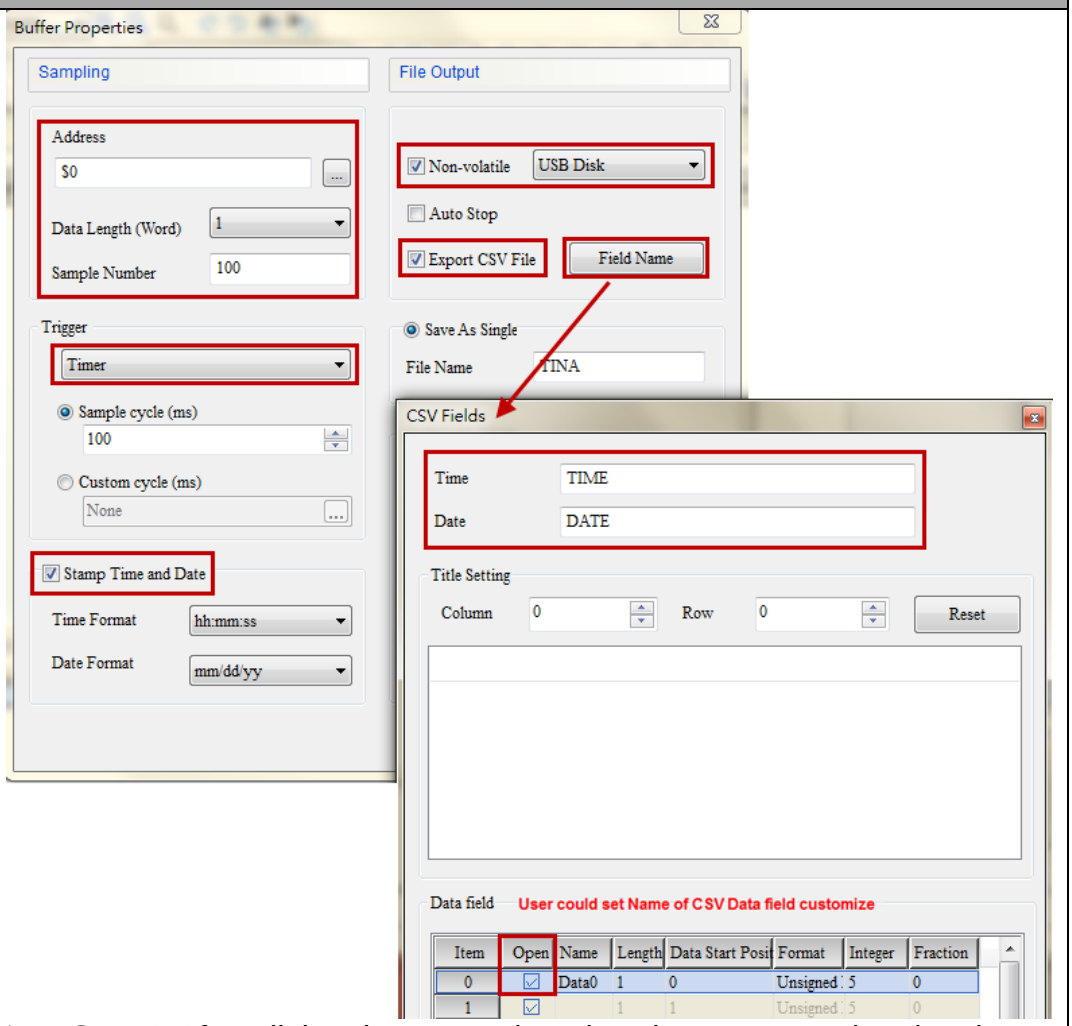
Please refer to as below table 15-1-3 History Buffer setup example.

History Setup Example Table 15-1-3 History Setup Example	
History Setup steps	➢ Step 1: Enter [Options] → [History Setup] to set up the property of the history data.  ➢ Step 2: Click the [Add] button to add a History datum.  ➢ Step 3: Set the buffer property as below:

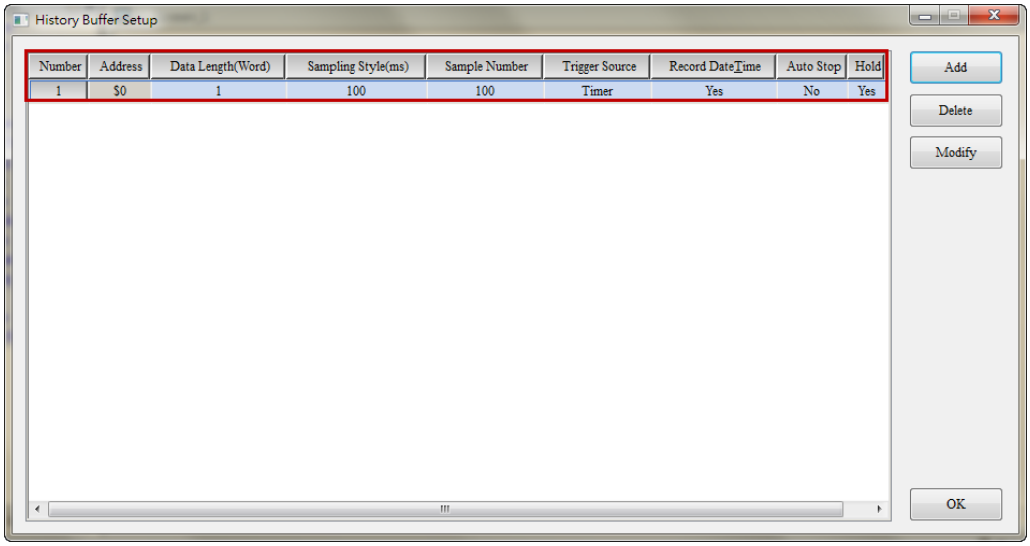
History Setup Example Table 15-1-3 History Setup Example	
	 ➢ Set the address and whether to record the time and date. Set the non-volatile data location to HMI, USB Disk or SD Card. Set whether to output to CSV file and set the trigger to Timer or PLC.

History Setup Example

Table 15-1-3 History Setup Example



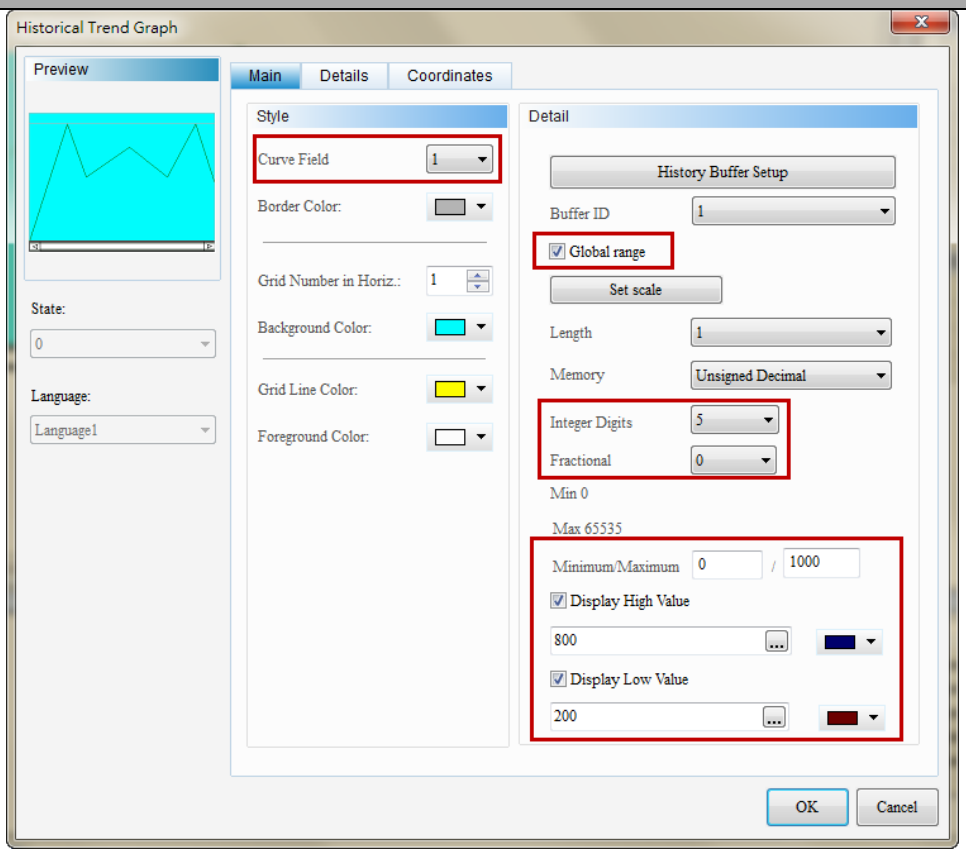
- Step 4: After all the above-mentioned settings are completed, a datum is added to the buffer.

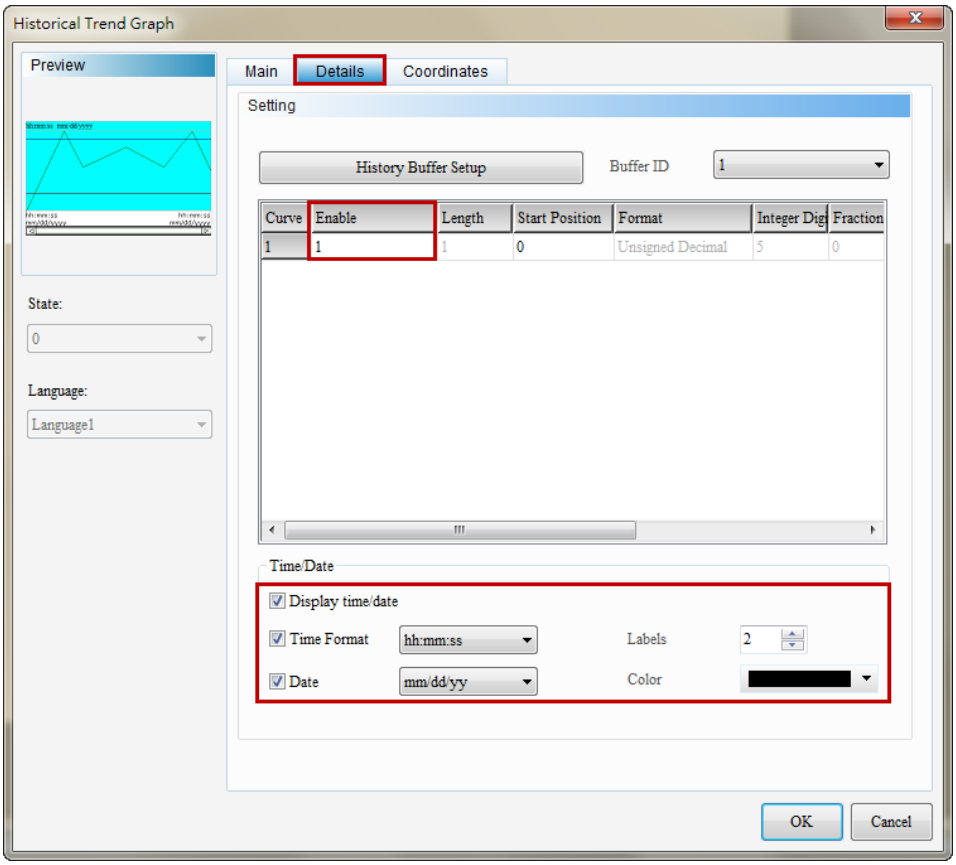


- Step 5: Create the element of historical trend graph and setup its property, such as time/date display, integer digits and fractional and whether to use global range. Then, go to details setting range to set curve 1 as 1 to access the data.

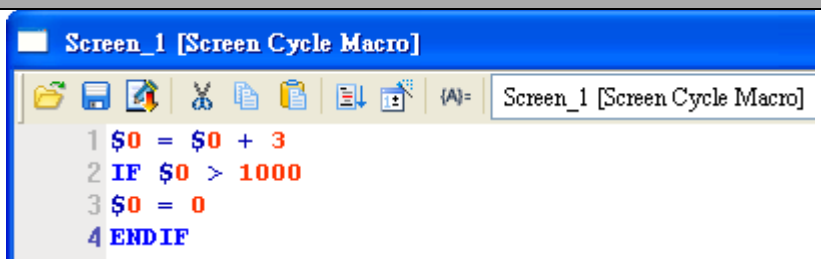
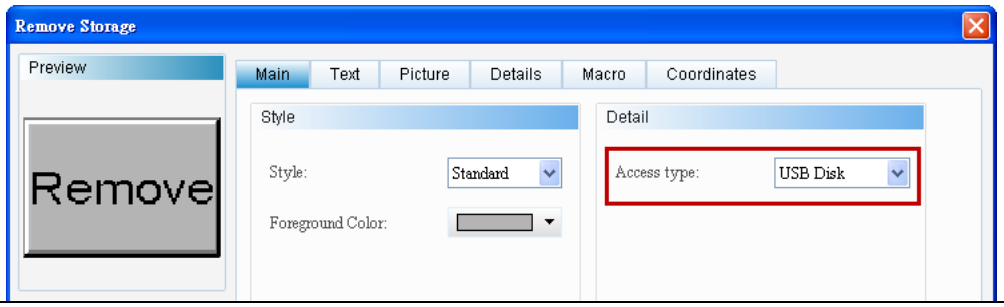
History Setup Example

Table 15-1-3 History Setup Example



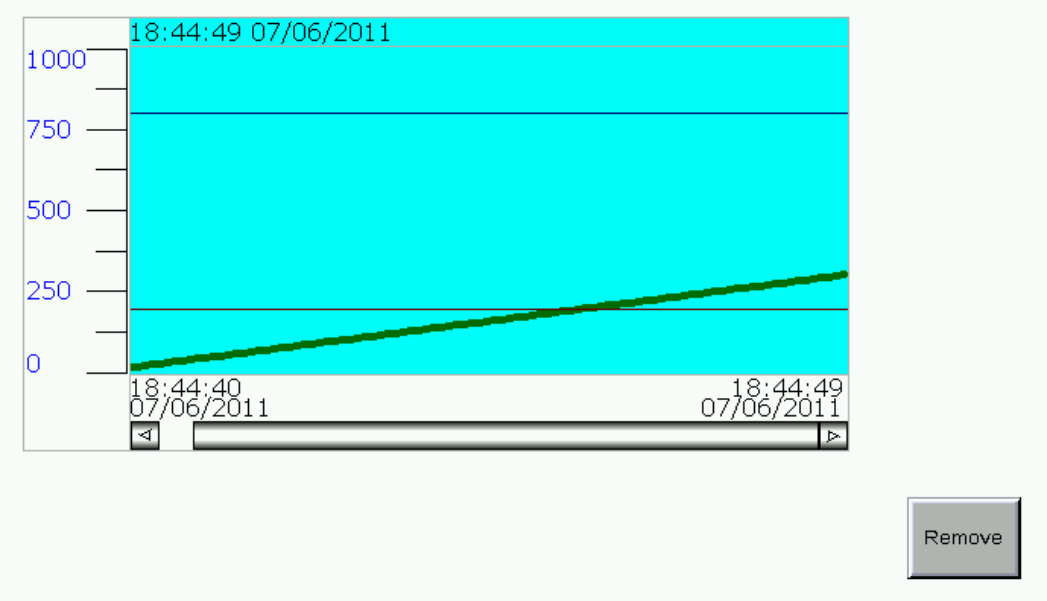


➢ Step 6: Enter [Screen] → [Screen Cycle Macro]. Edit the action to allow $0 increase automatically.

History Setup Example Table 15-1-3 History Setup Example	
	 ➢ Step 7: Create the Remove Storage button and set the Access Type to USB Disk. This action ensures writing the data to the USB Disk correctly. If the USB Disk is pulled out without executing the removal action, the data may be read/written incorrectly leading to corruption of the saved file. 
Execution Results	➢ After the setting of the History and the creation of the Historical Trend Graph and Remove Storage components are completed, perform the compilation and download the data to HMI. Since the retained area in this example is set to USB Disk, H.had and TINA.dat will be generated and stored in the USB Disk when HMI reads the screen. The History function will then execute the action in the Screen Cycle Macro to modify the data, and store on the USB Disk in CSV file format. To stop the storage, press the Remove button and remove the external device to ensure the correctness of the data.

History Setup Example

Table 15-1-3 History Setup Example



- Press the Remove button and the following message appears to inform the user that the USB Disk has been removed.

- The user can insert the USB Disk in the PC to read the CSV file and make sure that the data and file name are correct. The file name in this example is TINA. The path to save all CSV files is HMI\HMI-000\CSV\xxxxxxxx.CSV.

History Setup Example

Table 15-1-3 History Setup Example

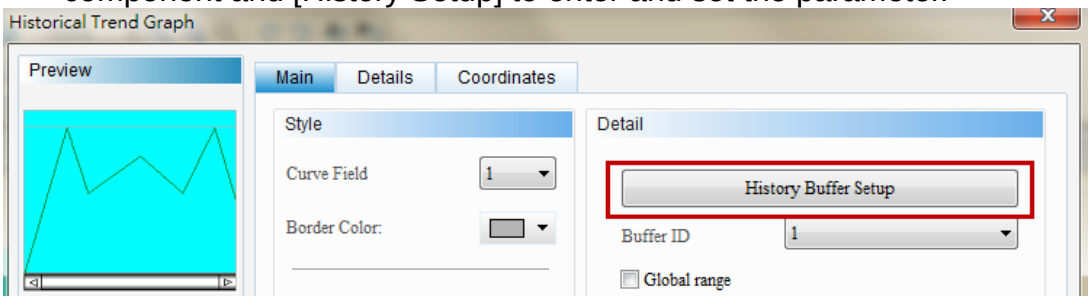
Tina.csv

	A	B	C
1	TIME	DATE	data0
2	14:37:46	07/06/2011	483
3	14:37:46	07/06/2011	486
4	14:37:46	07/06/2011	489
5	14:37:46	07/06/2011	495
6	14:37:47	07/06/2011	498
7	14:37:47	07/06/2011	498
8	14:37:47	07/06/2011	501
9	14:37:47	07/06/2011	504
10	14:37:47	07/06/2011	507
11	14:37:47	07/06/2011	510
12	14:37:48	07/06/2011	513
13	14:37:48	07/06/2011	519
14	14:37:48	07/06/2011	522
15	14:37:48	07/06/2011	525
16	14:37:48	07/06/2011	528
17	14:37:48	07/06/2011	531
18	14:37:49	07/06/2011	534
19	14:37:49	07/06/2011	537
20	14:37:49	07/06/2011	540
21	14:37:49	07/06/2011	543
22	14:37:49	07/06/2011	543
23	14:37:50	07/06/2011	549
24	14:37:50	07/06/2011	552
25	14:37:50	07/06/2011	552

Refer to the Historical Trend Graph example in Table 15-1-4.

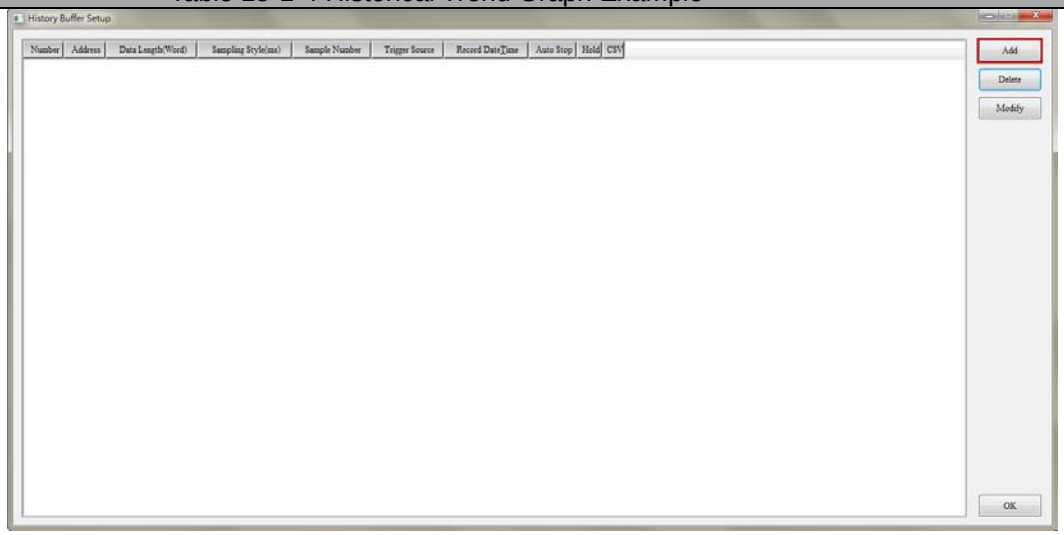
Historical Trend Graph Example

Table 15-1-4 Historical Trend Graph Example

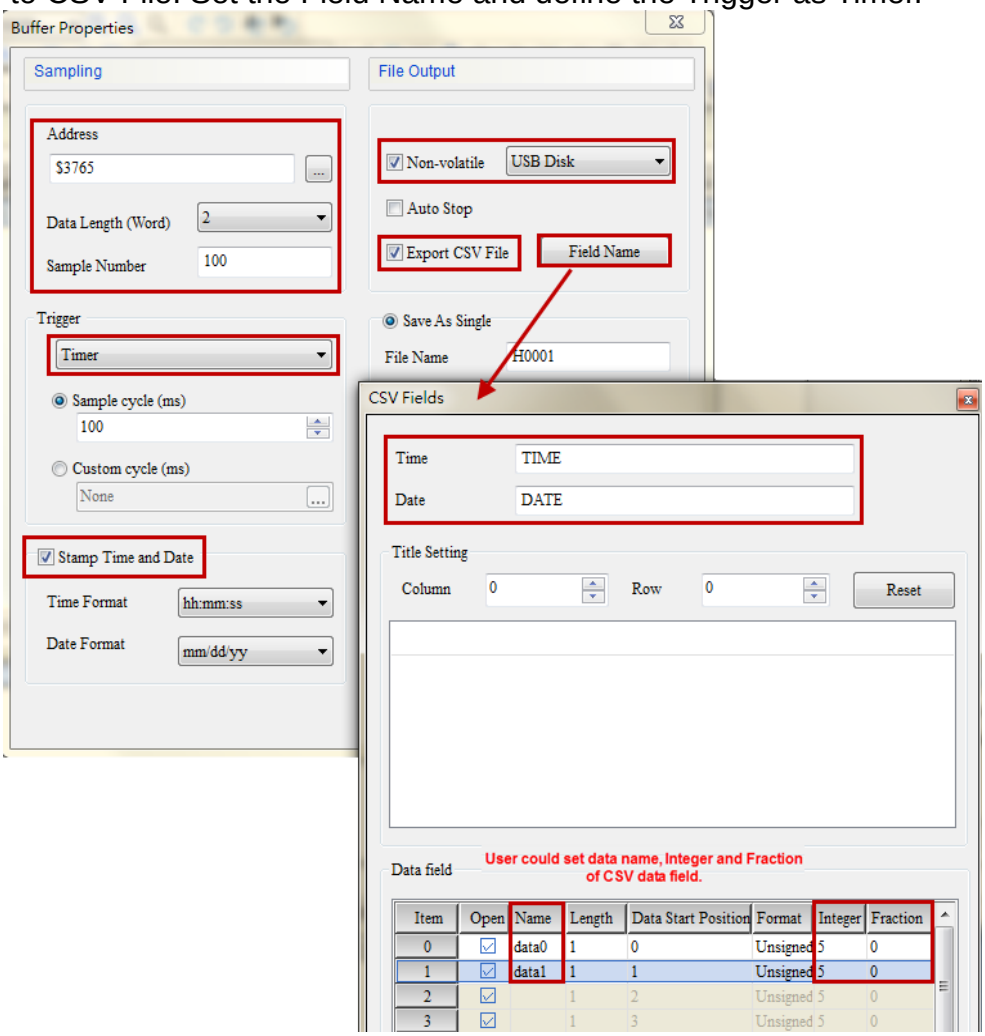
Add Historical Trend Graph Component	➢ Step 1: Create the Historical Trend Graph component. Double click this component and [History Setup] to enter and set the parameter.  ➢ Step 2: Click the [Add] button to add new history data.

Historical Trend Graph Example

Table 15-1-4 Historical Trend Graph Example



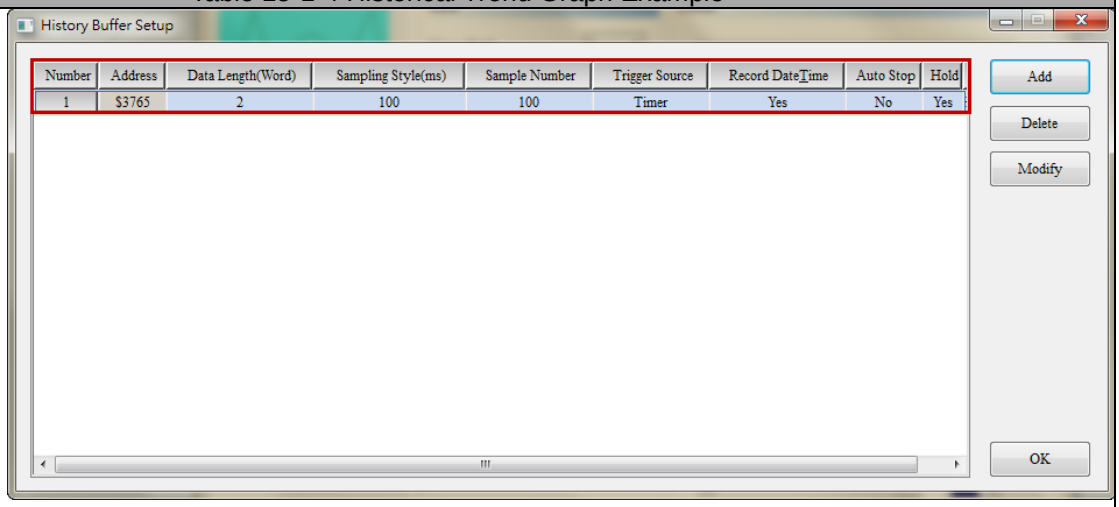
- Step 3: Set the Address to $3765, Data length to 2, sample number to 100. Check Record Time/Date and use the default H0001 as the file name. Set the Non-volatile Data Location to USB Disk and check Output to CSV File. Set the Field Name and define the Trigger as Timer.



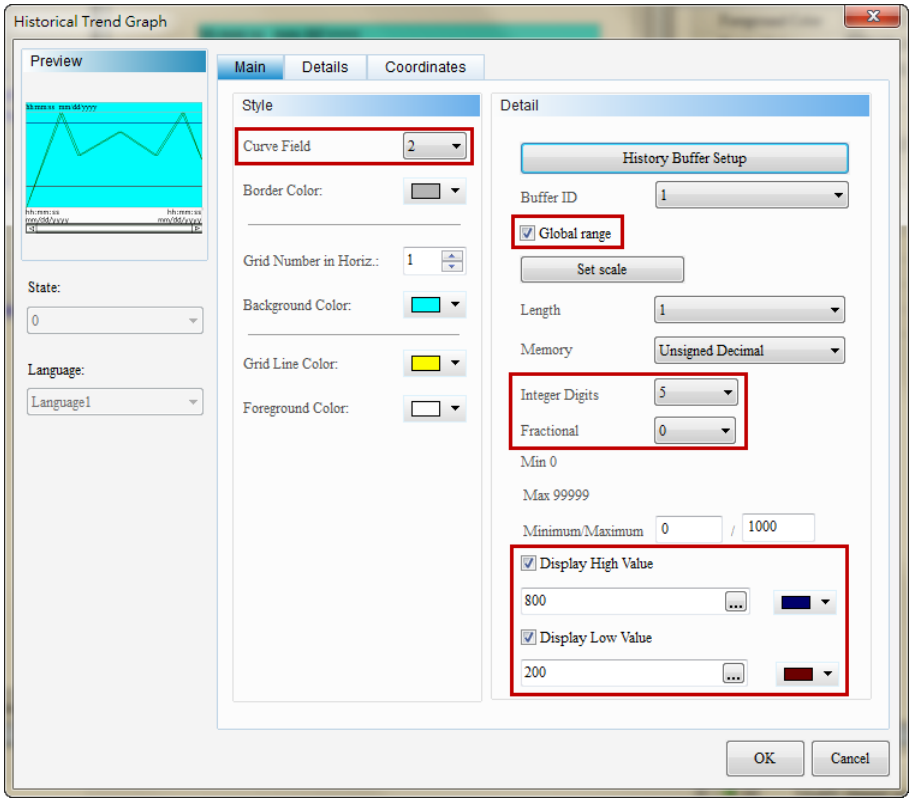
Step 4: After all the above-mentioned settings are completed, a datum is added to the buffer.

Historical Trend Graph Example

Table 15-1-4 Historical Trend Graph Example



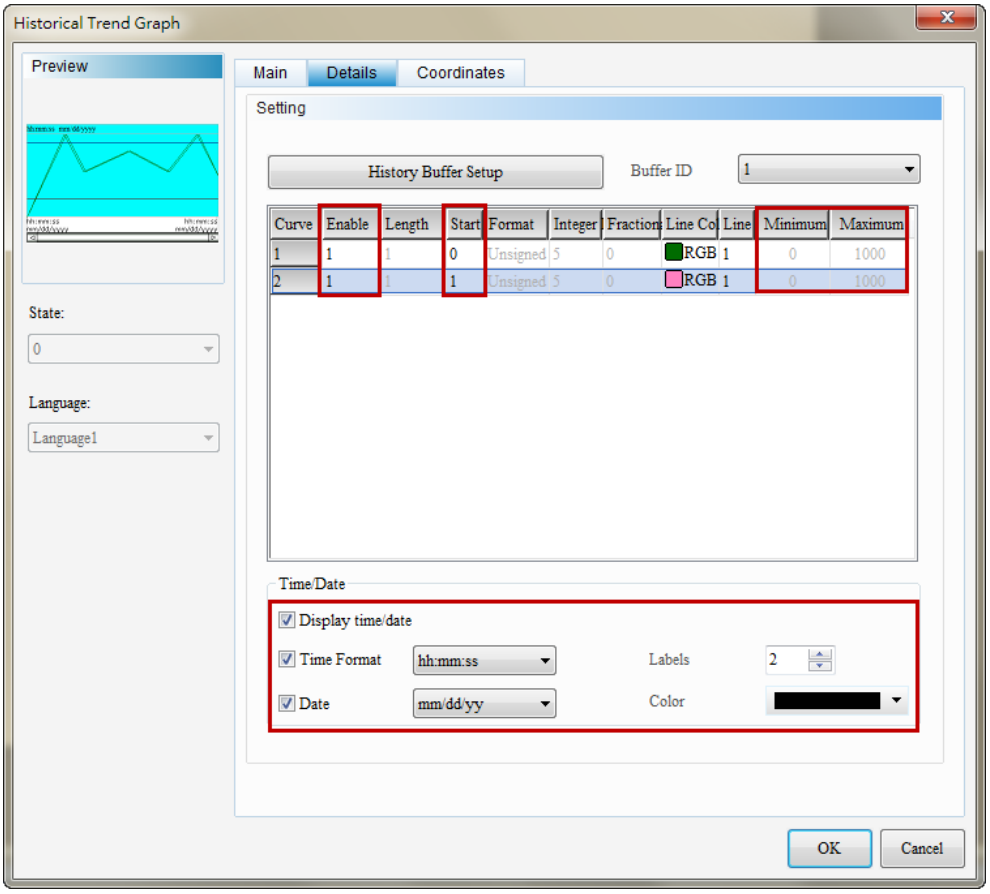
Step 5: Then configure other settings of the Historical Trend Graph, such as time/date display, integer and fractional and whether to use the global range. Also, go to Details Setting to set 1 as activation of curvilineal data capturing. Since you have already checked to use global range, it is unable to setup minimum and maximum value for each curve.



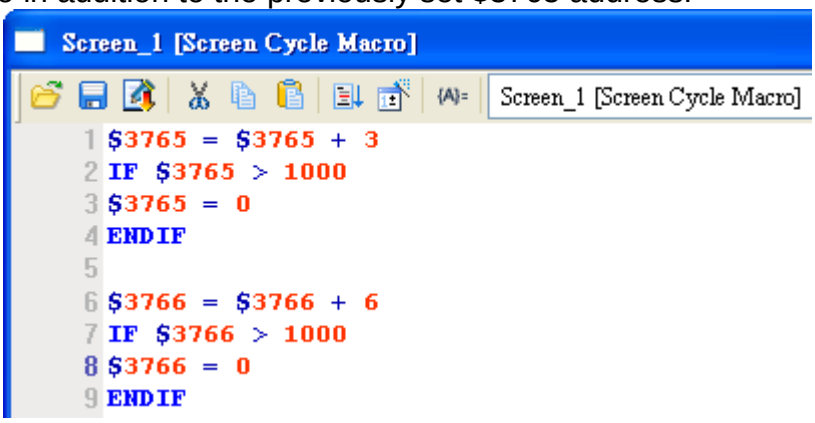
In Details Setting page, set 1 as activation of curvilinear data capturing. Then, set the start position of curve 1 and 2 to 0 and 1, respectively. Since you have already checked to use global range, it is unable to setup minimum and maximum value for each curve.

Historical Trend Graph Example

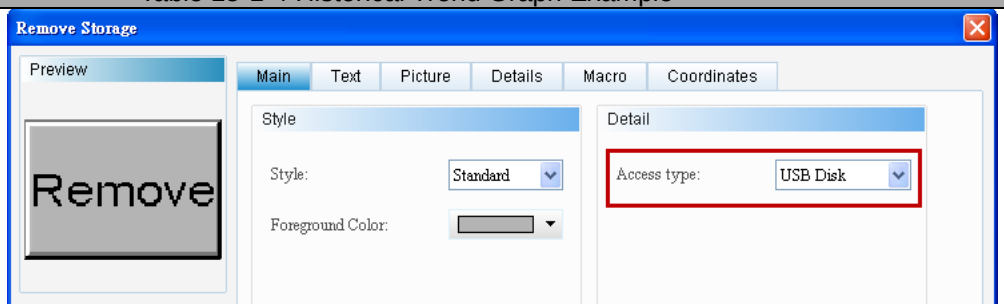
Table 15-1-4 Historical Trend Graph Example



- Step 6: Enter [Screen] → [Screen Cycle Macro]. Edit the action to modify the data in the History and store it in the external storage device USB Disk. Since two Words are read for the Data Type, two data locations are available for access and, thus, there is a $3766 data address in the macro in addition to the previously set $3765 address.

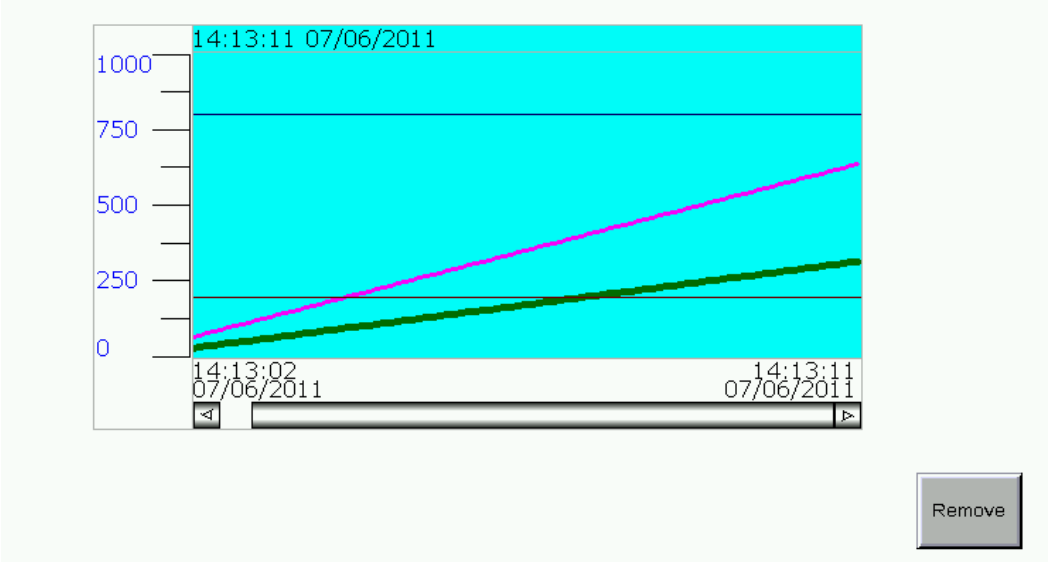


- Step 7: Create the Remove Storage button and set the Access Type to USB Disk. This action ensures writing the data to the USB Disk correctly. If the USB Disk is pulled out without executing the removal action, the data may be read/written incorrectly leading to corruption of the saved file.

Historical Trend Graph Example Table 15-1-4 Historical Trend Graph Example	
	
Execution Results	➢ After the creation of the History and Remove Storage components is completed, perform the compilation and download the data to HMI. Since the retained area in this example is set to USB Disk, H.had and H0001.dat will be generated and stored in the USB Disk when HMI reads the screen. The History function will then execute the action in the Screen Cycle Macro to modify the data, and store it on the USB Disk in CSV file format. To stop the storage, press the Remove button and remove the external device to ensure the correctness of the data.

Historical Trend Graph Example

Table 15-1-4 Historical Trend Graph Example



- Press the Remove button and the following message appears to inform the user that the USB Disk has been removed.

- The user can insert the USB Disk in the PC to read the CSV file and make sure that the data and file name are correct. The file name in this example is H0001. The path to save all CSV files is HMI\HMI-000\CSV\filename.CSV.

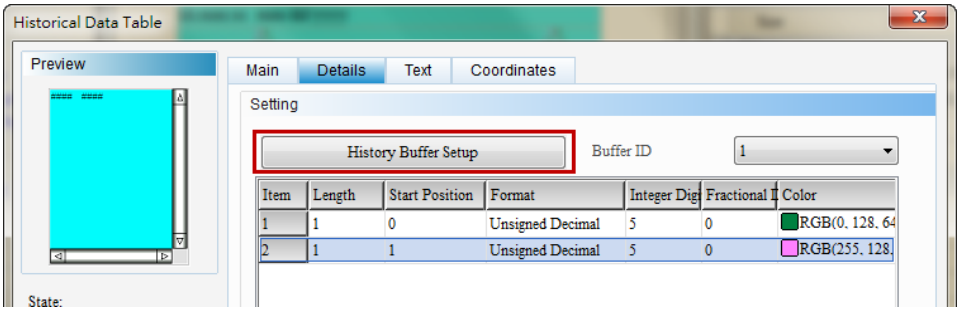
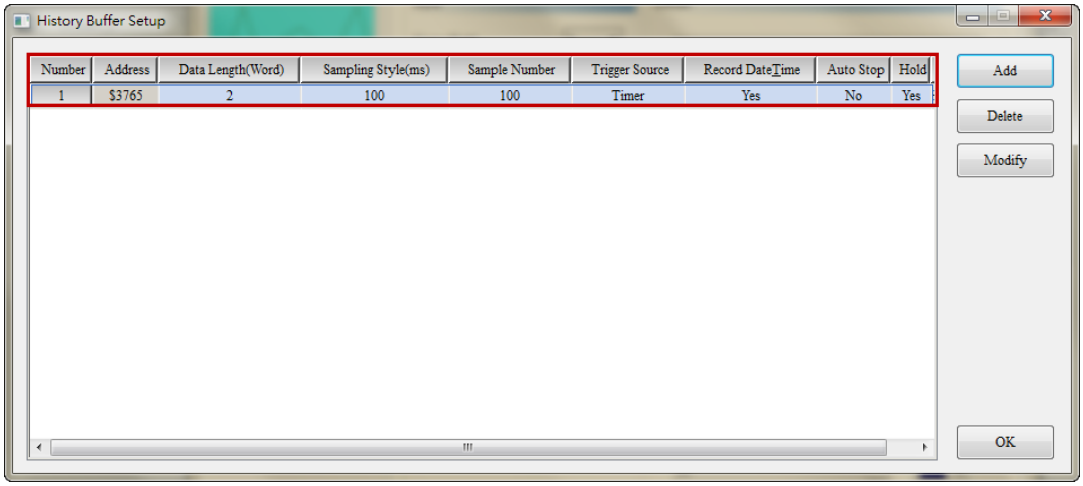
Historical Trend Graph Example

Table 15-1-4 Historical Trend Graph Example

H0001.csv

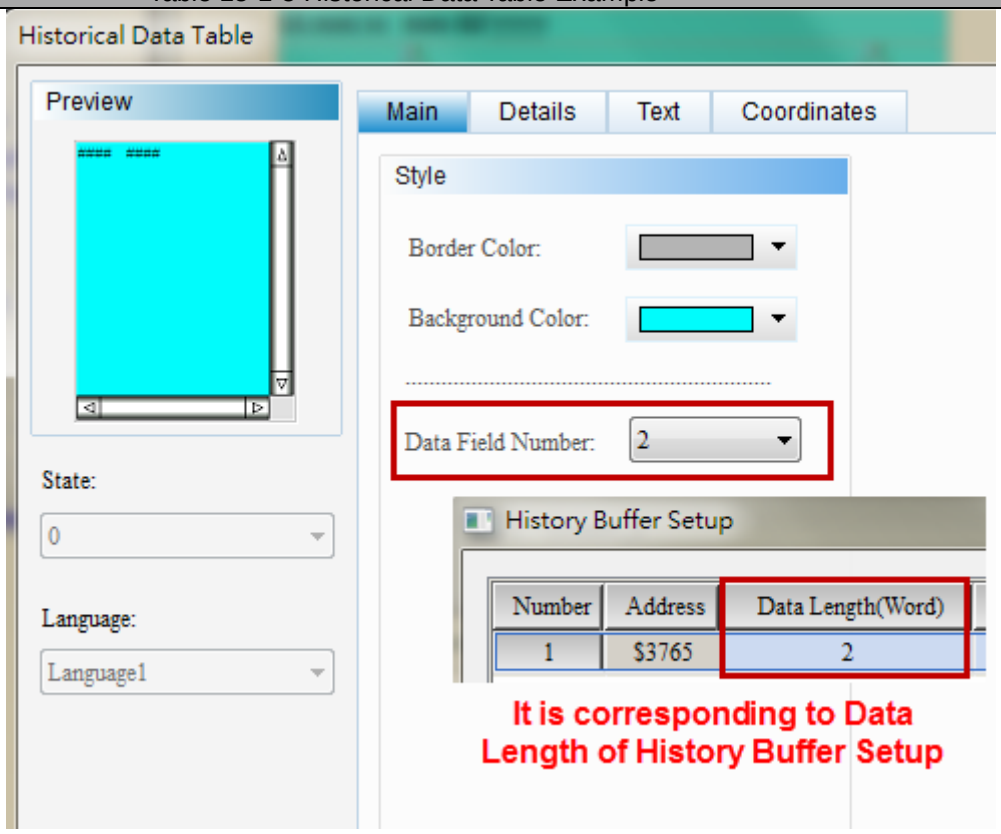
	A	B	C	D
1	TIME	DATE	data0	data1
2	11:45:32	07/06/2011	669	336
3	11:45:32	07/06/2011	672	342
4	11:45:32	07/06/2011	675	348
5	11:45:32	07/06/2011	678	354
6	11:45:33	07/06/2011	681	360
7	11:45:33	07/06/2011	684	366
8	11:45:33	07/06/2011	690	378
9	11:45:33	07/06/2011	693	384
10	11:45:33	07/06/2011	693	384
11	11:45:33	07/06/2011	696	390
12	11:45:34	07/06/2011	702	402
13	11:45:34	07/06/2011	702	402
14	11:45:34	07/06/2011	705	408
15	11:45:34	07/06/2011	708	414
16	11:45:34	07/06/2011	711	420
17	11:45:34	07/06/2011	714	426
18	11:45:35	07/06/2011	717	432
19	11:45:35	07/06/2011	720	438
20	11:45:35	07/06/2011	723	444
21	11:45:35	07/06/2011	726	450
22	11:45:35	07/06/2011	729	456
23	11:45:35	07/06/2011	732	462
24	11:45:36	07/06/2011	735	468
25	11:45:36	07/06/2011	738	474
26	11:45:36	07/06/2011	744	486

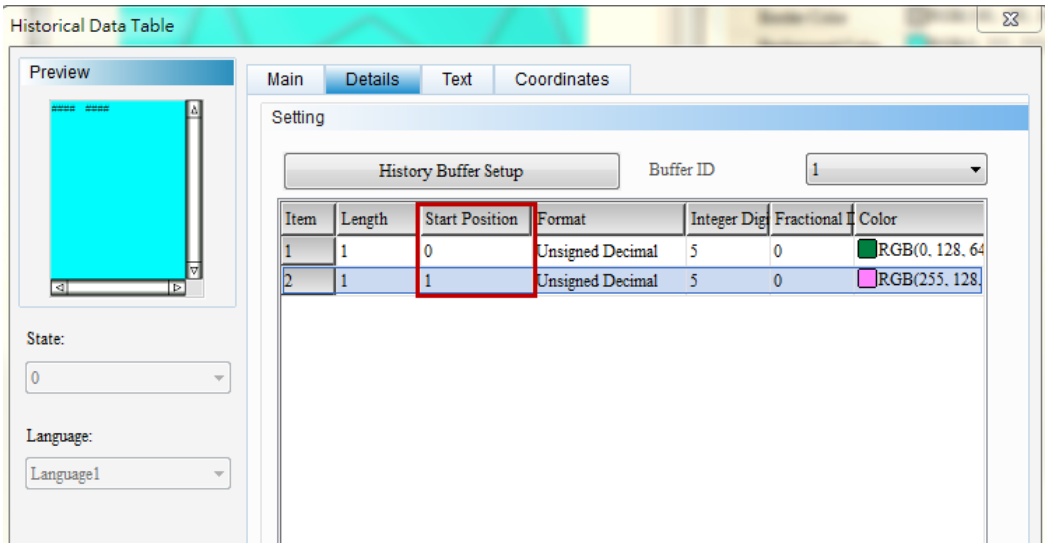
Refer to the Historical Data Table example in Table 15-1-5.

Historical Data Table Example Table 15-1-5 Historical Data Table Example	
Add Historical Data Table Component	The Historical Data Table example is described in conjunction with the Historical Trend Graph example in Table 15-1-4. Use the previously created Historical Trend Graph and perform the settings below. ➢ Step 1: Create the Historical Data Table component. Double click this component and click [History Setup]. You can see the data created in Table 15-1-4 Historical Trend Graph Example. Refer to the link.   ➢ Step 2: Set the Column Counts to 2 (corresponding to the Data Type 2 of the History). When the Column Counts 2 is selected, relevant parameters of Data 1 and Data 2 must be set up. Set the data location of Data 1 to 0 and the data location of Data 2 to 1. Set the color for the value to be displayed. Check Display Time/Date.

Historical Data Table Example

Table 15-1-5 Historical Data Table Example

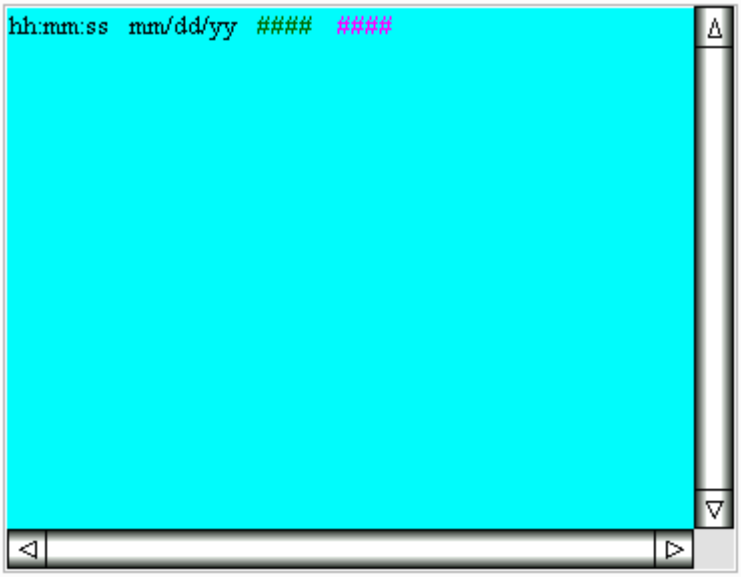




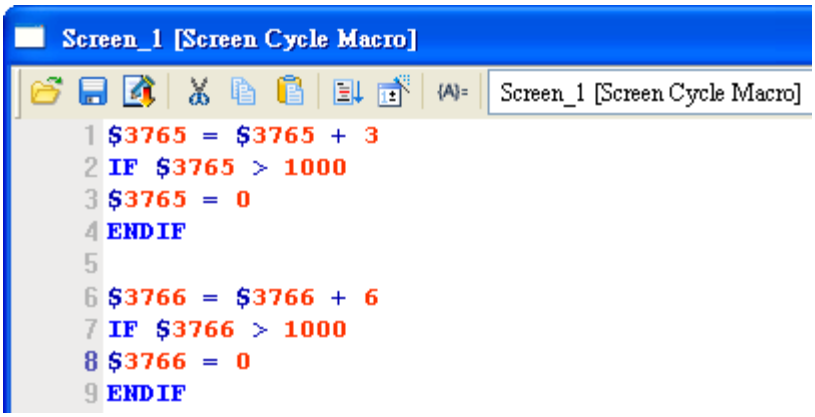
Step 3: The created Historical Data Table is shown below.

Historical Data Table Example

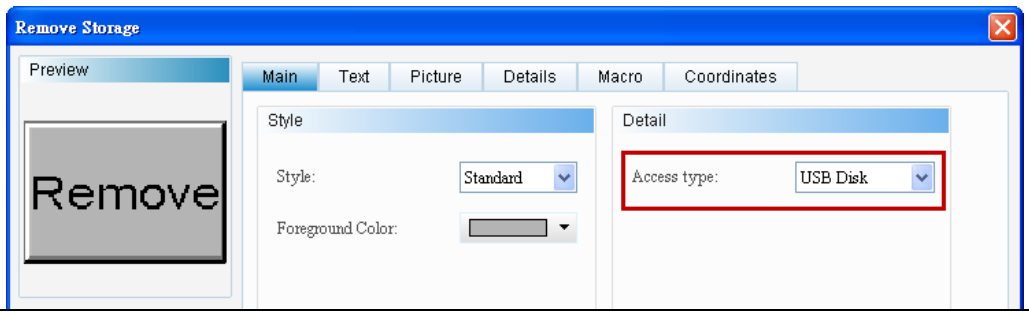
Table 15-1-5 Historical Data Table Example



- Step 4: Enter [Screen] → [Screen Cycle Macro]. Edit the action to modify the data in the History and store it in the external storage device USB Disk. Since two Words are read for the Data Type and the Column Counts is 2, the Historical Data Table will display two columns to read the two data locations.

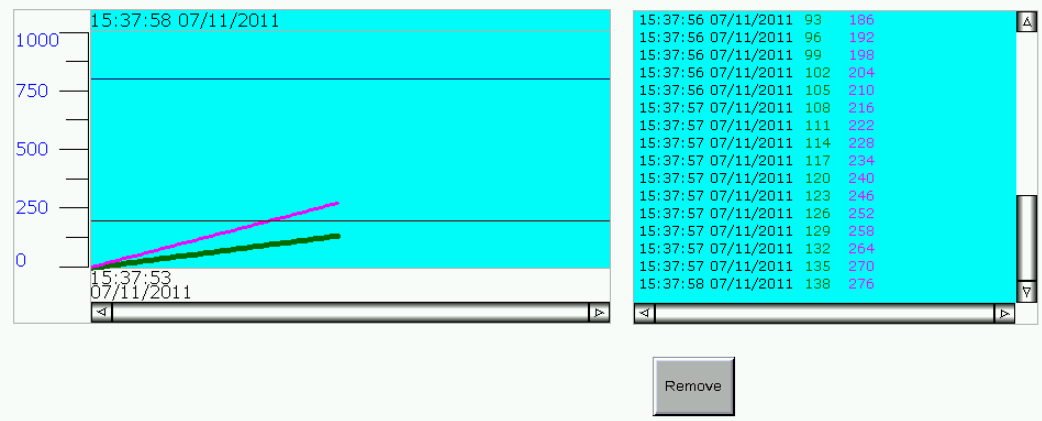


- Step 5: Create the Remove Storage button and set the Access Type to USB Disk. This action ensures writing the data to the USB Disk correctly. If the USB Disk is pulled out without executing the removal action, the data may be read/written incorrectly leading to corruption of the saved file.



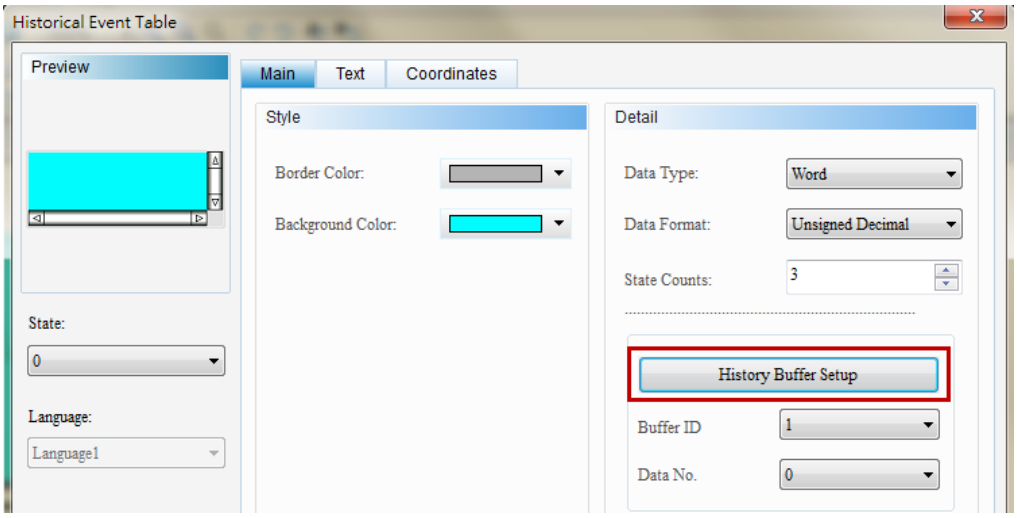
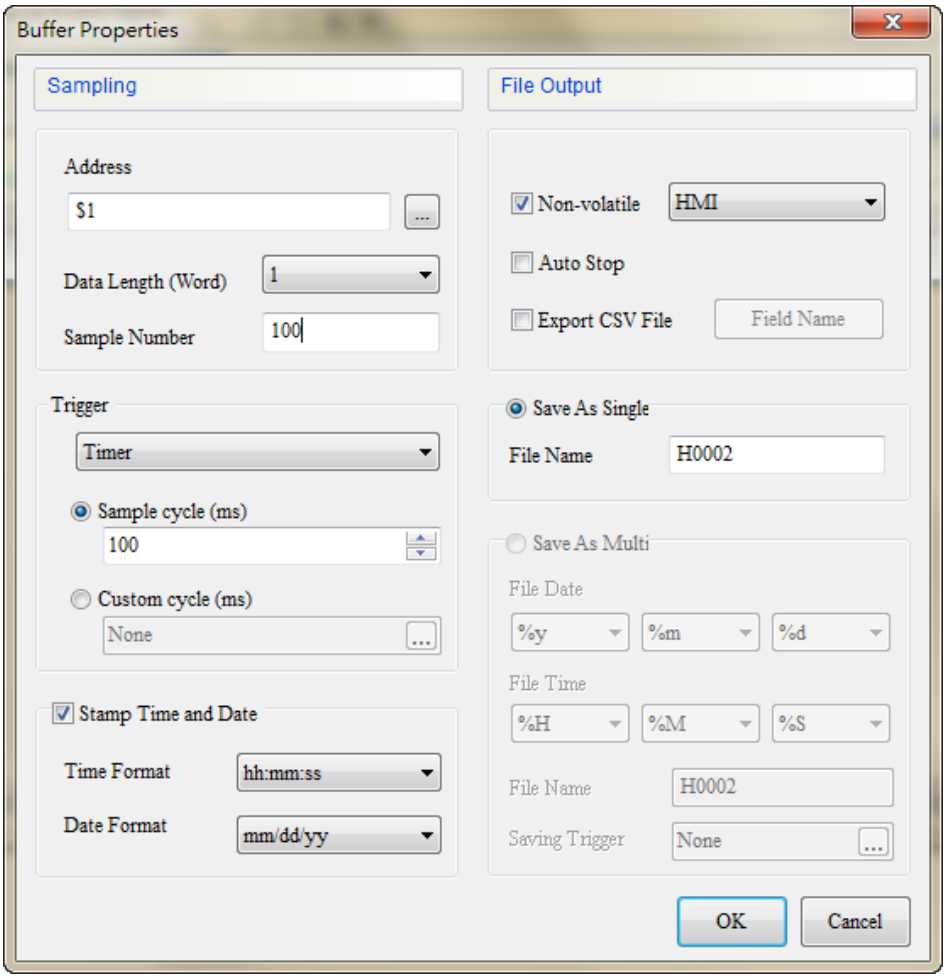
Historical Data Table Example

Table 15-1-5 Historical Data Table Example

Execution Results	➢ After the creation of the History and Remove Storage components is completed, perform the compilation and download the data to HMI. Since the retained area in this example is set to USB Disk, H.had and H0001.dat will be generated and stored in the USB Disk when HMI reads the screen. The History function will then execute the action in the Screen Cycle Macro to modify the data, and stored it in the USB Disk in CSV file format. To stop the storage, press the Remove button and remove the external device to ensure the correctness of the data.  ➢ Press the Remove button and the following message appears to inform the user that the USB Disk has been removed.

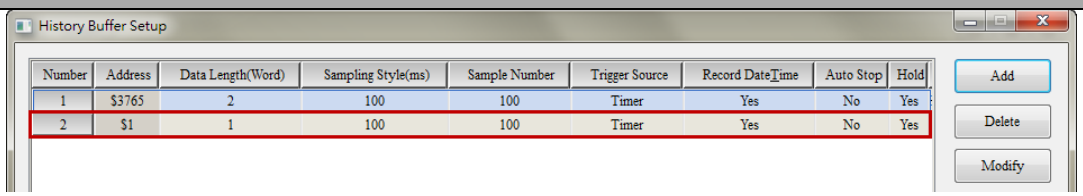
Historical Data Table Example Table 15-1-5 Historical Data Table Example		

Refer to the Historical Event Table example in Table 15-1-6.

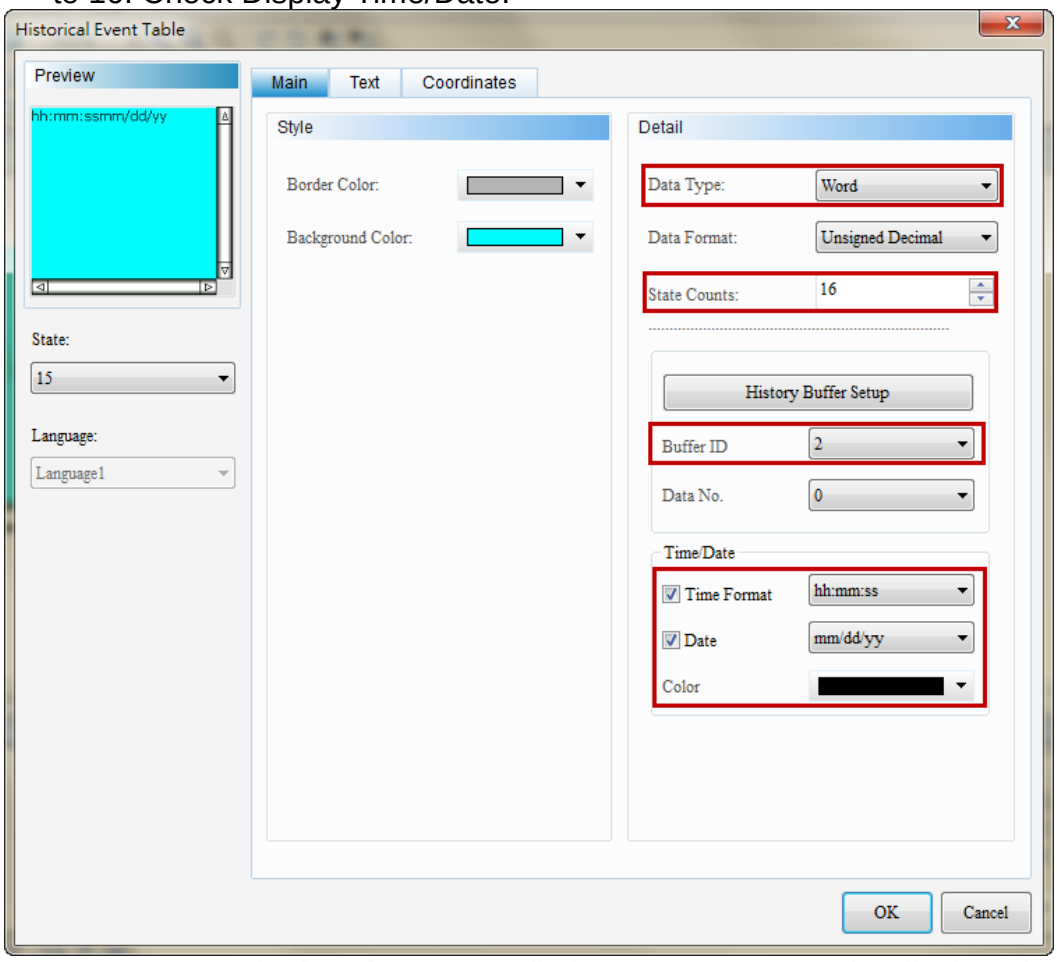
Historical Event Table Example Table 15-1-6 Historical Event Table Example	
Add Historical Event Table Component	➢ Step 1: Create the Historical Event Table component. Double click this component and click [History Setup] to create a new data buffer. Set the Address to 1 and set the Data Type to $1. Then set the Non-volatile Data Location to HMI.  

Historical Event Table Example

Table 15-1-6 Historical Event Table Example



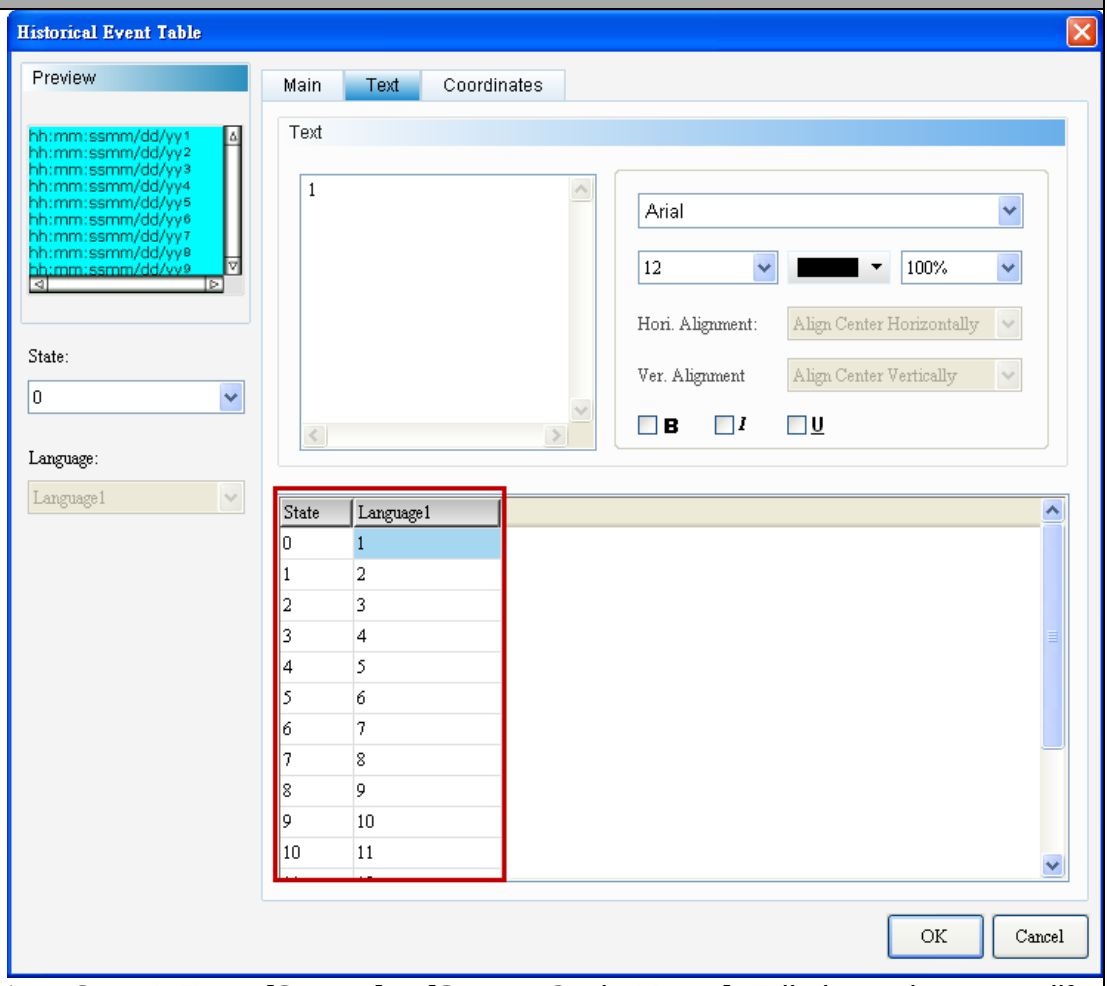
➢ Step 2: Set the Buffer Number to 2 corresponding to the number (2) of the history data buffer. Set the Data Type to Word and the State Counts to 16. Check Display Time/Date.



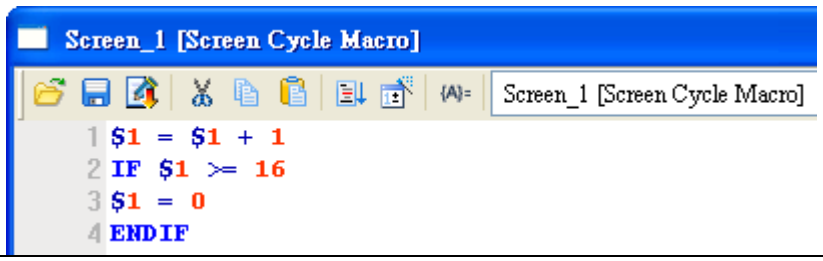
➢ Step 3: Enter the [Text] page to edit the text message to be displayed.

Historical Event Table Example

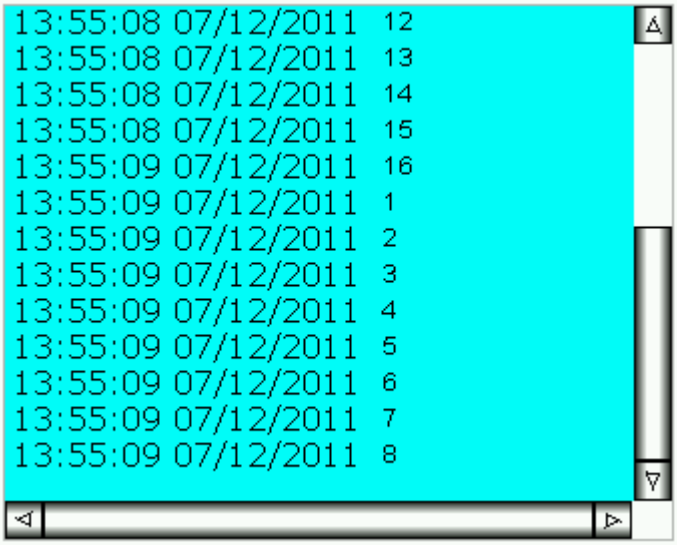
Table 15-1-6 Historical Event Table Example



- Step 4: Enter [Screen] → [Screen Cycle Macro]. Edit the action to modify the data in the History and display the user-customized text message in Historical Event Table.



Execution Results	➢ After the creation of the Historical Event Table component is completed, perform the compilation and download the data to HMI. The Historical Event Table function will then execute the action in the Screen Cycle Macro to modify the data, and display the user-customized text message in this component.

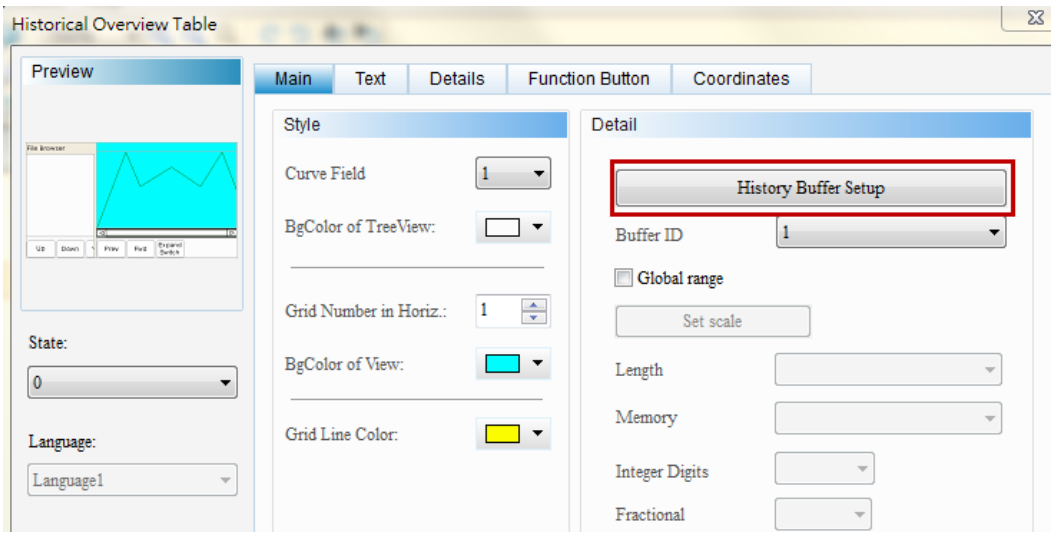
Historical Event Table Example Table 15-1-6 Historical Event Table Example	
	

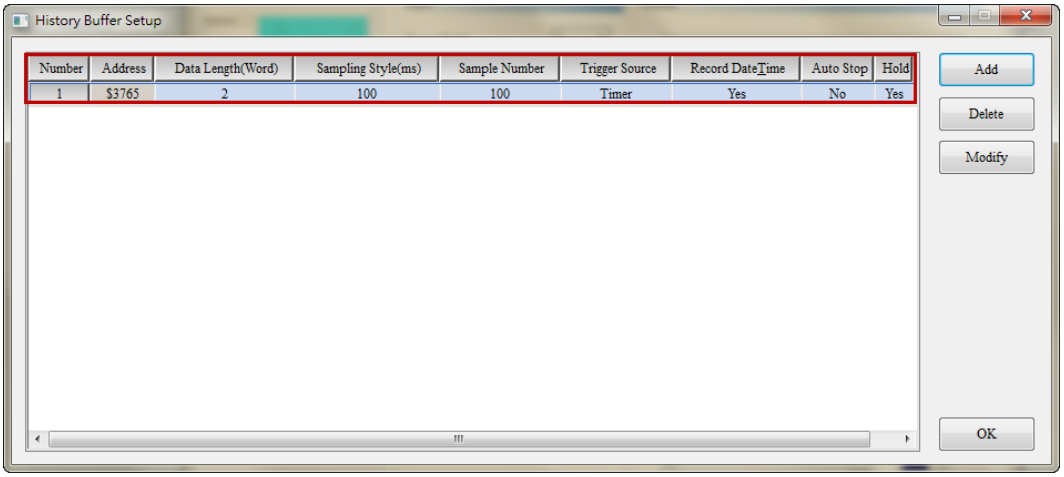
Historical Overview Table

《Table 15-1-7》 Example of Historical Overview Table

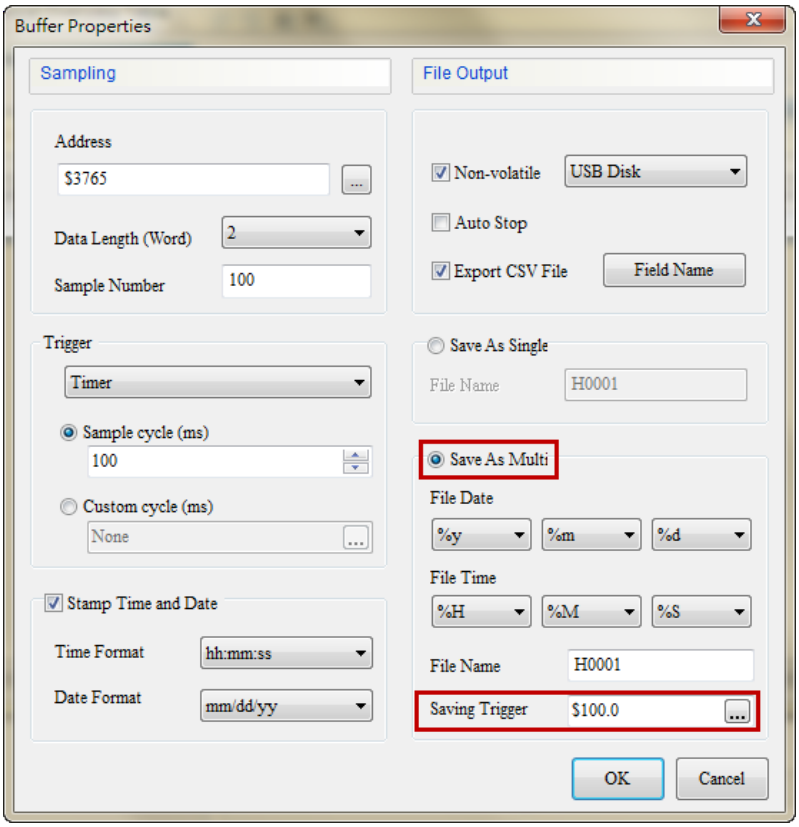
Add the Historical Overview Table Element

- Example of Historical overview table will be elaborated with table 15-1-4 Historical Trend Graph Example. We've created the historical trend graph in previous section. Now, let's see the setting steps.
- Step 1: Create the historical overview table. Double click on this element and click on [History Buffer Setup] to see the data created in Table 15-1-4 Historical Trend Graph Example.



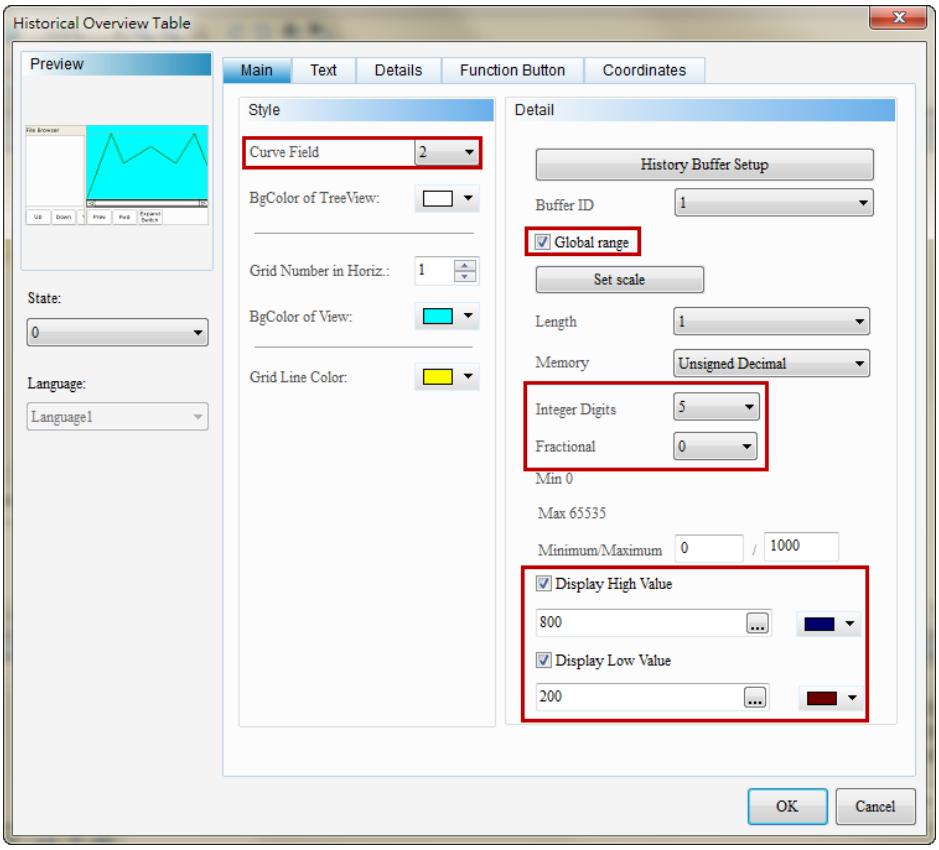


- Step 2: Click on [Modify] to change the setting of historical buffer setup. Check [Save As Multi] and set the saving trigger as $100.0.

Historical Overview Table 《Table 15-1-7》 Example of Historical Overview Table	
	 ➢ Step 3: Complete other settings of Historical overview table, such as time and date format, the display of integer digits and fractional and the setting of global range. Then, go to [Details] to and enter 1 in Enable field to show the curve on the screen. Since you've enabled the setting of global range, it is unable to setup the minimum and maximum value for each curve.

Historical Overview Table

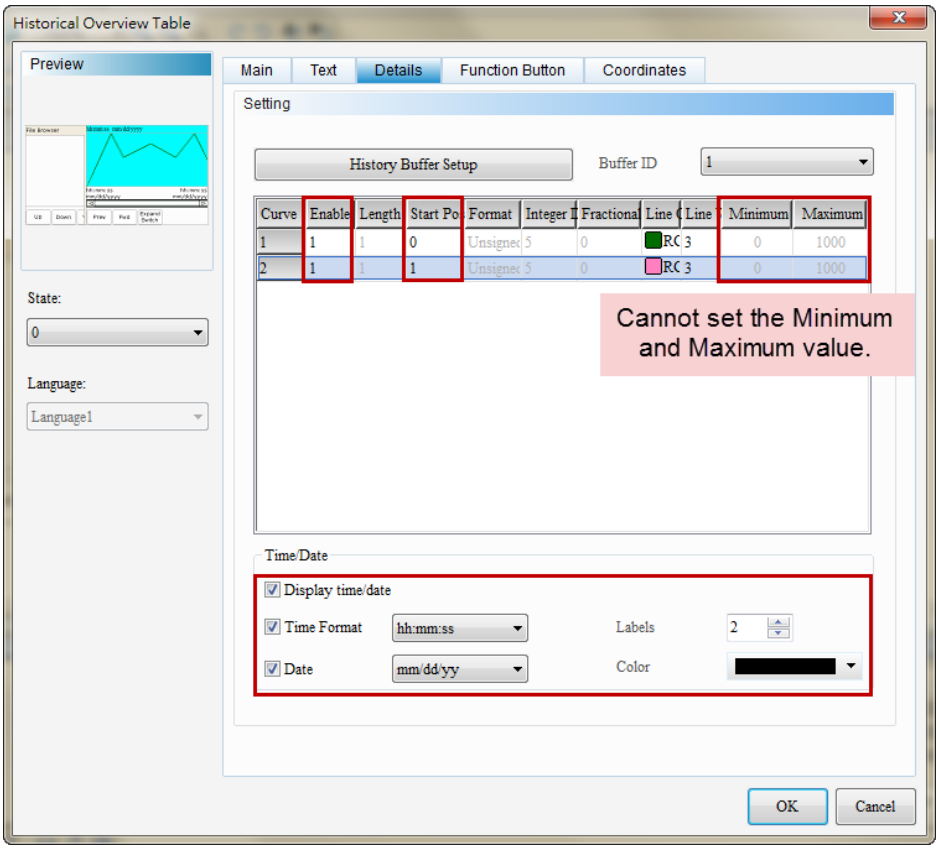
《Table 15-1-7》 Example of Historical Overview Table



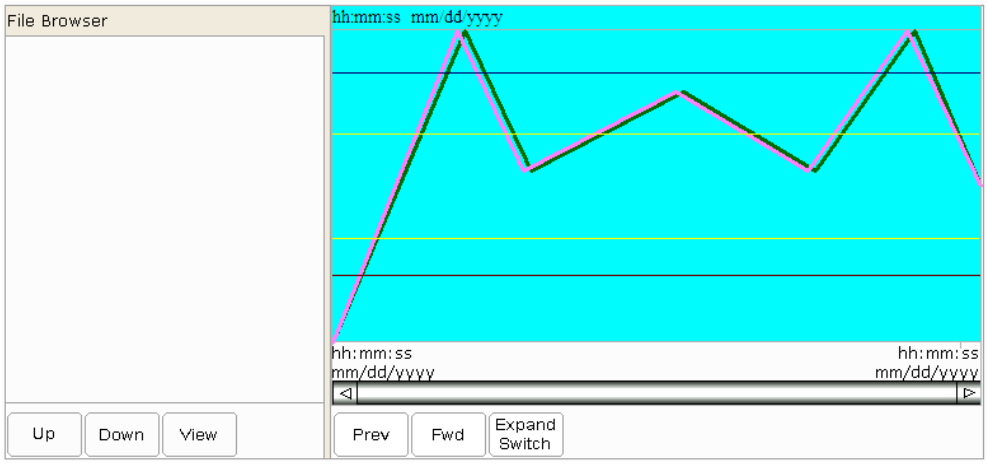
Go to [Details] setting page and set Enable column to 1 for setting the start position of curve 1 and 2 as 0 and 1 respectively. Since the setting of global range is enabled, it will be unable to set the minimum and maximum value of each curve.

Historical Overview Table

《Table 15-1-7》 Example of Historical Overview Table



➢ Step 4: When the setting of Historical overview table is complete, the screen will be shown as below.

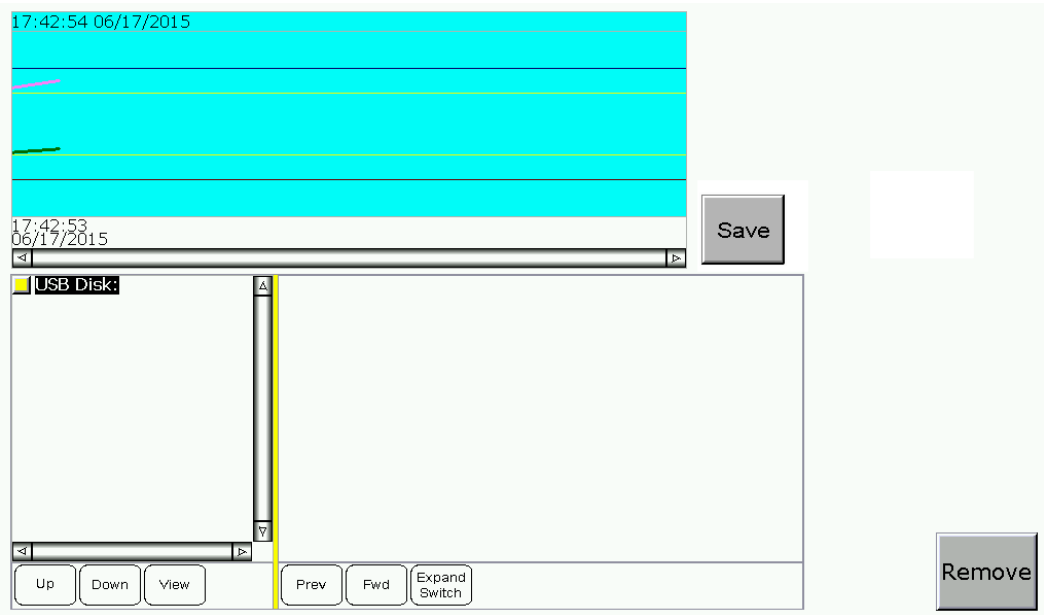


➢ Step 5: Go to [Options] > [Clock macro] to edit the data stored in history buffer and save it to the external device, USB Disk. There are two data stored in the buffer area, thus it has two accessing addresses, $3765 and $3766.

Historical Overview Table 《Table 15-1-7》 Example of Historical Overview Table	
	[Clock巨集] $3765 = $3765 + 3 IF $3765 > 1000 $3765 = 0 ENDIF $3766 = $3766+6 IF $3766 > 1000 $3766 = 0 ENDIF ➢ Step 6: Create the momentary button with the address of $100.0. Pressing this button can store the data in the history buffer area immediately without waiting for the sampling points to be reached. ➢ Step 7: Create a button for removing the external device. Select USB Disk as the access type. This is for ensuring the data will be correctly written to the USB Disk. Directly remove the USB Disk may cause error when reading or writing data and damage the saving file.
Execution Result	➢ When completing the creation of History buffer area, Historical overview table and removing external device, please compile and download the screen to the HMI. Since the USB Disk is set as the retained area in our example, when accessing the screen, data of H.had and H001.dat will be stored in the USB Disk first. Then, the history buffer area will execute the command in Clock macro to modify the data and save the data as CSV file to the USB Disk. If you wish to stop saving, please press the Remove button to remove the external device for ensuring data accuracy.

Historical Overview Table

《Table 15-1-7》 Example of Historical Overview Table

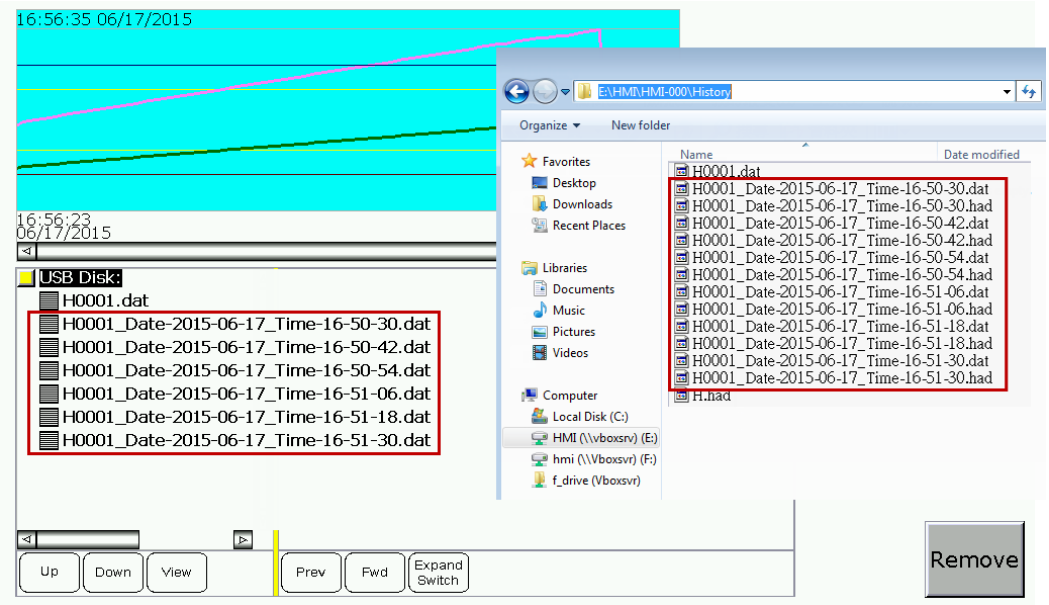


➢ Press Remove to remove the external device. And a message window showing "Disk Remove OK" will pop up.

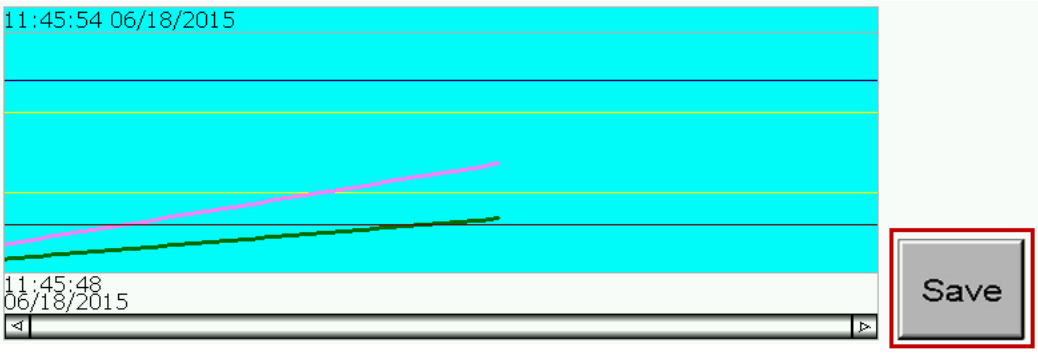
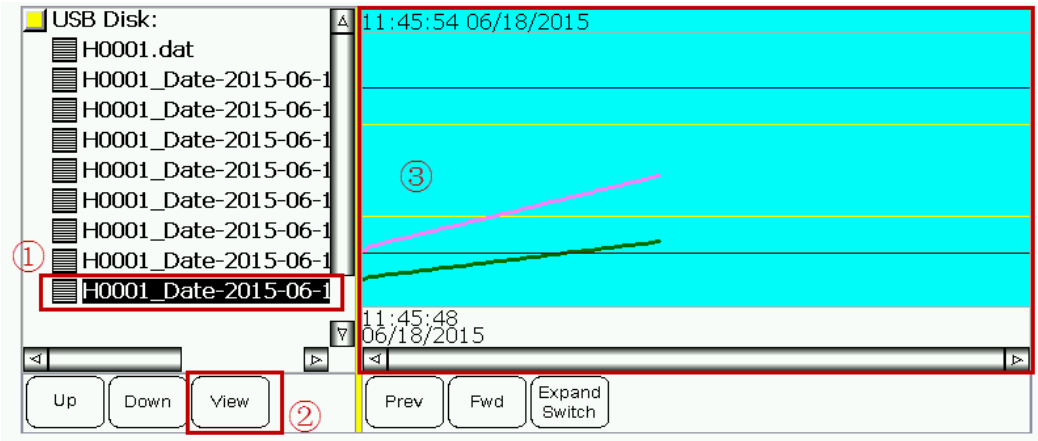
Historical Overview Table

《Table 15-1-7》 Example of Historical Overview Table

- When the set number in the sampling points field is reached or the saving trigger bit is triggered, the file will be saved to HMI\HMI-000\History under USB directory according to the file storage setting of USB. It will create a new file to carry on the sampling. Users can view the saved file via the Historical overview table.



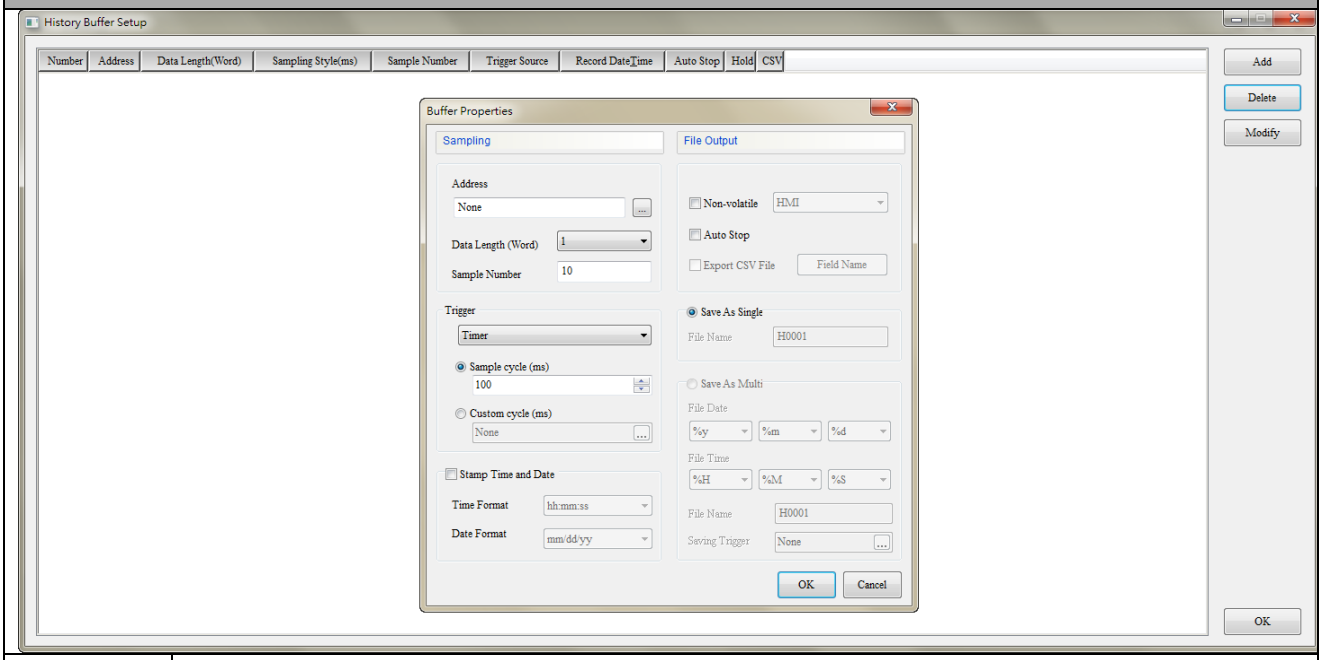
- Click [Save] to save the current data in the history buffer area.

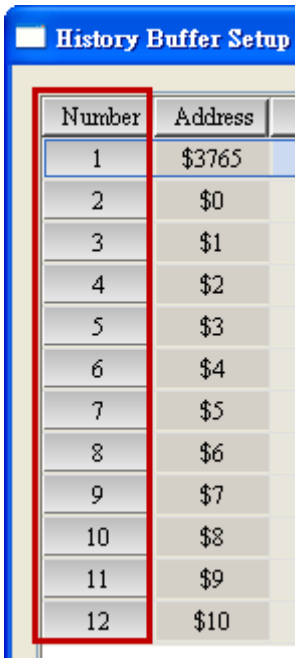
Historical Overview Table 《Table 15-1-7》 Example of Historical Overview Table	
	 ➢ Click on USB Disk on the left and select the file that saved before. Then, click [View] to see the historical trend graph. 

Present all example of Sampling, the History Setup properties are described in detail below.

History Setup Properties

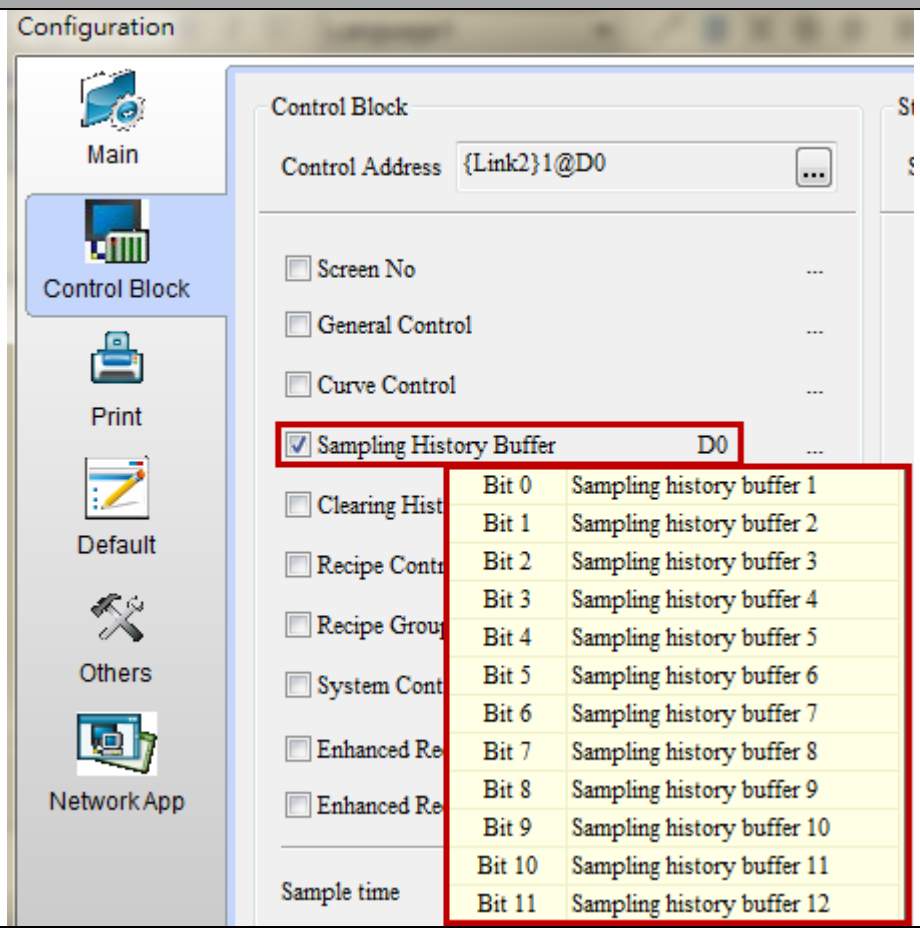
Table 15-1-7 History Setup Properties

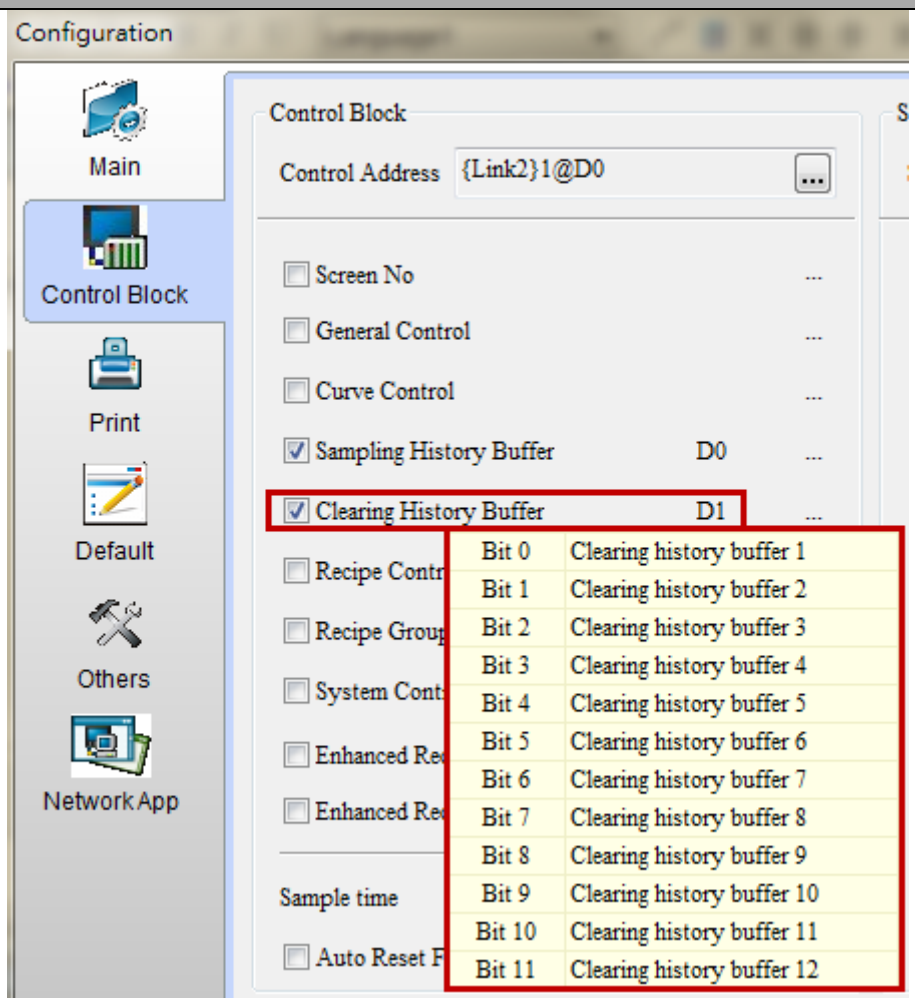


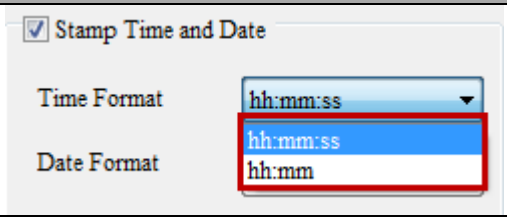
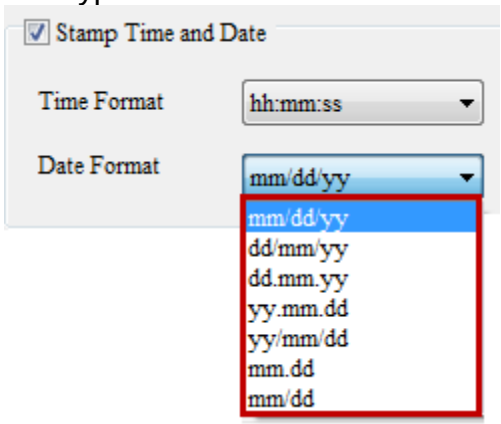
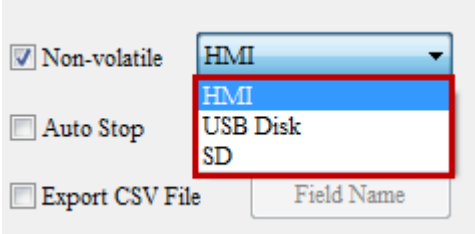
Add	➢ [Add] can be used to create additional data buffers. This property supports up to 12 buffers and the data in these buffers correspond individually to the Sampling History Flag 1~12 and Clearing History Flag 1~12 in the Control Block area.
Delete	

History Setup Properties

Table 15-1-7 History Setup Properties

Modify		

History Setup Properties Table 15-1-7 History Setup Properties		
	 ➢ Press the [Delete] button to delete a data buffer. ➢ Press the [Modify] to enter the buffer property window. You can change property settings from the window.	
Address	➢ Selects the address of internal memory or controller register. ➢ Selects link name or element type. Please refer to 5-1 Button of Chapter 05.	
Data Type (Word)	➢ The data type defines the number of Words to be samples. It indicates the length of data and supports up to 30 consecutive Words.	
Sampling Points	➢ The sampling points are the number of data to be recorded. It is usually used in conjunction with the Auto Stop option. If the Auto Stop is checked, the recording stops automatically when the setting in the Sampling Points field is reached. If the Auto Stop is not checked, the recording will not stop when the setting in the Sampling Points field is reached. Instead, the recording starts from the first data again and overrides the previous data. ➢ The Sampling Points function supports up to 9999999.	
Record Time/	Time format	➢ There are two types of time formats for selection.

History Setup Properties Table 15-1-7 History Setup Properties		
Date		
	Date format	➢ There are seven types of date formats for selection. 
Auto Stop	➢ The Auto Stop option determines whether recording stops automatically when the setting in the Sampling Points is reached. ➢ If the Auto Stop is checked, the recording stops automatically when the setting in the Sampling Points field is reached. If the Auto Stop is not checked, the recording will not stop when the setting in the Sampling Points field is reached. Instead, the recording starts from the first data again and overrides the previous data.	
Hold	Data Location	➢ The data location is HMI, USB Disk or SD Card.  ➢ If HMI is checked, data will be recorded in HMI SRAM in case of outage. ➢ When the Output to CSV File is selected, select USB Disk or SD Card as the retained area.
	File Name	➢ The file name is H0001 by default. The user can change the file name as required. This function supports English and cipher input with the length up to 8 characters or digits.
Output to CSV File	Data Type	➢ The supported data format will be different according to the length, 1 word or 2 words. Please refer to the followings: ➢ In format of Char, if the length is 1, it represents 2 Chars; if the length is 2, it represents 4 Chars. ➢ When the length is over 3, Char is the only format it supports.

Length is 1		
Data	**Format**	**Permissible Range**

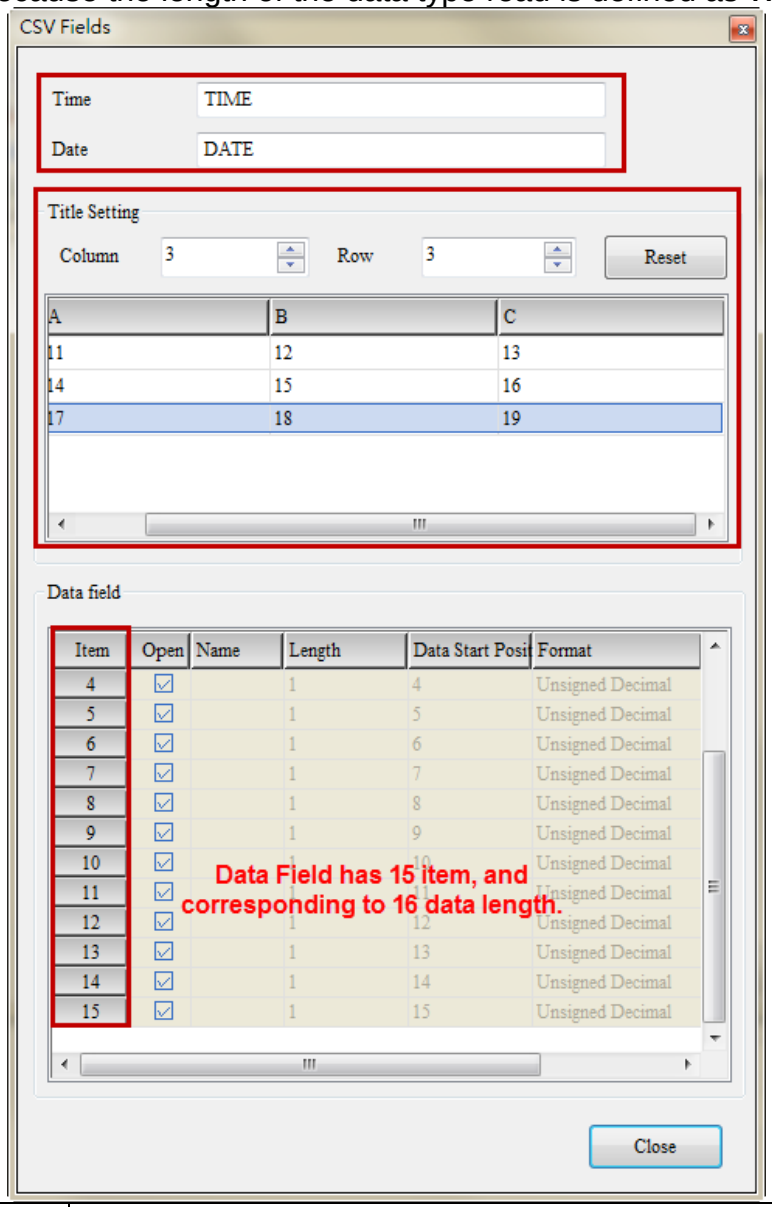
History Setup Properties

Table 15-1-7 History Setup Properties

Type		
Word	BCD	0~9999
	Signed BCD	-999 ~ 9999
	Signed Decimal	-32768~32767
	Unsigned Decimal	0~65535
	Hex	0~0xFFFF
	Char	2 words
Length is 2		
Data Type	**Format**	**Permissible Range**
DWord	BCD	0~99999999
	Signed BCD	-9999999 ~ 99999999
	Signed Decimal	-2147483648~2147483647
	Unsigned Decimal	0~4294697295
	Hex	0~0xFFFFFFFF
	Char	4 words
	Floating	0~9999999

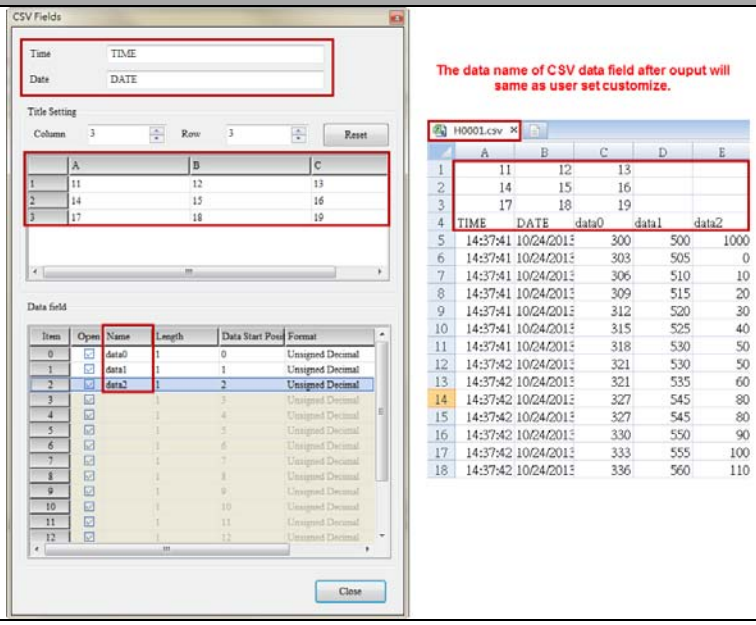
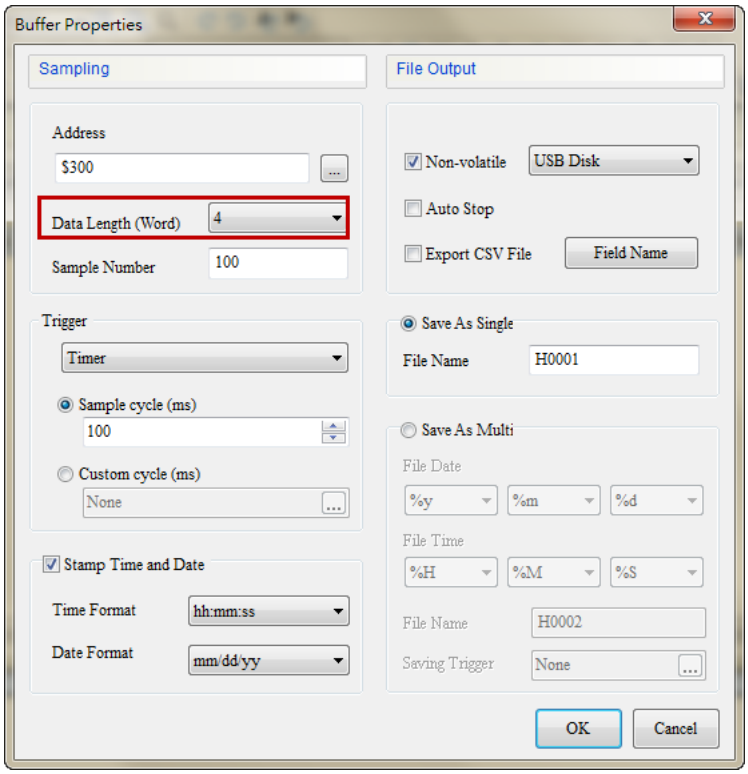
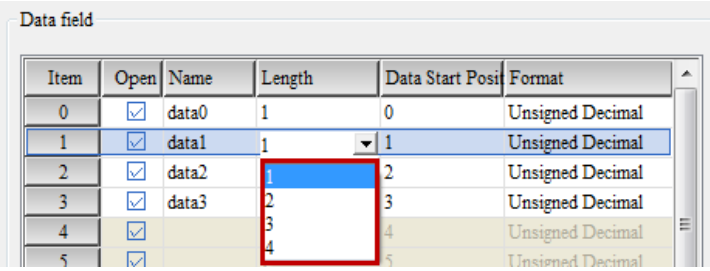
History Setup Properties

Table 15-1-7 History Setup Properties

	Field Name		➢ The user can input the file name to be displayed to the output CSV file, including the time, date and data names. The sum of the integer and decimal places can only support 5 digits, because the length of the data type read is defined as Word. 
		Time Name	➢ The time, data and value field names are user-customizable. The naming format supports all languages.

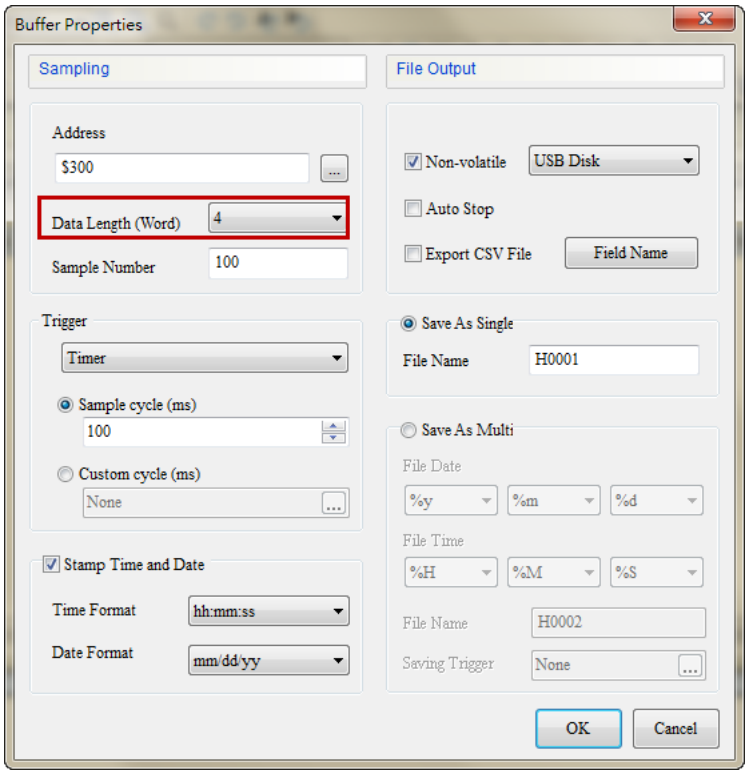
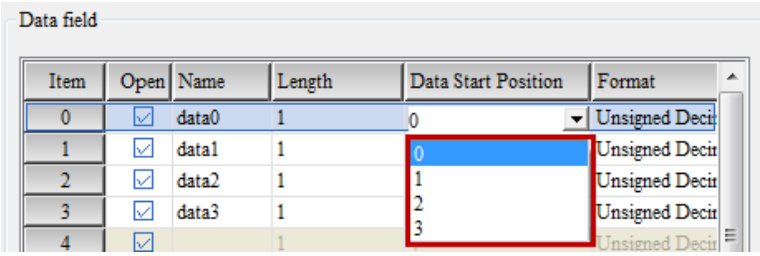
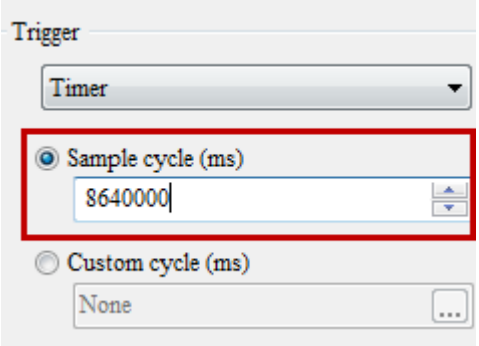
History Setup Properties

Table 15-1-7 History Setup Properties

		Date Name Column / Row Name	
		Length	➢ The length corresponds to the data length (Word). If the data length is 4, the length will be 1 ~ 4.  
		Data Start	➢ The data start position corresponds to the data

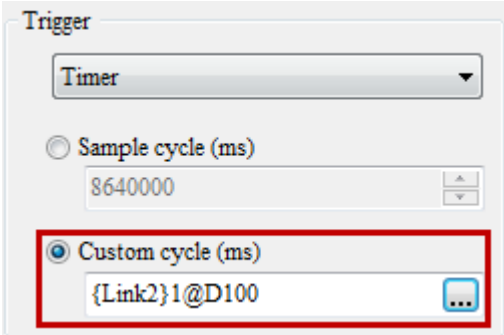
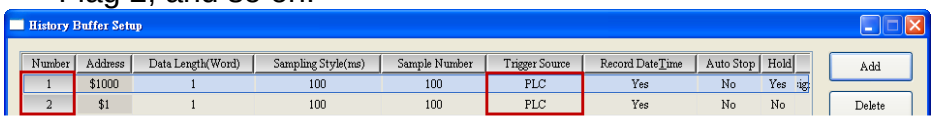
History Setup Properties

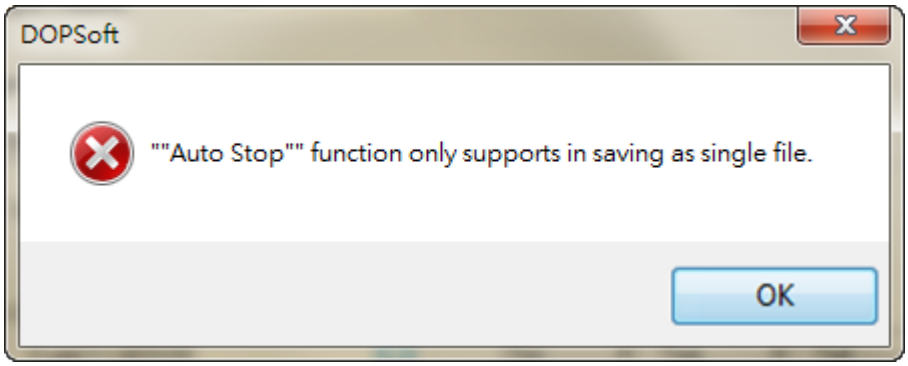
Table 15-1-7 History Setup Properties

		Position	length as well. If the data length (Word) is 4, then the data start position is 0 ~ 3.  
		Integer place Fractional	➢ Set the integer digits and fractional for the format you need.
Trigger Source	Timer	➢ Two sample times are available when Timer is selected as the trigger source: ➢ Fixed sample time: Min. 100ms; max. 86400000ms.  ➢ Dynamic sample time: The user can change the sample time dynamically using the specified memory address to trigger the	

History Setup Properties

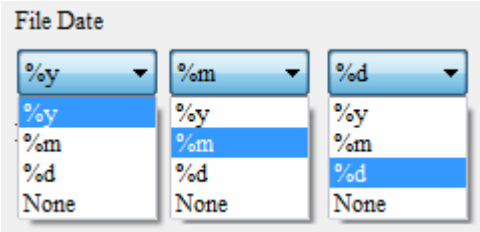
Table 15-1-7 History Setup Properties

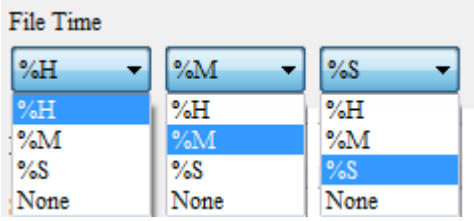
<table>
<tr><td rowspan="2"></td><td></td><td>sampling action.
 
</td></tr>
<tr><td>PLC</td><td>➢ When PLC is selected as the trigger source, the sampling action is triggered using the History flag in the control area. The sampling action is performed when the Bit is On. It is independent of the time cycle.
➢ Assuming that two Histories are set up. The trigger source PLC No. 1 corresponds to the Sampling History Flag 1, the trigger source PLC No. 2 corresponds to the Sampling History Flag 2, and so on.
 

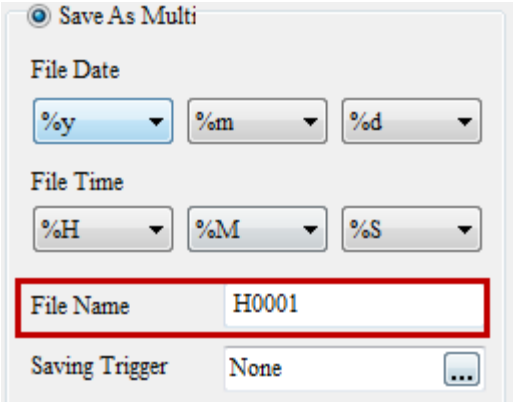
Trigger Source of Number 1 is releated sampling History buffer flag 1.
Trigger Source of Number 2 is releated sampling History buffer flag 2.</td></tr>
<tr><td colspan="2">Save as Single</td><td>➢ The file name is H0001 by default. The user can change the file name as required. This function supports English and cipher input with the length up to 8 characters or digits.</td></tr>
<tr><td>Save as Multi</td><td colspan="2">➢ If you check “Save as Multi”, when the setting in the Sampling Points field is reached or the saving trigger bit is triggered, it will save the current data and do the sampling again.
➢ The sampling data name is identical to the setting of file name, e.g. HMI0001.dat. And the filename of Save as Multi will attach the saving date and time, such as H0001_Date-2015-06-26_Time-12-02-30.dat.
➢ The function of Auto Stop will be invalid when you check “Save as Multi”. Click on OK in the property setting of buffer area, the following warning message will pop up.
 
</td></tr>
</table>

History Setup Properties

Table 15-1-7 History Setup Properties

<table>
<tr><td rowspan="4"></td><td>File Date</td><td rowspan="3">➢ When setting the file date, users can determine the display order by year, month, day or none (not to display).
 

➢ When setting the file time, users can determine the display order by hour, minute, second, or none (not to display).
 

➢ If the settings of file time, date and name are set as below and the reaching time of the setting in the Sampling Points field is 2015/6/26 12：02：30, then the file name will be **H0001**_Date-2015-06-26_Time-12-02-30.
 
</td></tr>
<tr><td>File Time</td></tr>
<tr><td>File Name</td></tr>
<tr><td>Saving Trigger</td><td>➢ When the set number of the sampling point field is reached, it can both save the file as Multi and trigger the saving trigger bit.
➢ It supports controller address (Bit) and the address of internal register (Bit).</td></tr>
</table>

15-2 Historical Trend Graph

	Historical Trend Graph

The Historical Trend Graph is used to store and display the address values read during a specific time period. This function can display up to 16 curves and read up to 16 Words. The user can save the data presented on the Historical Trend Graph. The external devices that HMI supports are USB Disk and SD Card.

Double click the Historical Trend Graph element and the following property setting screen appears.

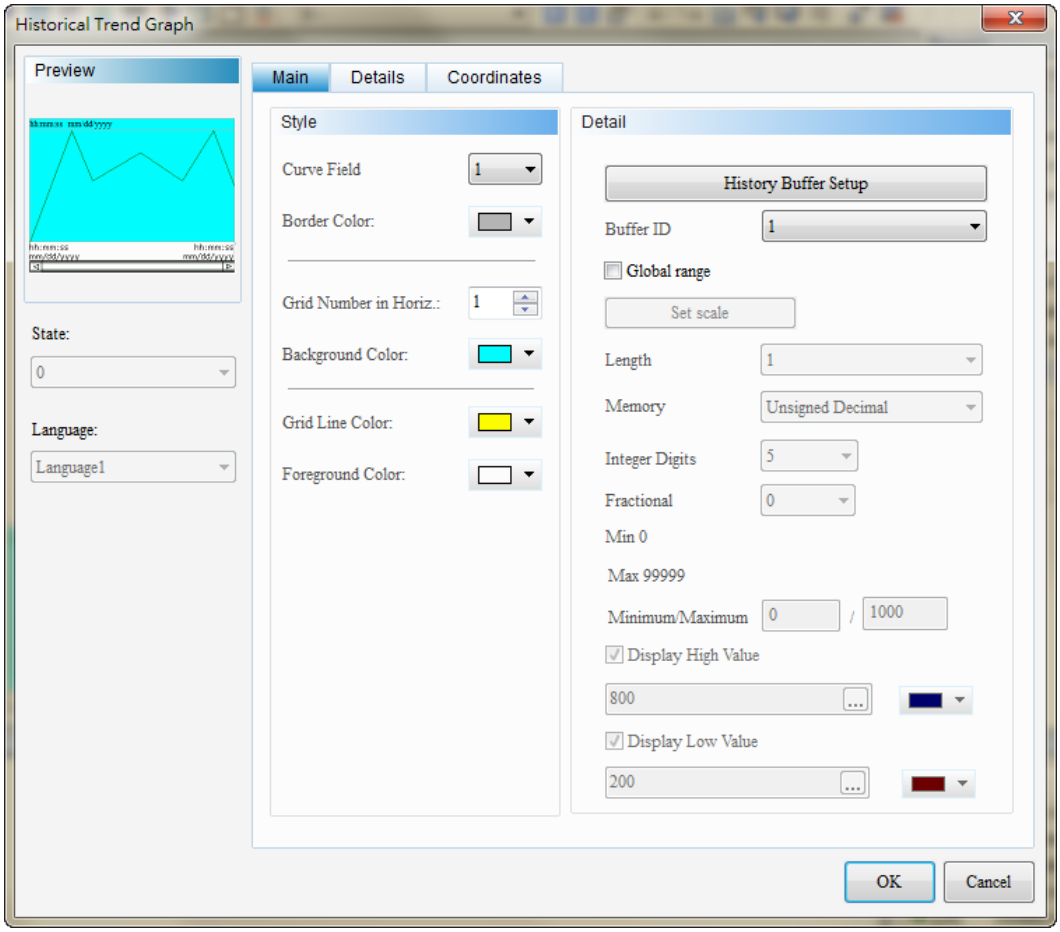


Figure 15-2-1 Historical Trend Graph properties setting screen

Historical Trend Graph		
Function Page	**Description**	
Preview	The State and Language are not available to the Historical Trend Graph.	
Main	Data	Sets the buffer number, data format, integer digits and fractional digits.
	Global Range	Sets the scale setting, min. value/max. value, display high value, display low value, high value color, low value color.
	Scale Setting	Sets the scale display, mark display, text size, text color, scale color, main scale number, sub scale number.
	Style	Curve fields, border color, Grid number in Horizontal, Grid line Color, foreground color, Background Color.
Details	Local Scope	Sets the length of curve, start position, format, integer digits, fractional digits, line width, line color, min. value, max. value.
	Display of Time/Date	Sets the time display, number of time scale, time format, date format, display color
Coordinates	Sets the X-Y coordinate, width and height of the component.	

Table 15-2-2 Historical Trend Graph function page

◆ Main

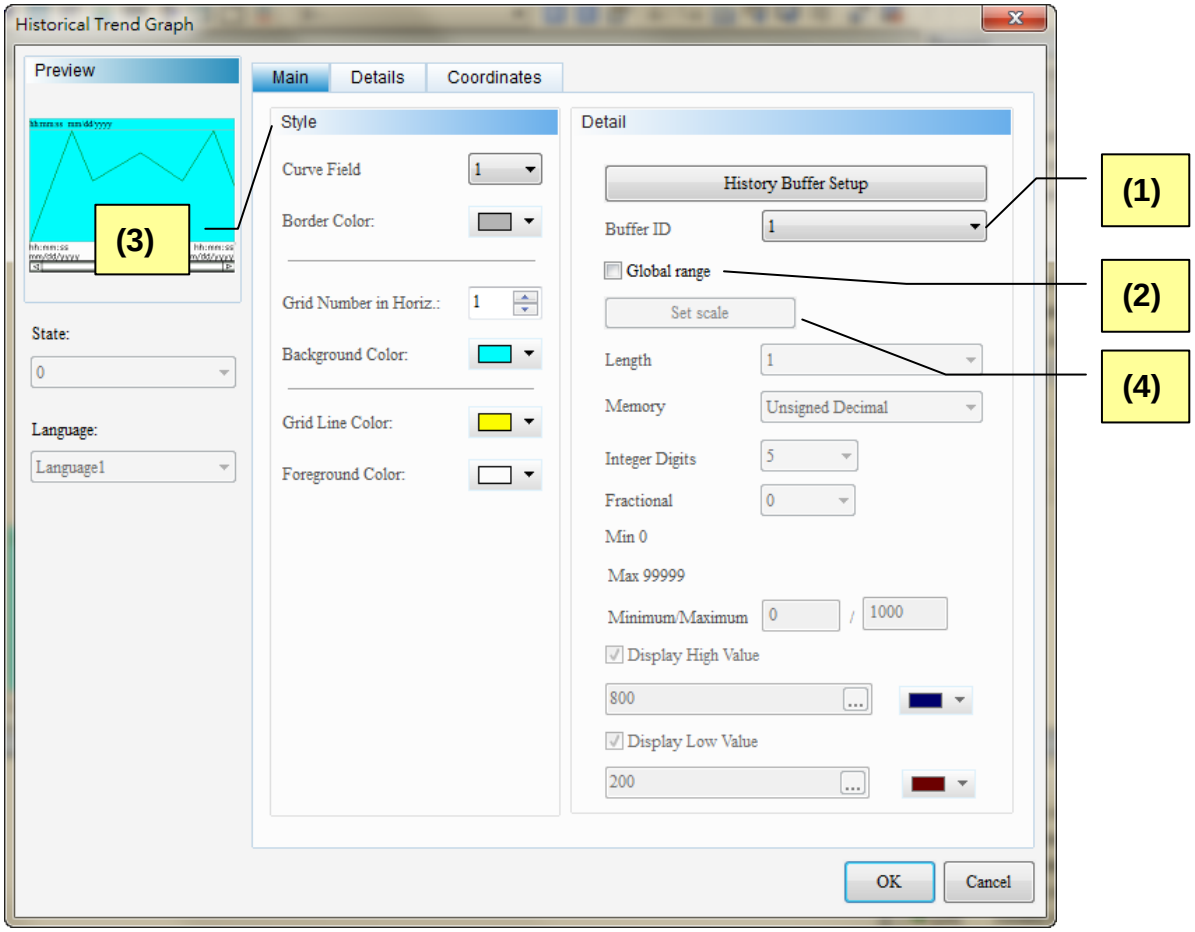
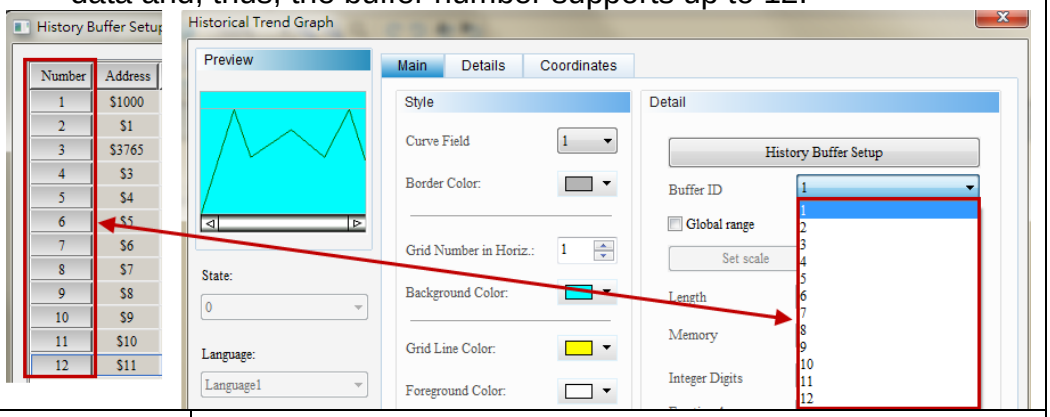
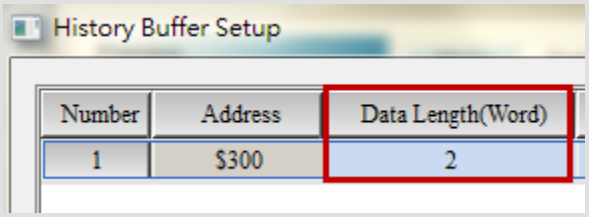
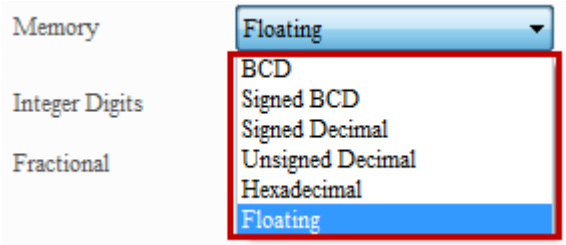
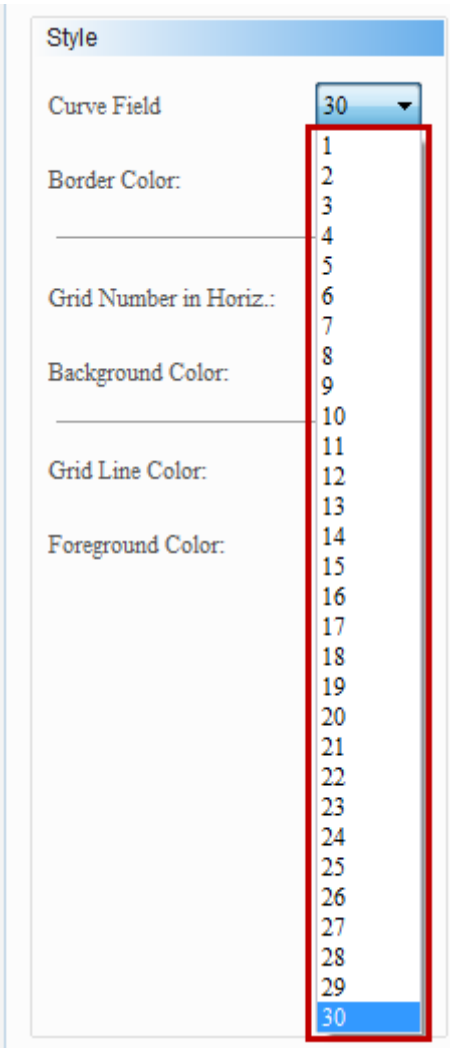


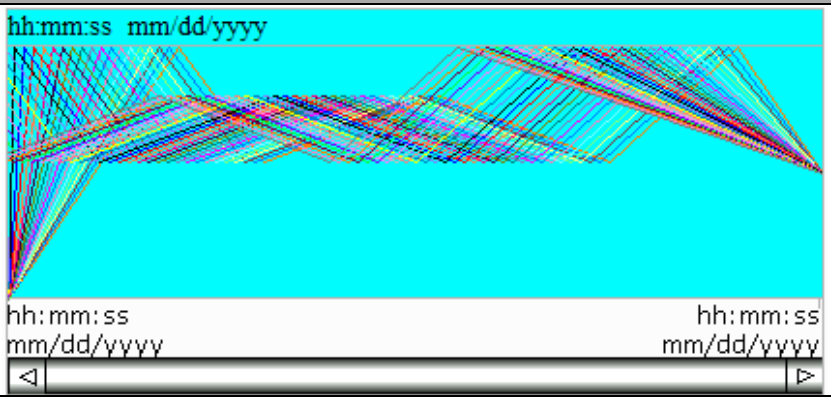
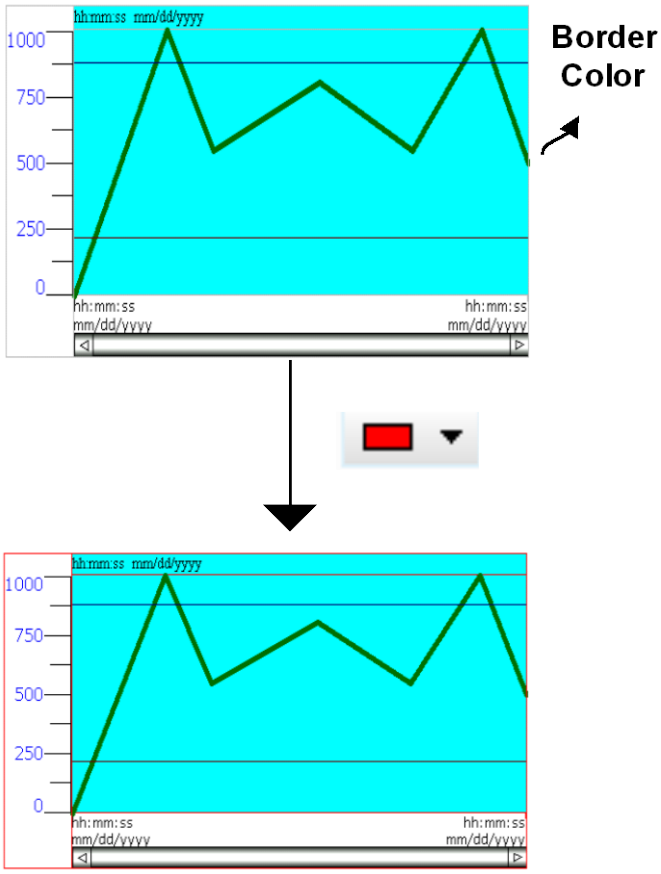
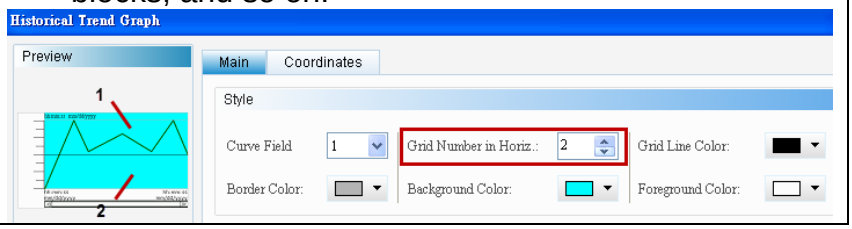
Figure 15-2-2 Historical Trend Graph Main properties page

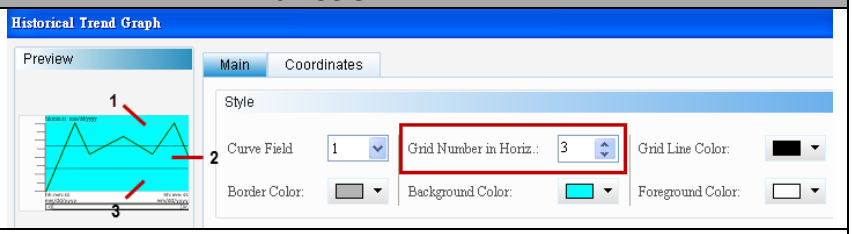
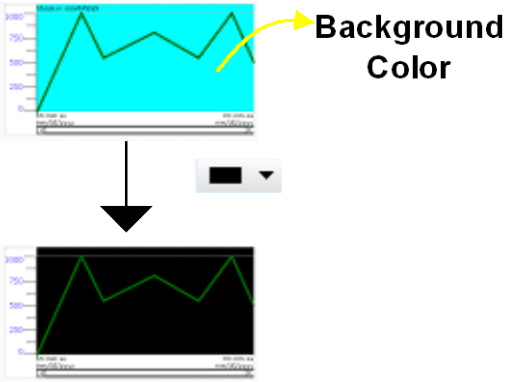
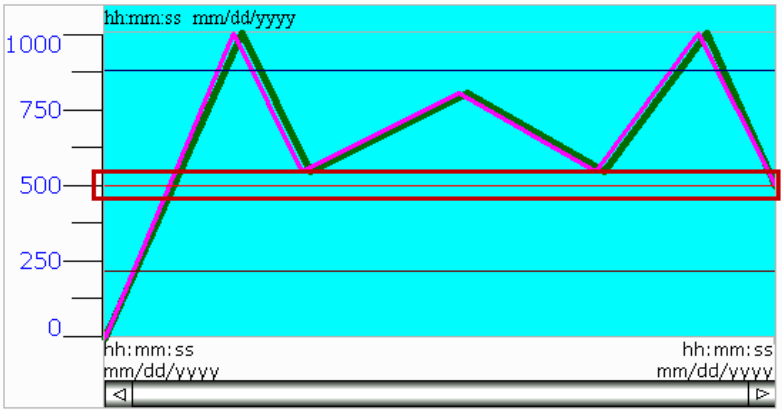
No.	Property	Function	
(1)	Buffer ID	➢ The buffer number corresponds to the data number in the History Data Buffer. The History Setup function can add up to 12 history data and, thus, the buffer number supports up to 12. 	
(2)	Global Scope	Data Length (Word)	➢ The data length (word) can be set as 1 or 2. ➢ When the data length is 1, it means it is 1 Word; when the data length is 2, it means it is 2 Words. NOTE： ➢ When select 2 as the length, the data length (Word)

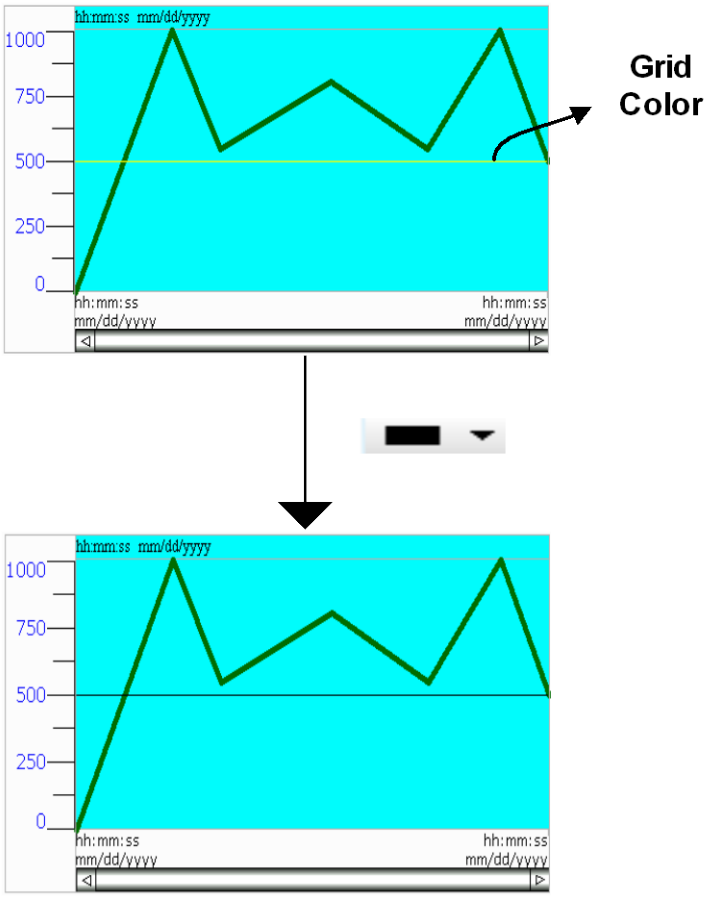
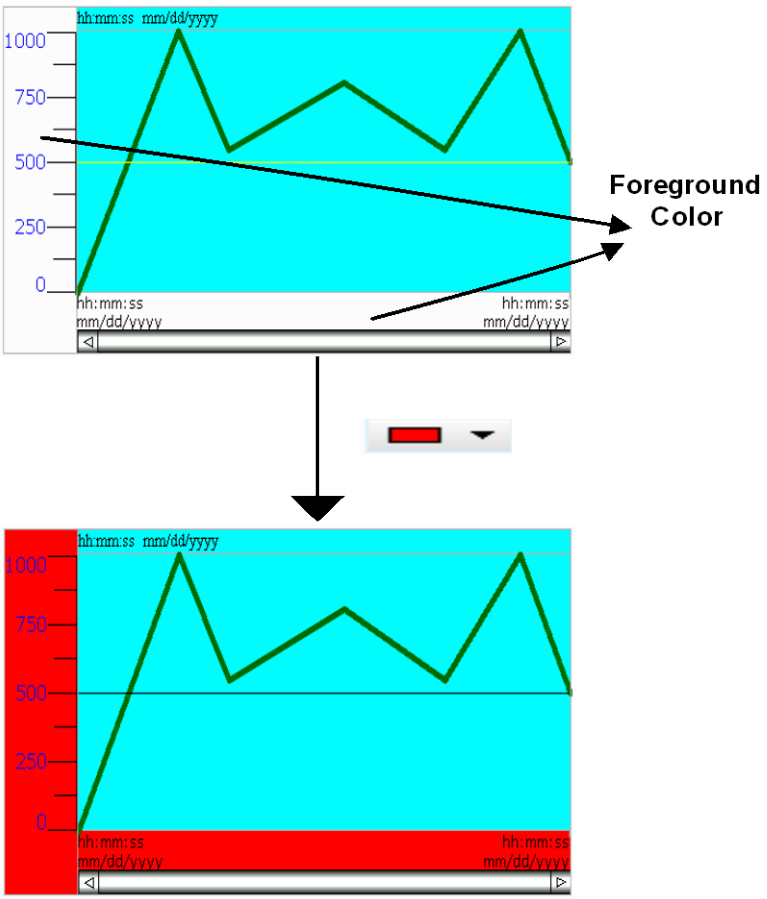
No.	Property	Function	
			should over 2. 
		Memory Format	➢ Historical Trend Graph supports the following format.  ➢ Floating value format can be used only when the data length (Word) is 2.
		Integer Digits / Fractional Digits	➢ Users can setup the displayed integer digits and fractional digits.
		Min. Value/Max. Value	➢ Choose Global Range, it will be unable to setup the curvilinear min. and max. value in details setting page. However, if not choose Global Range, the curvilinear min. and max. value will be able to setup. ➢ The permissible range of min. and max. value is based on the selected data type and format.

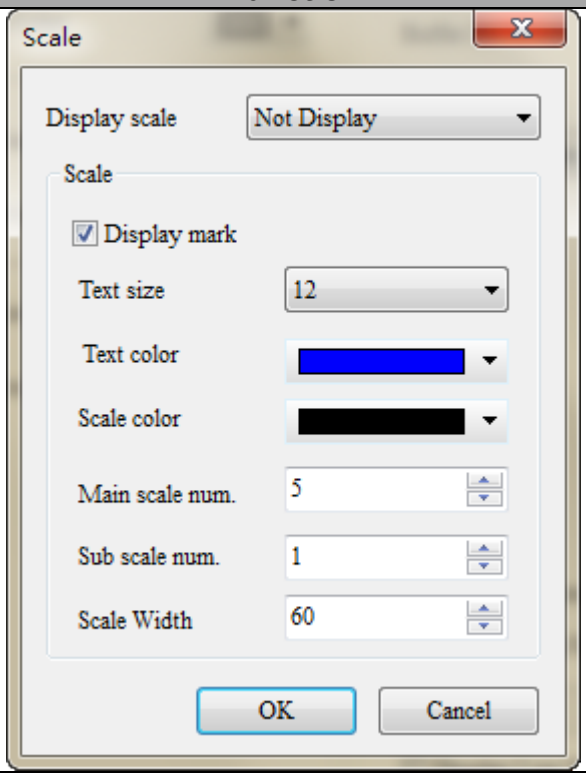
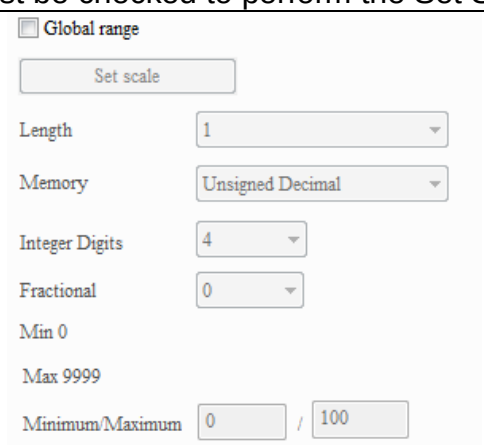
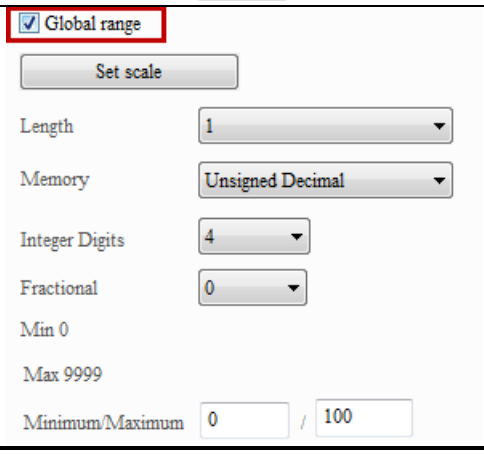
Data Type	Format	Permissible Range
Word	BCD	0~9999
	Signed BCD	-999 ~ 9999
	Signed Decimal	-32768~32767
	Unsigned Decimal	0~65535
	Hex	0~0xFFFF
DWord	BCD	0~99999999
	Signed BCD	-9999999 ~ 99999999
	Signed Decimal	-2147483648~2147483647
	Unsigned Decimal	0~4294697295
	Hex	0~0xFFFFFFFF

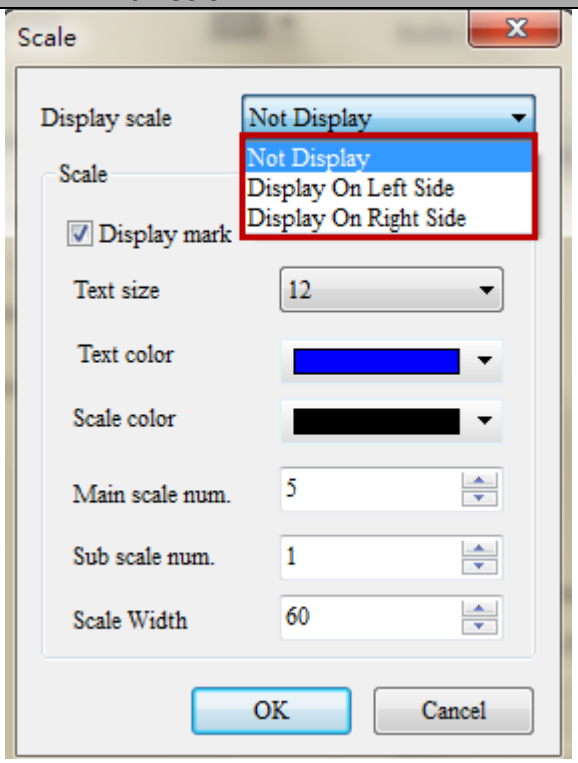
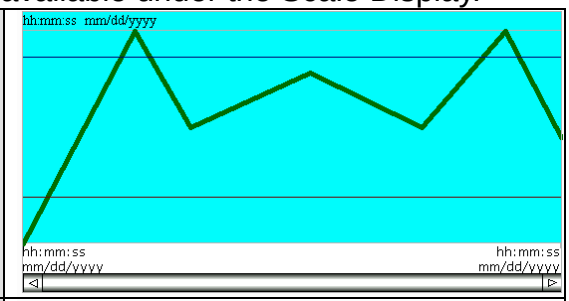
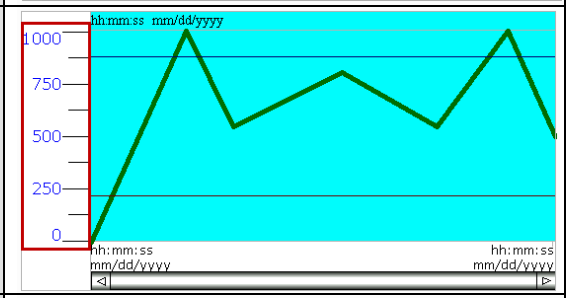
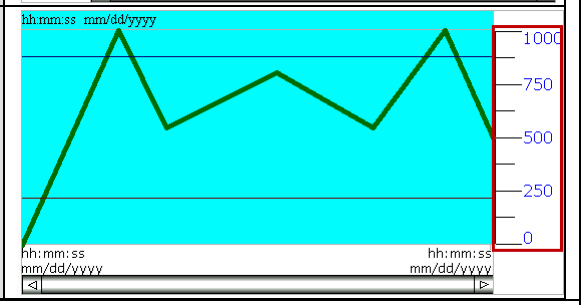
No.	Property	Function	
			Floating 0~9999999
		Display High Value	High value is displayed in Historical Trend Graph. Users can setup the constant value, Internal memory address or the PLC address (Word). Its display color can be setup, too.
		Display Low Value	Low value is displayed in Historical Trend Graph. Users can setup the constant value, Internal memory address or the PLC address (Word). Its display color can be setup, too.
(3)	Type	Curve Counts	➢ A Historical Trend Graph component supports up to 30 curves.  ➢ Up to 30 curves can be selected. The user can change the color and width of the line.

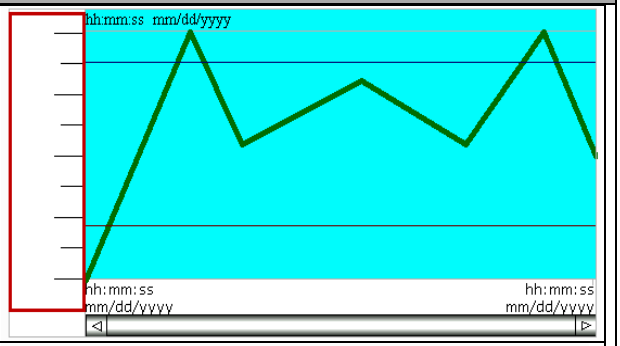
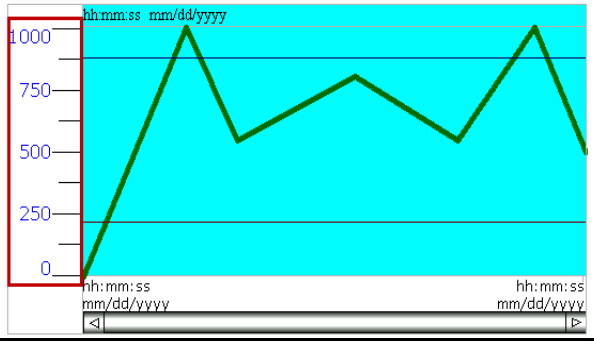
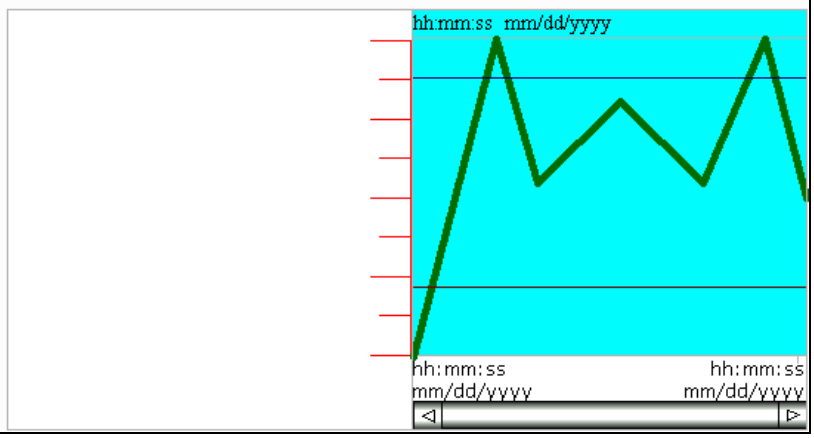
No.	Property	Function	
			
		Border Color	➢ The user can set the border color for the Historical Trend Graph component. 
		Grid Number in Horizontal	➢ This option is selectable up to 50. ➢ The Grid Number in Horizontal defines the number of the blocks within the Historical Trend Graph. The default value is 1 indicating no gridlines. 2 represent 1 gridline or two blocks, 3 indicates 2 gridlines or three blocks, and so on. 

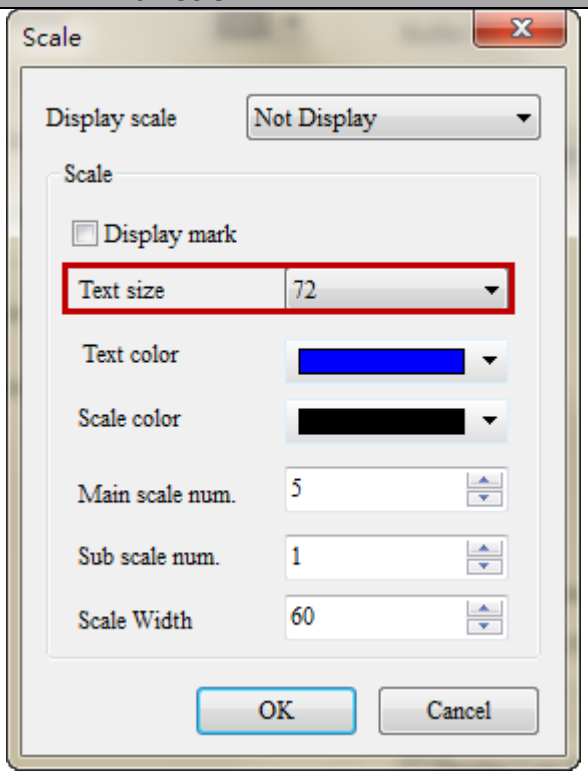
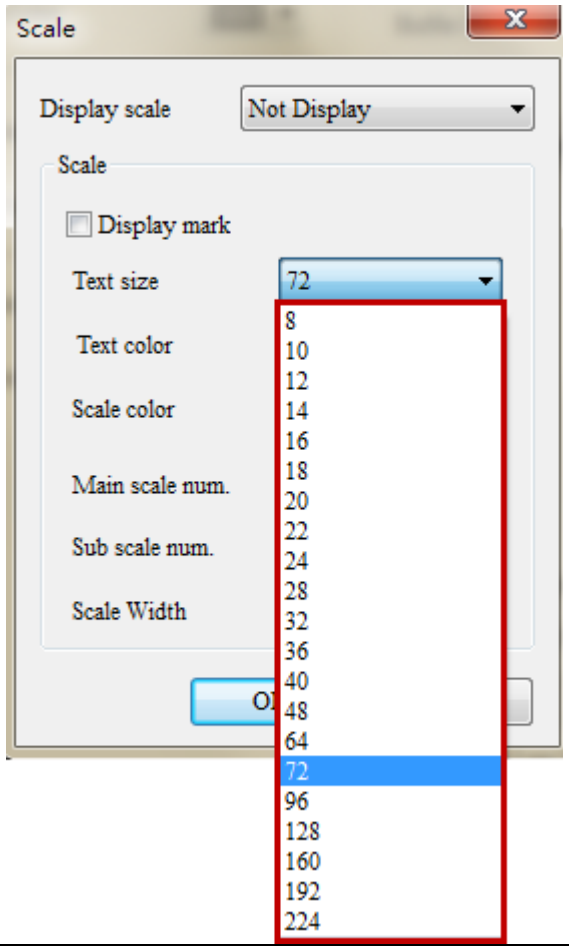
No.	Property	Function	
			
		Background Color	➢ The user can set the Background Color for the Historical Trend Graph component. 
		Grid line Color	➢ The user can set the color of the gridline within the Historical Trend Graph. It is by default.  ➢ The user can change the color at any time.

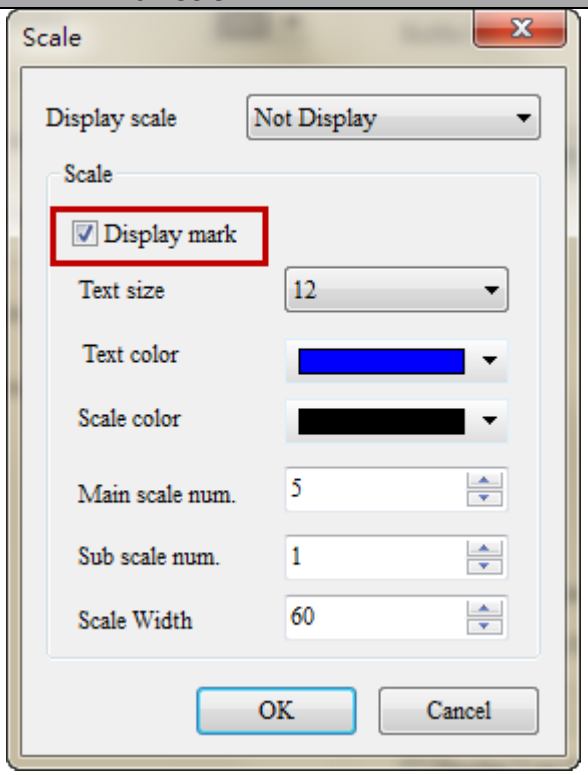
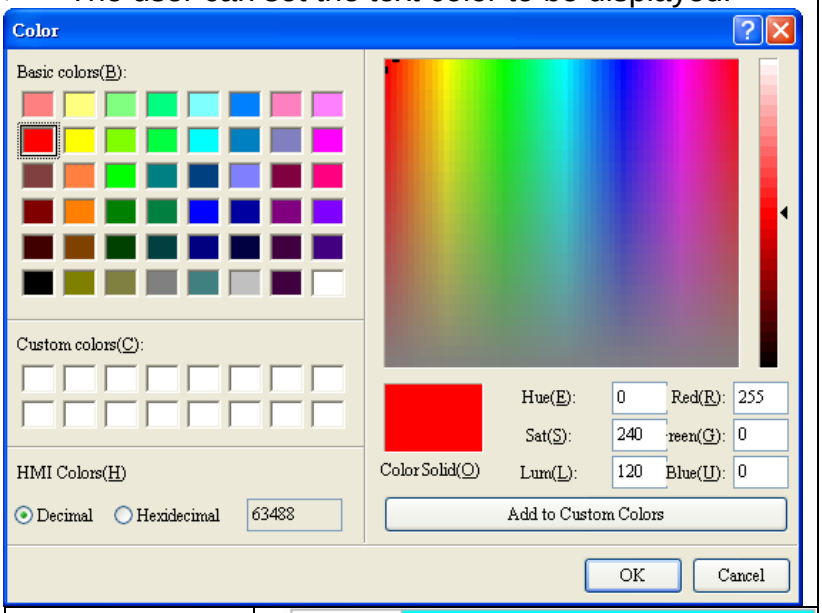
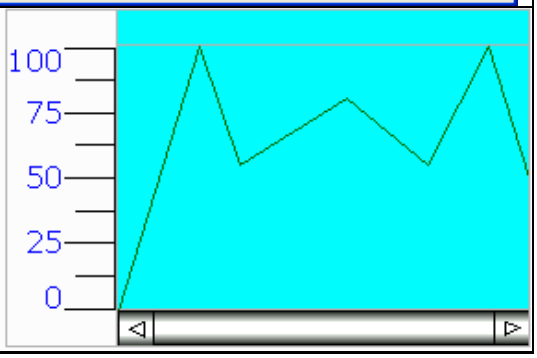
No.	Property	Function	
			
		Foreground Color	➢ The user can set the foreground color of the Historical Trend Graph component. 

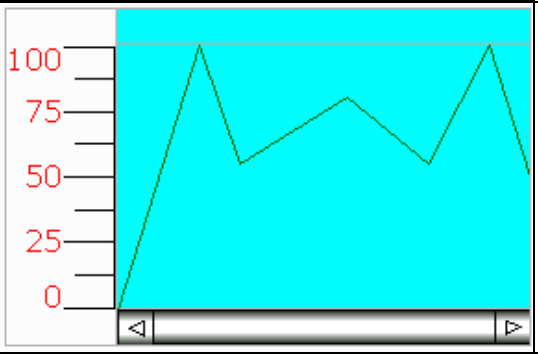
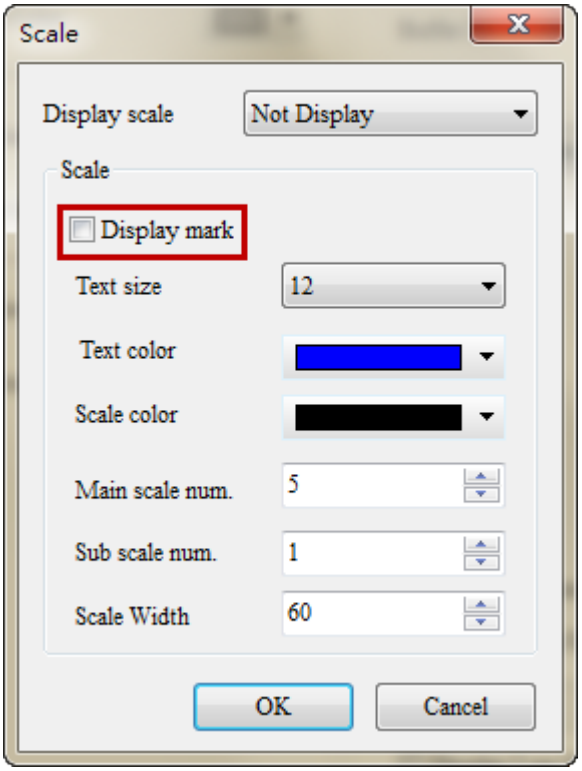
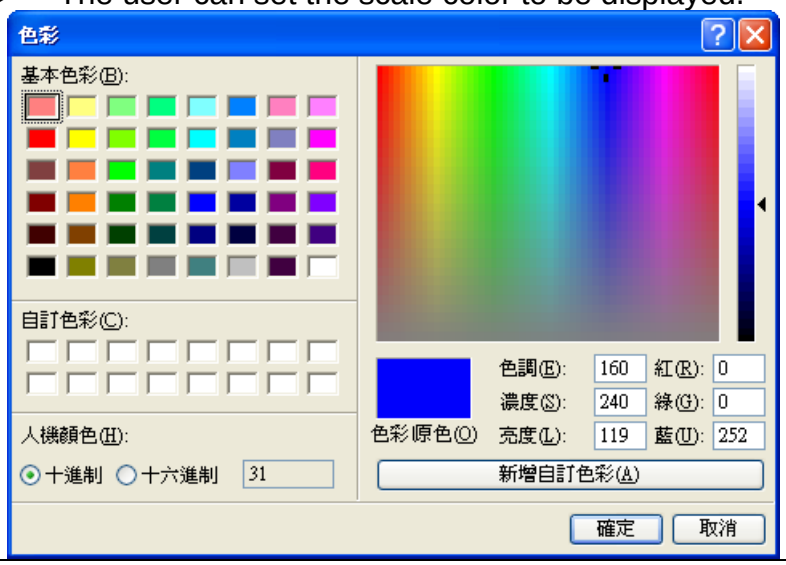
No.	Property	Function
(4)	Scale Setting	 ➢ The Global Range must be checked to perform the Set Scale. Unchecked:  Checked: 

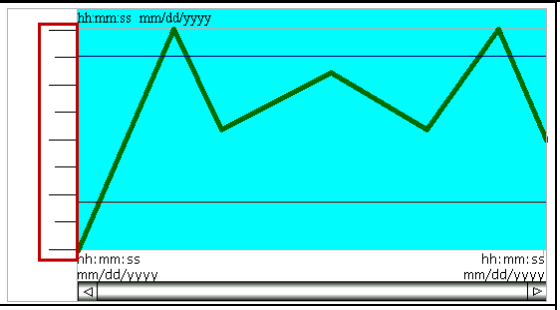
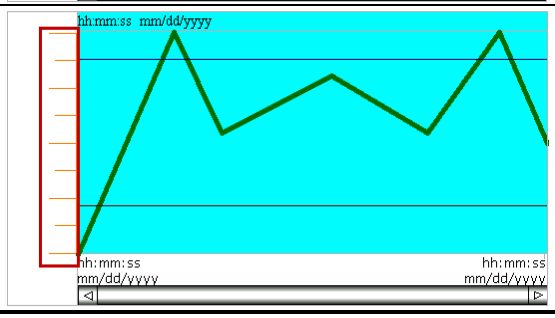
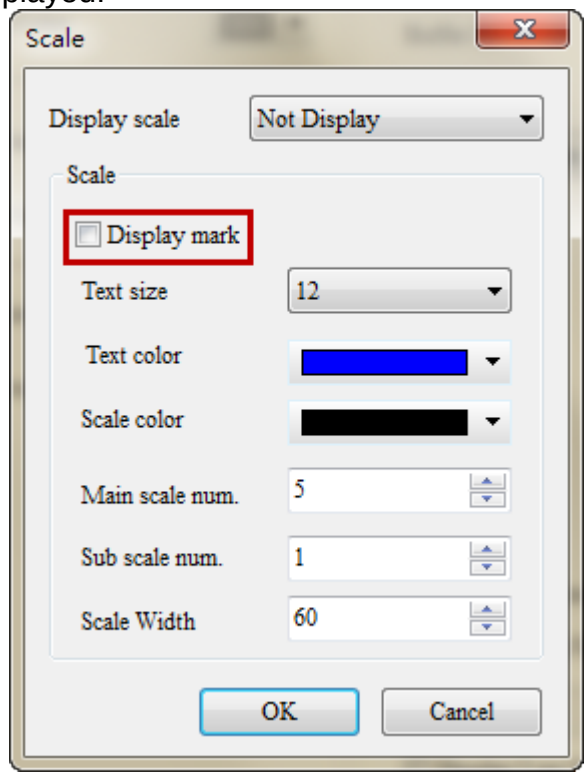
No.	Property	Function	
		Scale Display	 ➢ No scale display, Show scale on left and Show scale on right are available under the Scale Display. No scale display:  Show scale on left:  Show scale on right: 
		Mark Display	➢ The Mark Display option defines the display of the figure on the scale.

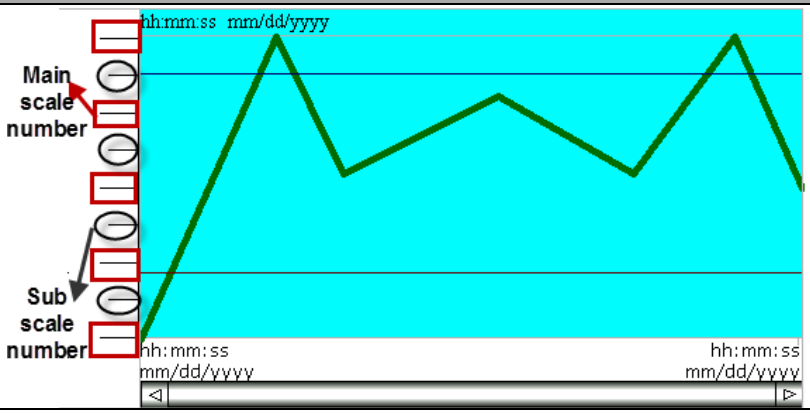
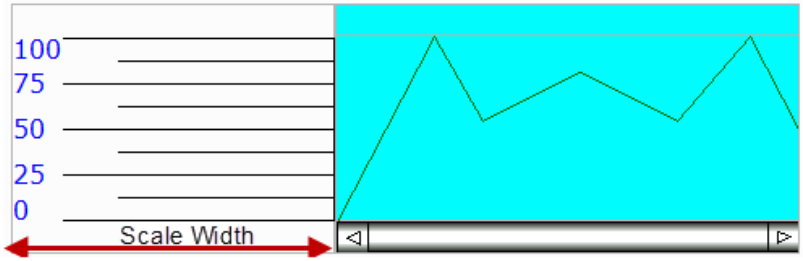
No.	Property	Function		
			Unchecked	
			Checked	
		Text Size	➢ The Text Size allows the scale to reserve a width corresponding to the size of the text if the Mark Display is not checked. The reserved width will be expanded when the typeface 72 is selected. 	

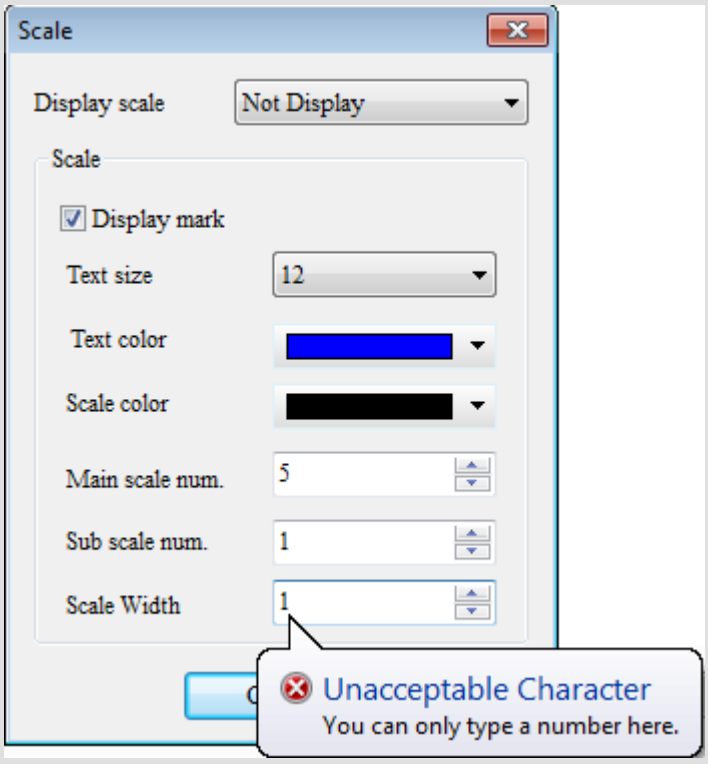
No.	Property	Function	
			 ➢ The text size is the size of the figure on the scale. Typefaces 8~224 are available for selection. 
		Text Color	➢ The Mark Display must be checked to set the Text Color.

No.	Property	Function
		 ➢ The user can set the text color to be displayed.  Before change 

No.	Property	Function	
			After change 
		Scale Color	➢ Checking the Mark Display is not needed to change the color of the scale.  ➢ The user can set the scale color to be displayed. 

No.	Property	Function		
			Before change	
			After change	
		Main Scale number	➢ Checking the Mark Display is not needed to change the primary and secondary scale counts to be displayed. 	
		Sub Scale number	➢ Both the primary and secondary scale counts can be set between 1 (min.) and 99 (max.). ➢ When the Primary Scale Counts is set to 5, the Secondary Scale Counts is set to 1 as shown in the figure below.	

No.	Property	Function	
			
		Scale Width	➢ Users can adjust the scale width to display the scale text according to its text size. When the scale width is set to 200, the figure will be shown as below.  NOTE: ✓ The scale width should be smaller than the element width. ✓ When the element width is dragged to be larger than the scale width, the scale will not be shown on the screen. ✓ If the scale width is bigger than the element width, the scale width will become smaller (the value will be minus 1) automatically. ✓ If you enter any non-numeric character, the software will show [Unacceptable Character] on the screen.

No.	Property	Function	
			

◆ Details

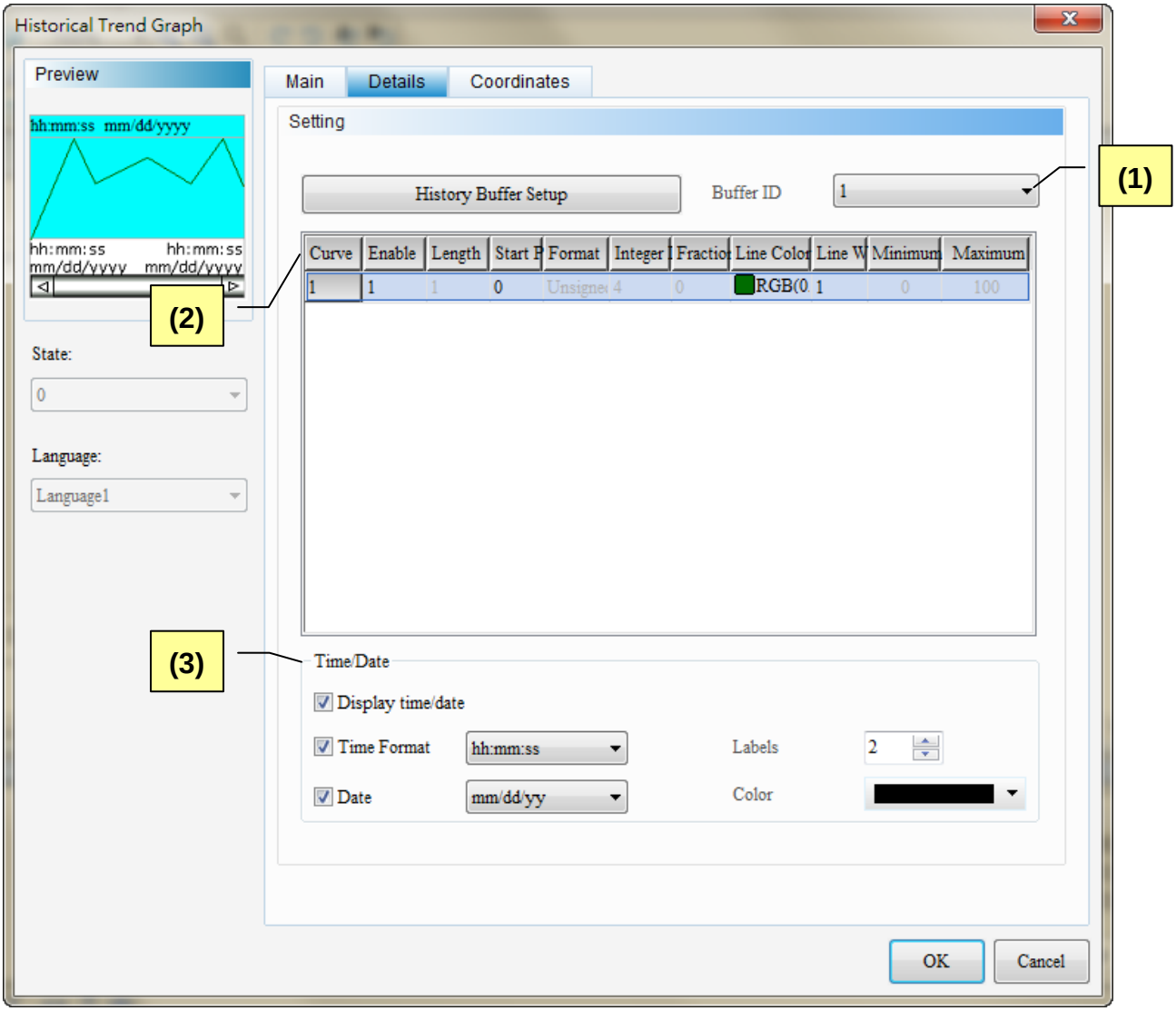
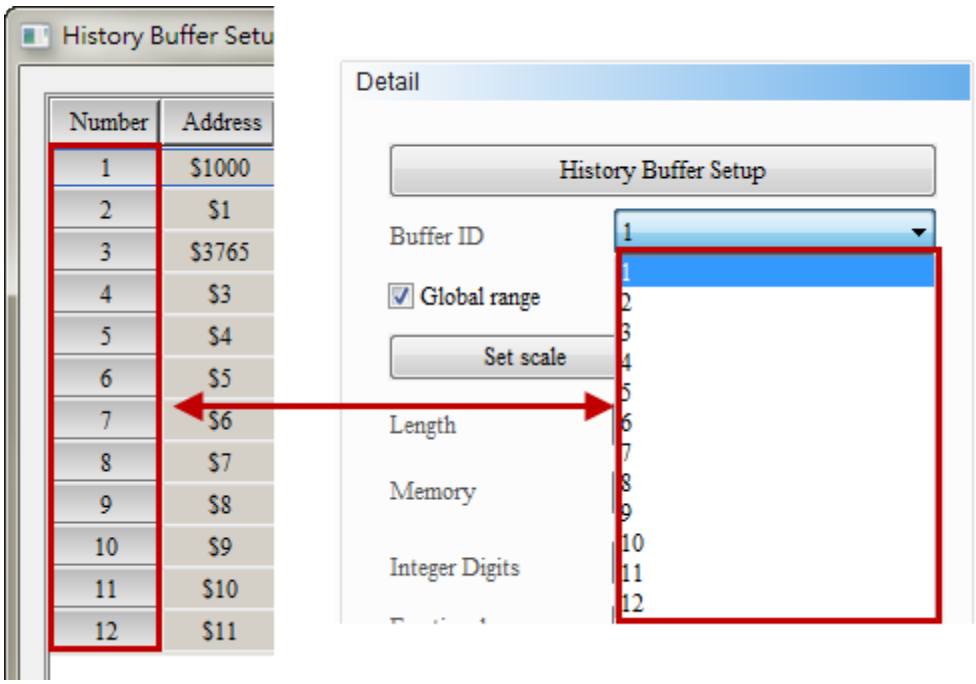
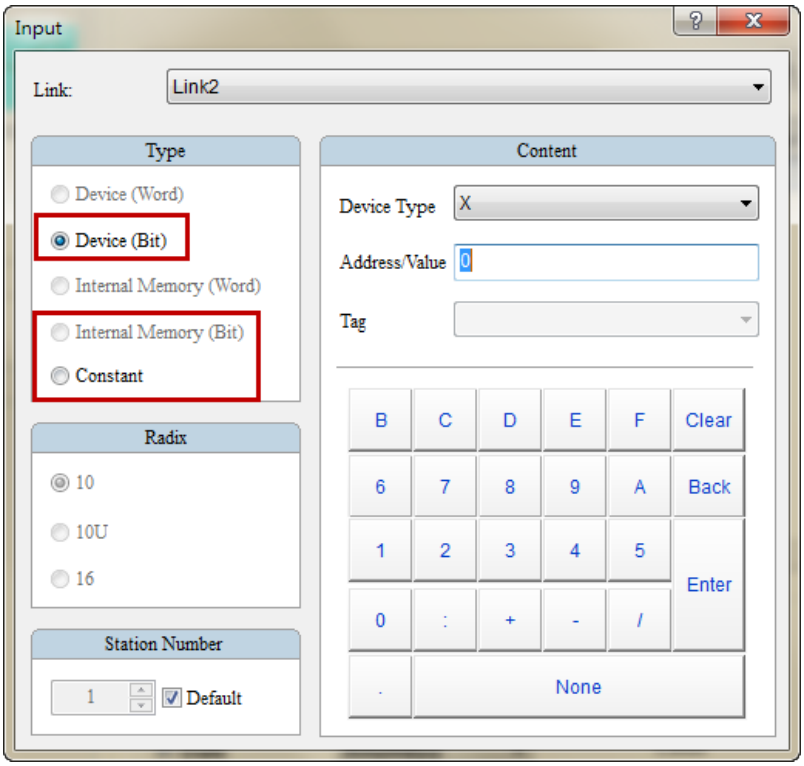
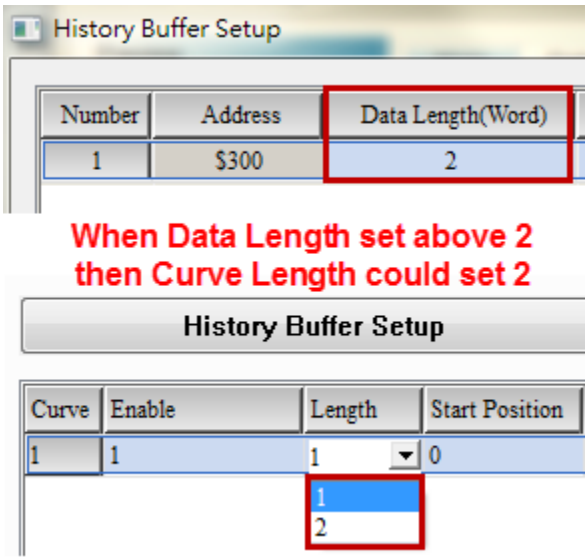
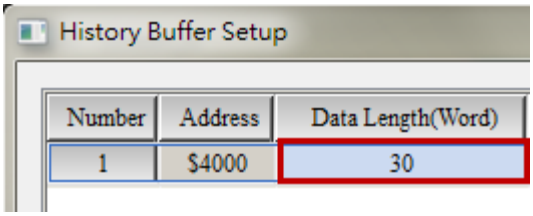
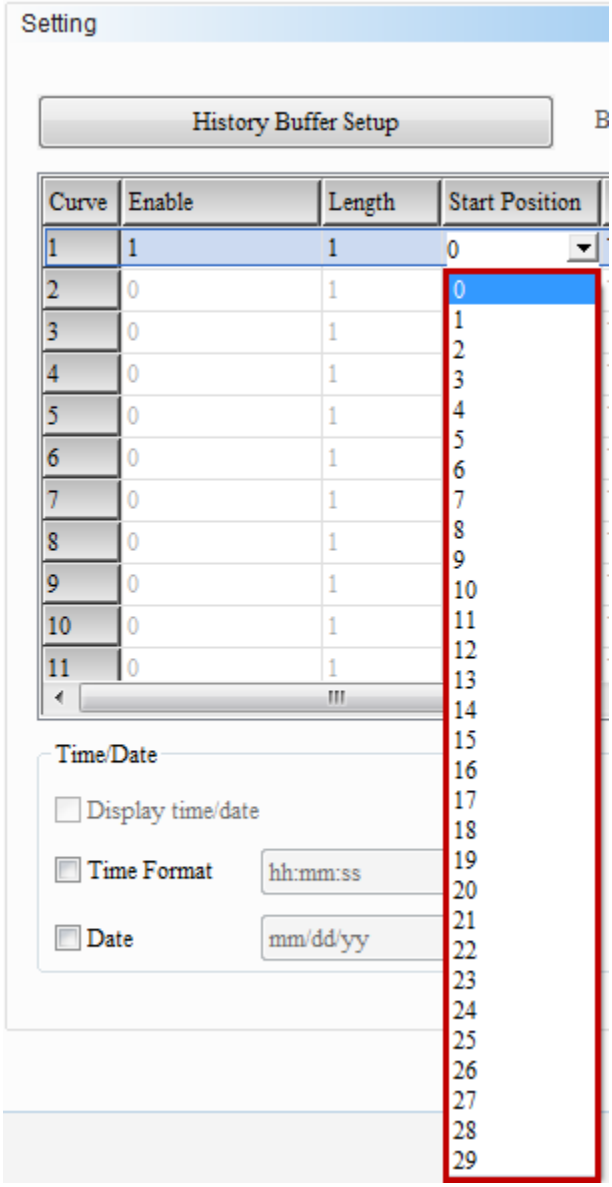
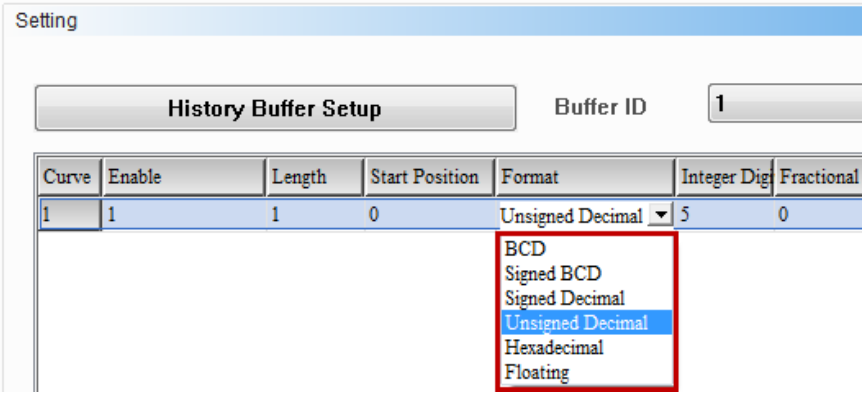


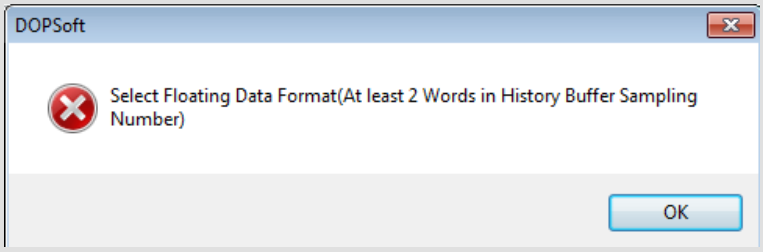
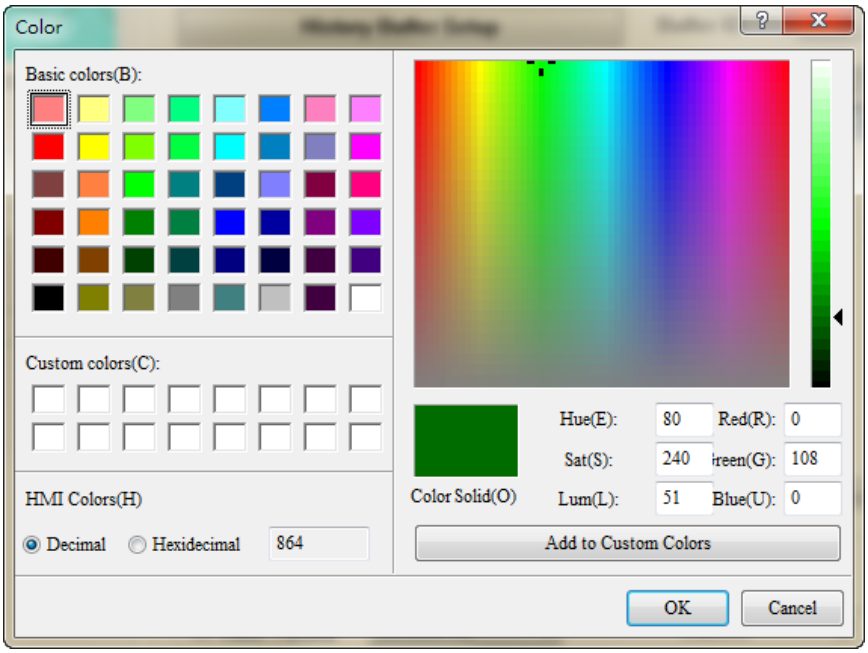
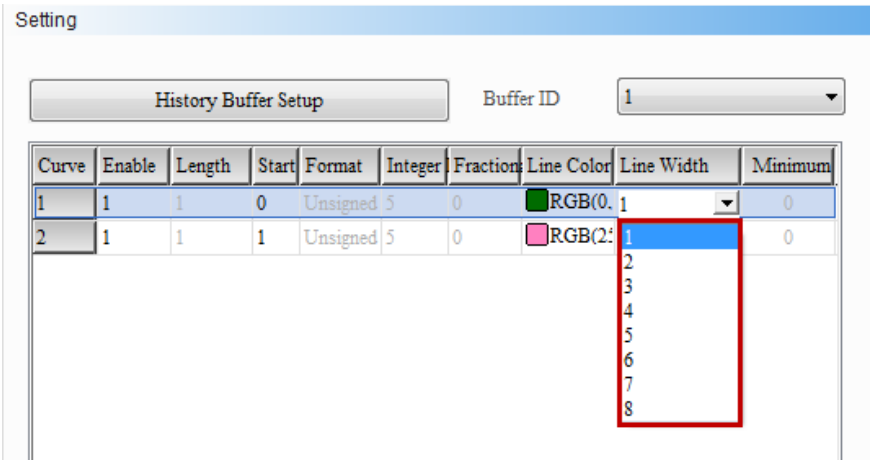
Figure 15-2-3 Historical Trend Graph Details properties page

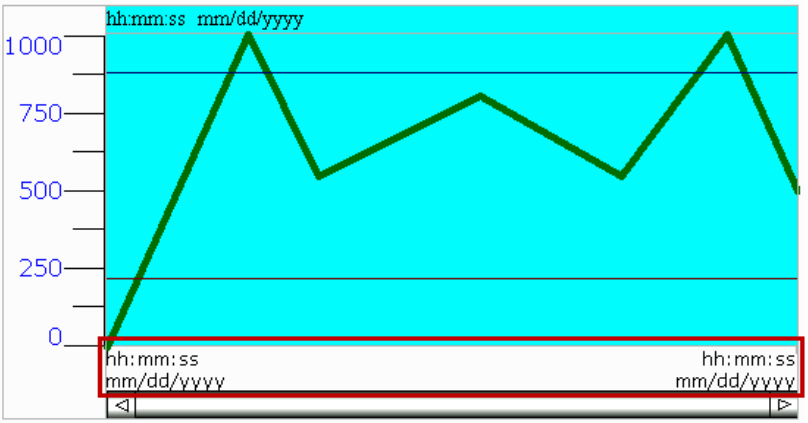
No.	Property	Function
(1)	Buffer ID	➢ The buffer number corresponds to the data number in the History Data Buffer. The History Setup function can add up to 12 history data and, thus, the buffer number supports up to 12.

No.	Property	Function	
			
(2)	Curve Setting	Enable	➢ Enable / Disable data accessing in buffer area. ➢ If constant is set as the type: Set the value to 1 as enable; set the value to 0 as disable. If Bit is set as the type: BitON means to enable; BitOFF means to disable. ➢ Sets up the bit supported by value, the one in Internal Memory and constant. 
		Length	➢ Two selections are provided for length 1 and length 2. Only when the data length is set above 2, can the user

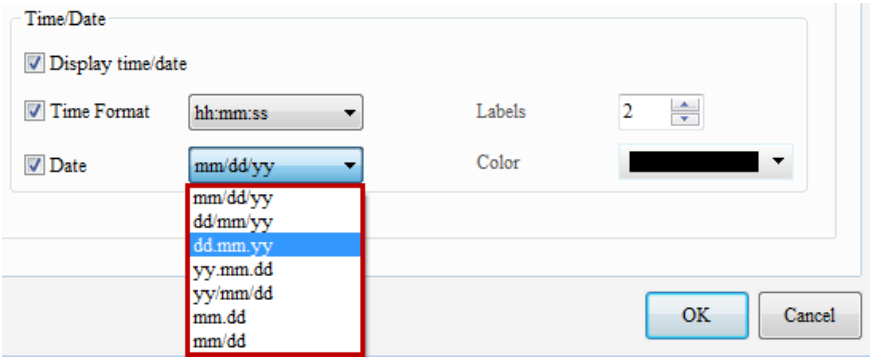
No.	Property	Function	
			choose 2 as the curve length.  ➢ If it is set to global scope, this function is invalid.
		Start Position	➢ Data length (Word) determines the start position of data. ➢ When the data length (Word) is 30, the data start position can be 0 ~ 29. 

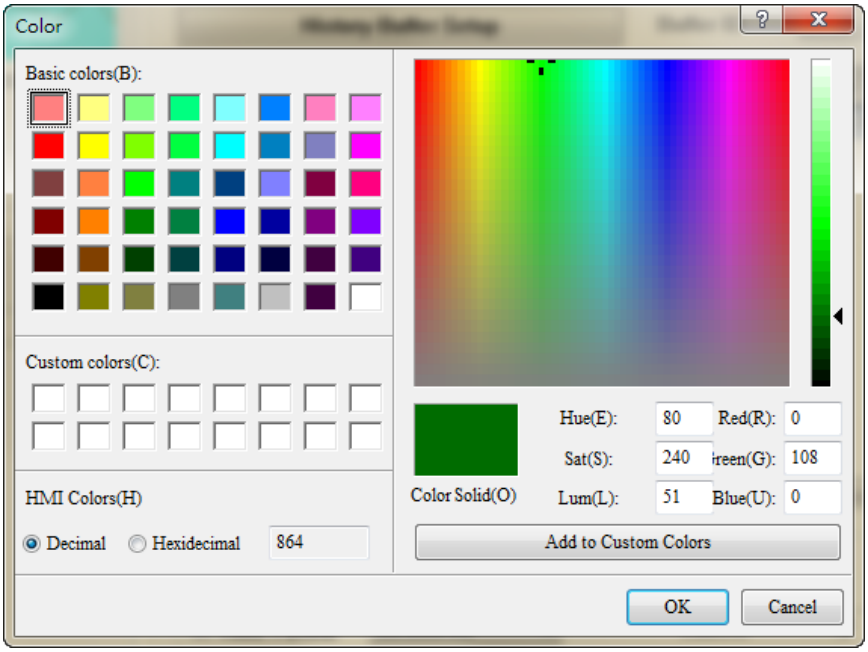
No.	Property	Function	
			
		Format	➢ Followings are the supported format:  ➢ If it is set to global scope, this function is invalid. NOTE： ➢ If the format is floating, please set the length to 2. ➢ When the format is floating, if the length only sets to 1

No.	Property	Function	
			Word, one prompt message will pop and ask the users to set it to 2 Words at least. 
		Integer Digits / Fractional	➢ Users can setup the displayed integer digits and fractional digits. ➢ If it is set to global scope, this function is invalid.
		Line Color	➢ The user can set the line color as desired. 
		Line Width	➢ Line width can set from 1 to 8. 

<table>
<tr><th>No.</th><th>Property</th><th colspan="2">Function</th></tr>
<tr><td></td><td></td><td>Min. / Max. Value</td><td>➢ Choose Global Range, it will be unable to setup the curvilinear min. and max. value. However, if not choose Global Range, the curvilinear min. and max. value will be able to setup.
➢ The permissible range of min. and max. value is based on the selected data type and format.
<table>
<tr><th>Data Type</th><th>Format</th><th>Permissible Range</th></tr>
<tr><td rowspan="5">Word</td><td>BCD</td><td>0~9999</td></tr>
<tr><td>Signed BCD</td><td>-999 ~ 9999</td></tr>
<tr><td>Signed Decimal</td><td>-32768~32767</td></tr>
<tr><td>Unsigned Decimal</td><td>0~65535</td></tr>
<tr><td>Hex</td><td>0~0xFFFF</td></tr>
<tr><td rowspan="6">DWord</td><td>BCD</td><td>0~99999999</td></tr>
<tr><td>Signed BCD</td><td>-9999999 ~ 99999999</td></tr>
<tr><td>Signed Decimal</td><td>-2147483648~2147483647</td></tr>
<tr><td>Unsigned Decimal</td><td>0~4294697295</td></tr>
<tr><td>Hex</td><td>0~0xFFFFFFFF</td></tr>
<tr><td>Floating</td><td>0~9999999</td></tr>
</table></td></tr>
<tr><td>(3)</td><td>Time / Date</td><td>Display Time / Date</td><td>➢ The selection of display time / date. Check this function, Historical Trend Graph will display time / date below. If the function is unchecked, then nothing will be shown.
 

➢ Check “Time/Date” to setup the number of time scale. The number can up to 9999. The above figure displays two time scales.</td></tr>
</table>

No.	Property	Function	
		Time Format	➢ It supports the following two formats:
		Date Format	➢ It supports the following seven formats: 
		Color	➢ Users can change the displayed color or time and data, including the one shown in Historical Trend Graph and the number of time scale shown in Time/Date. The default color is .

No.	Property	Function
	Line Color	➢ The user can set the line color as desired. 

◆ Coordinates

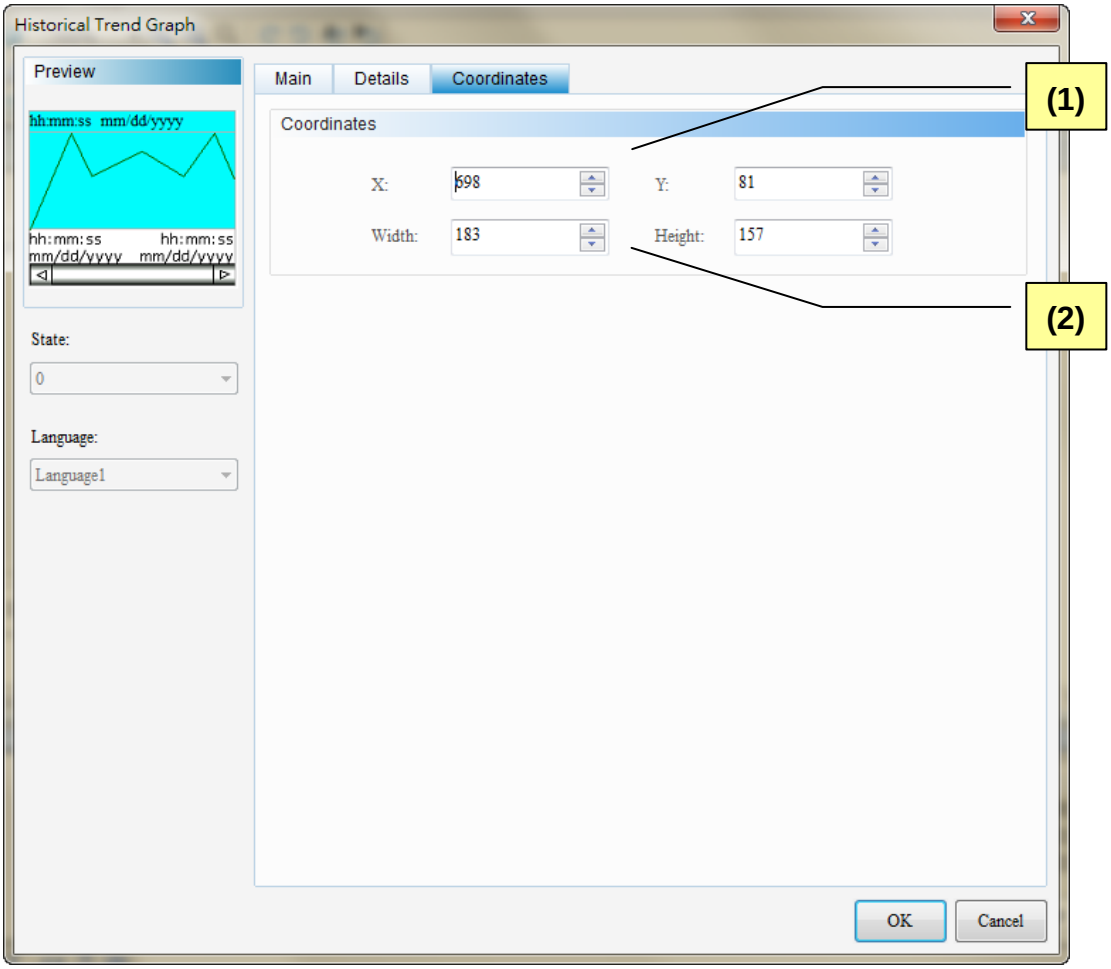


Figure 15-2-4 Historical Trend Graph Coordinates properties page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

15-3 Historical Data Table

	Historical Data Table

The data read from the History are converted to values and displayed in the Historical Data Table. The 30 columns of the history value data correspond individually to the 30 Word lengths of the data type in the Historical Trend Graph.
Double click the Historical Data Table icon and the following property setting screen appears.

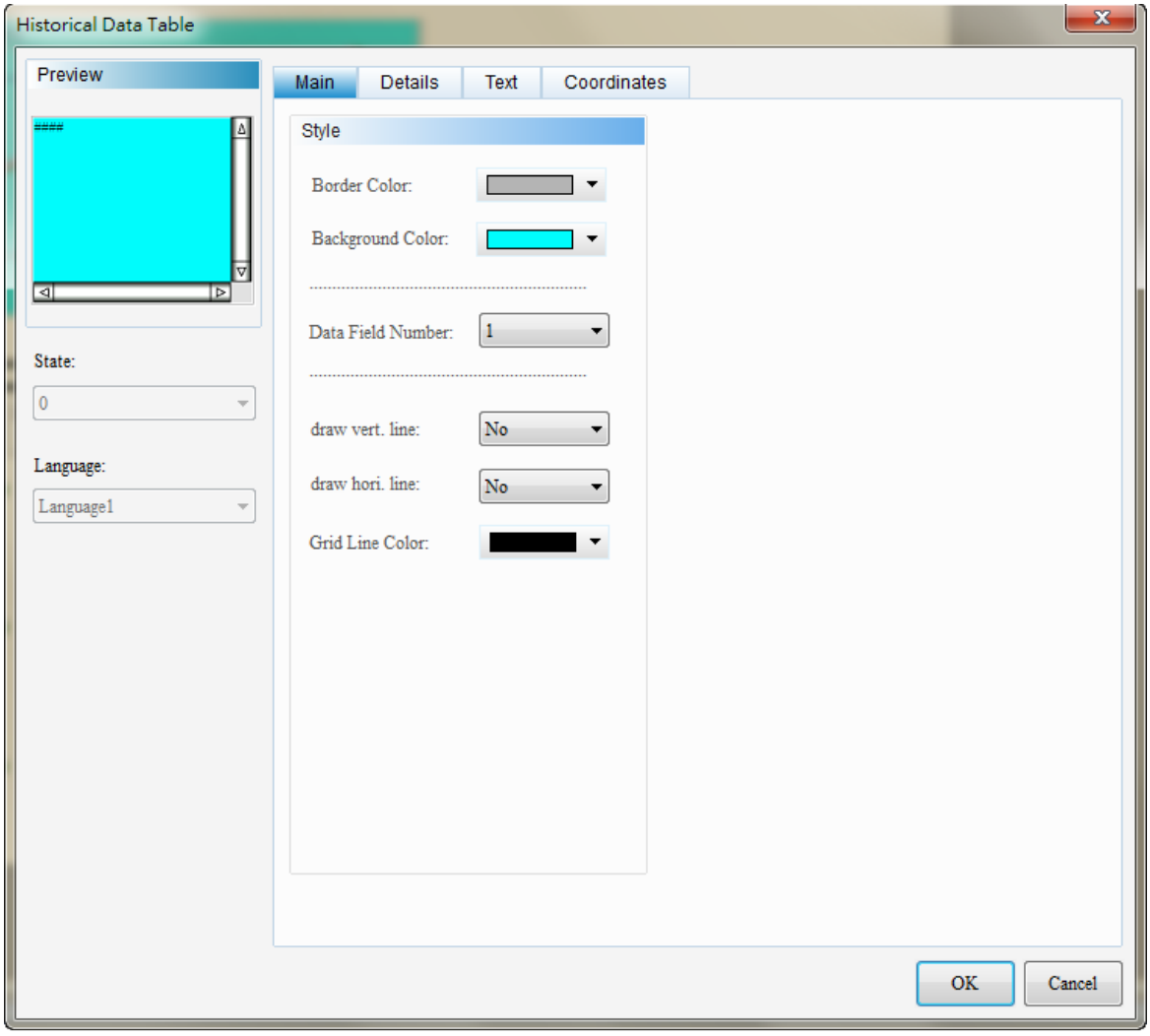


Figure 15-3-1 Historical Data Table properties setting screen

Historical Data Table	
Function Page	**Description**
Preview	The State and Language are not available to the Historical Data Table.
Main	Sets the border color, Background Color, Data Field number, draw vertical line, draw horizontal line and grid line color.
Details	Sets Buffer ID. Sets time / date display. Sets length, start position, value format, integer digits, fractional digits, color, field width and leading zero.
Text	Sets the text size of the value data to be displayed.
Coordinates	Sets the X-Y coordinate, width and height of the component.

Figure 15-3-2 Historical Data Table function page

◆ Main

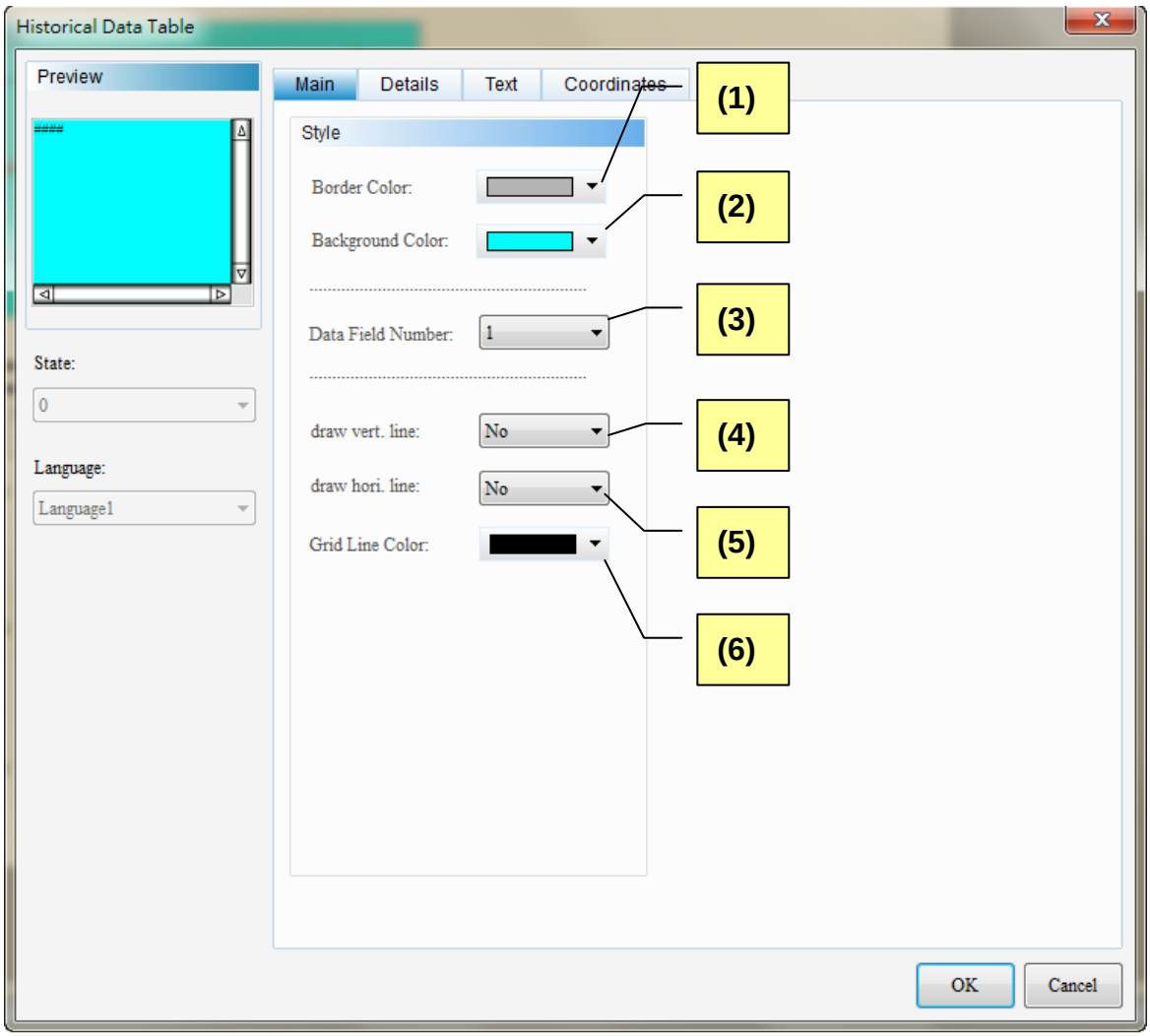
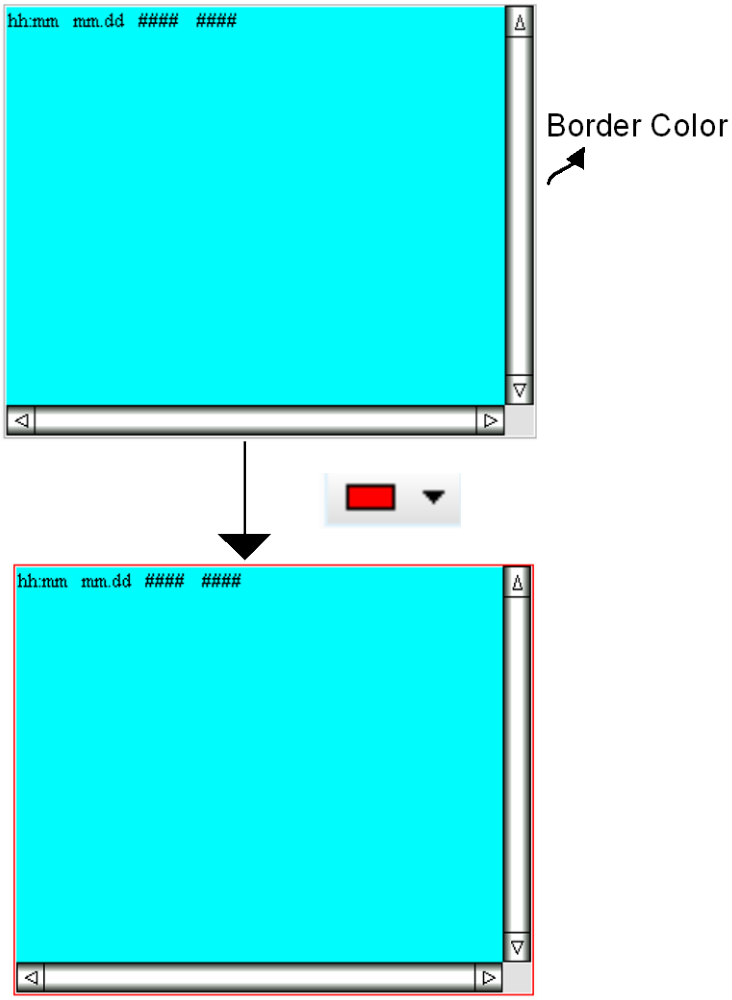
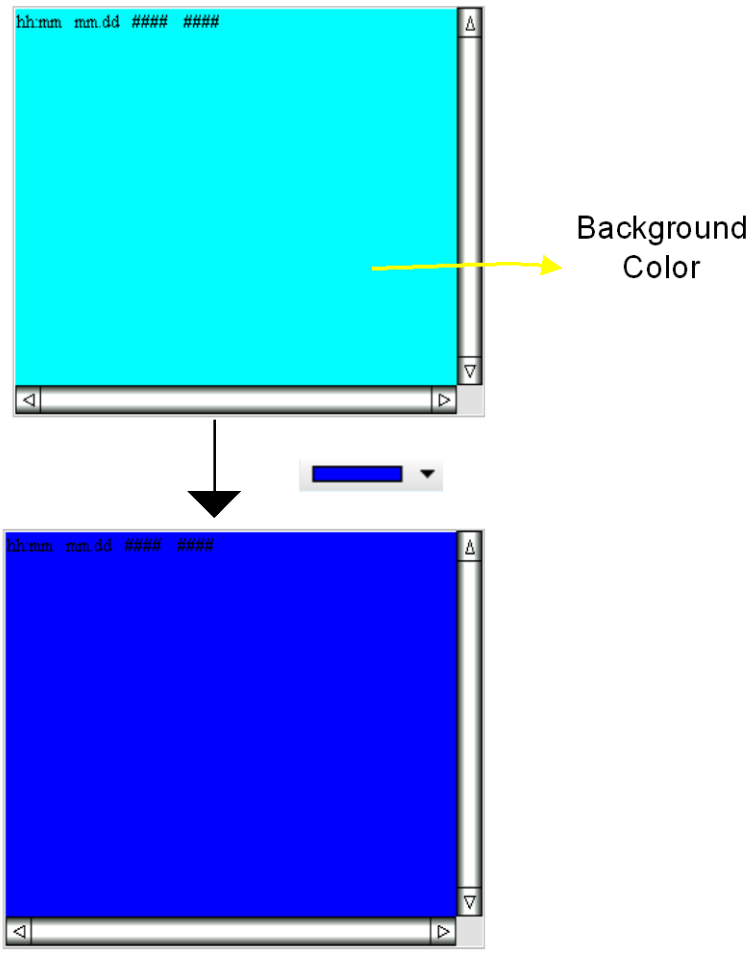
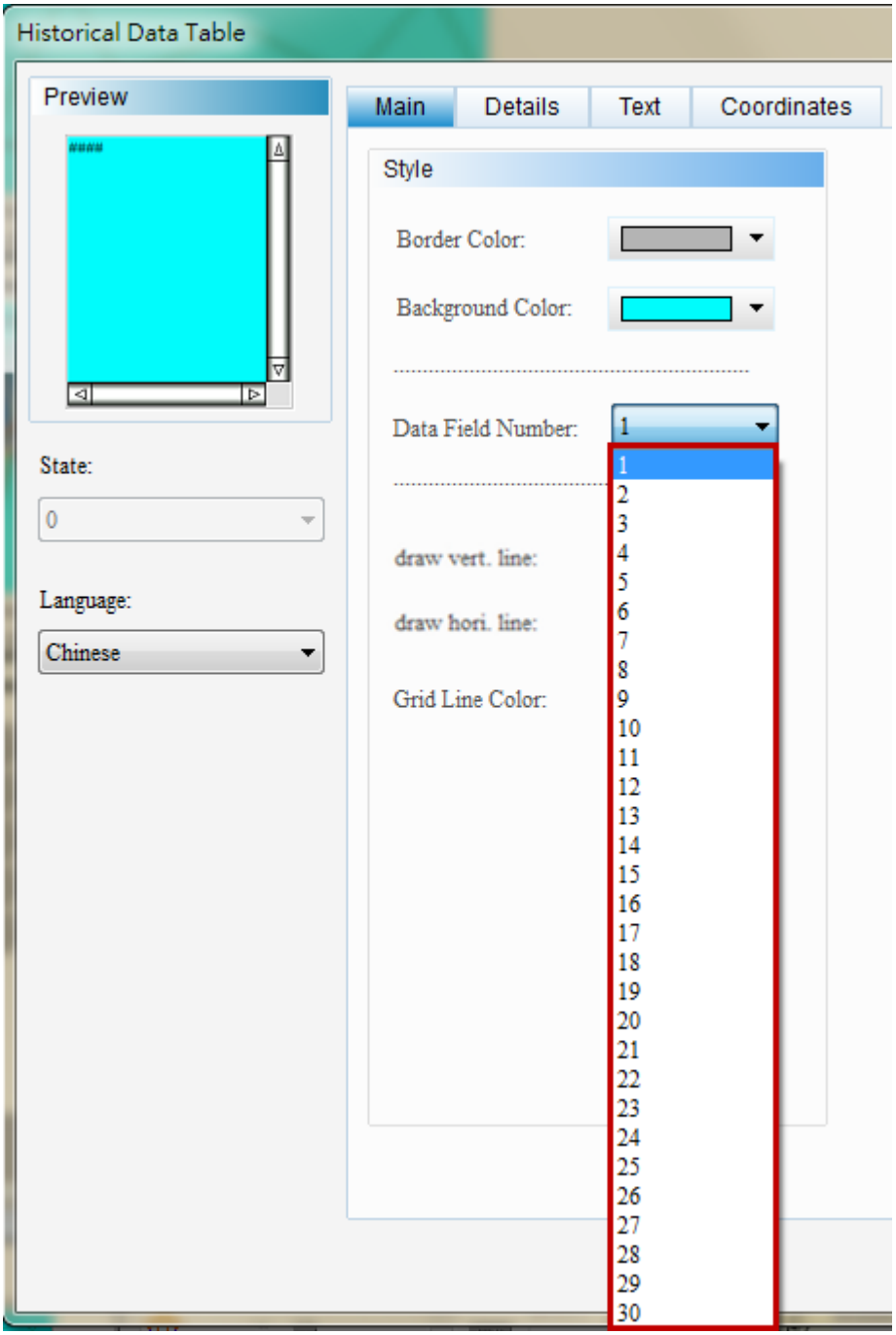
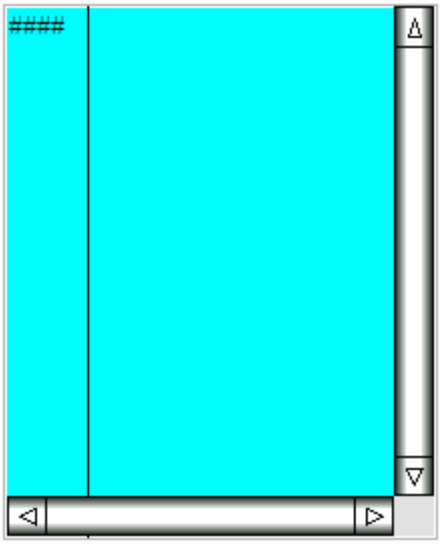
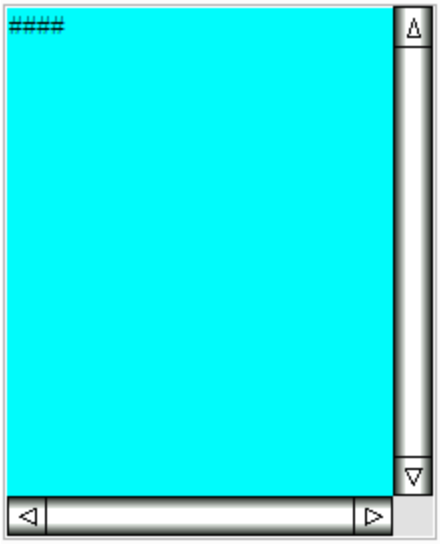
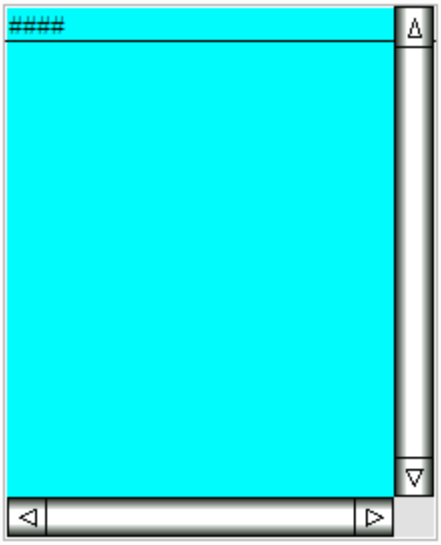
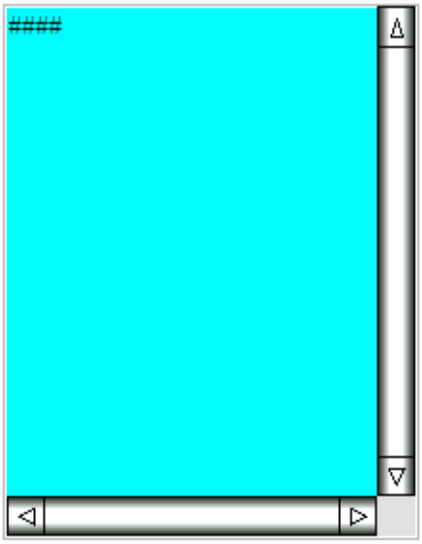


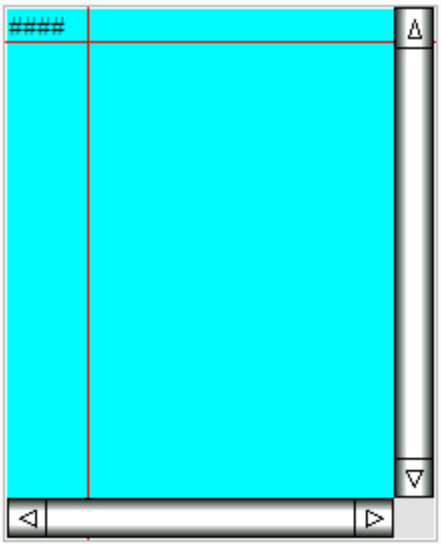
Figure 15-3-2 Historical Data Table Main properties page

No.	Property	Function
(1)	Border Color	➢ The user can set the border color for the Historical Data Table. 
(2)	Background Color	➢ The user can set the Background Color for the component.

		
(3)	Column Counts	➢ The Column Counts option supports up to 30 columns. They correspond individually to the 30 Word lengths of the data type in the History Data Buffer.

<table>
<tr>
<td></td>
<td></td>
<td> 
</td>
</tr>
<tr>
<td>(4)</td>
<td>Show vertical separator line</td>
<td>➢ This function can be used to separate the data display.
<table>
<tr><td>Show vertical separator line: YES</td><td>Show vertical separator line: NO</td></tr>
</table></td>
</tr>
</table>

		 
(5)	Show horizontal separator line	➢ This function can be used to separate the data display. Show horizontal separator line: YES  Show horizontal separator line: NO 
(6)	Grid color	➢ Users can define the displayed grid color. The default color is black.

◆ Details

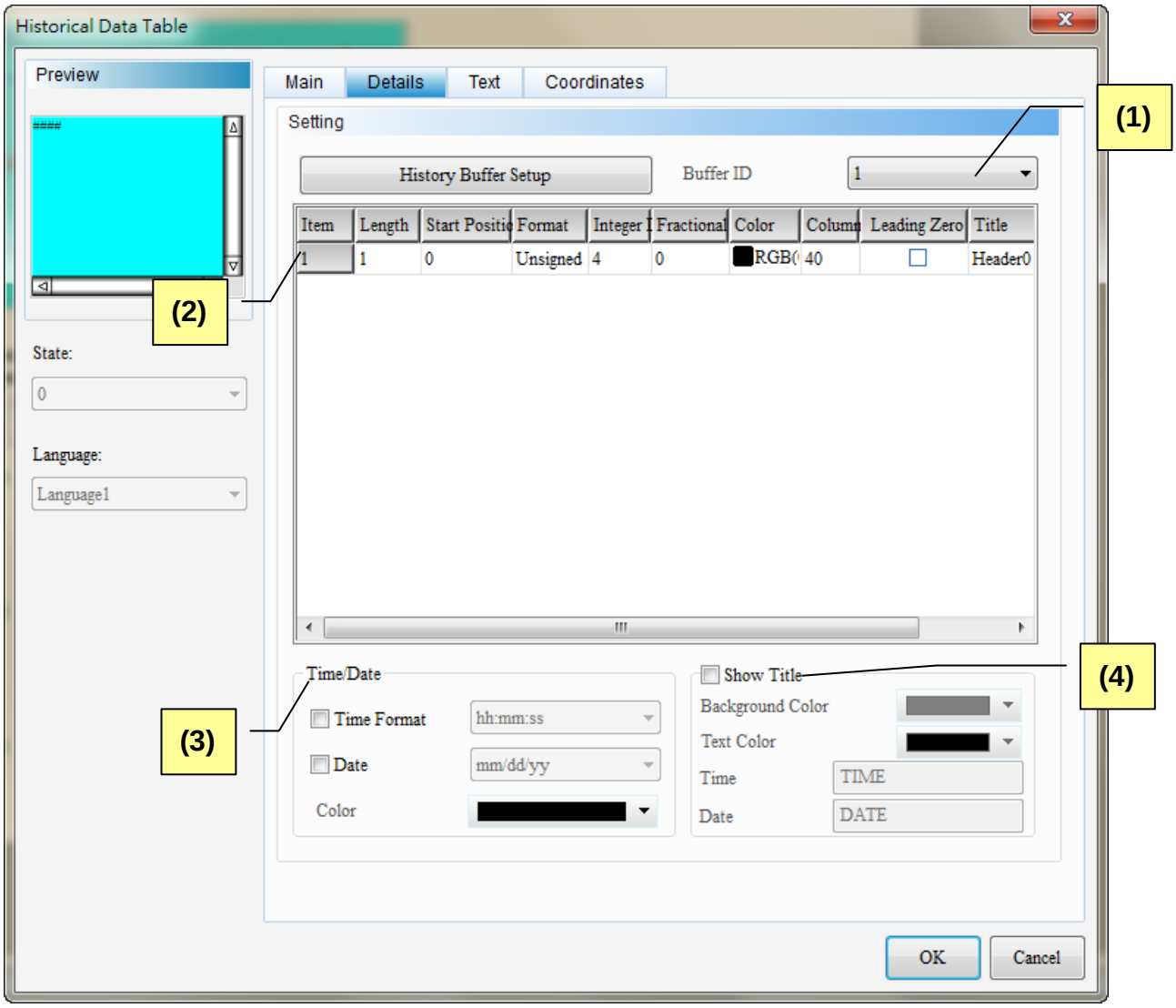
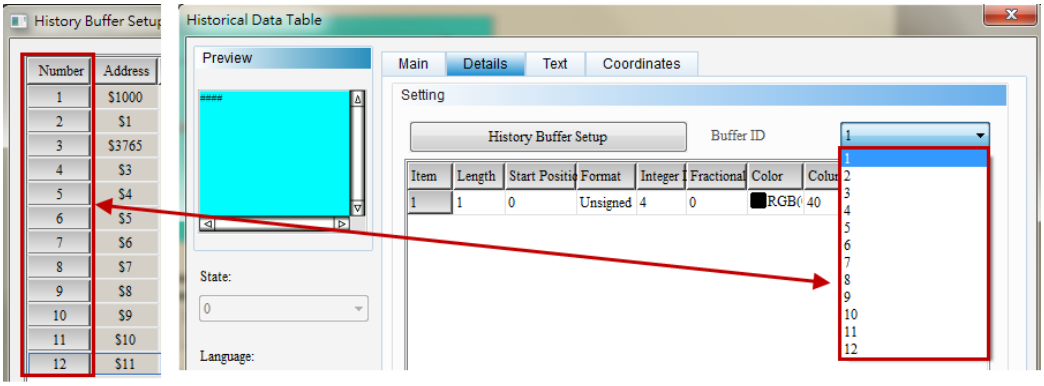
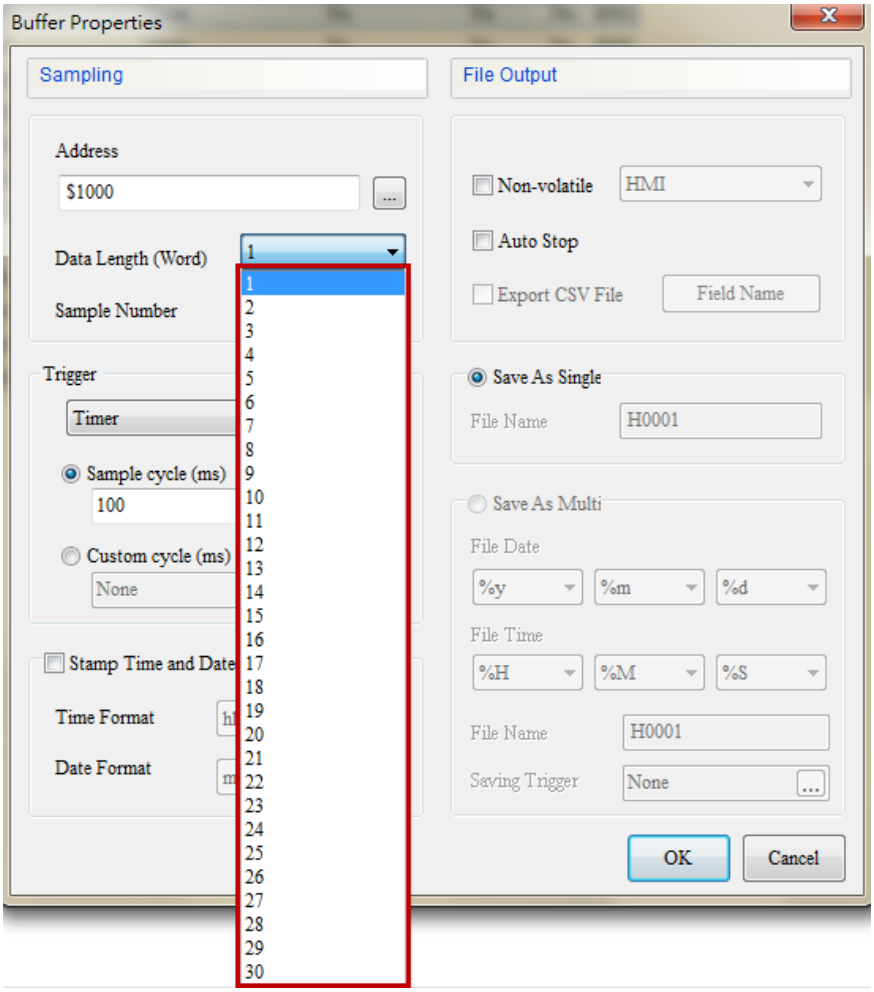
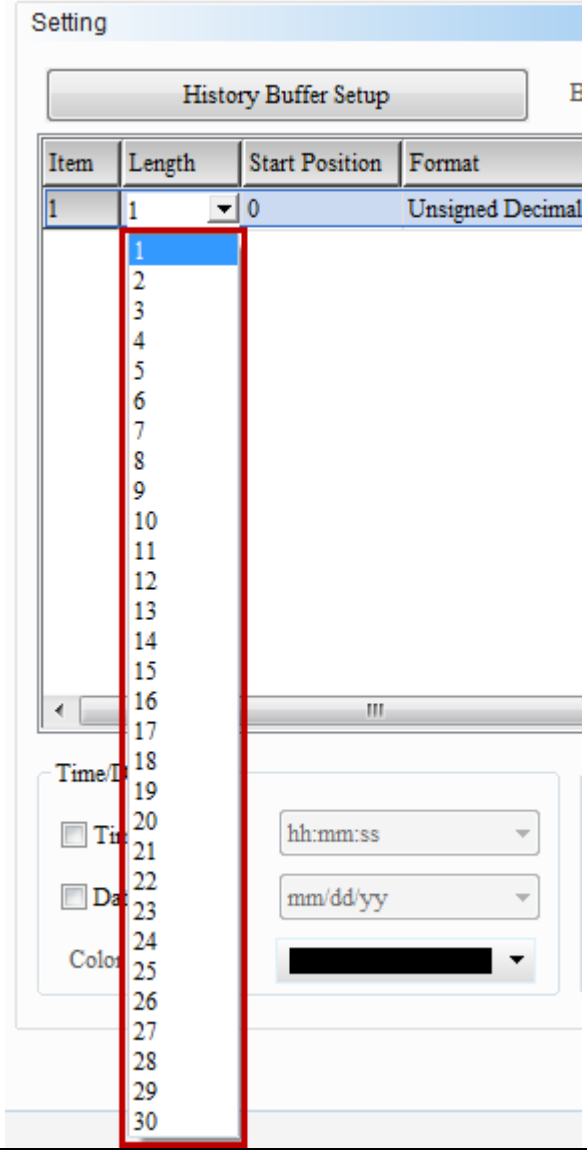
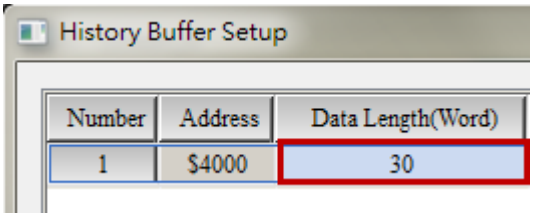
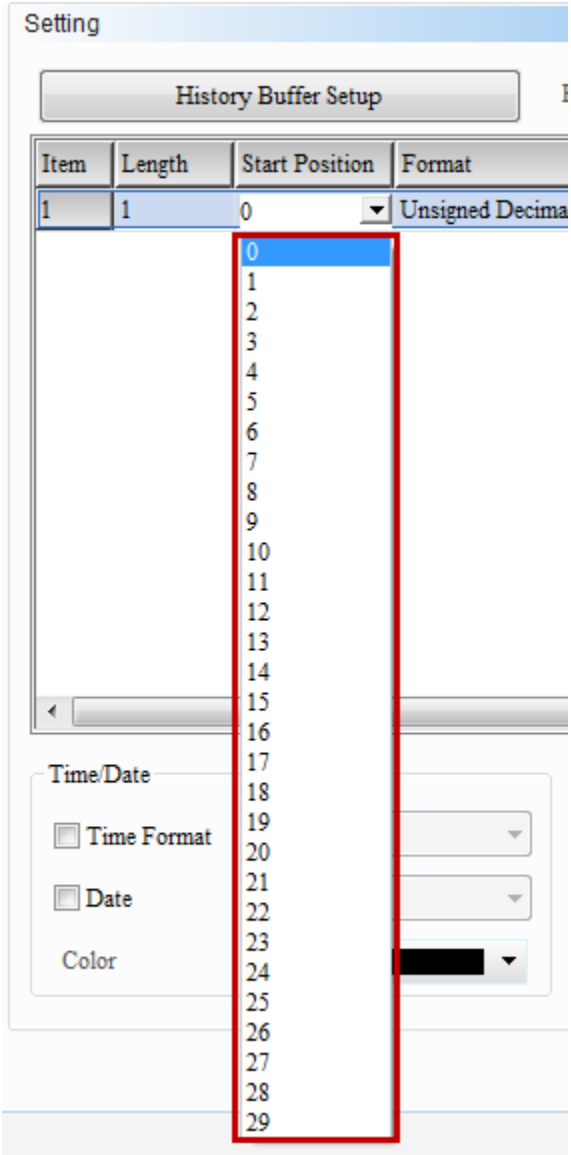


Figure 15-3-3 Historical Data Table Details properties page

No.	Property	Function	
(1)	Buffer ID	➢ The buffer number corresponds to the data number in the History Data Buffer. The History Setup function can add up to 12 history data and, thus, the buffer number supports up to 12. 	
(2)	Item Setting	Length	➢ The length corresponds to the data length (Word). If the data length is 30, then the length would be 1 ~ 30.

No.	Property	Function
		

No.	Property	Function	
			
		Start Position	➢ Data length (Word) determines the data start position. ➢ When the data length (Word) is 30, the start position is from 0 to 29. 

No.	Property	Function	
			
		Format	➢ The supported format of 1 Word is different from 2 Words. Please see the following table. ➢ For the format of Char, if the length is 1, it represents 2 Chars; if the length is 2, it represents 4. ➢ When the length is above 3, Char is the only format it supports.

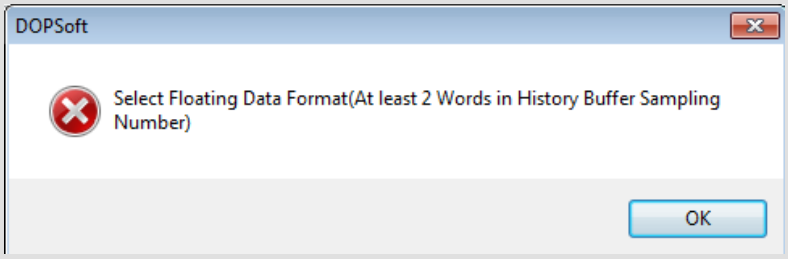
Length is 1		
Data Type	**Format**	**Permissible Range**
Word	BCD	0~9999
	Signed BCD	-999 ~ 9999
	Signed Decimal	-32768~32767
	Unsigned	0~65535

No.	Property	Function	

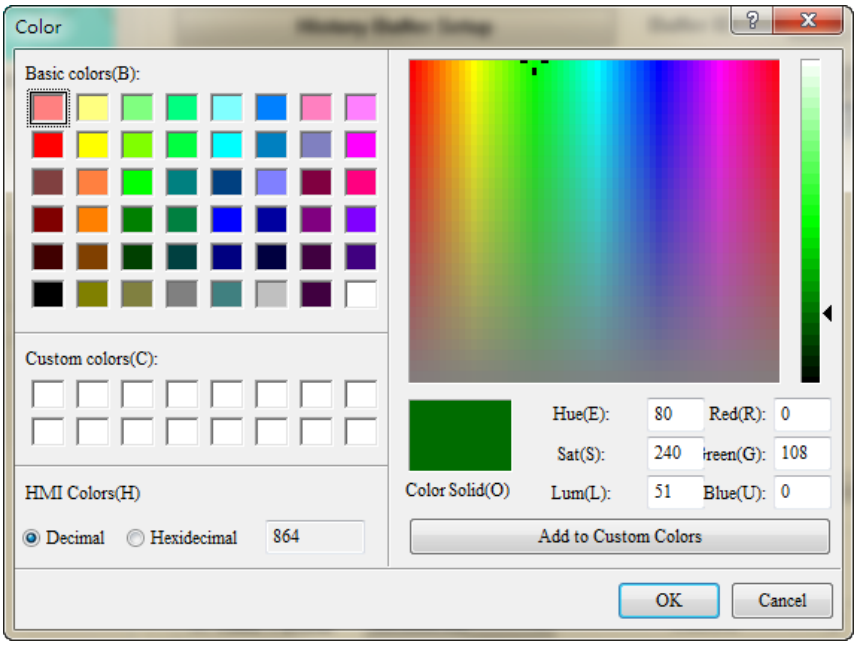
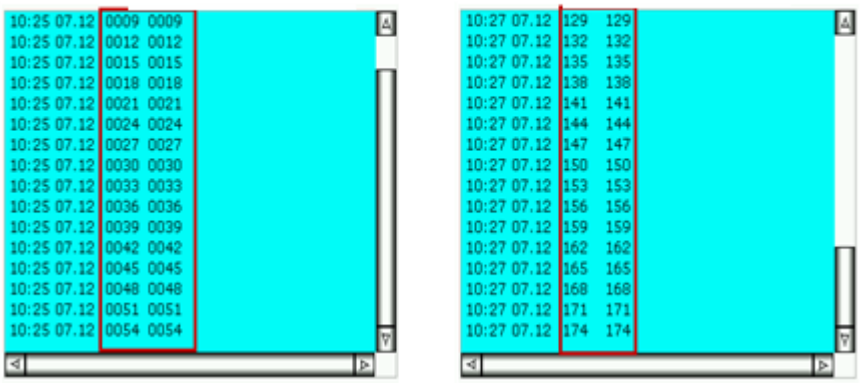
	Decimal	
	Hex	0~0xFFFF
	Char	2 words
Length is 2		
Data Type	**Format**	**Permissible Range**
DWord	BCD	0~99999999
	Signed BCD	-9999999 ~ 99999999
	Signed Decimal	-2147483648~2147483647
	Unsigned Decimal	0~4294697295
	Hex	0~0xFFFFFFFF
	Char	4 words
	Floating	0~9999999

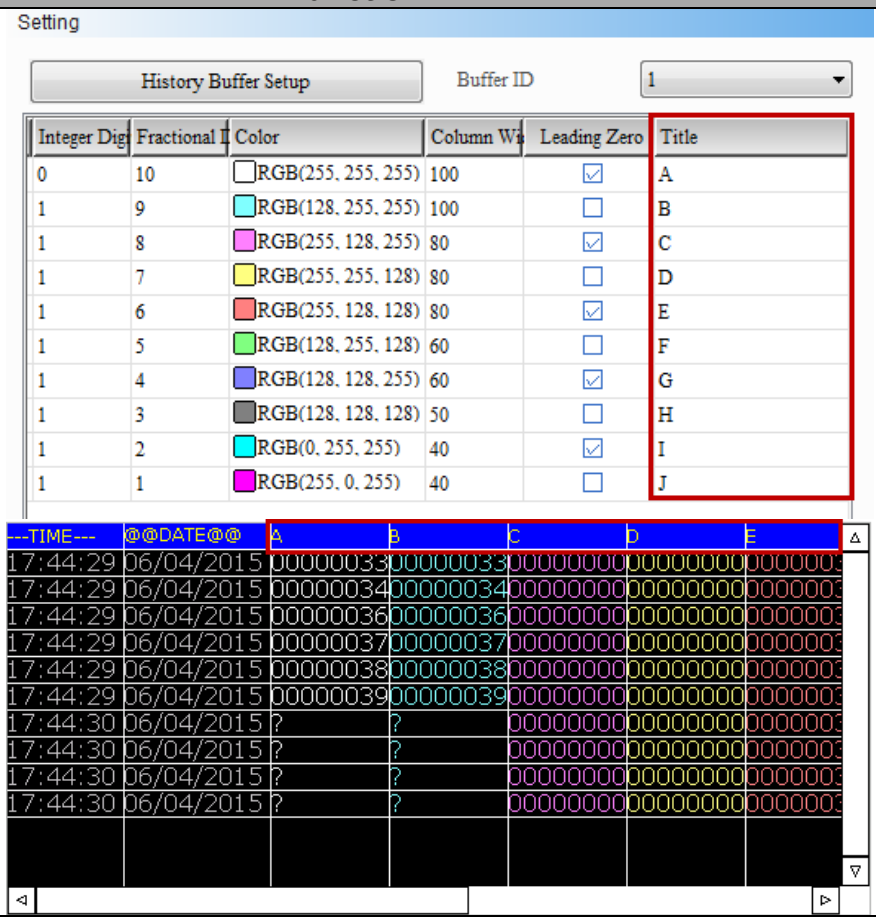
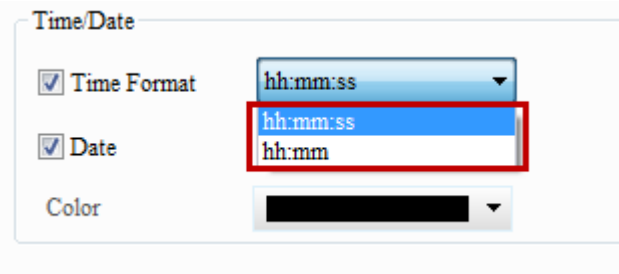
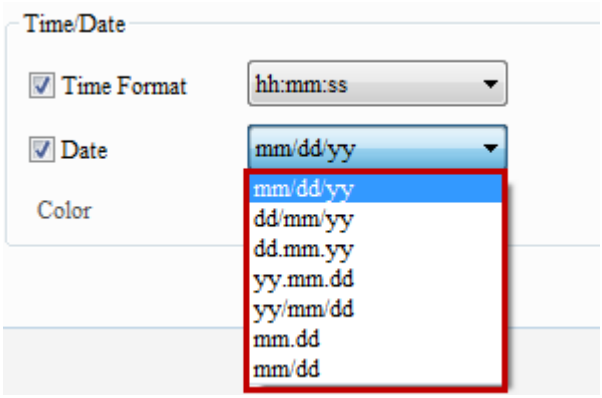
NOTE:

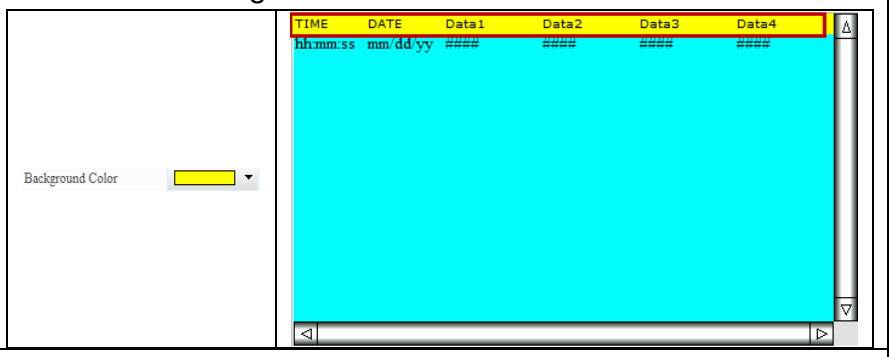
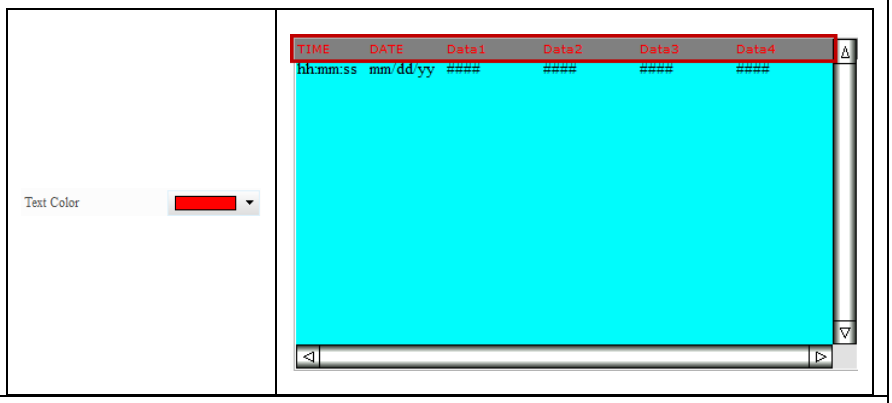
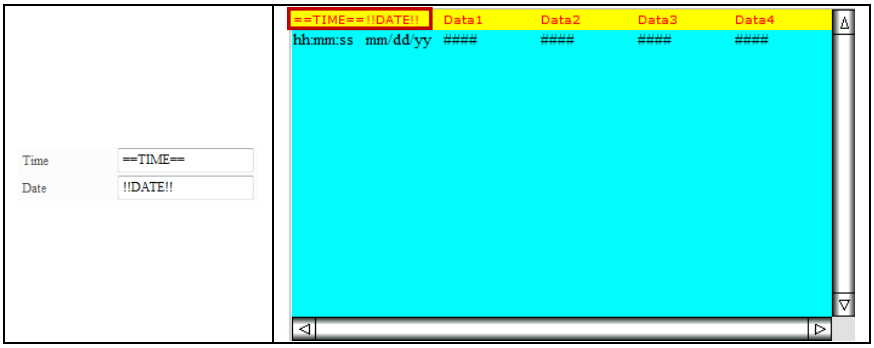
- If Floating is selected as the data format, select an even number from Data Location.
- If Floating is selected as the data format and 1 Word is set as the length of the data type, the software will remind the user to set to at least 2-word length.



Integer digits/Fractional digits	➢ The user can set the digits of the integer and decimal places to be displayed. ➢ When it is set to global scope, this function is invalid.
Color	➢ The user can set the line color as desired.

No.	Property	Function	
			
		Colum Width	➢ The Colum Width is used to set the distance between the value data records. For example. If the Column Counts is set to 2 and Column Width is set to 40, then the width between the first and second data records is 40. ➢ The column width is 40 by default. The range of the column width to be set is 0~999.
		Leading Zero	➢ Additional digits will be supplemented according to the integer digit setting when the Leading Zero is selected. Refer to the following figure. **Integer set to 4** ☑ Leading Zero ☐ Leading Zero 
		Title	➢ The title provide users custom the title name to display.

No.	Property	Function	
			
(3)	Time / Date	Time Format	➢ The following two time formats are supported: 
		Date Format	➢ he following seven date formats are supported: 

No.	Property	Function	
(4)	Show Title	Backgrou nd Color	➢ Set the background color of the title bar. 
		Text Color	➢ Set the text color of the title bar. 
		Time Date	➢ Set the title name of the displayed time and date. 

◆ Text

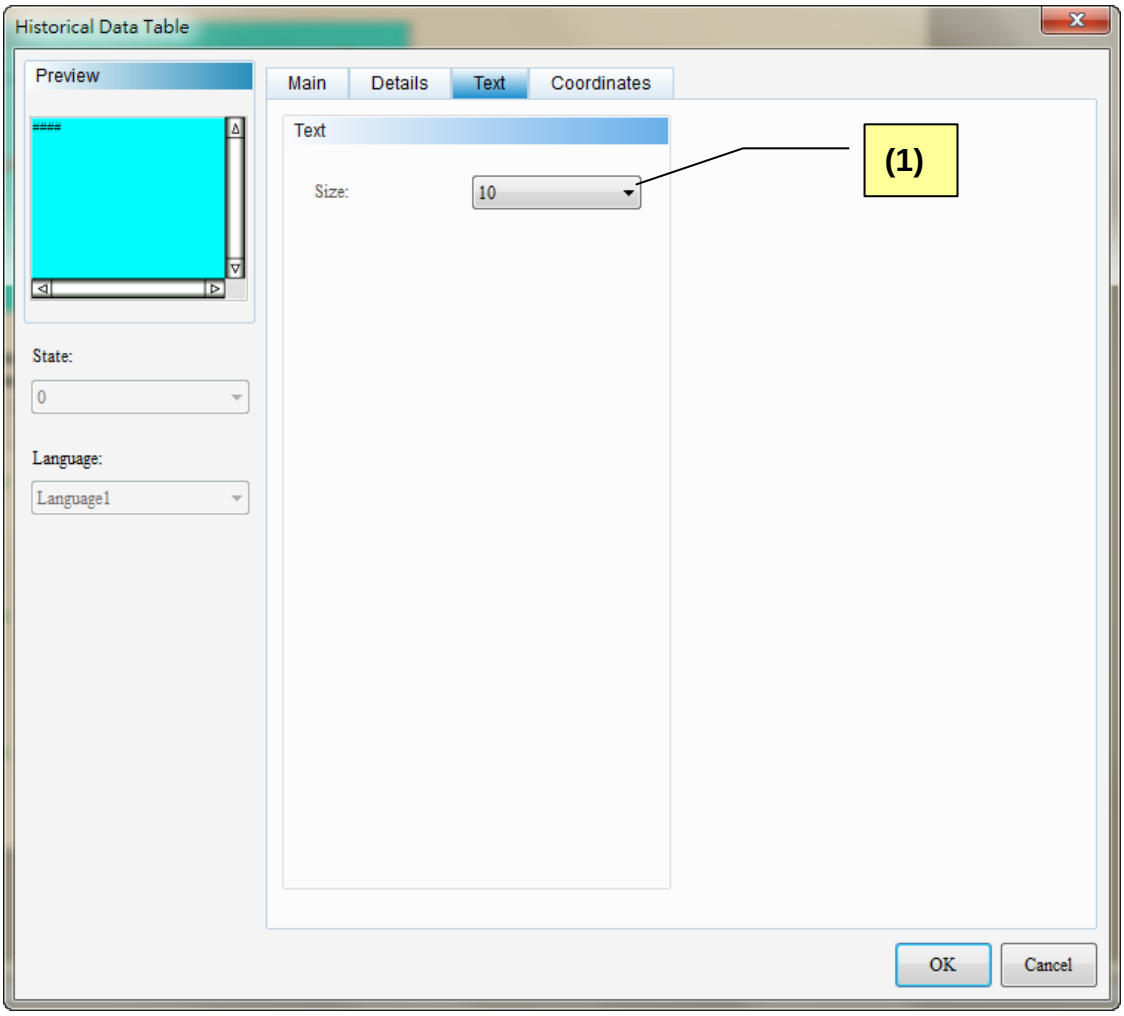
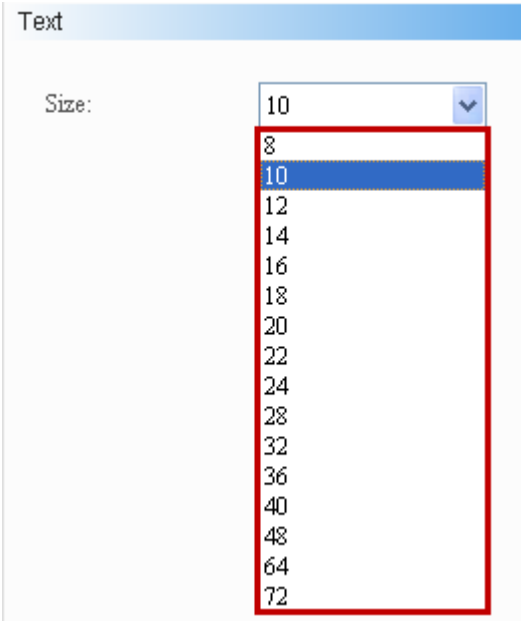


Figure 15-3-4 Historical Data Table Text properties page

No.	Property	Function
(1)	Text	➢ Set the text size of the value data to be displayed. 

◆ Coordinates

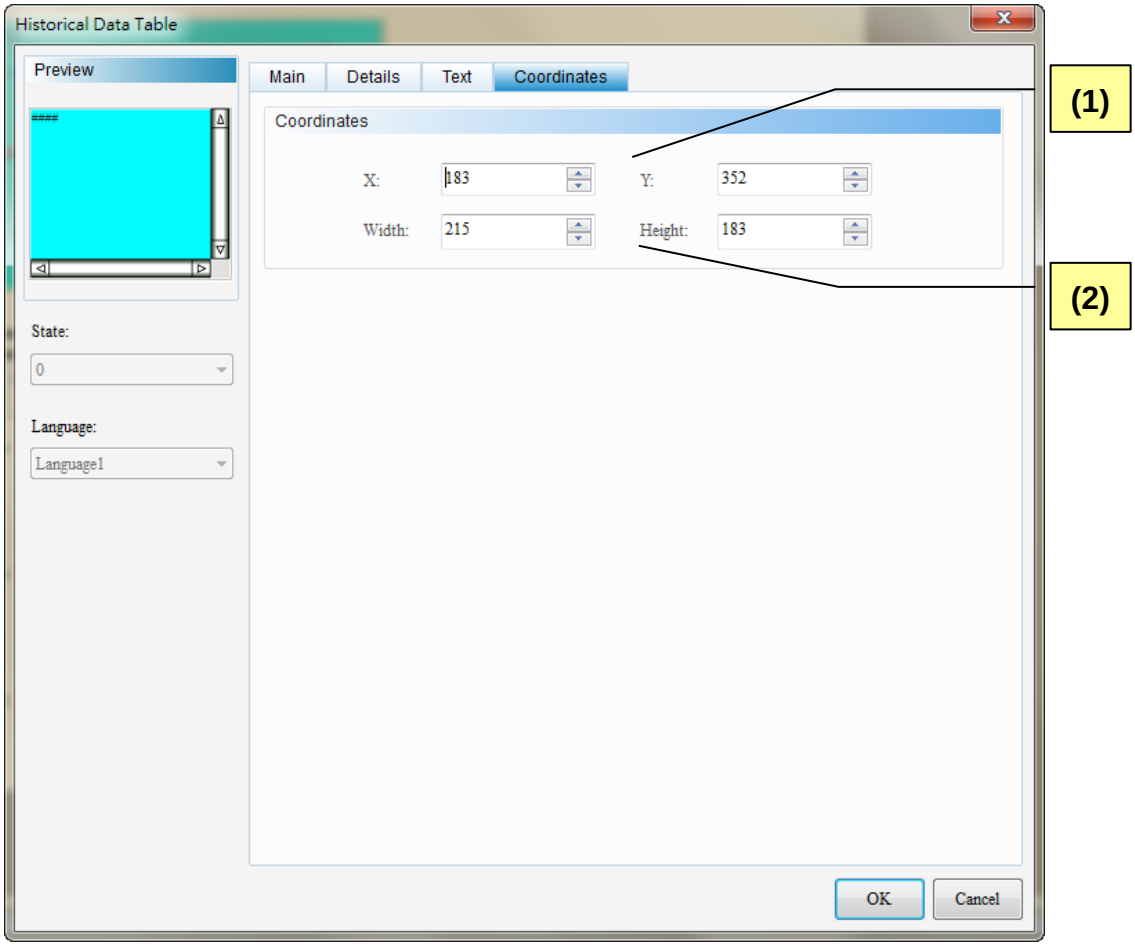


Figure 15-3-5 Historical Data Table Coordinates properties page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements
(2)	Width and Height	➢ Sets element width and height.

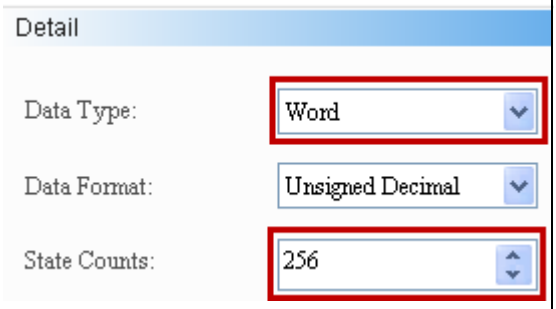
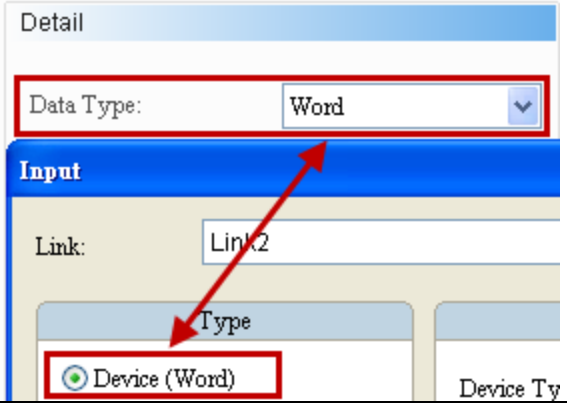
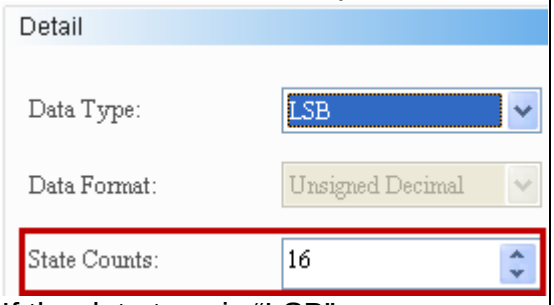
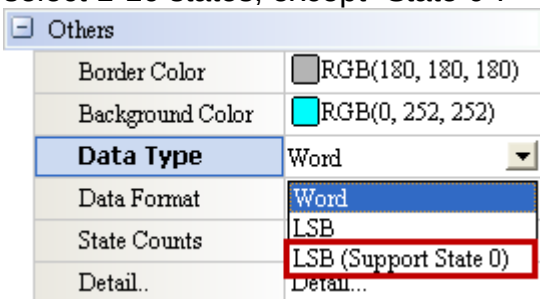
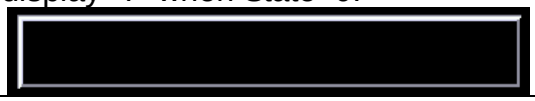
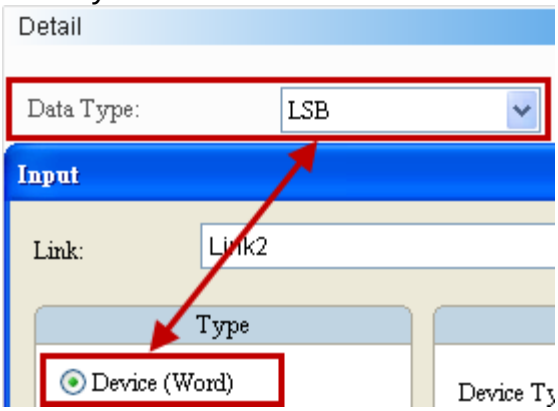
15-4 Historical Event Table

	Historical Event Table

The Historical Event Table supports three data types. Refer to Table 15-4-2 for more information. The user only needs to increase or reduce the state count value on the property page to add or delete the status counts.

Historical Event Table

Table 15-4-2 Data Type of the Historical Event Table

Data Type	State Counts	Memory Address
Word	If data type is “Word”, users can select 1-256 states.  	If data type is “Word”, “Word” is the data type of memory address. 
LSB / LSB (Support State 0)	If the data type is “LSB”, the data in the register are first converted into binary data. Next, the present object state is determined according to the element with the lowest non-zero bit. If the data type is “LSB”, users can select 1-16 states, except “State 0”.  If the data type is “LSB”, users can select 1-16 states, except “State 0”.  If users select “LSB”, the element will display “?” when State=0. 	If the data type is “LSB” or LSB (Support State 0), “Word” is the data type of memory address. 
	The examples in the following table show how state value is determined with the lowest non-zero bit after converting from a decimal value into a binary value. There are also examples demonstrating how the DOPSoft determines the state Numeric Displayed with the lowest bit when the decimal values are 3 and 7.	

Decimal	Binary	State Value

Historical Event Table

Table 15-4-2 Data Type of the Historical Event Table

	0	**0000000000000000**	**State=0 when all bits are "0"** **[LSB (Support State 0) must be selected]**
	1	0000000000000001	The lowest non-zero bit is bit 0, State=1.
	2	0000000000000010	The lowest non-zero bit is bit 1, State=2.
	3	**0000000000000011**	**The lowest non-zero bit is bit 0, State=1.**
	4	0000000000000100	The lowest non-zero bit is bit 2, State=3.
	7	**0000000000000111**	**The lowest non-zero bit is bit 0, State=1.**
	8	0000000000001000	The lowest non-zero bit is bit 3, State=4.
	16	0000000000010000	The lowest non-zero bit is bit 4, State=5.
	32	0000000000100000	The lowest non-zero bit is bit 5, State=6.
	64	0000000001000000	The lowest non-zero bit is bit 6, State=7.
	128	0000000010000000	The lowest non-zero bit is bit 7, State=8.
	256	0000000100000000	The lowest non-zero bit is bit 8, State=9.
	512	0000001000000000	The lowest non-zero bit is bit 9, State=10.
	1024	0000010000000000	The lowest non-zero bit is bit 10, State=11.
	2048	0000100000000000	The lowest non-zero bit is bit 11, State=12.
	4096	0001000000000000	The lowest non-zero bit is bit 12, State=13.
	8192	0010000000000000	The lowest non-zero bit is bit 13, State=14.
	16384	0100000000000000	The lowest non-zero bit is bit 14, State=15.
	32768	1000000000000000	The lowest non-zero bit is bit 15, State=16.

Double click the Historical Event Table icon and the following property setting screen appears

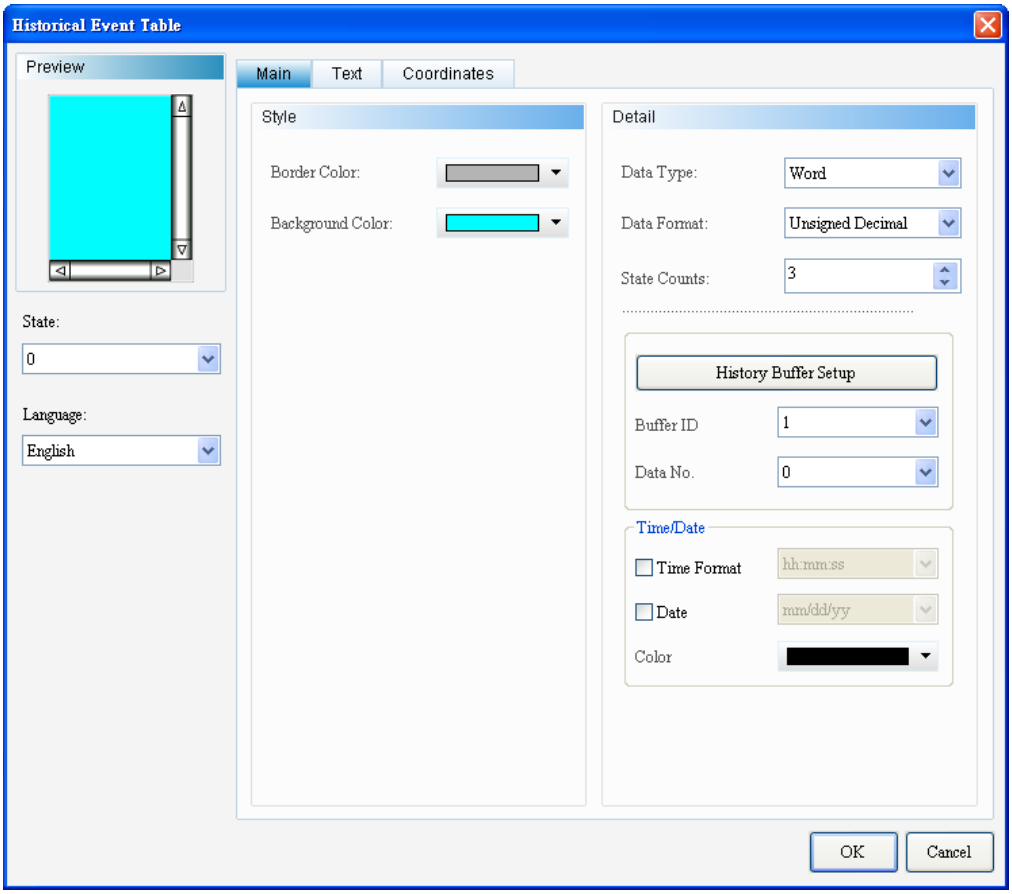


Figure 15-4-1 Historical Event Table properties setting screen

Historical Event Table	
Function Page	**Description**
Preview	The State and Language are available to the Historical Event Table.
Main	Sets the Border color, Background Color. Sets the Data type, Data format, State counts, Buffer ID, Data No.. Sets the Time/Date display.
Text	Sets the content/font/size/color/format/zoom/alignment of the text to be displayed.
Coordinates	Sets the X-Y coordinate, width and height of the component.

Table 15-4-3 Historical Event Table function page

◆ General

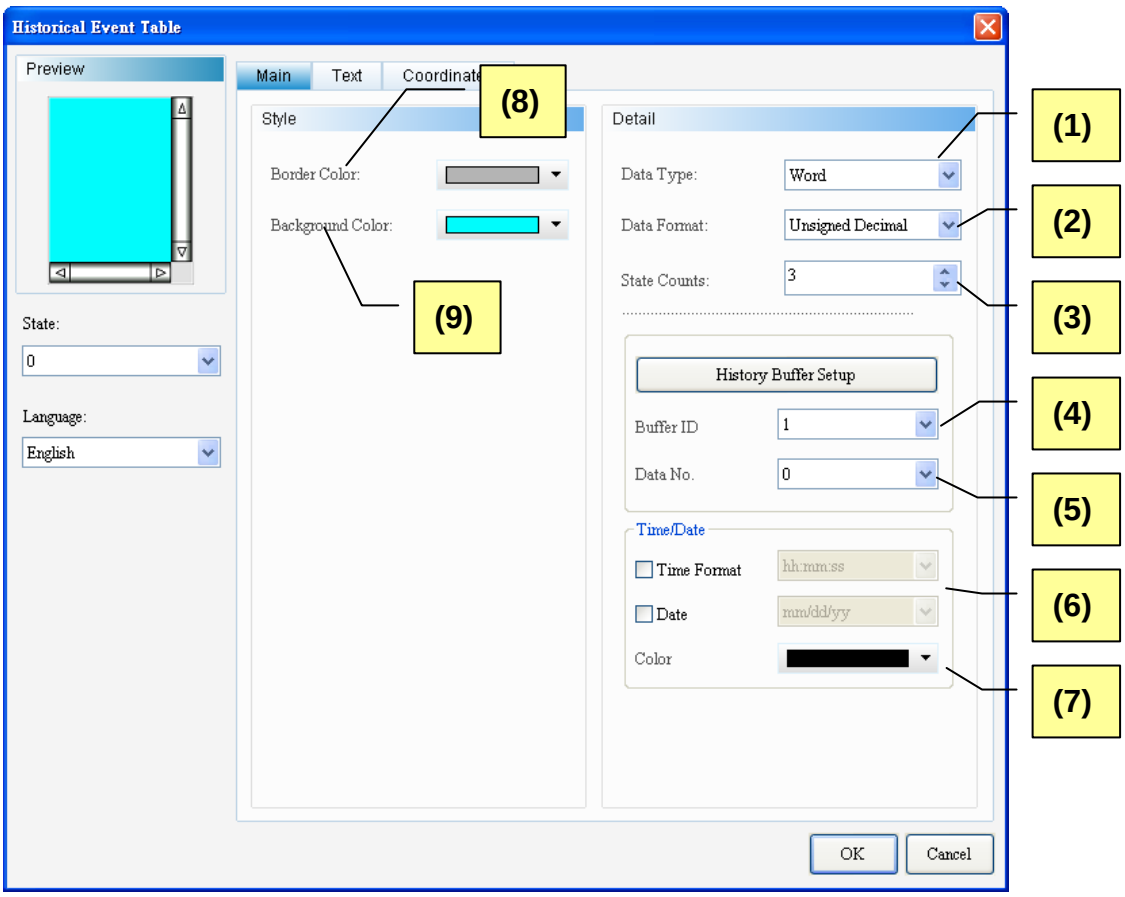
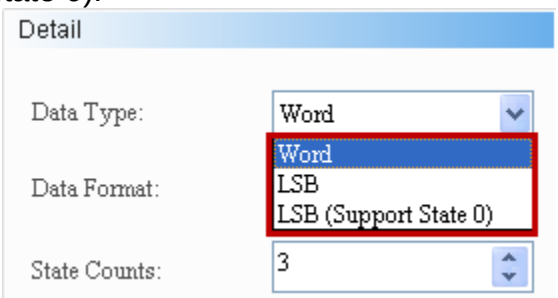
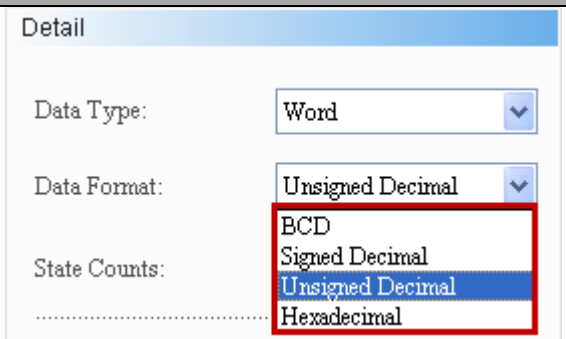
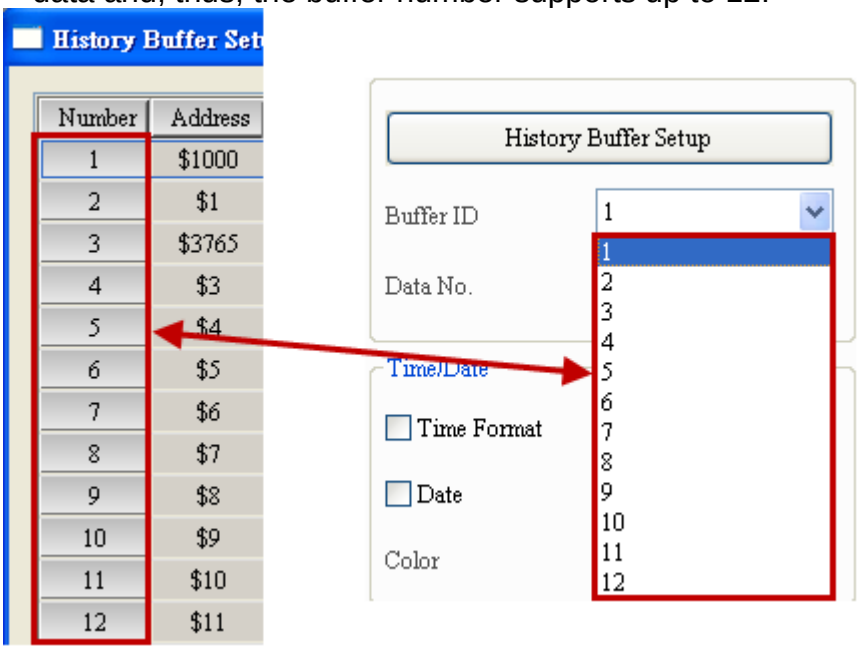
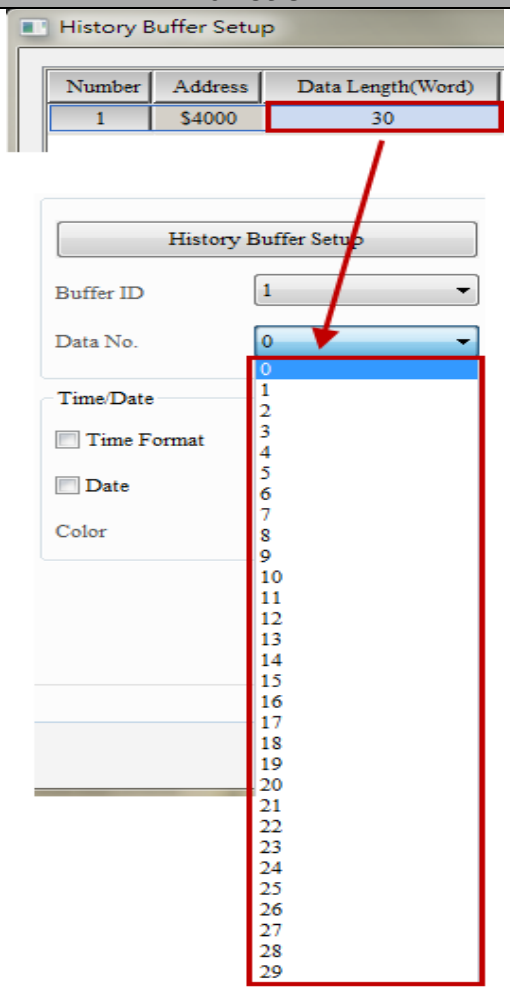
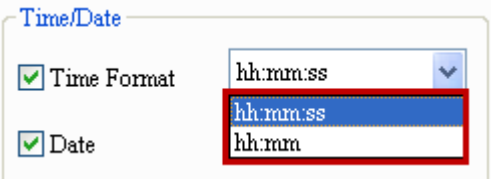
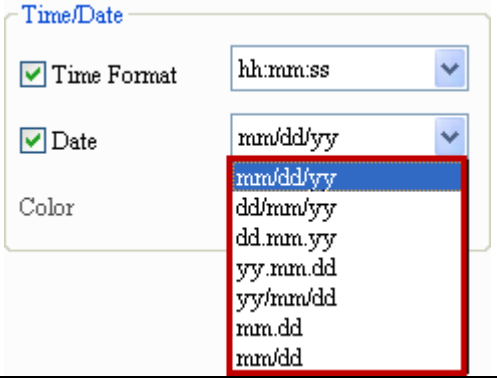
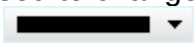
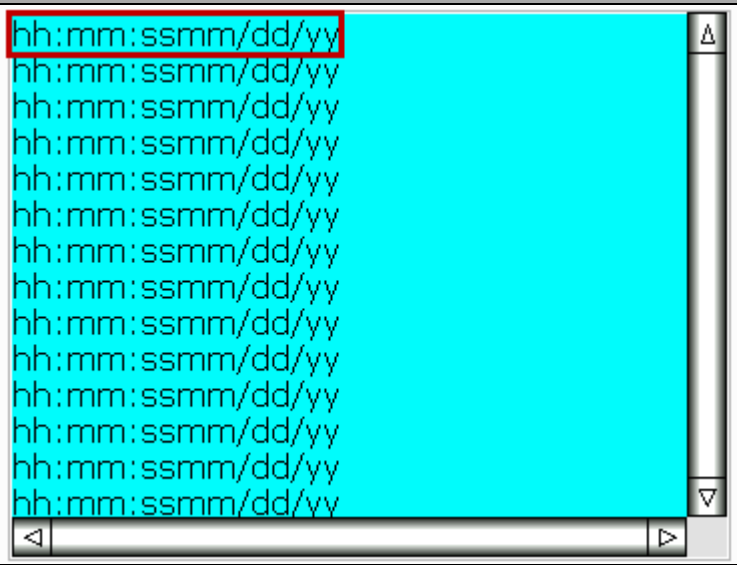
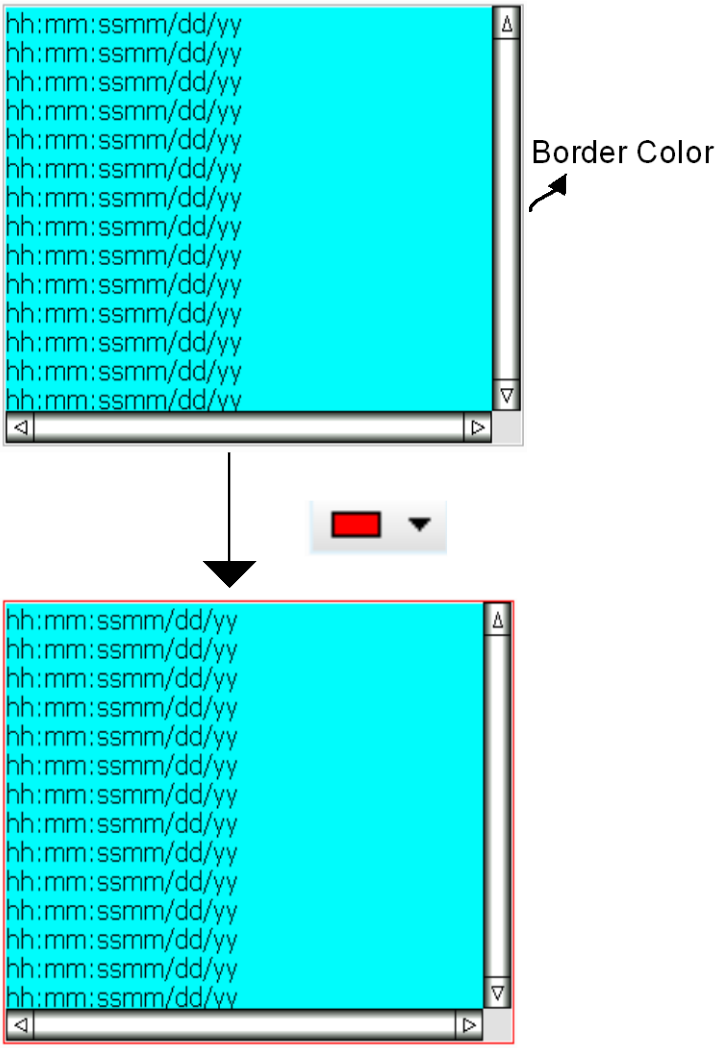


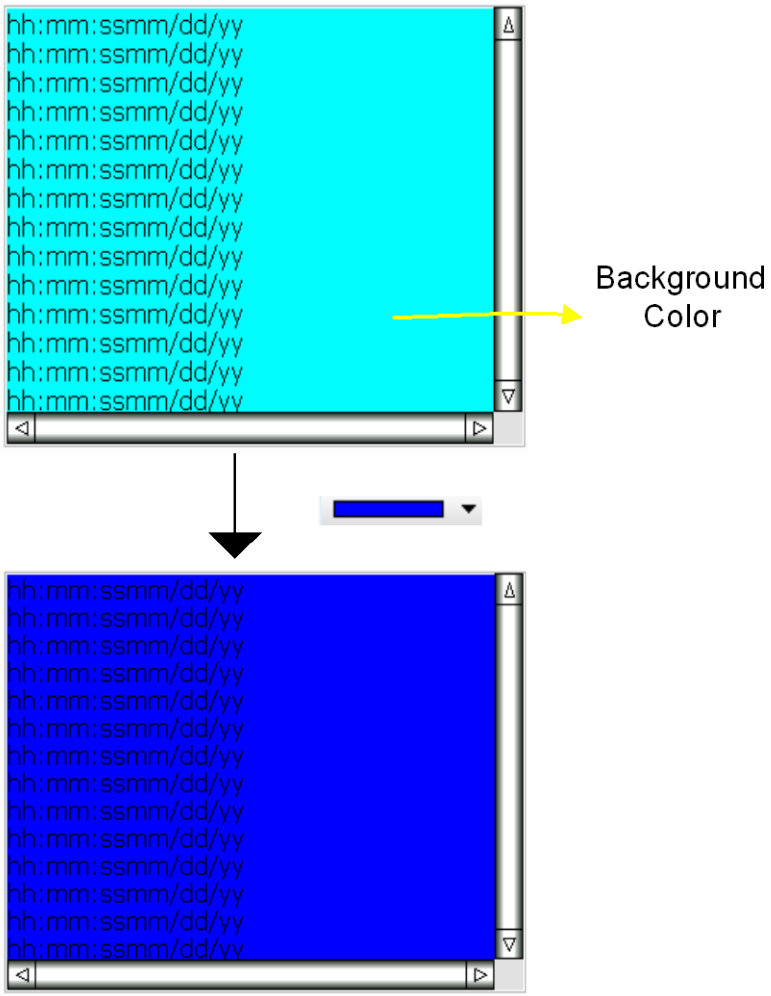
Figure 15-4-2 Historical Event Table Main properties page

No.	Property	Function
(1)	Data Type	➢ The Data Type supports three formats: Word, LSB and LSB (Support State 0). 
(2)	Data Format	➢ The Data Format can be selected only when the data type is Word. ➢ The Data Format supports BCD, Signed Decimal, Unsigned Decimal, and Hexadecimal formats.

No.	Property	Function
		
(3)	State Counts	➢ Set the state counts for the Historical Event Table. The state counts can be set between 1 and 256 with Word as the data type, 16 states can be set with LSB as the data type, and 17 states can be set with LSB Support State 0 as the data type. Refer to 15-4-2 for more information.
(4)	Buffer Number	➢ The buffer number corresponds to the data number in the History Data Buffer. The History Setup function can add up to 12 history data and, thus, the buffer number supports up to 12. 
(5)	Data No.	➢ The data location indicates the length of the data type to be read from the History Data Buffer. The Data No. is 0 when the data length is 1; the Data No. is 0 or 1 when the data length is 2. When 30 Words are read, the Data No. is 0~29.

No.	Property	Function
		
(6)	Time Format	➢ The following two time formats are supported:  ➢ The following seven date formats are supported: 
	Date Format	
(7)	Show Color	➢ The Show Color option is used to change the display color of the time and date. The color is  by default.

No.	Property	Function
		
(8)	Border Color	➢ The user can set the border color for the Historical Event Table. 
(9)	Background Color	➢ The user can set the Background Color for the Historical Event Table.

No.	Property	Function
		

◆ Text

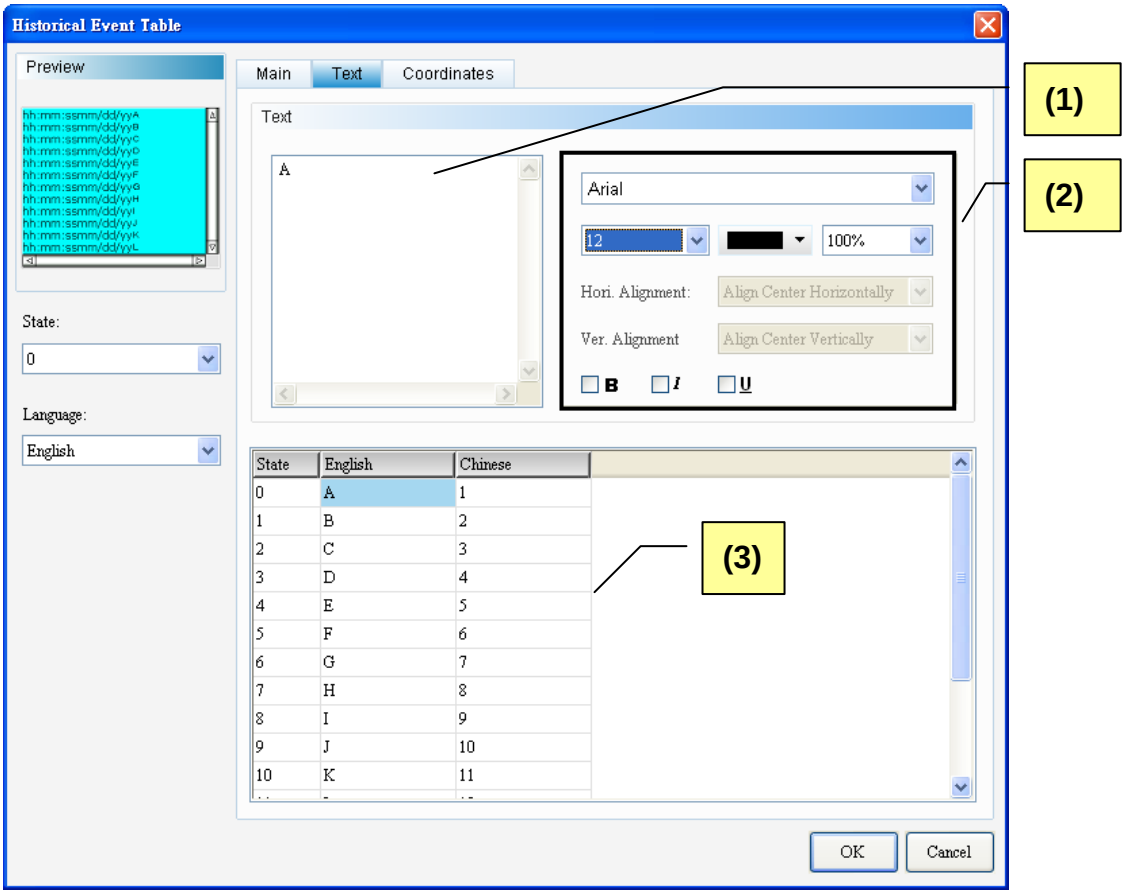
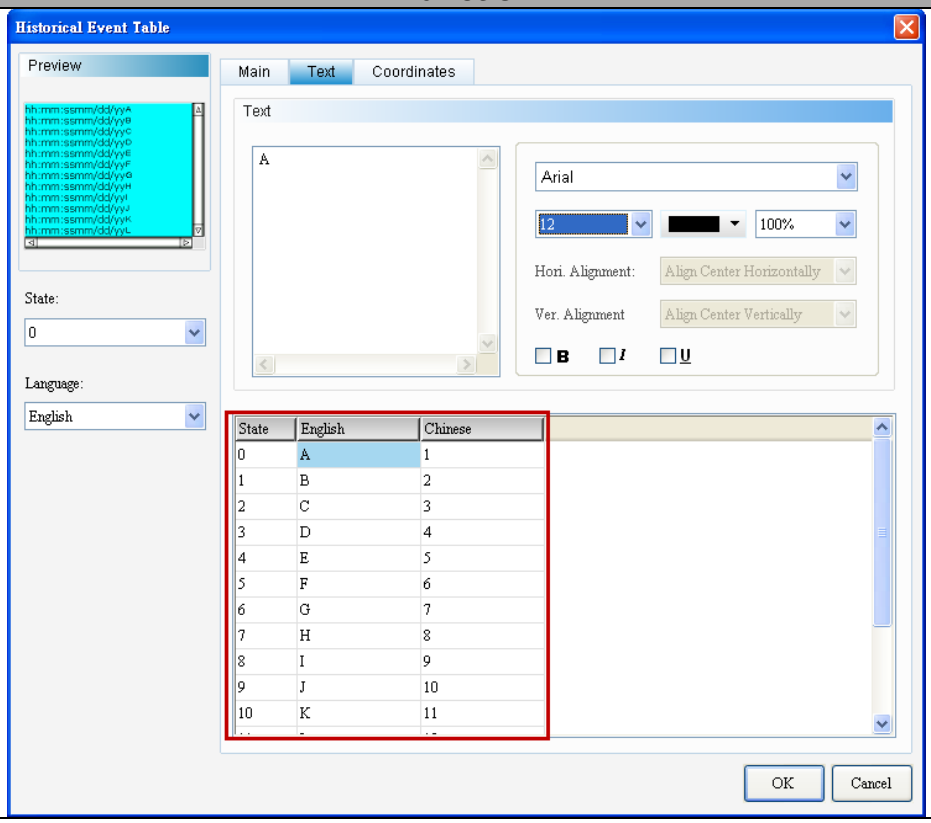


Figure 15-4-3 Historical Event Table Text properties page

No.	Property	Function
(1)	Text	➢ Users can input the text to be displayed in the text box.

No.	Property	Function
		
(2)	Text Properties	➢ Sets text properties, including font type, font size, font color, scaling, text alignment, and bold/italic/underline of font. Please refer to the above figure for details about the results of text properties.
(3)	Multilingual Text Data	➢ Users can add multilingual text data from the Multi-Language Text Page. As shown in the Text Properties Figure, users can input English text in the English field.

◆ Coordinates

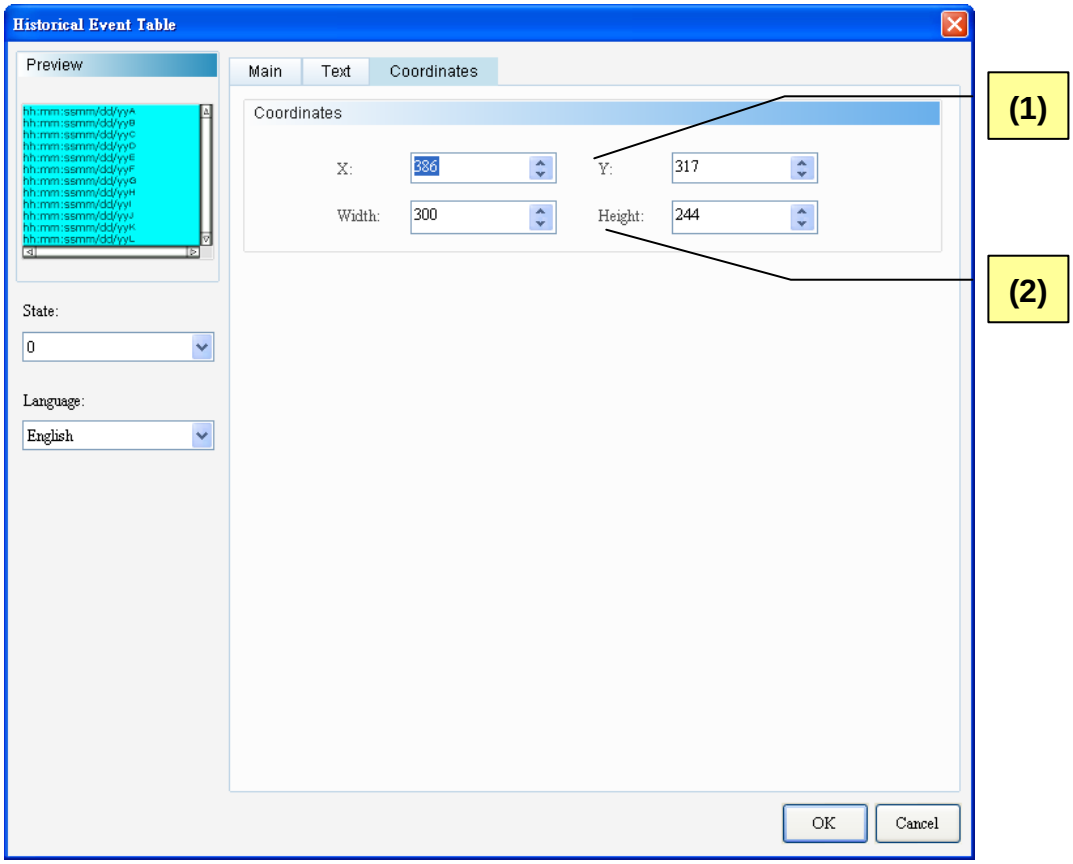


Figure 15-4-4 Historical Event Table Coordinates properties page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

15-5 Historical Overview Table

	Historical Overview Table

Historical overview table is used to view the saved historical trend graph. The left side of the screen is for viewing the file and the trend graph is on the right. Users can select the data of Historical trend graph saved in the external storage device, USB Disk or SD Card via the file preview area. One Historical overview table can show 30 curves and access 30 Words at most, just like the Historical trend graph.

The following property setting screen will pop up when you double click on the Historical overview table.

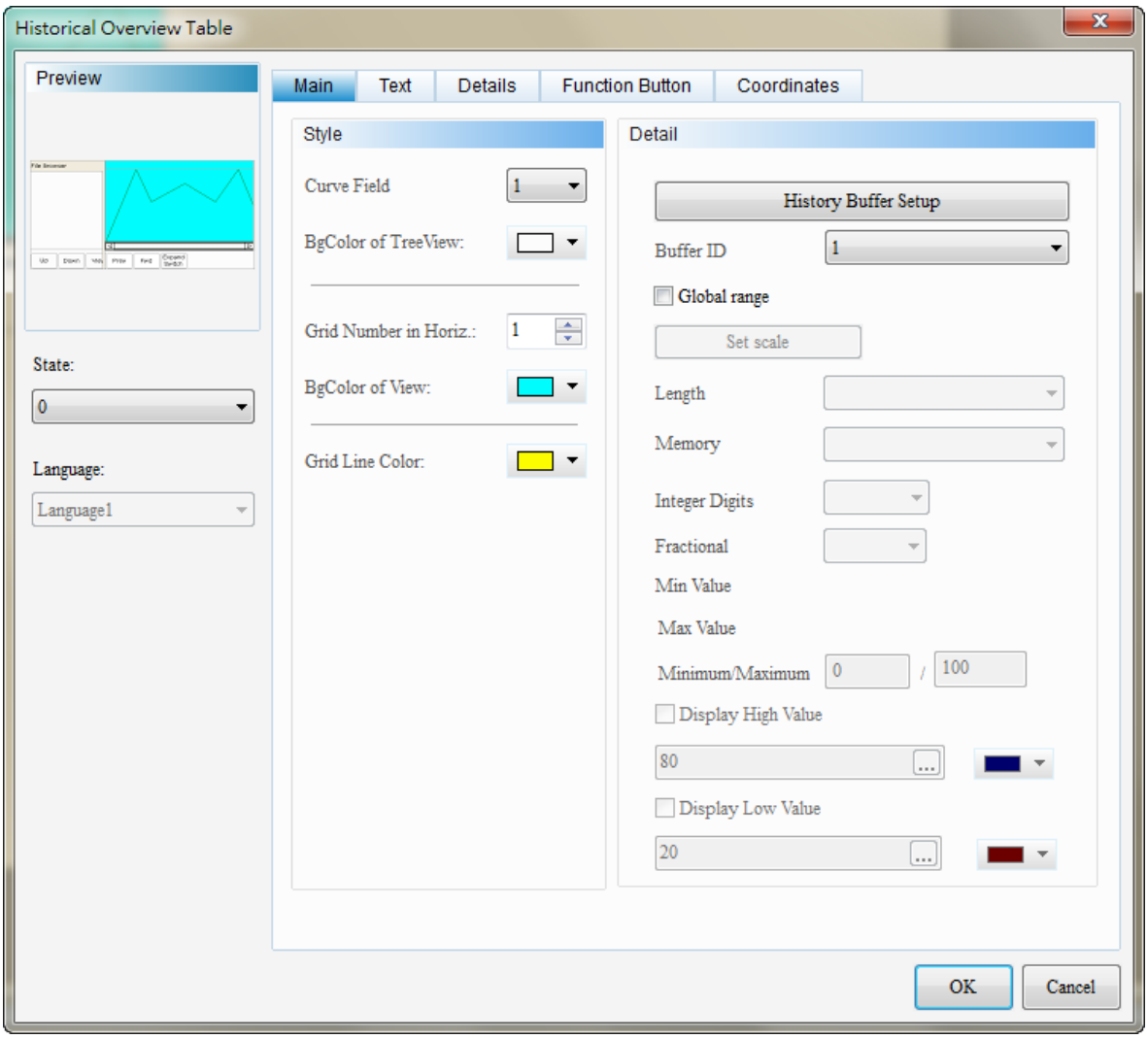


Figure 15-5-1 Property of Historical Overview Table

Historical Overview Table		
Function Page	**Descriptions**	
Preview	The Historical overview table allows users to view the information of multi-state and in multi-language.	
Main	**Buffer ID**	It sets the Buffer ID
	Global range	It sets the scale, Length, data format, Integer digits, fractional, min. value/max. value, display high value, display low value, color for the displayed high value and color for the displayed low value.
	Scale setting	It sets the displayed scale, display mark, text size, text color, scale color, main scale number and sub-scale number.
	Style	It sets the curve field, background color of the view, grid number in horizontal direction, background color of view and grid line color
Text	It sets the displayed text / font / size / color / format / scaling / alignment type.	
Details	**Local range**	It sets length, start position, format, integer digits, fractional, line width, line color, minimum and maximum value.
	Display of time/date	It sets the displayed time/date, labels, time format, date and color.
Function Button	**Function button**	It sets the file browser function buttons and trend graph function buttons.
	Button style	It sets the width and height of the button.
Coordinates	It sets the X-Y coordinate, width, and height of elements.	

Table 15-5-1 Function Page of Historical Overview Table

◆ Main

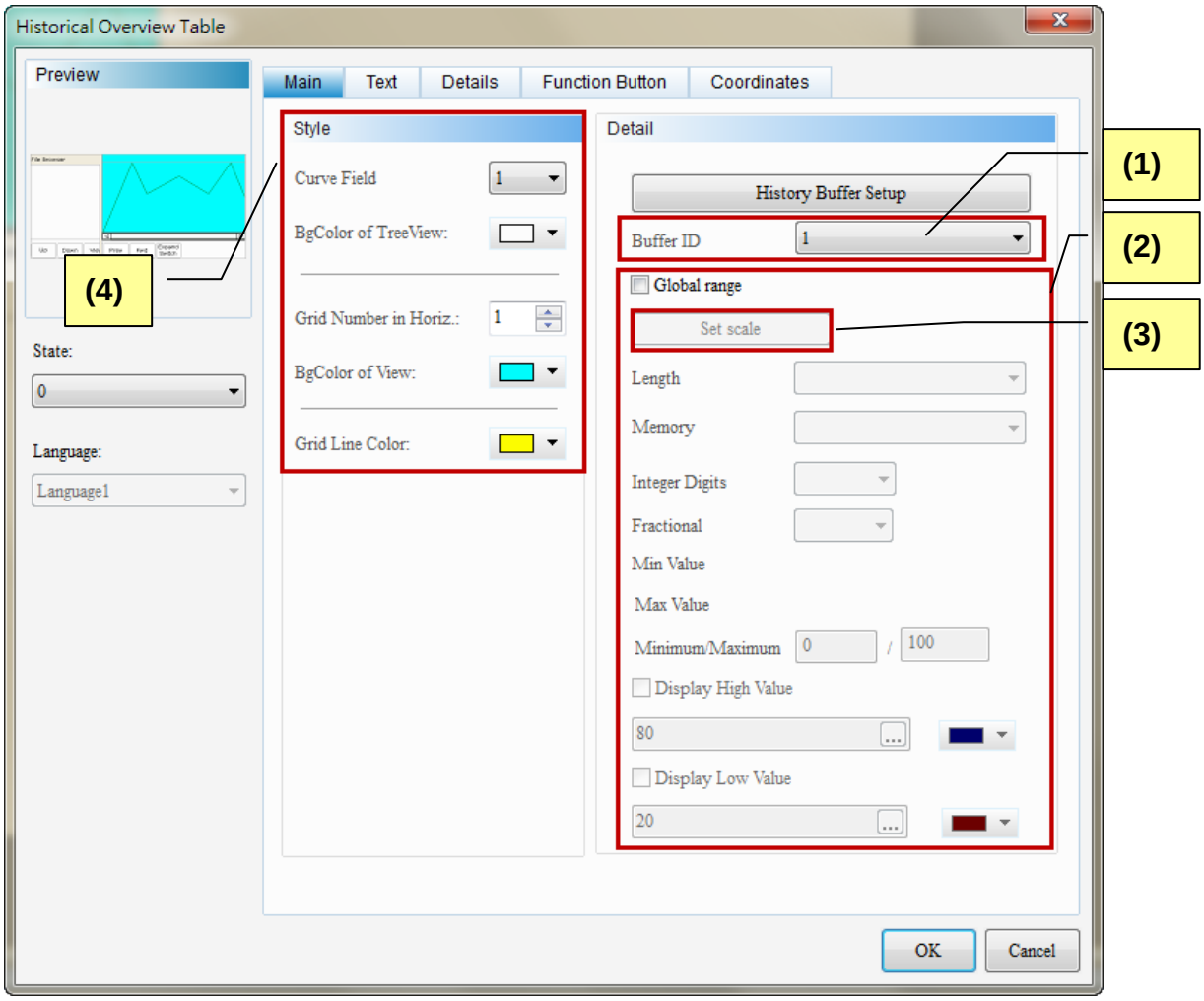
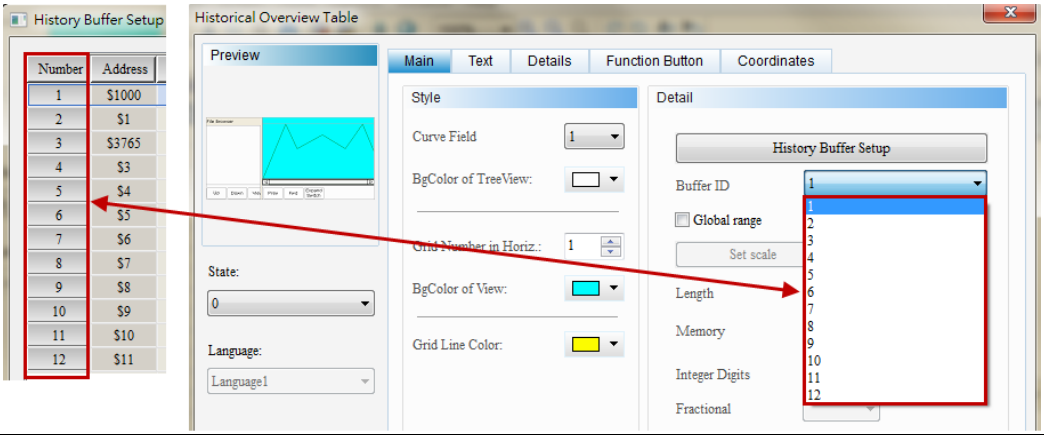
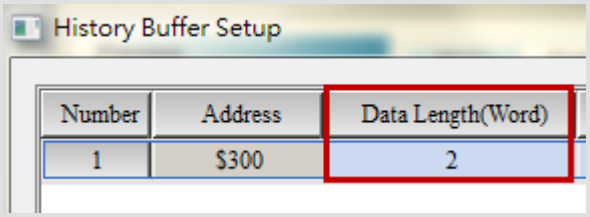
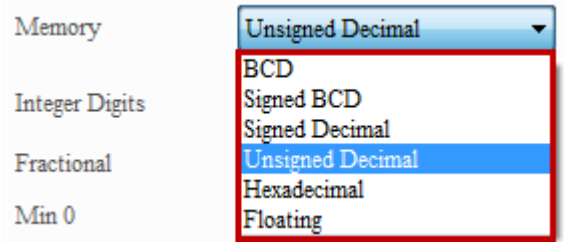
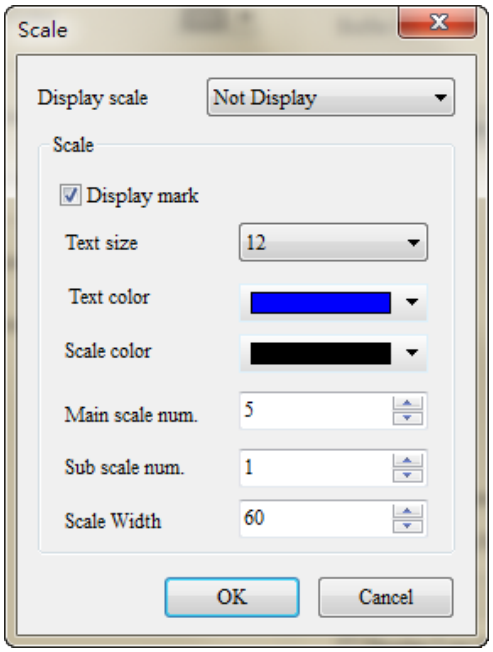
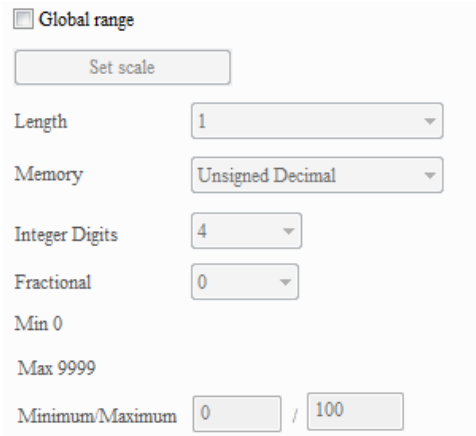
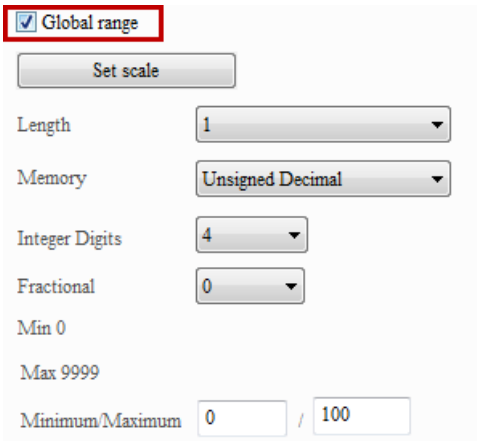
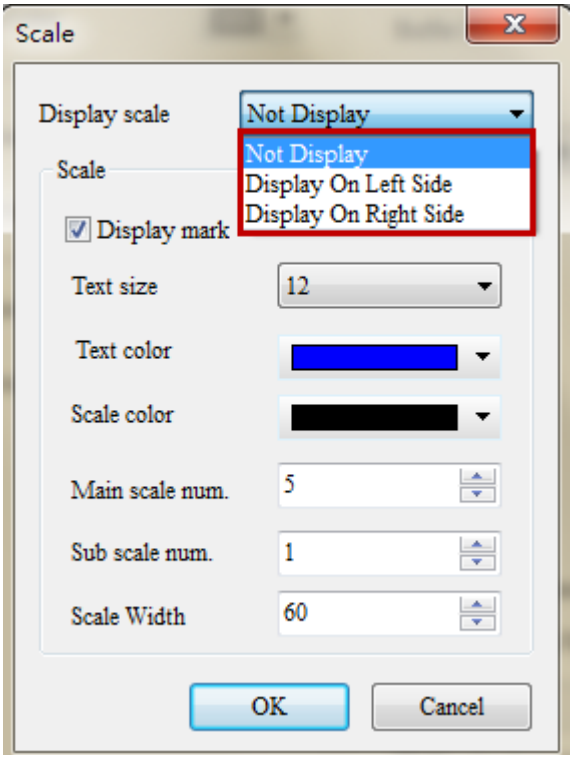


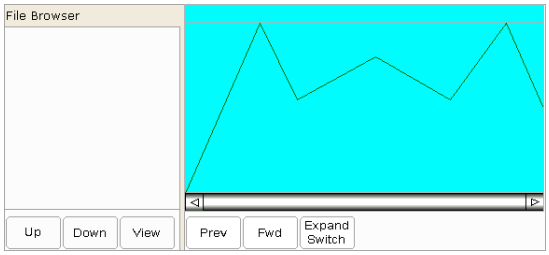
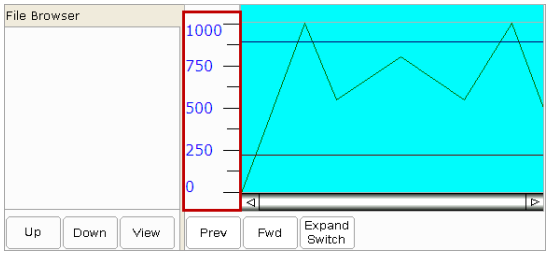
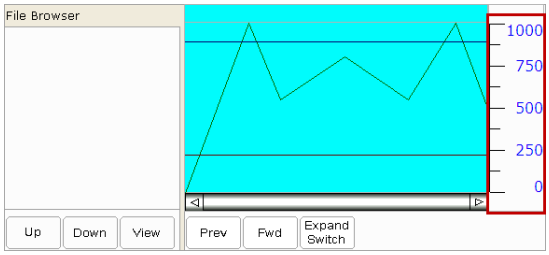
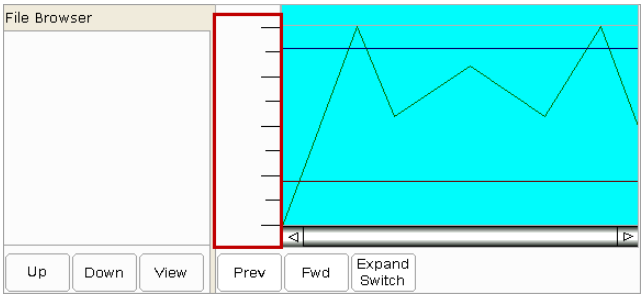
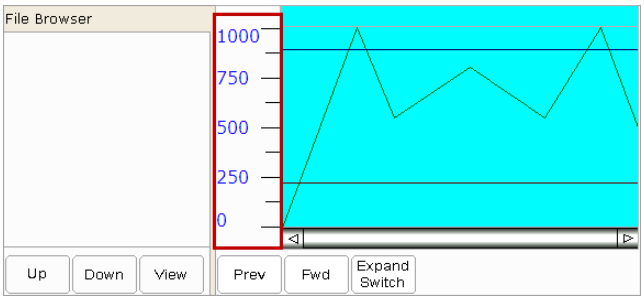
Figure 15-5-2 Main page of historical overview table

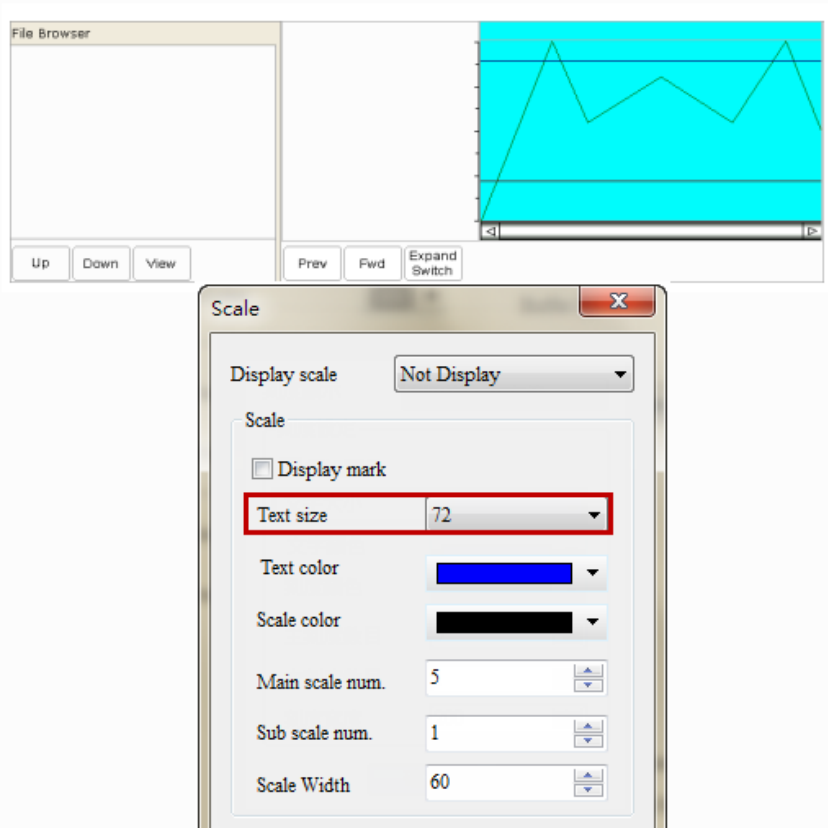
No.	Property	Function	
(1)	Buffer ID	➢ Buffer ID is the data ID that corresponds to history buffer setup. Users can enter 12 history data at most in history buffer setup. 	
(2)	Global Range	Data Length	➢ Users can set 1 or 2 as the data length. ➢ When you set it to 1, it means the accessing data length is 1 Word. 2 means the accessing data length is 2 Words.

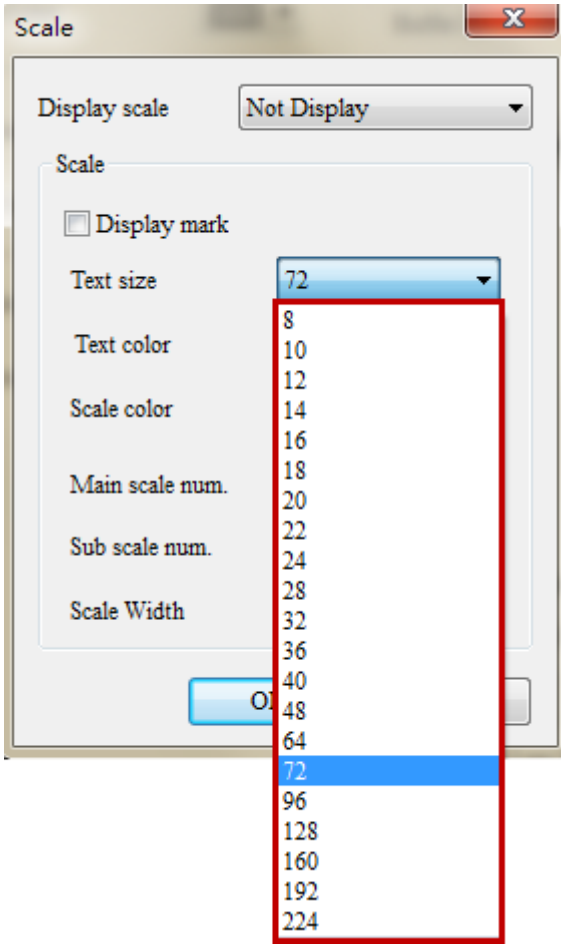
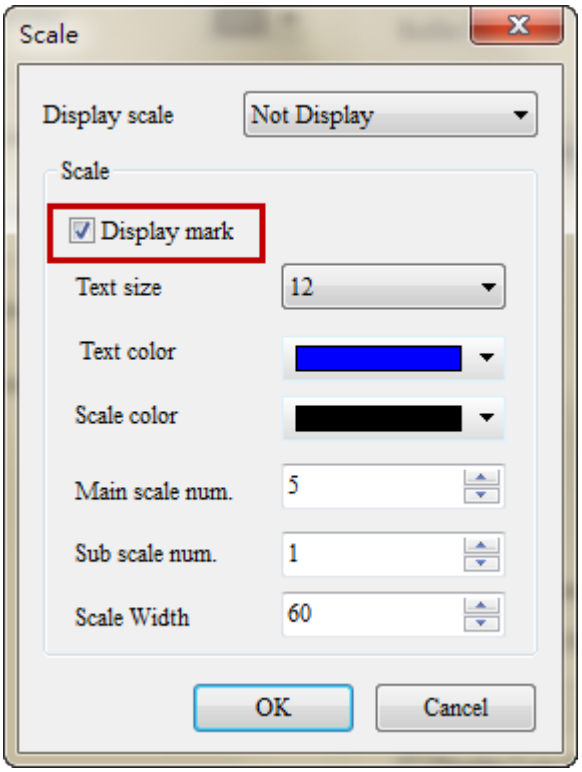
<table>
<tr><th>No.</th><th>Property</th><th colspan="2">Function</th></tr>
<tr><td></td><td></td><td></td><td>NOTE:
➢ If you select 2 as the data length, the data type should be set to 2 or above.
 
</td></tr>
<tr><td></td><td></td><td>Data format</td><td>➢ The supported memory in the Historical overview table is BCD, Signed BCD, Signed Decimal, Unsigned Decimal, Hexadecimal and Floating.
➢ Floating data format is only valid when data length is set to 2.
 
</td></tr>
<tr><td></td><td></td><td>Integer digits /Fractional</td><td>➢ Users can set the displayed number of digit of the integers and the decimals.</td></tr>
<tr><td></td><td></td><td>Min. value / Max. value</td><td>➢ When you check the setting of “Global range”, you will be unable to set the min. and max. value; To set them individually, please uncheck “Global range”.
➢ The valid setting range of the min. and max. value is according to the selected data type and data format.
<table>
<tr><th>Data Type</th><th>Data Format</th><th>Valid setting range</th></tr>
<tr><td rowspan="5">Word</td><td>□CD</td><td>0~9999</td></tr>
<tr><td>Signed BCD</td><td>-999 ~ 9999</td></tr>
<tr><td>Signed Decimal</td><td>-32768~32767</td></tr>
<tr><td>Unsigned Decimal</td><td>0~65535</td></tr>
<tr><td>Hex</td><td>0~0xFFFF</td></tr>
<tr><td rowspan="2">DWord</td><td>BCD</td><td>0~99999999</td></tr>
<tr><td>Signed BCD</td><td>-9999999 ~ 99999999</td></tr>
</table></td></tr>
</table>

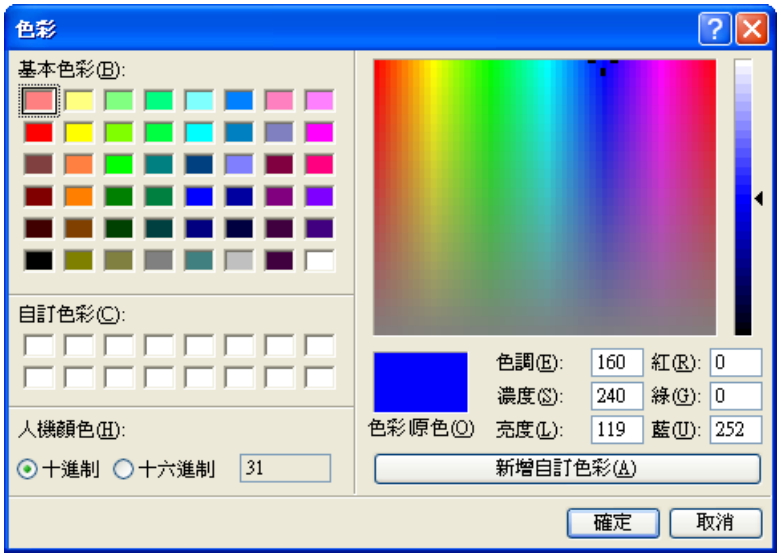
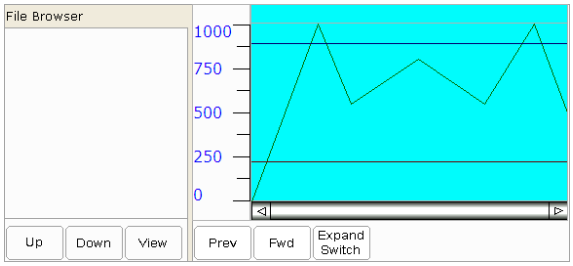
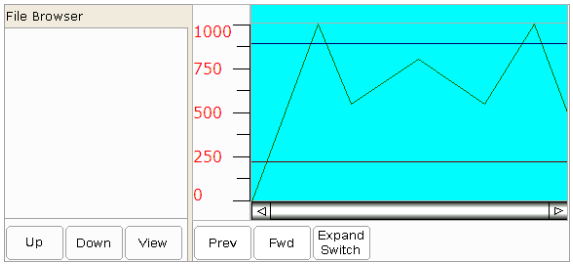
<table>
<tr><th>No.</th><th>Property</th><th colspan="3">Function</th></tr>
<tr><td rowspan="3"></td><td rowspan="3"></td><td></td><td></td><td>
<table>
<tr><td rowspan="4"></td><td>Signed Decimal</td><td>-□147483648~2147483647</td></tr>
<tr><td>Unsigned Decimal</td><td>0~4294697295</td></tr>
<tr><td>Hex</td><td>0~0xFFFFFFFF</td></tr>
<tr><td>Floating</td><td>0~9999999</td></tr>
</table>
</td></tr>
<tr><td>Display High Value</td><td></td><td>➢ Users can define the high value in the Historical overview table and set the constant or enter the address (Word) of internal memory or controller register. The color of the displayed high value can be set here, too.</td></tr>
<tr><td>Display Low Value</td><td></td><td>➢ Users can define the low value in the Historical overview table and set the constant or enter the address (Word) of internal memory or controller register. The color of the displayed low value can be set here, too.</td></tr>
<tr><td rowspan="2">(3)</td><td rowspan="2">Set Scale</td><td colspan="3"> 
</td></tr>
<tr><td colspan="3">➢ You have to check “Global range” first before you set up the scale.</td></tr>
</table>

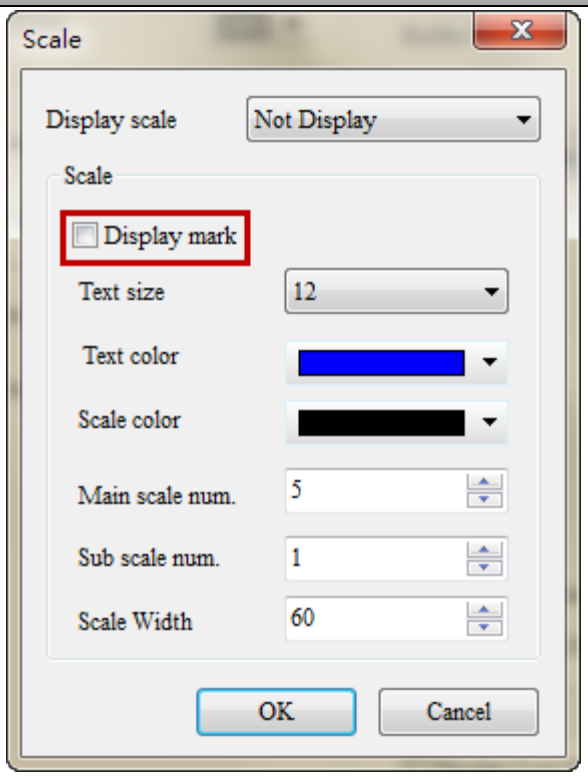
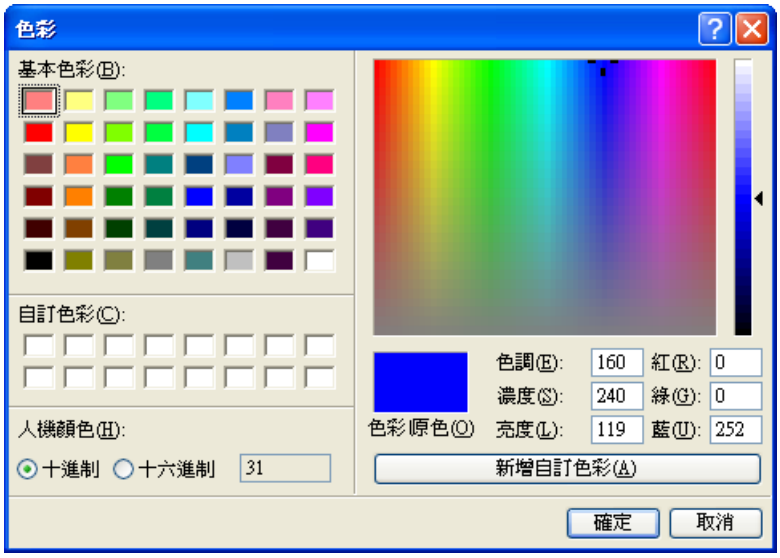
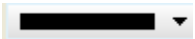
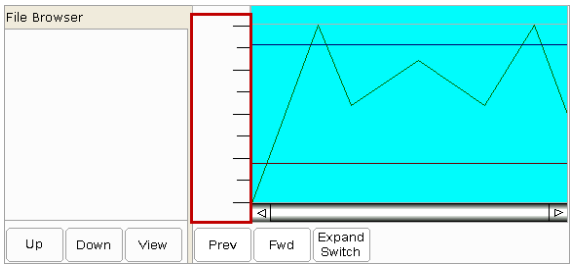
No.	Property	Function			
			Uncheck		
			Check		
		Display Scale	 ➢ Users can choose not to display the scale or to display the scale on the left or right side.		

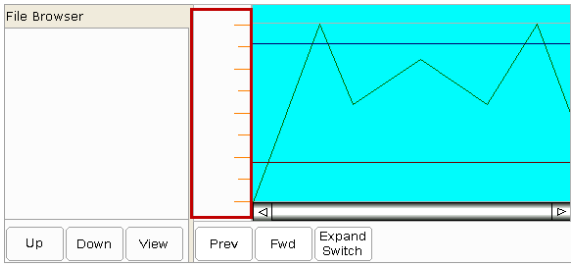
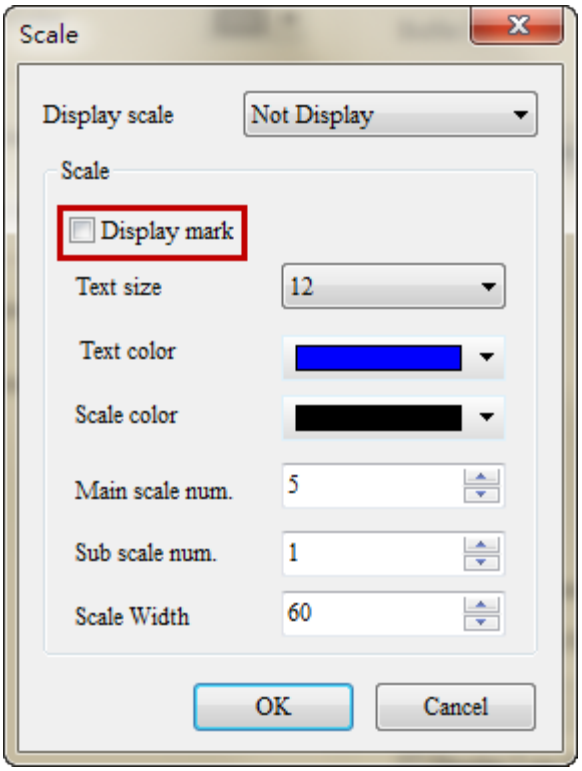
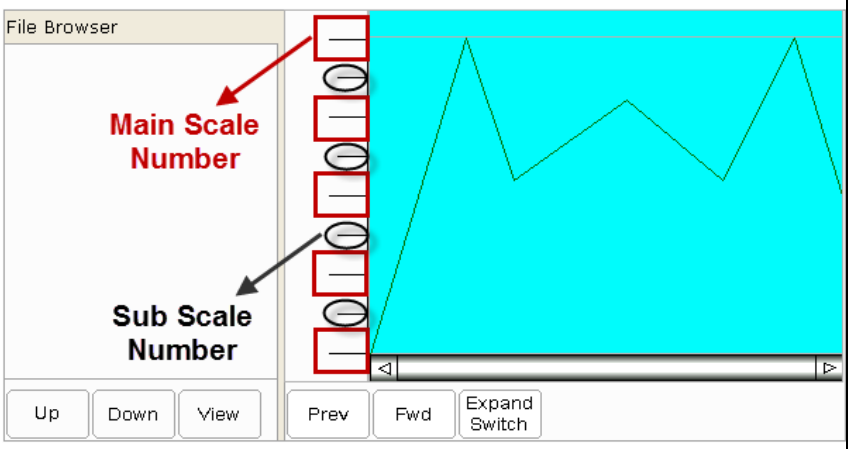
No.	Property	Function		
			Not Display	
			Display on left side	
			Display on right side	
		Display Mark	➢ Check “Display mark” to show the number on the scale.	
			Uncheck	
			Check	
		Text Size	➢ When you uncheck the setting of “Display mark”, it will not show any text on the scale. But it will reserve the width of the text size. For instance, when you set the text size to 72, it will reserve a wider width but no text	

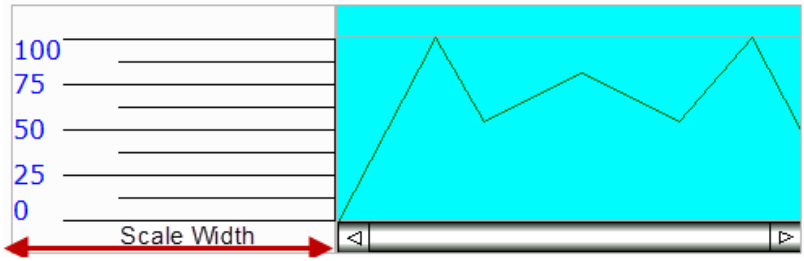
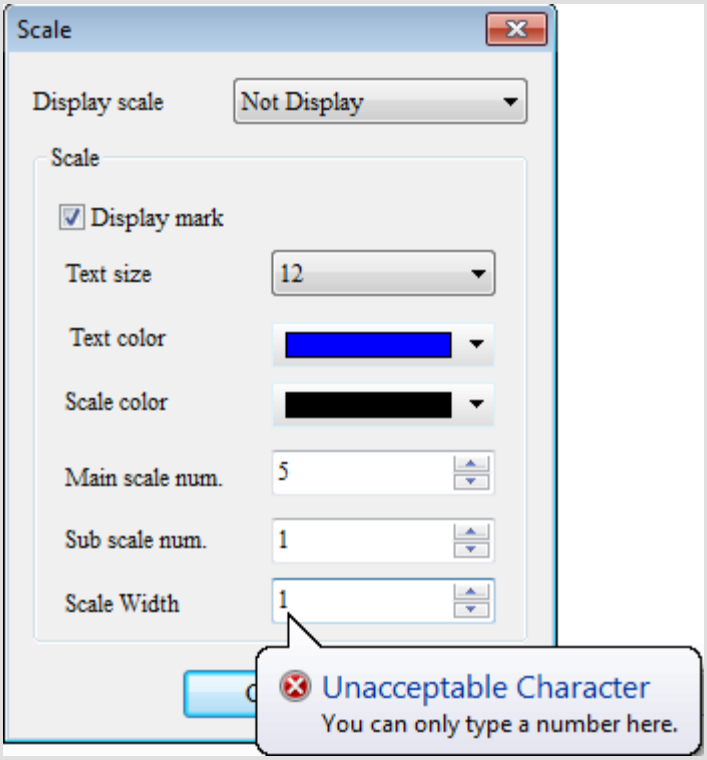
No.	Property	Function	
			will be shown.  ➢ Text size is for the number size showed on the scale, which ranges from 8 to 224.

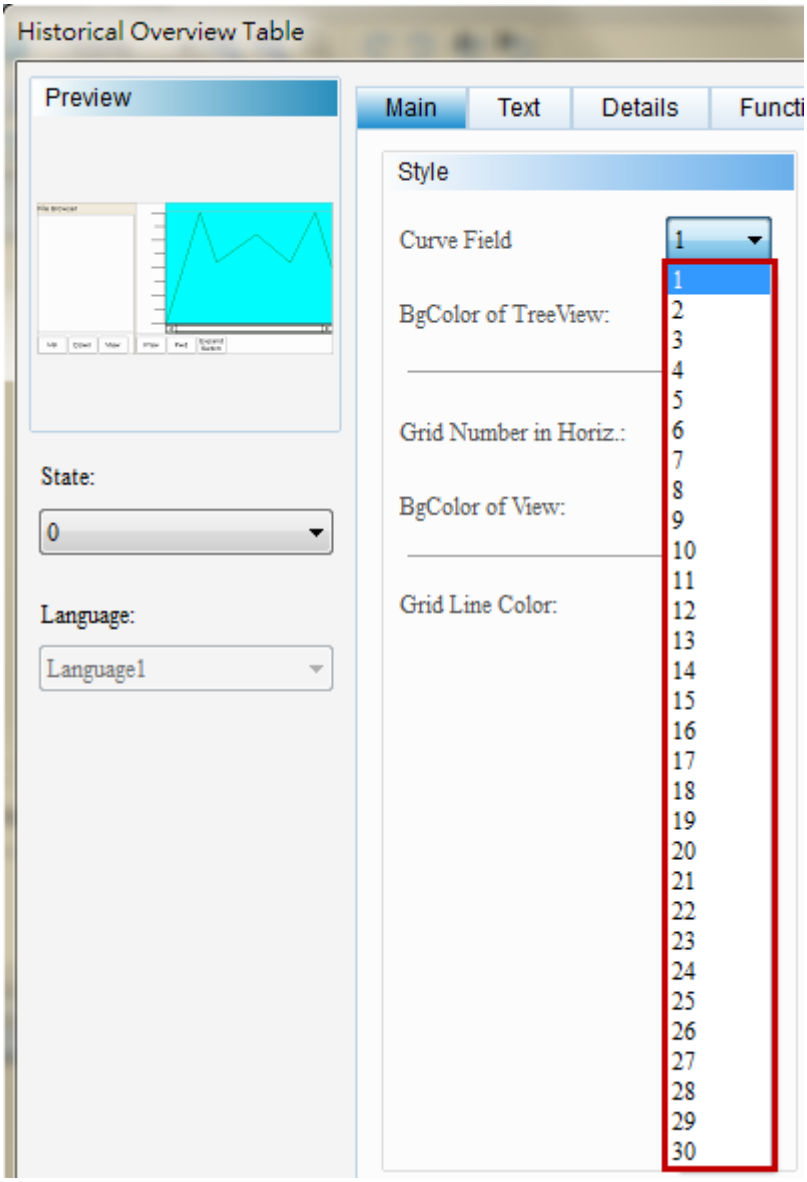
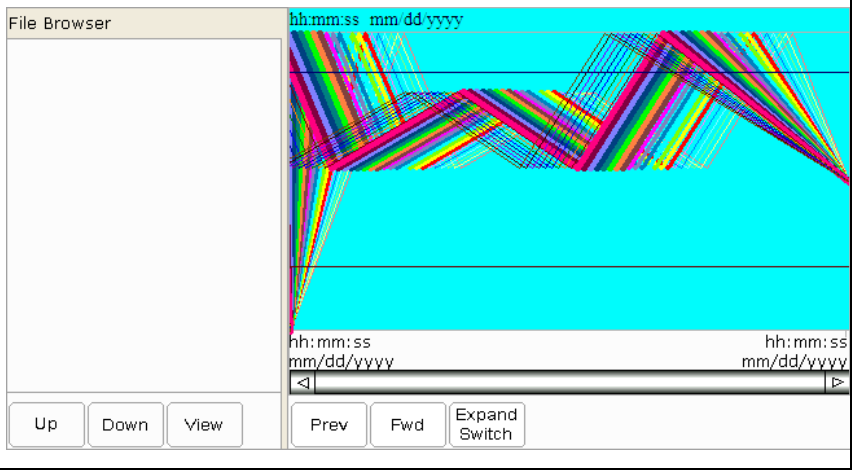
No.	Property	Function	
			
		Text Color	➢ Please check “Display mark” before setting the text color.  ➢ Users can select the displayed text color.

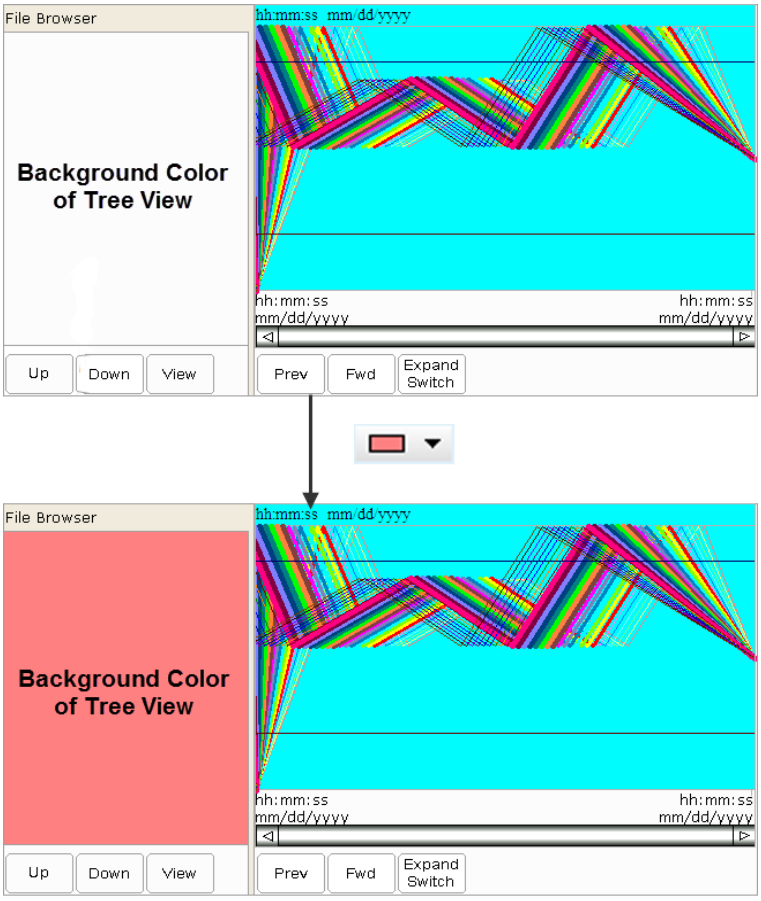
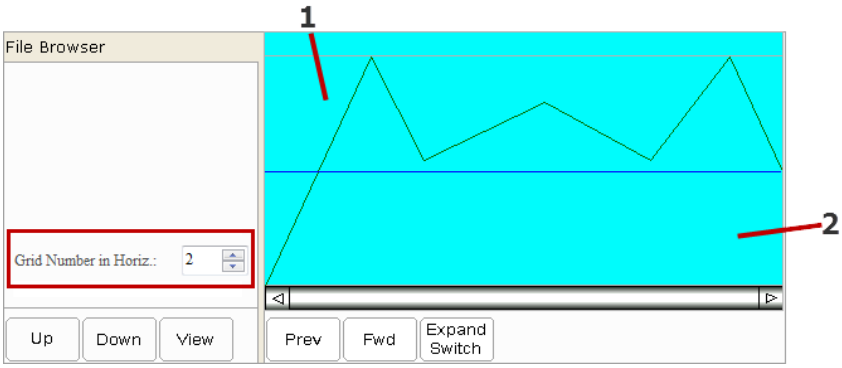
No.	Property	Function	
			 Before  After 
		Scale color	➢ Scale color can be set without checking “Display mark”.

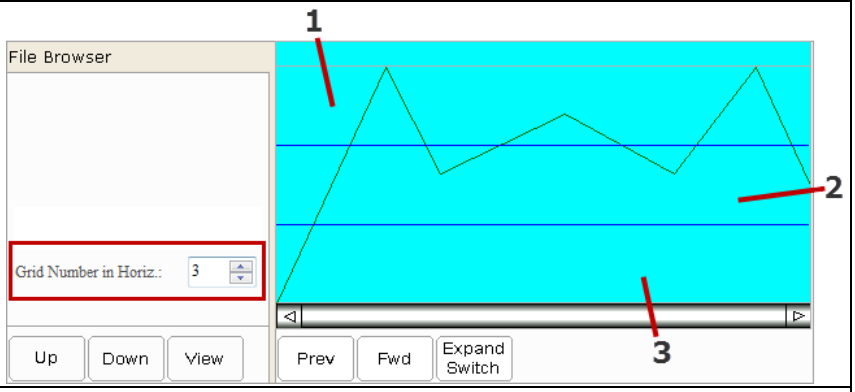
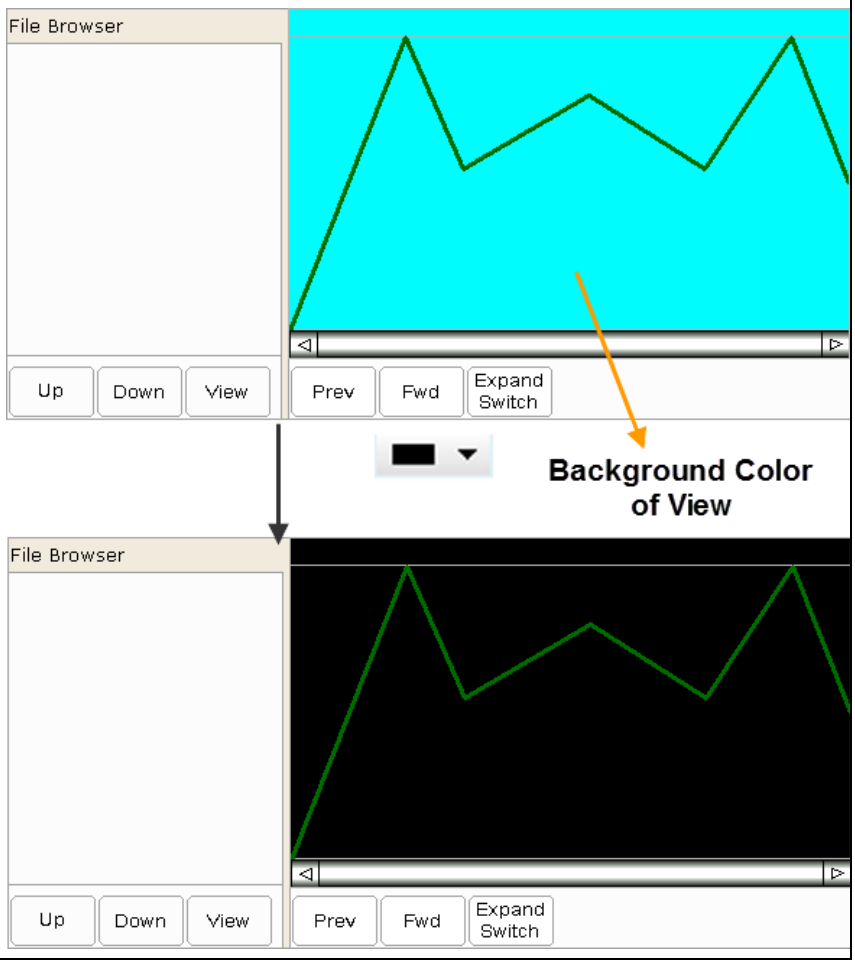
No.	Property	Function
		 ➢ Users can set the displayed scale color.  Before  

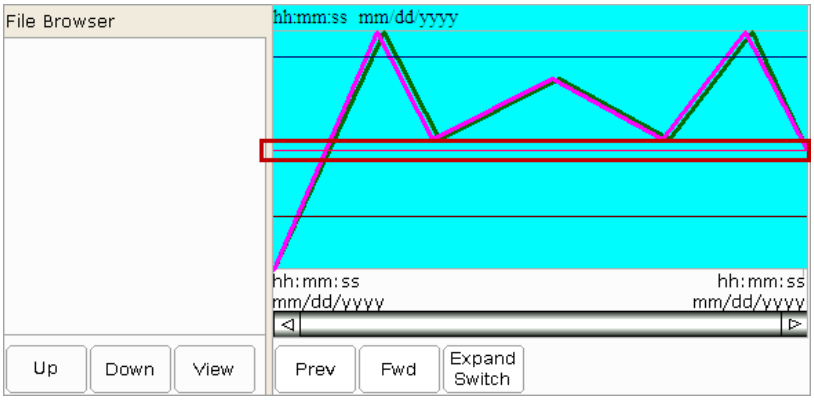
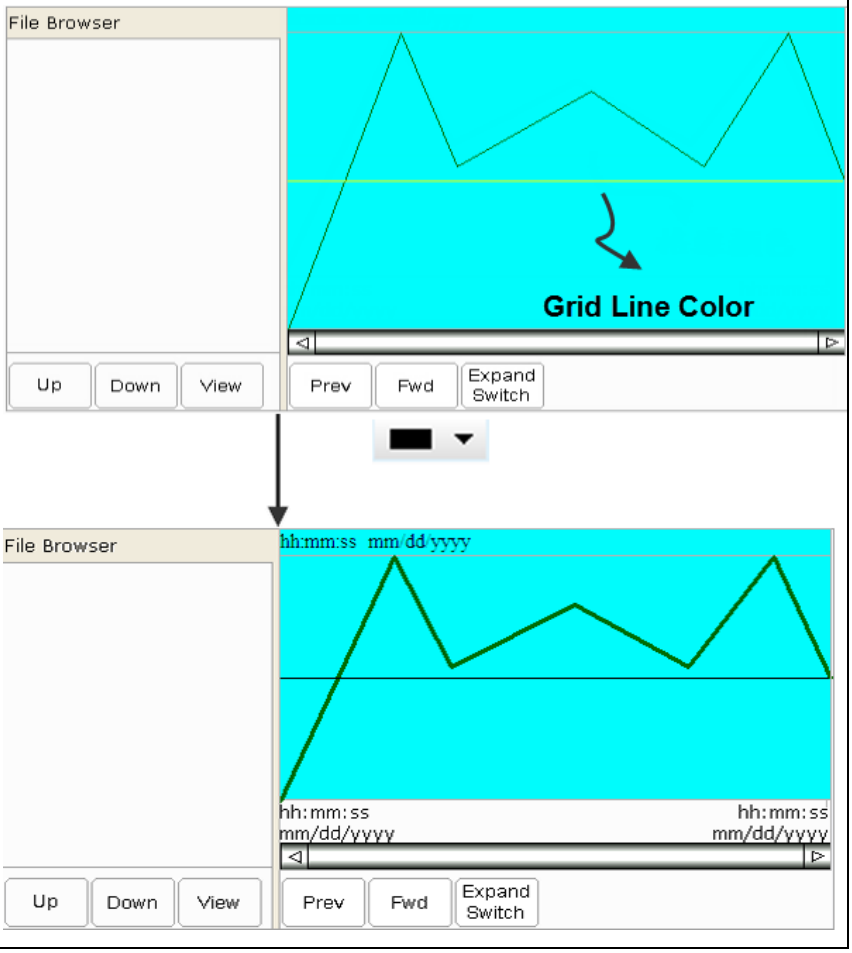
No.	Property	Function		
			After	
		Main Scale Number	➢ It can display the main and sub-scale number without checking “Display mark”. 	
		Sub-scale Number	➢ The minimum main scale number is 1 and the maximum is 99. ➢ When you set 5 as the main scale number and 1 as sub-scale number, the screen will be shown as below. 	

No.	Property	Function	
		Scale Width	➢ When you select a bigger size of the text, you can adjust the scale width for displaying the text. ➢ When the scale width is set to 200, the screen will be shown as below.  NOTE: ➢ The scale width should be smaller than the element width. ➢ When the element width is dragged to be larger than the scale width, the scale will not be shown on the screen. ➢ If the scale width is bigger than the element width, the scale width will become smaller (the value will be minus 1) automatically. ➢ If you enter any non-numeric character, a message showing [Unacceptable Character] will pop up. 

No.	Property	Function	
(4)	Style	Curve Field	➢ One Historical overview table element supports up to 30 curves.  ➢ Users can select 30 curves and define or change the line width and its color. 

No.	Property	Function	
		Background Color of Tree View	➢ It sets the background color of tree view on the left of historical overview table. 
		Grid Number in Horizontal Direction	➢ The max. grid number in horizontal direction is 50. ➢ The grid number in horizontal direction is used to separate the blocks of the Historical overview table. The default value is 1 which means not to show the grid line. If you set the value to 2, it means there will be one grid line in the Historical trend element and it has two blocks. Set the value to 3 means it has two grid lines (3 blocks). 

No.	Property	Function	
			
		Background color of view	➢ It sets the background color of the Historical overview table on the right. 

No.	Property	Function	
		Grid line color	➢ It is the grid line on the right of the Historical overview table. The default color is .  ➢ Users can define the grid line color. 

◆ Text

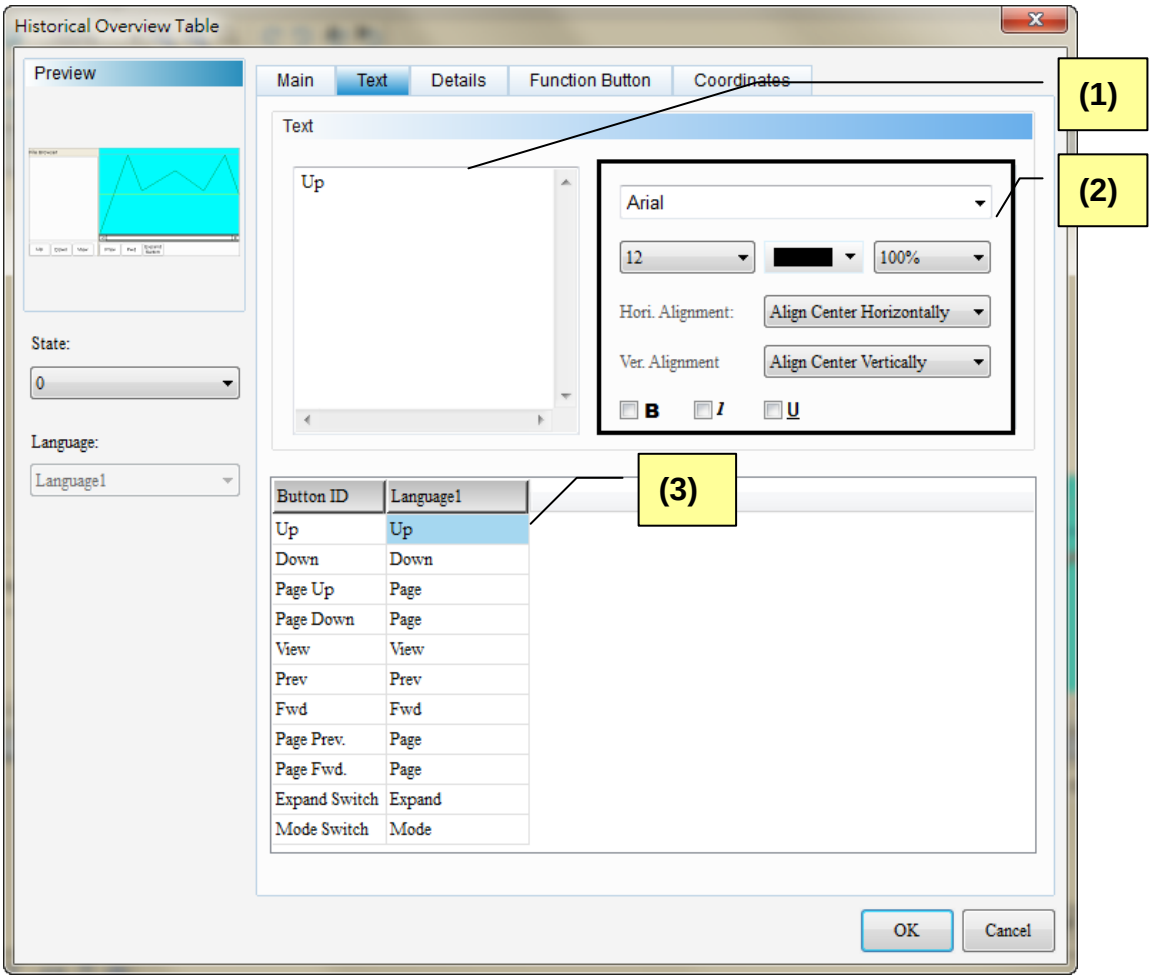
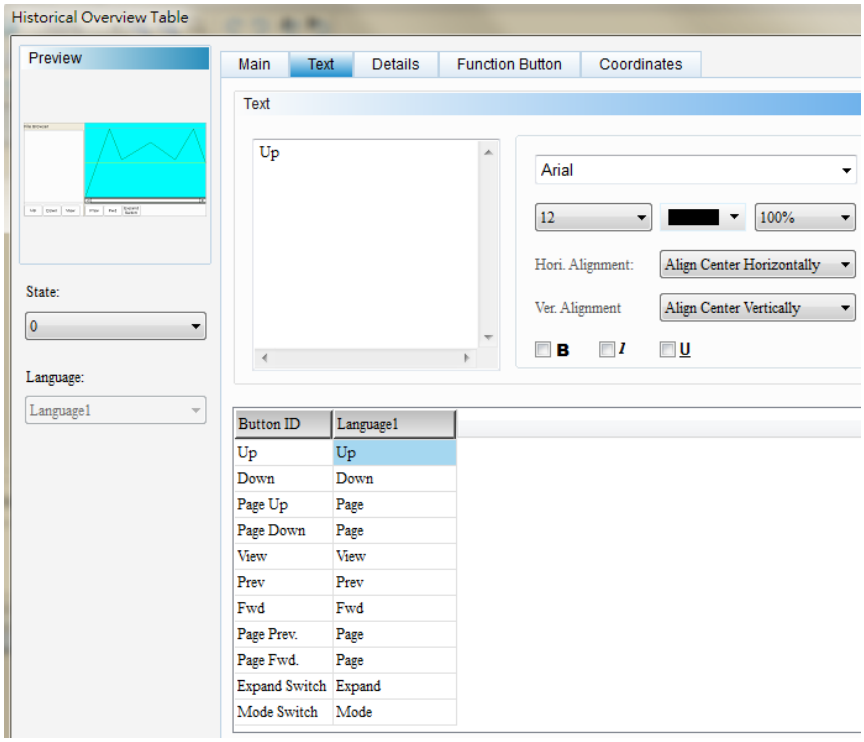


Figure 15-5-3 Text property setting of historical overview table

No.	Property	Function
(1)	Text	➢ Users can enter the text to be displayed in text box.

No.	Property	Function
		
(2)	Property related setting	➢ The property setting includes text font, size, color, scale and alignment. Users can determine if the text should be bold, italic or underlined. Please refer to the above figure for text property setting.
(3)	Edit the text in multiple languages	➢ When adding the text in multiple languages, users can go to this page to edit the text. See the figure above, users can enter the text in English field.

◆ Details

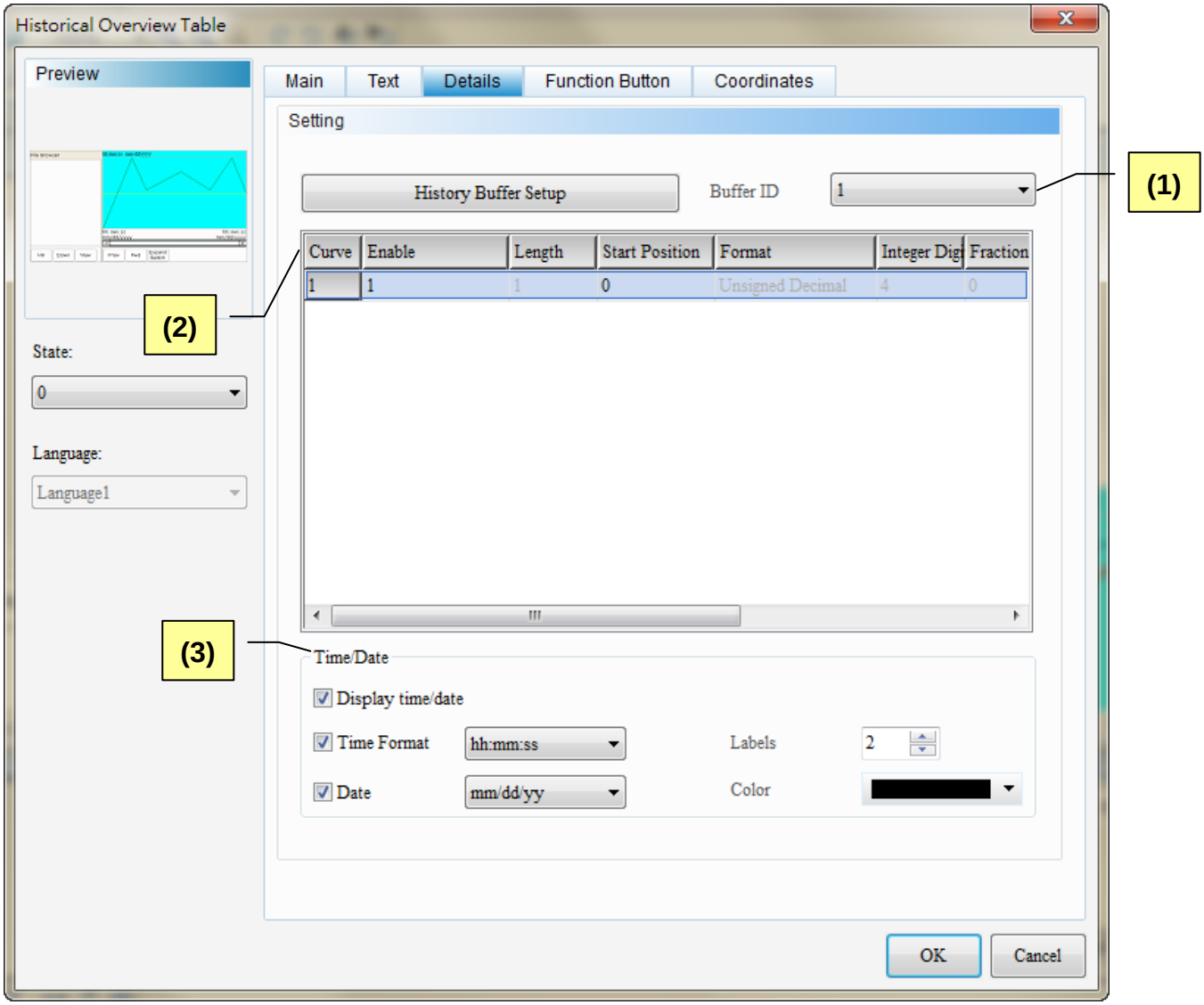
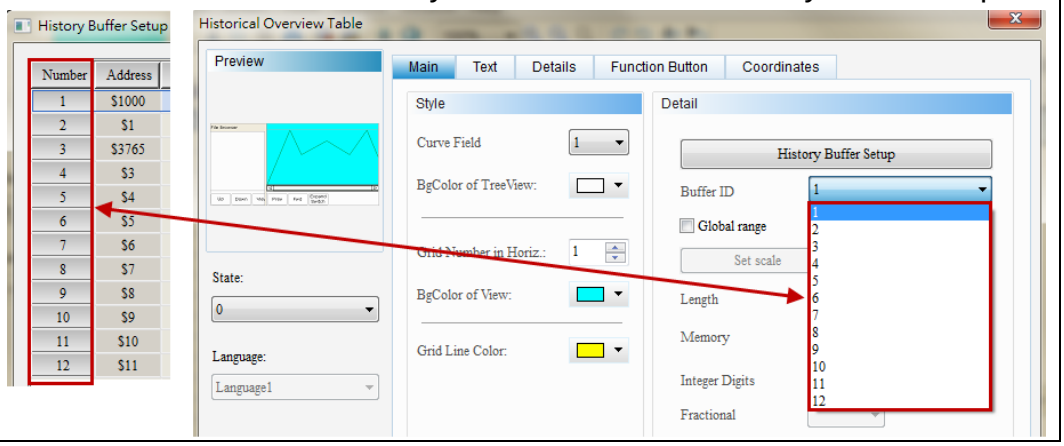
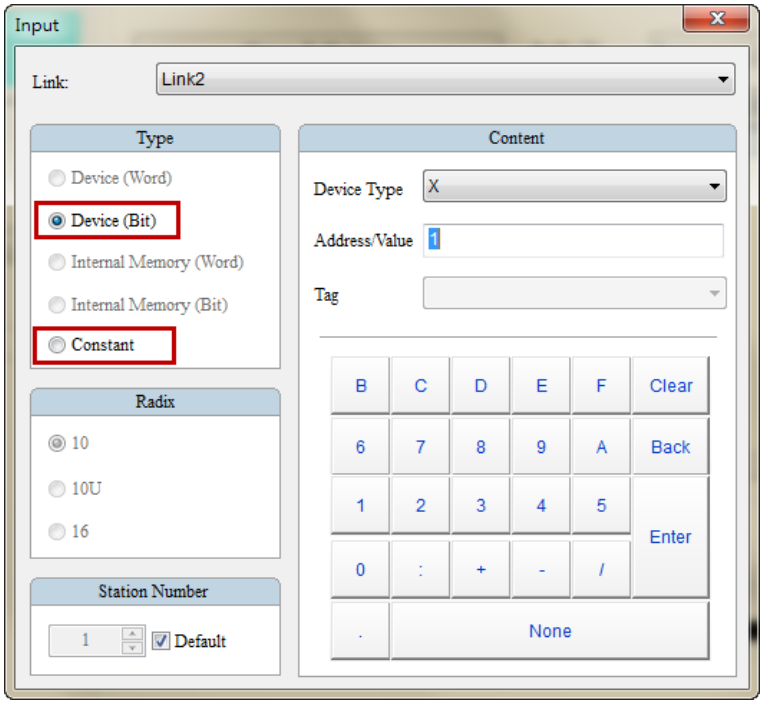
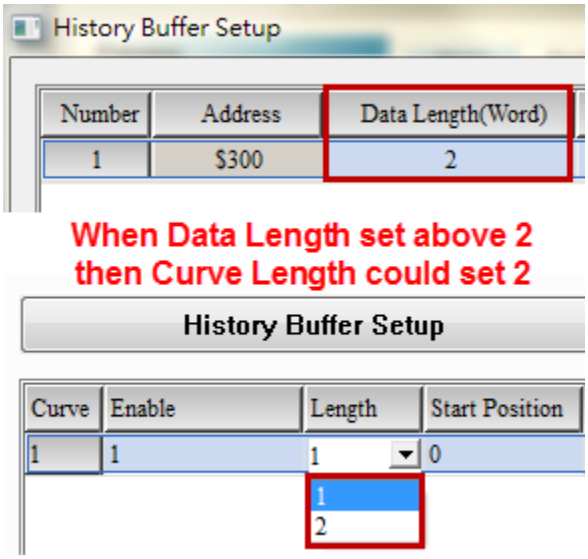
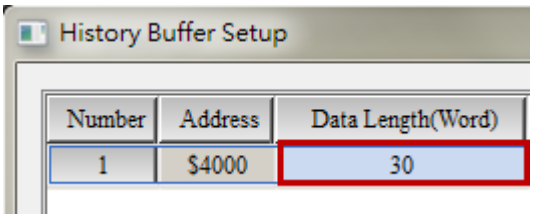
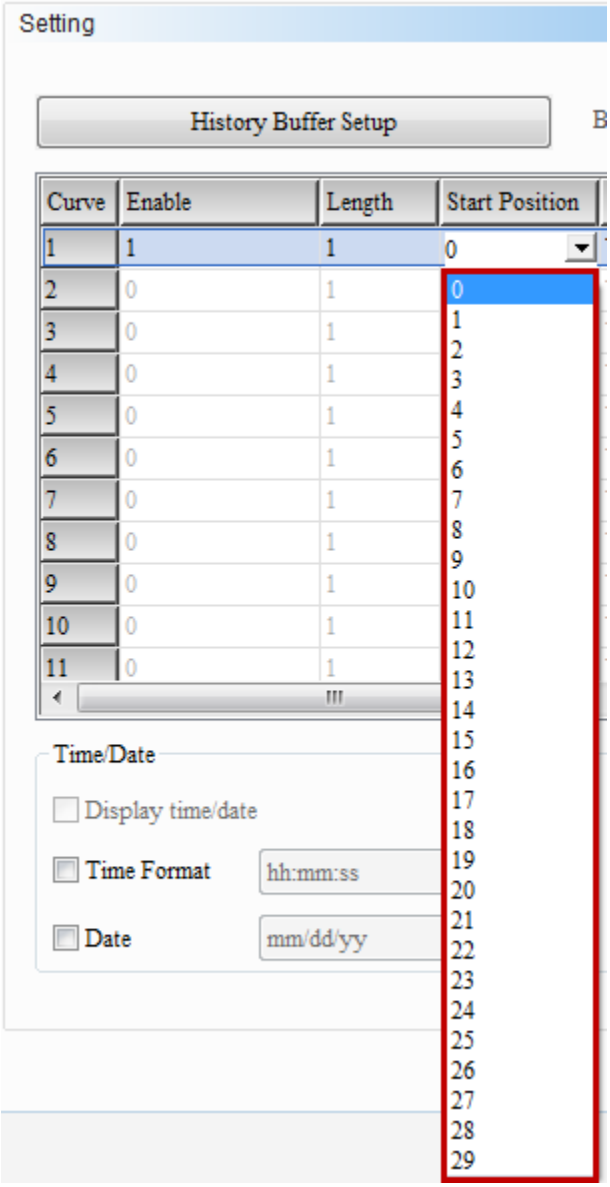
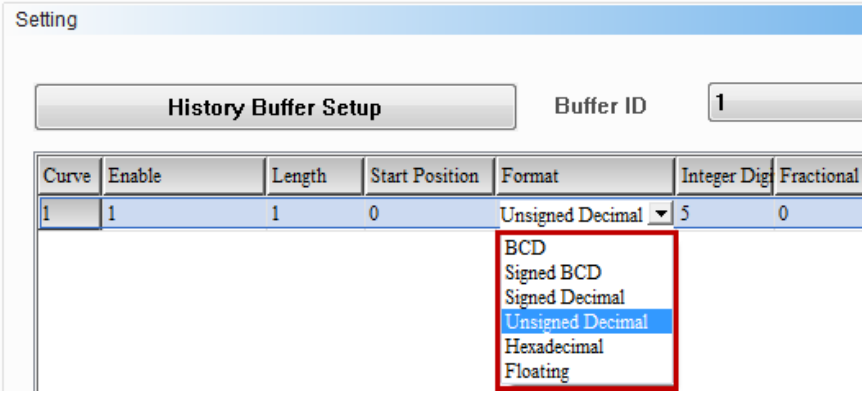
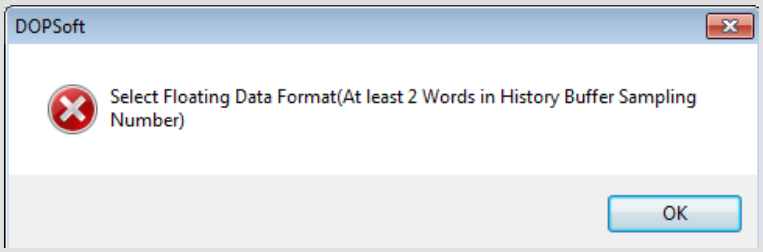


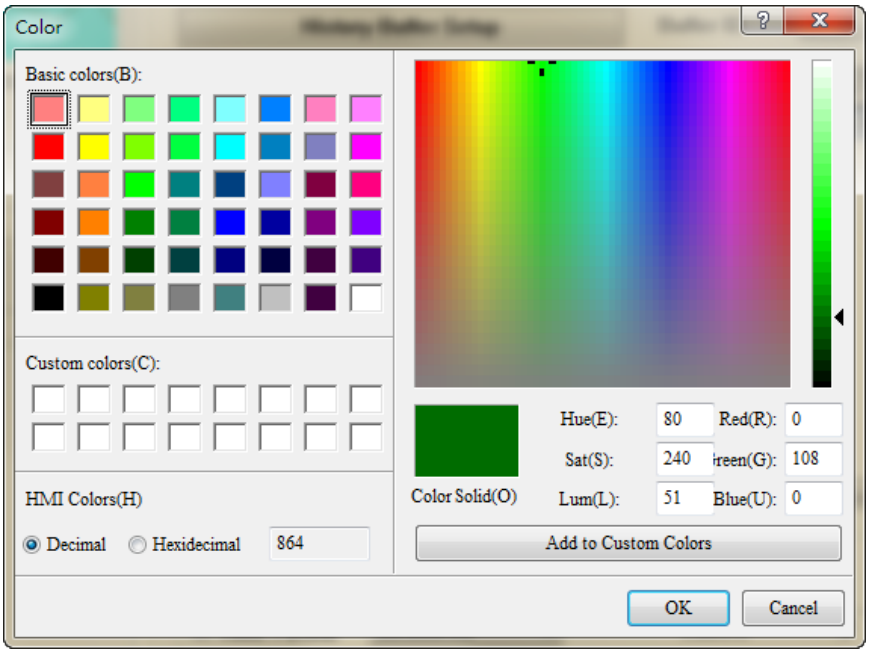
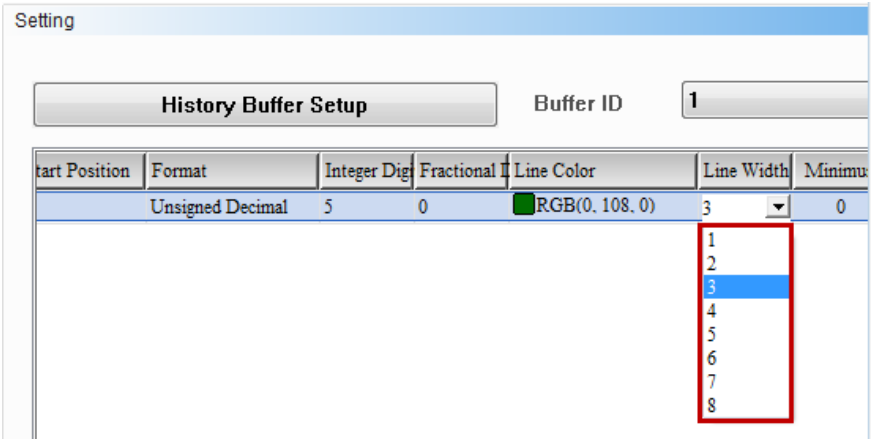
Figure 15-5-4 Detailed setting screen of historical overview table

No.	Property	Function
(1)	Buffer ID	➢ Buffer ID is the data ID that corresponds to history buffer setup. Users can enter 12 history data at most in the history buffer setup. 

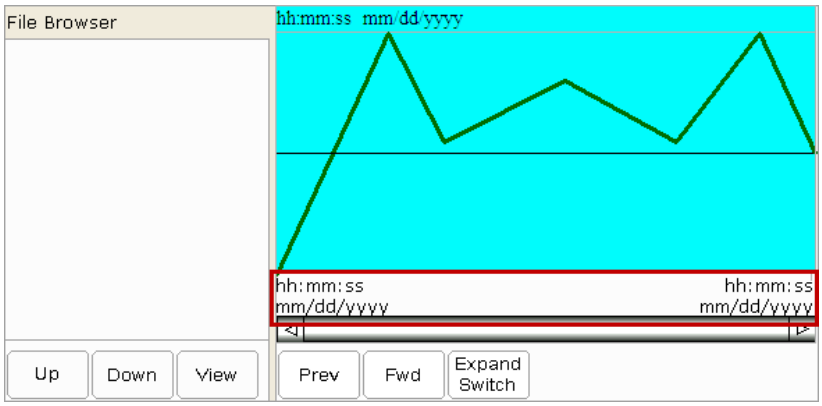
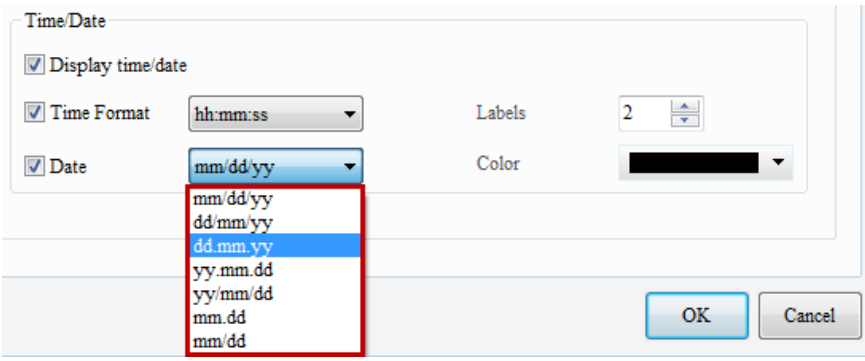
No.	Property	Function	
(2)	Curve Setting	Activate	➢ Set the [Enable] field and determine whether to show the curve or not. ➢ If the Type is set to constant, it will start to access data when the value is set to 1. If the value is set to 0, this function will be inactivated. If the Type is set to Bit, BitON means to activate the function while BitOFF means to deactivate it. ➢ It supports [Device (Bit)], [Internal Memory (Bit)] and [Constant]. 
		Data length	➢ When data length is set above 2, the curve length can set to 2.  ➢ This function will be invalid when you check “Global

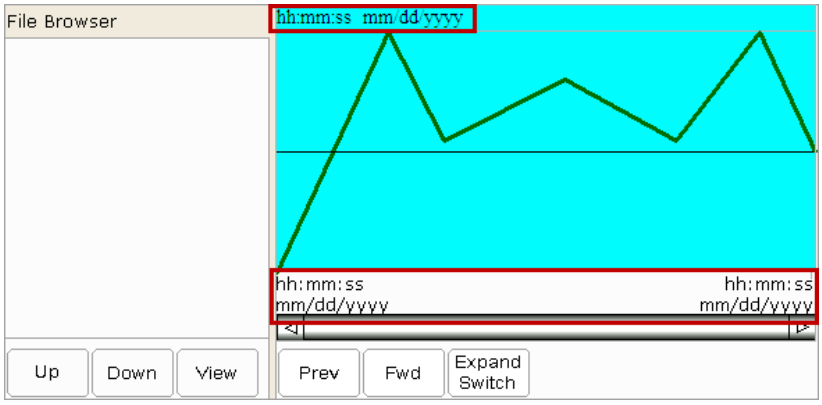
No.	Property	Function	
			range”.
		Data start position	➢ Data start position is determined by the data length (Word). ➢ If the data length is 30, then the start position is ranged from 0 to 29.  
		Format	➢ The supported data formats are as the following.

No.	Property	Function	
			 ➢ This function will be invalid when you check “Global range”. NOTE: ➢ When you select Floating as the data format, please select 2 as the Length. ➢ When you select Floating as the data format and select 1 as the Length, a prompt message will pop up and reminds the users that it requires 2 as the Length. 
		Integer digits /Fractional	➢ Users can set the displayed number of digit of the integers and decimals. ➢ This function will be invalid when you check “Global range”.
		Line color	➢ Users can set the line color.

No.	Property	Function	
			
		Line width	➢ The range of line width is from 1 to 8. 
		Min. value / Max. value	➢ When you check the setting of “Global range”, you will be unable to set the min. and max. value. To set them individually, please uncheck “Global range”. ➢ The valid setting range of the min. and max. value is set according to the selected data type and data format.

Data Type	Data Format	Valid Setting Range
Word	BCD	0~9999
	Signed BCD	-999 ~ 9999
	Signed Decimal	-32768~32767
	Unsigned Decimal	0~65535
	Hex	0~0xFFFF
DWord	BCD	0~99999999

No.	Property	Function	
			Signed BCD: -9999999 ~ 99999999 Signed Decimal: -2147483648~2147483647 Unsigned Decimal: 0□4294697295 Hex: 0~0xFFFFFFFF Floating: 0~9999999
(3)	Display Time / Date	Display Timeline	➢ Check this function to display the timeline below the historical overview table element. The timeline will not be shown on the screen if you uncheck it.  ➢ Check the timeline to set the display number of time/date, which range is from 1 to 9999. The figure above displays two sets of time/date.
		Time / Date Format	➢ It supports two time formats. See as below. ➢ It supports seven date formats. See as below. 

No.	Property	Function	
		Displayed Color	➢ This function is used to change the displayed color of time and date, including the recording time and date above the historical trend graph and the displayed number of timeline. The default color is . 

◆ Function Button

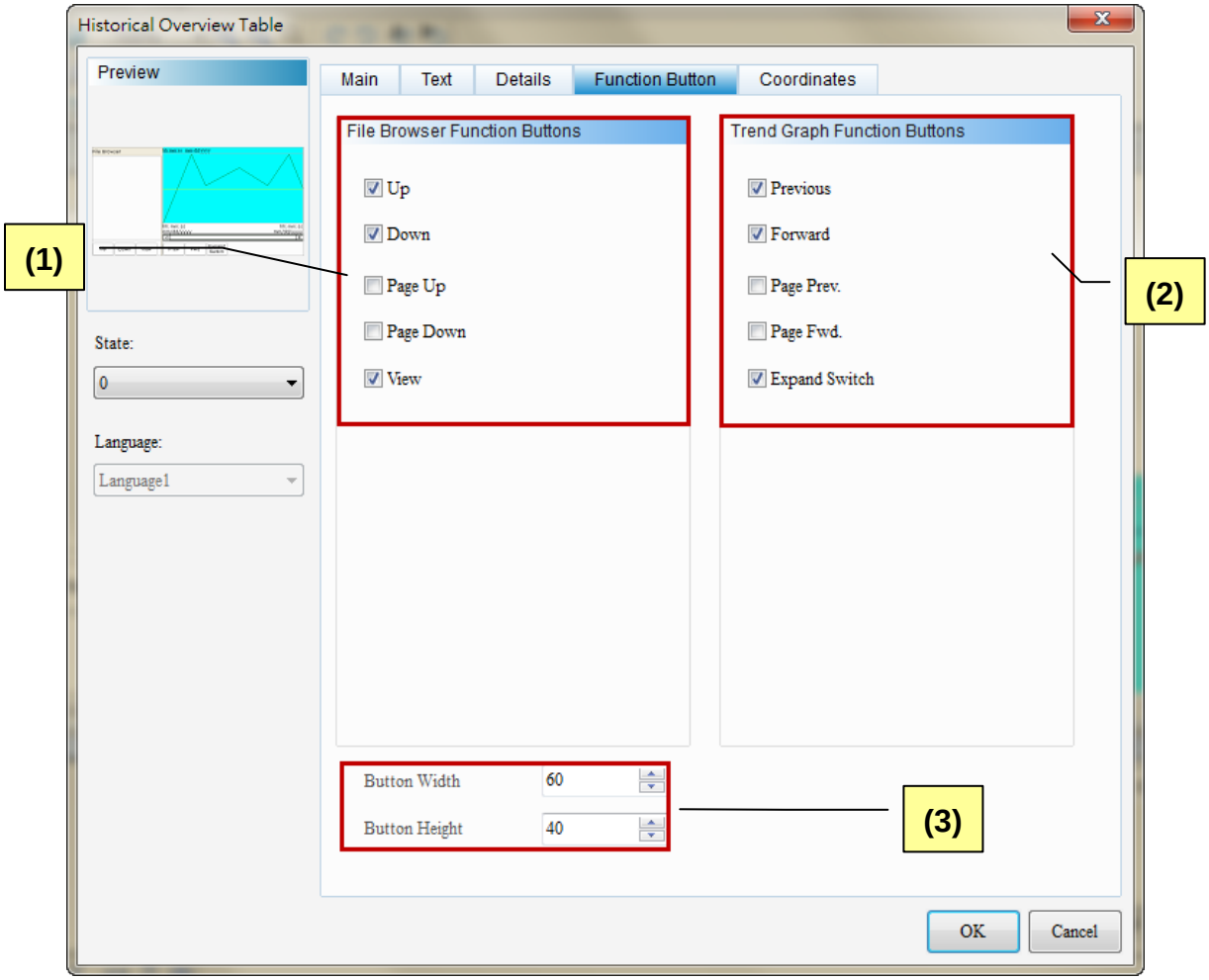
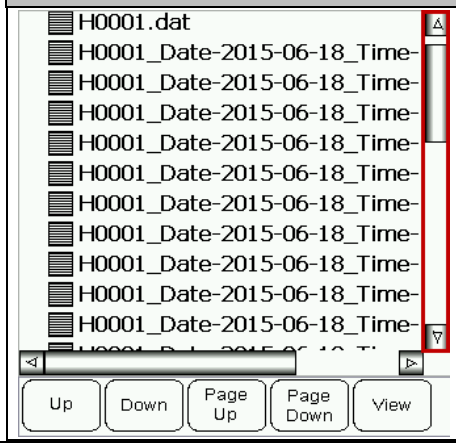
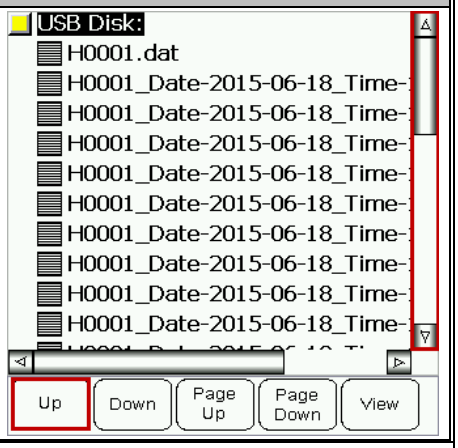
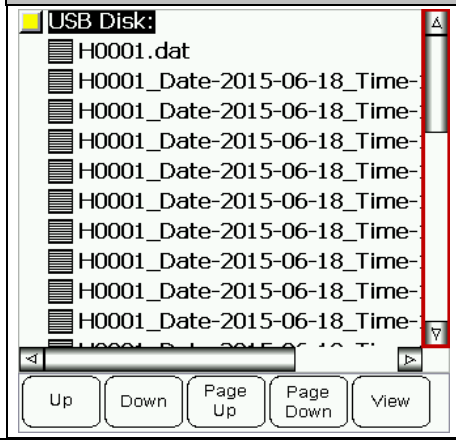
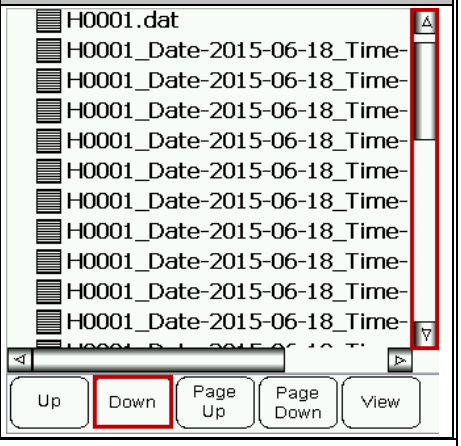
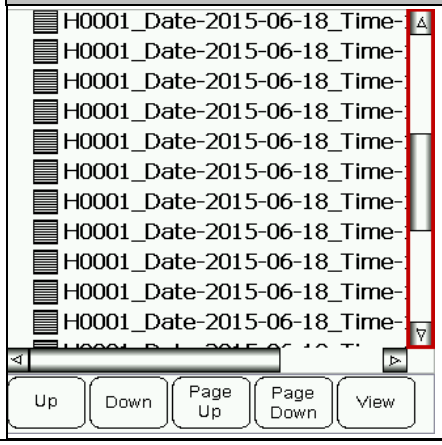
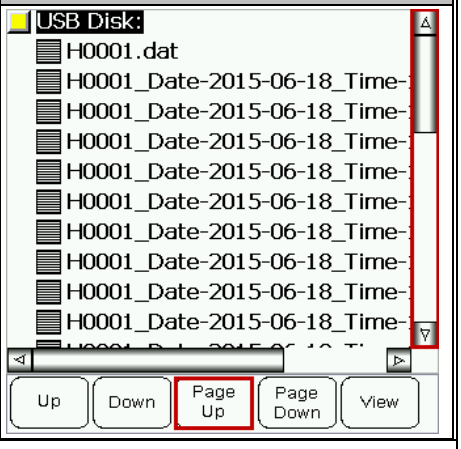
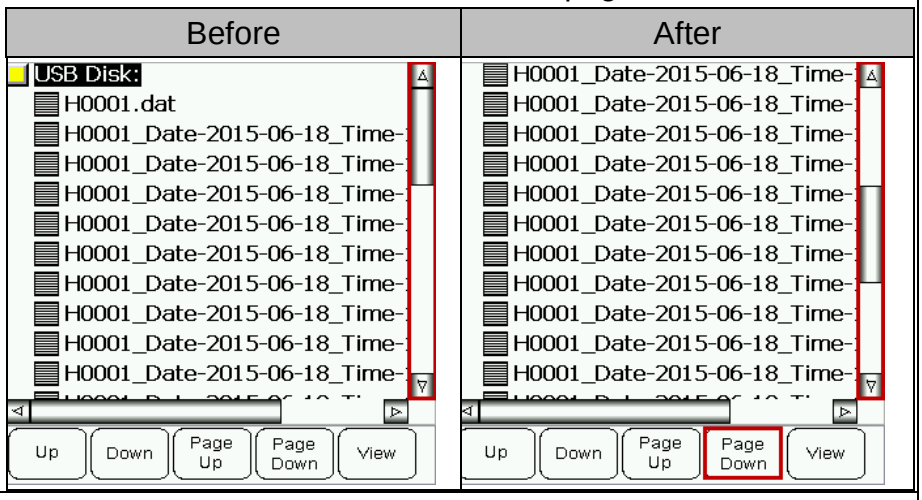
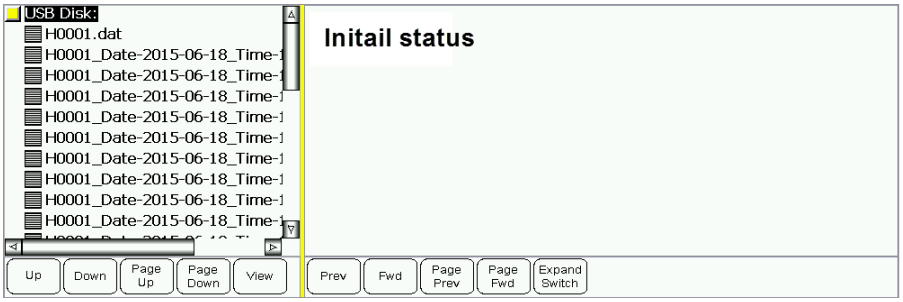
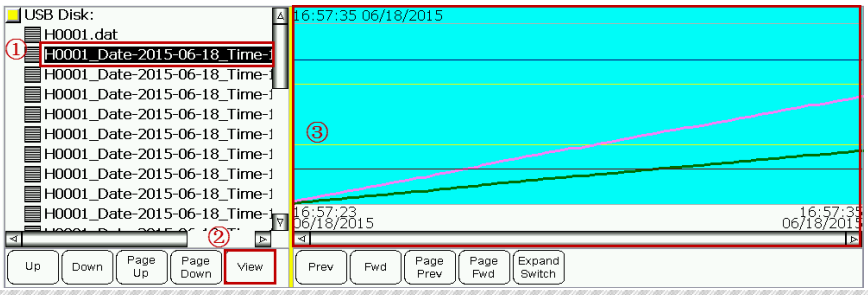
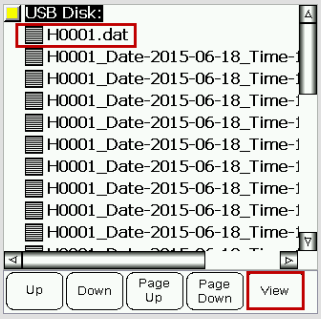
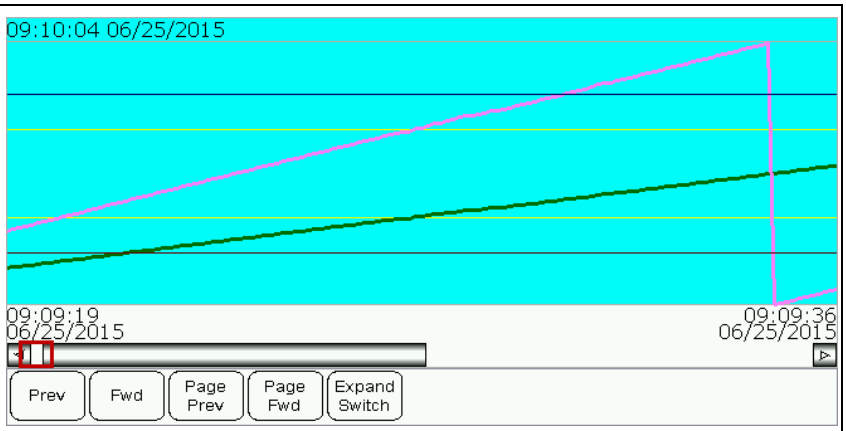
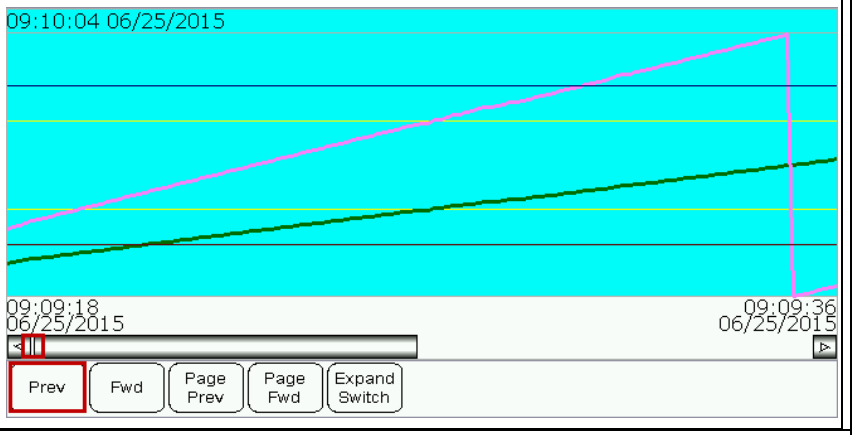
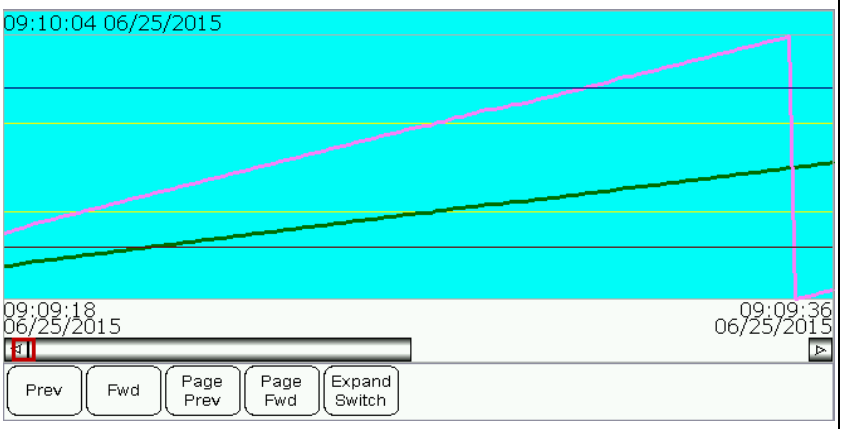
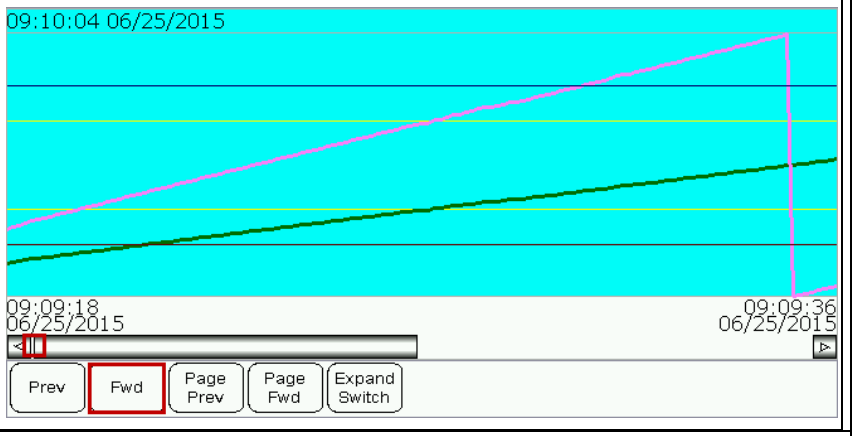
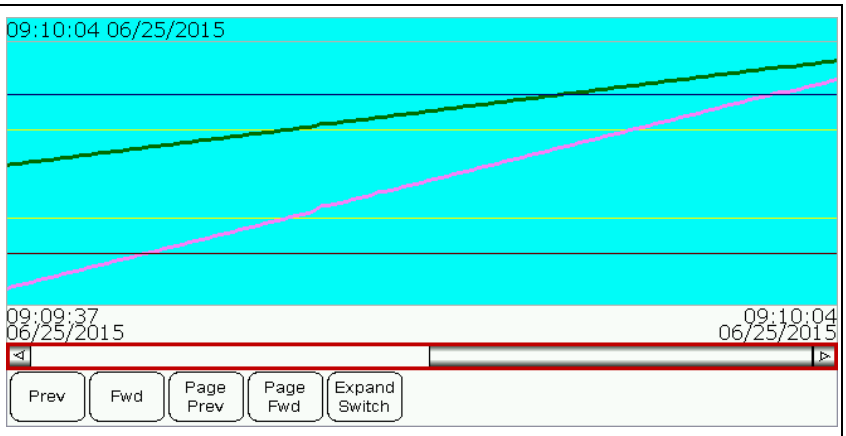
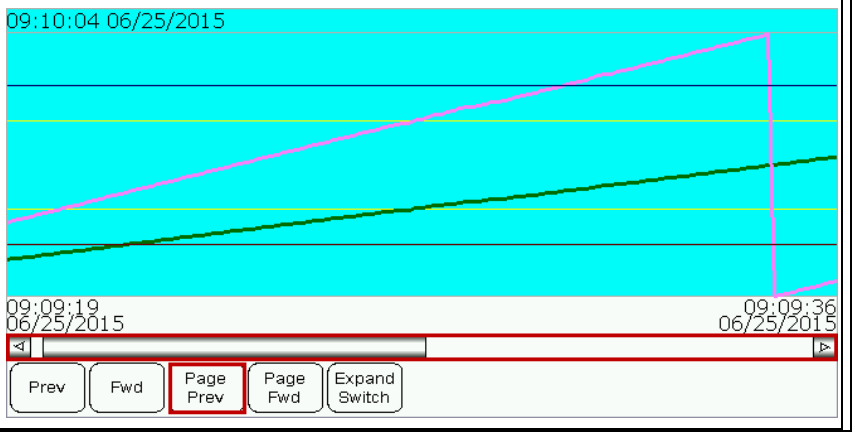


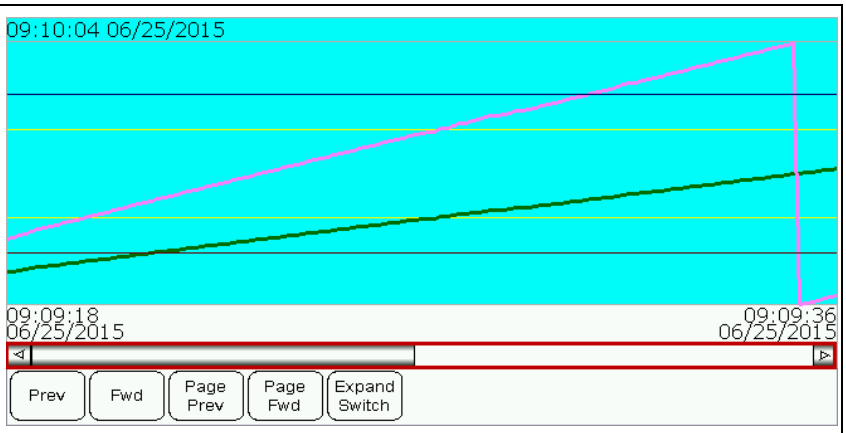
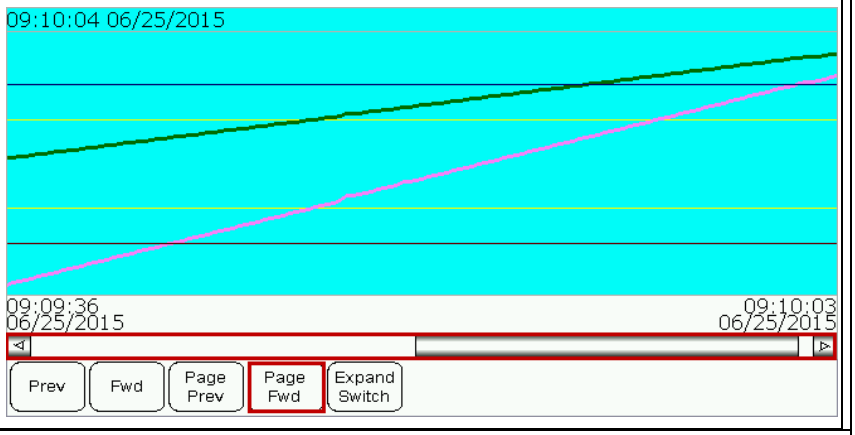
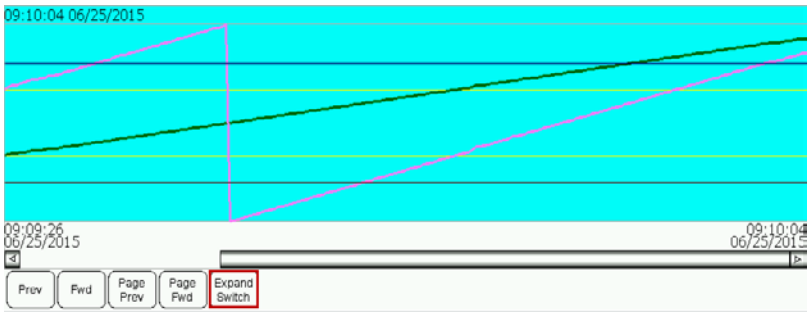
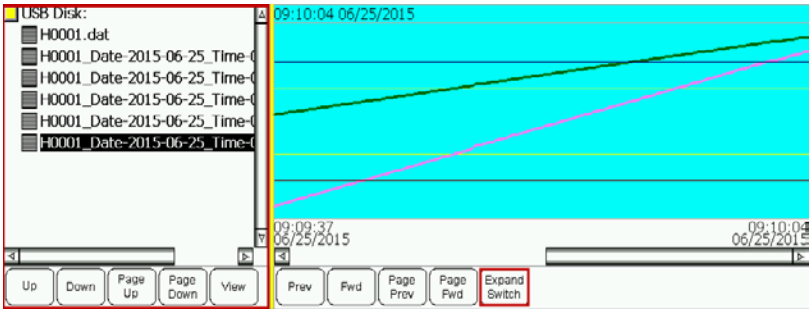
Figure 15-5-5 Property screen of Historical Overview Table

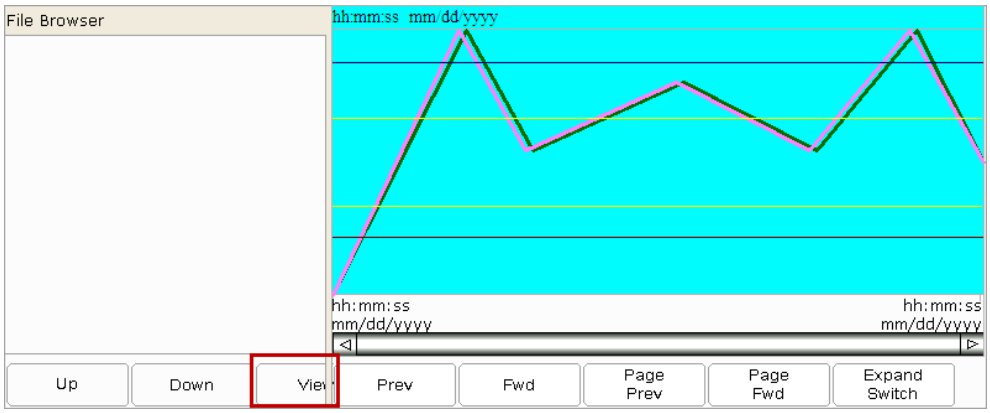
No.	Property	Function	
(1)	File Browser Function Buttons	Up	➢ Press the Up button, the scrollbar of the file browser area will move up one line. Before:  After: 
		Down	➢ Press the Down button, the scrollbar of the file browser area will move down one line. Before:  After: 
		Page Up	➢ Press the Page Up button, the scrollbar of the file browser area will move to the previous page. Before:  After: 
		Page	➢ Press the Page Down button, the scrollbar of the file

No.	Property	Function	
		Down	browser area will move to the next page. 
		View	➢ When it is in initial status, the area on the right of the Historical overview table is blank. Users need to select the data of Historical trend graph stored in USB storage device or SD card. Then, click the “View” button. And the trend graph will be shown on the right.   NOTE: ➢ The viewing area on the right of trend graph can only compatible with .dat file. ➢ If the file in viewing area has the same file name as it sets in the buffer area (no time and date), it means the file is sampling the data in the history buffer area and the Historical overview table cannot be showed. When pressing the [View] button, a warning message showing “Open history file fail!!!” will pop up.

No.	Property	Function	
			
(2)	Trend Graph Function Buttons	Previous	➢ Press the [Prev] button, the scrollbar of trend graph will slightly move to the left. Before  After 
		Forward	➢ Press the []Fwd] button, the scrollbar of trend graph will slightly move to the right.

No.	Property	Function	
			Before  After 
		Page Prev.	➢ Press the [Page Prev.] button, the scrollbar of trend graph will move to the previous page. Before  After 

No.	Property	Function	
		Page Fwd.	➢ Press the [Page Fwd.] button, the scrollbar of trend graph will move to the next page. Before  After 
		Expand Switch	➢ Press the [Expand Switch] button, it will hide / display the file viewing area on the left. Hide the file viewing area  Display the file viewing area 
(3)	Button Width	➢ The setting range of button width is between 25 and 100.	

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><td>The button width is 60.</td><td>Up Down View</td></tr>
<tr><td>The button width is 100.</td><td>Up Down View</td></tr>
</table>
➢ If the button width exceeds the element width, then it will not be able to show the complete button.


</td></tr>
<tr><td></td><td>Button Height</td><td>
➢ The setting range of button height is between 25 and 100.
<table>
<tr><td>The button height is 30.</td><td>Up Down View</td></tr>
<tr><td>The button height is 100.</td><td>Up Down View</td></tr>
</table>
</td></tr>
</table>

◆ Coordinates

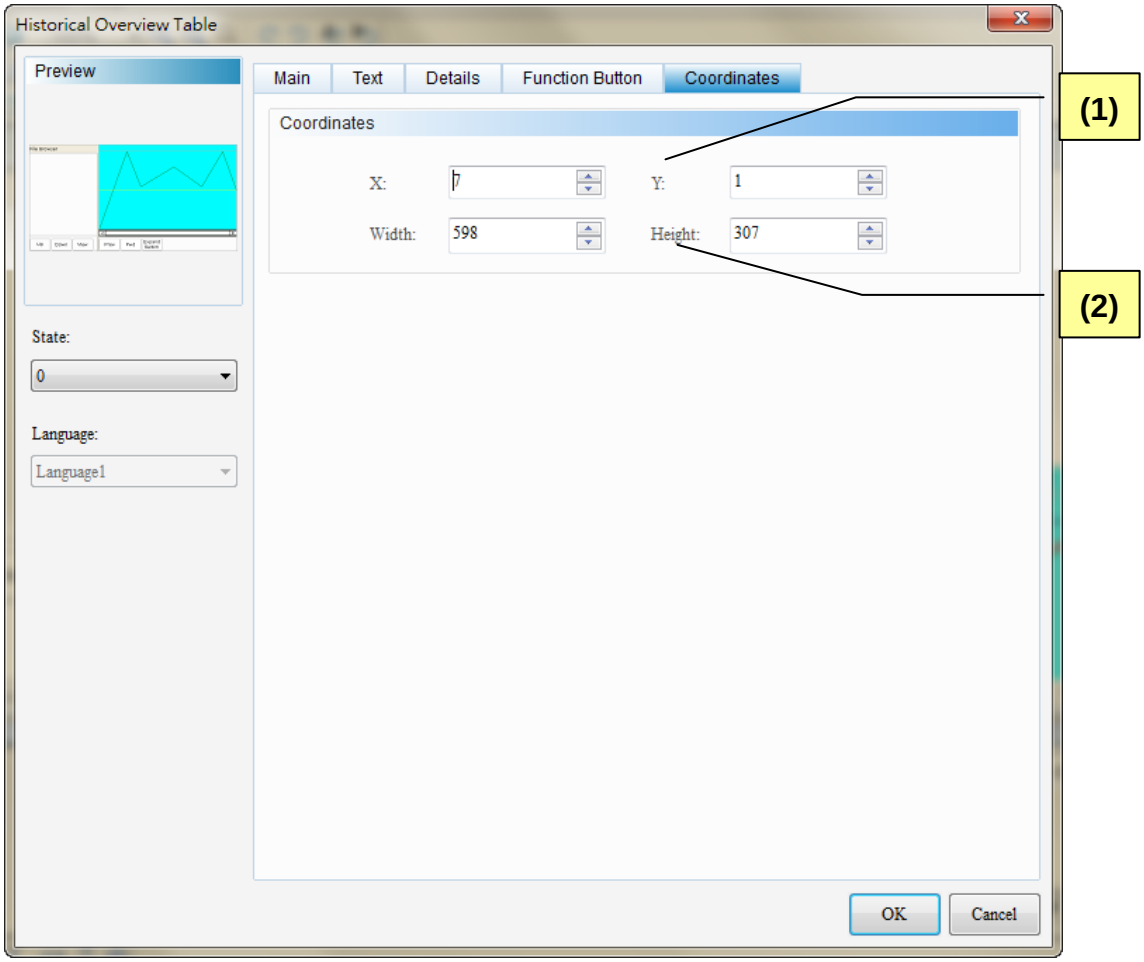


Figure 15-5-6 Historical Overview Table Coordinates properties page

No.	Property	Function
(1)	X- and Y-value	➢ It sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ It sets element width and height.

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16-5 Alarm Moving Sign.....50

Chapter 16 Alarm

This chapter describes the alarm elements that the DOPSoft software provides and how to operate Alarm Setup.

◆ Classification of alarm elements:

Alarm		History Alarm Table
		Active Alarm List
		Alarm Frequency Table
		Alarm Moving Sign

Table 16-1-1 Classification of alarm elements

◆ Common properties of alarm elements

Alarm	Read Address	Write Address	Style (Background Color/ Style/ Border Color)	Time Format/ Date Format	Alarm Number	Show Alarm Release Items	Display for Count 0	Time Interval/ Moving Points
History Alarm Table	◎		◎ (Only Background Color)	◎	◎	◎		
Active Alarm List	◎		◎ (Only Background Color)	◎	◎			
Alarm Frequency Table	◎		◎ (Only Background Color)	◎	◎		◎	
Alarm Moving Sign	◎		◎	◎	◎			◎

Table 16-1-2 Common properties of alarm elements

16-1 Alarm Setup

We will explain how to use the Alarm Setup function before describing the alarm elements. The Alarm Setup is used to set the properties such as reading address, sample time, max. records to be saved and retained area setup needed for display of the alarm. It is also used for the setting of alarm moving sign, output to CSV file and editing of alarm message content to be displayed.

The history buffer data that the user edited will be run using the formula provided by the software. The size data calculated will be stored in the preset retained area. If the data are stored in HMI, the size of the alarm varies depending on the HMI model. For more information, refer to the Hardware Specifications in the HMI Installation Manuel for the description of the non-volatile internal memory. If the data are stored in an external device (such as USB Disk, SD Card), the size of that device prevails

The following alarm formulas are applied to the alarm log file and Alarm Frequency Table. No formula is used for the CSV file because the length of the file is dependent on the size of the message that the user input

1. Alarm log file formula:

$$\{[6\text{Bytes}(a) + 2\text{Bytes}(b)] \times N(c)\} + 6\text{Bytes}(d) = \text{Actual file size Bytes}$$

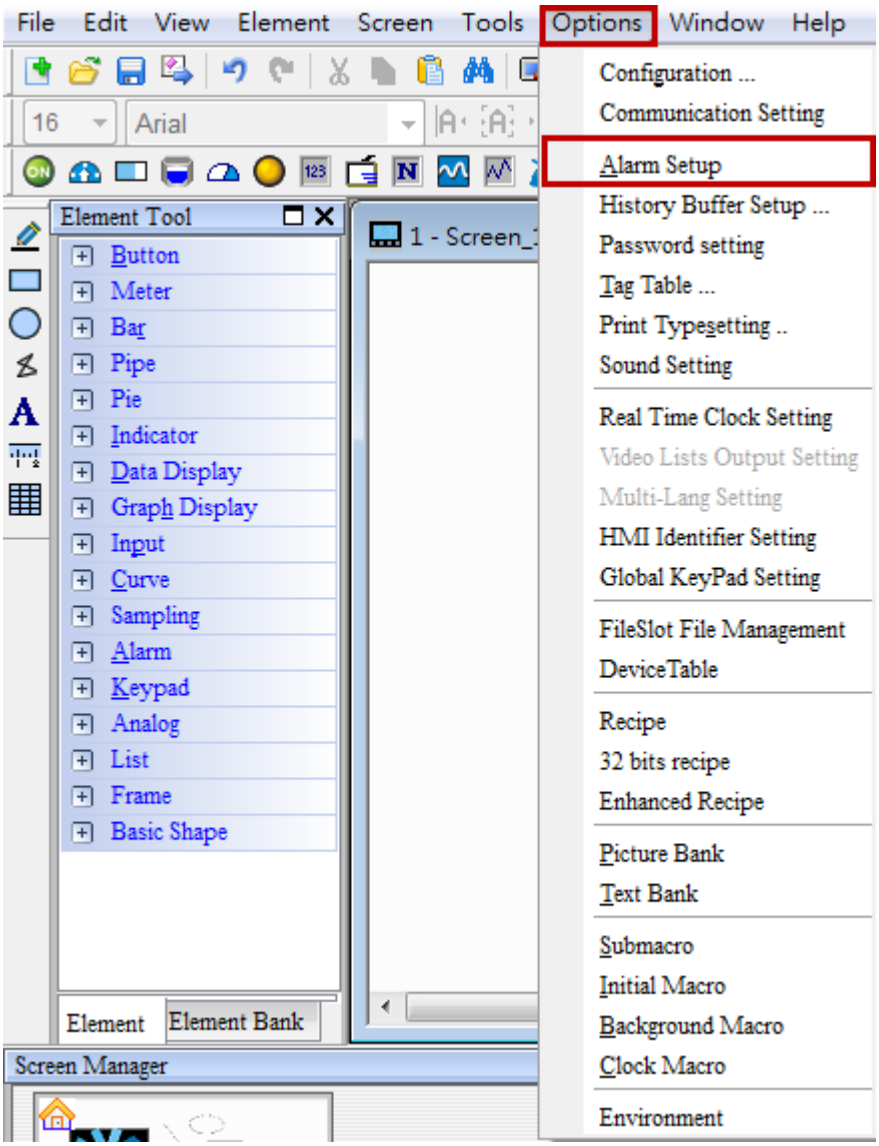
a	Time/date data
b	Alarm data
c	Sampling points
d	Header of data file

2. Alarm Frequency Table formula:

$$2\text{Bytes}(a) \times N(b) = \text{Actual file size Bytes}$$

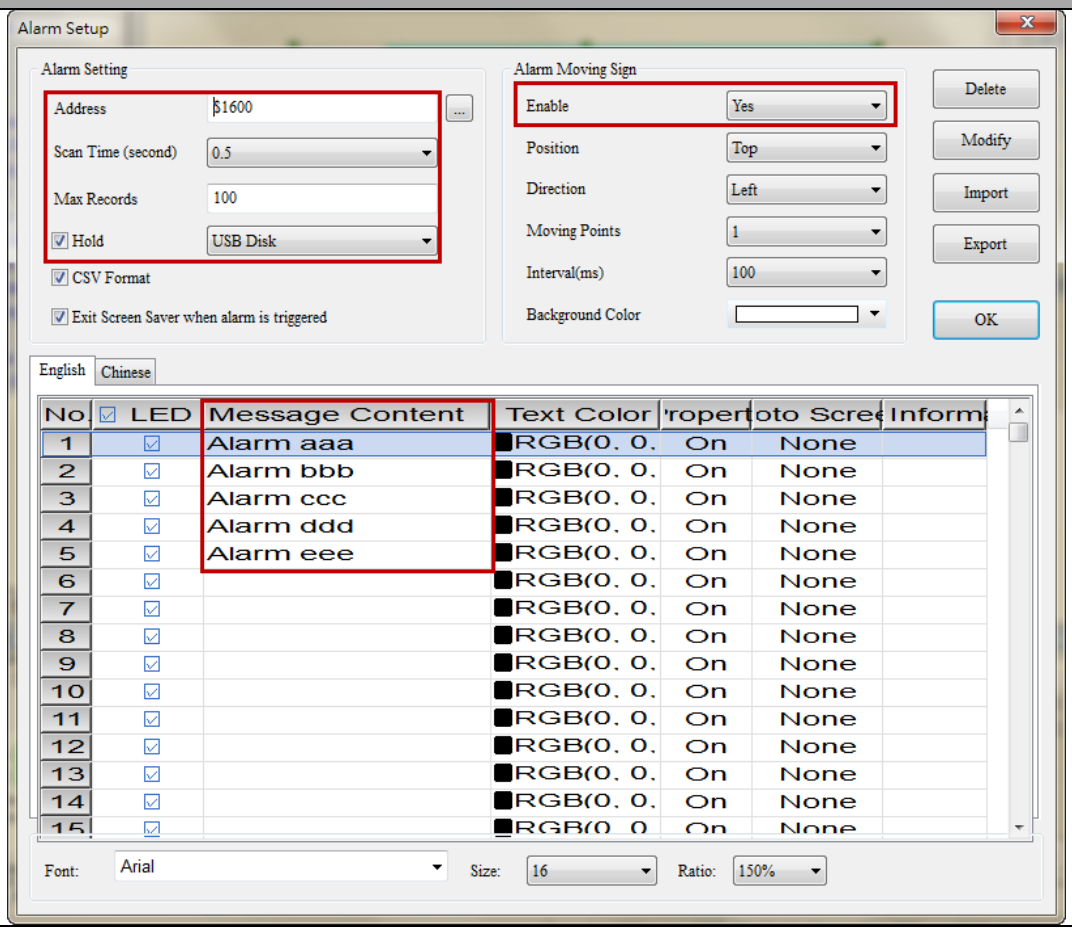
a	Alarm frequency data
b	Alarm records

Refer to the Alarm Setup Example in Table 16-1-3.

Alarm Setup Example Table 16-1-3 Alarm Setup Example	
Alarm Setup Steps	➢ Step 1: Enter [Options] → [Alarm Setup] to set up the property of the alarm.  ➢ Step 2: Set the Read Address to $1600, Sample Time to 0.5 second and max. records to 100. Select HMI as the Retained Area, activate the Alarm Moving Sign and edit the alarm message content to be displayed. After the settings are completed, click OK to leave the Alarm Setup. Refer to the figure below.

Alarm Setup Example

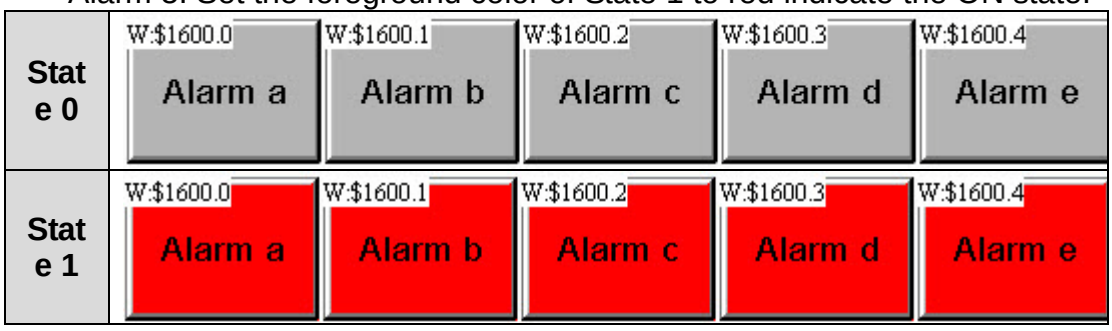
Table 16-1-3 Alarm Setup Example

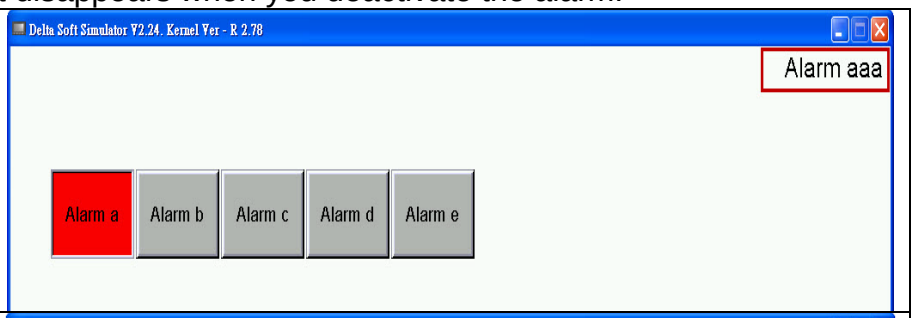
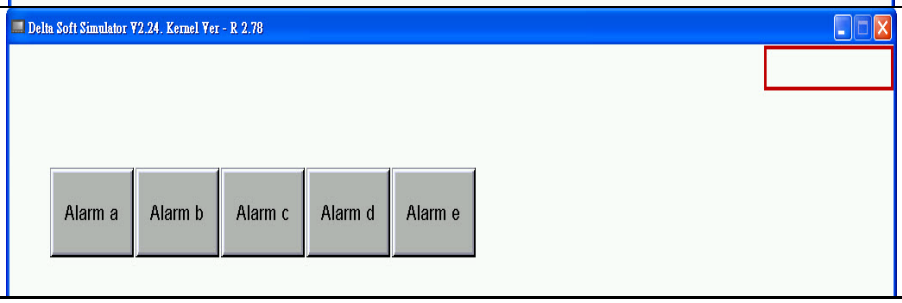


Create Maintained Button Elements

- Step 1: Create 5 maintained buttons and set their Write Address to $1600.0~$1600.4 respectively.

- Step 2: Edit the State 0/State 1 text of each maintained button to Alarm 1 ~ Alarm 5. Set the foreground color of State 1 to red indicate the ON state.

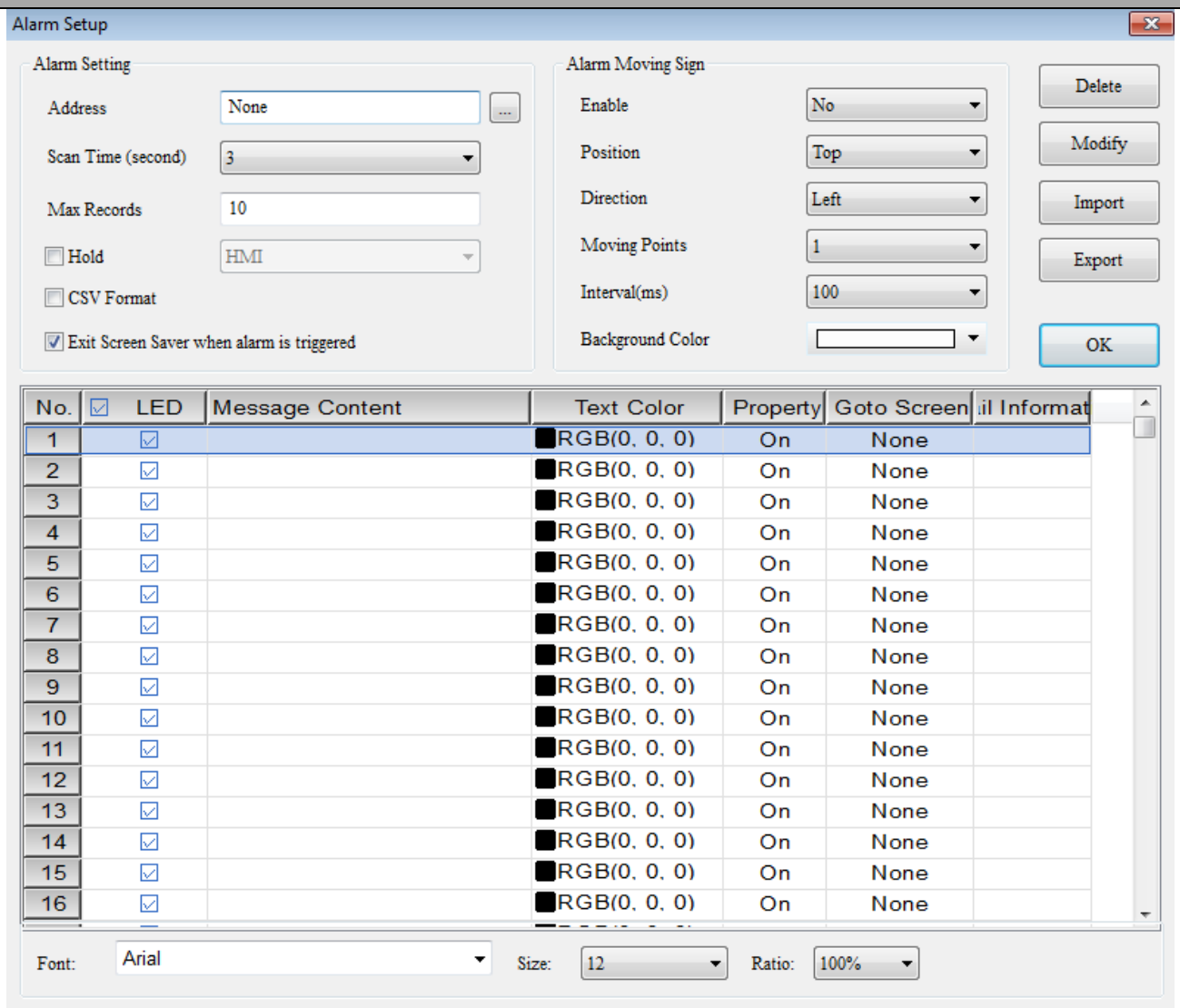


Alarm Setup Example Table 16-1-3 Alarm Setup Example		
Execution Results	➢ After creation of all elements, perform the compilation and download them to HMI. When you activate the maintained buttons of Alarm 1 ~ Alarm 5, the message of the Alarm Moving Sign will display on the top of the HMI screen. It disappears when you deactivate the alarm.	
	Alarm ON	
	Alarm OFF	

The Alarm Setup properties are described in detail below.

Alarm Setup Properties

Table 16-1-4 Alarm Setup Properties



➢ Alarm Setup

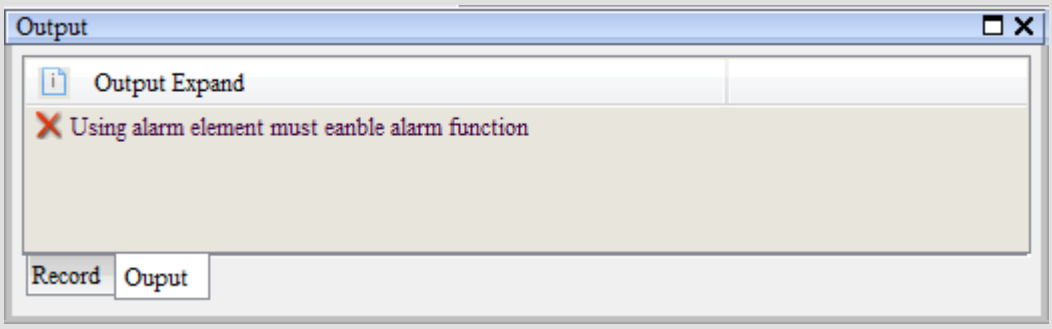
Read Address

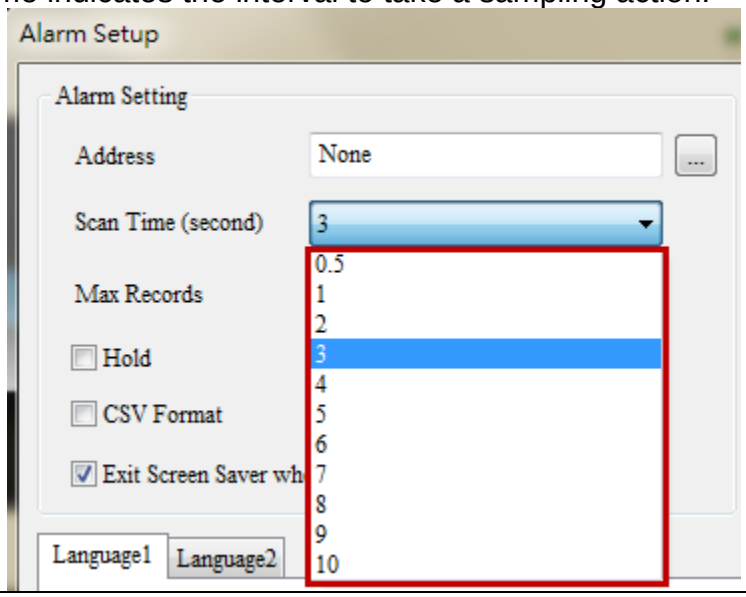
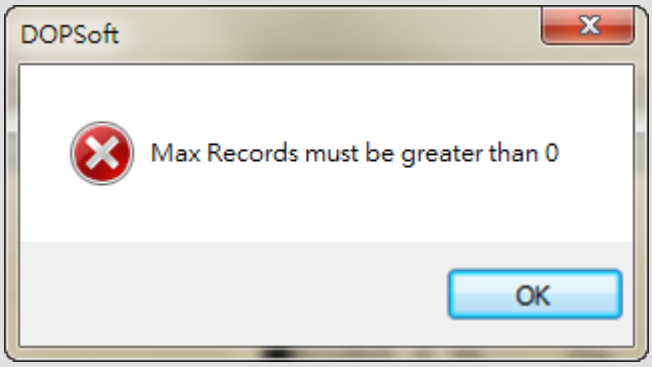
➢ You can select the internal memory or controller register address. The constraint is? When Bit is selected for the Read Address.

➢ For selection of the connection name or style, refer to 5-1 Button of Chapter 05.

NOTE:

✓ If creating alarm elements without setting up the read address, a warning message will pop up when compiling the screen. Please see the figure below.



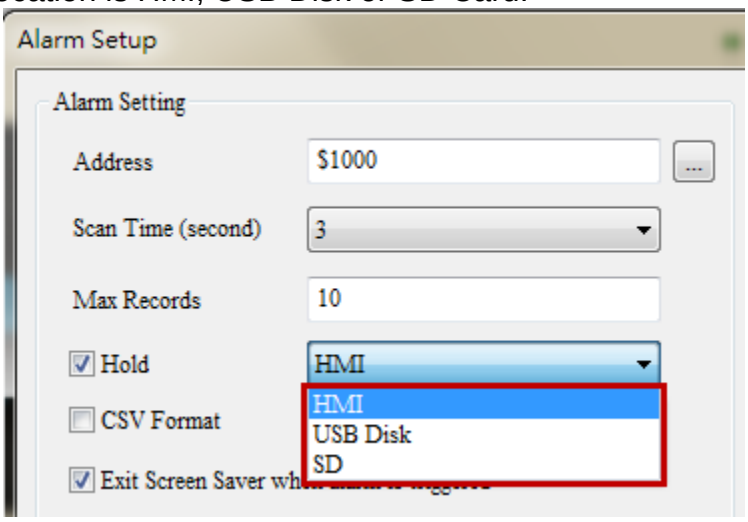
Alarm Setup Properties Table 16-1-4 Alarm Setup Properties	
Scan Time (second)	➢ Sample Time indicates the interval to take a sampling action. 
Max. Records	➢ When the records are accumulated to the number as shown in the Max. Records, the recording will start from the first data again and override the previous data. ➢ The Max. Records function supports up to 9999 records. NOTE: ✓ The max. records cannot be 0. ✓ If you set the Max. Records as 0, a warning message will pop up which shown as below. 

Alarm Setup Properties

Table 16-1-4 Alarm Setup Properties

Hold

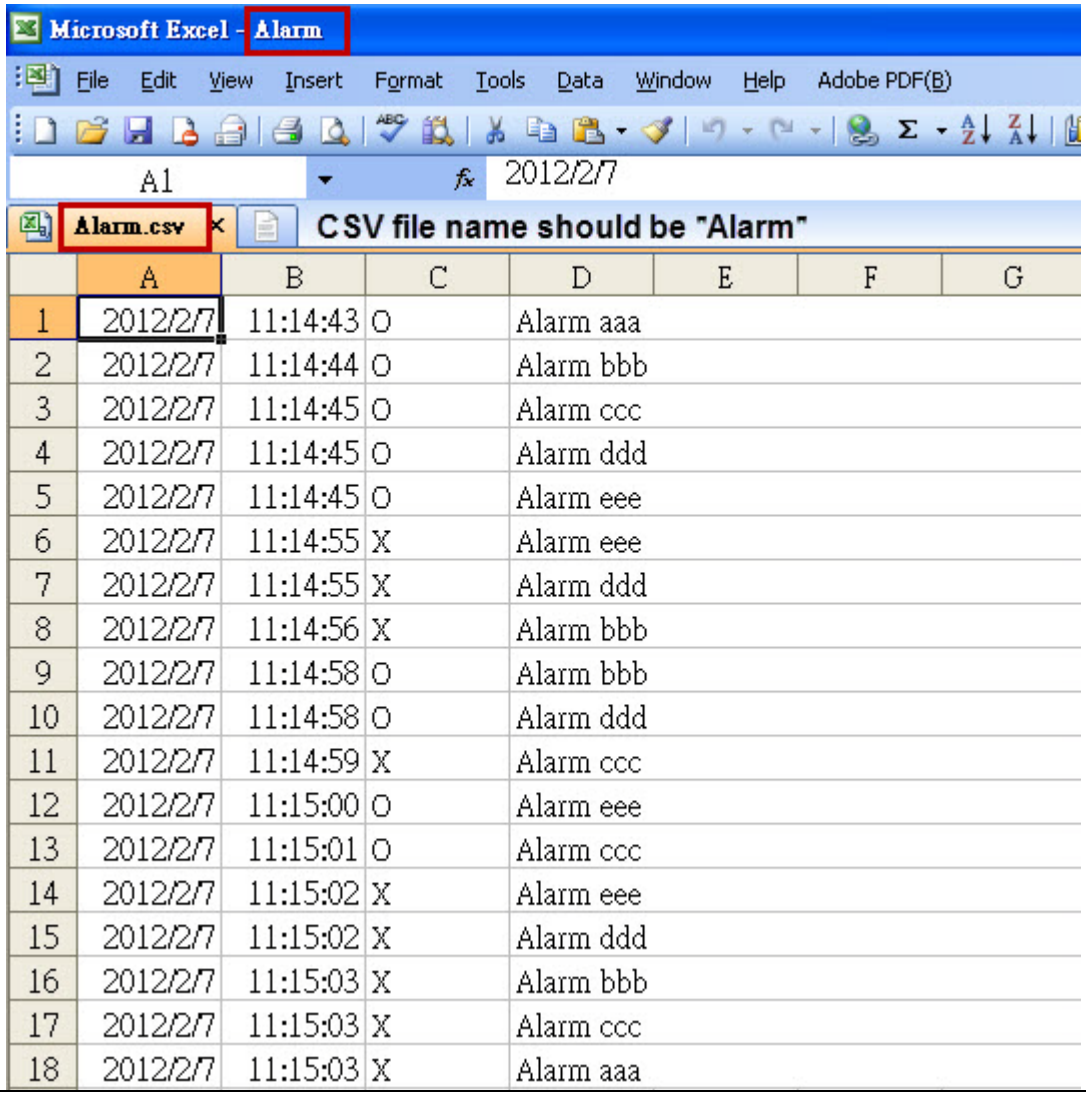
- The data location is HMI, USB Disk or SD Card.



- If HMI is checked, data will be recorded in HMI SRAM in case of outage.
- When the Output to CSV File is selected, select USB Disk or SD Card as the retained area.

CSV Format

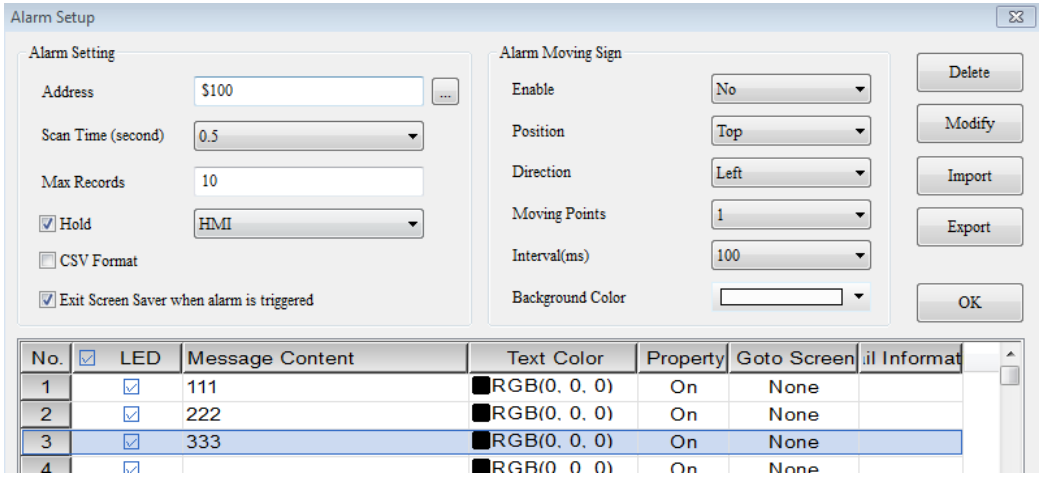
- When the CSV Format is checked, the alarm message can be saved to a CSV file or stored in USB Disk or SD Card.



	A	B	C	D	E	F	G
1	2012/2/7	11:14:43	O	Alarm aaa			
2	2012/2/7	11:14:44	O	Alarm bbb			
3	2012/2/7	11:14:45	O	Alarm ccc			
4	2012/2/7	11:14:45	O	Alarm ddd			
5	2012/2/7	11:14:45	O	Alarm eee			
6	2012/2/7	11:14:55	X	Alarm eee			
7	2012/2/7	11:14:55	X	Alarm ddd			
8	2012/2/7	11:14:56	X	Alarm bbb			
9	2012/2/7	11:14:58	O	Alarm bbb			
10	2012/2/7	11:14:58	O	Alarm ddd			
11	2012/2/7	11:14:59	X	Alarm ccc			
12	2012/2/7	11:15:00	O	Alarm eee			
13	2012/2/7	11:15:01	O	Alarm ccc			
14	2012/2/7	11:15:02	X	Alarm eee			
15	2012/2/7	11:15:02	X	Alarm ddd			
16	2012/2/7	11:15:03	X	Alarm bbb			
17	2012/2/7	11:15:03	X	Alarm ccc			
18	2012/2/7	11:15:03	X	Alarm aaa			

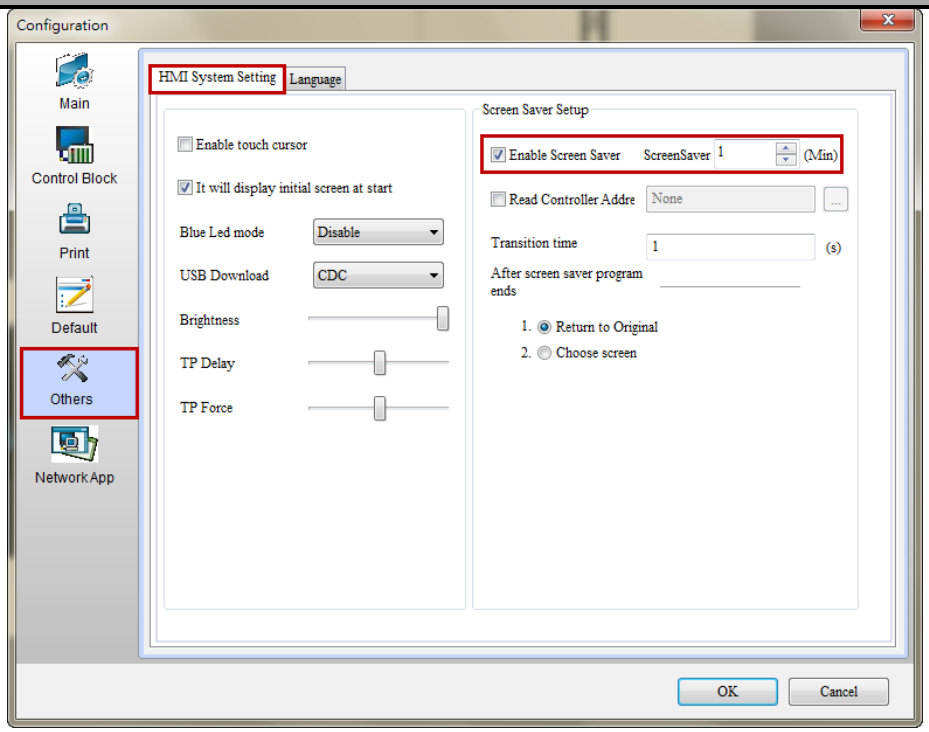
Alarm Setup Properties

Table 16-1-4 Alarm Setup Properties

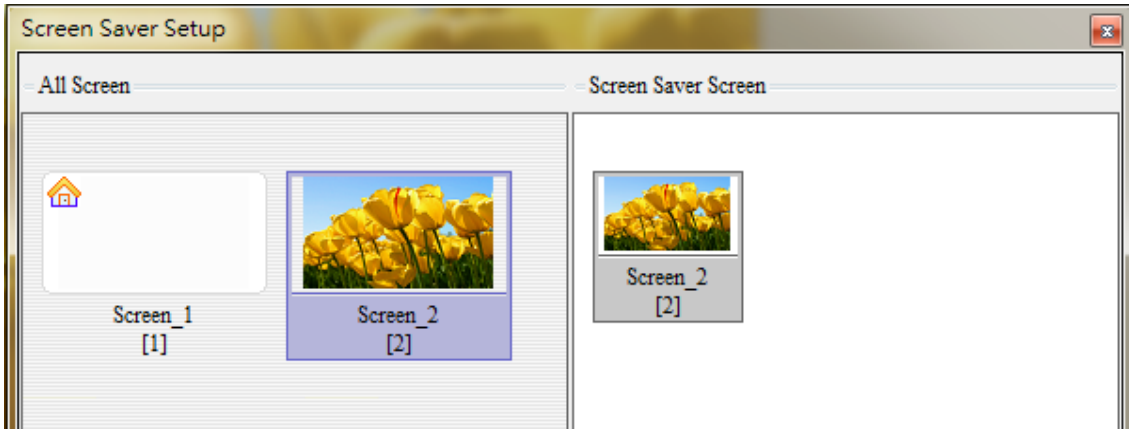
Exit Screen Saver when Alarm is triggered	➢ This function is set with the program of screen saver. The default setting is set to activate. ➢ Assume the user enables screen saver program and setup the screen of screen saver. If the alarm occurs, HMI will not be in screen saver mode. However, even when the user does not setup the screen for screen saver, HMI will not be in Blue Led mode. ➢ Disable the function of 【Exit Screen Saver when Alarm is Triggered】. When the alarm occurs for the first time, the system exits screen saver. After that, the system enters screen saver program according to the setting time no matter the alarm is cleared or not. **Example** ✓ Alarm Setup  ✓ Create the numeric entry element as $100. ✓ Go to [Option] > [Configuration] > [Others] > [HMI System Setting] to enable the screen saver.

Alarm Setup Properties

Table 16-1-4 Alarm Setup Properties



✓ Go to [Screen] > [Screen saver] to create a screen saver.



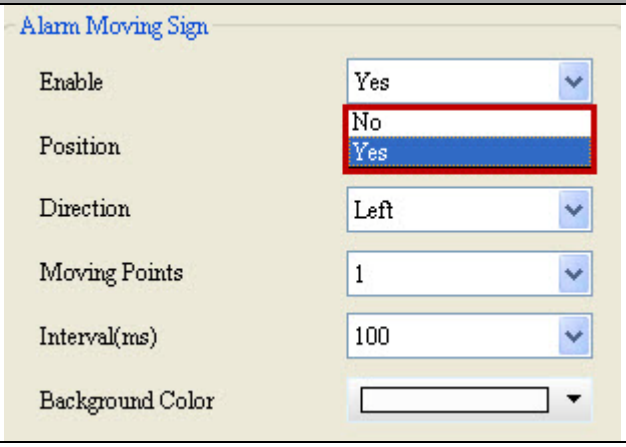
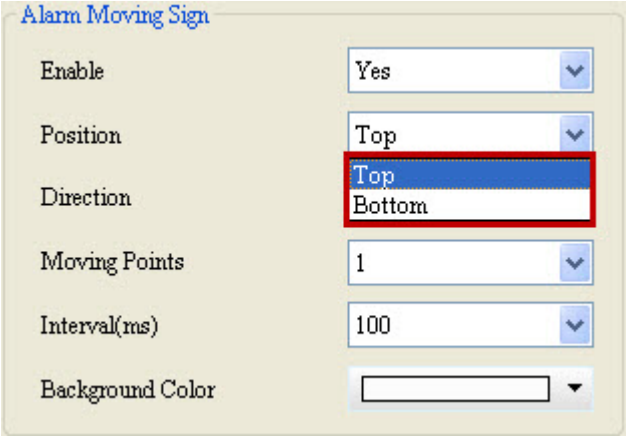
✓ Download the compile project to HMI. Enter 1 to numeric entry element $100 to trigger the alarm. After 1 minute, when screen saver program is activated and the alarm is detected, function of screen saver will be disabled.

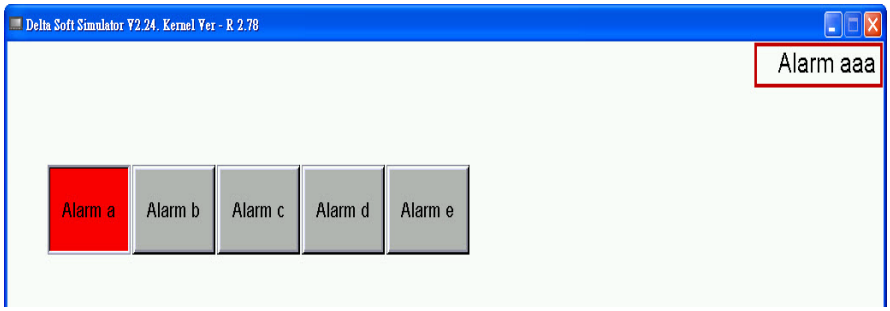
➢ **Alarm Moving Sign**

Enable	➢ Yes and No are selectable for the Start. If Yes is selected, the message of the triggered alarm will be displayed at the specified location on the screen. If No is selected, no alarm message will be displayed.

Alarm Setup Properties

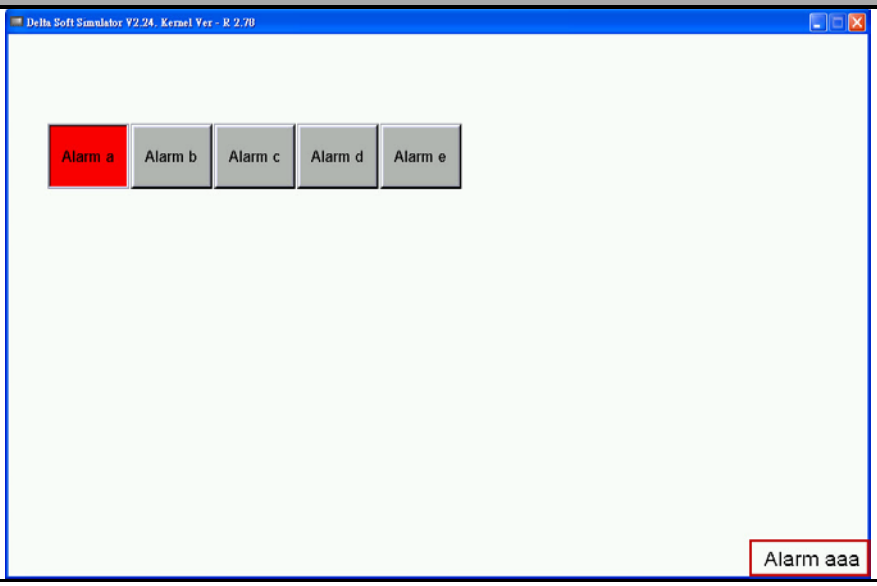
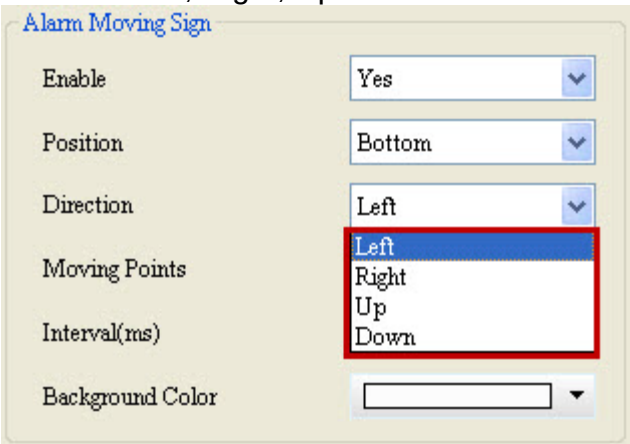
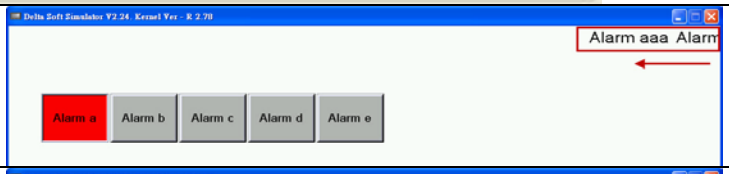
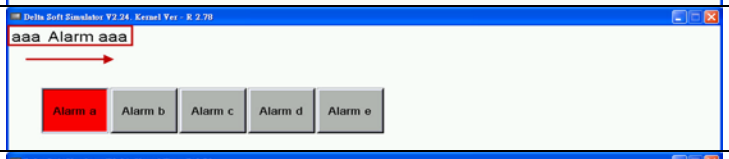
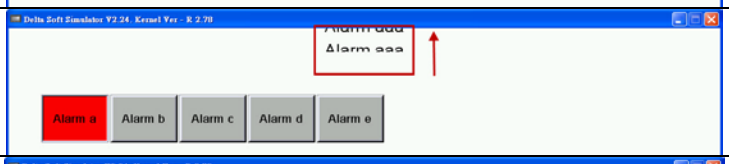
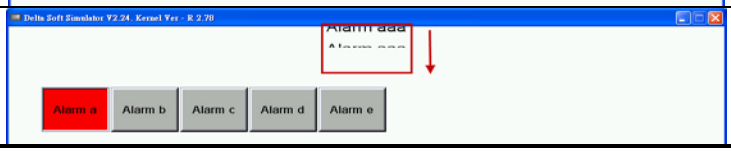
Table 16-1-4 Alarm Setup Properties

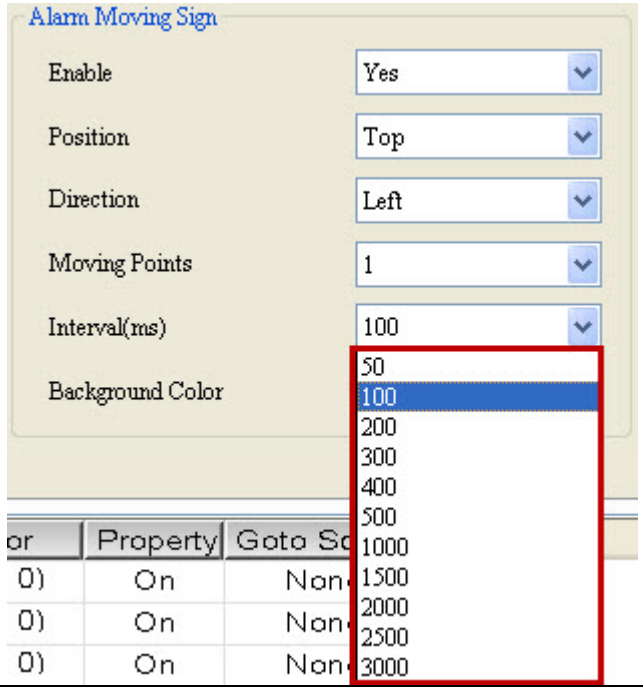
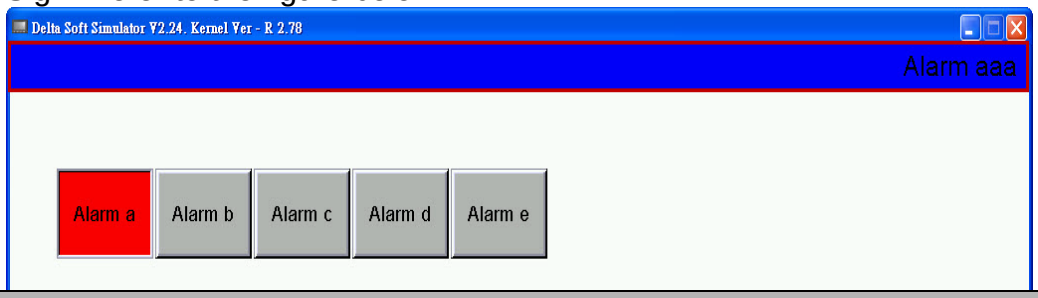
<table>
<tr><td></td><td> 
</td></tr>
<tr><td>Position</td><td>➢ Top and Bottom are available to the Position. If Top is selected, the message of the triggered alarm will be displayed at the top of the HMI screen. If Bottom is selected, the message of the alarm will be displayed at the bottom of the HMI screen.


<table>
<tr><td>Top</td><td> 
</td></tr>
</table></td></tr>
</table>

Alarm Setup Properties

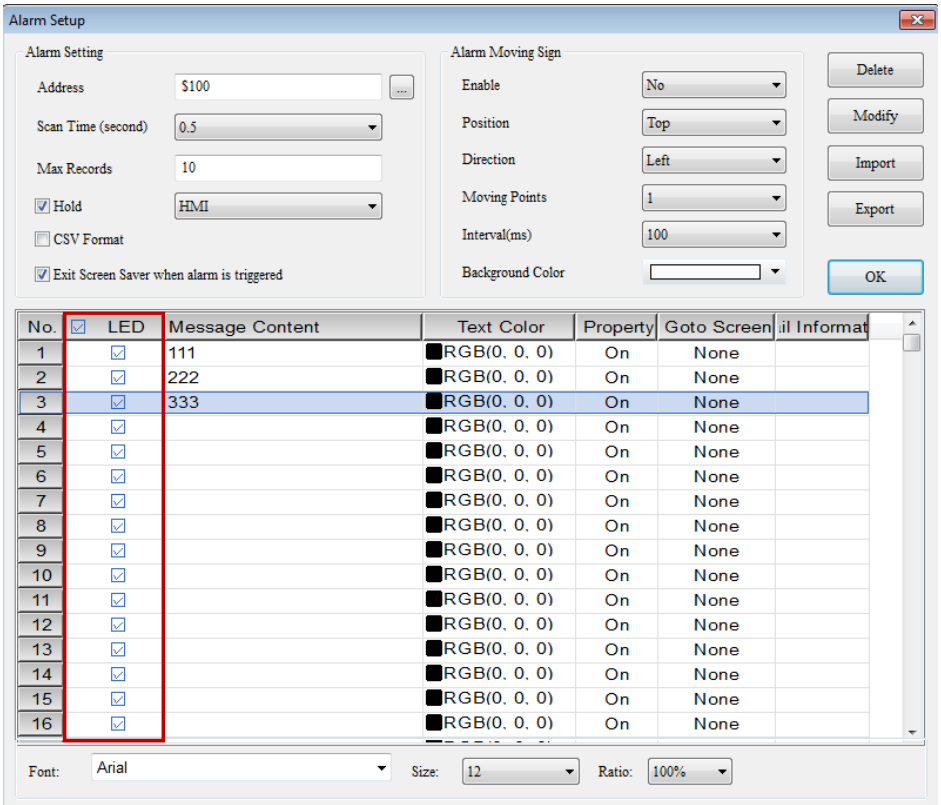
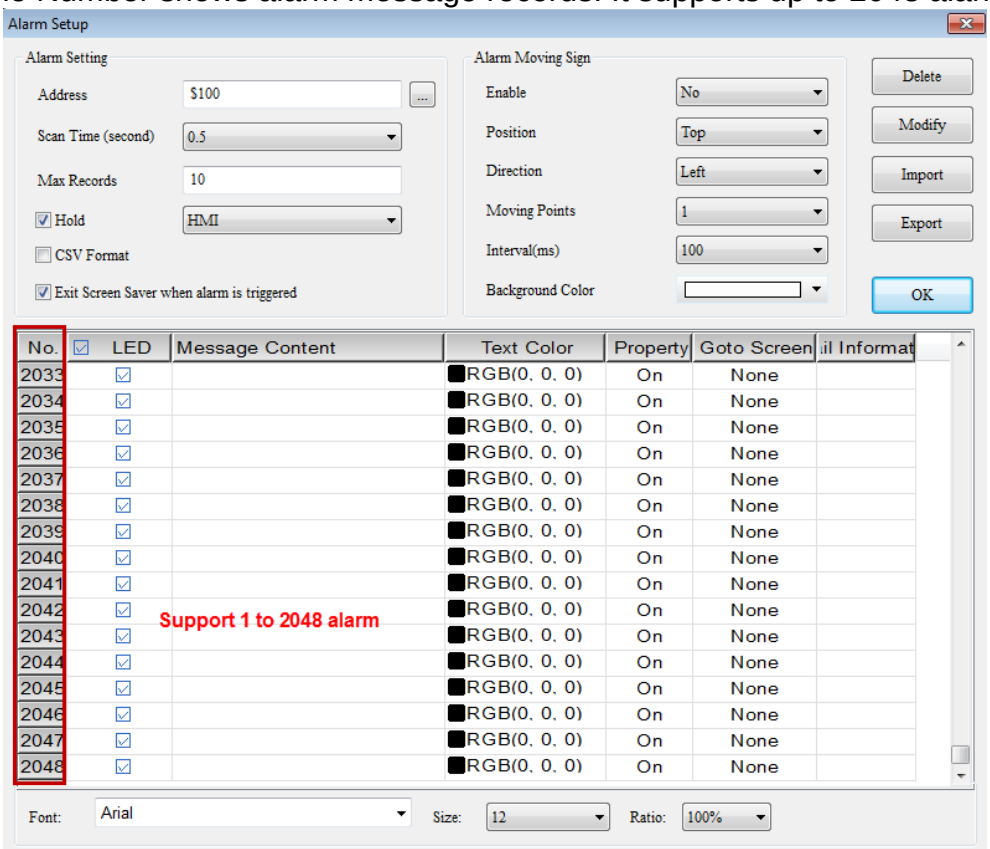
Table 16-1-4 Alarm Setup Properties

	Bottom	
Direction	➢ The moving direction is Left, Right, Up or Down. 	
	Left	
	Right	
	Up	
	Down	
Moving Points	➢ The higher the moving points, the more the distance to which the text moves. The setting range is 1~50 with Pixel as the unit.	

Alarm Setup Properties Table 16-1-4 Alarm Setup Properties	
Interval (ms)	➢ The Interval defines the time (ms) between two message movements of the Alarm Moving Sign. The moving distance is set up based on the setting of the Moving Points. 
Background Color	➢ This option provides the Background Color for the display of the Alarm Moving Sign. Refer to the figure below. 
➢ **Show Alarm Message Content**	
LED	➢ This function determines if LED will glitter when the alarm is triggered. ➢ In default setting, LED glitters when the alarm is triggered. Users can cancel this function.

Alarm Setup Properties

Table 16-1-4 Alarm Setup Properties

<table>
<tr><td></td><td> 
</td></tr>
<tr><td>Number</td><td>➢ The Number shows alarm message records. It supports up to 2048 alarms.
 
</td></tr>
<tr><td>Message Content</td><td>➢ The user can define the alarm message content to be displayed in the Message Content column.
➢ The user may modify the message content directly in the column or click the</td></tr>
</table>

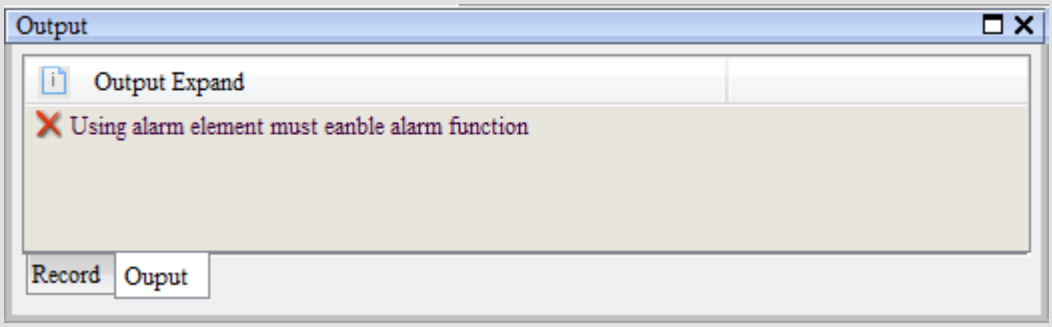
Alarm Setup Properties

Table 16-1-4 Alarm Setup Properties

Modify button.

NOTE:

✓ If creating alarm elements with read addresses but not filling in the message content, a warning message will pop up when compiling the screen. Please see the figure below.



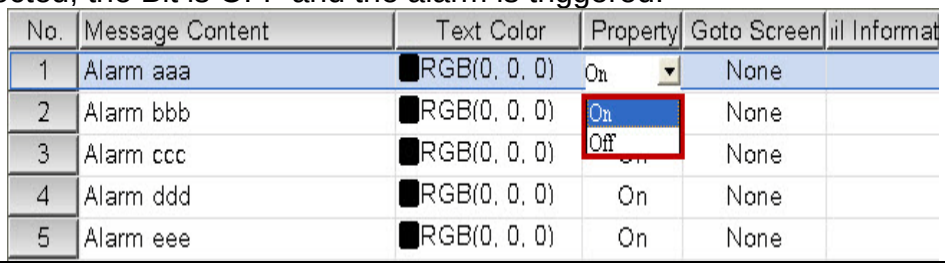
Text Color

➢ The Text Color column defines the display color of the alarm message. It is black by default.

Property

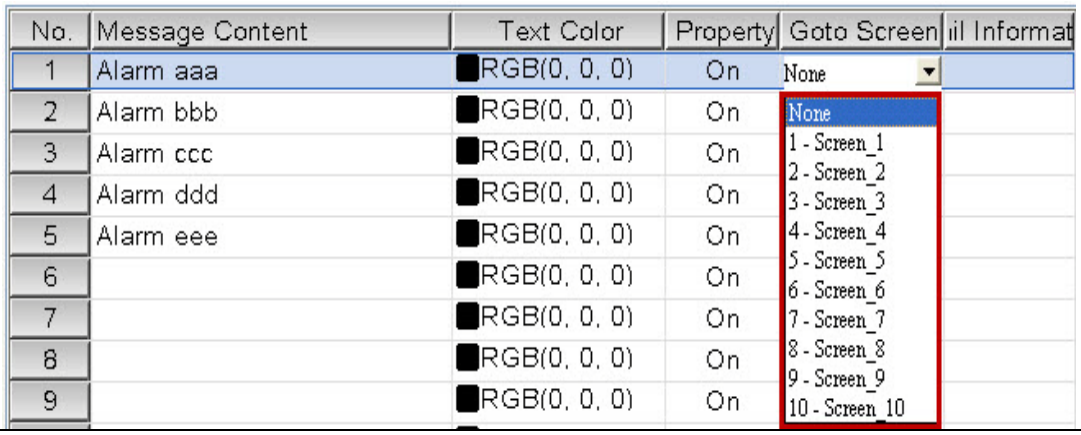
➢ ON and OFF are available for the Property.

➢ When ON is selected, the Bit is On and the alarm is triggered. When OFF is selected, the Bit is OFF and the alarm is triggered.



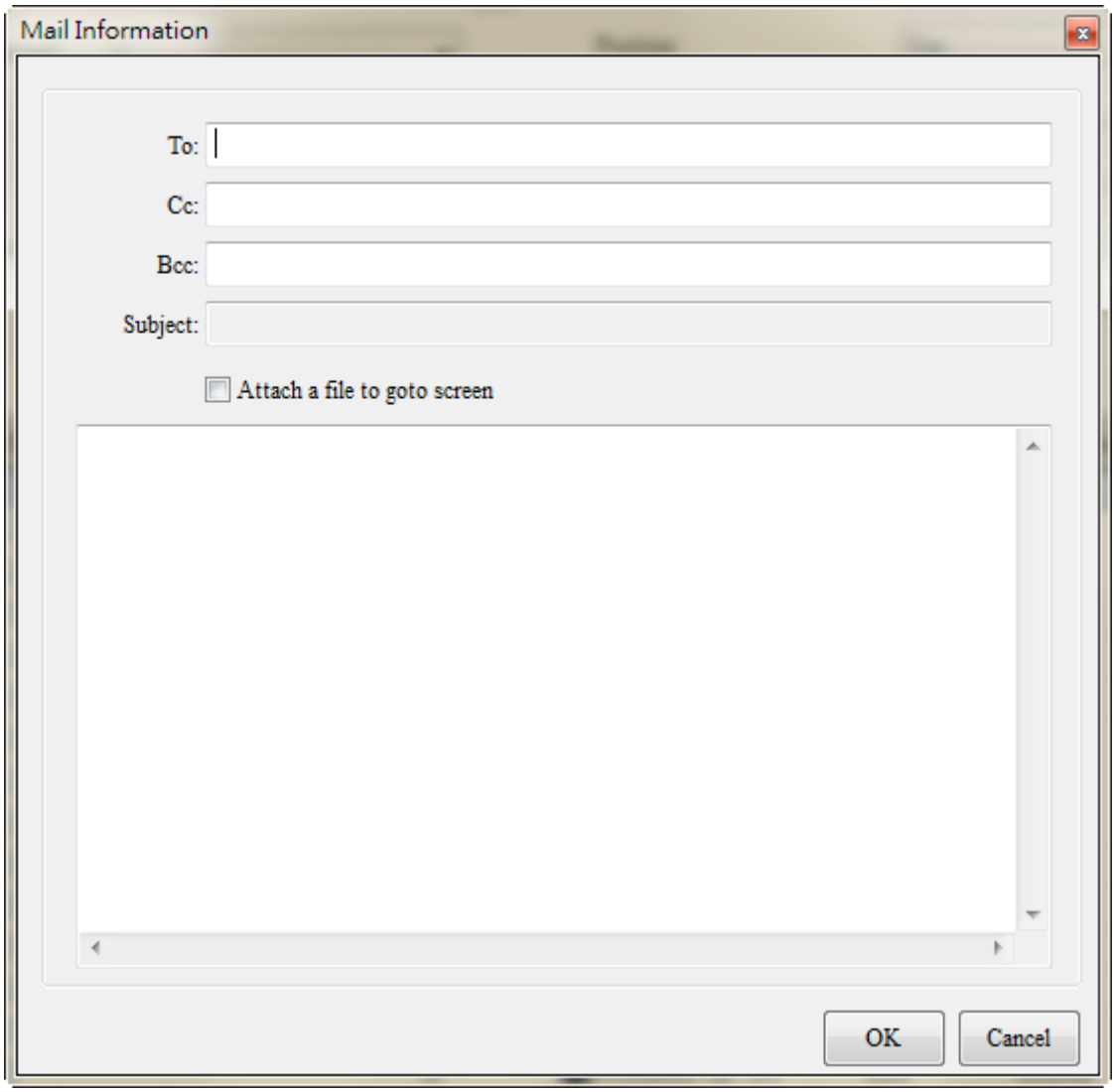
Go to Screen

➢ This column defines whether any specified screen will be displayed upon trigger of the alarm. If other screens are created, the user can show the screen as desired by selecting the corresponding screen number from the dropdown menu.



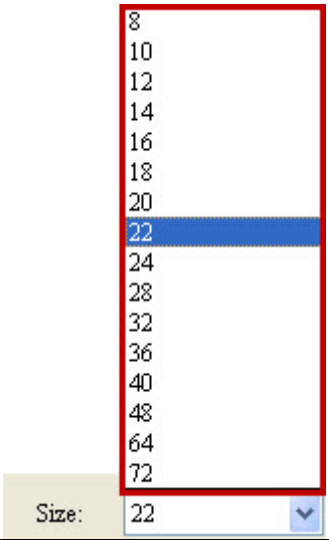
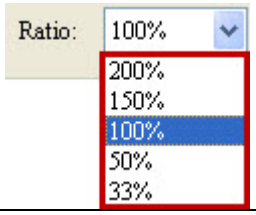
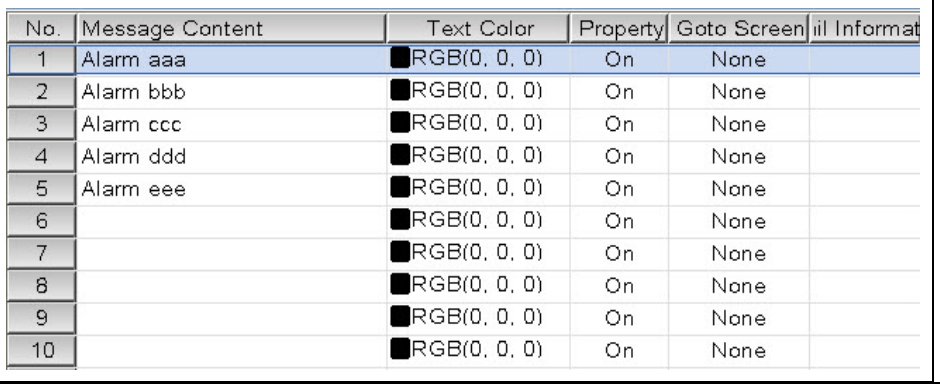
Alarm Setup Properties

Table 16-1-4 Alarm Setup Properties

Mail Information	➢ The Mail Information function can send an email to relevant personnel when an alarm is triggered. It must be used in conjunction with the [Options] → [Set Configurations] → [Network App] → [SMTP] function. ➢ When enabling the SMTP function, the user can enter mail messages in this mail information column.  	
	To:	➢ Complete this field with the mail address of the recipient to which a notice will be sent upon trigger of the alarm. Multiple recipients are acceptable, and ";" must be used as a separator between the recipients. The format is same as an ordinary email.
	Cc:	➢ Complete this field with the mail address of the person to which a copy of the notice will be sent upon trigger of the alarm. When this field is completed, the recipient of the mail can look at the mail information in this field.
	Bcc:	➢ The recipient in this field is invisible. When the mail is sent, both the recipients of the mail and copy cannot see the recipient in this field.
	Subject:	➢ The user cannot change the subject of the mail information

Alarm Setup Properties

Table 16-1-4 Alarm Setup Properties

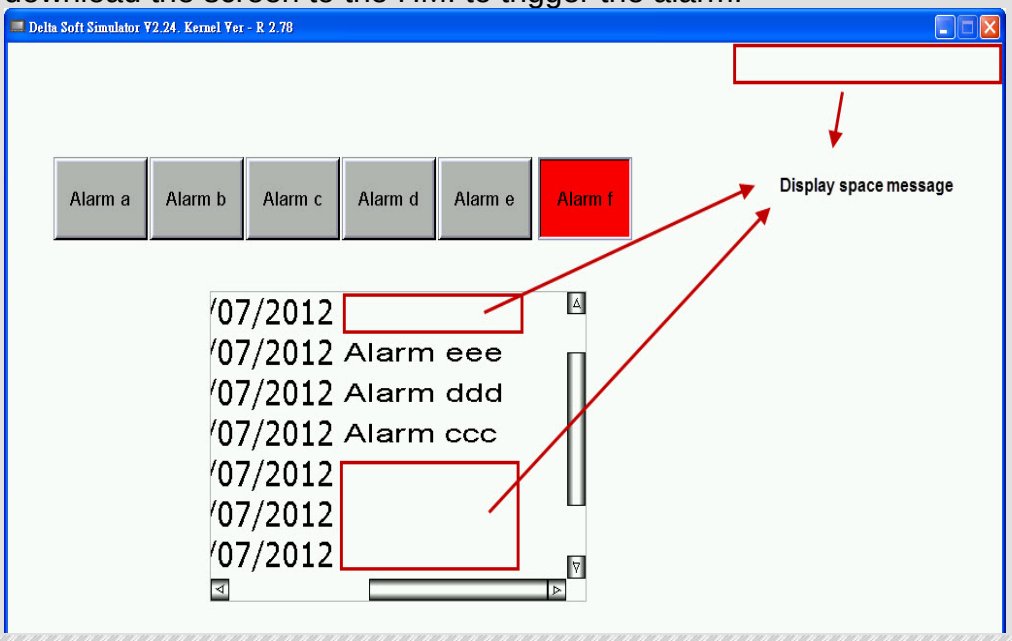
		because it is generated according to the alarm message contents edited. If change of the subject is needed, the user must be change the message content first.
	Attach a File to the Go to Screen	➢ If this option is checked, that current alarm screen will be sent to the recipient as an attachment. The attachment is created in .bmp format.
	Content	➢ The user can enter the mail content as desired.
➢ **Alarm Message Text Properties**		
Font	➢ This defines the font of the alarm message to be displayed. The user can set the font as desired. 	
Size	➢ This defines the size of the text for the alarm message to be displayed. 	
Zooming	➢ This defines the size of the window for the alarm message to be displayed. A scale of 100% is set by default. 	
	100%	

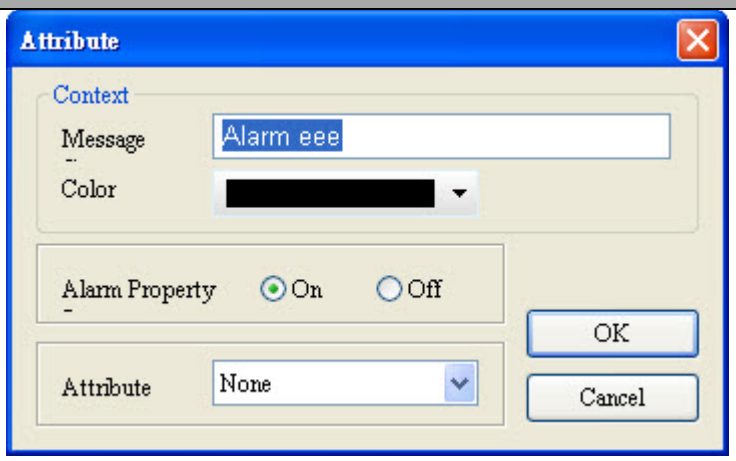
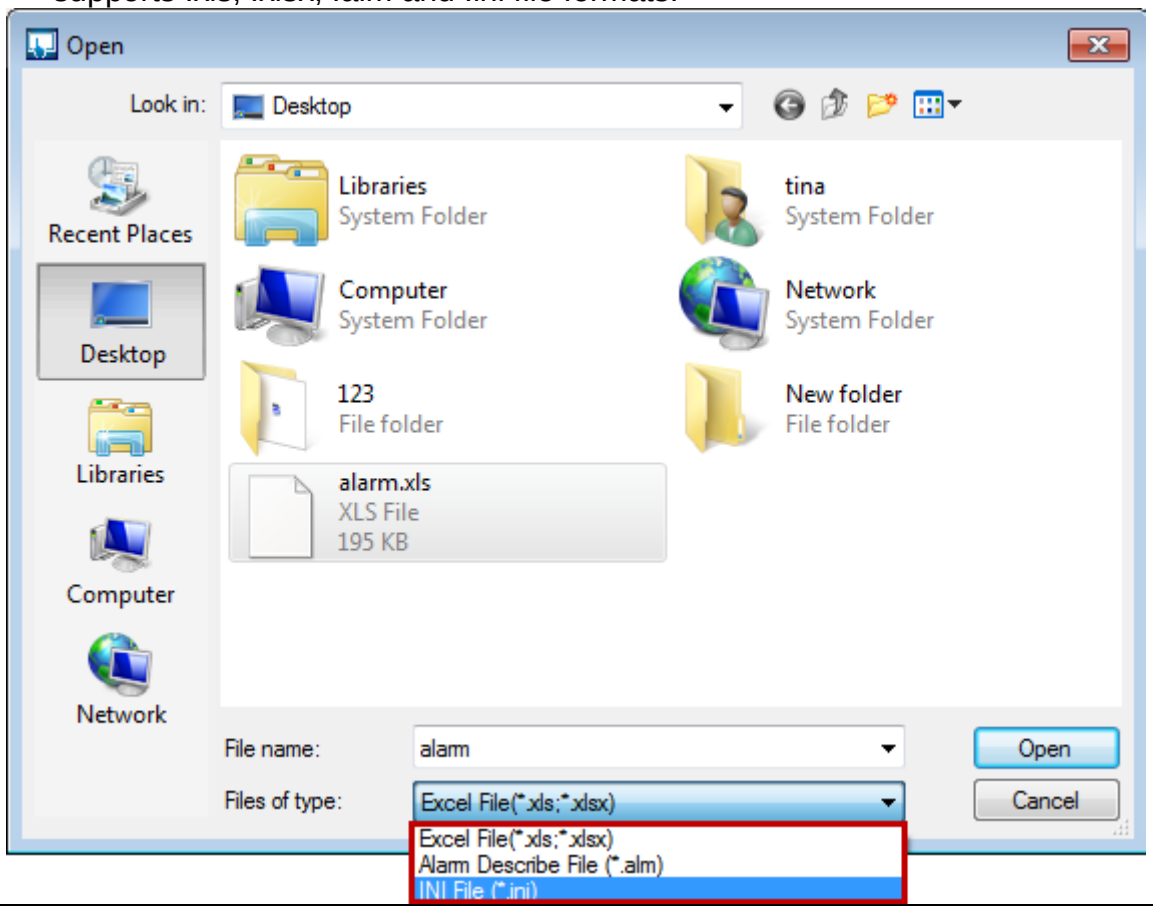
No.	Message Content	Text Color	Property	Goto Screen	il Informat
1	Alarm aaa	RGB(0, 0, 0)	On	None	
2	Alarm bbb	RGB(0, 0, 0)	On	None	
3	Alarm ccc	RGB(0, 0, 0)	On	None	
4	Alarm ddd	RGB(0, 0, 0)	On	None	
5	Alarm eee	RGB(0, 0, 0)	On	None	
6		RGB(0, 0, 0)	On	None	
7		RGB(0, 0, 0)	On	None	
8		RGB(0, 0, 0)	On	None	
9		RGB(0, 0, 0)	On	None	
10		RGB(0, 0, 0)	On	None	

Alarm Setup Properties

Table 16-1-4 Alarm Setup Properties

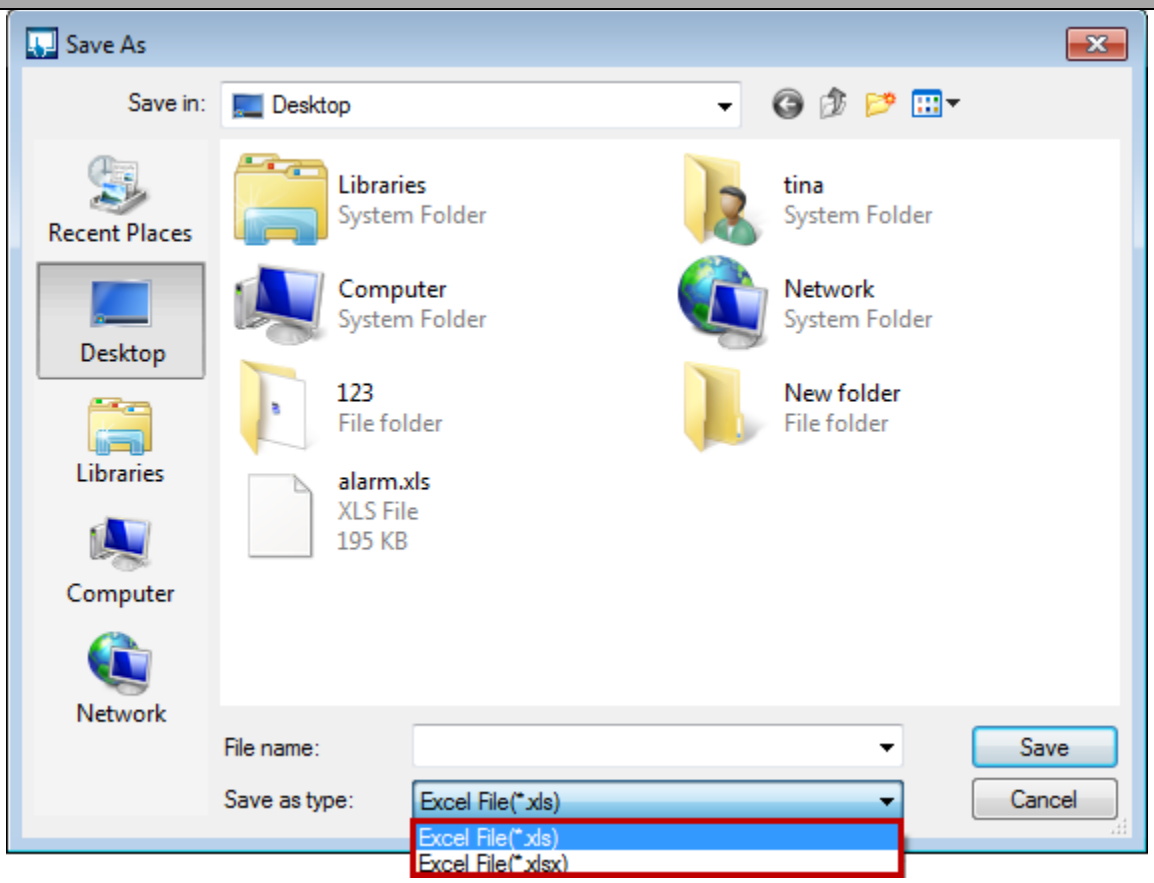
<table>
<tr><td></td><td>150%</td><td>
<table>
<tr><th>No.</th><th>Message Content</th><th>Text Color</th><th>'roperl</th><th>oto Scre</th><th>Inform</th></tr>
<tr><td>1</td><td>Alarm aaa</td><td>RGB(0, 0,</td><td>On</td><td>None</td><td></td></tr>
<tr><td>2</td><td>Alarm bbb</td><td>RGB(0, 0,</td><td>On</td><td>None</td><td></td></tr>
<tr><td>3</td><td>Alarm ccc</td><td>RGB(0, 0,</td><td>On</td><td>None</td><td></td></tr>
<tr><td>4</td><td>Alarm ddd</td><td>RGB(0, 0,</td><td>On</td><td>None</td><td></td></tr>
<tr><td>5</td><td>Alarm eee</td><td>RGB(0, 0,</td><td>On</td><td>None</td><td></td></tr>
<tr><td>6</td><td></td><td>RGB(0, 0,</td><td>On</td><td>None</td><td></td></tr>
<tr><td>7</td><td></td><td>RGB(0, 0,</td><td>On</td><td>None</td><td></td></tr>
<tr><td>8</td><td></td><td>RGB(0, 0,</td><td>On</td><td>None</td><td></td></tr>
<tr><td>9</td><td></td><td>RGB(0, 0,</td><td>On</td><td>None</td><td></td></tr>
<tr><td>10</td><td></td><td>RGB(0, 0,</td><td>On</td><td>None</td><td></td></tr>
</table>
</td></tr>
<tr><td>Delete</td><td>➢ After the alarm message content is created, the user can select a message to be deleted and click the Delete button to delete the selected message.

NOTE:
✓ The user can enter a message in a blank field of the Message Content and move the cursor to the next field for entering an additional message. If the user deletes the first message using the Delete or Backspace key on the keyboard instead of the Delete button on the screen, the blank alarm will be displayed at the specified position when the user leaves the alarm setup screen and download the screen to the HMI to trigger the alarm.
 
</td></tr>
<tr><td>Modify</td><td>➢ Press the Modify button to change the message content, text color and Goto screen.</td></tr>
</table>

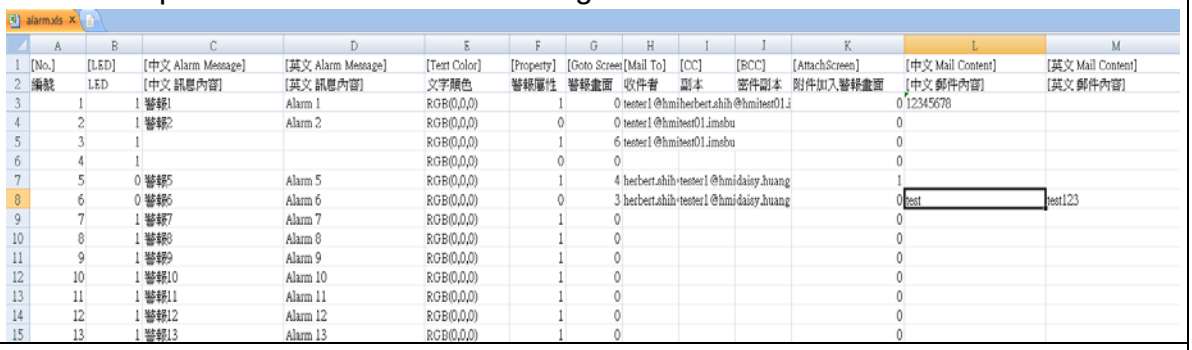
Alarm Setup Properties Table 16-1-4 Alarm Setup Properties	
	 ➢ The user can also change the message, text color and Goto screen directly in the corresponding field.
Import	➢ The user can press the Import button to import alarm information. It supports .xls, .xlsx, .alm and .ini file formats. 
Export	➢ The user can press the Export button to export edited alarm message. It supports .xls and .xlsx file formats.

Alarm Setup Properties

Table 16-1-4 Alarm Setup Properties



➢ Apart from the alarm setting, users also can set up the alarm mail content via alarm parameters. Please see the figure below.



	A	B	C	D	E	F	G	H	I	J	K	L	M
1	[No.]	[LED]	[中文 Alarm Message]	[英文 Alarm Message]	[Text Color]	[Property]	[Goto Screen	[Mail To]	[CC]	[BCC]	[AttachScreen]	[中文 Mail Content]	[英文 Mail Content]
2	編號	LED	[中文 訊息內容]	[英文 訊息內容]	文字顏色	警報屬性	警報畫面	收件者	副本	密件副本	附件加入警報畫面	[中文 郵件內容]	[英文 郵件內容]
3	1	1	警報1	Alarm 1	RGB(0,0,0)	1	0	tester1@hmi	herbert.shih@hmitest01.i		0	12345678	
4	2	1	警報2	Alarm 2	RGB(0,0,0)	0	0	tester1@hmi	test01.imebu		0		
5	3	1			RGB(0,0,0)	1	6	tester1@hmi	test01.imebu		0		
6	4	1			RGB(0,0,0)	0	0				0		
7	5	0	警報5	Alarm 5	RGB(0,0,0)	1	4	herbert.shih	tester1@hmi	daisy.huang	1		
8	6	0	警報6	Alarm 6	RGB(0,0,0)	0	3	herbert.shih	tester1@hmi	daisy.huang	0	test	test123
9	7	1	警報7	Alarm 7	RGB(0,0,0)	1	0				0		
10	8	1	警報8	Alarm 8	RGB(0,0,0)	1	0				0		
11	9	1	警報9	Alarm 9	RGB(0,0,0)	1	0				0		
12	10	1	警報10	Alarm 10	RGB(0,0,0)	1	0				0		
13	11	1	警報11	Alarm 11	RGB(0,0,0)	1	0				0		
14	12	1	警報12	Alarm 12	RGB(0,0,0)	1	0				0		
15	13	1	警報13	Alarm 13	RGB(0,0,0)	1	0				0		

OK	➢ Press the OK button to leave the Alarm Setup window. This button functions same as pressing the X mark at the upper right corner of the window. Where any change is made, pressing OK or the X mark will save the change and leave the window.

16-2 History Alarm Table

	History Alarm Table

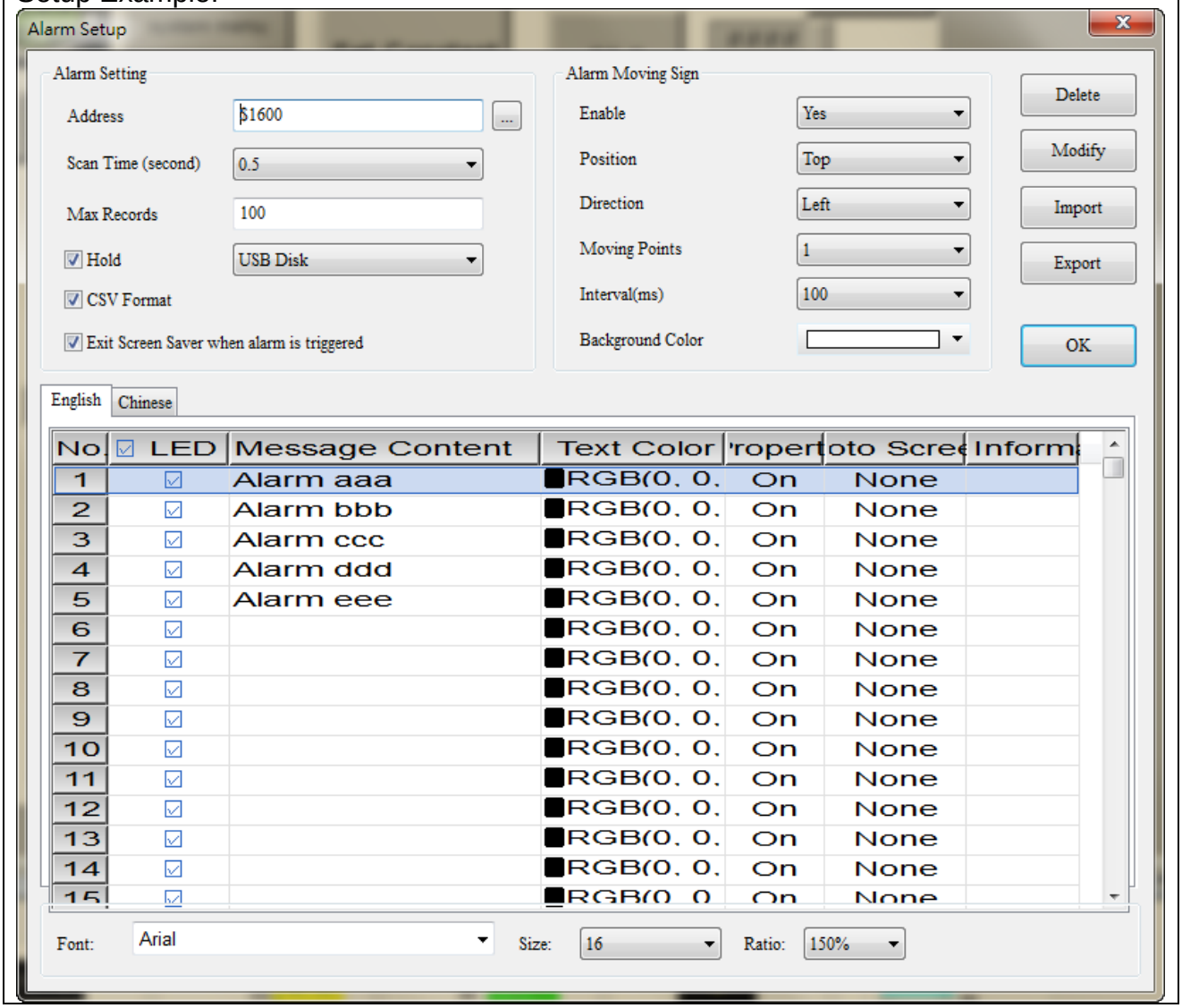
The History Alarm Table element is used to display the alarm information when an alarm is triggered. It also provides options for the user to display the release of the alarm. A corresponding state will be displayed for alarm ON and OFF.

Refer to the History Alarm Table example in Table 16-2-1.

History Alarm Table Example

Table 16-2-1 History Alarm Table Example

This example is described with reference to the alarm parameters in Table 16-1-3 Alarm Setup Example.

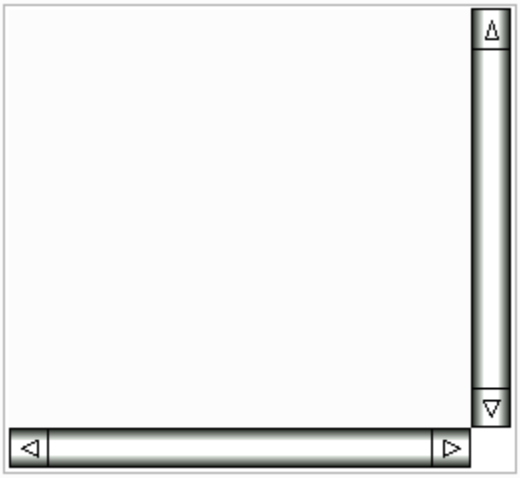


History Alarm Table Example

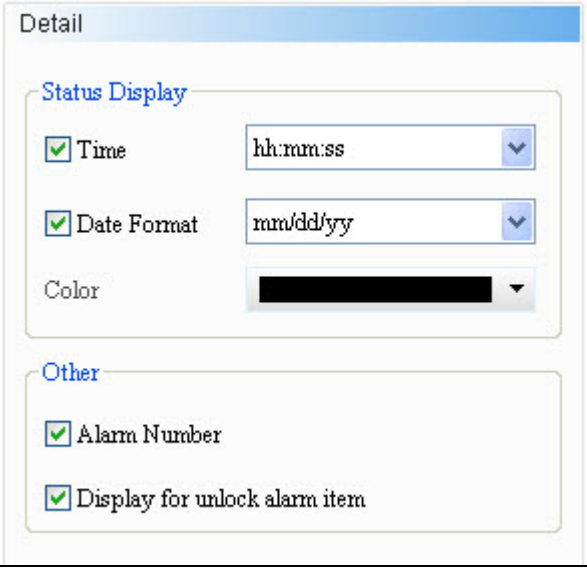
Table 16-2-1 History Alarm Table Example

Add History Alarm Table Element

- Step 1: Create the History Alarm Table element.

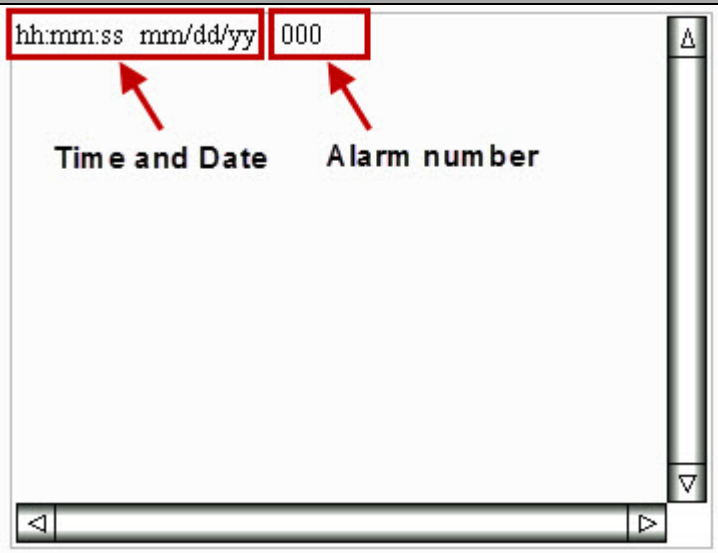


- Step 2: Check [Time Format] , [Date Format] , [Alarm Number] and [Show Alarm Release Item] . These options are used to show the time and date of the alarm, its number and whether to show alarm release.
  - Show Alarm Release Item: O stands for trigger of the alarm; X stands for release of the alarm.



History Alarm Table Example

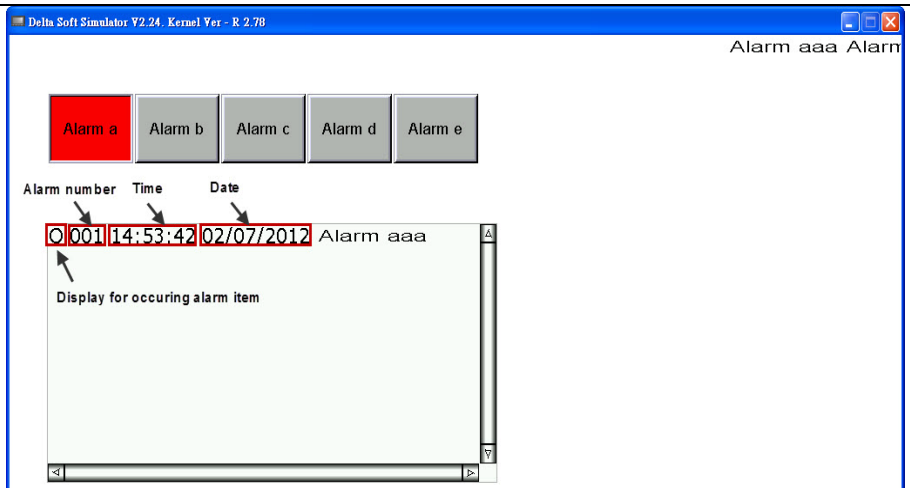
Table 16-2-1 History Alarm Table Example



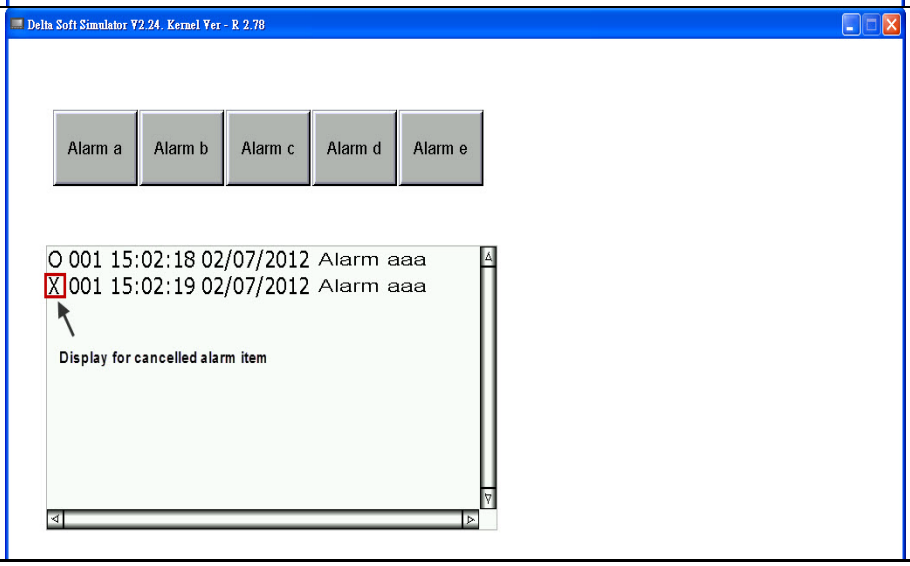
Execution Results

➢ After creation of the History Alarm Table element, perform the compilation and download the element to HIMI, when Alarm 1 is triggered, the History Alarm Table element will show the time and date of the alarm, its number, trigger and release states.

Alarm ON



Alarm OFF



Double click the History Alarm Table icon and the following property setting screen appears.

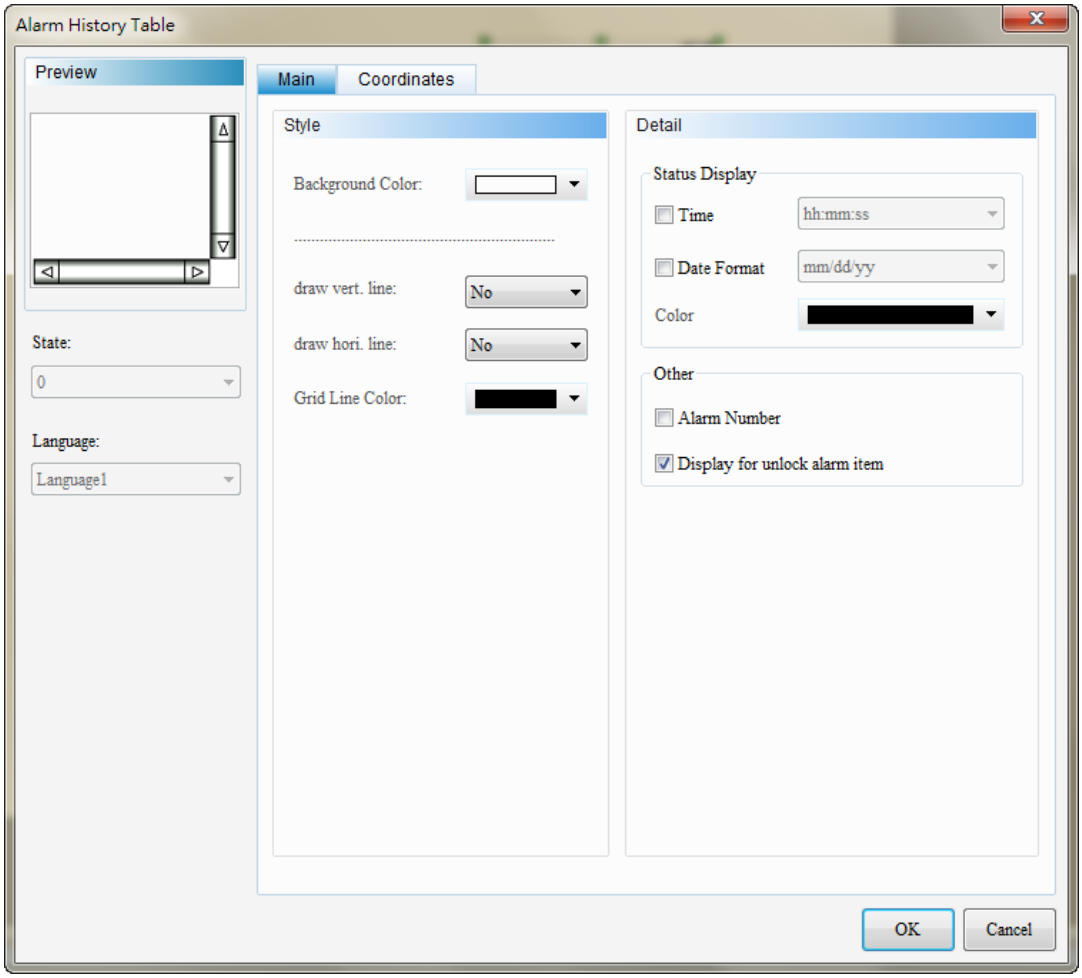


Fig. 16-2-1 History Alarm Table properties setting screen

History Alarm Table	
Function Page	**Content Description**
Preview	The State and Language are not available to the History Alarm Table.
Main	Sets the Background Color, time format, draw horizontal line, draw vertical line, date format, display color, alarm number, Display for unlock alarm item.
Coordinates	Sets the X-Y coordinates, width and height of the element.

Table 16-2-2 History Alarm Table function page

◆ Main

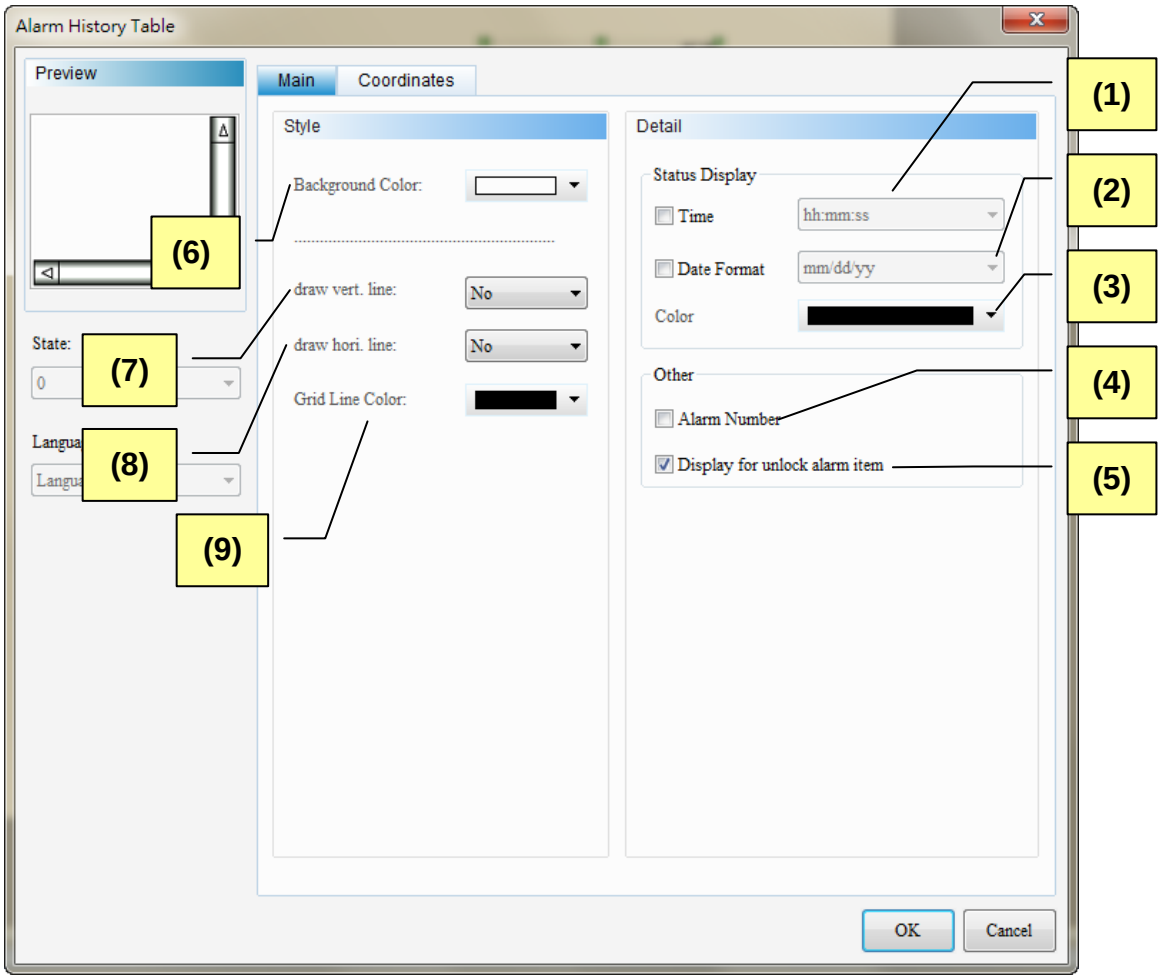
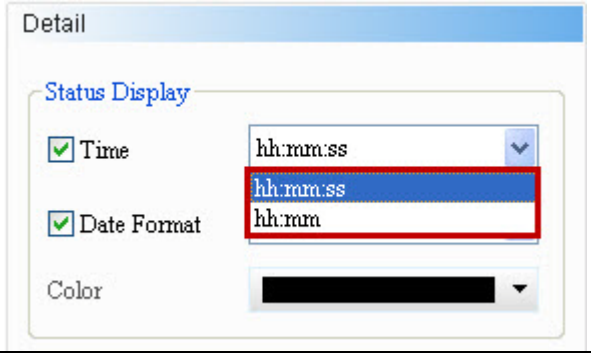
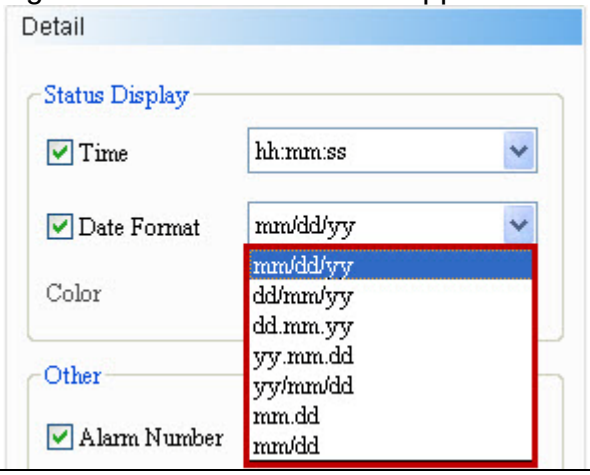
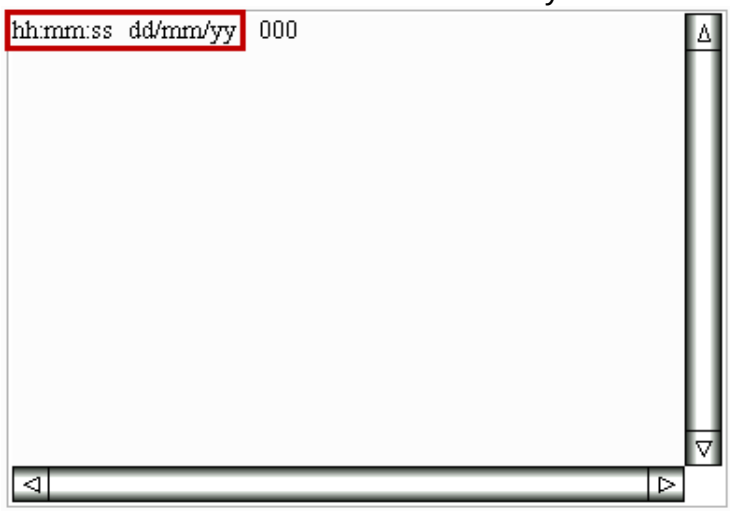
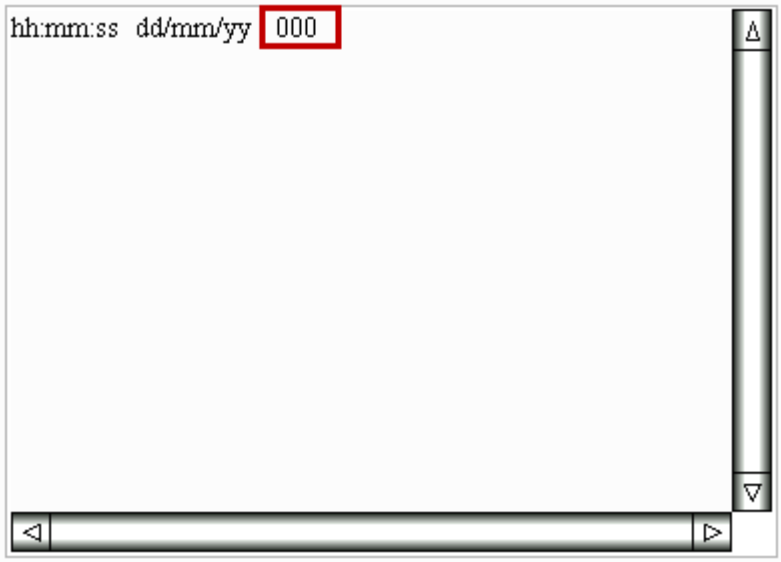
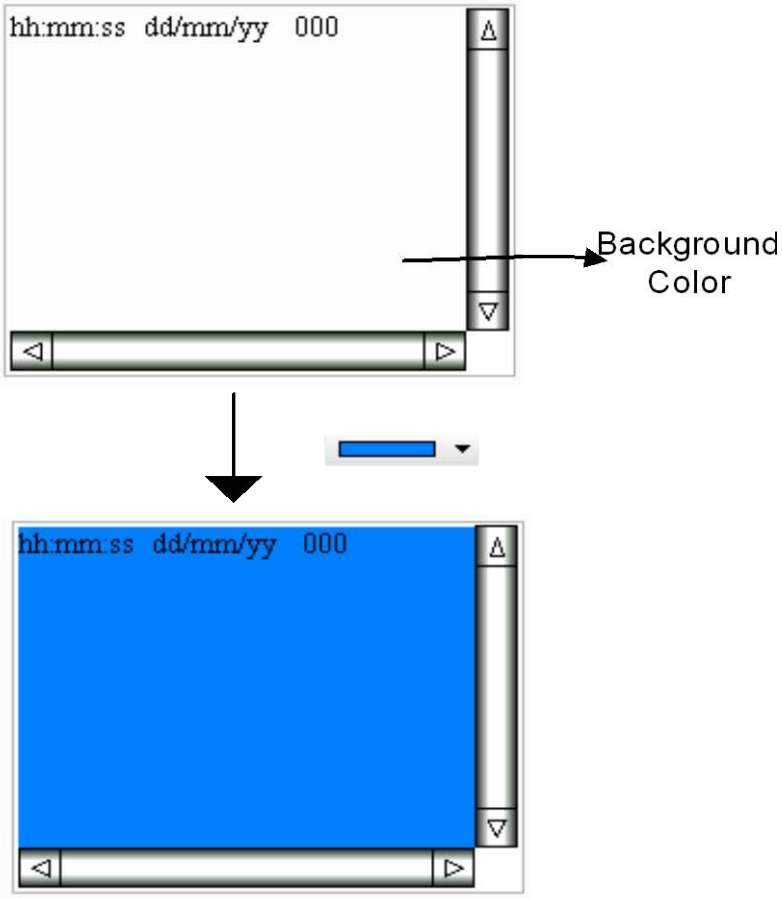
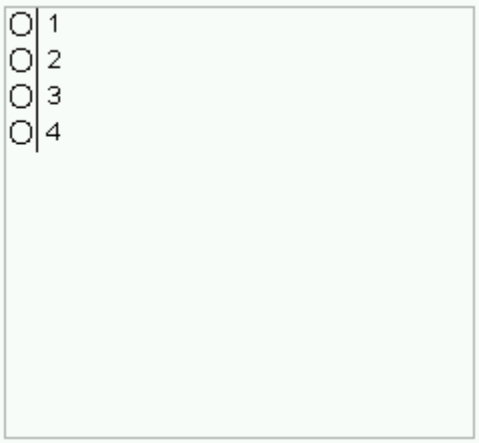
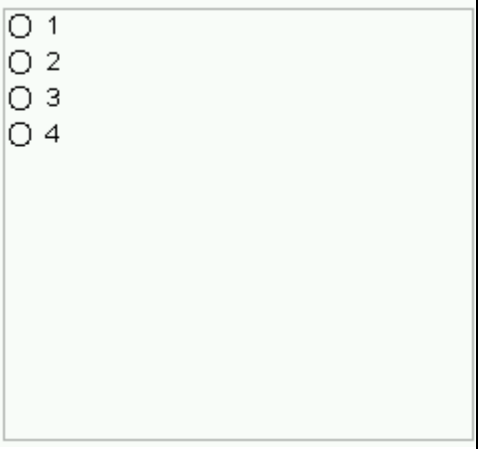
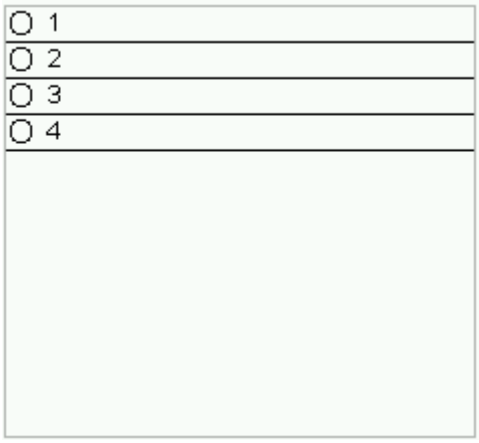
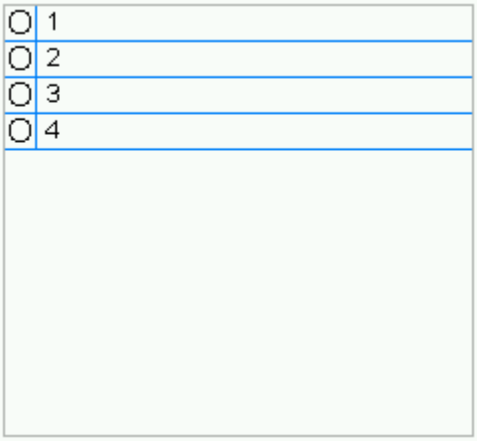


Fig. 16-2-2 History Alarm Table Main properties page

No.	Property	Function
(1)	Time Format	➢ The following two time formats are supported: 

No.	Property	Function
(2)	Date Format	➢ The following seven date formats are supported: 
(3)	Display Color	➢ The Display Color option is used to change the display color of the time and date. The color is by default. 
(4)	Alarm Number	➢ When the Alarm Number is check, the corresponding number will be display when an alarm is triggered. 
(5)	Display for unlock alarm item	➢ When this option is checked, the History Alarm Table will show the alarm trigger and release state and information. ➢ When this option is unchecked, the History Alarm Table will only show the alarm trigger state and information.

No.	Property	Function
(6)	Background Color	➢ The user can set the Background Color for the element. 
(7)	Show the vertical separator line	➢ This function can be used to separate the data display. Select YES to show the vertical separator line | Select NO to not show the vertical separator line

No.	Property	Function
		 
(8)	Show the horizontal rule	➢ This function can be used to separate the data display. Select YES to show the horizontal rule:  Select NO to not show the horizontal rule:
(9)	Grid color	➢ Users can define the grid color. The default color is black. 

◆ Coordinates

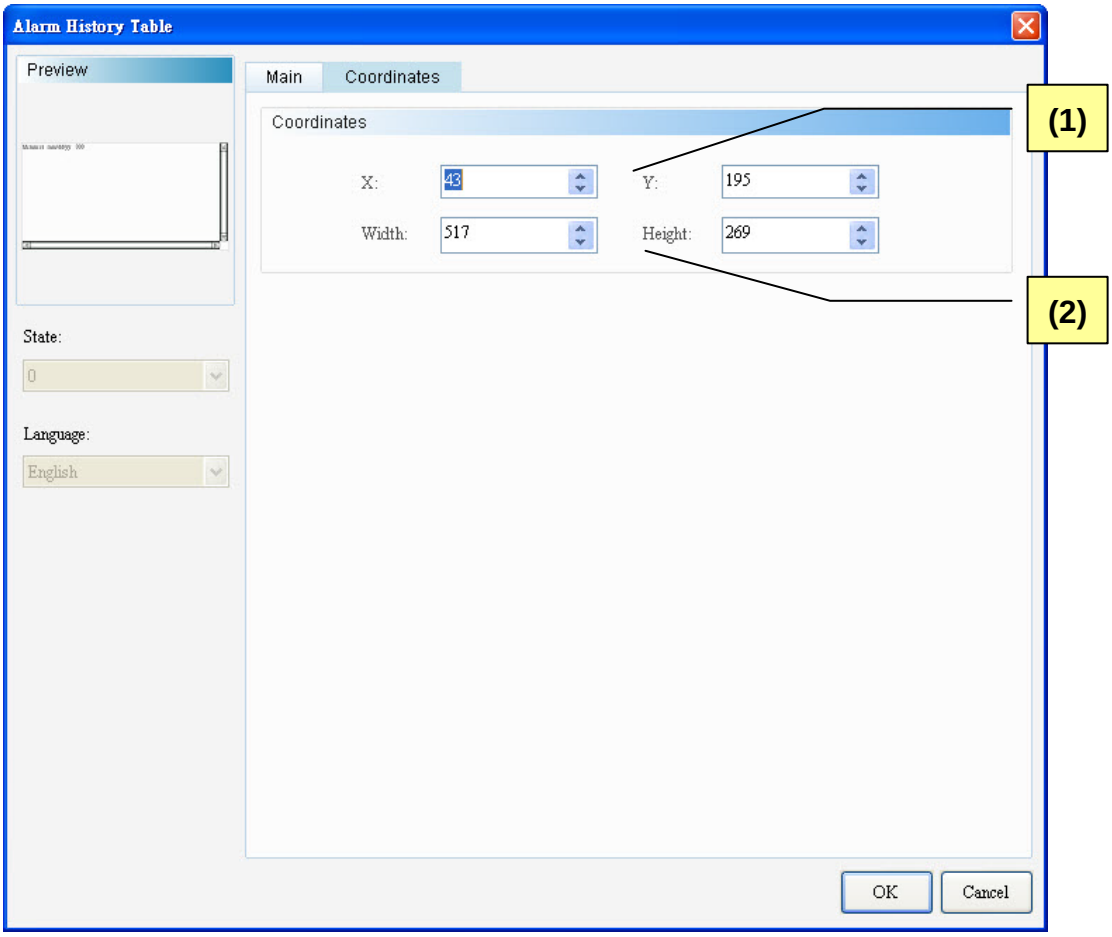


Fig. 16-2-3 History Alarm Table Coordinates properties page

No.	Property	Function
(1)	X value, Y value	➢ The X and Y coordinate at the upper left corner of the element.
(2)	Width, Height	➢ The width and height of the element.

16-3 Active Alarm List

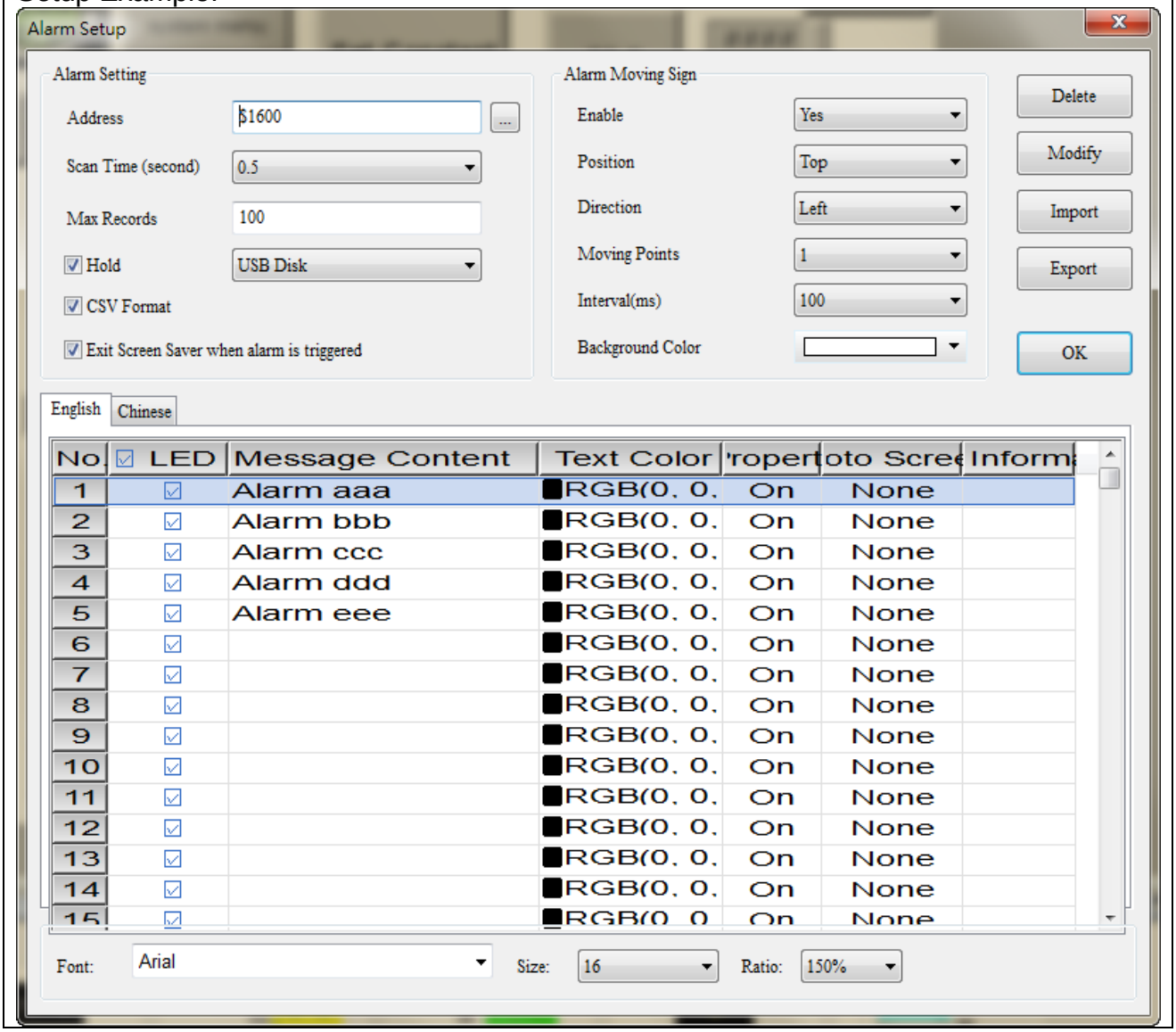
	Active Alarm List

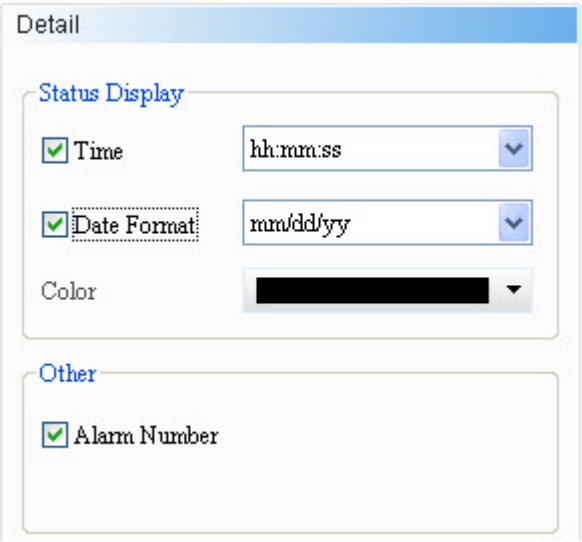
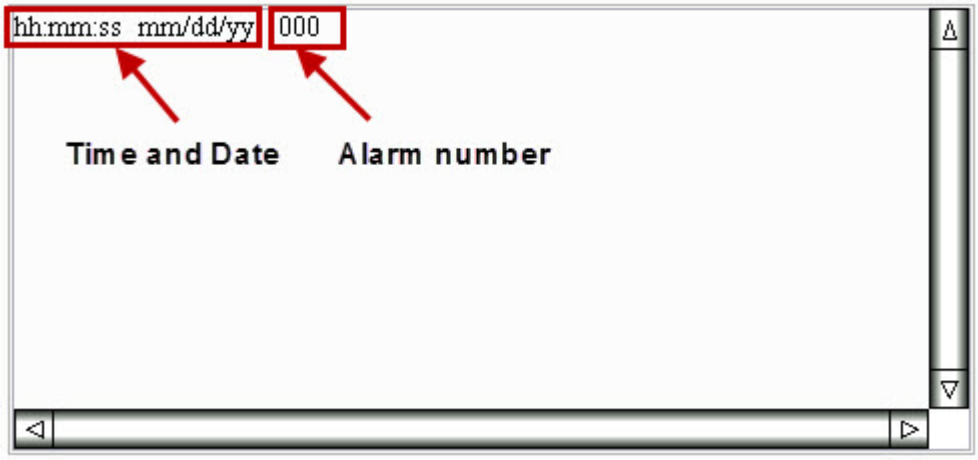
The Active Alarm List element is used to display the information of the alarm that occurs currently.

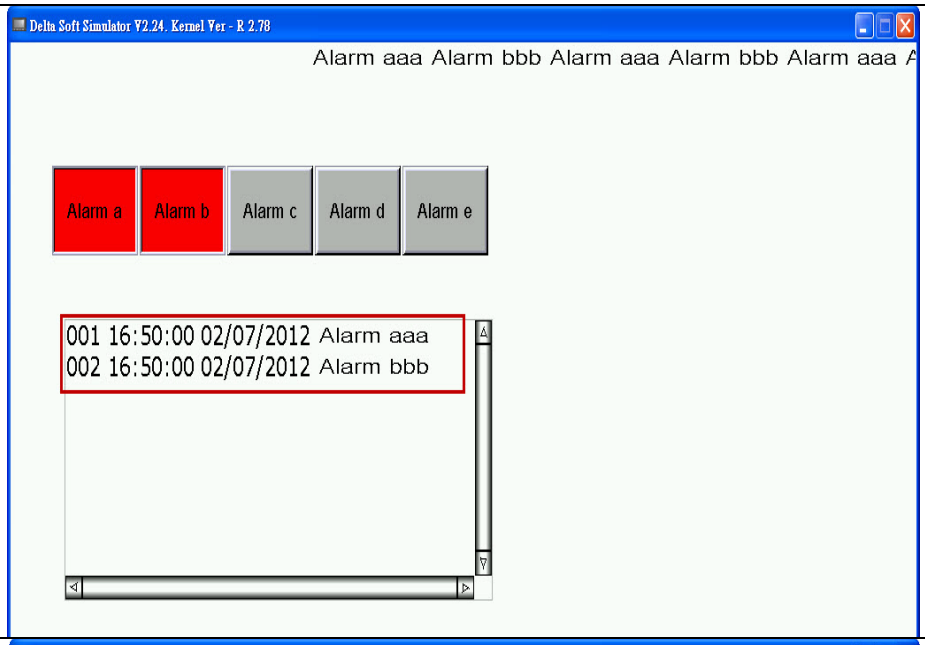
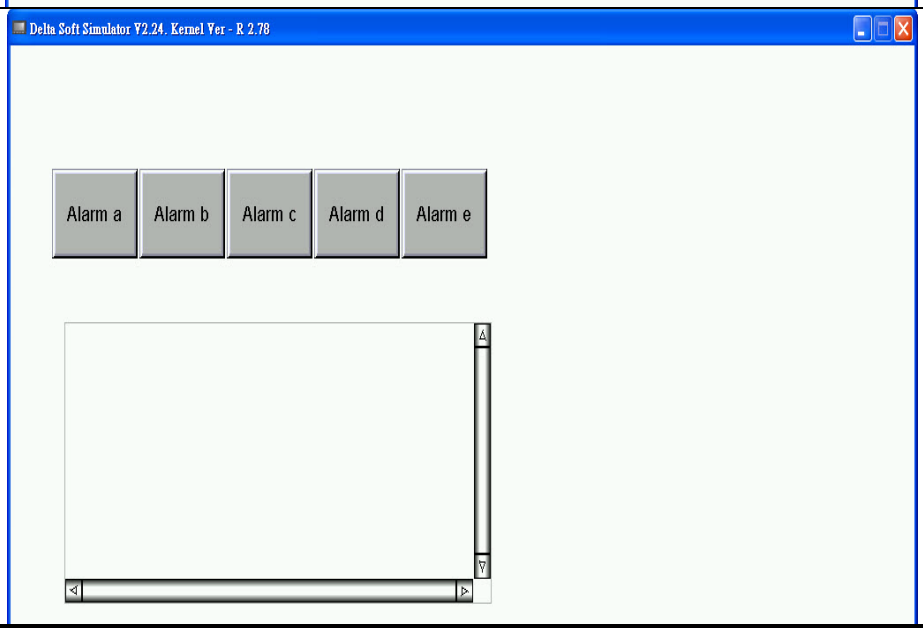
Refer to the Active Alarm List example in Table 16-3-1.

Active Alarm List Example
Table 16-3-1 Active Alarm List Example

This example is described with reference to the alarm parameters in Table 16-1-3 Alarm Setup Example.



Active Alarm List Example Table 16-3-1 Active Alarm List Example	
Add Active Alarm List Element	➢ Step 1: Create the Active Alarm List element. ➢ Step 2: Check [Time Format] and [Date Format] . These options are used to display the time and date of the alarm. The Alarm Number is checked by default.  

Active Alarm List Example Table 16-3-1 Active Alarm List Example	
Execution Results	➢ After creation of the Active Alarm List element, perform the compilation and download the element to HMI. When Alarm 1 and Alarm 2 are triggered, the Active Alarm List shows the time, date and numbering of the alarms that occur currently. No items will be displayed on the Active Alarm List when the alarms are released.
Alarm ON	
Alarm OFF	

Double click the Active Alarm List icon and the following property setting screen appears.

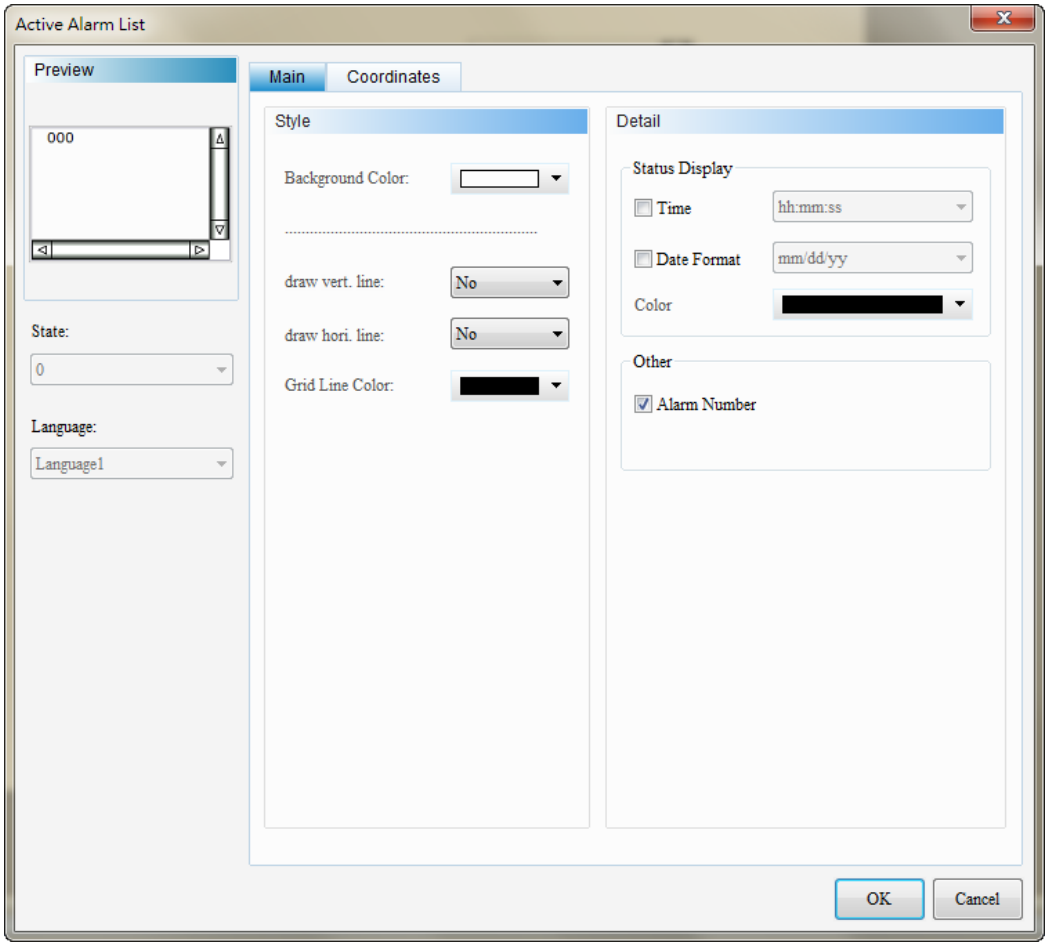


Fig. 16-3-1 Active Alarm List properties setting screen

Active Alarm List	
Function Page	**Content Description**
Preview	The State and Language are not available to the Active Alarm List.
Main	Sets the Background Color, draw vertical line, draw horizontal line, time format, Date format, Display color, Grid Line color, Alarm number.
Coordinates	Sets the X-Y coordinates, width and height of the element.

Table 16-3-2 Active Alarm List function page

◆ Main

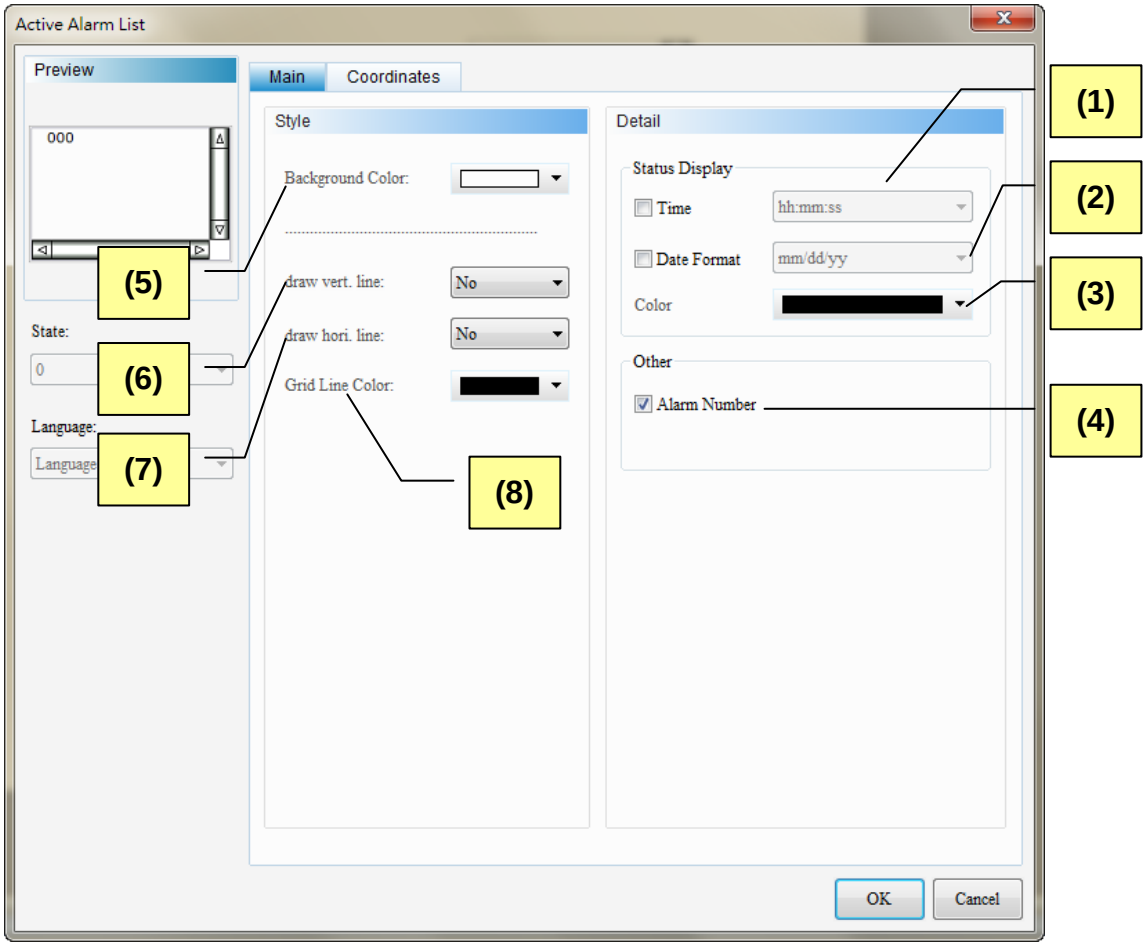
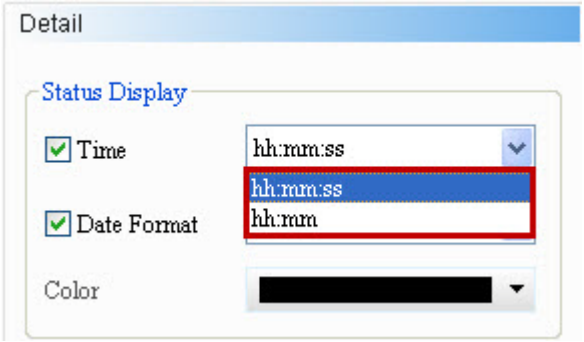
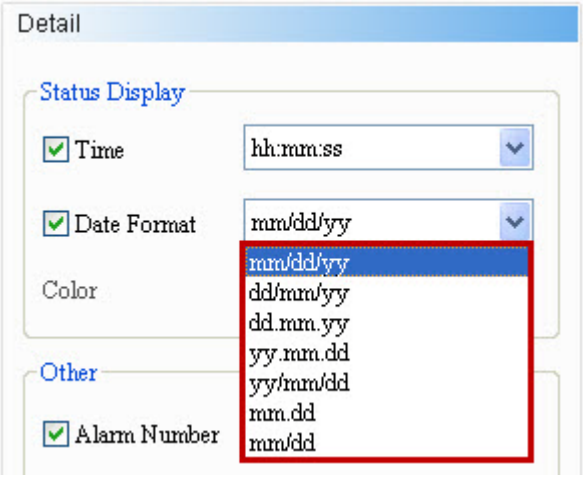
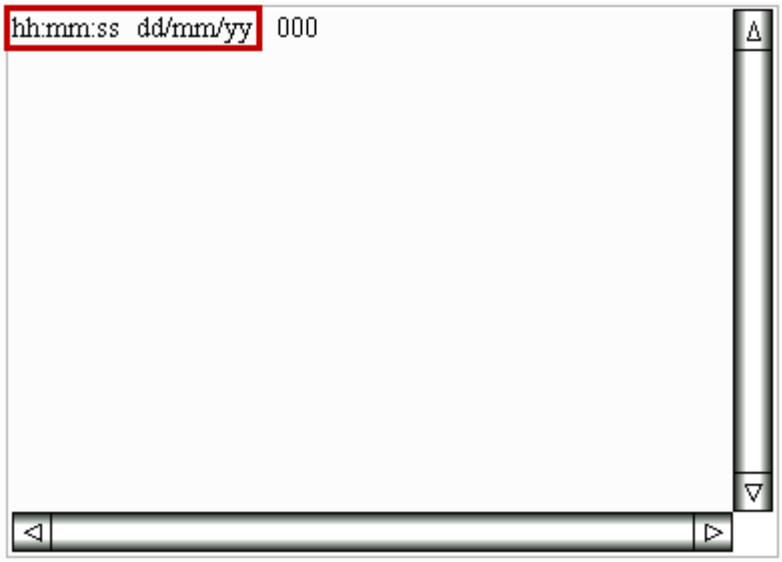
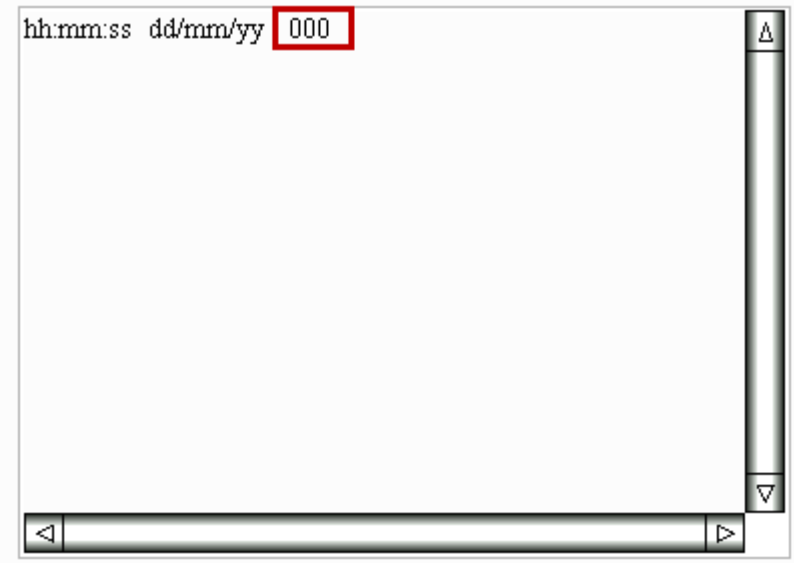
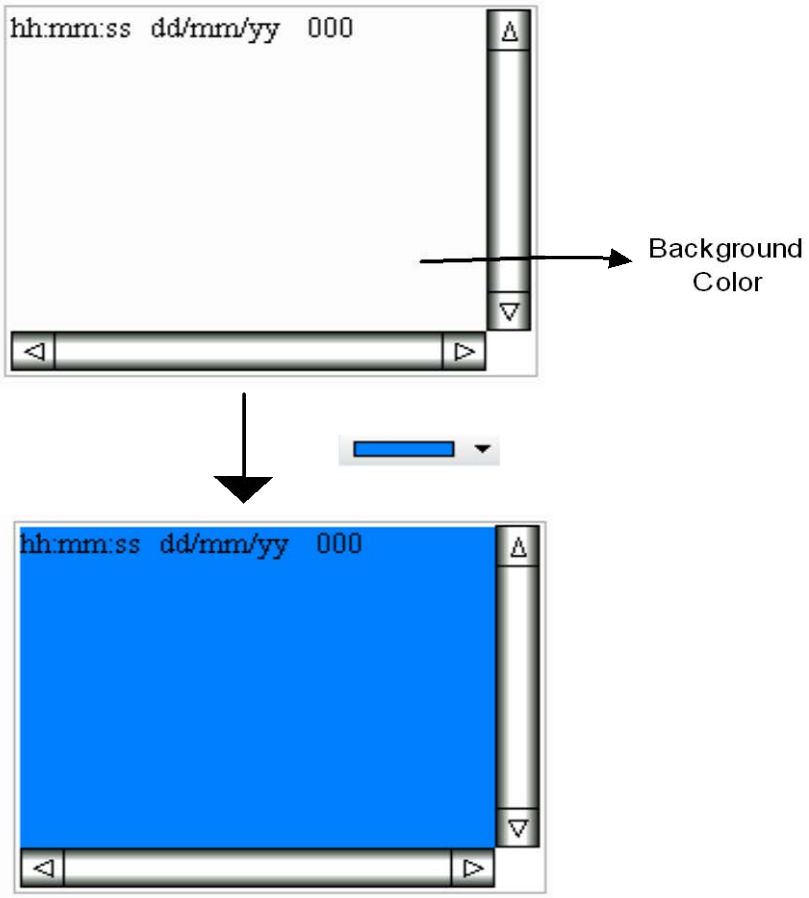
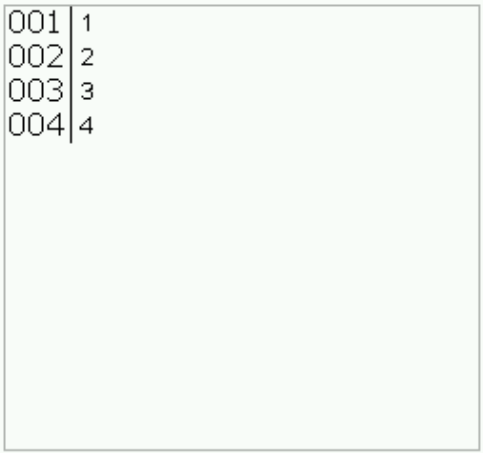
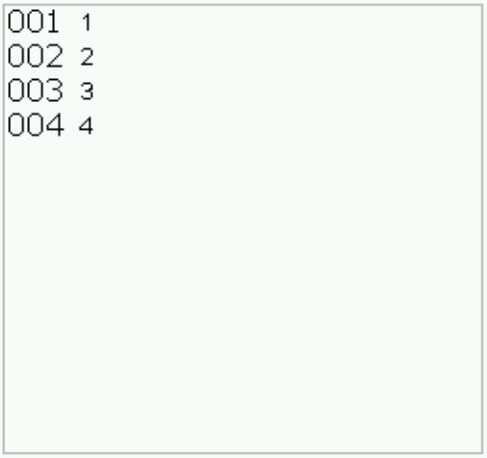
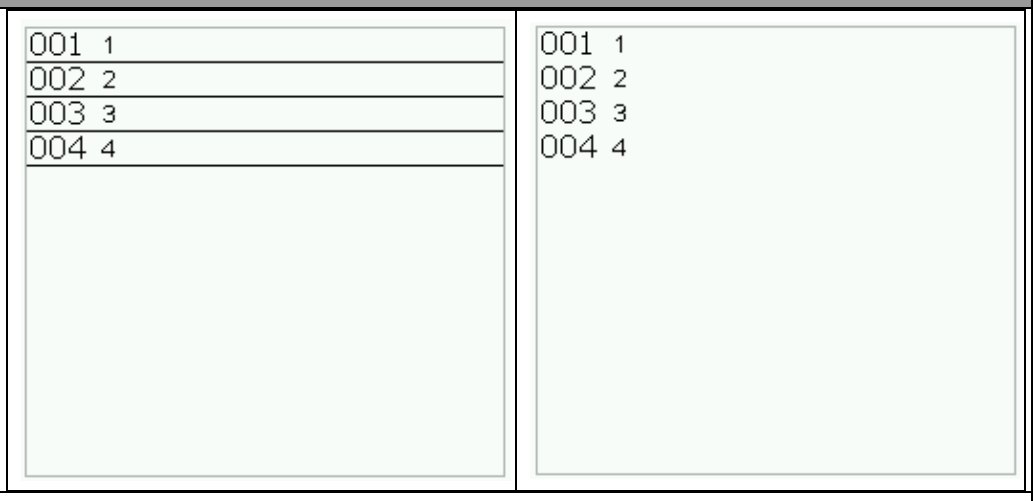
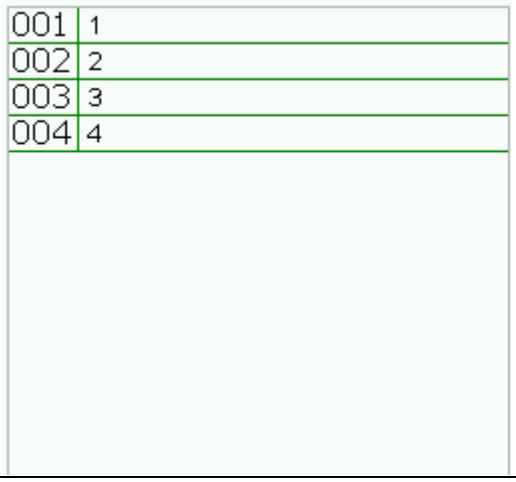


Fig. 16-3-2 Active Alarm List Main properties page

No.	Property	Function
(1)	Time Format	➢ The following two time formats are supported: 

No.	Property	Function
(2)	Date Format	➢ The following seven date formats are supported: 
(3)	Display Color	➢ The Display Color option is used to change the display color of the time and date. The color is by default. 
(4)	Alarm Number	➢ Check this option to show the number of the alarm with it is triggered. 

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td>(5)</td><td>Background Color</td><td>➢ The user can set the Background Color for the element.
 
</td></tr>
<tr><td>(6)</td><td>Show the vertical separator line</td><td>➢ This function can be used to separate the data display.
<table>
<tr><th>Select YES to show the vertical separator line</th><th>Select NO to not show the vertical separator line</th></tr>
<tr><td> 
</td><td> 
</td></tr>
</table></td></tr>
<tr><td>(7)</td><td>Show the horizontal rule</td><td>➢ This function can be used to separate the data display.
<table>
<tr><th>Select YES to show the horizontal rule</th><th>Select NO to not show the horizontal rule</th></tr>
</table></td></tr>
</table>

No.	Property	Function
		
(8)	Grid color	➢ Users can define the grid color. The default color is black. 

◆ Coordinates

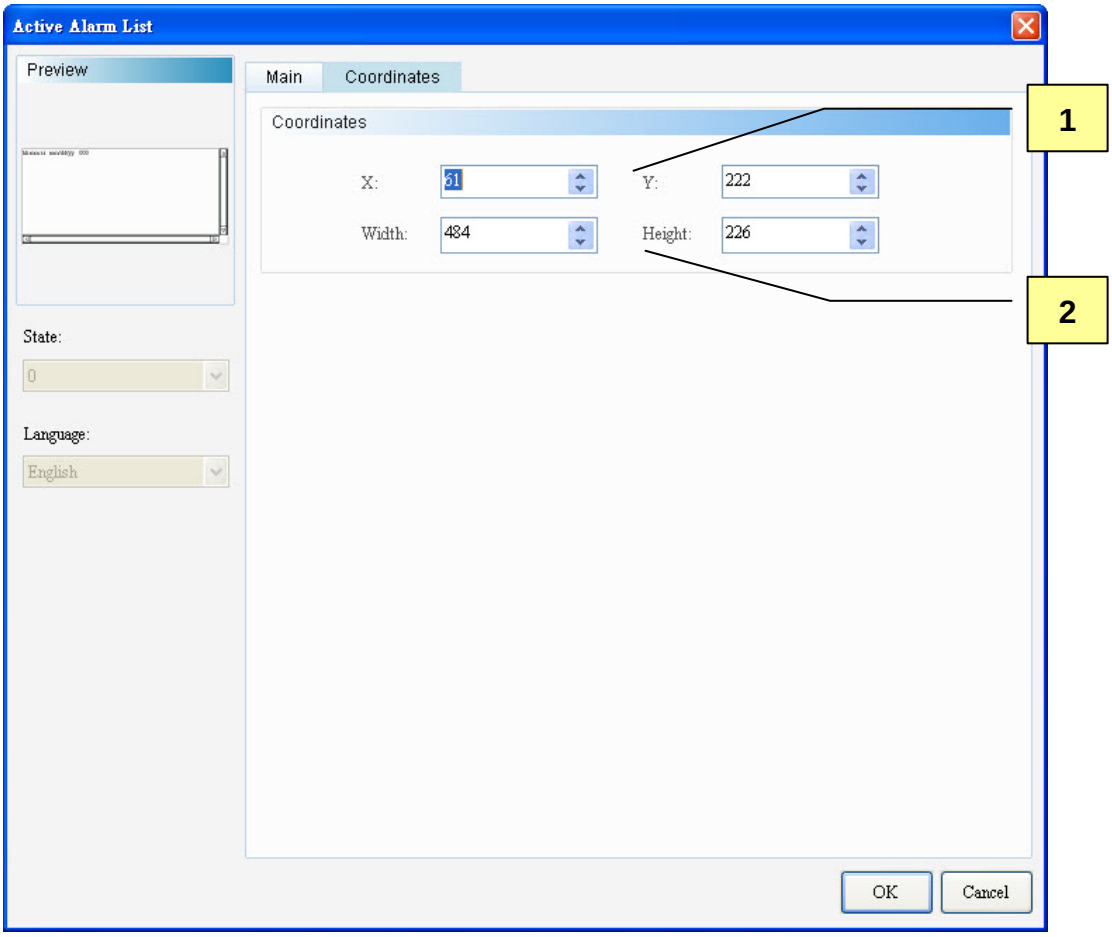


Fig. 16-3-3 Active Alarm List Coordinates properties page

No.	Property	Function
(1)	X Value, Y Value	➢ The X and Y coordinates at the upper left corner of the element.
(2)	Width, Height	➢ The width and height of the element.

16-4 Alarm Frequency Table

	Alarm Frequency Table

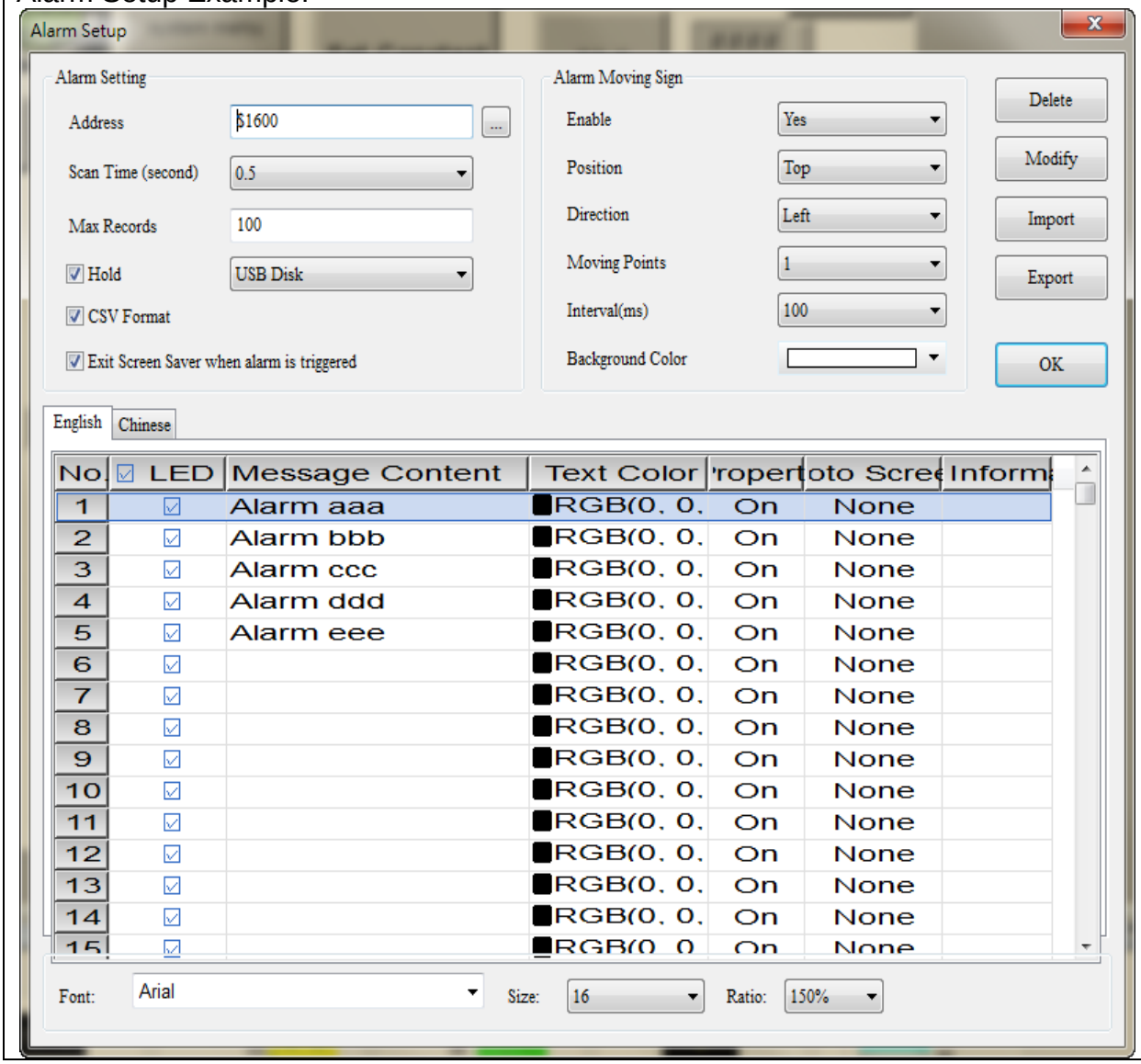
The Alarm Frequency Table element is sued to record and display the occurrence times of each alarm.

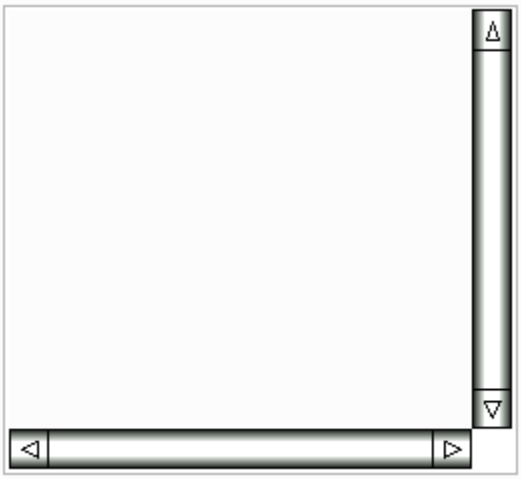
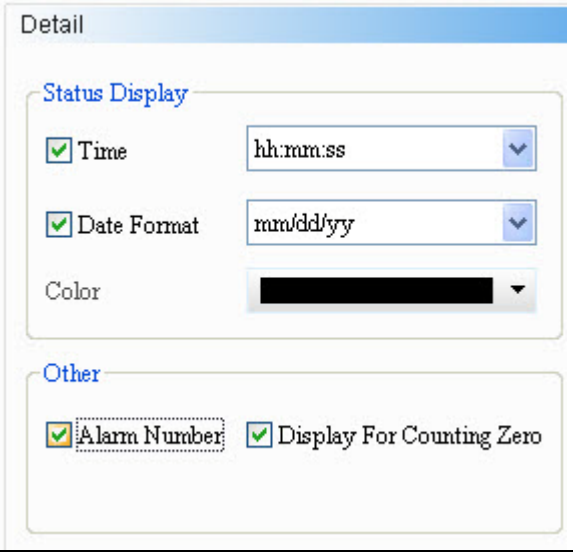
Refer to the Alarm Frequency Table example in Table 16-4-1.

History Frequency List Example

Table 16-4-1 Alarm Frequency Table Example

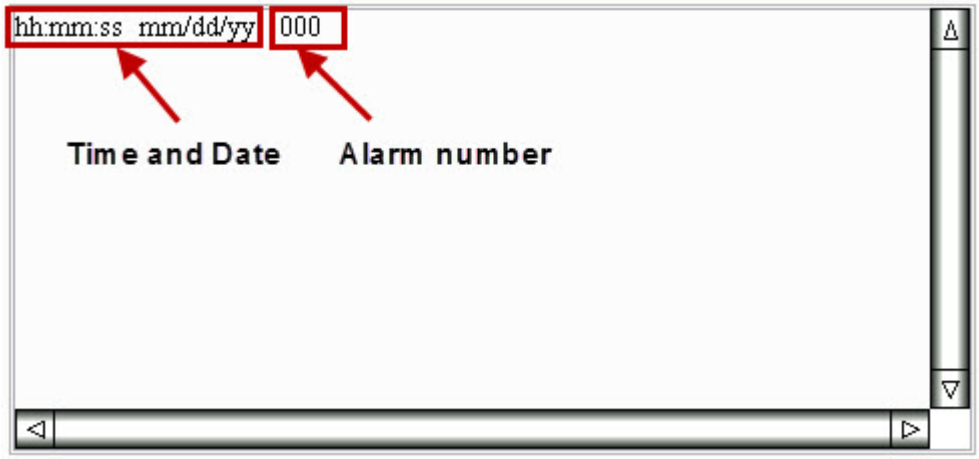
This example is described with reference to the alarm parameters in Table 16-1-3 Alarm Setup Example.



History Frequency List Example Table 16-4-1 Alarm Frequency Table Example	
Add Alarm Frequency Table Element	➢ Step 1: Create the Alarm Frequency Table element.  ➢ Step 2: Check [Time Format] , [Date Format] , [Alarm Number] and [Show 0 for No Alarm] to show the time, date and numbering of the alarm. When [Show 0 for No Alarm] is checked, 0 is displayed on the Alarm Frequency Table when there is no alarm triggered. Otherwise, no message is displayed when the occurrence time of the alarm is zero. 

History Frequency List Example

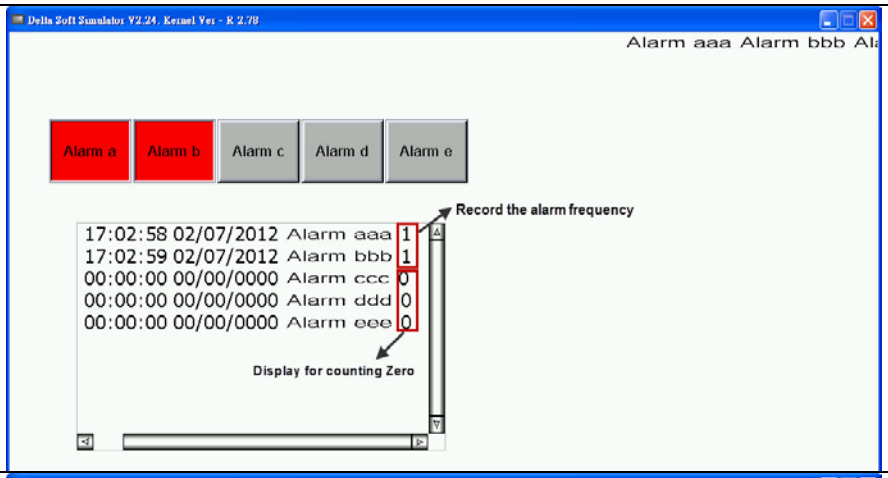
Table 16-4-1 Alarm Frequency Table Example



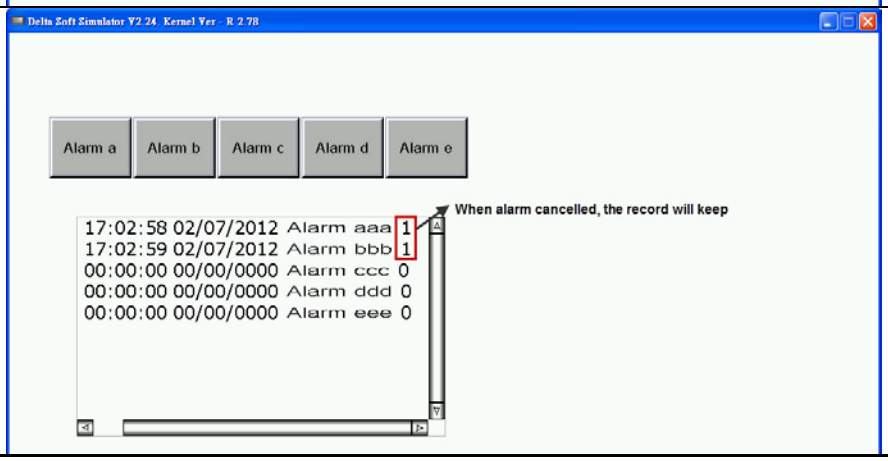
Execution Results

➢ After creation of the Alarm Frequency Table, perform the compilation and download the element to HMI. When Alarm 1 and Alarm 2 are triggered once, the time, date, numbering and occurrence times of the alarm will be recorded on the Alarm Frequency Table. When the alarm is released, the record on the Alarm Frequency Table will not be cleared unless the alarm counter Bit of the general control flag in the control area is used to trigger the alarm ON to clear the record in the counter.

Alarm ON



Alarm OFF



Double click the Alarm Frequency Table icon and the following property setting screen appears.

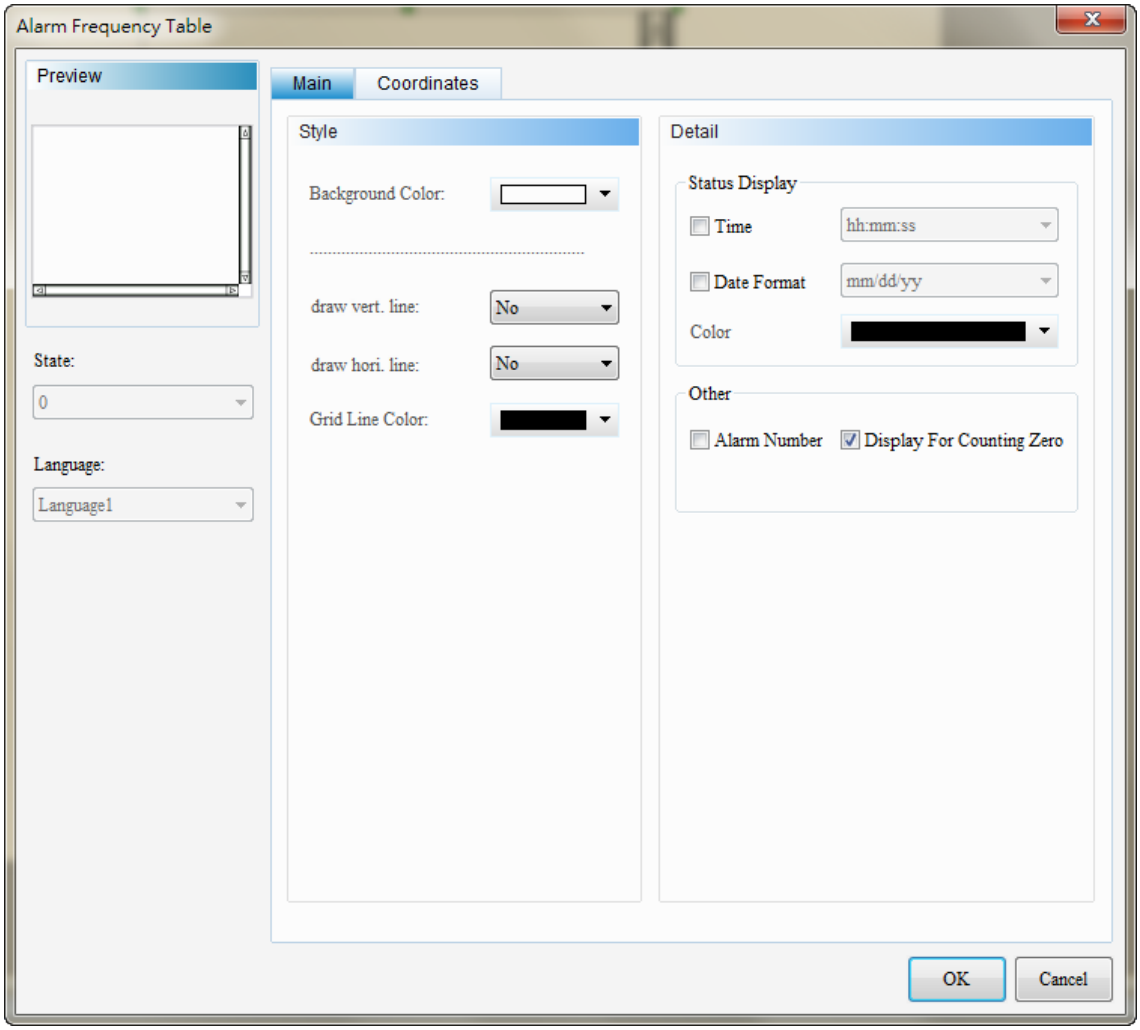


Fig. 16-4-1 Alarm Frequency Table properties setting screen

Alarm Frequency Table	
Function Page	**Content Description**
Preview	The State and Language are not available to the Alarm Frequency Table.
Main	Sets the Background Color, draw vertical line, draw horizontal line, time format, date format, display color, alarm number, Display For Counting Zero.
Coordinates	Sets the X-Y coordinates, width and height of the element.

Table 16-4-2 Alarm Frequency Table function page

◆ Main

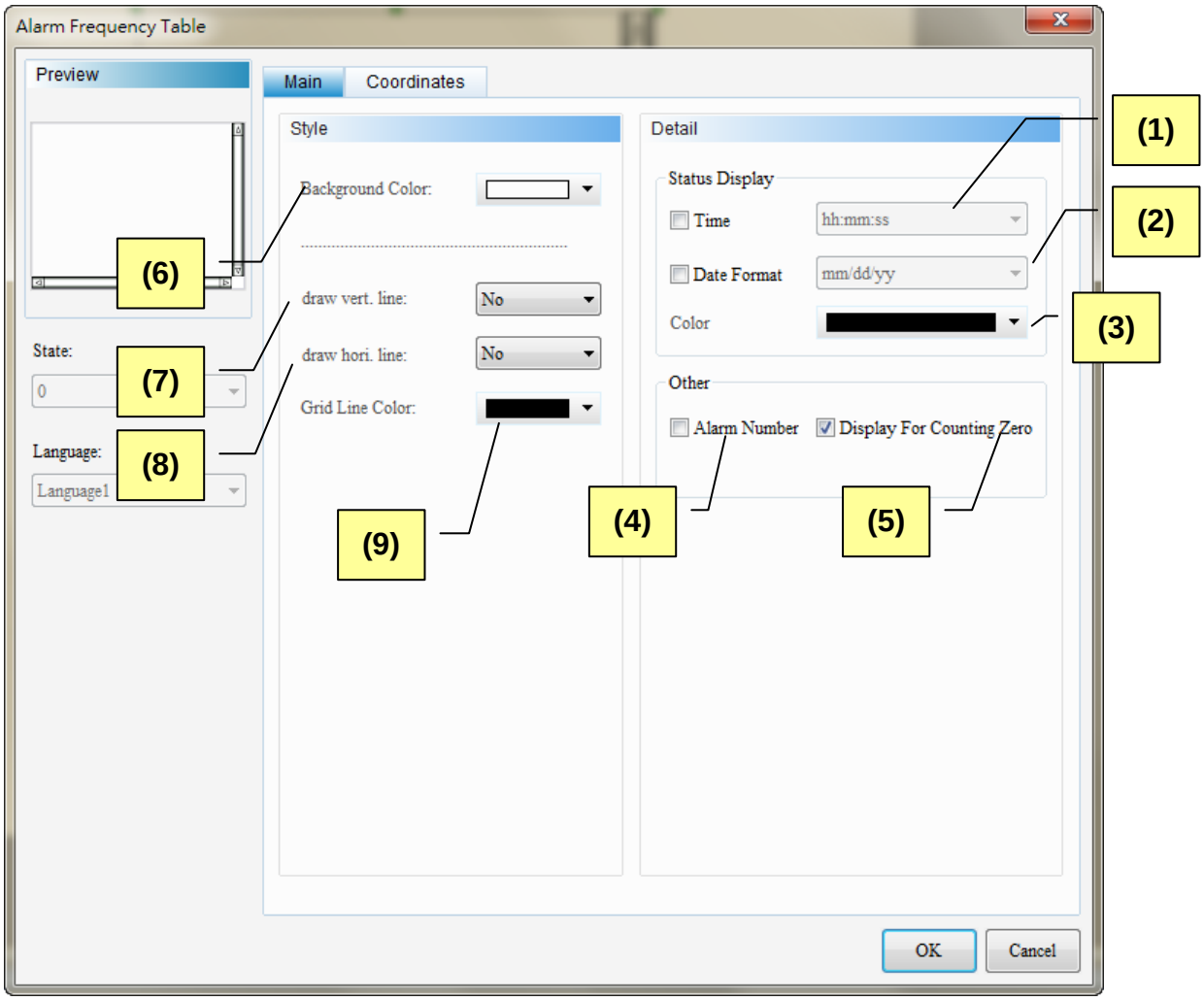
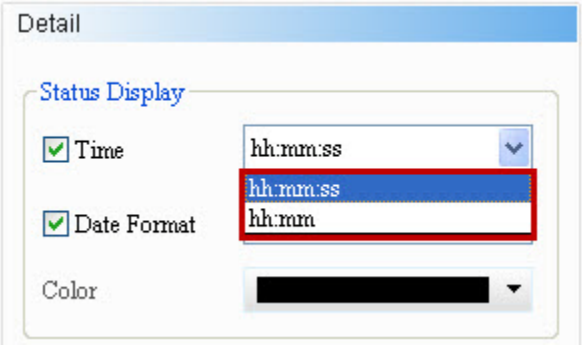
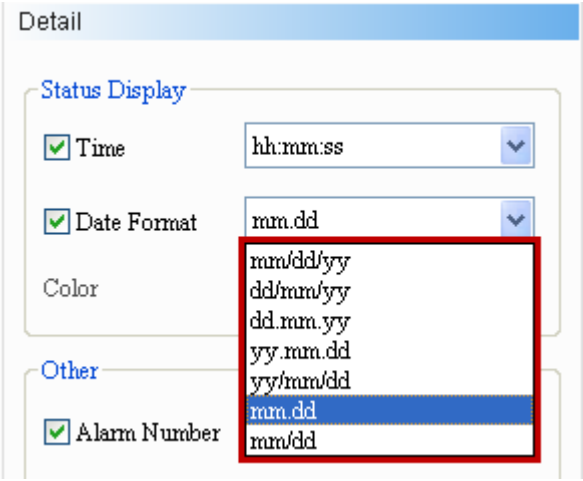
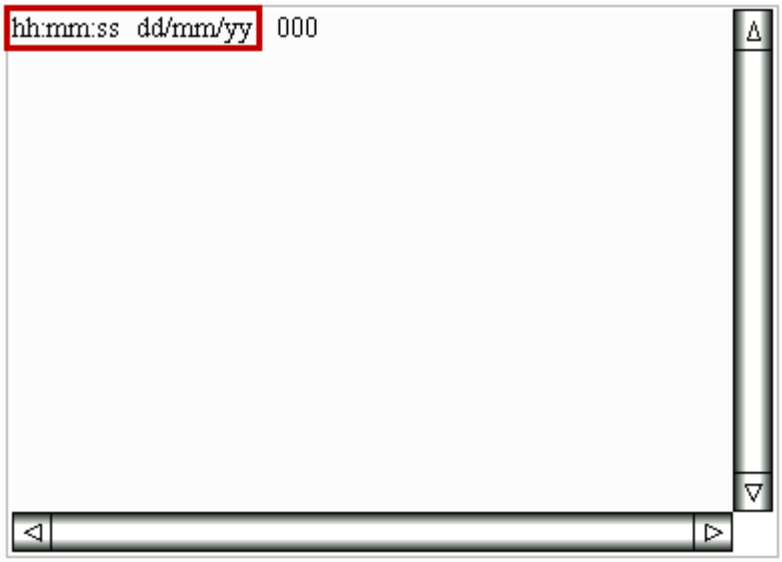
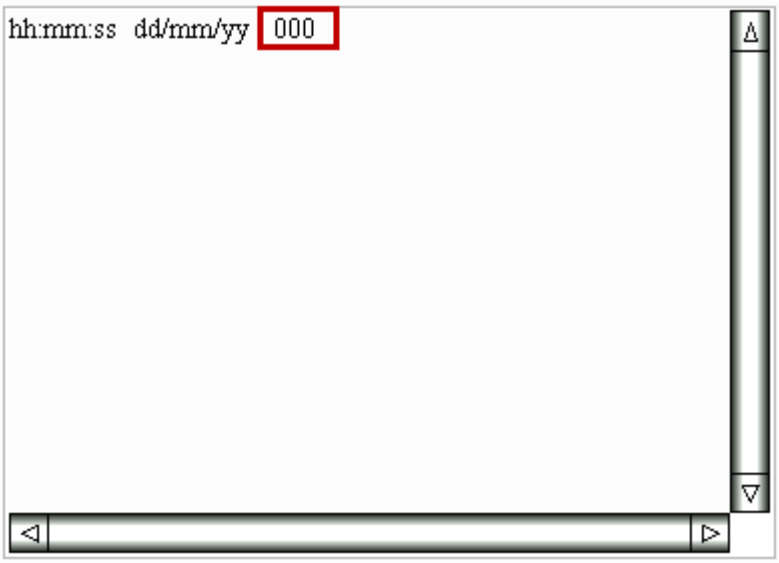
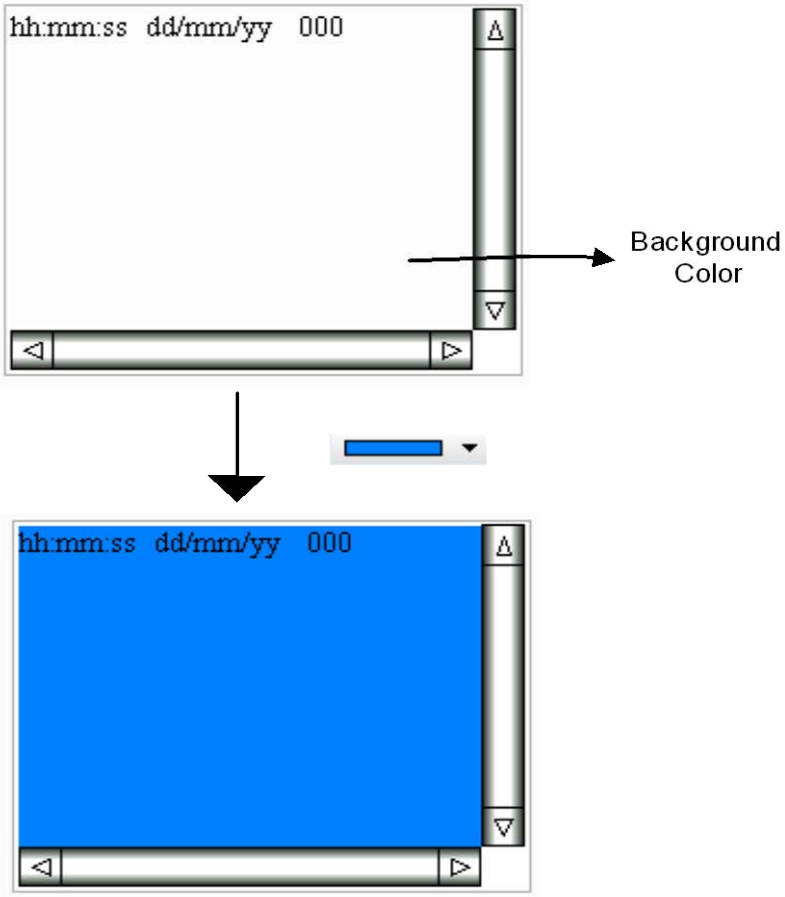
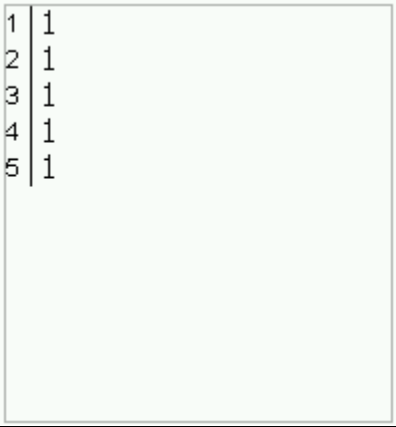
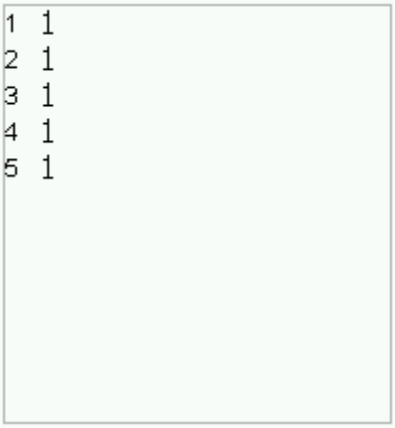


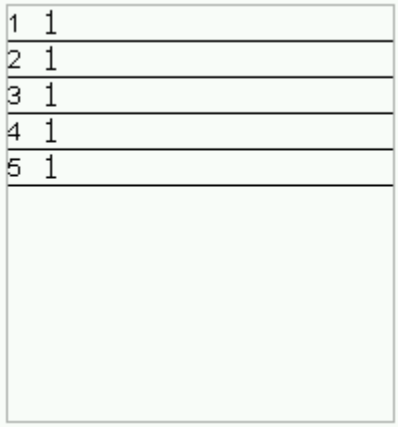
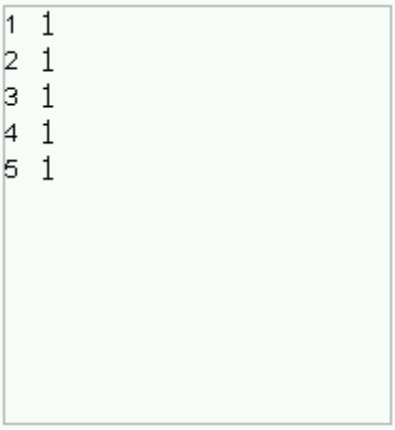
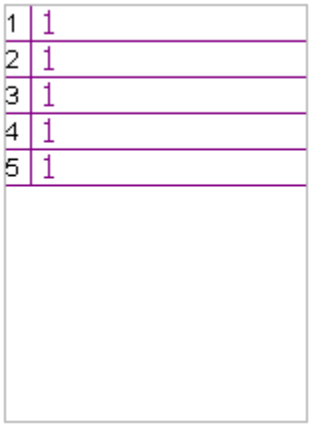
Fig. 16-4-2 Alarm Frequency Table Main properties page

No.	Property	Function
(1)	Time Format	➢ The following two time formats are supported: 

No.	Property	Function
(2)	Date Format	➢ The following seven date formats are supported: 
(3)	Display Color	➢ The Display Color option is used to change the display color of the time and date. The color is by default. 
(4)	Alarm Number	➢ When the Alarm Number is check, the corresponding number will be display when an alarm is triggered. 

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td>(5)</td><td>Display for Counting Zero</td><td>➢ Check this option to show 0 on the Alarm Frequency Table when no alarm is triggered. Otherwise, no message is displayed when the occurrence time of the alarm is zero.
<table>
<tr><td>Checked</td><td>
</td></tr>
<tr><td>Unchecked</td><td>
</td></tr>
</table></td></tr>
<tr><td>(6)</td><td>Background Color</td><td>➢ The user can set the Background Color for the element.</td></tr>
</table>

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td></td><td></td><td> 
</td></tr>
<tr><td>(7)</td><td>Show the vertical separator line</td><td>➢ This function can be used to separate the data display.
<table>
<tr><th>Select YES to show the vertical separator line</th><th>Select NO to not show the vertical separator line</th></tr>
<tr><td> 
</td><td> 
</td></tr>
</table></td></tr>
<tr><td>(8)</td><td>Show the horizontal rule</td><td>➢ This function can be used to separate the data display.
<table>
<tr><th>Select YES to show the horizontal rule</th><th>Select NO to not show the horizontal rule</th></tr>
</table></td></tr>
</table>

No.	Property	Function
		 
(9)	Grid color	➢ Users can define the grid color. The default color is black. 

◆ Coordinates

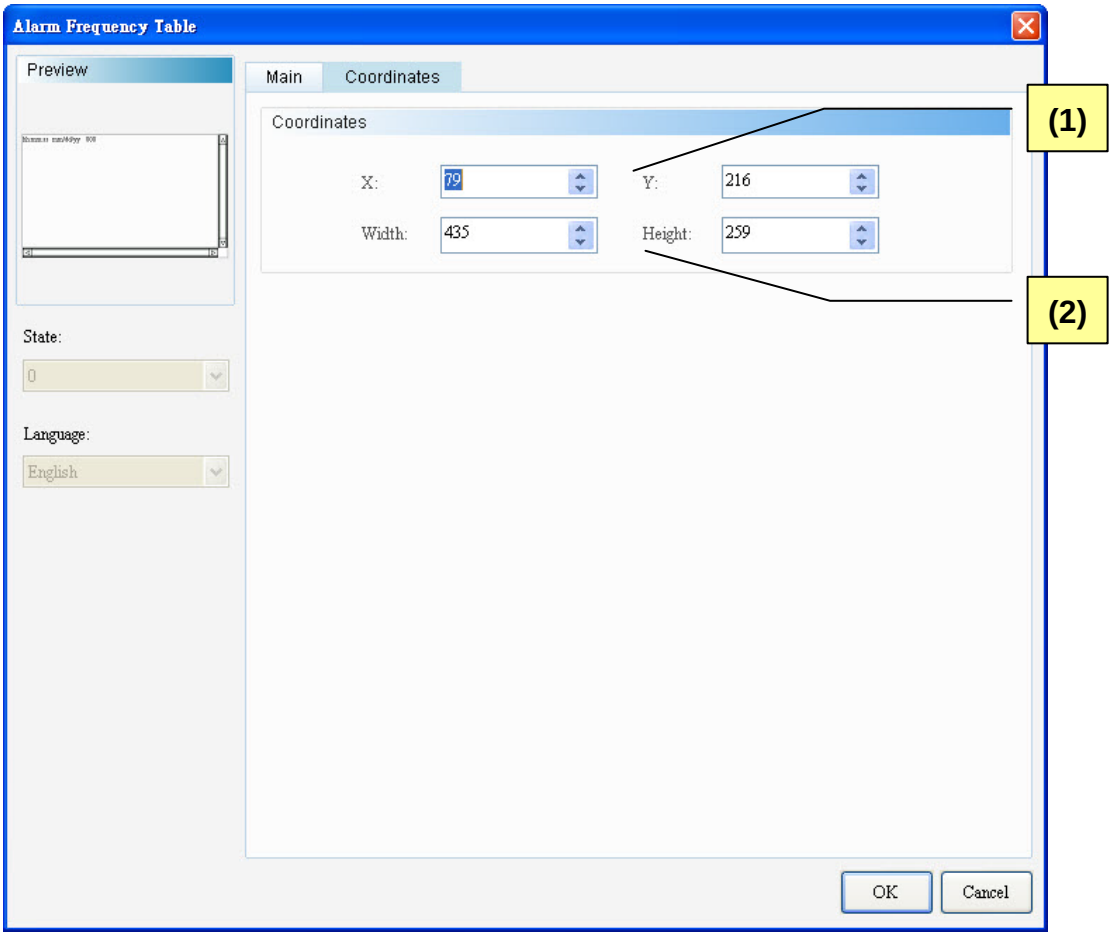


Fig. 16-4-3 Alarm Frequency Table Coordinates properties page

No.	Property	Function
(1)	X value, Y value	➢ The X and Y coordinate at the upper left corner of the element.
(2)	Width, Height	➢ The width and height of the element.

16-5 Alarm Moving Sign

	Alarm Moving Sign

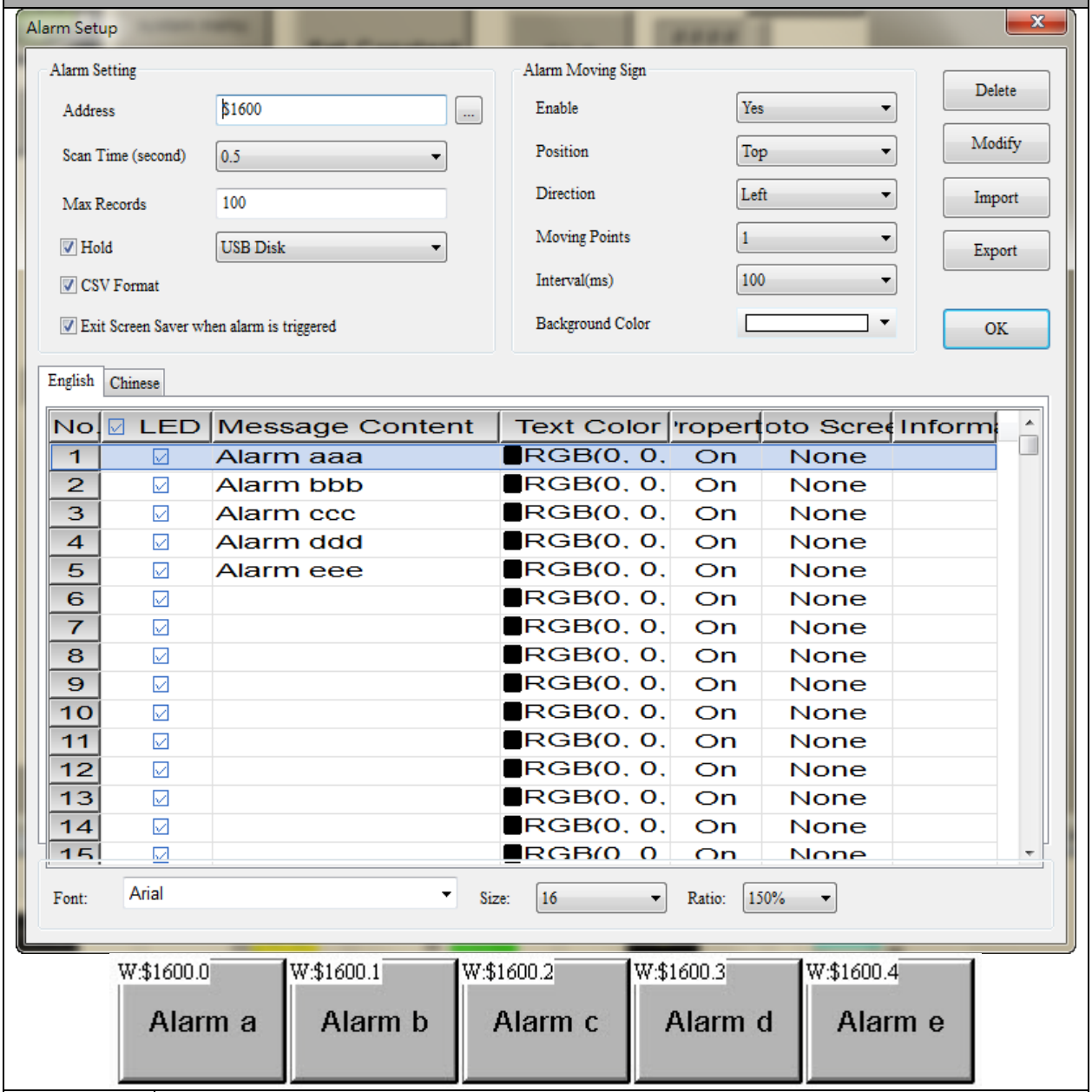
The Alarm Moving Sign element is used to record and display the numbering, time and date of the alarm. The user can define the preferred interval and moving points for the display. The parameter settings of this element are same as the [Options] → [Alarm Setup] Alarm Moving Sign. The user can use this element and the Alarm Moving Sign in the Alarm Setup simultaneously, but the Alarm Moving Sign element will generate a message in the form of a moving sign on the HMI screen regardless of the page it is used for. The settings of both elements are independent and no cross-reference exists in between.

Refer to the Alarm Moving Sign example in Table 16-5-1.

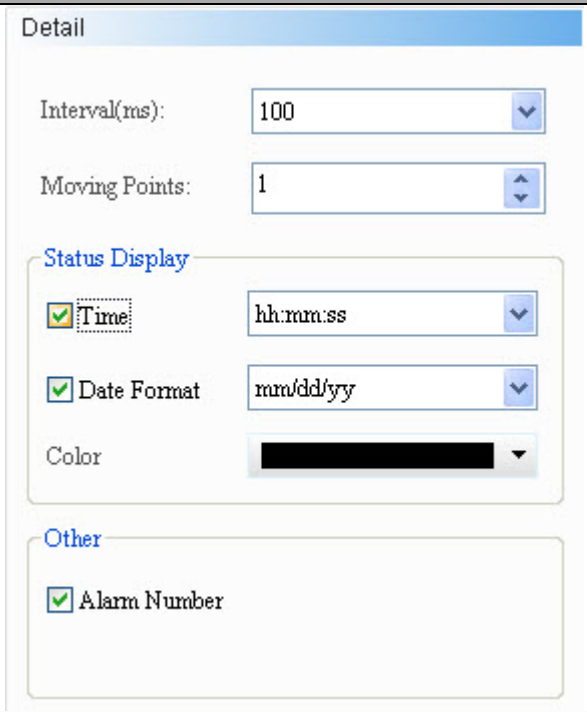
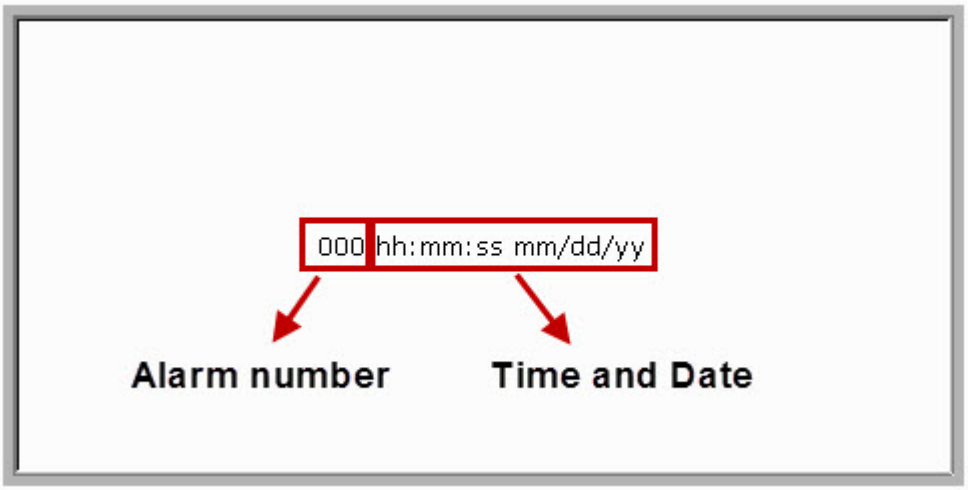
Alarm Moving Sign Example Table 16-5-1 Alarm Moving Sign Example
This example is described with reference to the alarm parameters in Table 16-1-3 Alarm Setup Example.

Alarm Moving Sign Example

Table 16-5-1 Alarm Moving Sign Example

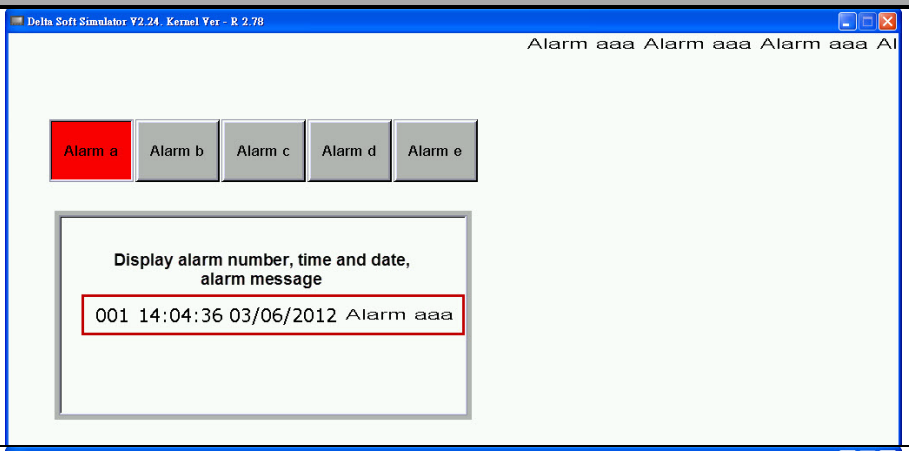
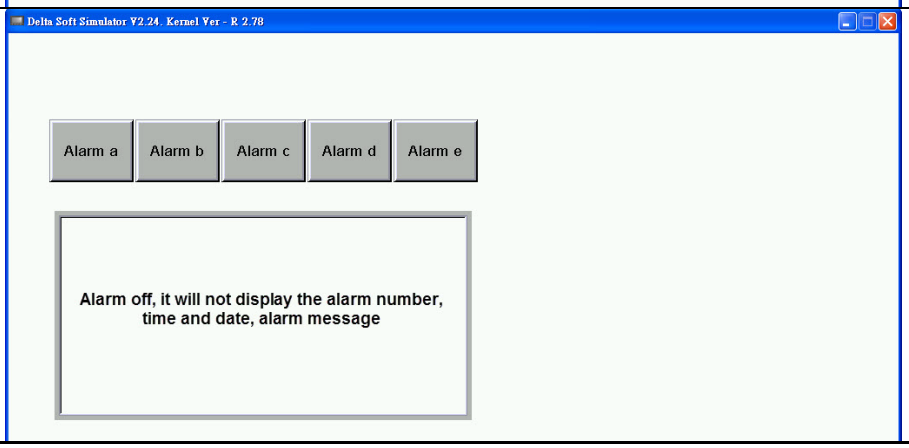


Add Alarm Moving Sign Element	➢ Step 1: Create the Alarm Moving Sign element. ➢ Step 2: Check [Time Format] , [Date Format] and [Alarm number] , and set [Time Interval] and [Moving Points] . This element is used to display the numbering, time and date of the alarm. The user can define the preferred interval and moving points for the display.

Alarm Moving Sign Example Table 16-5-1 Alarm Moving Sign Example	
	 
Execution results	➢ After creation of the Alarm Moving Sign element, perform the compilation and download the element to HMI. When Alarm 1 is triggered, the Alarm Moving Sign element will display the time, date and number of the alarm triggered according to the preset interval and moving points.

Alarm Moving Sign Example

Table 16-5-1 Alarm Moving Sign Example

Alarm ON	
Alarm OFF	

Double click the Alarm Moving Sign icon and the following property setting screen appears.

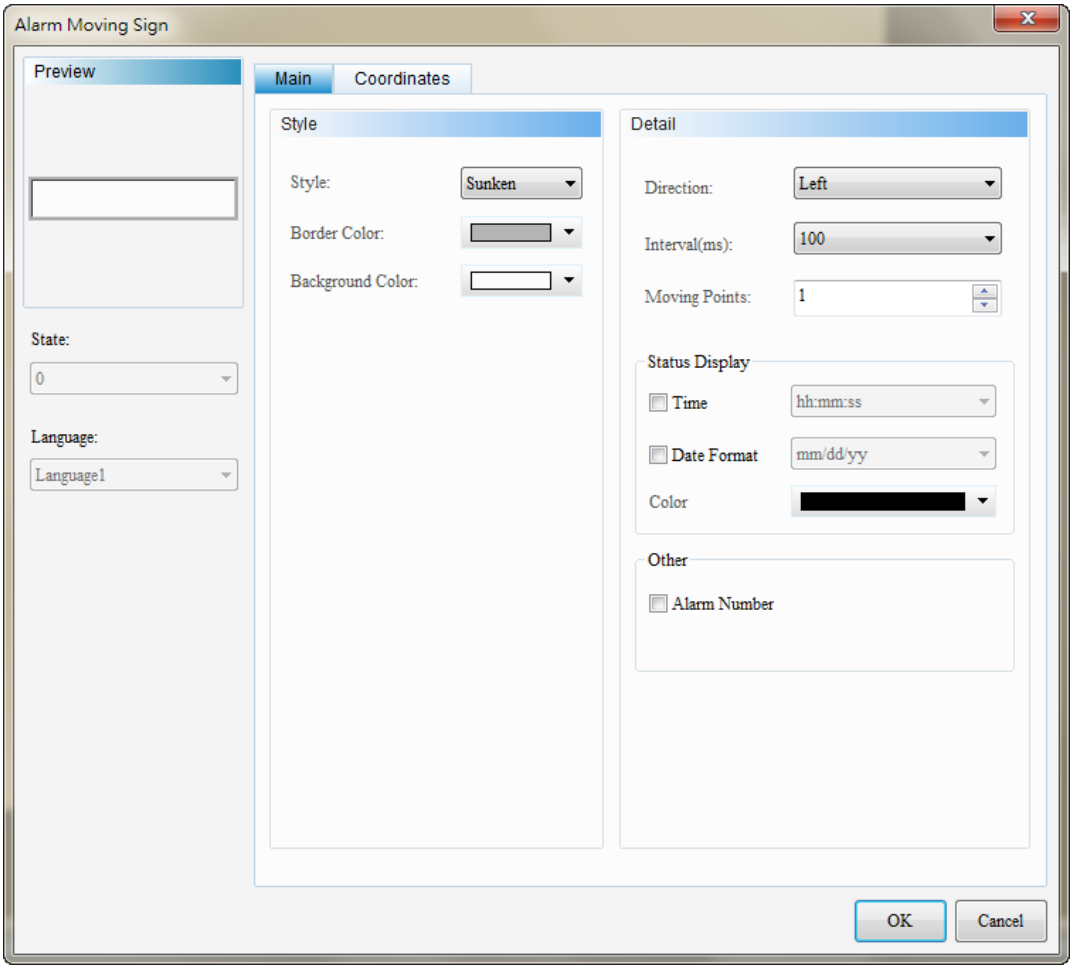


Fig. 16-5-1 Alarm Moving Sign properties setting screen

Alarm Moving Sign	
Function Page	**Content Description**
Preview	The State and Language are not available to the Alarm Moving Sign.
Main	Sets the style, border color, Background Color, Direction, interval time (ms), moving points, time format, date format, display color, alarm number.
Coordinates	Sets the X-Y coordinates, width and height of the element

Table 16-5-2 Alarm Moving Sign Function page

◆ Main

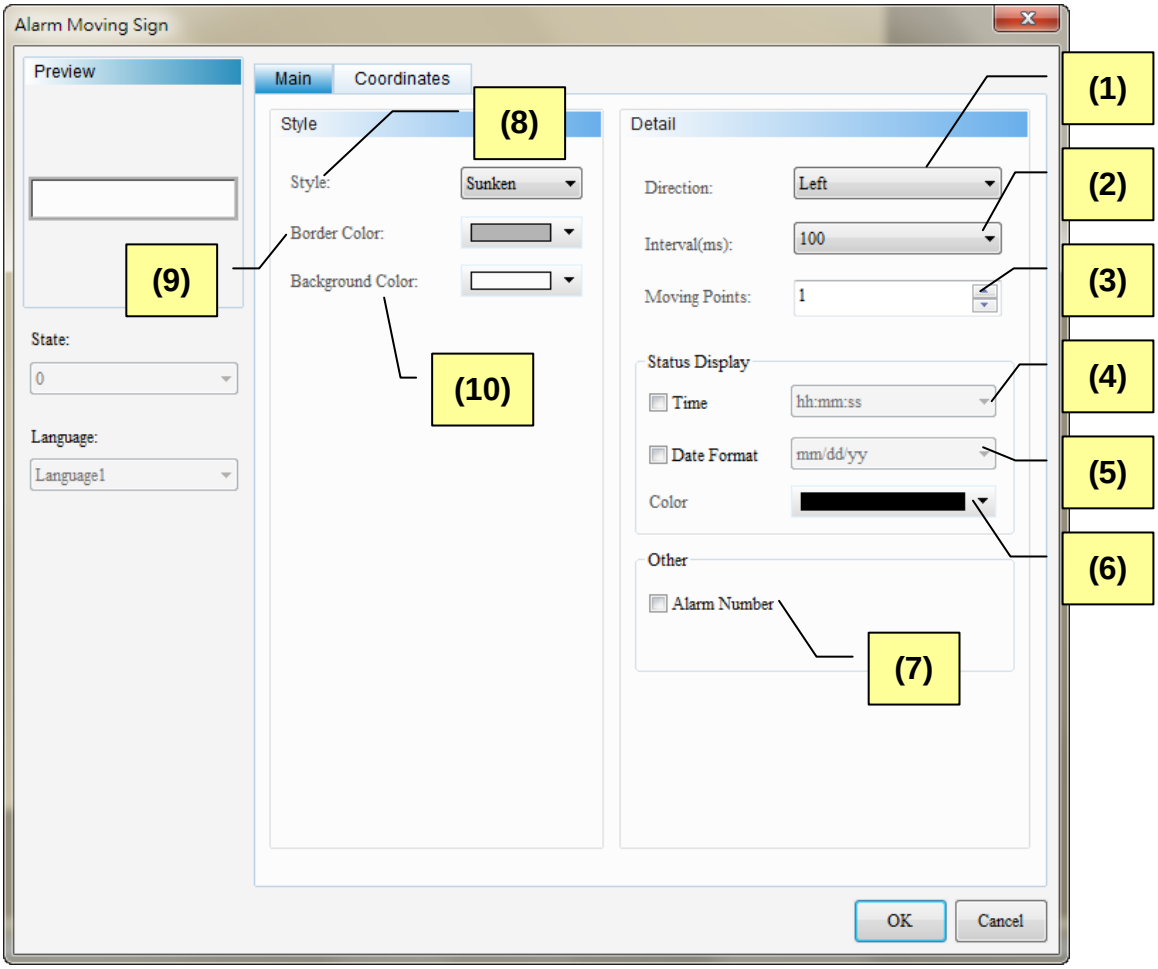
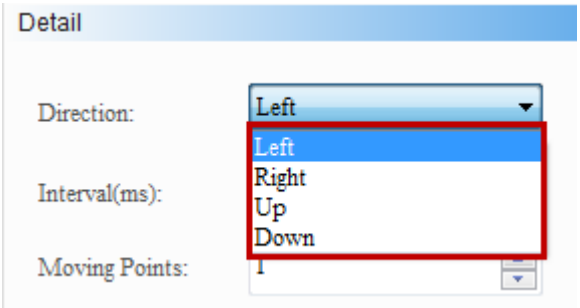
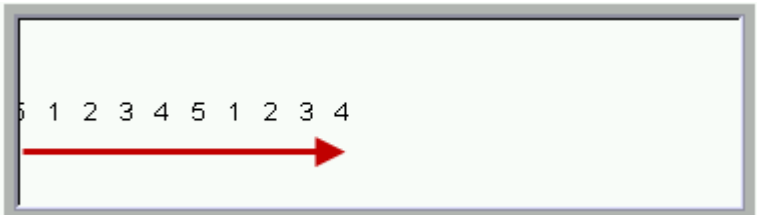
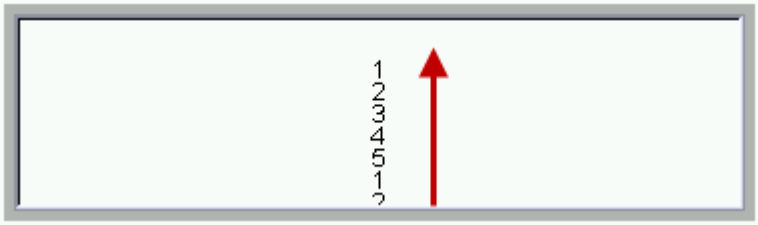
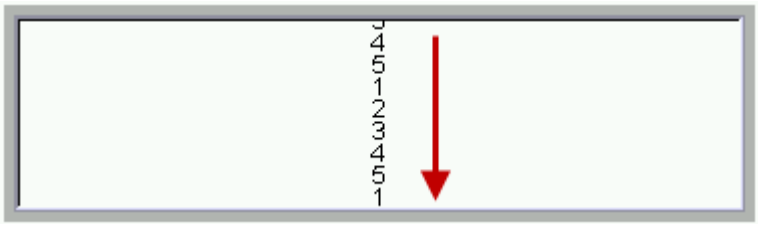
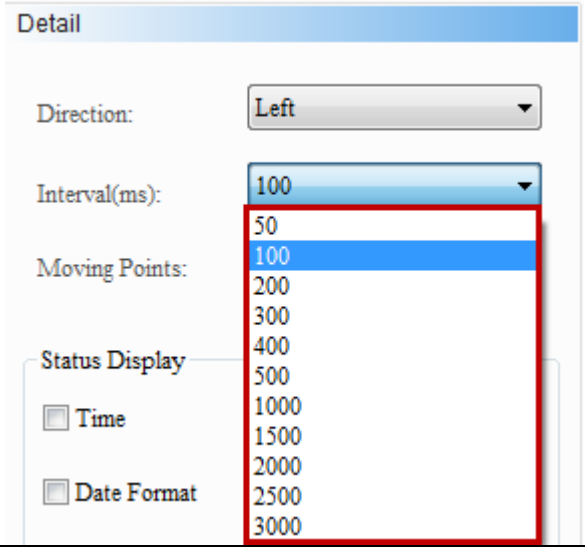
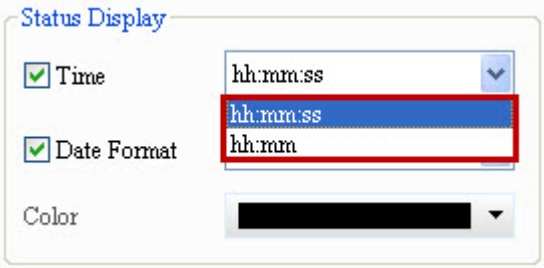
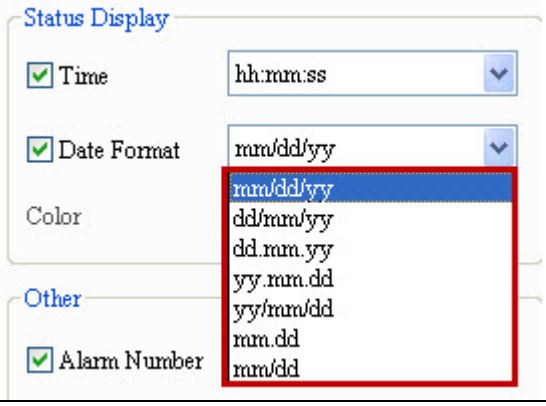
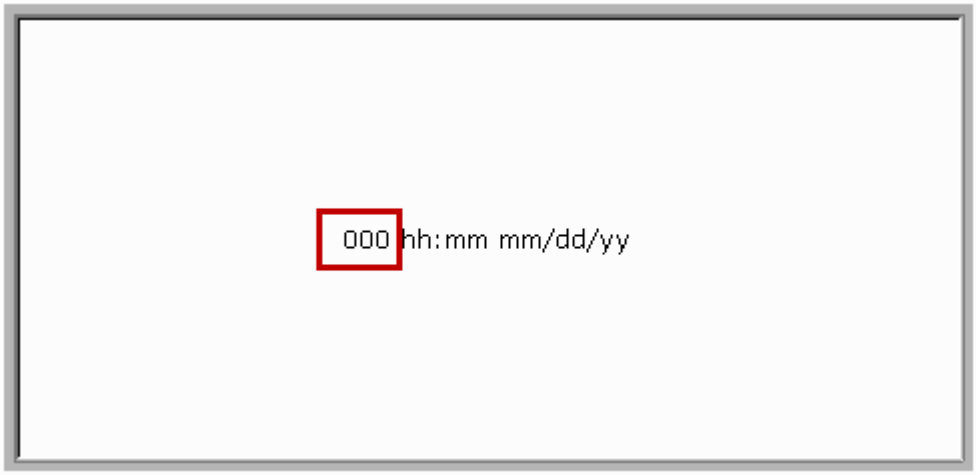
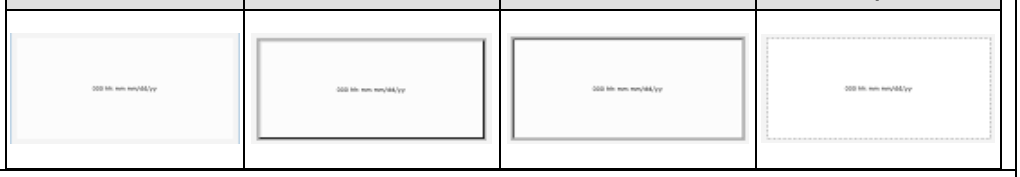
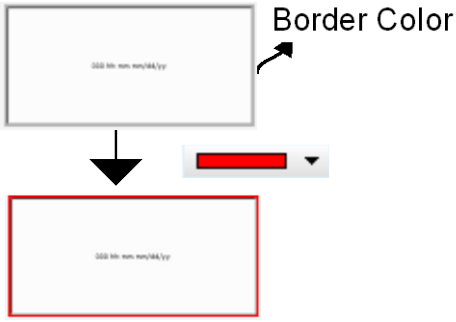
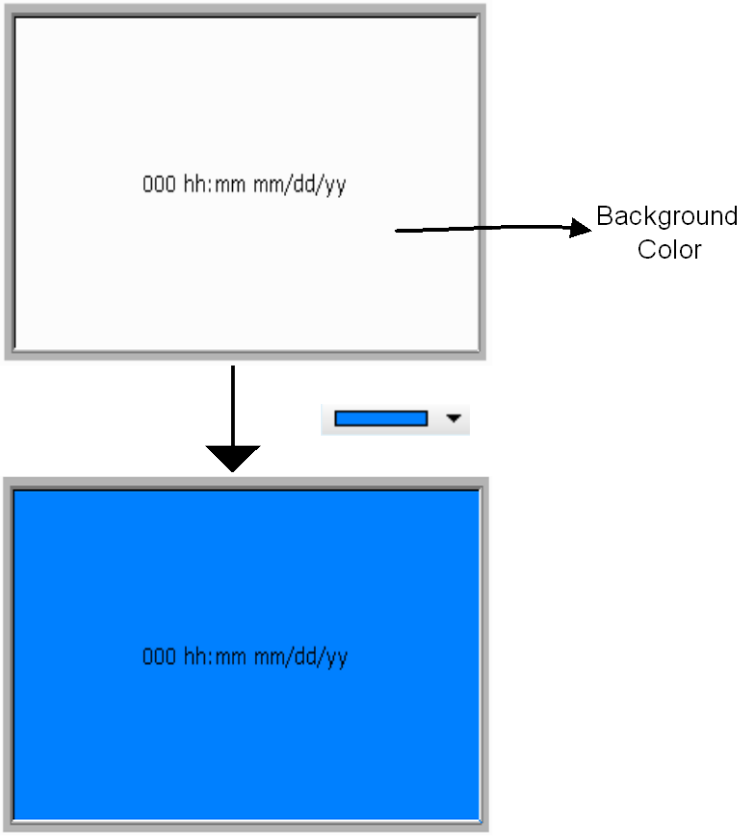


Fig. 16-5-2 Alarm Moving Sign Main properties page

No.	Property	Function
(1)	Direction	➢ Direction includes Left, Right, Up and Down.  **Left**

No.	Property	Function
		Right 
		Up 
		Down 
(2)	Interval Time (ms)	➢ The Interval defines the time (ms) between two message movements of the Alarm Moving Sign. The moving distance is set up based on the setting of the Moving Points. The moving distance is set up based on the setting of the Moving Points. 
(3)	Moving Points	➢ The higher the moving points, the more the distance to which the text moves. The setting range is 1~50 with Pixel as the unit.
(4)	Time Format	➢ The following two time formats are supported: 

No.	Property	Function
(5)	Date Format	➢ The following seven date formats are supported: 
(6)	Display Color	➢ The Display Color option is used to change the display color of the time and date. The color is by default.
(7)	Alarm Number	➢ When the Alarm Number is check, the corresponding number will be display when an alarm is triggered. 
(8)	Style	➢ The style is Standard, Raised, Sunken or Transparent. This setting allows the user to change the appearance of the element. Standard / Raised / Sunken / Transparent 
(9)	Border	➢ The user can set the border color for the element.

No.	Property	Function
	Color	➢ When Transparent is selected as the style, the setting of the border color is disabled. 
(10)	Background Color	➢ The user can set the Background Color for the element. 

◆ Coordinates

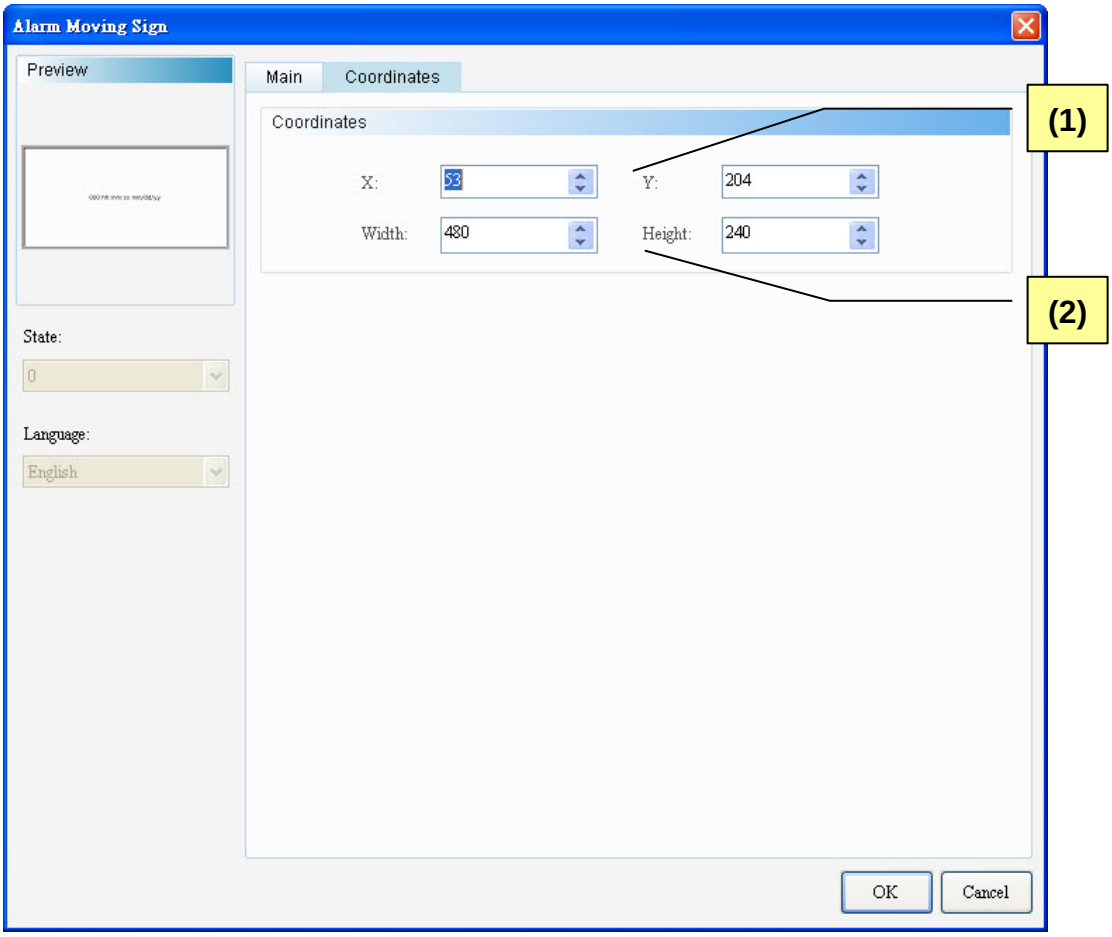


Fig. 16-5-3 Alarm Moving Sign Coordinates properties page

No.	Property	Function
(1)	X Value, Y Value	➢ The X and Y coordinate at the left corner of the element.
(2)	Width, Height	➢ The width and height of the element.

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Chapter 17 Keypad

This chapter describes the setting of the keypad elements that the DOPSoft software provides. These three keypad elements are used in conjunction with the numerical element, alphanumeric element and barcode element. For the numeric and alphanumeric entries, the property of Active Non-Bounce or Touch Non-Bounce must be selected for Start Input, while the property for Active Non-Bounce must be selected for Start Input in case of the barcode entry. The interlock addresses of these three elements must be set up simultaneously, and no interlock address is needed when Touch Non-Bounce is selected for the Start Input. Refer to CH13 Input for more information.

◆ Classification of keypad elements:

Keypad		Keypad (1)
		Keypad (2)
		Keypad (3)

Table 17-1-1 Classification of keypad elements

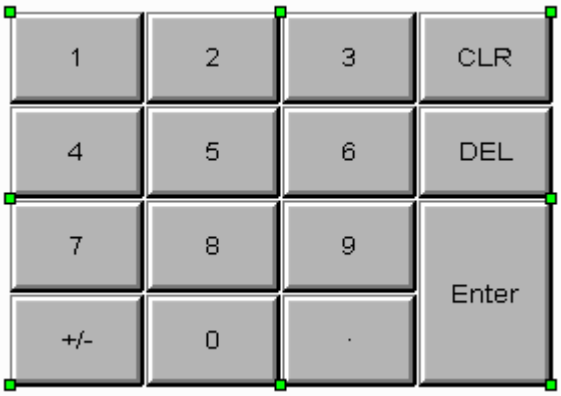
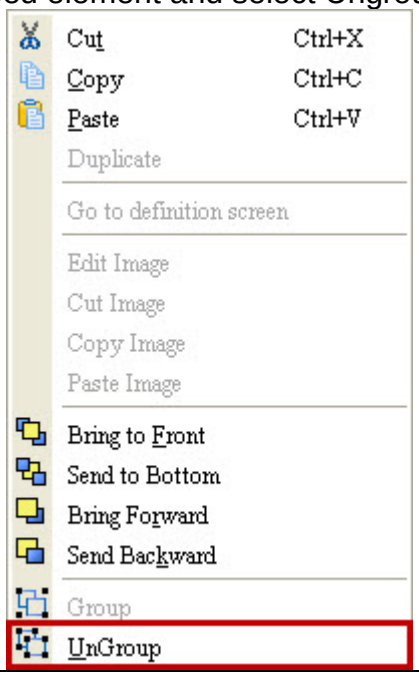
◆ Common properties of keypad element

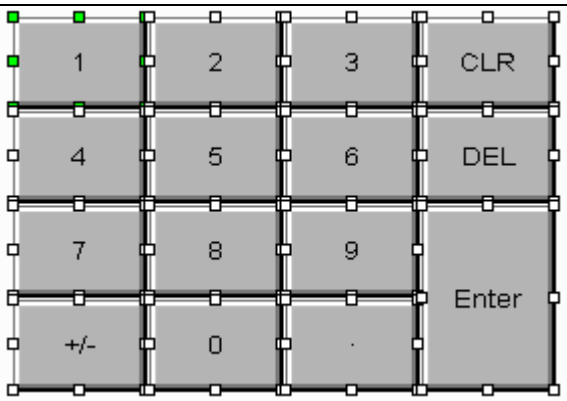
Keypad	Style (Foreground Color/ Style)	Display	Mode (ESC/ ENT/ CLR/ DEL/ ASCII/ CHARACTER)
Keypad (1)	◎	◎	◎
Keypad (2)	◎	◎	◎
Keypad (3)	◎	◎	◎

Table 17-1-2 Common properties of keypad elements

17-1 Keypad (1)

Keypad (1) is decimal in format. The user can customize the font, size, color and align type of the text to be displayed. It provides a variety of modes for the user to select, such as ESC, ENT, CLR, DEL and ASCII. The Keypad (1) element is grouped. The user can right click the element and select Ungroup to separate the blocks on the keypad individually. The user can also double click the block to be changed and edit it as desired.

<table>
<tr><td rowspan="2">Grouped</td><td> 
</td></tr>
<tr><td>➢ Right click the grouped element and select Ungroup.
 
</td></tr>
</table>

Not Grouped	

Double click the Keypad (1) icon and the following property setting screen appears.

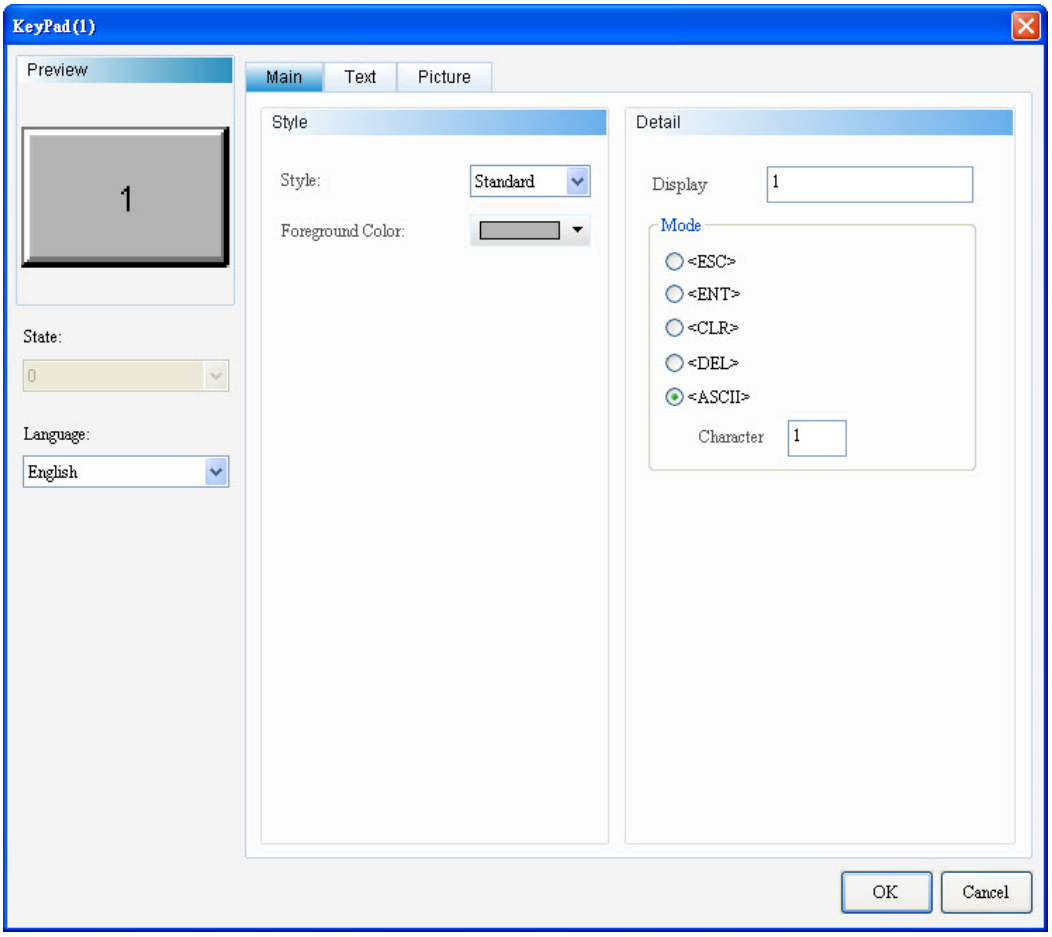


Figure 17-1-1 Keypad (1) properties setting screen

Keypad (1)	
Function Page	**Content Description**
Preview	The State is not available to Keypad (1), but the user can edit multi-language data.
Main	Sets the style. Foreground color, Display, Mode.
Text	Sets the content, font, font size, font color, font effects, scaling, and alignment of the text to be displayed.
Picture	Sets Picture Bank Name, Alignment, Picture Stretch Mode, and Transparent Color.

Table 17-1-3 Keypad (1) function page

◆ Main

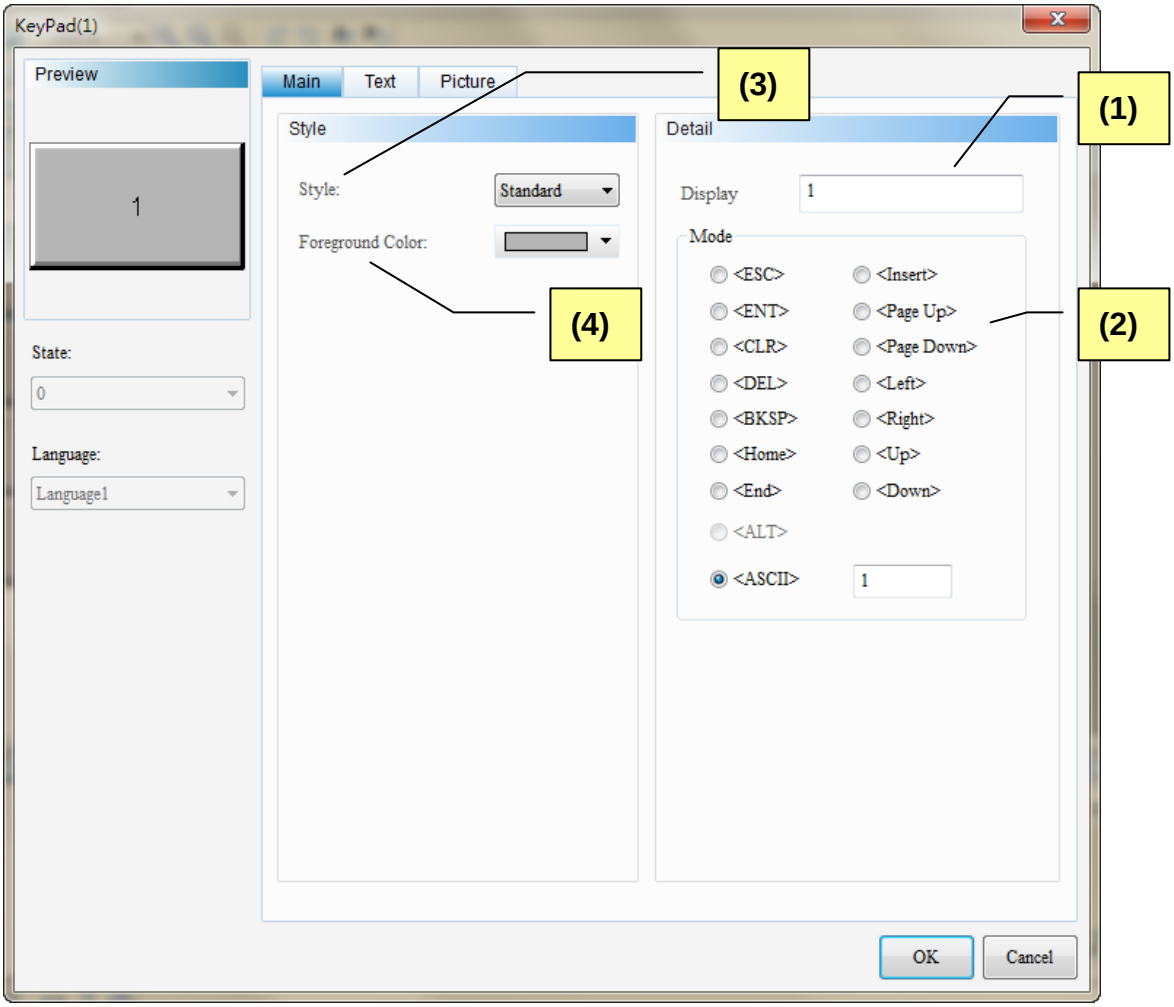
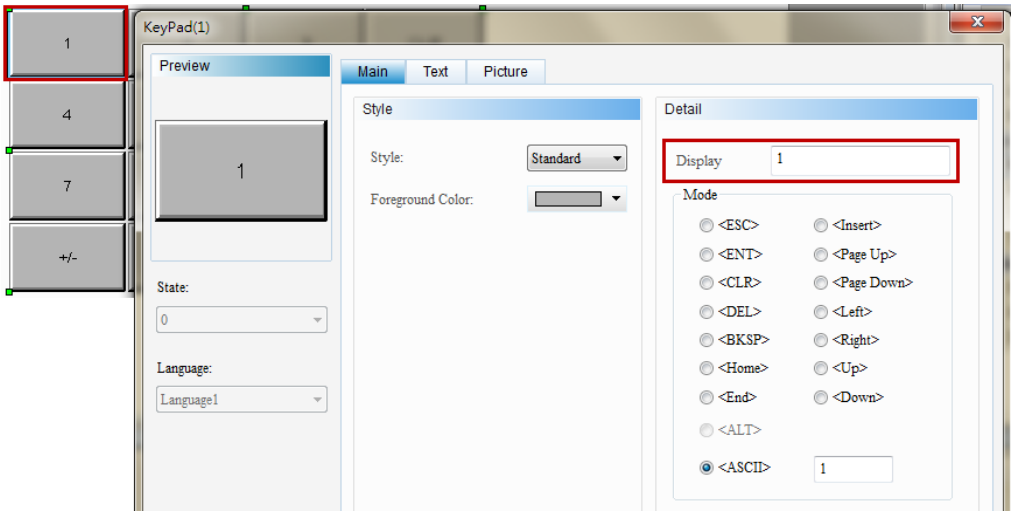
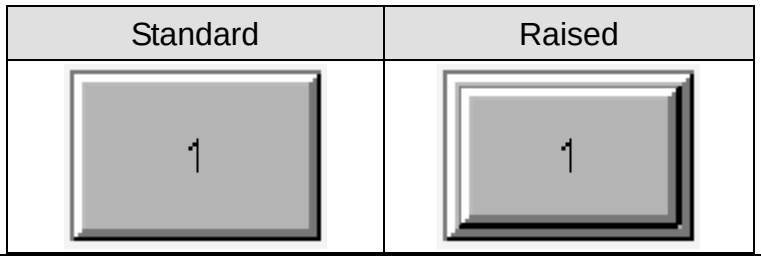
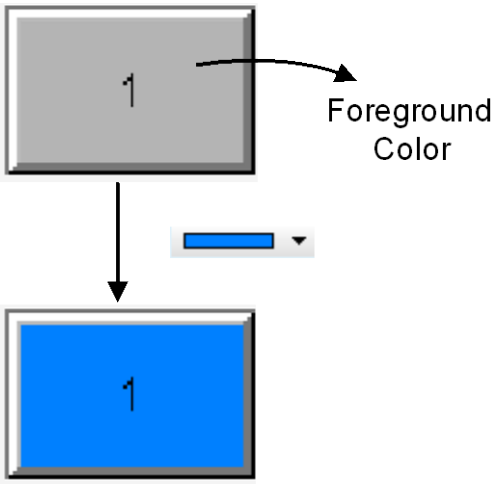


Figure 17-1-2 Keypad (1) Main properties page

No.	Property	Function
(1)	Display	➢ When the user click a block on Keypad (1), the value of that block will be displayed. 
(2)	Mode	➢ 15 modes are provided, including [ESC], [ENT], [CLR], [DEL], [BKSP], [Home], [End], [Insert], [Page Up], [Page Down], [Left],

No.	Property	Function
		[Right], [Up], [Down] and [ASCII] for users to define. ◆ [ESC] means to cancel the text entry; if the keypad element is placed on subscreen, the subscreen will be closed when you press ESC. ◆ [ENT] means to enter. ◆ [CLR] means to clear the whole string. ◆ [DEL] means to delete one character. ◆ [BKSP] means to delete one character (backspace). ◆ [Home] means the cursor will move to the beginning of the row. ◆ [End] means the cursor will move to the end of the row. ◆ [Insert] is the toggle key of inserting and replacing characters. ◆ [Page Up] means to go to the previous page. ◆ [Page Down] means to go to the next page. ◆ [Left] means the cursor will move to the left. ◆ [Right] means the cursor will move to the right. ◆ [Up] means the cursor will move to the previous row. ◆ [Down] means the cursor will move to the next row. ◆ [ASCII] means users can enter the specified character code.
(3)	Style	➢ The Style option provides Standard and Raised for selection. This setting allows the user to change the appearance of the element. 
(4)	Foreground Color	➢ Sets foreground color of elements. 

◆ Text

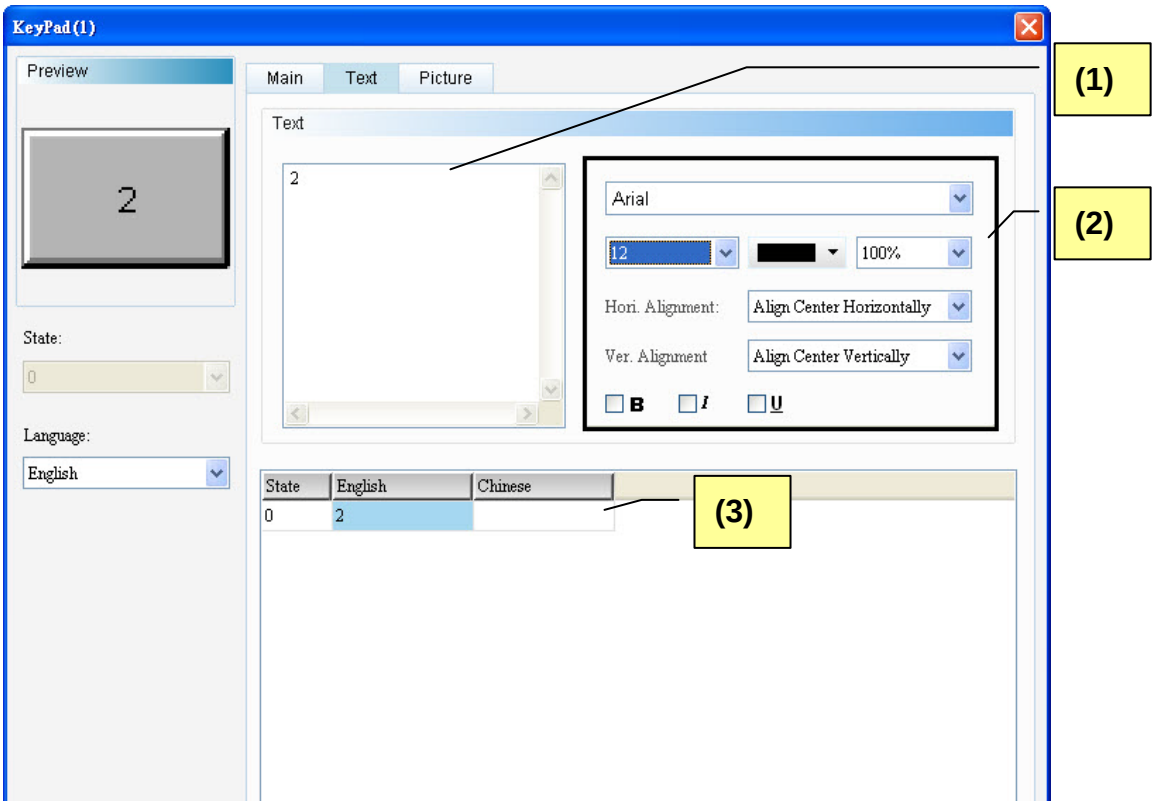
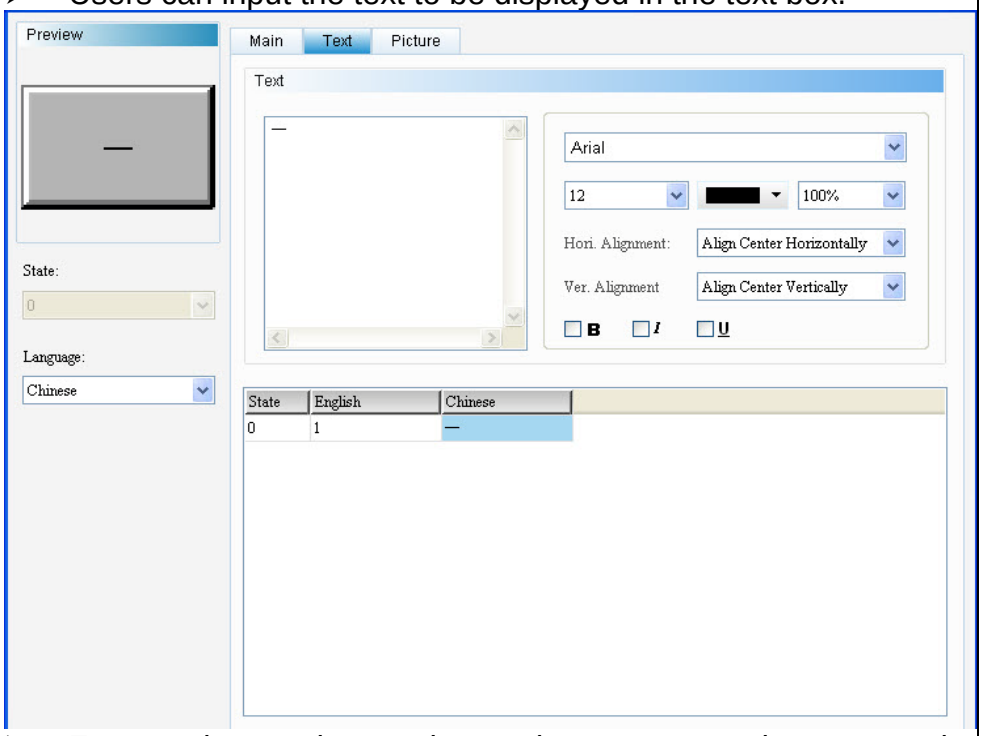


Figure 17-1-3 Keypad (1) Text properties page

No.	Property	Function
(1)	Text	➢ Users can input the text to be displayed in the text box.  ➢ For any element that can be used to enter texts, the user needs only to click the element on the screen and press the spacebar on the keypad to edit the text. This is very convenient for the user to enter texts.

No.	Property	Function
(2)	Text Properties	➢ Sets text properties, including font type, font size, font color, scaling, text alignment, and bold/italic/underline of font. Please refer to the above figure for details about the results of text properties.
(3)	Multi-Language Text Data	➢ Users can add Multi-Language text data from the Multi-Language Text Page. As shown in the Text Properties Figure, users can input English text in the English field.

◆ Picture

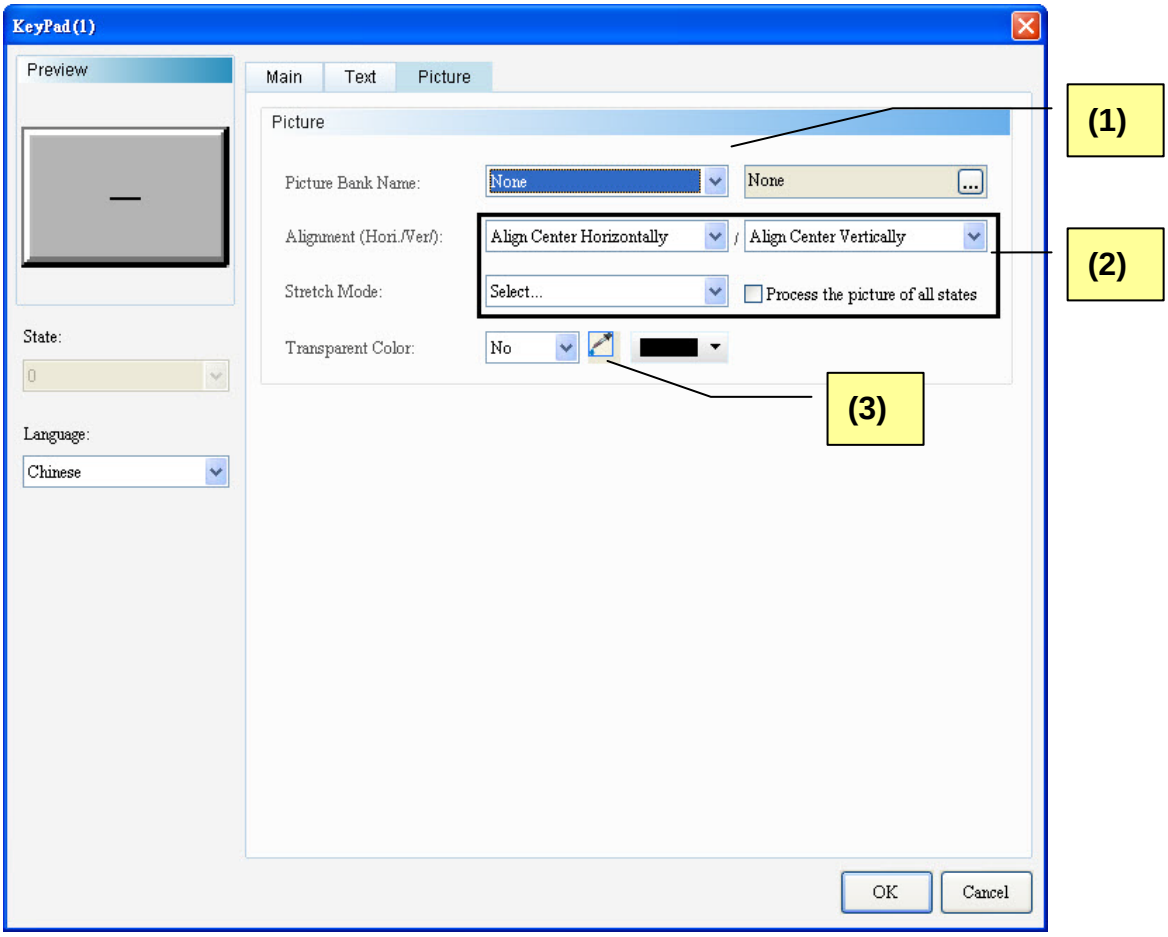
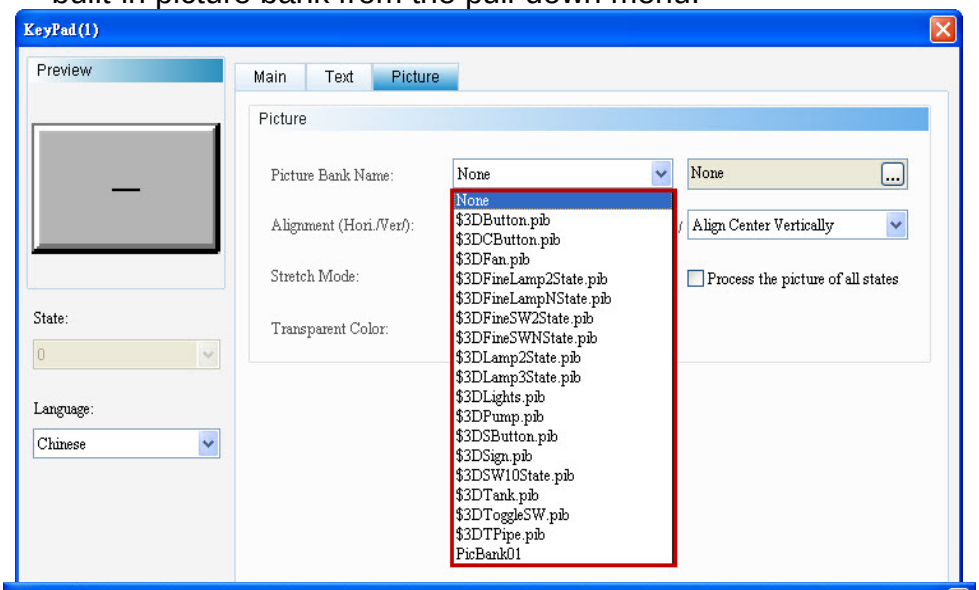
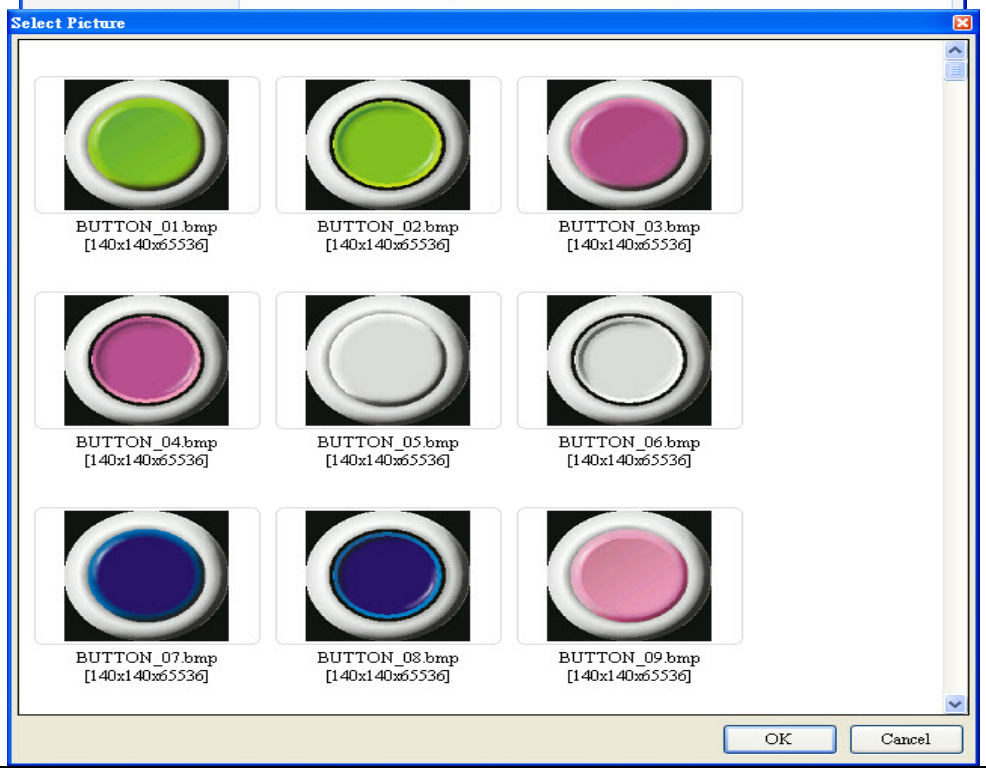
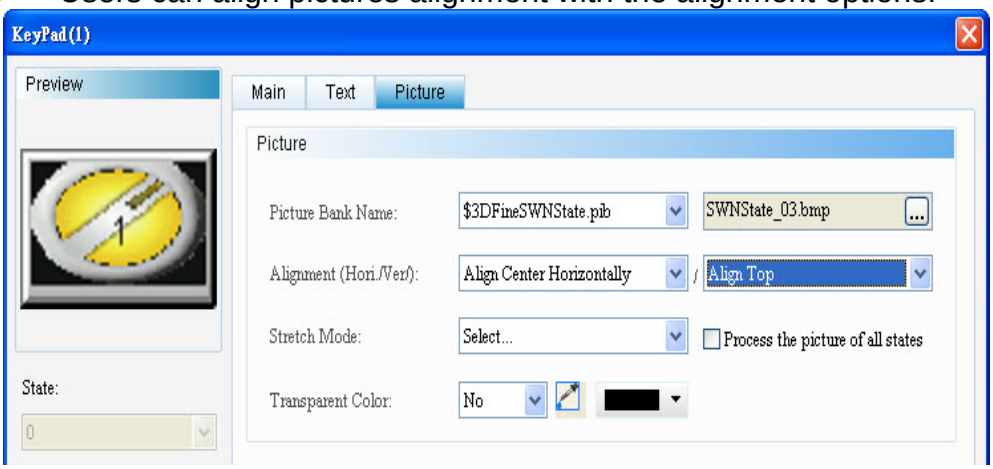
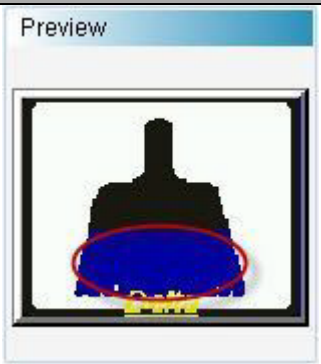


Figure 17-1-4 Keypad (1) Picture properties page

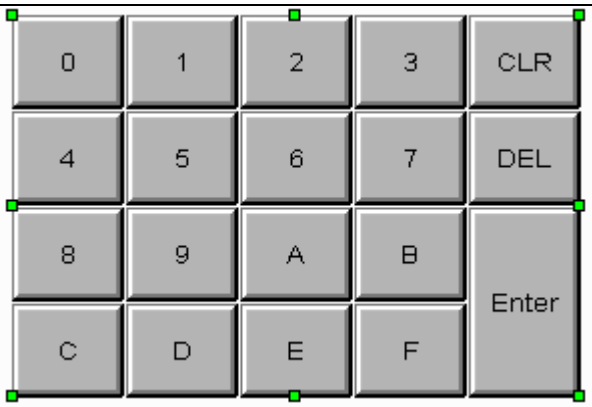
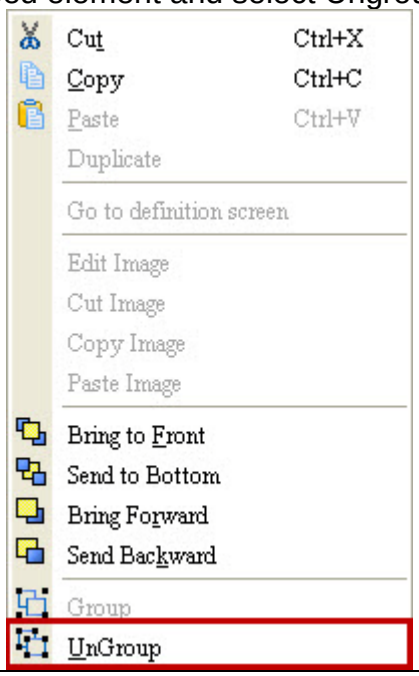
No.	Property	Function
(1)	Picture Bank Name	➢ The default value for Picture Bank Name is “None”. Users wishing to select a display picture can select the desired picture in the built-in picture bank from the pull-down menu.  

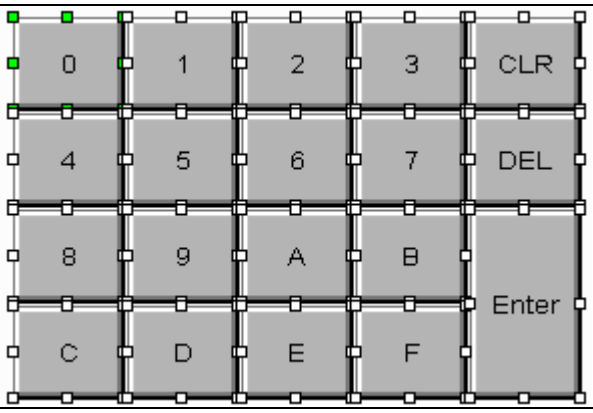
<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td rowspan="2">(2)</td><td>Alignment</td><td>➢ Users can align pictures alignment with the alignment options.
 
</td></tr>
<tr><td>Stretch Mode</td><td>➢ Stretch modes include: Fill, Keep Aspect Ratio, and Actual Size
<table>
<tr><th>Fill</th><th>Keep Aspect Ratio</th><th>Actual Size</th></tr>
<tr><td>In the “Fill” mode, the selected picture will fill up the entire display area.</td><td>In the “Keep Aspect Ratio” mode, the selected picture will fit in the display area proportionally according to the picture ratio.</td><td>In the “Actual Size” mode, the picture will be displayed in its original size in the display area.</td></tr>
<tr><td> </td><td> </td><td> </td></tr>
</table>
➢ If “Process all state pictures” is selected, the system assumes that each element has multiple entries of state data, and some pictures may be unable to fill the entire display area. By selecting this item, users will not need to set individual pictures to save time editing.
</td></tr>
<tr><td>(3)</td><td>Transparent Color</td><td>➢ Users can set a color in the picture to transparent. In this case, by clicking the Transparent Color icon and then the orange part of the loom, the DOPSoft will omit all orange parts in the picture and turn them into transparent; thus turning the foreground color transparent.
</td></tr>
</table>

No.	Property	Function
		

17-2 Keypad (2)

Keypad (2) is hexadecimal in format. The user can customizes the font, size, color and align type of the text to be displayed. It provides a variety of modes for the user to select, such as ESC, ENT, CLR, DEL and ASCII. The Keypad (2) element is grouped. The user can right click the element and select Ungroup to separate the blocks on the keypad individually. The user can also double click the block to be changed and edit it as desired.

<table>
<tr><td rowspan="2">Grouped</td><td> 
</td></tr>
<tr><td>➢ Right click the grouped element and select Ungroup.
 
</td></tr>
</table>

Not Grouped	

Double click the Keypad (2) icon and the following property setting screen appears.

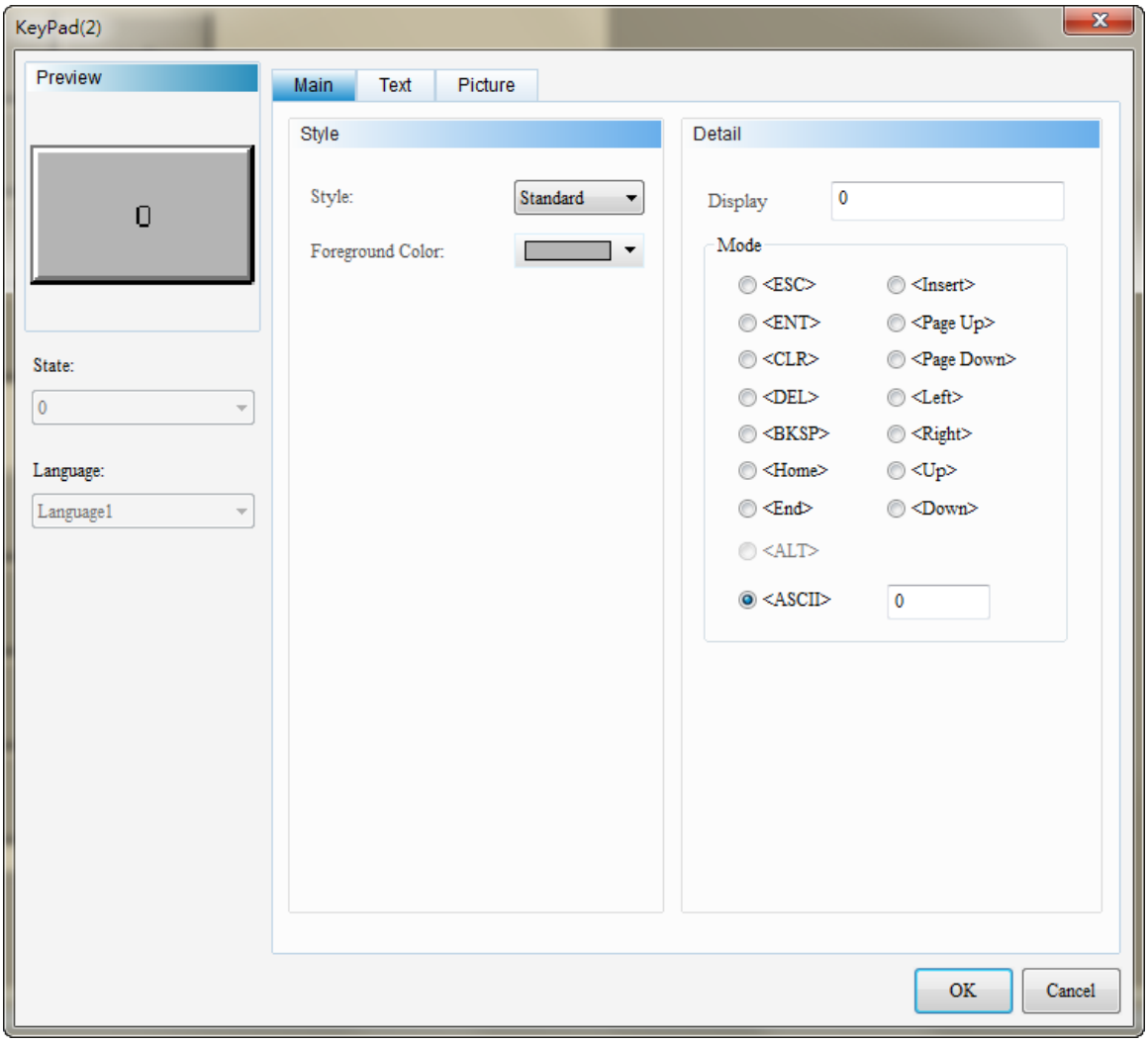


Figure 17-2-1 Keypad (2) properties setting screen

Keypad (2)	
Function Page	**Content Description**
Preview	The State is not available to Keypad (2), but the user can edit multi-language data.
Main	Sets the style. Foreground color, Display, Mode.
Text	Sets the content, font, font size, font color, font effects, scaling, and alignment of the text to be displayed.
Picture	Sets Picture Bank Name, Alignment, Picture Stretch Mode, and Transparent Color.

Table 17-2-3 Keypad (2) function page

◆ Main

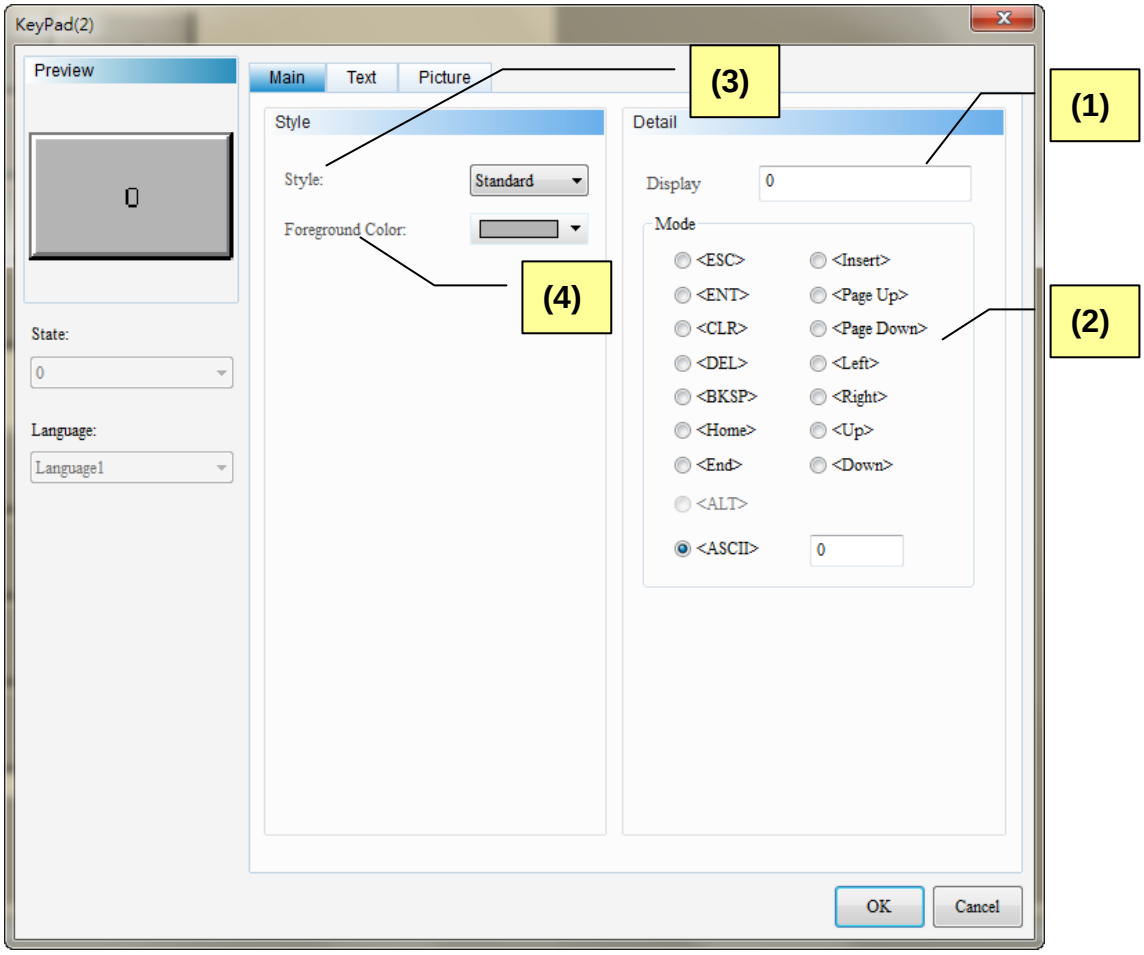
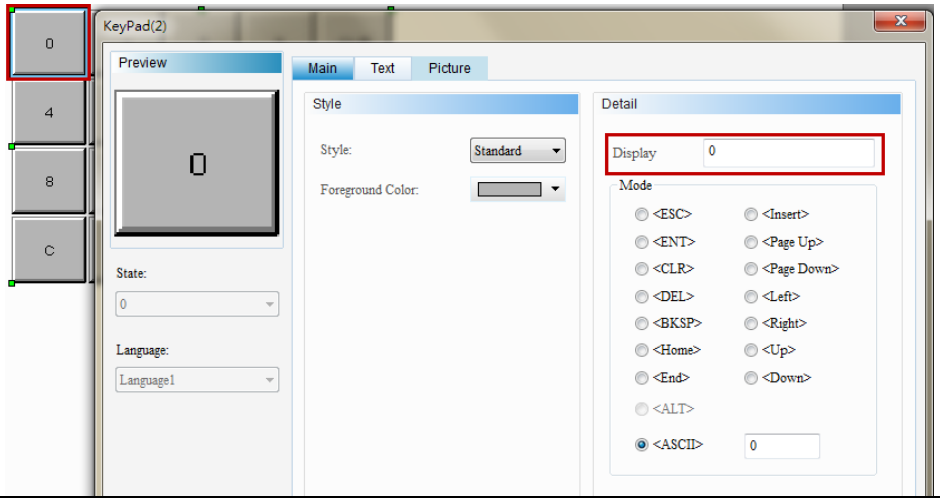
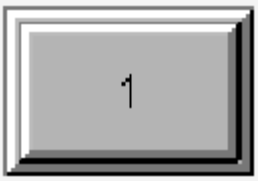
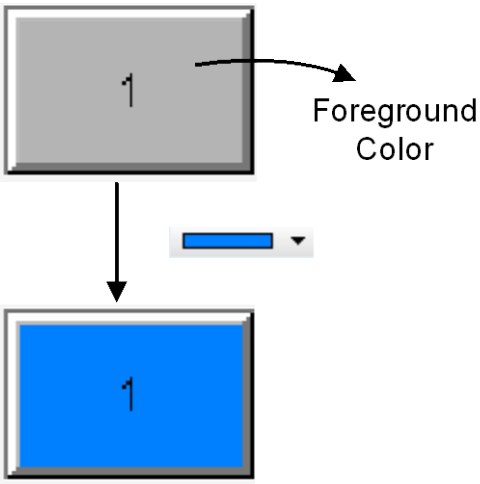


Figure 17-2-2 Keypad (2) Main properties page

No.	Property	Function
(1)	Display	➢ When the user click a block on Keypad (2), the value of that block will be displayed. 
(2)	Mode	➢ 15 modes are provided, including [ESC], [ENT], [CLR], [DEL], [BKSP], [Home], [End], [Insert], [Page Up], [Page Down], [Left], [Right], [Up], [Down] and [ASCII] for users to define.

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td></td><td></td><td>◆ [ESC] means to cancel the text entry; if the keypad element is placed on subscreen, the subscreen will be closed when you press ESC.
◆ [ENT] means to enter.
◆ [CLR] means to clear the whole string.
◆ [DEL] means to delete one character.
◆ [BKSP] means to delete one character (backspace).
◆ [Home] means the cursor will move to the beginning of the row.
◆ [End] means the cursor will move to the end of the row.
◆ [Insert] is the toggle key of inserting and replacing characters.
◆ [Page Up] means to go to the previous page.
◆ [Page Down] means to go to the next page.
◆ [Left] means the cursor will move to the left.
◆ [Right] means the cursor will move to the right.
◆ [Up] means the cursor will move to the previous row.
◆ [Down] means the cursor will move to the next row.
◆ [ASCII] means users can enter the specified character code.</td></tr>
<tr><td>(3)</td><td>Style</td><td>➢ The Style option provides Standard and Raised for selection. This setting allows the user to change the appearance of the element.
<table>
<tr><th>Standard</th><th>Raised</th></tr>
<tr><td> </td><td>  </td></tr>
</table></td></tr>
<tr><td>(4)</td><td>Foreground Color</td><td>➢ Sets foreground color of elements.
 
</td></tr>
</table>

◆ Text

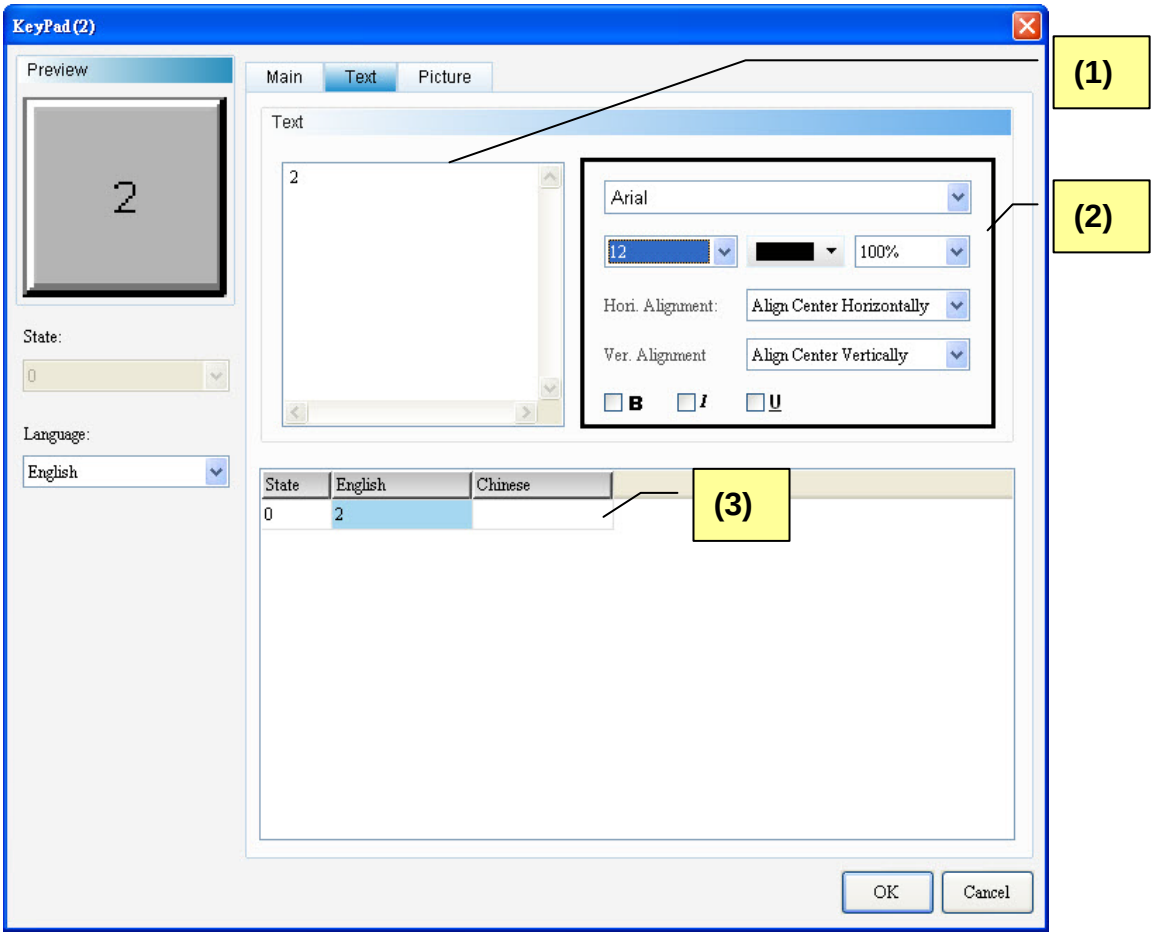
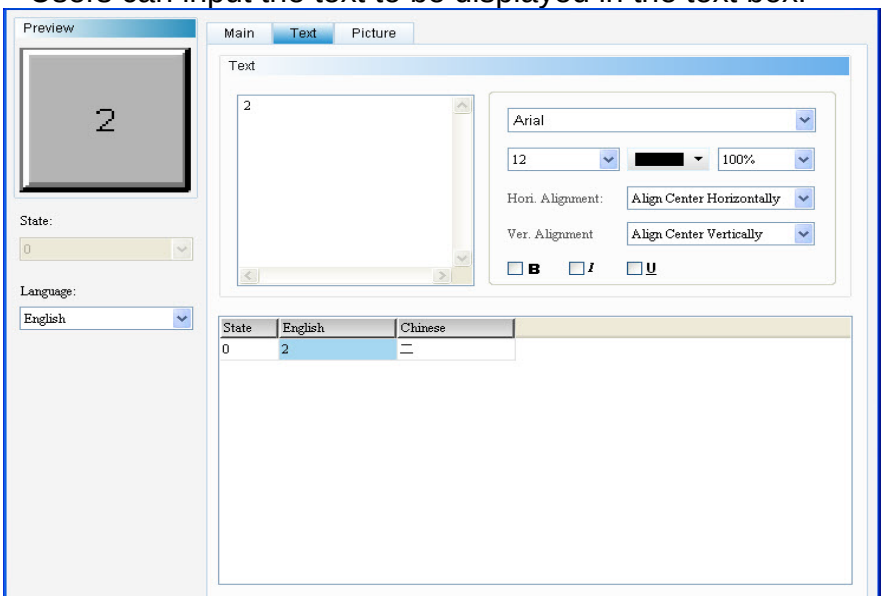


Figure 17-2-3 Keypad (2) Text properties page

No.	Property	Function
(1)	Text	➢ Users can input the text to be displayed in the text box.  ➢ For any element that can be used to enter texts, the user needs only to click the element on the screen and press the spacebar on the keypad to edit the text. This is very convenient for the user to enter texts.

No.	Property	Function
(2)	Text Properties	➢ Sets text properties, including font type, font size, font color, scaling, text alignment, and bold/italic/underline of font. Please refer to the above figure for details about the results of text properties.
(3)	Multi-Language Text Data	➢ Users can add Multi-Language text data from the Multi-Language Text Page. As shown in the Text Properties Figure, users can input English text in the English field.

◆ Picture

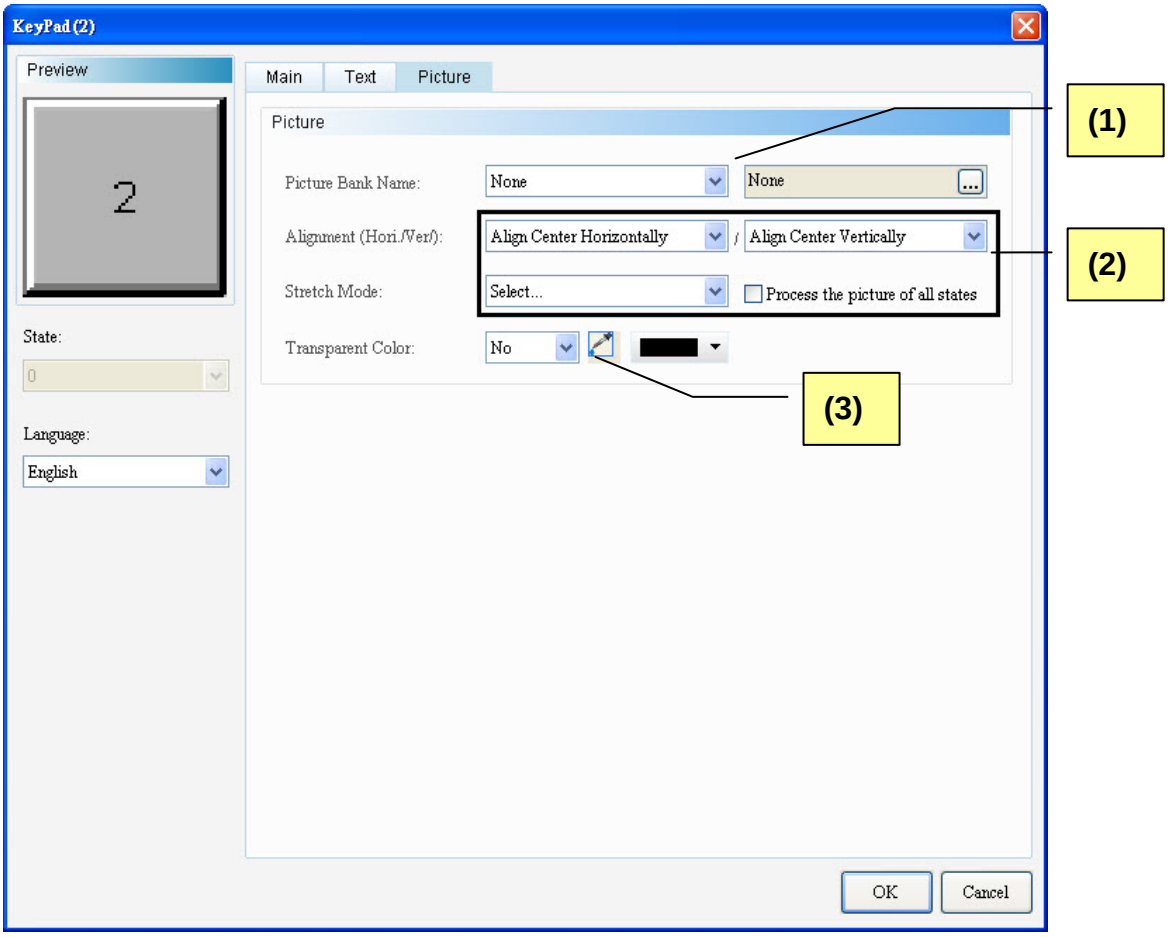
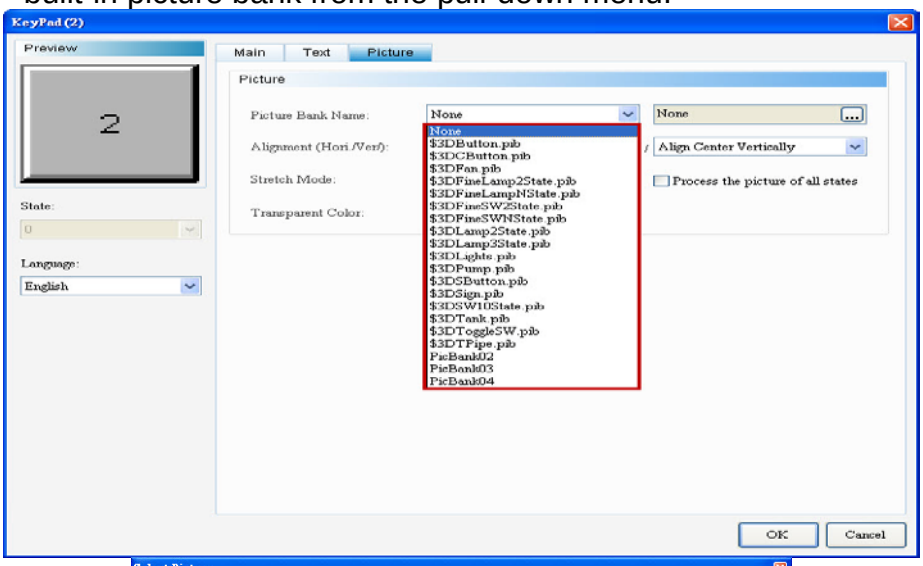
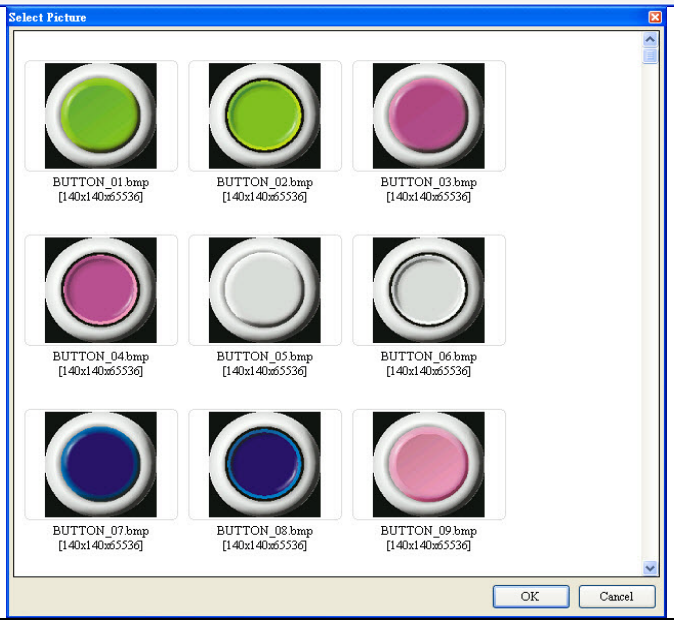
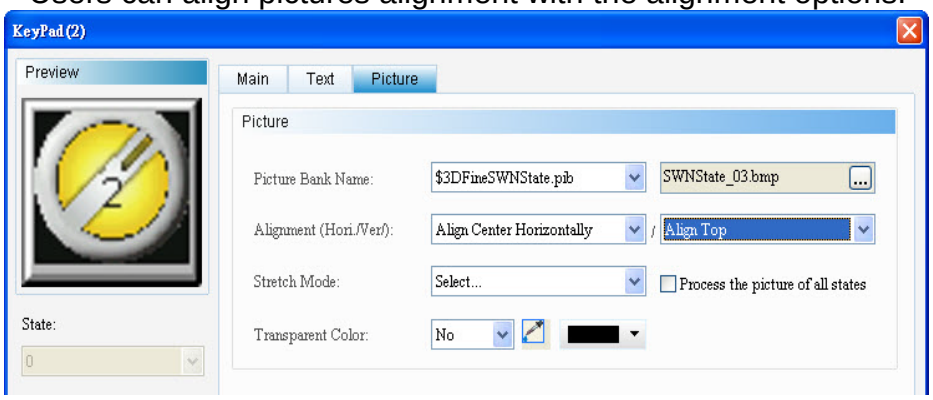
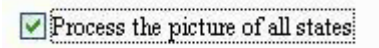
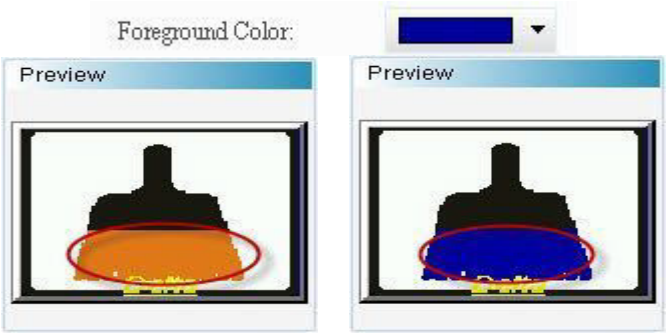


Figure 17-2-4 Keypad (2) Picture properties page

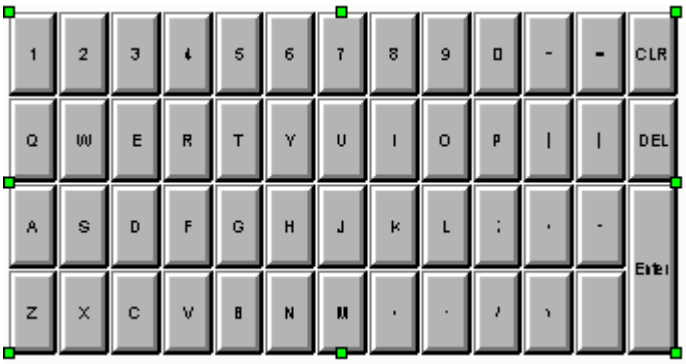
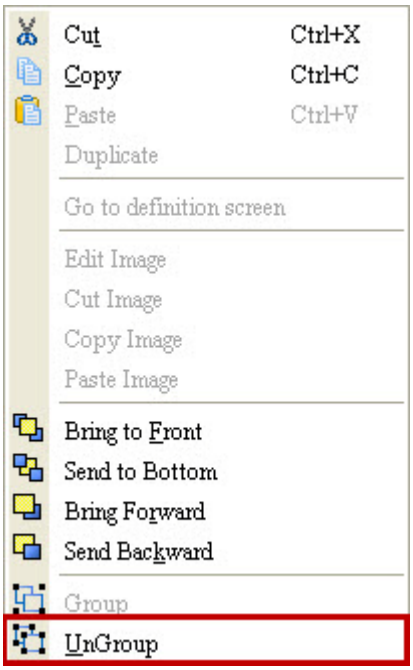
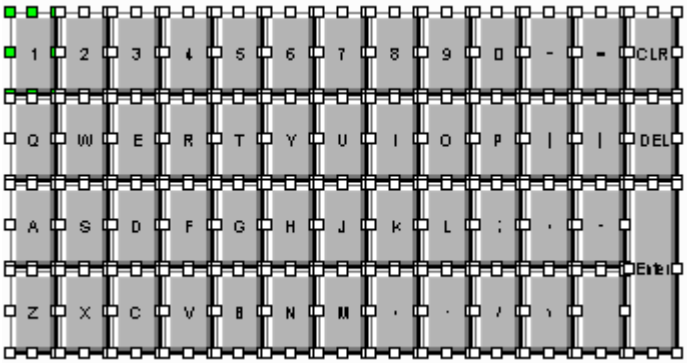
No.	Property	Function
(1)	Picture Bank Name	➢ The default value for Picture Bank Name is “None”. Users wishing to select a display picture can select the desired picture in the built-in picture bank from the pull-down menu.  
(2)	Alignment	➢ Users can align pictures alignment with the alignment options.  ➢ Stretch modes include: Fill, Keep Aspect Ratio, and Actual Size Fill | Keep Aspect Ratio | Actual Size

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td></td><td>Stretch Mode</td><td>
<table>
<tr><td>In the “Fill” mode, the selected picture will fill up the entire display area.</td><td>In the “Keep Aspect Ratio” mode, the selected picture will fit in the display area proportionally according to the picture ratio.</td><td>In the “Actual Size” mode, the picture will be displayed in its original size in the display area.</td></tr>
<tr><td> </td><td> </td><td> </td></tr>
</table>
➢ If “Process all state pictures” is selected, the system assumes that each element has multiple entries of state data, and some pictures may be unable to fill the entire display area. By selecting this item, users will not need to set individual pictures to save time editing.
 

</td></tr>
<tr><td>(3)</td><td>Transparent Color</td><td>➢ Users can set a color in the picture to transparent. In this case, by clicking the Transparent Color icon and then the orange part of the loom, the DOPSoft will omit all orange parts in the picture and turn them into transparent; thus turning the foreground color transparent.
 
</td></tr>
</table>

17-3 Keypad (3)

Keypad (3) is keypad in alphanumeric entry format. The user can customizes the font, size, color and align type of the text to be displayed. It provides a variety of modes for the user to select, such as ESC, ENT, CLR, DEL and ASCII. The Keypad (3) element is grouped. The user can right click the element and select Ungroup to separate the blocks on the keypad individually. The user can also double click the block to be changed and edit it as desired

Grouped	 ➢ Right click the grouped element and select Ungroup. 
Not Grouped	

Double click the Keypad (3) icon and the following property setting screen appears.

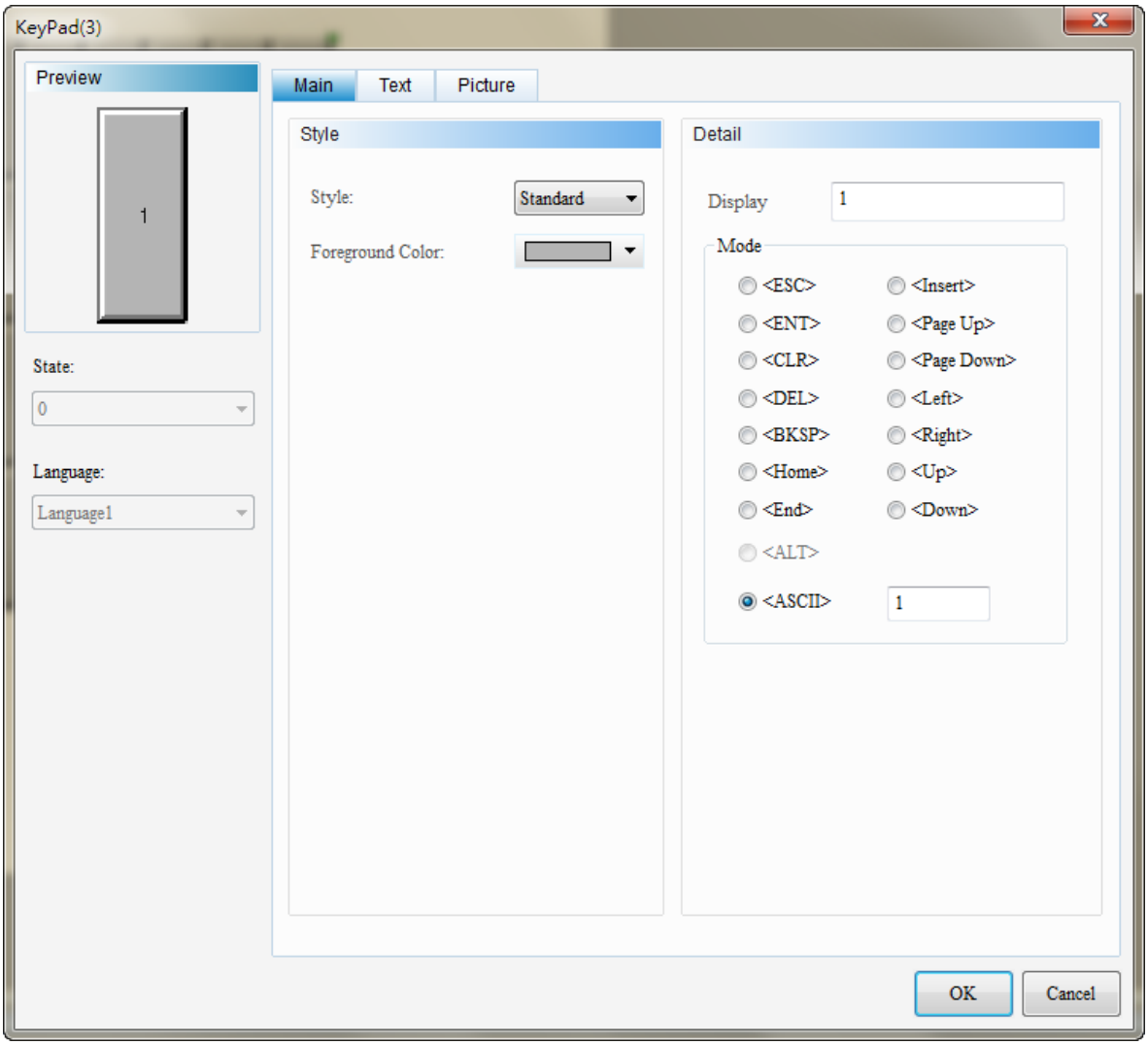


Figure 17-3-1 Keypad (3) properties setting screen

Keypad (3)	
Function Page	**Content Description**
Preview	The State is not available to Keypad (1), but the user can edit multi-language data.
Main	Sets the style. Foreground color, Display, Mode.
Text	Sets the content, font, font size, font color, font effects, scaling, and alignment of the text to be displayed.
Picture	Sets Picture Bank Name, Alignment, Picture Stretch Mode, and Transparent Color.

Table 17-3-3 Keypad (3) function page

◆ Main

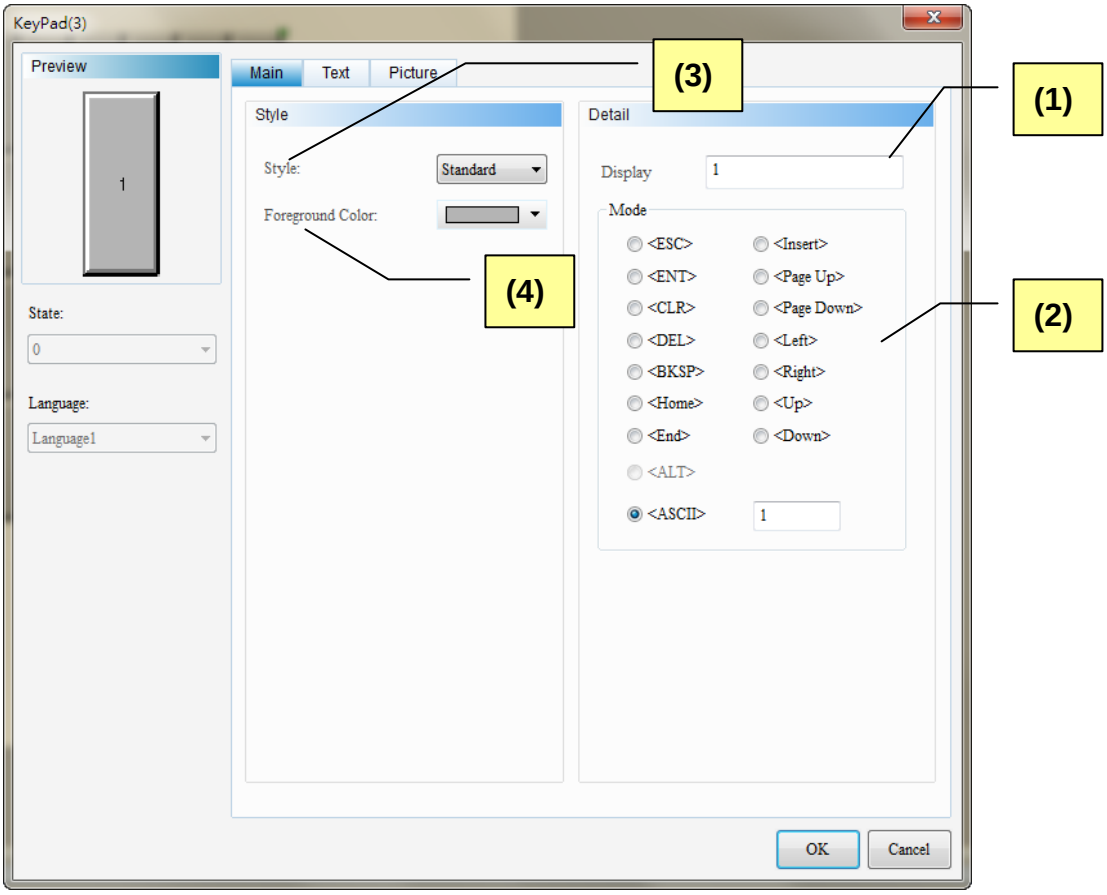
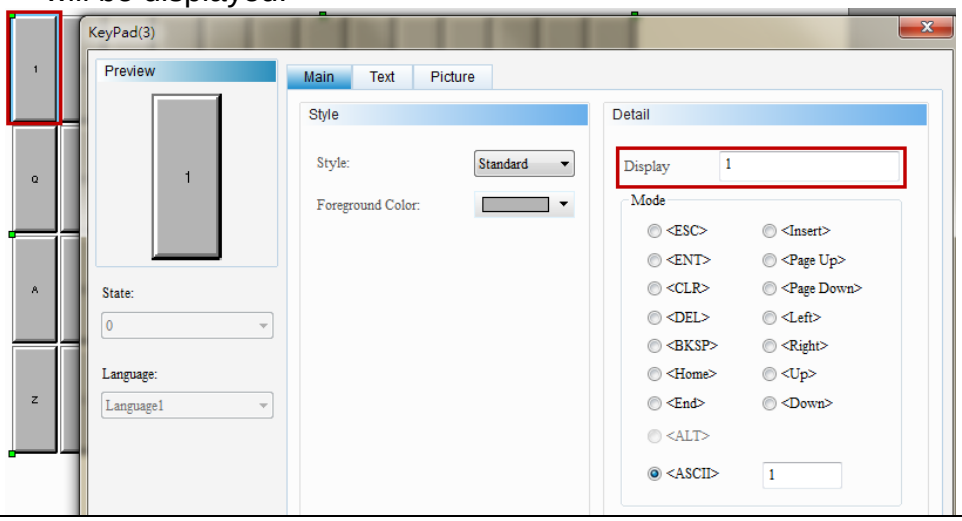
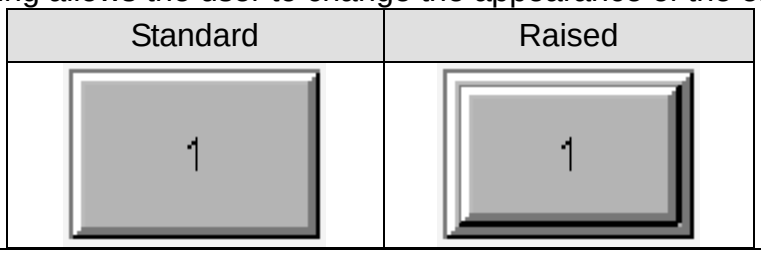
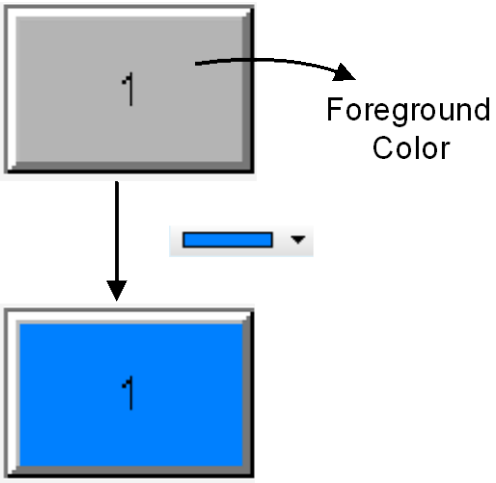


Figure 17-3-2 Keypad (3) Main properties screen

No.	Property	Function
(1)	Display	➢ When the user click a block on Keypad (3), the value of that block will be displayed. 
(2)	Mode	➢ [ASCII] means users can enter the specified character code. 15 modes are provided, including [ESC], [ENT], [CLR], [DEL], [BKSP], [Home], [End], [Insert], [Page Up], [Page Down], [Left], [Right], [Up], [Down] and [ASCII] for users to define. ◆ [ESC] means to cancel the text entry; if the keypad element is

No.	Property	Function
		placed on subscreen, the subscreen will be closed when you press ESC. ◆ [ENT] means to enter. ◆ [CLR] means to clear the whole string. ◆ [DEL] means to delete one character. ◆ [BKSP] means to delete one character (backspace). ◆ [Home] means the cursor will move to the beginning of the row. ◆ [End] means the cursor will move to the end of the row. ◆ [Insert] is the toggle key of inserting and replacing characters. ◆ [Page Up] means to go to the previous page. ◆ [Page Down] means to go to the next page. ◆ [Left] means the cursor will move to the left. ◆ [Right] means the cursor will move to the right. ◆ [Up] means the cursor will move to the previous row. ◆ [Down] means the cursor will move to the next row. ◆ [ASCII] means users can enter the specified character code.
(3)	Style	➢ The Style option provides Standard and Raised for selection. This setting allows the user to change the appearance of the element. 
(4)	Foreground Color	➢ Sets foreground color of elements. 

◆ Text

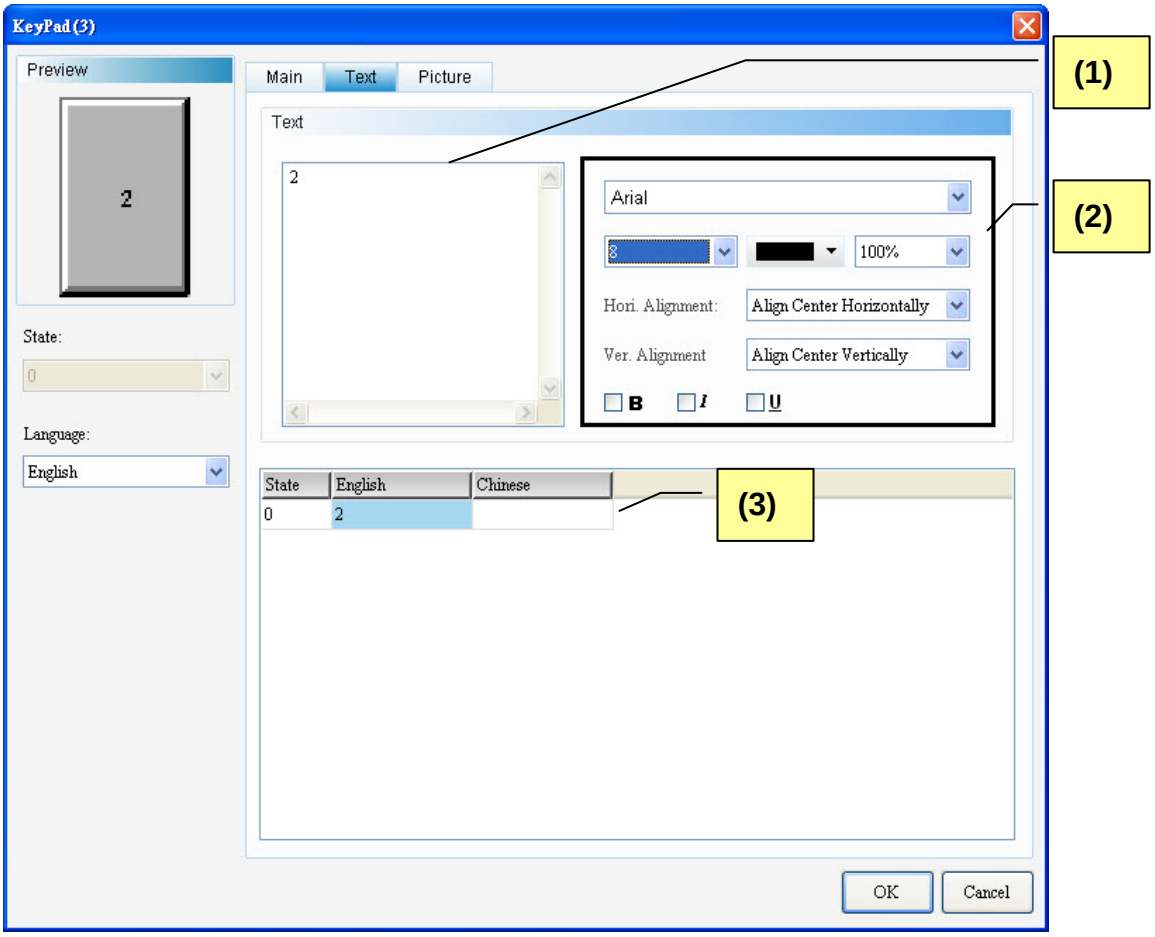
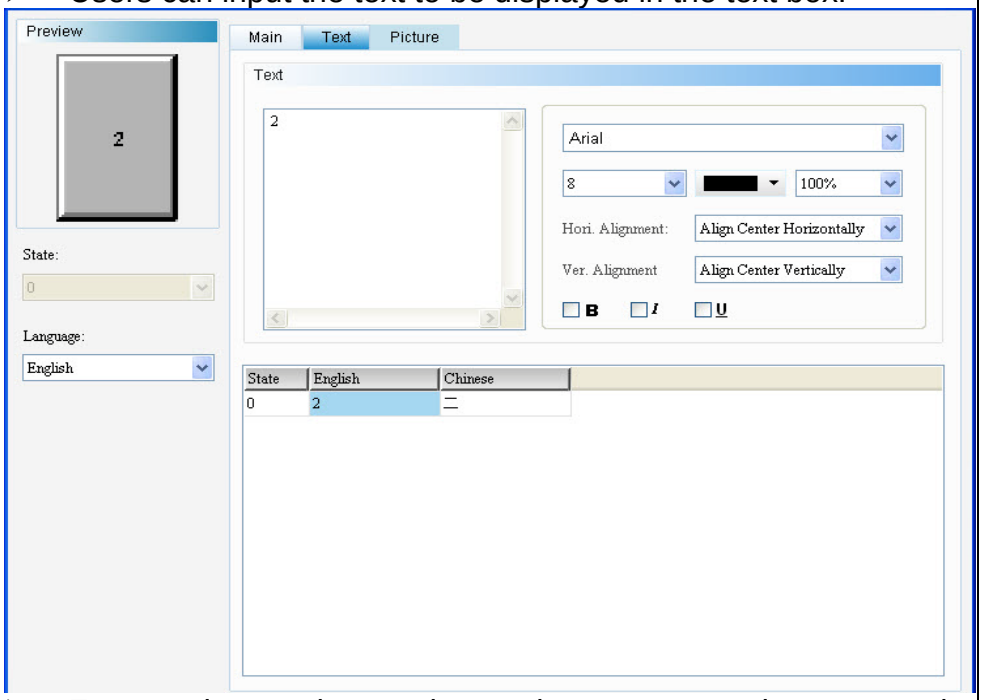


Figure 17-3-3 Keypad (3) Text properties page

No.	Property	Function
(1)	Text	➢ Users can input the text to be displayed in the text box.  ➢ For any element that can be used to enter texts, the user needs

No.	Property	Function
		only to click the element on the screen and press the spacebar on the keypad to edit the text. This is very convenient for the user to enter texts.
(2)	Text Properties	➢ Sets text properties, including font type, font size, font color, scaling, text alignment, and bold/italic/underline of font. Please refer to the above figure for details about the results of text properties.
(3)	Multi-Language Text Data	➢ Users can add Multi-Language text data from the Multi-Language Text Page. As shown in the Text Properties Figure, users can input English text in the English field.

◆ Picture

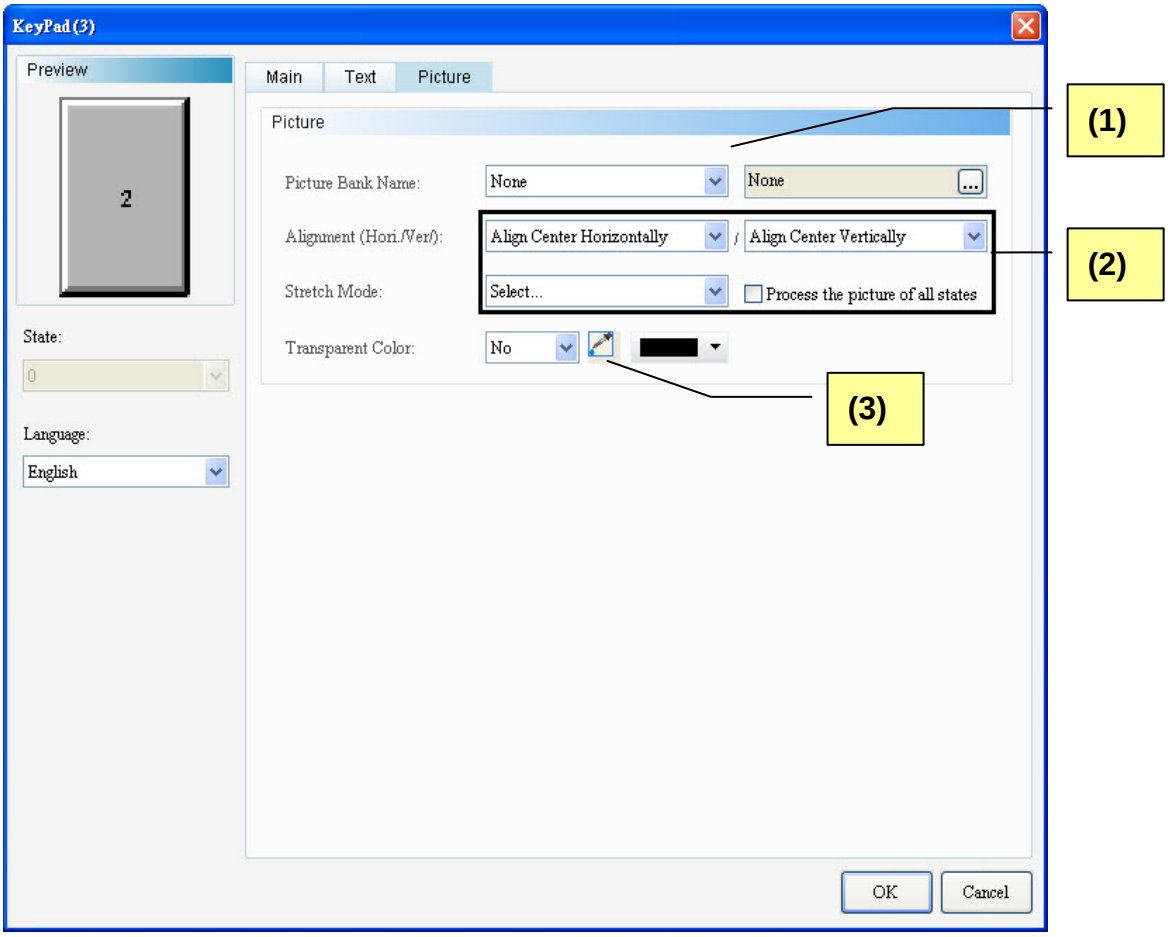
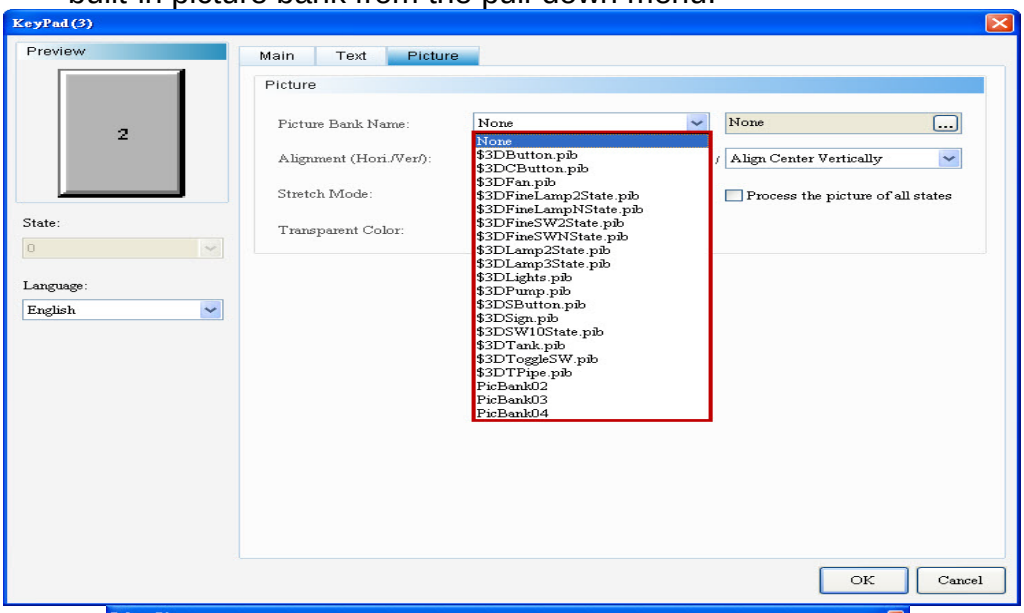
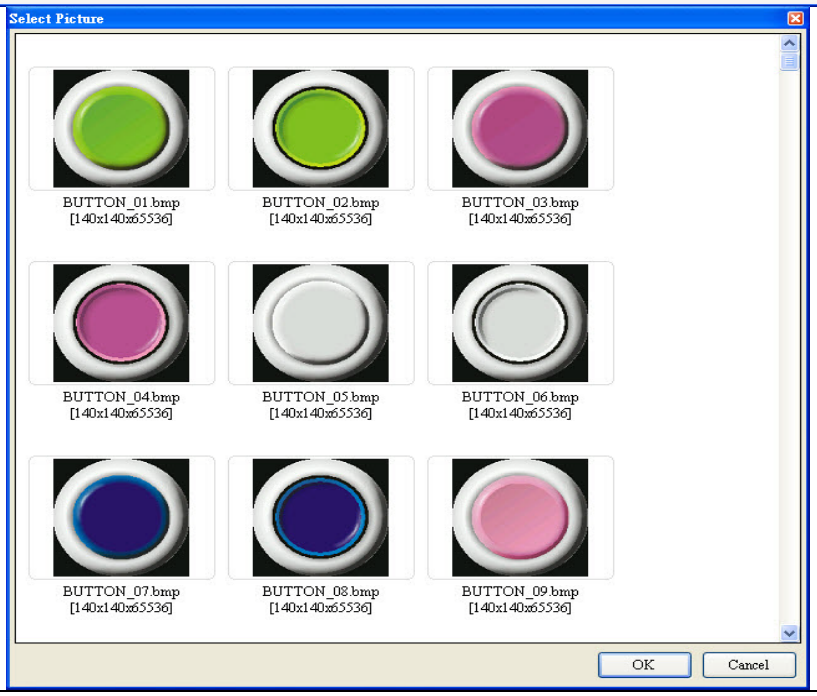
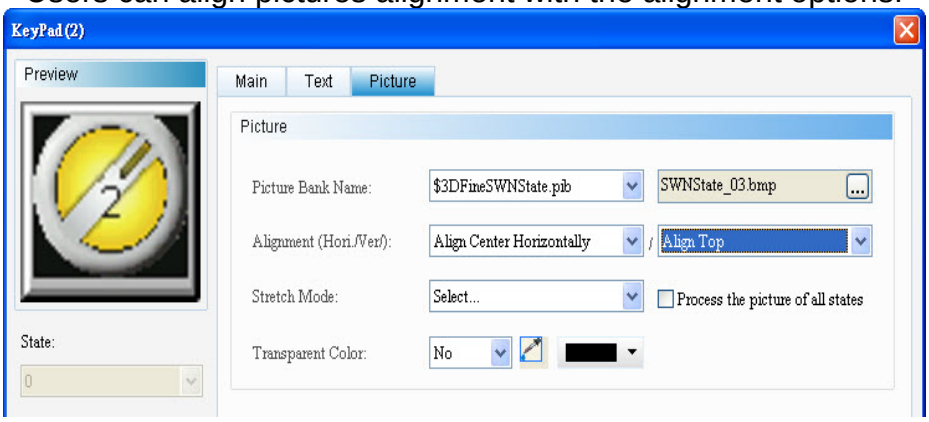
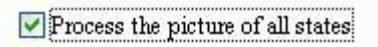
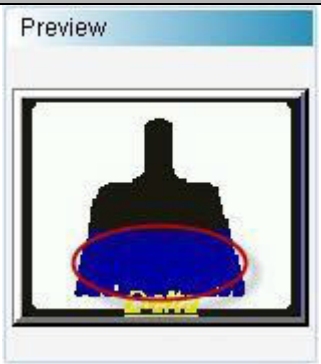


Figure 17-3-4 Keypad (3) Picture properties page

No.	Property	Function
(1)	Picture Bank Name	➢ The default value for Picture Bank Name is “None”. Users wishing to select a display picture can select the desired picture in the built-in picture bank from the pull-down menu.  

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td rowspan="2">(2)</td><td>Alignment</td><td>➢ Users can align pictures alignment with the alignment options.
 

➢ Stretch modes include: Fill, Keep Aspect Ratio, and Actual Size
<table>
<tr><th>Fill</th><th>Keep Aspect Ratio</th><th>Actual Size</th></tr>
<tr><td>In the “Fill” mode, the selected picture will fill up the entire display area.</td><td>In the “Keep Aspect Ratio” mode, the selected picture will fit in the display area proportionally according to the picture ratio.</td><td>In the “Actual Size” mode, the picture will be displayed in its original size in the display area.</td></tr>
<tr><td>
</td><td>
</td><td>
</td></tr>
</table>
➢ If “Process all state pictures” is selected, the system assumes that each element has multiple entries of state data, and some pictures may be unable to fill the entire display area. By selecting this item, users will not need to set individual pictures to save time editing.
 
</td></tr>
<tr><td>Stretch Mode</td></tr>
<tr><td>(3)</td><td>Transparent Color</td><td>➢ Users can set a color in the picture to transparent. In this case, by clicking the Transparent Color icon and then the orange part of the loom, the DOPSoft will omit all orange parts in the picture and turn them into transparent; thus turning the foreground color transparent.
</td></tr>
</table>

No.	Property	Function
		

Contents

18-1 Slider 3

Chapter 18 Analog

This chapter describes the settings of the analog elements that the DOPSoft software provides.

◆ Classification of analog elements:

Analog		Slider

Table 18-1-1 Classification of analog elements

◆ Common properties of analog elements

Analog	Read Address	Write Address	Write Offset Address	Read Offset Address	Style (Foreground Color/ Foreground Color/ Border Color)	Direction/Start Point	Slide Bar Width/Slide Button Length	Min. Value/Max. Value	Data Type	Data Format
Slider	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎

Table 18-1-2 Common properties of analog elements.

18-1 Slider

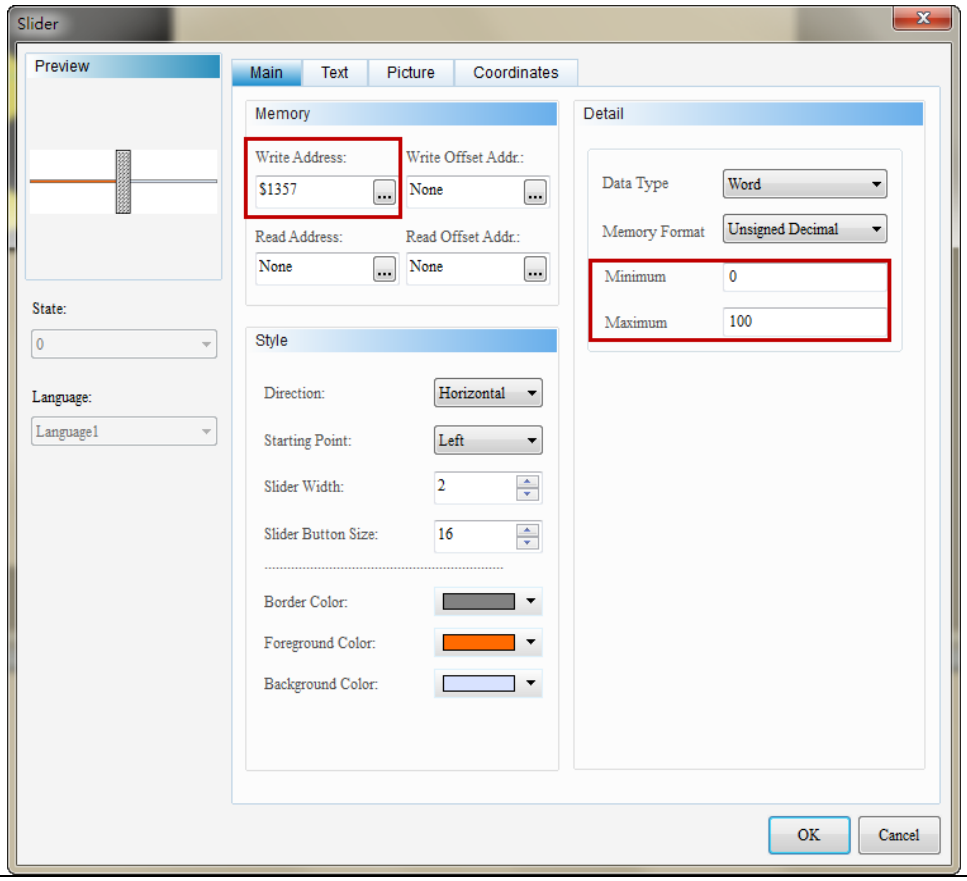
The Slider is used for easy drag and value adjustment.
Refer to the Slider example in Table 18-1-3.

Slider Example

Table 18-1-3 Slider Example

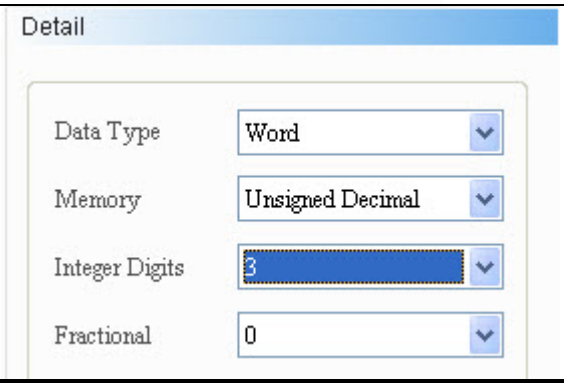
Create Slider

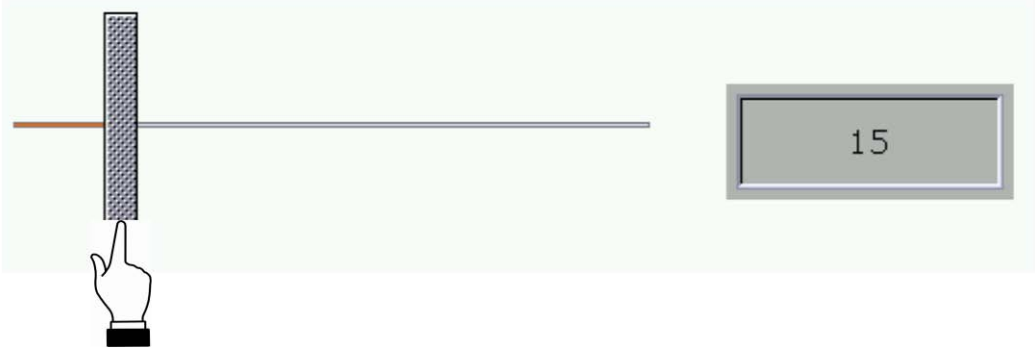
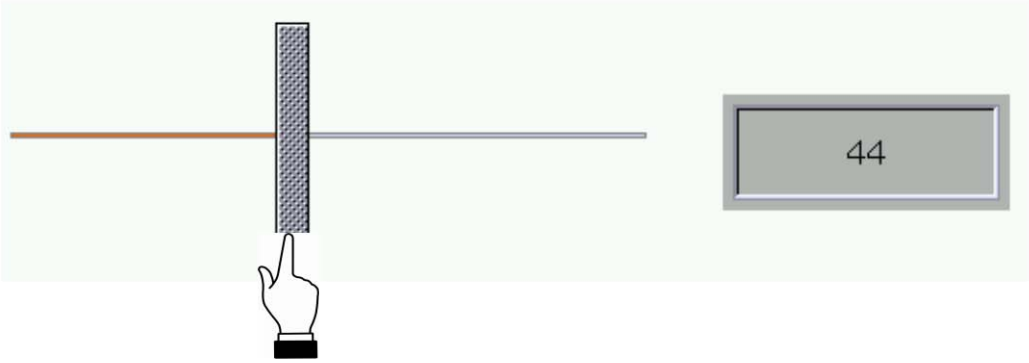
➢ Step 1: Create the Slider and set the Write Address to $1357. The min. and max. values are set to 0~100.



Create Increment and Decrement Button Elements

➢ Step 1: Create the data display element and set the Read Address to $1357. Also set the increment/decrement value and upper/lower limit for the element.

Data Display Element	**Read Address**	
	Setup	

Slider Example Table 18-1-3 Slider Example	
Execution Results	➢ After creation of all elements, perform the compilation and download them to HMI. When you move the Slider, the data display element will show the value corresponding to the movement of the Slider.  

Double click the Slider icon and the following property setting screen appears.

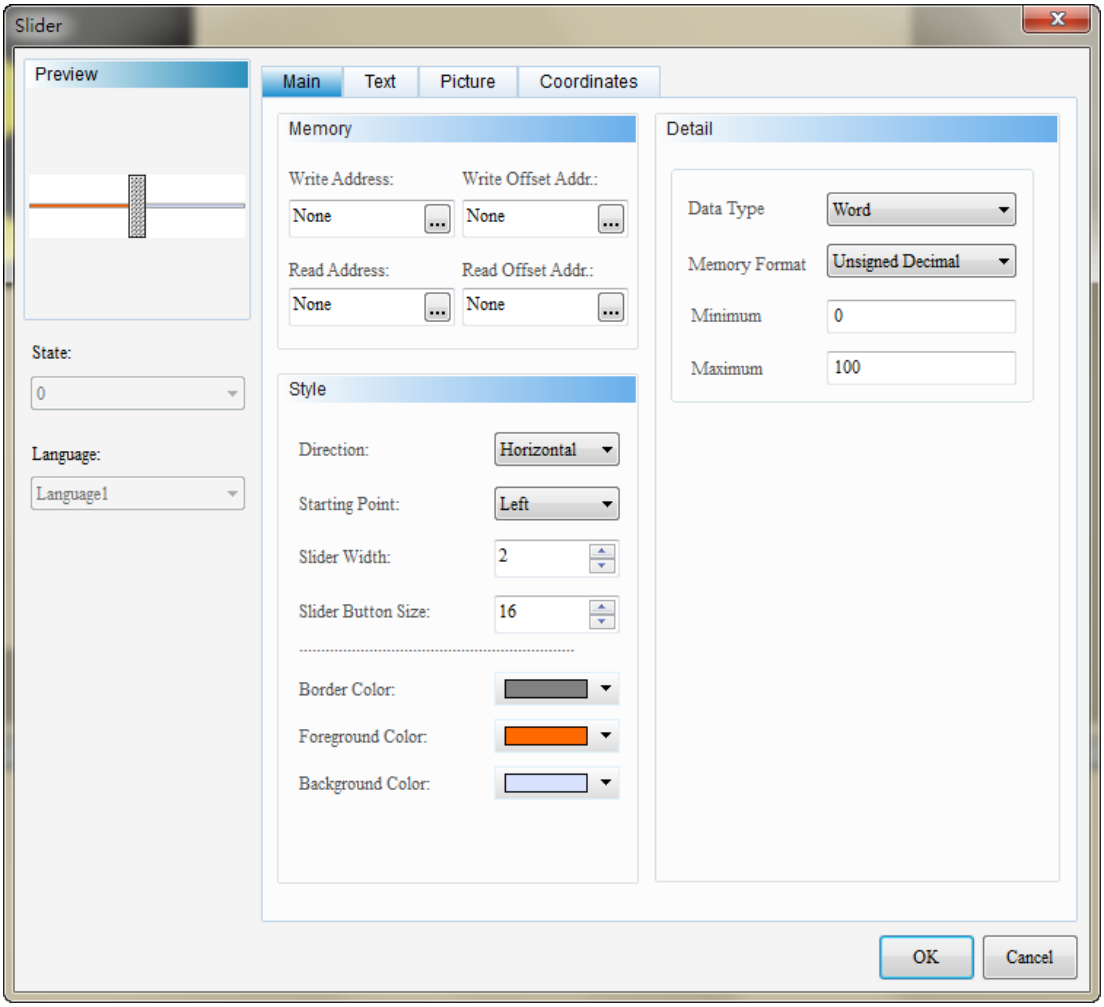


Figure 18-1-1 Slider properties setting screen

Slider	
Function Page	**Content Description**
Preview	The State is not available for Slider, but the user can edit multi-language data.
Main	Sets the write address, read address, write offset address, read offset address, data type, data format, min. value, max. value. Sets the direction, start point, slide bar width, slide button Size, border color, background color, foreground color.
Text	Sets the content, font, font size, font color, font effects, scaling, and alignment of the text to be displayed.
Picture	Sets Picture Bank Name, Alignment, Picture Stretch Mode, and Transparent Color.
Coordinates	Sets the X-Y coordinates, width and height of the element.

Table 18-1-4 Slider function page

◆ Main

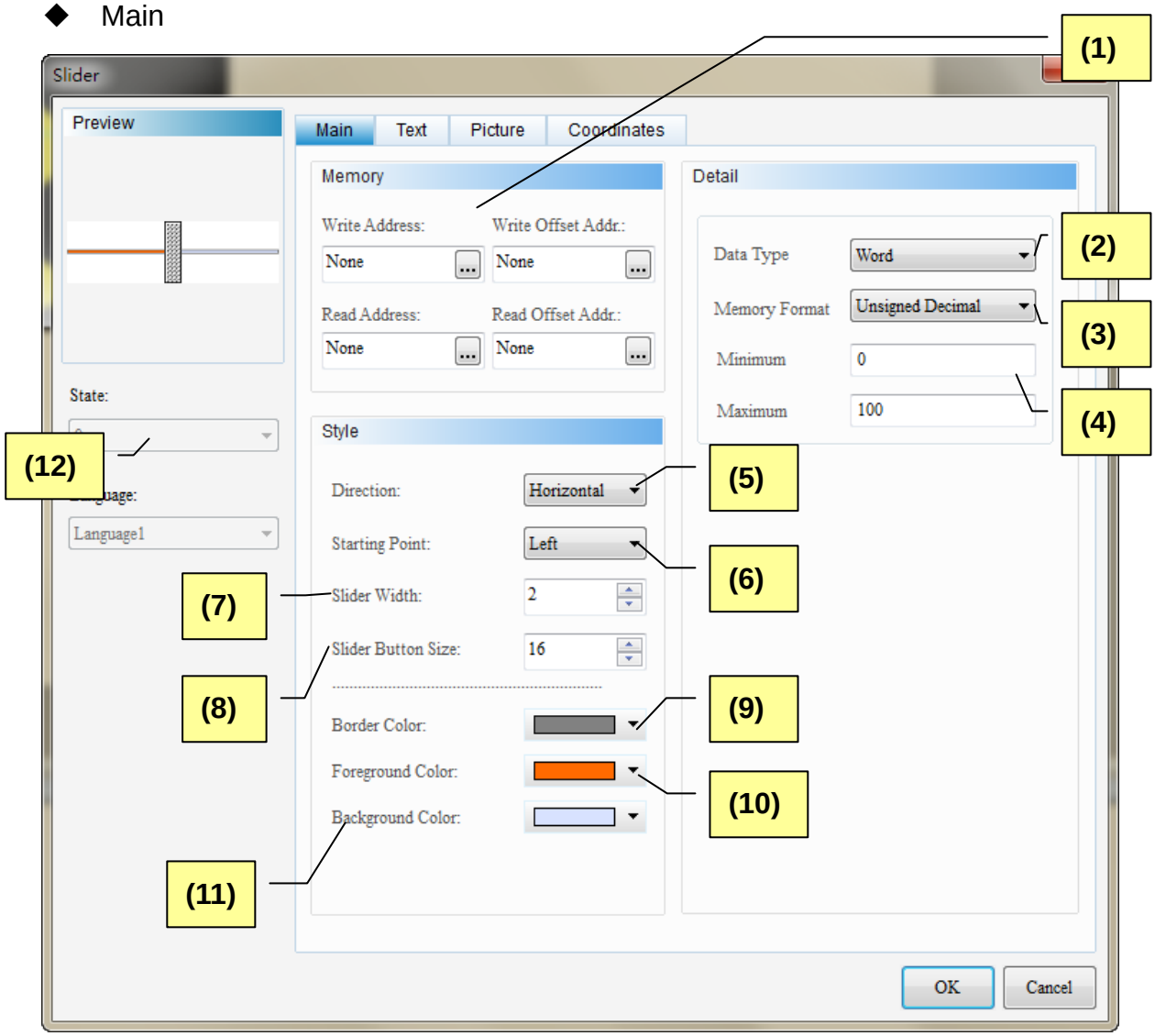
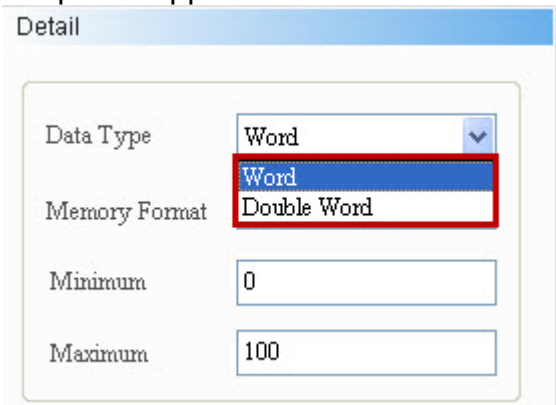
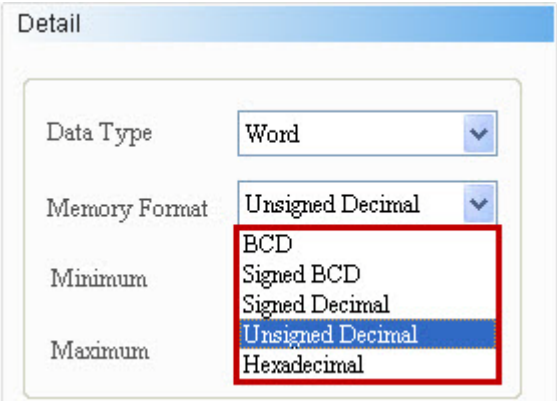
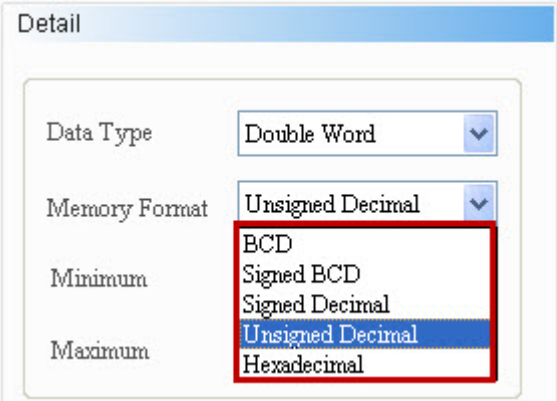
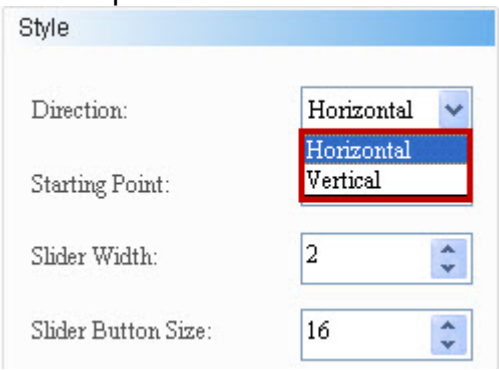


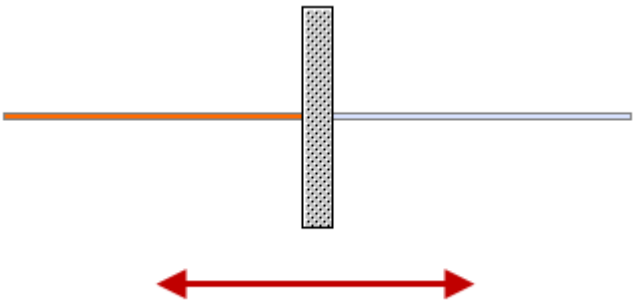
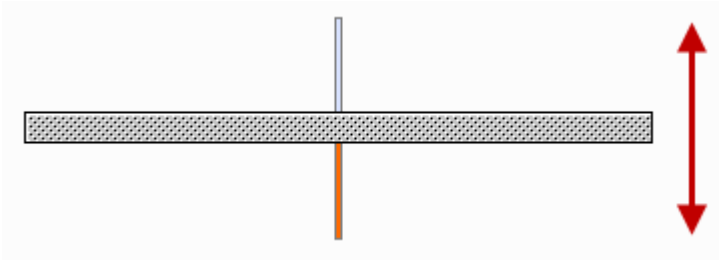
Figure 18-1-2 Slider Main properties page

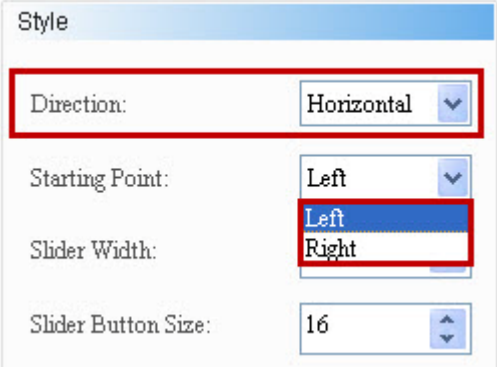
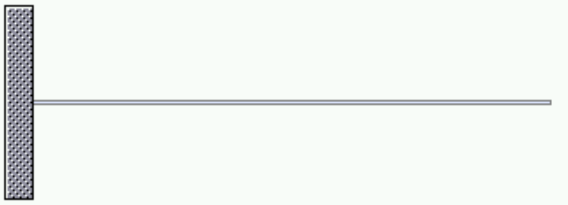
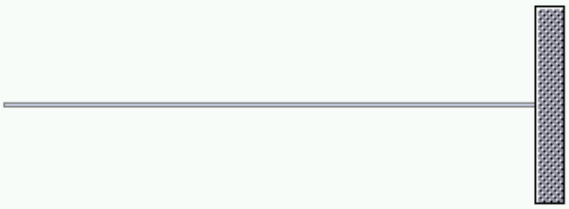
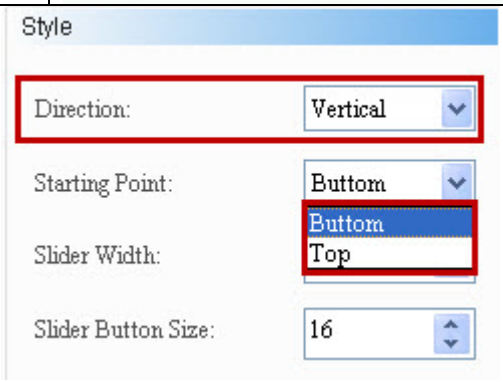
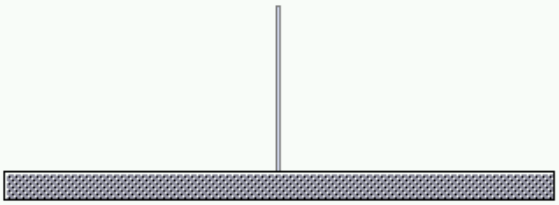
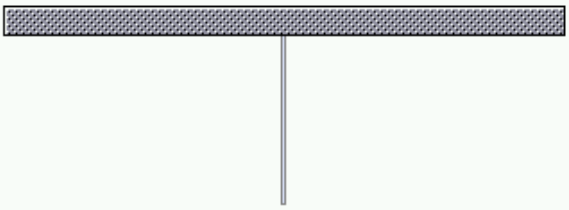
No.	Property	Function
(1)	Write Address	➢ The user can select the internal memory or controller register address. Only Word can be entered as the memory type. ➢ Selects link name or style. Please refer to 5-1Buttons of Chapter 05 for details.
	Read Address	
	Write Offset Address	➢ Please refer to Appendix D Write and Read Offset Address.
	Read Offset Address	

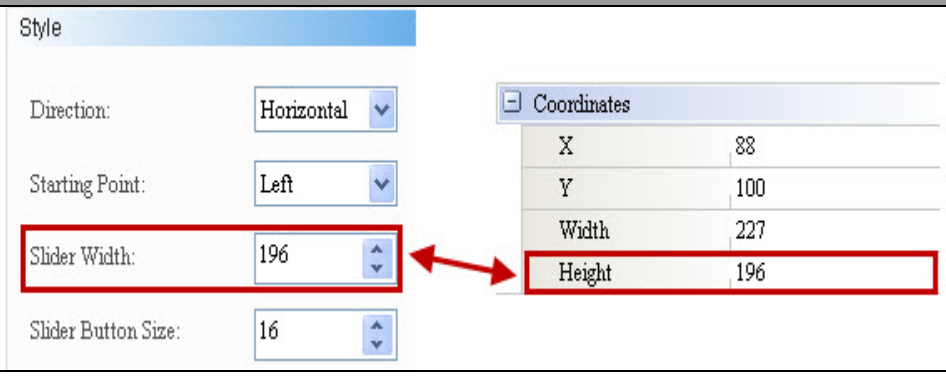
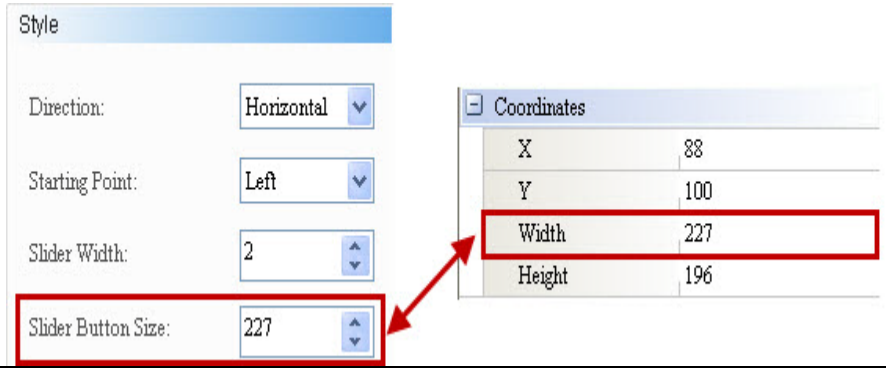
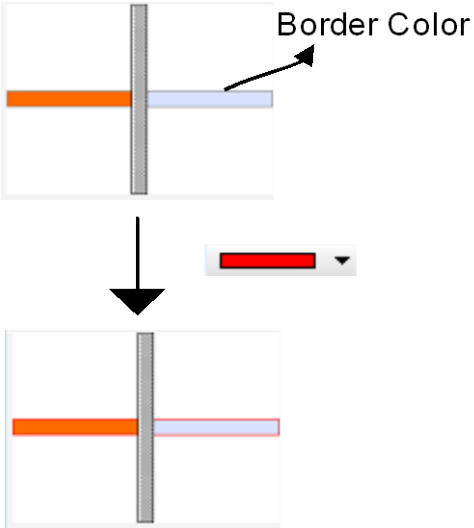
<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td>(2)</td><td>Data Type</td><td>➢ The Data Type option supports two formats: Word and Double Word.
 
</td></tr>
<tr><td>(3)</td><td>Data Format</td><td>➢ When Word is selected as the data type, the following data formats are supported.
 

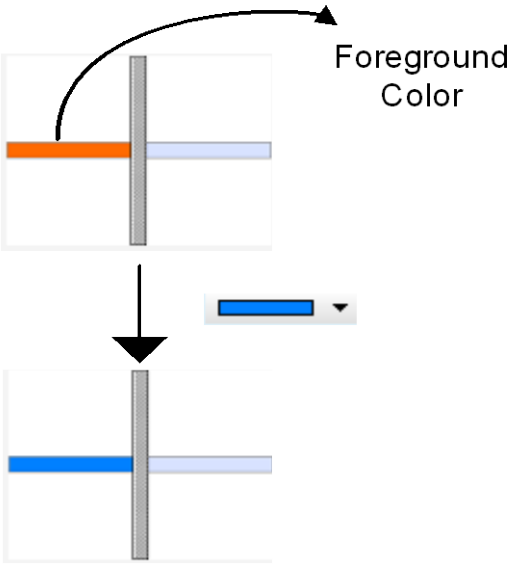
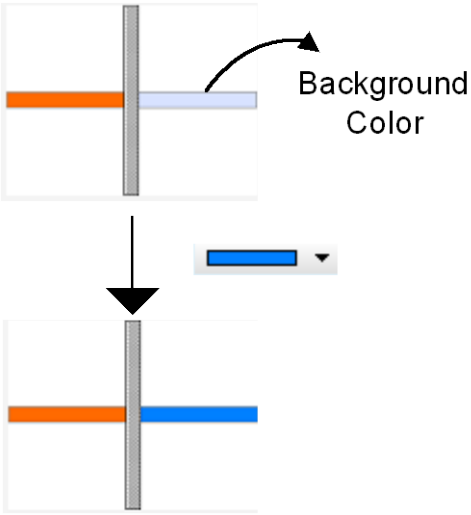
➢ When Double Word is selected as the data type, the following data formats are supported.
 
</td></tr>
<tr><td>(4)</td><td>Min. Value/ Max. Value</td><td>➢ The legal range of the min. and max. values is determined by the settings of the data type, integer place and decimal place. In the following example, no decimal is set.
<table>
<tr><th>Data Type</th><th>Data Format</th><th>Legal Range</th></tr>
<tr><td rowspan="5">Word</td><td>BCD</td><td>0~9999</td></tr>
<tr><td>Signed BCD</td><td>-999 ~ 9999</td></tr>
<tr><td>Signed Decimal</td><td>-32768~32767</td></tr>
<tr><td>Unsigned Decimal</td><td>0~65535</td></tr>
<tr><td>Hex</td><td>0~0xFFFF</td></tr>
<tr><td>Double</td><td>BCD</td><td>0~99999999</td></tr>
</table></td></tr>
</table>

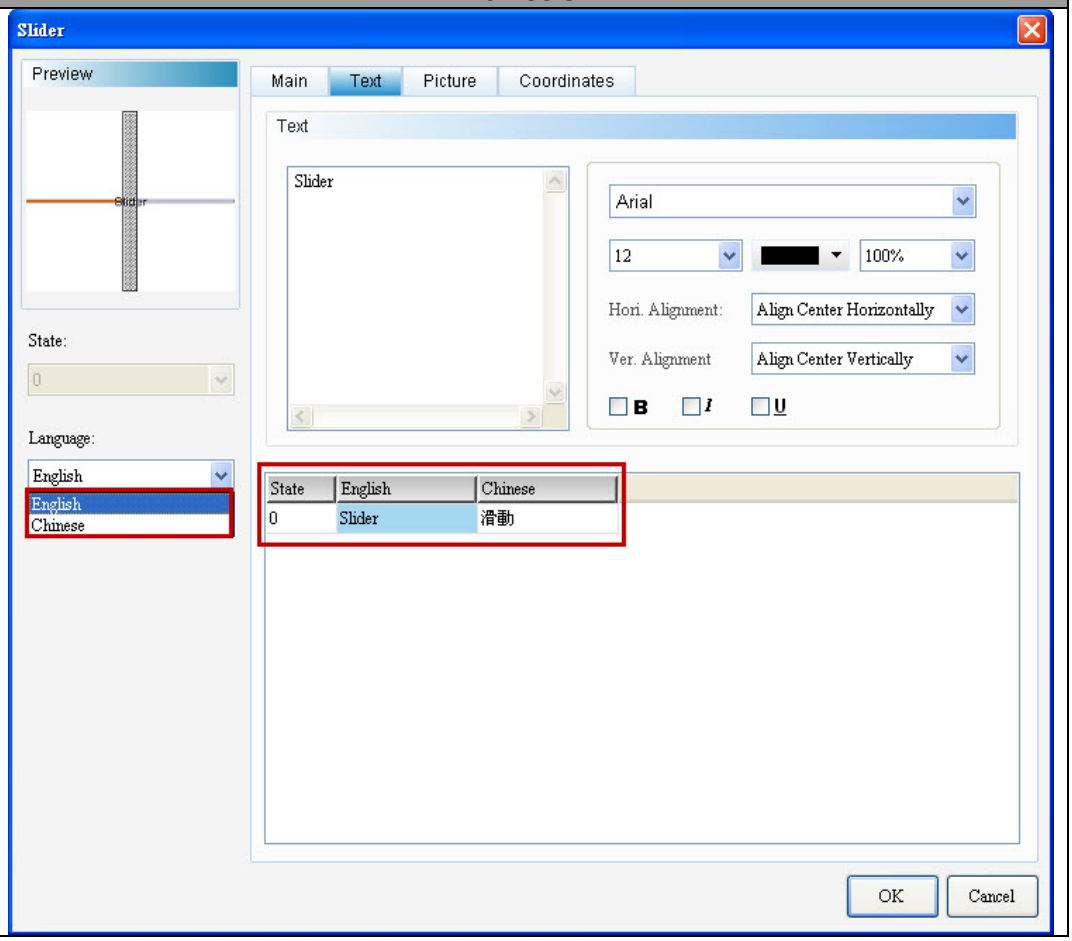
<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><td rowspan="4">Word</td><td>Signed BCD</td><td>-9999999 ~ 99999999</td></tr>
<tr><td>Signed Decimal</td><td>-2147483648~2147483647</td></tr>
<tr><td>Unsigned Decimal</td><td>0~4294967295</td></tr>
<tr><td>Hex</td><td>0~0xFFFFFFFF</td></tr>
</table>
</td></tr>
<tr><td>(5)</td><td>Direction</td><td>
➢ The Direction function provides Horizontal and Vertical options.


➢ Horizontal means the slide button moves horizontally (left/right), while Vertical means the slide button moves vertically (up/down).
<table>
<tr><td>Horizontal</td><td>  </td></tr>
<tr><td>Vertical</td><td>  </td></tr>
</table>
</td></tr>
<tr><td>(6)</td><td>Start Point</td><td>
➢ The start point changes depending on the selected direction. It is the point from which the slide button moves after the Slider is loaded.
➢ The start point is Left/Right in the horizontal direction or Bottom/Top in the vertical direction.
</td></tr>
</table>

No.	Property	Function
		Horizontal  Left  Right  **Vertical**  Bottom  Top 
(7)	Slide Bar Width	➢ The max. value of the slide bar width defines the height of the Slider.

No.	Property	Function
		
(8)	Slide Button Size	➢ The max. value of the slide button length defines the width of the Slider. 
(9)	Border Color	➢ The user can set the border color for the element. 
(10)	Foreground Color	➢ The user can set the foreground color for the element.

No.	Property	Function
		
(11)	Element Background Color	➢ The user can set the background for the element. 
(12)	Language	➢ When language data are defined, users can edit the properties of text display from Language.

No.	Property	Function
		

◆ Text

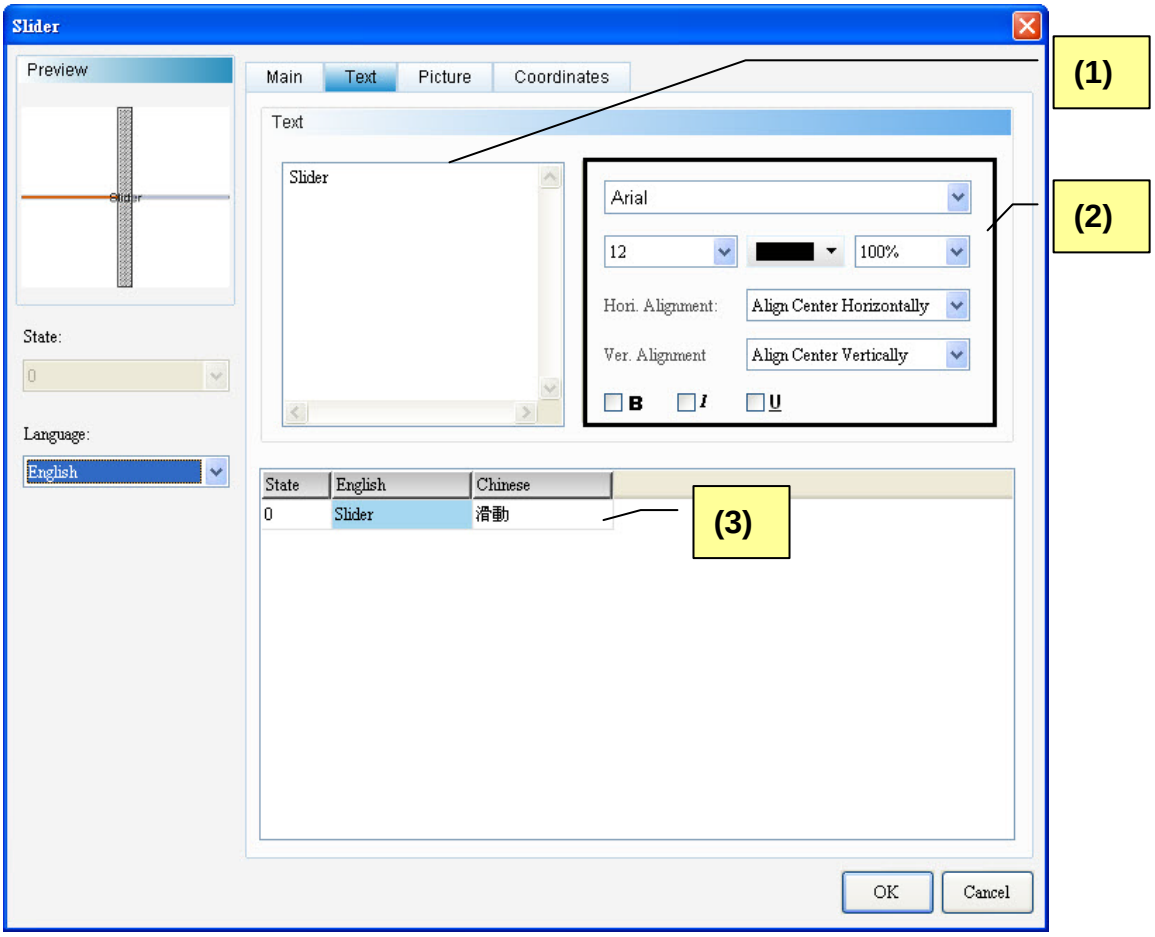
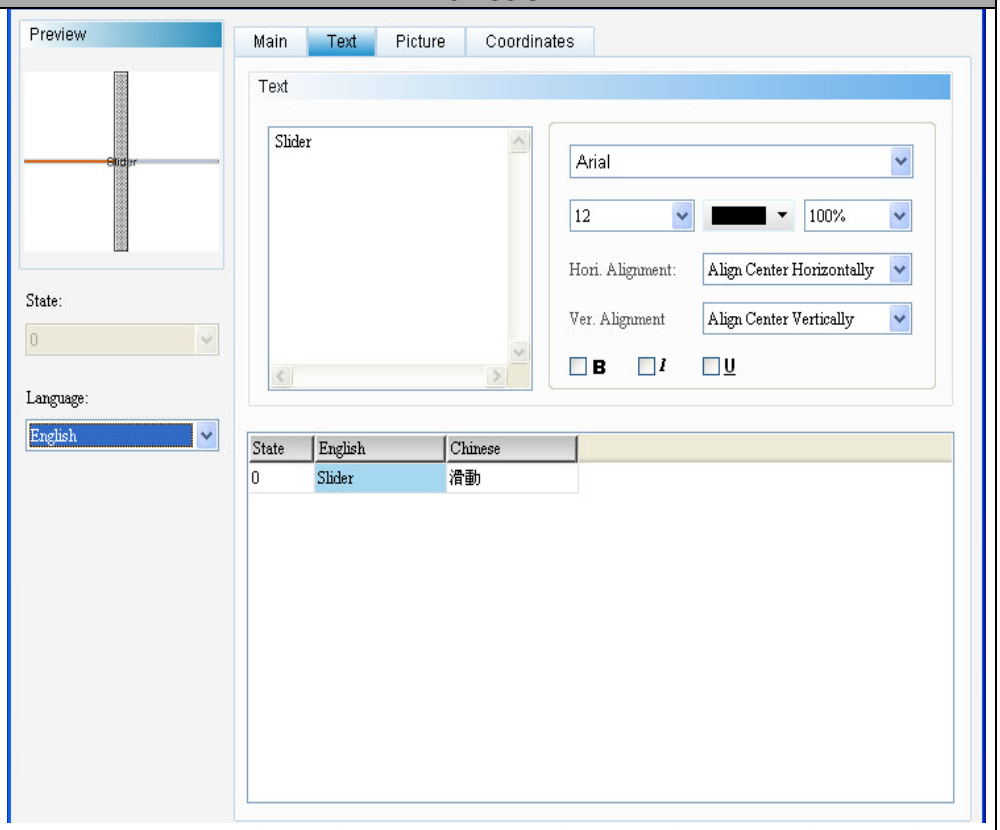


Figure 18-1-3 Slider Text properties page

No.	Property	Function
(1)	Text	➢ Users can input the text to be displayed in the text box.

No.	Property	Function
		 ➢ Users can select elements supporting text input as shown above and press the SPACE bar on the keyboard to edit text.
(2)	Text Properties	➢ Sets text properties, including font type, font size, font color, scaling, text alignment, and bold/italic/underline of font. Please refer to the above figure for details about the results of text properties.
(3)	Multi-Language Text Data	➢ Users can add Multi-Language text data from the Multi-Language Text Page. As shown in the Text Properties Figure, users can input English text in the English field.

◆ Picture

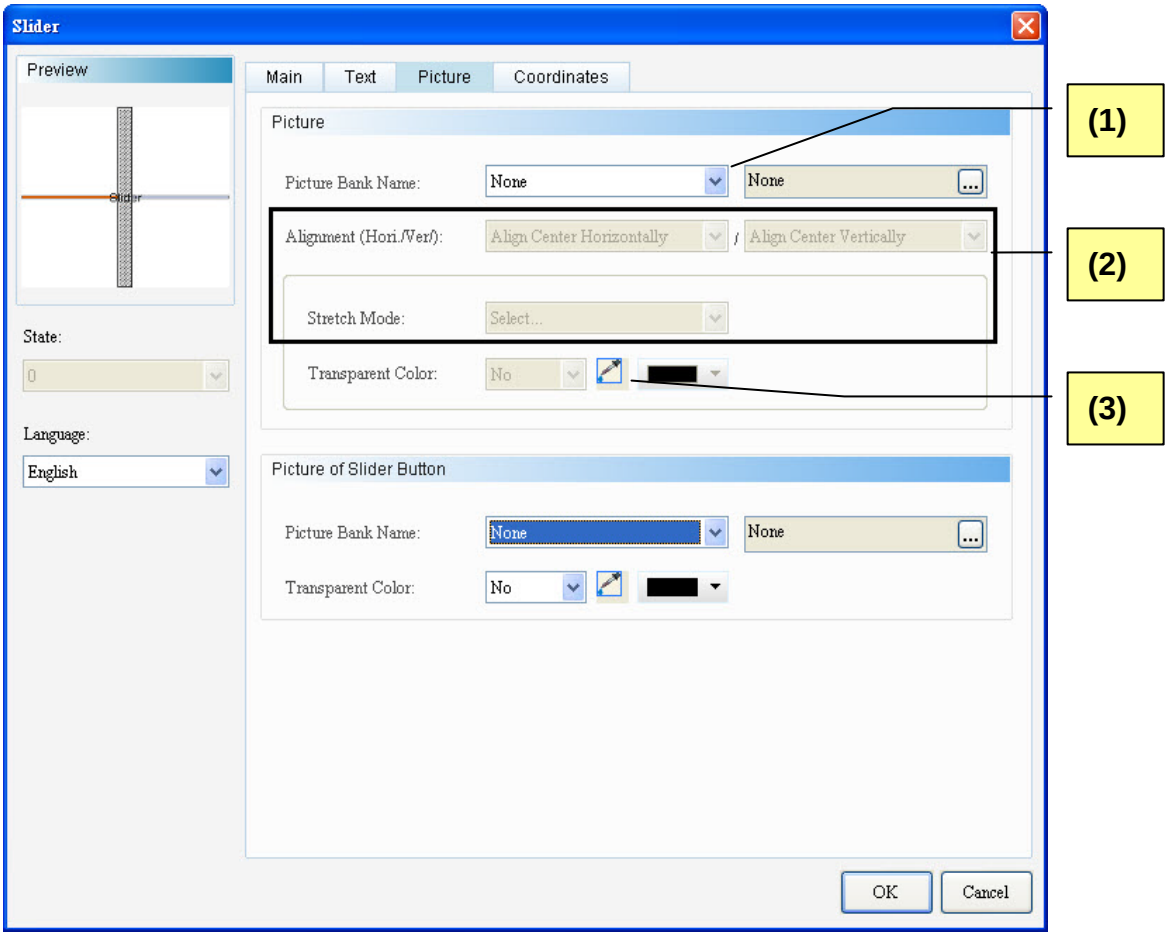
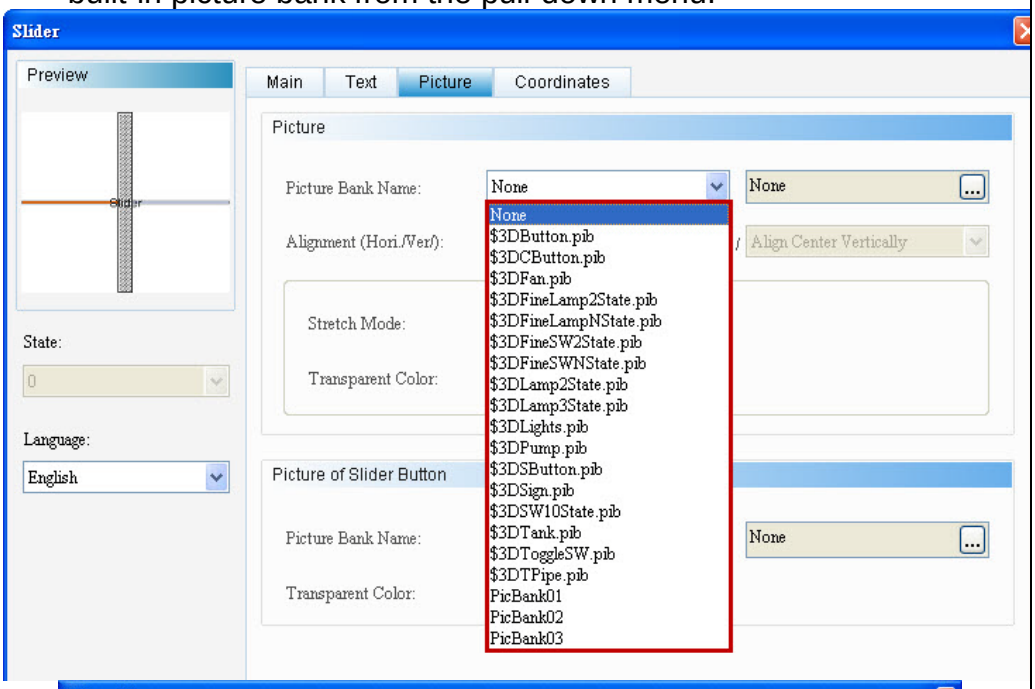
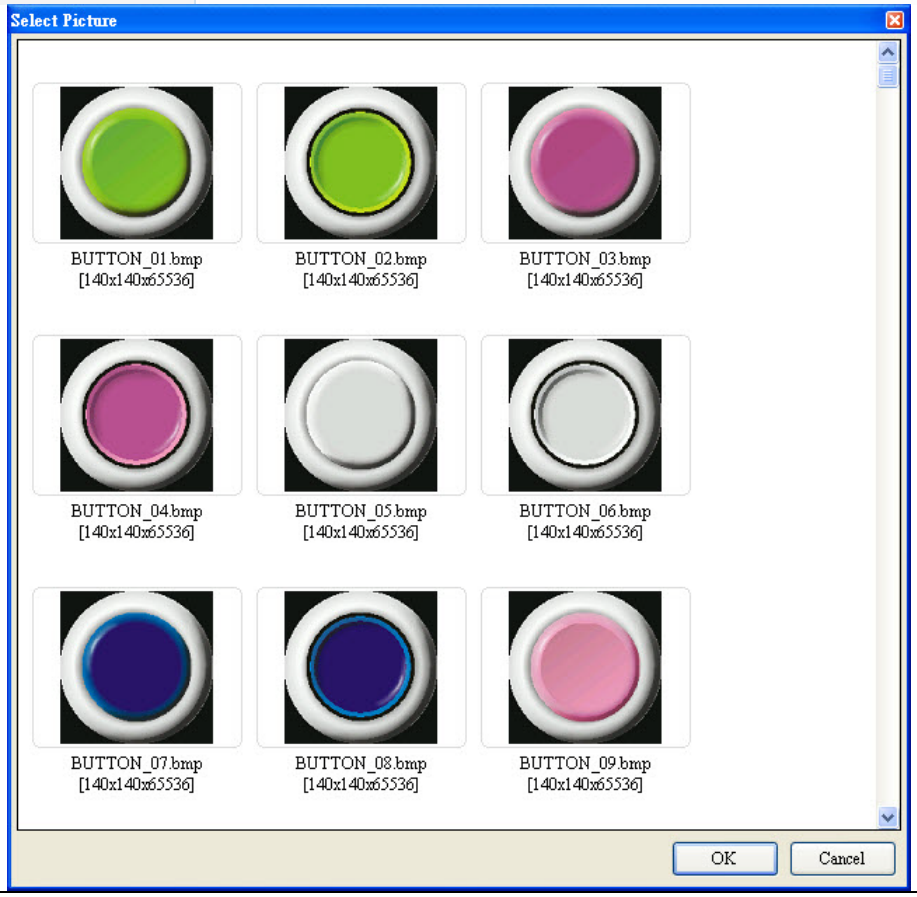
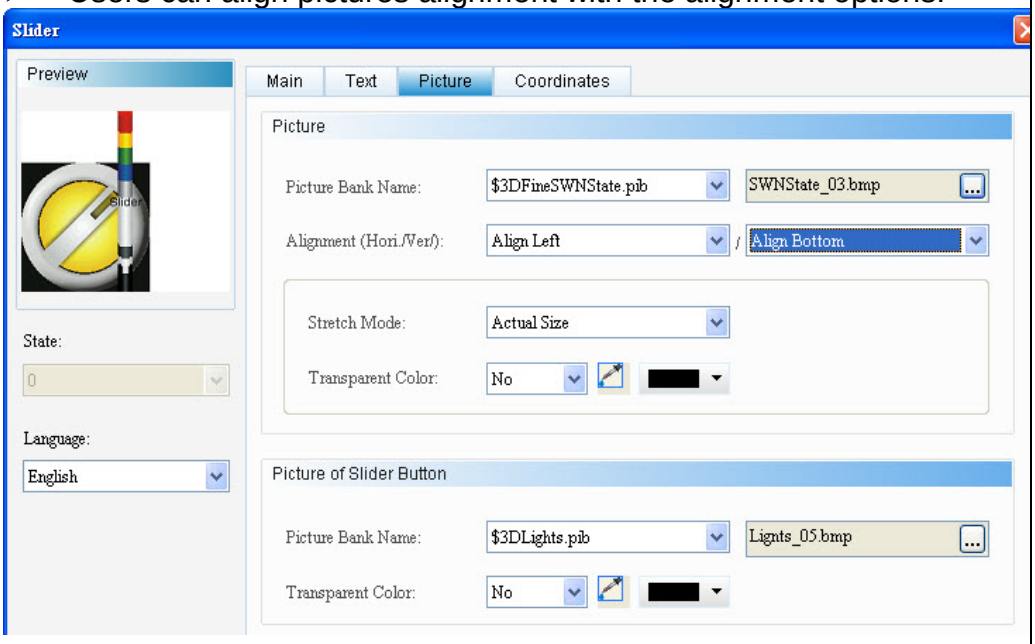
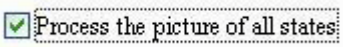
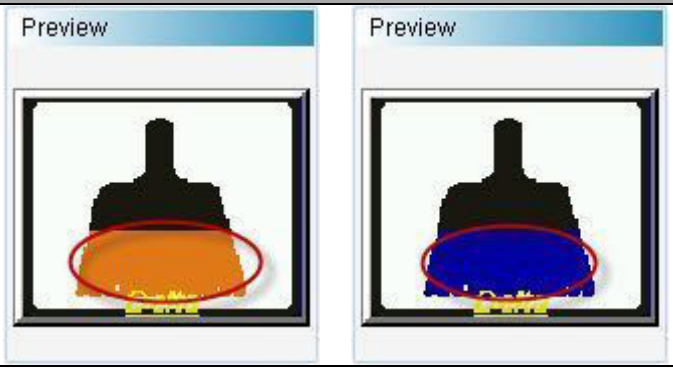


Figure 18-1-4 Slider Picture properties page

No.	Property	Function
(1)	Picture Bank Name	➢ The default value for Picture Bank Name is “None”. Users wishing to select a display picture can select the desired picture in the built-in picture bank from the pull-down menu.  

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td rowspan="2">(2)</td><td>Alignment</td><td>➢ Users can align pictures alignment with the alignment options.
 
</td></tr>
<tr><td>Stretch Mode</td><td>➢ Stretch modes include: Fill, Keep Aspect Ratio, and Actual Size
<table>
<tr><th>Fill</th><th>Keep Aspect Ratio</th><th>Actual Size</th></tr>
<tr><td>In the “Fill” mode, the selected picture will fill up the entire display area.</td><td>In the “Keep Aspect Ratio” mode, the selected picture will fit in the display area proportionally according to the picture ratio.</td><td>In the “Actual Size” mode, the picture will be displayed in its original size in the display area.</td></tr>
<tr><td>
</td><td>
</td><td>
</td></tr>
</table>
➢ If “Process all state pictures” is selected, the system assumes that each element has multiple entries of state data, and some pictures may be unable to fill the entire display area. By selecting this item, users will not need to set individual pictures to save time editing.
 
</td></tr>
<tr><td>(3)</td><td>Transparent Color</td><td>➢ Users can set a color in the picture to transparent. In this case, by clicking the Transparent Color icon and then the orange part of the loom, the DOPSoft will omit all orange parts in the picture and turn them into transparent; thus turning the foreground color transparent.
</td></tr>
</table>

No.	Property	Function
		

◆ Coordinates

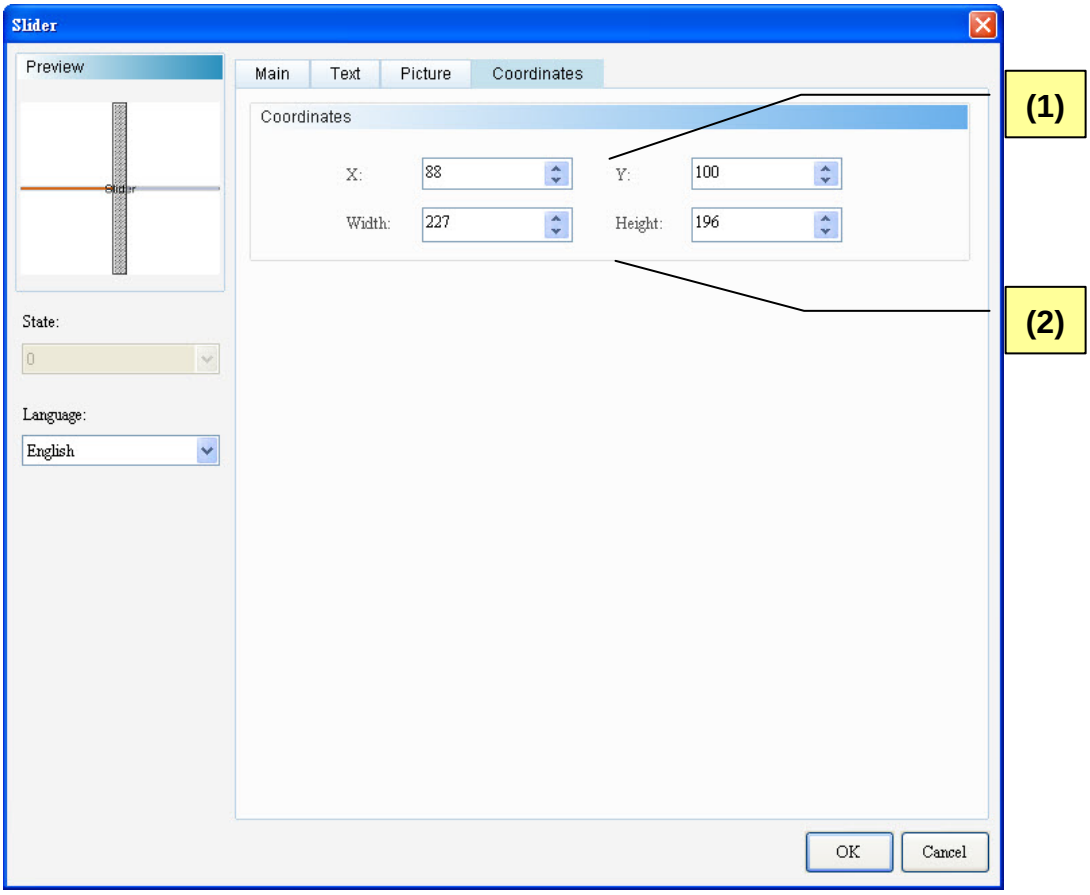


Figure 18-1-5 Slider Coordinates properties screen

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

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19-3 GridBox 40
19-4 Text List 93

Chapter 19 List

This chapter describes the setting of the List elements that the DOPSoftware software provides.

◆ Classification of List elements:

List		ComboBox
		ListBox
		GridBox
		Text List

Table 19-1-1 Classification of List components

◆ Common properties of List elements

List	Read Address	Read Address	Write Offset Address	Write Offset Address	Style (Foreground Color/ Foreground Color/ Border Color)	Interlock State/ Interlock Address/ Invisible Address	Activation/Activation Address	Min. Value/ Max. Value	Enable Confirm Window	Data Type/ Data Format/ State Counts	User Security Level/ Set Low Security
ComboBox	◎	◎	◎	◎	◎	◎	◎	◎		◎	◎
ListBox	◎	◎	◎	◎	◎ (No border color)	◎	◎	◎		◎	◎

Table 19-1-2 Common properties of List elements

19-1 ComboBox

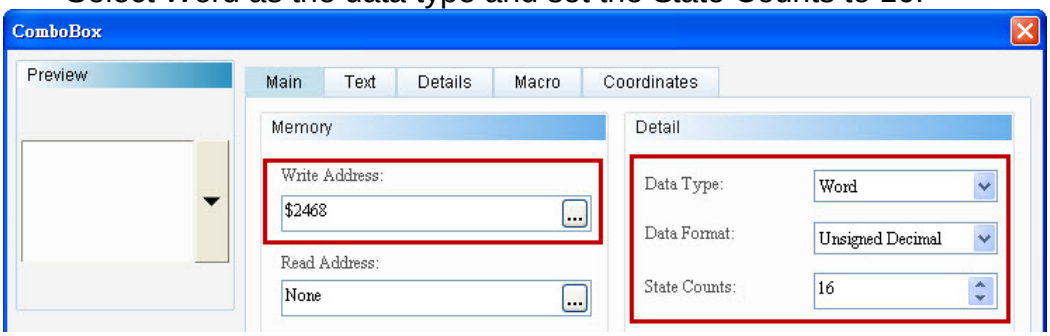
The ComboBox provides the user with multiple state display messages. The user can use this function to select the items to be performed. The functions of the same type are grouped in the same dropdown menu for the user. Since only the currently selected items are displayed in the ComboBox, the elements occupy a relatively small space. Refer to Table 19-1-3 for the example of the ComboBox.
Refer to the ComboBox example in Table 19-1-3.

ComboBox Example

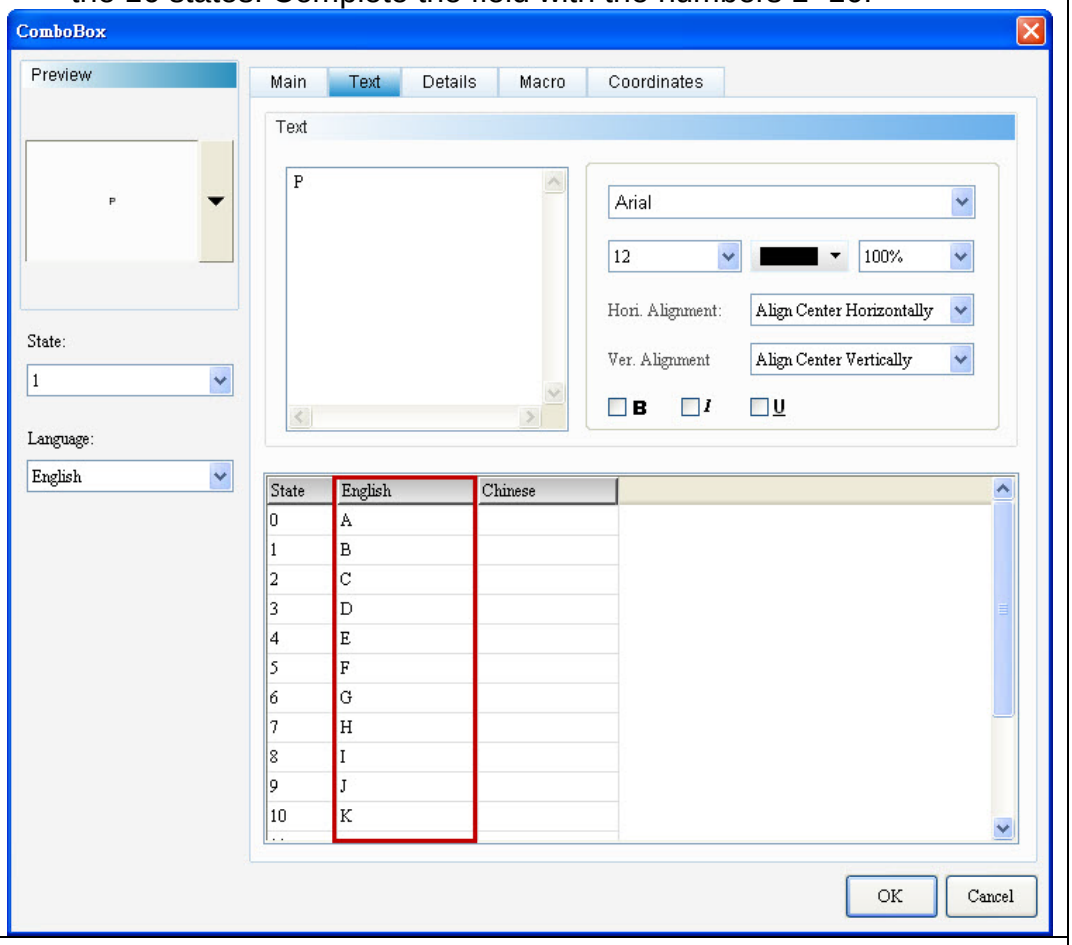
Table 19-1-3 ComboBox Example

Create ComboBox Element

➢ Step 1: Create the ComboBox. Set the Write Address to $2468. Select Word as the data type and set the State Counts to 16.



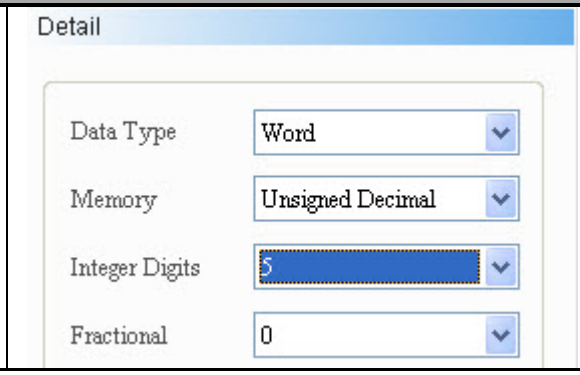
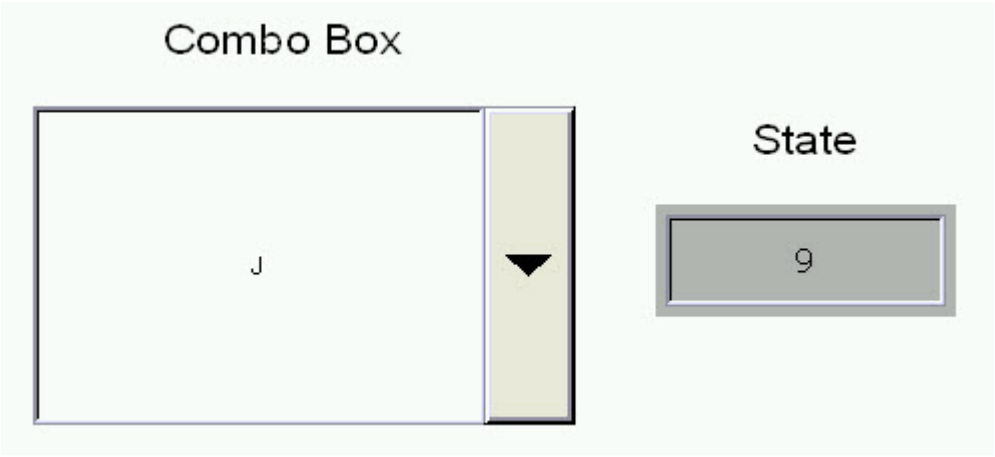
➢ Step 2: On the Text page, edit the text message to be displayed for the 16 states. Complete the field with the numbers 1~16.



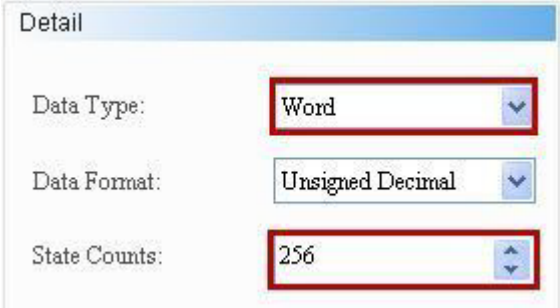
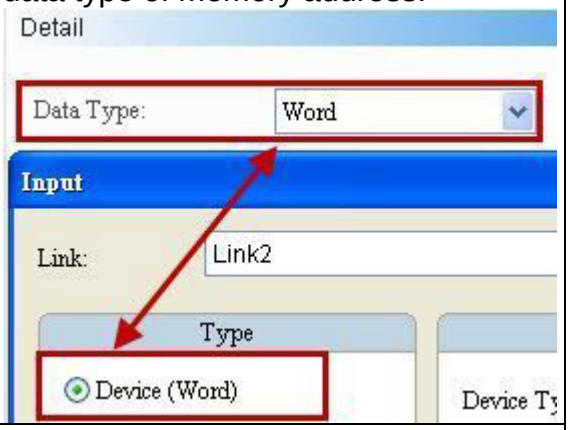
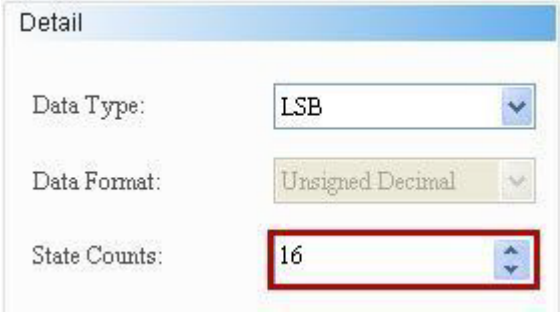
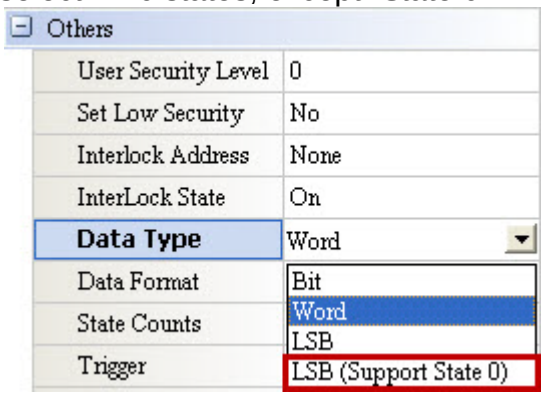
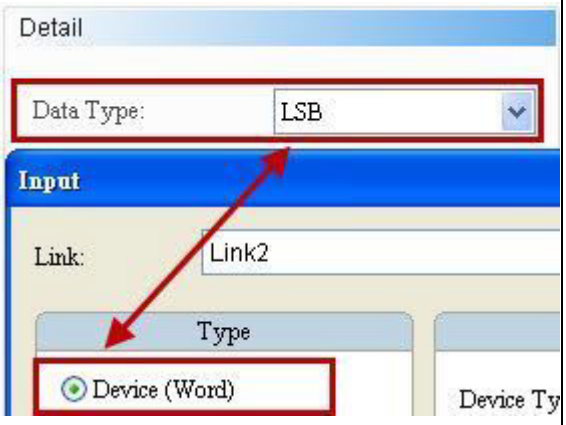
Create Data Display Element

➢ Step 1: Create the data display button. Set the Read Address to $2468 and complete the setting of other parameters.

Increment	**Write Address**	
	Setup	

ComboBox Example Table 19-1-3 ComboBox Example			
			
Execution Results	➢ After creation of all elements, perform the compilation and download them to HMI. When you select an item from the ComboBox, the data display element will show the state value corresponding to the selected ComboBox item. 		

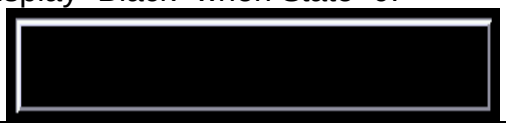
The ComboBox supports four data types. Refer to Table 19-1-4 for more information. The user only needs to increase or decrease the state counts in the property table to add or delete the counts.

ComboBox Table 19-1-4 Data Type of the ComboBox		
Data Type	**State Counts**	**Memory Address**
Word	If data type is “Word”, users can select 1-256 states.  	If data type is “Word”, “Word” is the data type of memory address. 
LSB / LSB (Support State 0)	If the data type is “LSB”, the data in the register are first converted into binary data. Next, the present object state is determined according to the element with the lowest non-zero bit. If the data type is “LSB”, users can select 1-16 states, except “State 0”.  If the data type is “LSB”, users can select 1-16 states, except “State 0”.  If users select “LSB”, the element will	If data type is “LSB” or LSB (Support State 0), “Word” is also data type of memory address. 

ComboBox

Table 19-1-4 Data Type of the ComboBox

display “Black” when State=0.

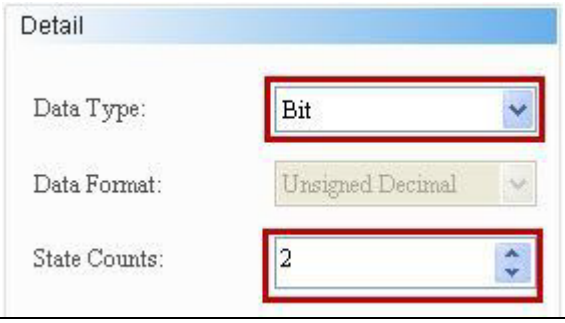


The examples in the following table show how state value is determined with the lowest non-zero bit after converting from a decimal value into a binary value. There are also examples demonstrating how the DOPSoft determines the state Numeric Displayed with the lowest bit when the decimal values are 3 and 7.

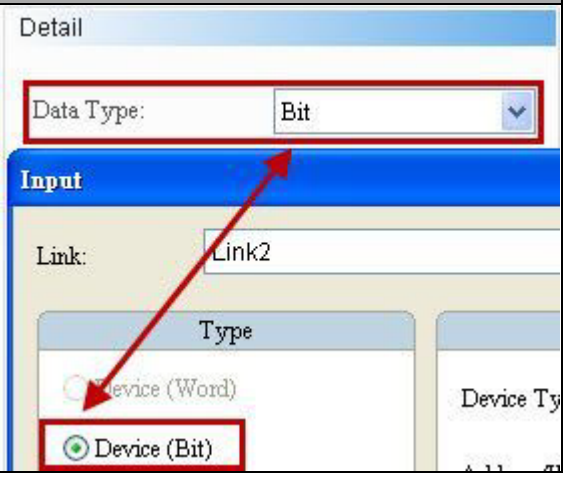
Decimal	Binary	State Value
0	**0000000000000000**	**State=0 when all bits are “0” [LSB (Support State 0) must be selected]**
1	0000000000000001	The lowest non-zero bit is bit 0, State=1.
2	0000000000000010	The lowest non-zero bit is bit 1, State=2.
3	**0000000000000011**	**The lowest non-zero bit is bit 0, State=1.**
4	0000000000000100	The lowest non-zero bit is bit 2, State=3.
7	**0000000000000111**	**The lowest non-zero bit is bit 0, State=1.**
8	0000000000001000	The lowest non-zero bit is bit 3, State=4.
16	0000000000010000	The lowest non-zero bit is bit 4, State=5.
32	0000000000100000	The lowest non-zero bit is bit 5, State=6.
64	0000000001000000	The lowest non-zero bit is bit 6, State=7.
128	0000000010000000	The lowest non-zero bit is bit 7, State=8.
256	0000000100000000	The lowest non-zero bit is bit 8, State=9.
512	0000001000000000	The lowest non-zero bit is bit 9, State=10.
1024	0000010000000000	The lowest non-zero bit is bit 10, State=11.
2048	0000100000000000	The lowest non-zero bit is bit 11, State=12.
4096	0001000000000000	The lowest non-zero bit is bit 12, State=13.
8192	0010000000000000	The lowest non-zero bit is bit 13, State=14.
16384	0100000000000000	The lowest non-zero bit is bit 14, State=15.
32768	1000000000000000	The lowest non-zero bit is bit 15, State=16.

Bit

If the data type is “Bit”, only 2 states are available.



If the data type is “Bit”, “Bit” is the data type of memory address.

ComboBox Table 19-1-4 Data Type of the ComboBox		
		

Double click the ComboBox icon and the following property setting screen appears.

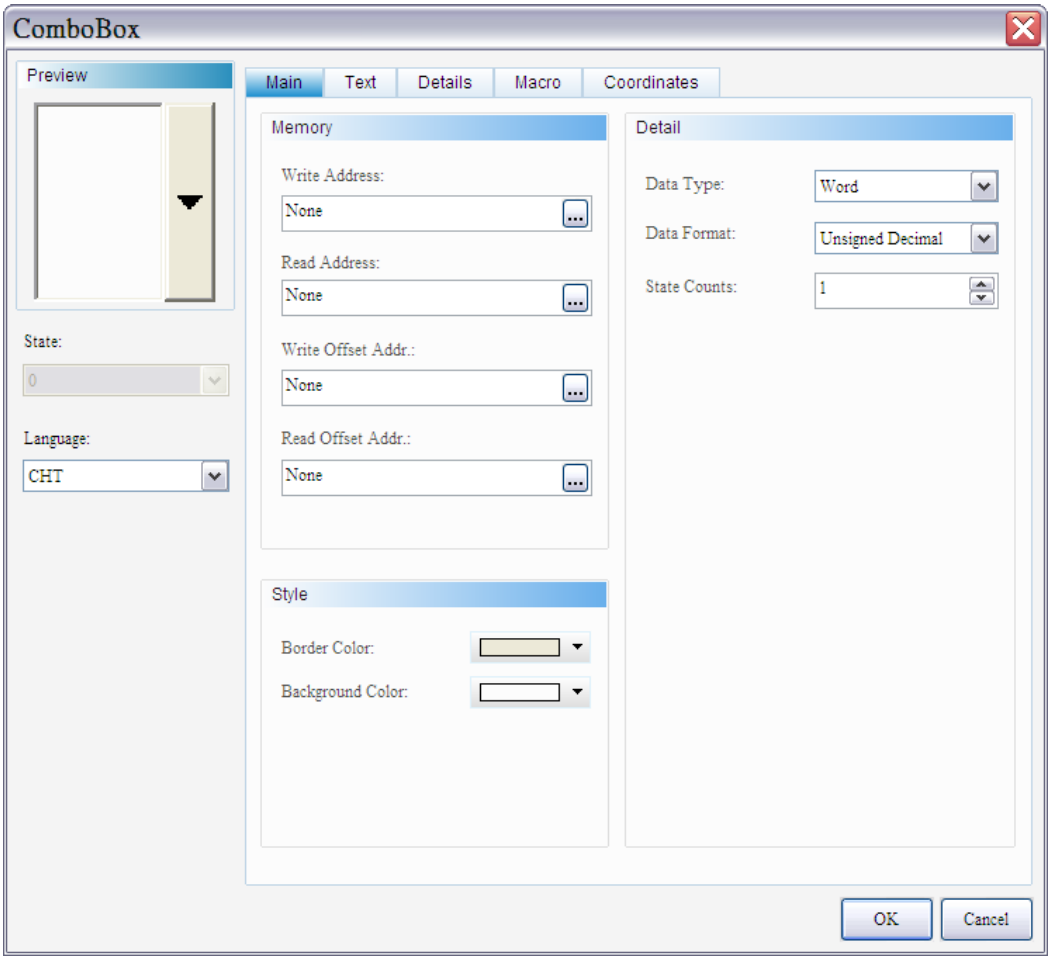


Figure 19-1-1 ComboBox properties setting screen

ComboBox	
Function Page	**Content Description**
Preview	Multiple state values are available for the ComboBox. The user can edit multi-language data.
Main	Sets the write address, read address, write offset address, read offset address, data type, data format, state counts. Sets border color, background color, foreground color.
Text	Sets the content, font, font size, font color, font effects, scaling, and alignment of the text to be displayed.
Details	Sets the interlock state, interlock address, Activation, Activation address, invisible address, user security level, set low security, confirm window.
Macro	Sets Edit Before execute Macro and After execute Macro.
Coordinates	Sets the X-Y coordinates, width and height of the element.

Table 19-1-5 ComboBox function page

◆ Main

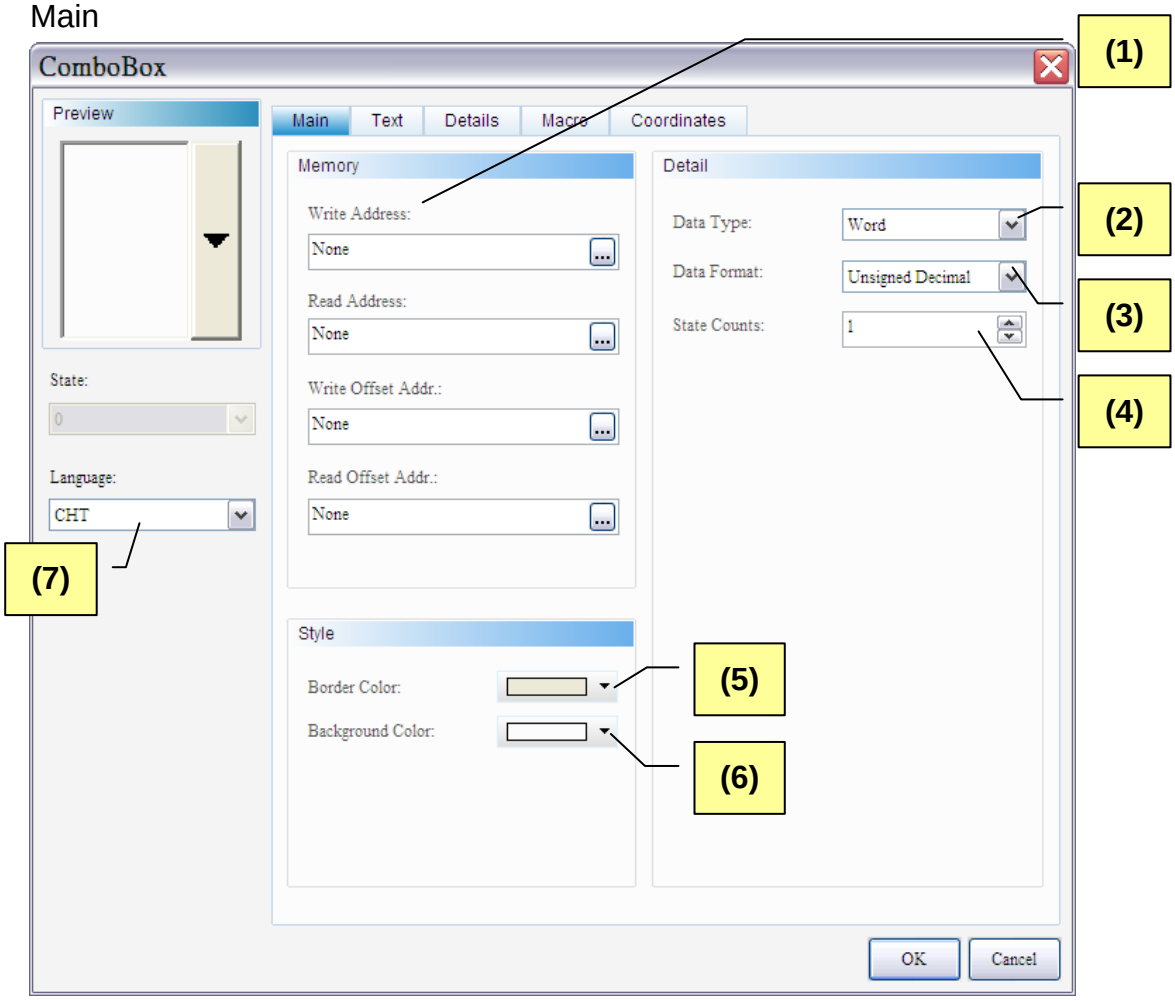
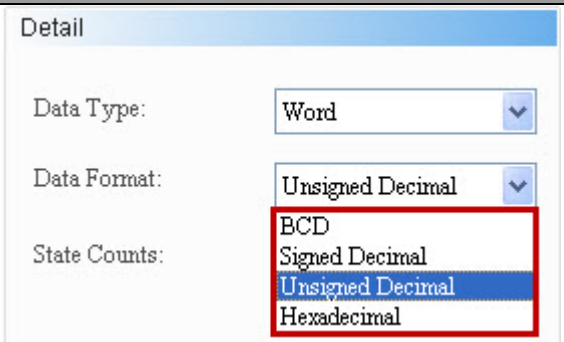
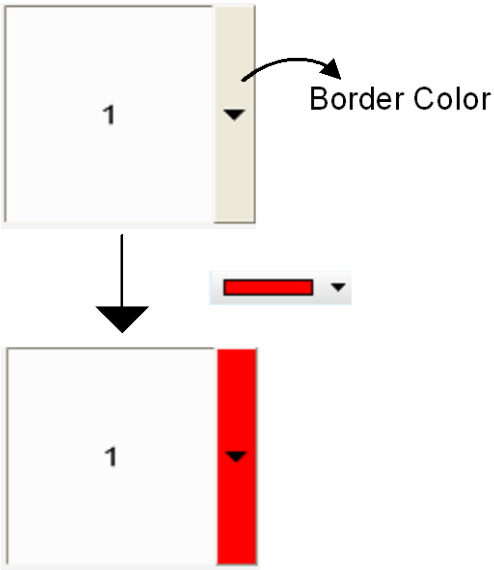
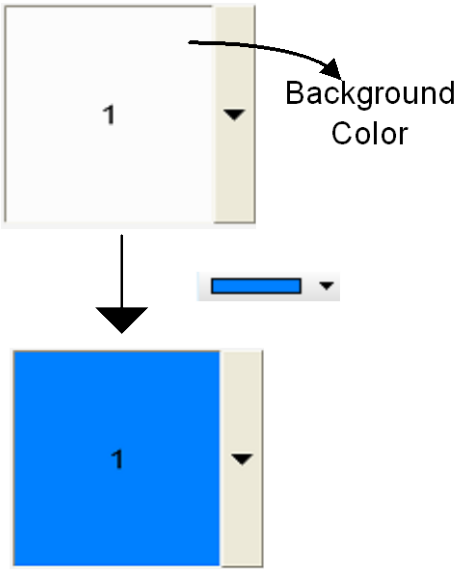
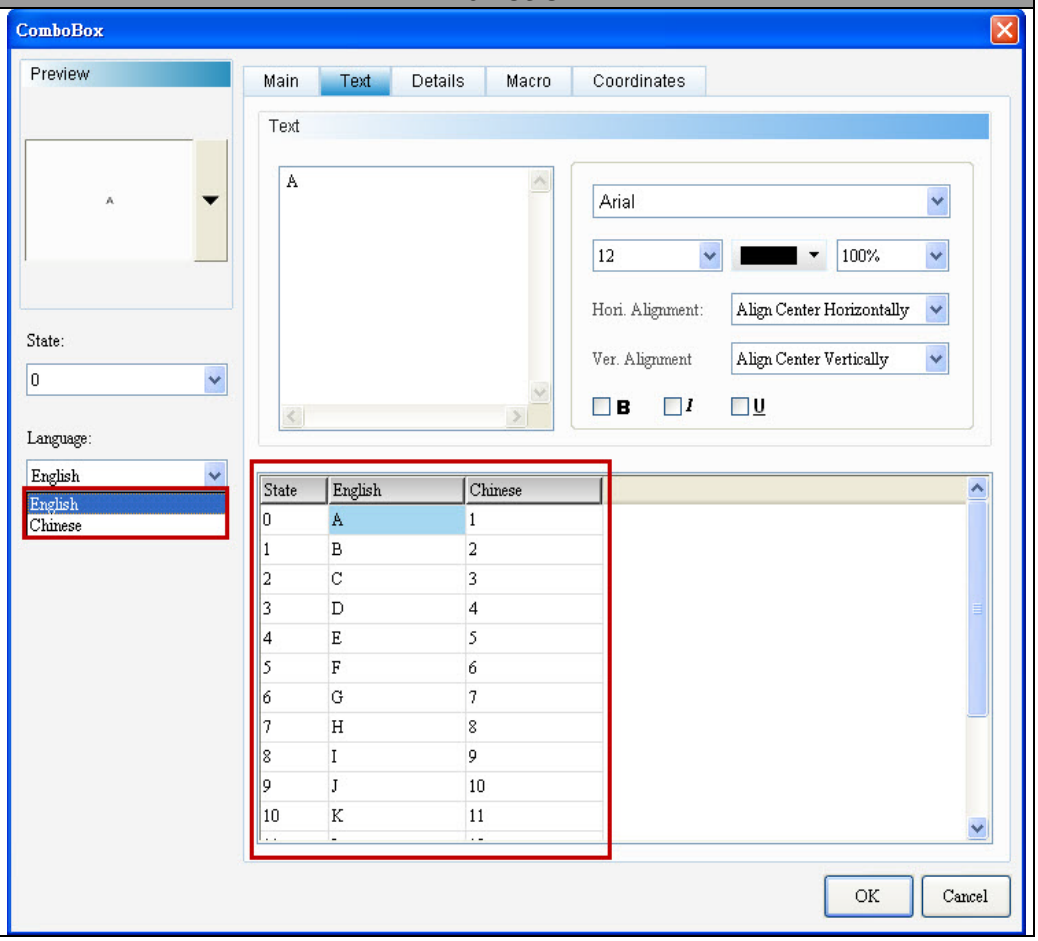


Figure 19-1-2 ComboBox Main properties page

No.	Property	Function
(1)	Write Address Read Address	➢ The user can select the internal memory or controller register address. The memory type entered changes depending on the data type (Word, LSB or Bit). Refer to Table 19-1-4. ➢ Selects link name or style. Please refer to 5-1 Button of Chapter 05 for details.
	Write Offset Address Read Offset Address	➢ Please refer to Appendix D Write and Read Offset Address.
(2)	Data Type	➢ The Data Type supports 4 formats: Bit, Word, LSB and LSB (Support State 0). Refer to Table 19-1-4 for more information.
(3)	Data Format	➢ The Data Format can be selected only when the data type is Word. ➢ The Data Format supports BCD, Signed Decimal, Unsigned Decimal and Hexadecimal.

No.	Property	Function
		
(4)	State Counts	➢ Set the state counts for the ComboBox. The state counts can be set between 1 and 256 with Word as the data type, 16 states can be set with LSB as the data type, 17 states can be set with LSB Support State 0 as the data type and only 2 states can be set with Bit as the data type. Refer to 19-1-4 for more information.
(5)	Border Color	➢ The user can set the border color. 
(6)	Backgroun d Color	➢ The user can set the background color for the element. 
(7)	Language	➢ When language data are defined, users can edit the properties of text display from Language.

No.	Property	Function
		

◆ Text

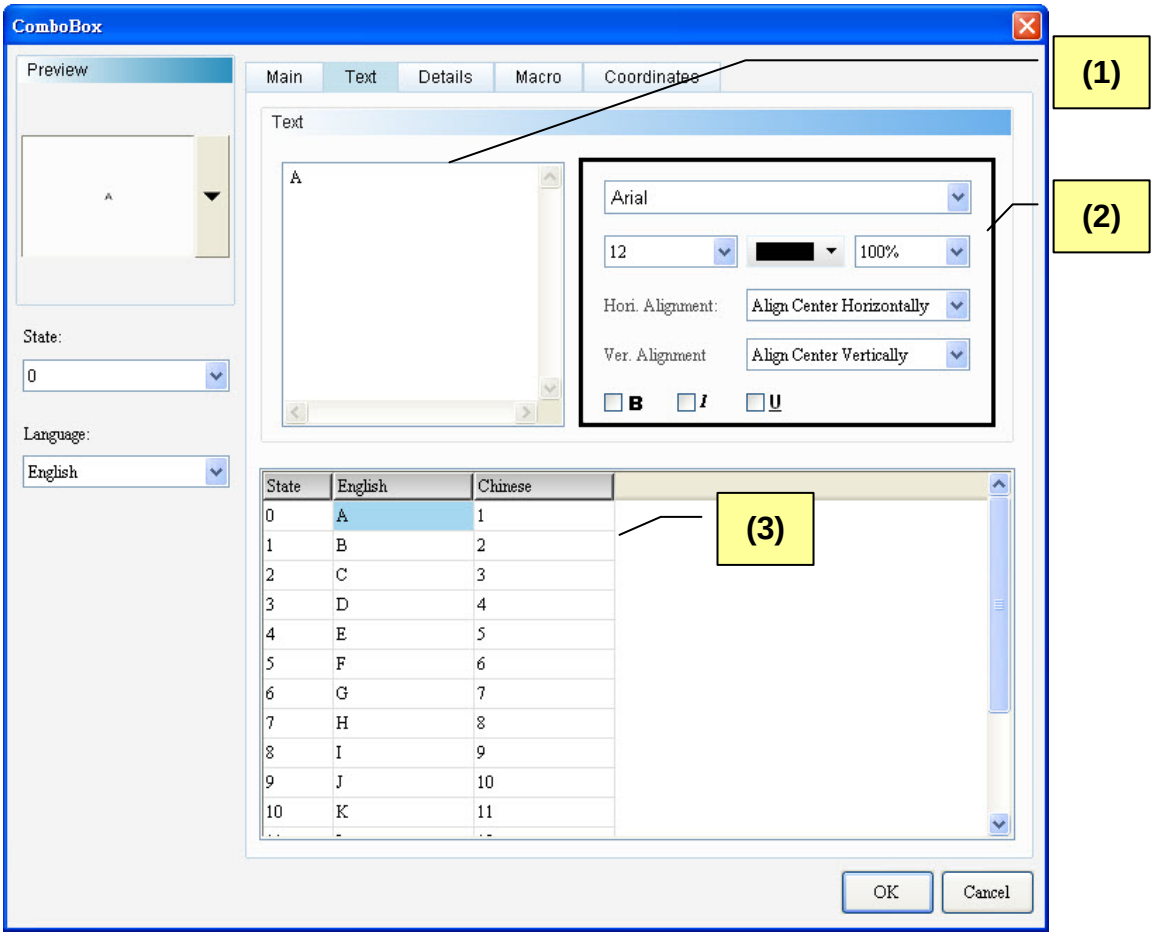
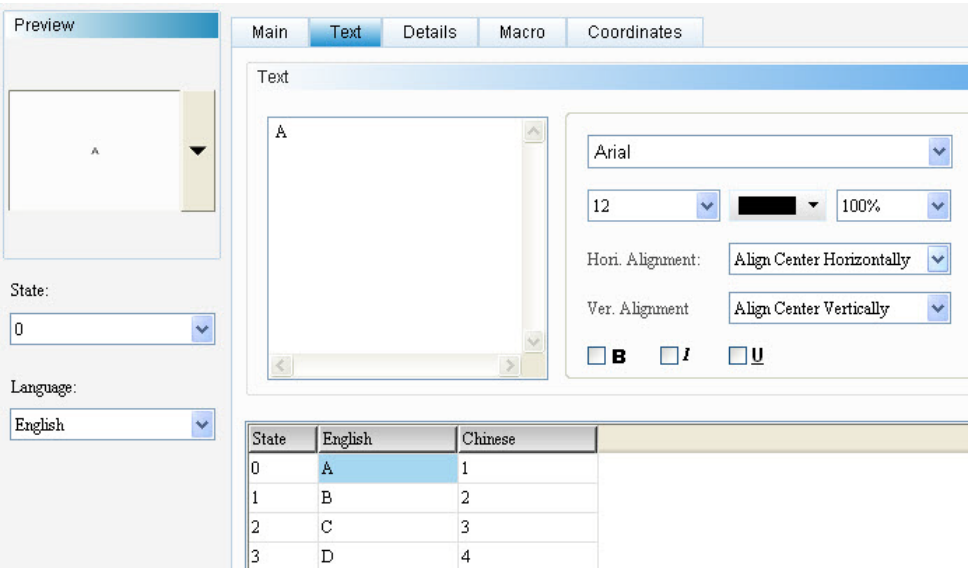


Figure 19-1-3 ComboBox Text properties page

No.	Property	Function
(1)	Text	➢ The user can input the text message to be displayed in the text box.  ➢ For any element that can be used to enter text, the user needs only to click the element on the screen and press the spacebar on the keypad to edit the text. This is very convenient for the user to enter text.

No.	Property	Function
(2)	Text Properties	➢ Sets text properties, including font type, font size, font color, scaling, text alignment, and bold/italic/underline of font. Please refer to the above figure for details about the results of text properties.
(3)	Multi-language Text Data	➢ Users can add Multi-Language text data from the Multi-Language Text Page. As shown in the Text Properties Figure, users can input English text in the English field.

◆ Details

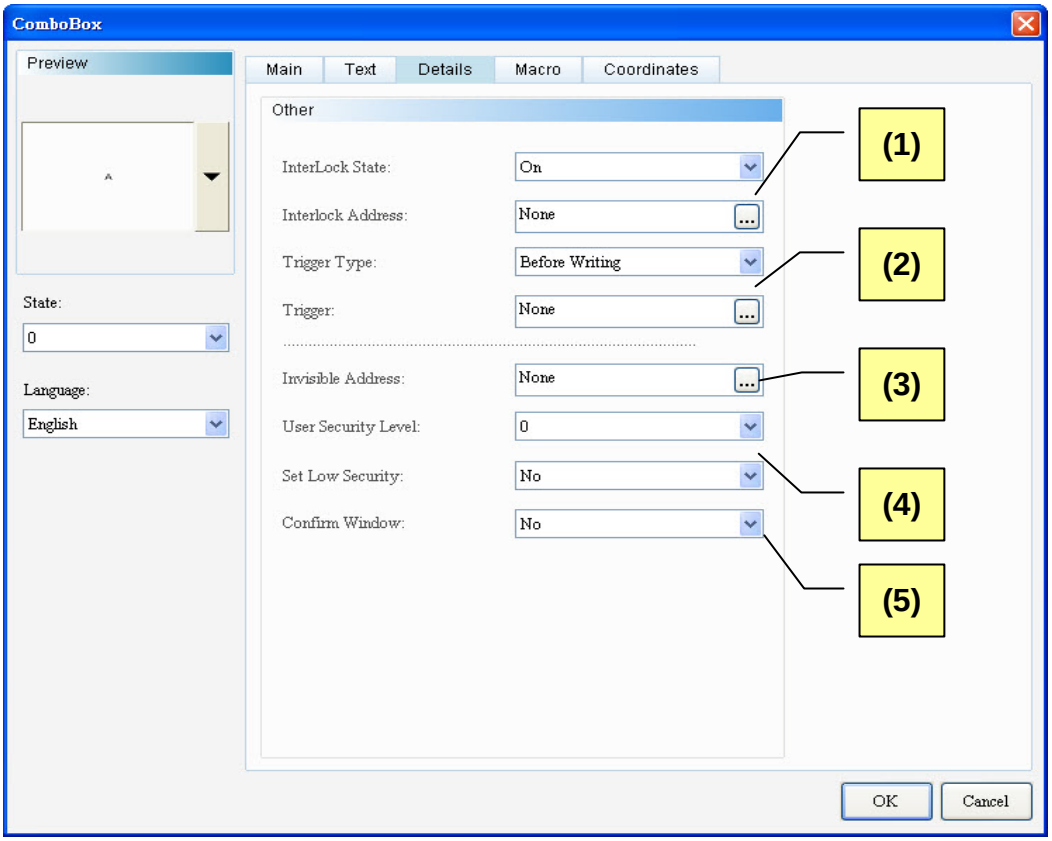
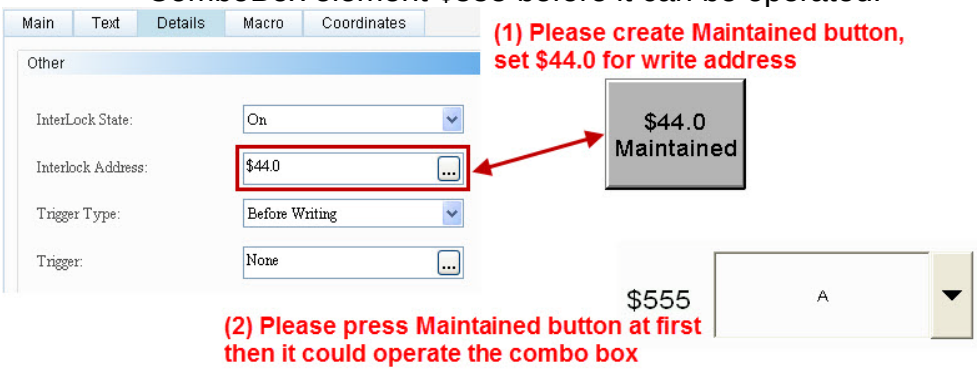
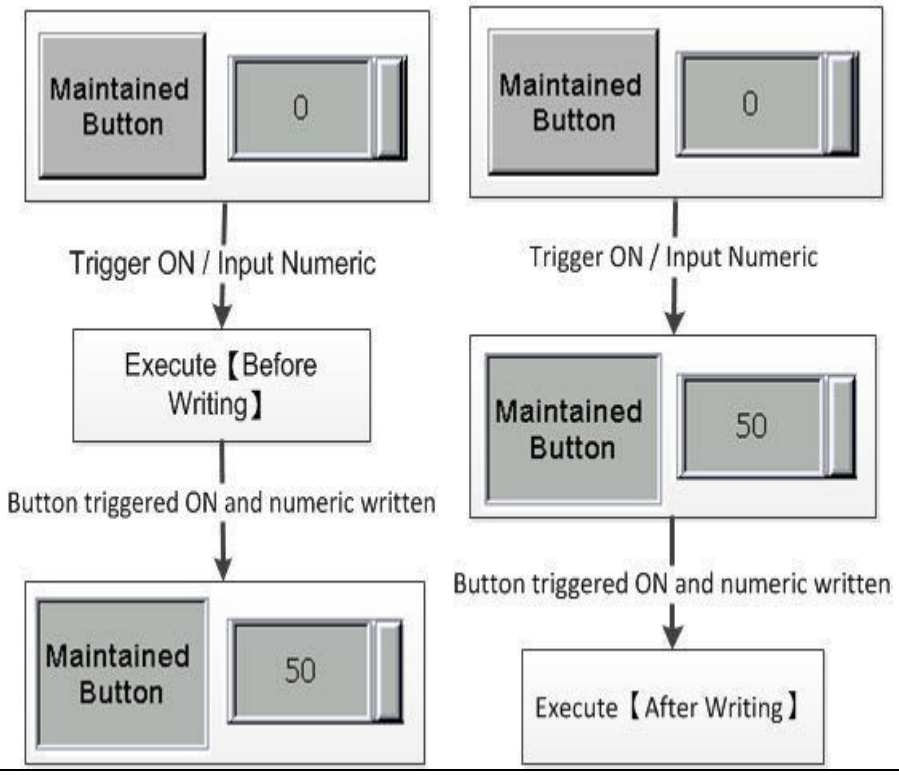
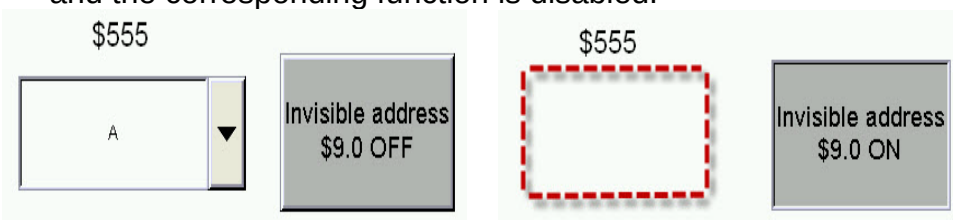
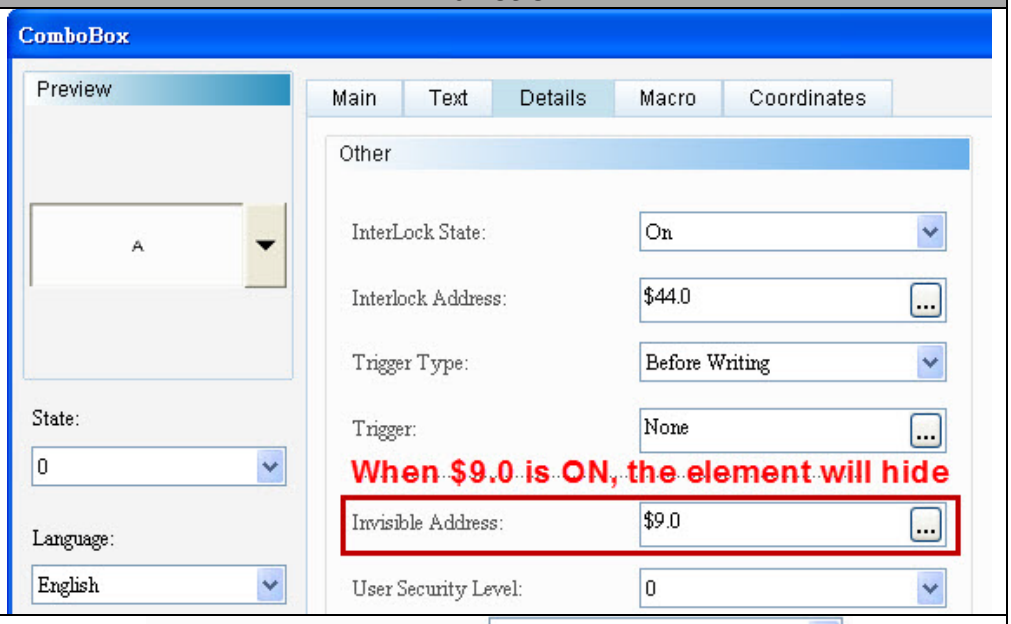
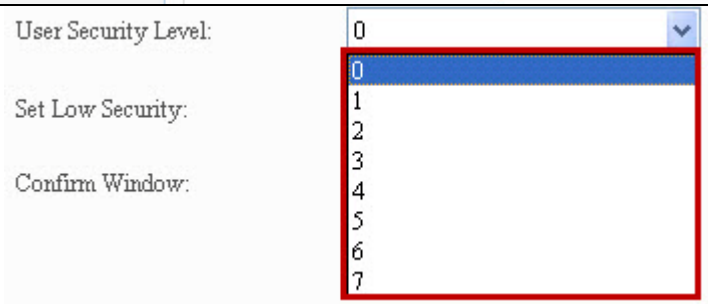
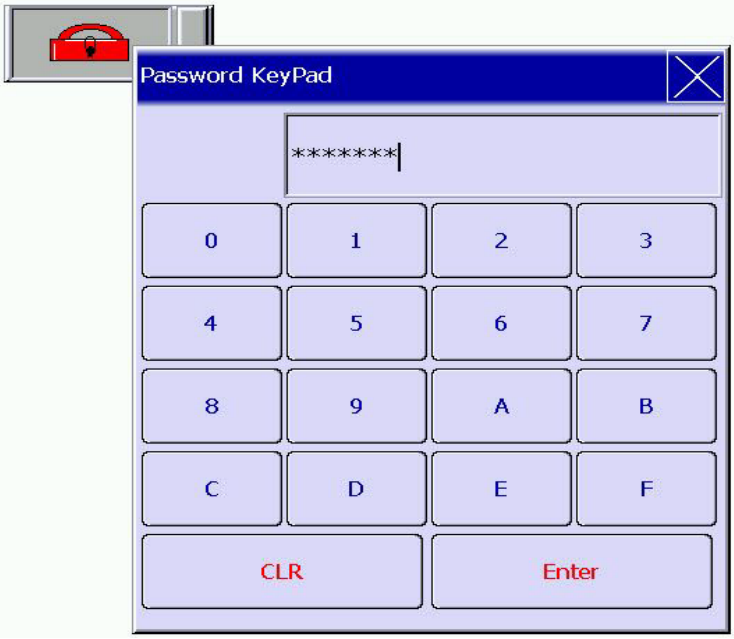
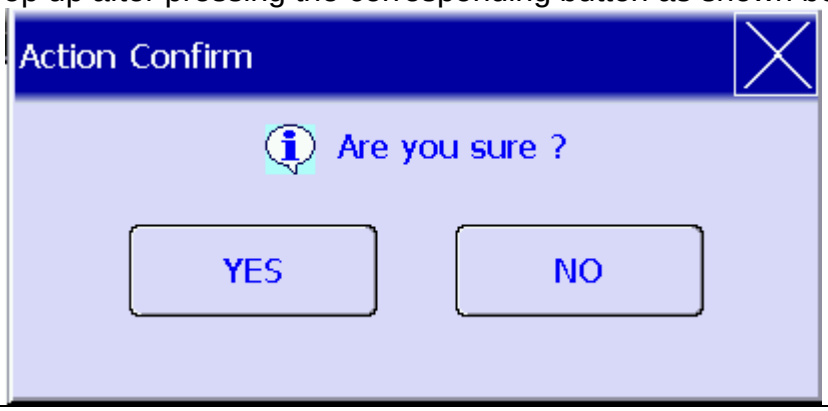


Figure 19-1-4 ComboBox Details properties page

No.	Property	Function
(1)	Interlock State	➢ Interlock Address allows users to operate an element from this particular address. It must be used along with Interlock State. If Interlock State is “OFF”, this means the interlock address is operable when the interlock state is “OFF”. In contrast, when Interlock State is “ON”, this means the interlock address is operable when the interlock state is “ON”. ➢ The behavior is described below: 1. Create a maintained button and set the Write Address to $44.0. Then Set the Write Address and Interlock Address of the ComboBox element to $555 and $44.0, respectively. 2. Press the maintained button $44.0 to activate the ComboBox element $555 before it can be operated.
	Interlock Address	

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td rowspan="2">(2)</td><td>Trigger type</td><td>➢ Trigger type include before writing and after writing.
<table>
<tr><th rowspan="2">Trigger type</th><th>Before writing</th><th>After writing</th></tr>
<tr><td>The activation bit is ON before changing values.</td><td>Values are changed before the activation bit is ON.</td></tr>
</table>
➢ As the activation function only sets the activation address to ON, users must set the activation address of OFF before re-activation.
➢ Before writing: After writing:

</td></tr>
<tr><td>Trigger</td></tr>
<tr><td>(3)</td><td>Invisible Address</td><td>➢ When Invisible Address is “ON”, the button element is hidden, and the corresponding function is disabled.

</td></tr>
</table>

No.	Property	Function
		
(4)	User Security Level	 ➢ Sets the user security level of element activities. Only users with equal or higher security level corresponding to the element can activate the element. ➢ After setting the user security level, when users activate the element, the password box will pop up and request users to input the password (the password can be changed from the password setup element, please see 5-7 Password Table of Chapter 05).
	Set Low Security	 ➢ If “YES” is selected for Set Low Security, HMI automatically sets the security level to the lowest every time users input the

No.	Property	Function
		password. When users activate the element again, they will be requested to input again the password corresponding to the element.
(5)	Confirm Window	➢ If Confirm Window is set to “YES”, the following dialog box will pop up after pressing the corresponding button as shown below: 

◆ Coordinates

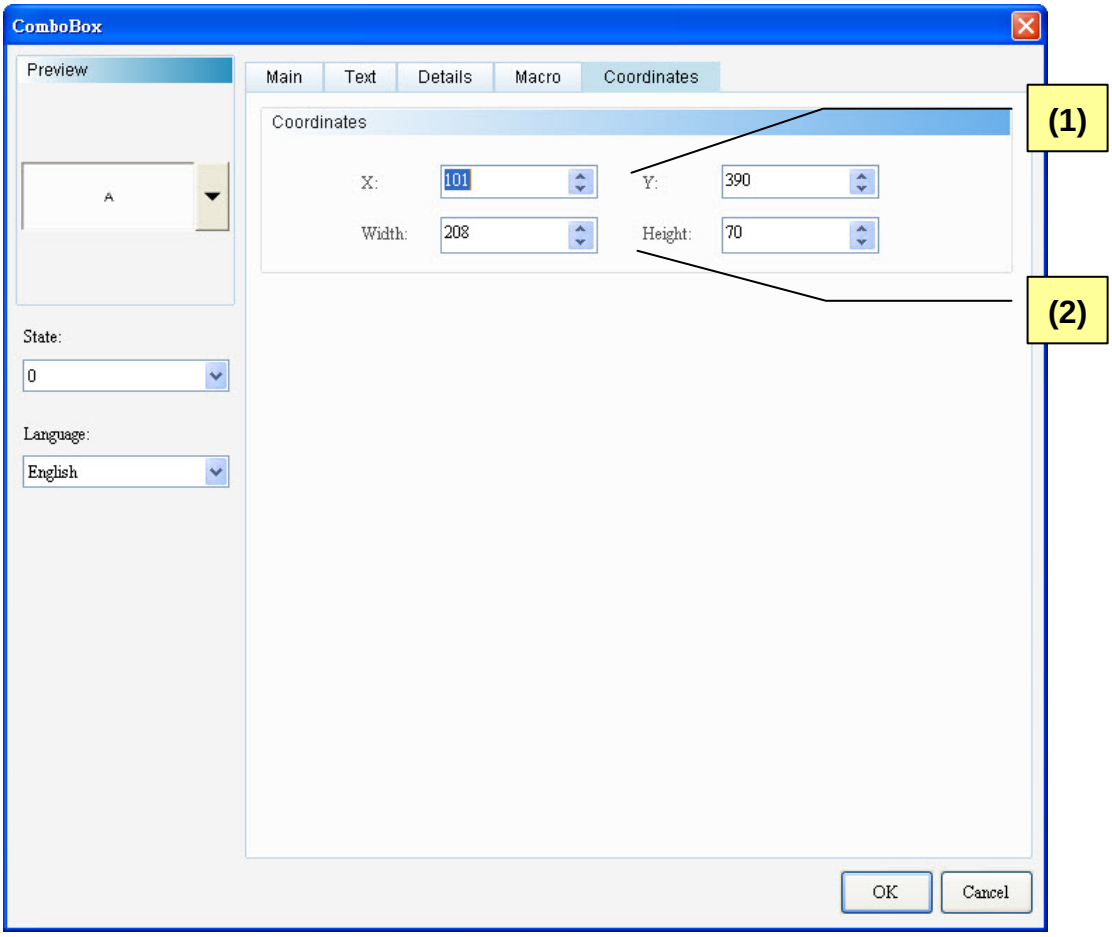


Figure 19-1-5 ComboBox Coordinates properties page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

◆ Macro

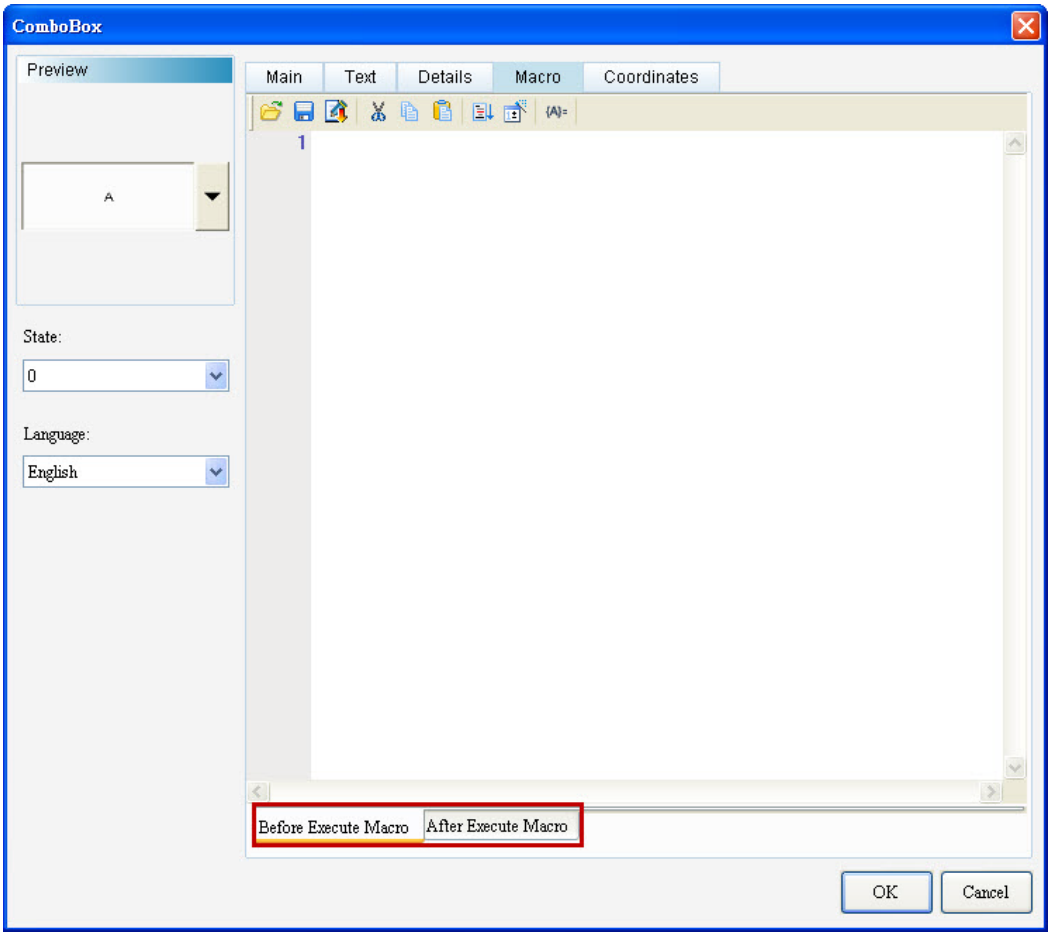
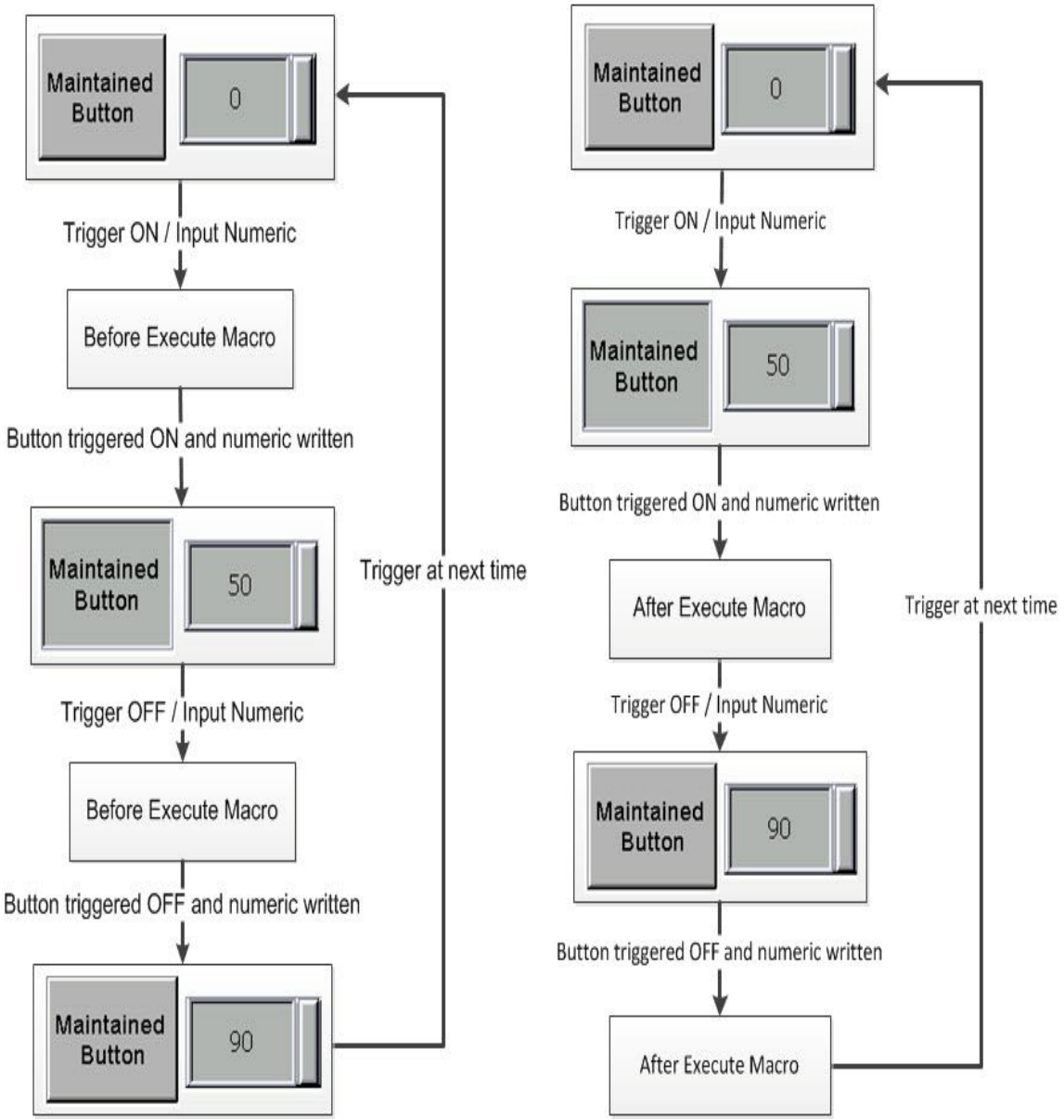


Figure 19-1-6 ComboBox Macro properties page

No.	Property	Function
(1)		➢ The before execute macro and after execute macro processes are diagrammed below: 
	Before execute Macro	➢ When users touch the button element, HMI will first run the commands in the corresponding macro pre-action of the button action. If the button state is not changed by means of touching button (using external controller commands or other macros), HMI will not run the corresponding macro commands.
	After execute Macro	➢ After users touch the button element, HMI will first run the button action pre-action the commands in the corresponding macro. If the button state is not changed by means of touching button (using external controller commands or other macros), HMI will not run the corresponding macro commands.

19-2 ListBox

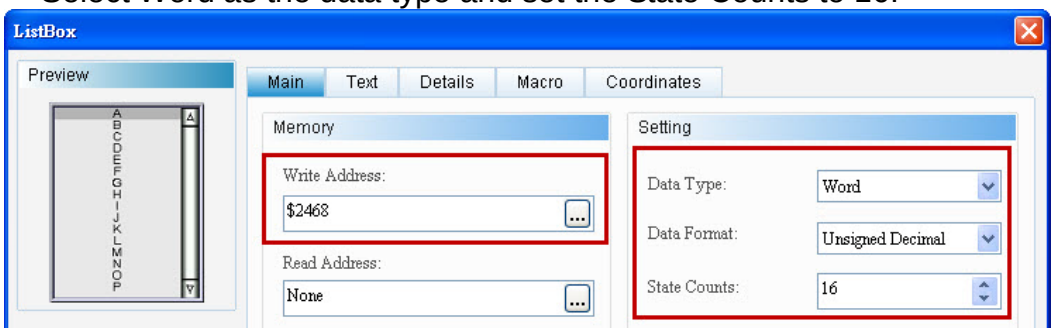
Like the ComboBox, the ListBox provides the user with multiple state display messages. It allows the user to view and select the item in a more intuitive way. Refer to Table 19-2-1 for the example of the ListBox.

ListBox Example

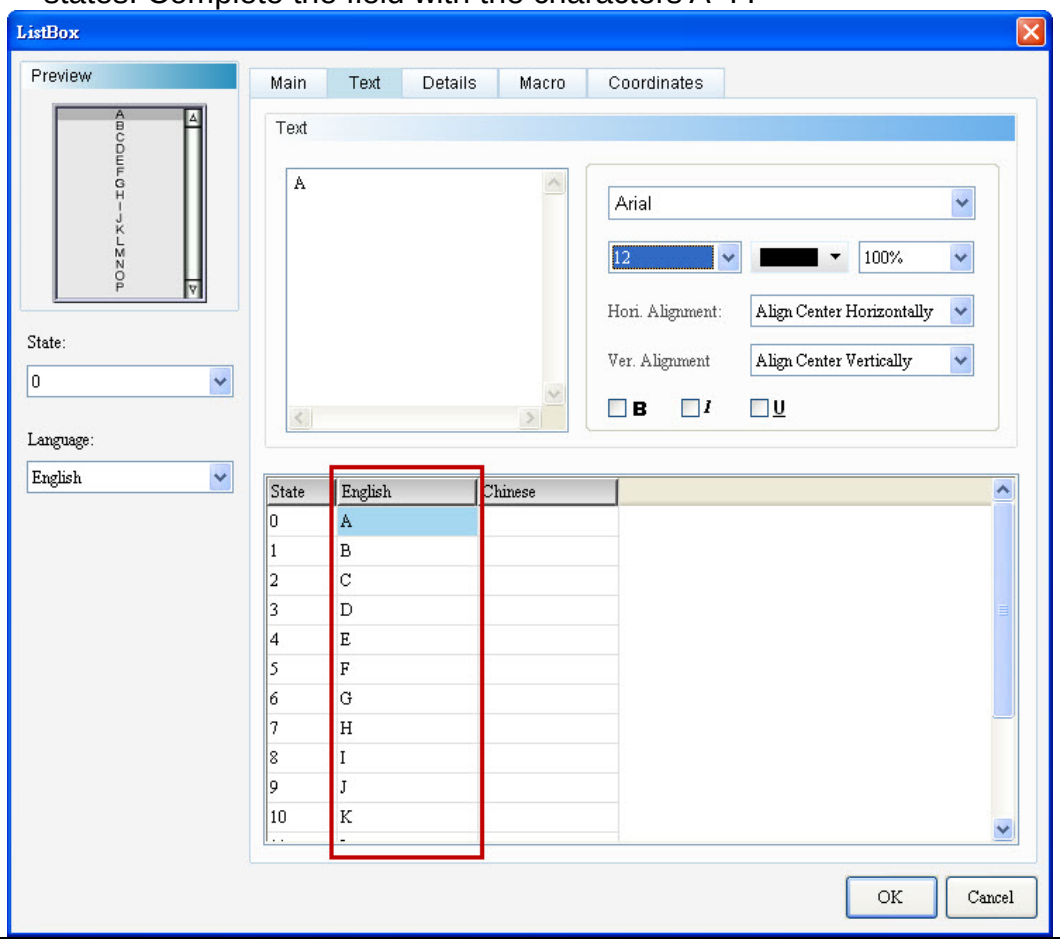
Table 19-2-1 ListBox Example

Create ListBox Element

➢ Step 1: Create the ListBox element. Set the Write Address to $2468. Select Word as the data type and set the State Counts to 16.



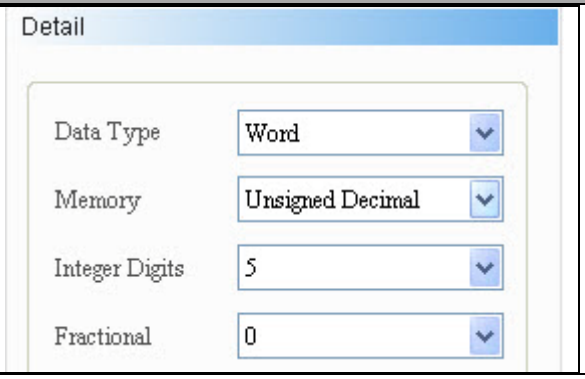
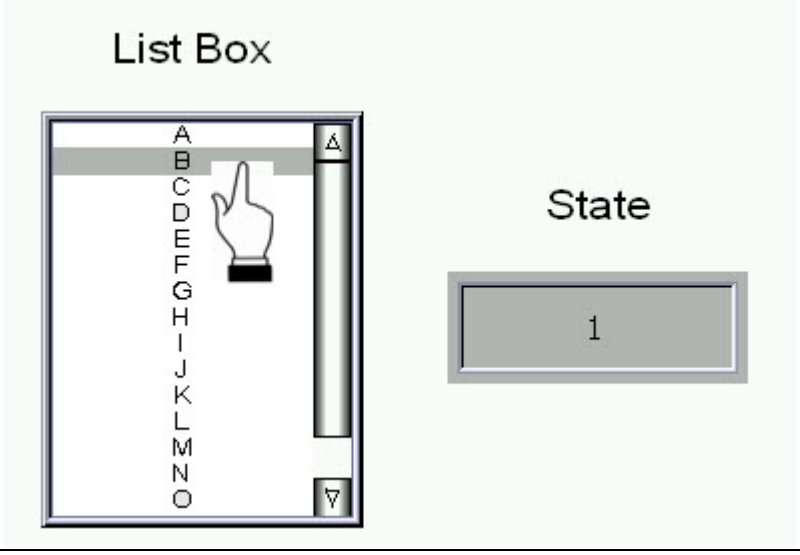
➢ Step 2: On the Text page, edit the text message to be displayed for the 16 states. Complete the field with the characters A~P.



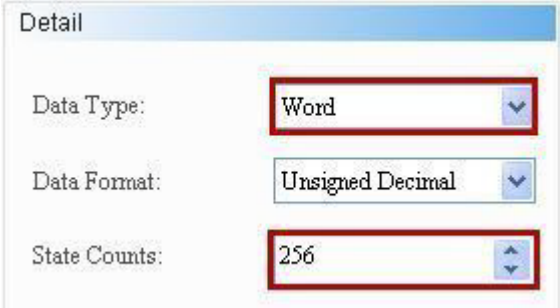
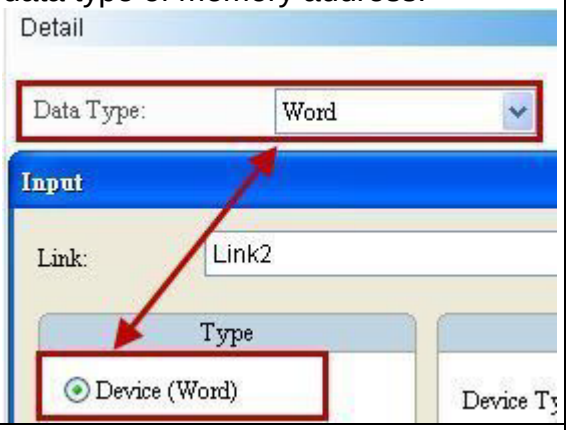
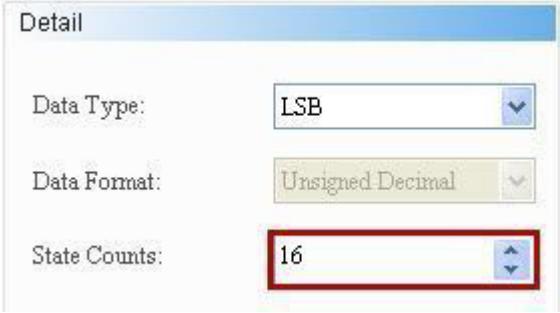
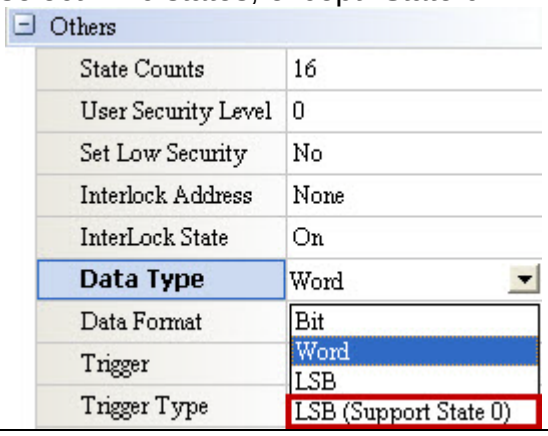
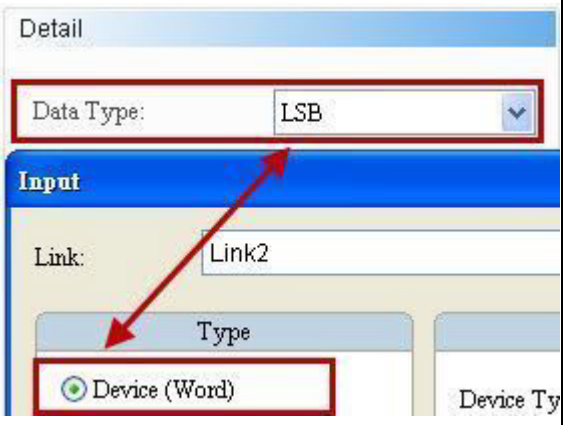
Create Data Display Element

➢ Step 1: Create the data display button. Set the Write Address to $2468 and complete the setting of other parameters.

Data Display Element	Read Address	

ListBox Example Table 19-2-1 ListBox Example				
			Setup	
Execution Results	➢ After creation of all elements, perform the compilation and download them to HMI. When you select an item from the ListBox, the data display element will show the state value corresponding to the selected ListBox item. 			

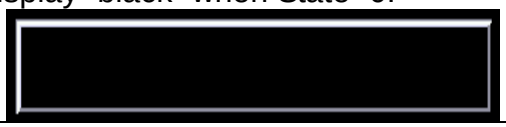
The ListBox supports four data types. Refer to Table 19-2-2 for more information. The user only needs to increase or decrease the state counts in the property table to add or delete the counts.

ListBox Table 19-2-2 Data Type of the ListBox		
Data Type	**State Counts**	**Memory Address**
Word	If data type is “Word”, users can select 1-256 states.  	If data type is “Word”, “Word” is the data type of memory address. 
LSB / LSB (Support State 0)	If the data type is “LSB”, the data in the register are first converted into binary data. Next, the present object state is determined according to the element with the lowest non-zero bit. If the data type is “LSB”, users can select 1-16 states, except “State 0”.  If the data type is “LSB”, users can select 1-16 states, except “State 0”.  	If data type is “LSB” or LSB (Support State 0), “Word” is also data type of memory address. 

ListBox

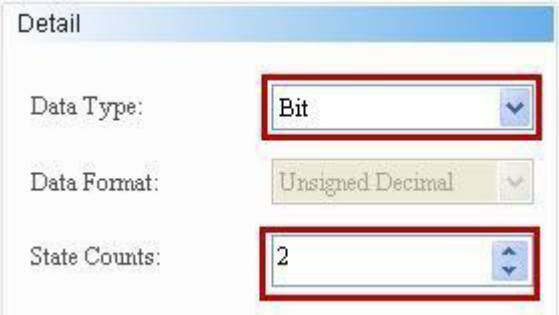
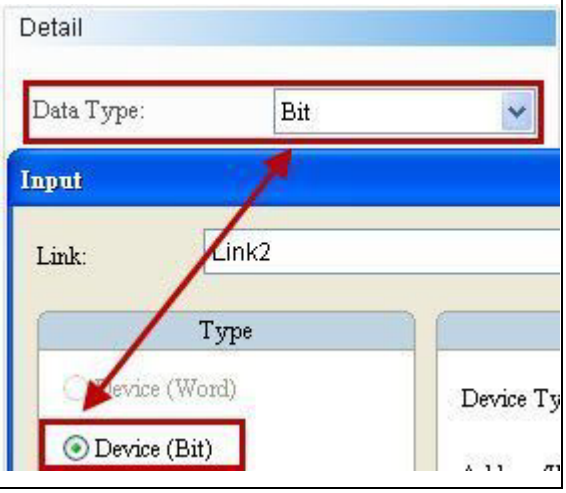
Table 19-2-2 Data Type of the ListBox

If users select “LSB”, the element will display “black” when State=0.



The examples in the following table show how state value is determined with the lowest non-zero bit after converting from a decimal value into a binary value. There are also examples demonstrating how the DOPSoft determines the state Numeric Displayed with the lowest bit when the decimal values are 3 and 7.

Decimal	Binary	State Value
0	**0000000000000000**	**State=0 when all bits are “0” [LSB (Support State 0) must be selected]**
1	0000000000000001	The lowest non-zero bit is bit 0, State=1
2	0000000000000010	The lowest non-zero bit is bit 1, State=2
3	**0000000000000011**	**The lowest non-zero bit is bit 0, State=1**
4	0000000000000100	The lowest non-zero bit is bit 2, State=3
7	**0000000000000111**	**The lowest non-zero bit is bit 0, State=1**
8	0000000000001000	The lowest non-zero bit is bit 3, State=4
16	0000000000010000	The lowest non-zero bit is bit 4, State=5
32	0000000000100000	The lowest non-zero bit is bit 5, State=6
64	0000000001000000	The lowest non-zero bit is bit 6, State=7
128	0000000010000000	The lowest non-zero bit is bit 7, State=8
256	0000000100000000	The lowest non-zero bit is bit 8, State=9
512	0000001000000000	The lowest non-zero bit is bit 9, State=10
1024	0000010000000000	The lowest non-zero bit is bit 10, State=11
2048	0000100000000000	The lowest non-zero bit is bit 11, State=12
4096	0001000000000000	The lowest non-zero bit is bit 12, State=13
8192	0010000000000000	The lowest non-zero bit is bit 13, State=14
16384	0100000000000000	The lowest non-zero bit is bit 14, State=15
32768	1000000000000000	The lowest non-zero bit is bit 15,

ListBox Table 19-2-2 Data Type of the ListBox				
				State=16
Bit	If the data type is “Bit”, only 2 states are available.  			If the data type is “Bit”, “Bit” is the data type of memory address. 

Double click the ListBox icon and the following property setting screen appears.

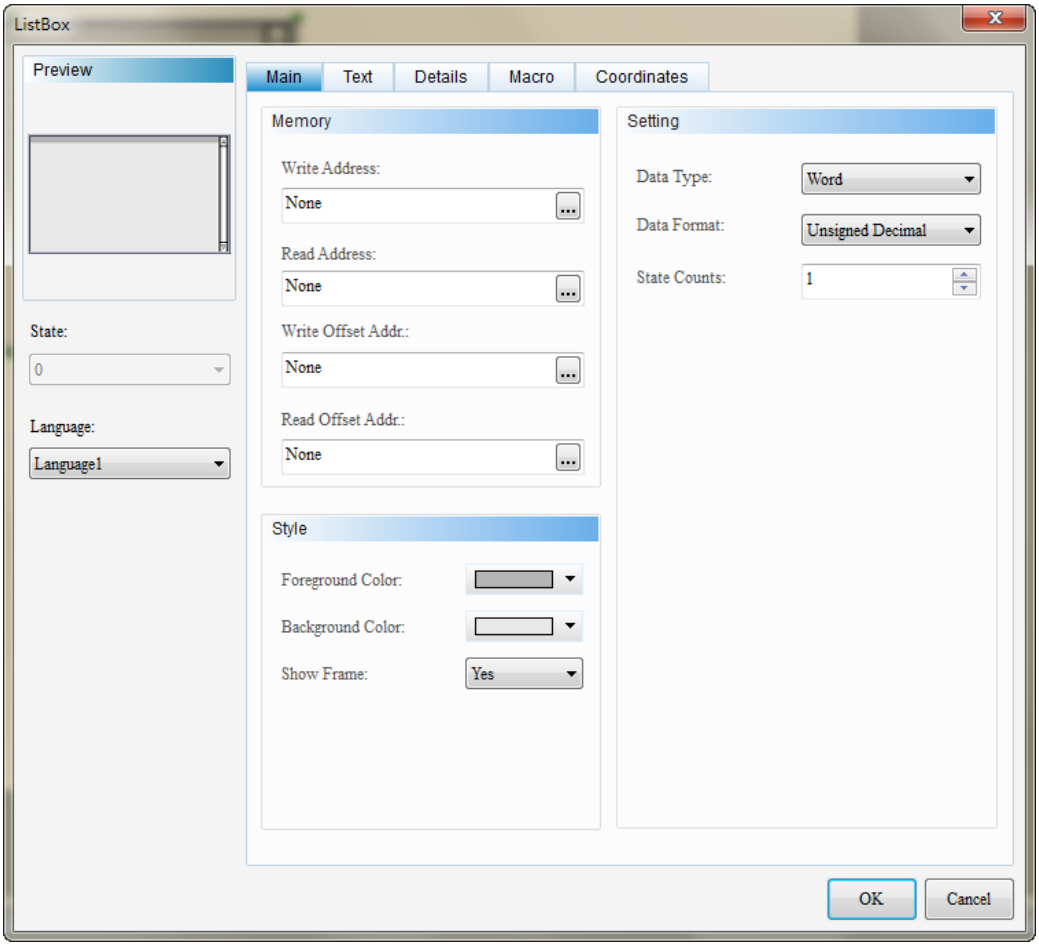


Figure 19-2-1 ListBox properties setting screen

ListBox	
Function Page	**Content Description**
Preview	Multiple state values are available for the ListBox. The user can edit multi-language data.
Main	Sets the write address, read address, write offset address, read offset address, data type, data format, state counts. Sets background color, foreground color.
Text	Sets the content, font, font size, font color, font effects, scaling, and alignment of the text to be displayed.
Details	Sets the interlock state, interlock address, Activation, Activation address, invisible address, user security level, set low security, Confirm Window.
Macro	Sets Edit Before execute Macro and After execute Macro.
Coordinates	Sets the X-Y coordinates, width and height of the element.

Table 19-2-3 ListBox function page

◆ Main

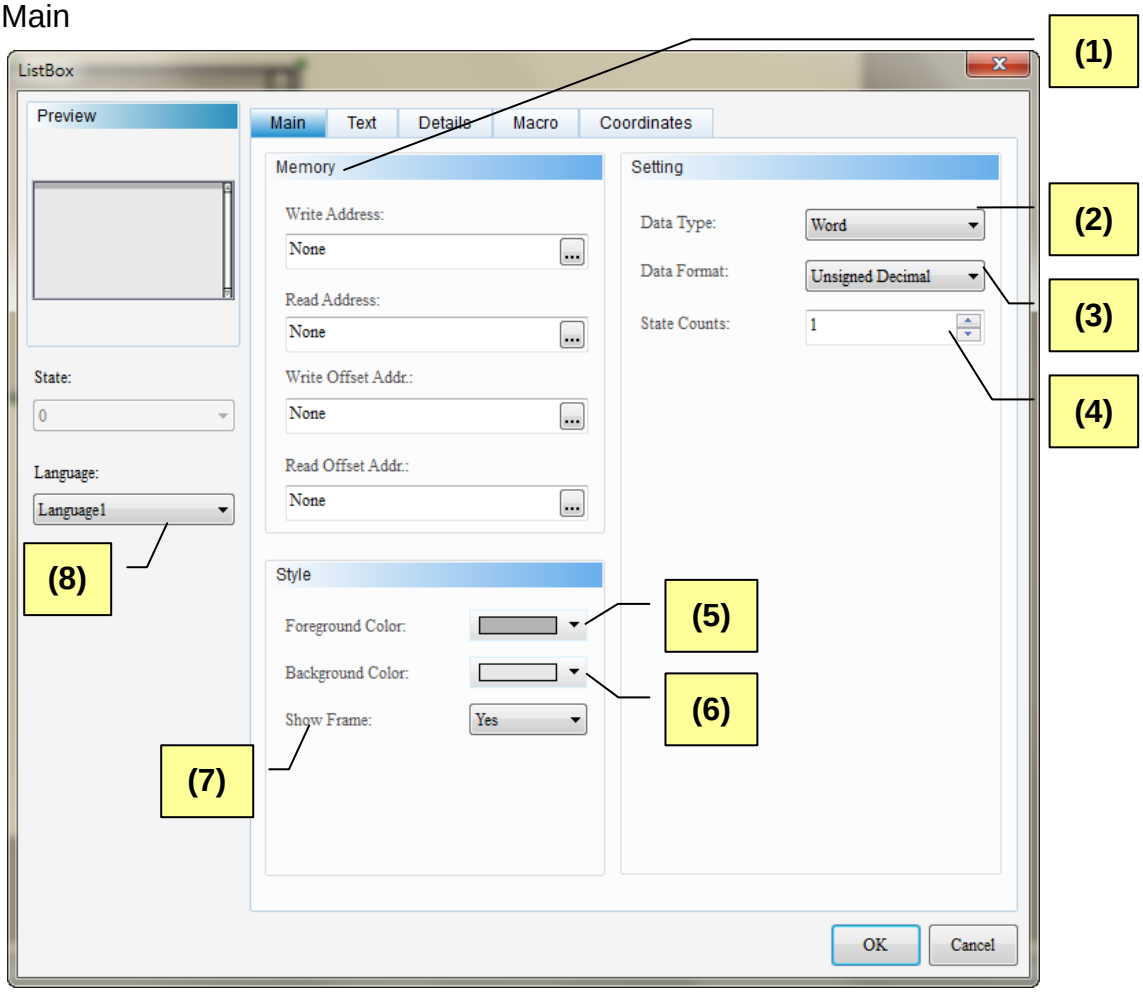
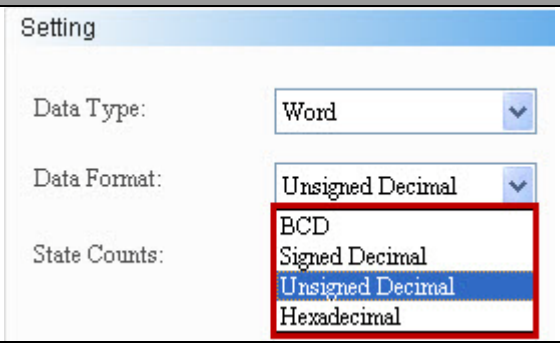
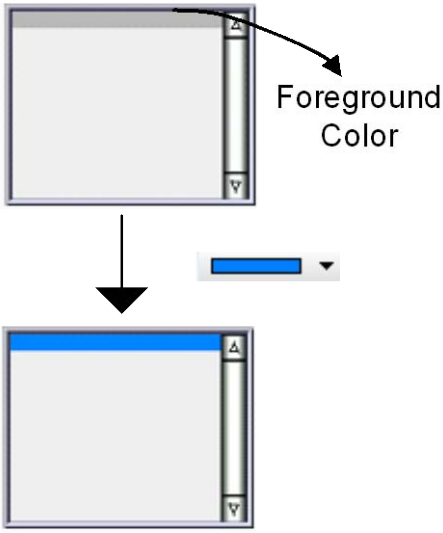
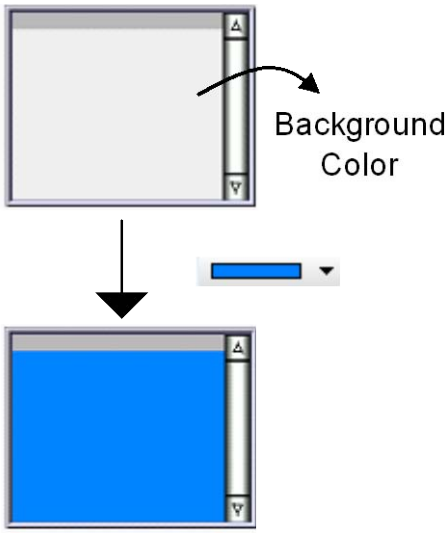
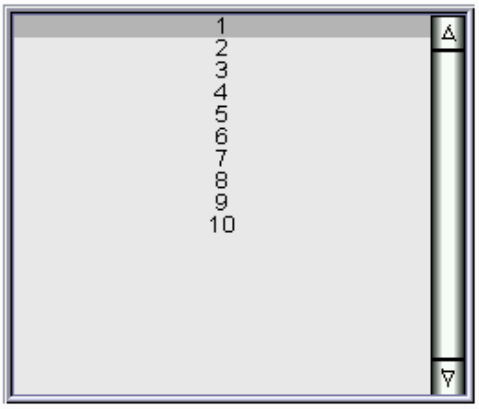
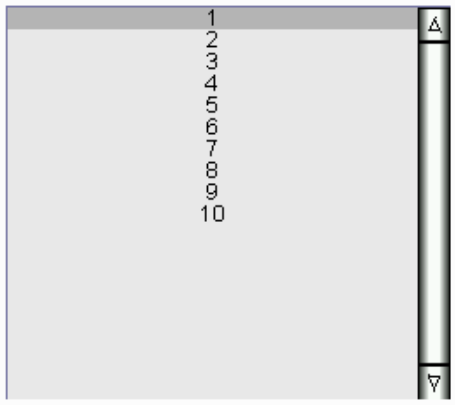
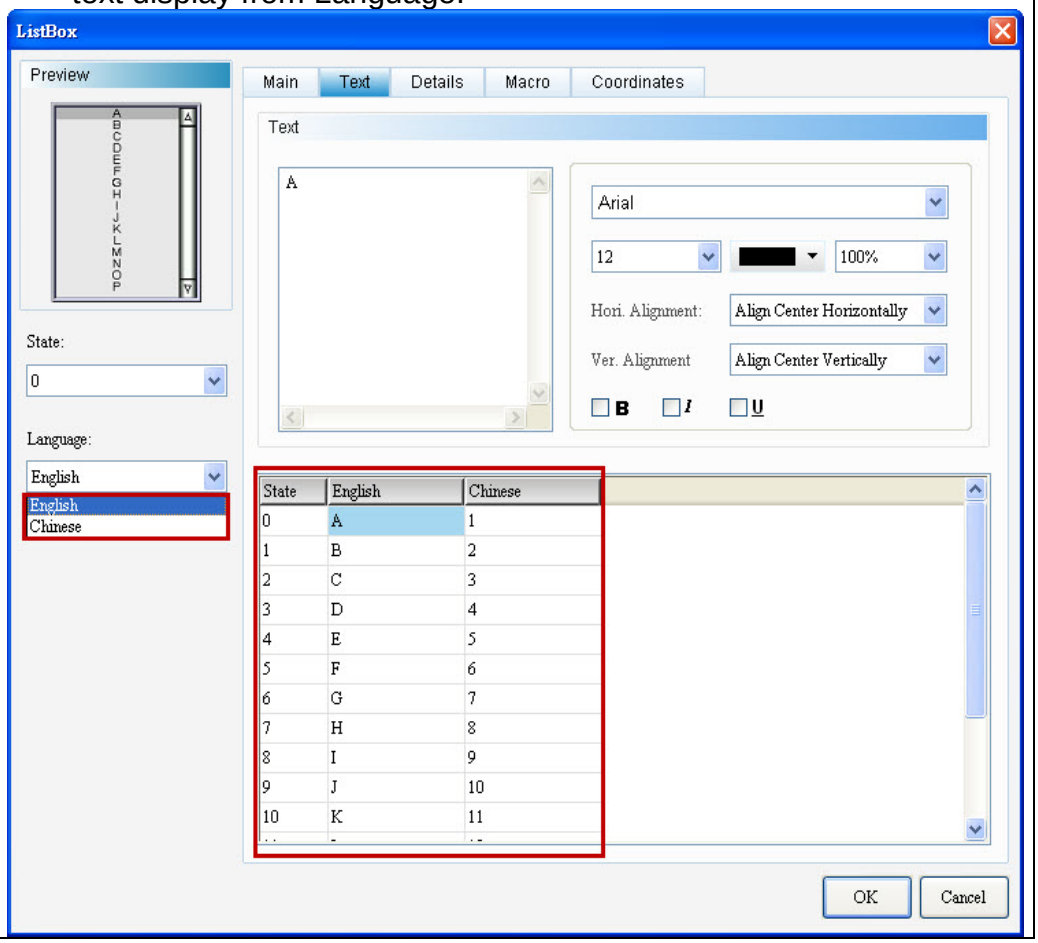


Figure 19-2-2 ListBox Main properties page

No.	Property	Function
(1)	Write Address Read Address	➢ The user can select the internal memory or controller register address. The memory type entered changes depending on the data type (Word, LSB or Bit). Refer to Table 19-2-2. ➢ Selects link name or style. Please refer to 5-1 Button of Chapter 05 for details.
	Write Offset Address Read Offset Address	➢ Please refer to Appendix D Write and Reading Offset Address.
(2)	Data Type	➢ The Data Type supports 4 formats: Bit, Word, LSB and LSB (Support State 0). Refer to Table 19-2-2 for more information.
(3)	Data Format	➢ The Data Format can be selected only when the data type is Word. ➢ The Data Format supports BCD, Signed Decimal, Unsigned Decimal, and Hexadecimal.

No.	Property	Function
		
(4)	State Counts	➢ Set the state counts for the ListBox. The state counts can be set between 1 and 256 with Word as the data type, 16 states can be set with LSB as the data type, 17 states can be set with LSB Support State 0 as the data type and only 2 states can be set with Bit as the data type. Refer to 19-2-2 for more information.
(5)	Foreground Color	➢ The user can set the foreground color for the element. 
(6)	Background Color	➢ The user can set the background color for the element. 
(7)	Show Frame	➢ Users can determine whether to show the frame of the list or not. Show Frame: YES | Show Frame: NO

No.	Property	Function
		 
(8)	Language	➢ When language data are defined, users can edit the properties of text display from Language. 

◆ Text

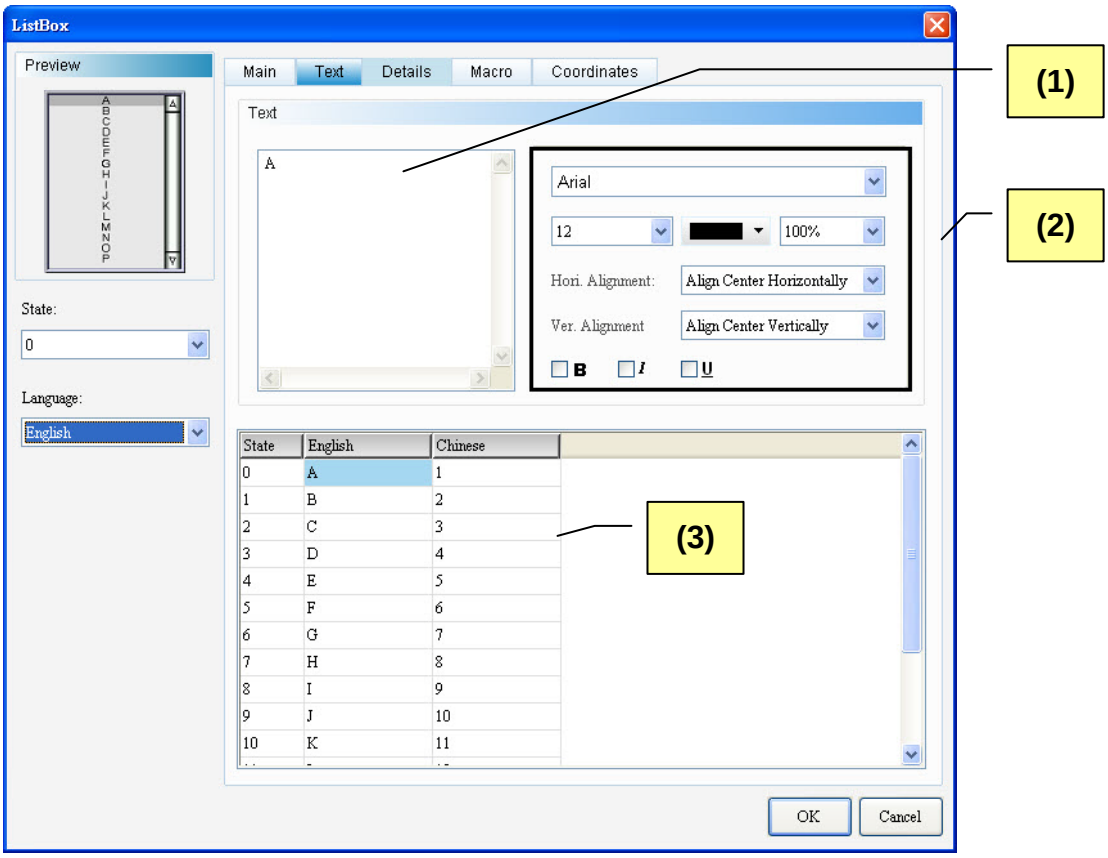
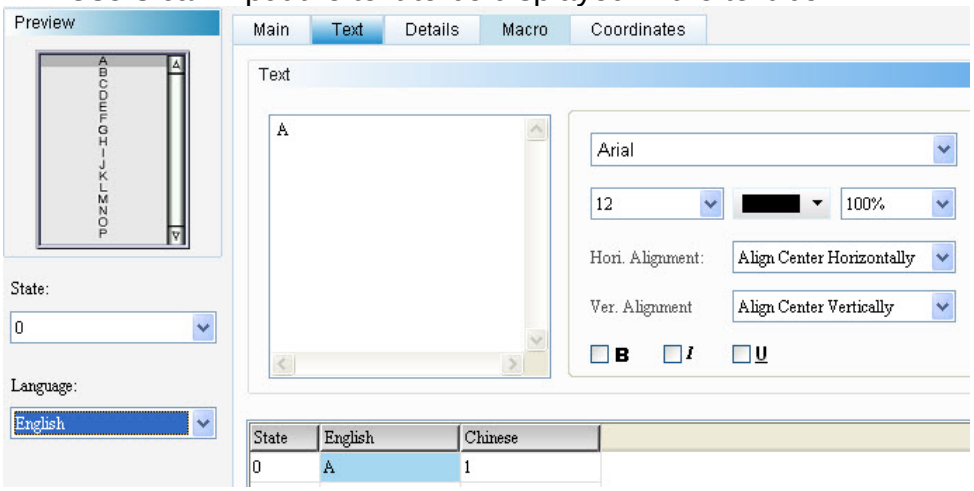


Figure 19-2-3 ListBox Text properties page

No.	Property	Function
(1)	Text	➢ Users can input the text to be displayed in the text box.  ➢ Users can select elements supporting text input as shown above and press the SPACE bar on the keyboard to edit text.
(2)	Text Properties	➢ Sets text properties, including font type, font size, font color, scaling, text alignment, and bold/italic/underline of font. Please refer to the above figure for details about the results of text properties.
(3)	Multi-Language Text Data	➢ Users can add Multi-Language text data from the Multi-Language Text Page. As shown in the Text Properties Figure, users can input English text in the English field.

◆ Details

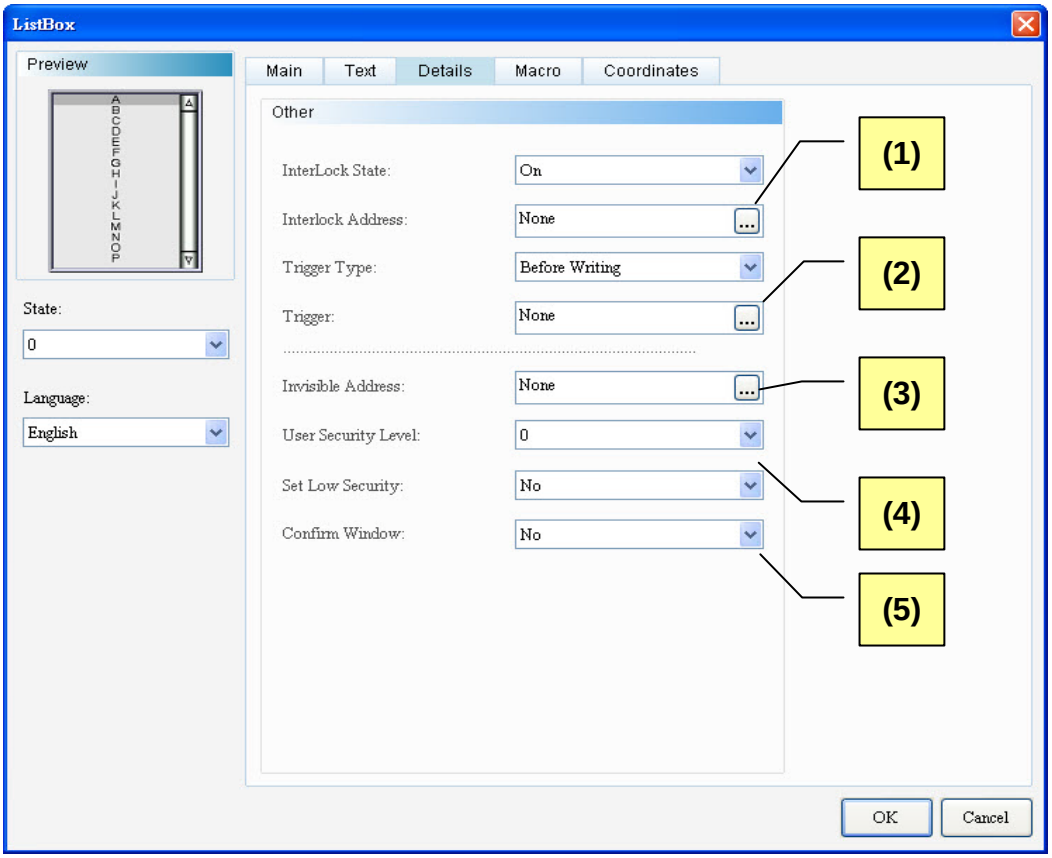
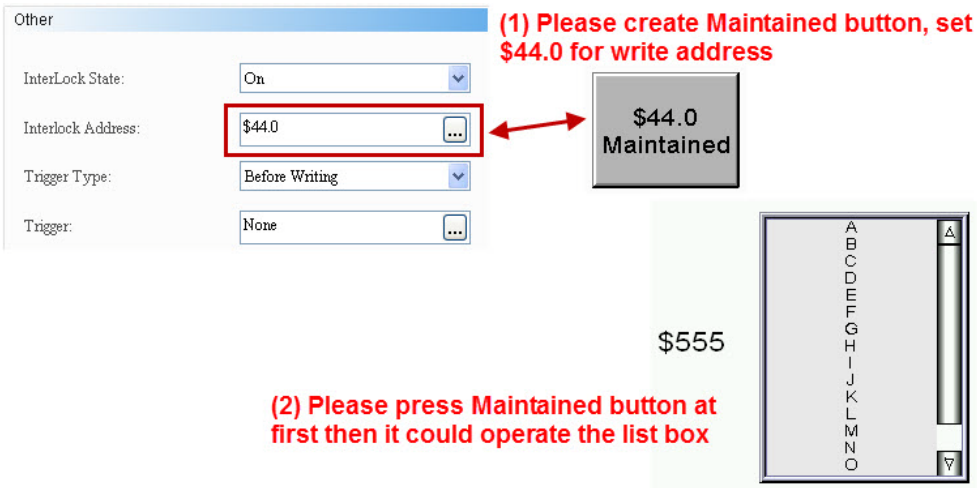
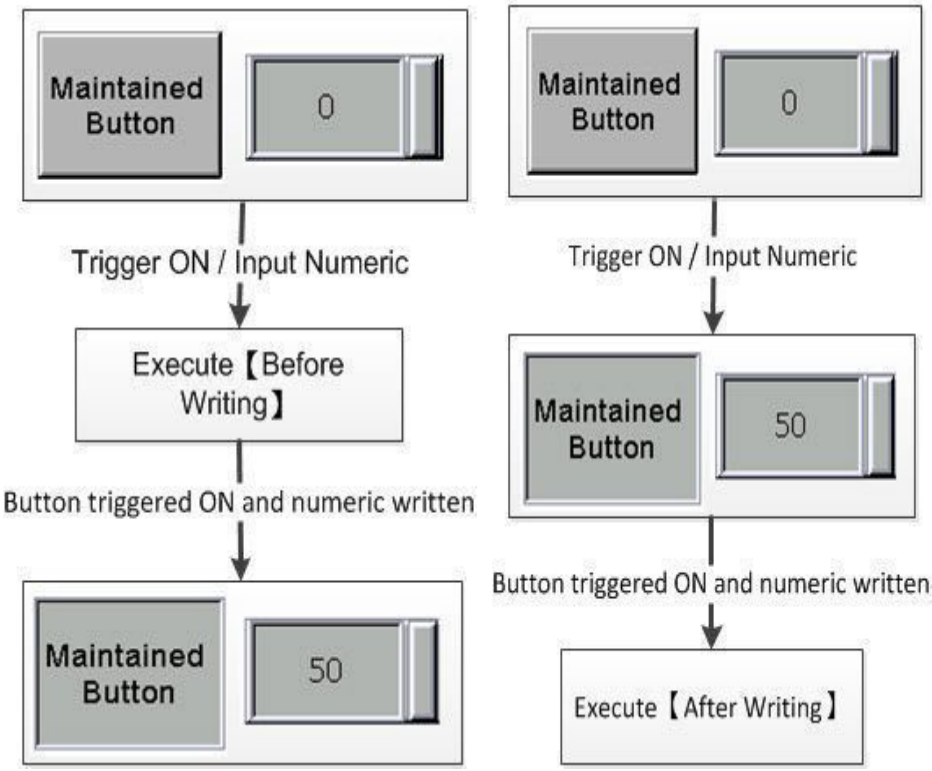


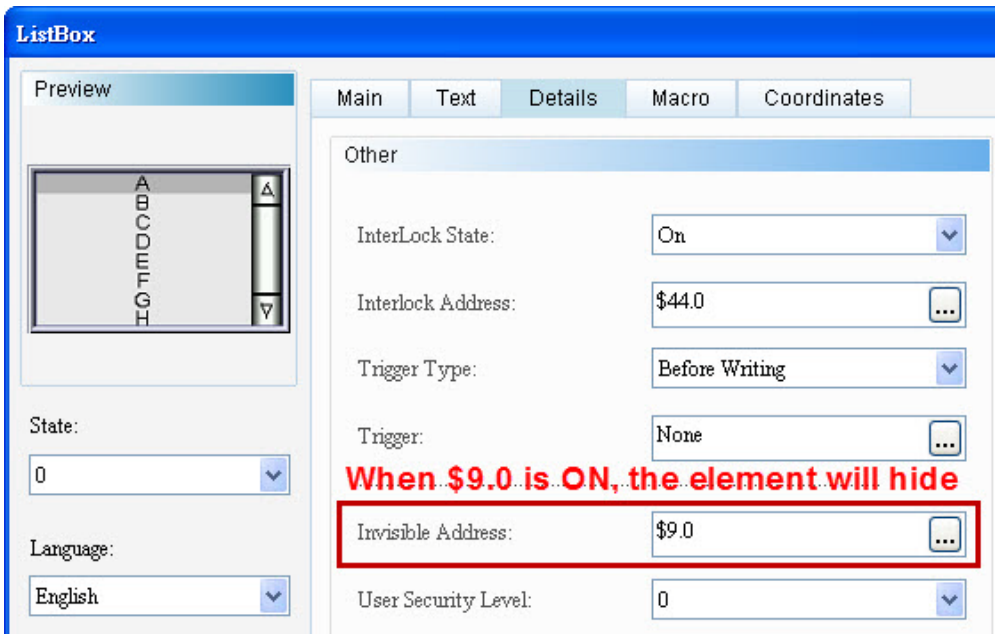
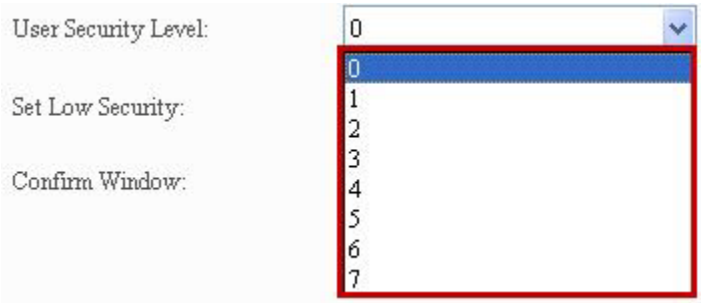
Figure 19-2-4 ListBox Details properties page

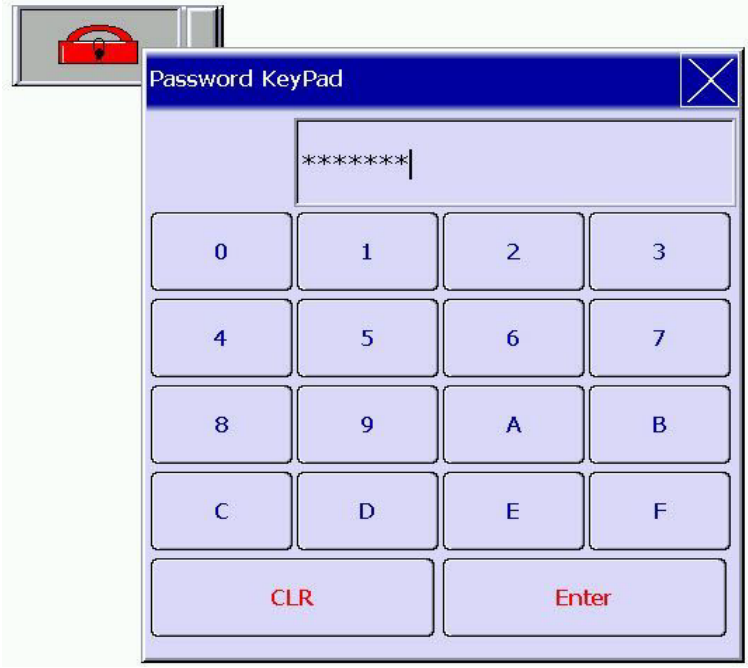
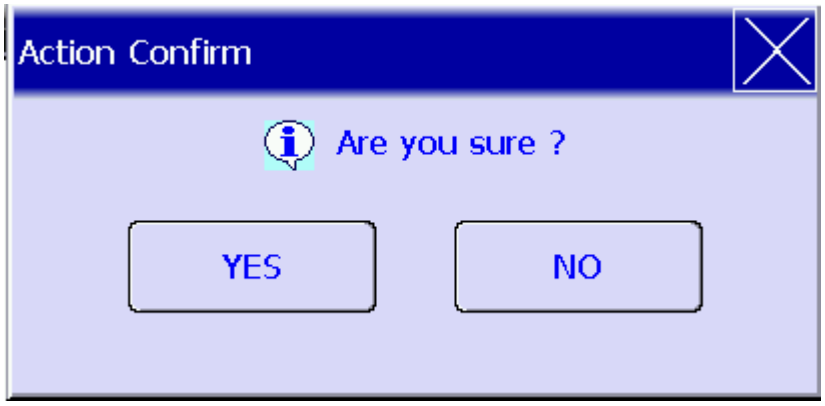
No.	Property	Function
(1)	Interlock State	➢ Interlock Address allows users to operate an element from this particular address. It must be used along with Interlock State. If Interlock State is “OFF”, this means the interlock address is operable when the interlock state is “OFF”. In contrast, when Interlock State is “ON”, this means the interlock address is operable when the interlock state is “ON”. ➢ The behavior is described below: 1. Create a maintained button and set the Write Address to $44.0. Then Set the Write Address and Interlock Address of the ListBox element to $555 and $44.0, respectively. 2. Press the maintained button $44.0 to activate the ListBox element $555 before it can be operated.
	Interlock Address	

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td></td><td></td><td>


</td></tr>
<tr><td rowspan="2">(2)</td><td>Trigger type</td><td rowspan="2">
➢ Trigger type include before writing and after writing.
<table>
<tr><th rowspan="2">Trigger type</th><th>Before writing</th><th>After writing</th></tr>
<tr><td>The activation bit is ON before changing values.</td><td>Values are changed before the activation bit is ON.</td></tr>
</table>
➢ As the activation function only sets the activation address to ON, users must set the activation address of OFF before re-activation.
➢ Before writing: After writing:


</td></tr>
<tr><td>Trigger</td></tr>
</table>

No.	Property	Function
(3)	Invisible Address	➢ When Invisible Address is "ON", the button element is hidden, and the corresponding function is disabled. 
(4)	User Security Level	
	Set Low Security	➢ Sets the user security level of element activities. Only users with equal or higher security level corresponding to the element can activate the element. ➢ After setting the user security level, when users activate the element, the password box will pop up and request users to input the password (the password can be changed from the password setup element, please see 5-7 Password Table of Chapter 05).

No.	Property	Function
		 ➢ If "YES" is selected for Set Low Security, HMI automatically sets the security level to the lowest every time users input the password. When users activate the element again, they will be requested to input again the password corresponding to the element.
(5)	Confirm Window	➢ If Confirm Window is set to "YES", the following dialog box will pop up after pressing the corresponding button as shown below: 

◆ Coordinates

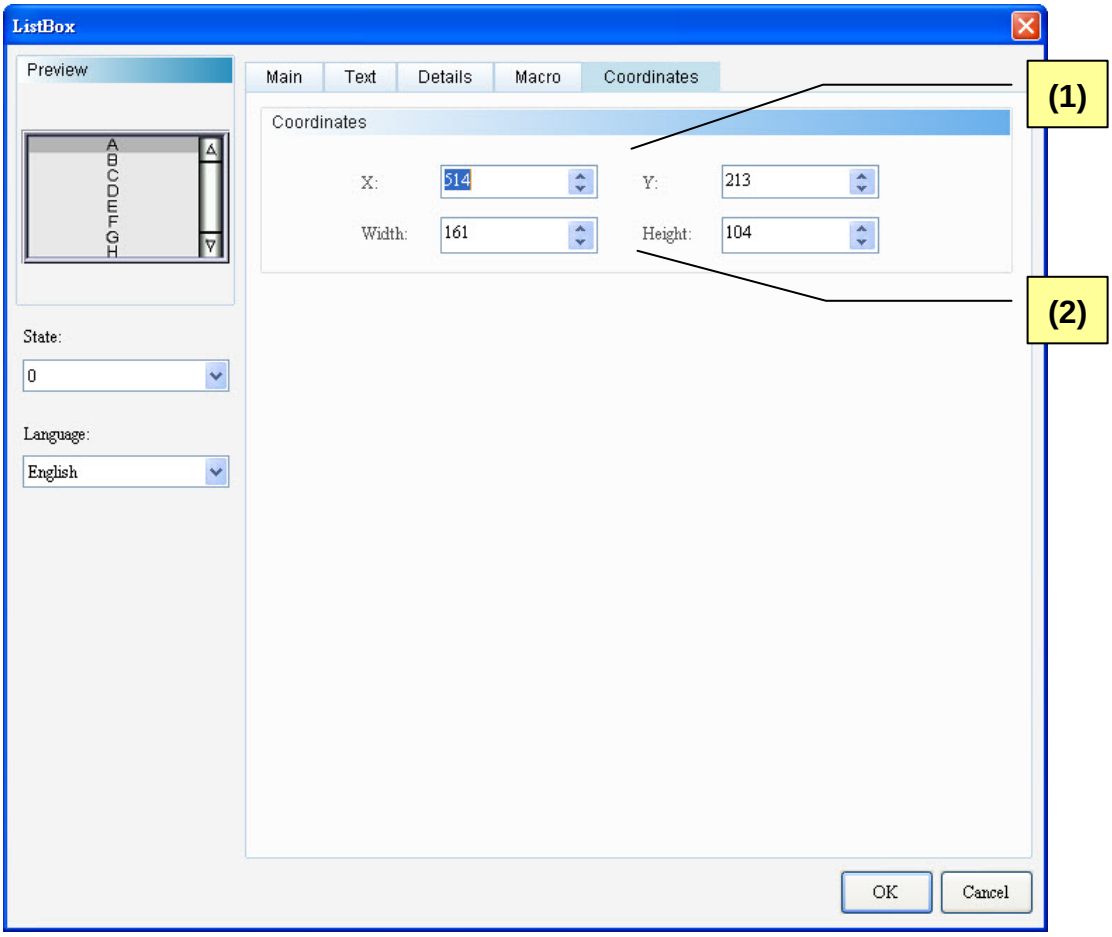


Figure 19-2-5 ListBox Coordinates properties page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

◆ Macro

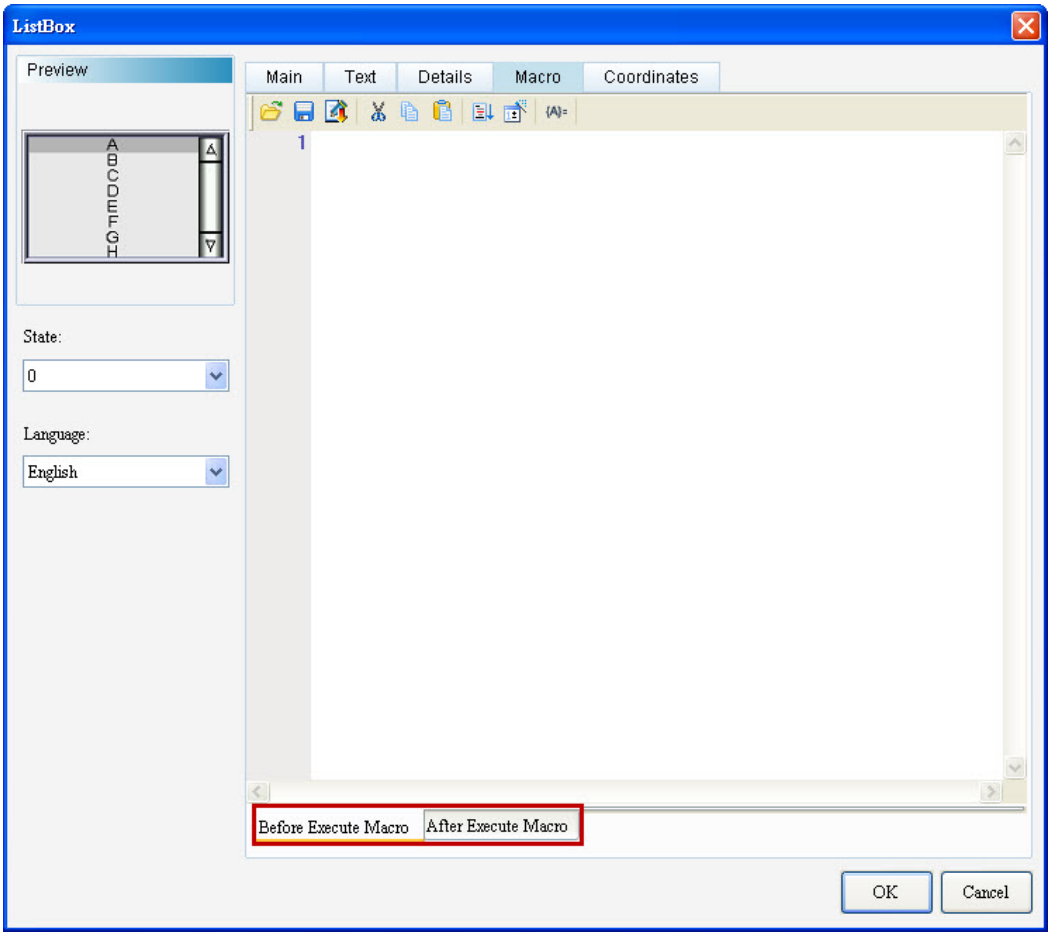
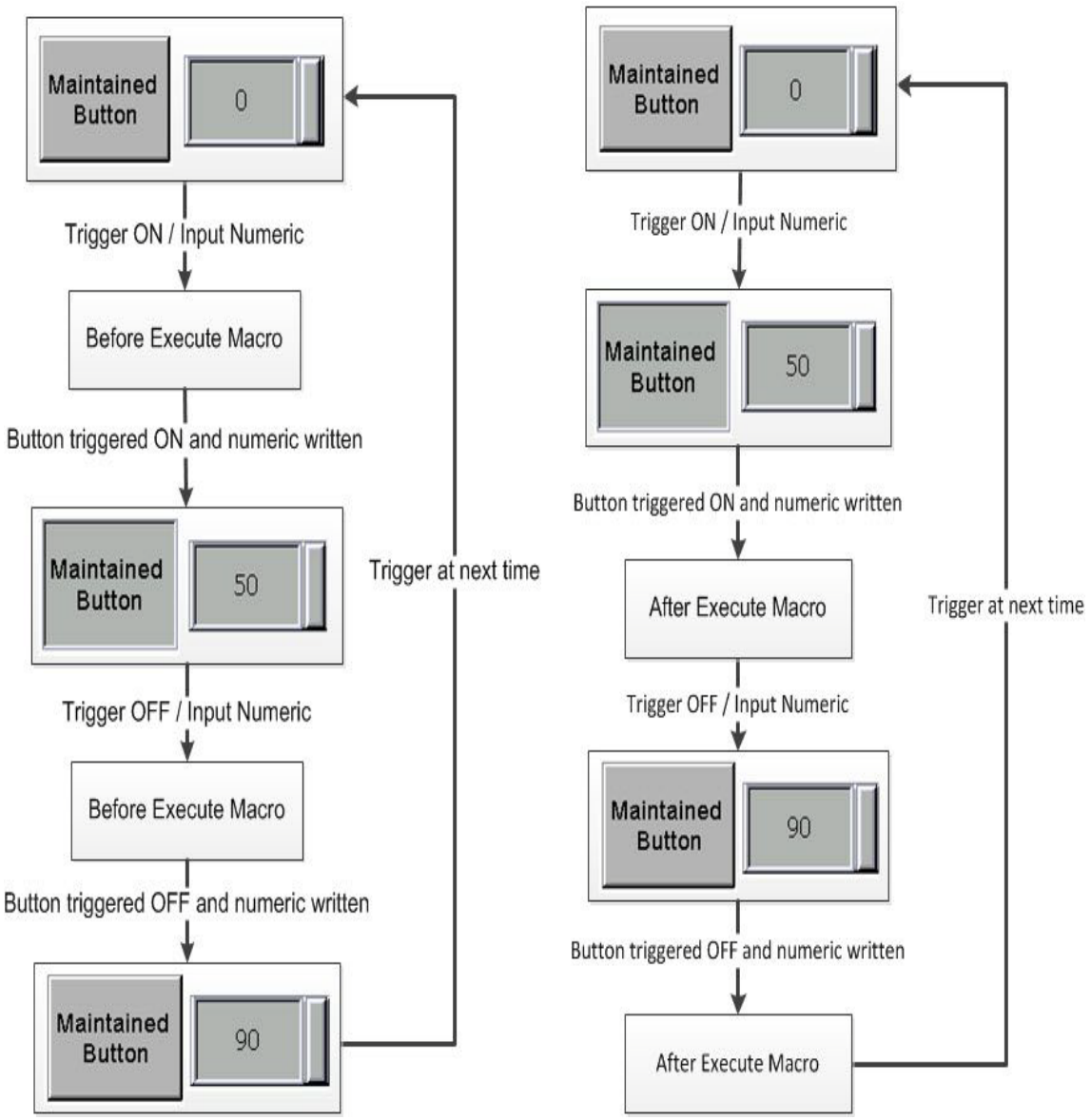
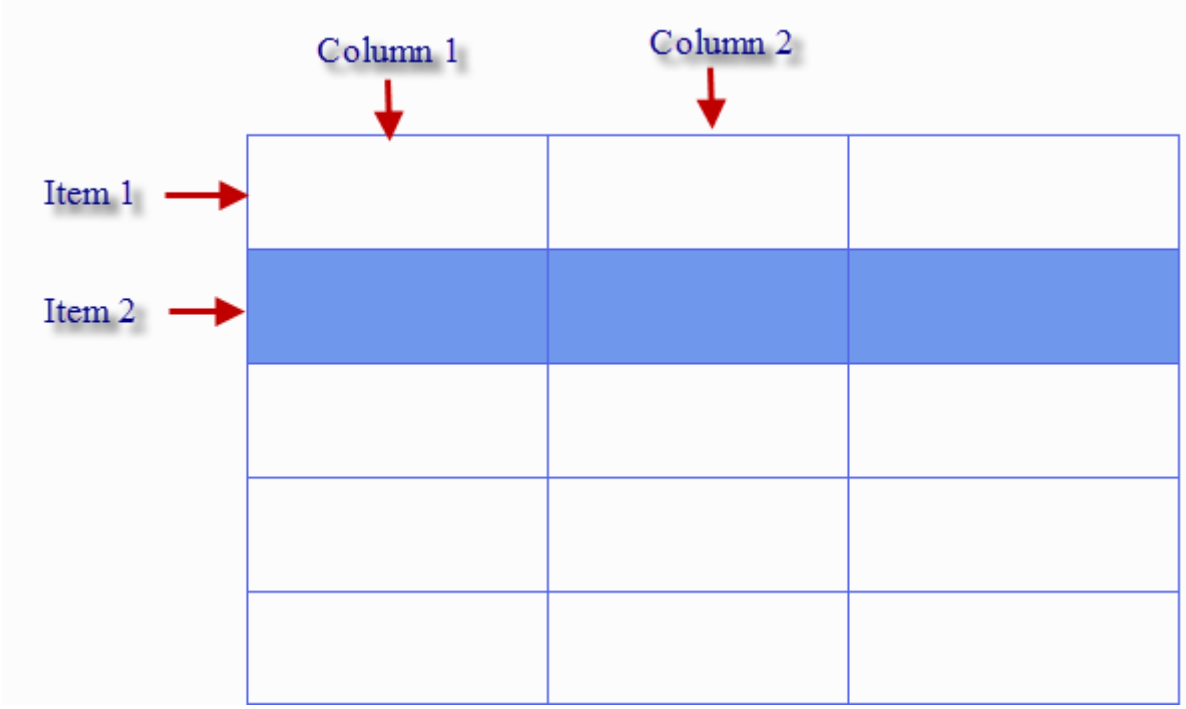


Figure 19-2-6 ListBox Macro properties page

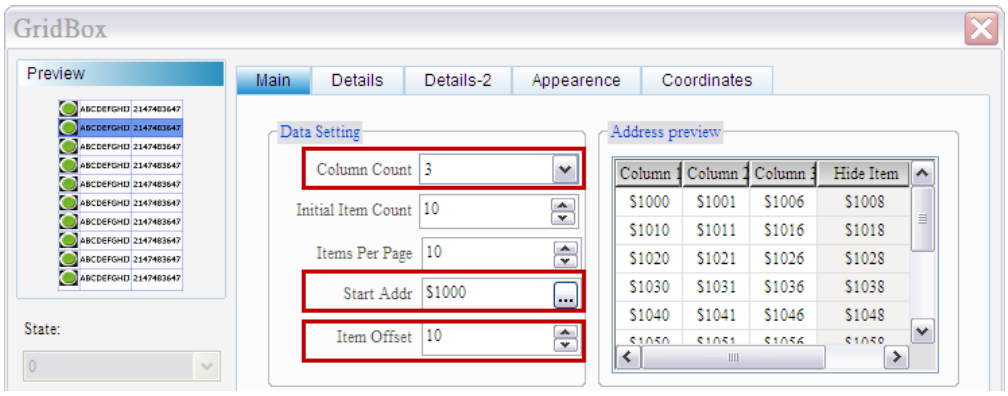
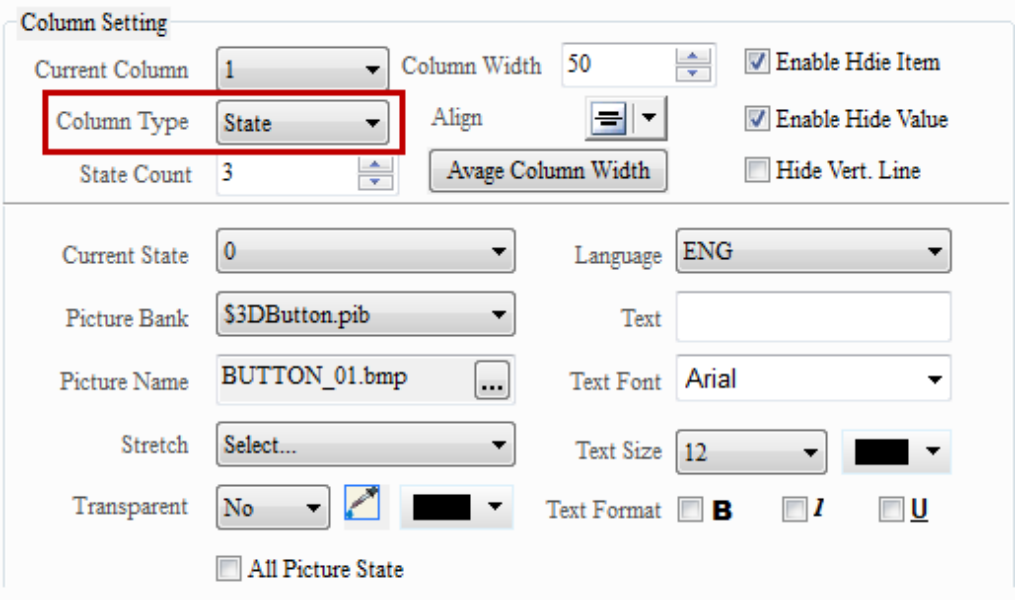
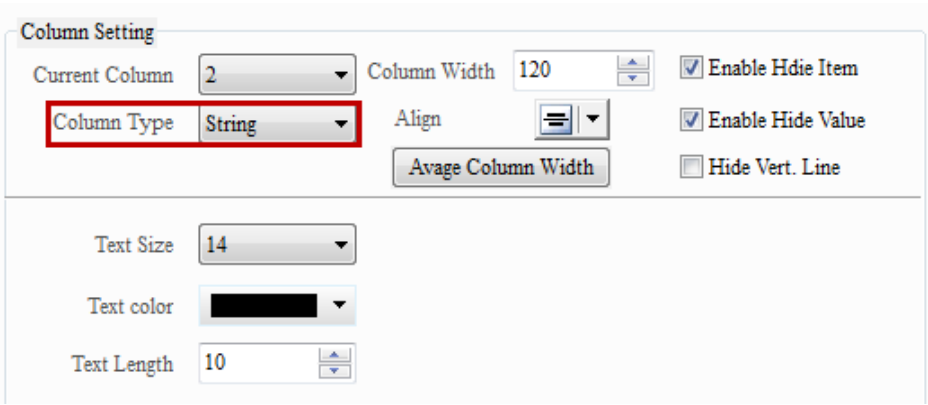
No.	Property	Function
(1)		➢ The before execute macro and after execute macro processes are diagrammed below: 
	Before execute Macro	➢ When users touch the button element, HMI will first run the commands in the corresponding macro pre-action of the button action. If the button state is not changed by means of touching button (using external controller commands or other macros), HMI will not run the corresponding macro commands.
	After execute Macro	➢ After users touch the button element, HMI will first run the button action pre-action the commands in the corresponding macro. If the button state is not changed by means of touching button (using external controller commands or other macros), HMI will not run the corresponding macro commands.

19-3 GridBox

Display the data set by users by Gridbox and provides a convenient and easy-to-operate interface for users, functions including built-in auto-change page, insert, delete, copy and paste.



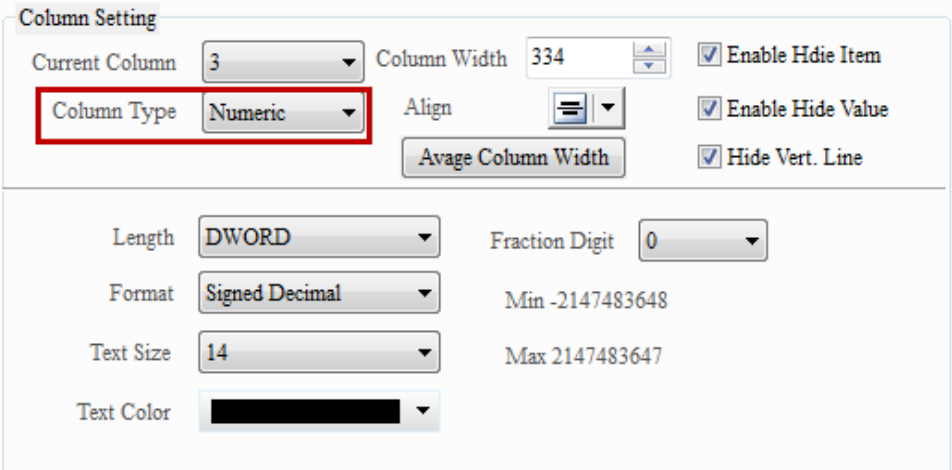
Please refer to table 19-3-1 below for descriptions of GridBox.

Description of GridBox Table 19-3-1 Description of GridBox	
Create GridBox Element	➢ Step 1: Select『List』➔『GridBox』 and create it on screen 1. To setup 3 column count and the start address is $1000. Each item offset is 10 Words.  ➢ Step 2: Column 1 is set as State. Setting is shown as below.  ➢ Step 3: Column 2 is set to String, which can determine the string length. Setting is shown as below. 

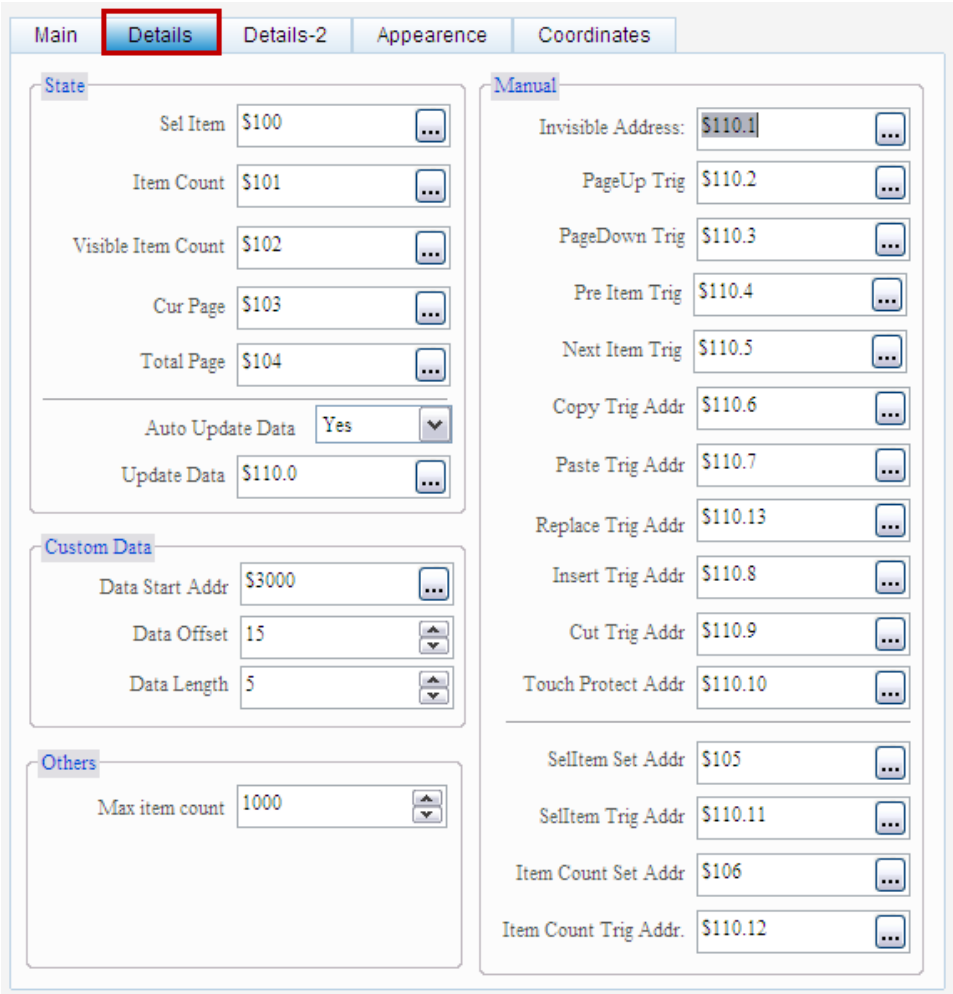
Description of GridBox

Table 19-3-1 Description of GridBox

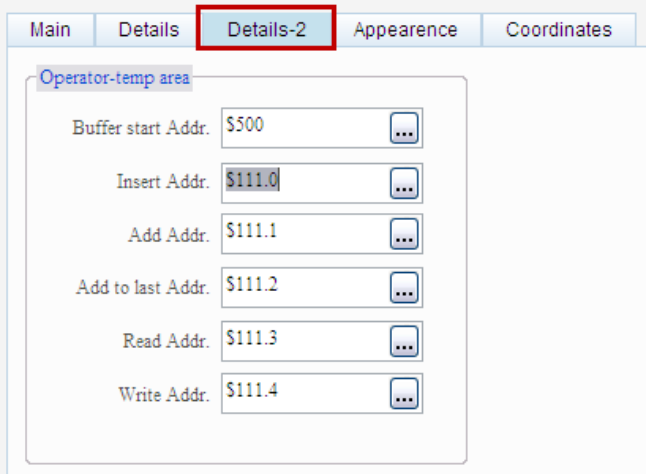
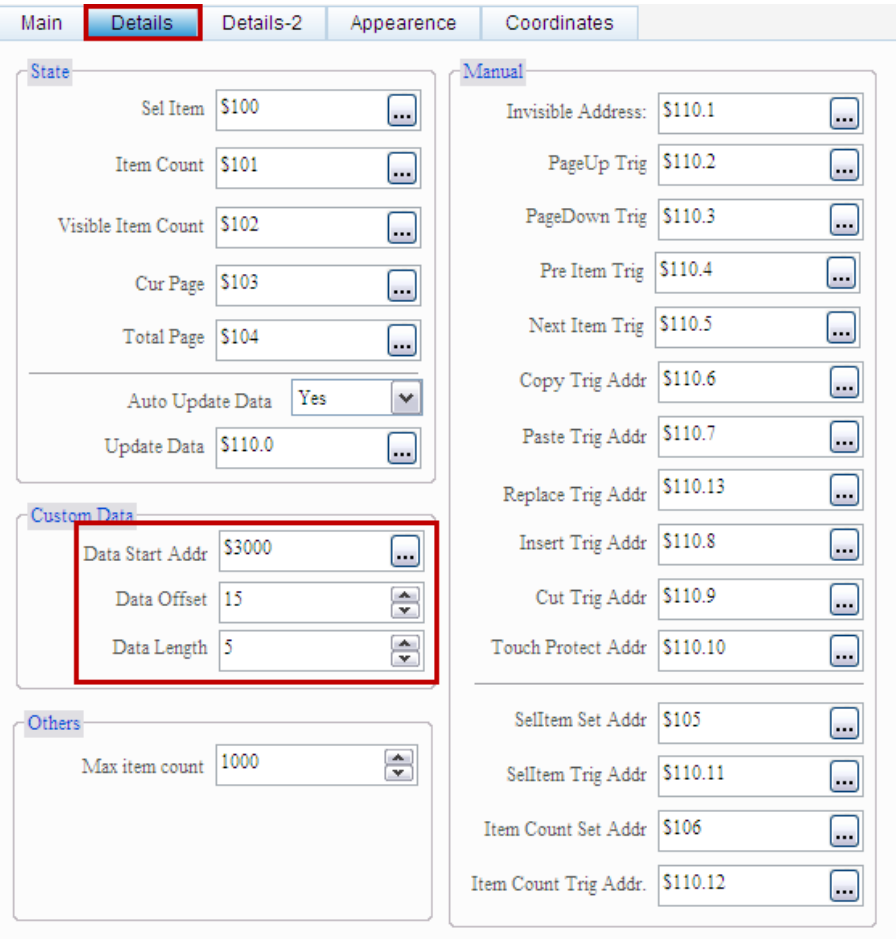
- Step 4: Column 3 is set to Numeric. The unit can be Word or DWord.

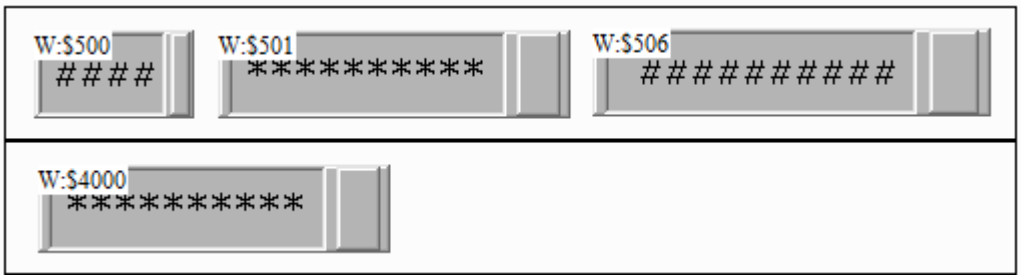
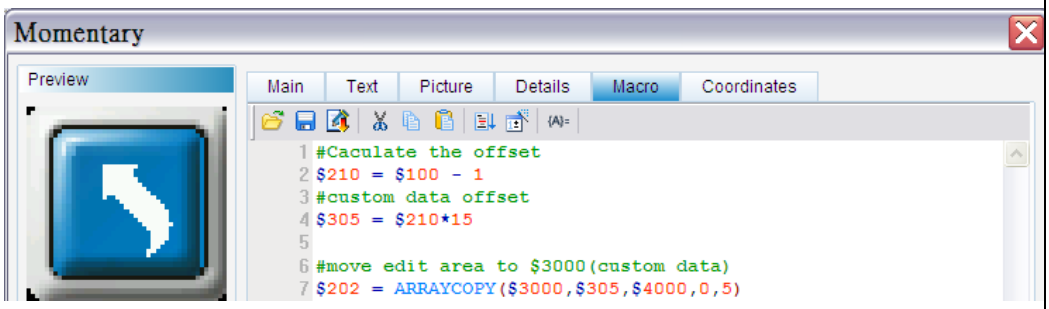


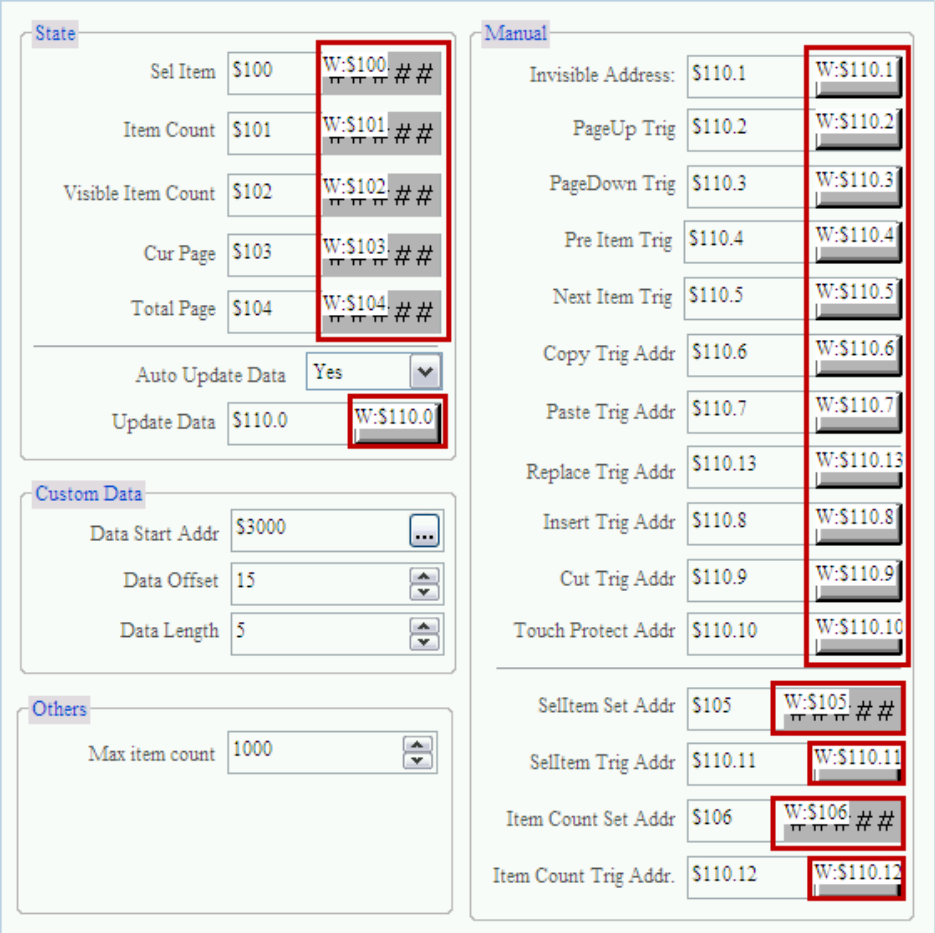
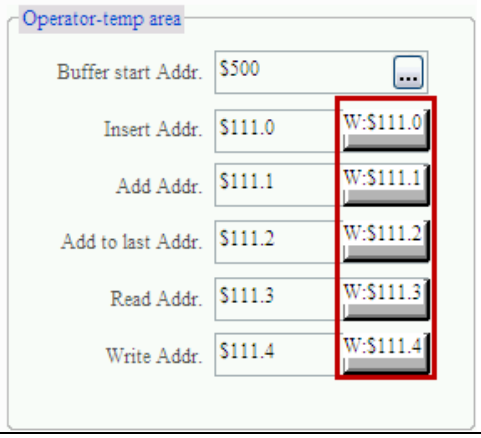
- Step 5: Details setting of controlled address and bit setting are shown as below.

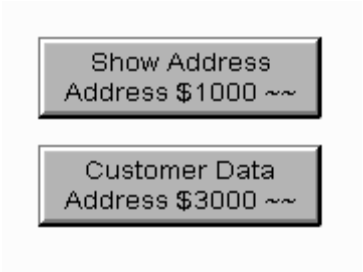
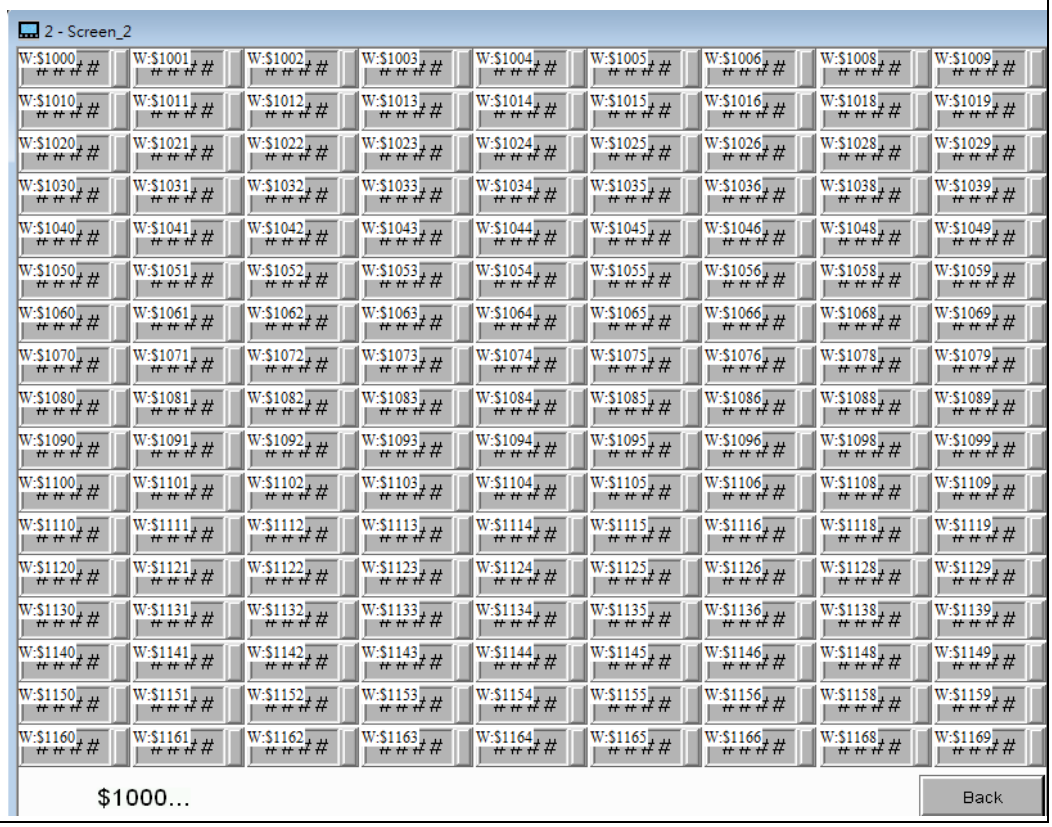


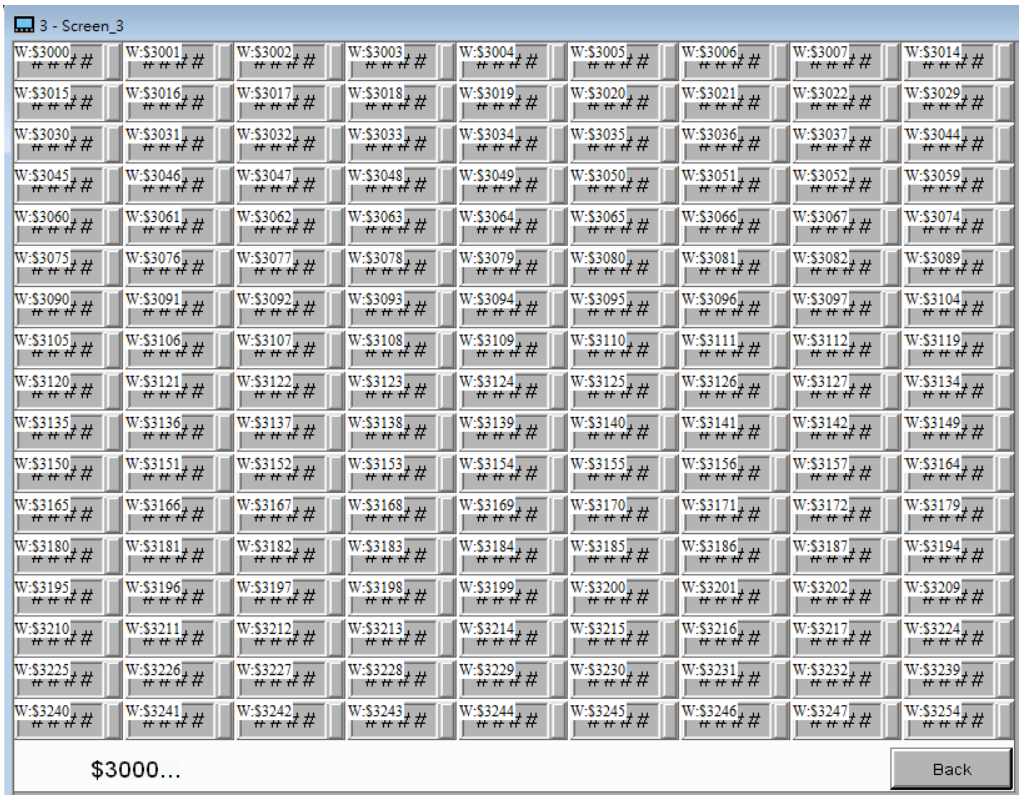
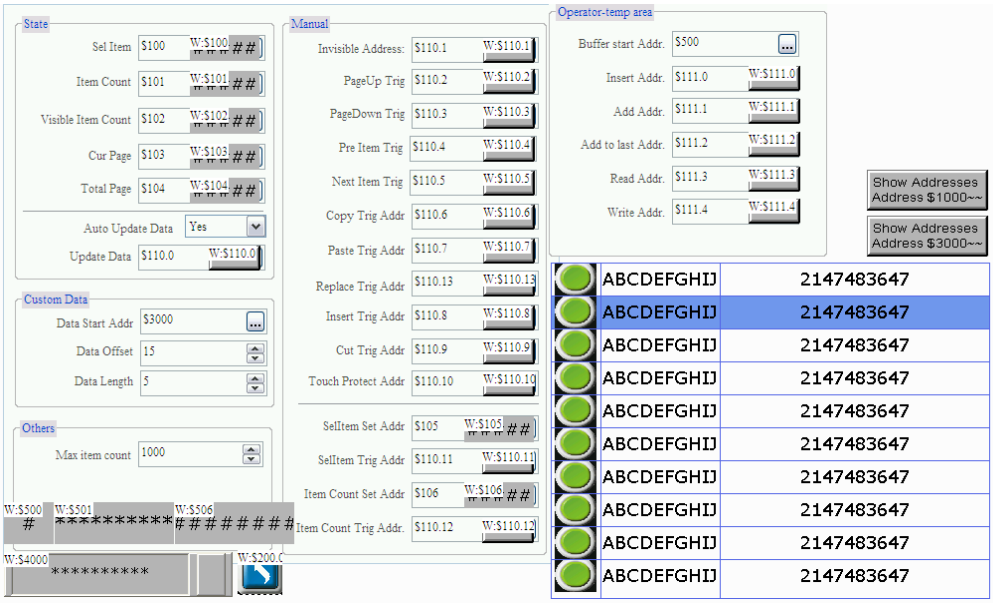
- Step6、Set Details-2 address as below.

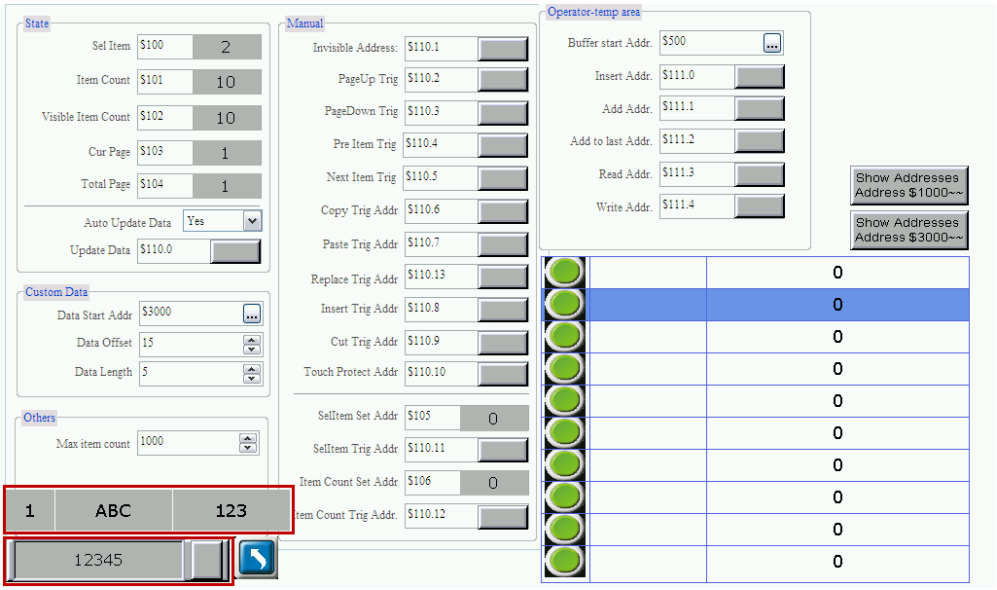
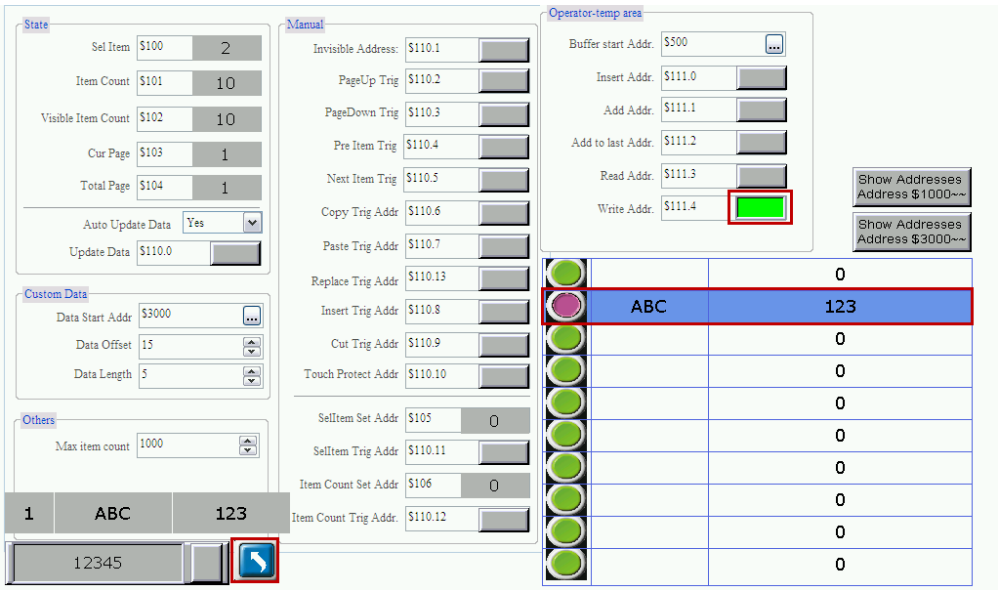
Description of GridBox Table 19-3-1 Description of GridBox	
	 ➢ Step 7: The data address starts from $3000 and the interval offset is 15 Words, which means each data length is 5 Words. 

Description of GridBox Table 19-3-1 Description of GridBox	
Create the numeric entry element and character entry element	➢ Step 1: Create two numeric entry elements with the address of $500 and $506 respectively on the screen. And create one character entry element with the address of $501. These three elements are the temporary memory. Users can write the data saved in temporary memory into the Grid Box through the operating bit. ➢ Step 2: Create one character entry element with the address of $4000 on the screen. This element is the editing area that can define the address. Users can write the data in the editing area into the Grid box through the macro. 
Create the element of momentary button	➢ Step 1: Create the address ($200.0) for one momentary button on the screen.【On Macro】will copy the data from editing area to the selected items of GridBox. 

Description of GridBox Table 19-3-1 Description of GridBox	
Create numeric entry elements from $100 to 106 and maintained button elements from $110.0 to $110.12	➢ Step 1: Create the details setting figures of GridBox on the screen and place the corresponding elements and buttons on it for editing.  

Description of GridBox Table 19-3-1 Description of GridBox	
Create the button for screen changing	➢ Step 1: Create two buttons for screen changing on the screen. Open screen 2 and 3 to view the actual contents in GridBox. 
Create numeric entry element ($1000~$1169)	➢ Step 1: Make screen 2. Display the contents shown in GridBox ($1000, $1001, …). 

Description of GridBox Table 19-3-1 Description of GridBox	
Create numeric entry element ($3000~$3254)	➢ Step 1: Make screen 3. Display the content set by users shown in GridBox ($3000, $3001, …). 
Result	➢ When the elements creation is complete, please compile the screen before downloading it into HMI.  ➢ Select the item and edit the data editing area.

Description of GridBox Table 19-3-1 Description of GridBox	
	
Result	➢ Press data moving button and it will show the change on elements.  ➢ Click the screen changing button, 【Element accessing address $1000】to switch the screen to screen 2. Set value of $1019 (hidden value) to 1. Then, the content in the 1st field will be hidden.

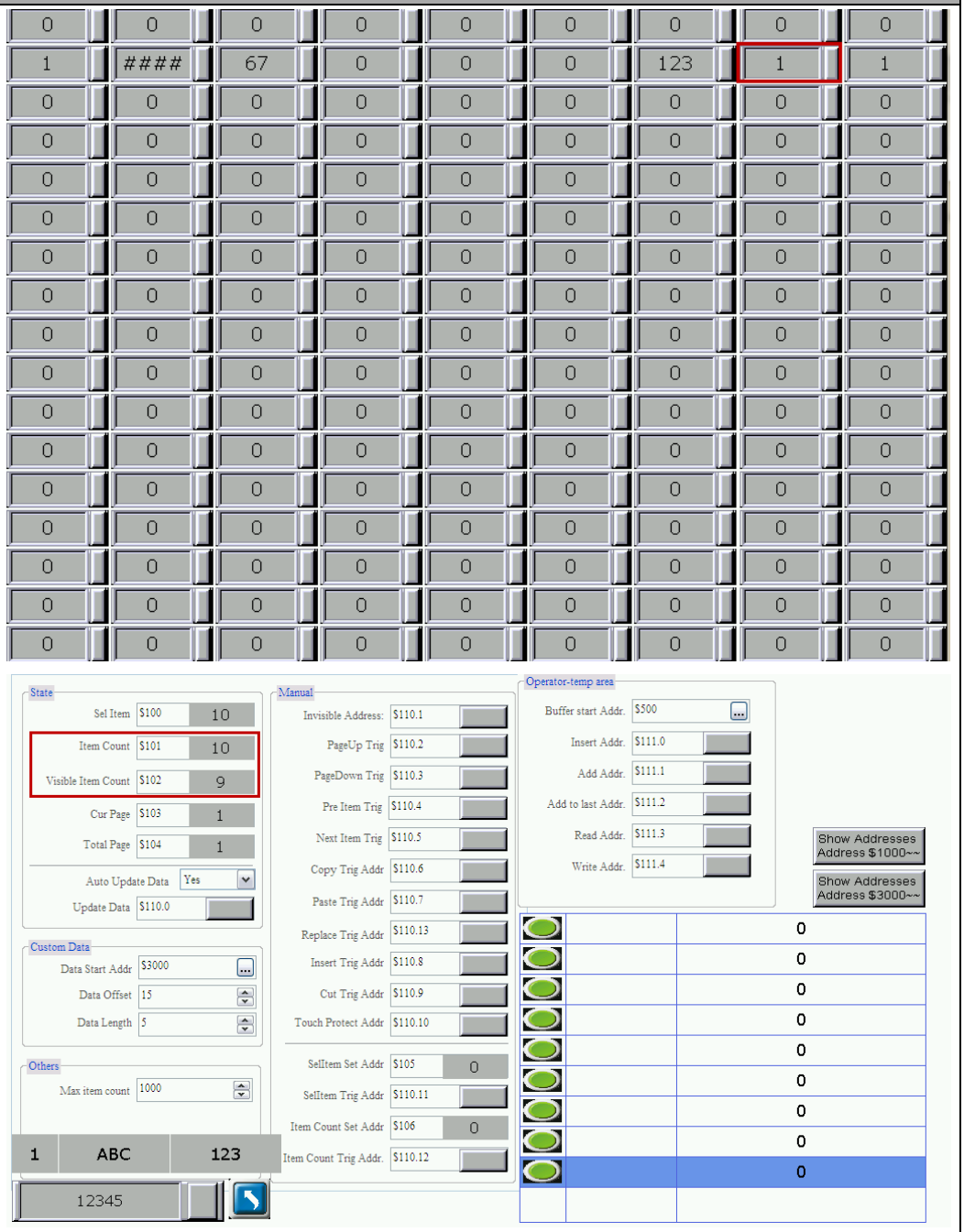
Description of GridBox

Table 19-3-1 Description of GridBox

- Set $1018 (hidden item) in screen 2 to 1. Then, this item will not be displayed and the actual item number will be more than the displayed number.

Description of GridBox

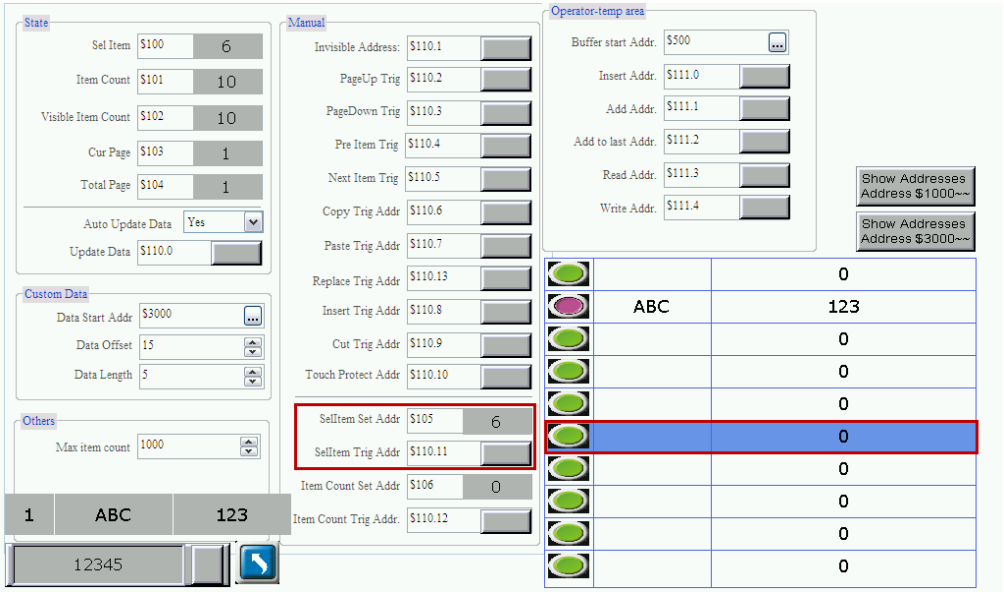
Table 19-3-1 Description of GridBox



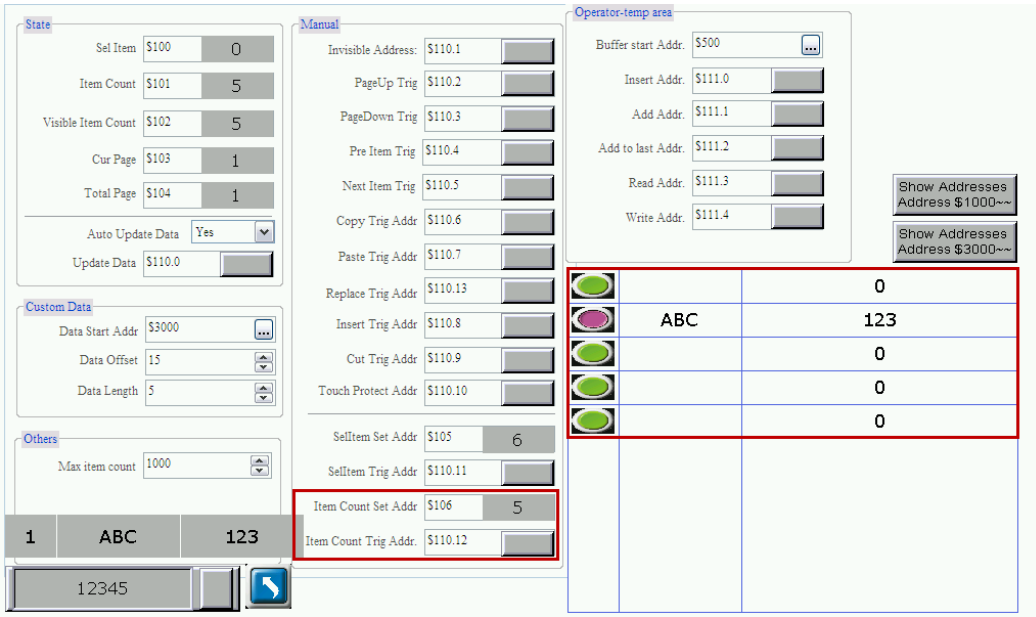
- Set 【SelItem Set Addr】 to 6 and click 【SelItem Trig Addr】. The item will jump to the 6th one.

Description of GridBox

Table 19-3-1 Description of GridBox



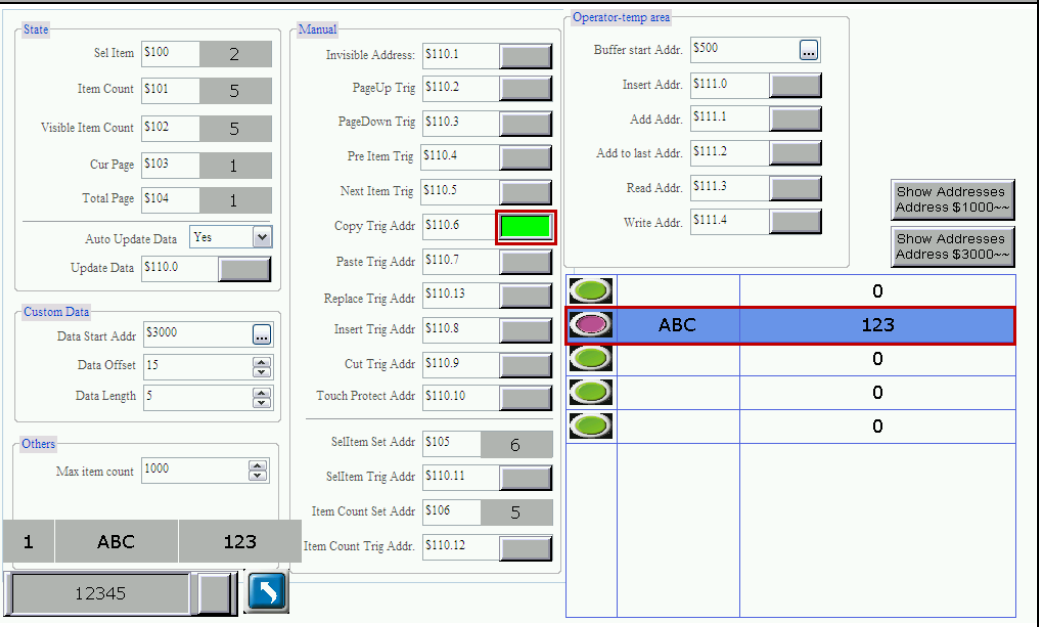
- Set 【Visible Item Count】to 5 and click【Trigger the Visible Item Count】. The displayed item becomes 5 and others will not be shown.

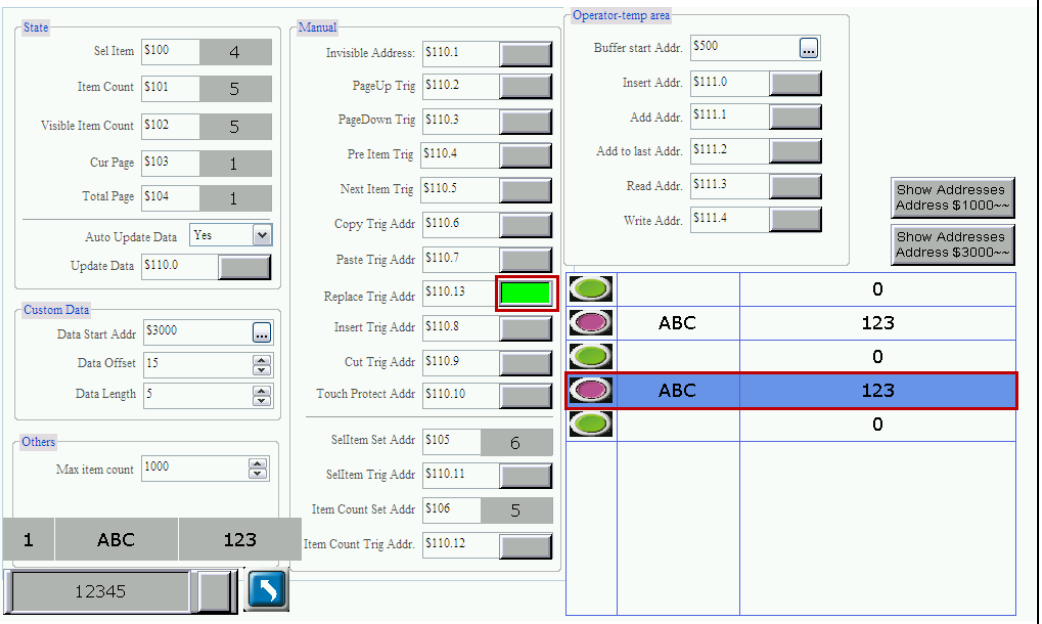


- Select the second item and click on [Copy Trig Addr]. Then, select the fourth item and click on [Replace Trig Addr]. Contents of the second item will be pasted to the fourth item.

Description of GridBox

Table 19-3-1 Description of GridBox





➢ Click [Element Accessing Address $3000] to switch the screen. Users can see the content of the second item had already been pasted to the fourth item.

Description of GridBox

Table 19-3-1 Description of GridBox

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12849	13363	53	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12849	13363	53	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

$3000 ...

Back

Following is the property setting screen after double clicking GridBox

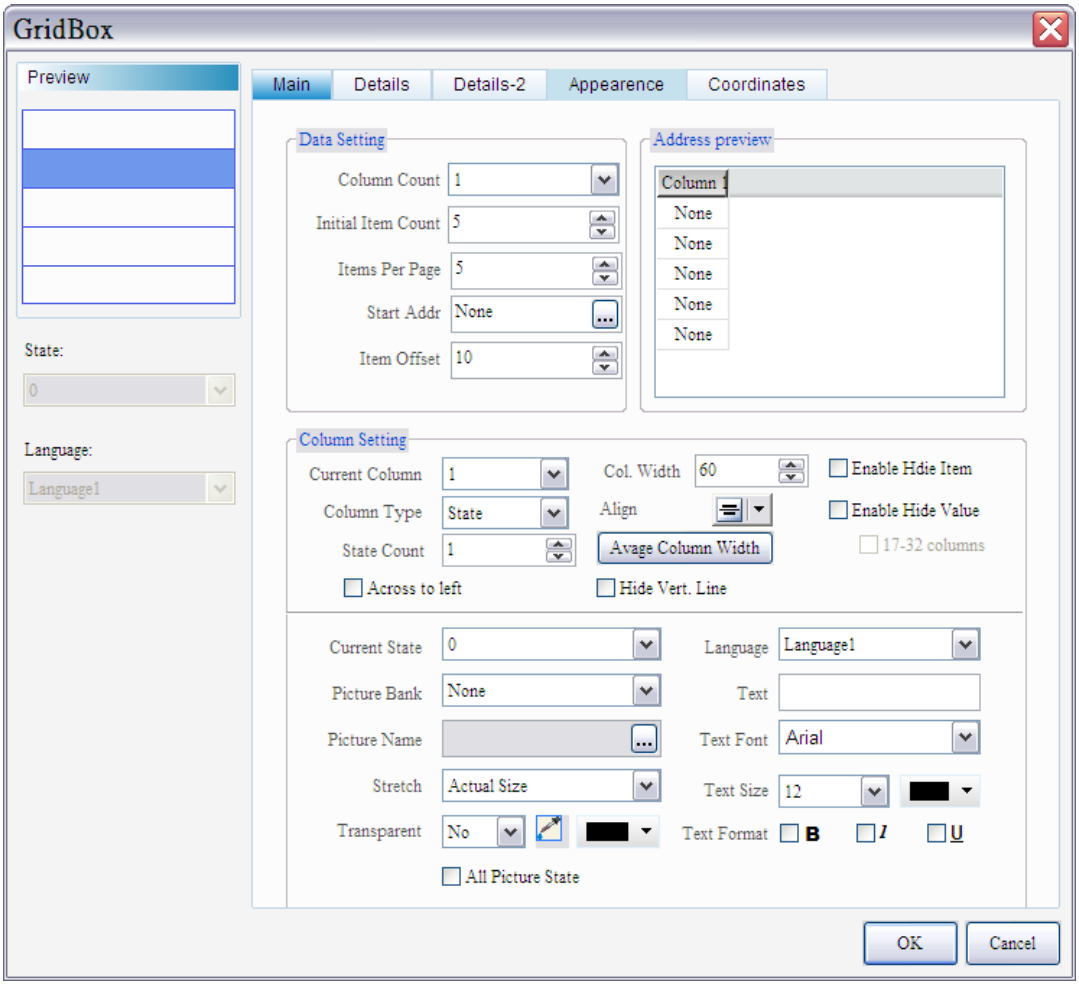


Figure 19-3-1 Properties of GridBox

GridBox	
Function	**Description**
Main	It includes data setting and column setting. Data setting: column count, initial item count, items per page, start address, Item offset. Column setting: current column, column width, column type, align, state count, average column width, enable hide item, enable hide value, hide vertical line, across to left, 17~32 columns . According to different type of column, the required setting format will be different.
Details	It includes the setting of state, custom data, others and manual. State: selected item, actual item number, visible item count, current page, total page, auto update data, and update data. Custom Data: data start address, data offset, and data length. Others: max item count Manual: invisible address, PageUp triggering address, PageDown triggering address, Pre Item Triggering address, Next item triggering address, copy triggering address, paste triggering address, replace triggering address, insert triggering address, delete triggering address, touch protect address, SelItem set address, SelItem trigger address, visible column address, visible count triggering item.
Details-2	Operator template area setting, include buffer start address, insert address, add address, add to last address, read address and write address.
Appearance	It includes the setting of field, style. Field: enable auto number, field width, font size and text color. Style: sets grid line color, background color, selected color and determines to show the grid line or not.
Position	X-Y coordinates values, width and height setting

Table 19-3-2 Function page of GridBox Element

◆ Main

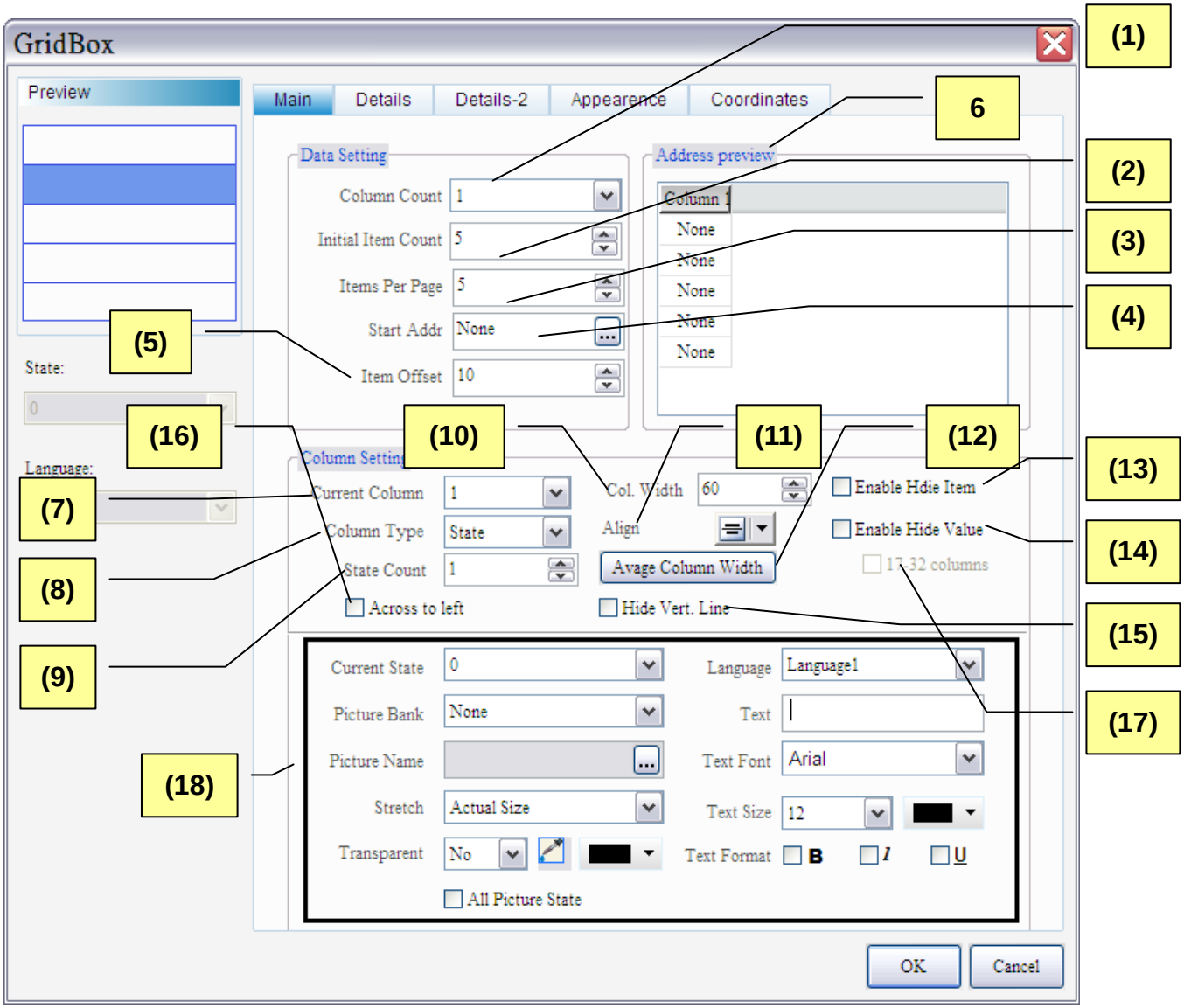
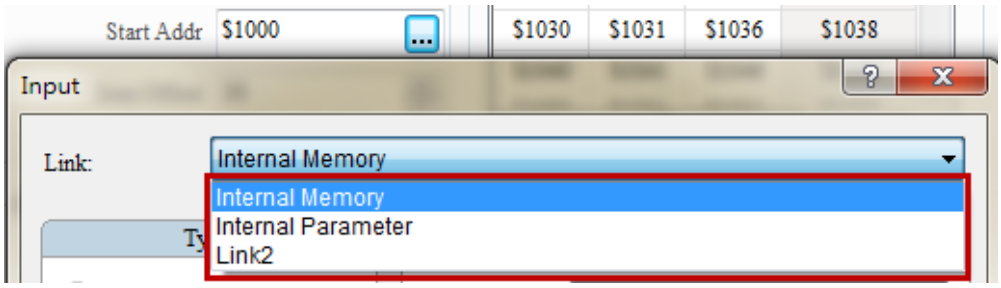
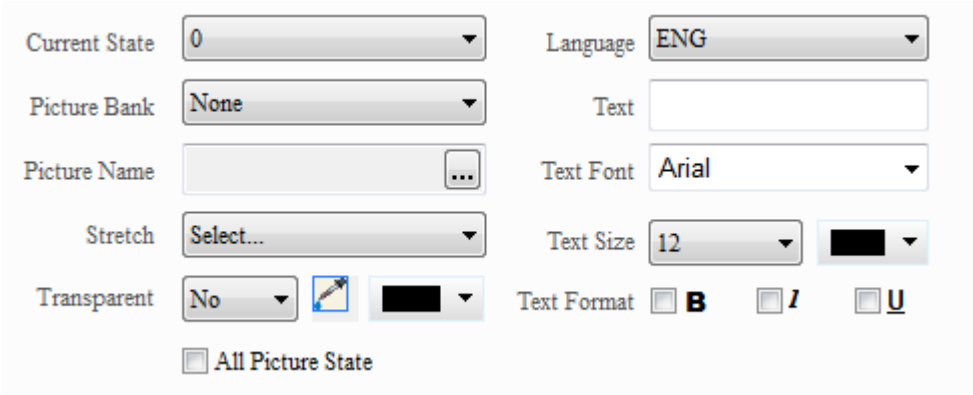
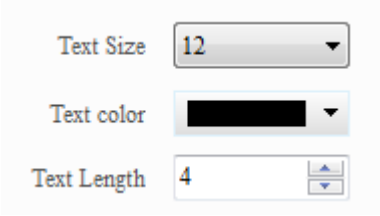
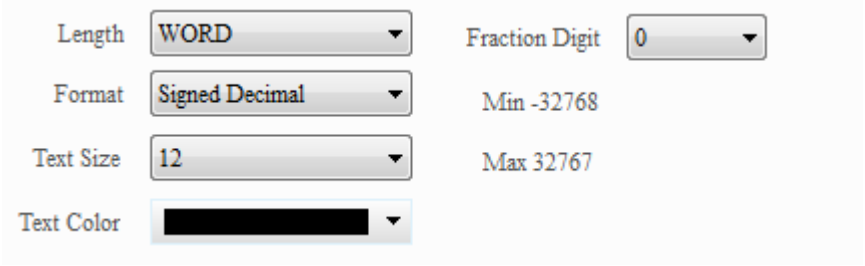
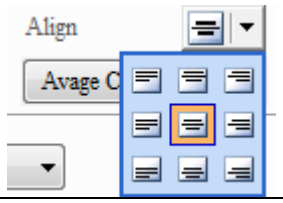
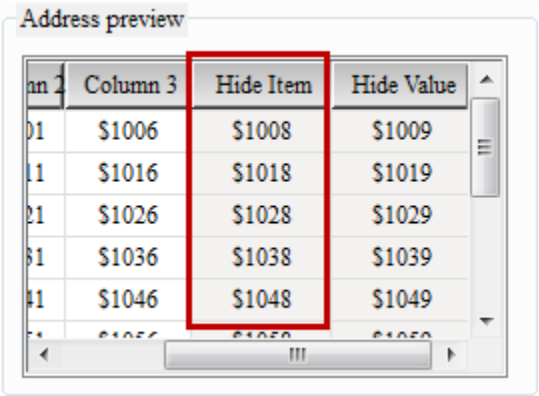
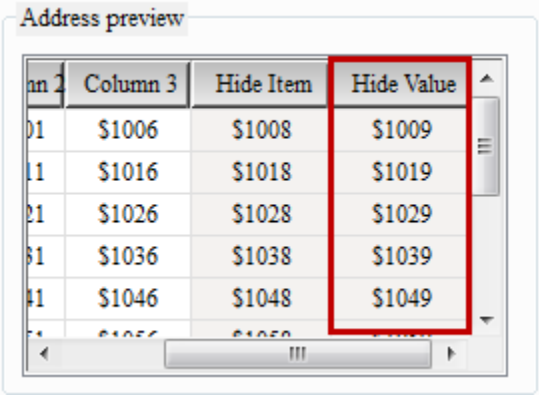
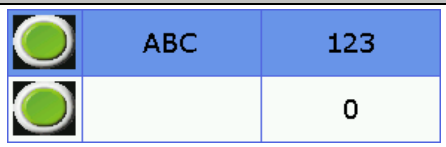
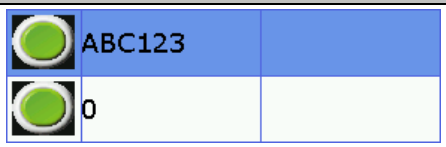
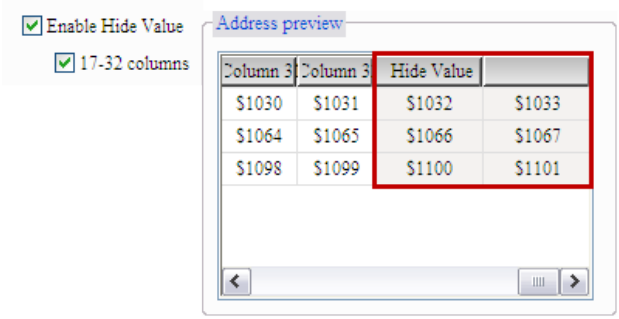


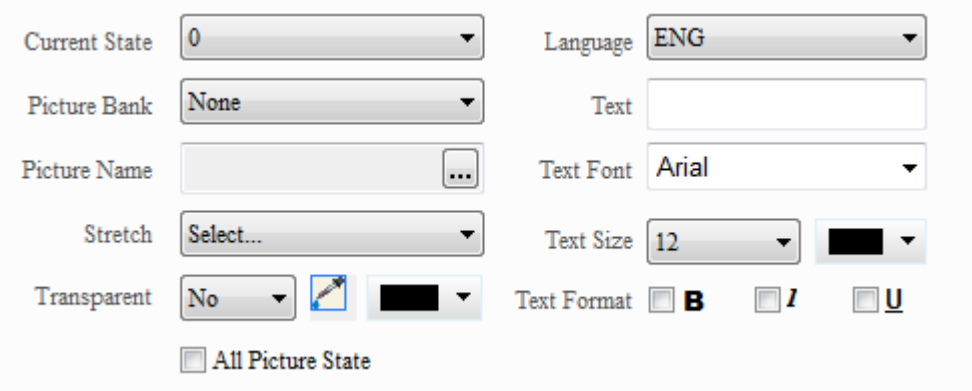
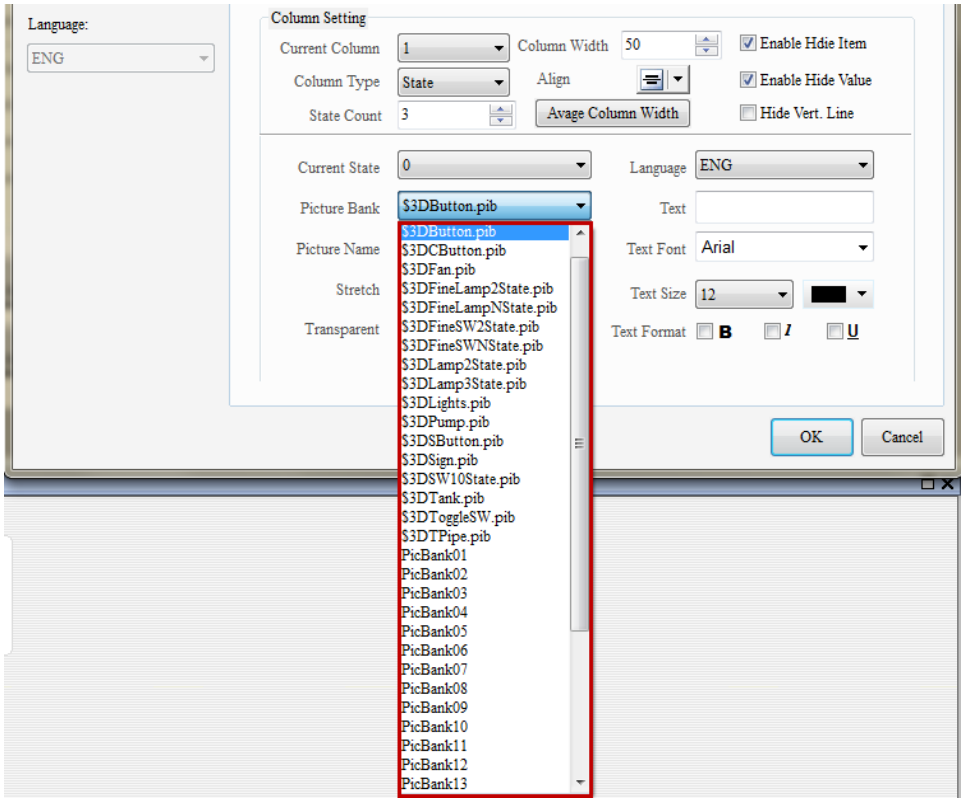
Figure 19-3-2 GridBox Element Main Properties

No.	Property	Function
(1)	Column Count	➢ The column number used by GridBox element can be set up to 32. ➢ If the column total number is more than the item offset, a warning message of address overlap will pop up.
(2)	Initial Item Count	➢ The total number of initial item can be set up to 1000.
(3)	Item Per Page	➢ The displayed item number in single page can be set up to 100.
(4)	Start address	➢ Address the element starts to read. ➢ It supports the selected controller address (Word) and the address of internal register (Word).

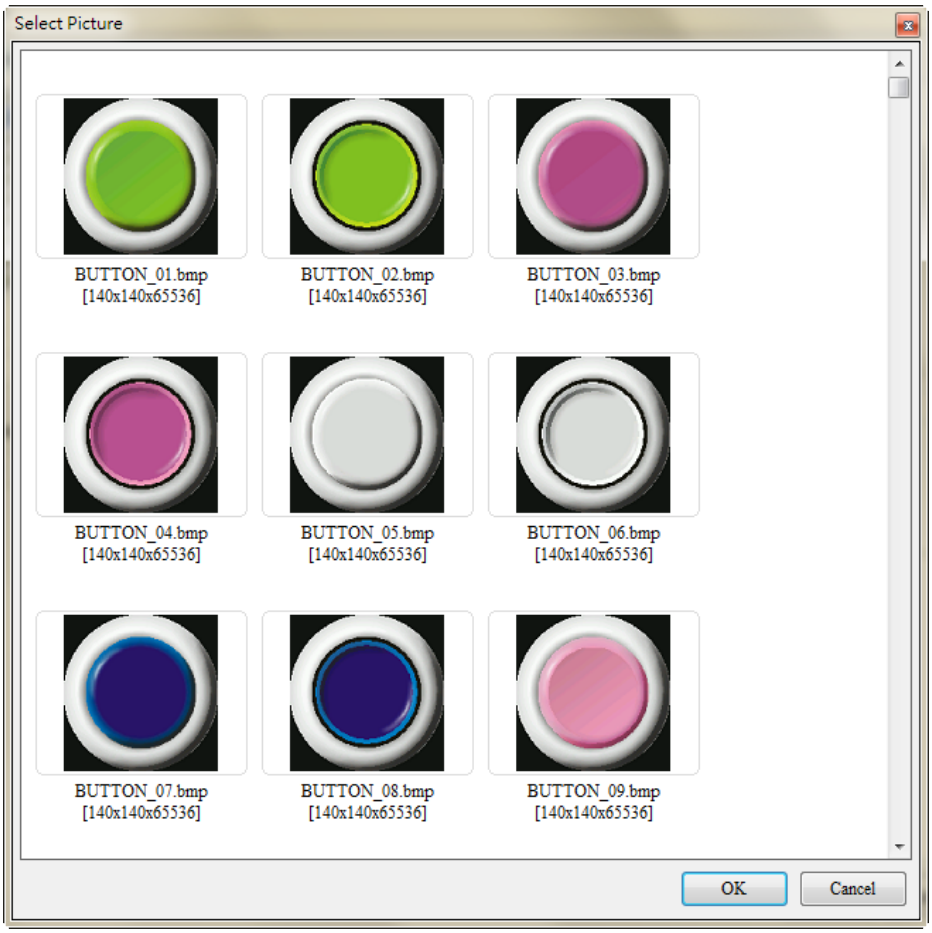
No.	Property	Function
		
(5)	Item Offset	➢ Item offset can be set up to 10000. ➢ If item offset is more than the column count, a warning message of address overlap will pop up.
(6)	Address Preview	➢ According to the property setting, it displays the start address of each unit.
(7)	Current Column	➢ Select the column that needs to be edited. The maximum number should not exceed the setting of【Column Count】.
(8)	Column Type	➢ It has the type of State, String and Numeric. ➢ State: status display; String: string display; Numeric: numeric display ➢ If select State, setting of No. (16) is shown as below:  ➢ If select String, setting of No. (16) is shown as below:  ➢ If select Numeric, setting of No. (16) is shown as below: 

No.	Property	Function
(9)	Column Count	➢ Column count will be shown only when selecting 【State】 in 【Column Type】. ➢ It can set up to 256 states to display state type. This would influence the displayed number of【Current State】. If state count is set to 3, then the number in current state would be 0, 1, 2.
(10)	Column Width	➢ Width of editing column can be set to 65535 at most.
(11)	Align	➢ It can be used to adjust the alignment type to the cell. 
(12)	Average Column Width	➢ This function can average the width of the column.
(13)	Enable Hide Item	➢ When this function is activated, the corresponding address of hide item will be shown in【Address Preview】. When the address 【Hide Item】from any item is not 0, then, that item will not be shown. 
(14)	Enable Hide Value	➢ When this function is activated, the corresponding address of hide value will be shown in【Address Preview】. ➢ Each bit of the address in【Hide Value】determines the display of the corresponding column. For example, when bit0 is On, it means data in the first column of the item will not be showed. When bit1 is On, it means data in the second column of the item will not be showed.

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td></td><td></td><td> 
</td></tr>
<tr><td>(15)</td><td>Hide Vertical Line</td><td>➢ Enable this function. The vertical line in the right side will be hidden in the table.</td></tr>
<tr><td>(16)</td><td>Across to Left</td><td>➢ Function of Across to Left enable the displayed text to flush left in the previous column.
➢ This function merges two columns of data. When applying this function, please select the columns to be merged. For example, if you wish to merge the data of column 2 and 3, remember to select column 2 and 3 before enabling the function of Across to Left.
<table>
<tr><th>Across to Left is disabled</th><th>Across to Left is enabled for column 2 and 3.</th></tr>
<tr><td> 
</td><td> 
</td></tr>
</table></td></tr>
<tr><td>(17)</td><td>17~32 Columns</td><td>➢ Grid Box now supports up to 32 columns for the hide value.
➢ Check [17 ~ 32 columns], two addresses are provided for the hide value. The first address corresponds to column 1 ~ 16 and the second one corresponds to column 17 ~ 32.
 
</td></tr>
<tr><td rowspan="2">(18)</td><td rowspan="2">Column Data</td><td>➢ Edit the details setting of the selected field in【Current Column】</td></tr>
<tr><td>➢ <u>【Current Column】is State</u></td></tr>
</table>

No.	Property	Function
	Setting	 ➢ **Text related setting**: It includes the setting of text font, text size, text color, text format and the displayed text, bold, italic or underline. ➢ **Multi-language**: If multiple languages are added, users can select the displayed information. ➢ **Picture Bank**: Preset the picture bank to None. If users desire to setup the picture display, select from the drop-down list of built-in picture bank. 

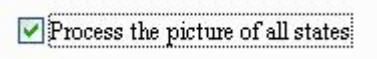
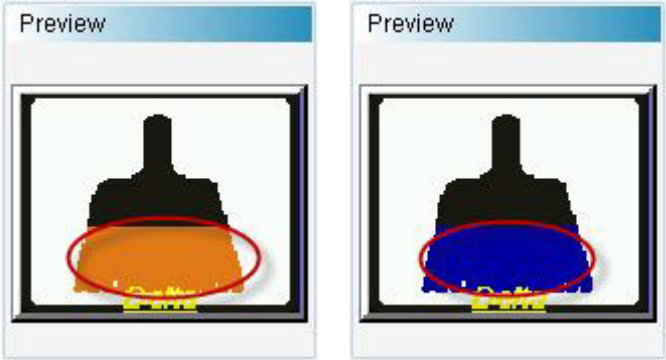
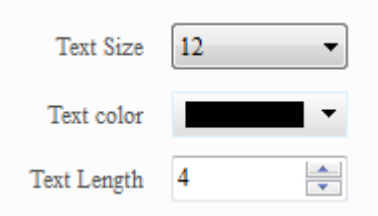
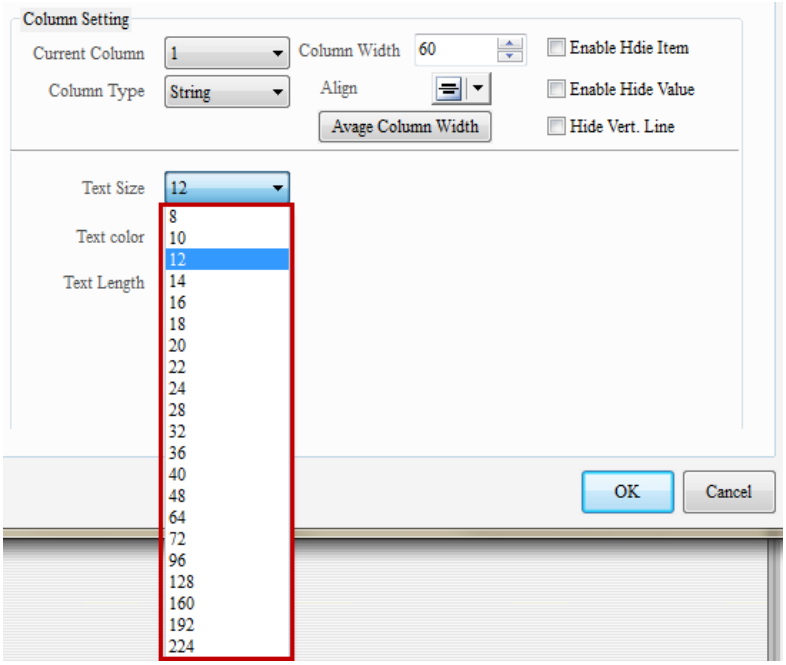
No.	Property	Function

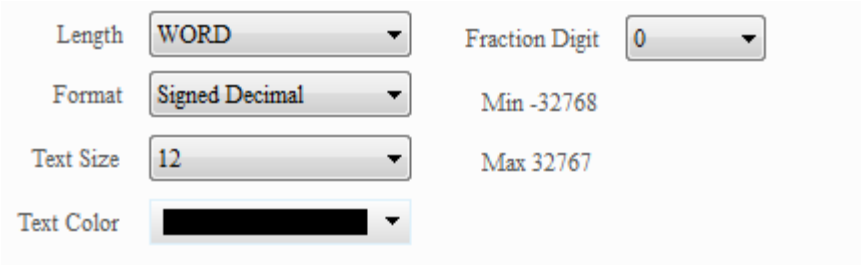
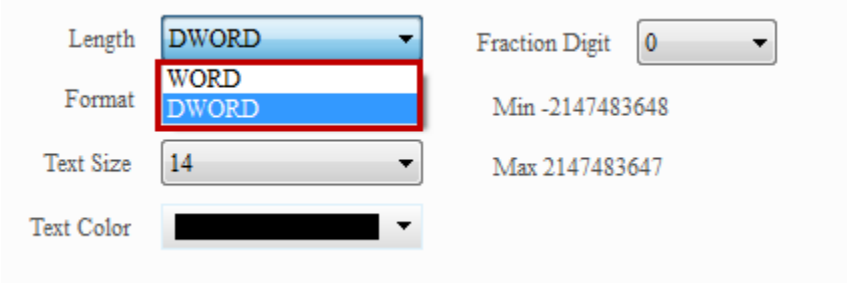
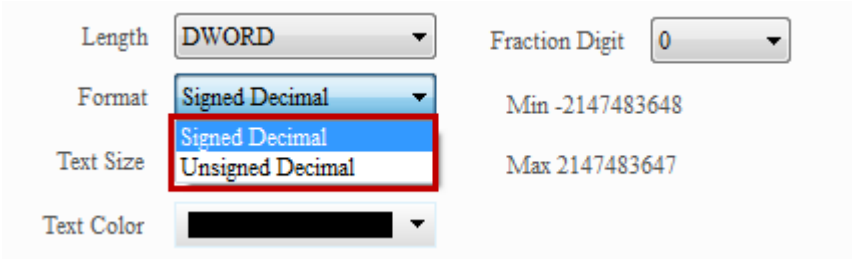


- Three types of extended mode are provided, including Stretch All, Stretch 1:1 and Actual Size.

Stretch All	Stretch 1:1	Actual Size
It means the element displayed area will fill with the picture.	It means the picture will be shown according to the aspect ratio.	It means regardless the size of the element, the picture will be shown in actual size in element displayed area.

- If users choose “Process the picture of all states”, it means the element is assumed to have multiple states values and the picture might not be extended to the whole area. Through this function, users can process all pictures at one time.

No.	Property	Function
		 ➢ With this function, users can specify one color of the picture and turn it into transparent. It means if check the icon and click on the orange part of the broom, the orange part will become transparent, which means the color will be identical with the foreground color. 
		➢ **【Current Column】is String**  ➢ It can set text size, text color and text length. 
		➢ **【Current Column】is Numeric**

No.	Property	Function
		 ➢ The length has two types, Word and DWORD.  ➢ No matter the user chooses Word or DWORD, it only supports Signed Decimal and Unsigned Decimal.  ➢ If the length of fractional digits is Word, its setting range is from 0 to 5; if the length is DWORD, its setting range is between 0 and 10.

◆ Details

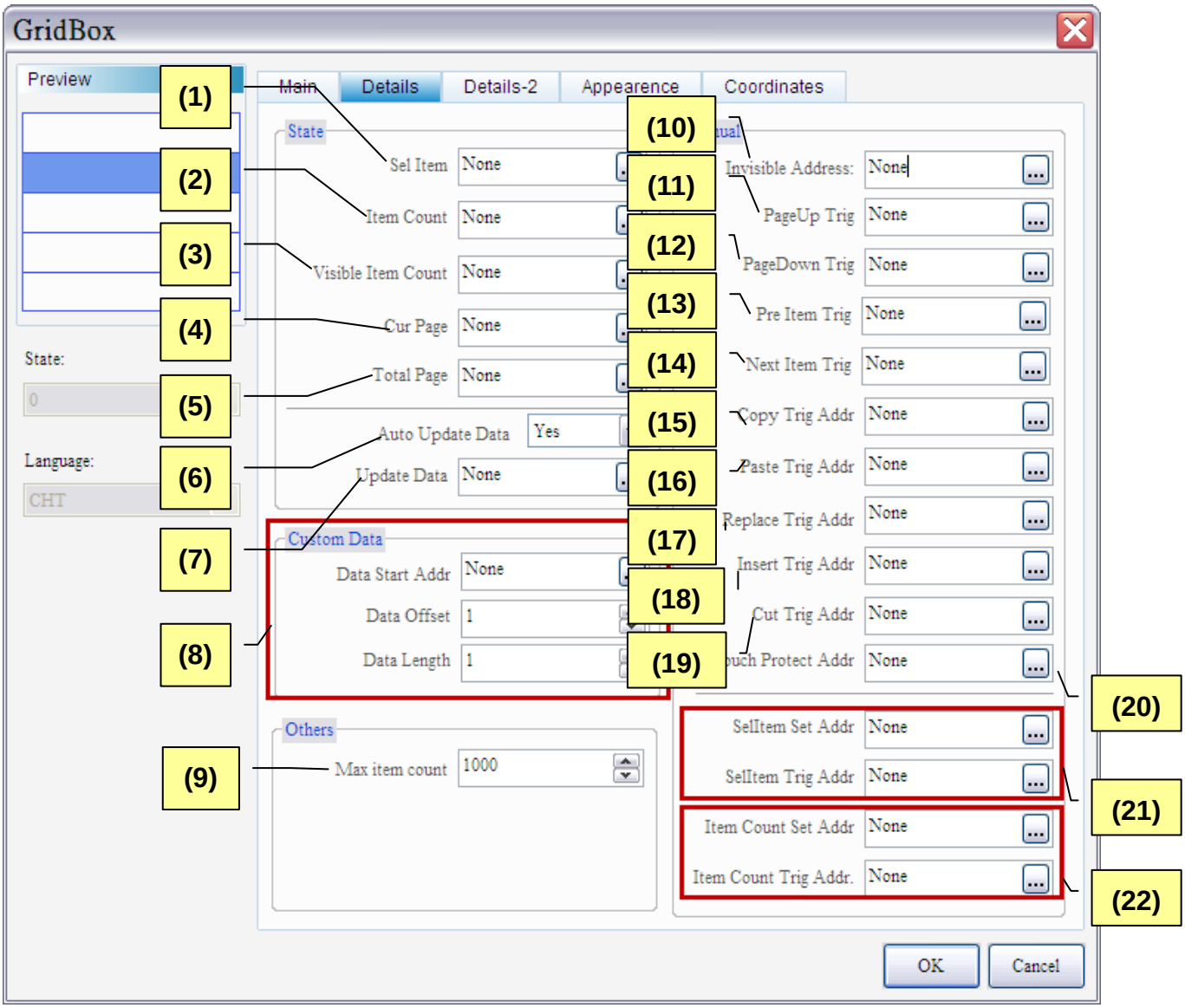
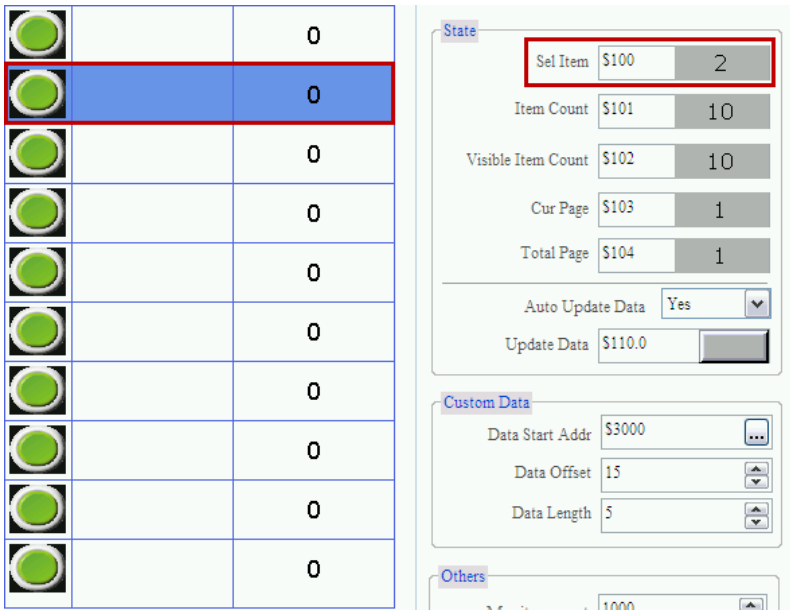
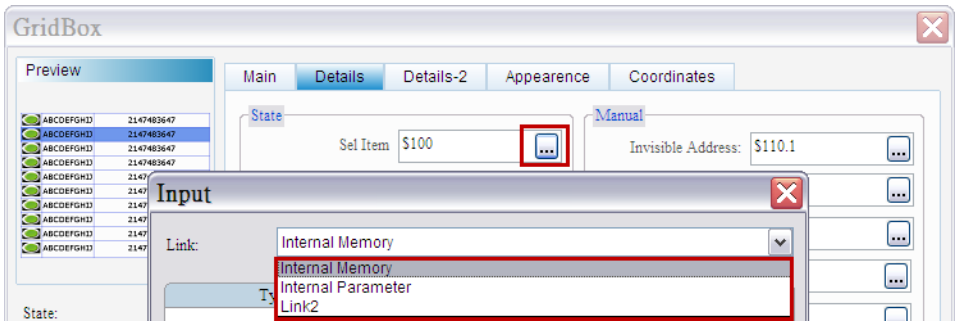
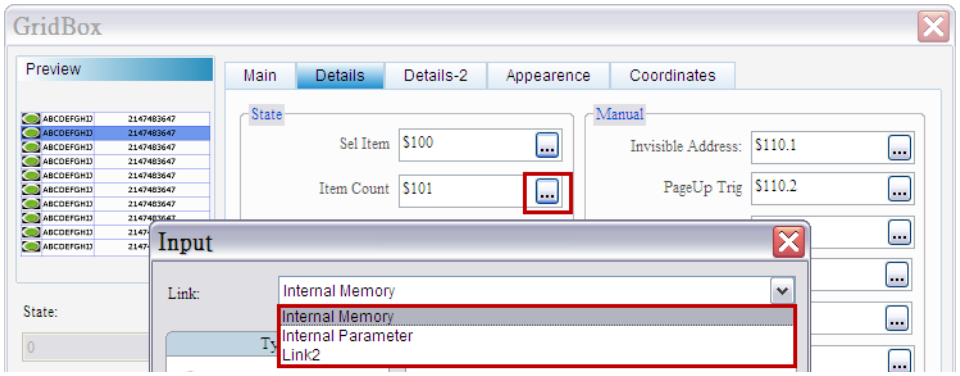
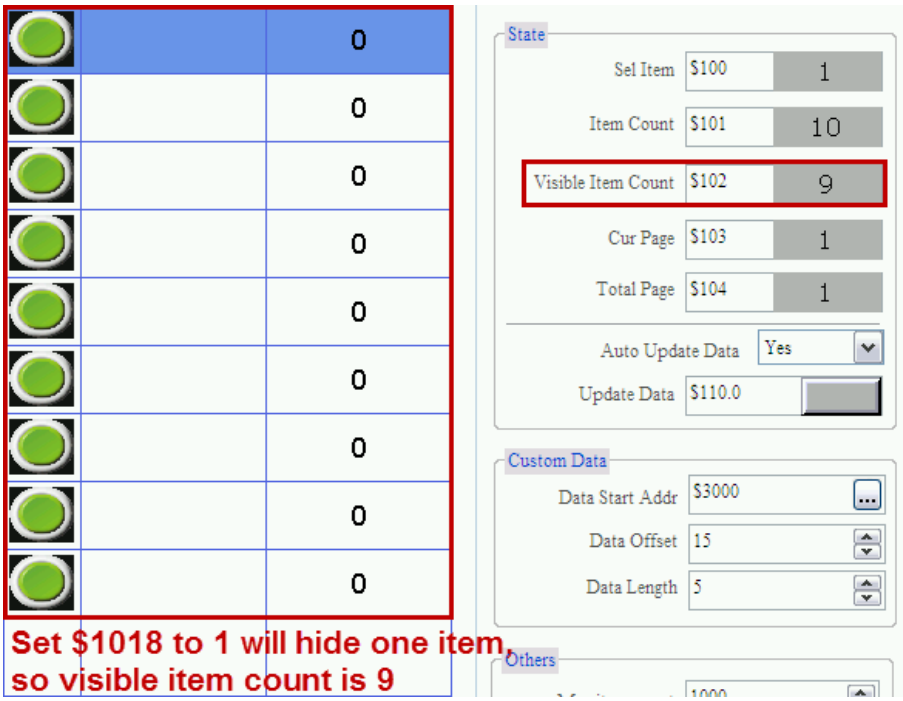
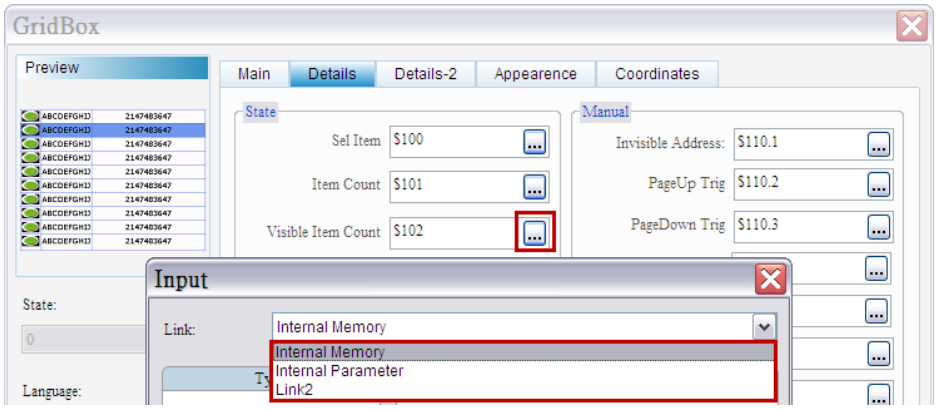
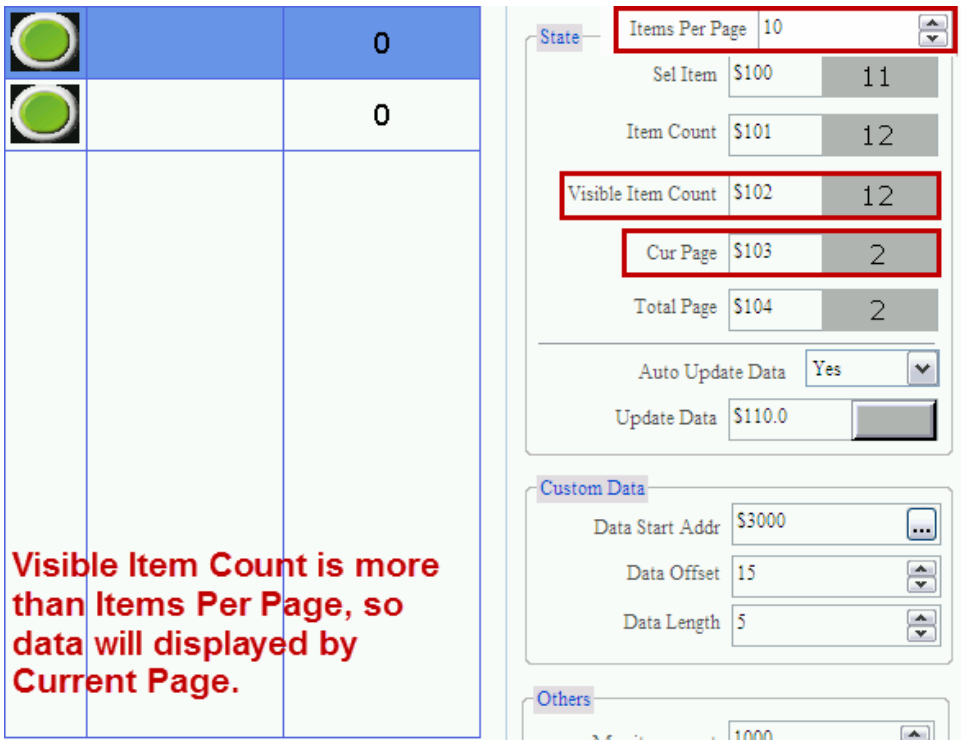
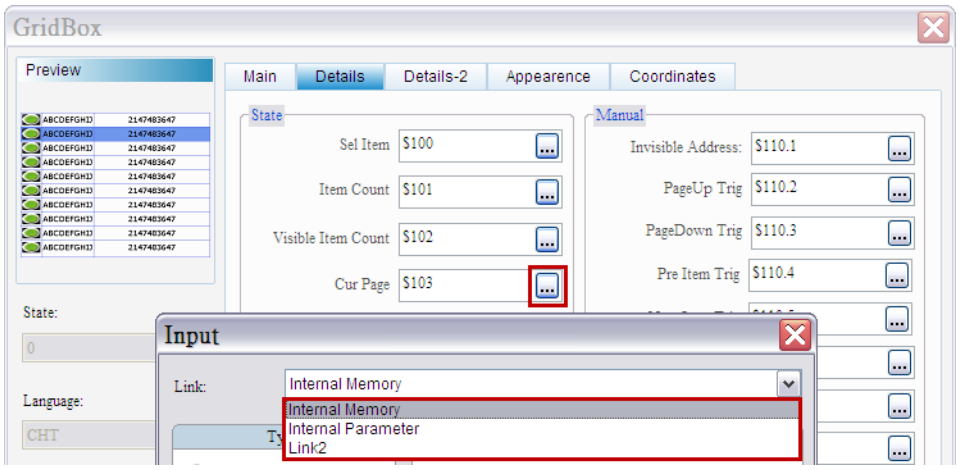


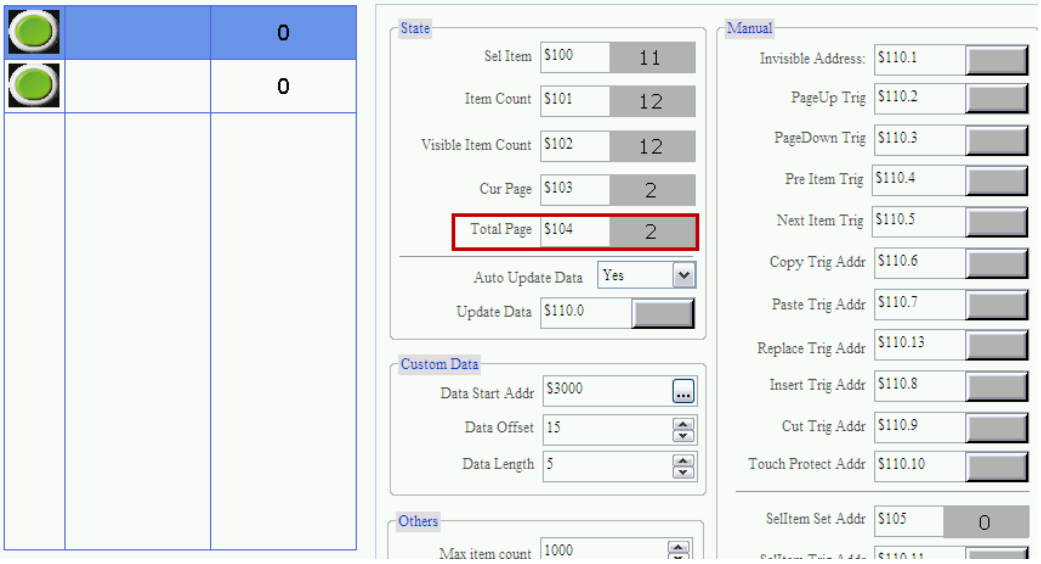
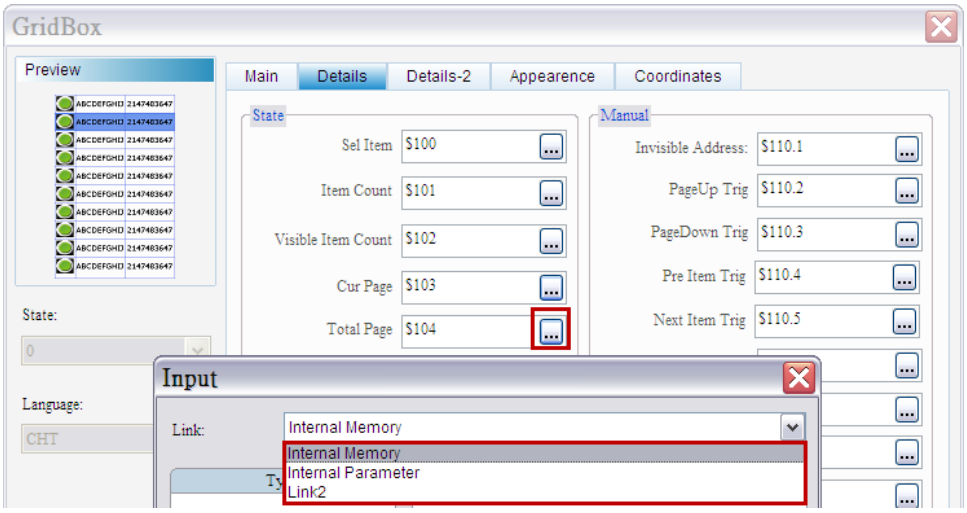
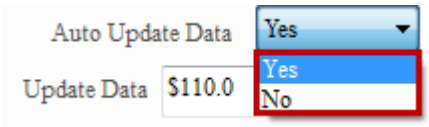
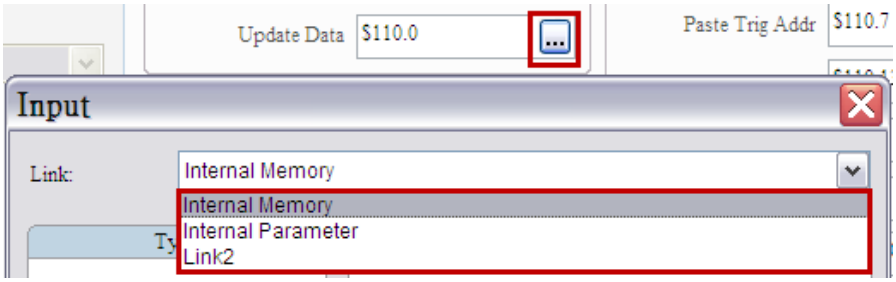
Figure 19-3-3 Grid Box Details Properties Page

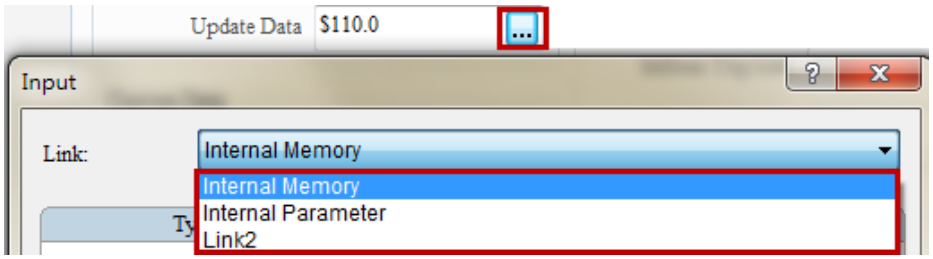
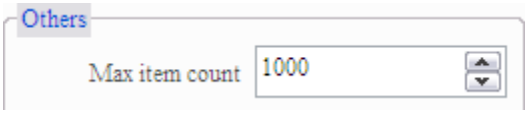
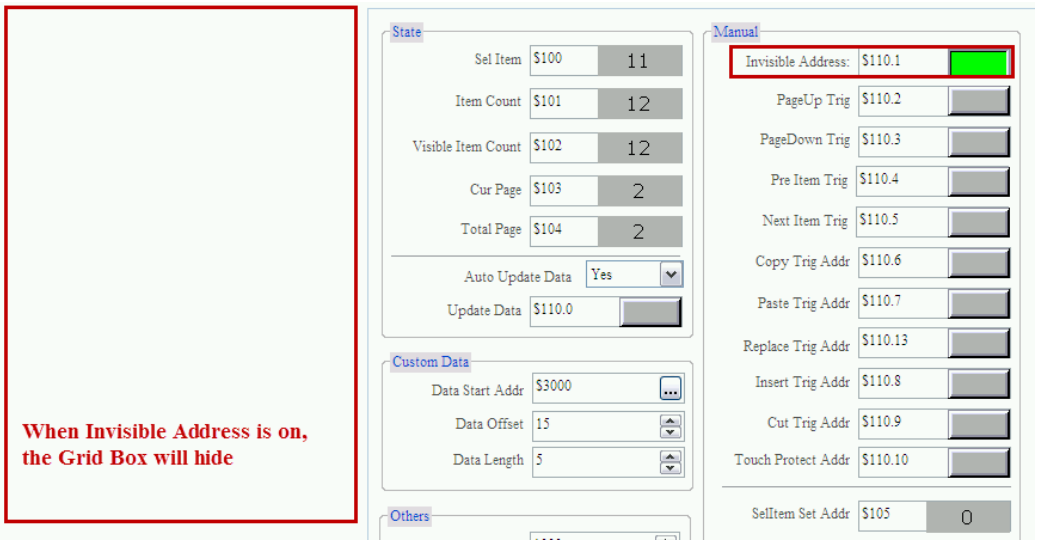
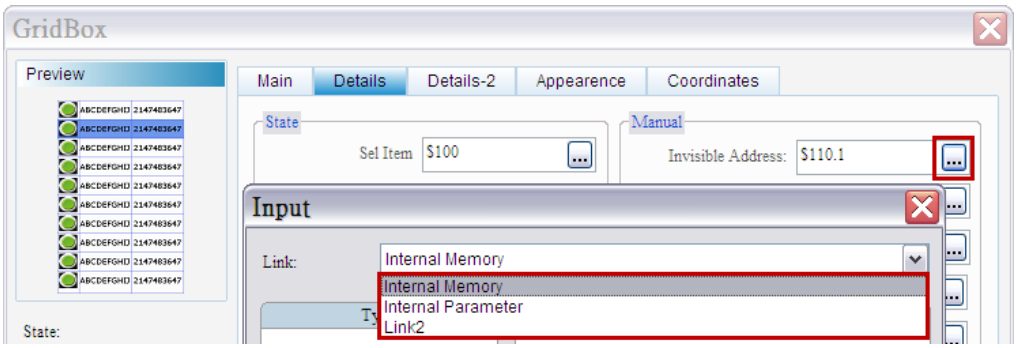
No.	Property	Function
(1)	Selected Items	➢ Select the item number. ➢ When selecting the item in the second row, the value shown in selected item is 2.

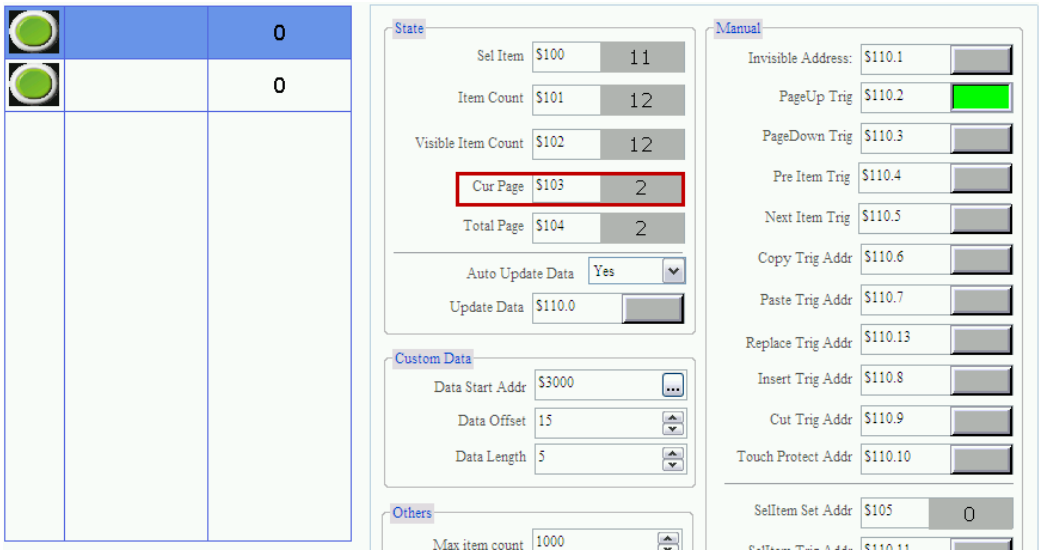
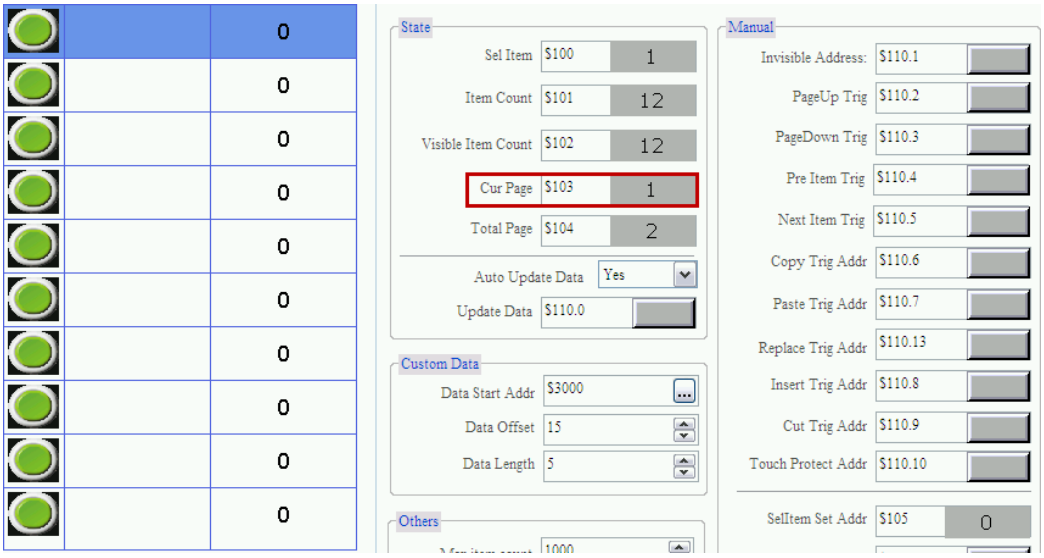
No.	Property	Function
		 ➢ It supports controller address (Word) and the address of internal register (Word). 
(2)	Item Count	➢ Displays the total number of actual item.

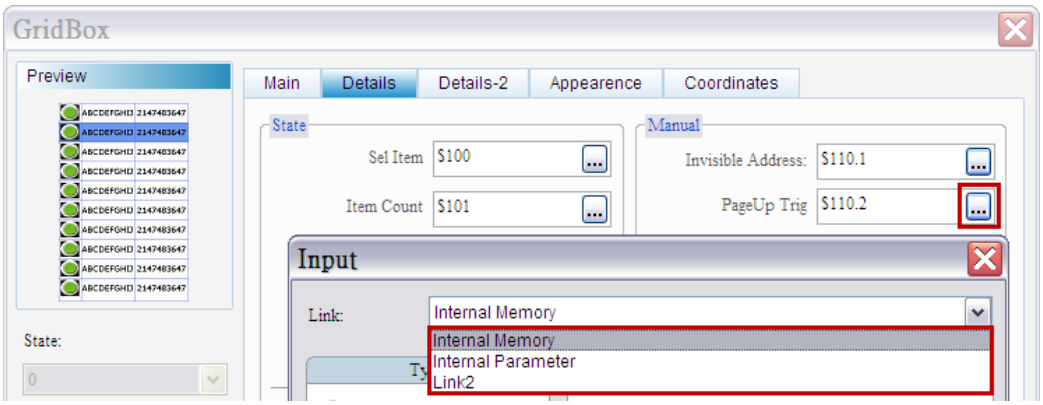
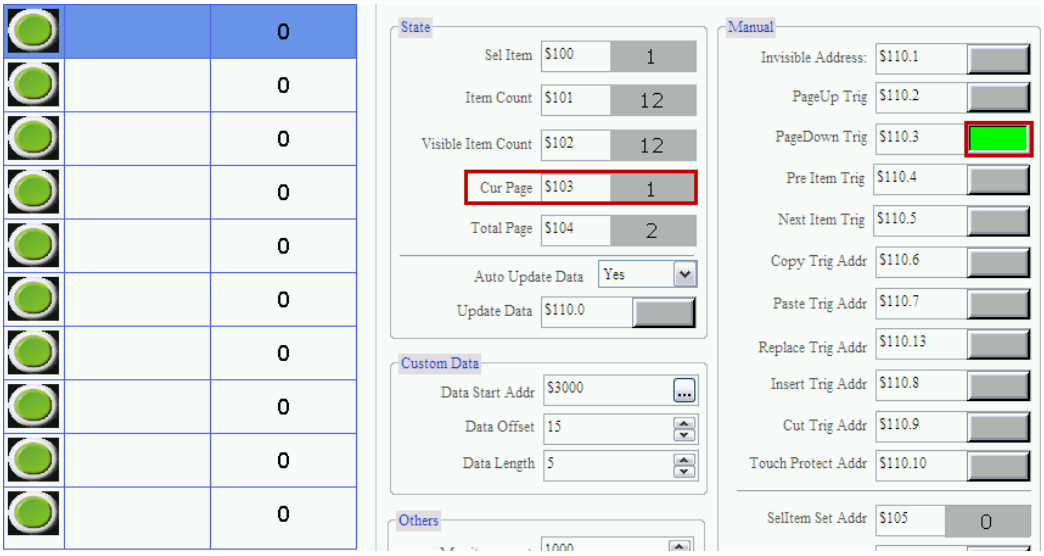
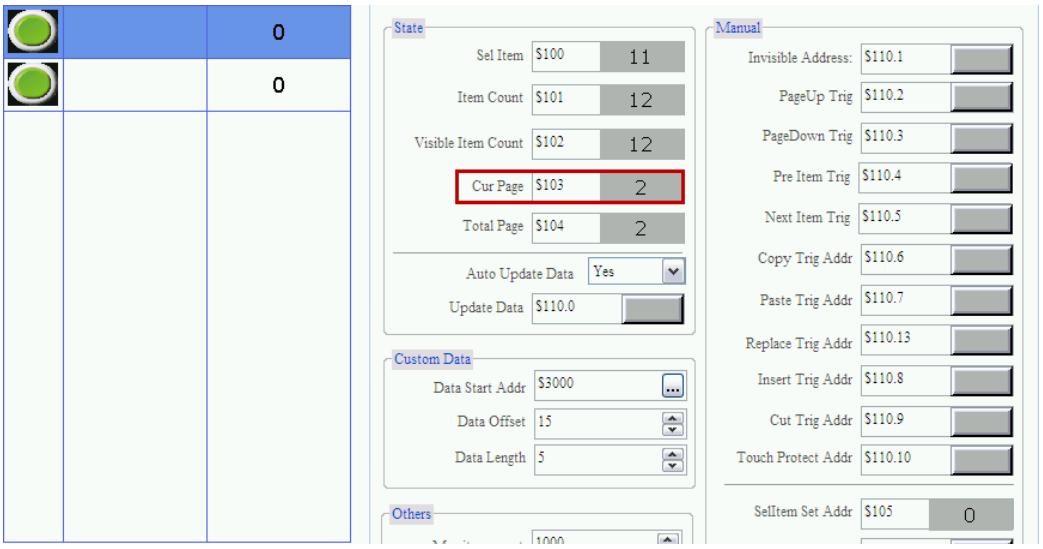
No.	Property	Function
		➢ It supports controller address (Word) and the address of internal register (Word). 
(3)	Visible Item Count	➢ The visible item count is the deduction of item count from hide item count.  ➢ It supports controller address (Word) and the address of internal register (Word). 
(4)	Current	➢ When value of 【Visible item count】 is bigger than【Item per page】,

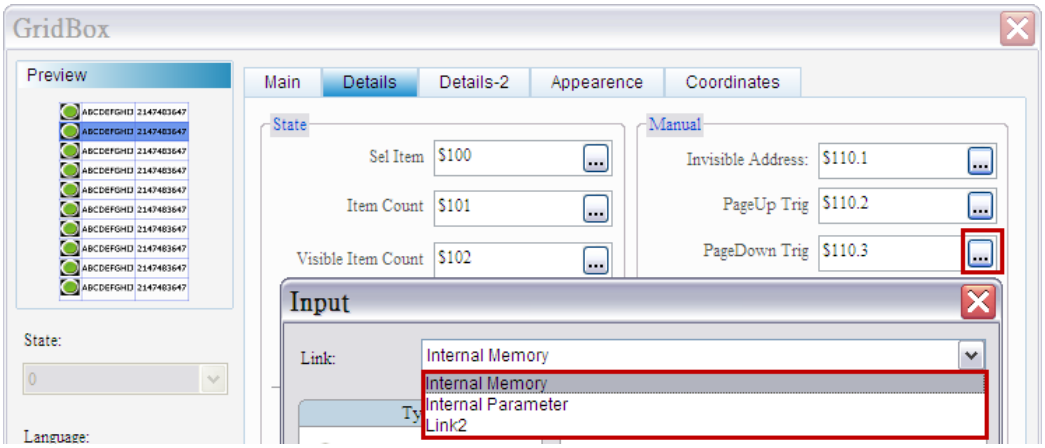
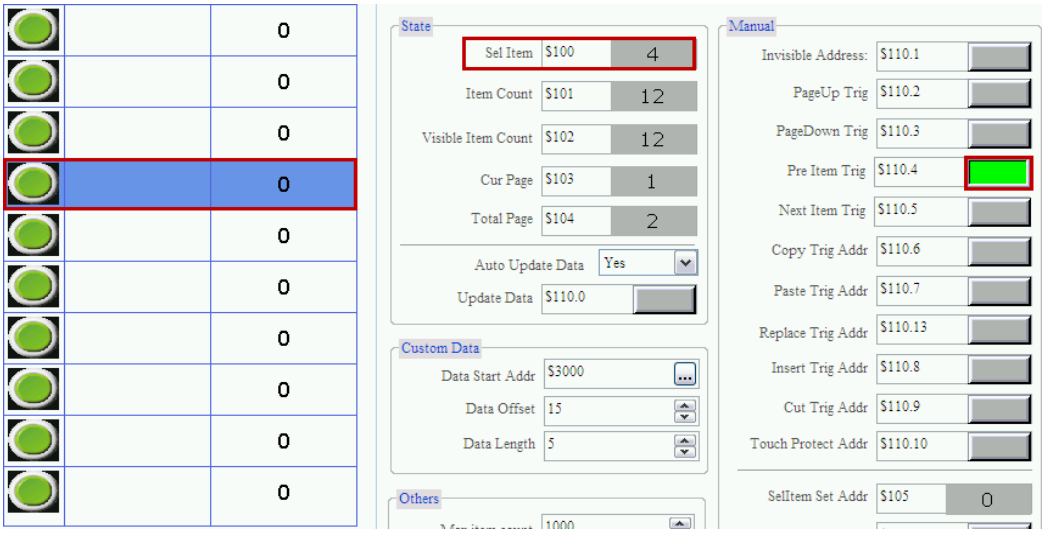
No.	Property	Function
	Page	the data will be shown in paging. The property value is displayed according to the value shown in current page.  ➢ It supports controller address (Word) and the address of internal register (Word). 
(5)	Total Page	➢ The element displays total page number used by displayed items.

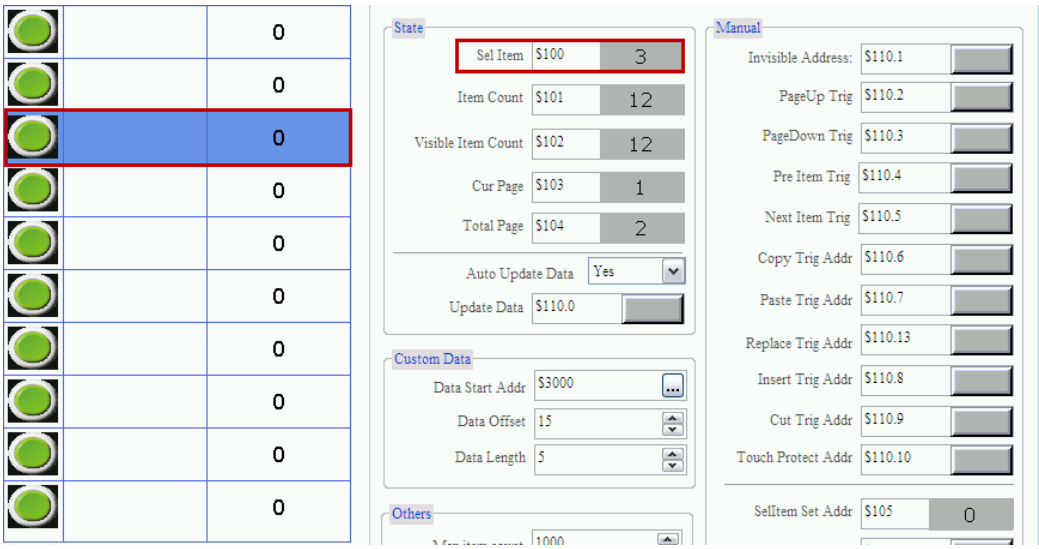
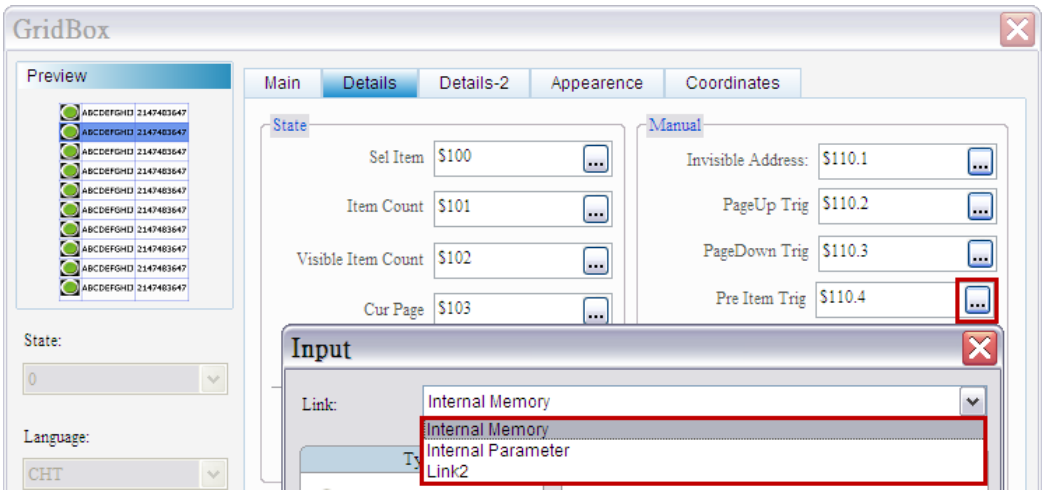
No.	Property	Function
		 ➢ It supports controller address (Word) and the address of internal register (Word). 
(6)	Auto Update Data	➢ Select【Yes】, it auto updates the data. Select【No】, it updates the data only when【Update Data】 is triggered. 
(7)	Update Data	➢ When the bit of update data is On, the displayed content will be updated. 
(8)	Custom	➢ It has data start address, Data offset and data length.

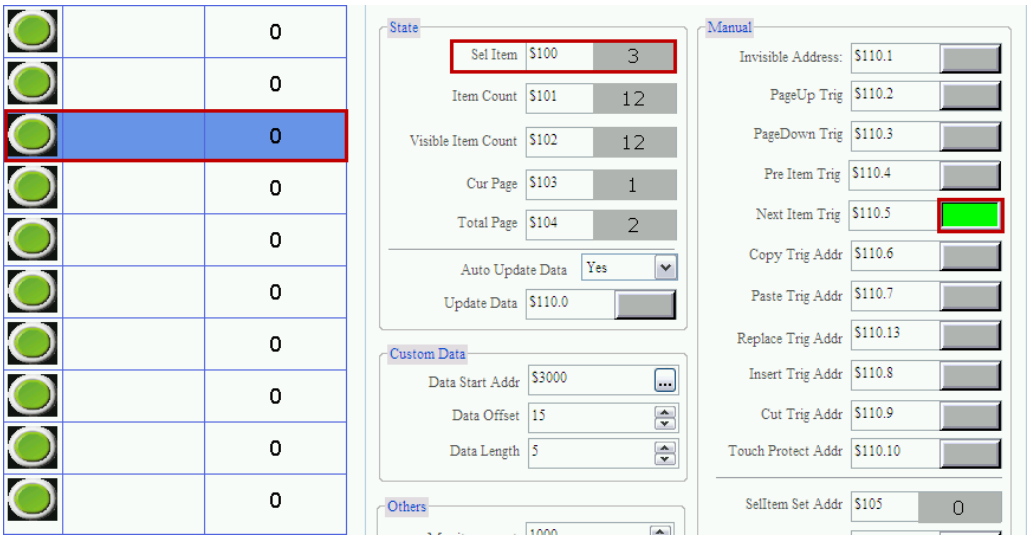
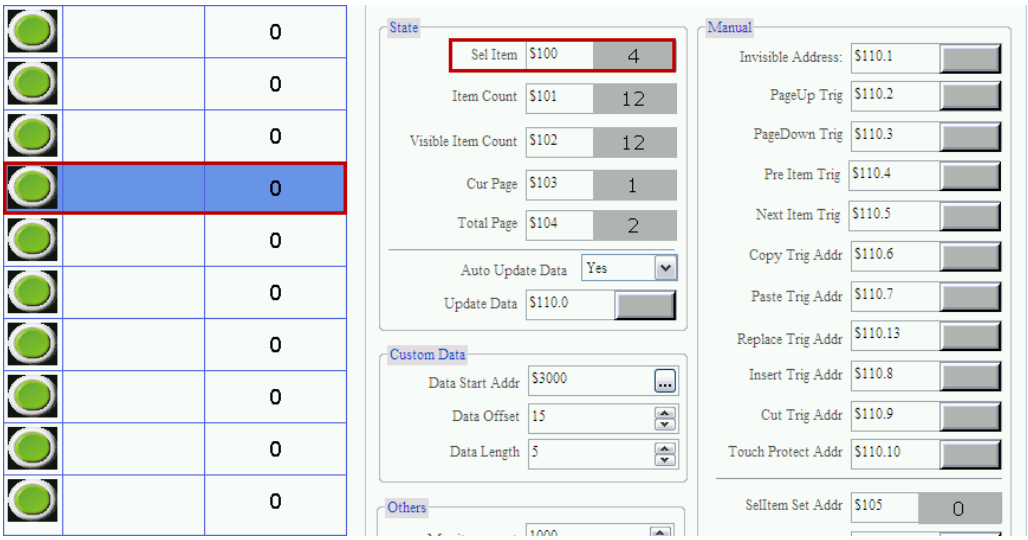
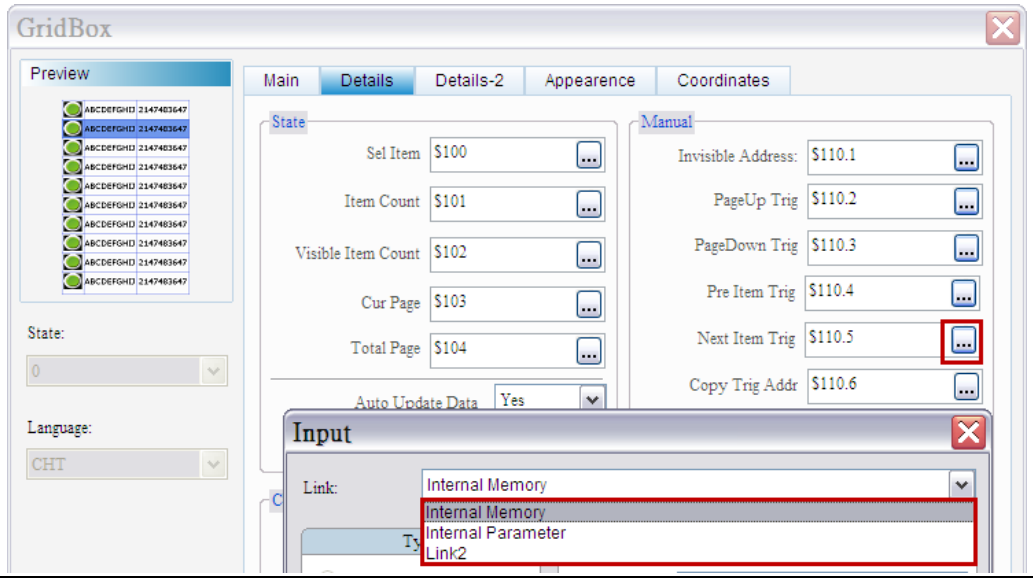
No.	Property	Function
	Data	➢ Users can customize another data block and the data will be changed accompanies elements editing. ➢ Data start address: It supports controller address (Word) and the address of internal register (Word). 
(9)	Max item count	➢ Max. item count is used to set up the newly added items in Grid Box. ➢ The maximum value of Max. item count is 1000. 
(10)	Invisible Address	➢ When the invisible address is On, the Grid Box will be hidden.  ➢ It supports controller address (Bit) and the address of internal register (Bit). 
(11)	Page Up	➢ When the bit of triggering address on previous page is on, it

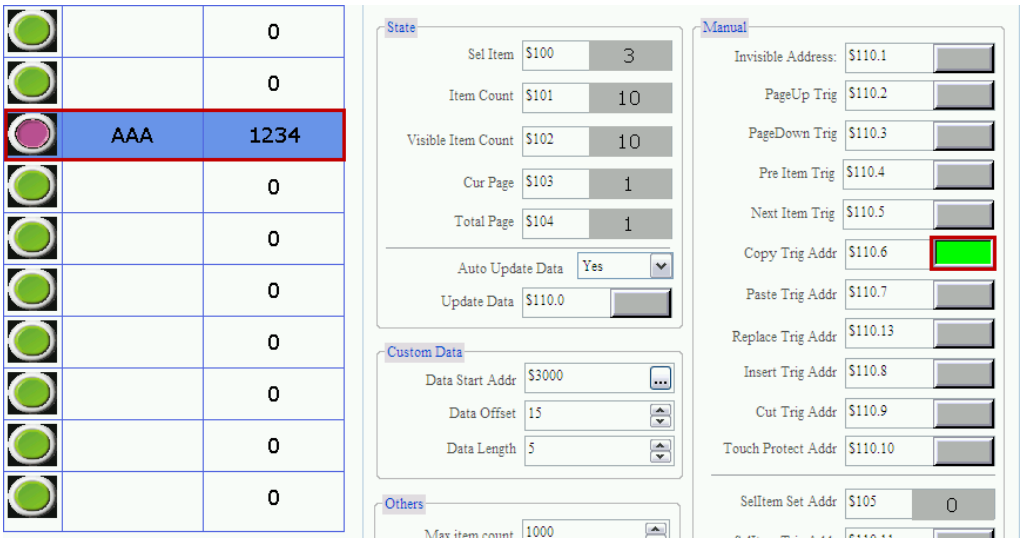
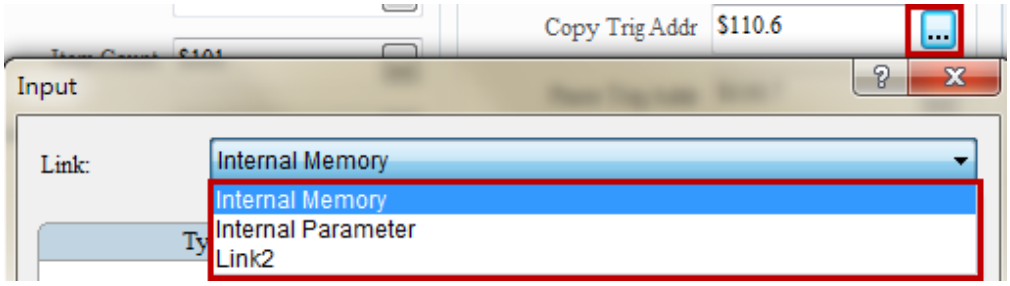
No.	Property	Function
	Triggering Address	switches to the previous page and the bit is off. ➢ When the bit of triggering address on previous page is not on, page 2 is displayed as the current page. When it is on, the current page would be page 1.   ➢ It supports controller address (Bit) and the address of internal register (Bit).

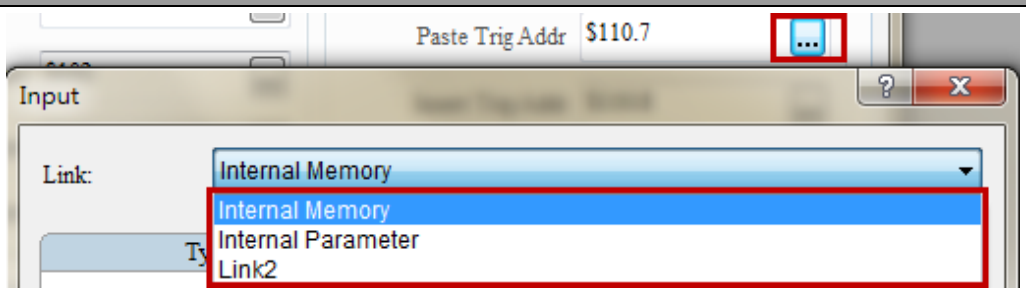
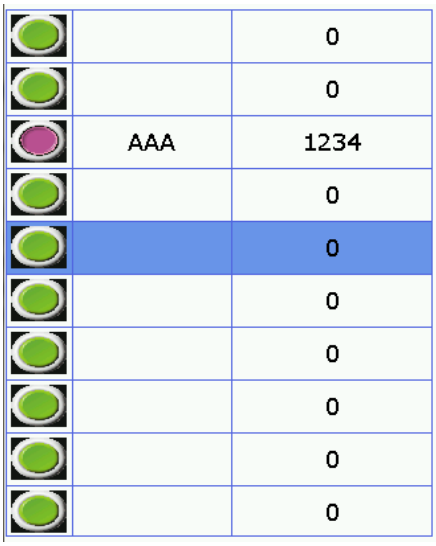
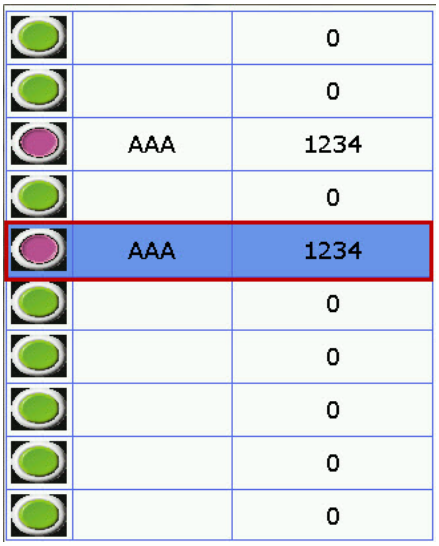
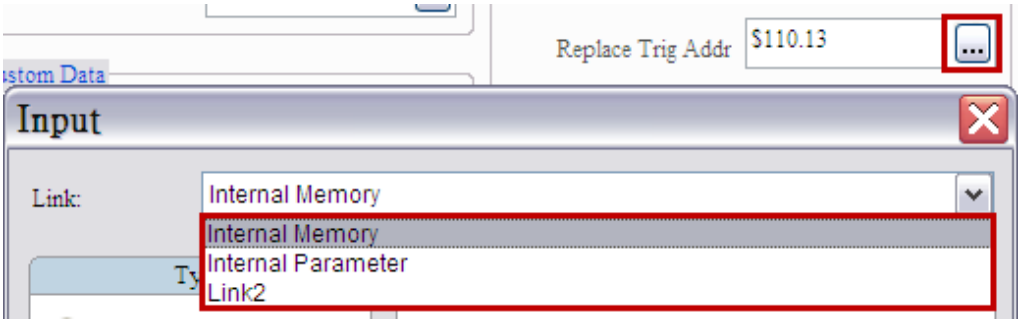
No.	Property	Function
		
(12)	Page Down Triggering Address	➢ When the bit of triggering address on next page is on, it switches to the next page and the bit is off. ➢ When the bit of triggering address on next page is not on, page 1 is displayed as the current page. When it is on, the current page would be page 2.  

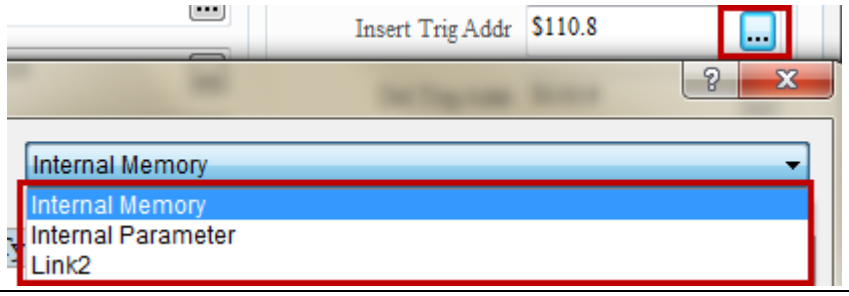
No.	Property	Function
		➢ It supports controller address (Bit) and the address of internal register (Bit). 
(13)	Previous Item Triggering Address	➢ When the bit of triggering address of previous item is on, it goes to the previous item and the bit is off. ➢ When the bit of triggering address of previous item is not on, item 4 is displayed as the selected item. When it is on, the selected item would be item 3.  ⬇

No.	Property	Function
		 ➢ It supports controller address (Bit) and the address of internal register (Bit). 
(14)	Next Item Triggering Address	➢ When the bit of triggering address of next item is on, it goes to the next item and the bit is off. ➢ When the bit of triggering address of next item is not on, item 3 is displayed as the selected item. When it is on, the selected item would be item 4.

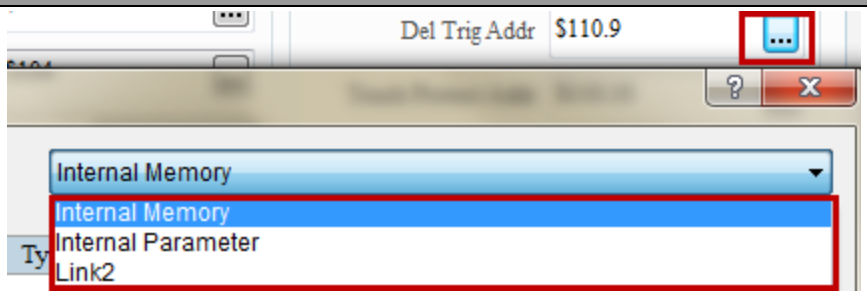
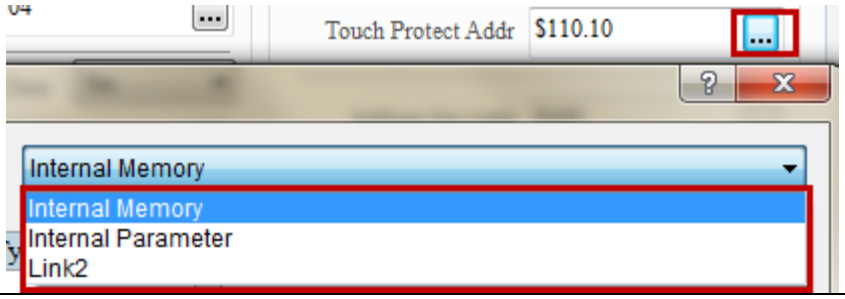
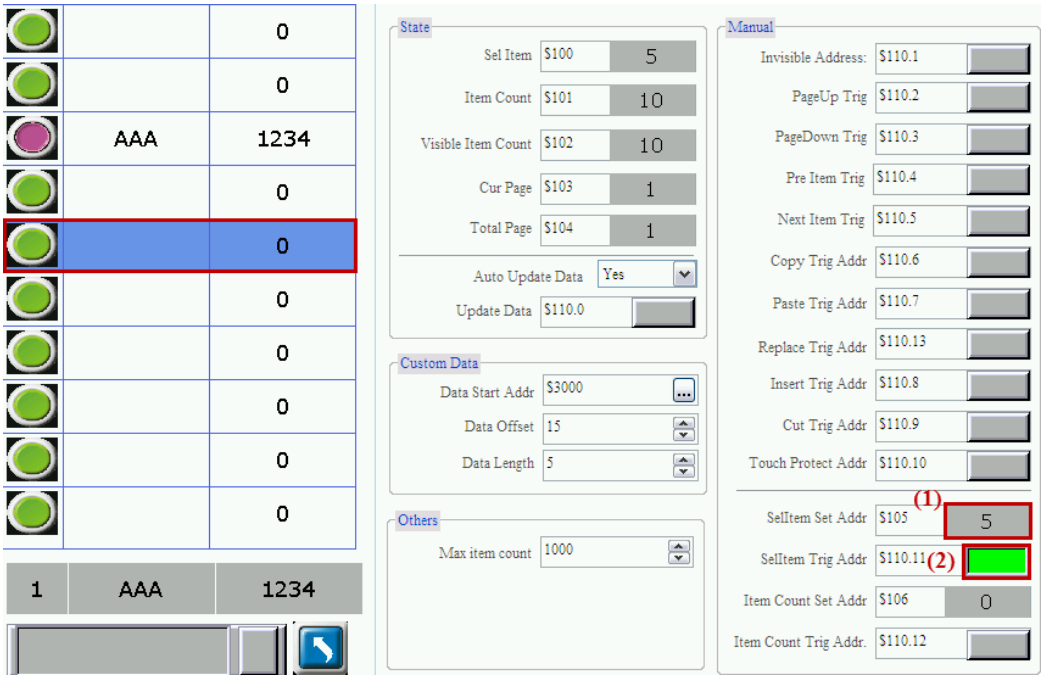
No.	Property	Function
		  ➢ It supports controller address (Bit) and the address of internal register (Bit). 

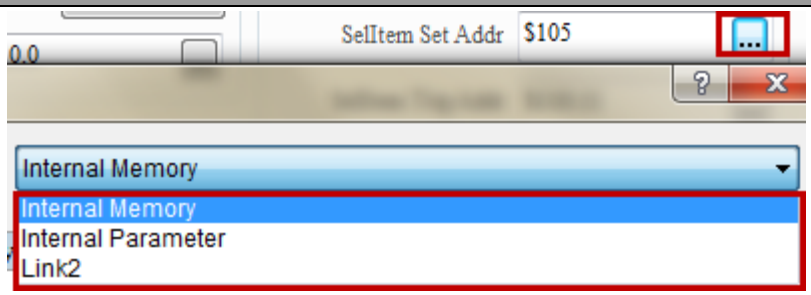
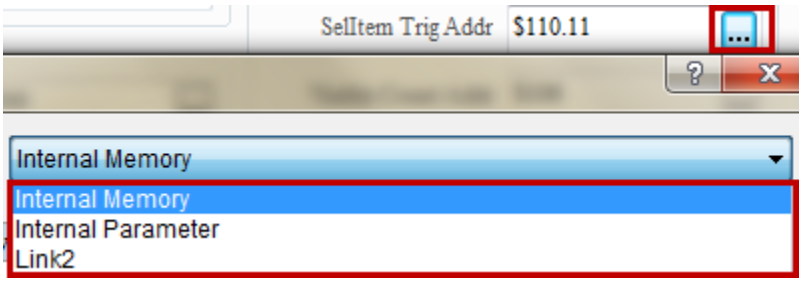
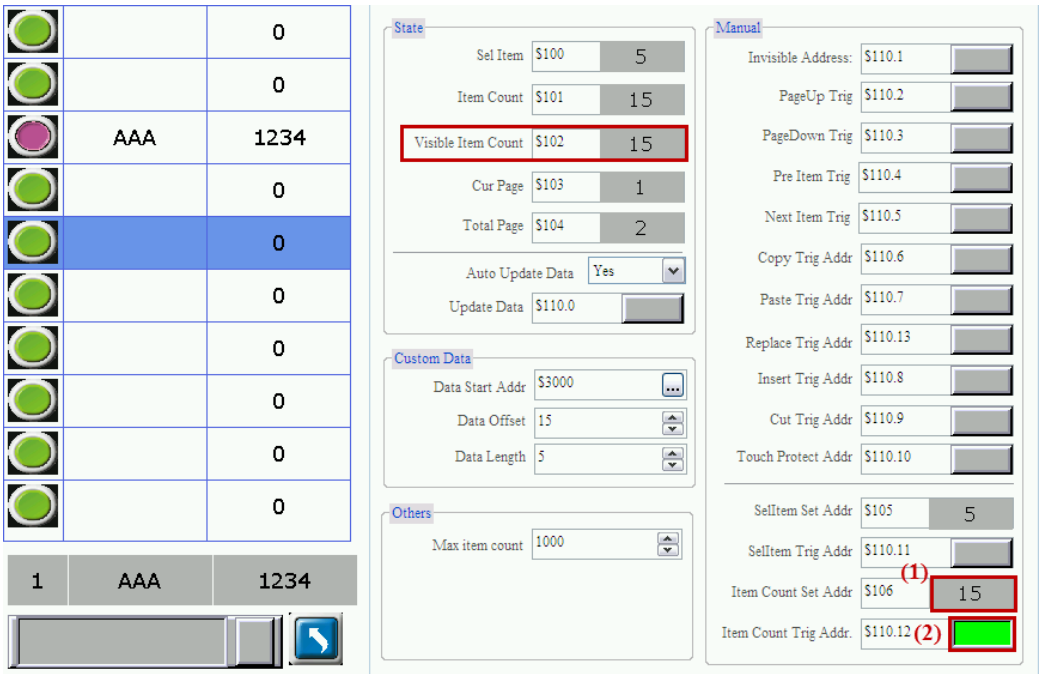
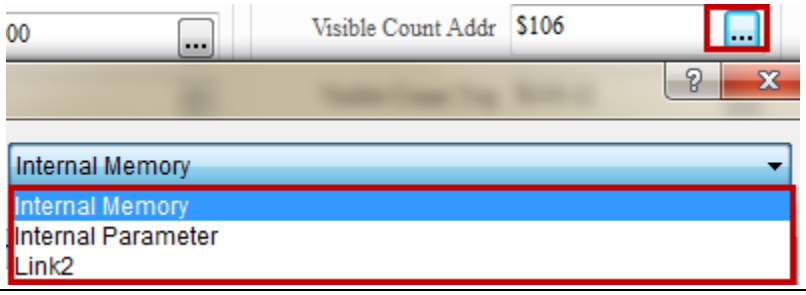
No.	Property	Function
(15)	Copy Triggering Address	➢ When the bit of copy triggering address is on, it copies the current item and the bit is off.  ➢ It supports controller address (Bit) and the address of internal register (Bit). 
(16)	Paste Triggering Address	➢ When the bit of paste triggering address is on, it pastes the current item and the bit is off. ➢ It supports controller address (Bit) and the address of internal register (Bit).

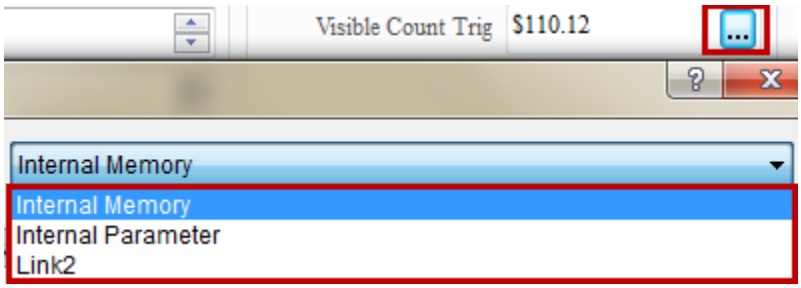
<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td></td><td></td><td> 
</td></tr>
<tr><td>(17)</td><td>Replace Trig Addr</td><td>➢ When Replace Trig Addr is On, the selected item will be replaced by the copied item. And the flag will be off automatically.
<table>
<tr><th>Before the item is replaced</th><th>After the item is replaced</th></tr>
<tr><td> 
</td><td> 
</td></tr>
</table>
➢ It supports controller address (Bit) and the address of internal register (Bit).

</td></tr>
<tr><td>(18)</td><td>Insert Triggering Address</td><td>➢ When the bit of insert triggering address is on, it inserts the blank item and the bit is off.
<table>
<tr><th>Before</th><th>After</th></tr>
</table></td></tr>
</table>

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><td></td><td></td><td>0</td></tr>
<tr><td></td><td></td><td>0</td></tr>
<tr><td></td><td>AAA</td><td>1234</td></tr>
<tr><td></td><td>AAA</td><td>1234</td></tr>
<tr><td></td><td>AAA</td><td>1234</td></tr>
<tr><td></td><td></td><td>0</td></tr>
<tr><td></td><td></td><td>0</td></tr>
<tr><td></td><td></td><td>0</td></tr>
<tr><td></td><td></td><td>0</td></tr>
<tr><td></td><td></td><td>0</td></tr>
</table>
<table>
<tr><td></td><td></td><td>0</td></tr>
<tr><td></td><td></td><td>0</td></tr>
<tr><td></td><td>AAA</td><td>1234</td></tr>
<tr><td></td><td>AAA</td><td>1234</td></tr>
<tr><td></td><td></td><td>0</td></tr>
<tr><td></td><td>AAA</td><td>1234</td></tr>
<tr><td></td><td></td><td>0</td></tr>
<tr><td></td><td></td><td>0</td></tr>
<tr><td></td><td></td><td>0</td></tr>
<tr><td></td><td></td><td>0</td></tr>
</table>
➢ It supports controller address (Bit) and the address of internal register (Bit).


</td></tr>
<tr><td>(19)</td><td>Delete Triggering Address</td><td>
➢ When the bit of delete triggering address is on, it deletes the current item and the bit is off.
<table>
<tr><th>Before</th><th>After</th></tr>
<tr><td>
<table>
<tr><td></td><td></td><td>0</td></tr>
<tr><td></td><td></td><td>0</td></tr>
<tr><td></td><td>AAA</td><td>1234</td></tr>
<tr><td></td><td>AAA</td><td>1234</td></tr>
<tr><td></td><td>AAA</td><td>1234</td></tr>
<tr><td></td><td></td><td>0</td></tr>
<tr><td></td><td></td><td>0</td></tr>
<tr><td></td><td></td><td>0</td></tr>
<tr><td></td><td></td><td>0</td></tr>
<tr><td></td><td></td><td>0</td></tr>
</table>
</td><td>
<table>
<tr><td></td><td></td><td>0</td></tr>
<tr><td></td><td></td><td>0</td></tr>
<tr><td></td><td>AAA</td><td>1234</td></tr>
<tr><td></td><td>AAA</td><td>1234</td></tr>
<tr><td></td><td></td><td>0</td></tr>
<tr><td></td><td></td><td>0</td></tr>
<tr><td></td><td></td><td>0</td></tr>
<tr><td></td><td></td><td>0</td></tr>
<tr><td></td><td></td><td>0</td></tr>
<tr><td></td><td></td><td>0</td></tr>
</table>
</td></tr>
</table>
➢ It supports controller address (Bit) and the address of internal register (Bit).
</td></tr>
</table>

No.	Property	Function
		
(20)	Touch Protect Address	➢ When the bit of touch protect address is On, elements on GridBox will be invalid. ➢ It supports controller address (Bit) and the address of internal register (Bit). 
(21)	Selected Item Set Address	➢ Use 【Selected Item Set Address】 to specify the selected item. Then, trigger the bit of【Selected Item Triggering Address】to on, the element would display the selected item. 
	Selected Item Triggering Address	➢ It supports controller address (Word) and the address of internal register (Word).

No.	Property	Function
		 ➢ It supports controller address (Bit) and the address of internal register (Bit). 
(22)	Visible Count Address	➢ Use【Visible Count Address】to specify the displayed item. Then, trigger the bit of 【Visible Item Trigger】 to on. The element would change the current value of 【Visible Item Count】. 
	Visible Item Trigger	➢ It supports controller address (Word) and the address of internal register (Word). 

No.	Property	Function
		➢ It supports controller address (Bit) and the address of internal register (Bit). 

◆ Details-2

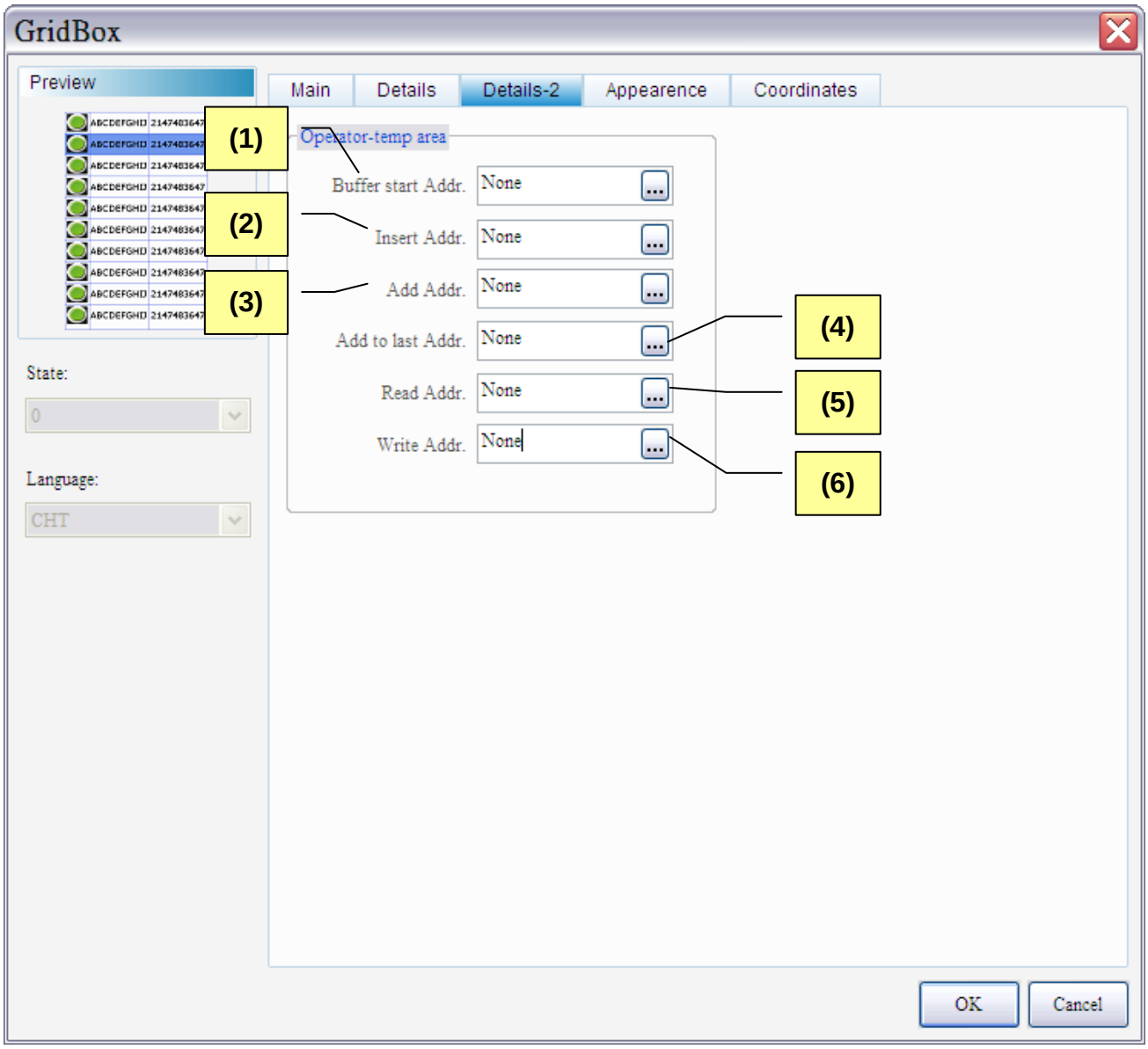
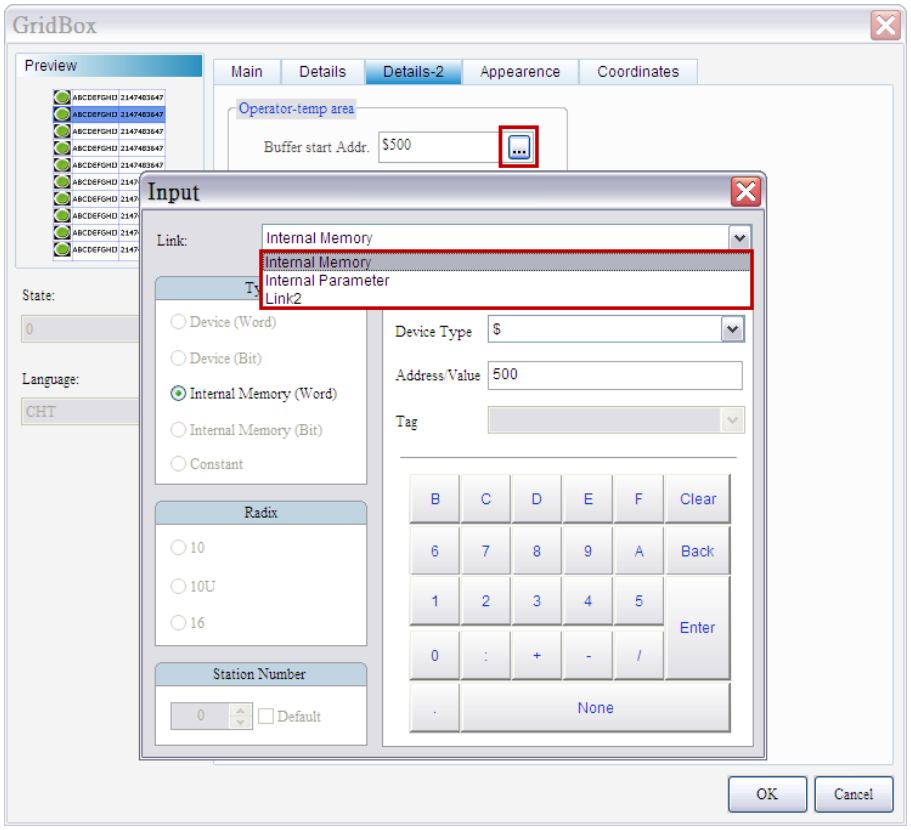
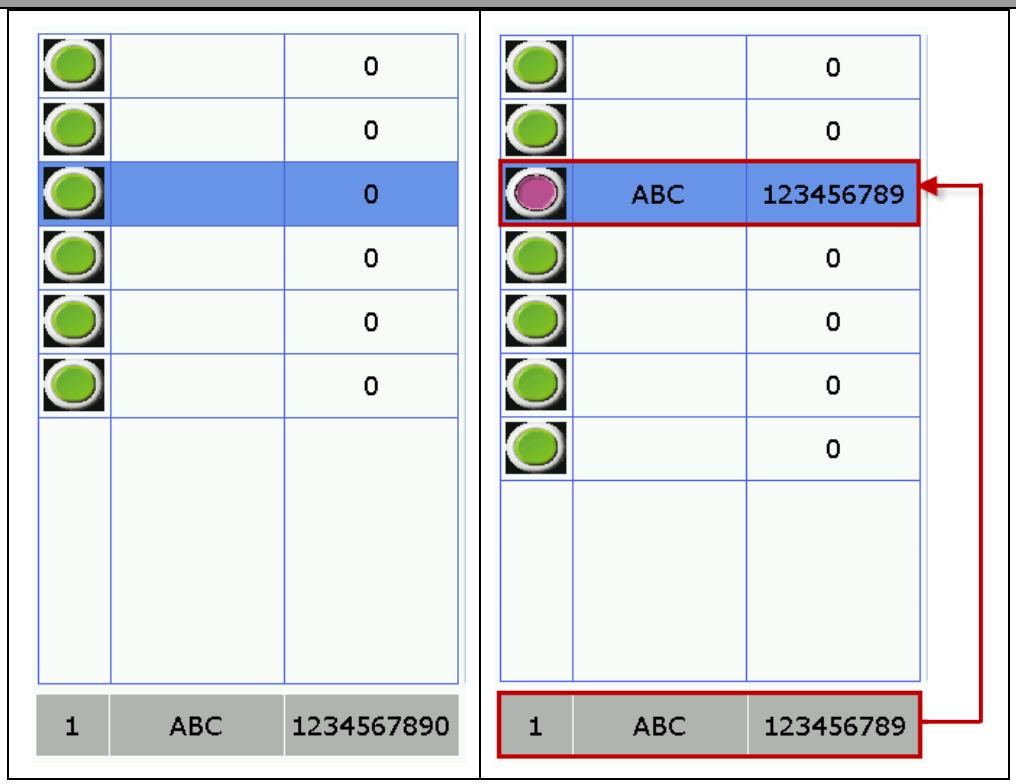
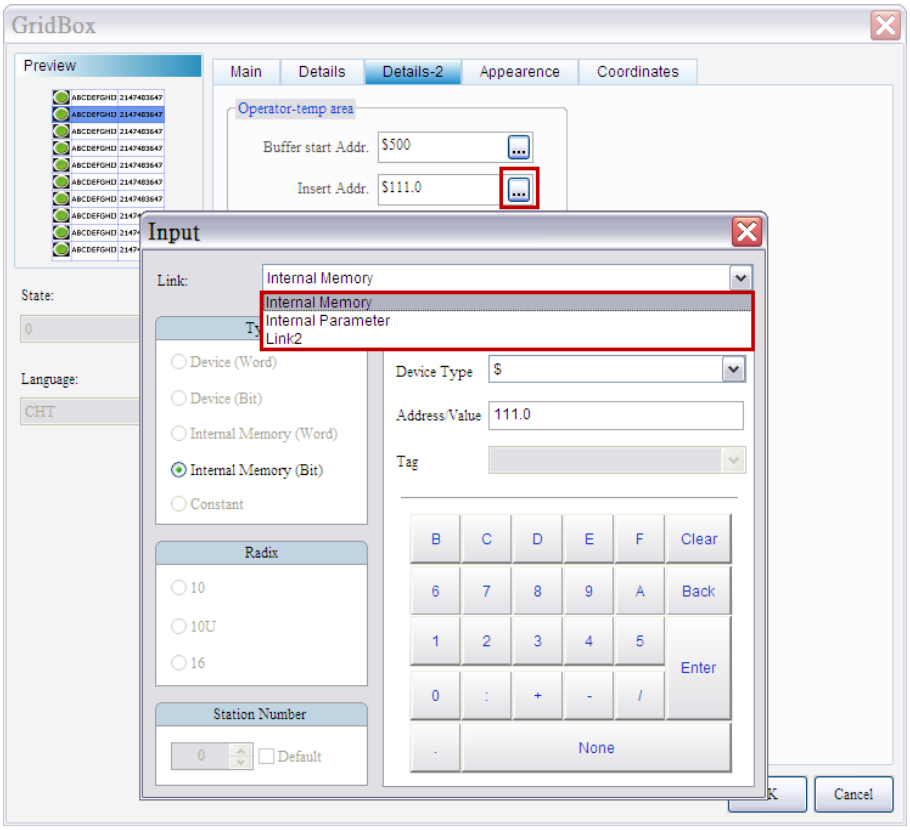


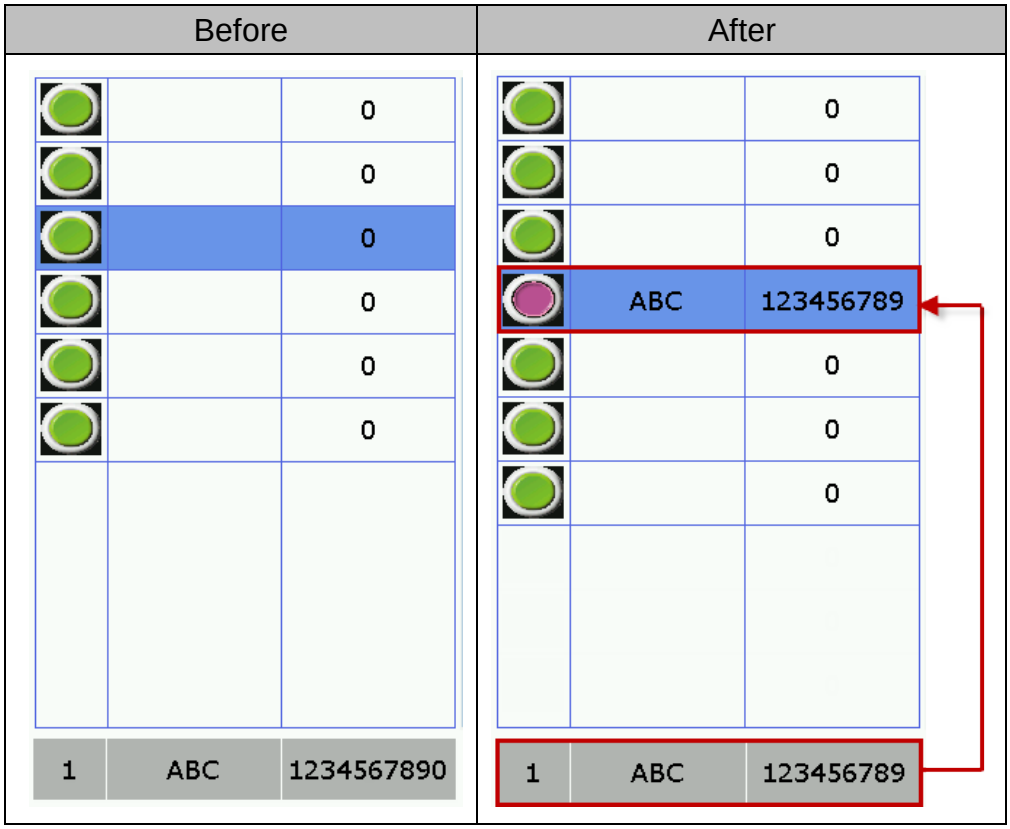
Figure 19-3-4 Setting Screen of GridBox Details-2

No.	Property	Function
(1)	Buffer start Address	➢ It is the start address for temporarily saving the element. Users can insert, add and write the data that saved in temporary memory (buffer) to the selected item. Or users can read the data from the selected item to temporary memory (buffer). ➢ It supports controller address (Word) and the address of internal register (Word).

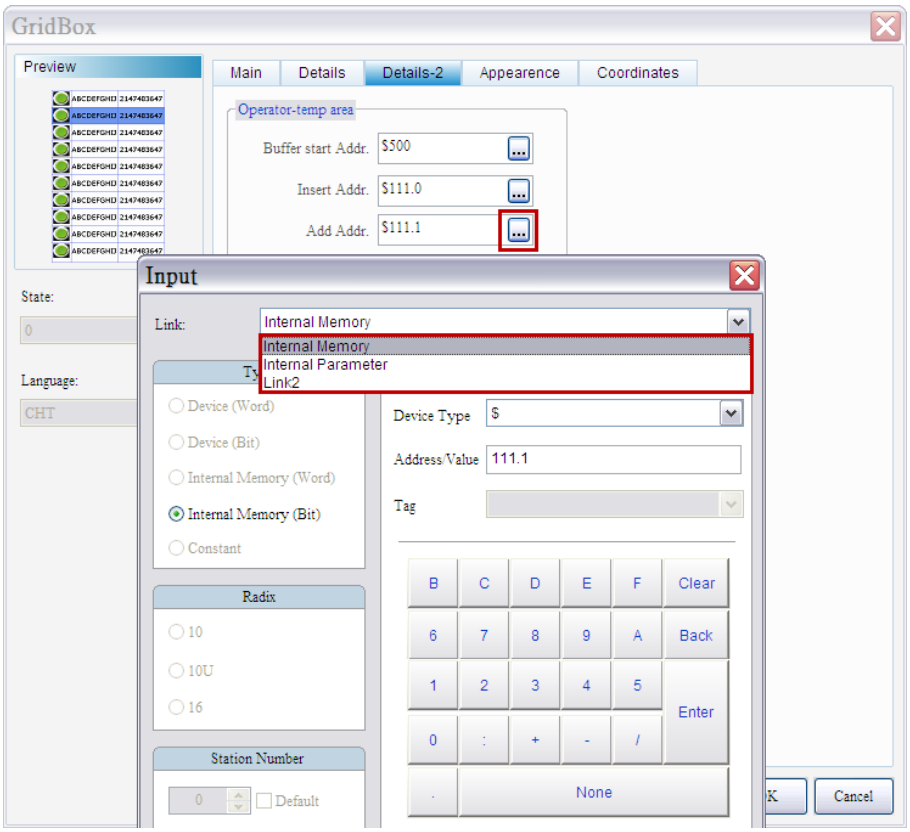
No.	Property	Function
		
(2)	Insert Address	➢ When this bit is On, the element will insert the [Selected item] starting from [Buffer start address] according to the [Item offset] address. And the [Actual item number] will increase 1. ➢ If the [Actual item number] has reached the value of [Max. item count], users will be unable to insert the selected item. Before inserting the item | After inserting the item

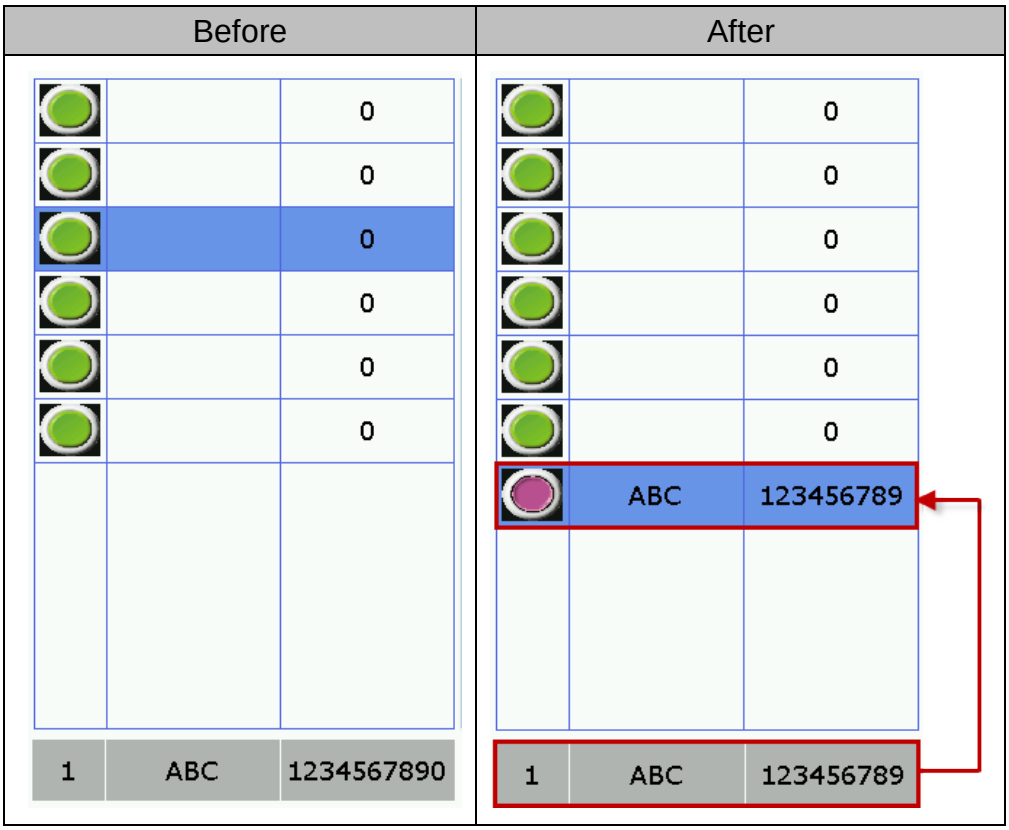
No.	Property	Function
		 ➢ It supports controller address (Bit) and the address of internal register (Bit). 
(3)	Add Address	➢ When this bit is On, the element will add one item locates after the [Selected item] starting from [Buffer start address] according to the [Item offset] address. And the [Actual item number] will increase 1.

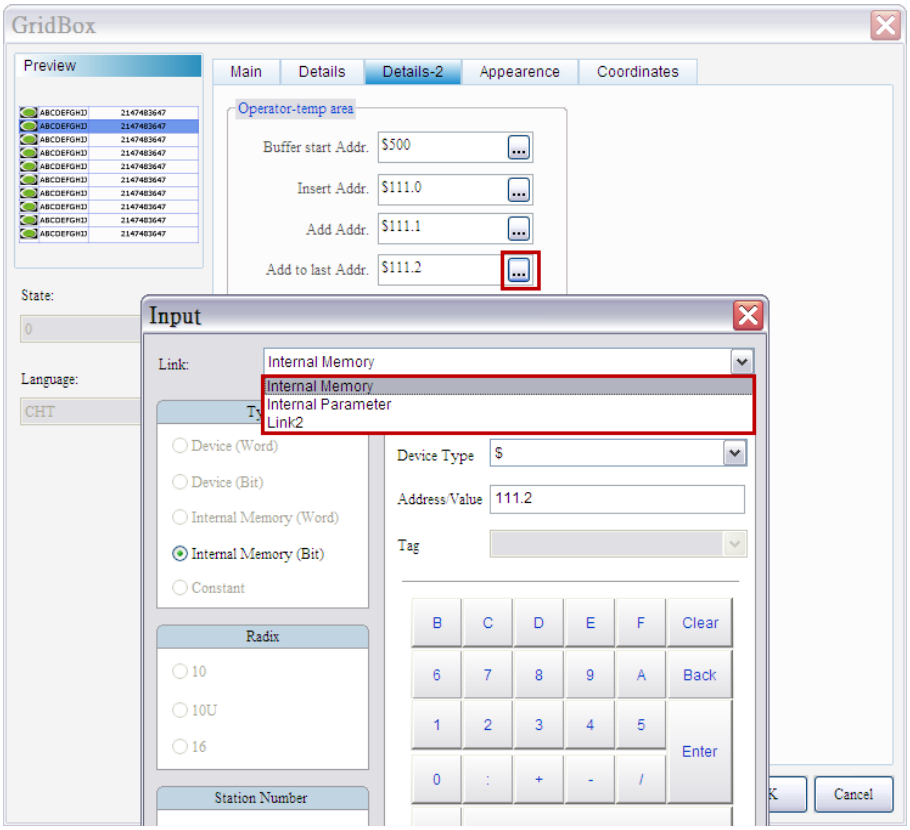
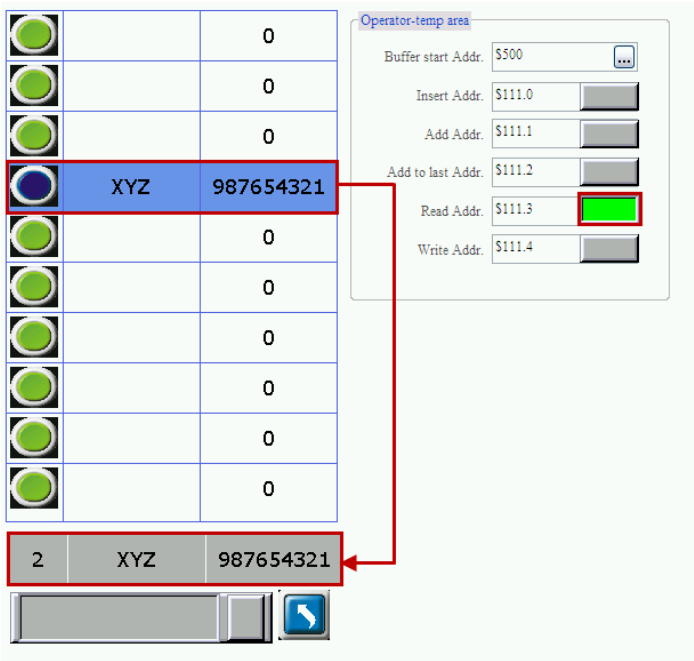
No.	Property	Function
		➢ If the [Actual item number] reaches the value of [Max. item count], users will be unable to add the selected item.

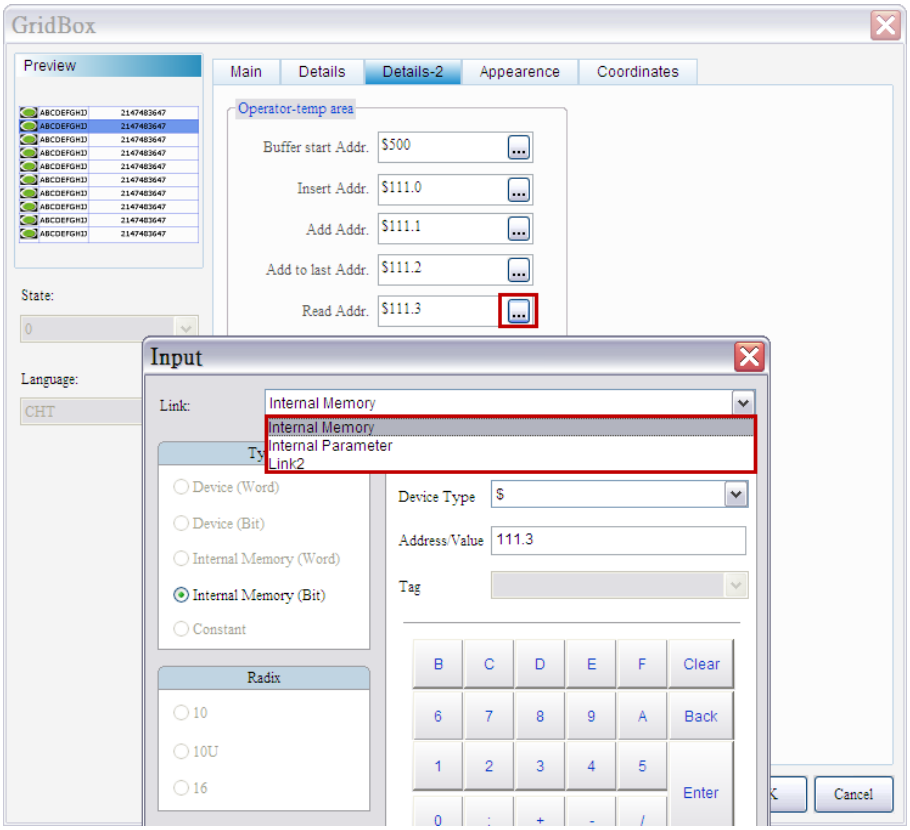
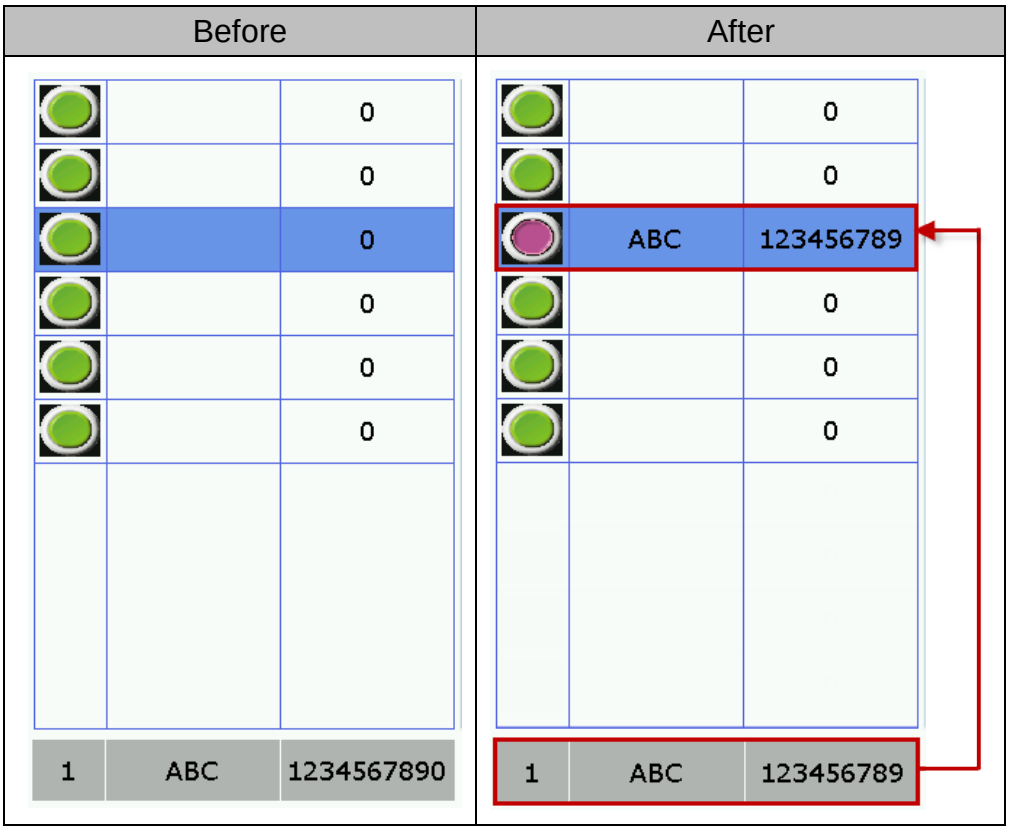


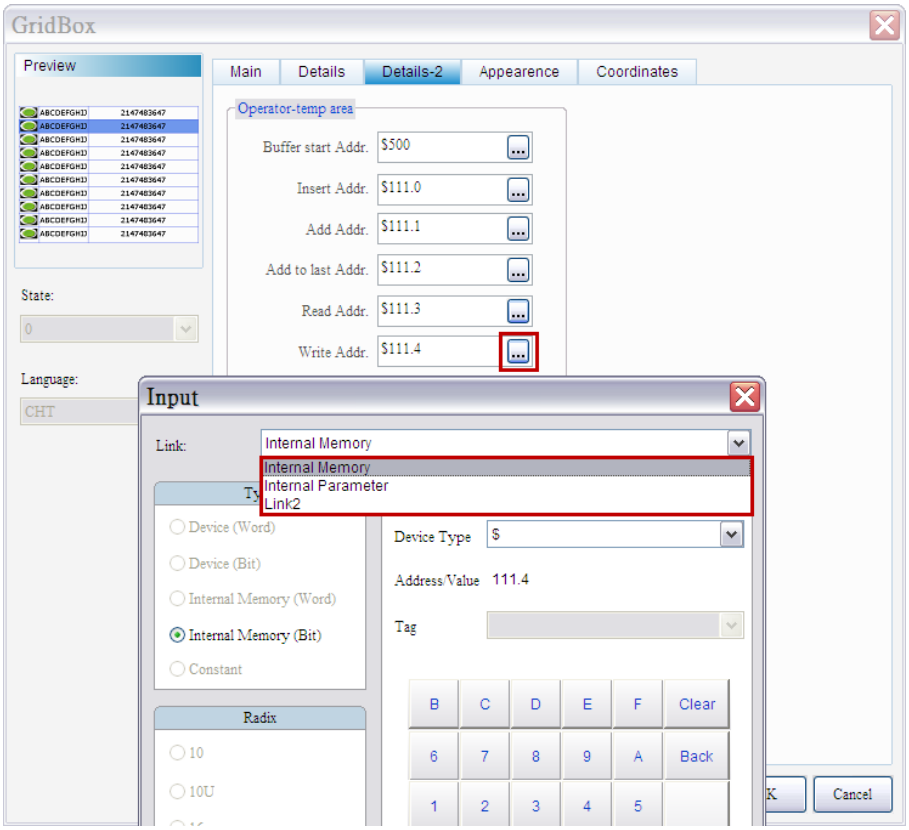
➢ It supports controller address (Bit) and the address of internal register (Bit).



No.	Property	Function
(4)	Add to last Address	➢ When this bit is On, the element will be added to the last item starting from [Buffer start address] according to the [Item offset] address. And the [Actual item number] will increase 1. ➢ If the [Actual item number] reaches the value of [Max. item count], users will be unable to add the selected item.  ➢ It supports controller address (Bit) and the address of internal register (Bit).

No.	Property	Function
		
(5)	Read Address	➢ When this bit is On, contents in the [Selected item] will be saved to [Buffer start address]. This will not change the content.  ➢ It supports controller address (Bit) and the address of internal register (Bit).

No.	Property	Function
		
(6)	Write Address	➢ When this bit is On, the element will be wrote to the [Selected item] starting from [Buffer start address] according to the [Item offset] address.  ➢ It supports controller address (Bit) and the address of internal

No.	Property	Function
		register (Bit). 

◆ Appearance

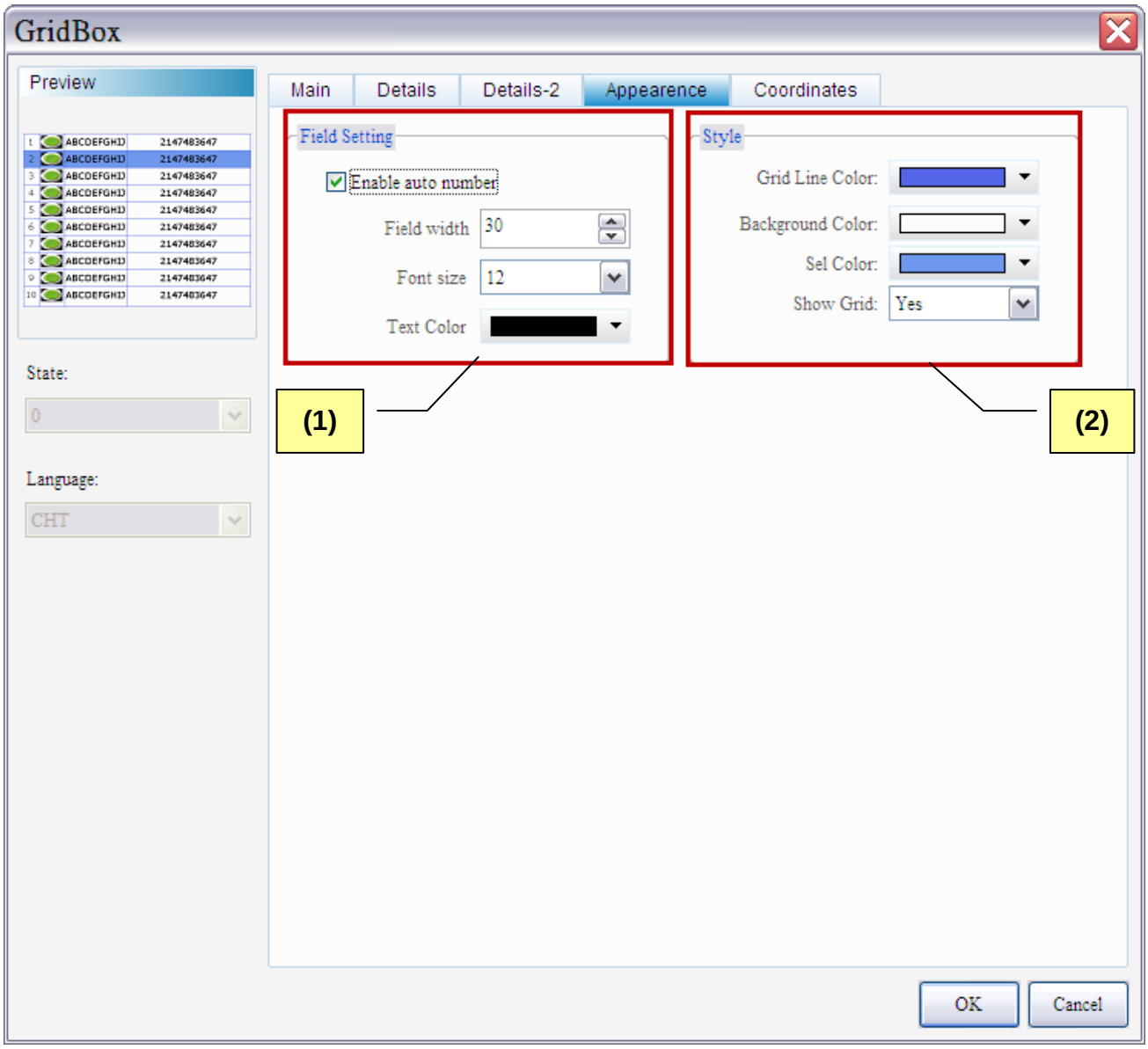
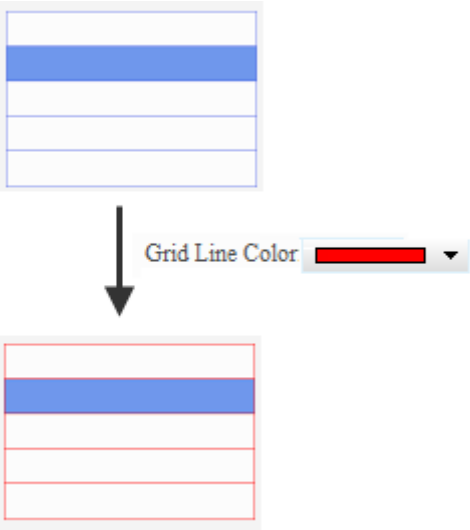
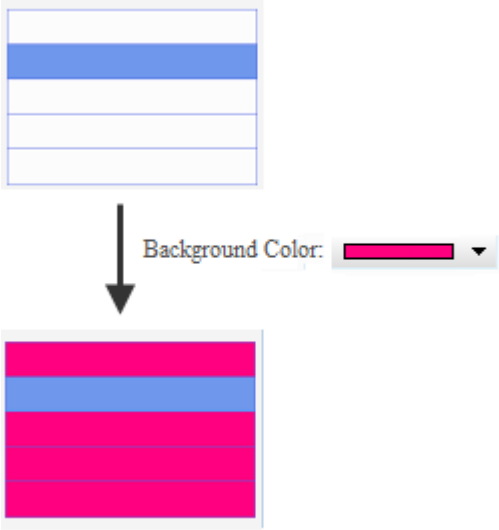
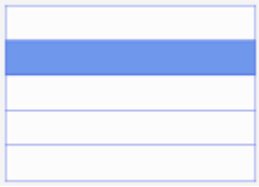
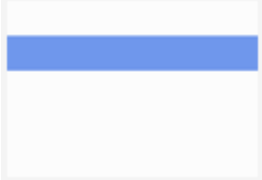


Figure 19-3-5 Appearance setting page of GridBox

No.	Property	Function
(1)	Field Setting	➢ This is for setting Enable auto number, Field width, Font size and Text color. ➢ Users can determine whether to show the auto number or not and set its field width, font size and text color. ➢ To show auto number: To not show the auto number / Show the auto number

		 ➢ Field width: Users can define the field width of auto number, 65535 is the maximum.
(2)	Style	➢ It can be divided into grid line color, background color, selected color and determine if users are going to show grid line. ➢ It can be used to select the element displayed color and grid line setting. ➢ Grid line color:  ➢ Background color:  ➢ Selected color:

- Show grid line?

Choose **YES** to show grid line	Choose **NO** to not show grid line
	

◆ Coordinates

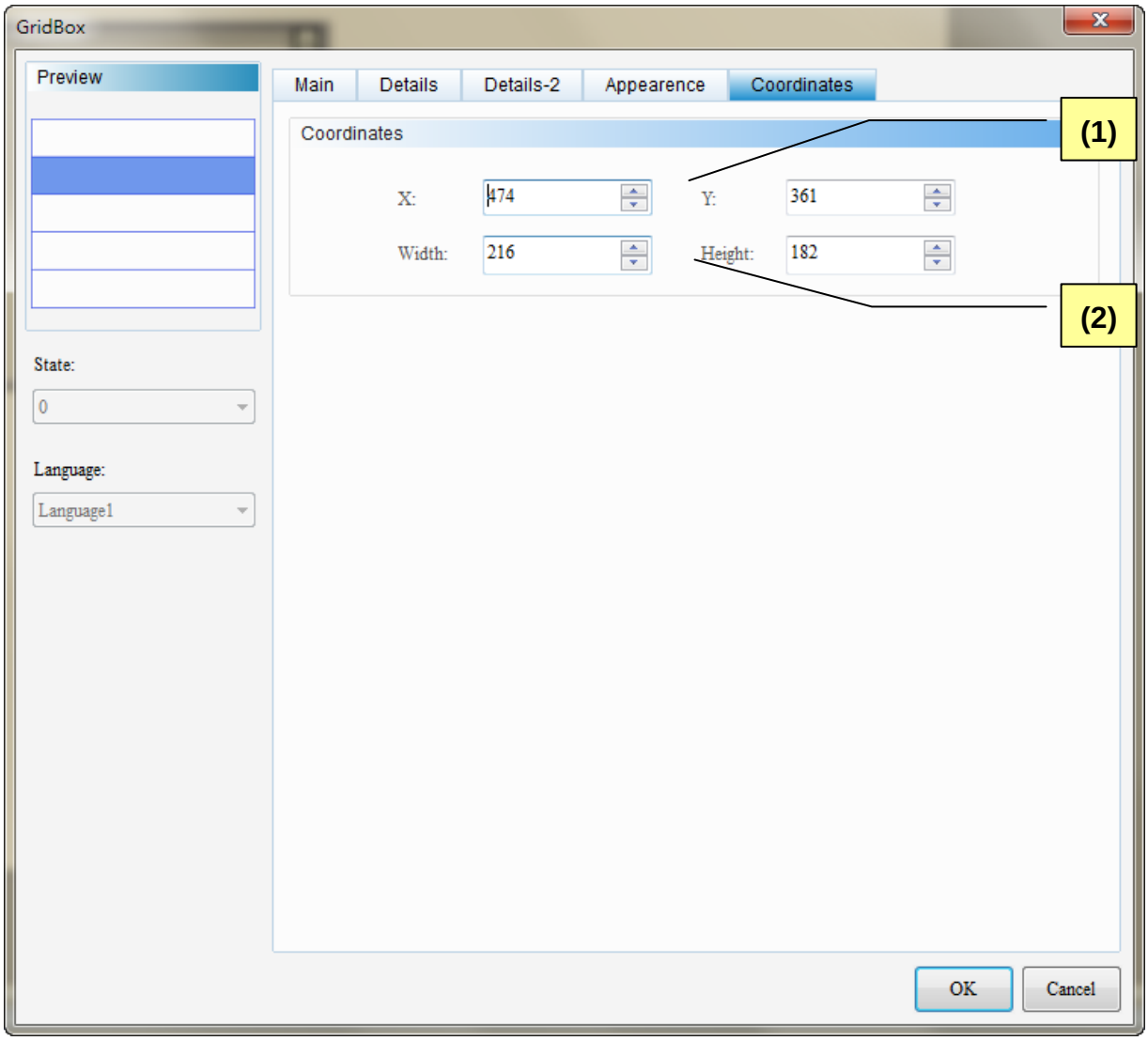


Figure 19-3-6 Grid Box Coordinates Properties Page

No.	Property	Function
(1)	Value of X and Y	➢ Coordinate X and Y on the upper-left corner of the element
(2)	Width, Height	➢ Element width and height

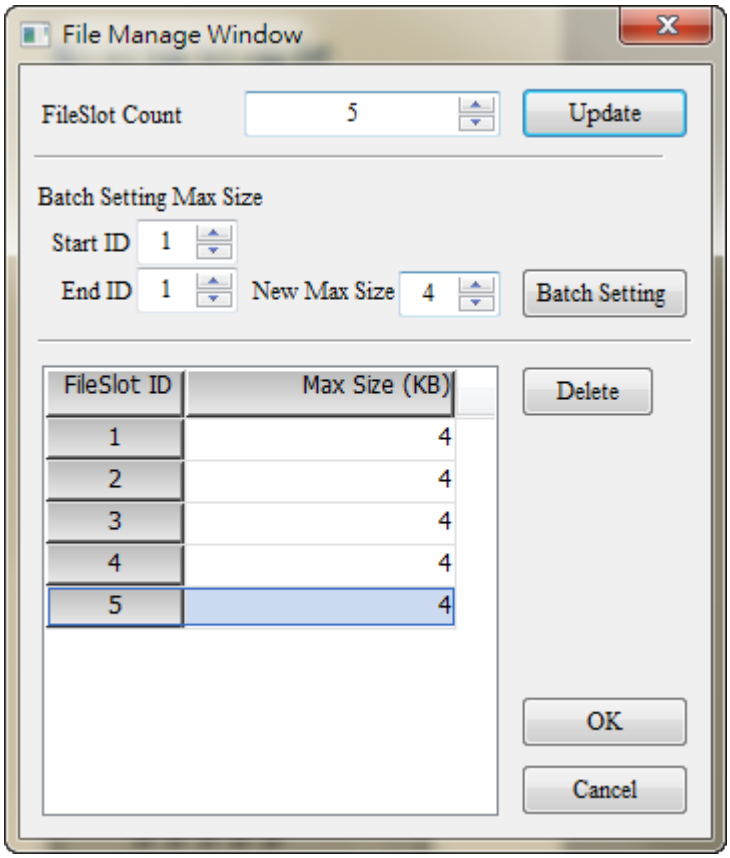
19-4 Text List

The imported FileSlot is displayed as text file (ASCII) which is an easier way for users to modify the data. The built-in function also includes page through, insert, delete, copy, paste and save files.

NOTE：

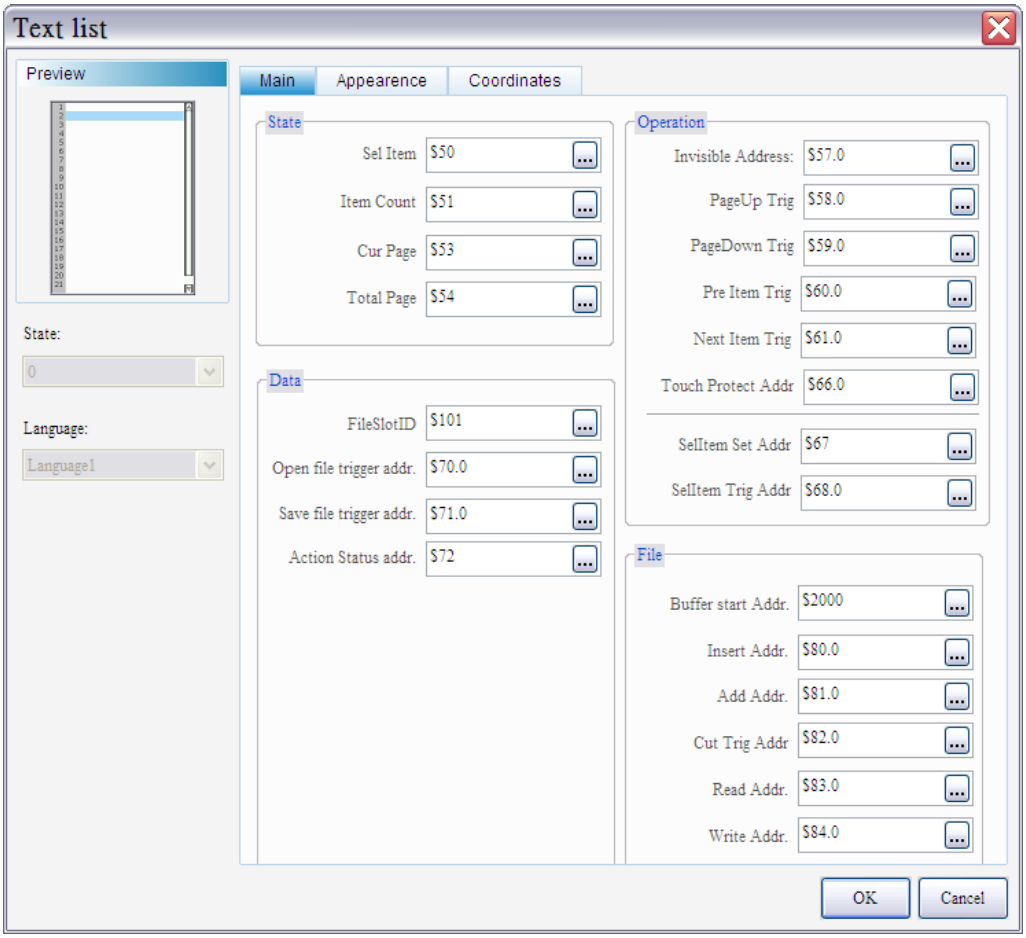
- ✓ Text list only supports ASCII characters. If there is any non-ASCII character in the file, the [Action status address] setting of text list will show 15.
- ✓ Text list supports up to 4096 lines. When the line number exceeds the limit (4096), the [Action status address] setting of text list will show 10. And it will be unable to execute the command of [Insert address] and [Add address]. If the command of [Save file trigger address] is executed, it only saves 4096 lines that displayed in the text list. Others that exceed line 4096 will be discarded.
- ✓ Text list supports up to 128 characters. When executing [Open file trigger address], if the character number in any line exceeds the limit, the [Action status address] setting of text list will show 11. When executing [Save file trigger address], up to 128 characters of each line will be saved. Others that exceed the limit will be discarded. When writing the text to the text list by triggering [Write address], the write-in character number will be 128.
- ✓ Only support for DOP-H series.

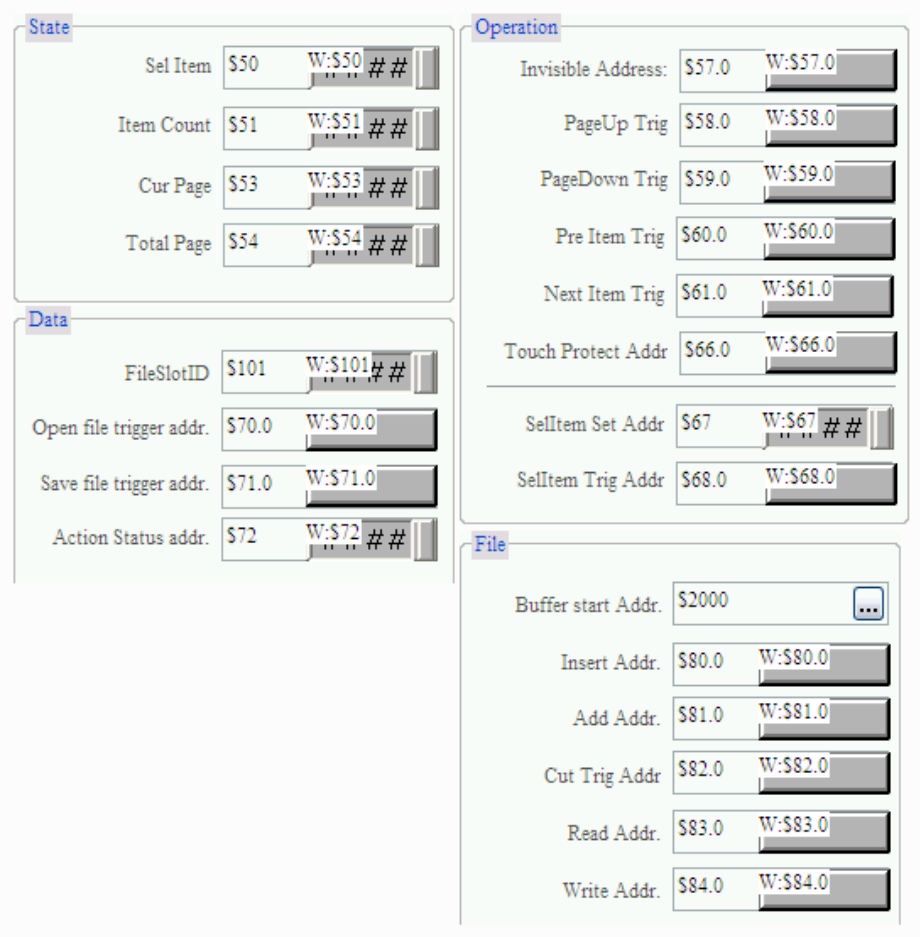
Please refer to Table 19-4-1 for the examples of text list.

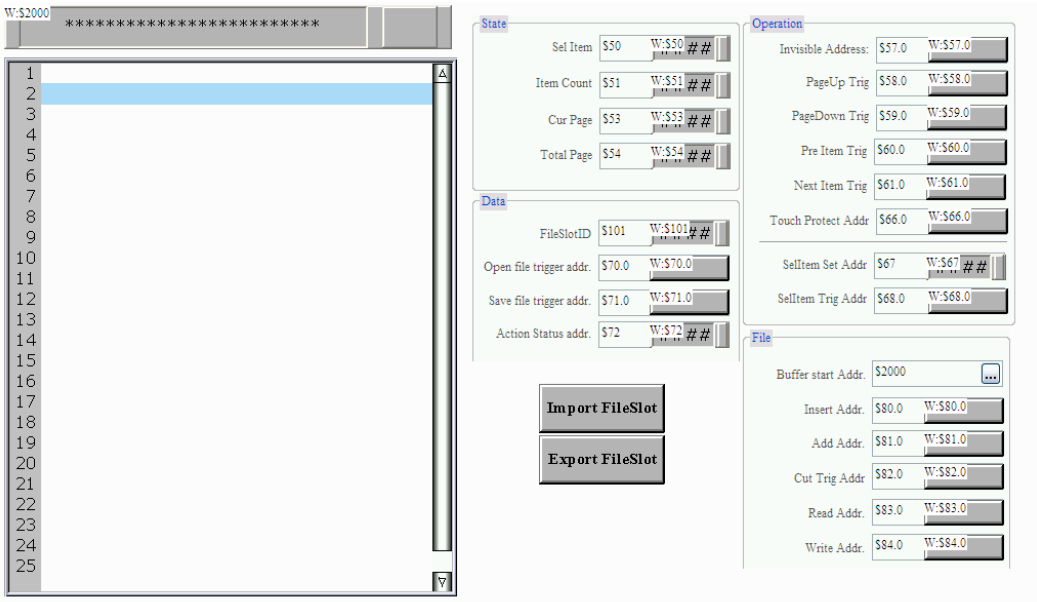
Text List Table 19-4-1 Example of Text List	
New FileSlot	➢ Step 1: Go to [Options] > [FileSlot File Manage] ➢ Step 2: Set FileSlot Count to 5 and click on [Update]. The set FileSlot number will appear. Users can set the max. size for each FileSlot file. Then, click [OK] to complete the setting. 
Create Text List Element	➢ Step 1: Select 『List』>『Text list』on element tool and create the element on screen 1. ➢ Step 2: See the general setting below.

Text List

Table 19-4-1 Example of Text List

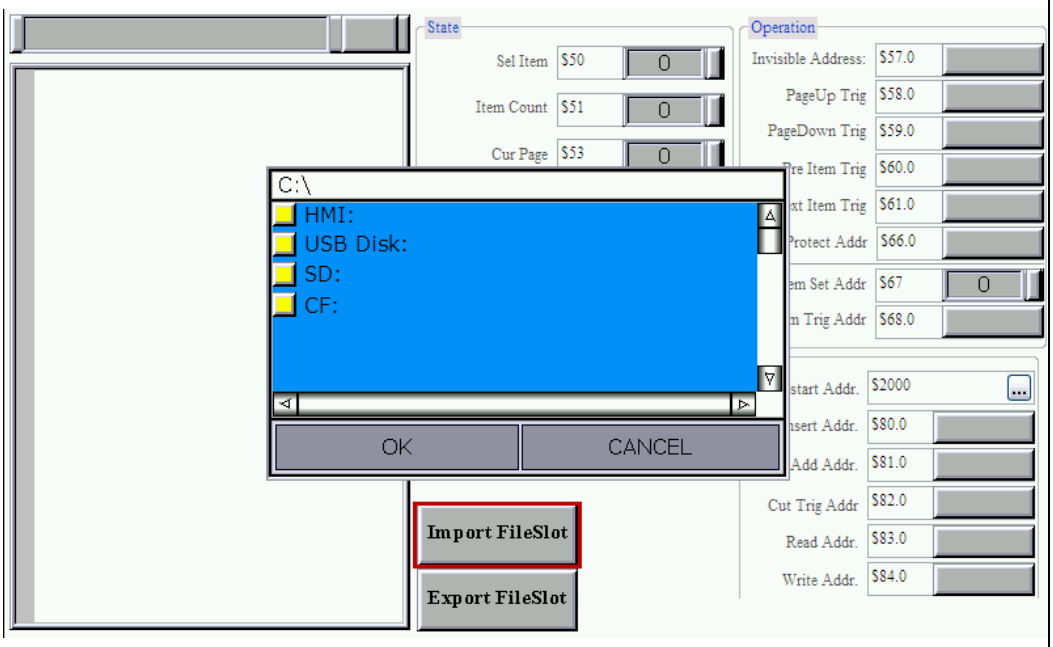


Text List Table 19-4-1 Example of Text List	
Create the numeric entry element and maintained button element	➢ Create the screen for setting Text List and place the corresponded elements and buttons on the graph for editing. 
Create the import/export FileSlot button element	➢ Create the import/export FileSlot button element on the screen.

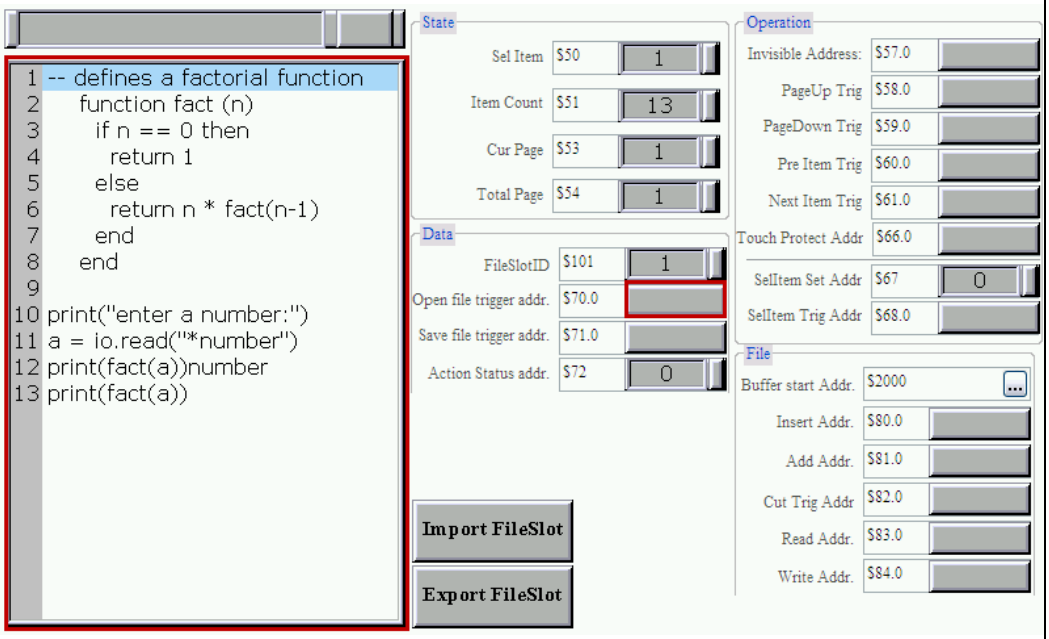
Text List Table 19-4-1 Example of Text List	
Create character entry element ($2000)	➢ Create the character entry element ($2000) on the screen and set the string length to 25.
Results	➢ Step 1: When the element creation is complete, please compile and download the screen to the HMI.  ➢ Step 2: Set FileSlotID($101) to 1. ➢ Step 3: Click on Import FileSlot button and select the file that is going to be imported.

Text List

Table 19-4-1 Example of Text List



➢ Step 4: Trigger the Open file trigger addr. You can see the content of FileSlot displayed in the format of text file in the text list.



Following shows the property setting screen when you double click on Text List.

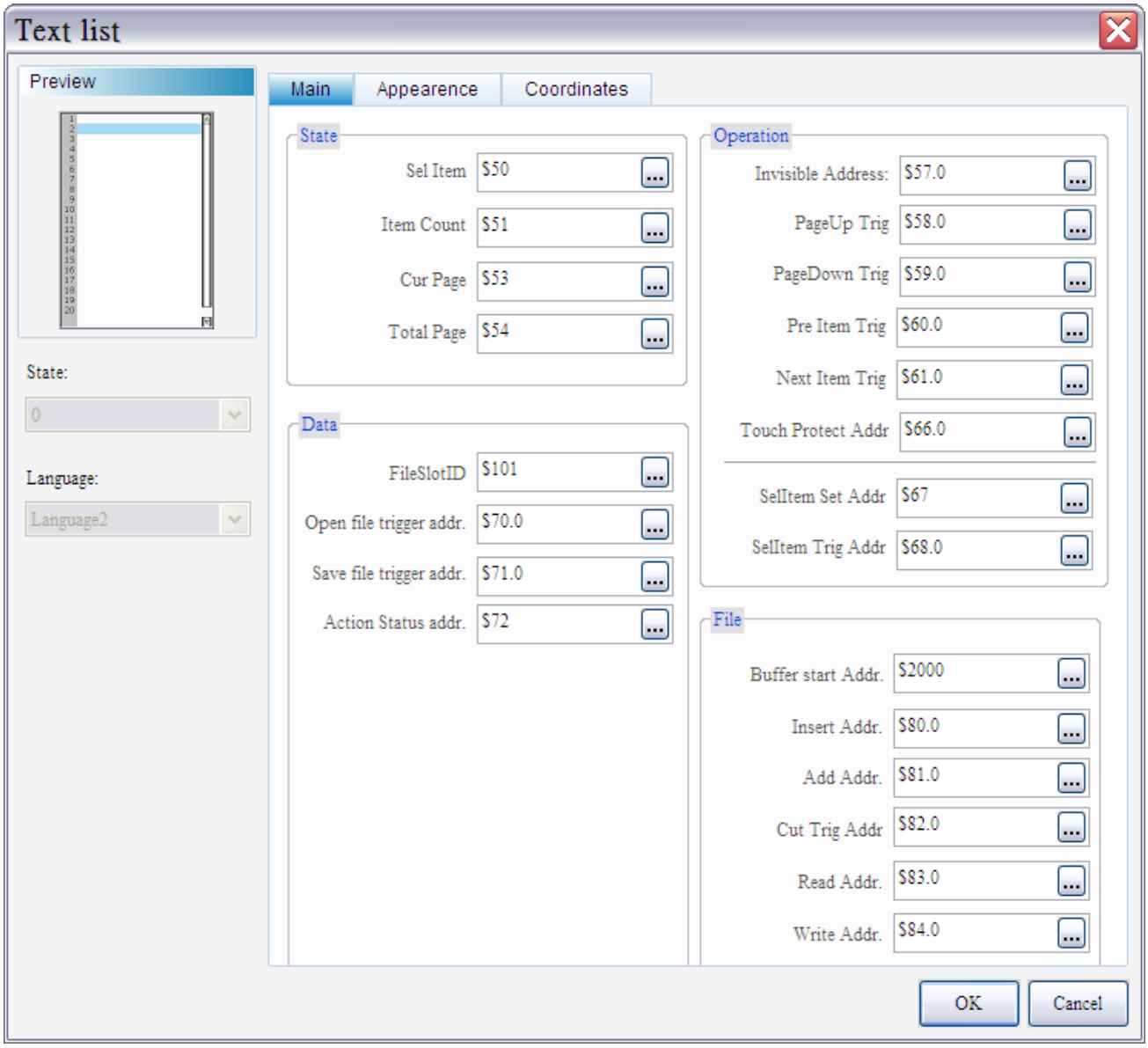


Figure 19-4-1 Property of Text List

Text List	
Functions	**Descriptions**
Main	It includes the setting of state, data, operation and file. State: selected item, item count, current page and total page. Data: FileSlotID, open file trigger address, save file trigger address and action status address. Operation: invisible address, PageUp triggering address, PageDown triggering address, Pre Item Triggering address, Next item triggering address, touch protect address, SelItem set address and SelItem triggering address. File: buffer start address, insert address, add address, cut triggering address, read address and write address.
Appearance	It includes the setting of font size, element background color, selected color and determines whether to show the line number, the frame and item height or not.
Coordinates	X-Y coordinates values, width and height setting

Table 19-4-2 Functional page of text list

◆ Main

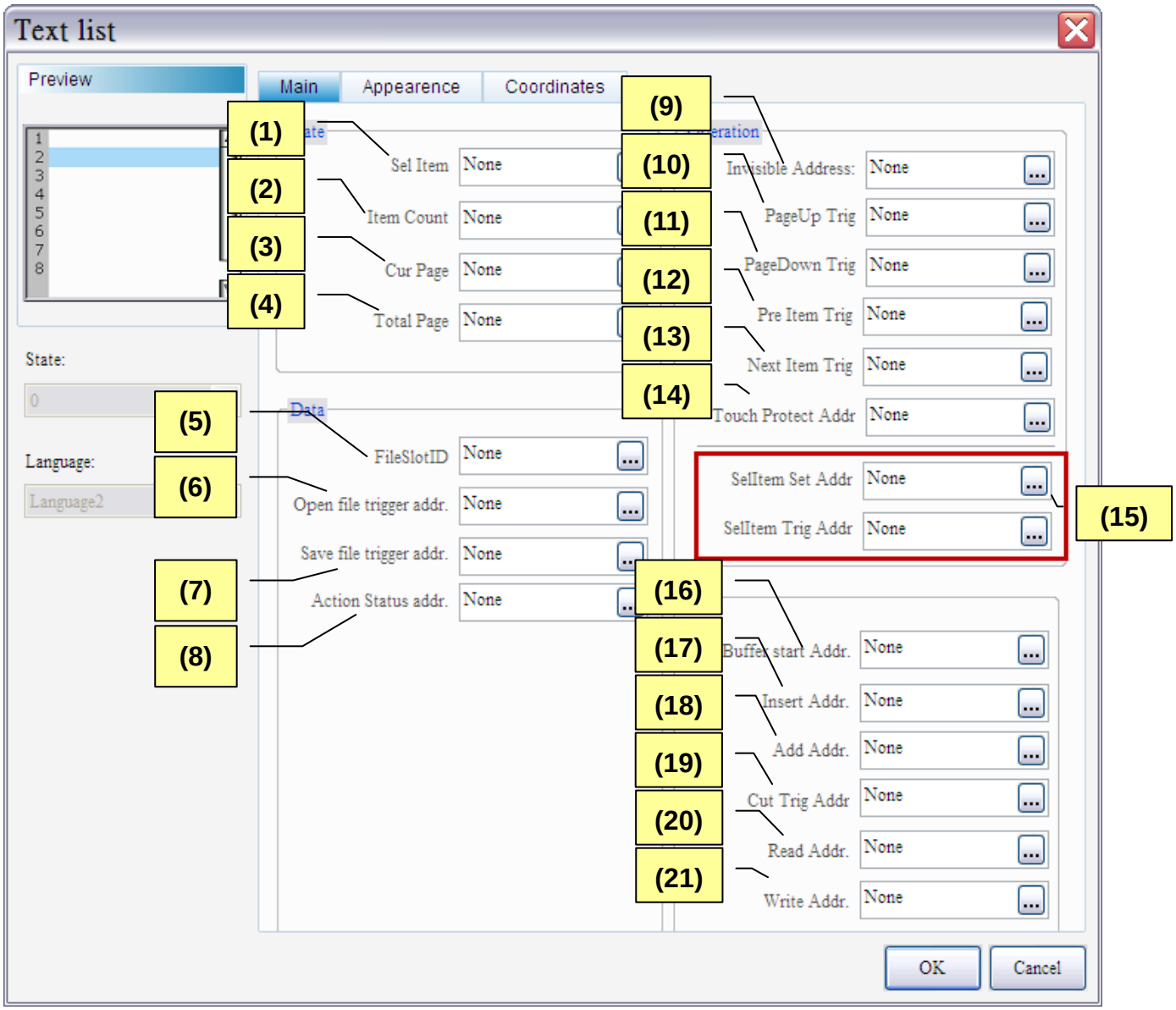
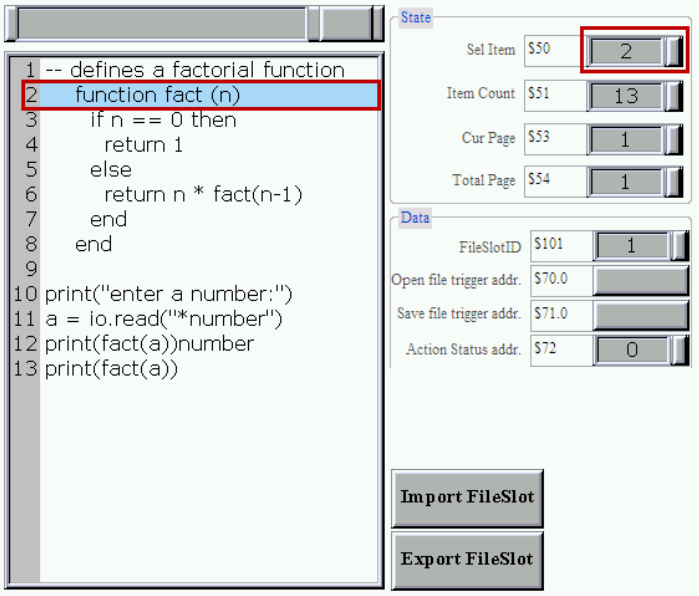
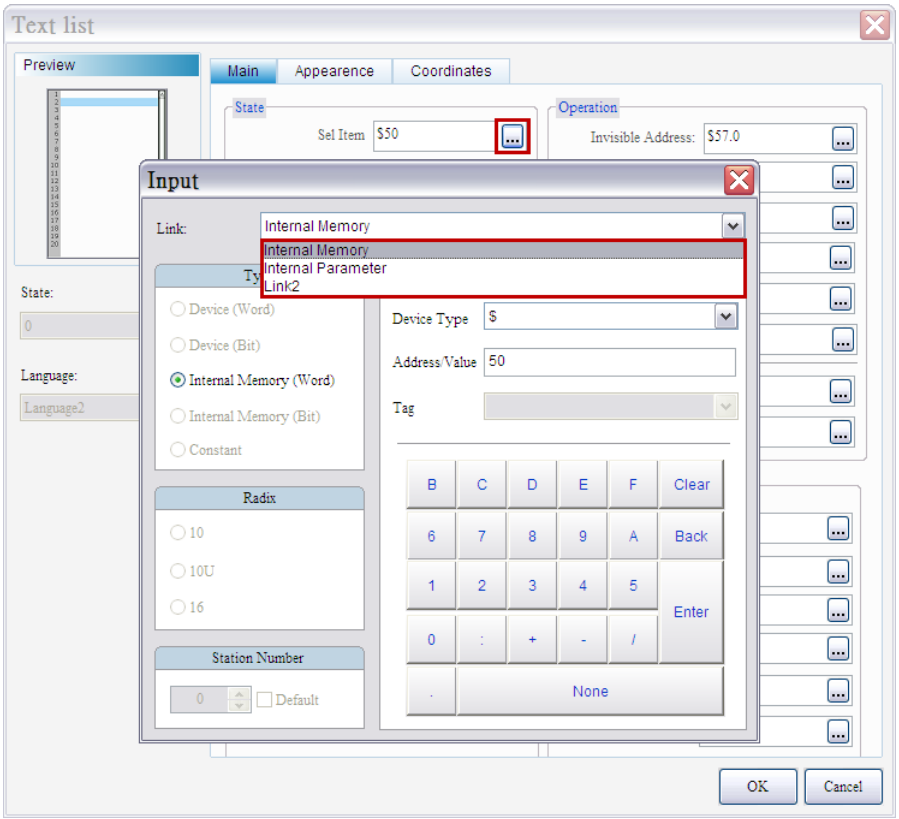
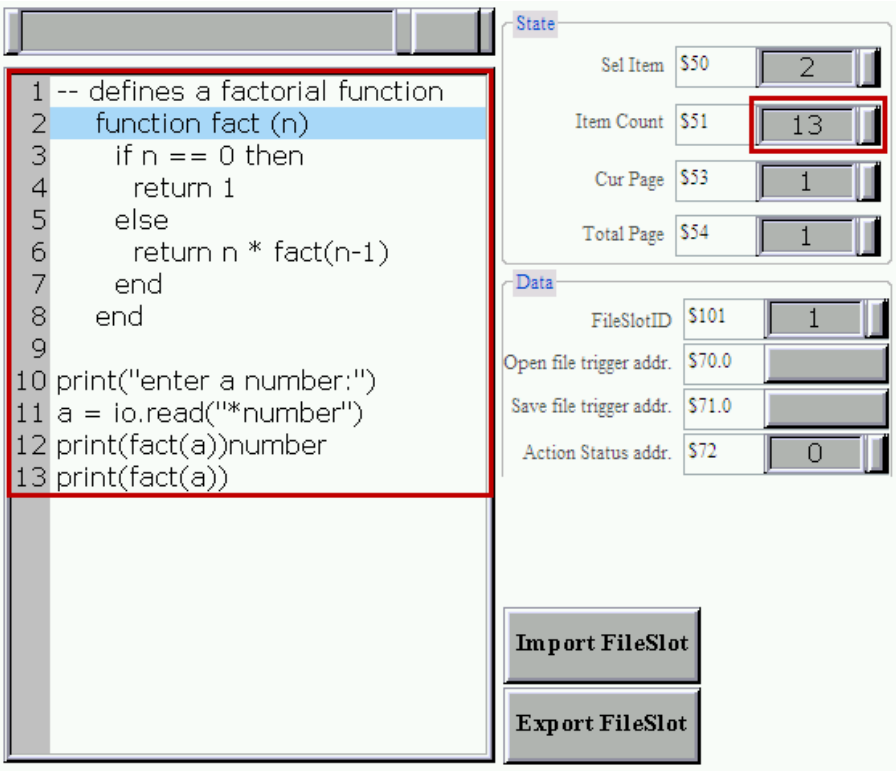
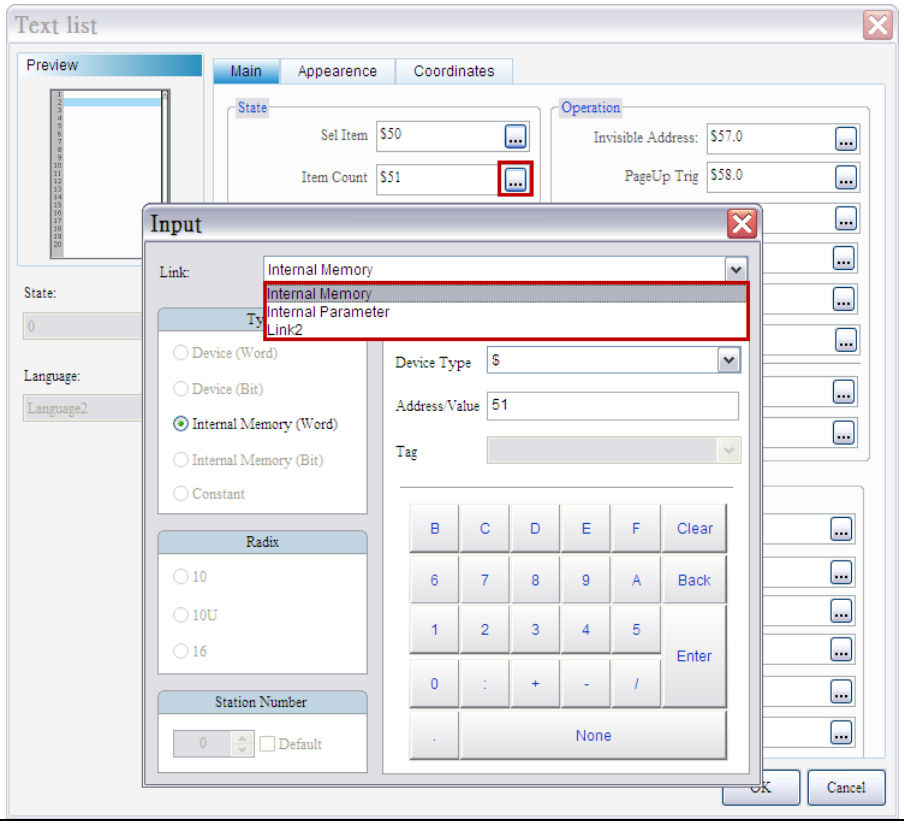


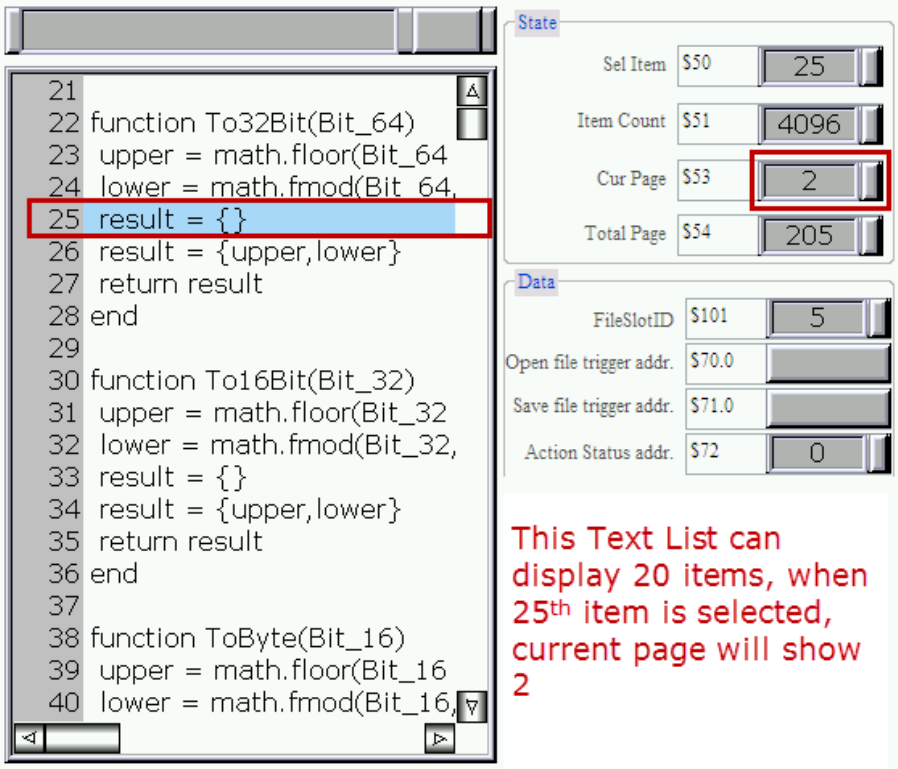
Figure 19-4-2 Main page of Text list

No.	Property	Function
(1)	Selected Item	➢ It shows the item number of the selected element. ➢ When you select the second row item, the number it shows on the selected item will be 2.

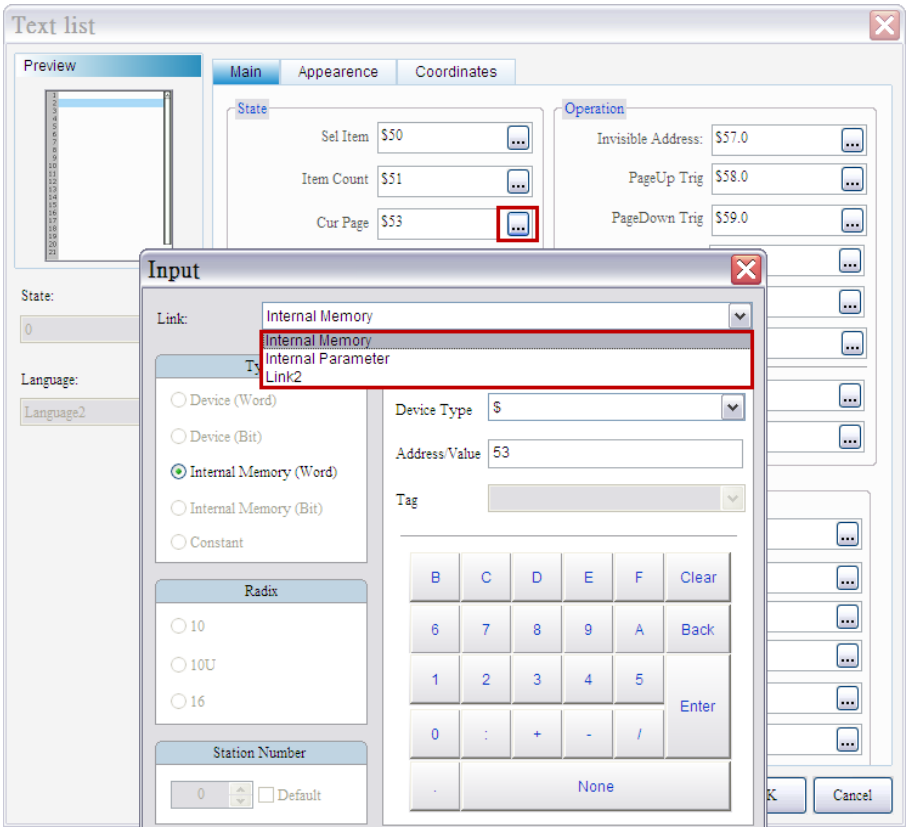
No.	Property	Function
		 ➢ It supports controller address (Word) and the address of internal register (Word). 
(2)	Actual Item Number	➢ It shows the actual item number that shows on the element.

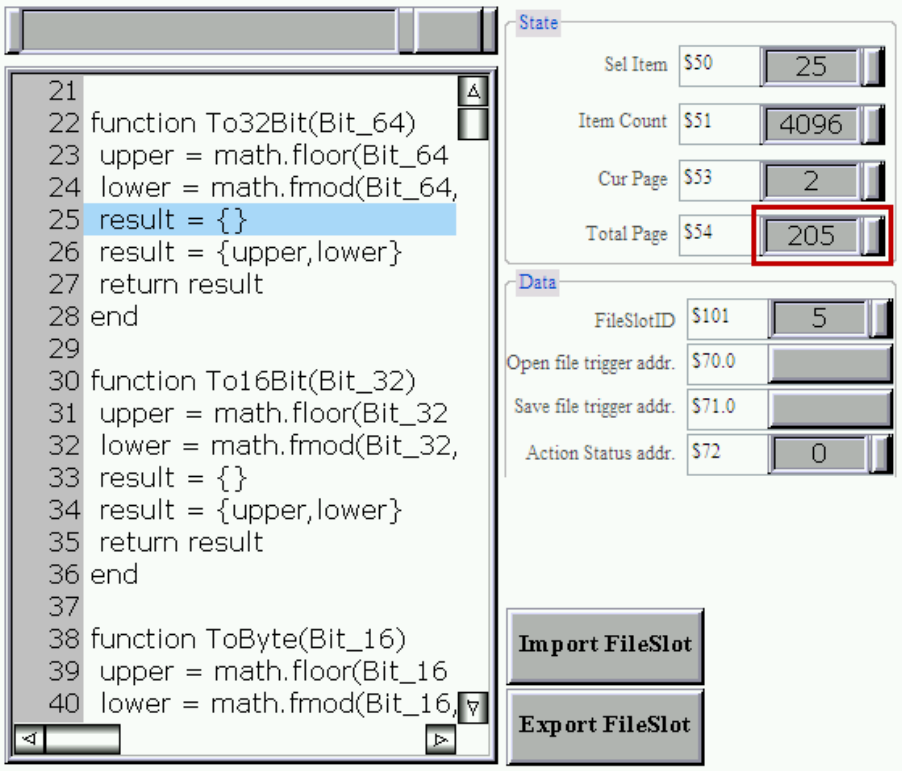
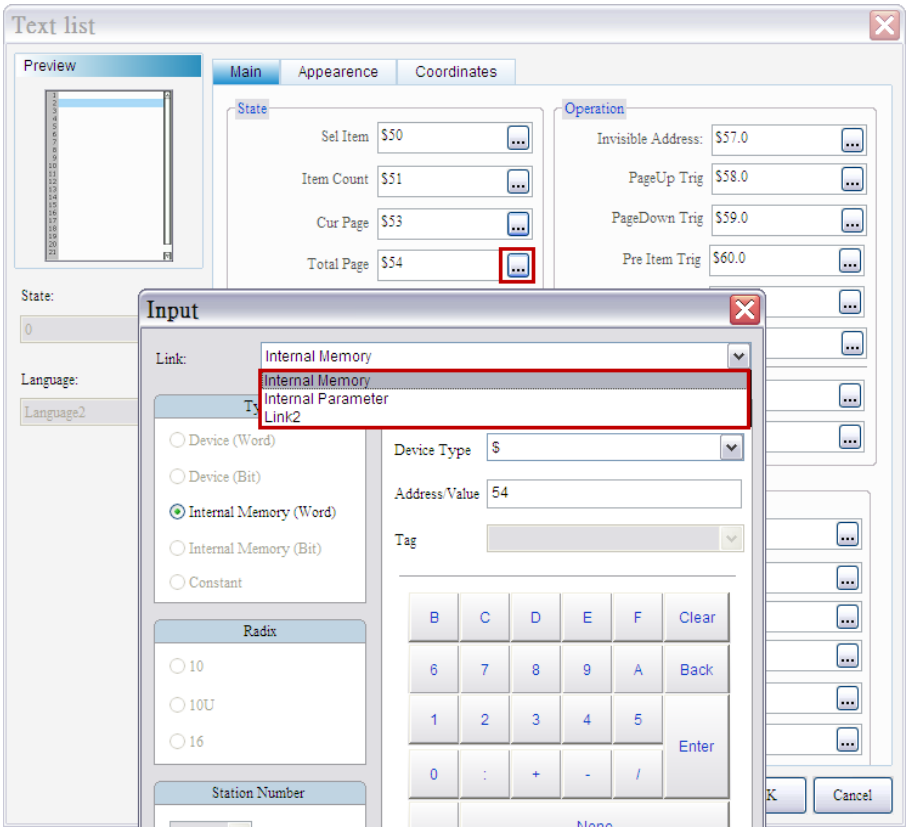
No.	Property	Function
		 ➢ It supports controller address (Word) and the address of internal register (Word). 
(3)	Current Page	➢ When FileSlot is displayed as a text file and its line number exceeds the displaying range in one page, elements will be displayed in a different page. And the property value will show the

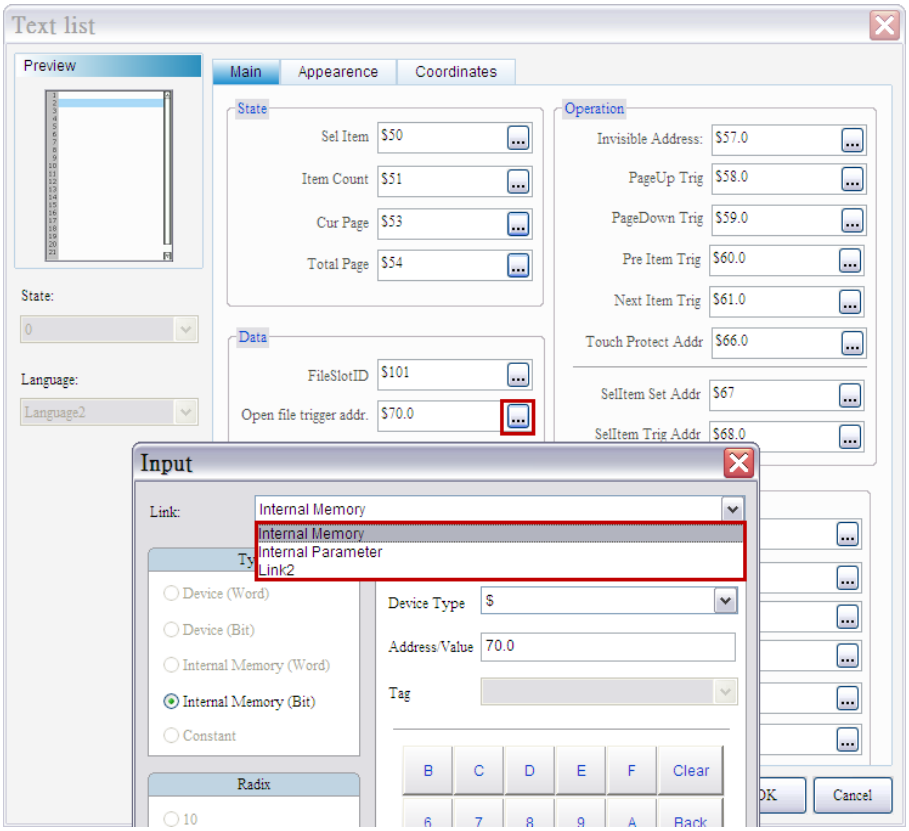
No.	Property	Function
		current page number.

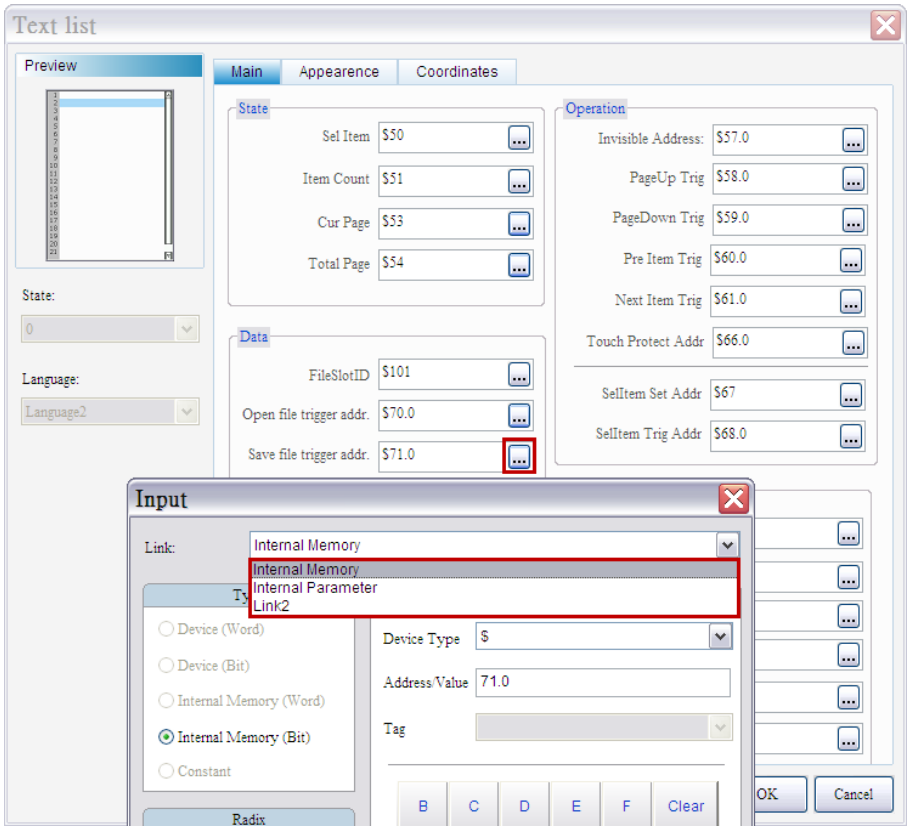


➢ It supports controller address (Word) and the address of internal register (Word).

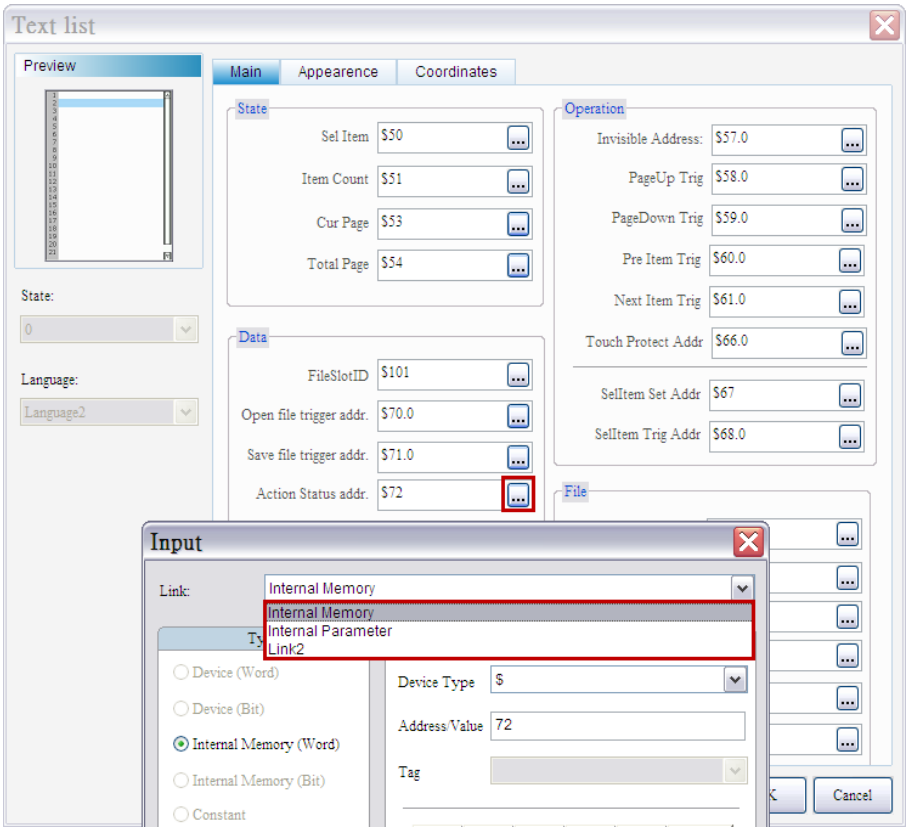


No.	Property	Function
(4)	Total Page	➢ This shows the total page when FileSlot is displayed as a text file.  ➢ It supports controller address (Word) and the address of internal register (Word). 

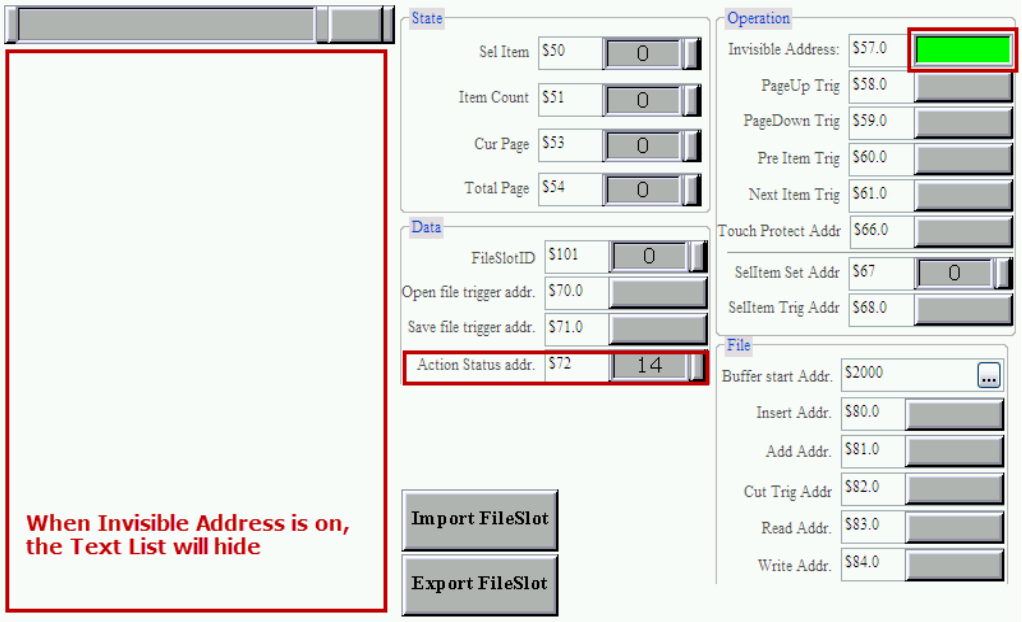
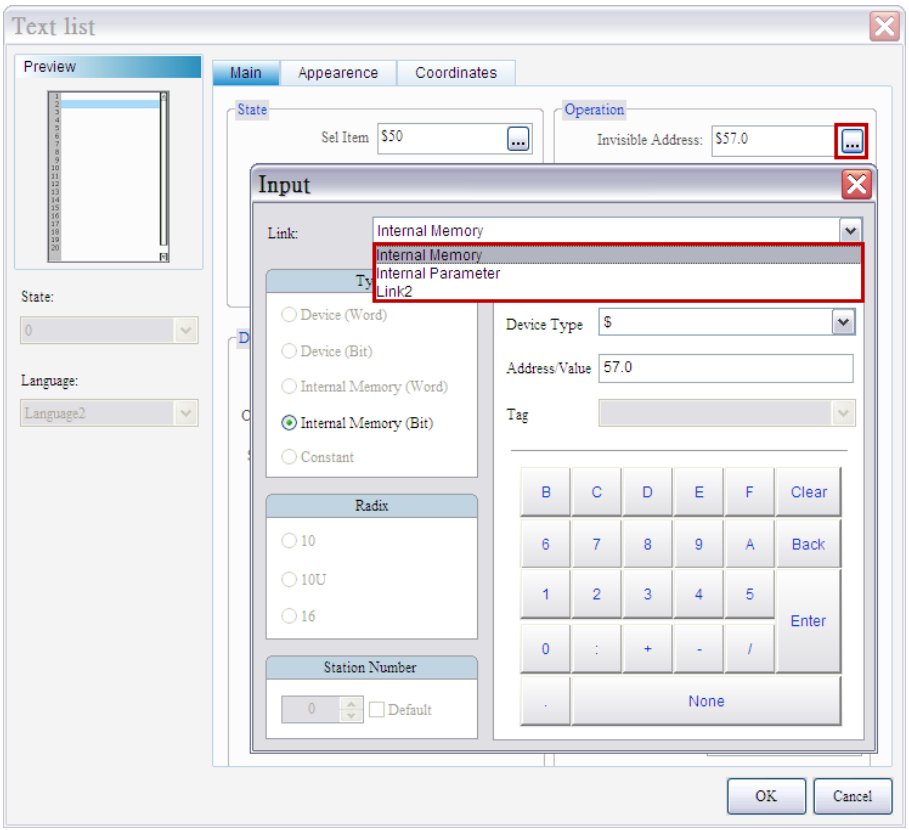
<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td>(5)</td><td>FileSlot ID</td><td>➢ It shows the text file ID of FileSlot.
➢ Please refer to 2-2-8-7 File Manage about the setting and usage of FileSlot.
➢ FileSlot ID can be a memory address or a constant.
<table>
<tr><th colspan="4">Memory Usage</th></tr>
<tr><th>Variables</th><th>Internal Memory</th><th>PLC Register</th><th>Constant</th></tr>
<tr><td>FileSlot ID</td><td>◎</td><td>◎</td><td>◎</td></tr>
</table></td></tr>
<tr><td>(6)</td><td>Open File Triggering Address</td><td>➢ When this bit is triggered, the specified FileSlotID will be displayed as a text file. Then, the flag will be off automatically.
➢ If the specified FileSlotID is 0 or does not exist, it is unable to trigger this bit.
➢ It supports controller address (Bit) and the address of internal register (Bit).
 
</td></tr>
<tr><td>(7)</td><td>Save File Triggering Address</td><td>➢ When this bit is On, the edited result will be saved in the specified FileSlotID address. Then, the flag will be off automatically.
➢ If the specified FileSlotID is 0 or does not exist, it is unable to trigger this bit.
➢ It supports controller address (Bit) and the address of internal register (Bit).</td></tr>
</table>

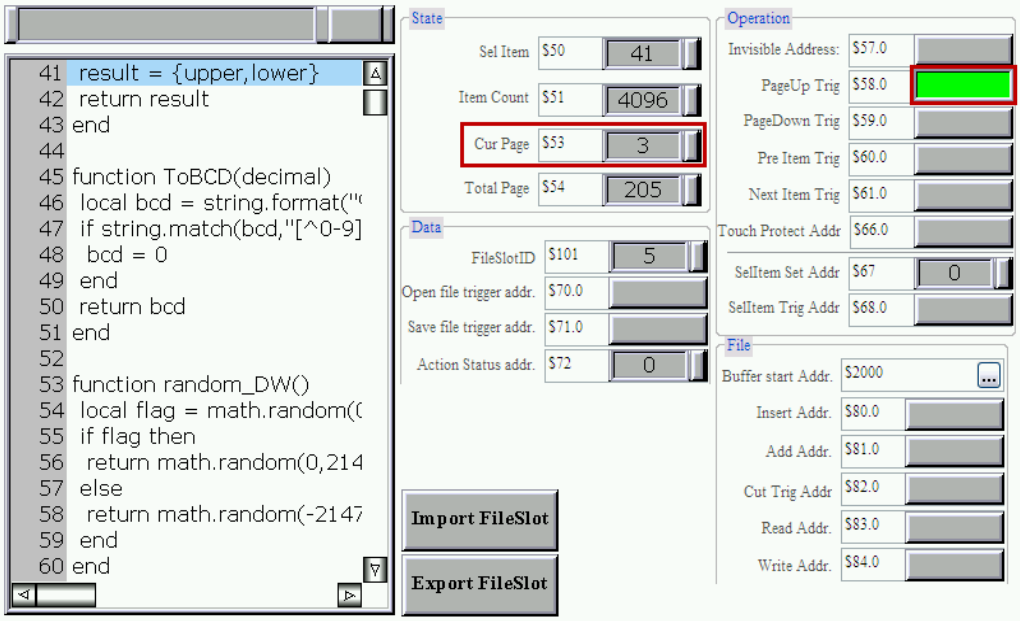
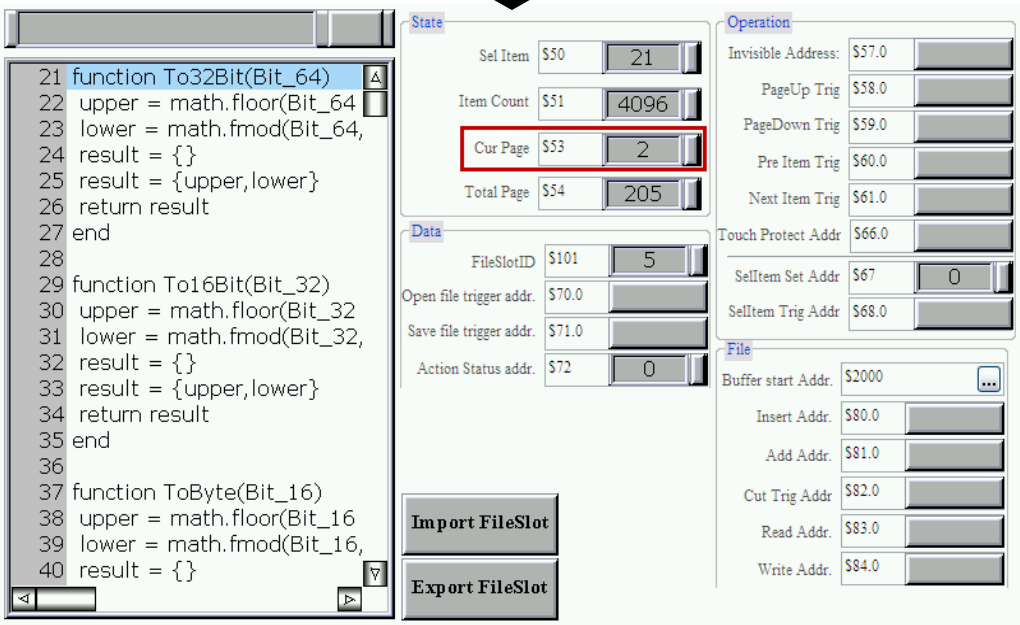
No.	Property	Function
		
(8)	Action Status Address	➢ When reading and editing the text file, the code of Action Status Address will be displayed in this address. ➢ See the descriptions as below:

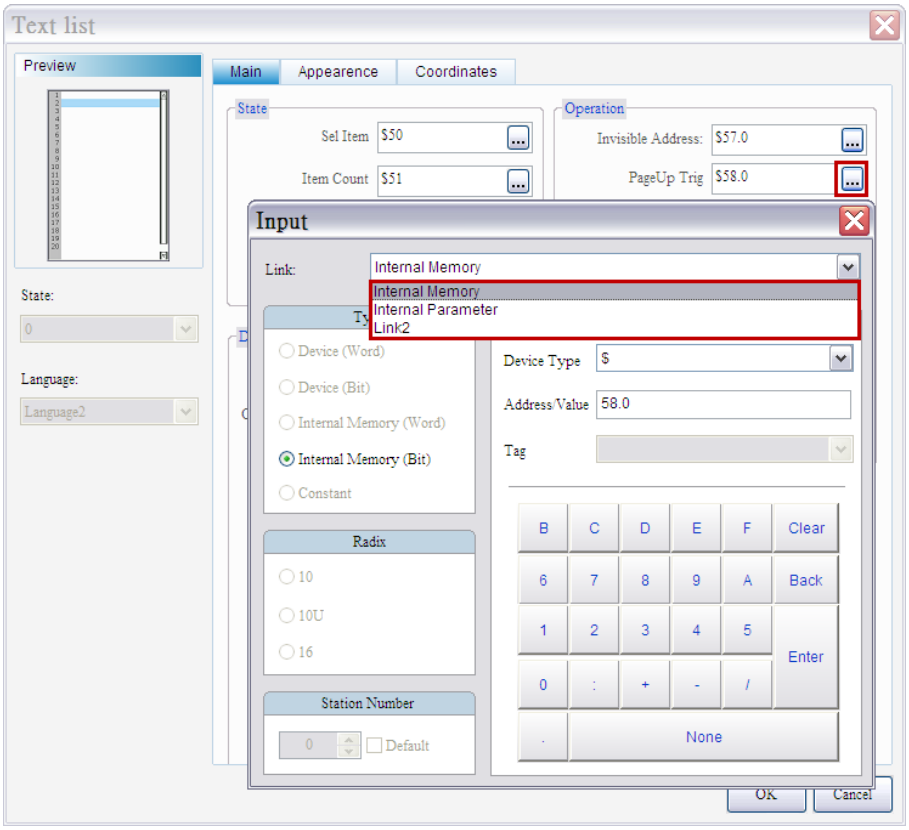
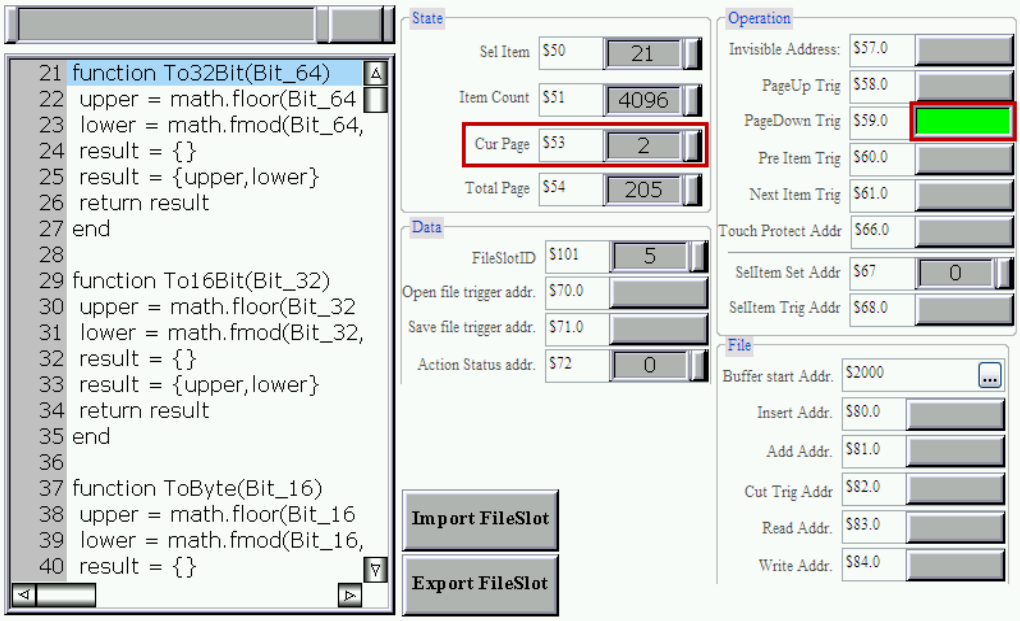
Code	Name
0	Normal
1	Invalid line number
2	Fail to arrange the memory
3	The file does not exist
4	Fail to delete the file
5	Fail to open the file
6	Fail to write to the file
7	Open or save the file without specifying FileSlotID address
8	Set the selected item without specifying the item
9	Set the selected page without specifying the page
10	Exceeds the max. line number (4096 lines)
11	Exceeds the max. character limit in one line (128 characters)
12	Fail to read the data

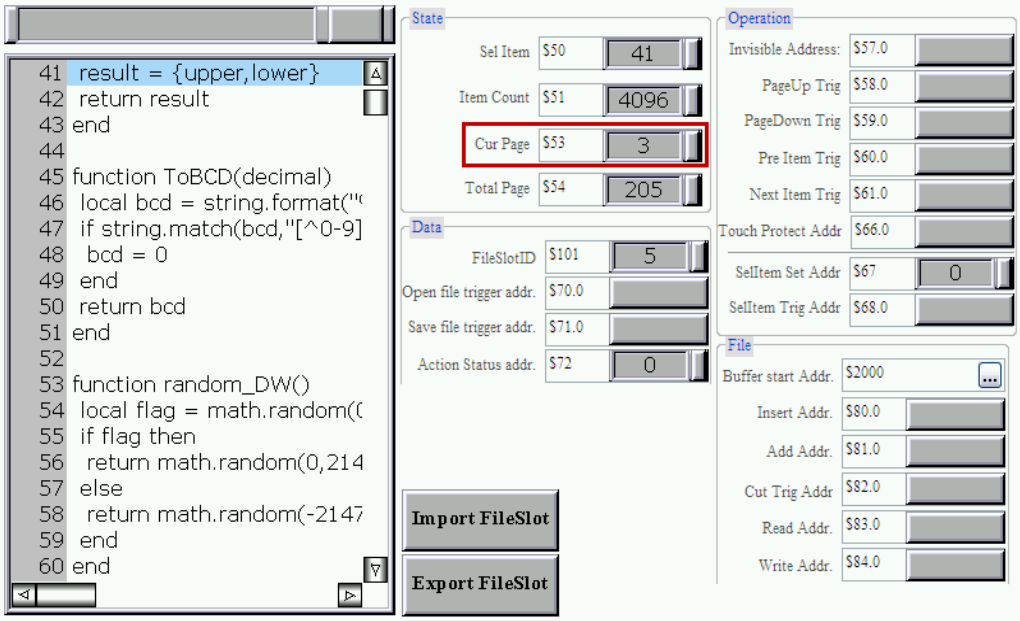
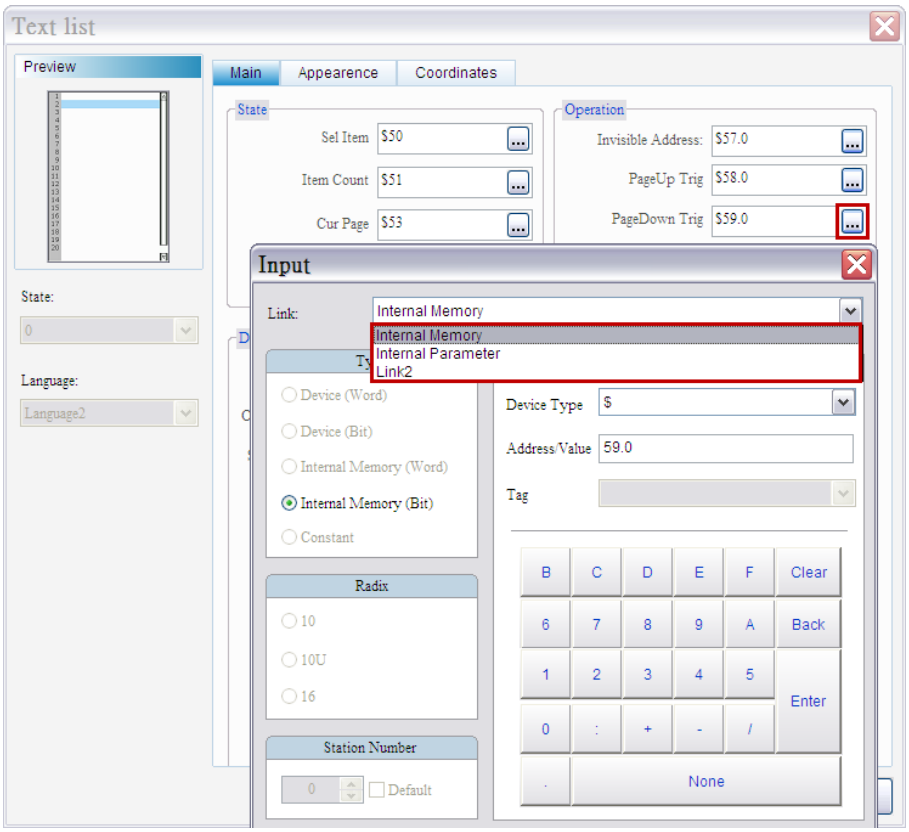
<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><td>13</td><td>Activate touch protection</td></tr>
<tr><td>14</td><td>Element is invisible</td></tr>
<tr><td>15</td><td>Illegal character (non-ASCII character) is included in the file</td></tr>
</table>
➢ When there is more than one Action Status, it only shows the code with bigger number. For example, when the file content exceeds the max. line number (code: 10) and includes the illegal character (code: 15), [Action Status Address] will only show 15.
➢ It supports controller address (Word) and the address of internal register (Word).


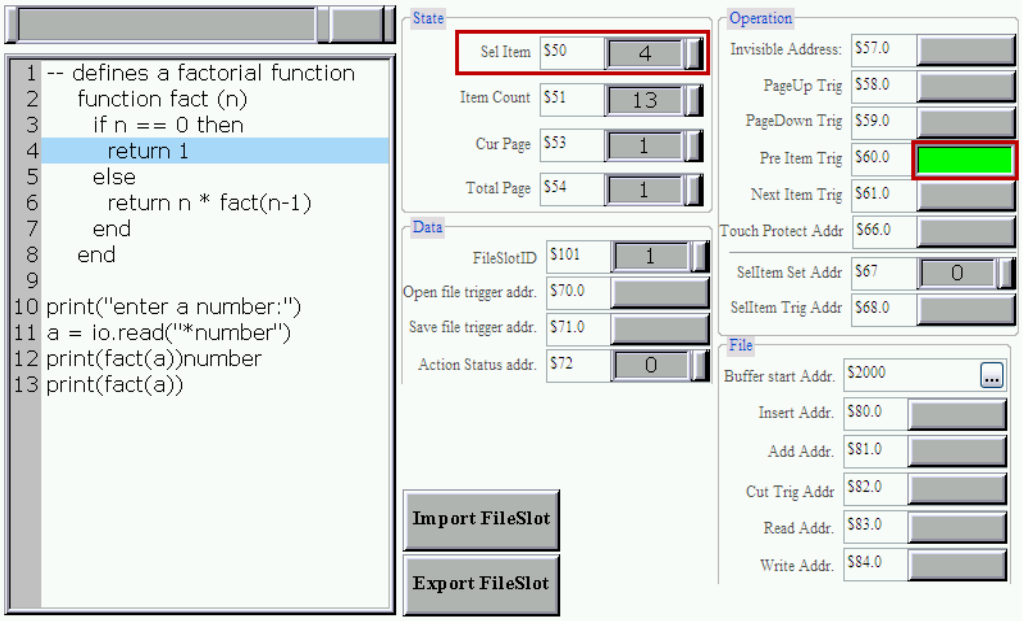
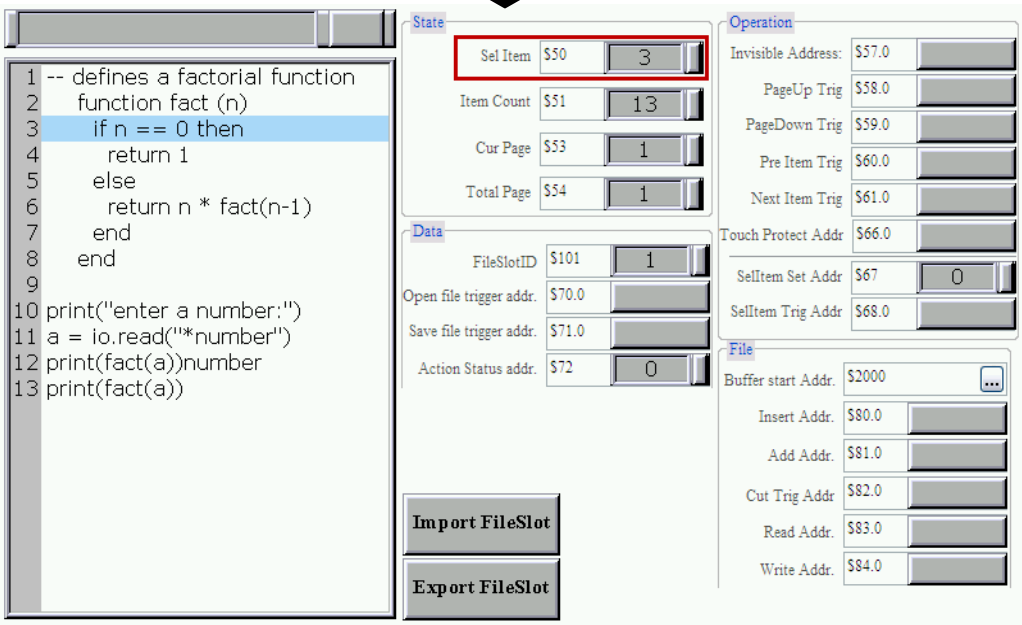
</td></tr>
<tr><td>(9)</td><td>Invisible Address</td><td>➢ When this bit is On, the element is hidden and [Action Status Address] shows 14. When this bit is Off, the element is visible.</td></tr>
</table>

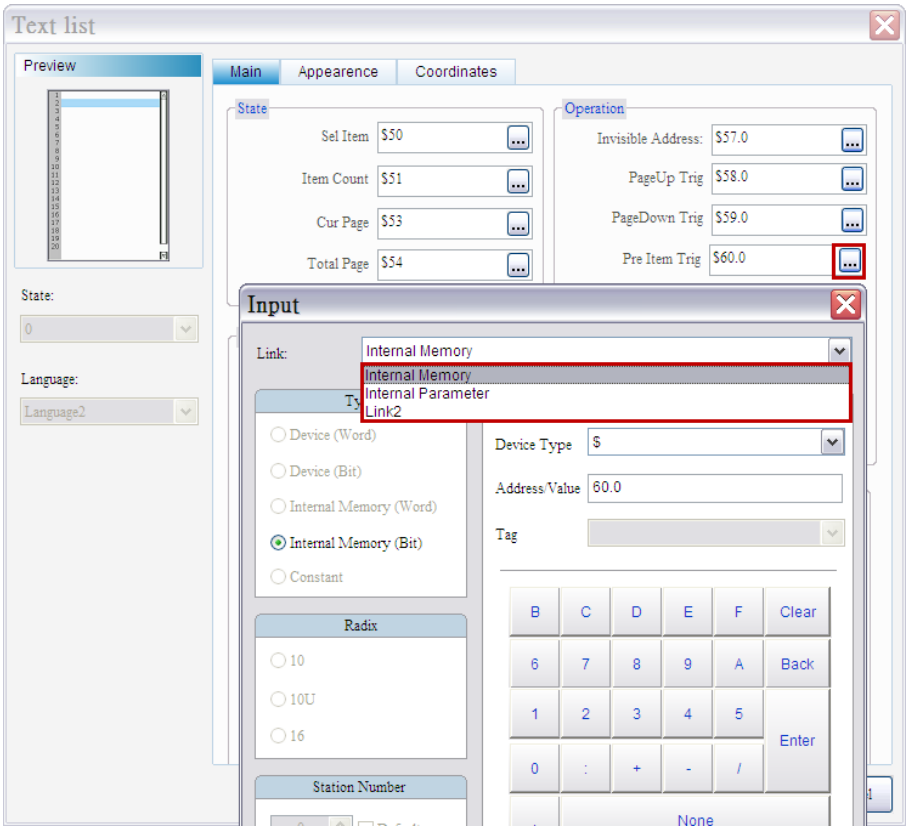
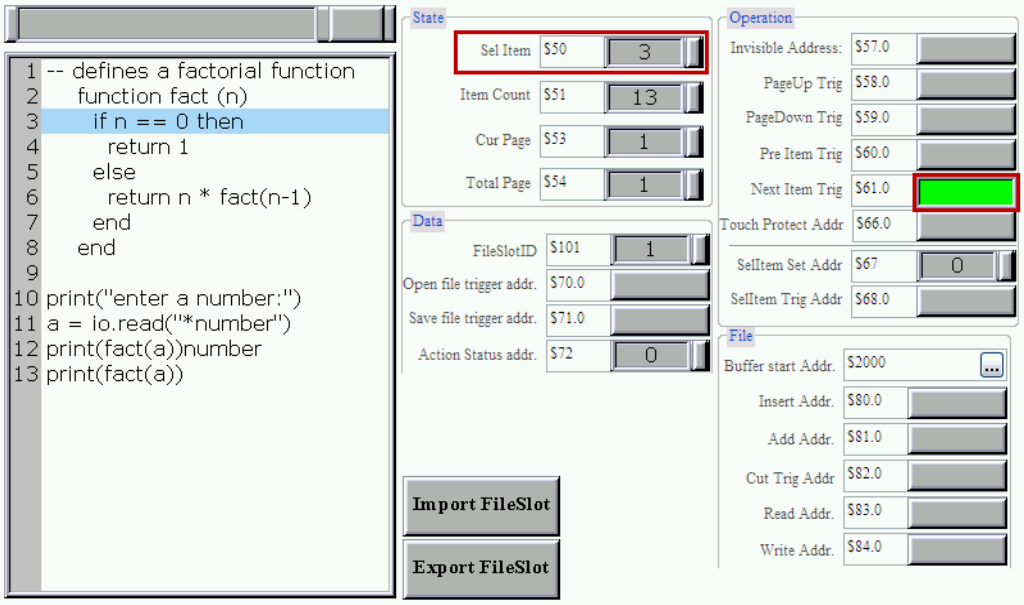
No.	Property	Function
		 ➢ It supports controller address (Bit) and the address of internal register (Bit). 
(10)	PageUp Triggering Address	➢ When this bit is On, it will switch to the previous page. Then, the flag is Off automatically. ➢ If the [Current page] is the first page, it will remain at the first page when this bit is On. ➢ If this bit is Off and the [Current page] is the third page, the [Current screen] will switch to the second page when this bit is On.

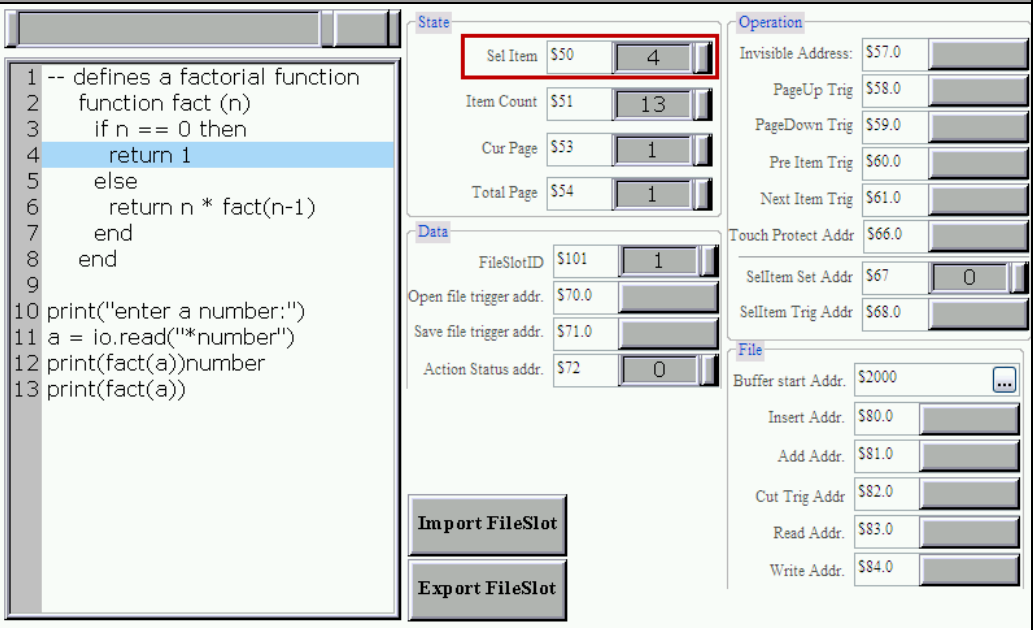
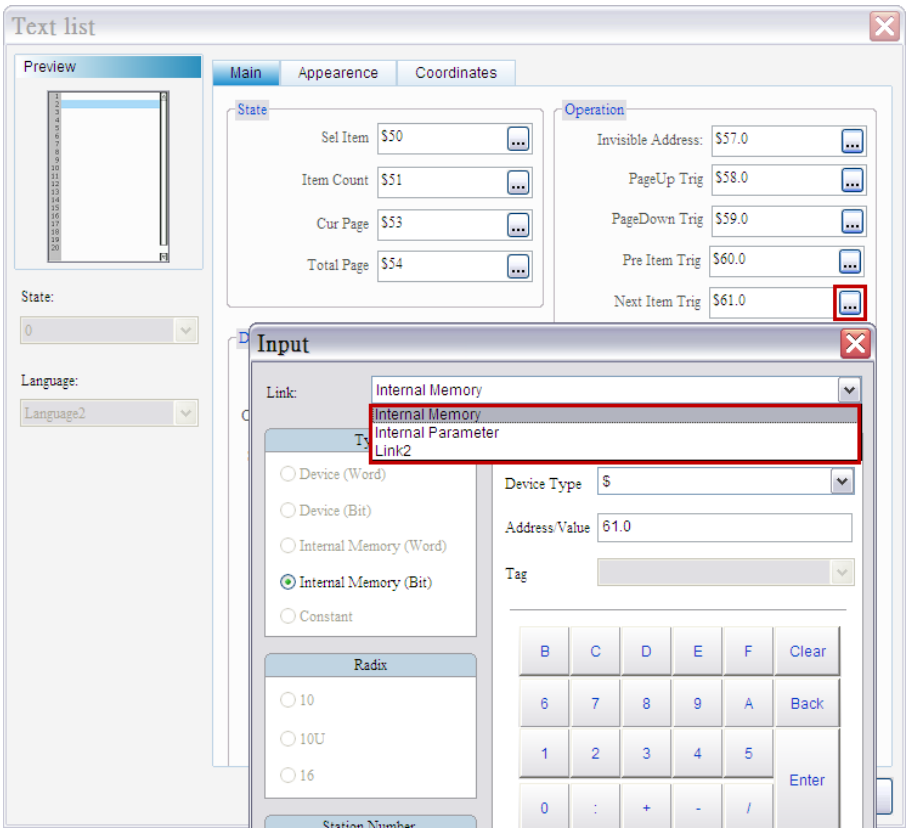
No.	Property	Function
		  ➢ It supports controller address (Bit) and the address of internal register (Bit).

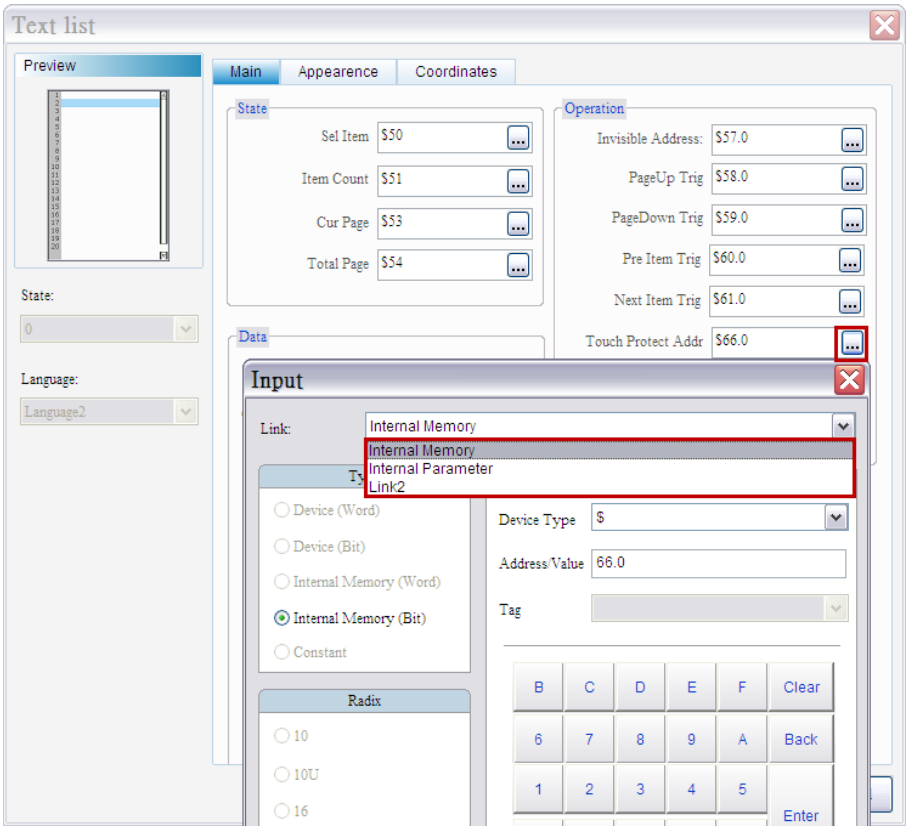
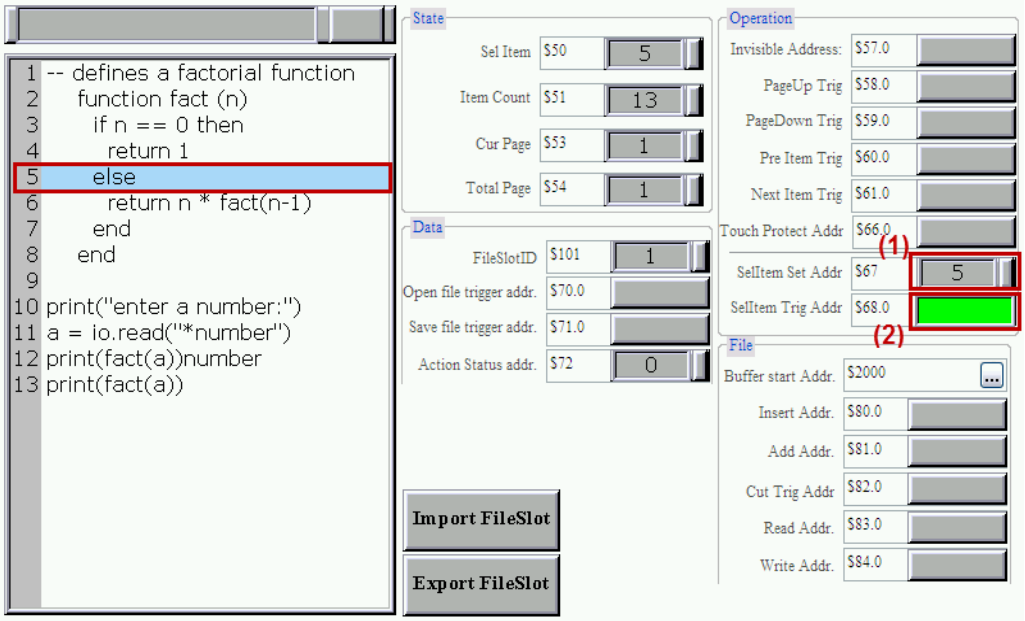
No.	Property	Function
		
(11)	PageDown Triggering Address	➢ When this bit is On, it will switch to the next page. Then, the flag is Off automatically. ➢ If the [Current page] is the [Total page], it will remain at the last page when this bit is On. ➢ If this bit is Off and the [Current page] is the second page, the [Current screen] will switch to the third page when this bit is On. 

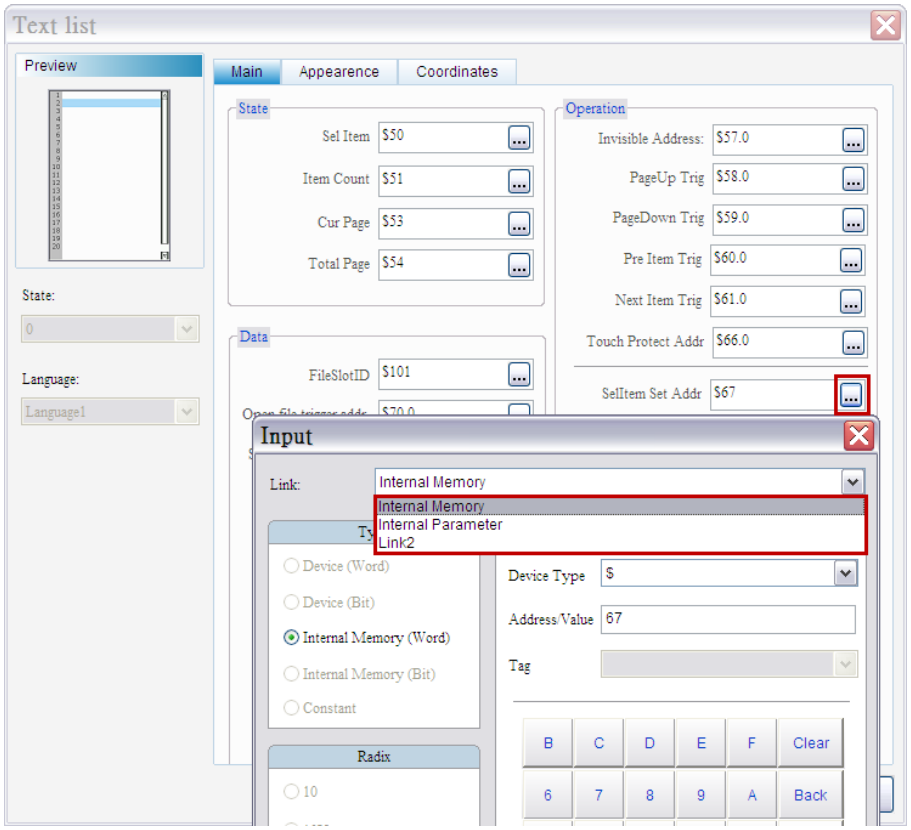
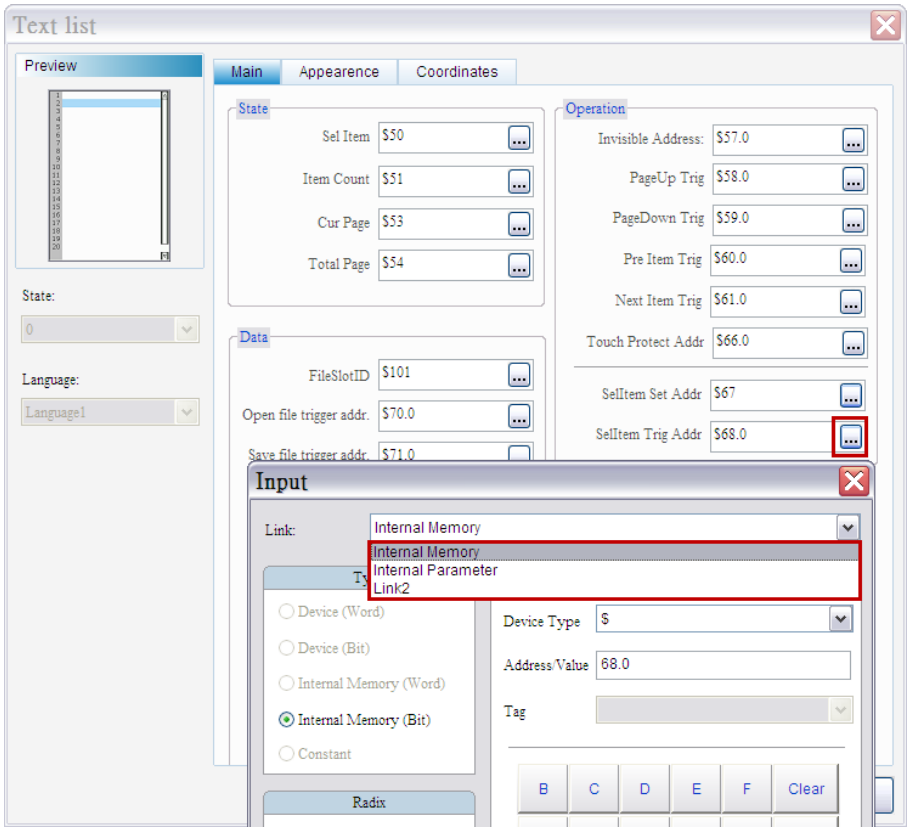
No.	Property	Function
		 ➢ It supports controller address (Bit) and the address of internal register (Bit). 
(12)	Previous Item Triggering Address	➢ When this bit is On, it will select the previous item. Then, the flag is Off automatically. ➢ If the [Selected item] is the first item, it will remain at the first item when this bit is On. ➢ If this bit is Off and the [Selected item] is the fourth one, it will select the third item when this bit is On.

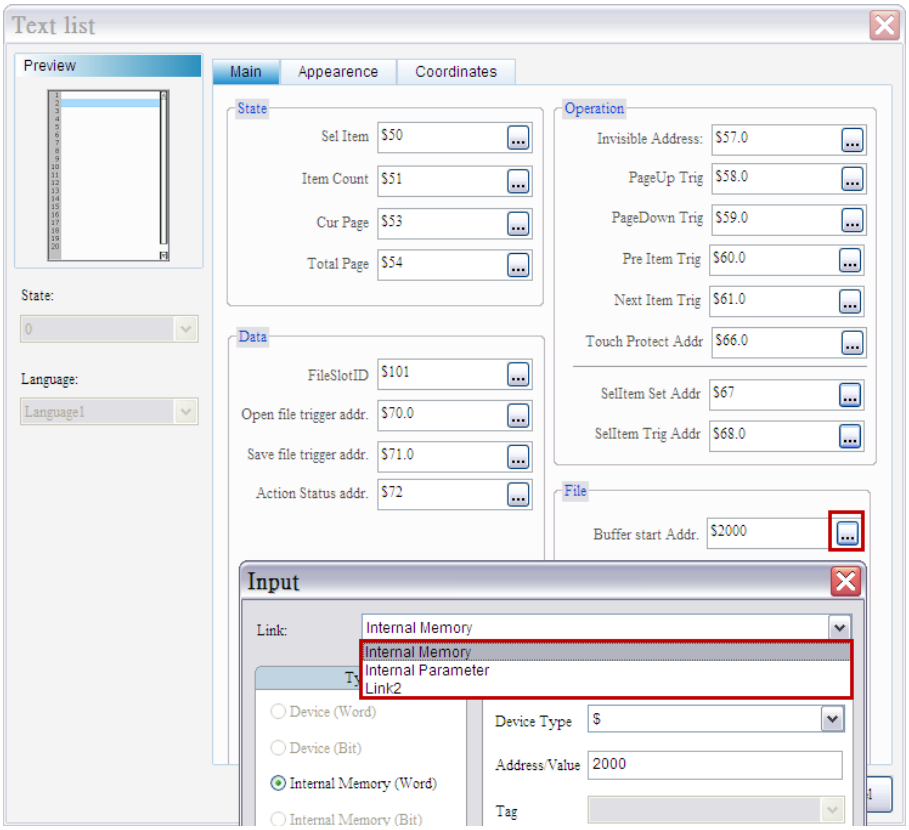
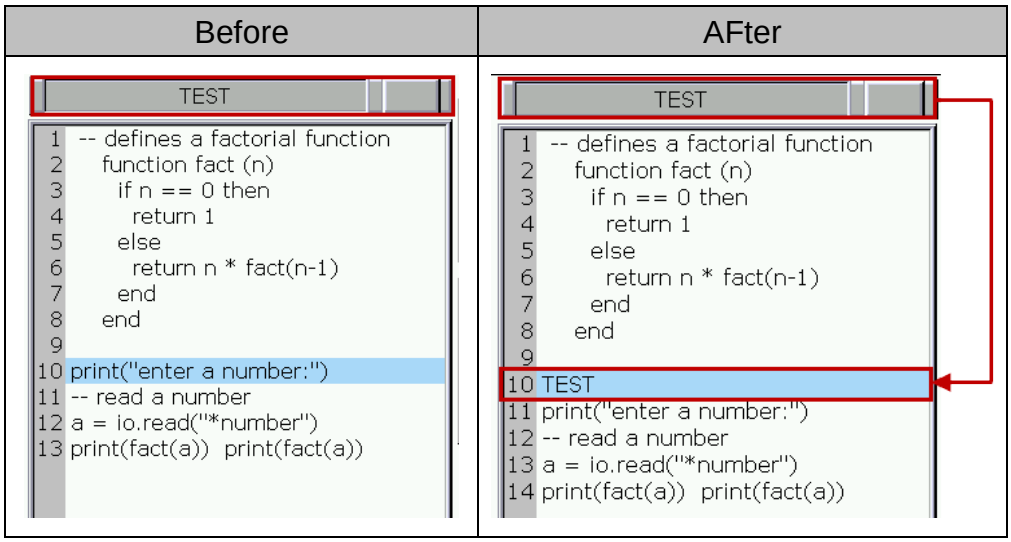
No.	Property	Function
		  ➢ It supports controller address (Bit) and the address of internal register (Bit).

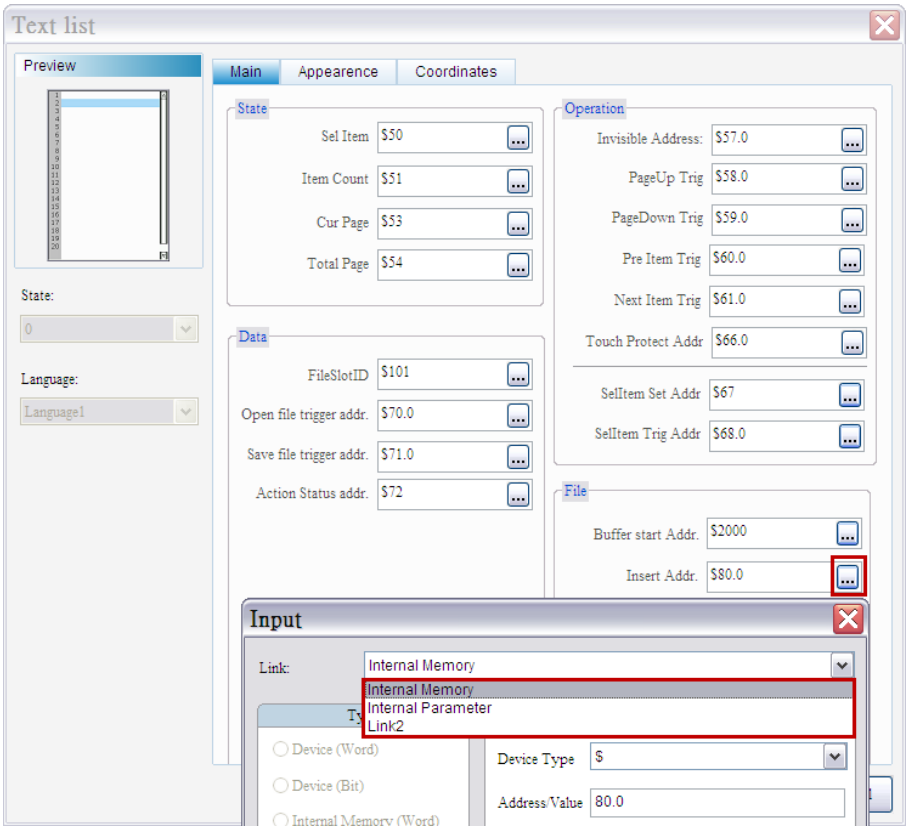
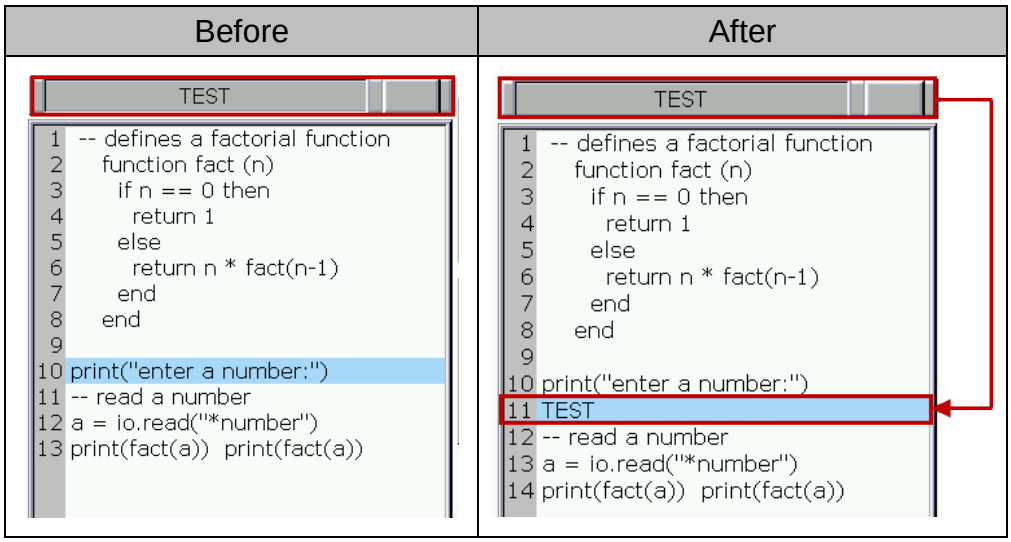
No.	Property	Function
		
(13)	Next Item Triggering Address	➢ When this bit is On, it will select the next item. Then, the flag is Off automatically. ➢ If the [Selected item] is the [Actual item number], it will remain at the last item when this bit is On. ➢ If this bit is Off and the [Selected item] is the third one, it will select the fourth item when this bit is On. 

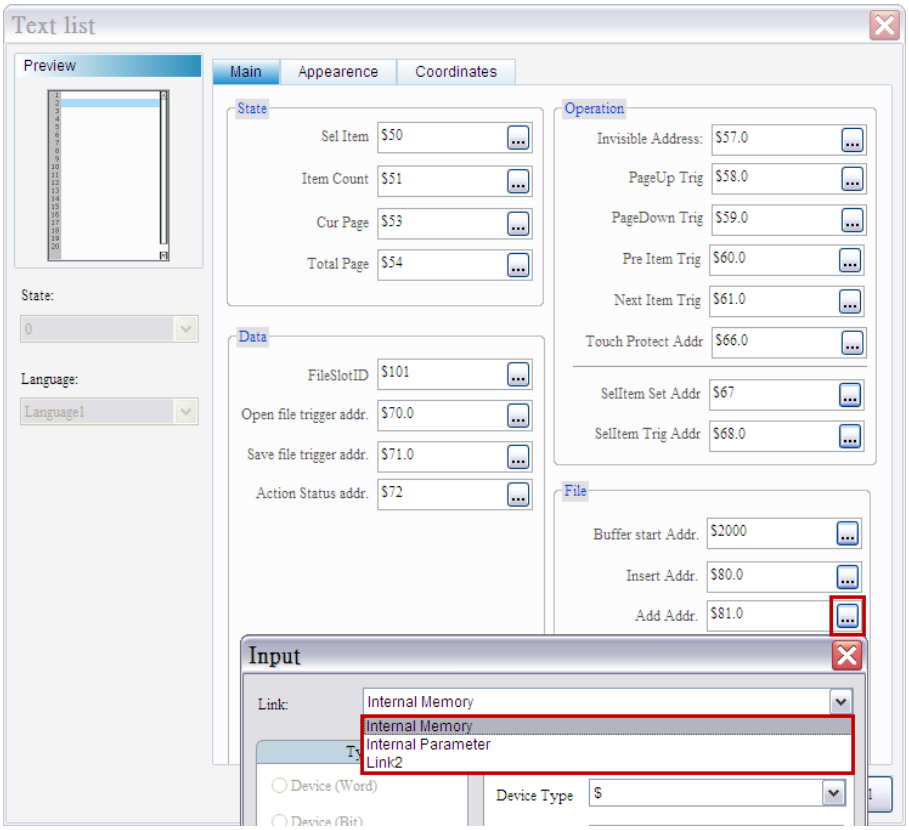
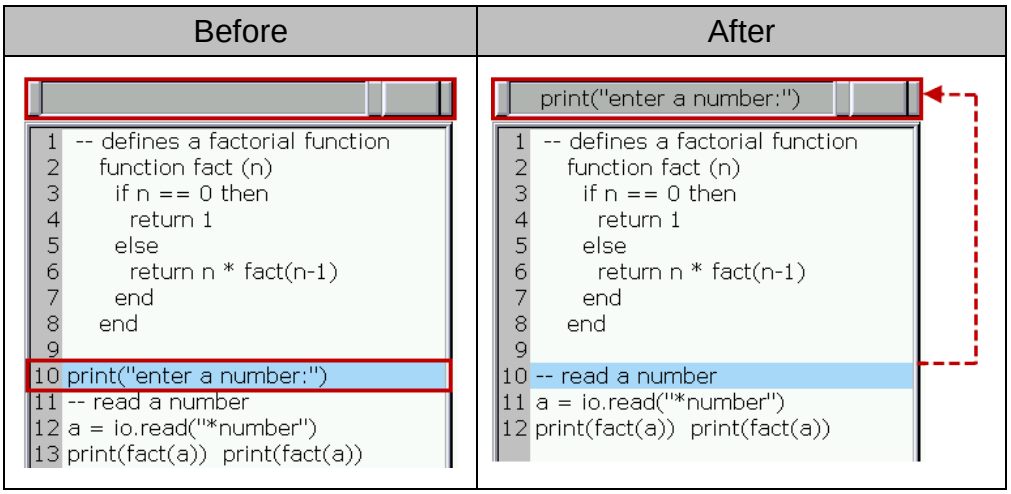
No.	Property	Function
		 ➢ It supports controller address (Bit) and the address of internal register (Bit). 
(14)	Touch Protection Address	➢ When this bit is On, the element is untouchable and [Action status address] will show 13. When this bit is Off, the element becomes touchable. ➢ It supports controller address (Bit) and the address of internal register (Bit).

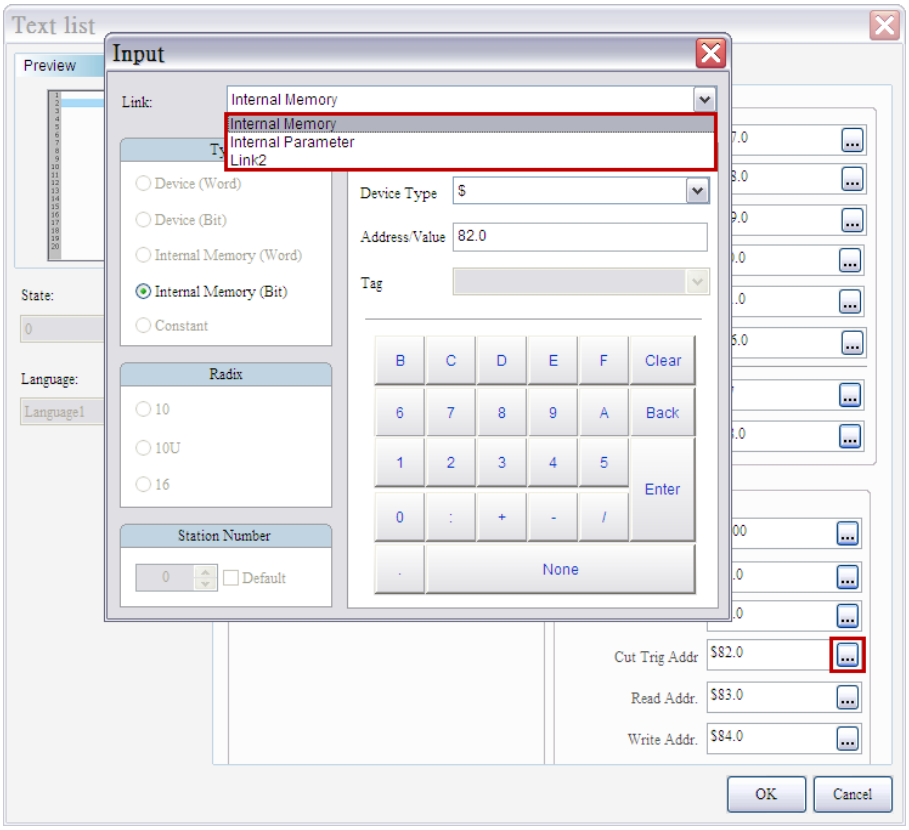
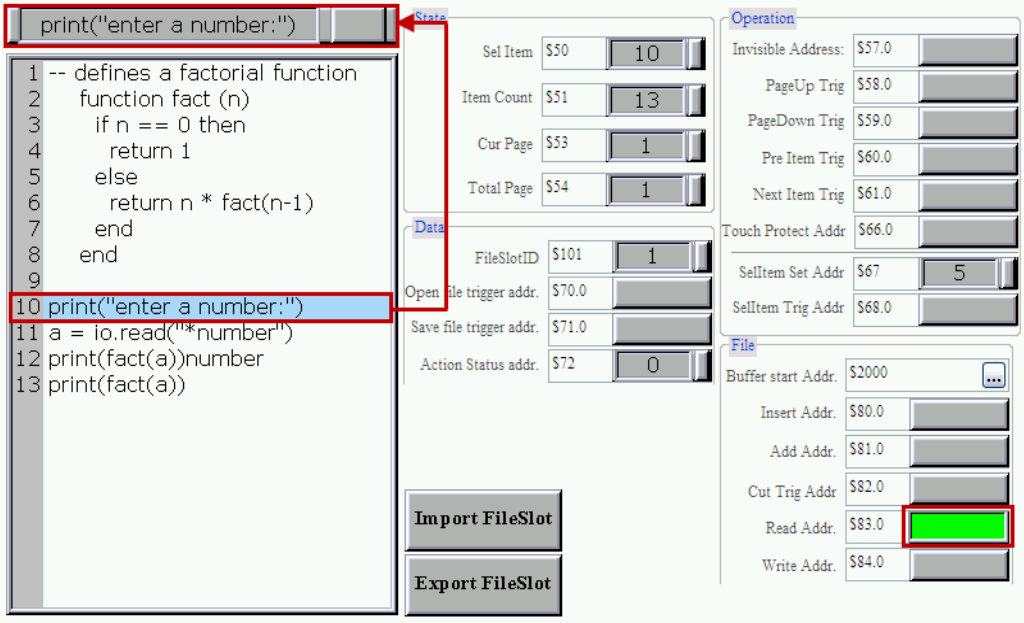
No.	Property	Function
		
(15)	SelItem Set Address SelItem Triggering Address	➢ Specify the selected item via [SelItem set address] and turn on the bit of [SelItem Triggering Address], then the element will display the selected item.  ➢ [SelItem set address] supports controller address (Word) and the address of internal register (Word).

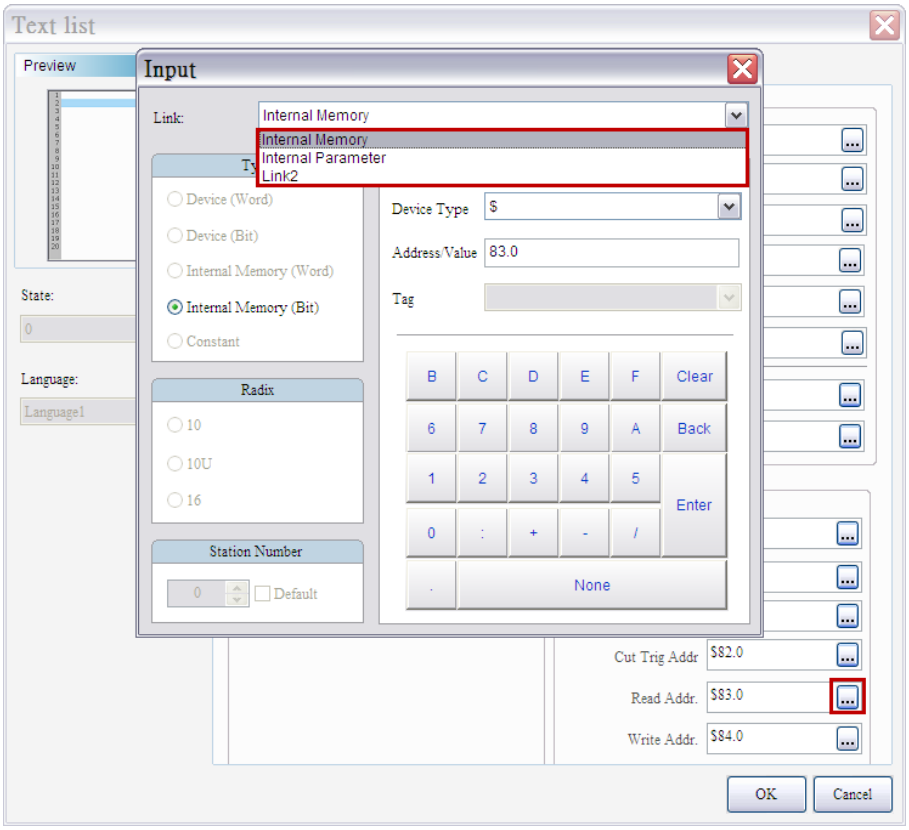
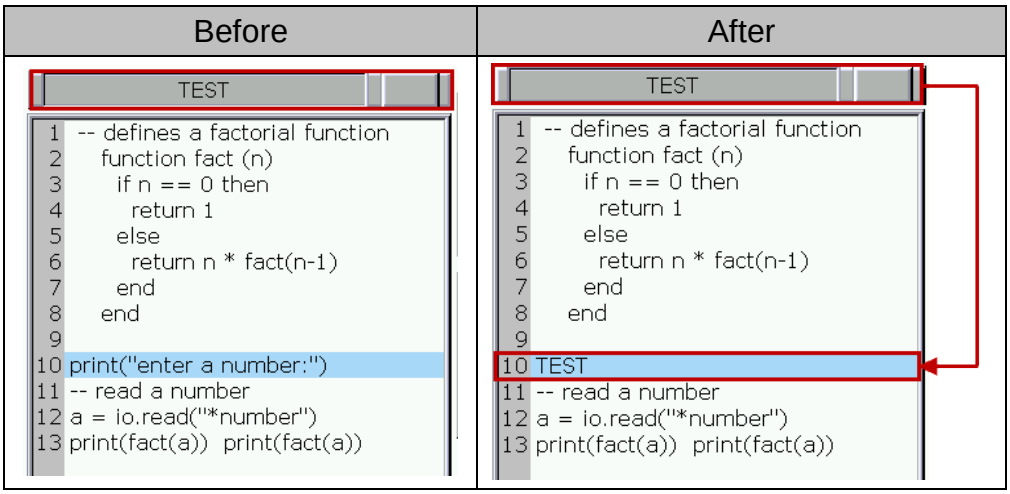
No.	Property	Function
		 ➢ [SelItem Triggering Address] supports controller address (Bit) and the address of internal register (Bit). 
(16)	Buffer Start	➢ It is the start address that temporary memory saves the data. Users

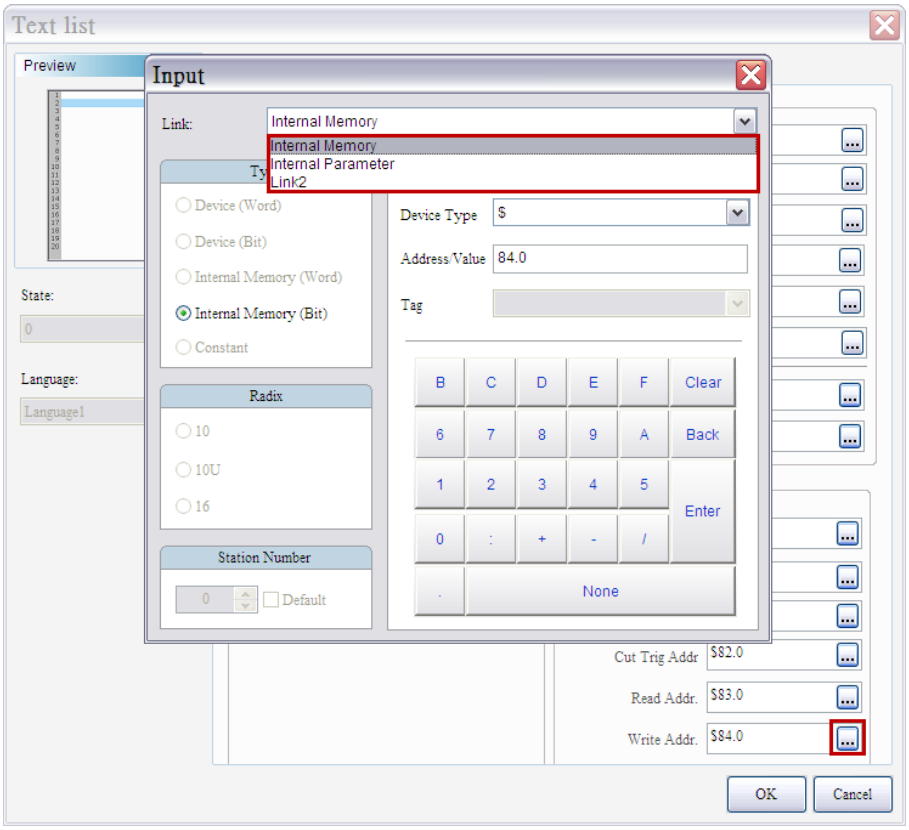
No.	Property	Function
	Address	can insert, add and write the data in temporary memory to the selected item. Or the user can read data saved in selected item to the t temporary memory. ➢ It supports controller address (Word) and the address of internal register (Word). 
(17)	Insert Address	➢ When this bit is On, the element will insert the [Selected item] to the address that starts from [Buffer start address] followed by data of 128 bits (64 words in total).  ➢ It supports controller address (Bit) and the address of internal register (Bit).

No.	Property	Function
		
(18)	Add Address	➢ When this bit is On, the element will add one item right after the [Selected item] to the address that starts from [Buffer start address] followed by data of 128 bits (64 words in total).  ➢ It supports controller address (Bit) and the address of internal register (Bit).

No.	Property	Function
		
(19)	Cut Address	➢ When this bit is On, the element will save the data of 128 bits (64 words in total) starting from the [Selected item] to [Buffer start address] and delete [Selected item] in the text list.  ➢ It supports controller address (Bit) and the address of internal register (Bit).

No.	Property	Function
		
(20)	Read Address	➢ When this bit is On, the element will save the data of 128 bits (64 words in total) starting from the [Selected item] to [Buffer start address]. This will not change the content of the text list.  ➢ It supports controller address (Bit) and the address of internal register (Bit).

No.	Property	Function
		
(21)	Write Address	➢ When this bit is On, the element will write the data of 128 bits (64 words in total) to the [Selected item] starting from [Buffer start address] and replace the original content saved in [Selected item].  ➢ It supports controller address (Bit) and the address of internal register (Bit).

No.	Property	Function
		

◆ Appearance

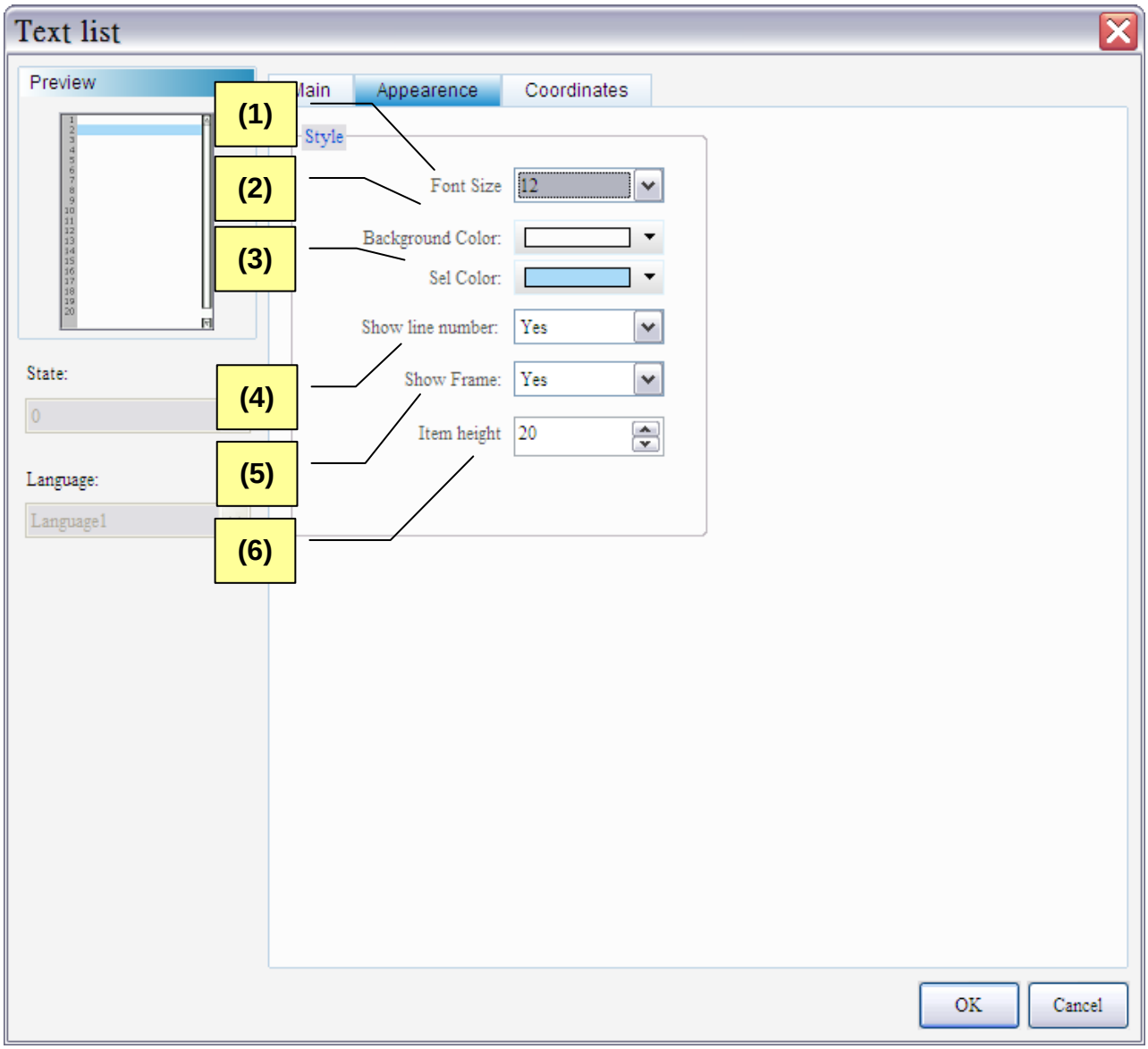
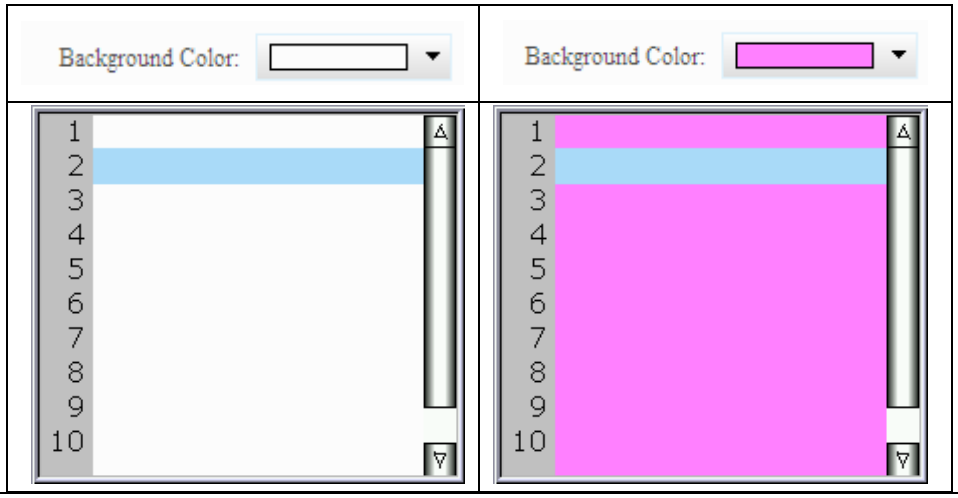
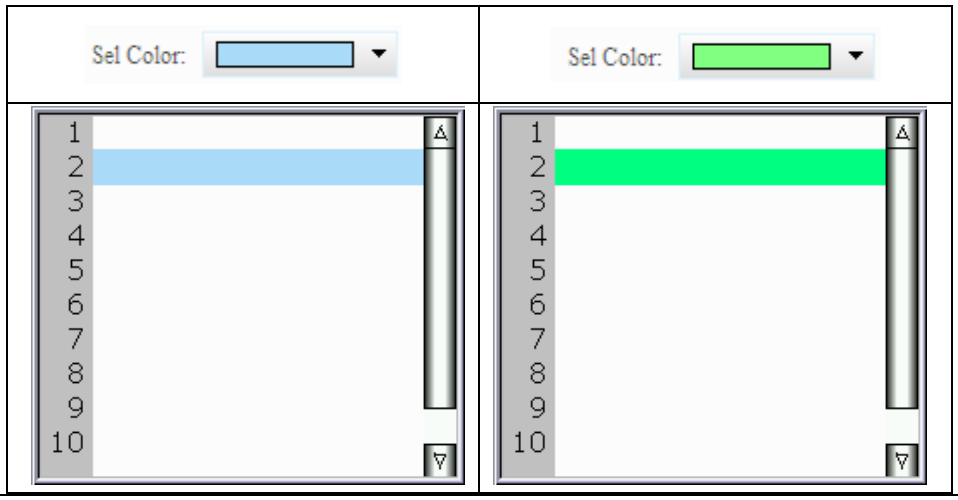
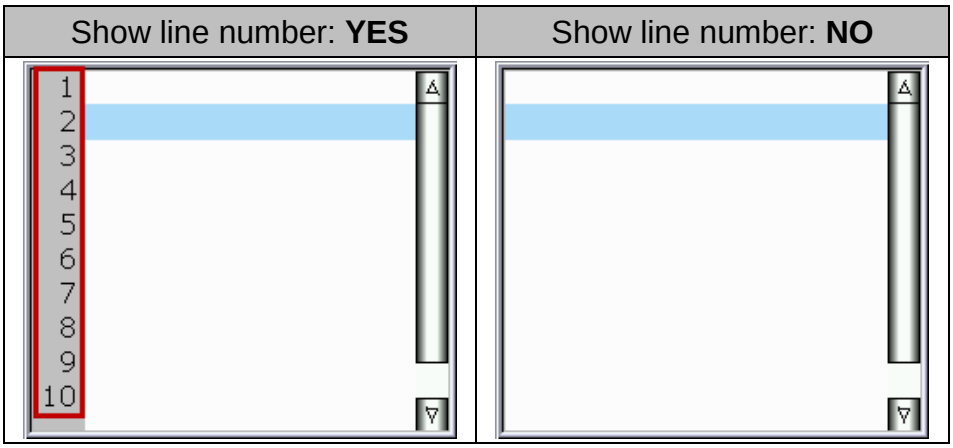
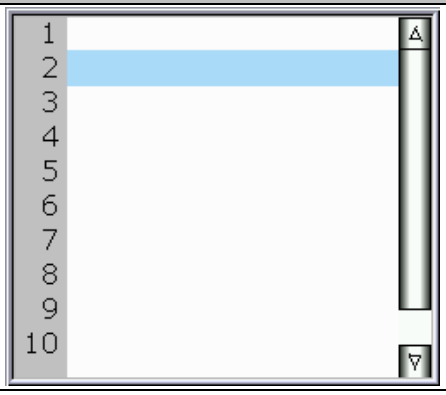
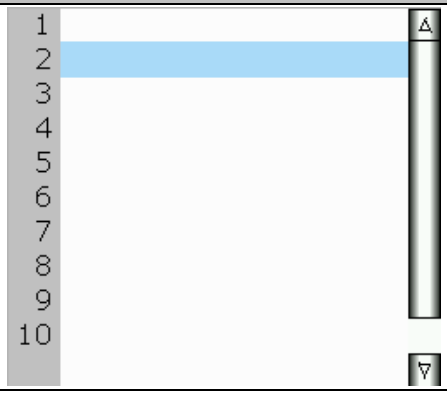


Figure 19-4-3 Appearance Property Setting Screen of Text List

No.	Property	Function
(1)	Font size	➢ It can set up the font size that displayed in the text list.

No.	Property	Function
(2)	Background color	➢ It can set the background color of the element. 
(3)	Set color	➢ It can set the color for the selected item. 
(4)	Show line number	➢ Users can determine whether to show the line number or not. 

No.	Property	Function
(5)	Show frame	➢ Users can determine whether to show frame or not. Show frame: **YES**  Show frame: **NO** 
(6)	Item height	➢ This can set the height of one single line. The minimum value is 1 and the maximum is 256.

◆ Coordinates

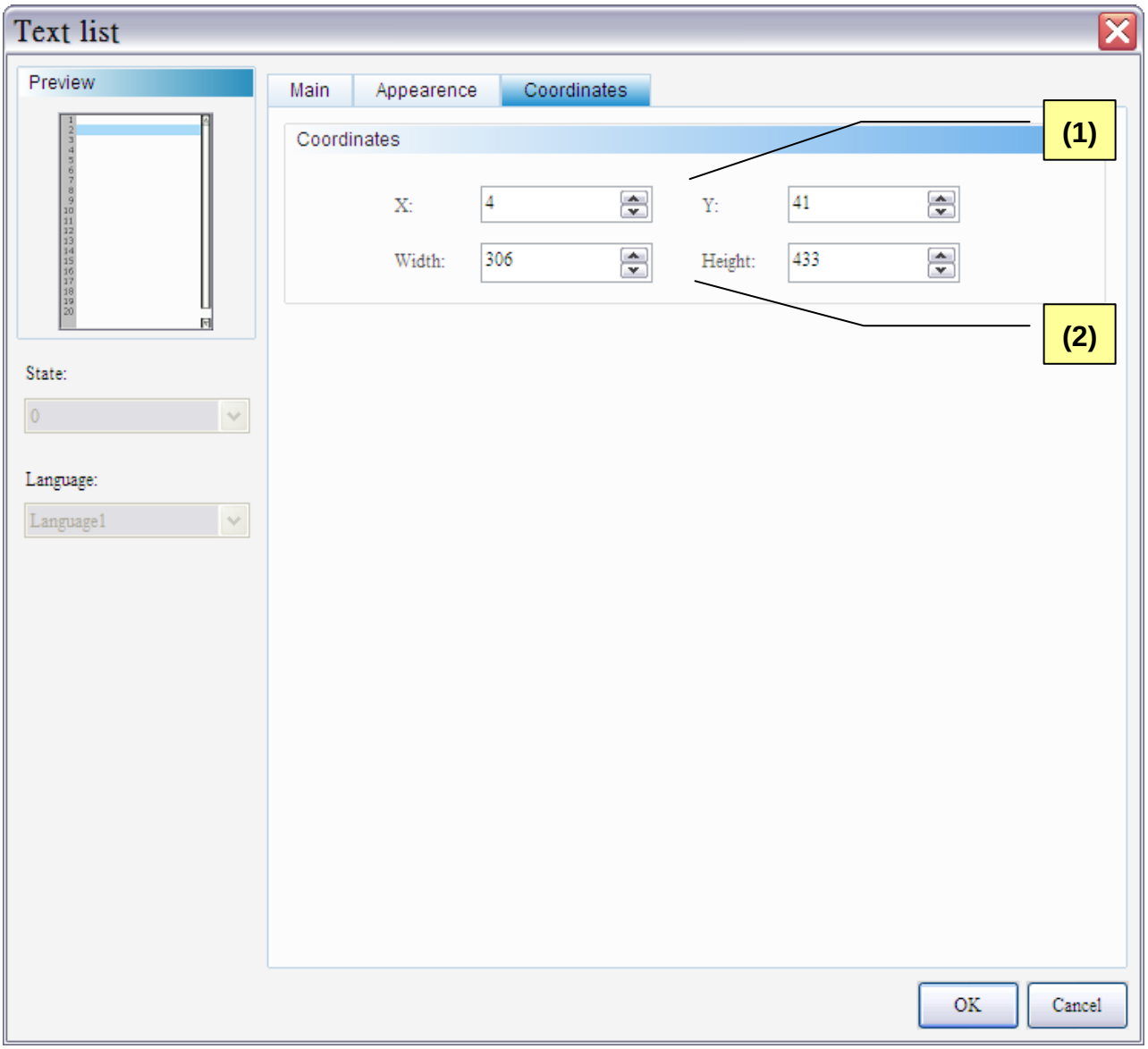


Figure 19-4-4 Coordinates Property Setting Page of Text List

No.	Property	Function
(1)	X-value and Y- value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width, Height	➢ Element width and height

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Chapter 20 Frame

This chapter mainly describes the detailed settings of frame element provided by DOPSoft.

◆ Classification table of frame element:

Frame		Embedded SubScreen
		Ladder Monitor Screen

Table 20-1-1 Classification Table of Frame Element

◆ Property Table of Frame Element

Frame Element	LeftTop-X	LeftTop-Y	Embedded SubScreen	Invisible Address	Background color	Foreground Color	Color of Value
Embedded SubScreen	◎	◎	◎	◎			
Ladder Monitor Screen				◎	◎	◎	◎

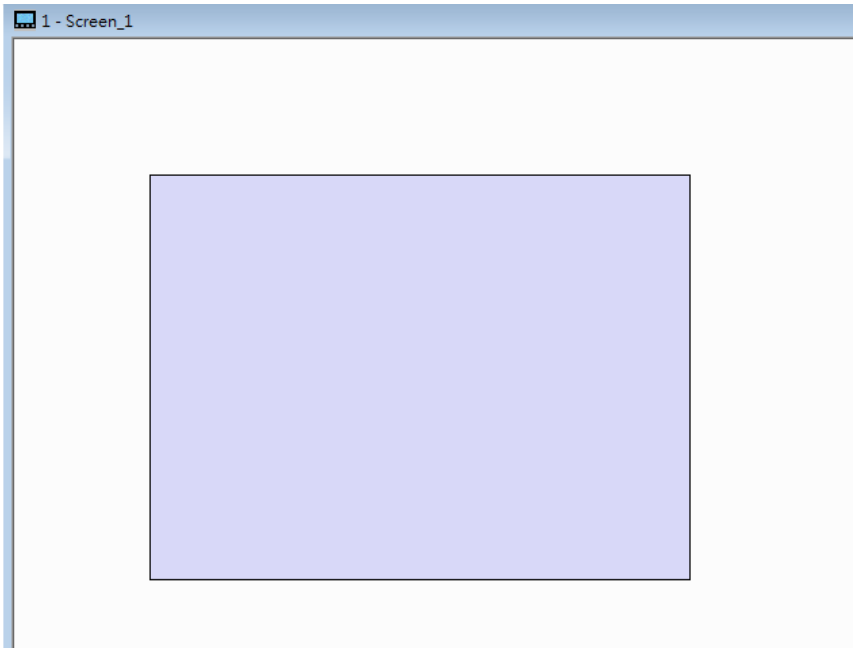
Table 20-1-2 Property Table of Frame Element

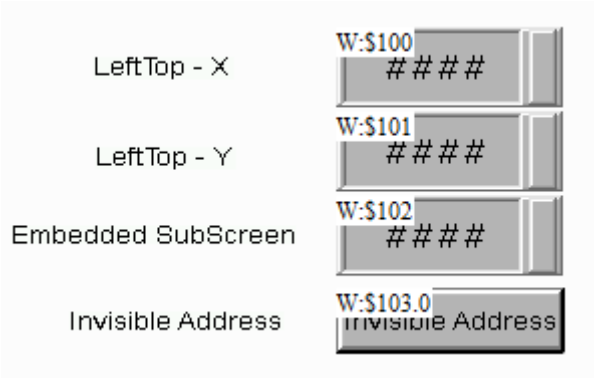
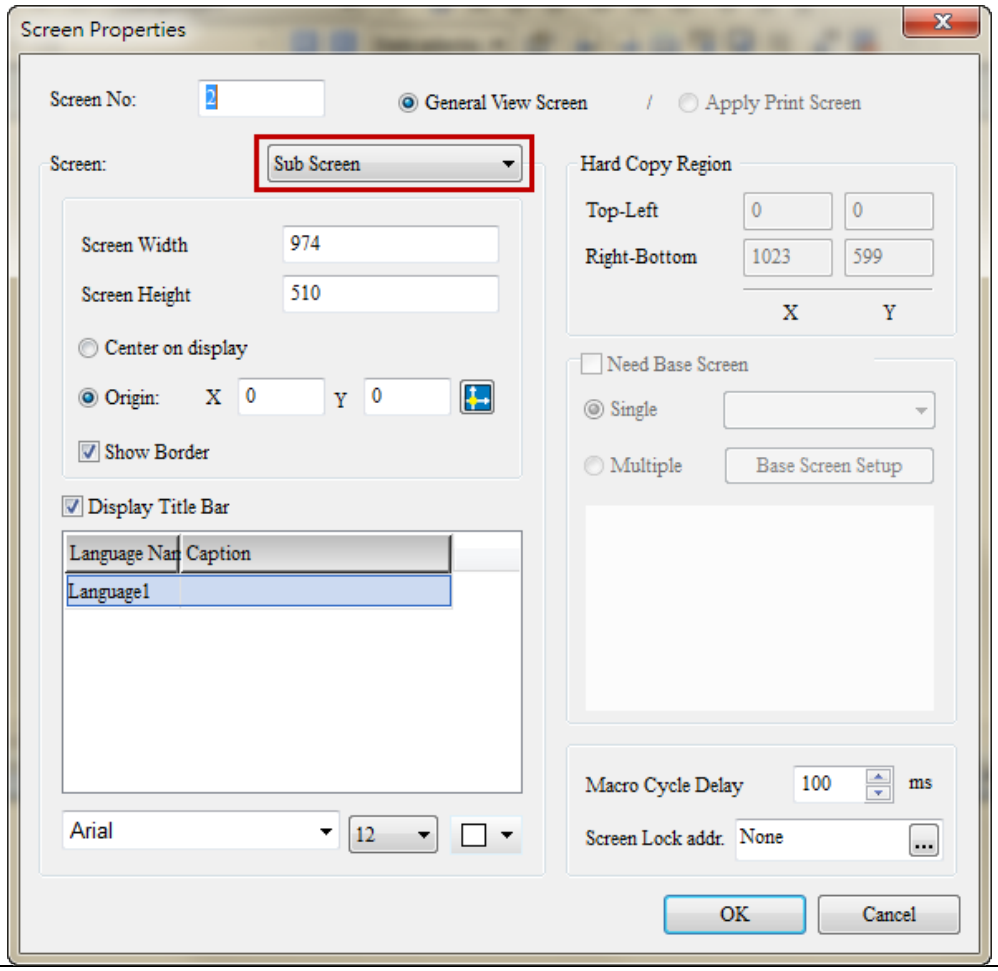
20-1 Embedded SubScreen

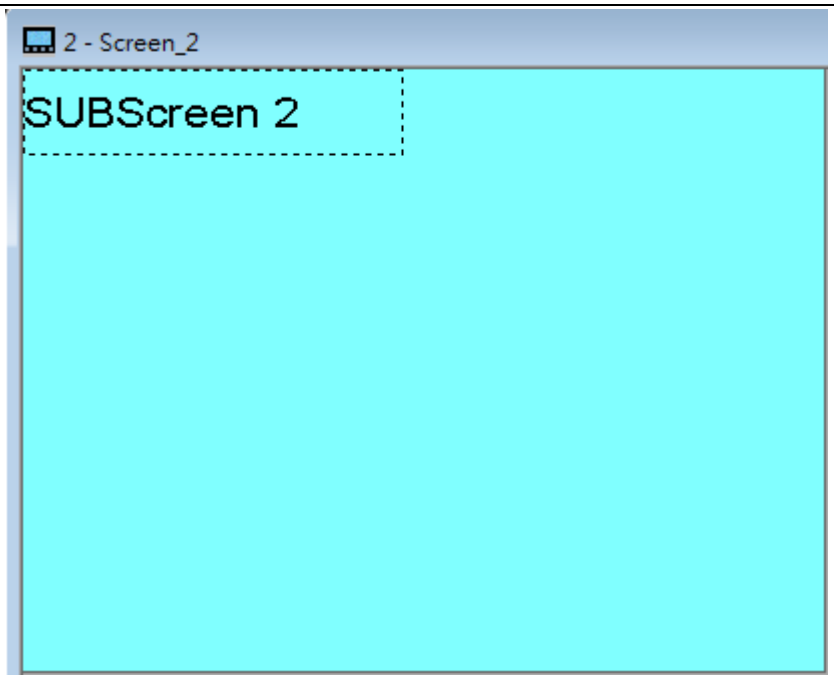
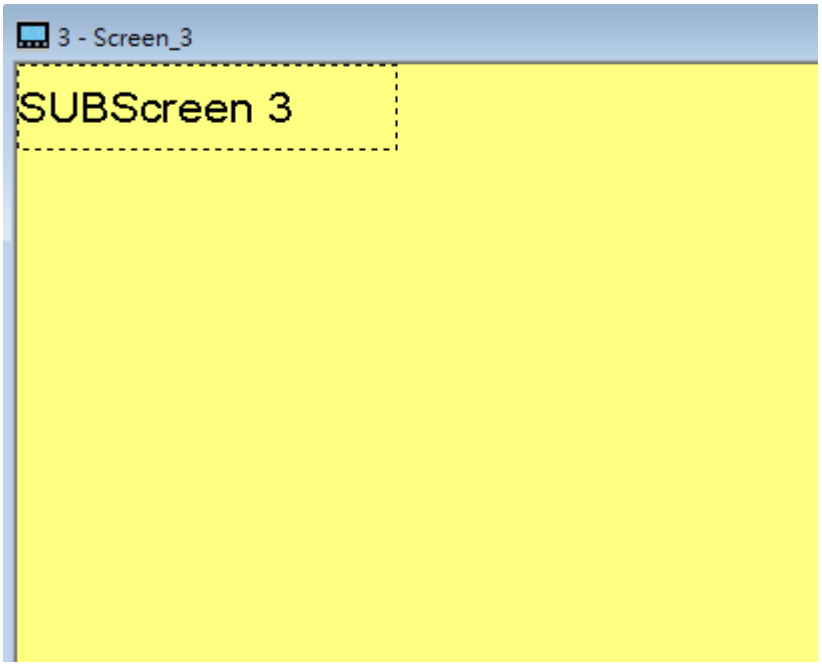
Embed the SubScreen into the main screen and switch different subscreens on main screen.

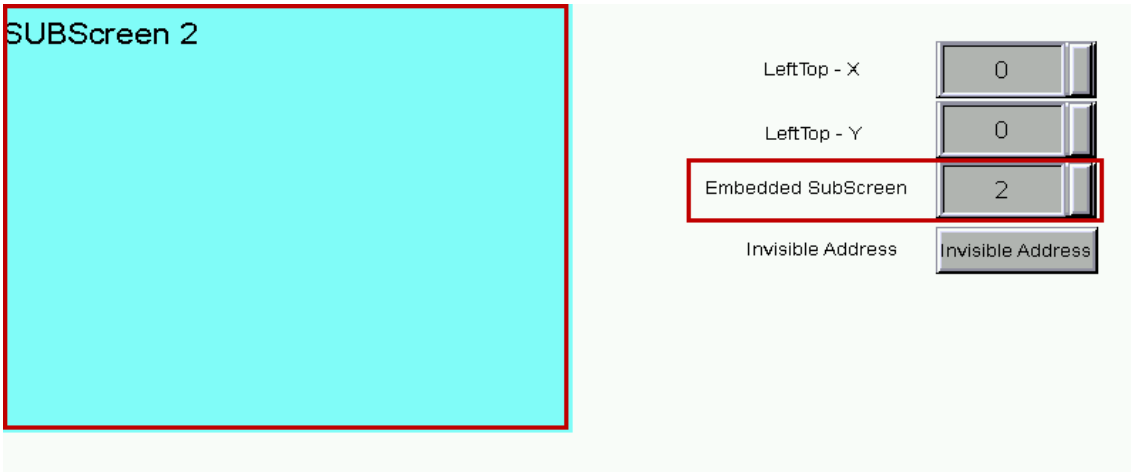
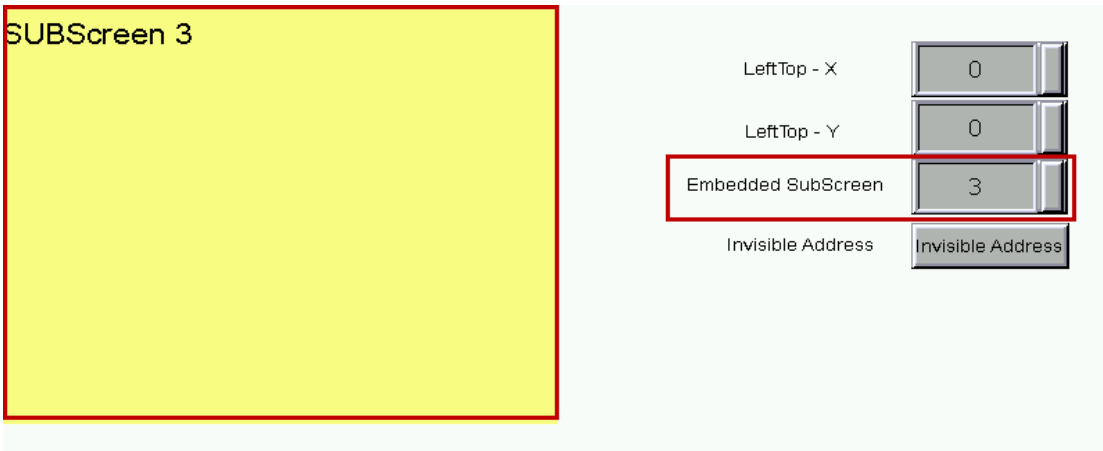
NOTE：

- ✓ Element of embedded subscreen cannot be placed on subscreen.
- ✓ Size of subscreen can be different from the embedded element. Its size will be remained after embedding.
- ✓ When the embedded subscreen has lock function, the lock function will be cancelled after embedded into the main screen.

Description of Embedded SubScreen Table 20-1-1 Example of Embedded SubScreen	
Create Element of Embedded SubScreen	➢ Select 『Frame』 ➔ 『Embedded SubScreen』 from element tool and create it on Screen 1. 
Setup Memory Address	➢ Setup memory address of embedded subscreen element.

Create 3 numerical entry elements and 1 maintained button element.	➢ Create three numerical entry element ($100, $101, $102) and one maintained button element ($103.0). 
Create Subscreen	➢ Create subscreen 2 and 3. 

Result	➢ After the screen is downloaded to HMI, no subscreen exists in HMI screen. ➢ Change the subscreen number $102 as 2. Subscreen 2 is embedded to the screen.  ➢ Change the subscreen number $102 as 3. Subscreen 3 is embedded to the screen.  ➢ Change elements' position: $100 is set to 100 and $101 is set to 100.

	Subscreen is moved according to coordinate position.

The following is the property setting screen when double clicking the embedded subscreen.

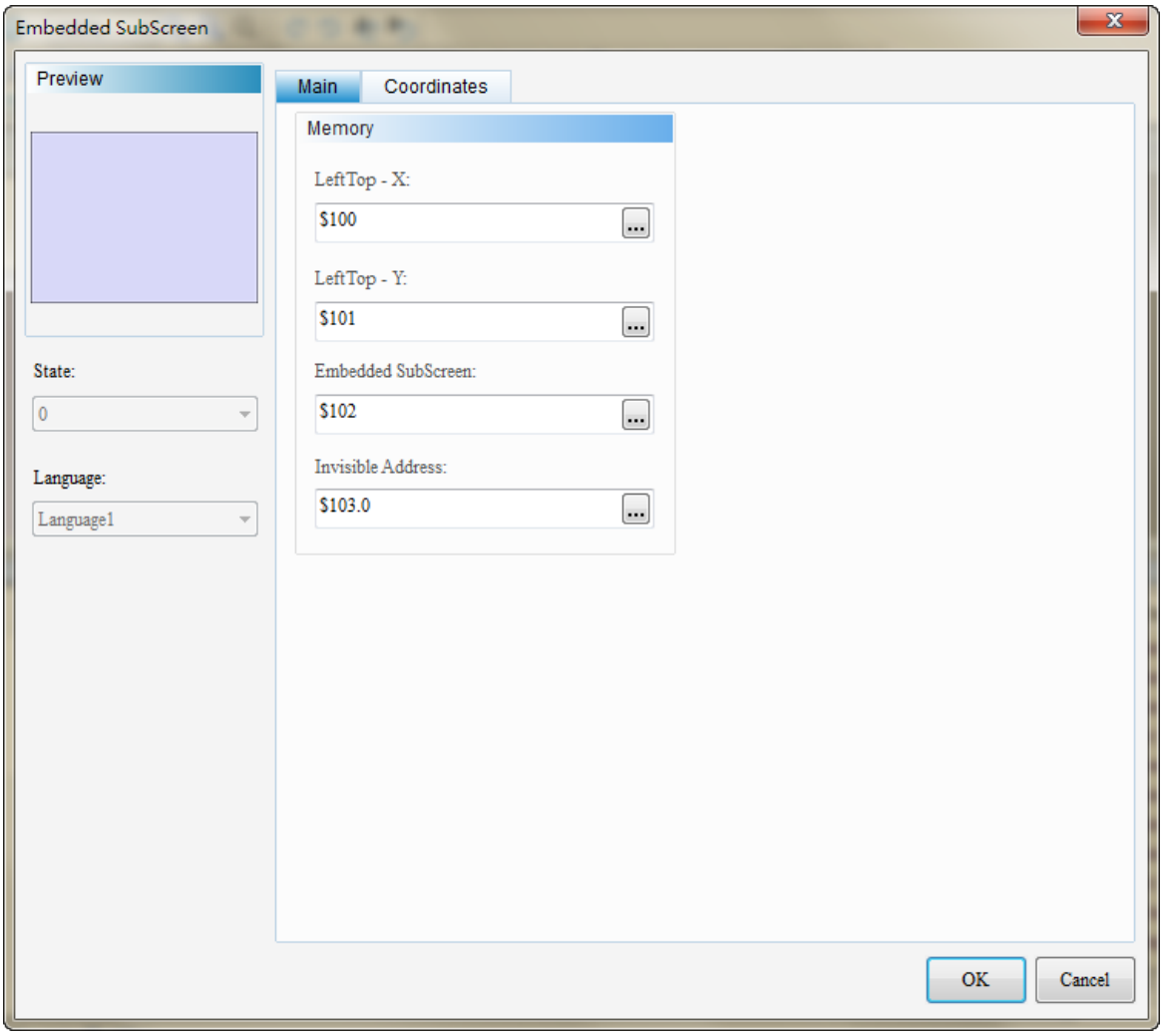


Figure 20-1-1 Properties of Embedded Subscreen

Embedded Subscreen	
Function page	**Content Description**
Preview	The embedded subscreen has no multiple status value, thus, it is unable to edit the displayed data with multiple languages.
Main	Sets coordinate X in upper-left corner, coordinate Y in upper-left corner, embedded subscreen, invisible address
Coordinates	Sets X-Y coordinates value, element width and height.

Table 20-1-3 Function Page of Embedded Subscreen Element

◆ Main

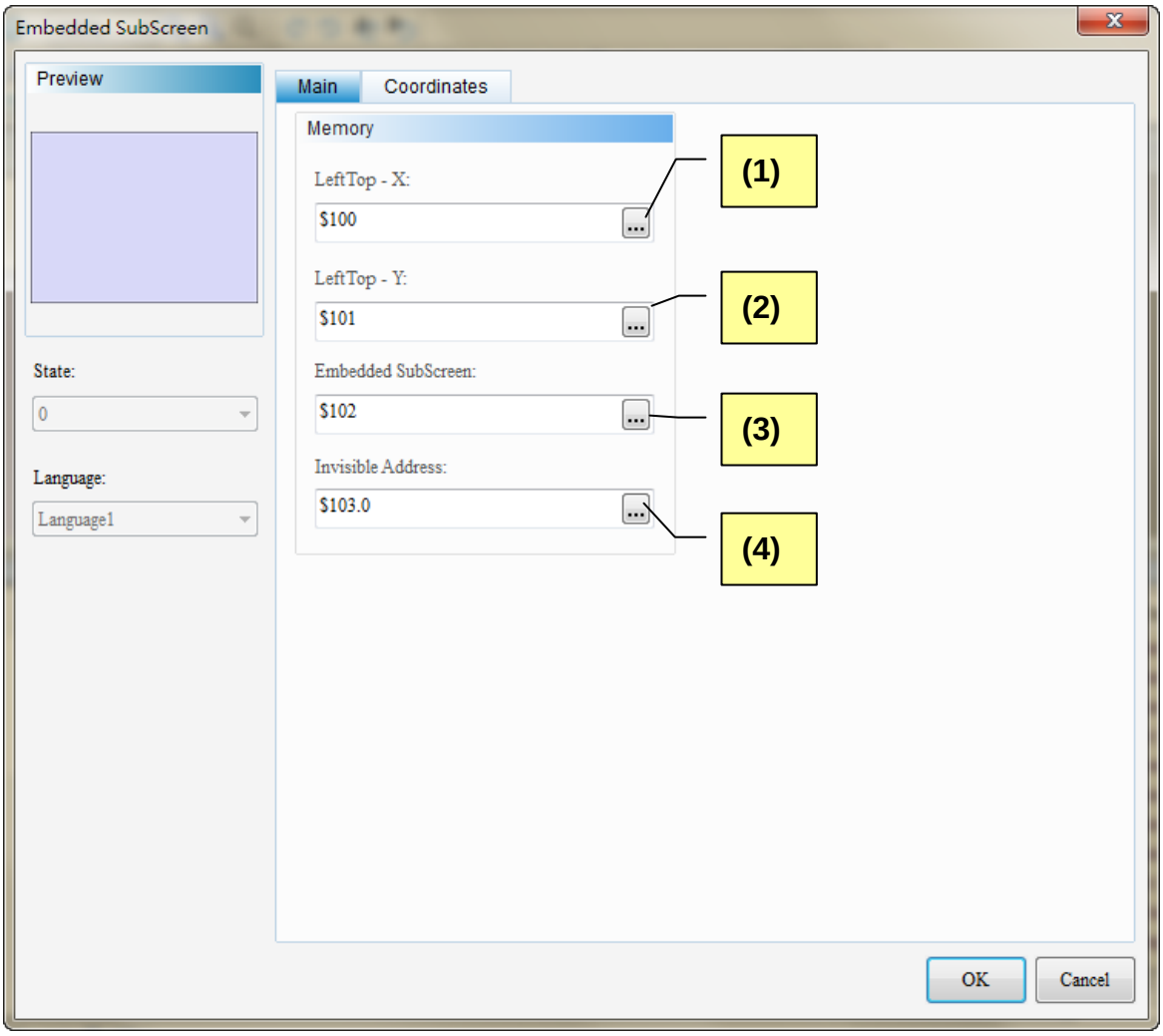
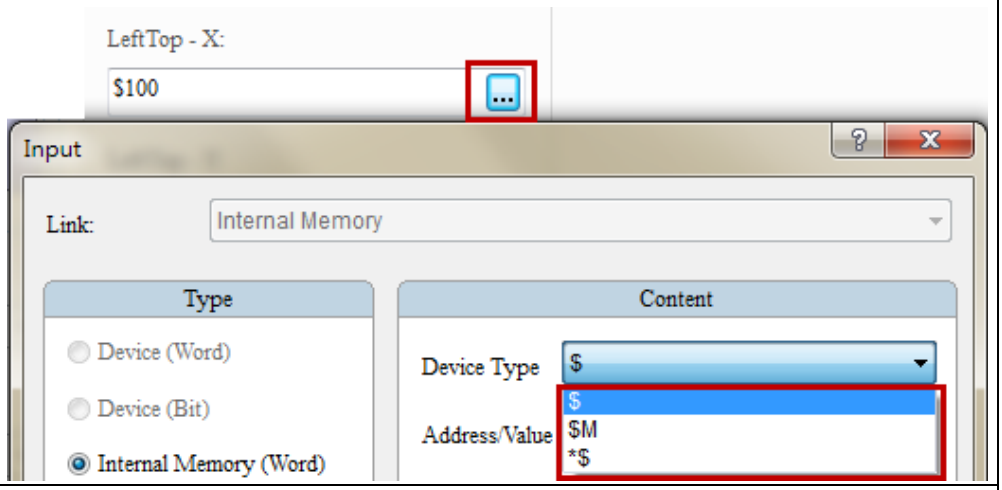
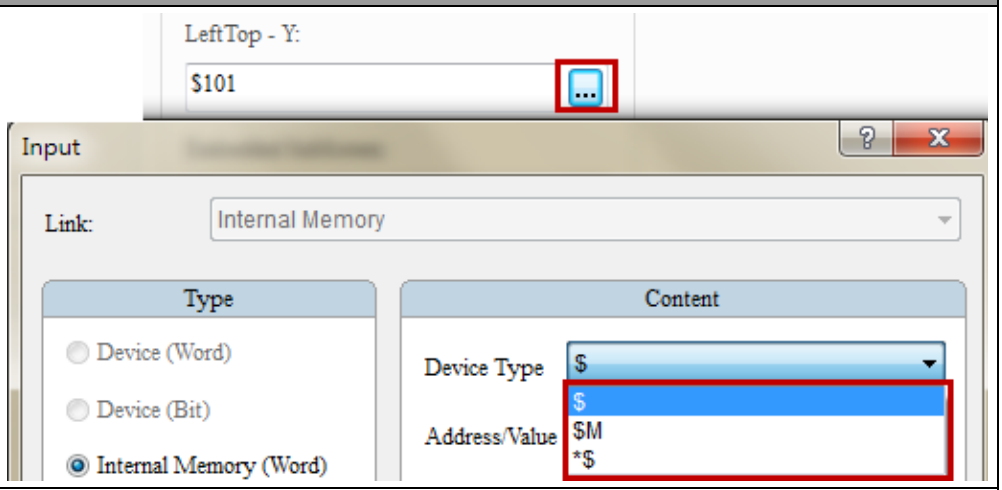
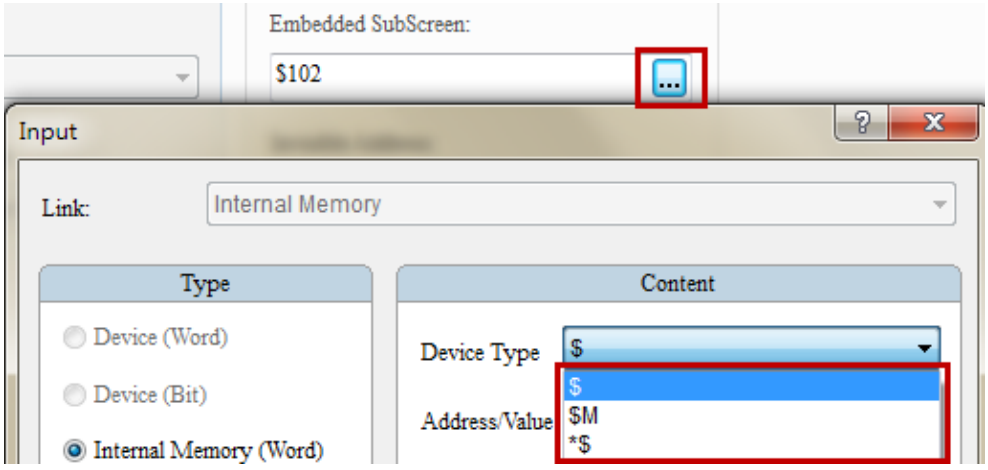
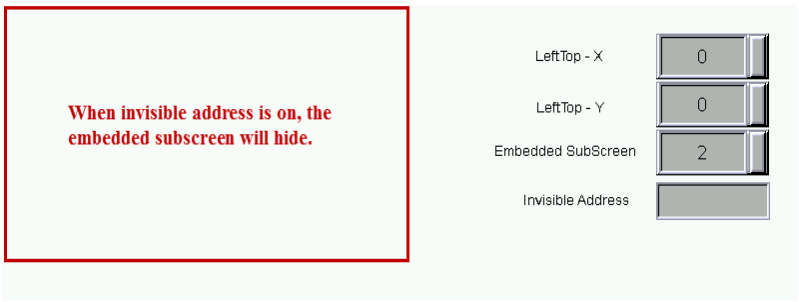
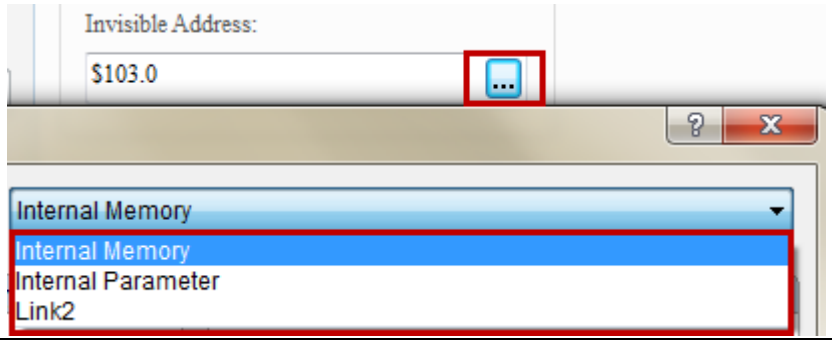


Figure 20-1-2 Main Page of Embedded Subscreen Element

No.	Property	Function
(1)	Coordinate X in upper-left corner (Left Top-X)	➢ The control element is in axis X of the screen (Left Top-X). ➢ Supports internal memory address (Word) only. 
(2)	Coordinate Y in upper-left	➢ The control element is in axis Y of the screen (Left Top-Y). ➢ Supports internal memory address (Word) only.

No.	Property	Function
	corner (Left Top-Y)	
(3)	Embedded Subscreen	➢ Controls the displayed subscreen number. ➢ Supports internal memory address (Word) only. 
(4)	Invisible Address	➢ When the invisible address is set to On, element of embedded subscreen will be hidden and its setting function will be disabled. The invisible address has not been set to On. The invisible address is set to On. 

No.	Property	Function
		➢ Supports external control address (Bit) and internal memory address (Bit). 

◆ Coordinates

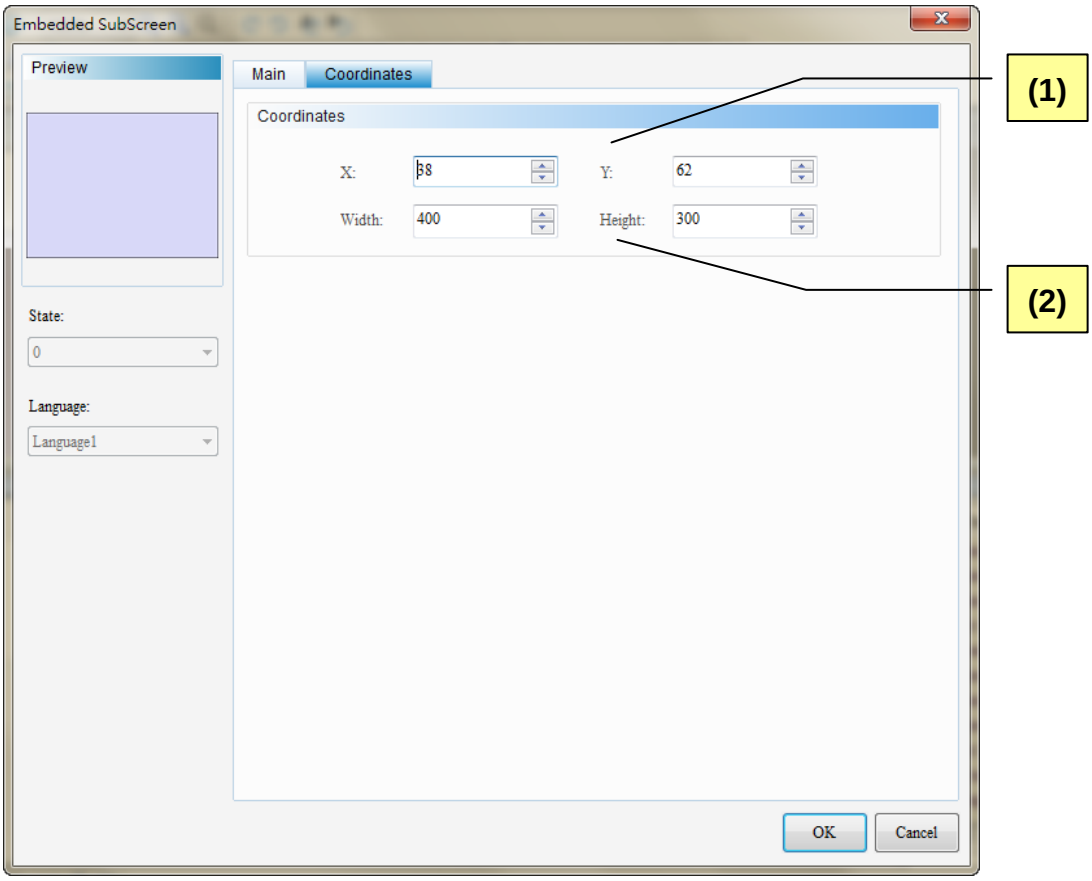


Figure 20-1-3 Coordinates properties page of embedded subscreen element

No.	Property	Function
(1)	X value, Y value	➢ Coordinate X in upper-left corner, coordinate Y in upper-left corner
(2)	Width, Height	➢ Element width and height

20-2 Ladder Monitor Screen

It is mainly used to monitor the status (On/Off) on ladder.

NOTE：

✓ Function of ladder monitor screen is only suitable for HMC models.

Following figure is the property setting when double clicking ladder monitor screen.

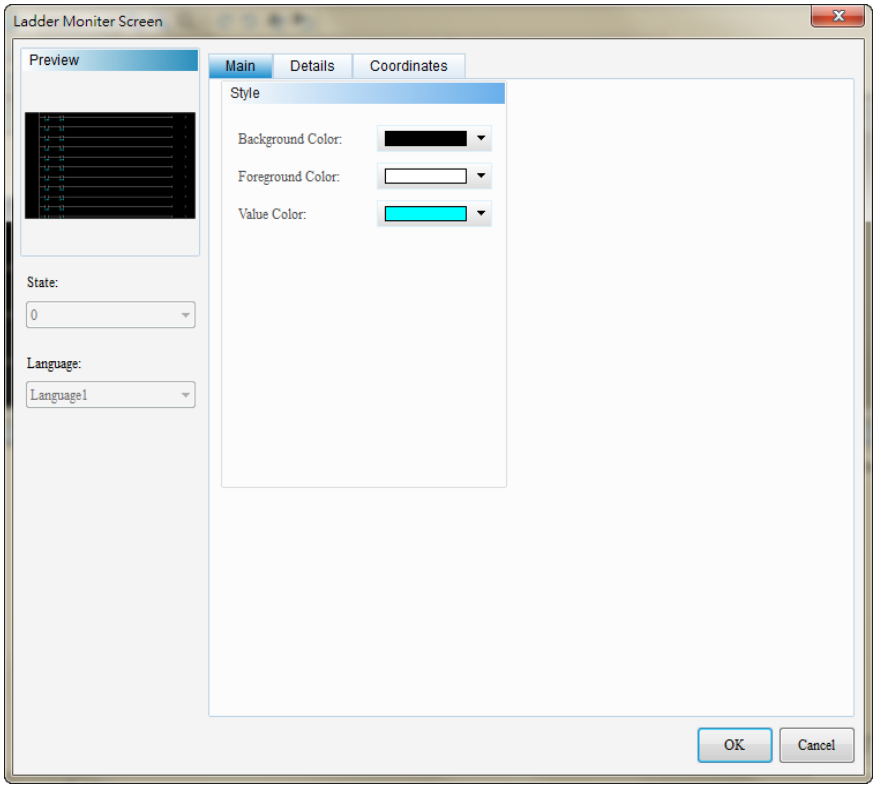
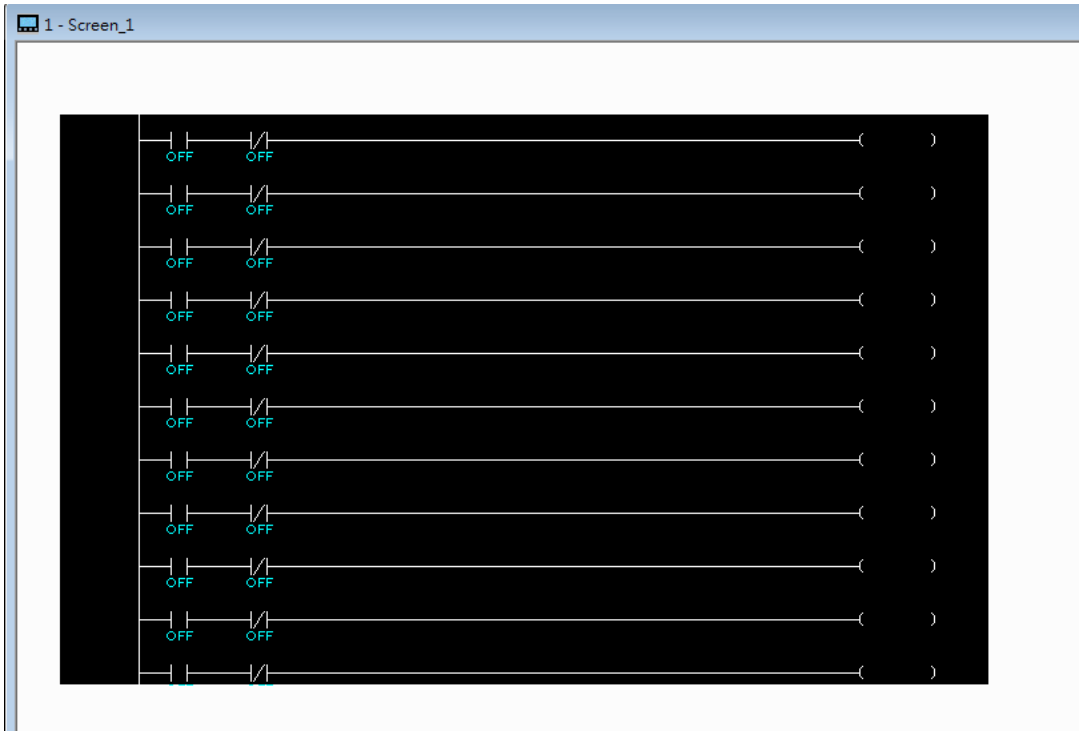
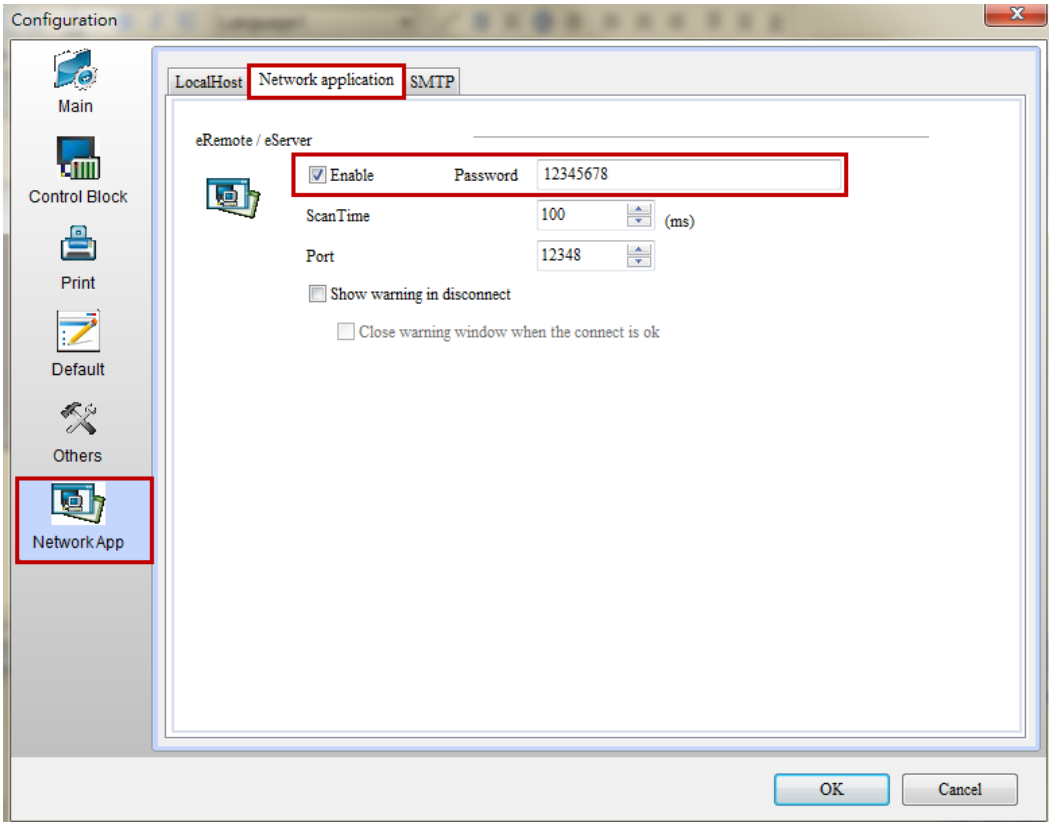


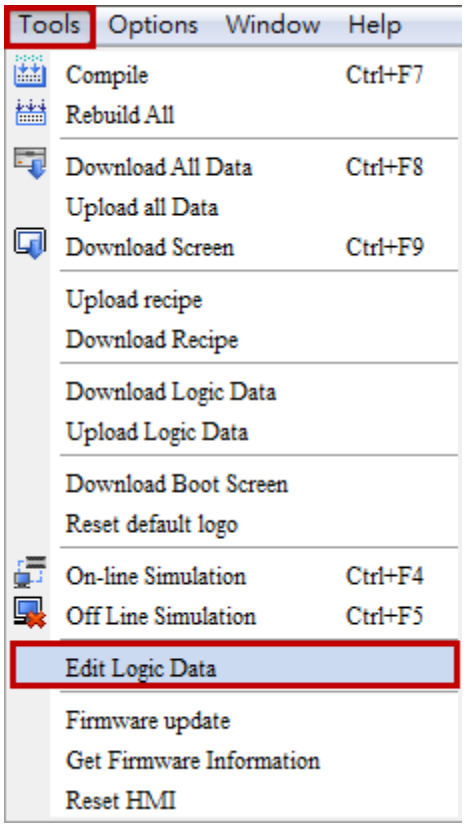
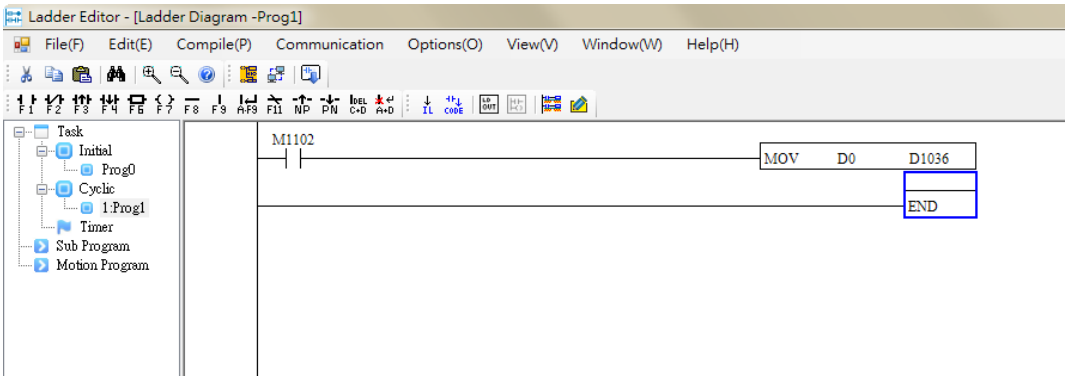
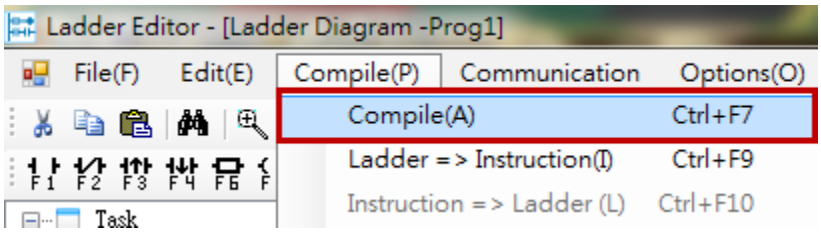
Figure 20-2-1 Properties of Ladder Monitor Screen

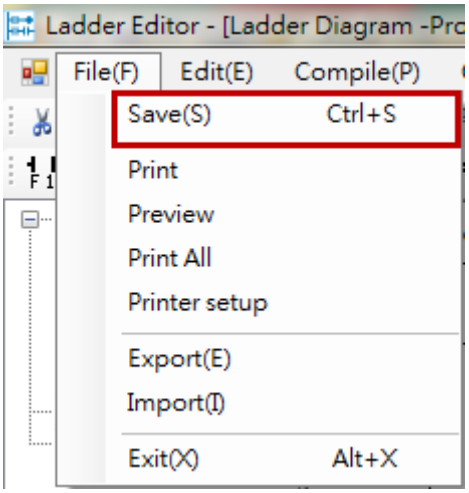
Ladder Monitor Screen	
Function Page	**Content Description**
Preview	Ladder monitor screen has no multiple status value, thus, it is unable to edit the displayed data with multiple languages.
Main	Sets element background color, foreground color and value color.
Coordinates	Sets X-Y coordinates value, element width and height.

Table 20-2-1 Function page of ladder monitor screen

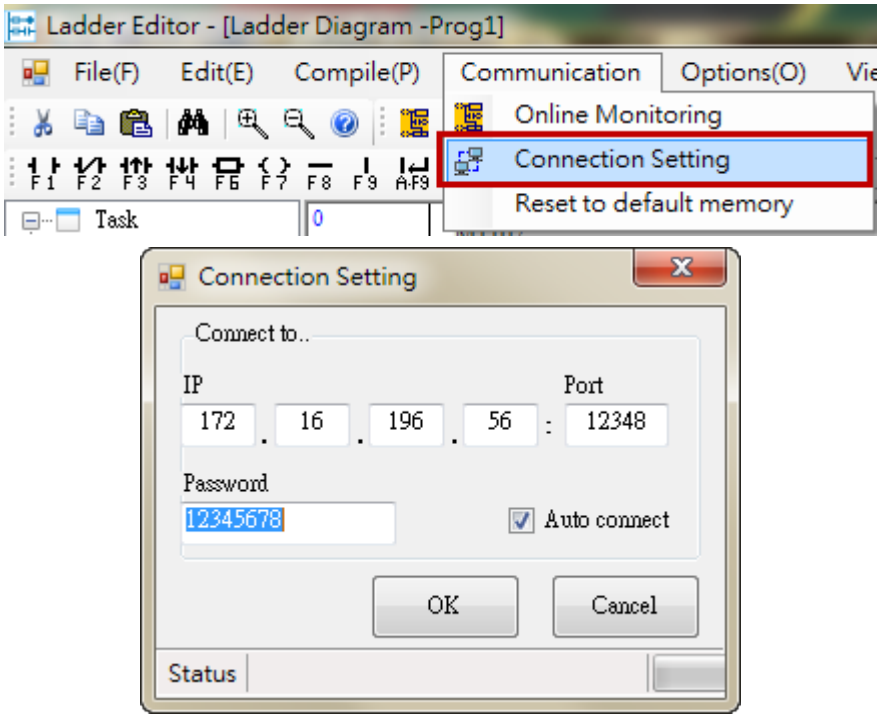
Description of Ladder Monitor Screen Table 20-2-2 Example of Ladder Monitor Screen	
Create Element of Ladder Monitor Screen	Select 『Frame』➔『Ladder Monitor Screen』from element tool on editing screen and create it Screen 1. 
Setup Comm. Setting.	➢ Select 【Option】→【Setup Communication Setting】→【Ethernet1】→【Local Host】. Check “Obtain an IP address automatically”. In this example, the IP address is 172.16.196.56. ➢ To activate online monitor, users have to check “Enable” eServer/eRemote. Password has to be identical with the one for setting up online monitor.


Configuration
Main
Control Block
Print
Default
Others
Network App
LocalHost
Network application
SMTP
eRemote / eServer
Enable
Password
12345678
ScanTime
100
(ms)
Port
12348
Show warning in disconnect
Close warning window when the connect is ok
OK
Cancel

Edit Logic Data	➢ Select【Tools】→【Edit Logic data】to enter Logic Data Editing.  ➢ Then, the content of Edit Logic Data:  ➢ After editing, please compile it.  ➢ Then, please save the file.

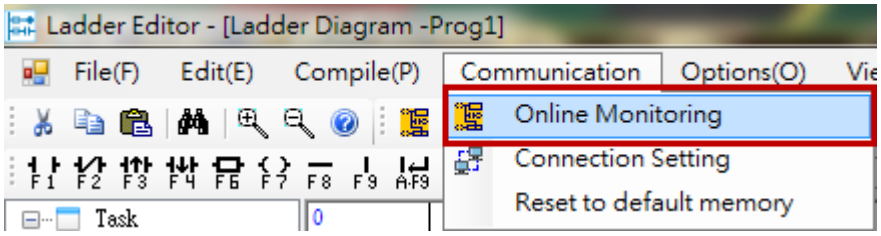


➢ Select【Communication】→【Connection Setting】. Setup IP address, which should be the same as the one set by HMI.

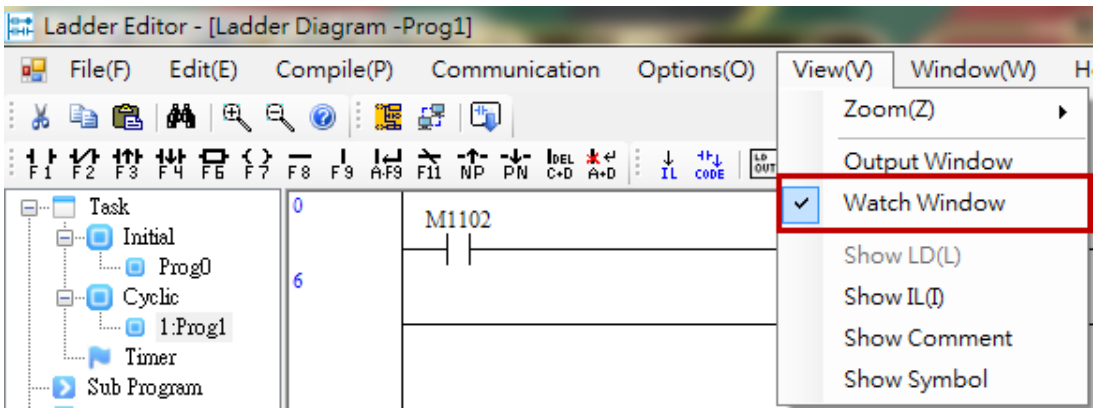


Result

- Download the screen to HMC and execute online monitoring in Edit Logic Data.

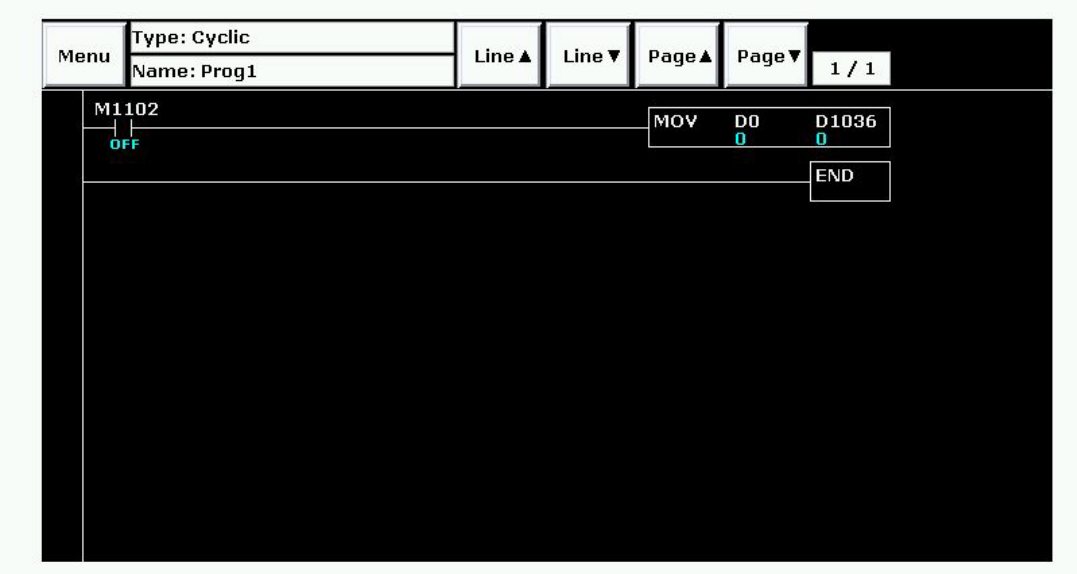


- Select the displayed monitoring screen and add the device of D1036 and M1102.

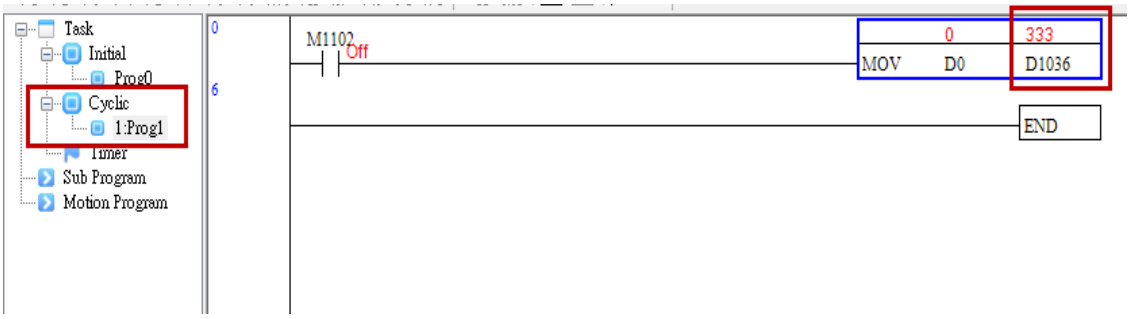


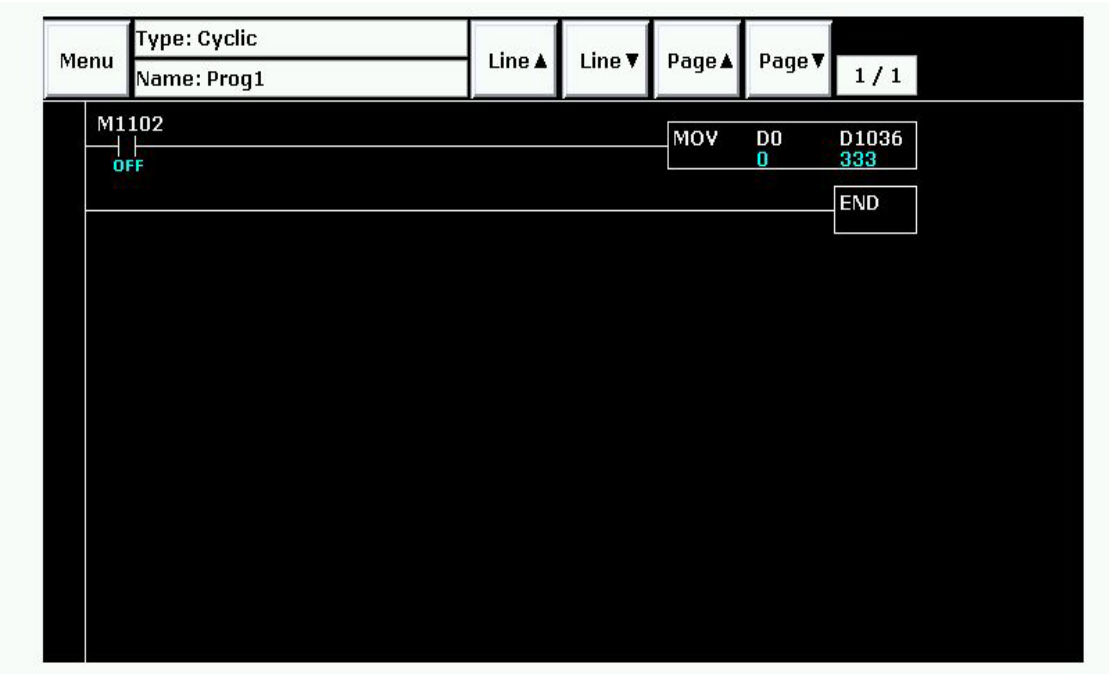
	Device	Comment	Value	Data Length	Format
▸	D1036		0	WORD	Signed decimal
	M1102		0 OFF	BIT	
*					

- After executing online monitoring, the displayed ladder monitor screen and edit logic data will be identical.

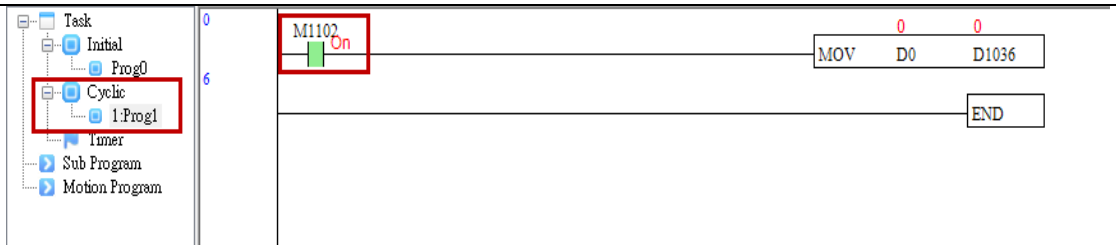


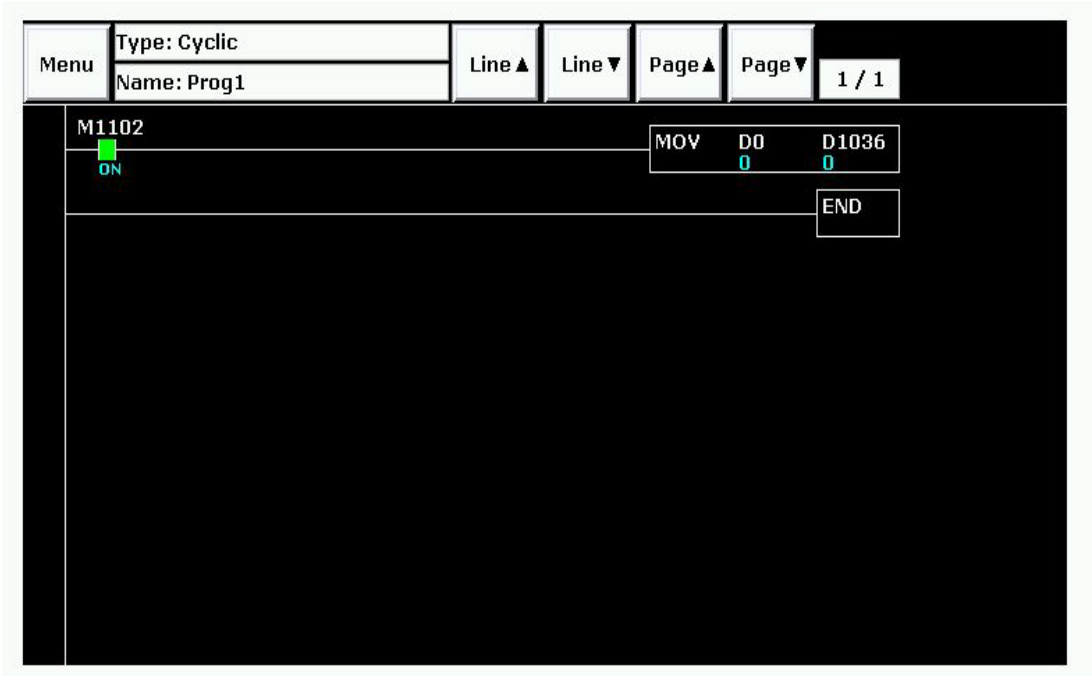
➢ Change the value of D1036 to 333. Then, value in ladder monitor screen and edit logic data will be changed to 333.



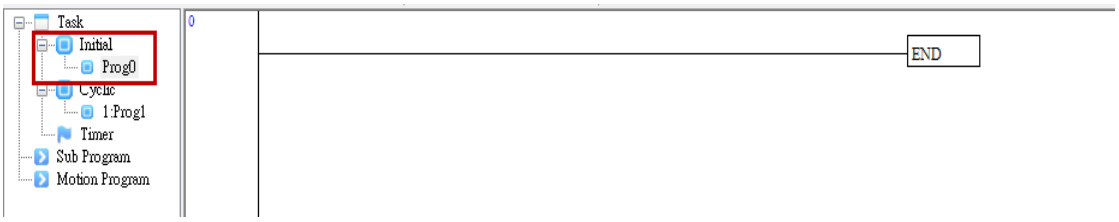


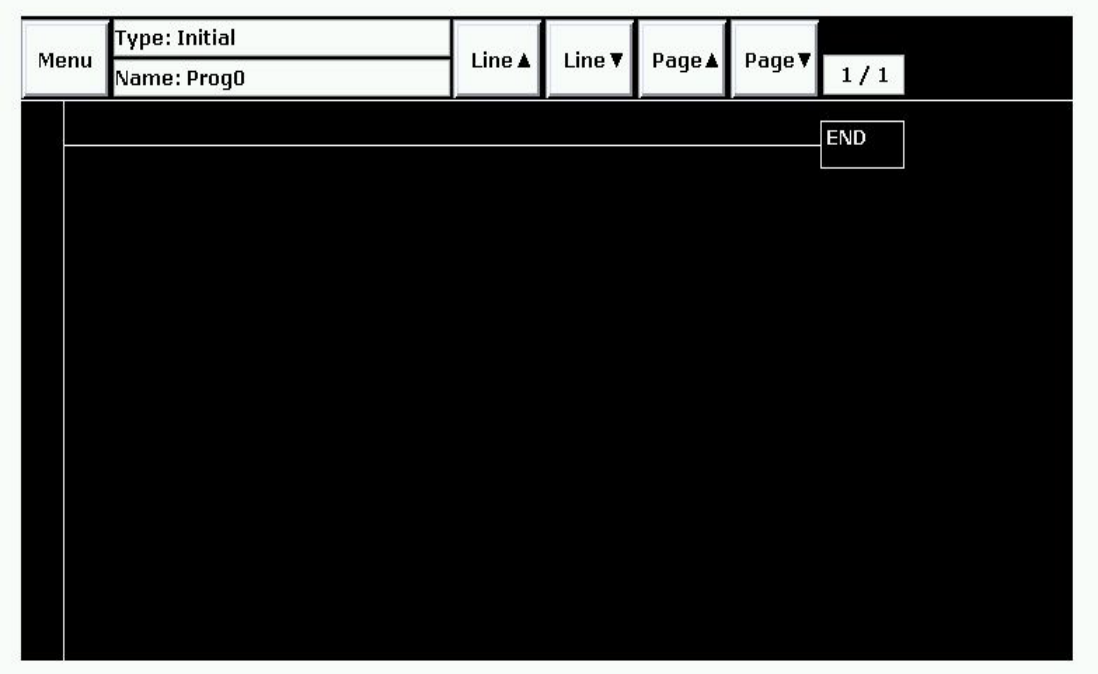
➢ Set M1102 to ON. Data in ladder monitor screen and edit logic data will change M1102 to ON.





➢ Click the Menu button on ladder monitor screen. Select Initial → Prog0. The screen shown on HMI will be identical to the one in edit logic data.



	 Menu Type: Initial Name: Prog0 Line▲ Line▼ Page▲ Page▼ 1 / 1 END

◆ Main

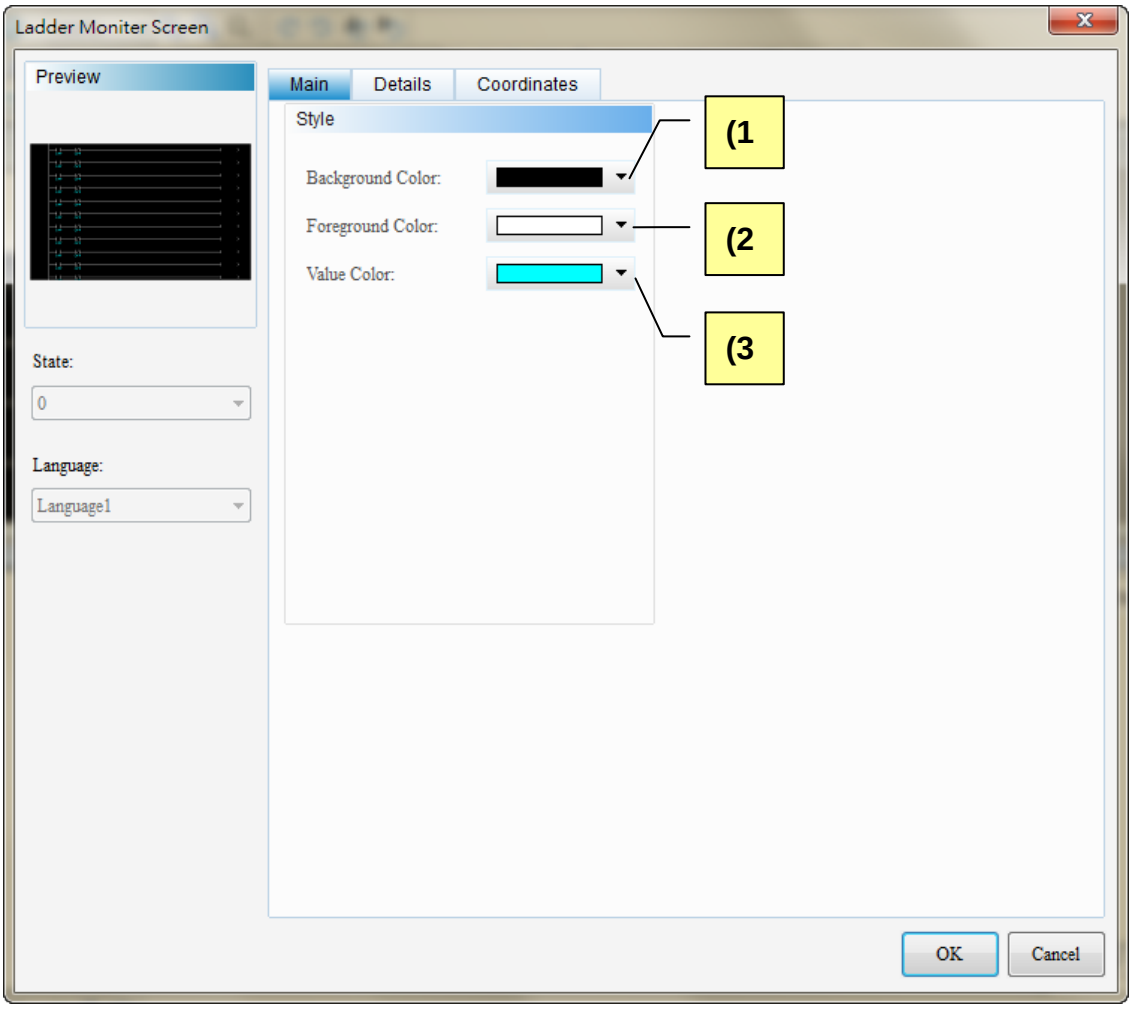
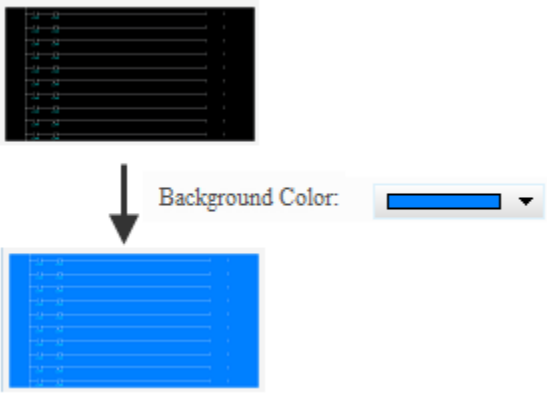
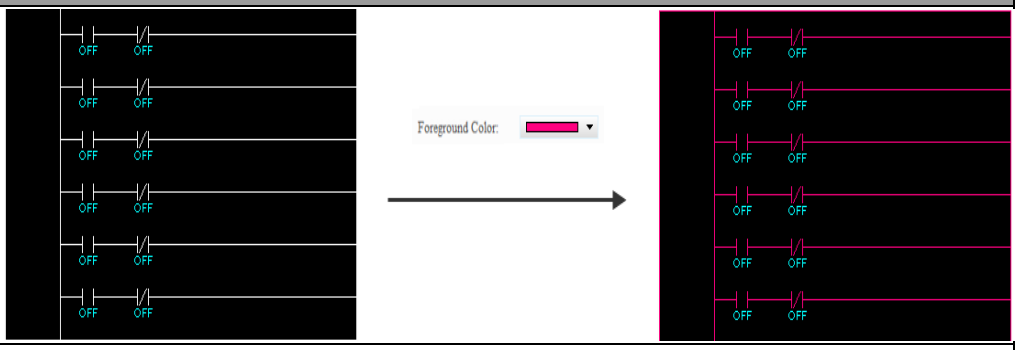
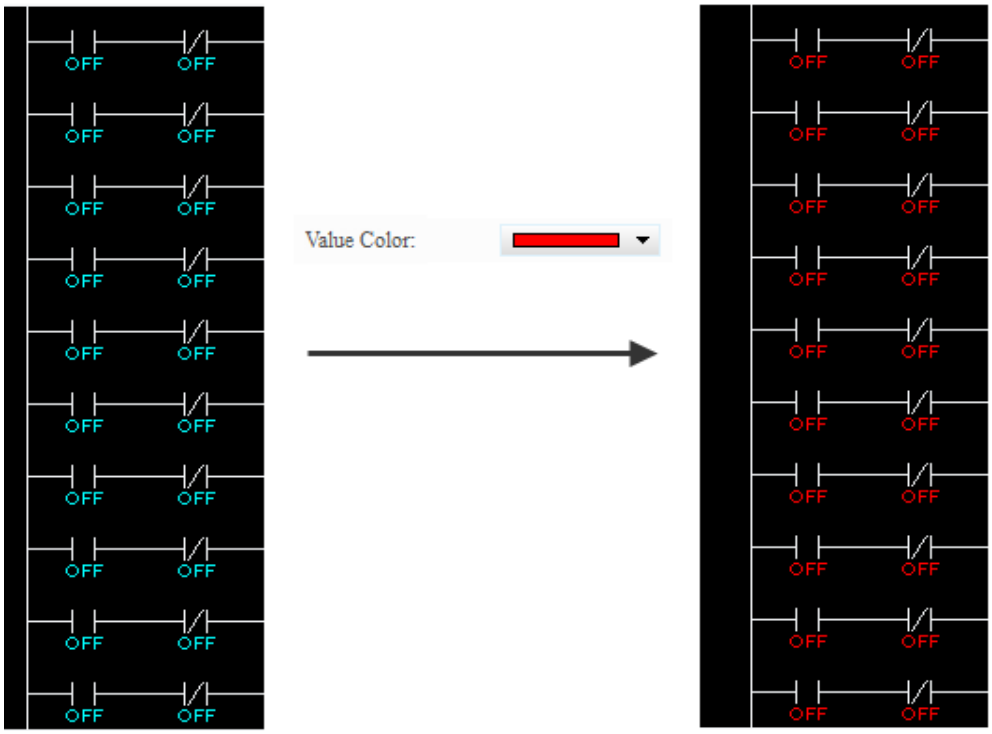


Figure 20-2-2 Main page of Ladder monitor screen element

No.	Property	Function
(1)	Background Color	➢ Sets element background color. 
(2)	Foreground Color	➢ Sets element foreground color.

No.	Property	Function
		
(3)	Value Color	➢ Sets the displayed value color. 

◆ Details

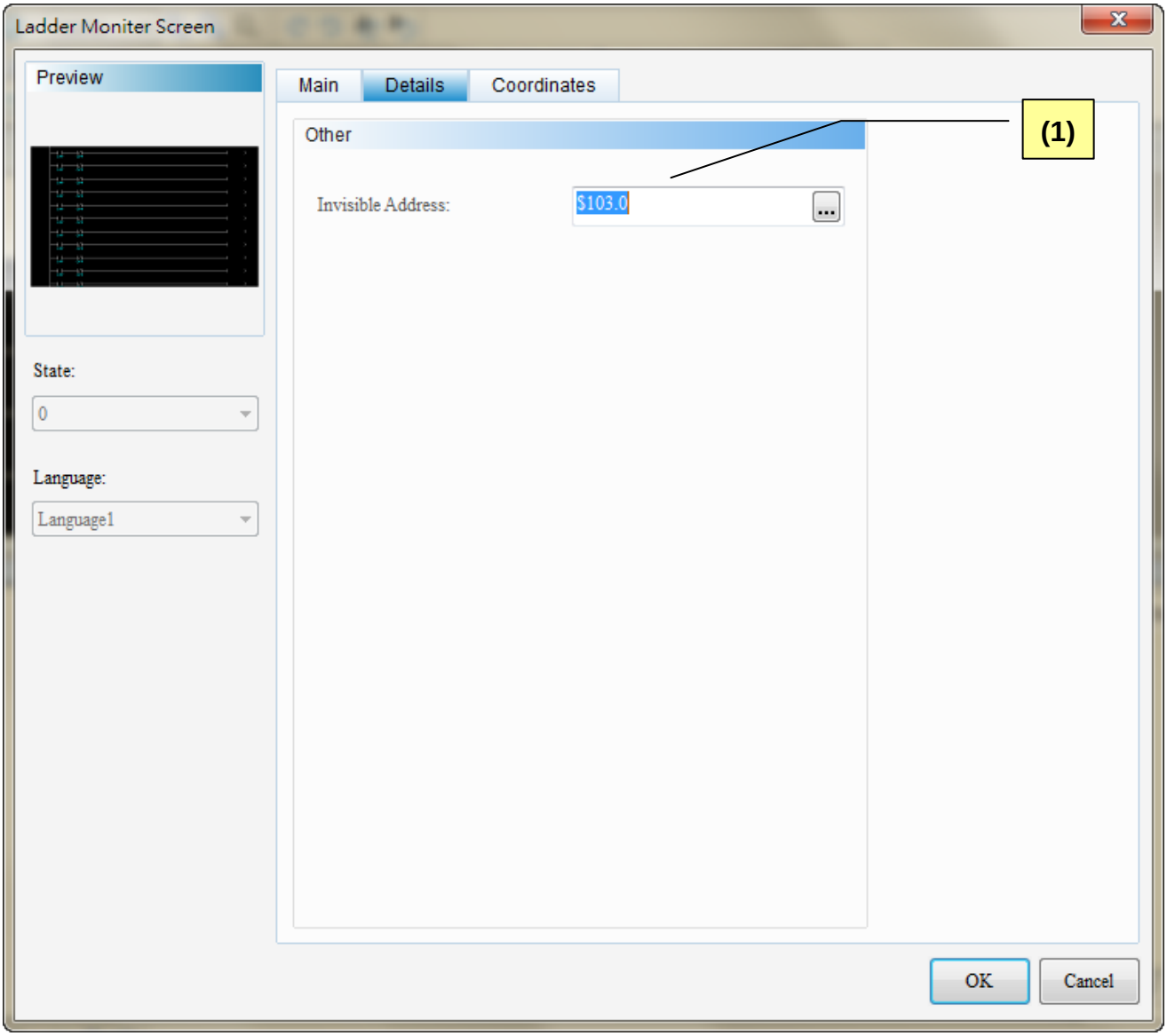
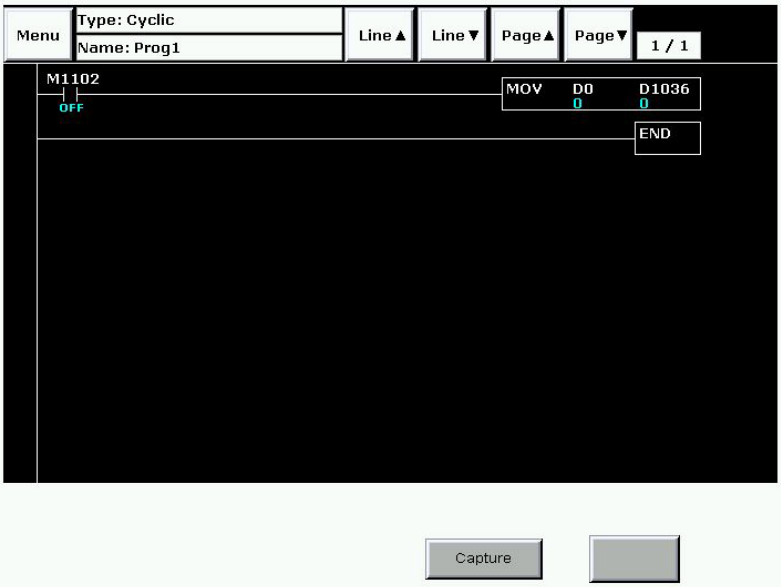
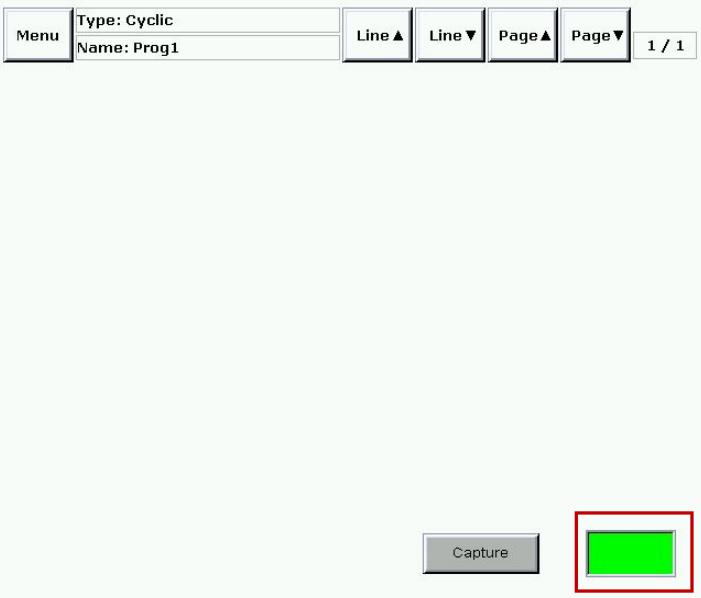
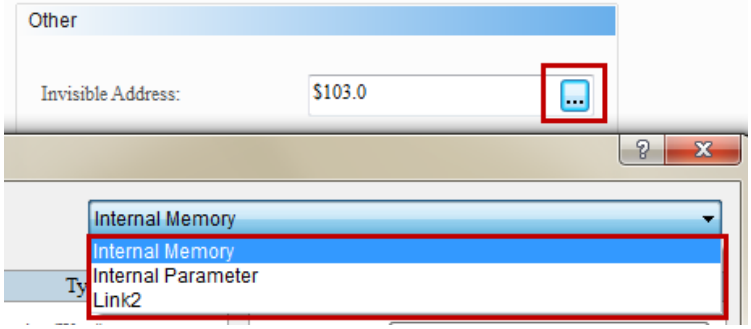


Figure 20-2-3 Details page of ladder monitor screen element

No.	Property	Function
(1)	Invisible Address	➢ When the invisible address is set to on, elements in ladder monitor screen will be hidden and the function will be disabled.

No.	Property	Function
		The invisible address has not been set to On. 
		The invisible address is set to On. 
		➢ Supports external controller address (Bit) and internal memory address (Bit). 

◆ Coordinates

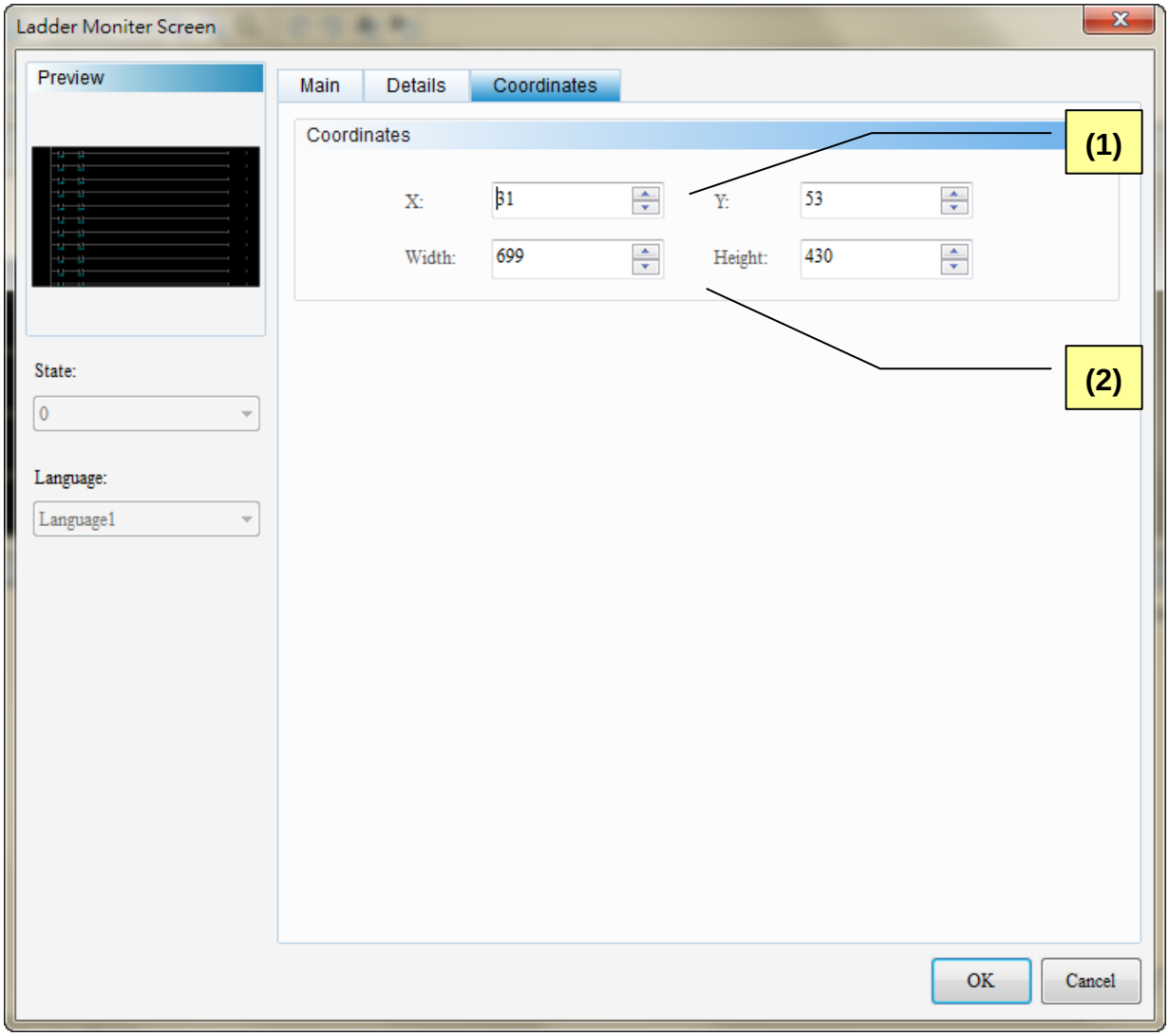


Figure 20-2-4 Coordinates page of ladder monitor screen element

No.	Property	Function
(1)	X value, Y value	➢ Coordinate X in upper-left corner, coordinate Y in upper-left corner
(2)	Width, Height	➢ Element width and height.

Contents

21-1 Rhombus/ Right Triangle/ Pentagon/ Pie Chart/ Arc/ Hexagon/ Star Shape/ Triangle/ Hollow Circle/ Stop Circle/ 1/4 Arc 4

Chapter 21 Basic Shape

This chapter describes the setting of the basic shape element that the DOPSoft software provides.

◆ Classification of basic shape elements:

Basic Shape		Rhombus
		Right Triangle
		Pentagon
		Pie Chart
		Arc
		Hexagon
		Star Shape
		Triangle
		Hollow Circle
		Stop Circle
		1/4 Arc

Table 21-1-1 Classification of basic shape elements

◆ Common properties of basic shape elements:

Basic Shape	**Line Color**	**Line Width**	**Foreground Color**	**Transparent Color**	**Star Shapet Angle/End Angle**	**Length**	**Style**
Rhombus	◎	◎	◎	◎			
Right Triangle	◎	◎	◎	◎			◎
Pentagon	◎	◎	◎	◎			
Pie Chart	◎	◎	◎	◎	◎		
Arc	◎	◎	◎	◎	◎		
Hexagon	◎	◎	◎	◎			
Star Shape	◎	◎	◎	◎			
Triangle	◎	◎	◎	◎			
Hollow Circle	◎	◎	◎	◎		◎	
Stop Circle	◎	◎	◎	◎		◎	
1/4 Arc	◎	◎	◎	◎			

Table 21-1-2 Common properties of basic shape elements

21-1 Rhombus/ Right Triangle/ Pentagon/ Pie Chart/ Arc/ Hexagon/ Star Shape/ Triangle/ Hollow Circle/ Stop Circle/ 1/4 Arc

The DOPSoft software provides the user with the basic shape drawing function. The properties of each basic shape element are described below.

Rhombus

Double click the Rhombus icon and the following property setting screen appears.

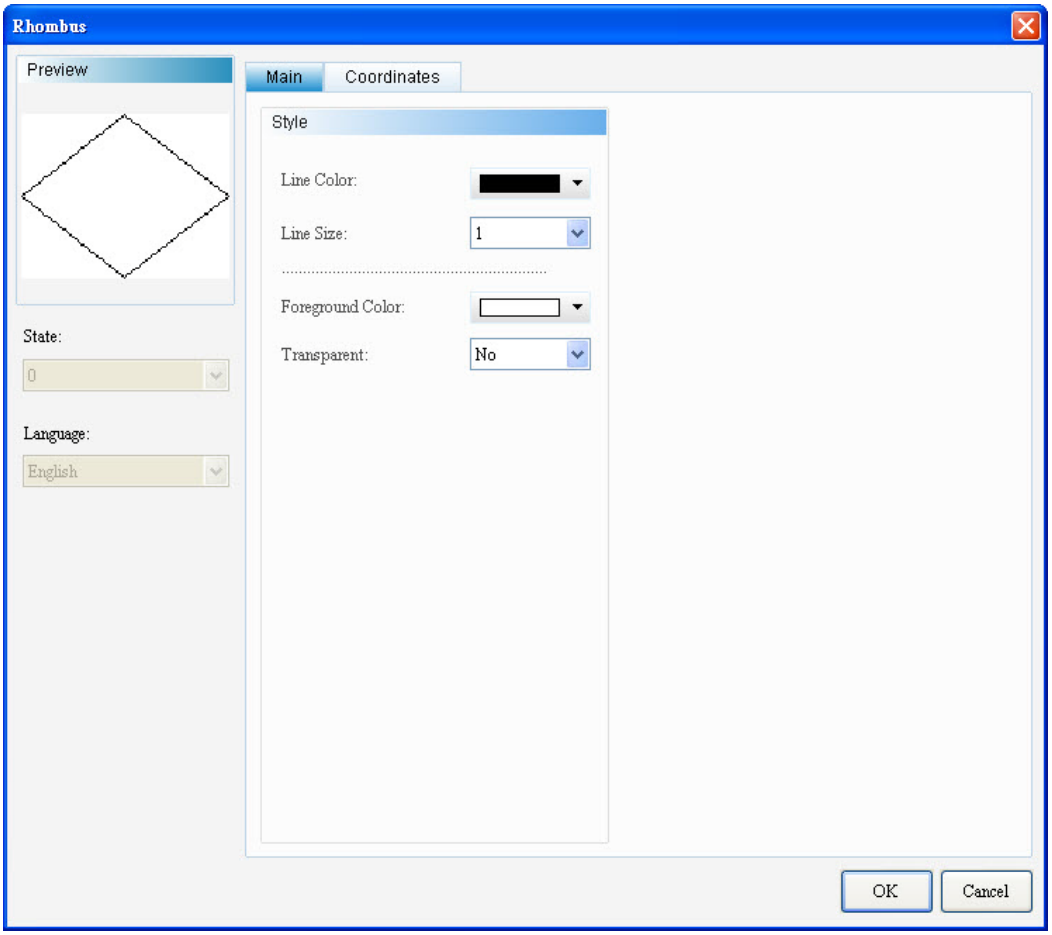


Figure 21-1-1 Rhombus Properties Setting Screen

Rhombus	
Function Page	**Content Description**
Preview	The State and Multi-Language are not available for the Rhombus.
Main	Sets the line color, line size, foreground color, and transparent color.
Coordinates	Sets the X-Y coordinates, width and height of the element.

Table 21-1-3 Rhombus Element Function Page

◆ Main

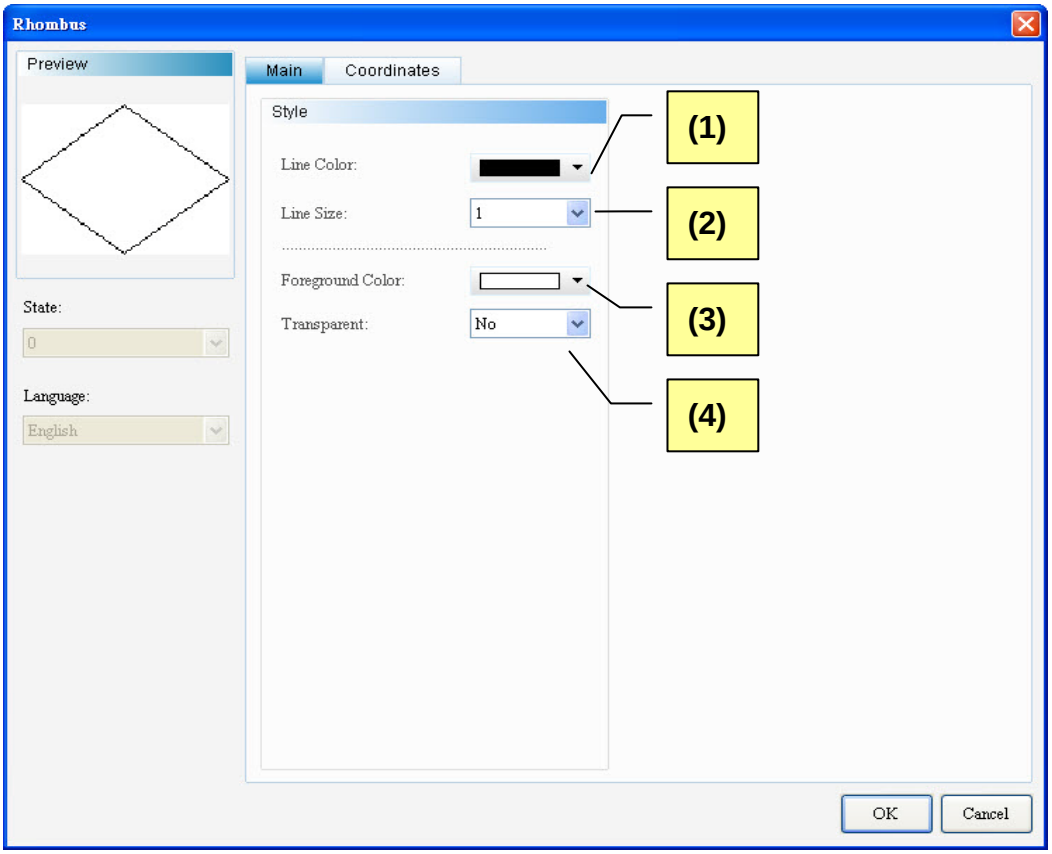
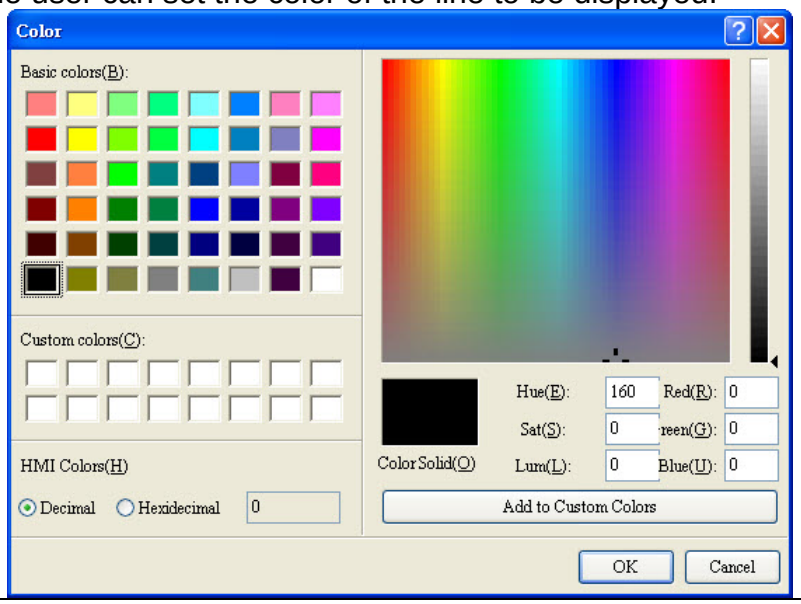
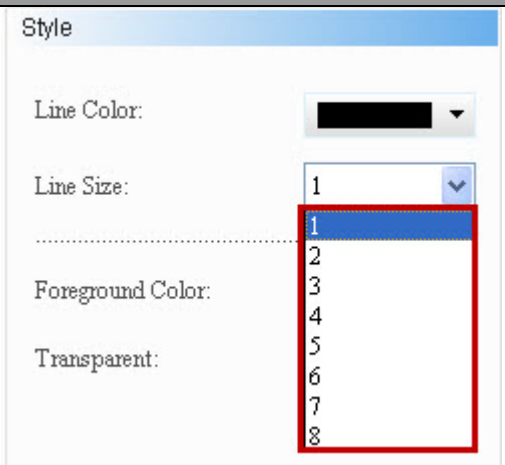
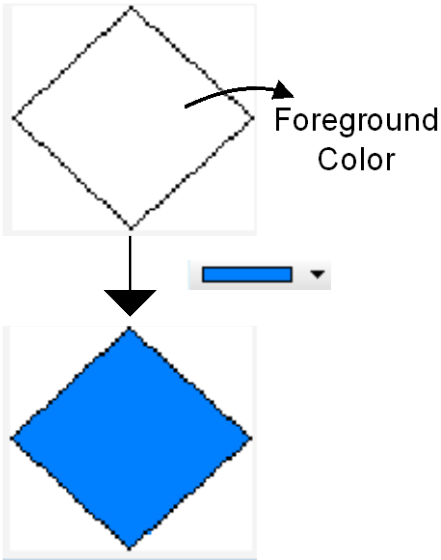
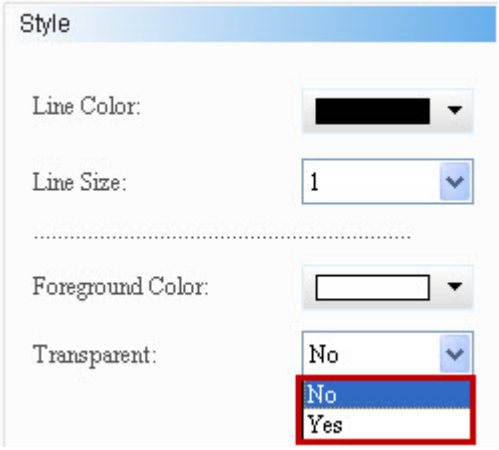
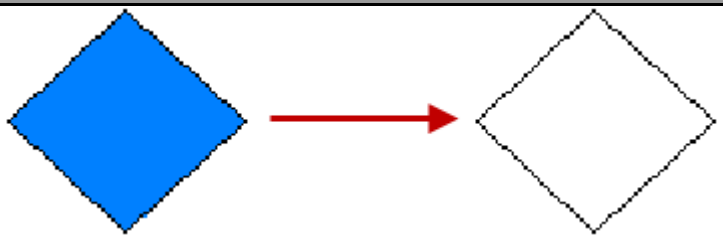
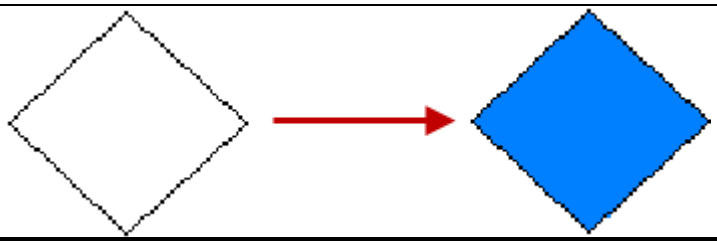


Figure 21-1-2 Rhombus Element Main Properties Page

No.	Property	Function
(1)	Line Color	➢ The user can set the color of the line to be displayed. 
(2)	Line Size	➢ The width of the line can be set between 1 and 8.

No.	Property	Function
		
(3)	Foreground Color	➢ The user can set the foreground color for the element. 
(4)	Transparent Color	➢ Yes and No are available for selection.  ➢ When Yes is selected, the foreground color of the Rhombus element is transparent and only the border color of the Rhombus is displayed. When No is selected, the foreground color of the element is displayed.

No.	Property	Function	
		Transparent Color: Yes	
		Transparent Color: No	

◆ Coordinates

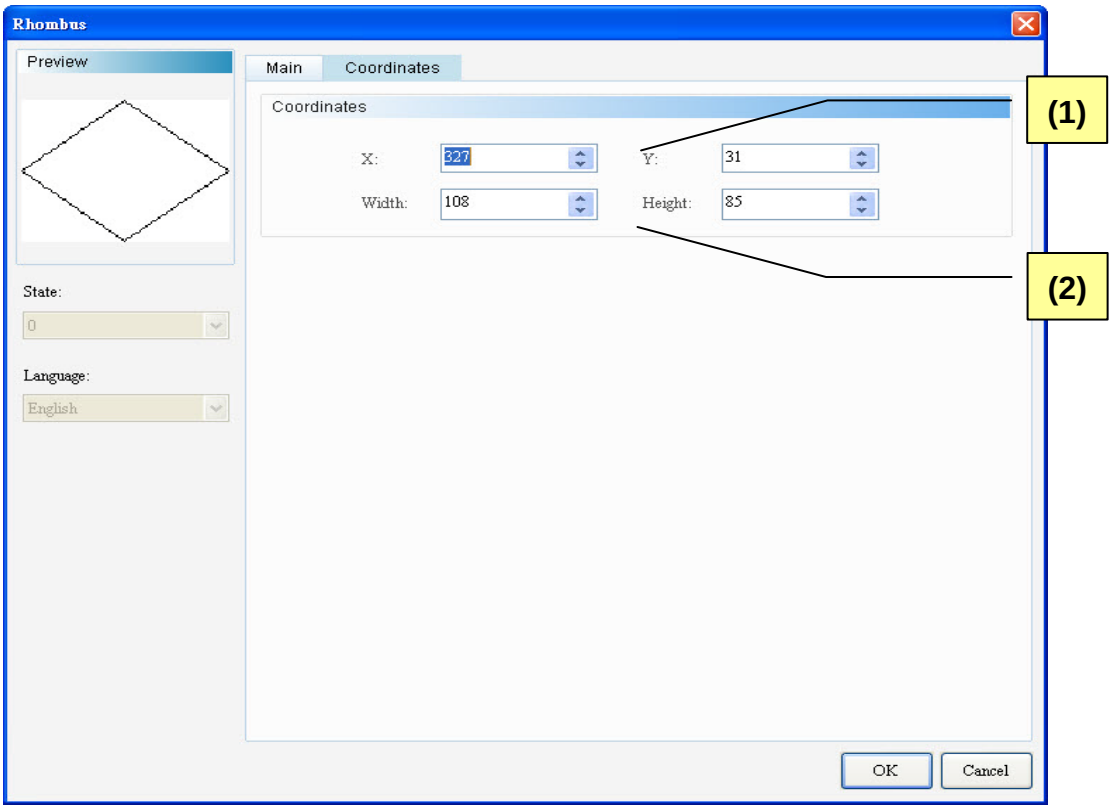


Figure 21-1-3 Rhombus Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

Right Triangle

Double click the Right Triangle icon and the following property setting screen appears.

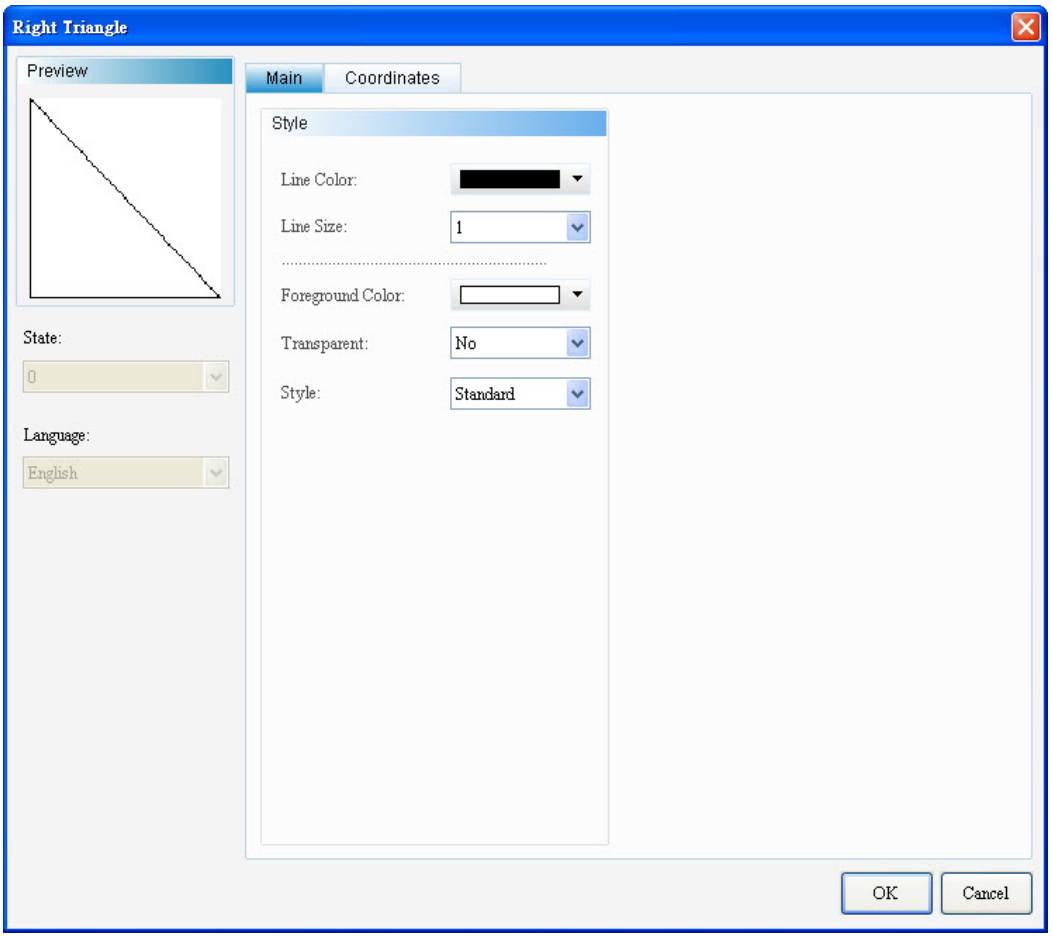


Figure 21-1-4 Right Triangle Properties Setting Screen

Right Triangle	
Function Page	**Content Description**
Preview	The State and Multi-Language are not available for the Right Triangle.
Main	Sets the line color, line size, foreground color, transparent color, and style.
Coordinates	Sets the X-Y coordinates, width and height of the element.

Table 21-1-4 Right Triangle Element Function Page

◆ Main

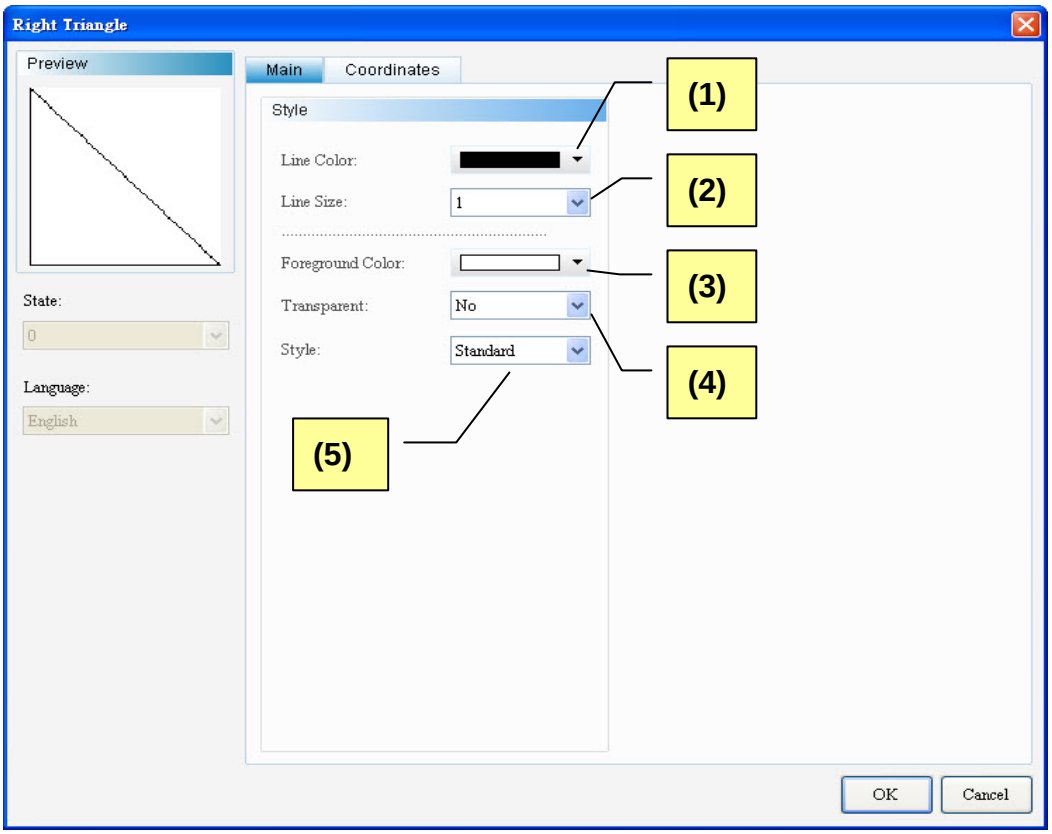
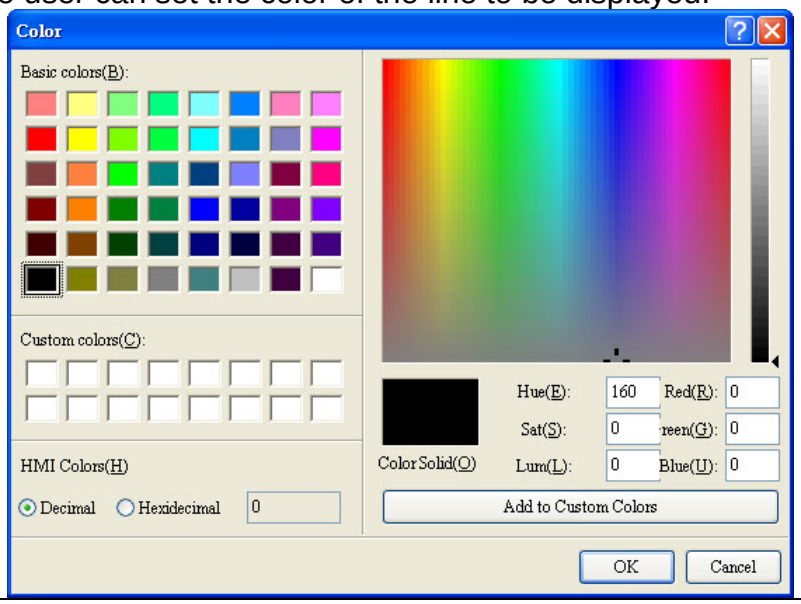
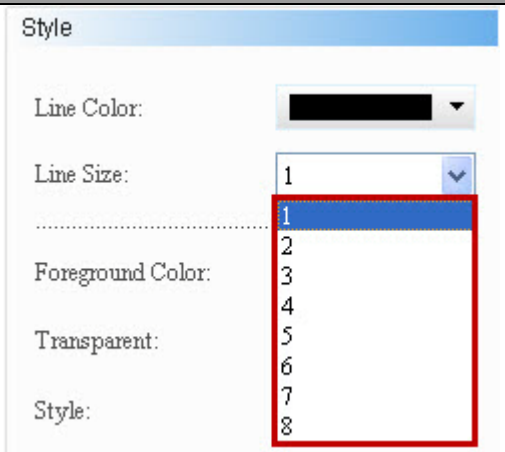
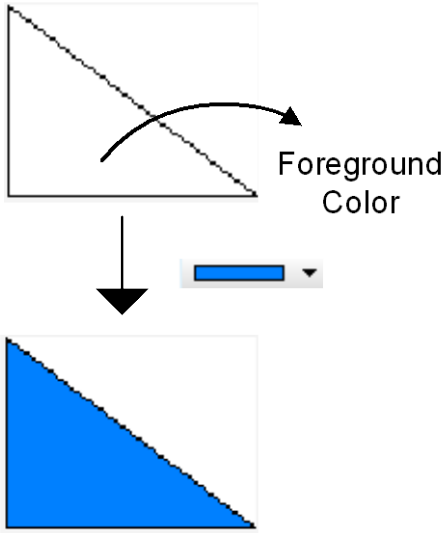
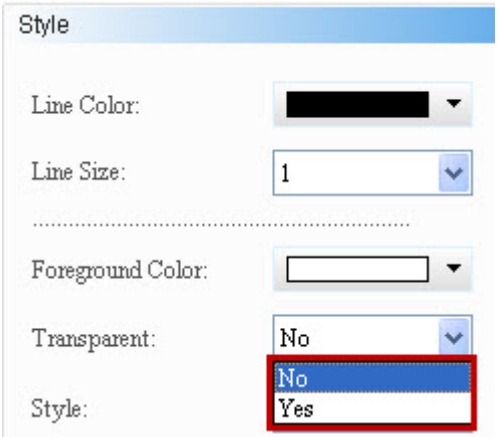
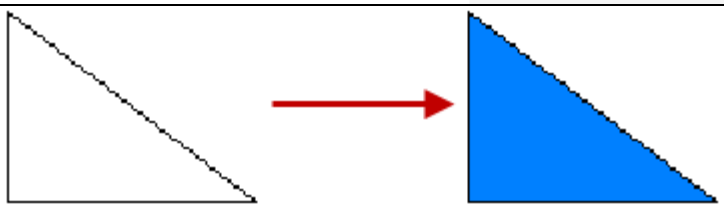
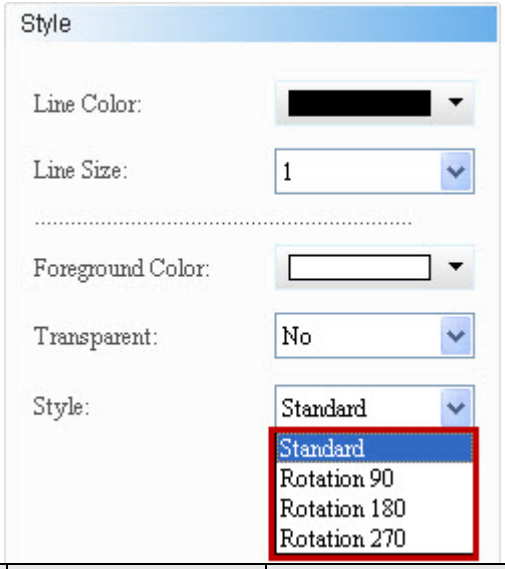
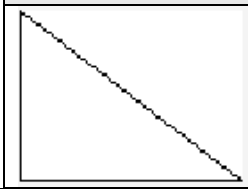
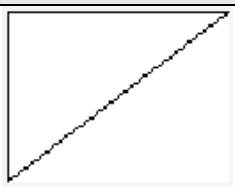
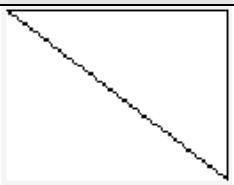
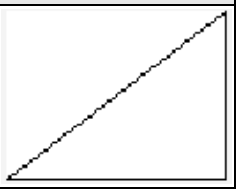


Figure 21-1-5 Right Triangle Element Main Properties Page

No.	Property	Function
(1)	Line Color	➢ The user can set the color of the line to be displayed. 
(2)	Line Size	➢ The width of the line can be set between 1 and 8.

No.	Property	Function
		
(3)	Foreground Color	➢ The user can set the foreground color for the element. 
(4)	Transparent Color	➢ Yes and No are available for selection.  ➢ When Yes is selected, the foreground color of the right triangle element is transparent and only the border color of the right triangle is displayed. When No is selected, the foreground color of the element is displayed.

No.	Property	Function
		Transparent Color: Yes
		Transparent Color: No 
(5)	Style	➢ The Style option supports Standard, Rotation 90, Rotation 180, and Rotation 270. 

Standard	Rotation 90	Rotation 180	Rotation 270
			

◆ Coordinates

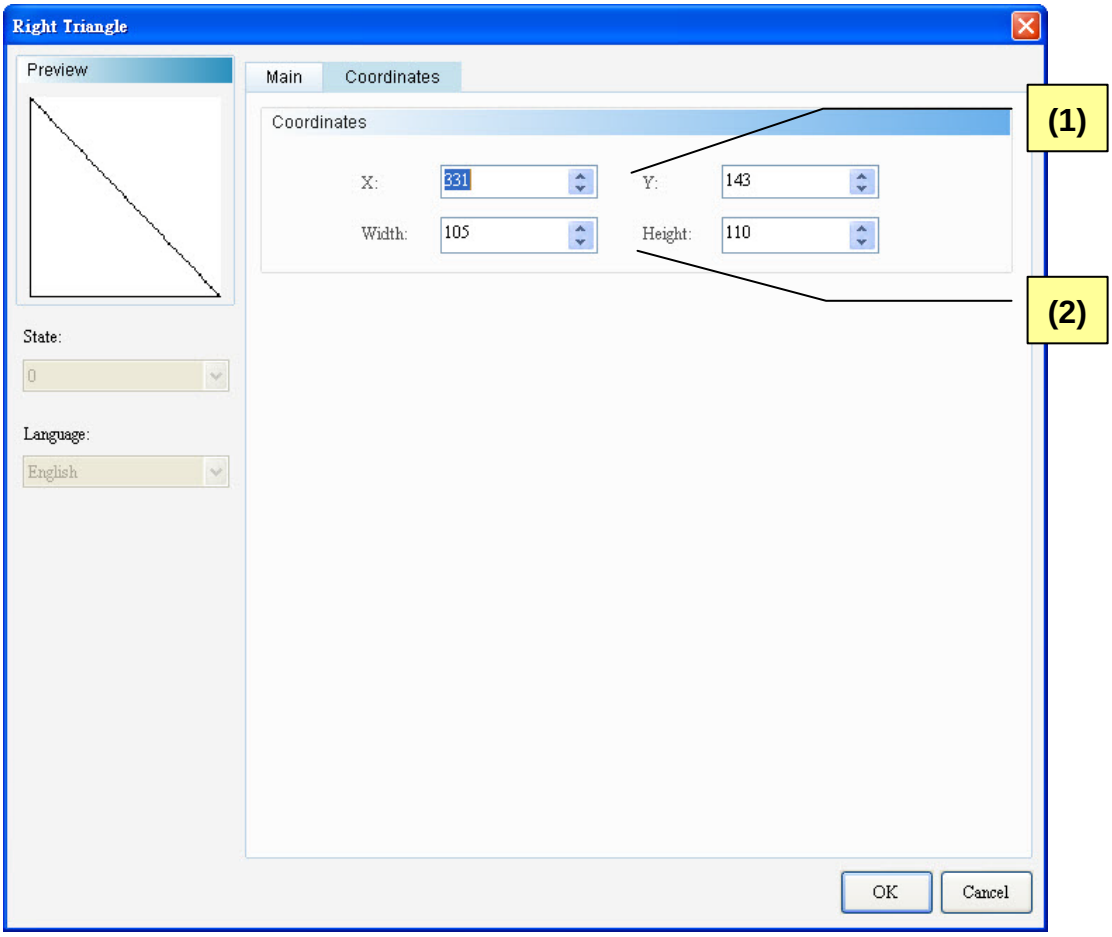


Figure 21-1-6 Right Triangle Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

Pentagon

Double click the Pentagon icon and the following property setting screen appears.

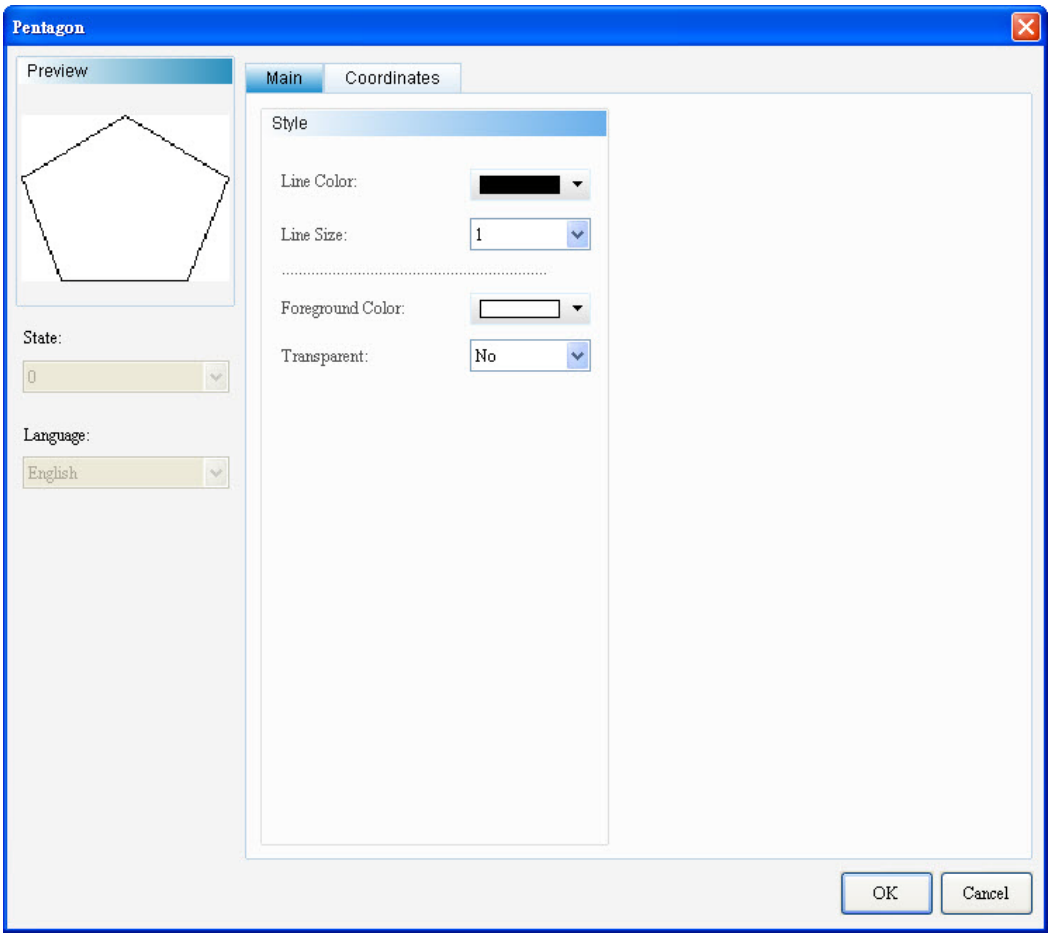


Figure 21-1-7 Pentagon Properties Setting Screen

Pentagon	
Function Page	**Content Description**
Preview	The State and Multi-Language are not available for the Pentagon.
Main	Sets the line color, line size, foreground color, and transparent color.
Coordinates	Sets the X-Y coordinates, width and height of the element.

Table 21-1-5 Pentagon Element Function Page

◆ Main

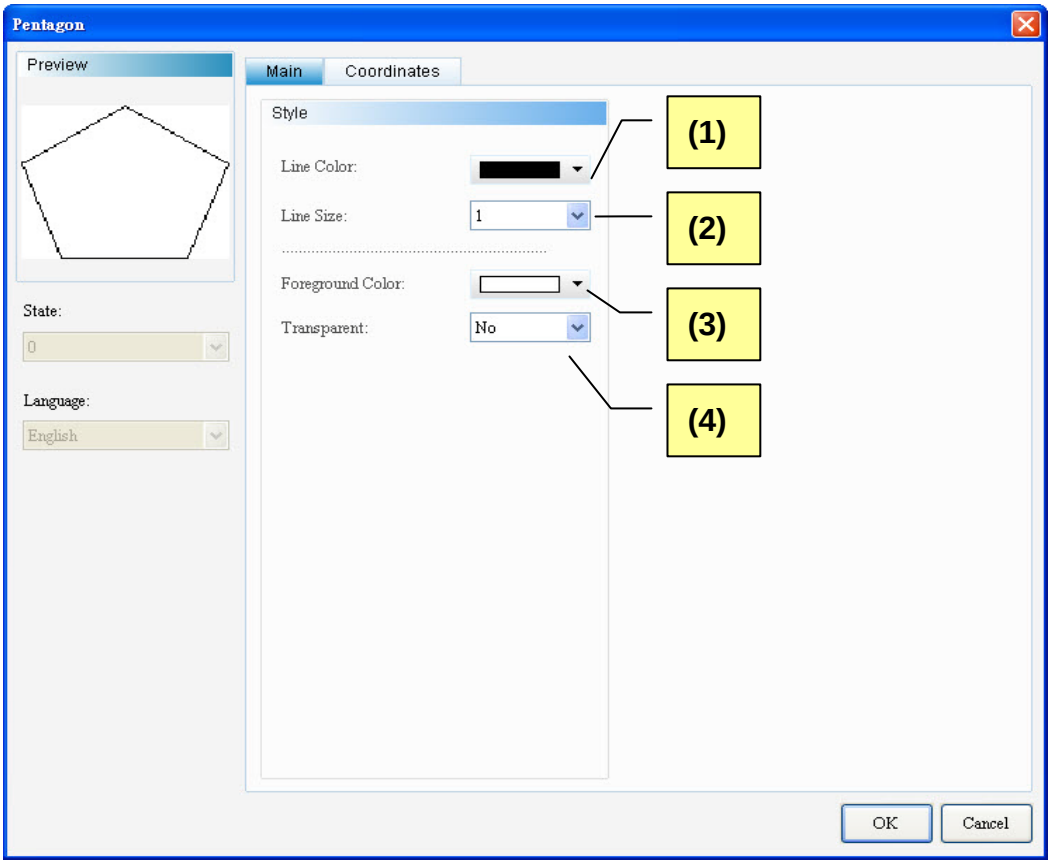
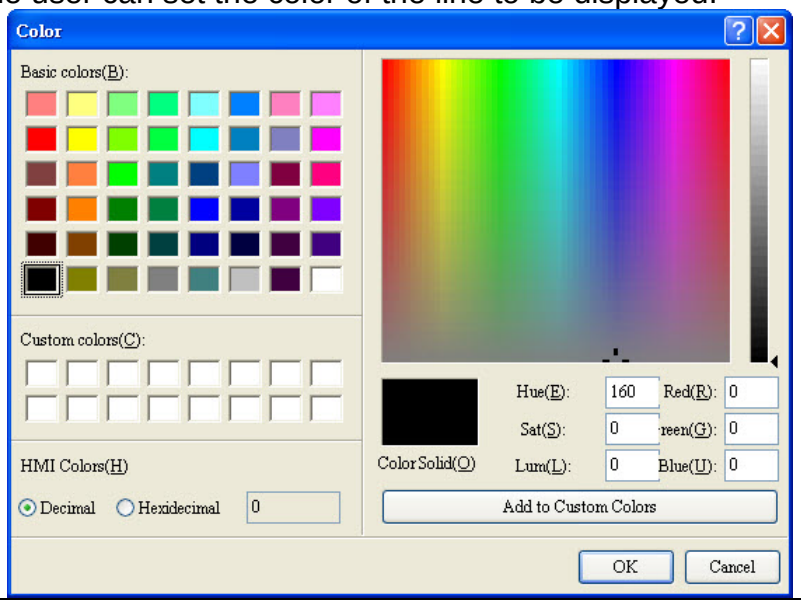
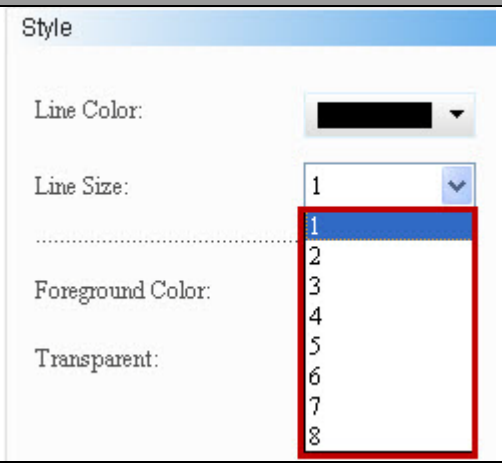
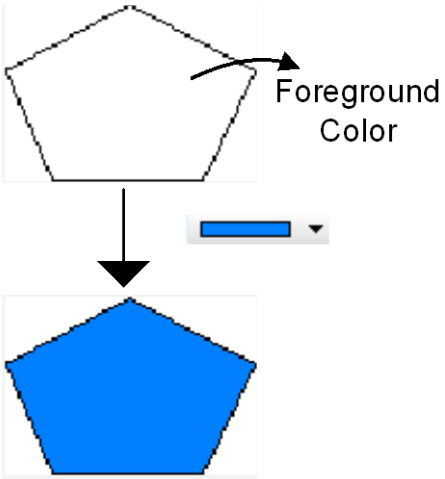
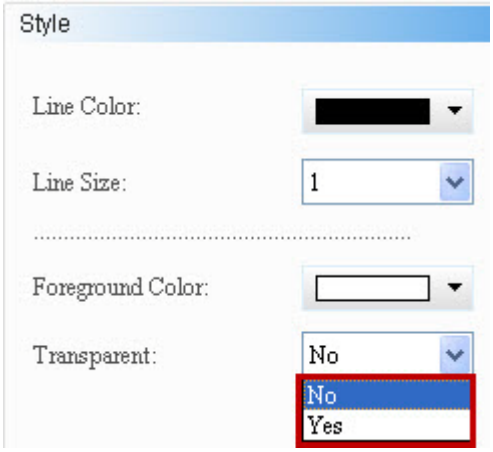
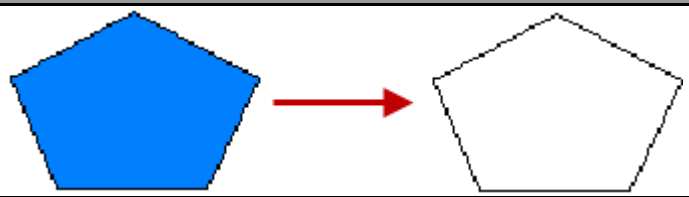
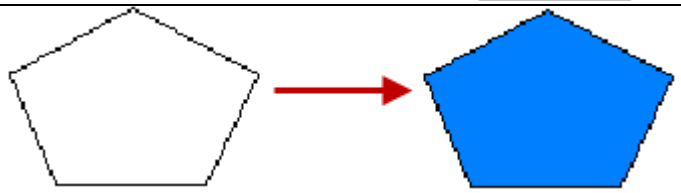


Figure 21-1-8 Pentagon Element Main Properties Page

No.	Property	Function
(1)	Line Color	➢ The user can set the color of the line to be displayed. 
(2)	Line Size	➢ The width of the line is defined between 1 and 8.

No.	Property	Function
		
(3)	Foreground Color	➢ The user can set the foreground color for the element. 
(4)	Transparent Color	➢ Yes and No are available for selection.  ➢ When Yes is selected, the foreground color of the pentagon element is transparent and only the border color of the pentagon is displayed. When No is selected, the foreground color of the element is displayed.

No.	Property	Function	
		Transparent Color: Yes	
		Transparent Color: No	

◆ Coordinates

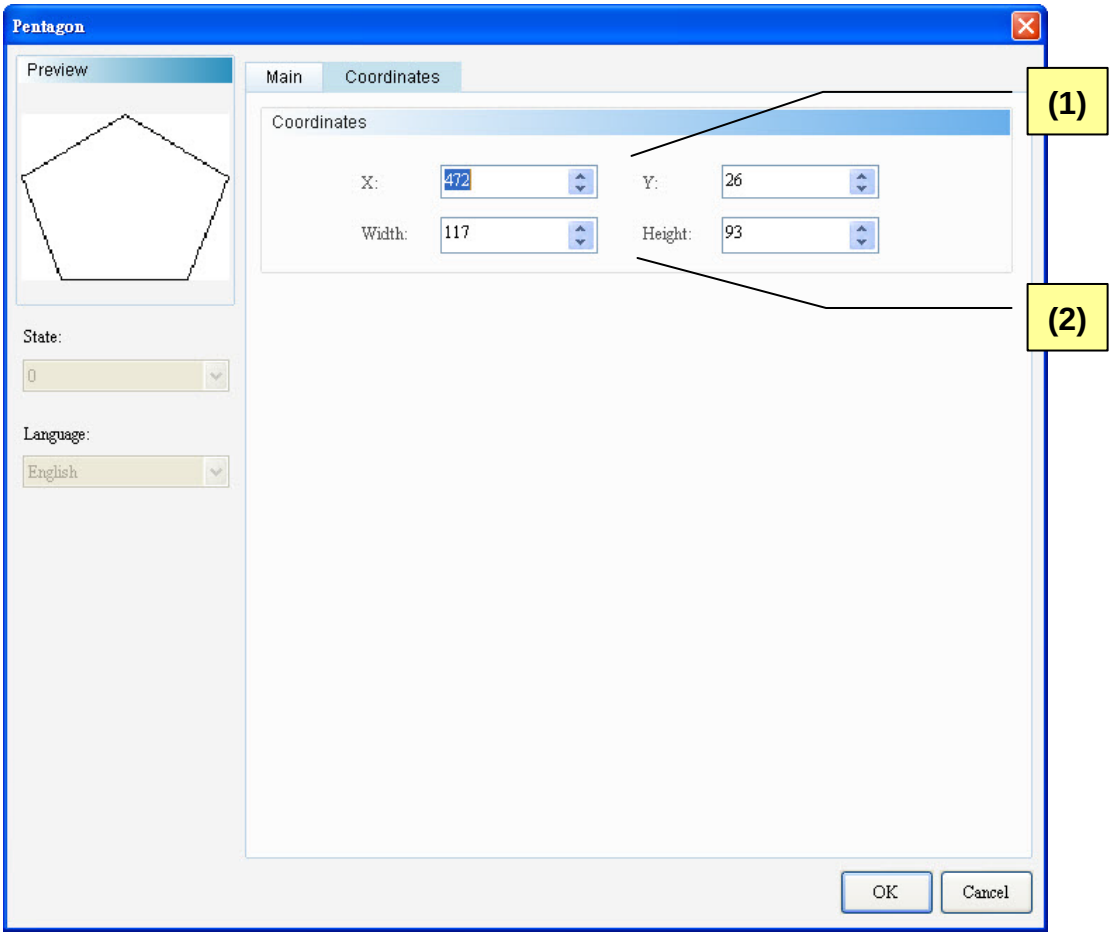


Figure 21-1-9 Pentagon Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

Pie Chart

Double click the Pie Chart icon and the following property setting screen appears.

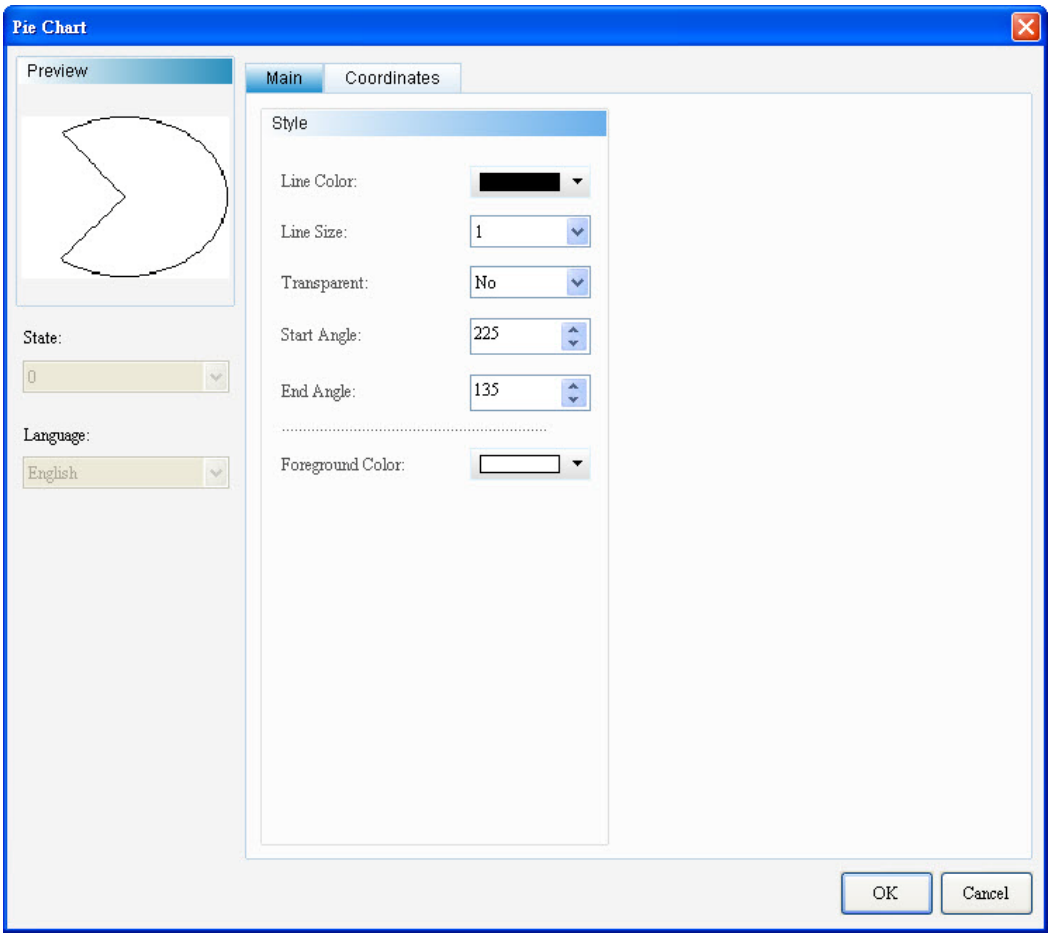


Figure 21-1-10 Pie Chart Properties Setting Screen

Pie Chart	
Function Page	**Content Description**
Preview	The State and Language are not available for the Pie Chart.
Main	Sets the line color, line size, transparent color, Star angle, end angle, and foreground color.
Coordinates	Sets the X-Y coordinates, width and height of the element.

Table 21-1-6 Pie Chart Element Function Page

◆ Main

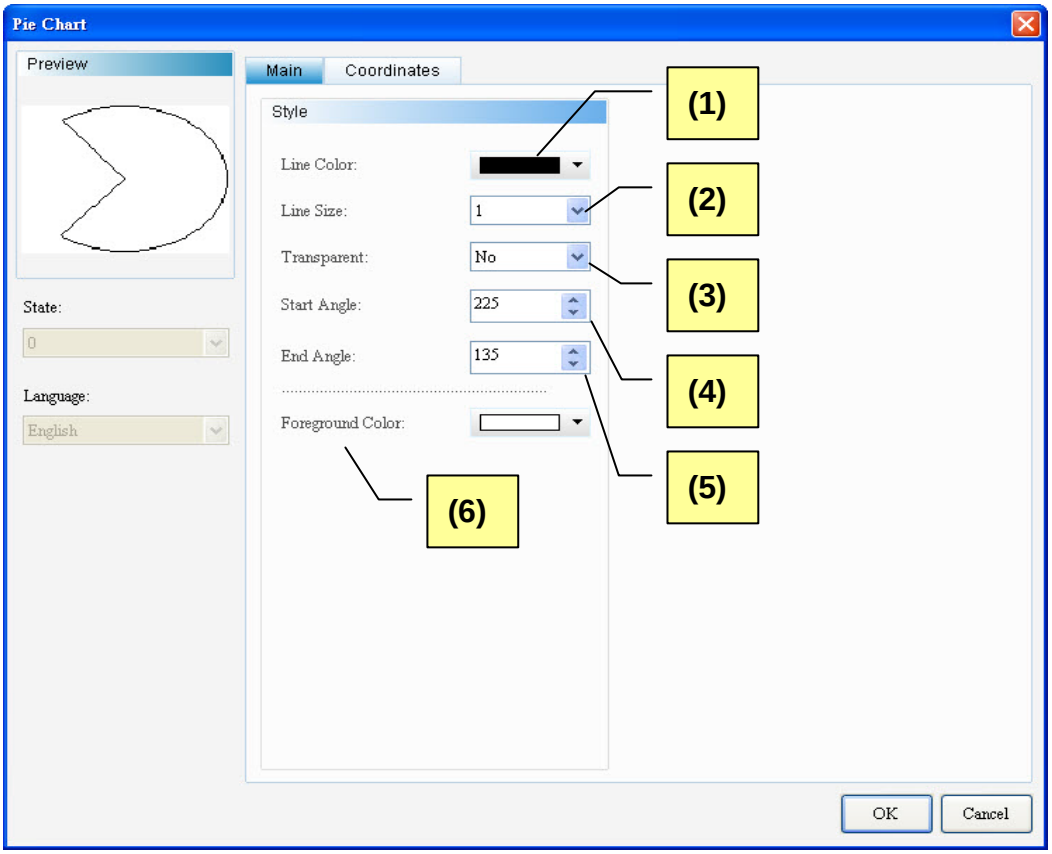
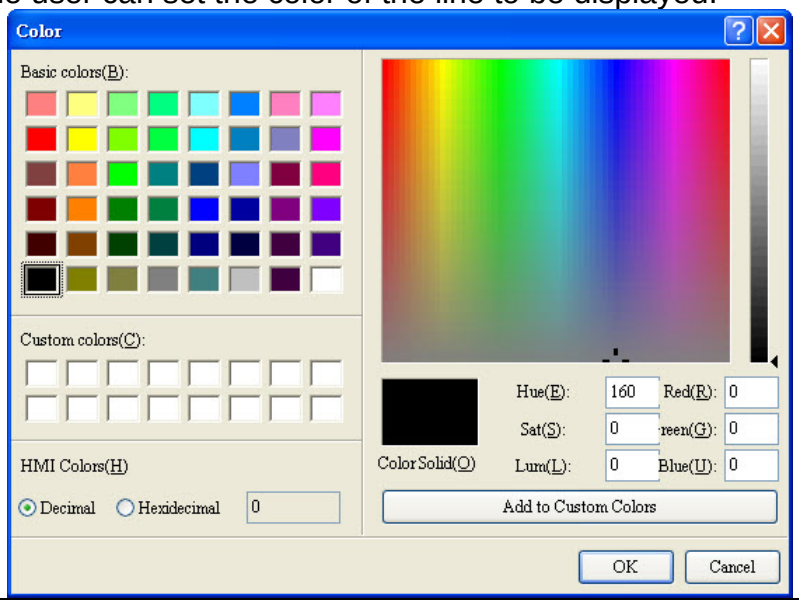
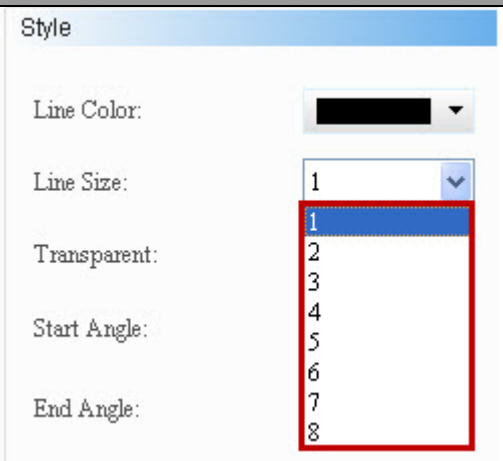
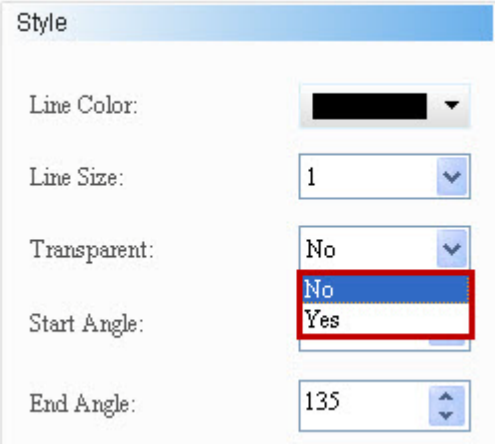
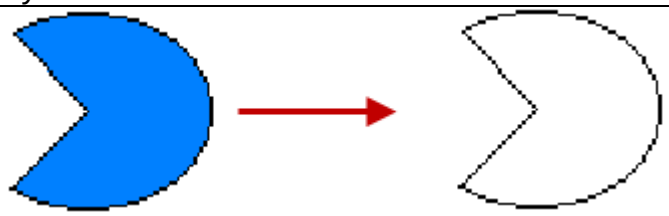
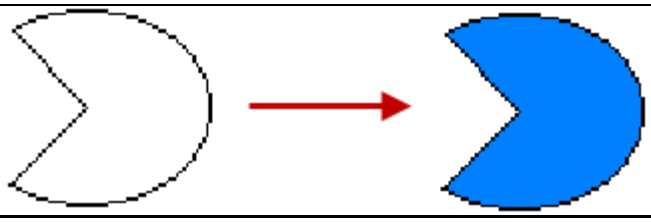
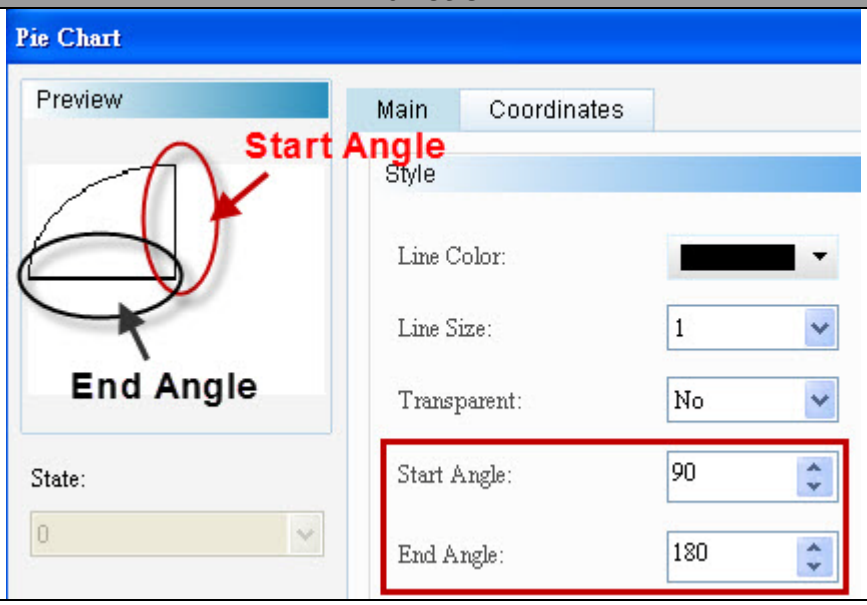
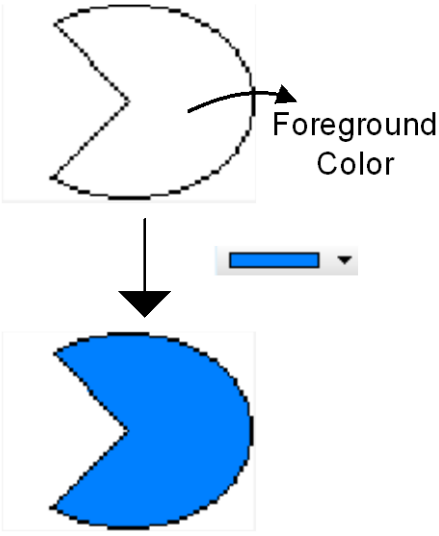


Figure 21-1-11 Pie Chart Element Main Properties Page

No.	Property	Function
(1)	Line Color	➢ The user can set the color of the line to be displayed. 
(2)	Line Size	➢ The width of the line can be set between 1 and 8.

No.	Property	Function
		
(3)	Transparent Color	➢ Yes and No are available for selection.  ➢ When Yes is selected, the foreground color of the Pie Chart element is transparent and only the border color of the Pie Chart is displayed. When No is selected, the foreground color of the element is displayed. **Transparent Color: Yes**  **Transparent Color: No** 
(4)	Star Angle	➢ The user can use the Star Angle and End Angle to set the opening angle of the Pie Chart.
(5)	End Angle	

No.	Property	Function
		
(6)	Foreground Color	➢ The user can set the foreground color for the element. 

◆ Coordinates

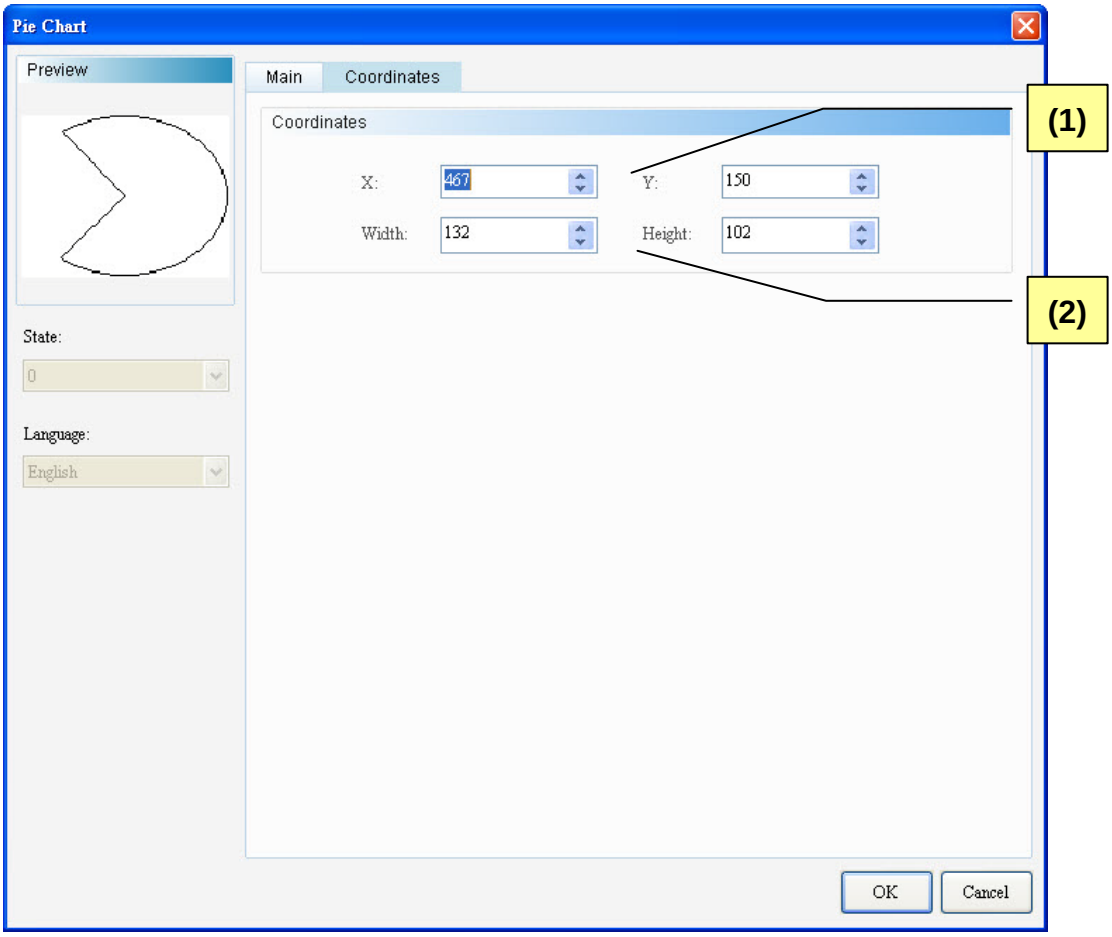


Figure 21-1-12 Pie Chart Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

Arc

Double click the Arc icon and the following property setting screen appears.

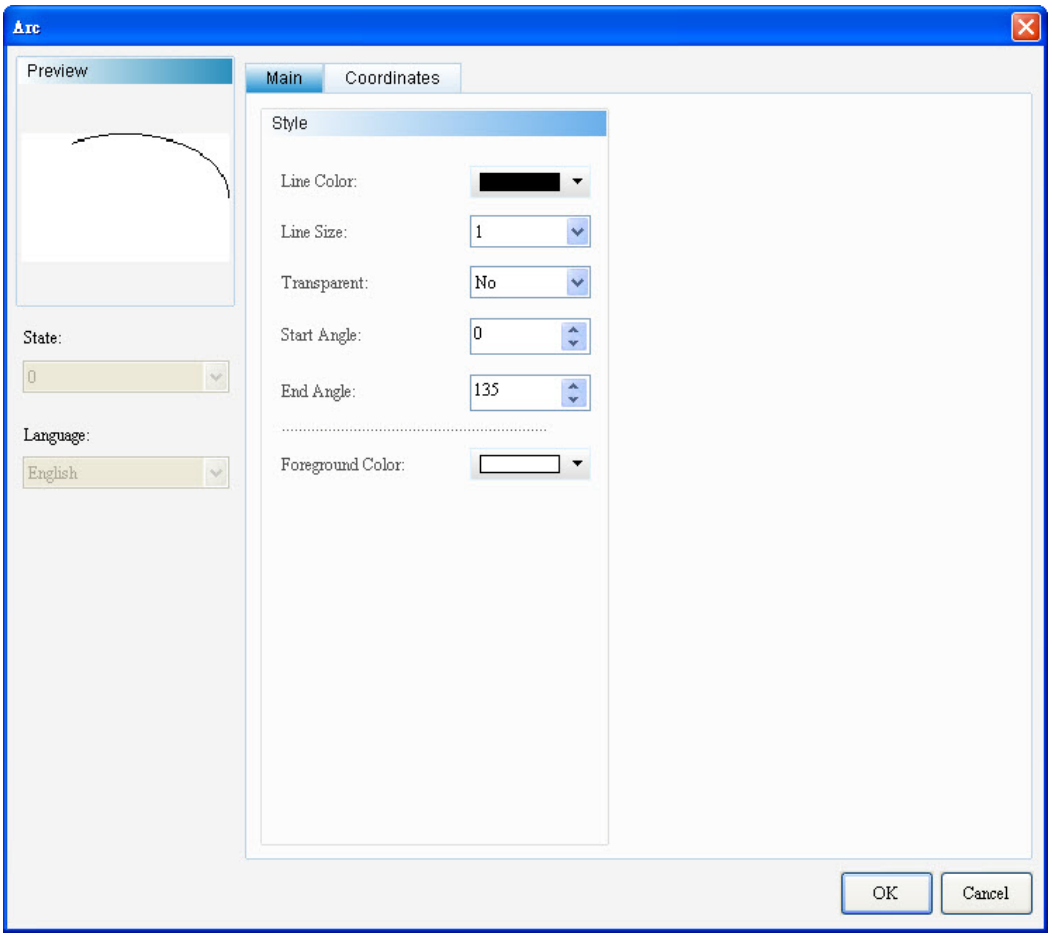


Figure 21-1-13 Arc Properties Setting Screen

Arc	
Function Page	**Content Description**
Preview	The State and Multi-Language are not available for the Arc.
Main	Sets the line color, line size, transparent color, Star angle, end angle, and foreground color.
Coordinates	Sets the X-Y coordinates, width and height of the element.

Table 21-1-7 Arc Element Function Page

◆ Main

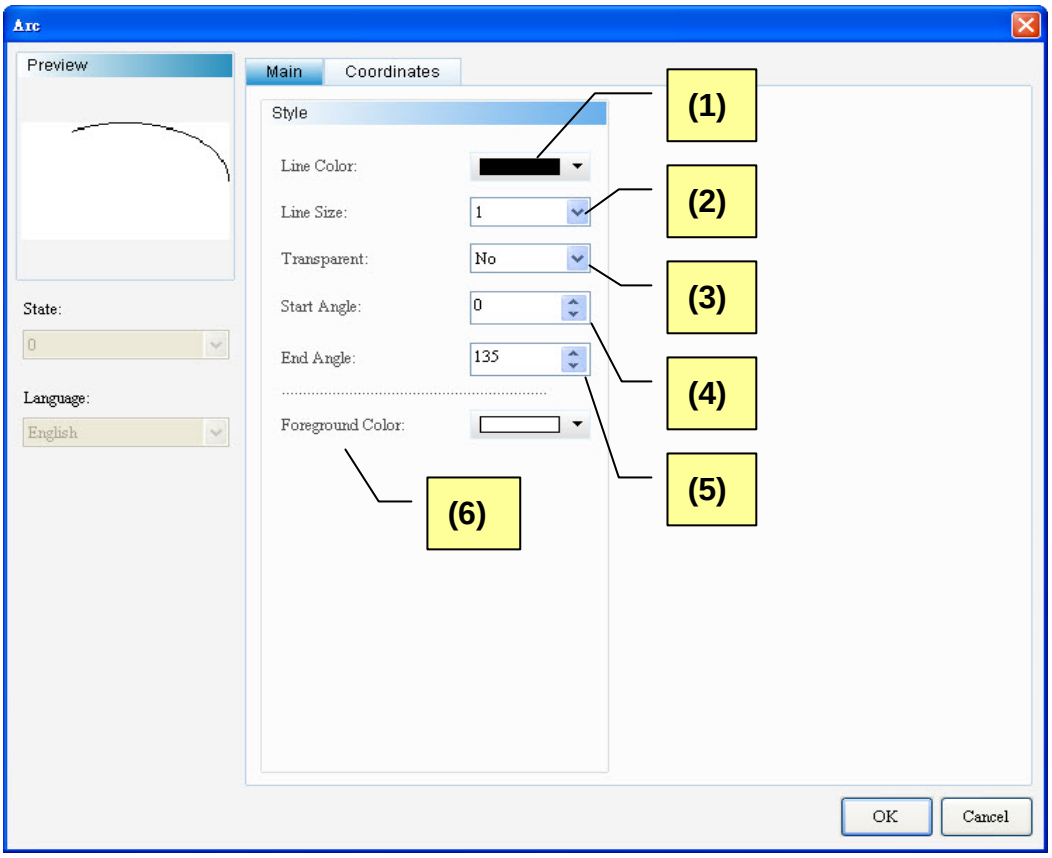
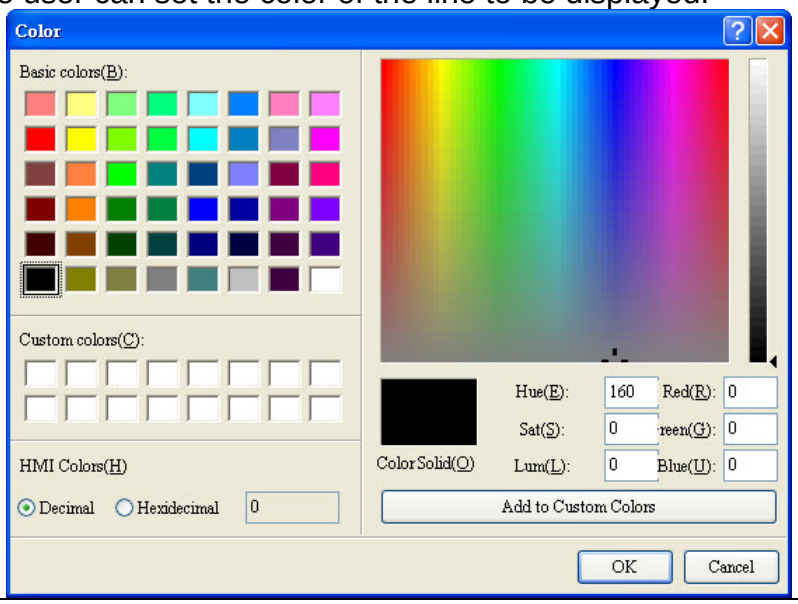
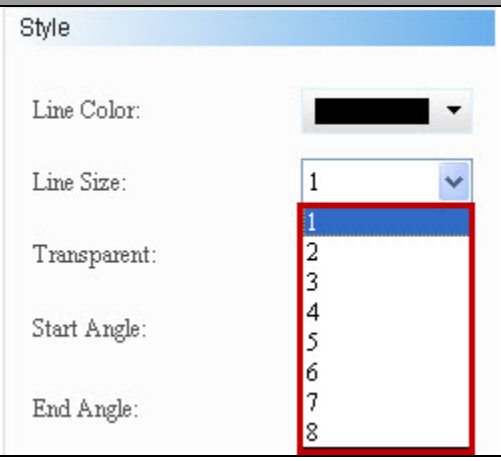
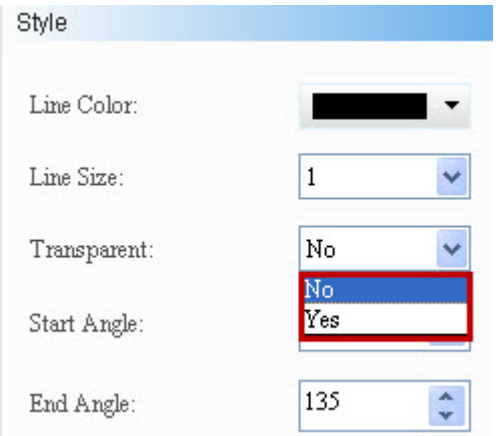
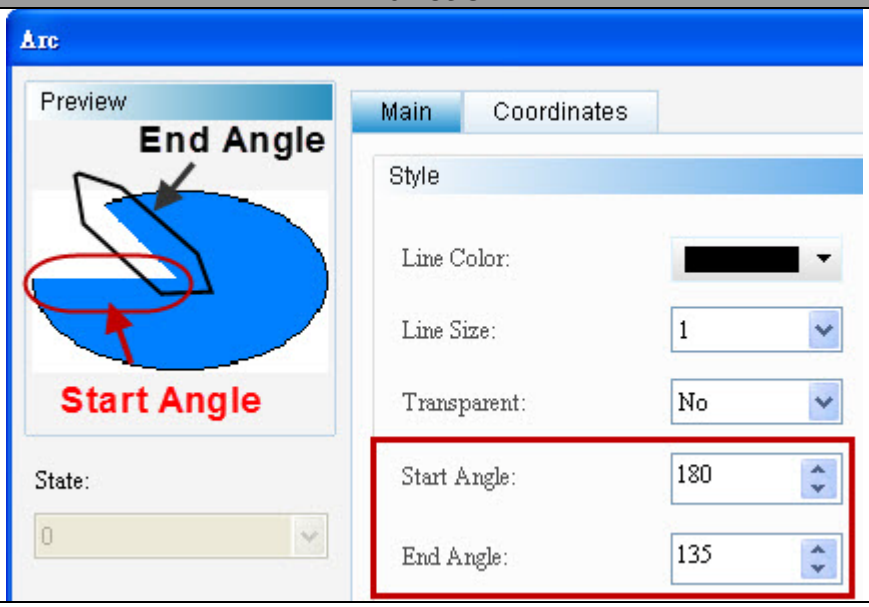
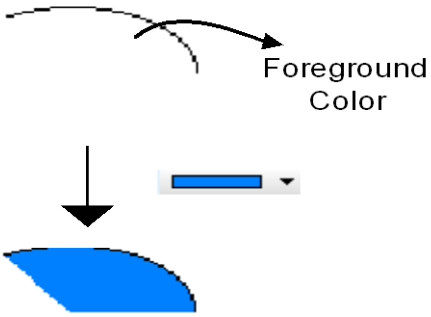


Figure 21-1-14 Arc Element Main Properties Page

No.	Property	Function
(1)	Line Color	➢ The user can set the color of the line to be displayed. 
(2)	Line Size	➢ The width of the line can be set between 1 and 8.

No.	Property	Function
		
(3)	Transparent Color	➢ Yes and No are available for selection.  ➢ When Yes is selected, the foreground color of the arc element is transparent and only the border color of the arc is displayed. When No is selected, the foreground color of the element is displayed. **Transparent Color: Yes** **Transparent Color: No**
(4)	Star Angle	➢ The user can use the Star Angle and End Angle to set the opening angle of the arc.
(5)	End Angle	

No.	Property	Function
		
(6)	Foreground Color	➢ The user can set the foreground color for the element. 

◆ Coordinates

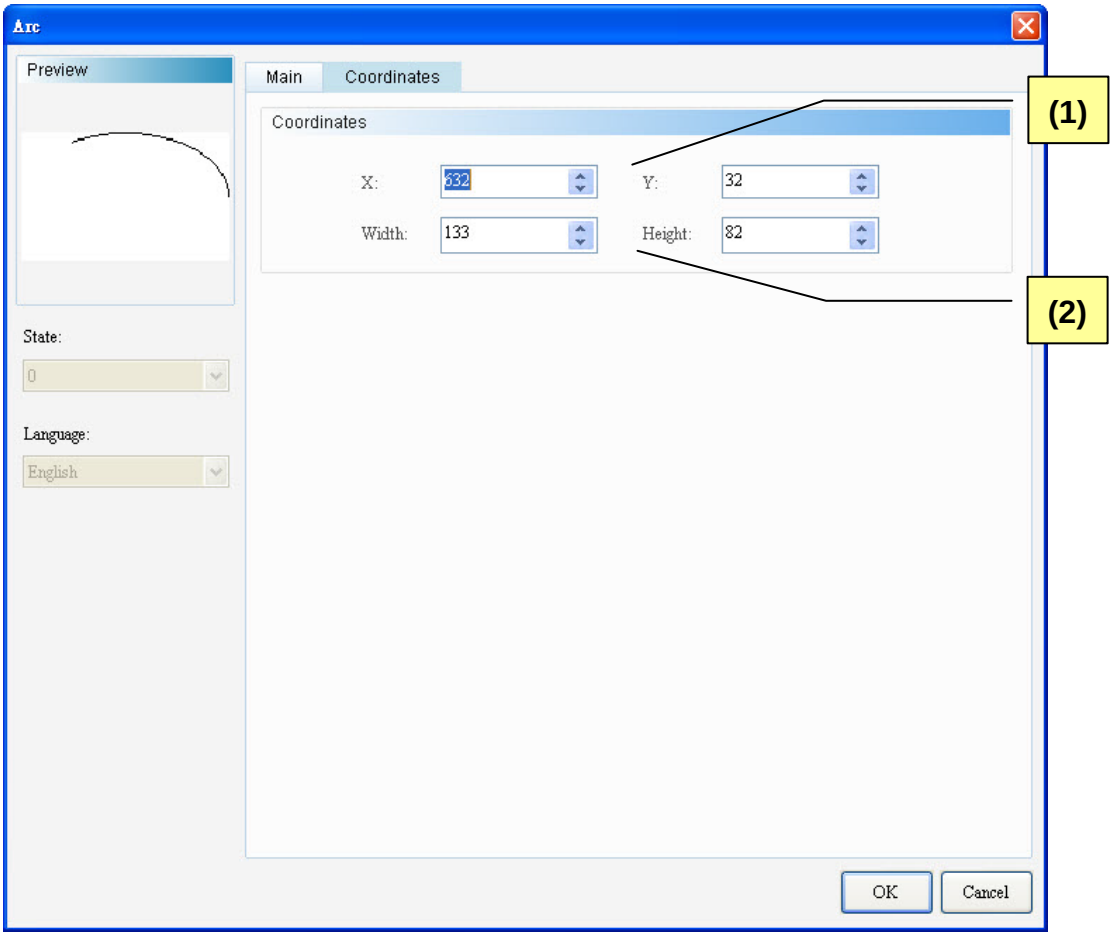


Figure 21-1-15 Arc Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

Hexagon

Double click the Hexagon icon and the following property setting screen appears.

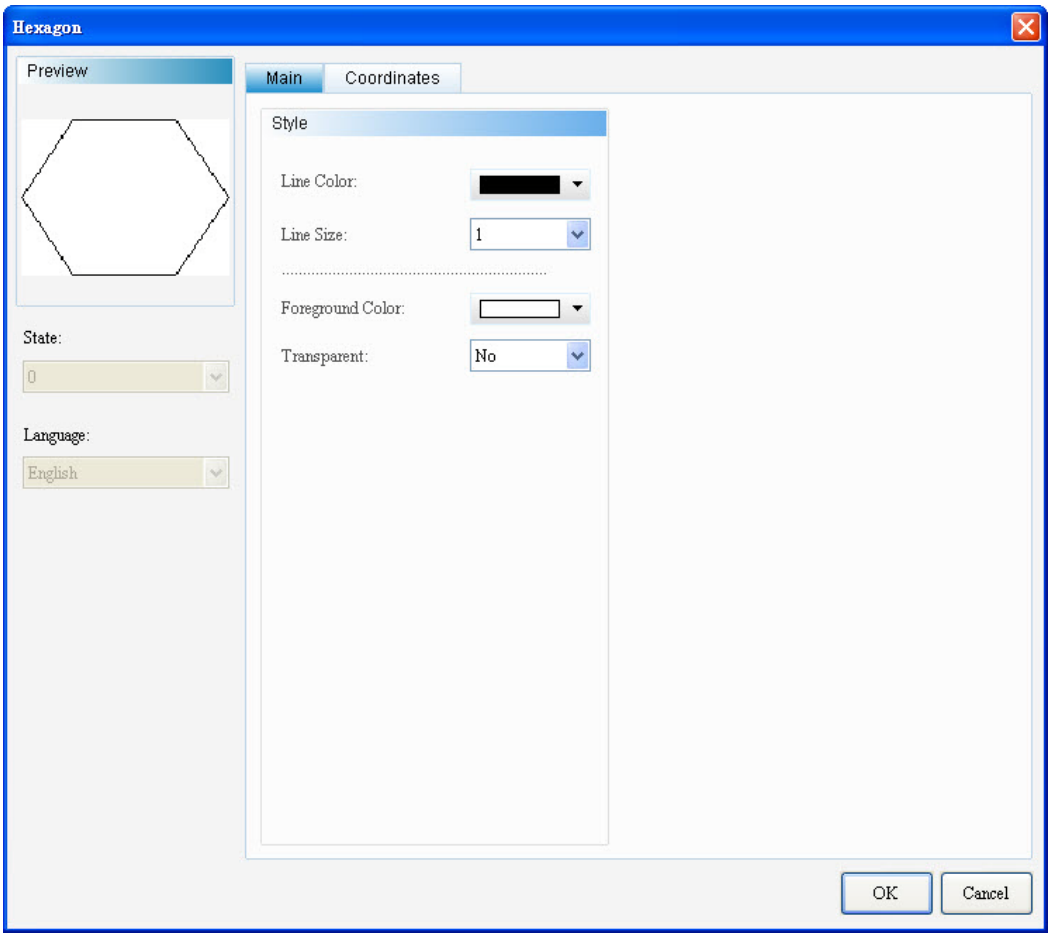


Figure 21-1-16 Hexagon Properties Setting Screen

Hexagon	
Function Page	**Content Description**
Preview	The State and Multi-Language are not available for the Hexagon.
Main	Sets the line color, line size, foreground color, and transparent color.
Coordinates	Sets the X-Y coordinates, width and height of the element.

Table 21-1-8 Hexagon Element Function Page

◆ Main

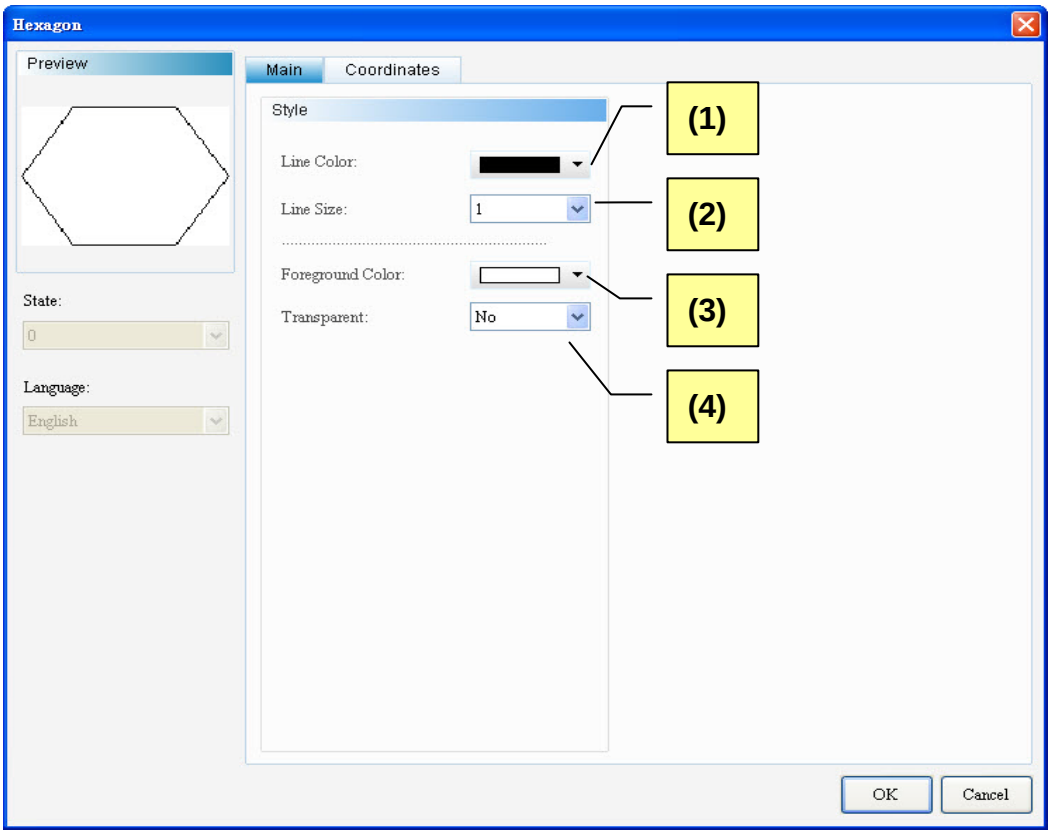
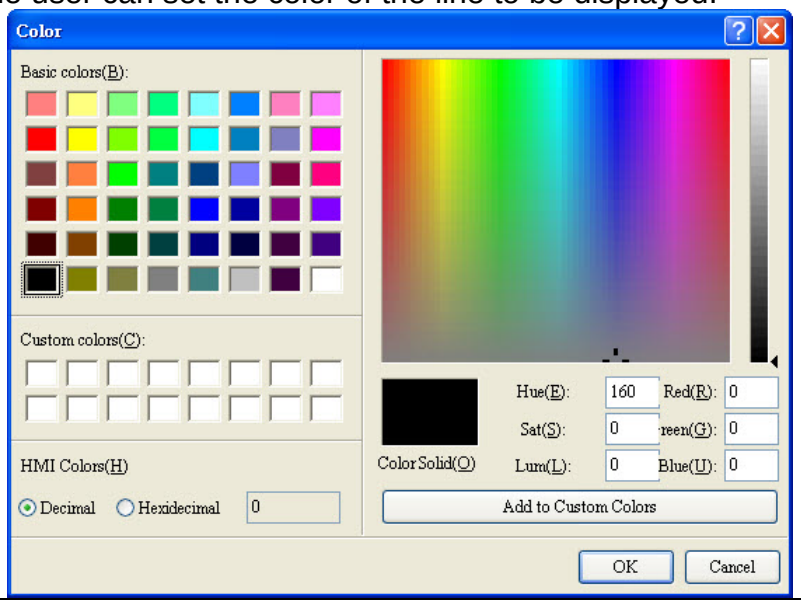
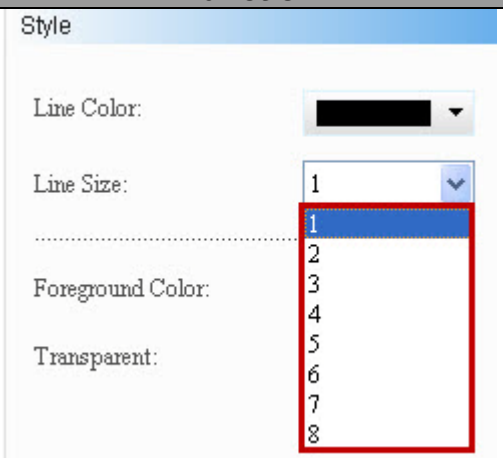
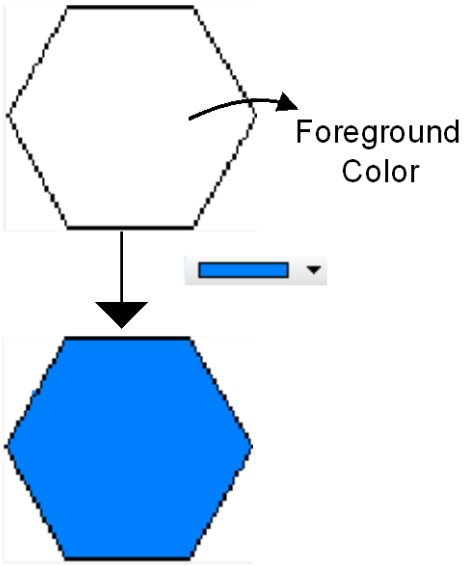
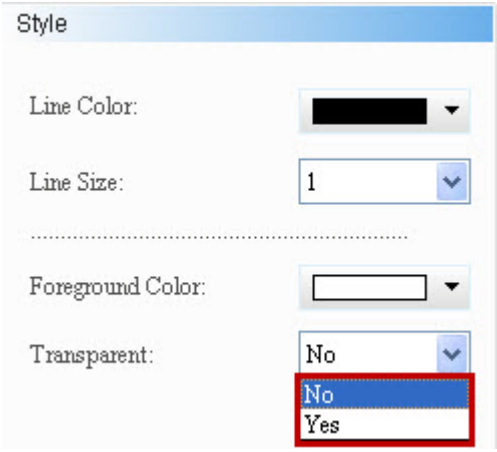
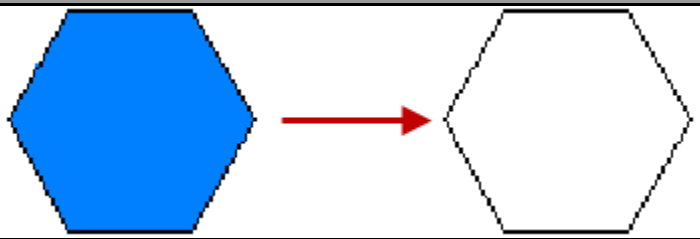
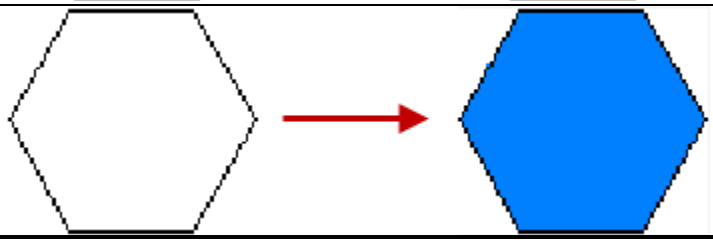


Figure 21-1-17 Hexagon Element Main Properties Page

No.	Property	Function
(1)	Line Color	➢ The user can set the color of the line to be displayed. 
(2)	Line Size	➢ The width of the line can be set between 1 and 8.

No.	Property	Function
		
(3)	Foreground Color	➢ The user can set the foreground color for the element. 
(4)	Transparent Color	➢ Yes and No are available for selection.  ➢ When Yes is selected, the foreground color of the hexagon element is transparent and only the border color of the hexagon is displayed. When No is selected, the foreground color of the element is displayed.

No.	Property	Function	
		Transparent Color: Yes	
		Transparent Color: No	

◆ Coordinates

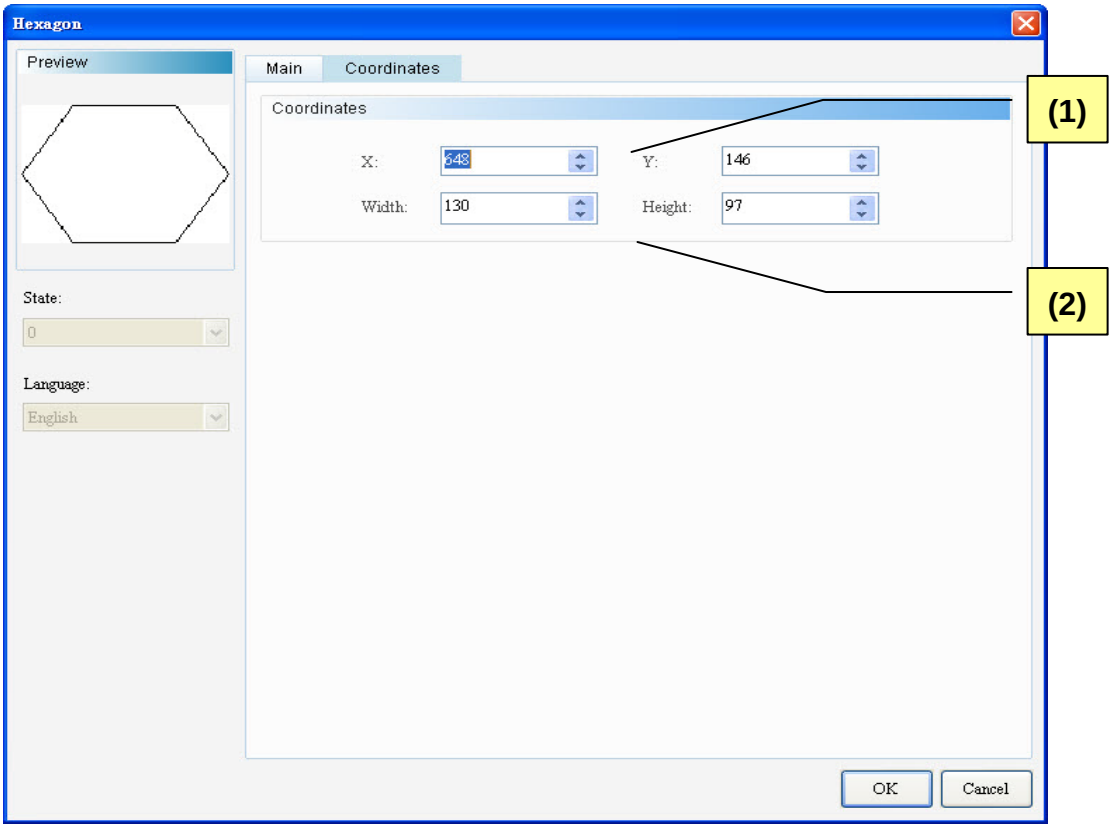


Figure 21-1-18 Hexagon Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

Star Shape

Double click the Star Shape icon and the following property setting screen appears.

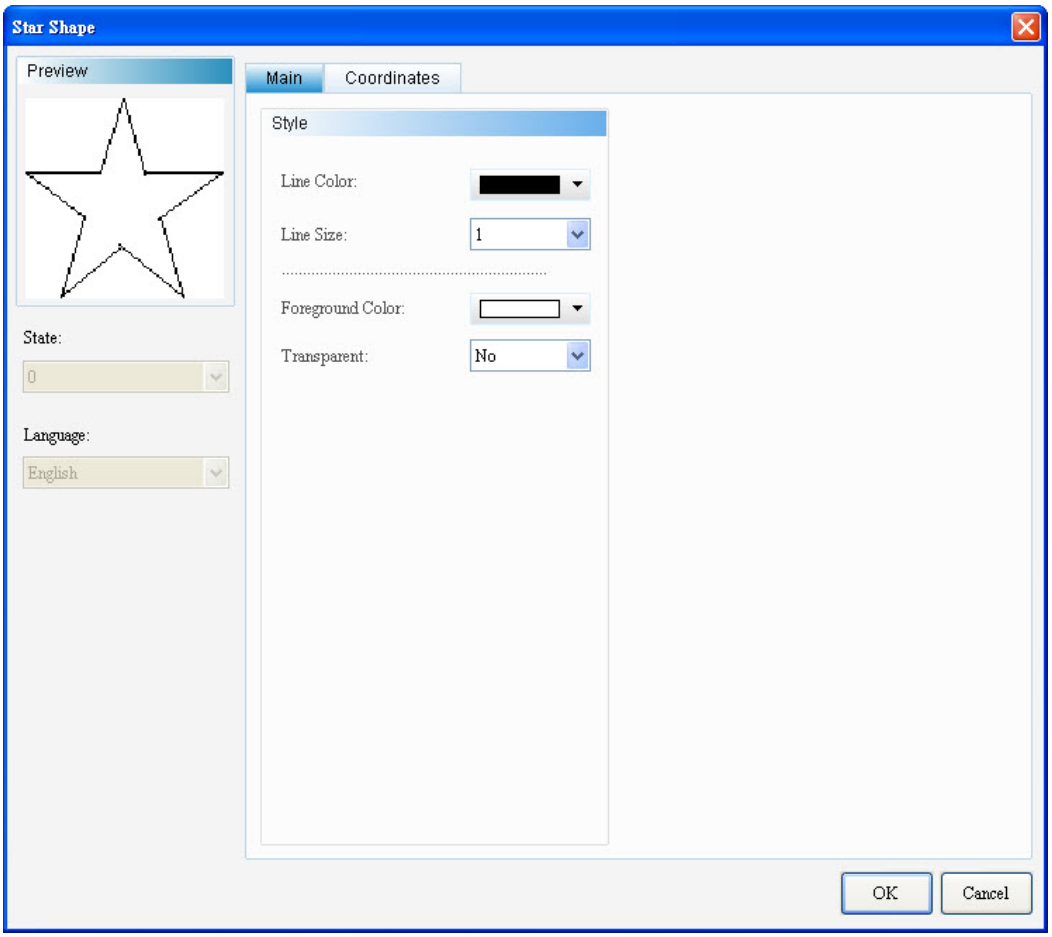


Figure 21-1-19 Star Shape Properties Setting Screen

Star Shape	
Function Page	**Content Description**
Preview	The State and Multi-Language are not available for the Star Shape.
Main	Sets the line color, line size, foreground color and transparent color.
Coordinates	Sets the X-Y coordinates, width and height of the element.

Table 21-1-9 Star Shape Element Function Page

◆ Main

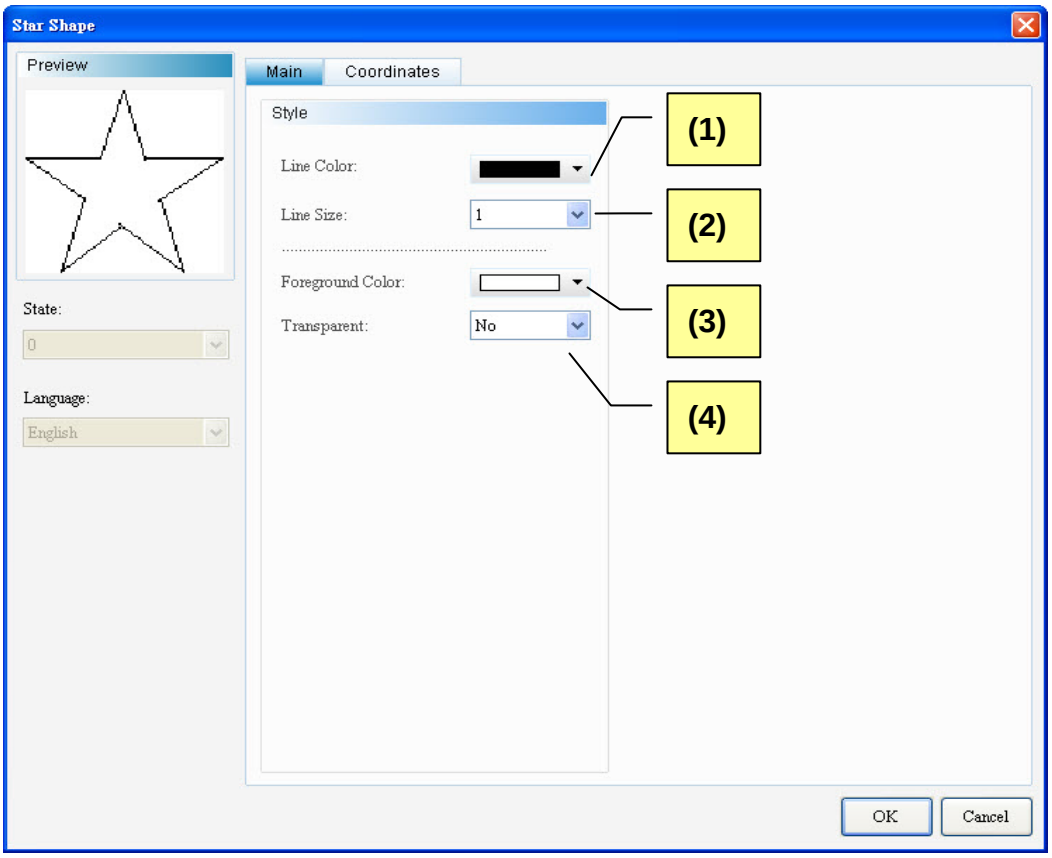
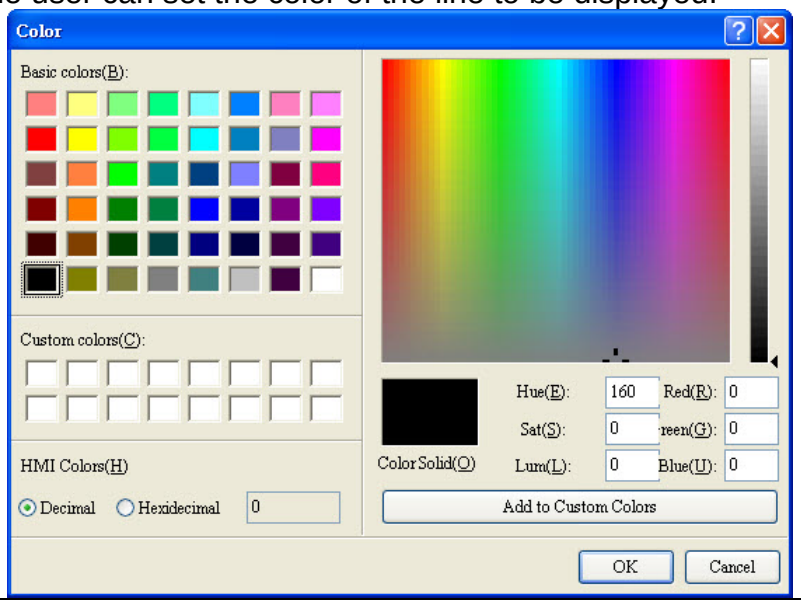
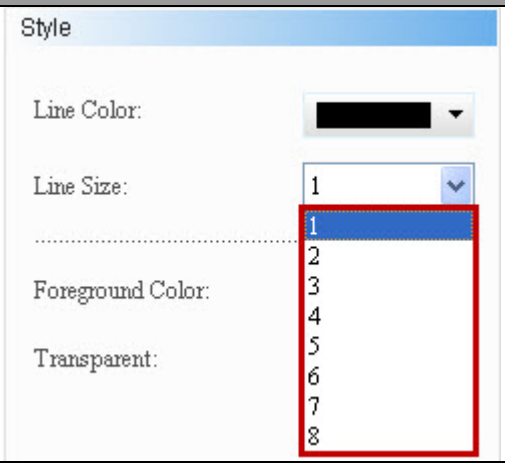
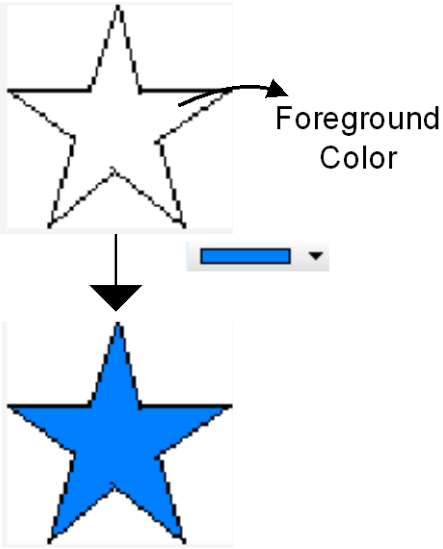
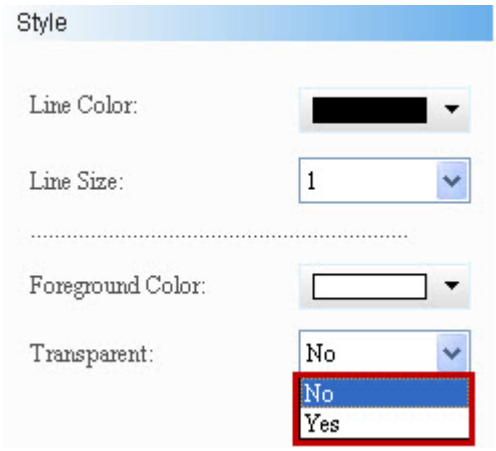
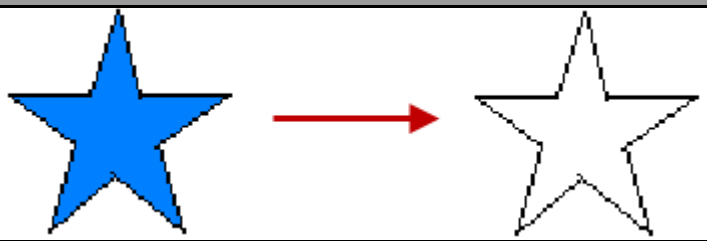
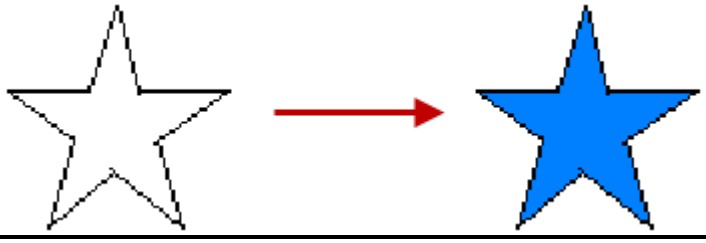


Figure 21-1-20 Star Shape Element Main Properties Page

No.	Property	Function
(1)	Line Color	➢ The user can set the color of the line to be displayed. 
(2)	Line Size	➢ The width of the line can be set between 1 and 8.

No.	Property	Function
		
(3)	Foreground Color	➢ The user can set the foreground color for the element. 
(4)	Transparent Color	➢ Yes and No are available for selection.  ➢ When Yes is selected, the foreground color of the Star Shape element is transparent and only the border color of the Star Shape is displayed. When No is selected, the foreground color of the element is displayed.

No.	Property	Function	
		Transparent Color: Yes	
		Transparent Color: No	

◆ Coordinates

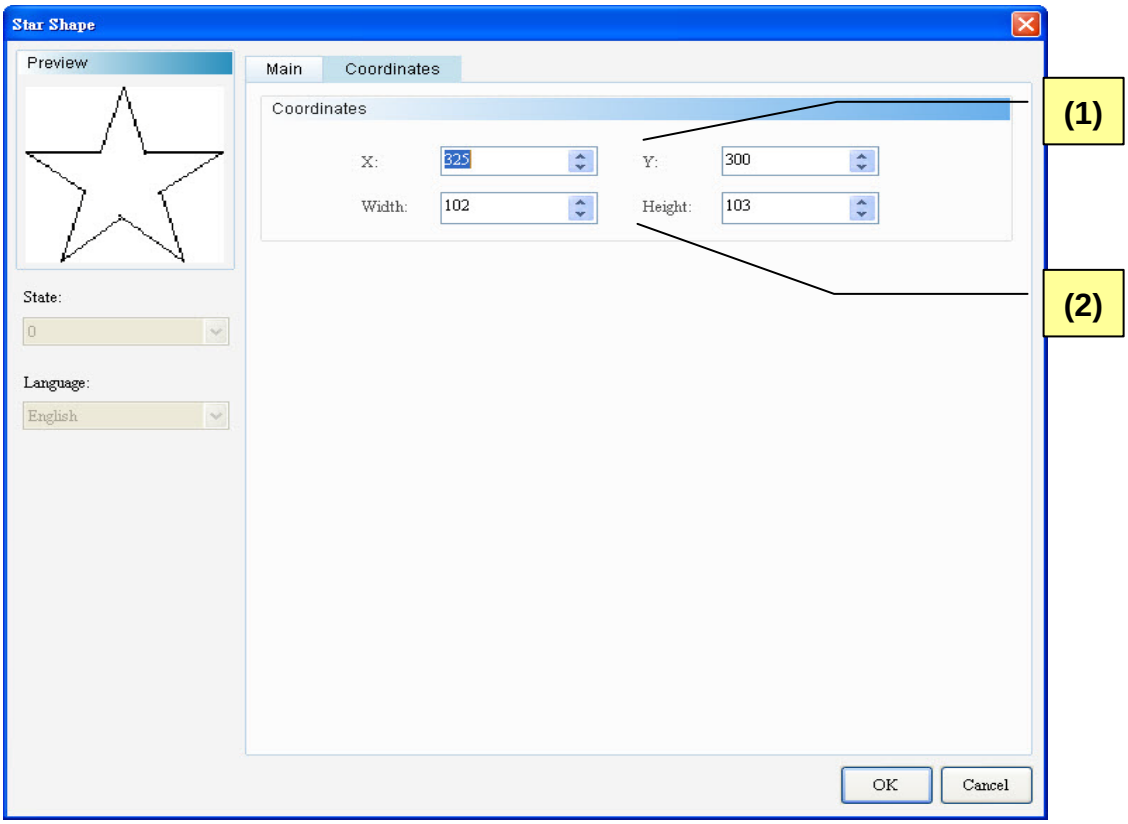


Figure 21-1-21 Star Shape Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

Triangle

Double click the Triangle icon and the following property setting screen appears.

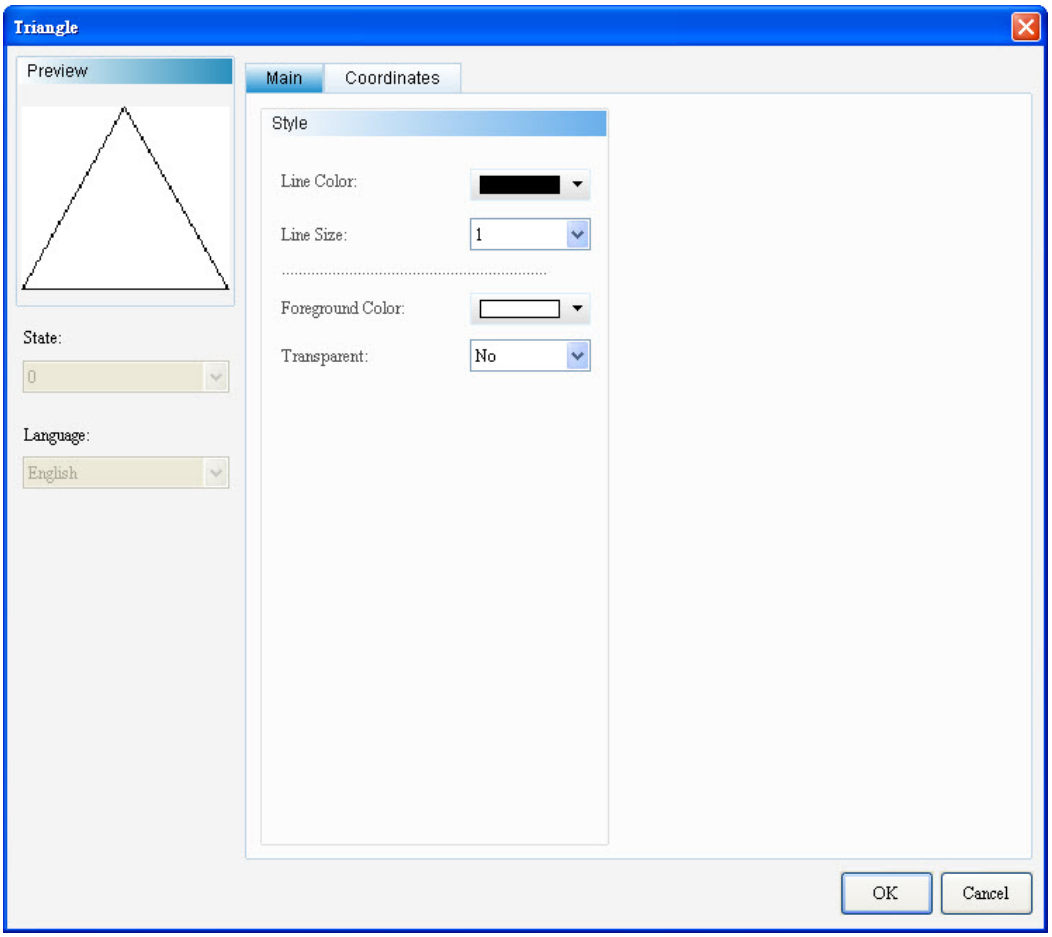


Figure 21-1-22 Triangle Properties Setting Screen

Triangle	
Function Page	**Content Description**
Preview	The State and Multi-Language are not available for the Triangle.
Main	Sets the line color, line size, foreground color and transparent color.
Coordinates	Sets the X-Y coordinates, width and height of the element.

Table 21-1-10 Triangle Element Function Page

◆ Main

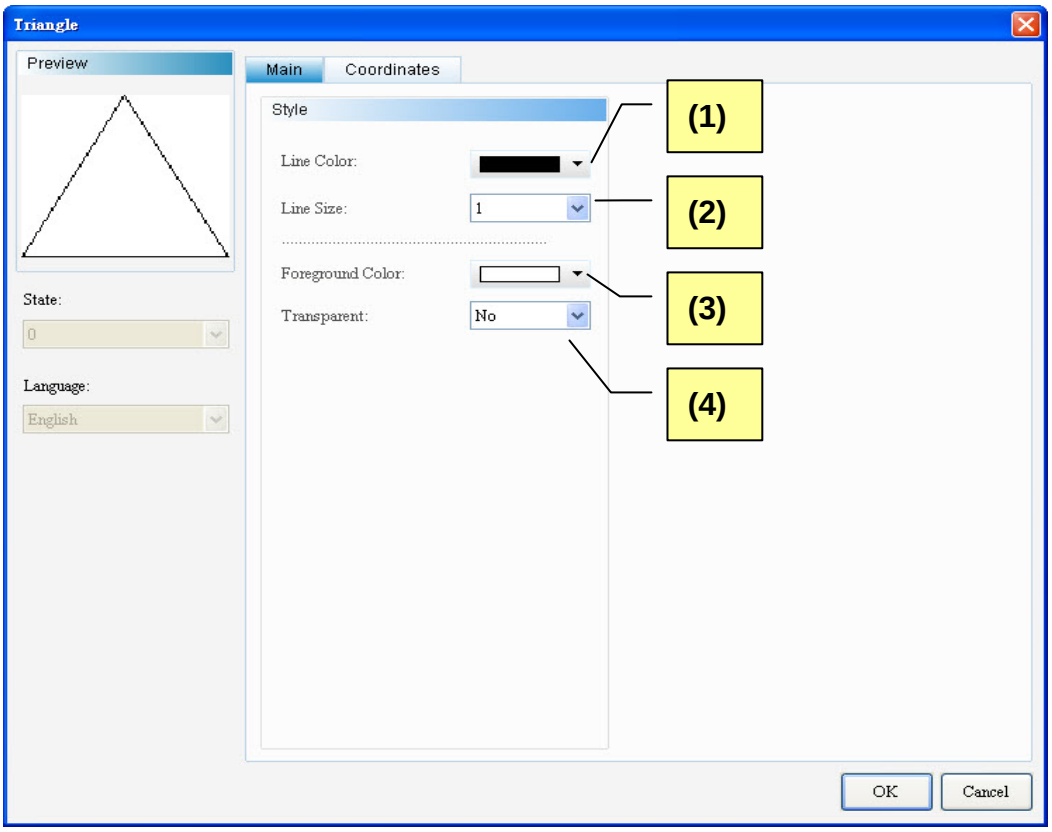
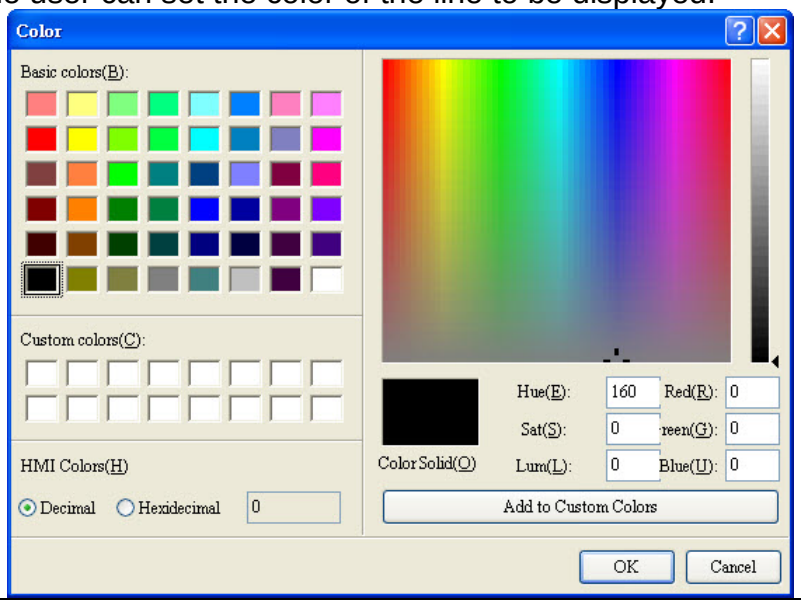
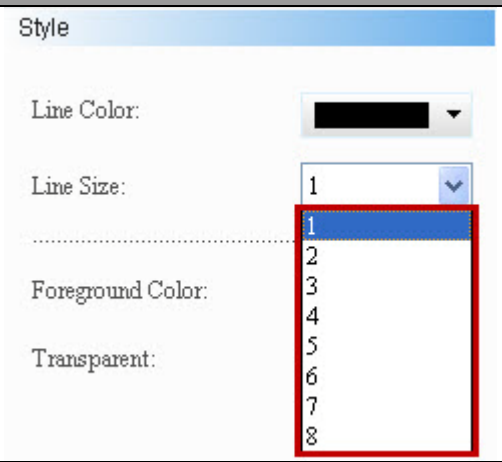
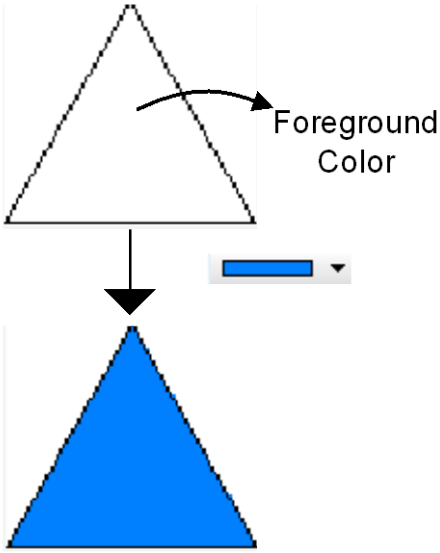
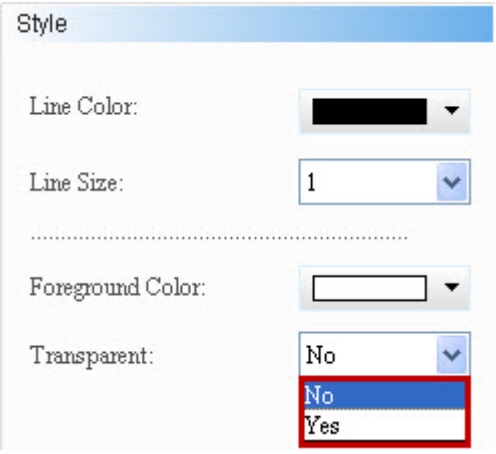
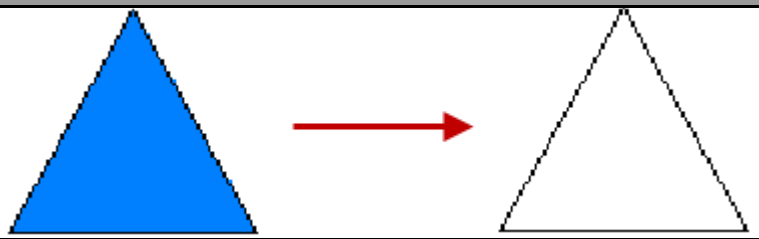
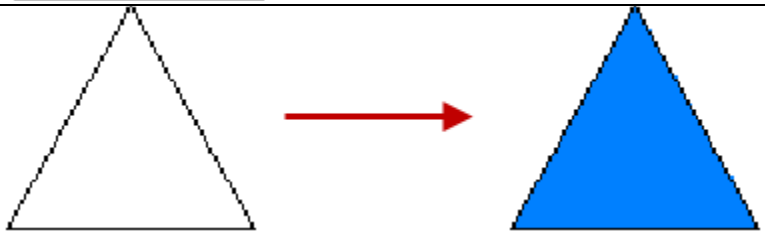


Figure 21-1-23 Triangle Element Main Properties Page

No.	Property	Function
(1)	Line Color	➢ The user can set the color of the line to be displayed. 
(2)	Line Size	➢ The width of the line can be set between 1 and 8.

No.	Property	Function
		
(3)	Foreground Color	➢ The user can set the foreground color for the element. 
(4)	Transparent Color	➢ Yes and No are available for selection.  ➢ When Yes is selected, the foreground color of the triangle element is transparent and only the border color of the triangle is displayed. When No is selected, the foreground color of the element is displayed.

No.	Property	Function	
		Transparent Color: Yes	
		Transparent Color: No	

◆ Coordinates

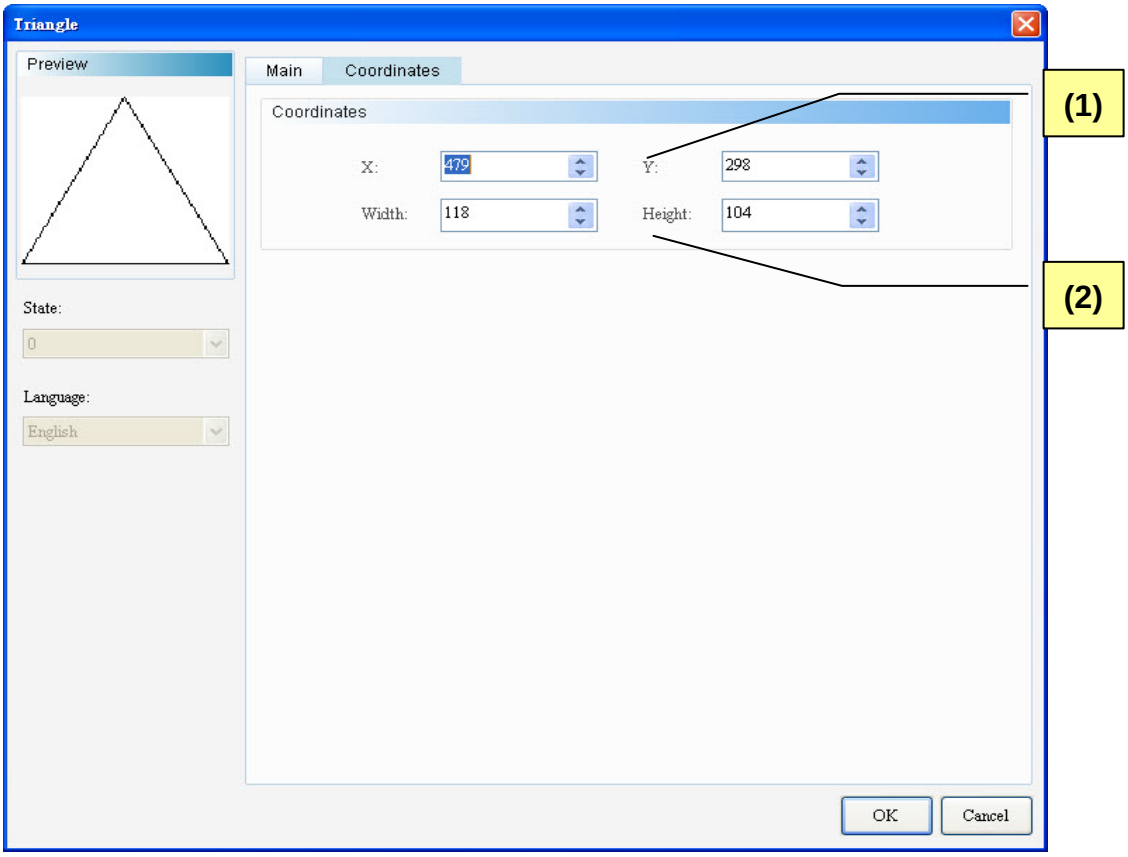


Figure 21-1-24 Triangle Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

Hollow Circle

Double click the Hollow Circle icon and the following property setting screen appears.

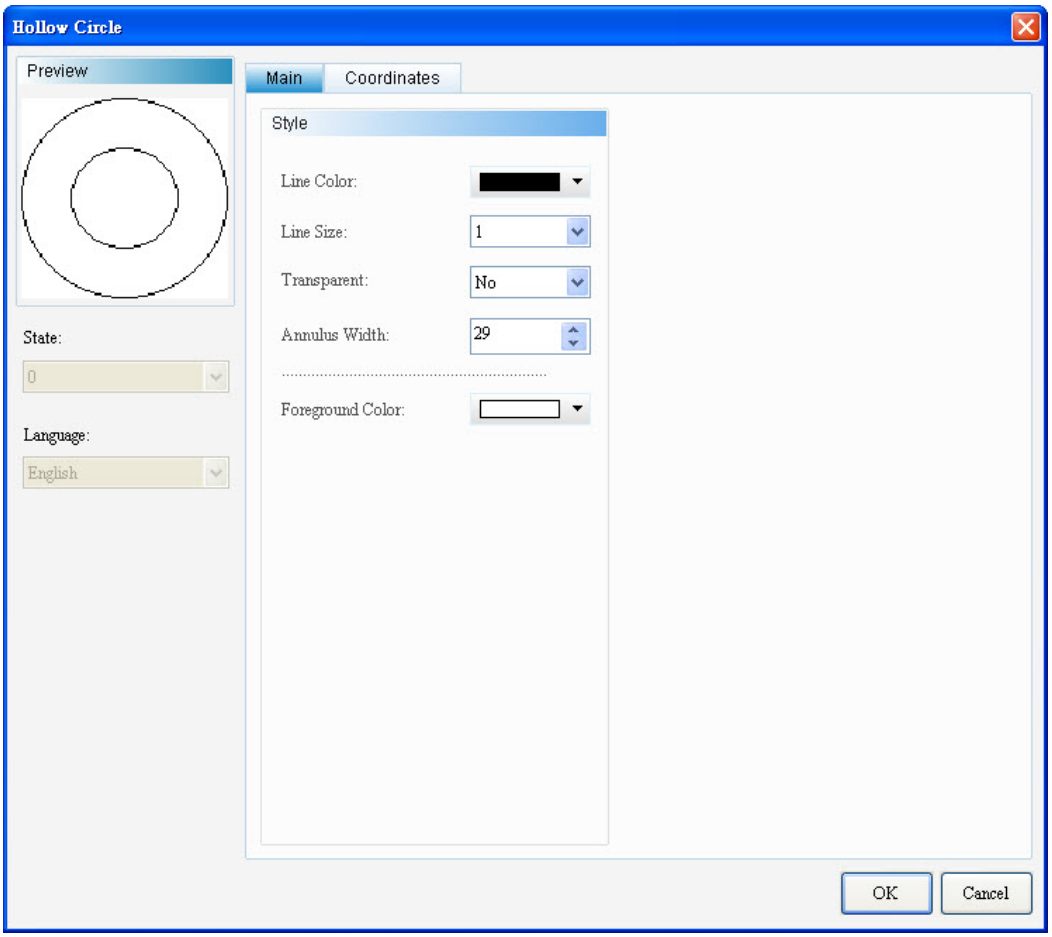


Figure 21-1-25 Hollow Circle Properties Setting Screen

Hollow Circle	
Function Page	**Content Description**
Preview	The State and Multi-Language are not available for the Hollow Circle.
Main	Sets the line color, line size, transparent color, length, and foreground color.
Coordinates	Sets the X-Y coordinates, width and height of the element.

Table 21-1-11 Hollow Circle Element Function Page

◆ Main

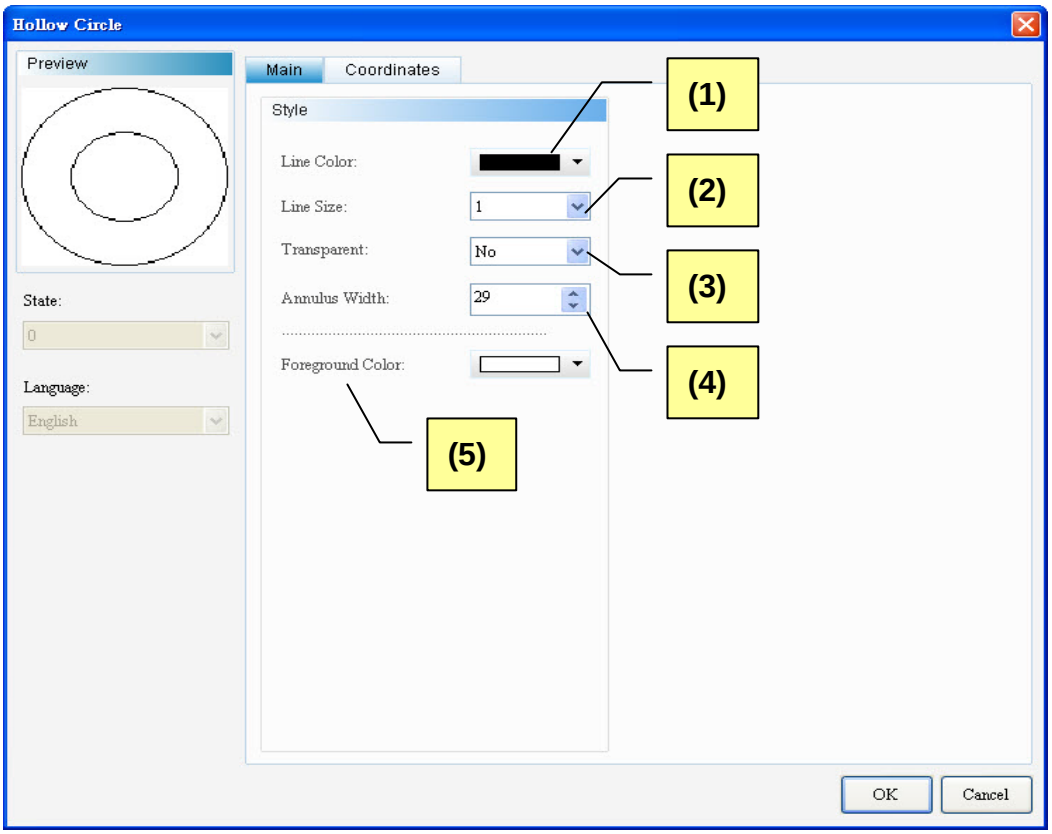
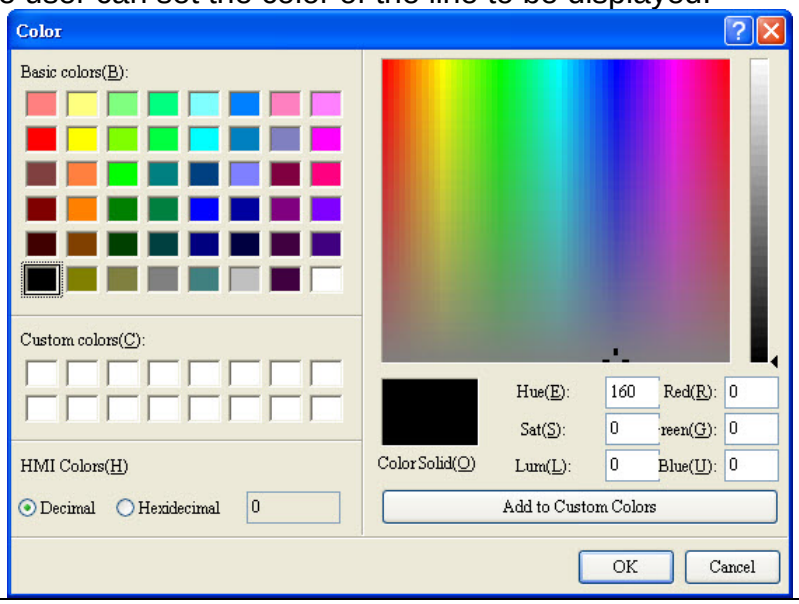
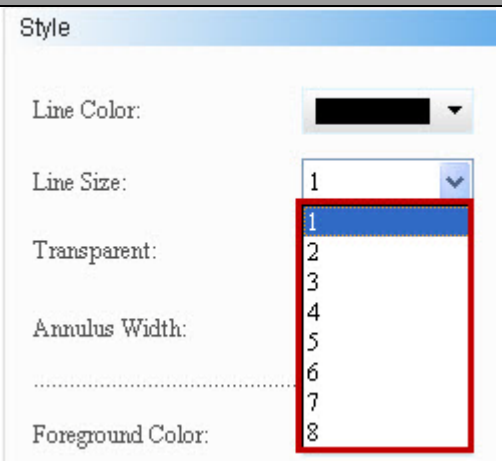
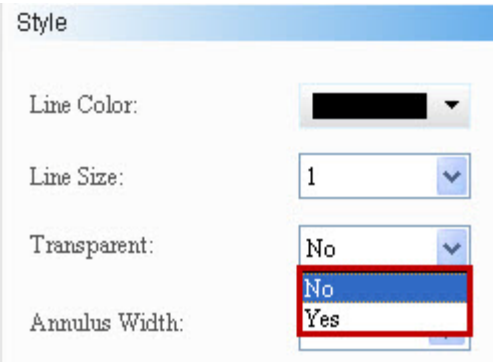
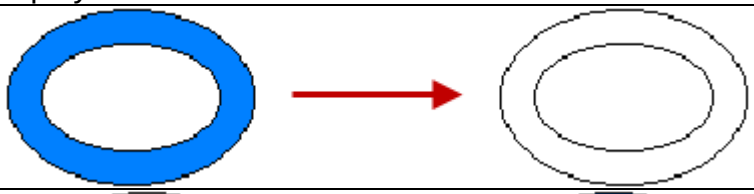
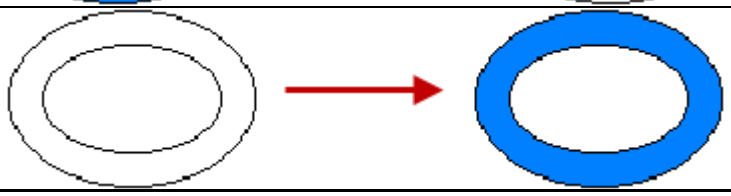
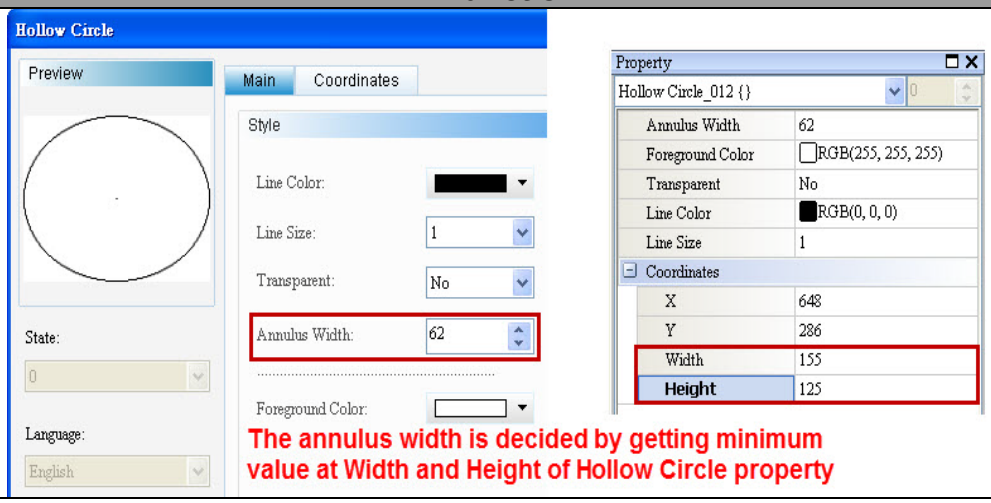
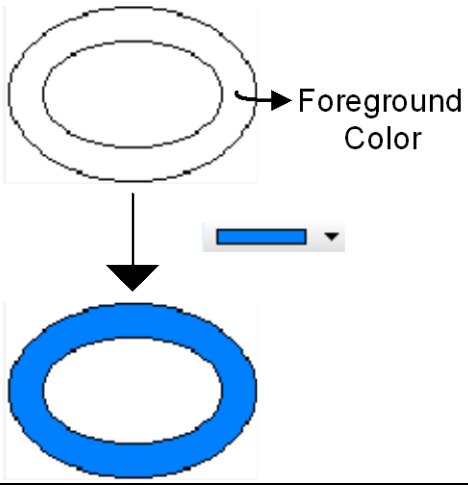


Figure 21-1-26 Hollow Circle Element Main Properties Page

No.	Property	Function
(1)	Line Color	➢ The user can set the color of the line to be displayed. 
(2)	Line Size	➢ The width of the line can be set between 1 and 8.

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td></td><td></td><td> 
</td></tr>
<tr><td>(3)</td><td>Transparent Color</td><td>➢ Yes and No are available for selection.
 

➢ When Yes is selected, the foreground color of the hollow circle element is transparent and only the border color of the hollow circle is displayed. When No is selected, the foreground color of the element is displayed.
<table>
<tr><td>Transparent Color: Yes</td><td>  </td></tr>
<tr><td>Transparent Color: No</td><td>  </td></tr>
</table></td></tr>
<tr><td>(4)</td><td>Length</td><td>➢ The maximum value of the length is defined by the minimum value of the width and height of the element divided by 2.</td></tr>
</table>

No.	Property	Function
		
(5)	Foreground Color	➢ The user can set the foreground color for the element. 

◆ Coordinates

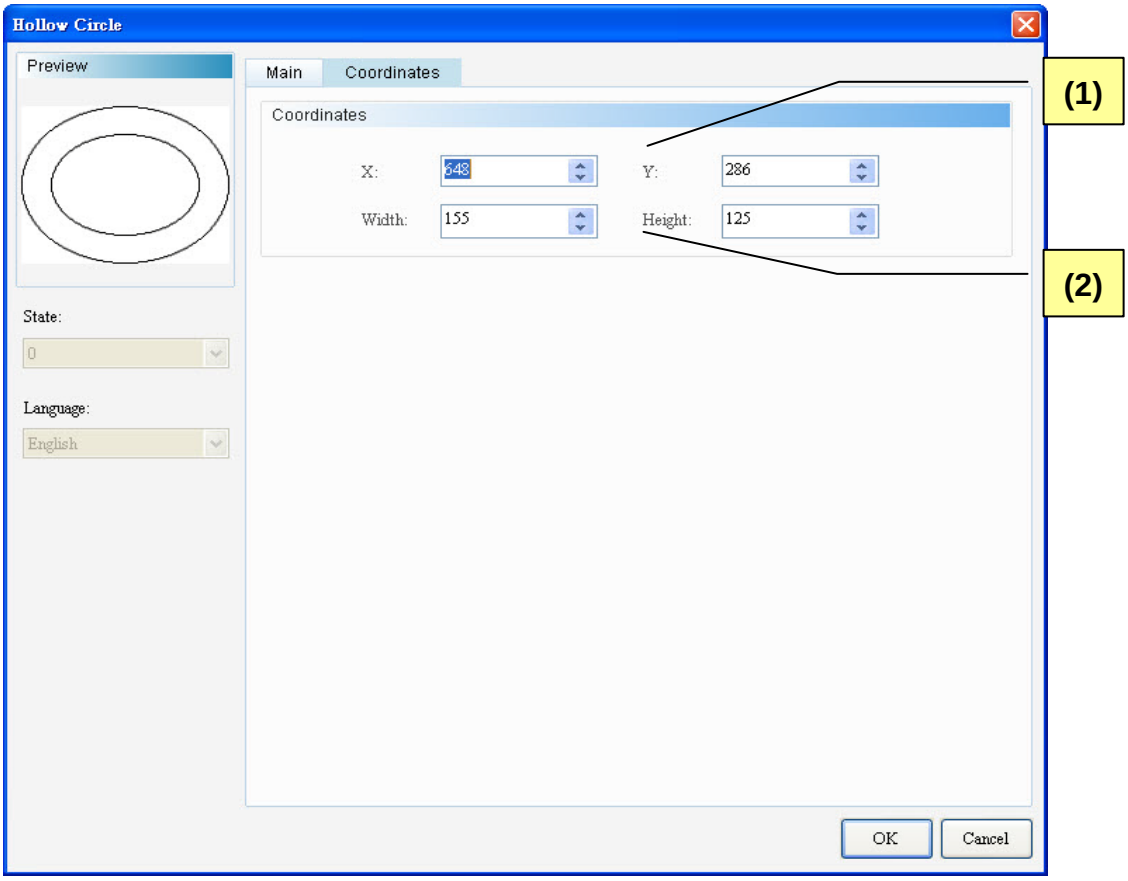


Figure 21-1-27 Hollow Circle Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

Stop Circle

Double click the Stop Circle icon and the following property setting screen appears.

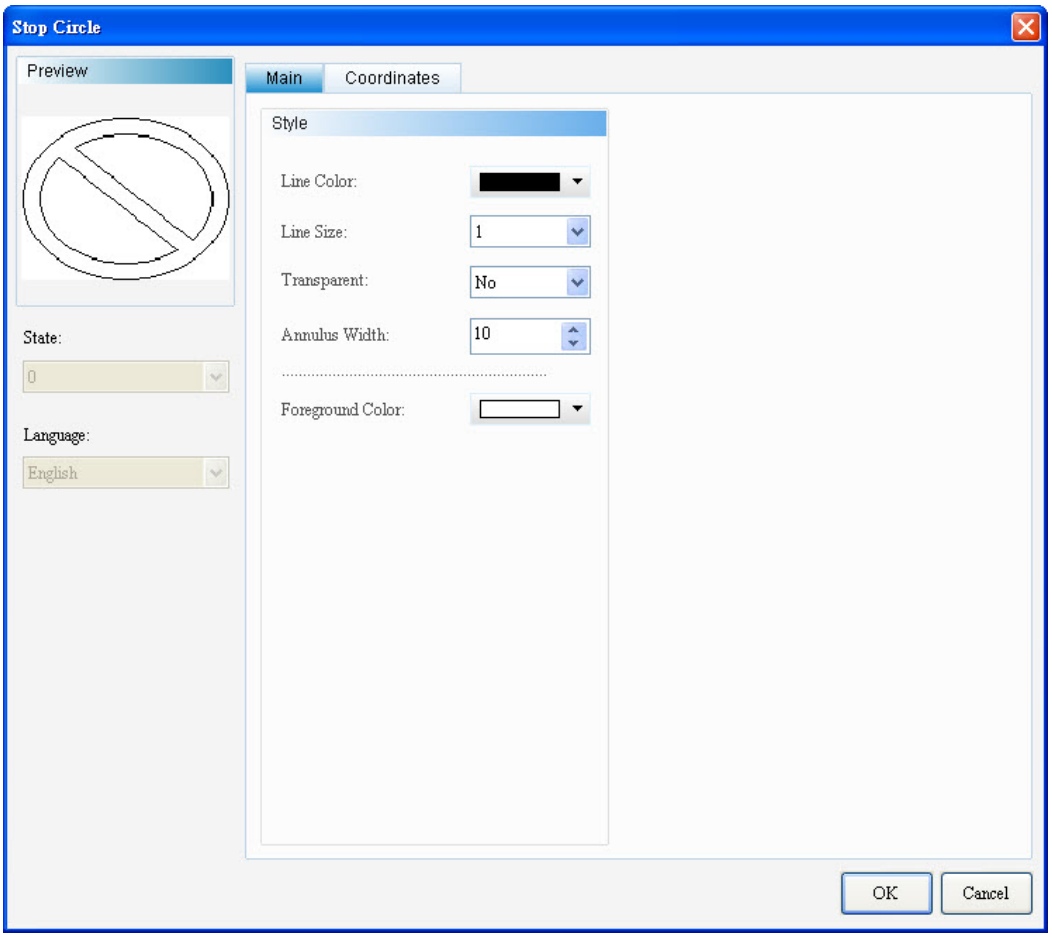


Figure 21-1-28 Stop Circle Properties Setting Screen

Stop Circle	
Function Page	**Content Description**
Preview	The State and Multi-Language are not available for the Stop Circle.
Main	Sets the line color, line size, transparent color, length, and foreground color.
Coordinates	Sets the X-Y coordinates, width and height of the element.

Table 21-1-12 Stop Circle Element Function Page

◆ Main

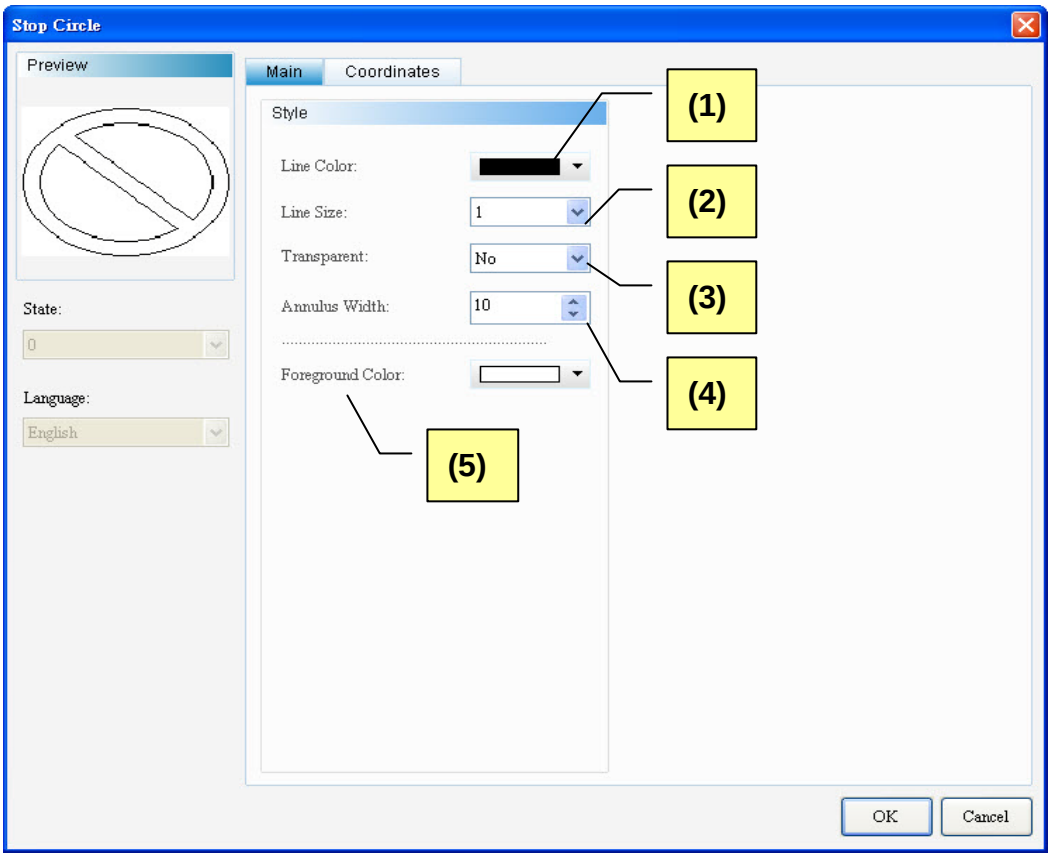
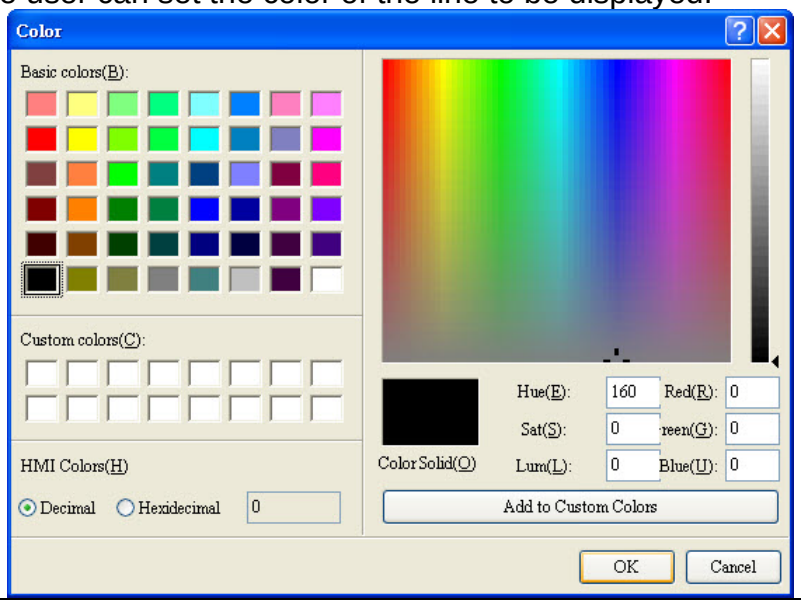
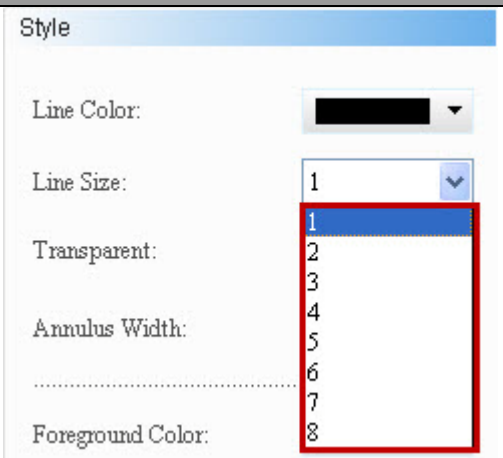
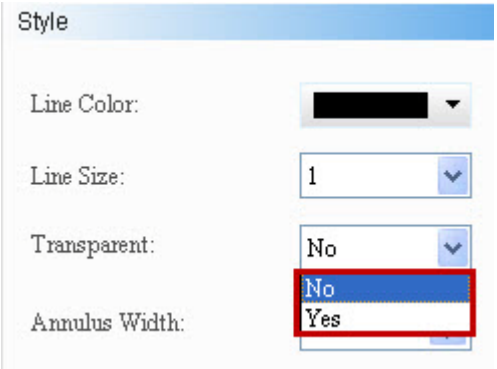
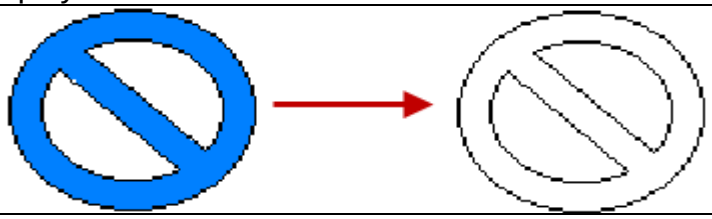
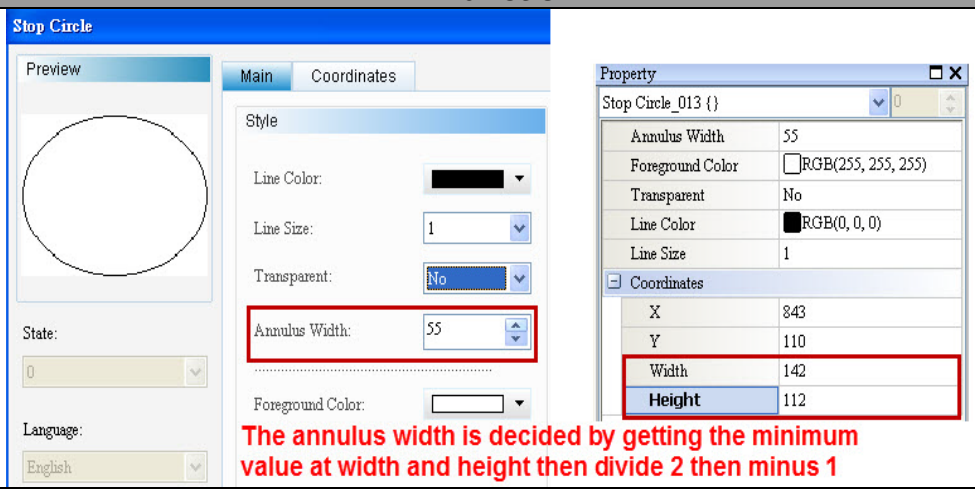
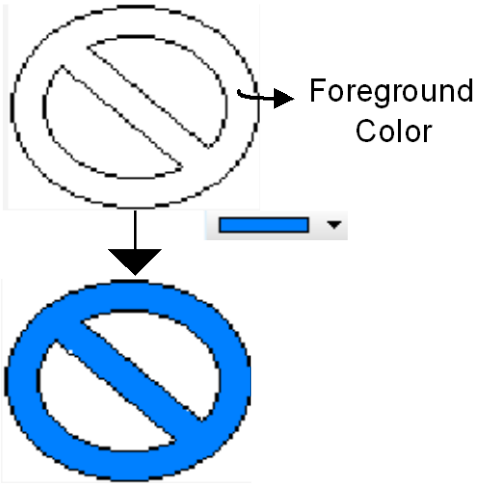


Figure 21-1-29 Stop Circle Element Main Properties Page

No.	Property	Function
(1)	Line Color	➢ The user can set the color of the line to be displayed. 
(2)	Line Size	➢ The width of the line can be set between 1 and 8.

No.	Property	Function
		
(3)	Transparent Color	➢ Yes and No are available for selection.  ➢ When Yes is selected, the foreground color of the Stop Circle element is transparent and only the border color of the Stop Circle is displayed. When No is selected, the foreground color of the element is displayed. **Transparent Color: Yes**  **Transparent Color: No**
(4)	Length	➢ The maximum value of the length is defined by the minimum value of the width and height of the element divided by 2 and minus 1. The reason to subtract 1 is that the minimum value of the Stop Circle is 1 and not 0.

No.	Property	Function
		
(5)	Foreground Color	➢ The user can set the foreground color for the element. 

◆ Coordinates

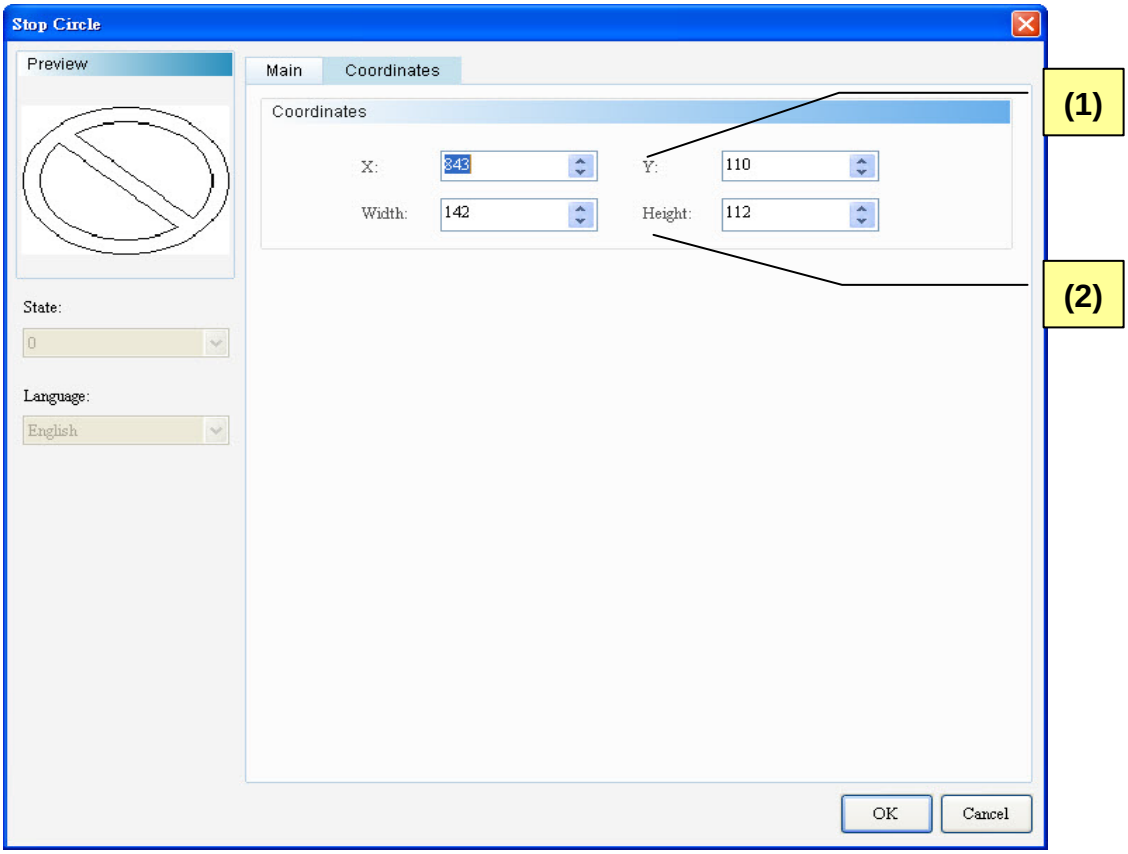


Figure 21-1-30 Stop Circle Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

1/4 Arc

Double click the 1/4 Arc icon and the following property setting screen appears.

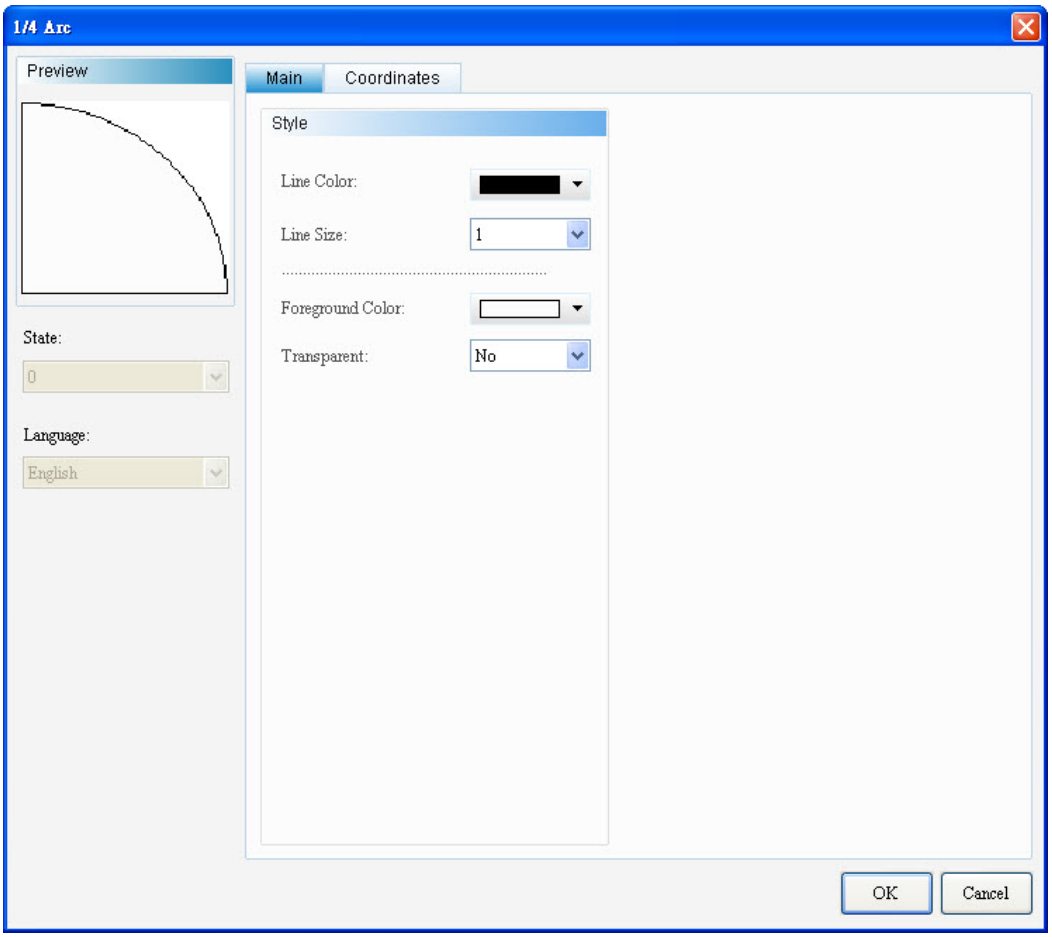


Figure 21-1-31 1/4 Arc Properties Setting Screen

1/4 Arc	
Function Page	**Content Description**
Preview	The State and Multi-Language are not available for the Rhombus.
Main	Sets the line color, line size, foreground color and transparent color.
Coordinates	Sets the X-Y coordinates, width and height of the element.

Table 21-1-13 1/4 Arc Element Function Page

◆ Main

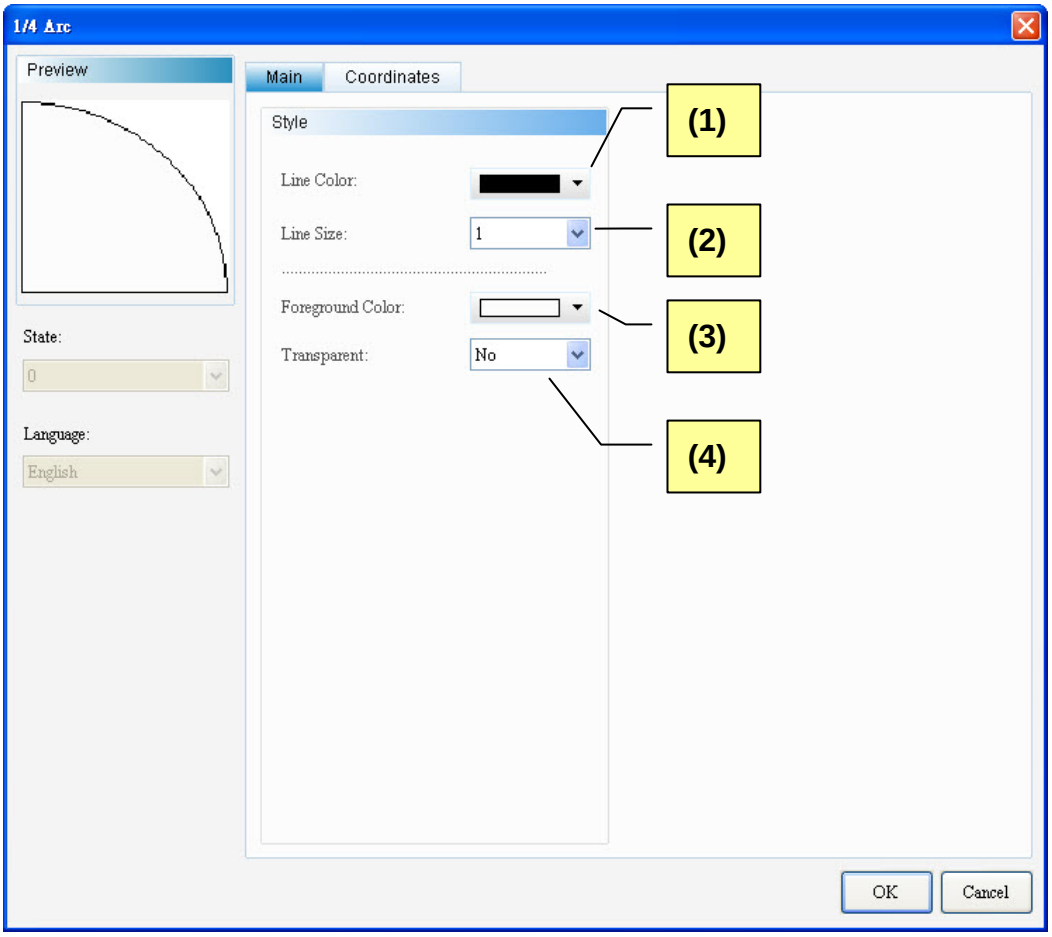
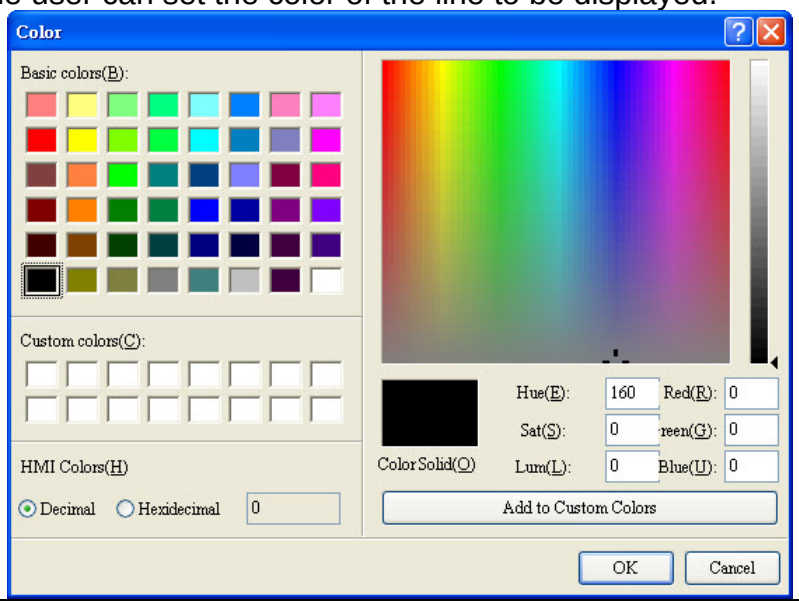
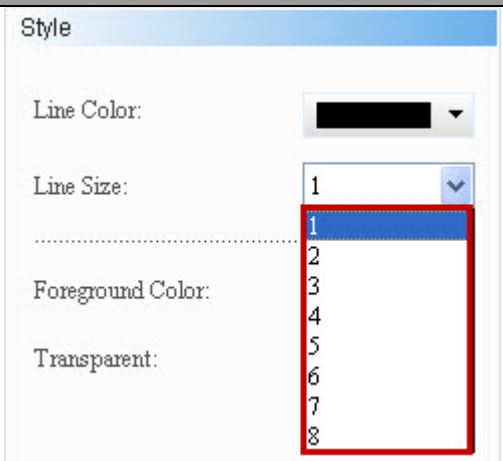
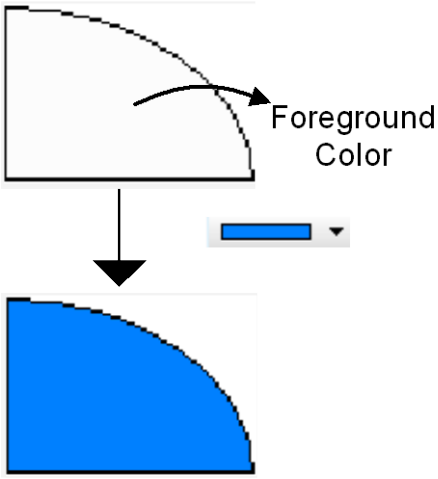
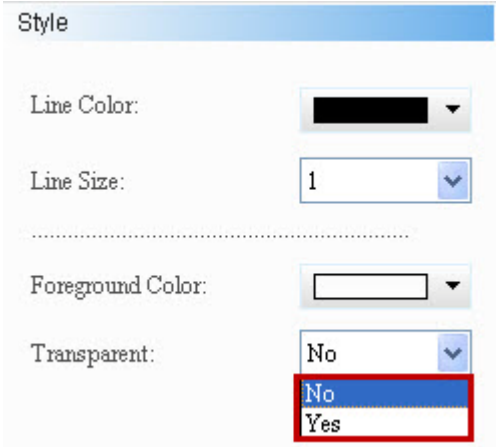


Figure 21-1-32 1/4 Arc Element Main Properties Page

No.	Property	Function
(1)	Line Color	➢ The user can set the color of the line to be displayed. 
(2)	Line Size	➢ The width of the line can be set between 1 and 8.

No.	Property	Function
		
(3)	Foreground Color	➢ The user can set the foreground color for the element. 
(4)	Transparent Color	➢ Yes and No are available for selection.  ➢ When Yes is selected, the foreground color of the 1/4 Arc element is transparent and only the border color of the arc part is displayed. When No is selected, the foreground color of the 1/4 Arc element is completely displayed. **Transparent Color: Yes**

No.	Property	Function	
		Transparent Color: No	

◆ Coordinates

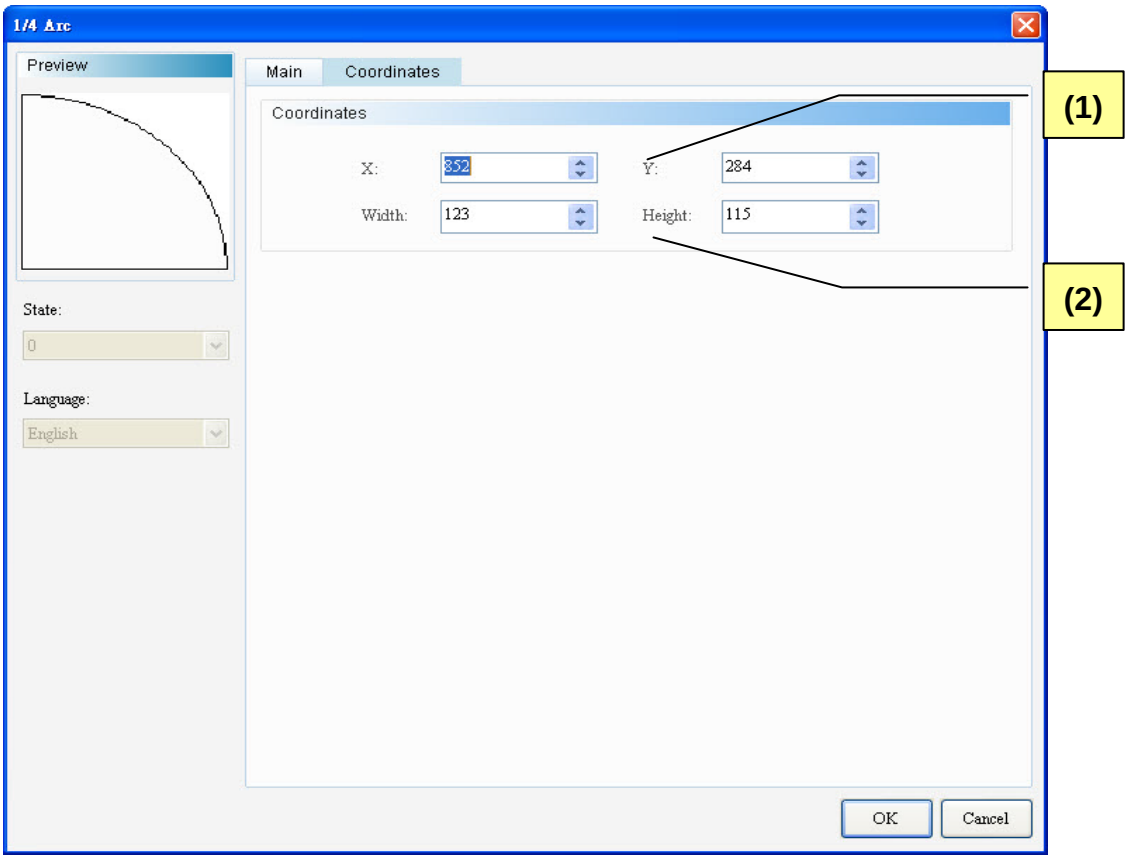


Figure 21-1-33 1/4 Arc Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

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22-5 Text 30
22-6 Scale 37
22-7 Table 43

Chapter 22 Drawing

This chapter describes the setting of the drawing elements that the DOPSoft software provides. To create drawing elements, the user needs to enter [Element] → [Drawing] and click the element to be created, or click the toolbar on the utmost left side of the window and select the drawing element.

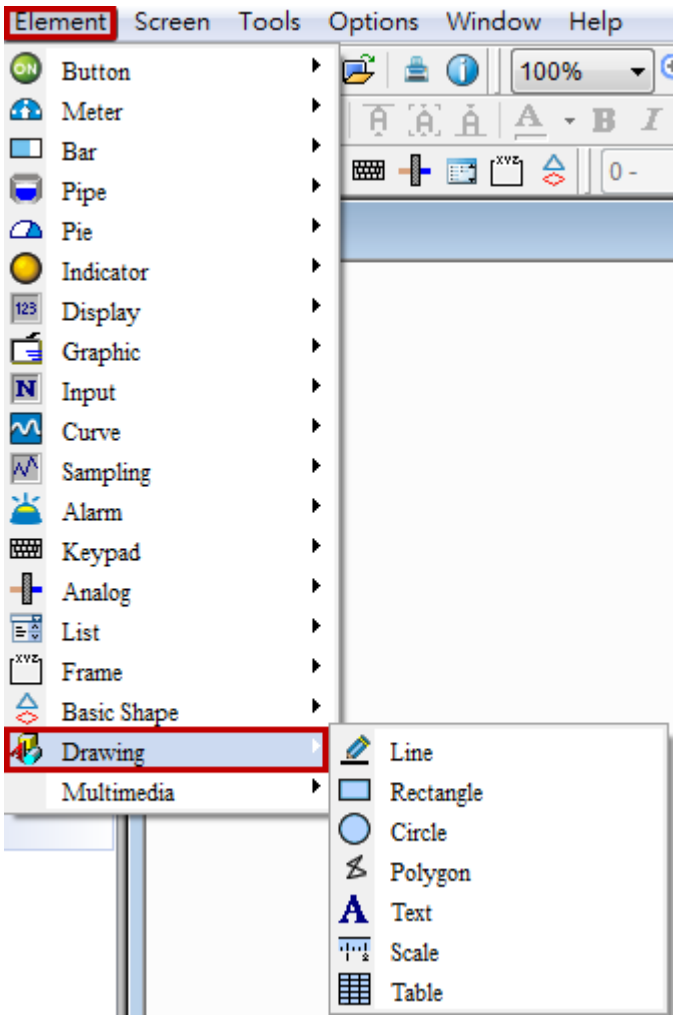


Figure 22-1-1 Drawing Element on the Toolbar

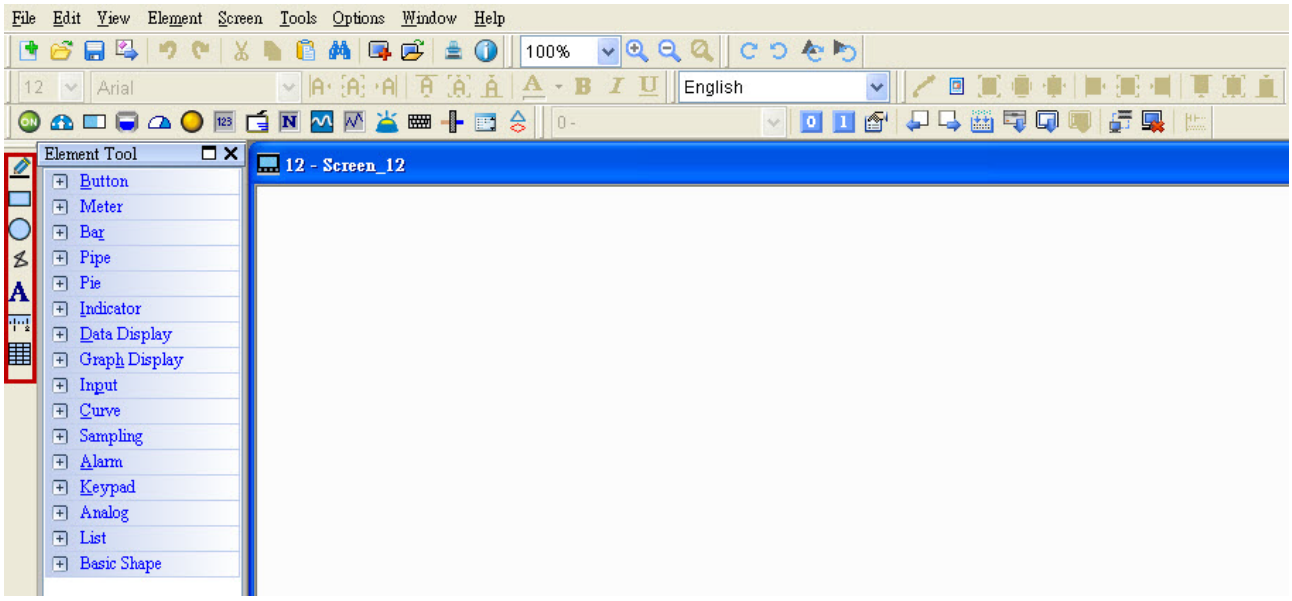


Figure 22-1-2 Drawing Elements on the Utmost Left Side of the Window

◆ Classification of drawing elements:

Drawing		Line
		Rectangle
		Circle
		Polygon
		Text
		Scale
		Table

Table 22-1-1 Classification of Drawing Elements

◆ Common properties of drawing elements

Drawing	Line Type	Line Color/ Line Width	Fillet Radius/ Invisible Address	Element Foreground Color/ Transparent Color	Integer Place/ Decimal Place	Show Mark/ Primary Scale Counts/ Secondary Scale Counts/ Scale Color/ Style	Min. Value/ Max. Value	Font Smoothing	Data Type/ Data Format
Line	◎	◎		◎					
Rectangle		◎	◎	◎					
Circle		◎		◎					
Polygon		◎		◎	◎				
Text			◎ (Only has Invisible Address)	◎				◎	
Scale					◎	◎	◎		◎

Drawing	Border Color/ Grid Color	Rows/ Lines	Element Background Color	Row Header/ Line Header	Row Interlacing/ Line Interlacing	Row Header Interlacing/ Line Header Interlacing	Row Spacing	Line Spacing
Table	◎	◎	◎	◎	◎	◎	◎	◎

Table 22-1-2 Common properties of drawing elements

22-1 Line

To create a line element, press and hold the left mouse key to define the start point of the line. Then drag the mouse to the length to be created and release the mouse to define the end point of the line. When clicking this line, a rectangle frame will appear for the user to adjust the line easily. The user can change the width, color and style of the line to be displayed.

Double click the Line icon and the following property setting screen appears.

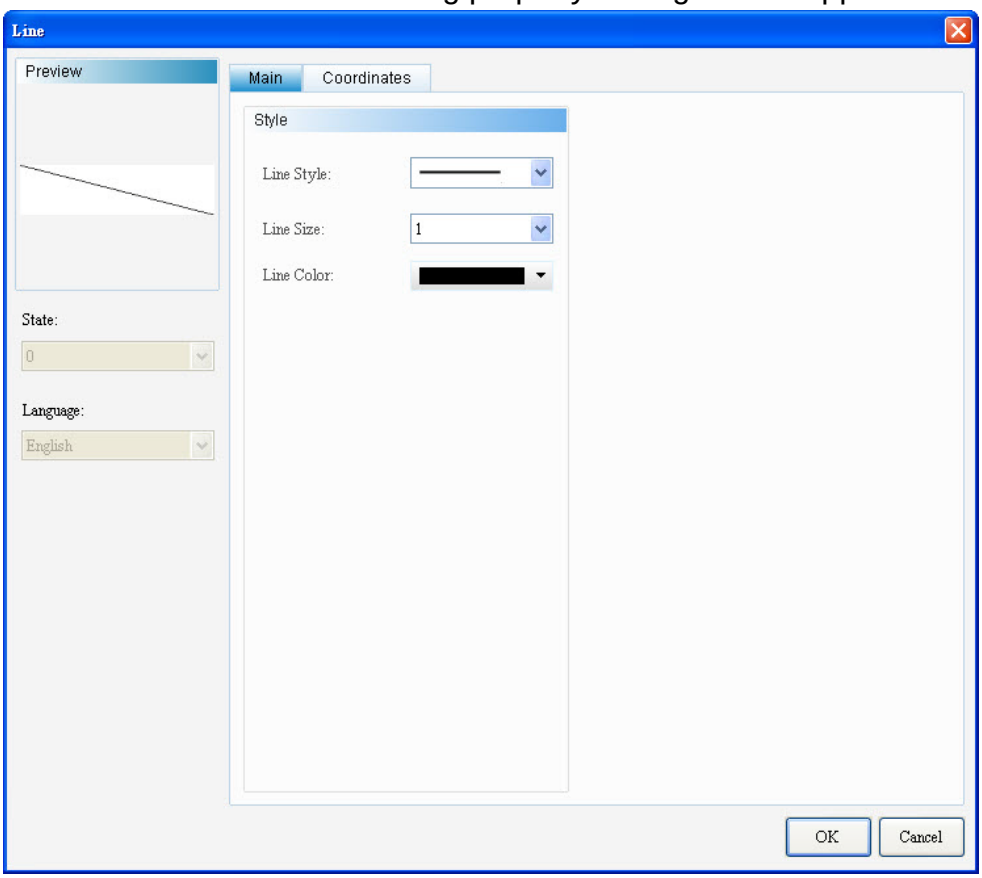


Figure 22-1-3 Line Properties Setting Screen

Line	
Function Page	**Content Description**
Preview	The State and Language are not available for the Line.
Main	Sets the line type, line color, and line width.
Coordinates	Sets the X-Y coordinate, width and height of the element.

Table 22-1-3 Line Element Function Page

◆ Main

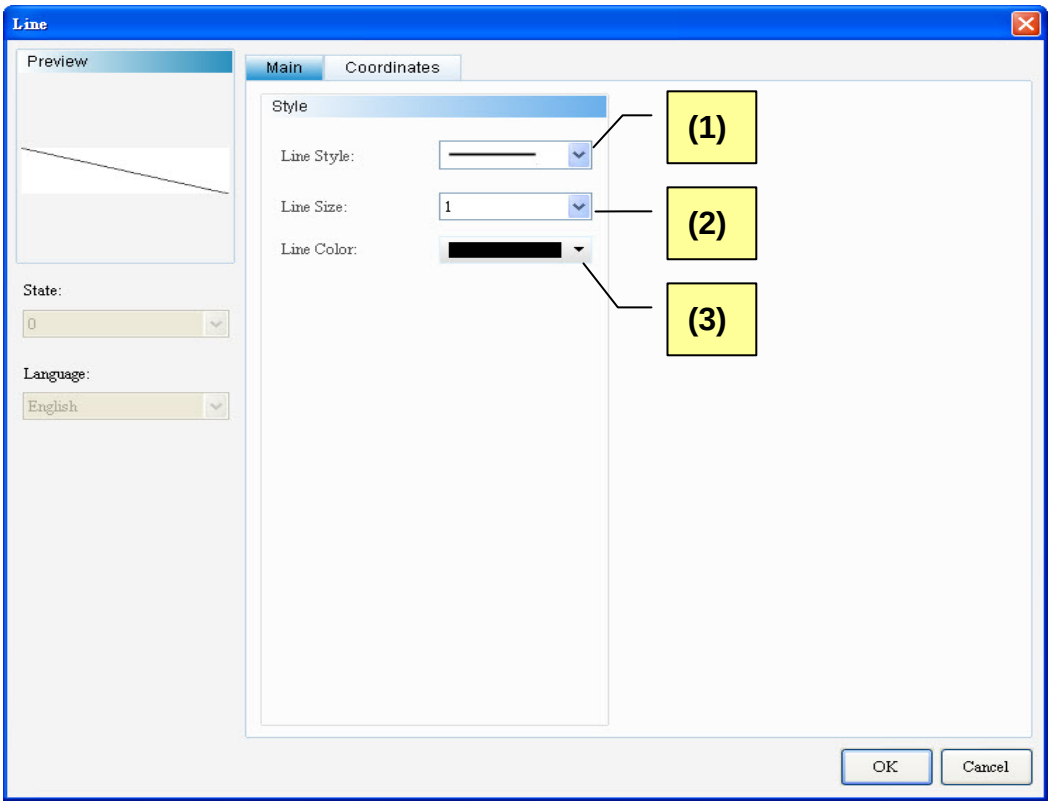
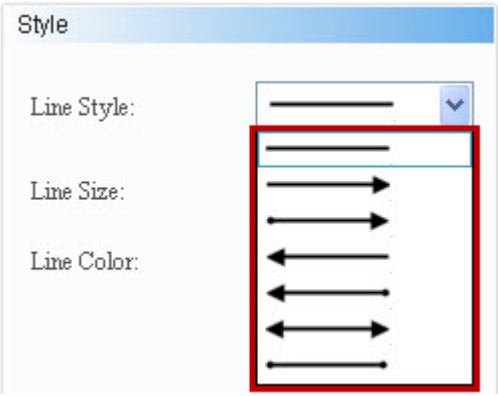
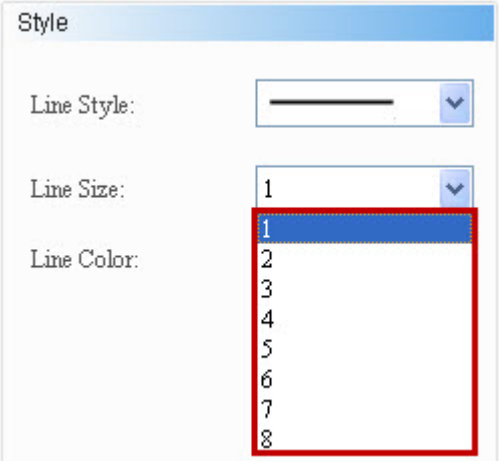
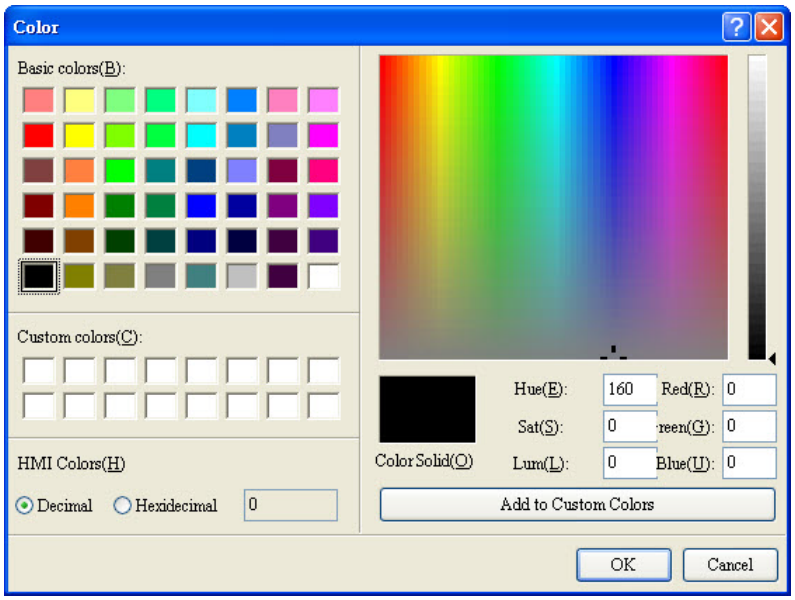


Figure 22-1-4 Line Element Main Properties Page

No.	Property	Function
(1)	Line Style	➢ The Line Type allows the user to change the style of the line, such as a line with an arrow, two arrows or dot(s). 
(2)	Line Size	➢ The width of the line can be set between 1 and 8.

No.	Property	Function
		
(3)	Line Color	➢ The user can set the color of the line to be displayed. 

◆ Coordinates

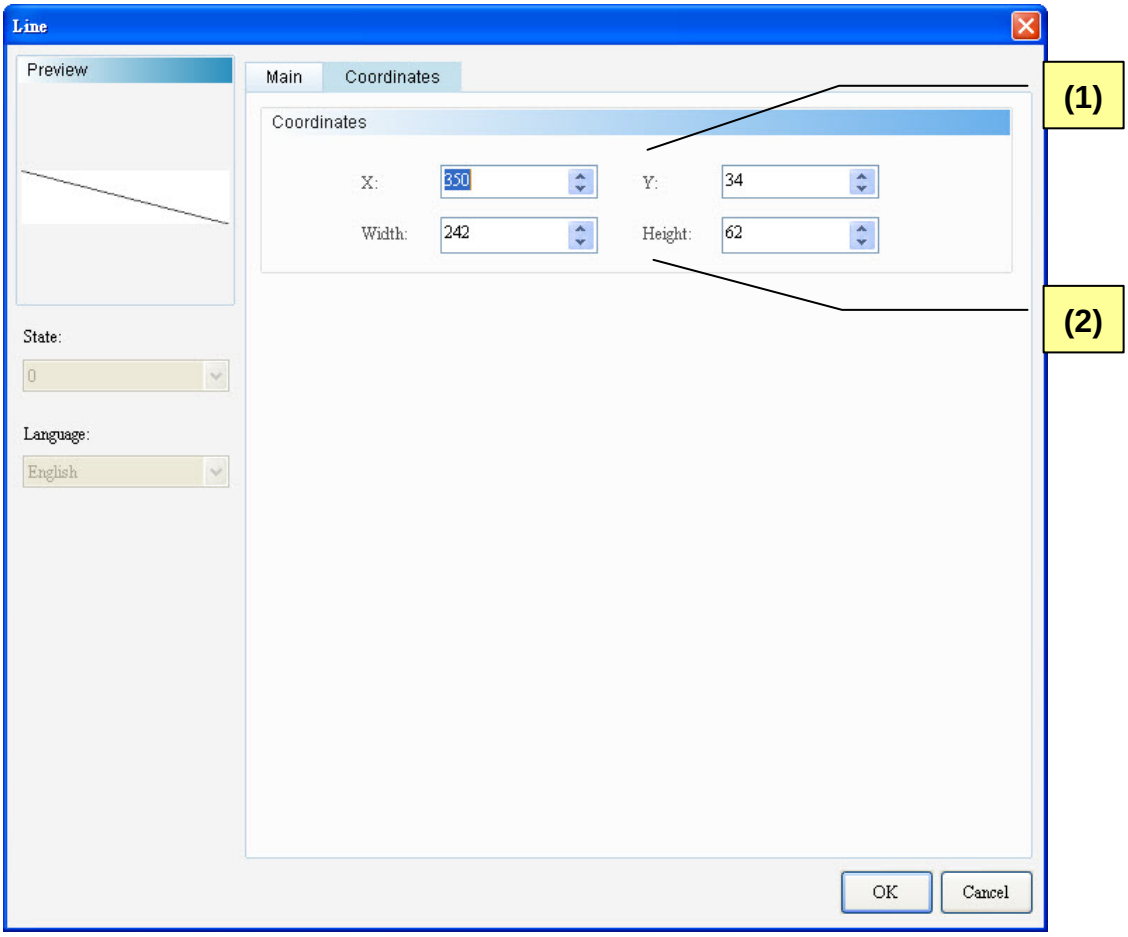
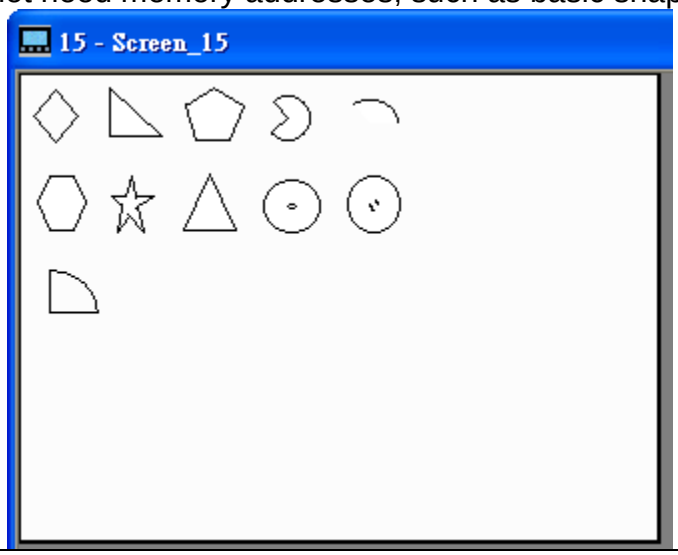
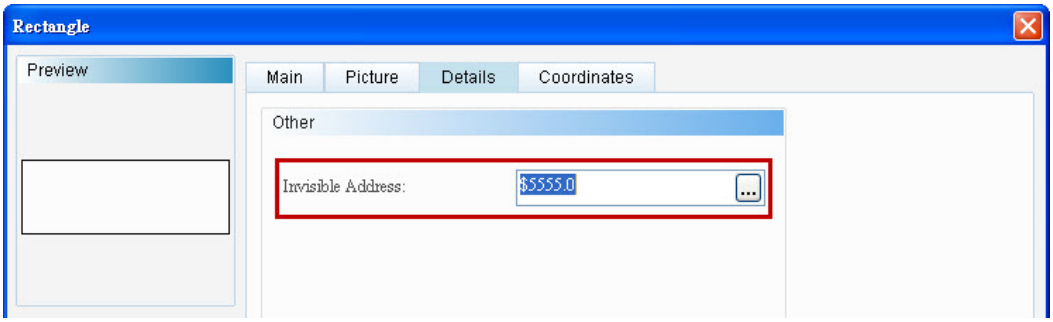
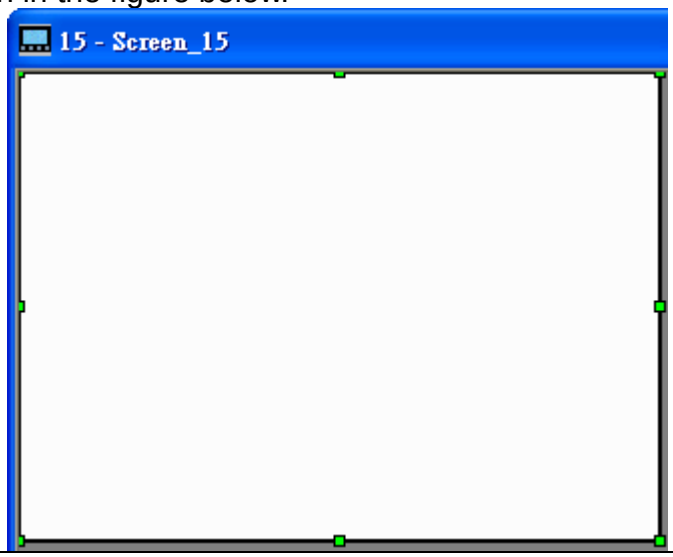


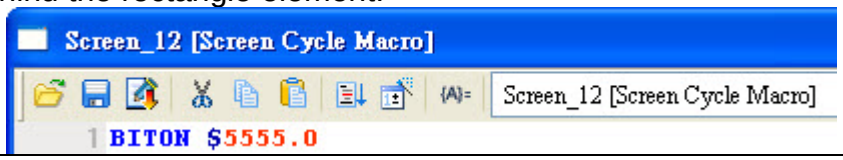
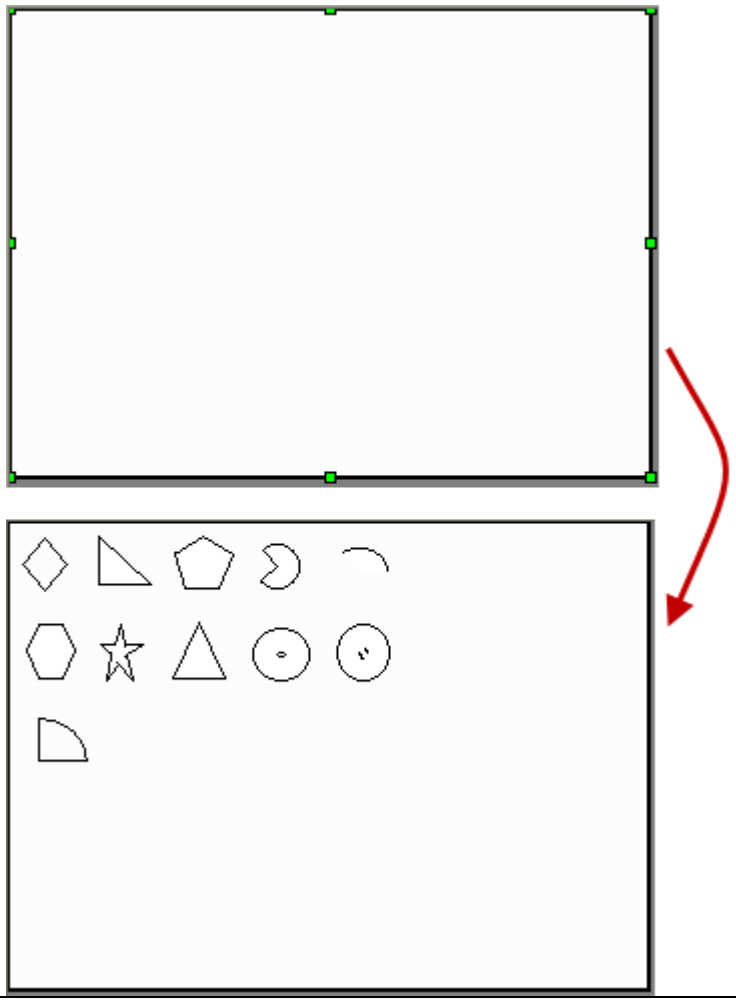
Figure 22-1-5 Line Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

22-2 Rectangle

In addition to drawing rectangular pictures, the rectangle function enables the user to import pictures from the picture bank. The invisible address property is added to this function. When the entire editing screen is covered by the rectangle element and display of the screen is needed, the user can trigger the invisible address to display the screen behind the rectangle element.
Refer to the rectangle example in Table 22-2-1.

Rectangle Example Table 22-2-1 Rectangle Example	
Create Elements	➢ Create any elements on the screen. The user can create the elements that do not need memory addresses, such as basic shape elements. 
Create Rectangle Element	➢ Step 1: Create the Rectangle element and set the Invisible Address to $5555.0.  ➢ Step 2: Cover the entire editing screen using the Rectangle element as shown in the figure below. 

Rectangle Example Table 22-2-1 Rectangle Example	
Make Screen Macro Action	➢ Enter [Screen] → [Screen Cycle Macro] to make the action. This allows automatic triggering of the invisible address of the Rectangle when the user switches to this screen to display the editing screen behind the rectangle element. 
Execution Results	➢ After creation of all elements, perTable the compilation and download them to HMI. When the user switches to this screen, the Screen Cycle Macro action will be executed automatically to trigger the invisible address $5555.0 and display the screen behind the rectangle element. 

Double click the Rectangle icon and the following property setting screen appears.

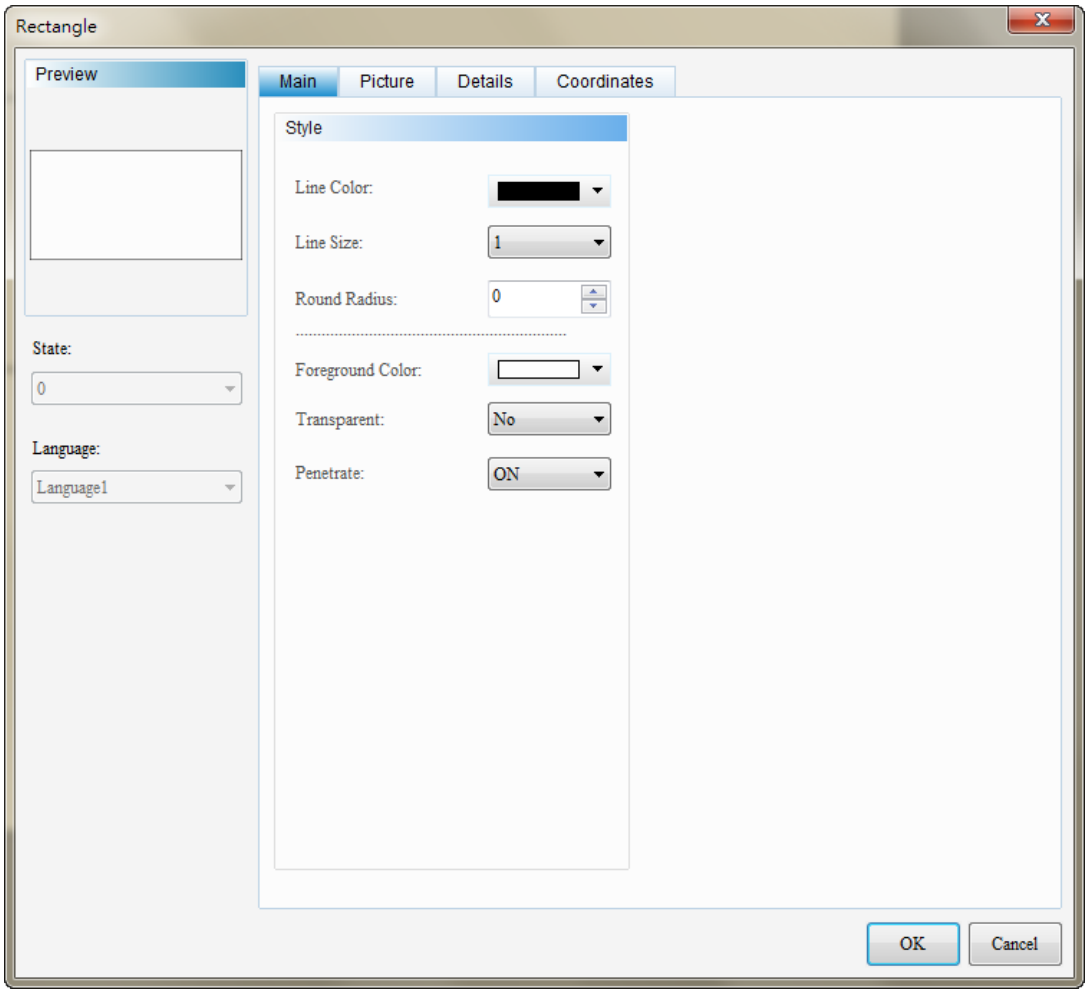


Figure 22-2-1 Rectangle Properties Setting Screen

Rectangle	
Function Page	**Content Description**
Preview	The State and Language are not available for the Rectangle.
Main	Sets the line color, line width, round radius, foreground color, transparent color and penetrate.
Picture	Sets the picture bank name, alignment, picture stretch mode, and transparent color.
Details	Invisible address.
Coordinates	Sets the X-Y coordinate, width and height of the element.

Table 22-2-2 Rectangle Element Function Page

◆ Main

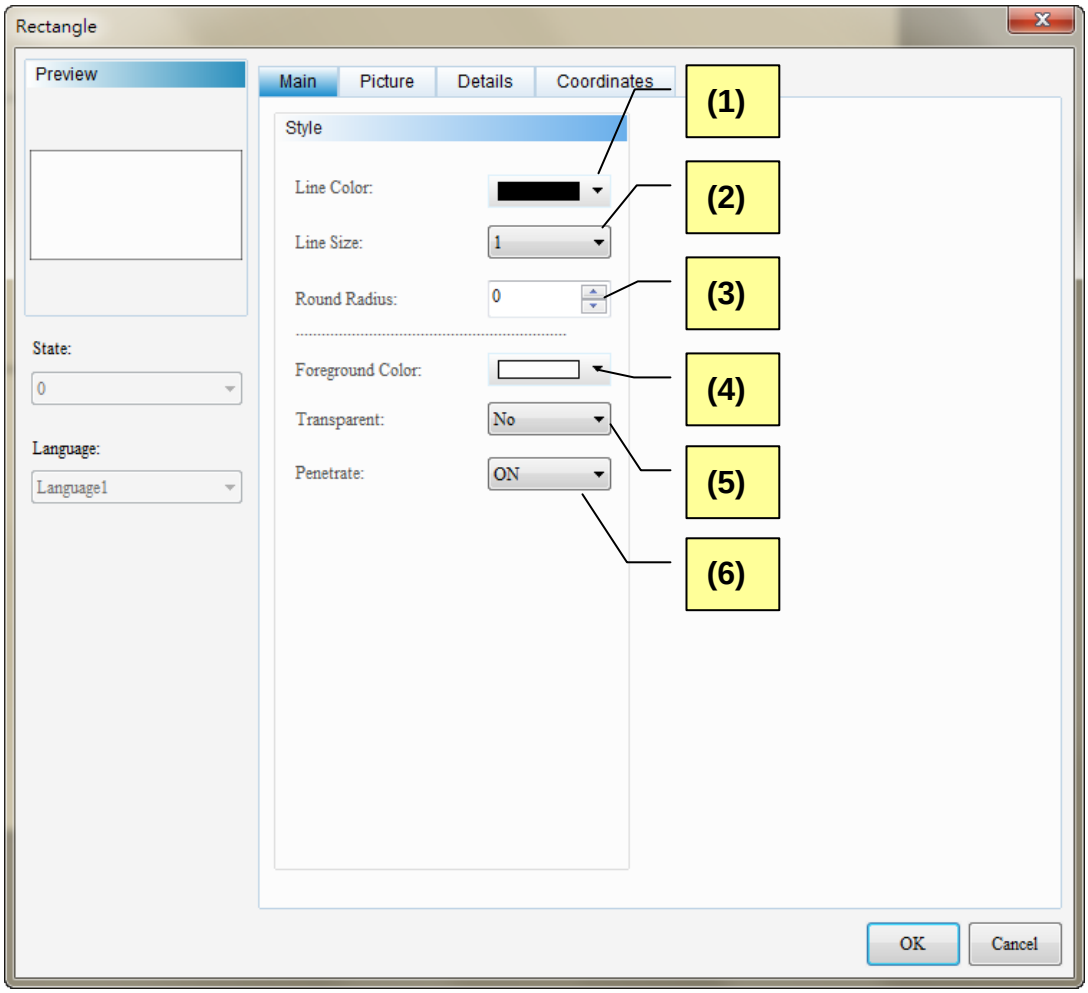
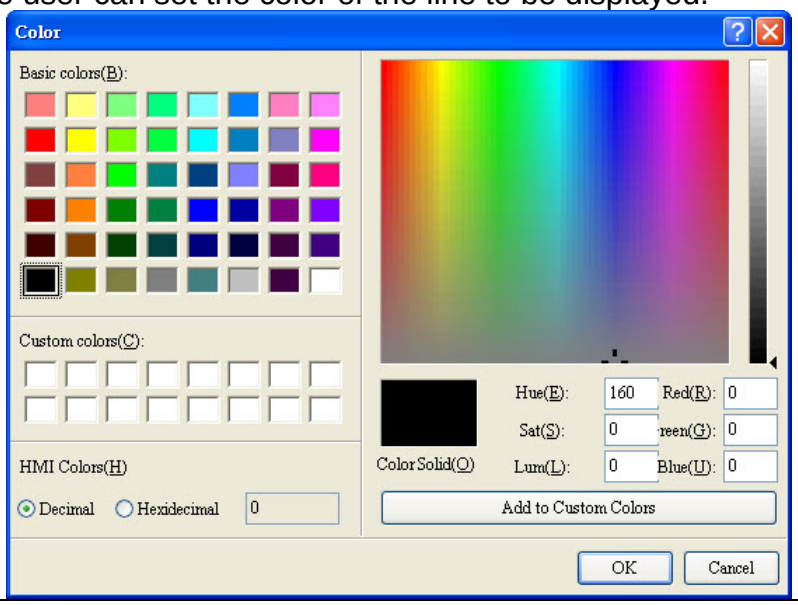
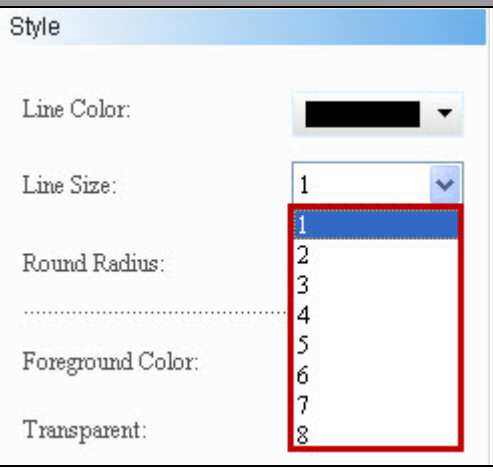
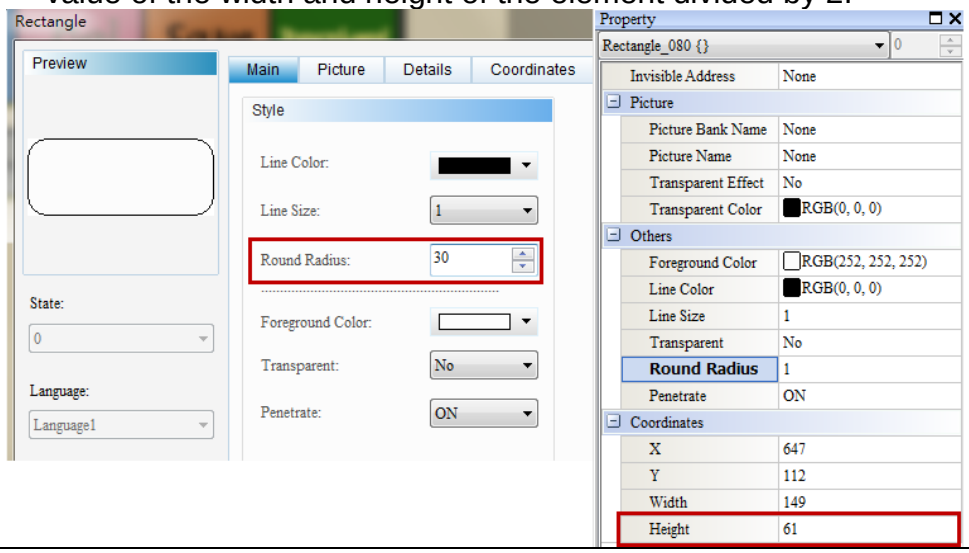
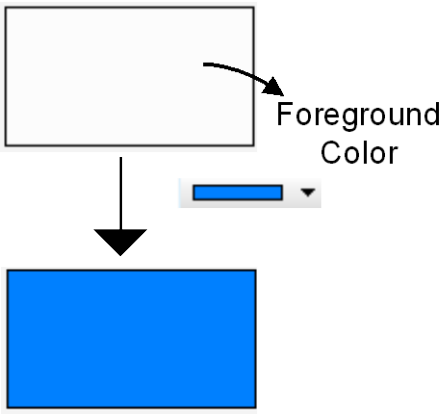
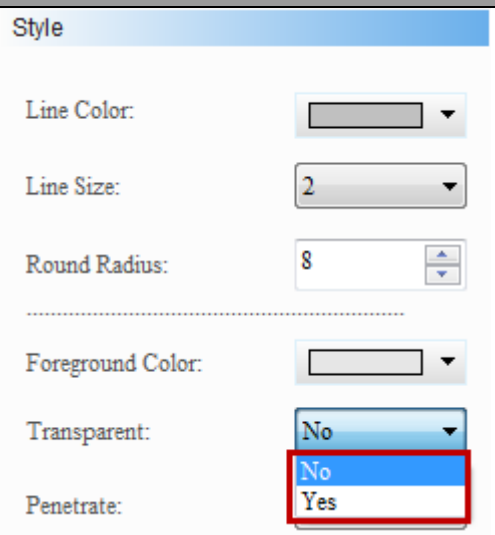
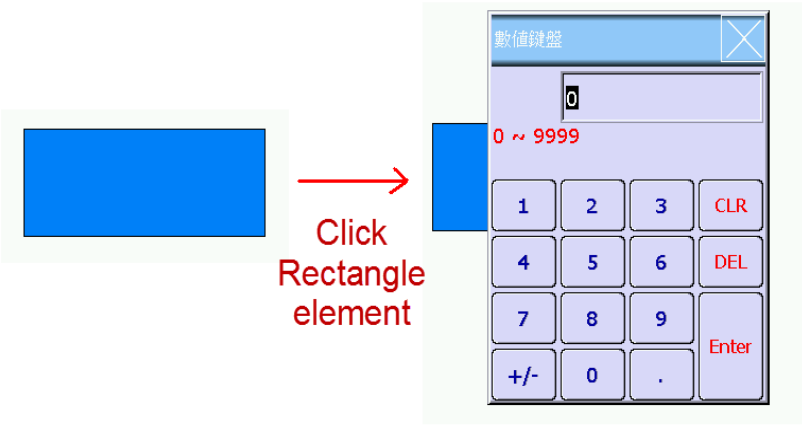
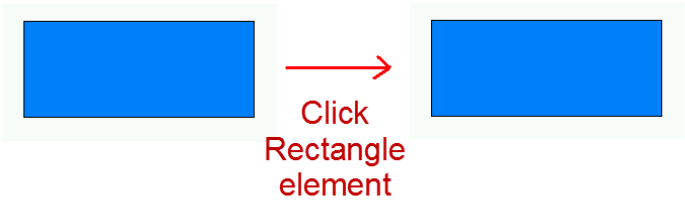


Figure 22-2-2 Rectangle Element Main Properties Page

No.	Property	Function
(1)	Line Color	➢ The user can set the color of the line to be displayed. 
(2)	Line Width	➢ The width of the line can be set between 1 and 8.

No.	Property	Function
		
(3)	Round Radius	➢ The software draws the rectangle element in clear color if the round radius is not 0. ➢ The maximum value of the round radius is defined by the minimum value of the width and height of the element divided by 2. 
(4)	Foreground Color	➢ The user can set the foreground color for the element. 
(5)	Transparent Color	➢ Yes and No are available for selection.

No.	Property	Function
		 ➢ When Yes is selected, the foreground color of the rectangle element is transparent and only the border color of the rectangle is displayed. When No is selected, the foreground color of the element is displayed. **Transparent Color: Yes** **Transparent Color: No**
(6)	Penetrate	➢ This function enables users to click the element that is overlapped by the rectangle. ➢ Please refer to the example below. Users have to create a numeric entry element first. Then, create a rectangle element which will be placed above the numeric element. **Penetrate : ON** ➢ Users can directly click on the numeric entry element through the rectangle. 

No.	Property	Function	
		Penetrate : OFF	➢ Users cannot directly click on the numeric entry element through the rectangle. 

◆ Picture

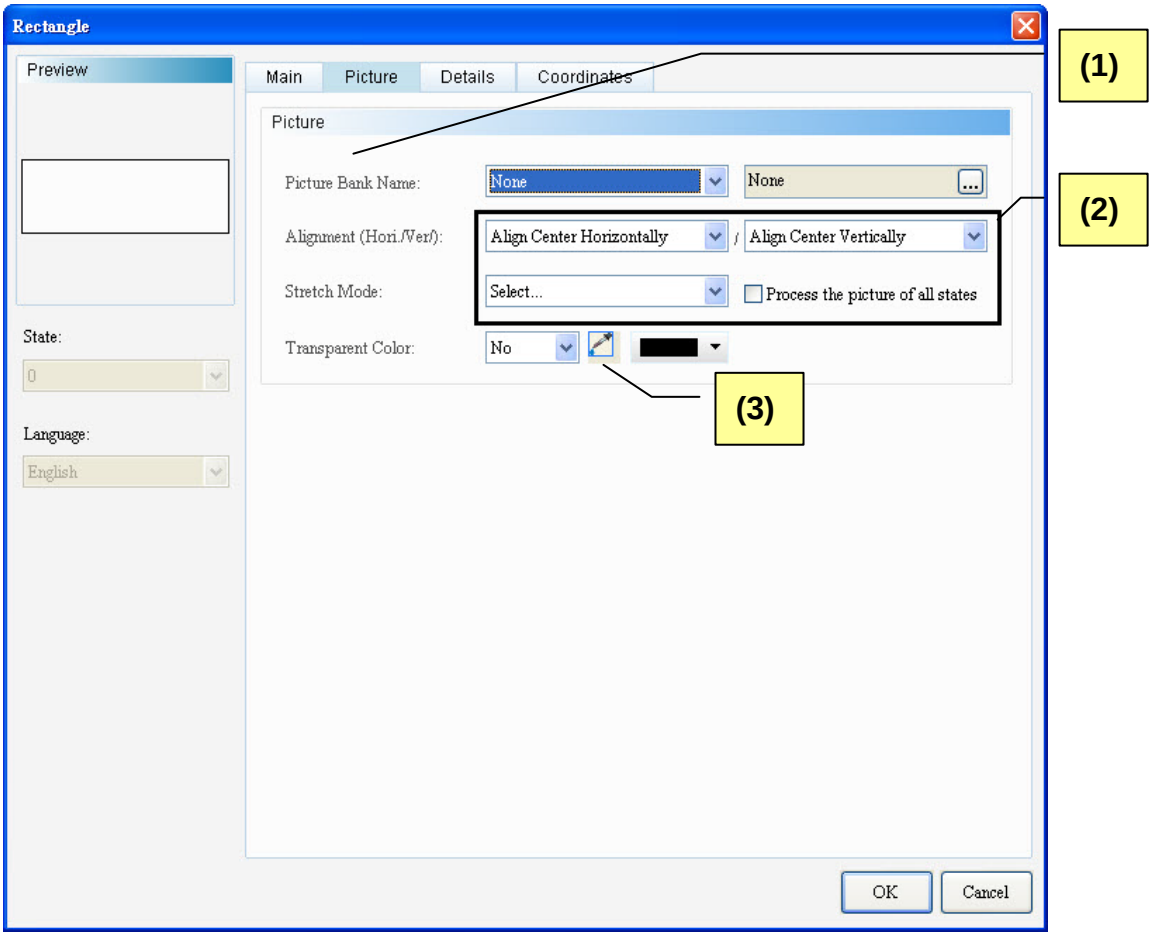
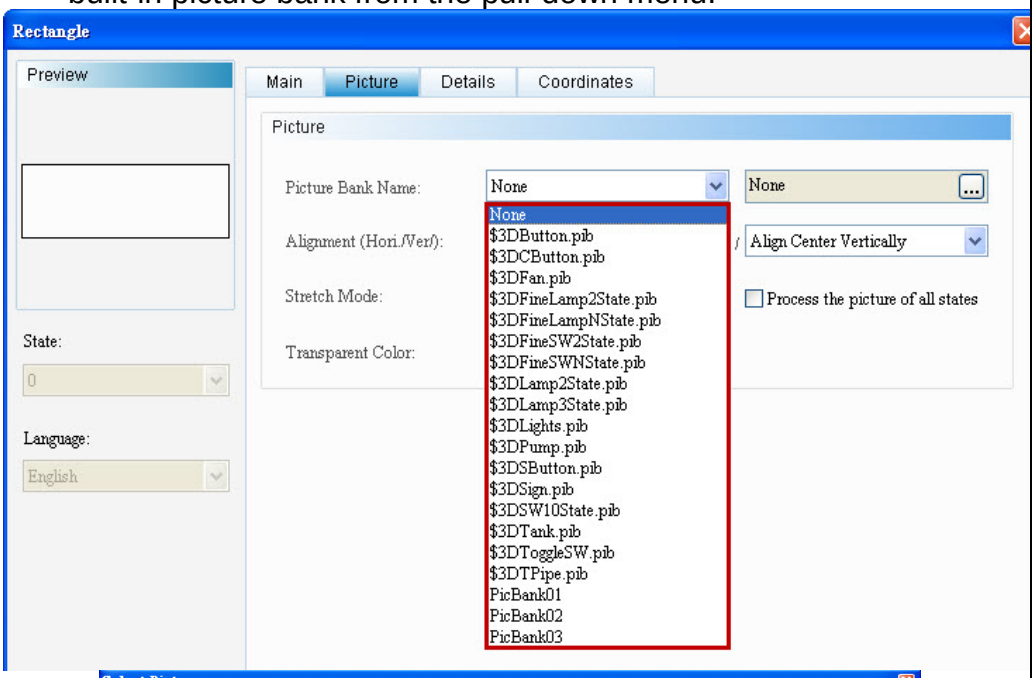
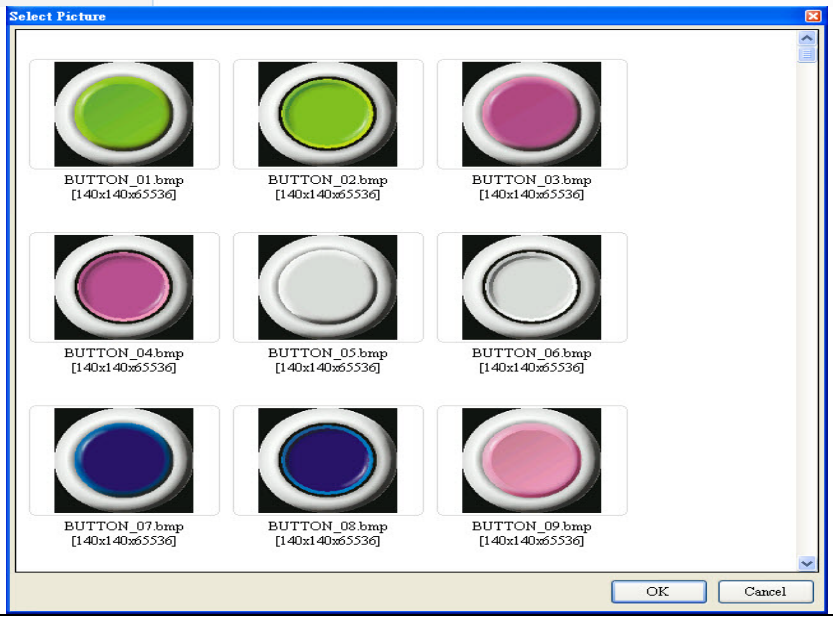
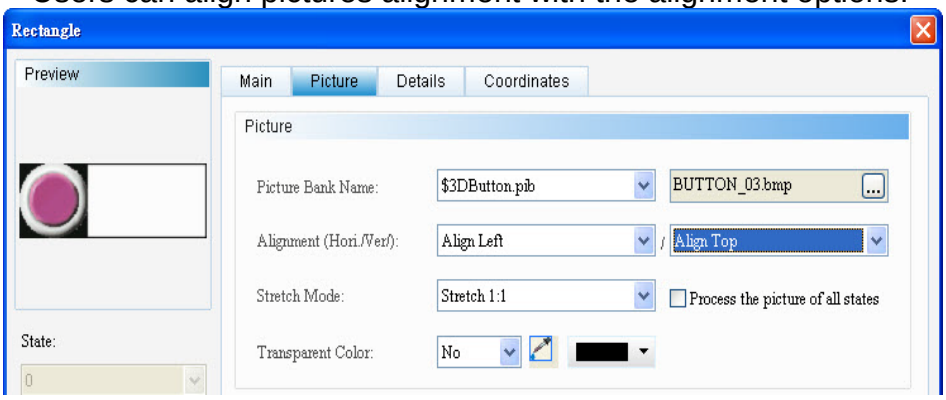
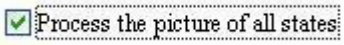
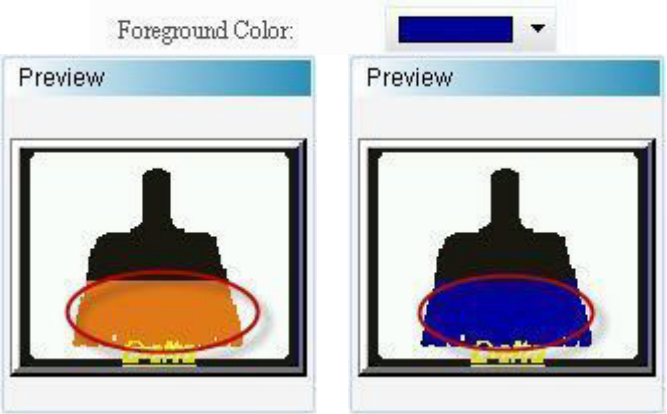


Figure 22-2-3 Rectangle Element Picture Properties Page

No.	Property	Function
(1)	Picture Bank Name	➢ The default value for Picture Bank Name is “None”. Users wishing to select a display picture can select the desired picture in the built-in picture bank from the pull-down menu.  

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td rowspan="2">(2)</td><td>Alignment</td><td>➢ Users can align pictures alignment with the alignment options.
 

➢ Stretch modes include: Fill, Keep Aspect Ratio, and Actual Size.</td></tr>
<tr><td>Stretch Mode</td><td>
<table>
<tr><th>Fill</th><th>Keep Aspect Ratio</th><th>Actual Size</th></tr>
<tr><td>In the “Fill” mode, the selected picture will fill up the entire display area.</td><td>In the “Keep Aspect Ratio” mode, the selected picture will fit in the display area proportionally according to the picture ratio.</td><td>In the “Actual Size” mode, the picture will be displayed in its original size in the display area.</td></tr>
<tr><td> </td><td> </td><td> </td></tr>
</table>
➢ If “Process all state pictures” is selected, the system assumes that each element has multiple entries of state data, and some pictures may be unable to fill the entire display area. By selecting this item, users will not need to set individual pictures to save time editing.
 

</td></tr>
<tr><td>(3)</td><td>Transparent Color</td><td>➢ Users can set a color in the picture to transparent. In this case, by clicking the Transparent Color icon and then the orange part of the loom, the DOPSoft will omit all orange parts in the picture and turn them into transparent; thus turning the foreground color transparent.
 
</td></tr>
</table>

◆ Details

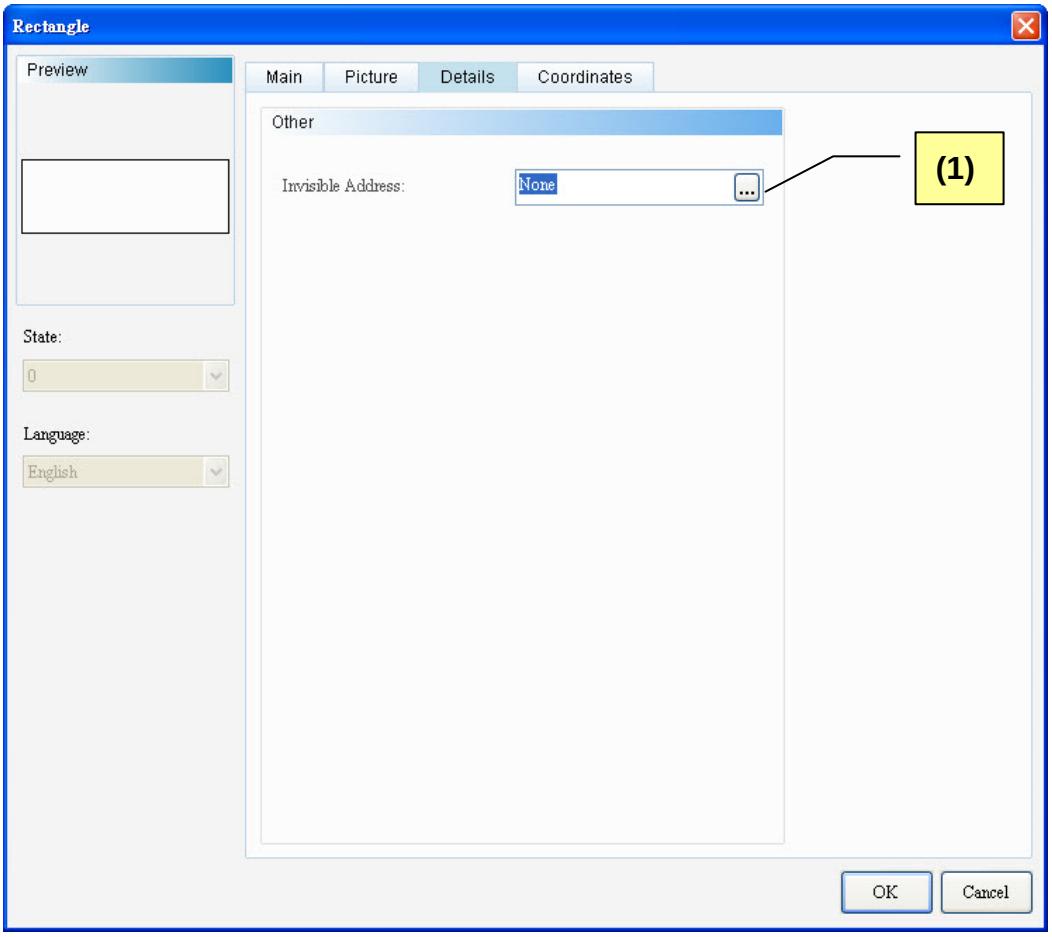
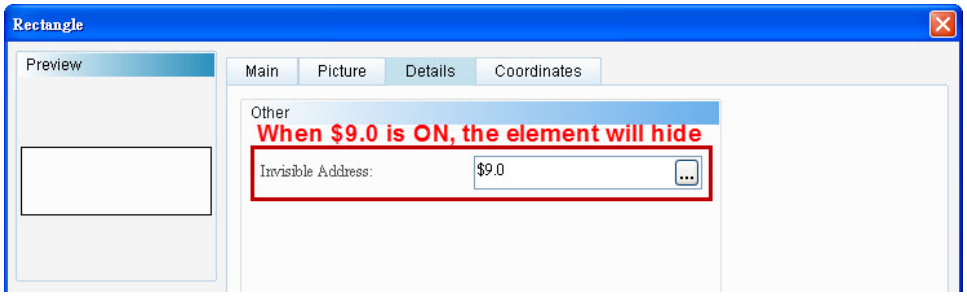


Figure 22-2-4 Rectangle Element Details Properties Page

No.	Property	Function
(1)	Invisible Address	➢ When the Invisible Address is set to ON, the button element becomes invisible and cannot be run any more. 

◆ Coordinates

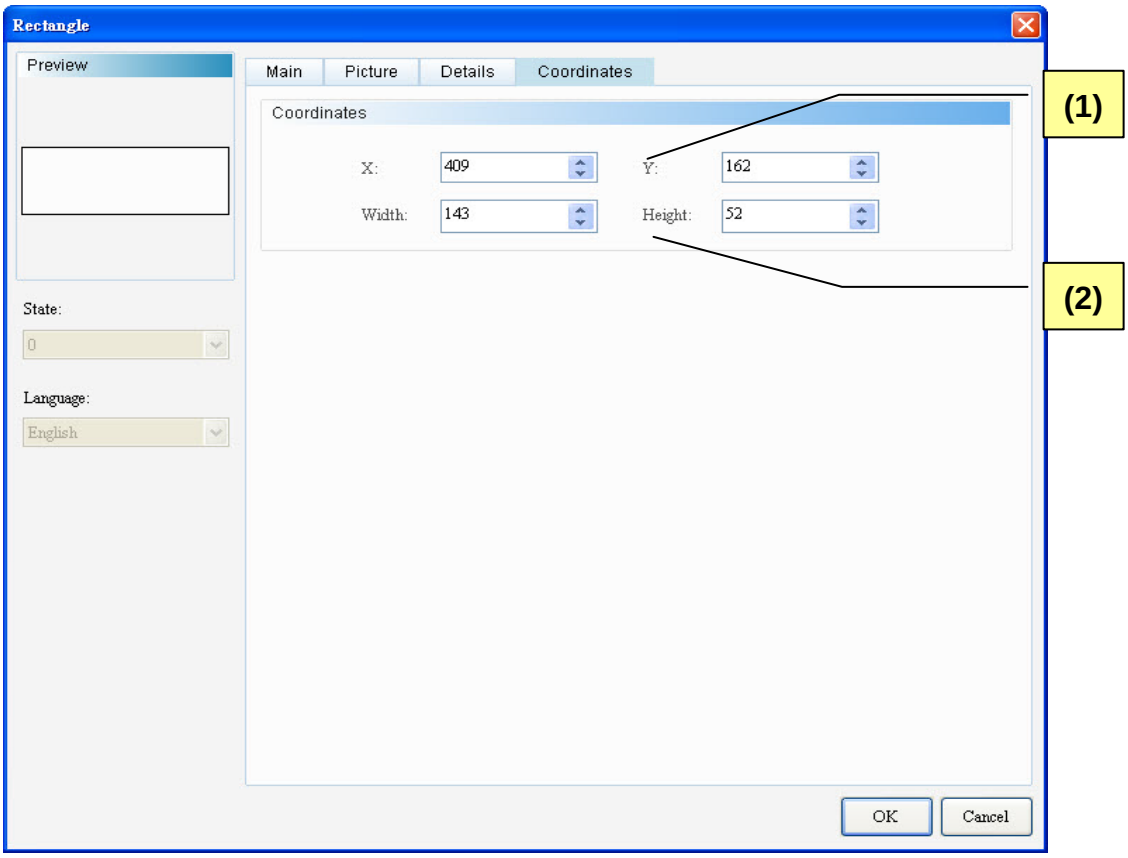


Figure 22-2-5 Rectangle Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

22-3 Circle

Press and hold the left mouse key to drag a picture frame. It is a circle if the length is equal to the width or an oval if the length is not equal to the width.

Double click the Circle icon and the following property setting screen appears.

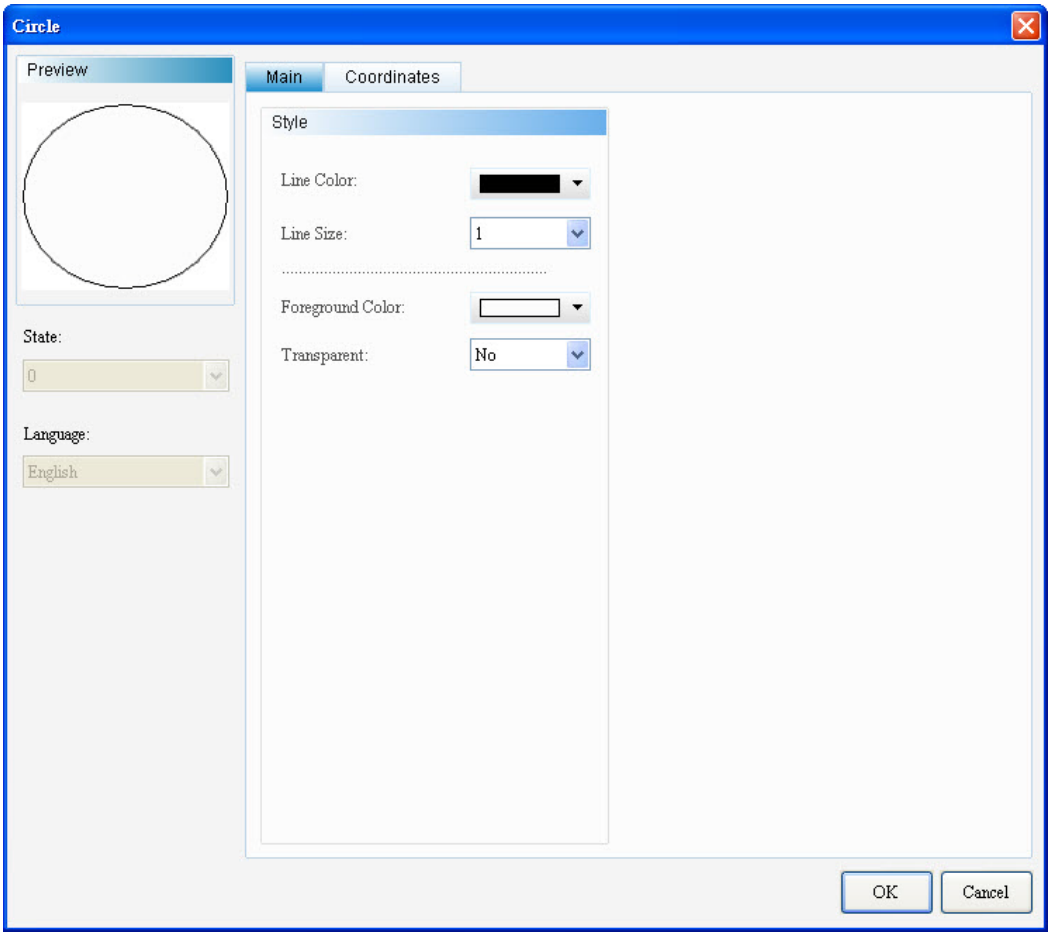


Figure 22-3-1 Circle Properties Setting Screen

Circle	
Function Page	**Content Description**
Preview	The State and Multi-Language are not available for the Circle.
Main	Sets the line color, line size, Foreground Color, and transparent color.
Coordinates	Sets the X-Y coordinate, width and height of the element.

Table 22-3-1 Circle Element Function Page

◆ Main

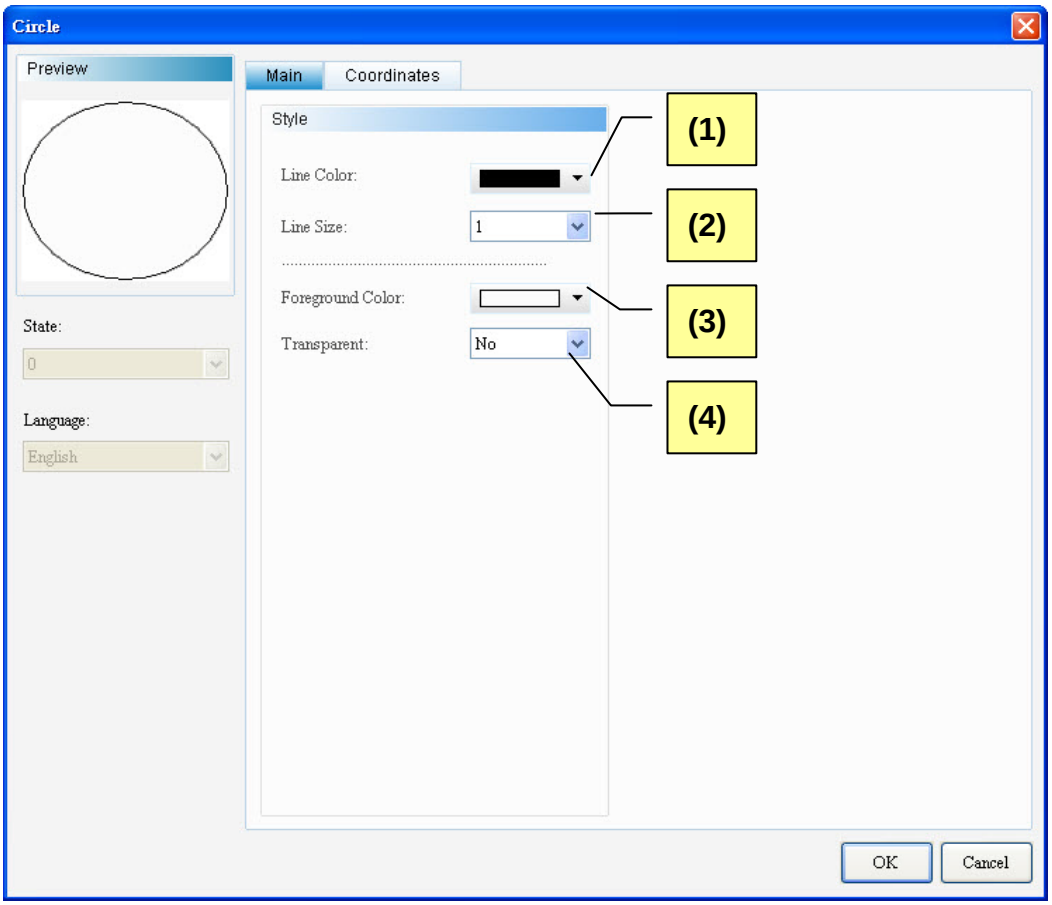
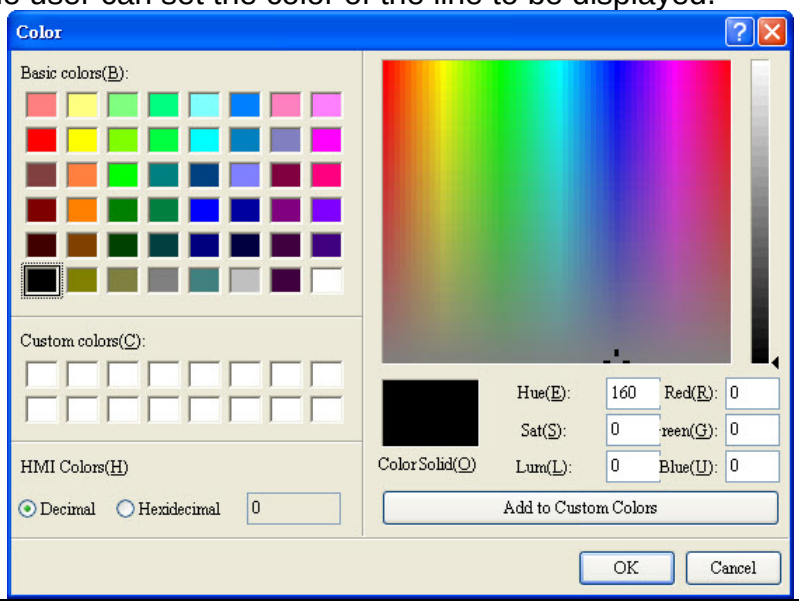
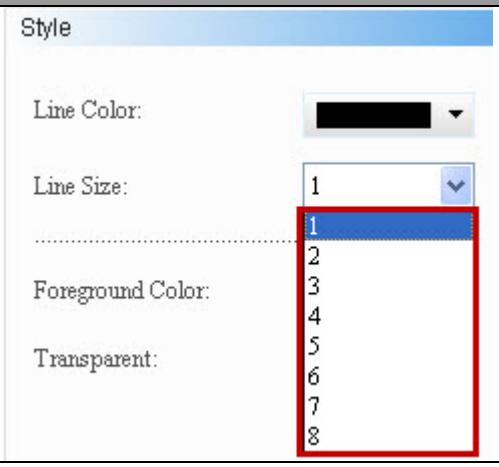
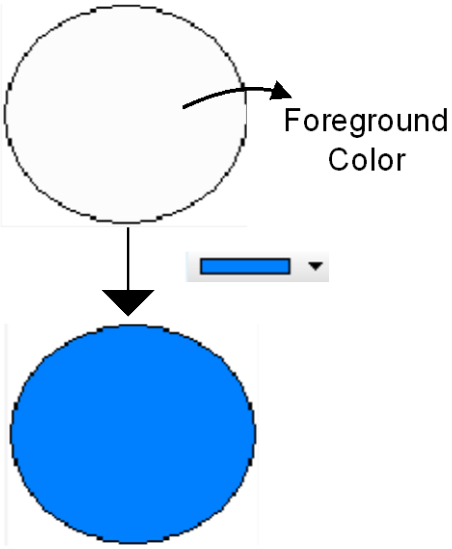
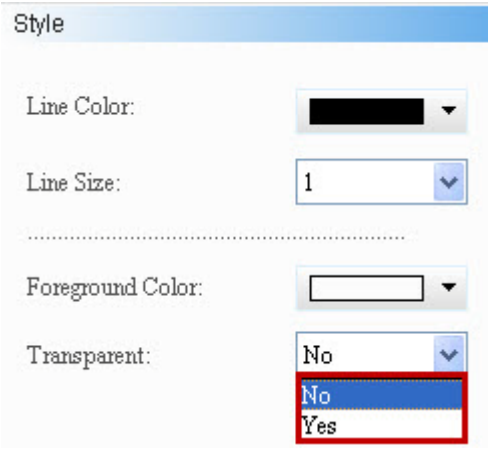
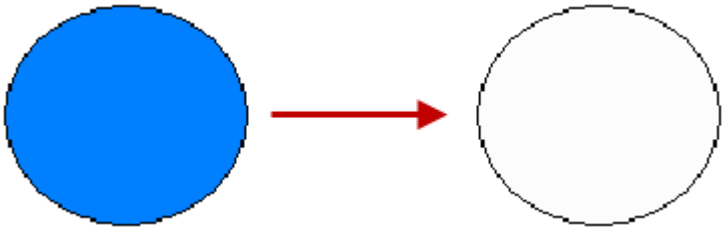
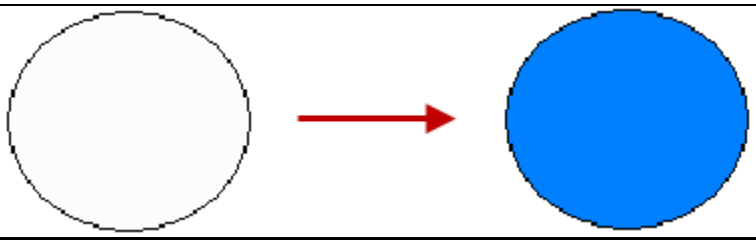


Figure 22-3-2 Circle Element Main Properties Page

No.	Property	Function
(1)	Line Color	➢ The user can set the color of the line to be displayed. 
(2)	Line Size	➢ The width of the line can be set between 1 and 8.

No.	Property	Function
		
(3)	Foreground Color	➢ The user can set the foreground color for the element. 
(4)	Transparent Color	➢ Yes and No are available for selection.  ➢ When Yes is selected, the foreground color of the circle element is transparent and only the border color of the circle is displayed. When No is selected, the foreground color of the element is displayed.

No.	Property	Function	
		Transparent Color: Yes	
		Transparent Color: No	

◆ Coordinates

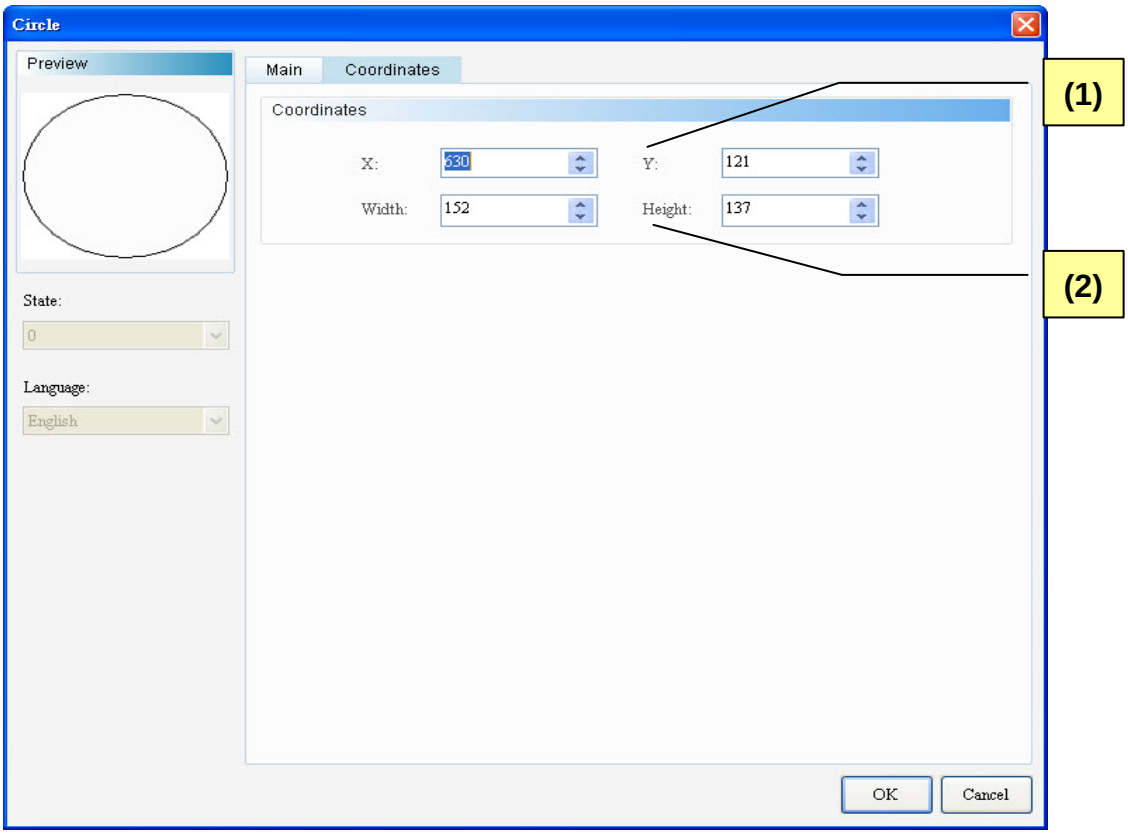


Figure 22-3-3 Circle Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

22-4 Polygon

The user can press the left mouse key to define each point of a polygon. When all points are set up, press the right mouse key to Table the polygon.

Double click the Polygon icon and the following property setting screen appears.

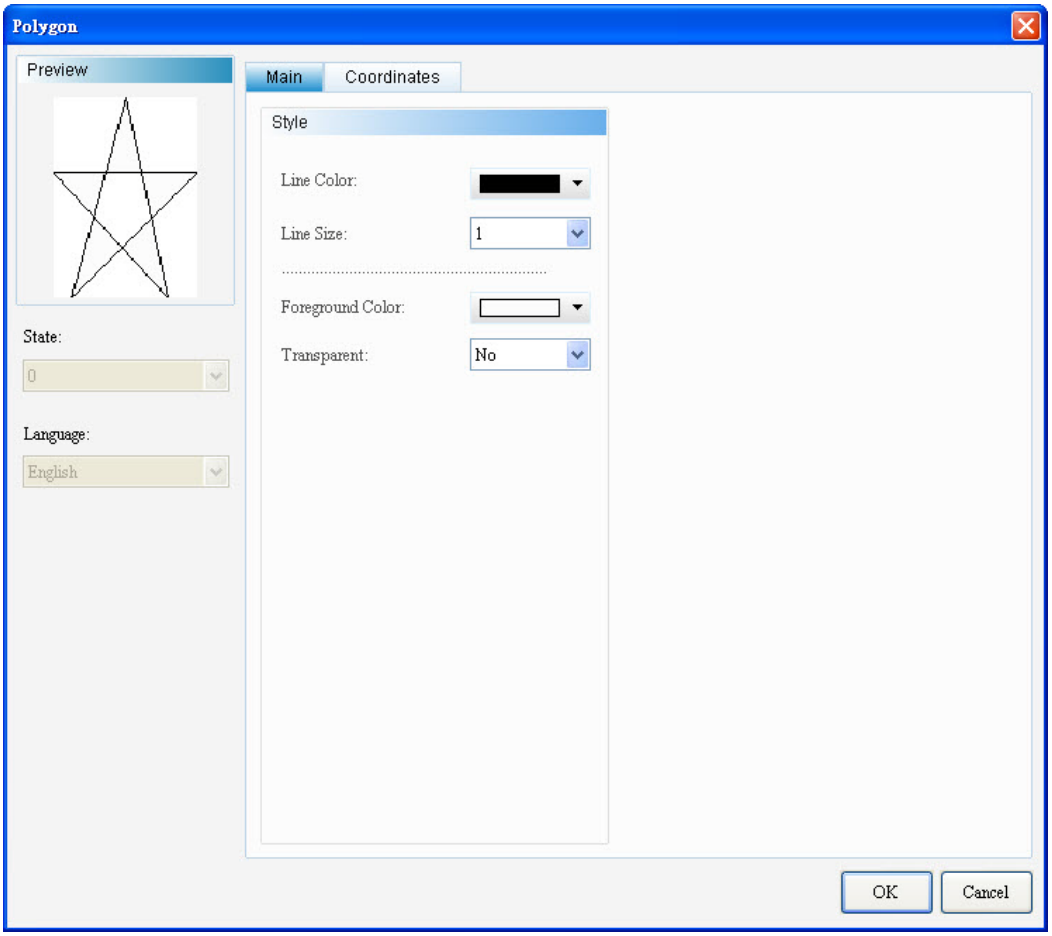


Figure 22-4-1 Polygon Properties Setting Screen

Polygon	
Function Page	**Content Description**
Preview	The State and Language are not available to the Polygon.
Main	Sets the line color, line size, Foreground Color, and Transparent color.
Coordinates	Sets the X-Y coordinate, width and height of the element.

Table 22-4-1 Polygon Element Function Page

◆ Main

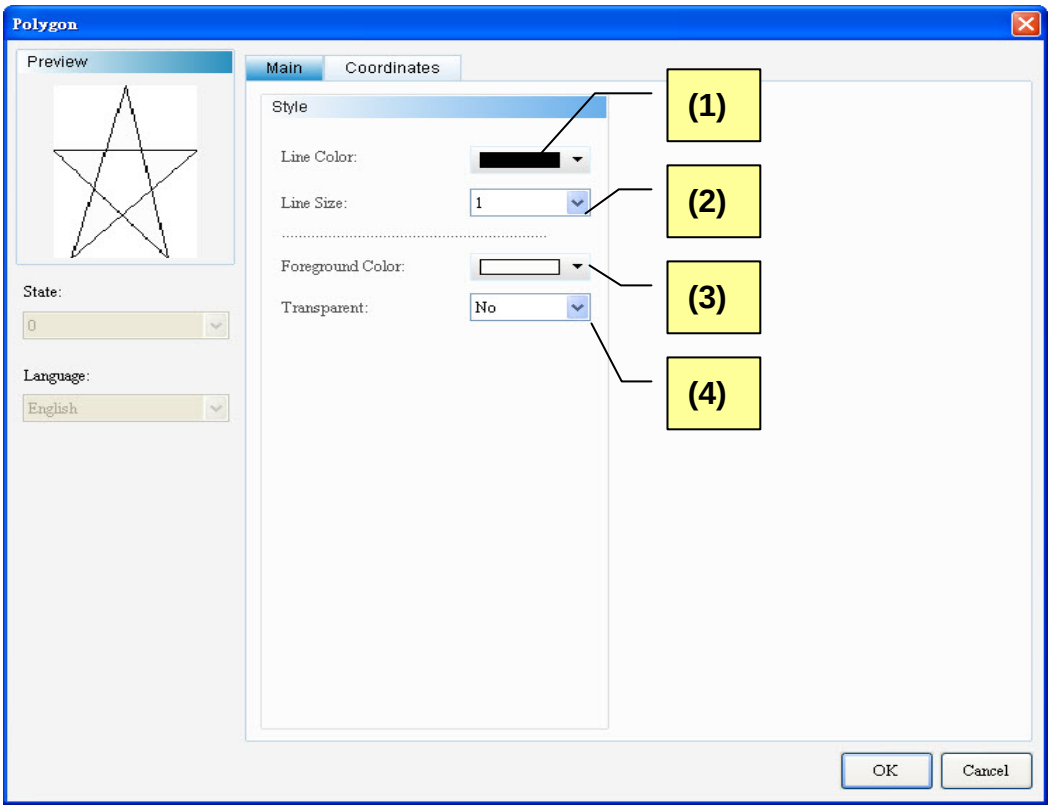
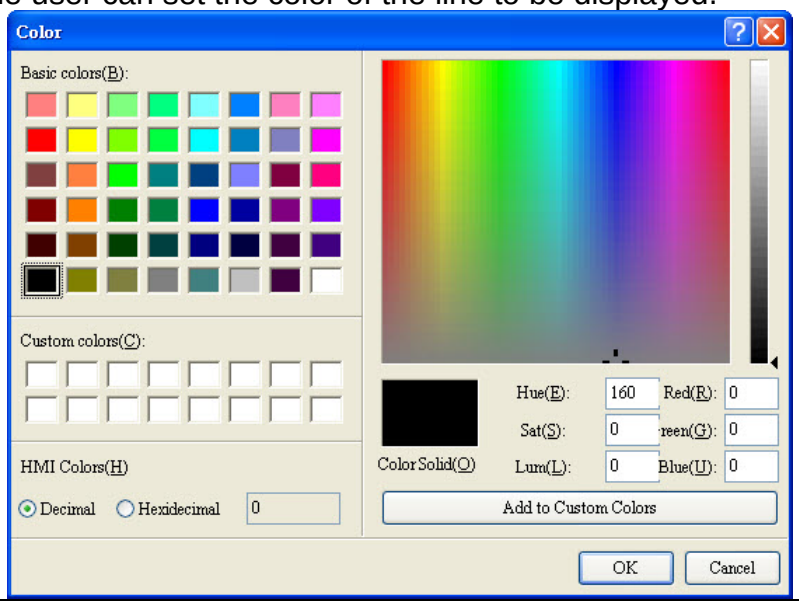
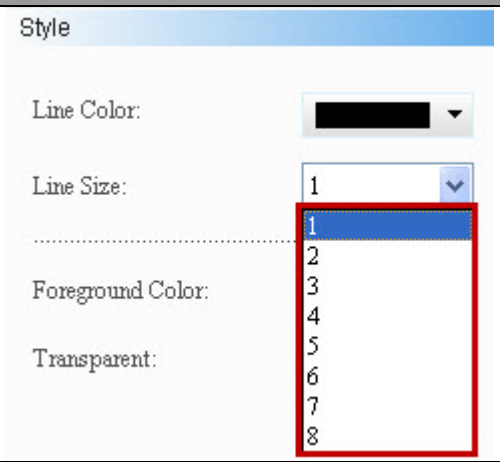
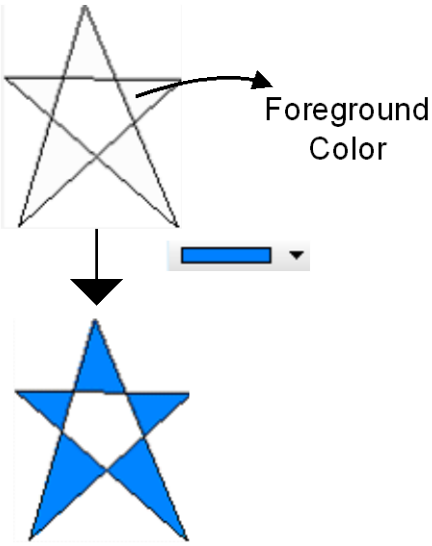
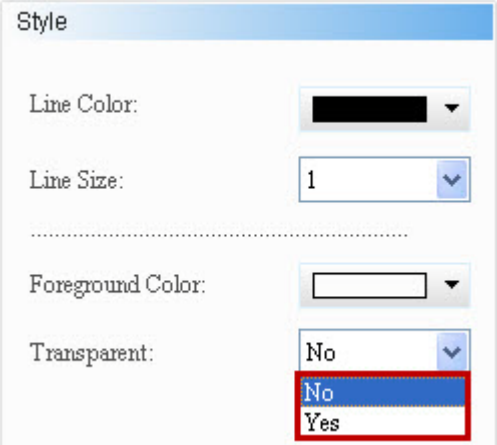
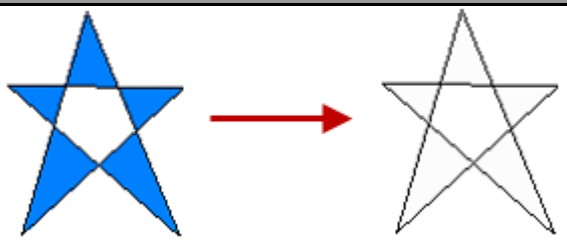
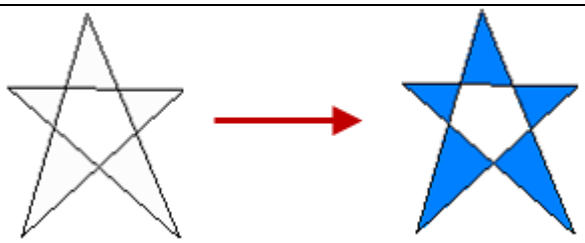


Figure 22-4-2 Polygon Element Main Properties Page

No.	Property	Function
(1)	Line Color	➢ The user can set the color of the line to be displayed. 
(2)	Line Size	➢ The width of the line can be set between 1 and 8.

No.	Property	Function
		
(3)	Foreground Color	➢ The user can set the foreground color for the element. 
(4)	Transparent Color	➢ Yes and No are available for selection.  ➢ When Yes is selected, the foreground color of the polygon element is transparent and only the border color of the polygon is displayed. When No is selected, the foreground color of the element is displayed.

No.	Property	Function	
		Transparent Color: Yes	
		Transparent Color: No	

◆ Coordinates

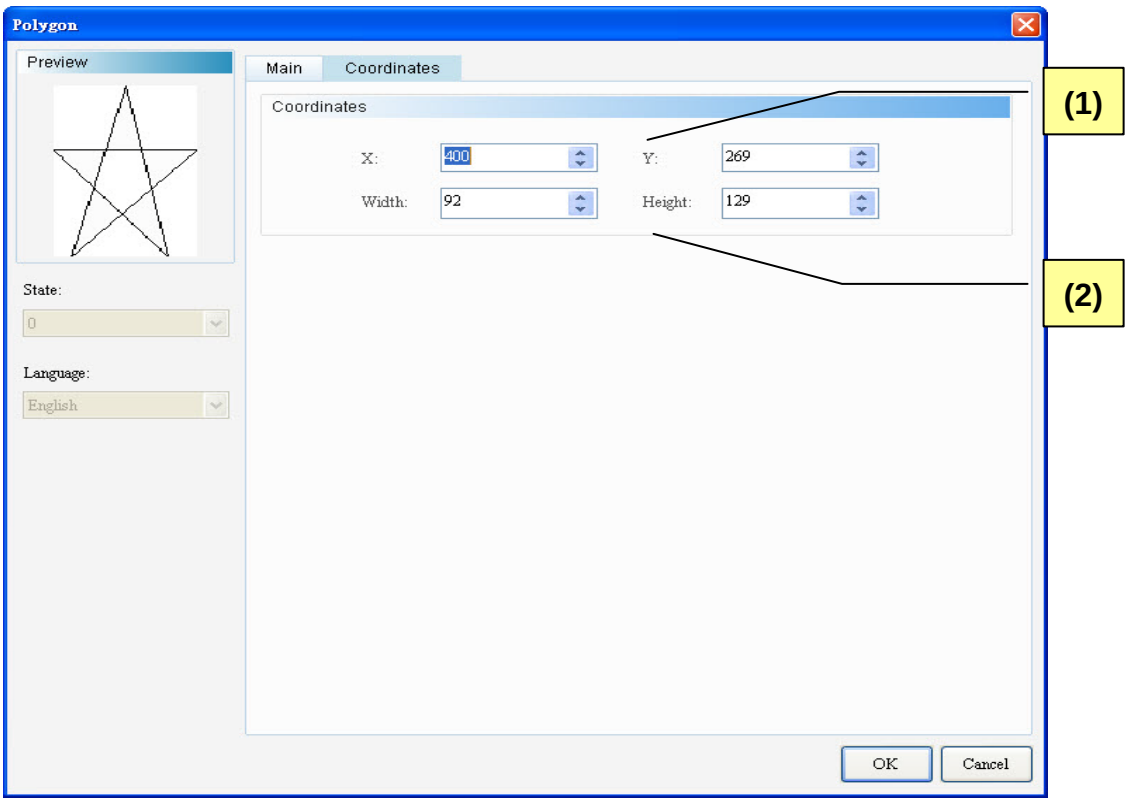


Figure 22-4-3 Polygon Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

22-5 Text

User could use Text element to input displayed word.

Double click the Text icon and the following property setting screen appears.

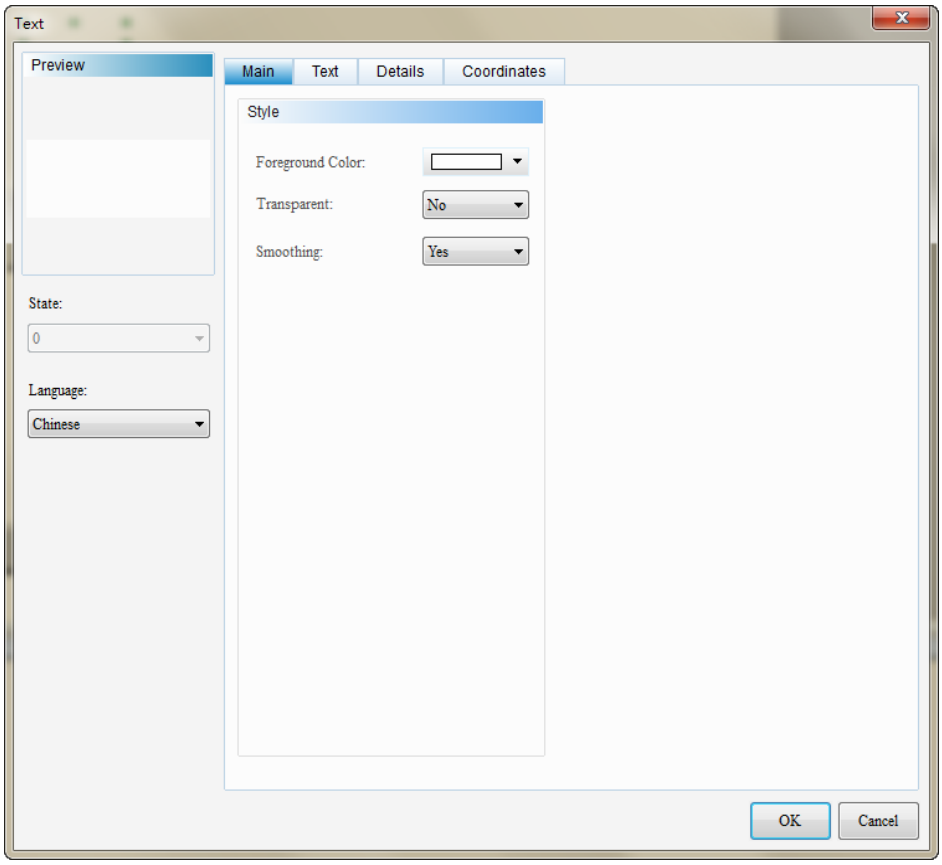


Figure 22-5-1 Text Properties Setting Screen

Text	
Function Page	**Content Description**
Preview	The State is not available for the Text, but the user can edit multi-language data.
Main	Sets the foreground color, transparent color, and font smooth.
Text	Sets the content, font, font size, font color, font effects, scaling, and alignment of the text to be displayed.
Details	Set invisible address.
Coordinates	Sets the X-Y coordinates, width and height of the element.

Table 22-5-1 Text Element Function Page

◆ Main

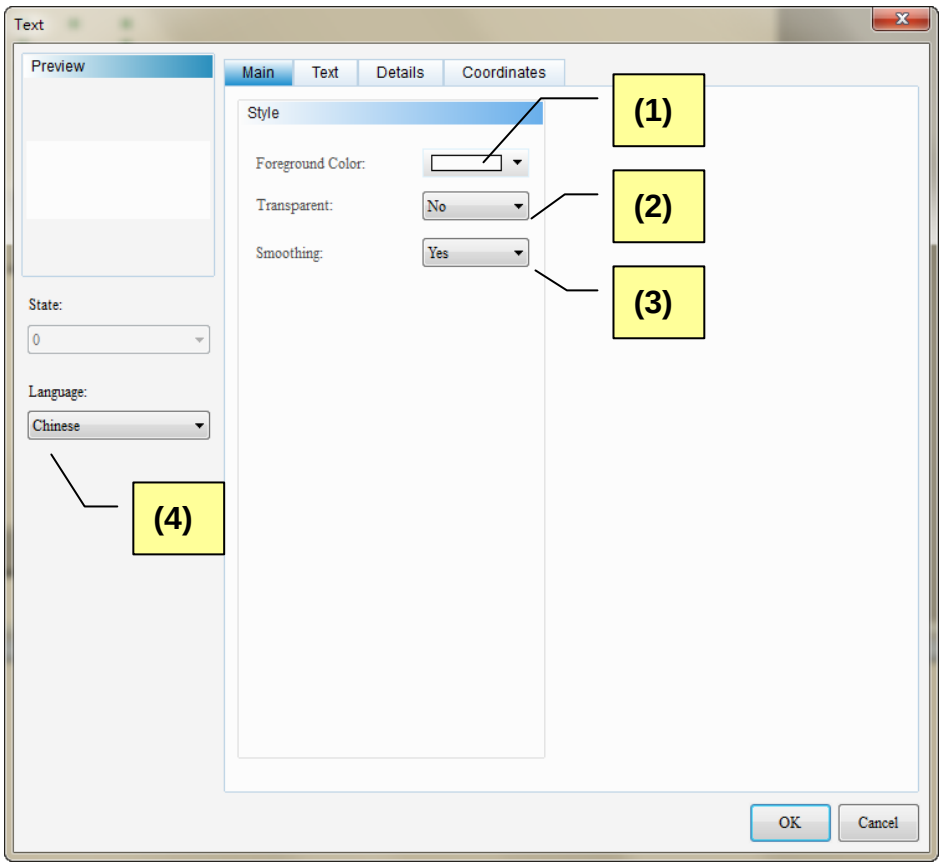
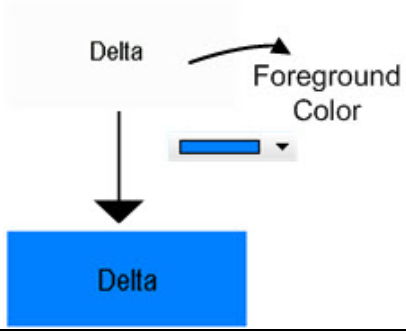
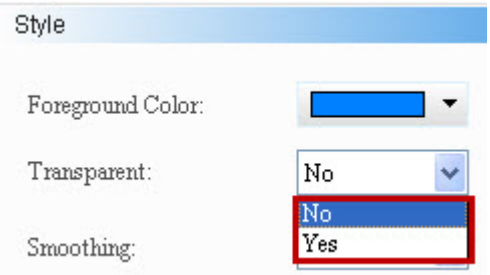
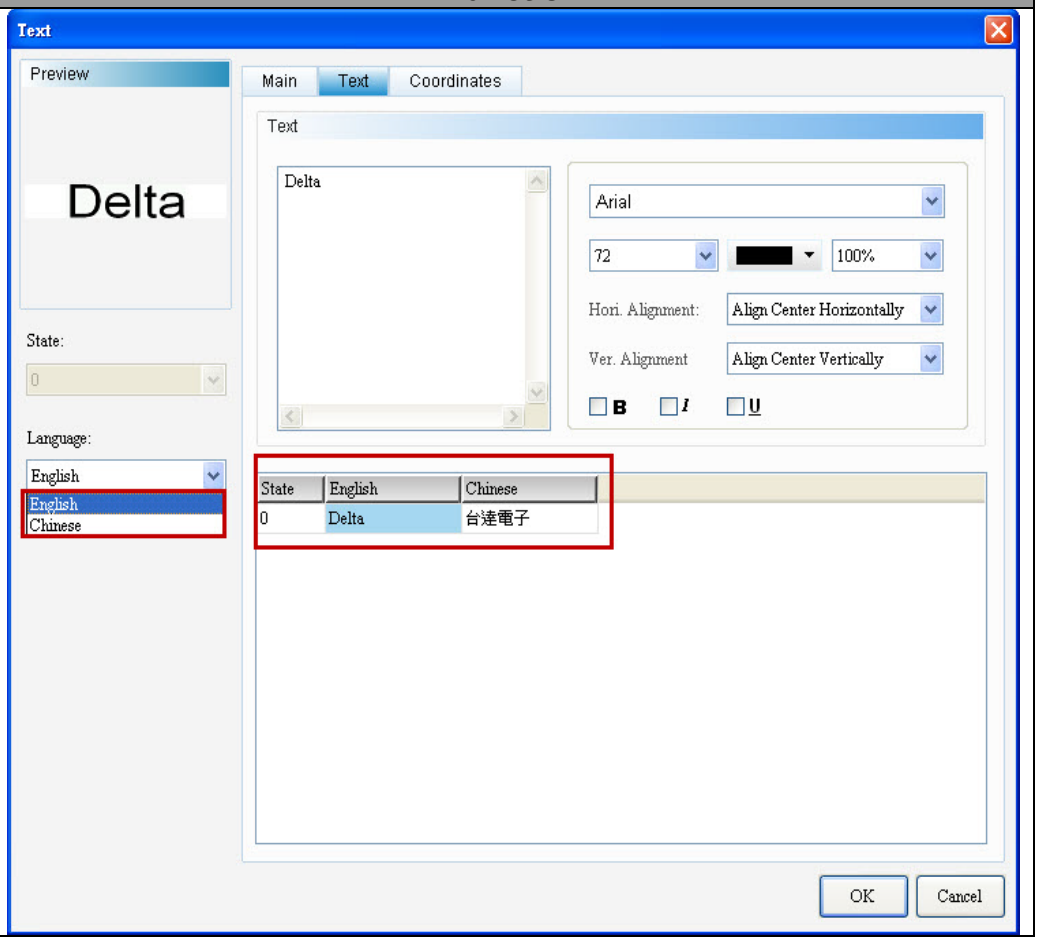


Figure 22-5-2 Text Element Main Properties Page

No.	Property	Function
(1)	Foreground Color	➢ The user can set the foreground color for the element. 
(2)	Transparent Color	➢ Yes and No are available for selection.  ➢ When Yes is selected, the foreground color of the Text element is transparent and only the border color of the Text is displayed. When No is selected, the foreground color of the element is displayed.

No.	Property	Function
		Transparent Color: Yes
		Transparent Color: No
(3)	Font Smooth	➢ Yes and No are available for selection. When Yes is selected, the font is smooth without the “sawtooth” shape. When No is selected, the font is displayed in “sawtooth” shape and is not smooth.
		Smoothing: Yes
		Smoothing: No
(4)	Language	➢ When language data are defined, users can edit the properties of text display from Language.

No.	Property	Function
		

◆ Text

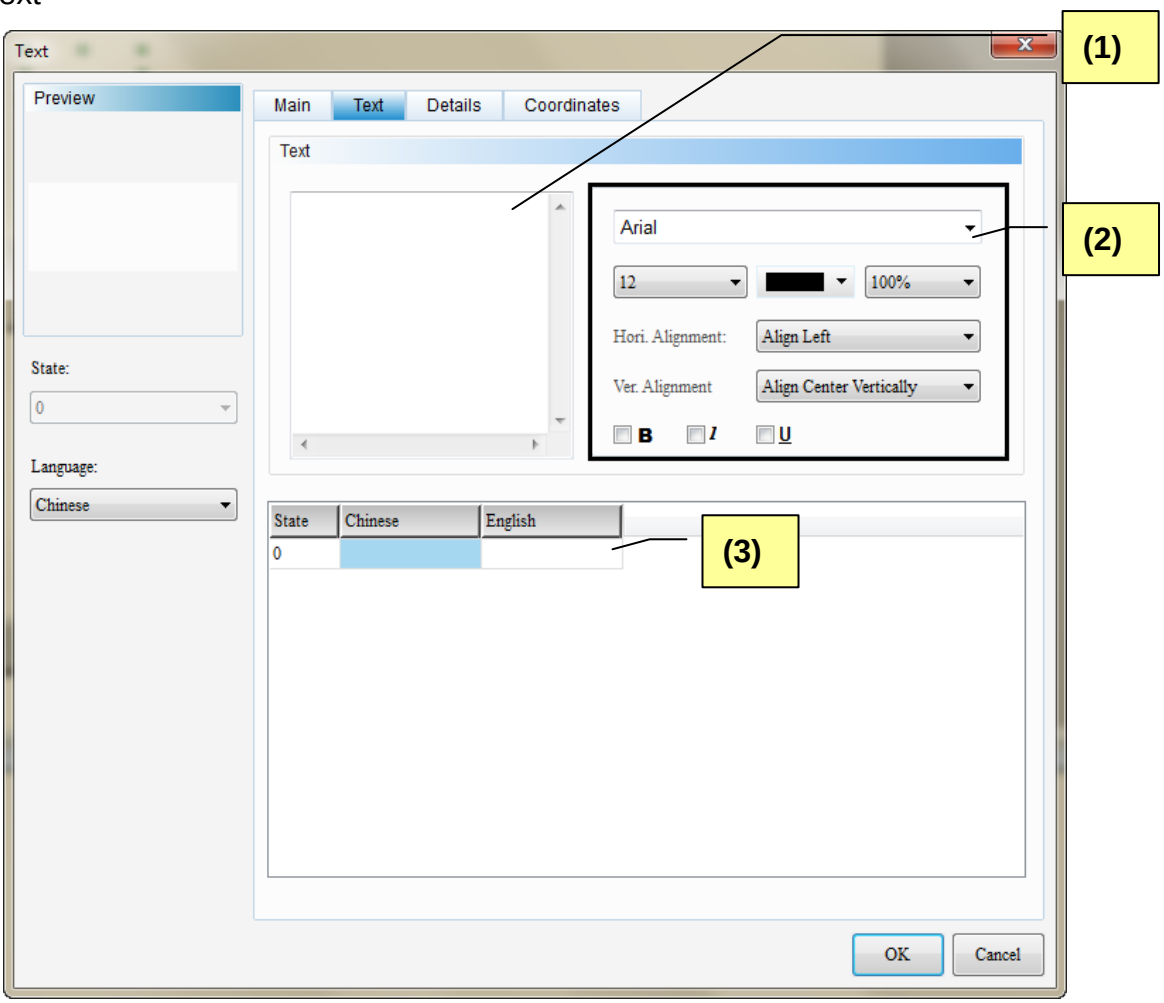
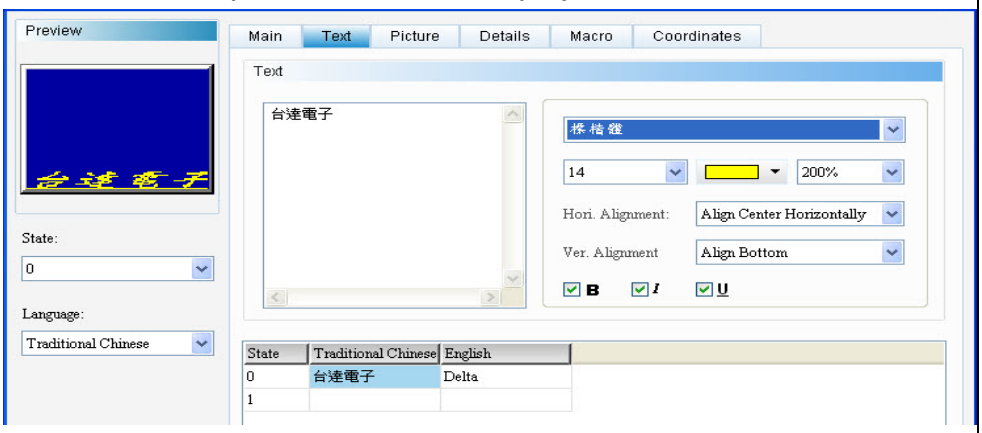


Figure 22-5-3 Text Element Text Properties Page

No.	Property	Function
(1)	Text	➢ Users can input the text to be displayed in the text box.  ➢ Users can select elements supporting text input as shown above and press the SPACE bar on the keyboard to edit text.
(2)	Text Properties	➢ Sets text properties, including font type, font size, font color, scaling, text alignment, and bold/italic/underline of font. Please refer to the above figure for details about the results of text properties.

No.	Property	Function
(3)	Multi-Language Text Data	➢ Users can add Multi-Language text data from the Multi-Language Text Page. As shown in the Text Properties Figure, users can input English text in the English field.

◆ Details

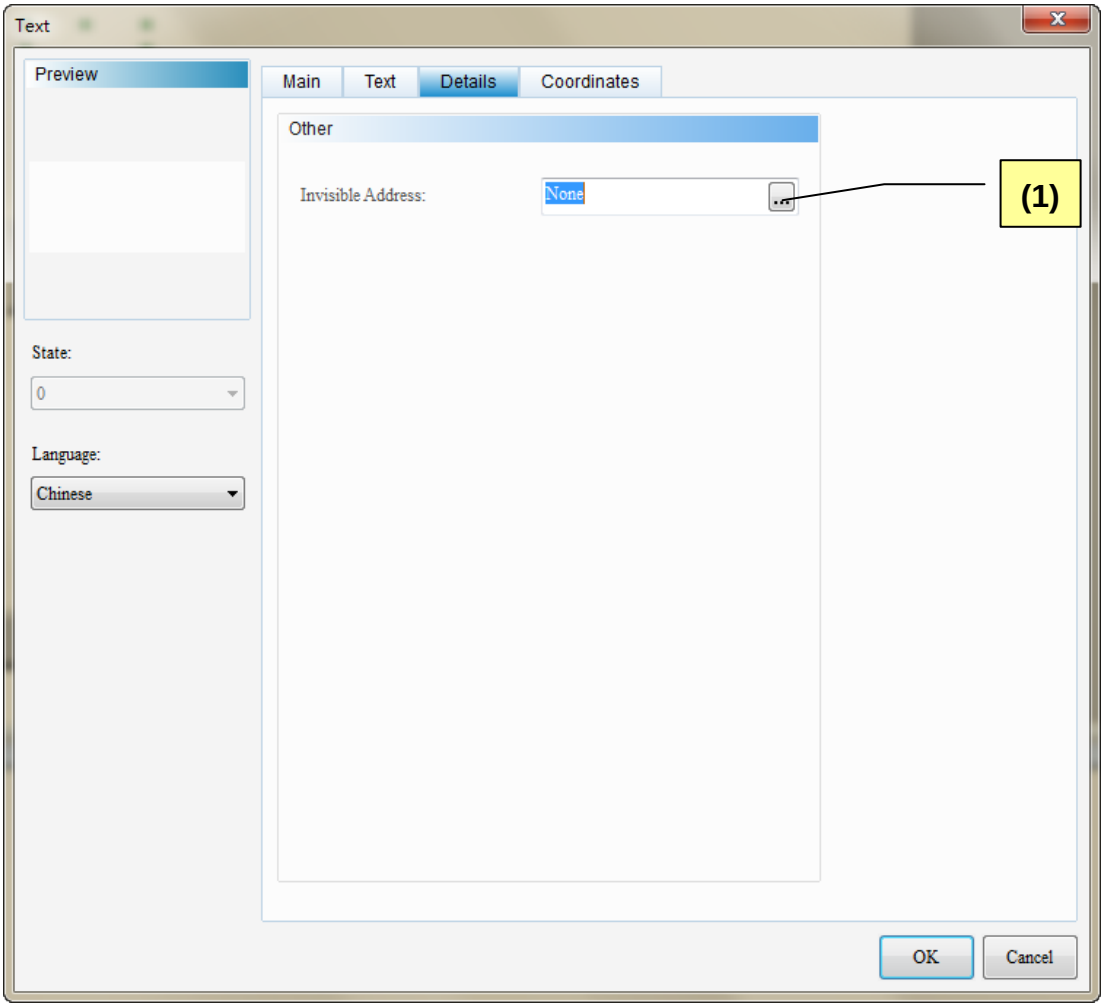
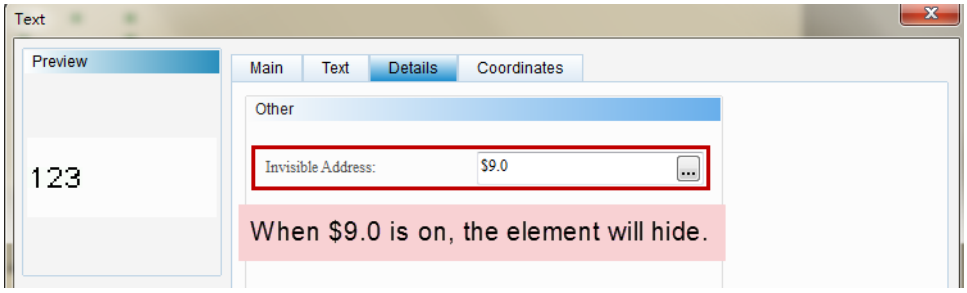


Figure 22-5-4 Text Element Details Properties Page

No.	Property	Function
(1)	Invisible Address	➢ When the Invisible Address is set to ON, the button element becomes invisible and cannot be run any more. 

◆ Coordinates

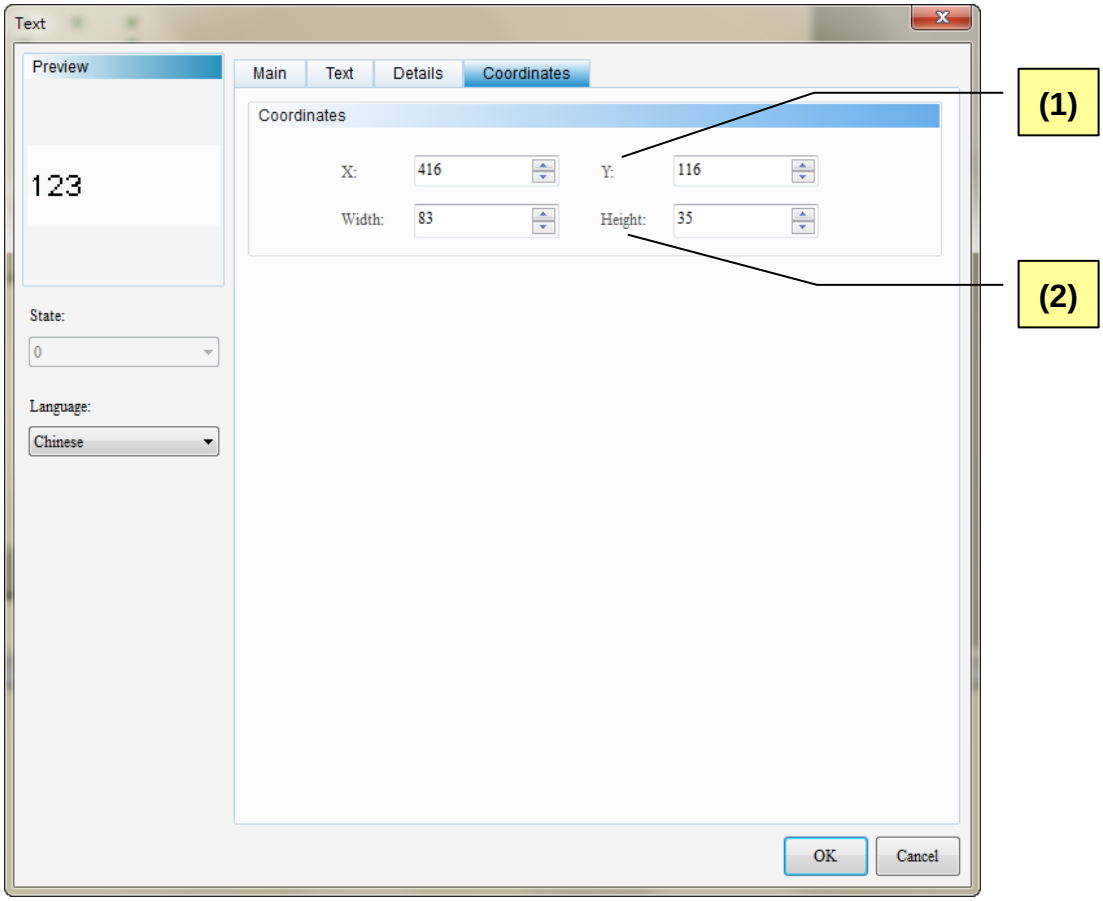


Figure 22-5-5 Text Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

22-6 Scale

The user can use the Scale element to present the curve value of the History Trend Chart. It provides Primary Scale Counts and Secondary Scale Counts options, and the user can define the Data Type, Data Format, Min. value and Max. value for the scale element. The user can also determine whether to show the mark or only show the scale.

Double click the Scale icon and the following property setting screen appears.

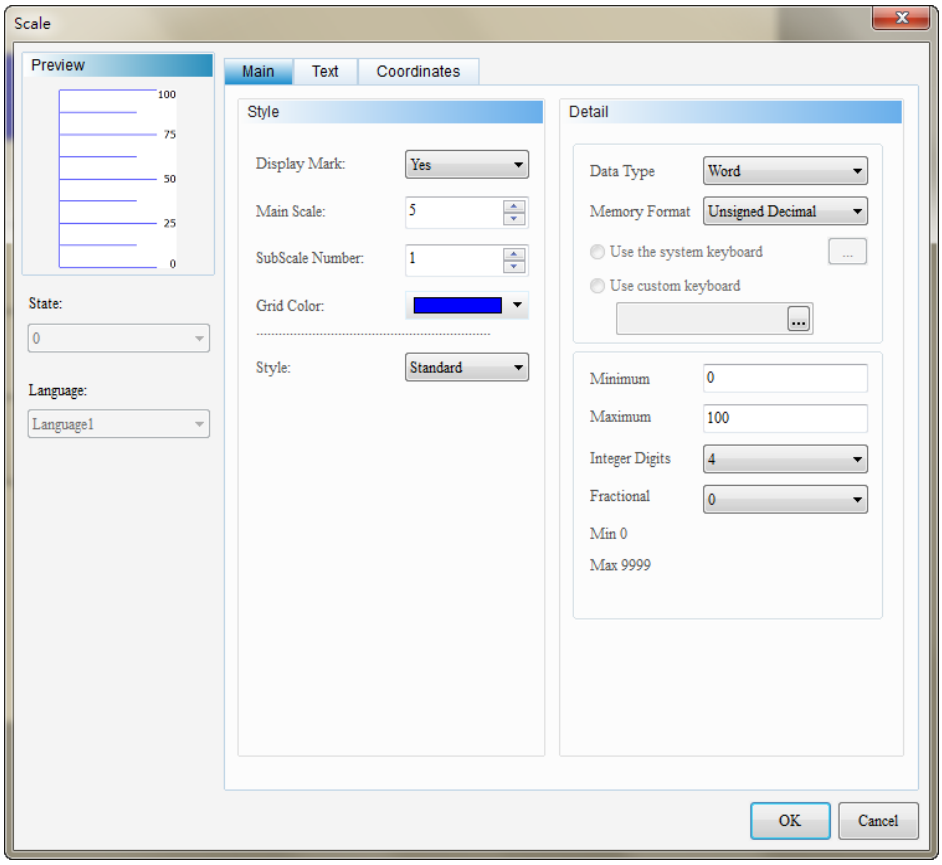


Figure 22-6-1 Scale Properties Setting Screen

Scale	
Function Page	**Content Description**
Preview	The State and Language are not available for the Scale.
Main	Sets the mark display, primary scale counts, secondary scale counts, scale color, and style. Sets the data type, data format, min. value, max. value, integer place, and decimal place.
Text	Sets the font/size/color of the text to be displayed.
Coordinates	Sets the X-Y coordinates, width and height of the element.

Table 22-6-1 Scale Element Function Page

◆ Main

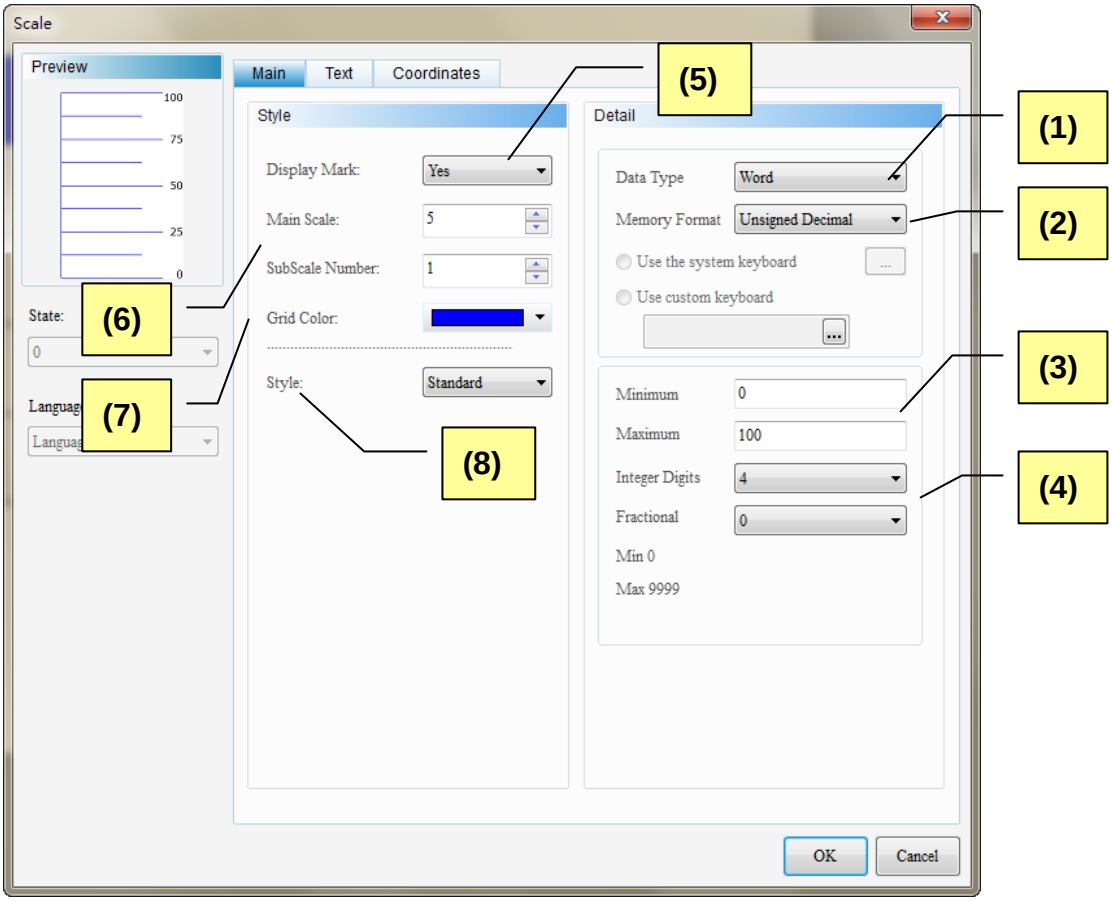
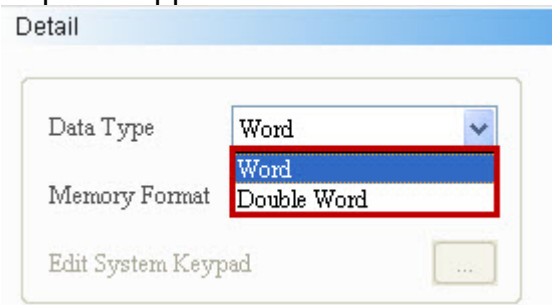
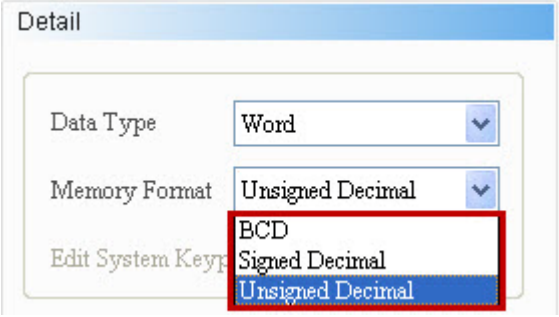
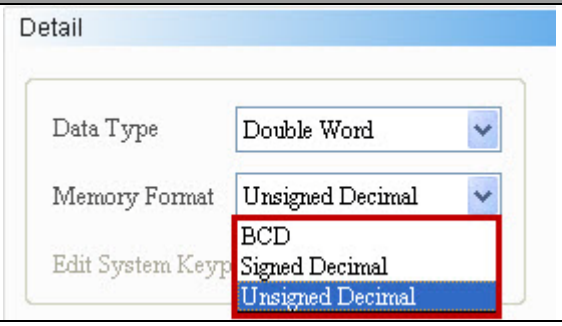
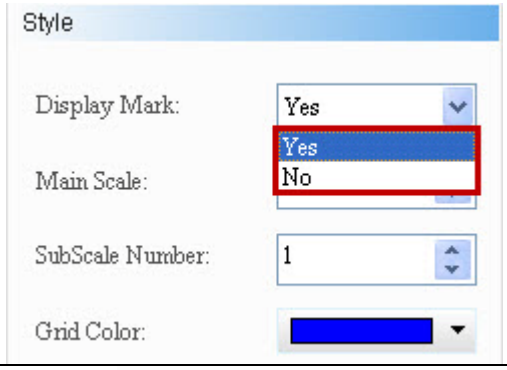
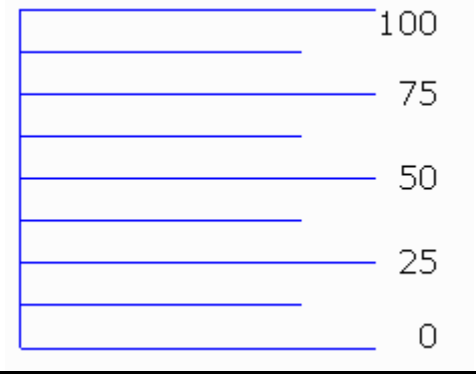
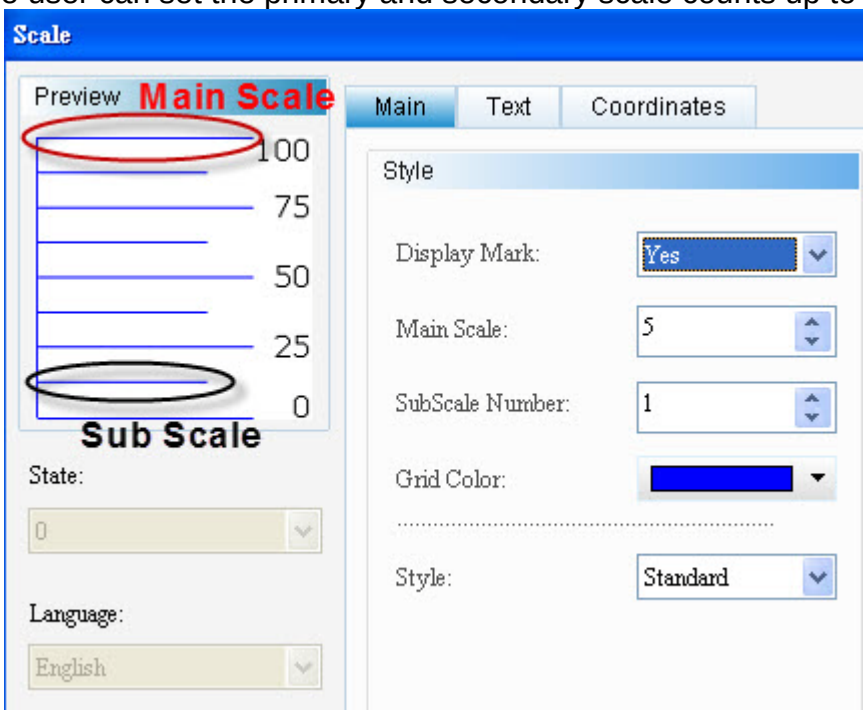
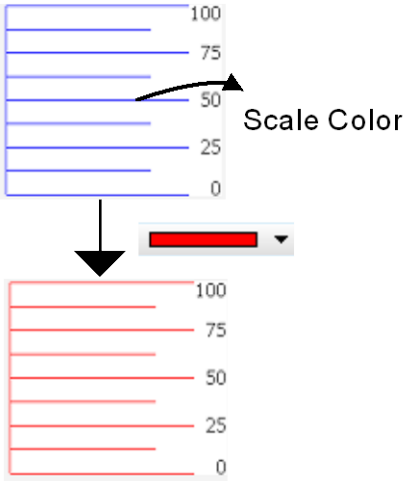


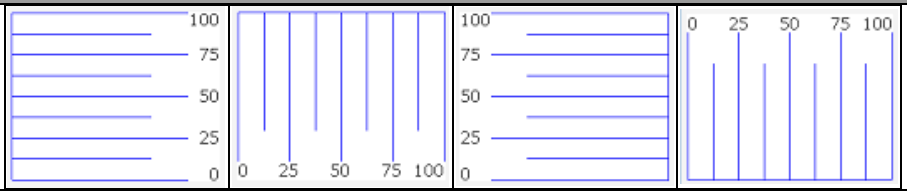
Figure 22-6-2 Scale Element Main Properties Page

No.	Property	Function
(1)	Data Type	➢ The Data Type option supports two Tableats: Word and Double Word. 
(2)	Data Format	➢ The following data Tableats are supported when Word is selected as the data type.  ➢ The following data Tableats are supported when Double Word is selected as the data type.

<table>
<tr><th>No.</th><th>Property</th><th>Function</th></tr>
<tr><td></td><td></td><td> 
</td></tr>
<tr><td>(3)</td><td>Min. Value/Max. Value</td><td>➢ The legal range of the min. and max. values is determined by the settings of the data type, integer place and decimal place. In the following example, no decimal is set.
<table>
<tr><th>Data Type</th><th>Data Tableat</th><th>Legal Range</th><th>Integer Place</th><th>Decimal Place</th></tr>
<tr><td rowspan="3">Word</td><td>BCD</td><td>0~9999</td><td>4</td><td>0</td></tr>
<tr><td>Signed Decimal</td><td>-3278~32767</td><td>5</td><td>0</td></tr>
<tr><td>Unsigned Decimal</td><td>0~65535</td><td>5</td><td>0</td></tr>
<tr><td rowspan="3">Double Word</td><td>BCD</td><td>0~99999999</td><td>8</td><td>0</td></tr>
<tr><td>Signed Decimal</td><td>-2147483648~2147483647</td><td>10</td><td>0</td></tr>
<tr><td>Unsigned Decimal</td><td>0~4294697295</td><td>10</td><td>0</td></tr>
</table></td></tr>
<tr><td>(4)</td><td>Integer Digits / Fractional</td><td>➢ The user can set the integer digits and fractional to be displayed.</td></tr>
<tr><td>(5)</td><td>Display Mark</td><td>➢ Yes and No are available for selection. When Yes is selected, the numeric marks on the scale will be displayed. When No is selected, the scale is displayed without numeric marks.


<table>
<tr><td>Display Mark: Yes</td><td> 
</td></tr>
</table></td></tr>
</table>

No.	Property	Function
		Display Mark: No
(6)	Main Scale Sub Scale Number	➢ The user can set the primary and secondary scale counts up to 99. 
(7)	Scale Color	➢ The user can set the display color of the scale. 
(8)	Style	➢ The Style option supports Standard, Rotation 90, Rotation 180 and Rotation 270. The user can use this option to change the appearance of the element. Standard | Rotation 90 | Rotation 180 | Rotation 270

No.	Property	Function					
							

◆ Text

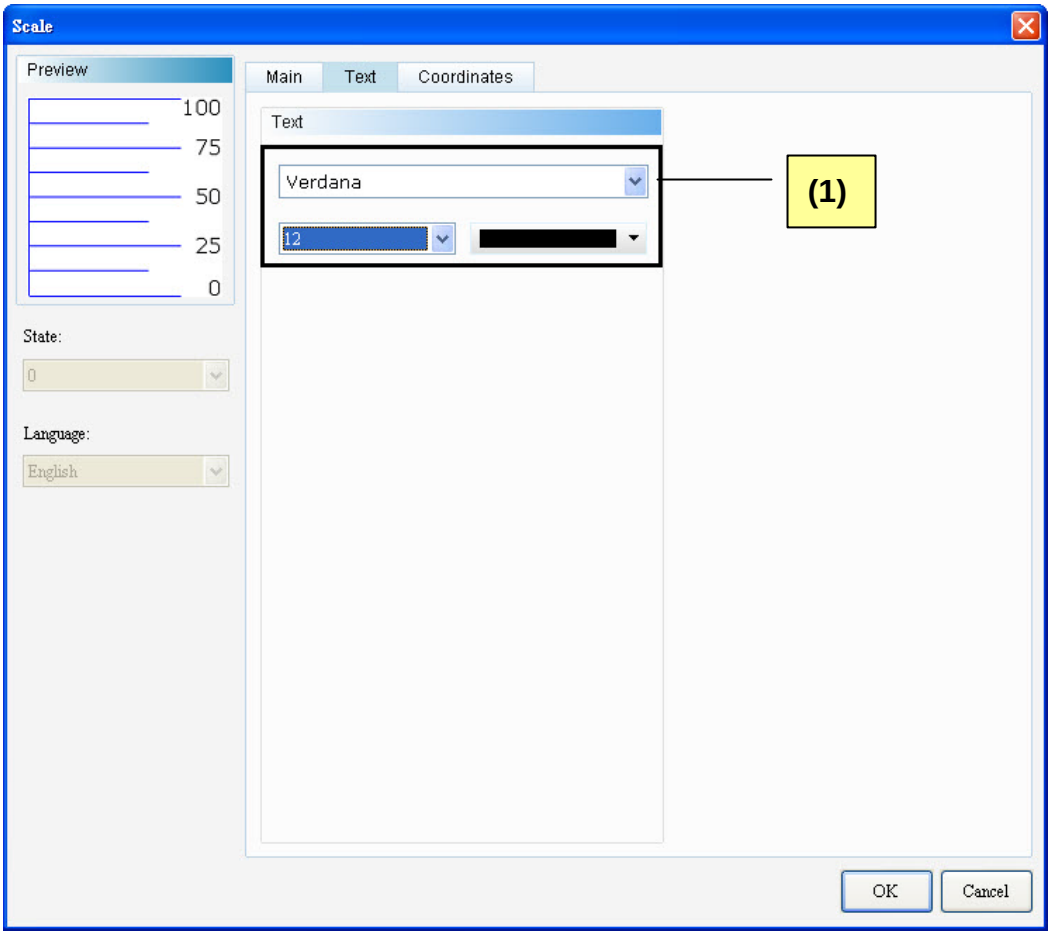


Figure 22-6-3 Scale Element Text Properties Page

No.	Property	Function
(1)	Text Properties	➢ The user can set the font, size and color of the text to be displayed.

◆ Coordinates

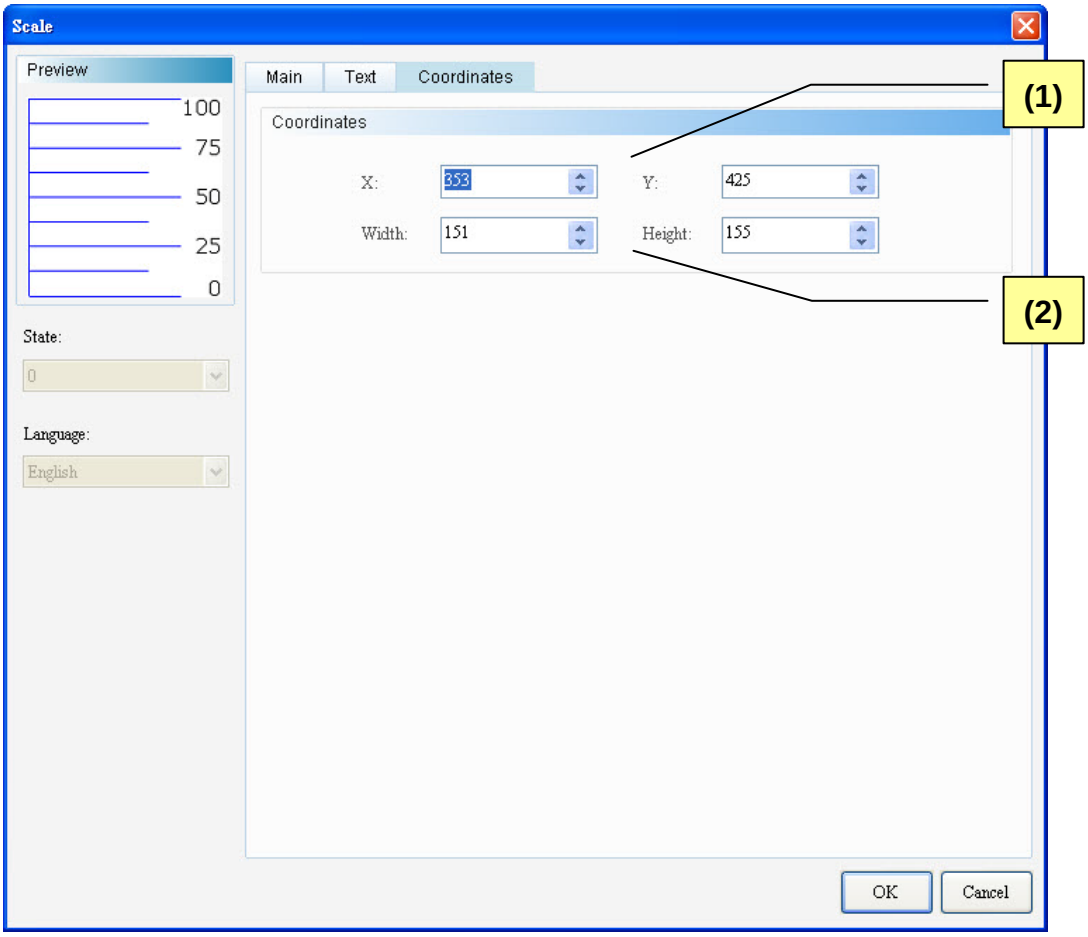


Figure 22-6-4 Scale Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

22-7 Table

The Table element provides the function same as Office Editor. It allows the user to increase the number of rows and lines or set the color for the row and line to make the appearance display more varied.

Double click the Table icon and the following property setting screen appears.

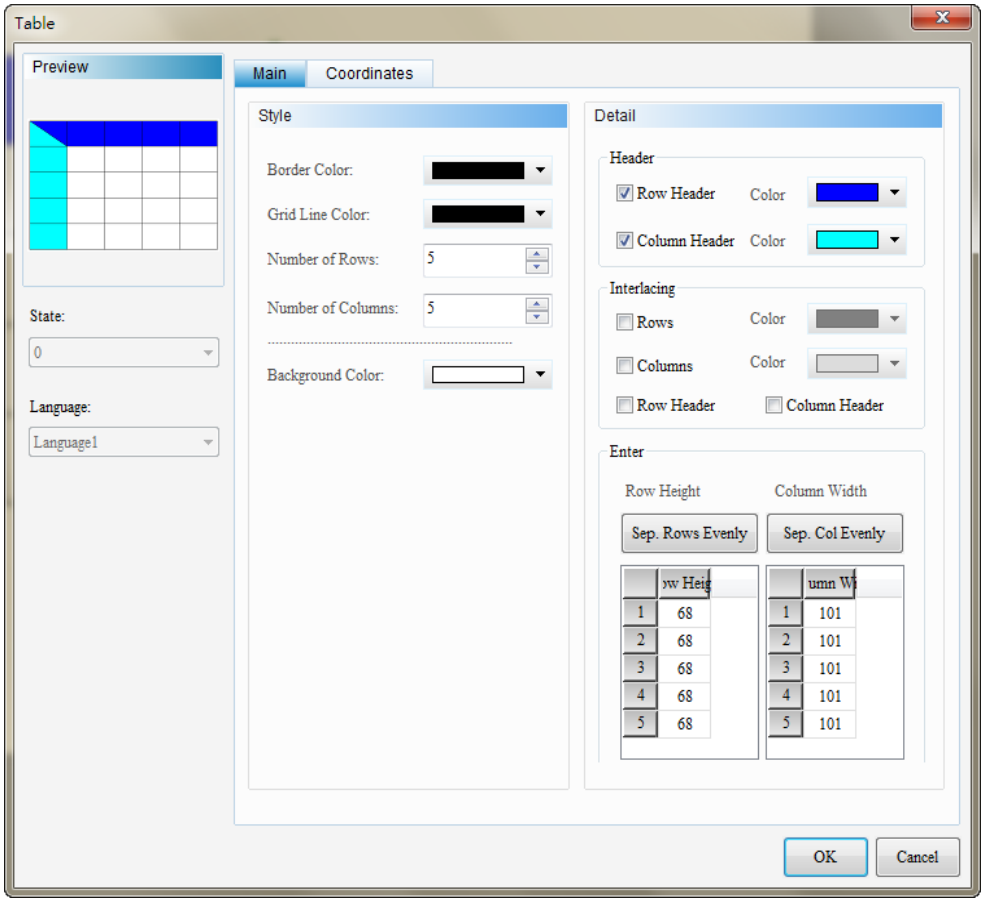


Figure 22-7-1 Table Properties Setting Screen

Table	
Function Page	**Content Description**
Preview	The State and Multi-Language are not available to the Table.
Main	Sets the border color, Grid Color, rows, lines, and style. Sets the row header, line header, row interlacing, line interlacing, row header interlacing, and line header interlacing. Sets the row spacing and line spacing.
Text	Sets the font/size/color of the text to be displayed.
Coordinates	Sets the X-Y coordinates, width and height of the element.

Table 22-7-1 Table element Setting Screen

◆ Main

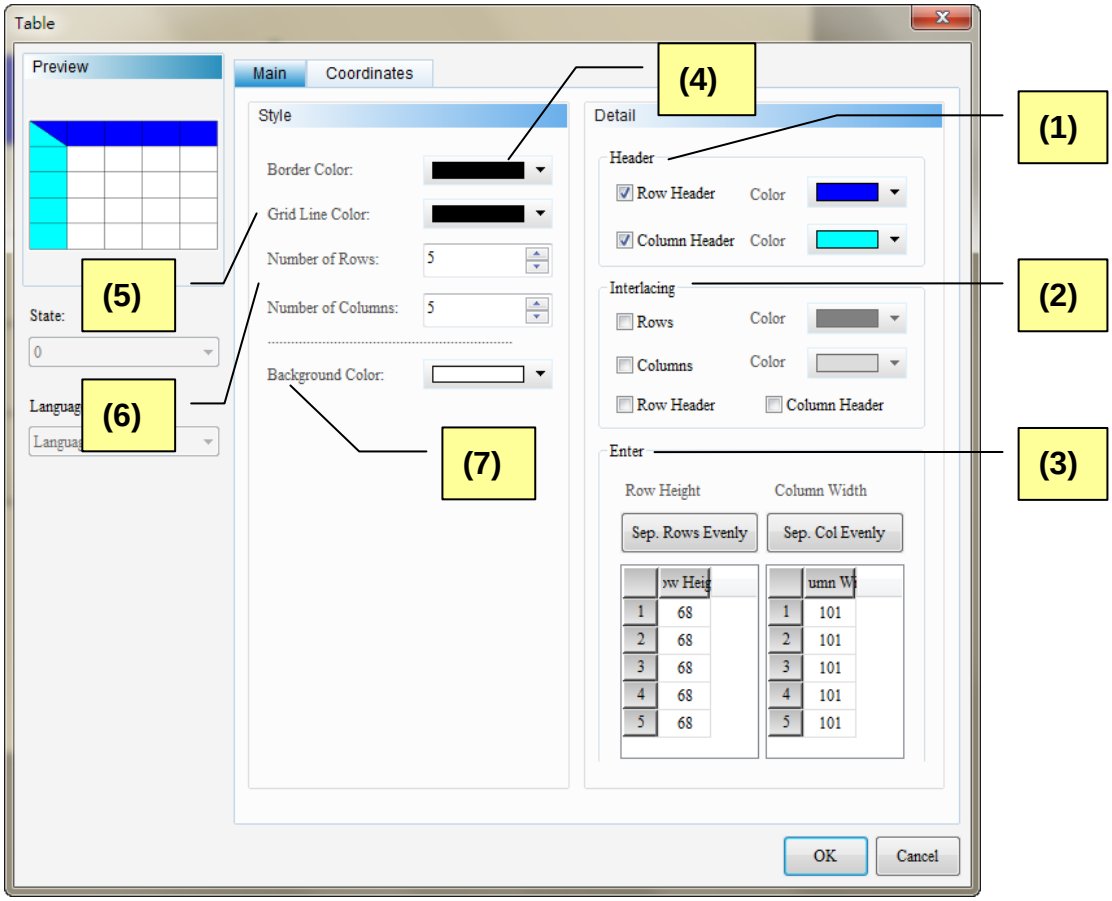
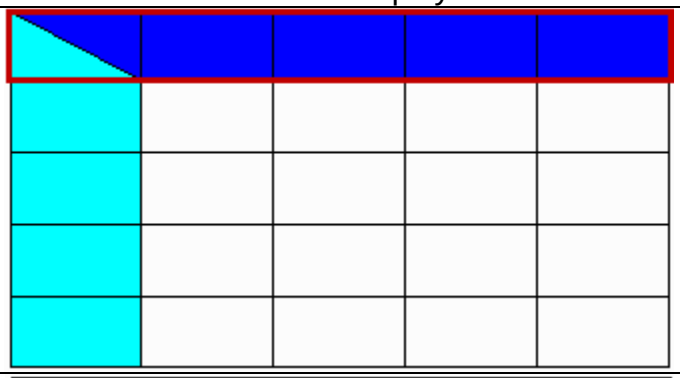
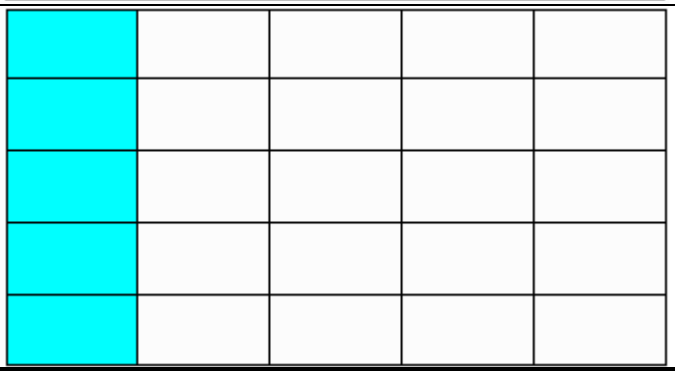
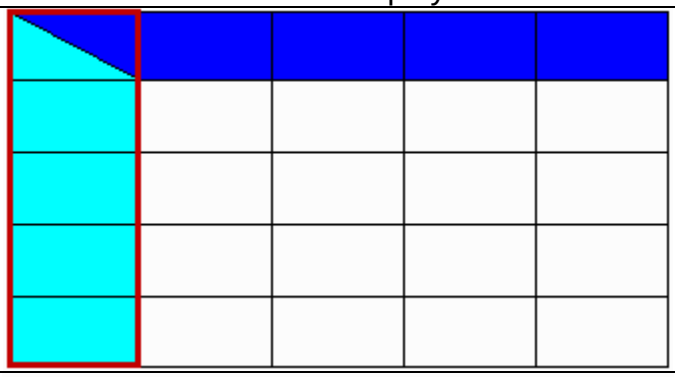
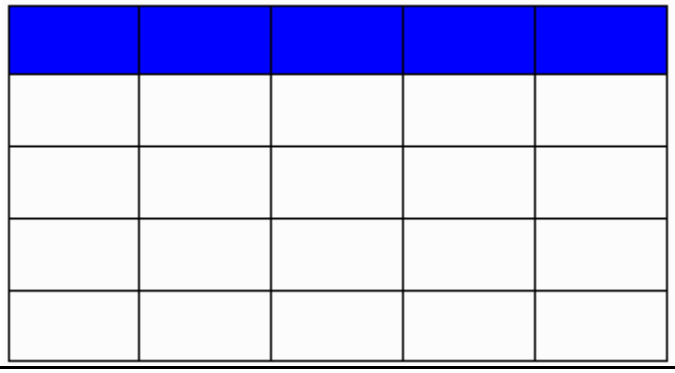
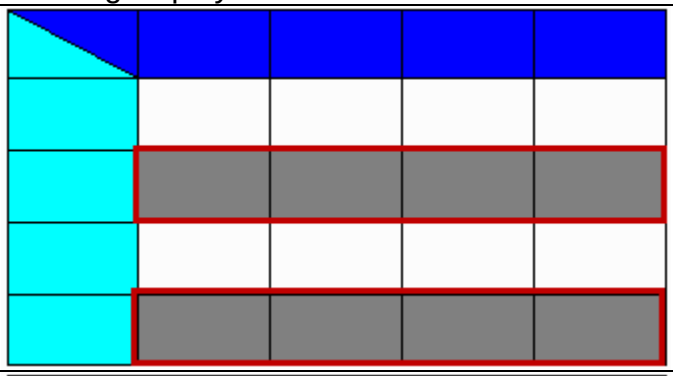
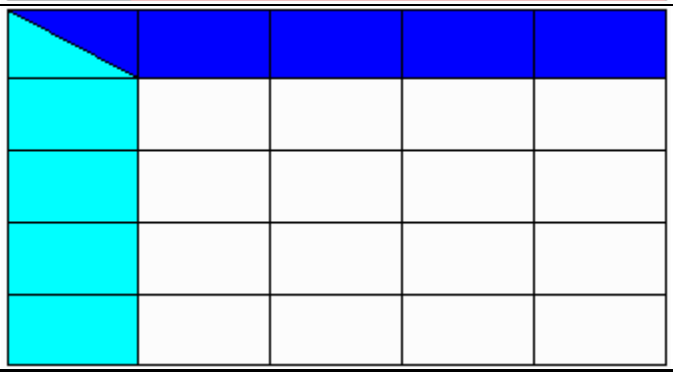
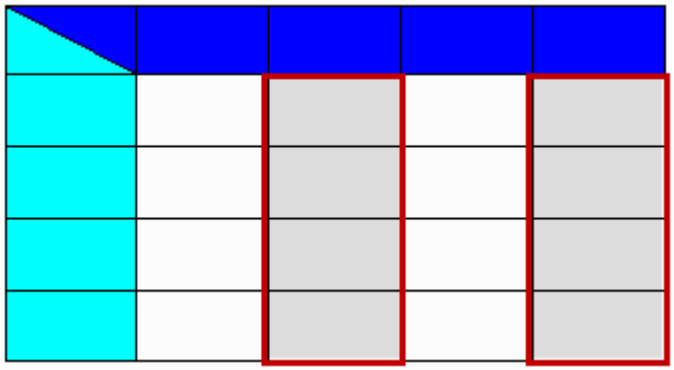
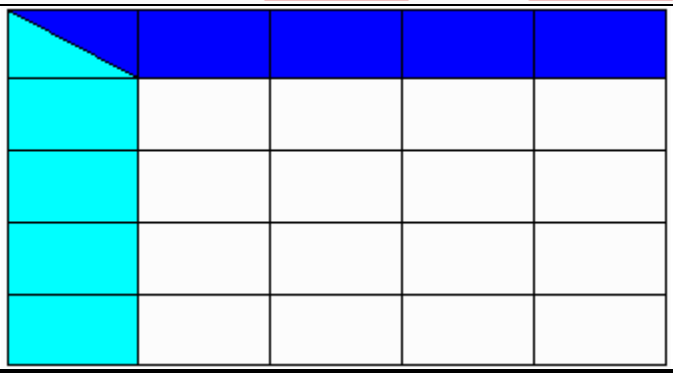
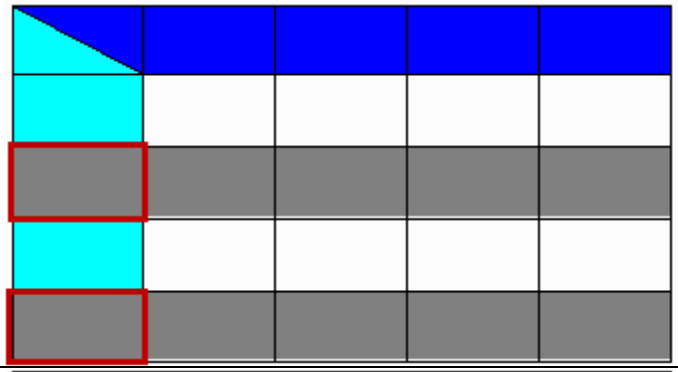
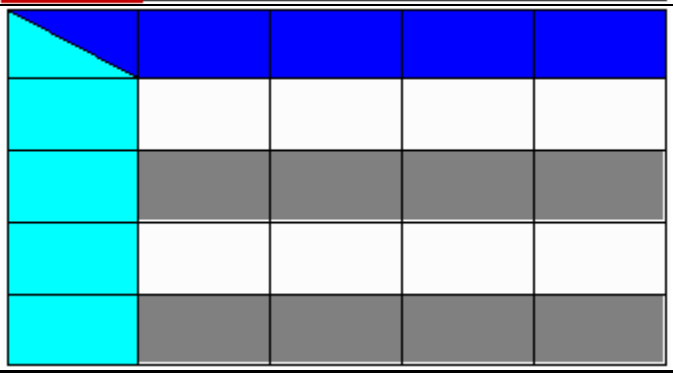
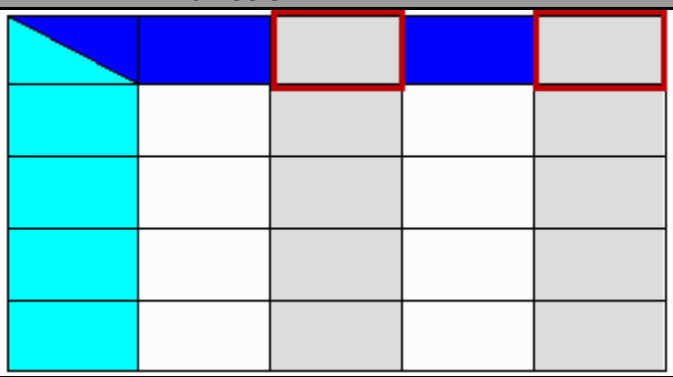
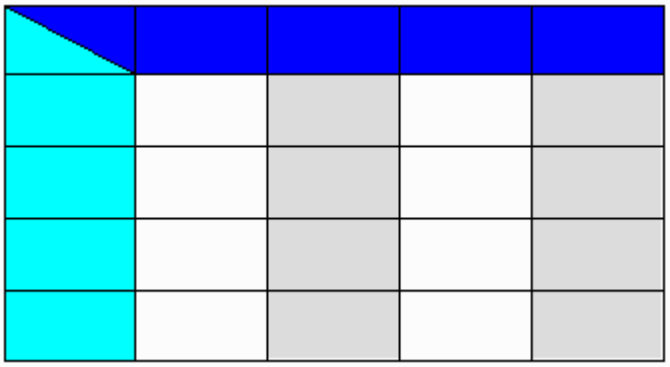
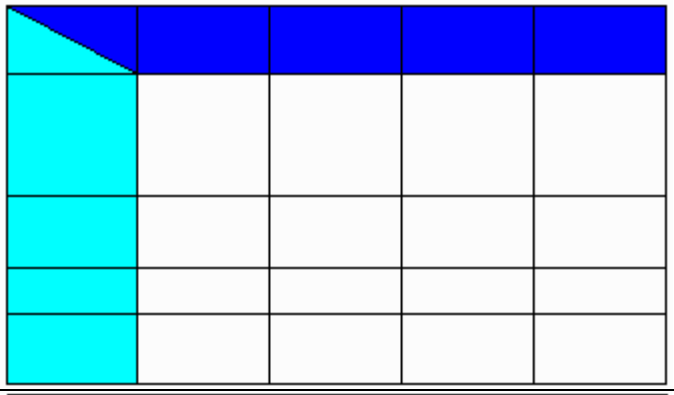
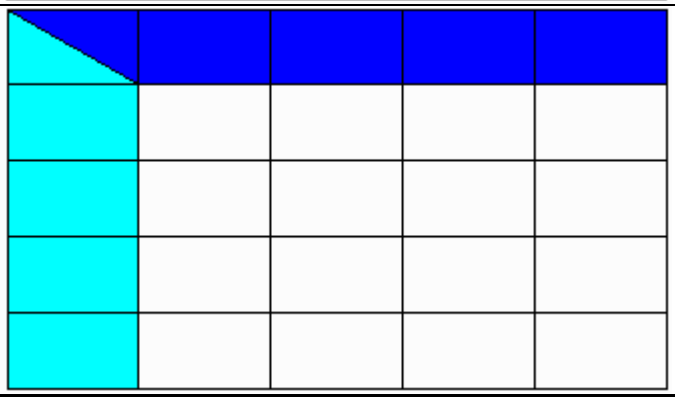


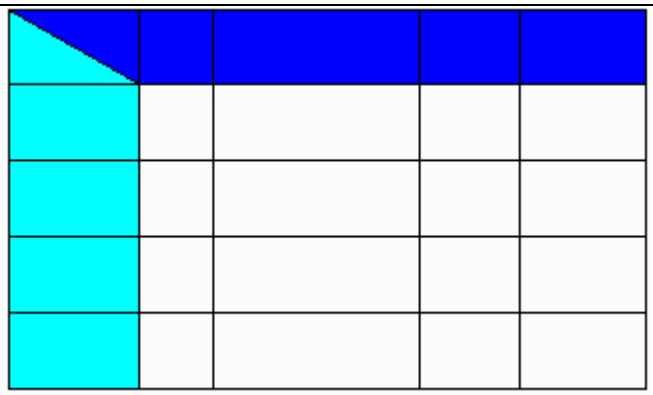
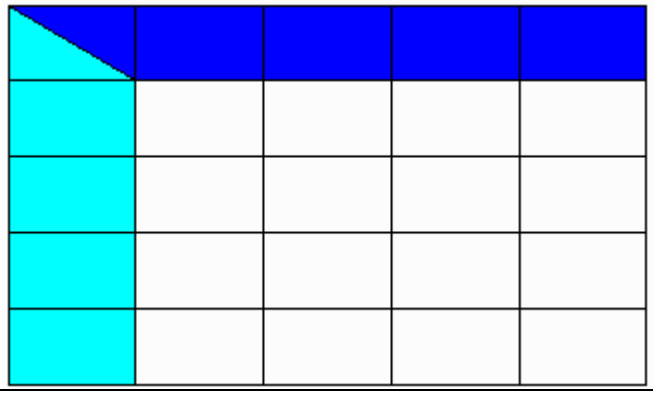
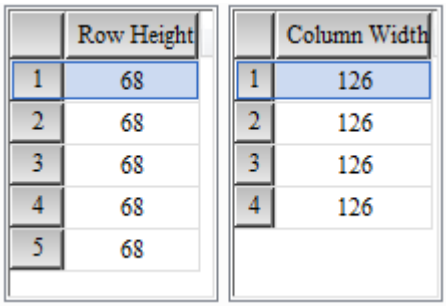
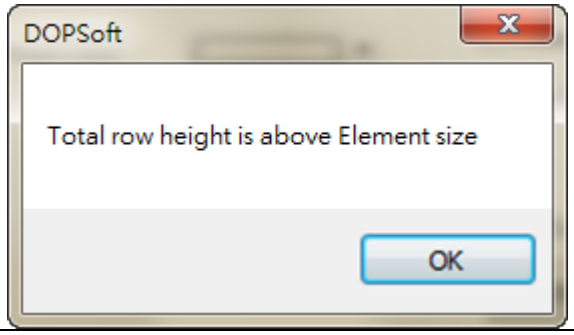
Figure 22-7-2 Table Element Main Properties Page

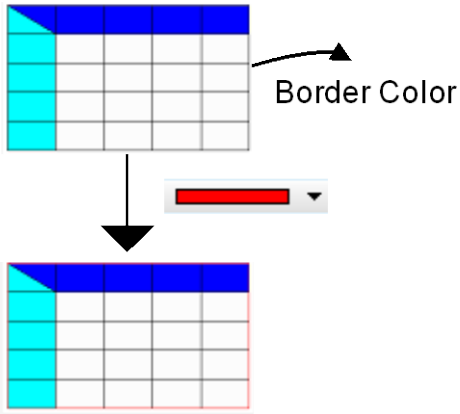
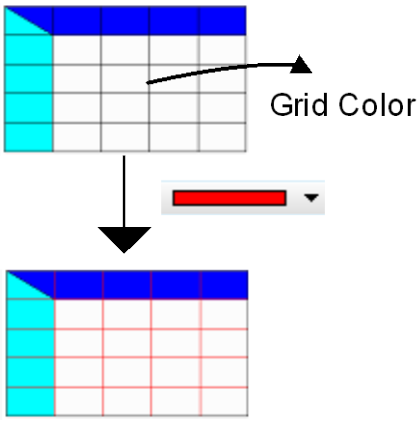
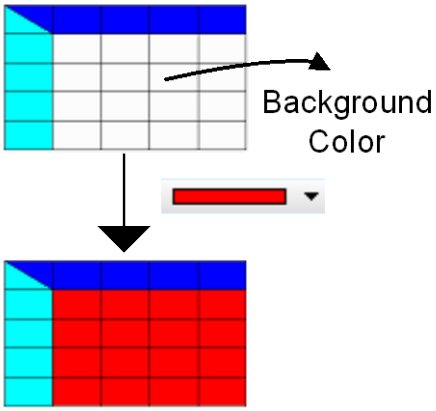
No.	Property	Function
(1)	Row Header	➢ The user can determine whether to display the header on the first row and what color of the row is to be displayed. **Checked**  **Unchecked** 

No.	Property	Function
	Column Header	➢ The user can determine whether to display the header on the first line and what color of the line is to be displayed. **Checked**  **Unchecked** 
(2)	Row Interlacing	➢ The user can determine whether to use the row interlacing Tablet and set the interlacing display color. **Checked**  **Unchecked** 
	Column Interlacing	➢ The user can determine whether to use the line interlacing Tablet and set the interlacing display color.

No.	Property	Function
		Checked 
		Unchecked 
	Row Header Interlacing	➢ The Row Interlacing option must be checked to enable the Row Header Interlacing.
		Checked 
		Unchecked 
	Line Header Interlacing	➢ The Line Interlacing option must be checked to enable the Line Header Interlacing.

No.	Property	Function
		Checked 
		Unchecked 
(3)	Sep. Rows Evenly	➢ The function is used to adjust the height and make it even between rows.
		Before Adjustment 
		After Adjustment 

No.	Property	Function
	Sep. Column Evenly	➢ The function is used to adjust the height and make it even between columns. **Before Adjustment**  **After Adjustment**  ➢ Users can define the row height. And the sum cannot exceed the element size.  ➢ If the row height exceeds the element size, a warning message will pop up which shown as below. 
(4)	Border Color	➢ The user can set the border color for the element.

No.	Property	Function
		
(5)	Grid Color	➢ The user can set the Grid Color for the element. 
(6)	Numbers of Rows Numbers of Columns	➢ The number of rows and columns can be increased up to 99.
(7)	Background Color	➢ The user can set the background color for the element. 

◆ Coordinates

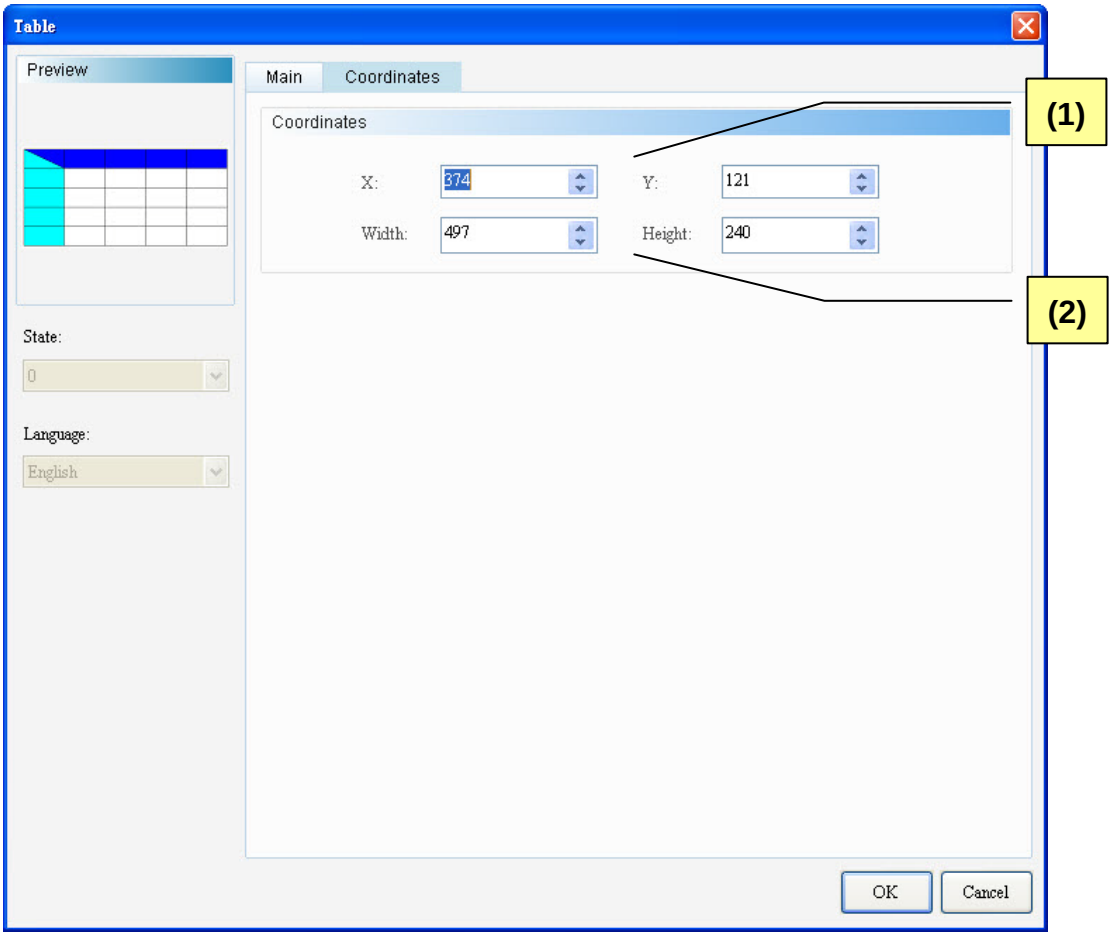


Figure 22-7-3 Table Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

Contents

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23-5 Enhance Indirect Recipe Index Register (*ENRCP).....90

Chapter 23 Recipe

This chapter describes the Recipe function that the DOPSoft software provides, the memory address it occupies and the method to set the recipe. A recipe is comprised of a number of parameters. In industrial application, different products match their own parameters and the user can make the products correspond to different recipe parameters by changing the type of the products. The user can also set and maintain the recipe parameters. The established recipe form can be uploaded from HMI to PLC, or vice versa. The Recipe function enables the user to store a large number of numeric parameters in the HMI memory area. For example, the baking time varies for different types of bread, and these time variables can be controlled by the HMI Recipe function to reduce the load of the controller. The register of the controller, thus, can be conserved for more flexible applications.

◆ Classification of recipe setup elements:

Recipe Setup	Recipe
	32 bits Recipe
	Enhance Recipe

Table 23-1-1 Classification of Recipe Setup Elements

◆ Common Properties of recipe setup elements:

Recipe Setup	Address	Length	Group	Retained Area	Data Format	Integer Place	Fractional Place	Read Length
Recipe	◎	◎	◎	◎				
32 bits recipe	◎	◎	◎	◎	◎	◎	◎	
Enhance Recipe	◎	◎	◎	◎	◎	◎	◎	◎

Table 23-1-2 Common Properties of Recipe Setup Elements

23-1 16 bits Recipe

The [Enable Recipe] must be checked to create 16 bits recipe data. The dedicated registers for the 16 bits recipe are RCP and RCPNO.

RCP	Recipe Register
RCPNO	Recipe number register

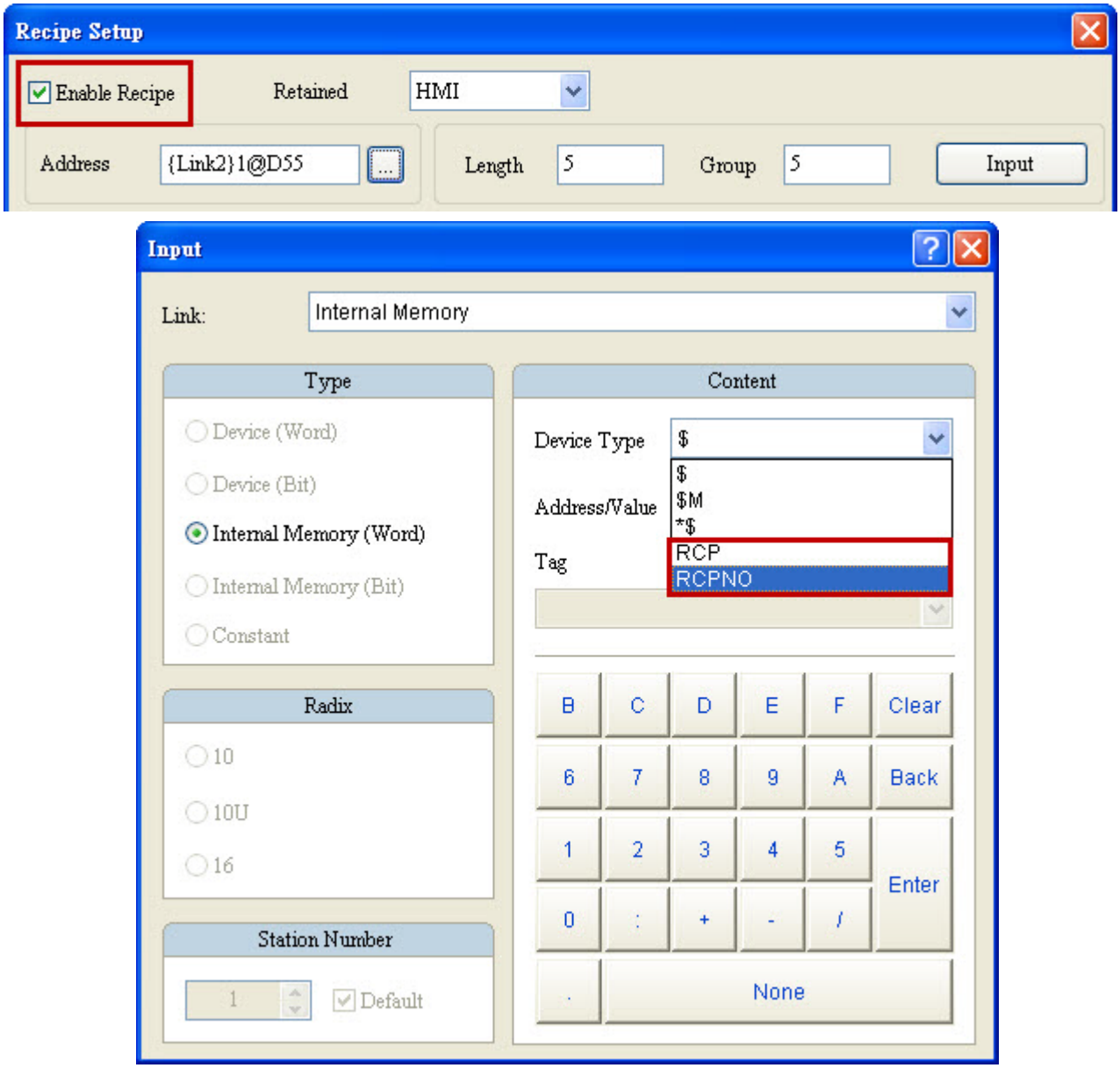


Figure 23-1-1 16 bits Recipe Register

For the 16 bits Recipe, the size of each recipe register is 16 bits (16 bits = 1 word). Assuming that the Length is L and the Group is G, the actual recipe counts are L*G = words.

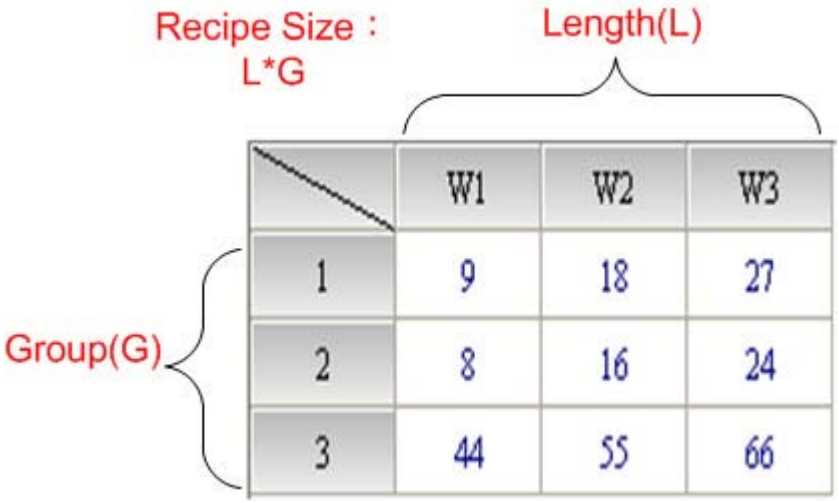


Figure 23-1-2 16 bits Recipe Register Size

■ Recipe Number Register (RCPNO)

RCPNO is used to specify the group for the 16 bits Recipe. Read/write of the recipe means to read/write a group of recipes according to the group assignment in the recipe number register. When the first group of recipes is selected, RCPNO = 1; when the fourth group of recipes is selected, RCPNO = 4.

NOTE:

✓ The recipe number register does not provide the non-volatile function, and the data in the register cannot be maintained when HMI is powered off.

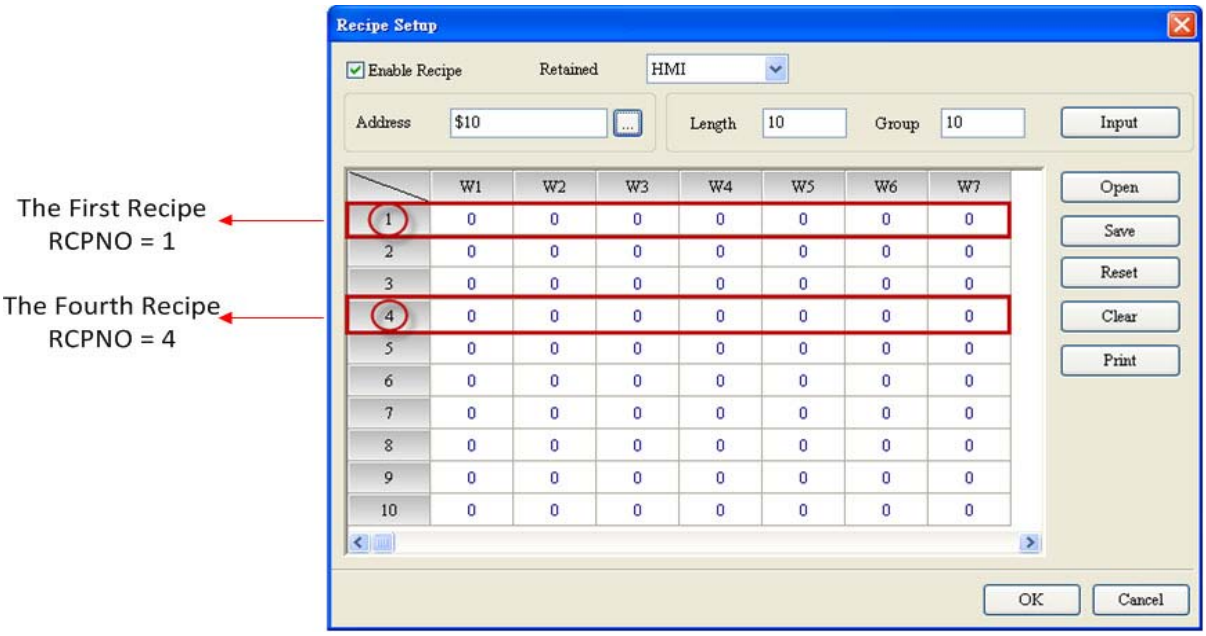


Figure 23-1-3 Recipe Number Editing Screen

■ Recipe Register (RCP)

A recipe buffer is provided in HMI and configured in the utmost front of the register. This buffer is used to store the recipe of the group that the user selected. The length of the buffer is equal to the length of the selected recipe, indicating that the recipe buffer occupies a number of registers equal to L. The number of the registers that a recipe form occupies is L * (G+1), where G+1 stands for the additional register for the buffer. With the recipe buffer, the user only needs to switch between the groups to check the currently specified recipe parameter. When the selected recipe group (RCPNO) is 1, the recipe value of Group 1 will be displayed in the recipe buffer (i.e. RCPNO = 1 in the figure below).

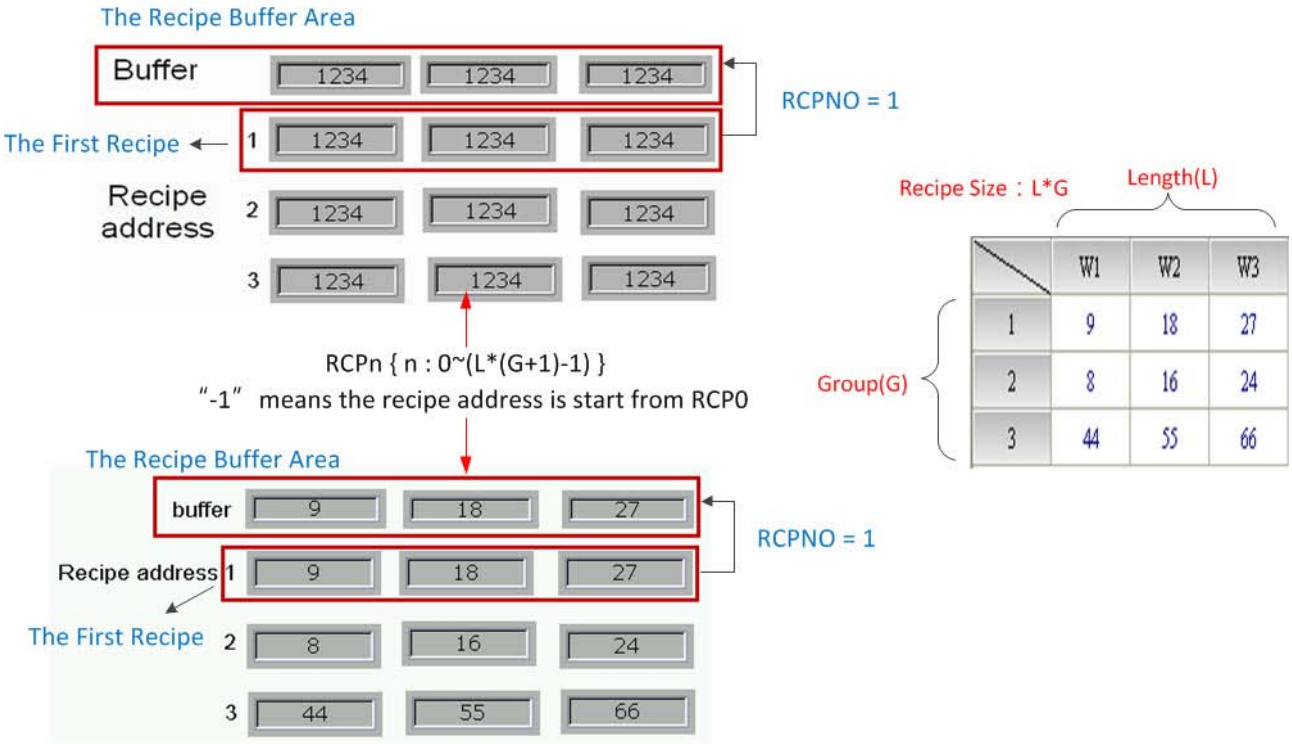


Figure 23-1-4 16 bits Recipe Buffer Configuration

Address accessing range of recipe register:

Accessing Type	Device Type	Accessing Range
Word	RCPn	RCP0~RCP65535
Bit	RCPn	RCP0.0~RCP65535.15
Note: n = Word (0-65535)		

Table 23-1-3 Recipe Register

The address accessing range provided by RCP is limited according to the recipe size that users created. Assume the recipe size is length 3*group 3, then RCP address is range from RCP0 to RCP11. When creating address of RCP12, a warning message will pop up. Please see the figure below.

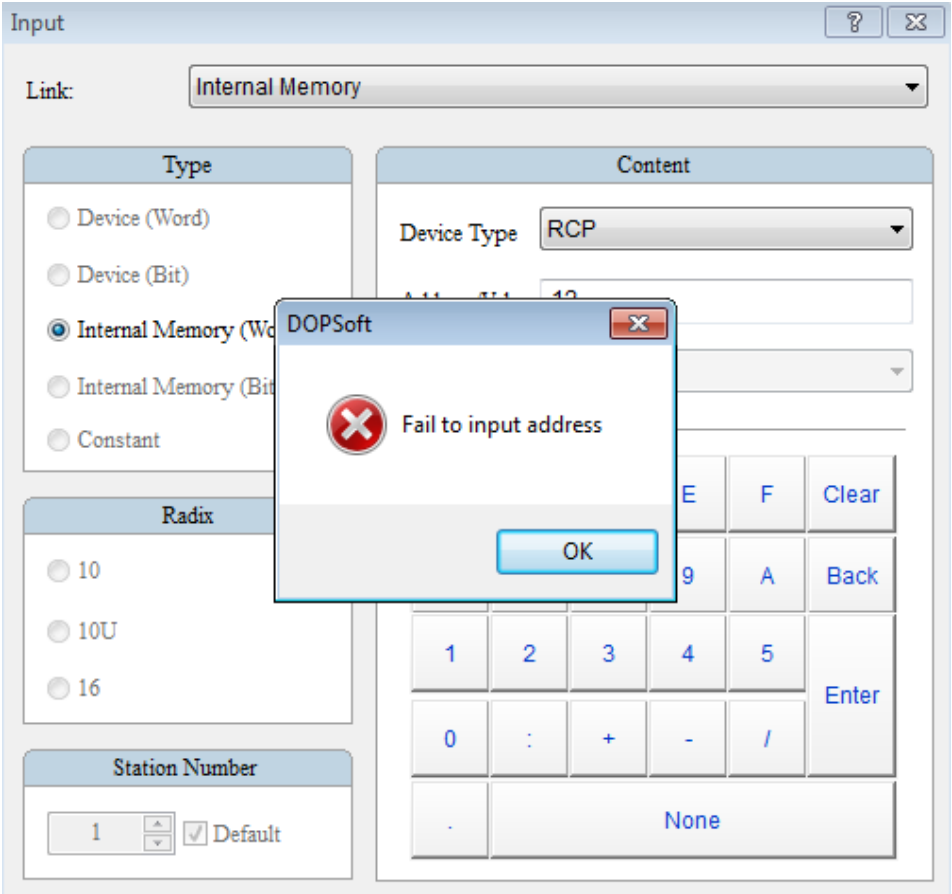


Figure 23-1-5 Recipe Register Configuration

■ 16 bits Recipe Size Limit

If the retained area is set to USB Disk or SD Card, the editable size of a 16 bits Recipe is (L*G) = 4194304. The user can enter [View] → [Memory List] to check the 16 bits Recipe size and capacity.

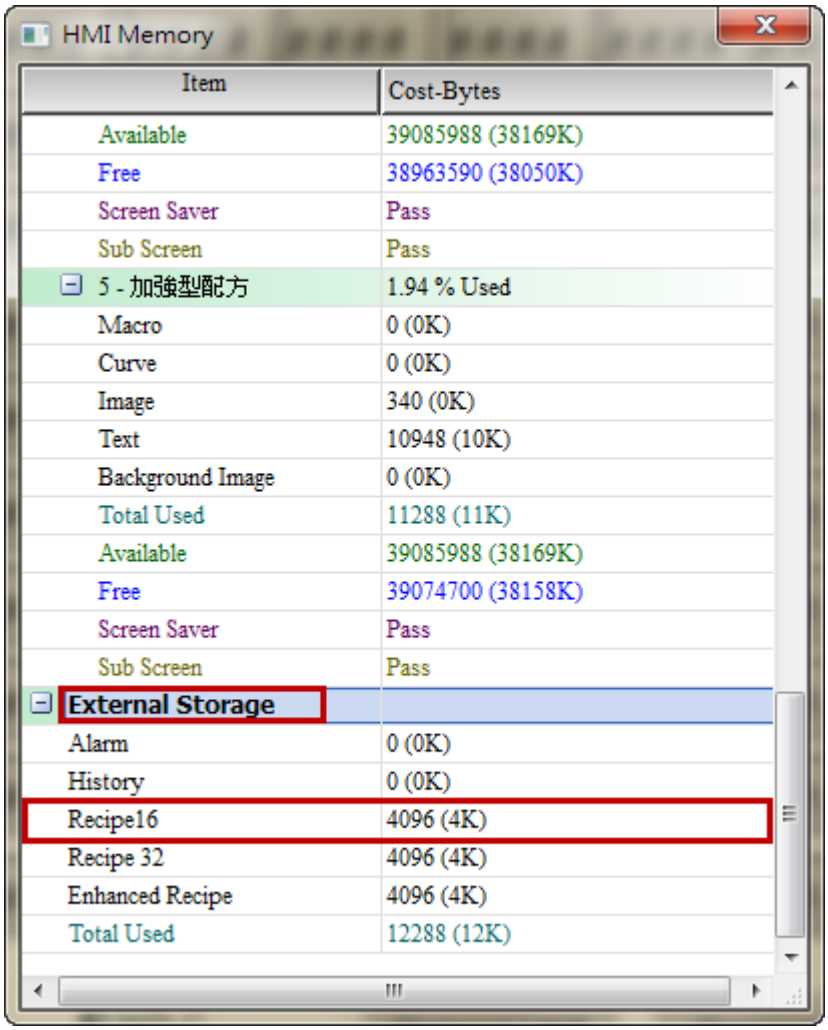


Figure 23-1-6 16 bits Recipe External Storage

If the retained area is set to HMI, the editable size of a 16 bits Recipe is (L*G) = 65536 words, or 64K. Hence, when the currently edited 16 bits Recipes are larger than 64K, a warning message will appear on the Recipe Setup window to remind the user that the recipe size has exceeded the allowable limit.

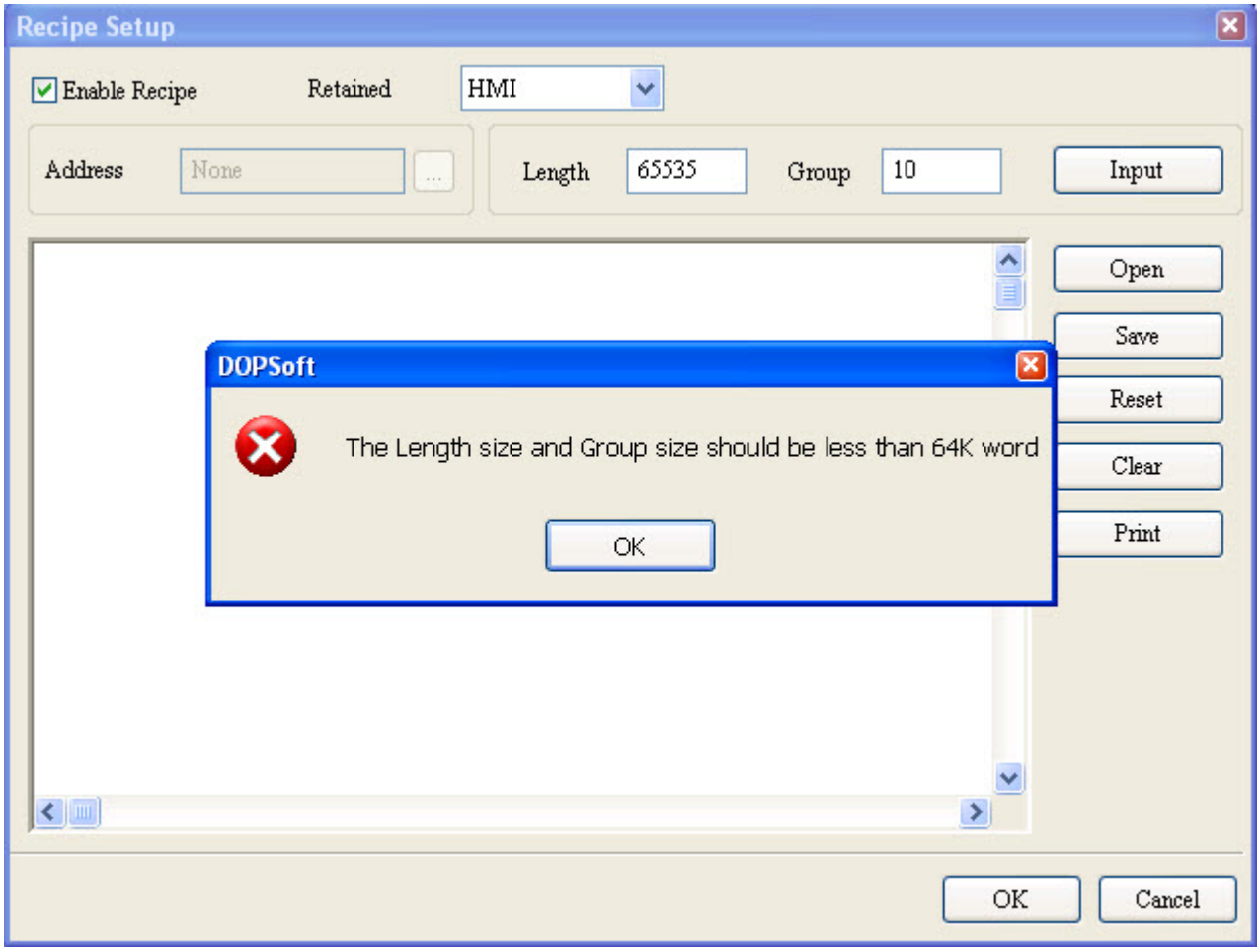


Figure 23-1-7 16 bits Recipe Internal Storage

Enter [Options] → [Recipe] to create 16 bits Recipe data. By setting the recipe, the user can write a large number of batch data to PLC using the recipe control flag in the control area, or read the data from PLC to HMI. The recipe can be used for control applications in the industry. It is very helpful in processing a large number of data.

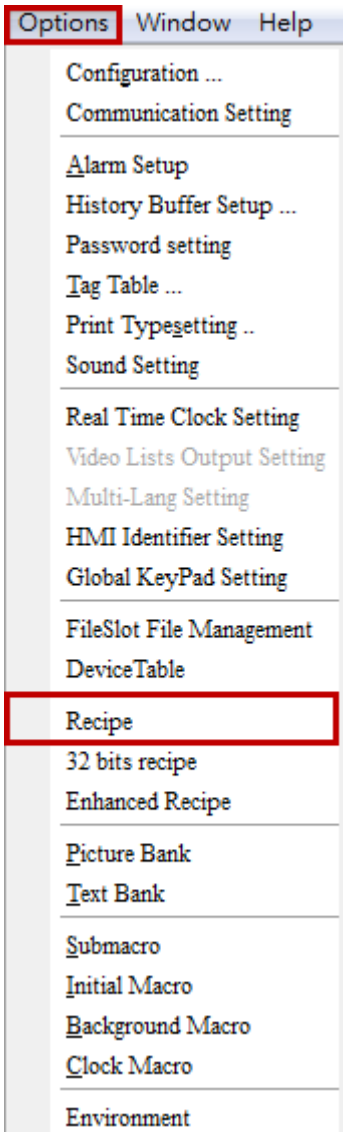
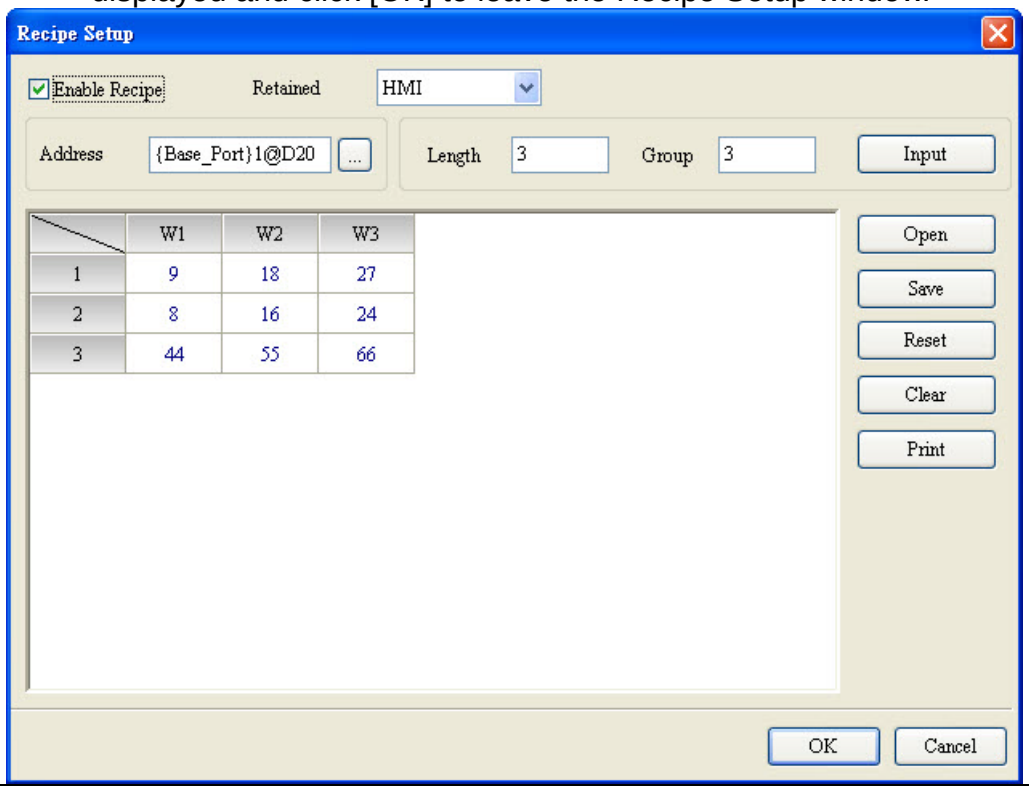


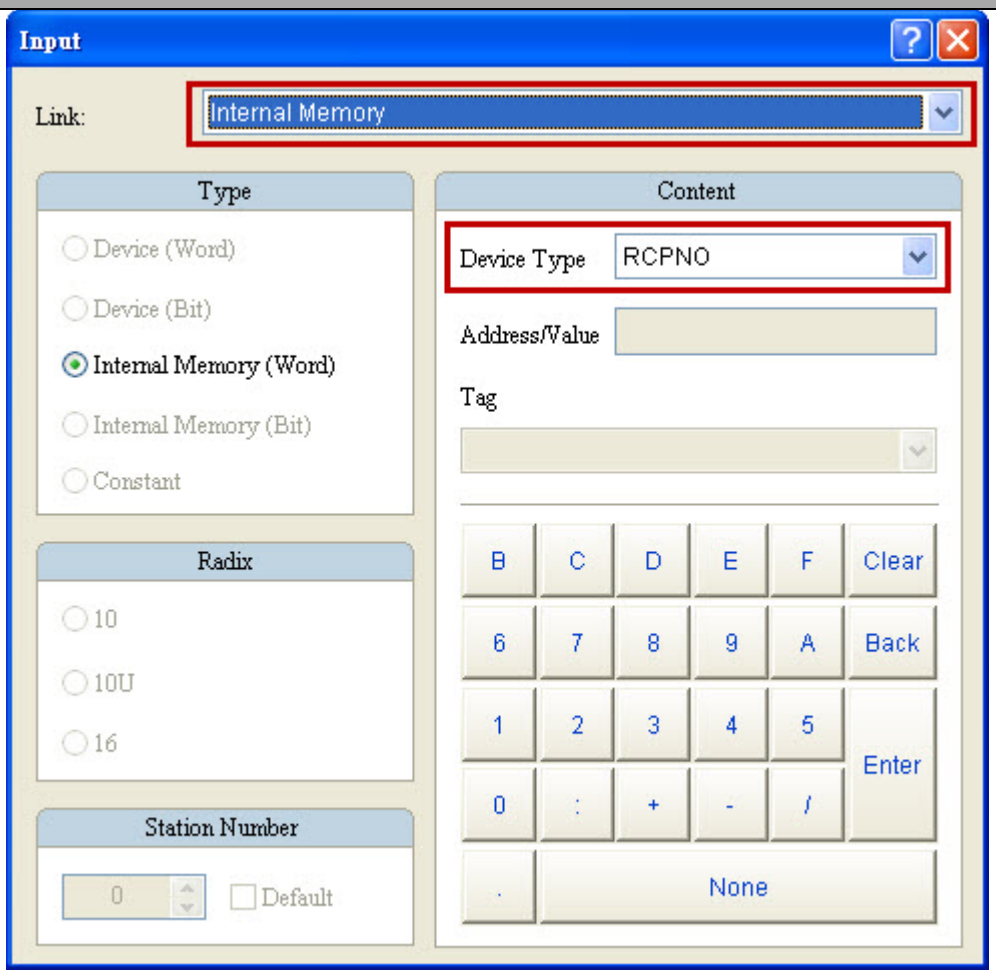
Figure 23-1-8 16 bits Recipe

Refer to the 16 bits Recipe example in Table 23-1-4

16 bits Recipe Example Table 23-1-4 16 bits Recipe Example	
Set 16 bits Recipe	➢ Step 1: Enter [Options] → [Recipe]. ● Set the Address to D20. ● Set the Retained Area to HMI. ● Set both Length and Group of the recipe to 3. ● Click [Configure] and a form is generated with the Length and Group values set up previously. Complete the form with the values to be displayed and click [OK] to leave the Recipe Setup window. 
Create Numeric Element	➢ Create a numeric element. Set the Write Address to Internal Memory and select RCPNO as the element type. This element is used for selection of the recipe group.

16 bits Recipe Example

Table 23-1-4 16 bits Recipe Example



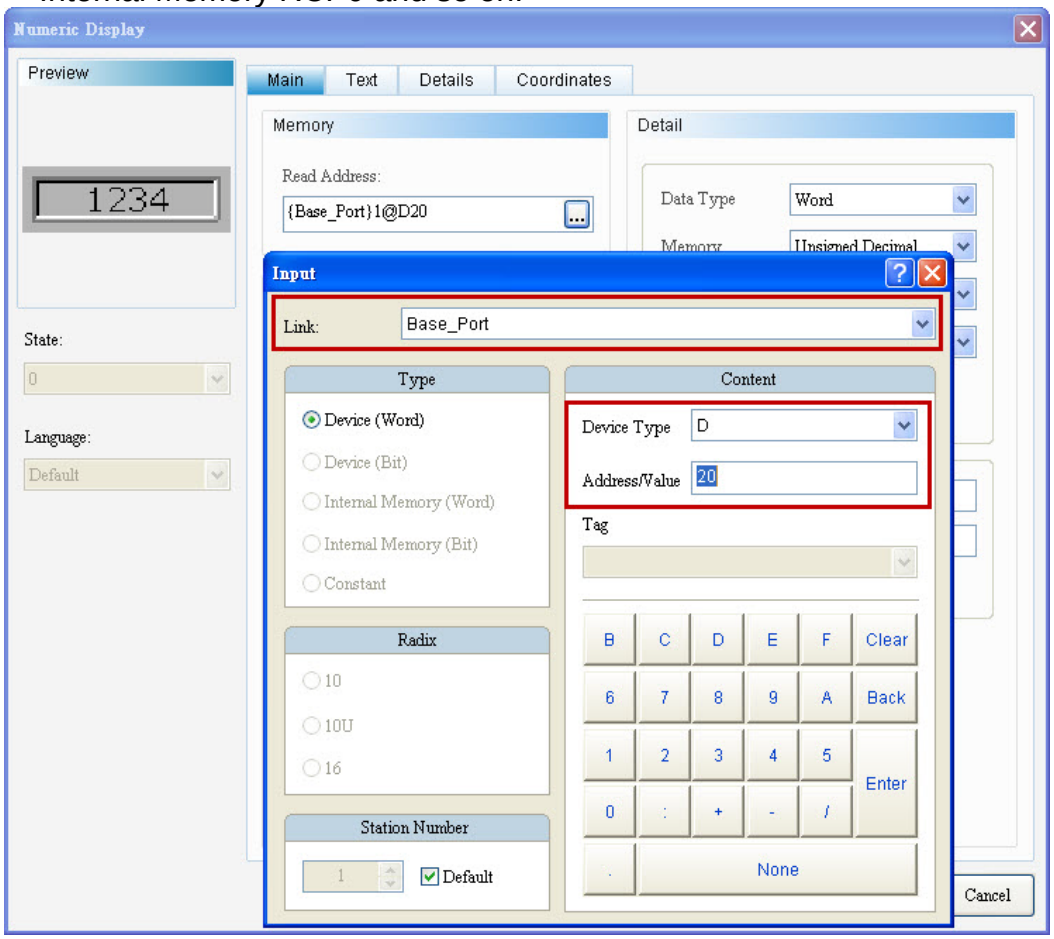
➢ The following is displayed when the creation is completed.

16 bits Recipe Example

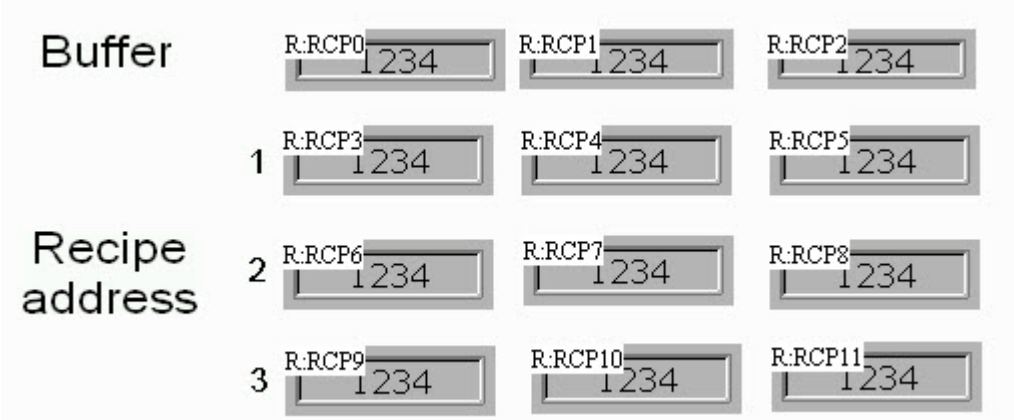
Table 23-1-4 16 bits Recipe Example

Create Numeric Display Element

- Step 1: Use the configured recipe size (L*G = 3 x 3) and put it in the formula L * (G+1) to gain the actually configured RCPs = RCP0~RCP11.
- Step 2: Create 12 numeric display elements and set the Read Address to Internal Memory RCP0 and so on.



- The following is displayed when the creation is completed.

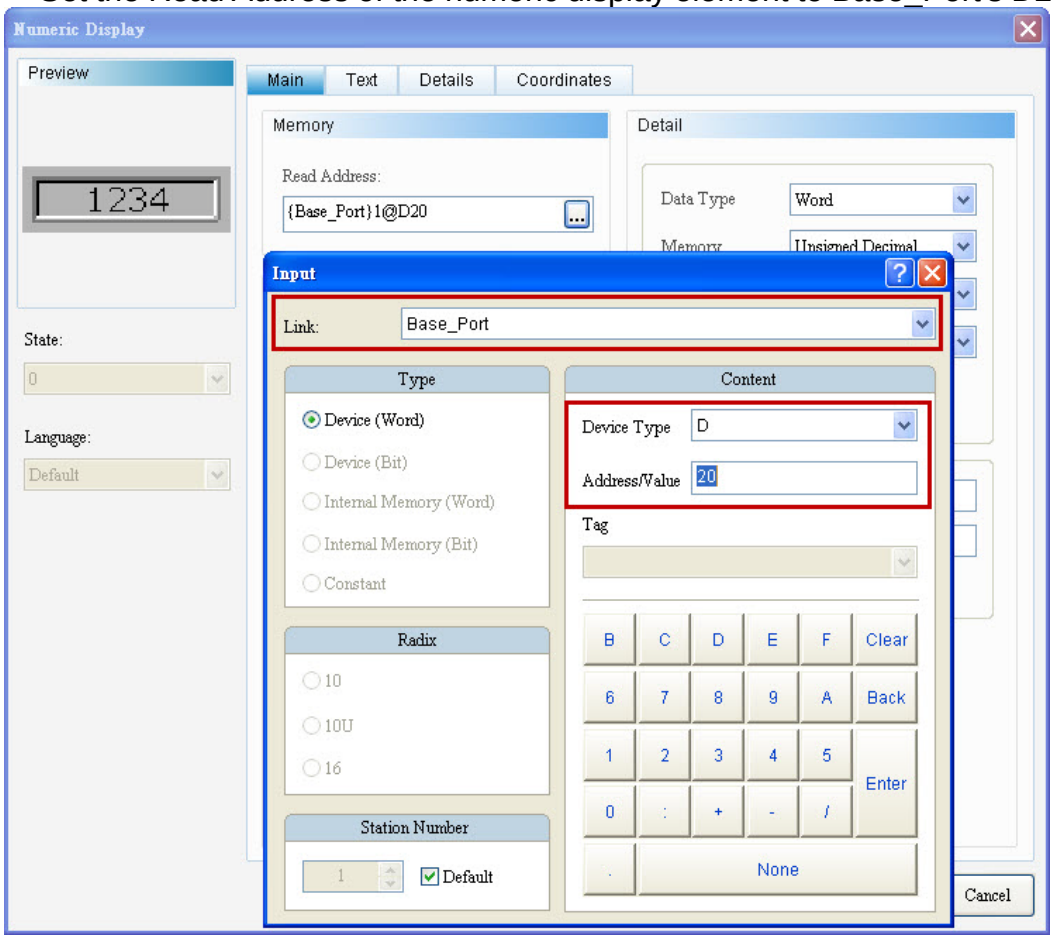


NOTE:

- ✓ The RCP0~RCP2 created are the recipe buffers and the actual recipe data RCPs are RCP3~RCP11. For more information, refer to Figure 23-1-4 16 bits Recipe Buffer Configuration.

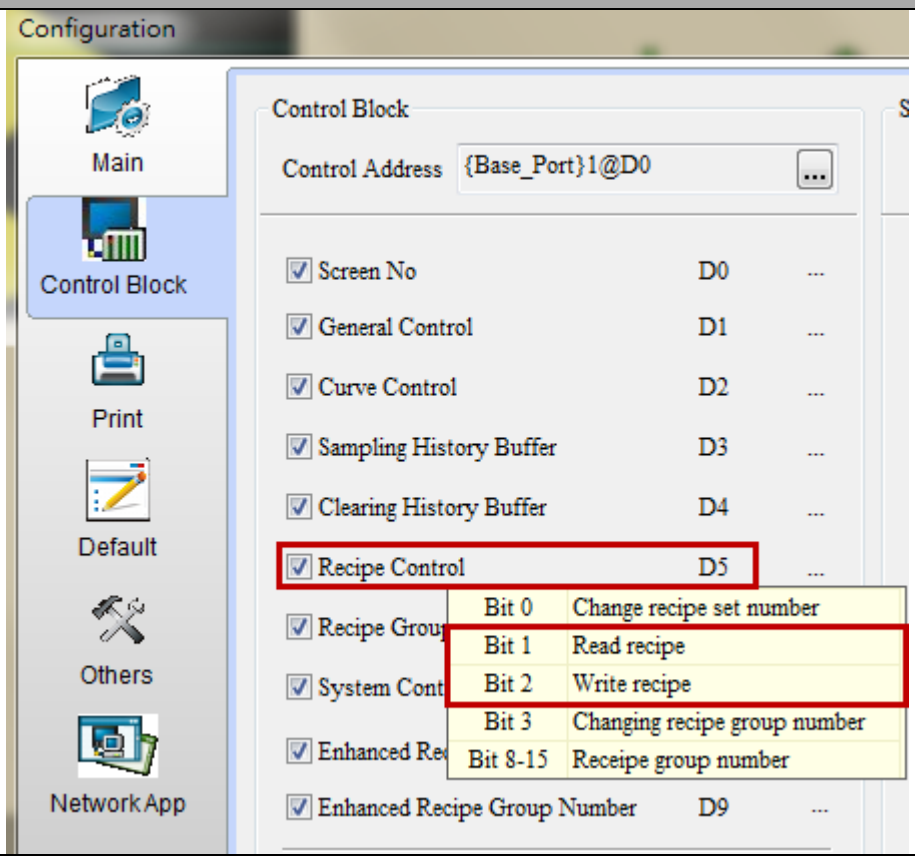
16 bits Recipe Example

Table 23-1-4 16 bits Recipe Example

Create Numeric Display Element	➢ Create 3 numeric display elements D20, D21 and D23 to show the change of the data when the user reads or writes PLC recipes. ➢ Set the Read Address of the numeric display element to Base_Port's D20.  ➢ The following displays when the creation is completed.
Set Recipe Control Flag in Control Block	➢ Enter [Options] → [Configuration] → [Control Block] and check the [Recipe Control] flag. Set the Control Address in the Control Block to define that Recipe Control address. After the setting is completed, click [OK] to leave the Configuration Window.

16 bits Recipe Example

Table 23-1-4 16 bits Recipe Example

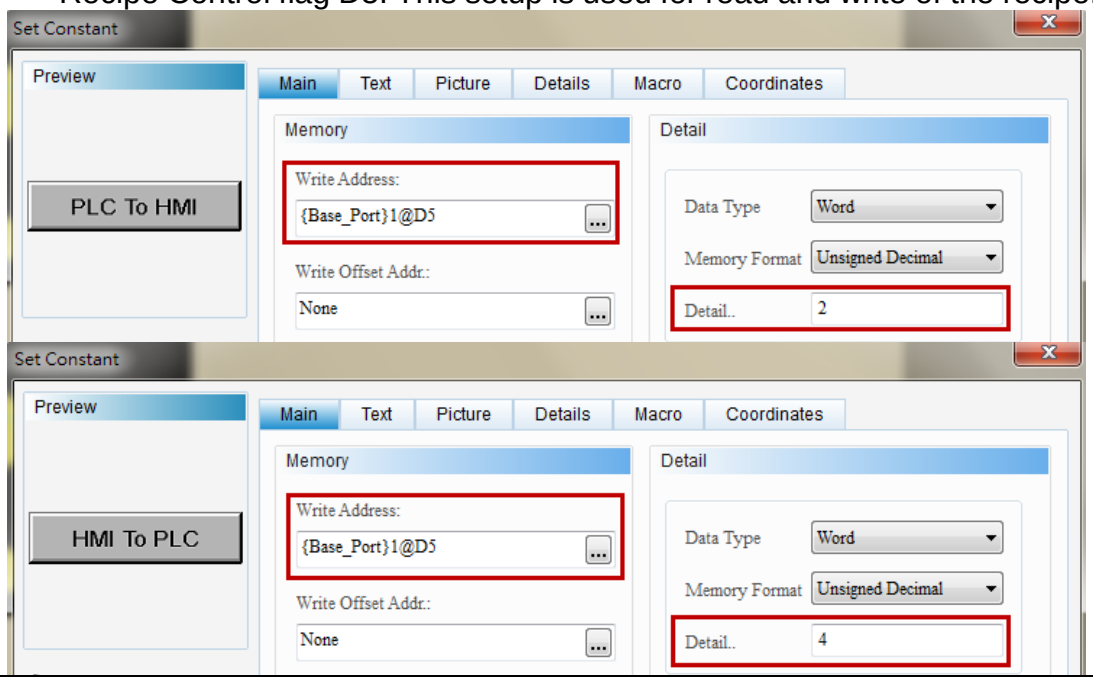


16 bits Recipe Example

Table 23-1-4 16 bits Recipe Example

Create Permanent Numeric Button Element

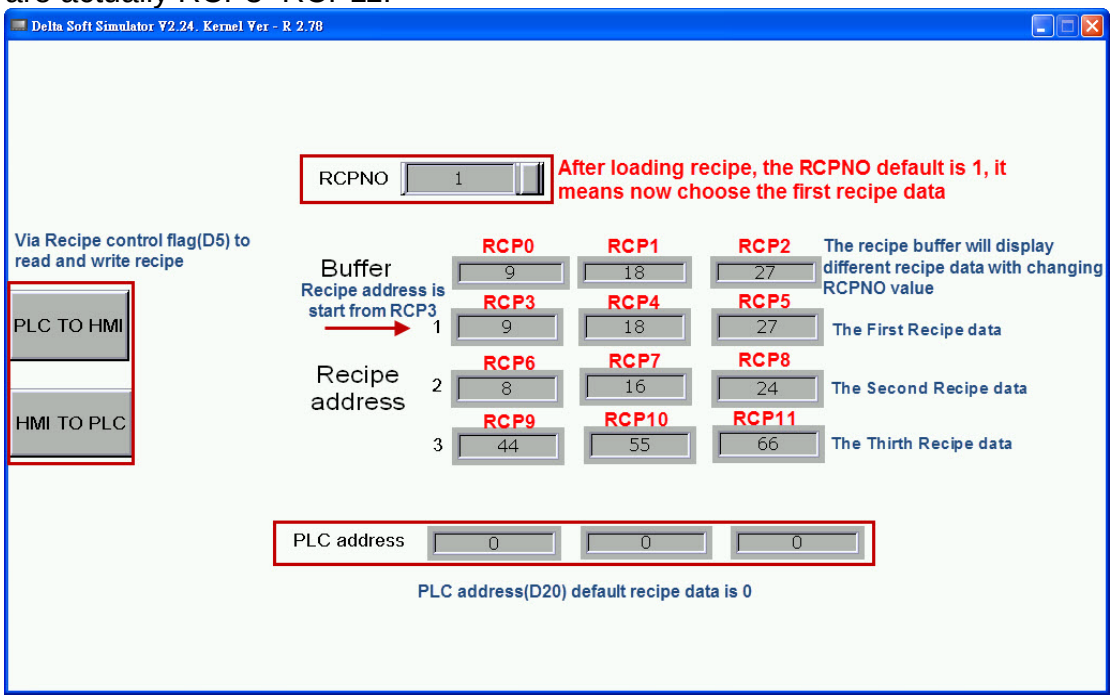
➢ Create 2 permanent numeric buttons. Set the Write Address to D5 and the Setting to 2 and 4, respectively, corresponding to Bit 1 and Bit 2 of the Recipe Control flag D5. This setup is used for read and write of the recipe.



Execution Results

➢ After creation of all elements, perform the compilation and download the screen data and recipe to HMI.

Select a recipe group. The recipe data will be displayed in the created RCP0~RCP11 with reference to the selected recipe group. The RCP0~RCP2 created are the recipe buffers and the RCPs for the first group of recipe data are actually RCP3~RCP11.



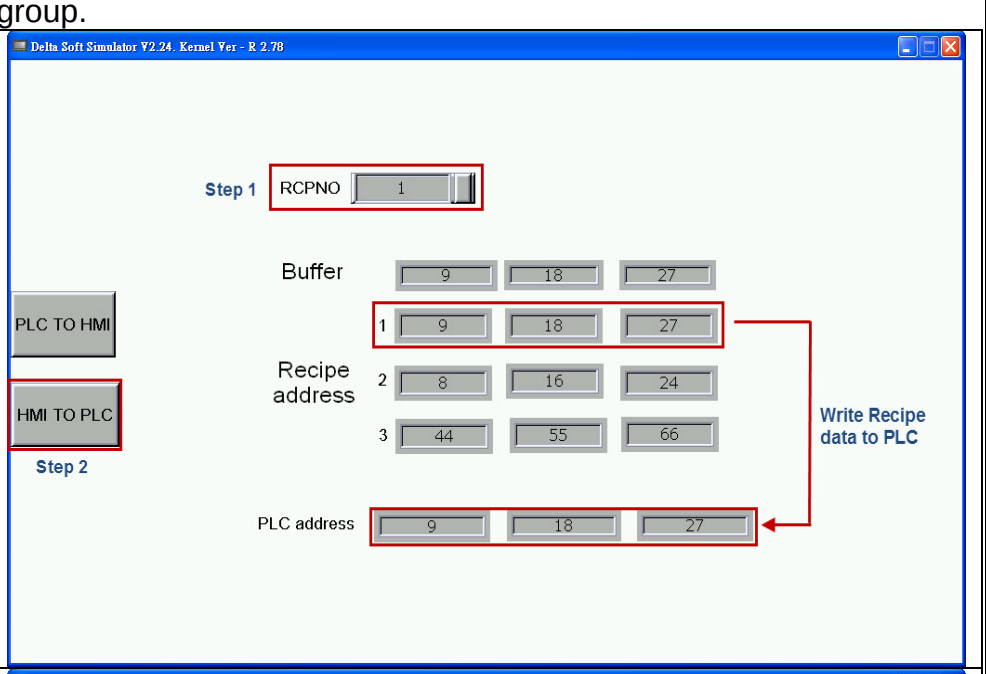
Activate the Recipe Write button and the recipe data of the selected group will

16 bits Recipe Example

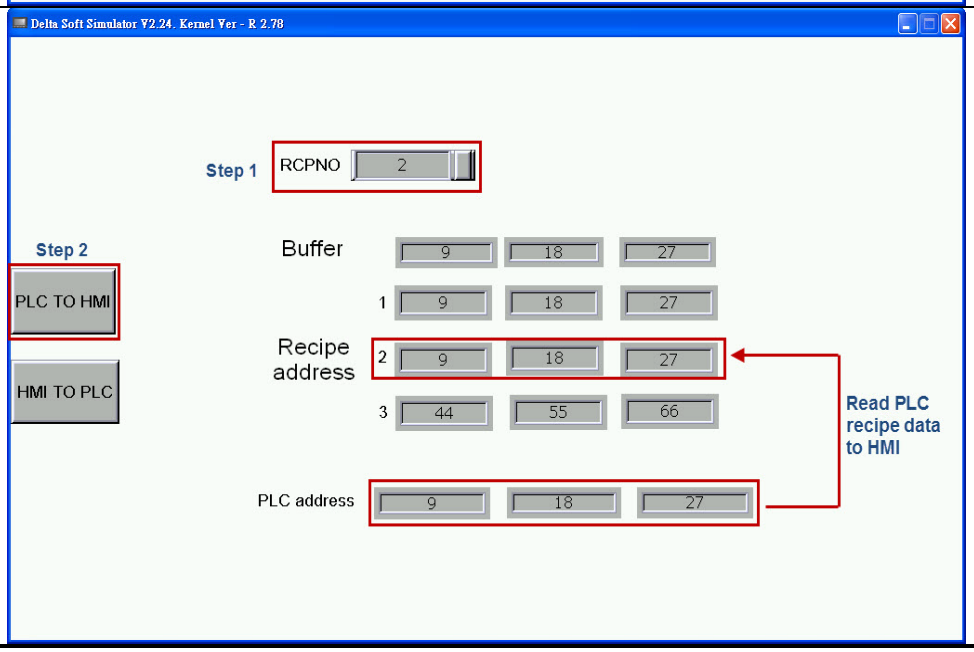
Table 23-1-4 16 bits Recipe Example

be written to PLC. Activate the Recipe Read button and the recipe data that were written to the PLC will be read back to HMI with reference to the selected recipe group. The recipe data will be changed to match the content of the selected group.

Recipe Read

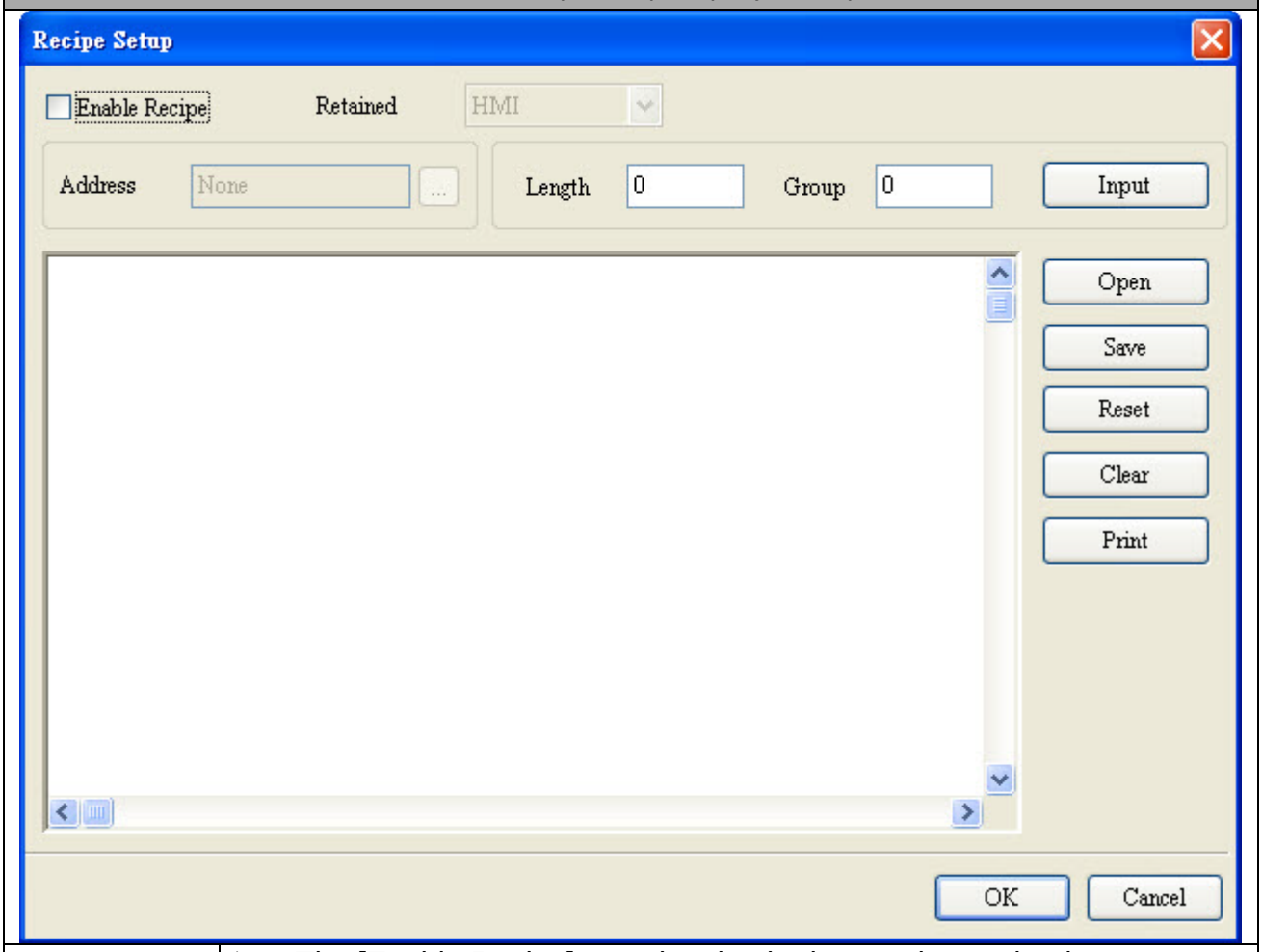


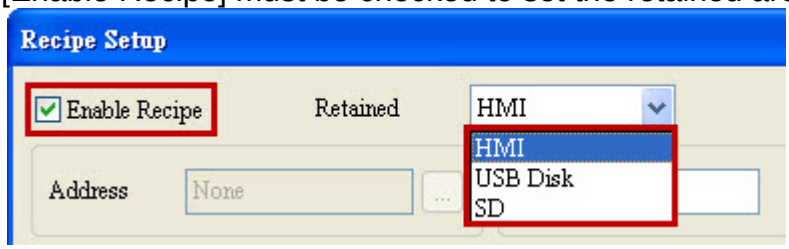
Recipe Write

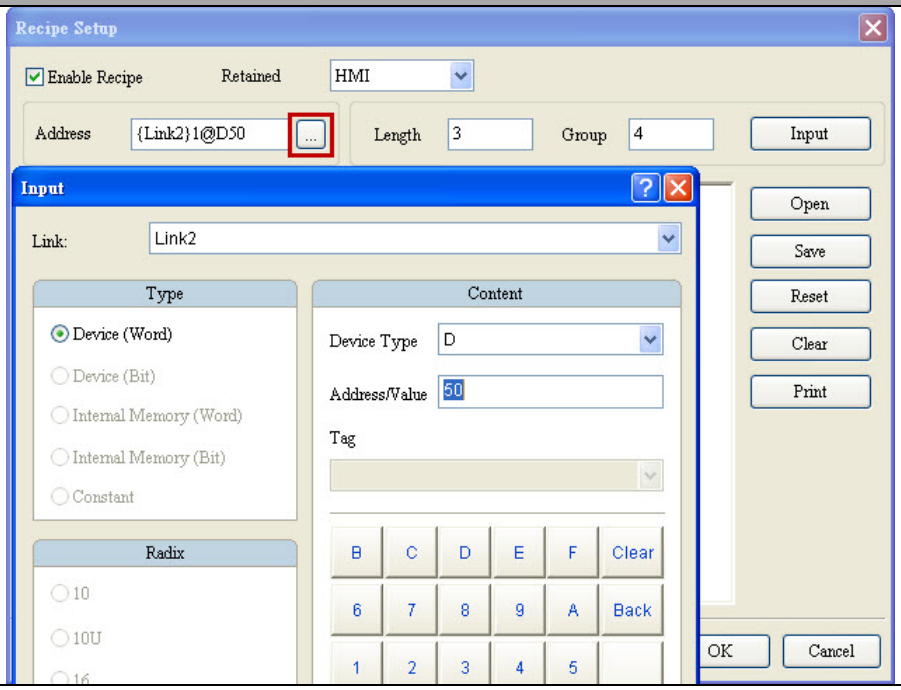
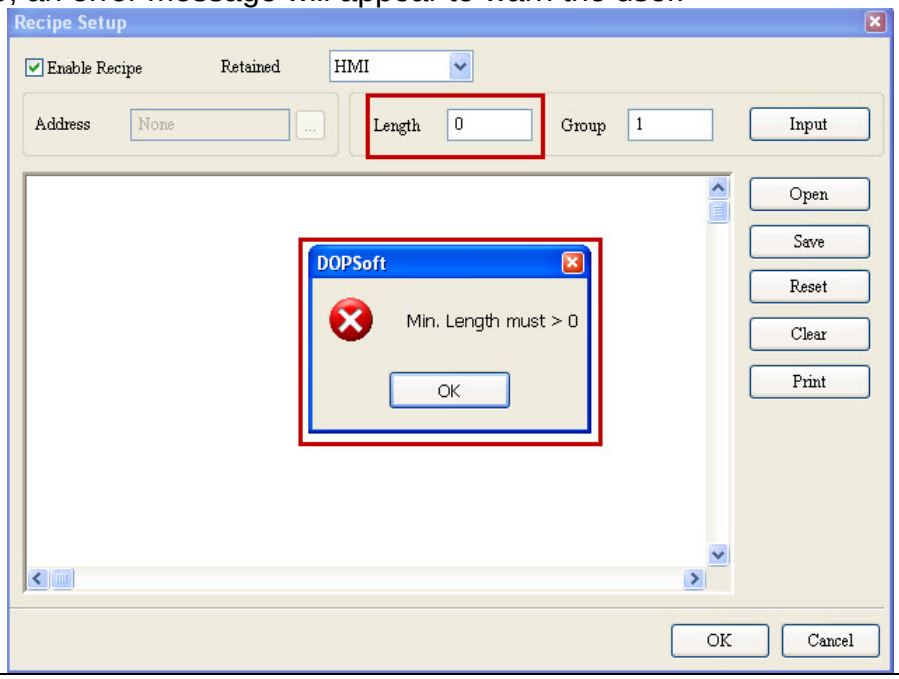


Recipe Setup Property Description

Table 23-1-5 Recipe Setup Property Description

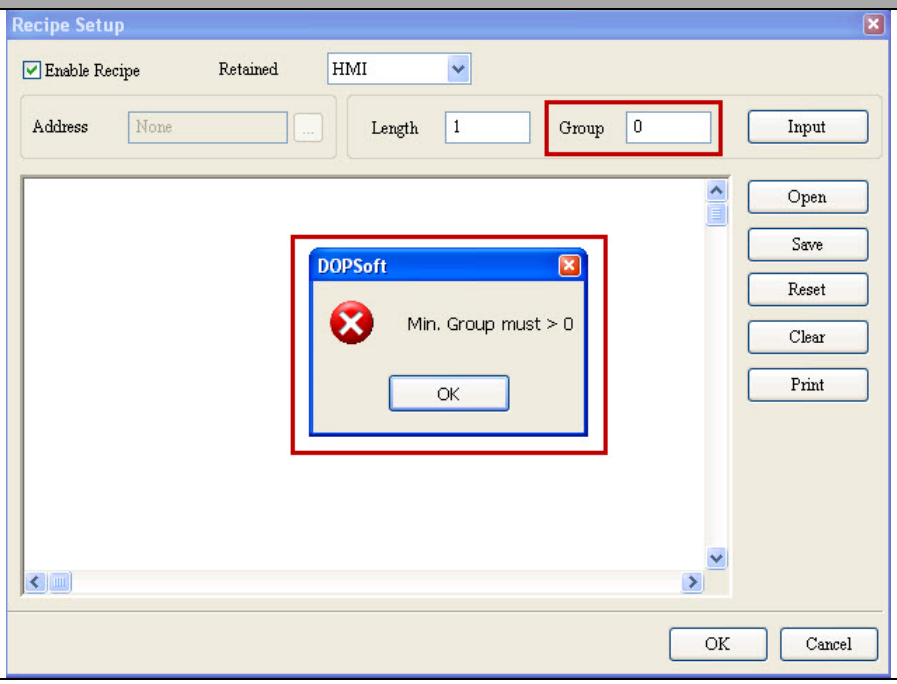


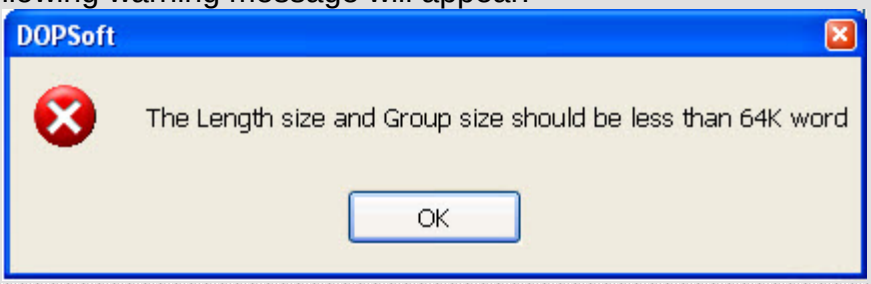
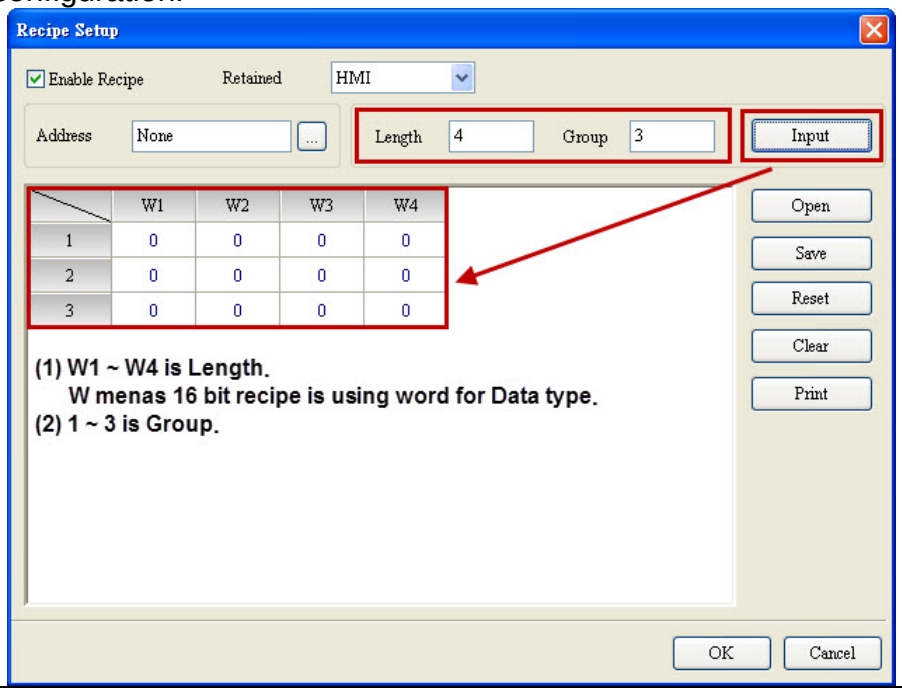
Retained Area	➢ The [Enable Recipe] must be checked to set the retained area.  ➢ The retained area can be HMI, USB Disk or SD Card. ➢ When HMI is selected as the retained area, the data will be recorded in HMI SRAM in case of power-off.
Address	➢ Selects the address of internal memory or controller register. ➢ Selects link name or element type. Please refer to 5-1 Button of Chapter 05 for details.

Recipe Setup Property Description Table 23-1-5 Recipe Setup Property Description	
	
Length/Group	➢ The Length and Group represent the length and group size that the user entered. With these values set up, the user can click [Configure] to create the form. ➢ The Length and Group cannot be set to 0. If any of the values is set to 0, an error message will appear to warn the user. 

Recipe Setup Property Description

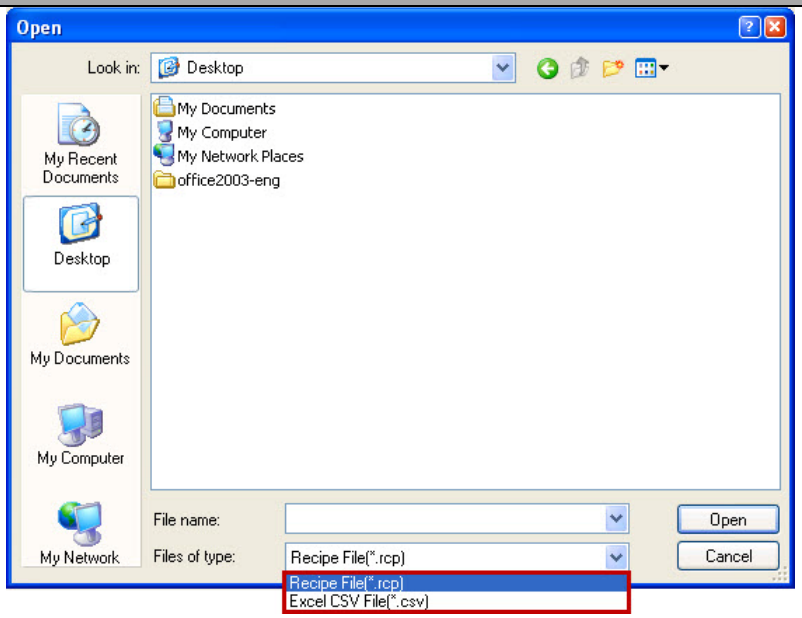
Table 23-1-5 Recipe Setup Property Description



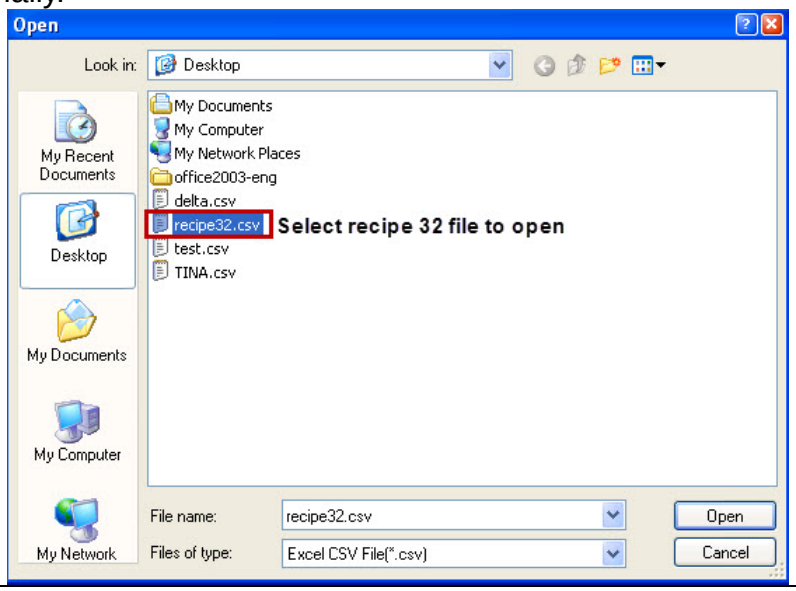
Recipe Setup Property Description Table 23-1-5 Recipe Setup Property Description	
Configure	➢ After the Length and Group are set, click the [Configure] button to generate a form in the blank area with L*G as its size. For example, with 4 and 3 as the settings for the Length and Group, respectively, the size of the form is 4 x 3. NOTE: ✓ Due to the limit of HMI memory, the size of the recipe should not be greater than **64K** (L*G not greater than 65536). Otherwise, the following warning message will appear:  ➢ The user can complete the form with recipe data after the configuration. 
Open	➢ The [Open] function provides CSV and RCP file formats for the user to import the recipe.

Recipe Setup Property Description

Table 23-1-5 Recipe Setup Property Description



- The opened and imported recipe file only provides the content of the recipe data. The address of the recipe does not support loading the address that was set up previously. If a 32-bit RCP or CSV recipe file is opened as a 16 bits Recipe, the data loaded will not be displayed normally.



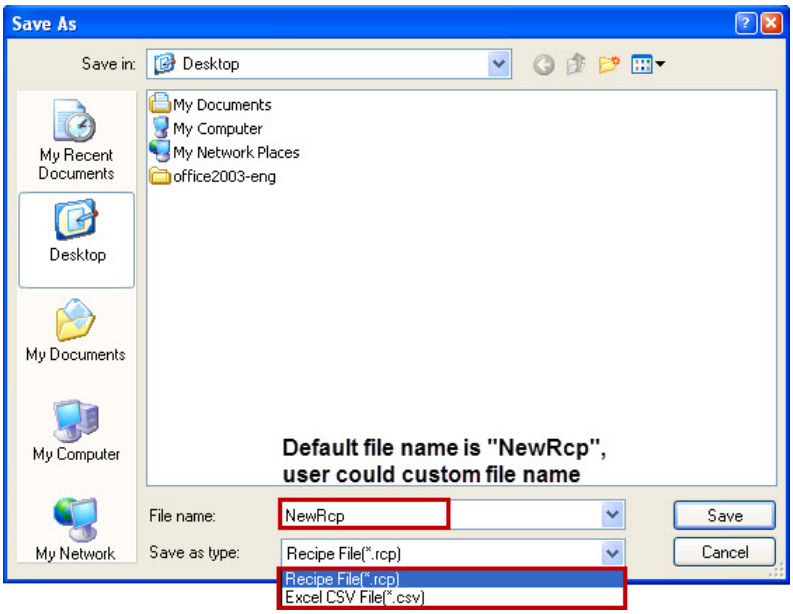
Recipe Setup Property Description Table 23-1-5 Recipe Setup Property Description		

Recipe Setup Property Description

Table 23-1-5 Recipe Setup Property Description

Save

- The [Save] function enables the user to save the current 16 bits Recipe. Like the Open function, the Save function supports CSV and RCP file formats.

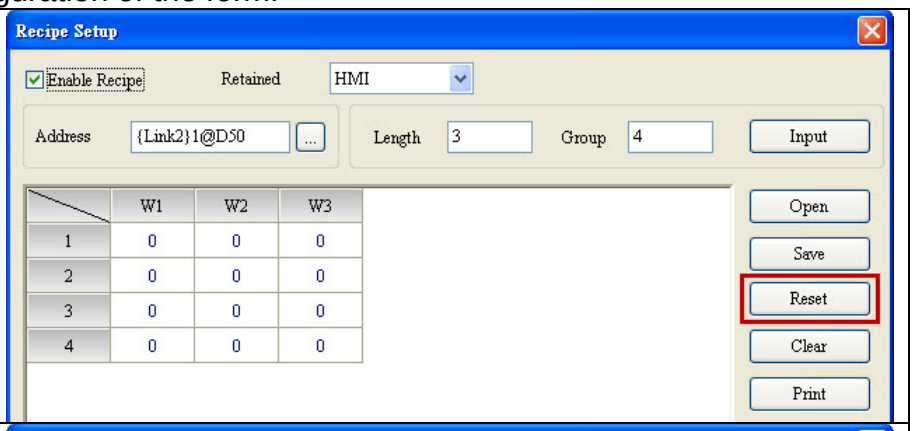


- The recipe data that the user saved does not support the recipe address set up by the Save function.

Reset

- The [Reset] function is used to empty the configured form. The user needs to enter the length and group values after the reset for the next configuration of the form.

Before Reset



After Reset

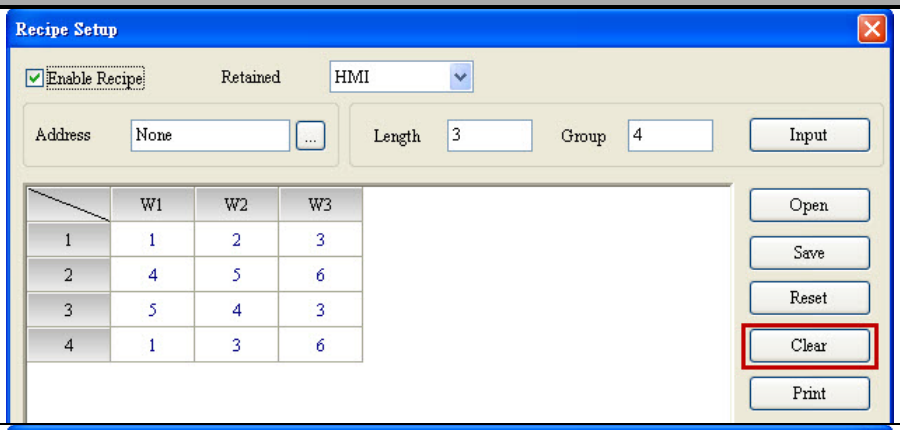
Clear

- The [Clear] function is used to clear the recipe data in the form to 0.

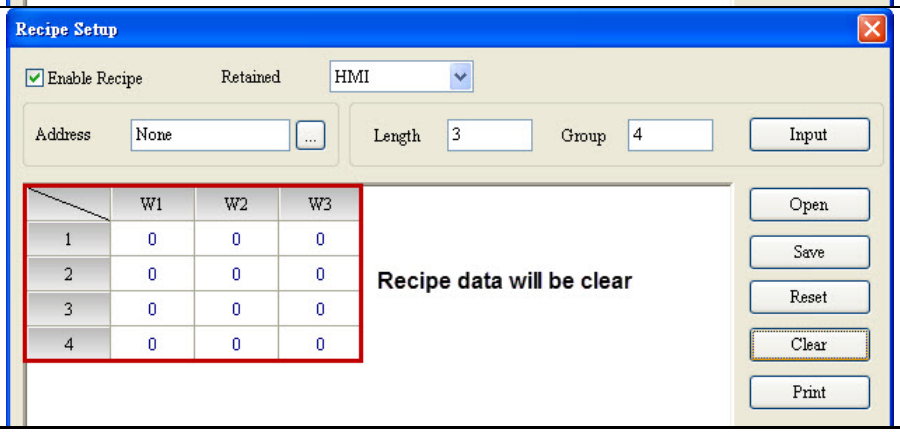
Recipe Setup Property Description

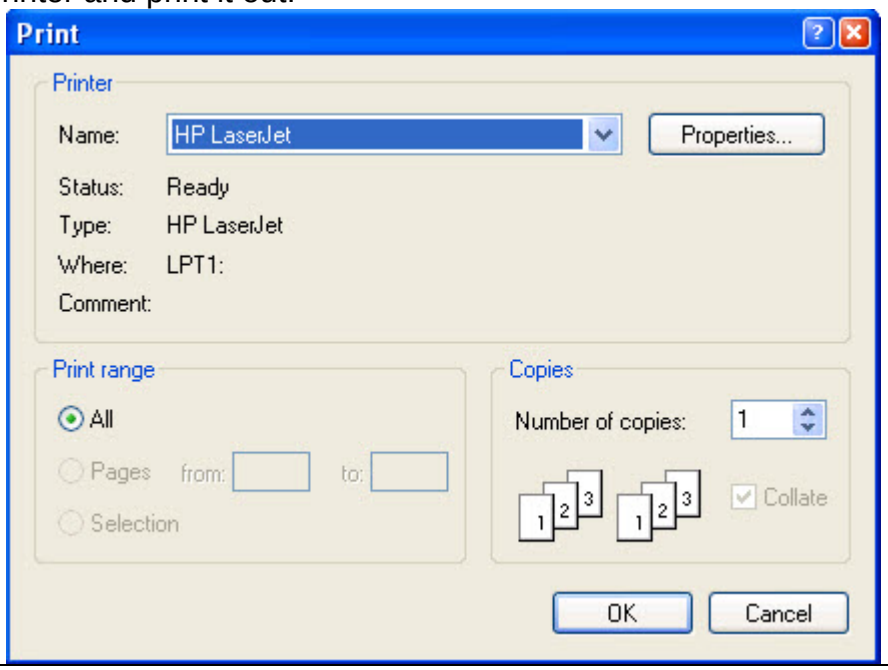
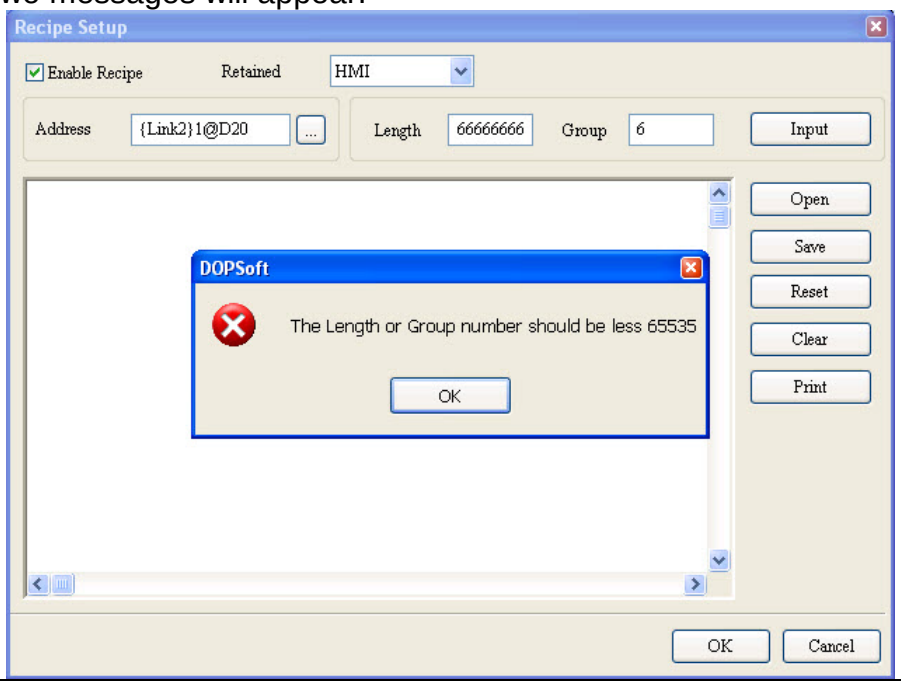
Table 23-1-5 Recipe Setup Property Description

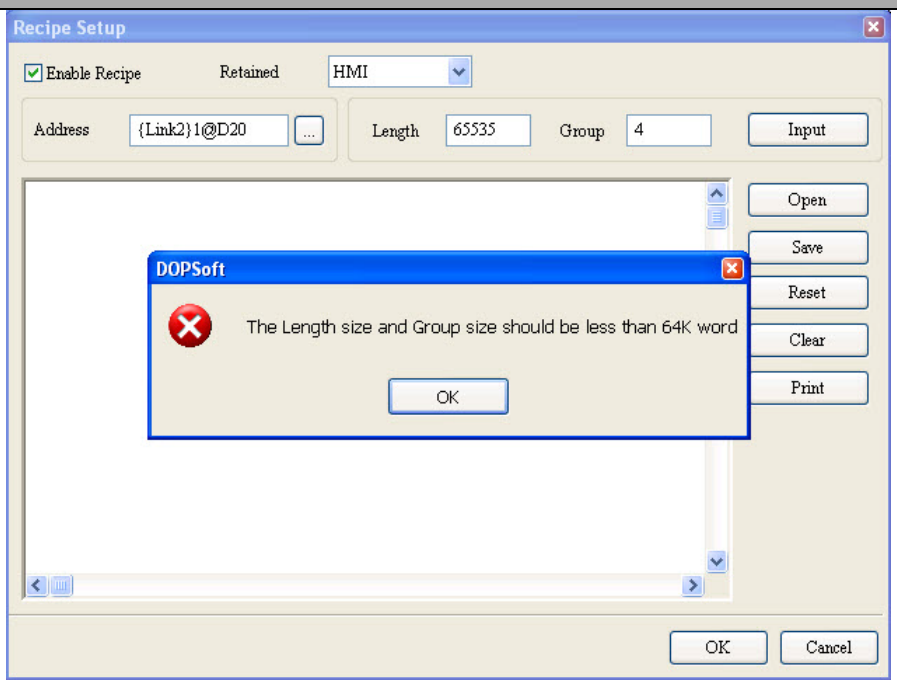
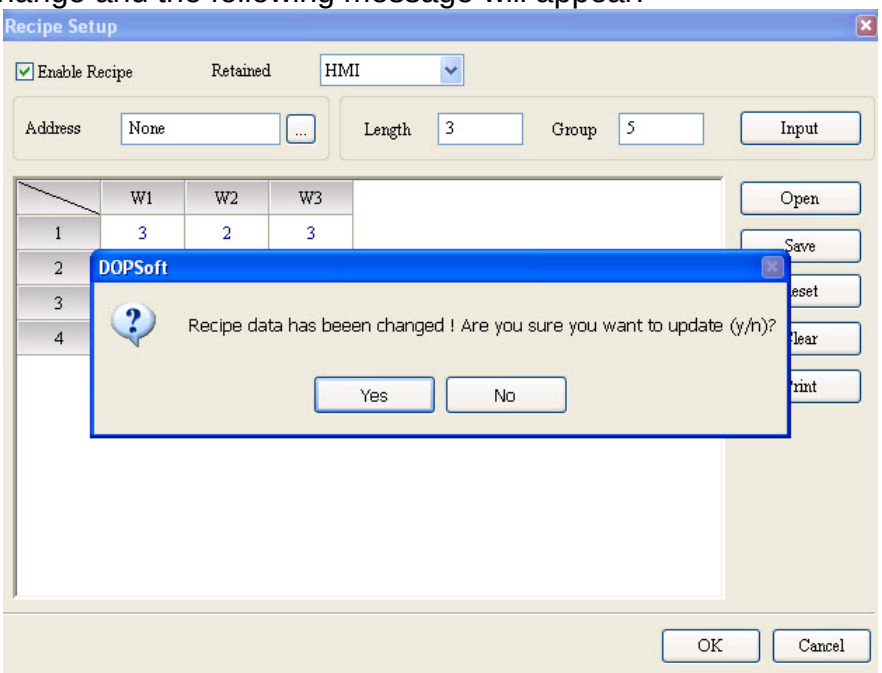
Before clear



After Clear



Recipe Setup Property Description Table 23-1-5 Recipe Setup Property Description	
Print	➢ The [Print] function is used to output the current recipe data to the printer and print it out. 
OK	➢ After the 16 bits Recipe properties are set up, click [OK] to save the changes and leave the Recipe Setup window. ➢ When the [OK] button is pressed, the length and group values that the user entered will be checked again for their change or excess. ➢ If the length or group size exceeds the allowable limit, the following two messages will appear: 

Recipe Setup Property Description Table 23-1-5 Recipe Setup Property Description	
	 ➢ If the length or group size is inconsistent with the configured form, the data will also be checked when the OK button is pressed for their change and the following message will appear: 
Cancel	➢ Click [Cancel] to leave the Recipe Setup window without saving any change of the data. It has the same effect as pressing the X mark at the upper right corner of the window.

23-2 32 bits recipe

The 32 bits recipe supports the data type Double Word. The data format supports Signed Decimal, Unsigned Decimal and Floating. The size of each register is 32 bits (2 Words or 1 Double Word, DW).

Unlike the 16 bits Recipe, the 32 bits recipe provides an additional recipe grouping option. When performing recipe read or recipe write, the user must specify both recipe number and recipe group to read or write a group of recipes.

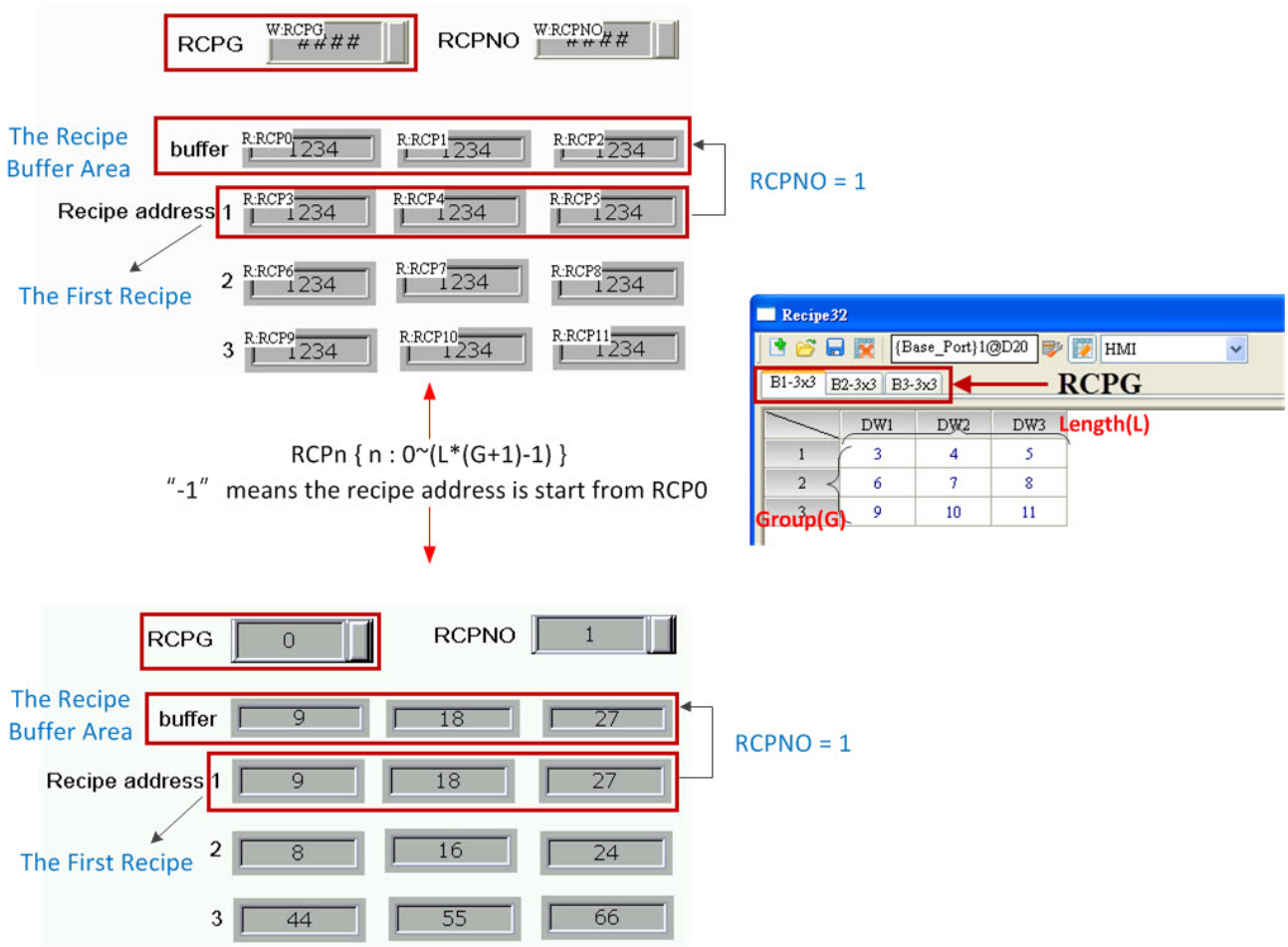


Figure 23-2-1 32 bits recipe Buffer Configuration

32 bits recipe has its own registers, which are RCP, RCPNO and RCPG.

RCP	Recipe register
RCPNO	Recipe number register
RCPG	Recipe group register

RCP and RCPNO are shared with 16 bits recipe, which already mentioned before. The

following introduces features of RCPG.

■ Recipe group register (RCPG)

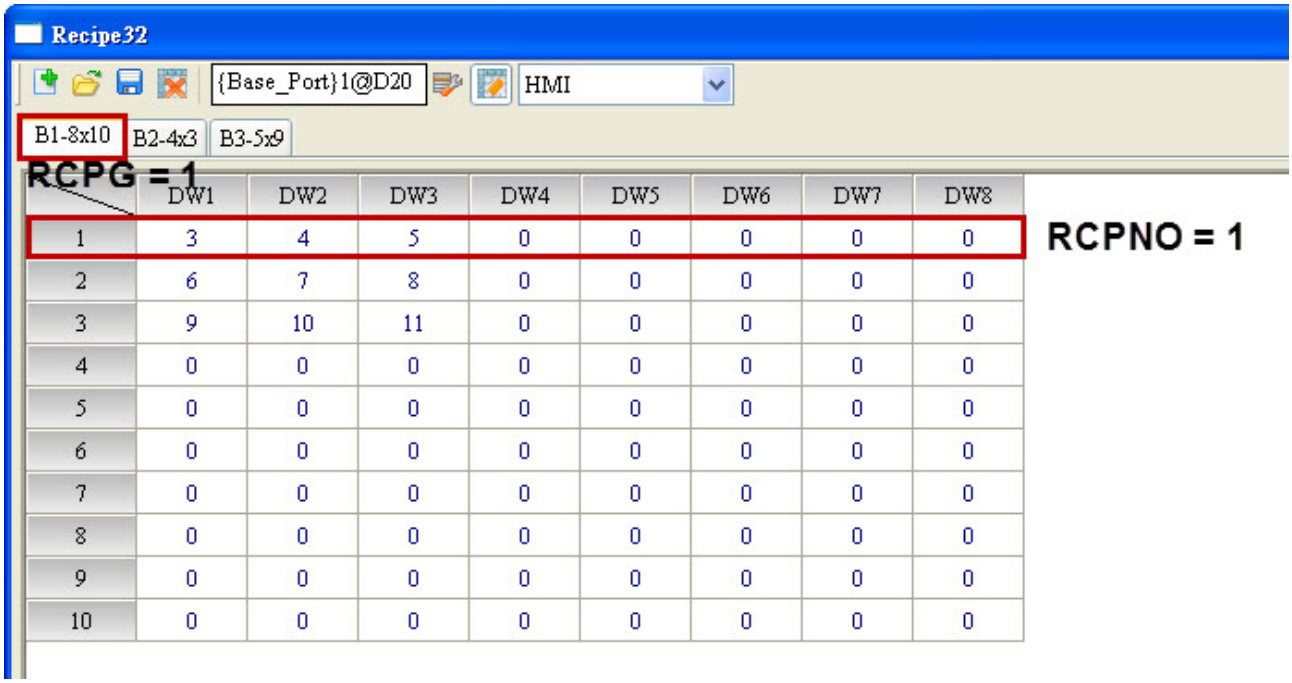
The recipe group register is used to specify the 32 bits recipe group register. Up to 235 groups of 32 bits recipe data can be created.

The RCPG 0 is assigned to 16 bits Recipe. RCPG 1~235 (RCPG 1~255) must be used to call 32 bits recipe data.

For a 32 bits recipe, when the first group of recipes in the first grouping is selected, RCPG = 1 and RCPNO = 1; when the fourth group of recipes in the third grouping is selected, RCPG = 3 and RCPNO = 4.

NOTE:

✓ The recipe group register does not provide the non-volatile function, and the data in the register cannot be maintained when HMI is powered off.



	DW1	DW2	DW3	DW4	DW5	DW6	DW7	DW8
1	3	4	5	0	0	0	0	0
2	6	7	8	0	0	0	0	0
3	9	10	11	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0

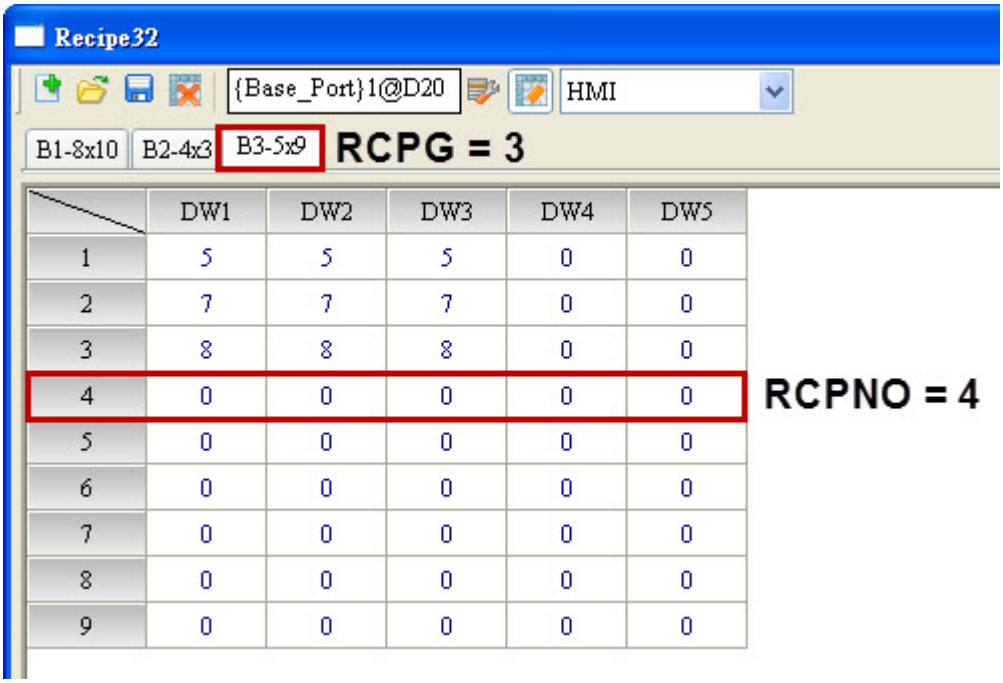


Figure 23-2-2 32 bits recipe number Editing Screen

■ Recipe number register (RCPNO)

RCPNO is used to specify the group for the 32 bits recipe. Read/write of the recipe means to read/write a group of recipes according to the group assignment in the recipe number register. When the first group of recipes is selected, RCPNO = 1; when the fourth group of recipes is selected, RCPNO = 4.

NOTE:

✓ The recipe number register does not provide the non-volatile function, and the data in the register cannot be maintained when HMI is powered off.

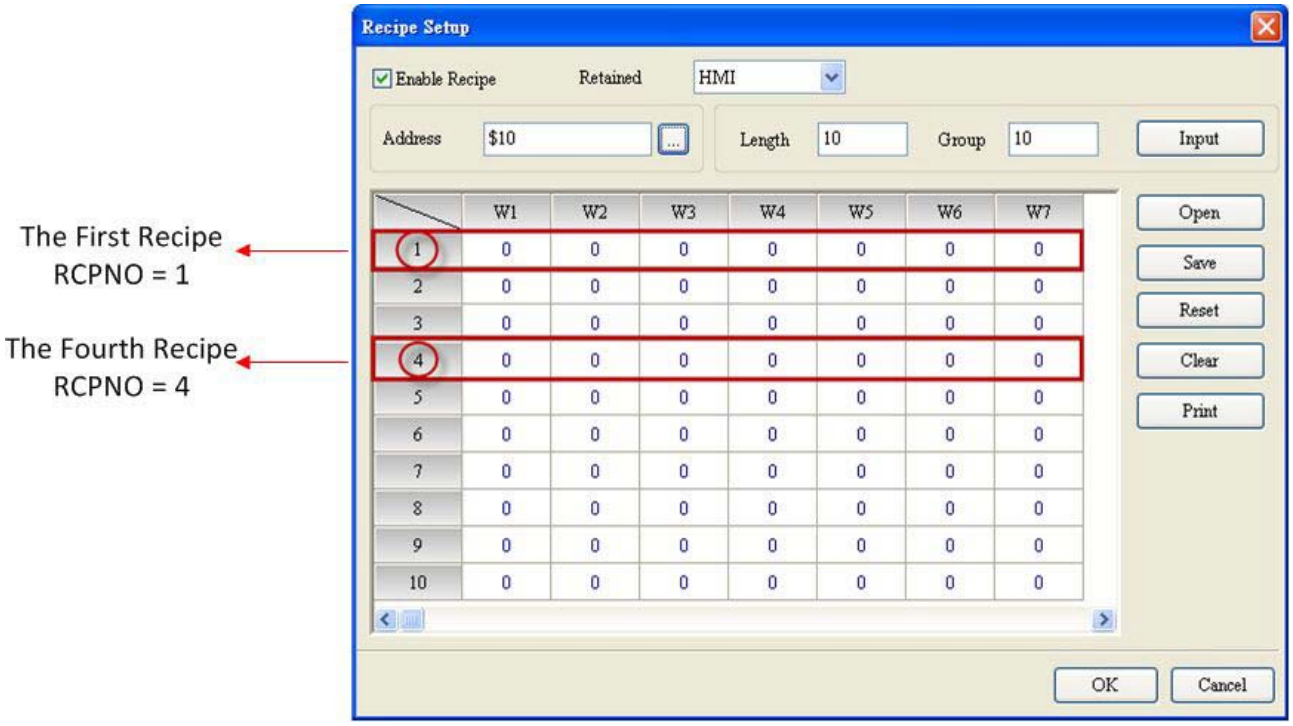


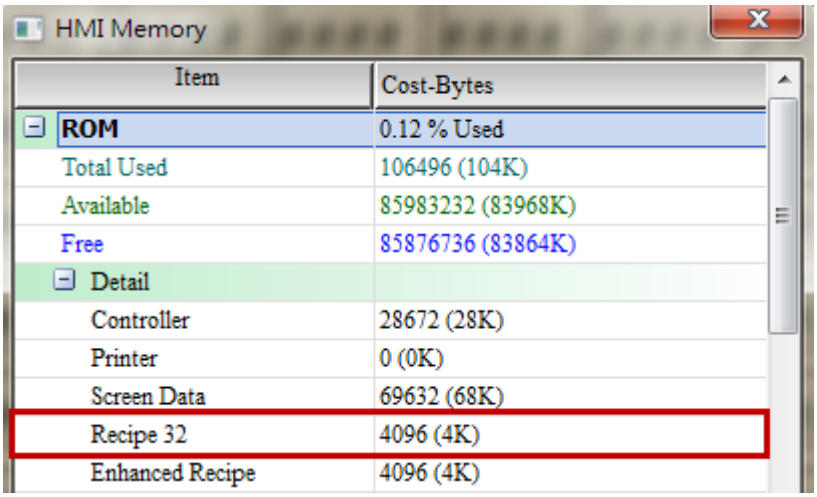
Figure 23-2-3 Recipe Number Editing Screen

■ 32 bits Recipe Size Limit

If the retained area is set to USB Disk or SD Card, the size of a 32 bits recipe file must not be greater than 50MB.

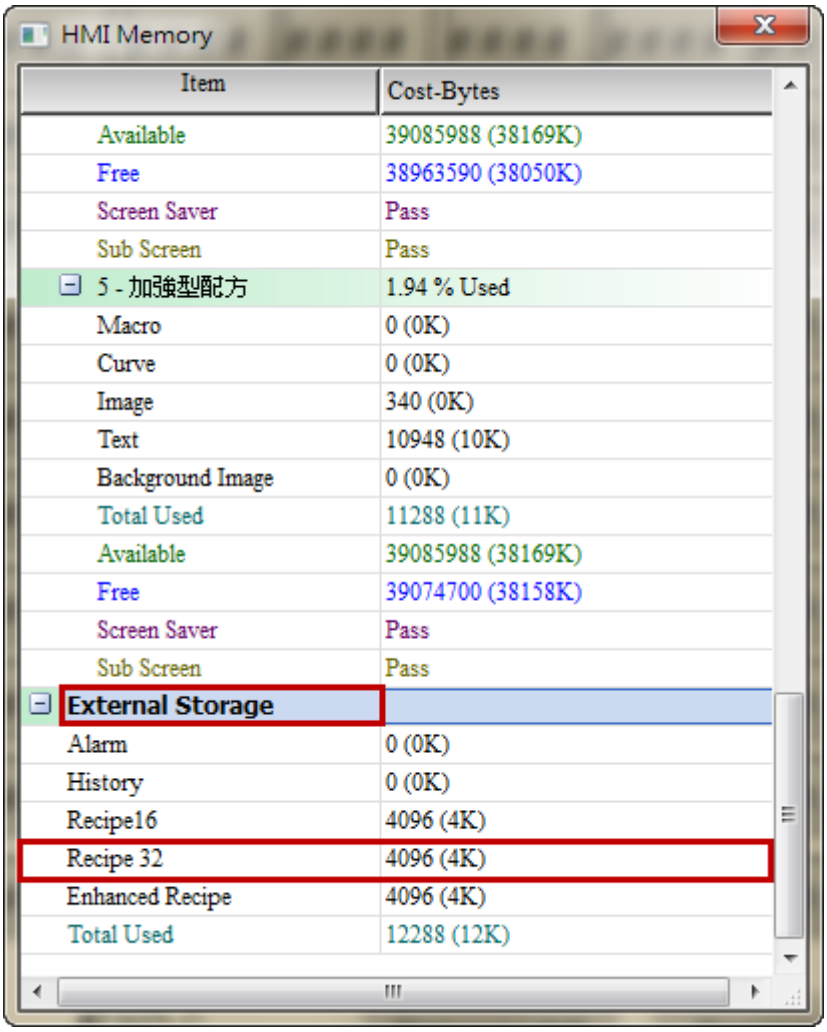
Unlike the 16 bits Recipe, the editable size of a 32 bits recipe is dependent on the HMI flash memory specifications of different models when the retained area is set to HMI.

The user can enter [View] → [Memory List] to check the editable 32 bits recipe size and capacity. (Figure 23-2-4)



HMI Memory

Item	Cost-Bytes
ROM	0.12 % Used
Total Used	106496 (104K)
Available	85983232 (83968K)
Free	85876736 (83864K)
Detail	
Controller	28672 (28K)
Printer	0 (0K)
Screen Data	69632 (68K)
Recipe 32	4096 (4K)
Enhanced Recipe	4096 (4K)

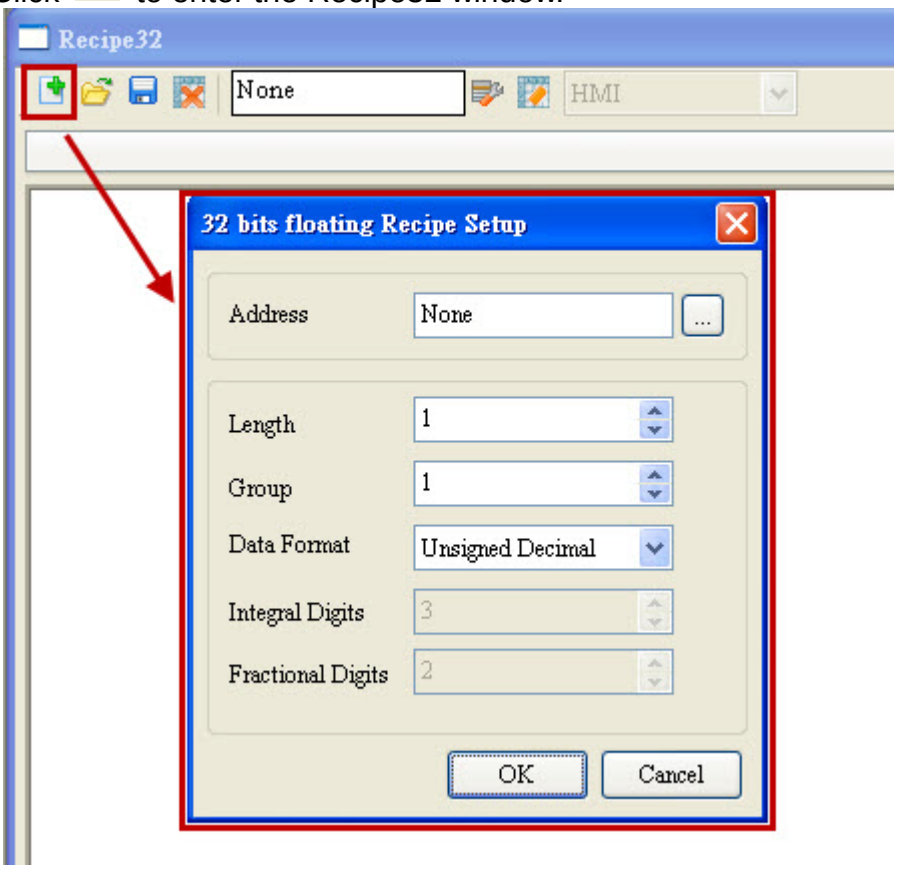
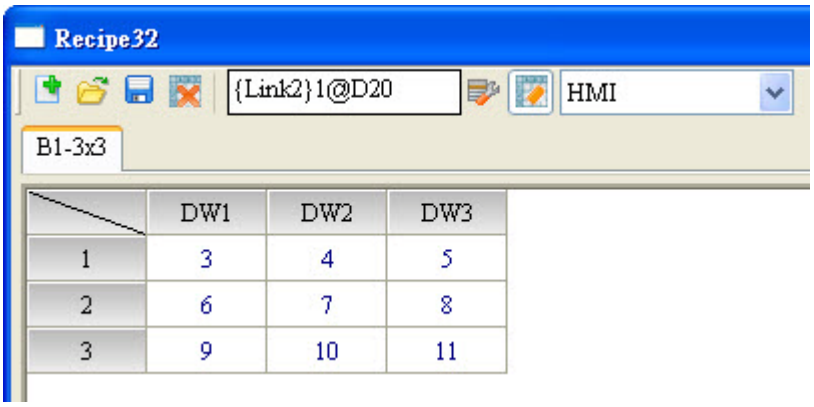


HMI Memory

Item	Cost-Bytes
Available	39085988 (38169K)
Free	38963590 (38050K)
Screen Saver	Pass
Sub Screen	Pass
5 - 加強型配方	1.94 % Used
Macro	0 (0K)
Curve	0 (0K)
Image	340 (0K)
Text	10948 (10K)
Background Image	0 (0K)
Total Used	11288 (11K)
Available	39085988 (38169K)
Free	39074700 (38158K)
Screen Saver	Pass
Sub Screen	Pass
External Storage	
Alarm	0 (0K)
History	0 (0K)
Recipe16	4096 (4K)
Recipe 32	4096 (4K)
Enhanced Recipe	4096 (4K)
Total Used	12288 (12K)

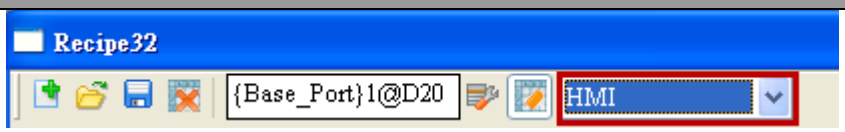
Figure 23-2-4 32 bits recipe Memory List

Refer to the 32 bits recipe example in Table 23-2-1.

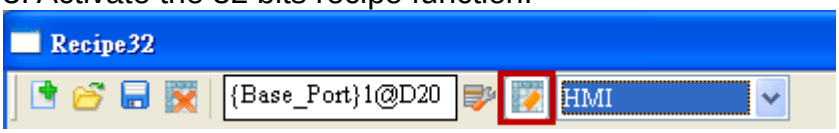
32 bits Recipe Example Table 23-2-1 32 bits recipe Example	
Set 32 bits recipe	➢ Step 1: Enter [Options] → [32 bits recipe] . ● Click to enter the Recipe32 window.  ● Set the Address to D20. ● Set both Length and Group to 3 for the first group of recipe. Both values should not be set to 0. ● Set the Data Format to Unsigned Decimal.  ➢ Step 2: Set the Retained Area to HMI.

32 bits Recipe Example

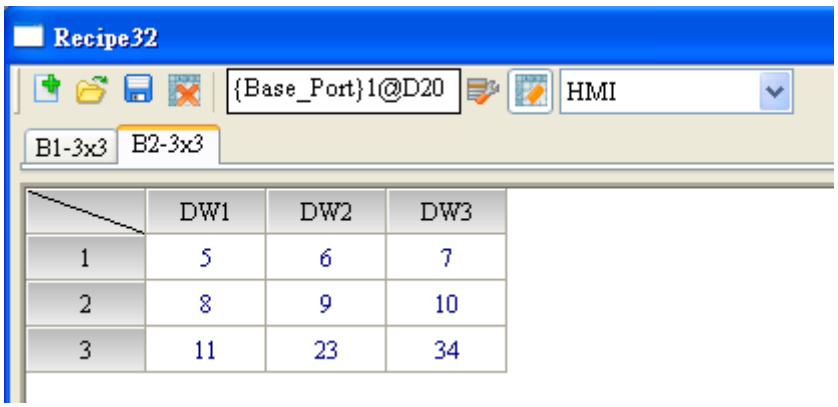
Table 23-2-1 32 bits recipe Example



- Step 3: Activate the 32 bits recipe function.

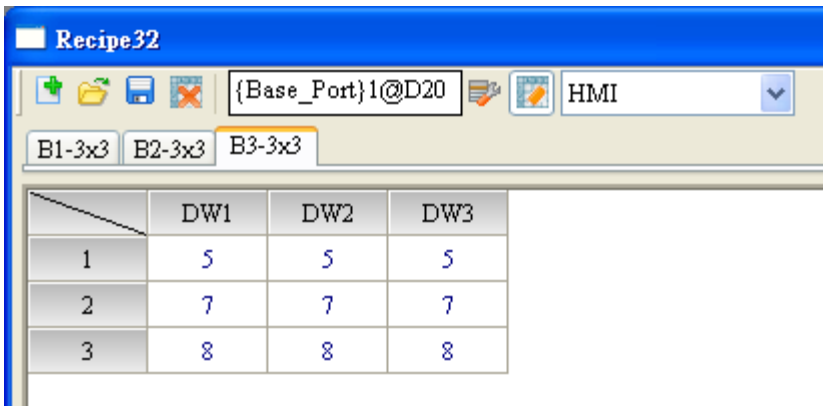


- Step 4: Repeat Step 1 to set both Length and Group to 3. The recipe data are shown below:

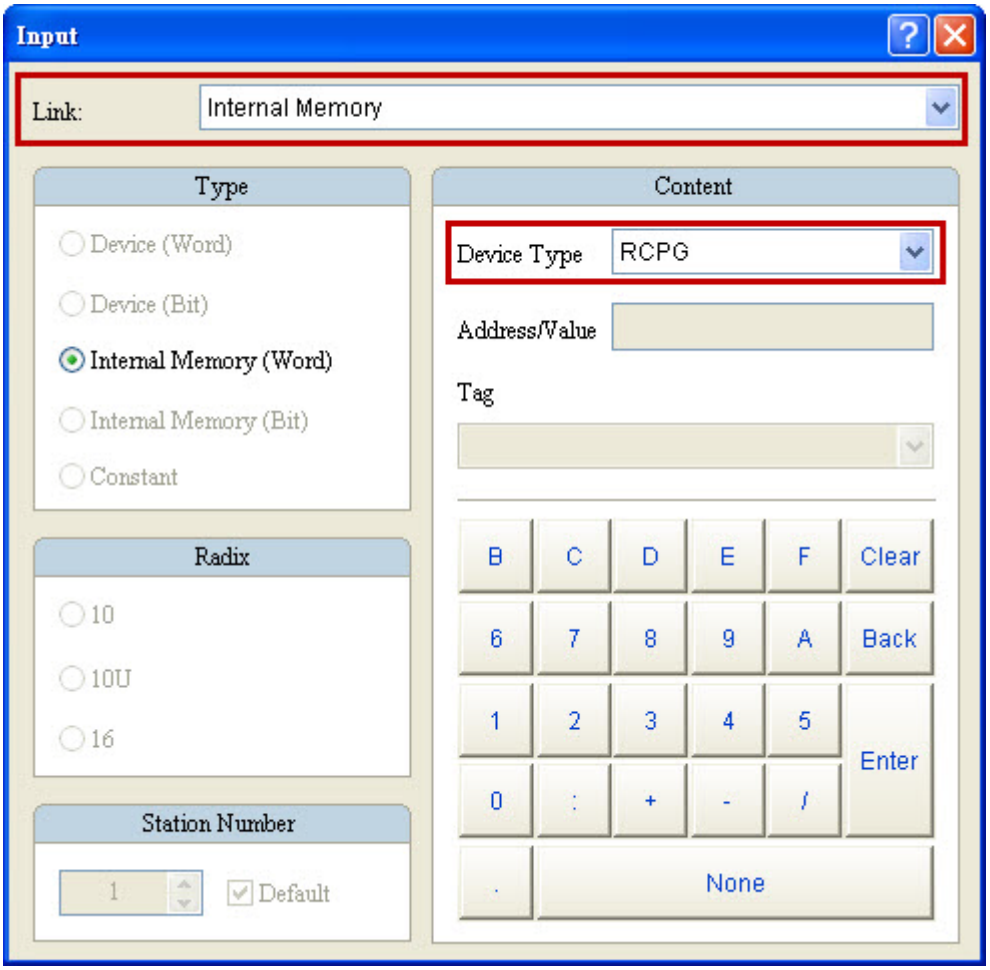


	DW1	DW2	DW3
1	5	6	7
2	8	9	10
3	11	23	34

- Step 5: Repeat Step 1 to set both Length and Group to 3. The recipe data are shown below:

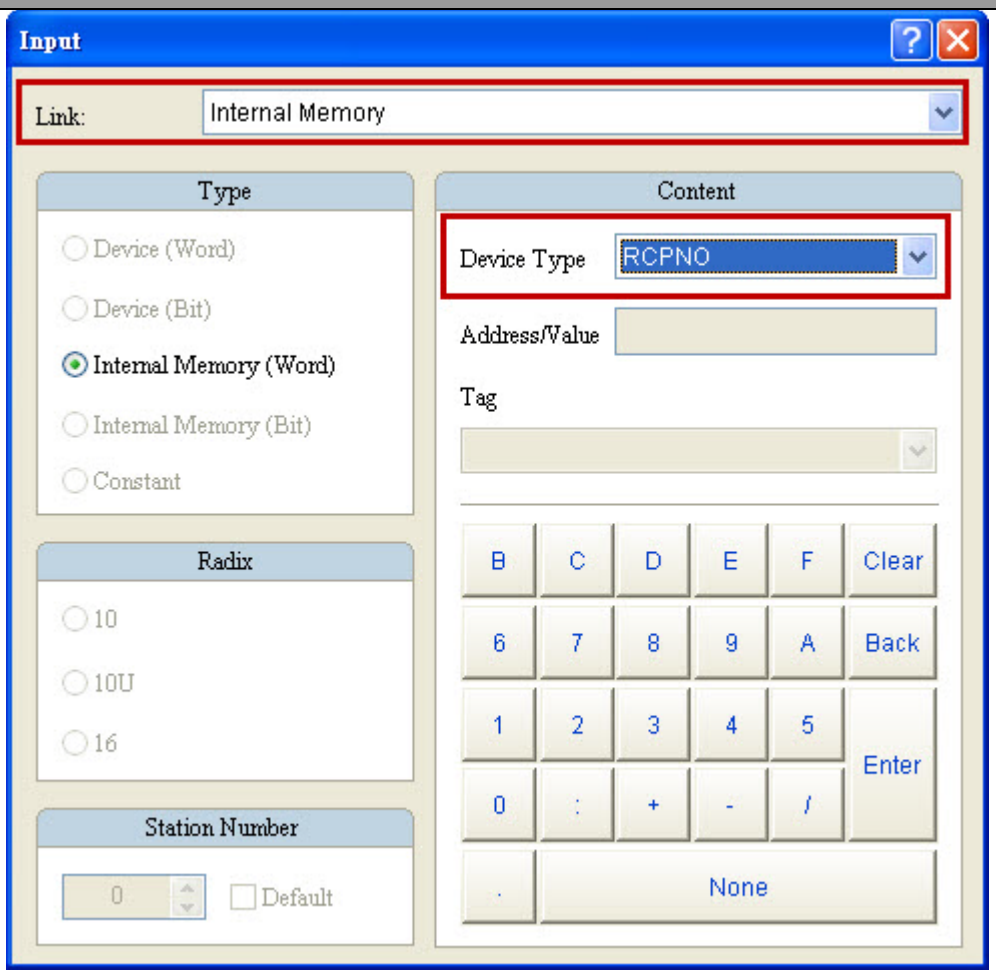


	DW1	DW2	DW3
1	5	5	5
2	7	7	7
3	8	8	8

32 bits Recipe Example Table 23-2-1 32 bits recipe Example	
Create Numeric Element	➢ Create a numeric element. Set the Write Address to Internal Memory and select RCPG as the element type. This element is used for selection of the recipe grouping.  ➢ The following is displayed when the creation is completed. ➢ Create a numeric element. Set the Write Address to Internal Memory and select RCPNO as the Element Type. This element is used for selection of the recipe number.

32 bits Recipe Example

Table 23-2-1 32 bits recipe Example



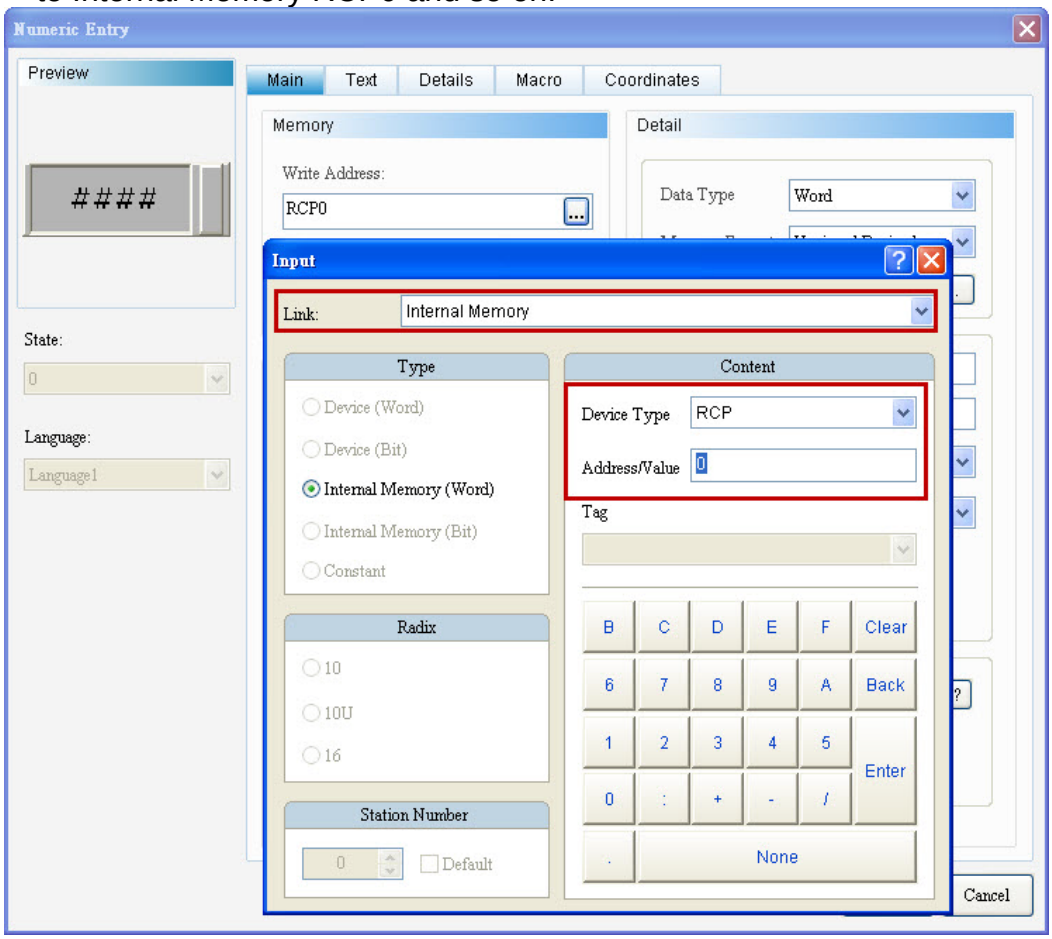
➢ The following is displayed when the creation is completed.

32 bits Recipe Example

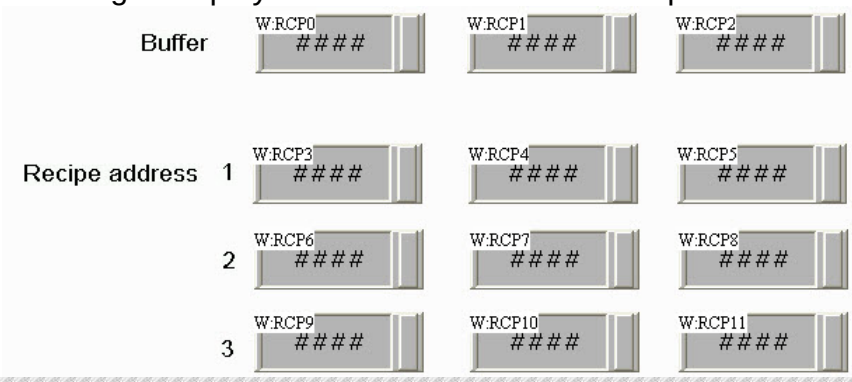
Table 23-2-1 32 bits recipe Example

Create Numeric Display Element

- Step 1: Before the numeric display element is created to display the 32-bit recipe register, the user can use the recipe register formula [(L*(G+1)-1) }] to gain the number that n in RCPn represents. Put the size of the recipe (L*G = 3 x 3) in the formula to gain RCPn = RCP0~RCP11.
- Step 2: Create 12 numeric display elements and set the Read Address to Internal Memory RCP0 and so on.



- The following is displayed when the creation is completed.



NOTE:

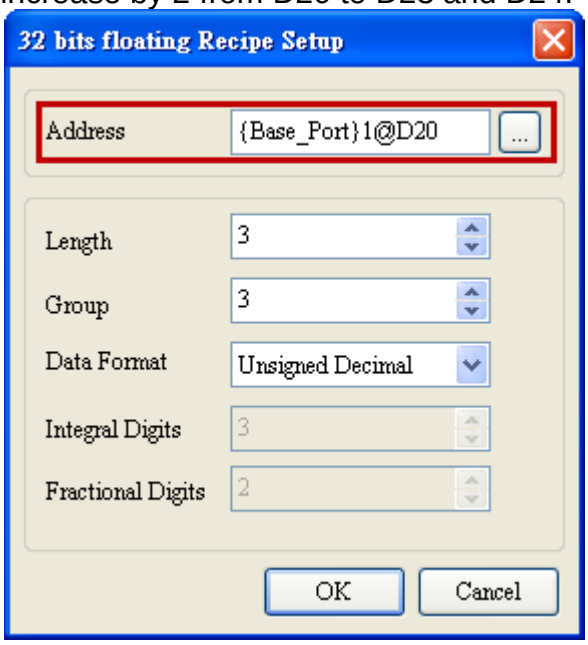
✓ The RCP0~RCP2 created are the recipe buffers and the actual recipe data RCPs are RCP3~RCP11. For more information, refer to Figure 23-2-1 32 bits Recipe Buffer Configuration.

32 bits Recipe Example

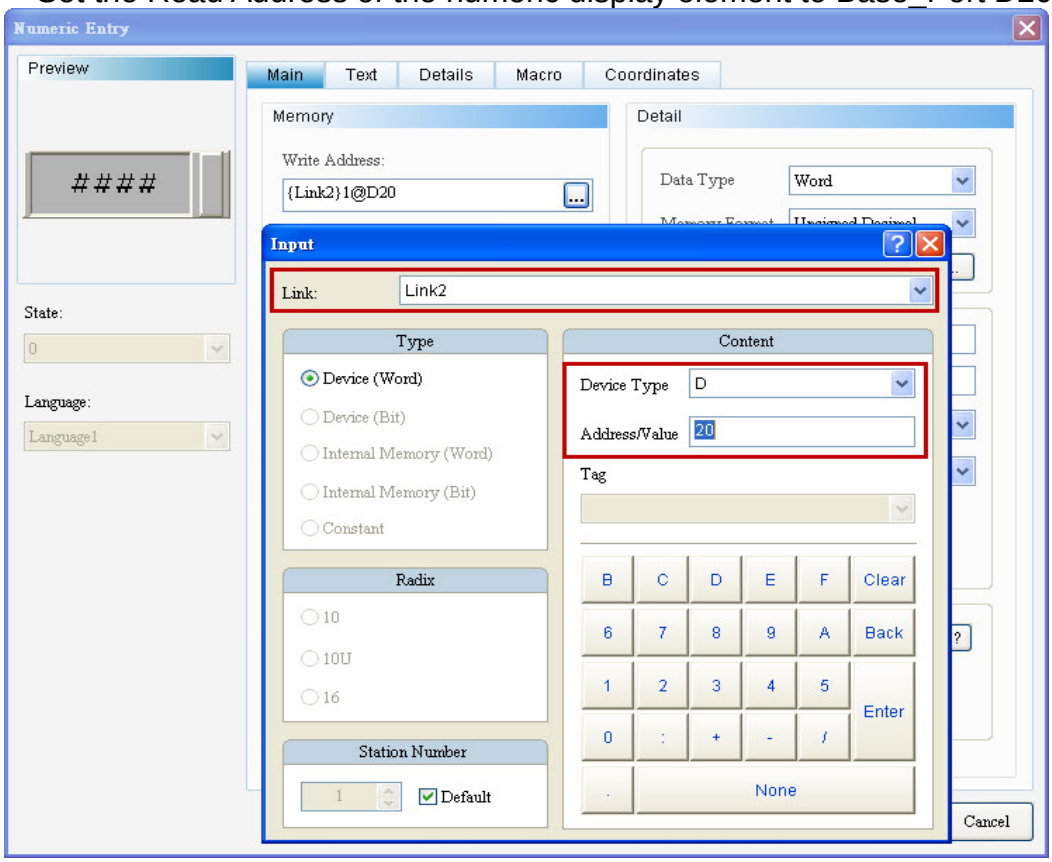
Table 23-2-1 32 bits recipe Example

Create Numeric Display Element

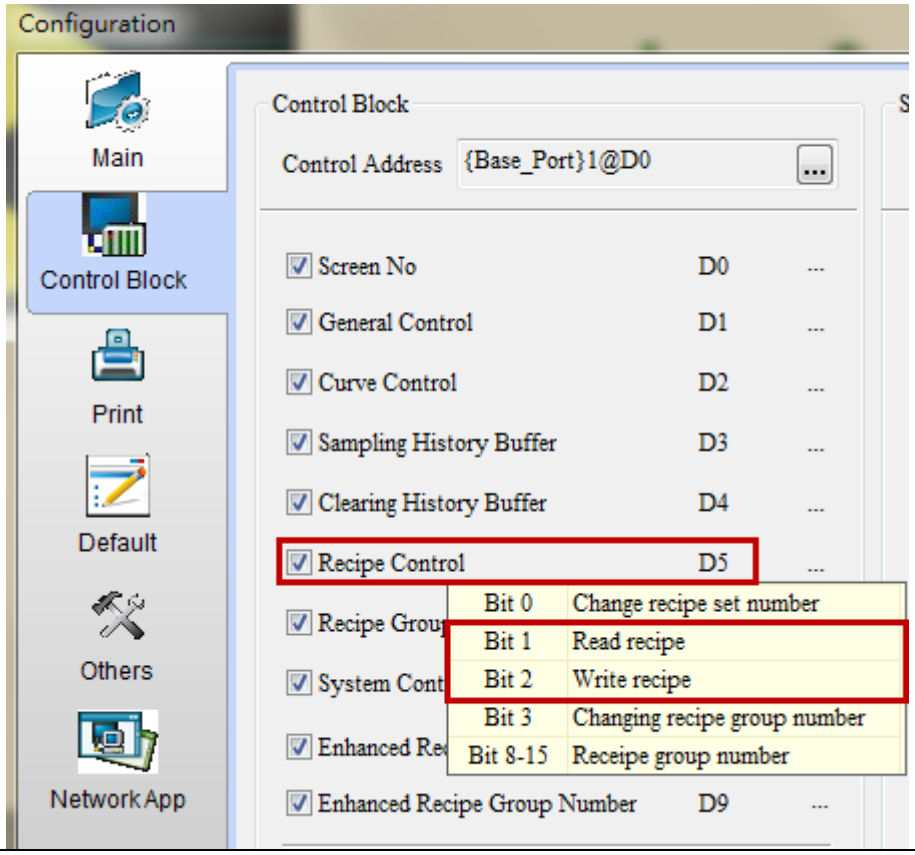
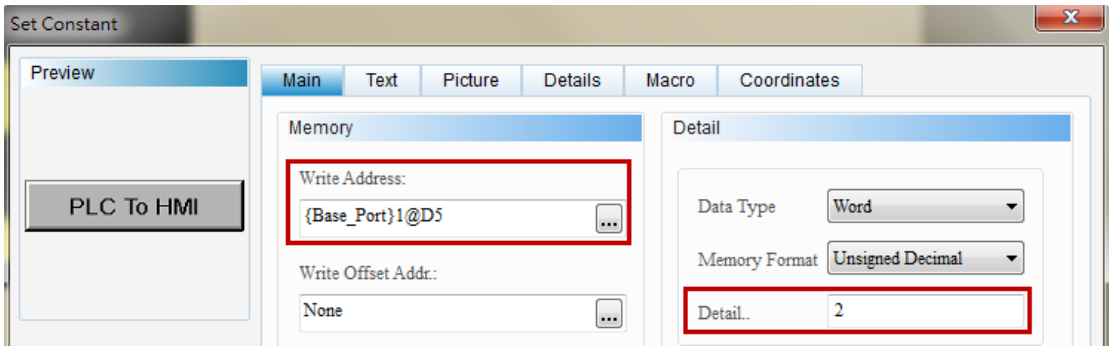
- Create 3 numeric display elements with reference to the address set up on the 32 Bits Recipe Setup window. The purpose of the creation is to show the change of the data when the user reads or writes PLC recipes. Since the 32 bits recipe uses the Double Word format, the recipe address entered must increase by 2 from D20 to D23 and D24.



- Set the Read Address of the numeric display element to Base_Port D20.

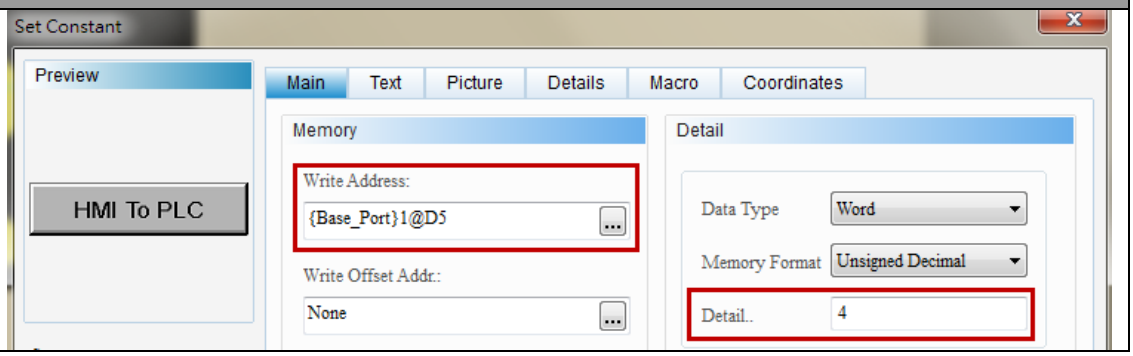


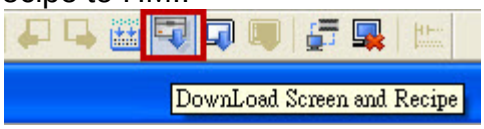
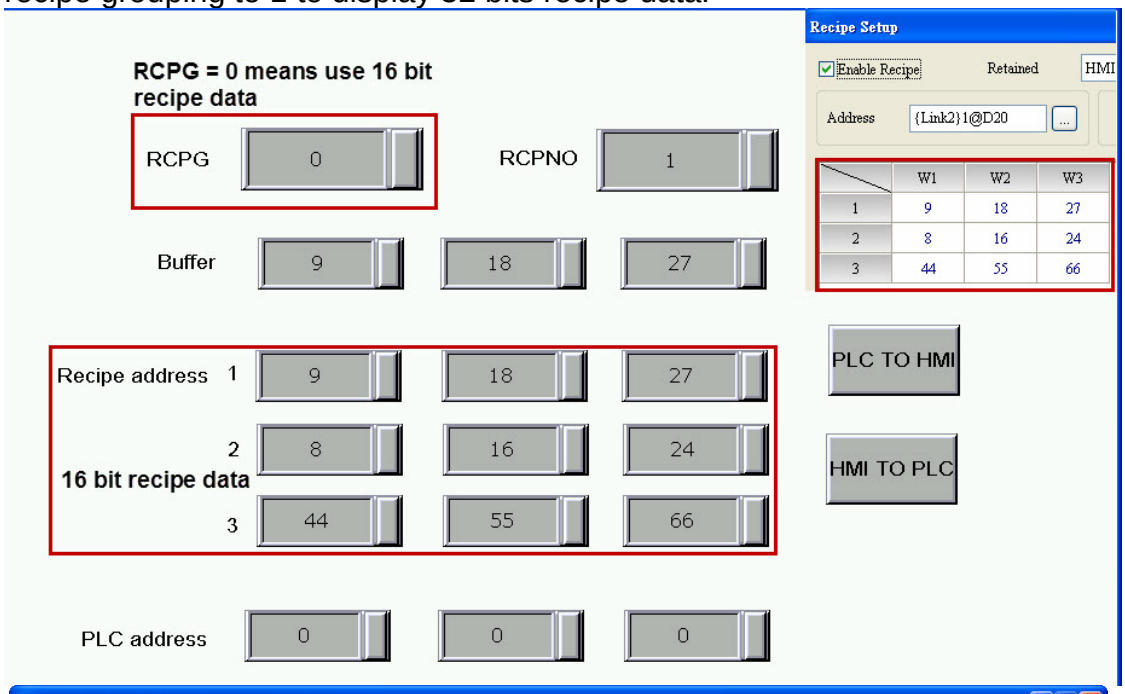
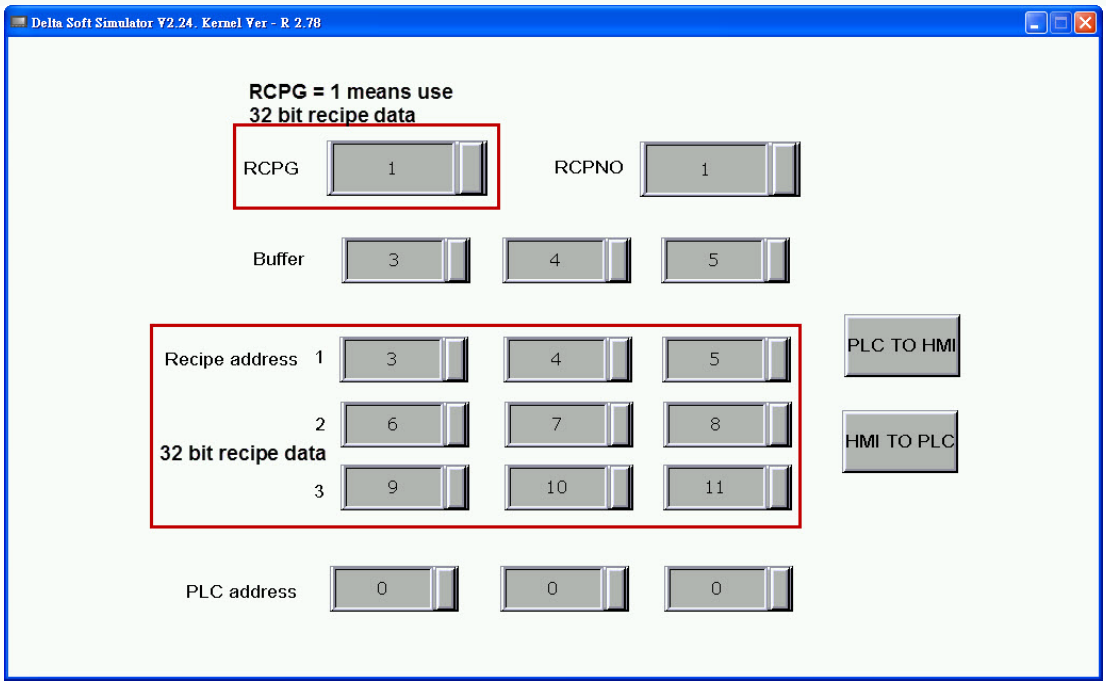
- The following is displayed when the creation is completed.

32 bits Recipe Example Table 23-2-1 32 bits recipe Example	
	PLC address W:{Link2}1@D20 #### W:{Link2}1@D22 #### W:{Link2}1@D24 ####
Set Recipe Control Flag in Control Block	➢ Enter [Options] → [Configuration....] → [Control Block] and check the [Recipe Control] flag. Set the Control Address in the Control Block to define that Recipe Control address. After the setting is completed, click [OK] to leave the Configuration Window. 
Create Permanent Numeric Button Element	➢ Create 2 permanent numeric buttons. Set the Write Address to D5 and the Setting to 2 and 4, respectively, corresponding to Bit 1 and Bit 2 of the Recipe Control flag D5. This setup is used for read and write of the recipe. 

32 bits Recipe Example

Table 23-2-1 32 bits recipe Example

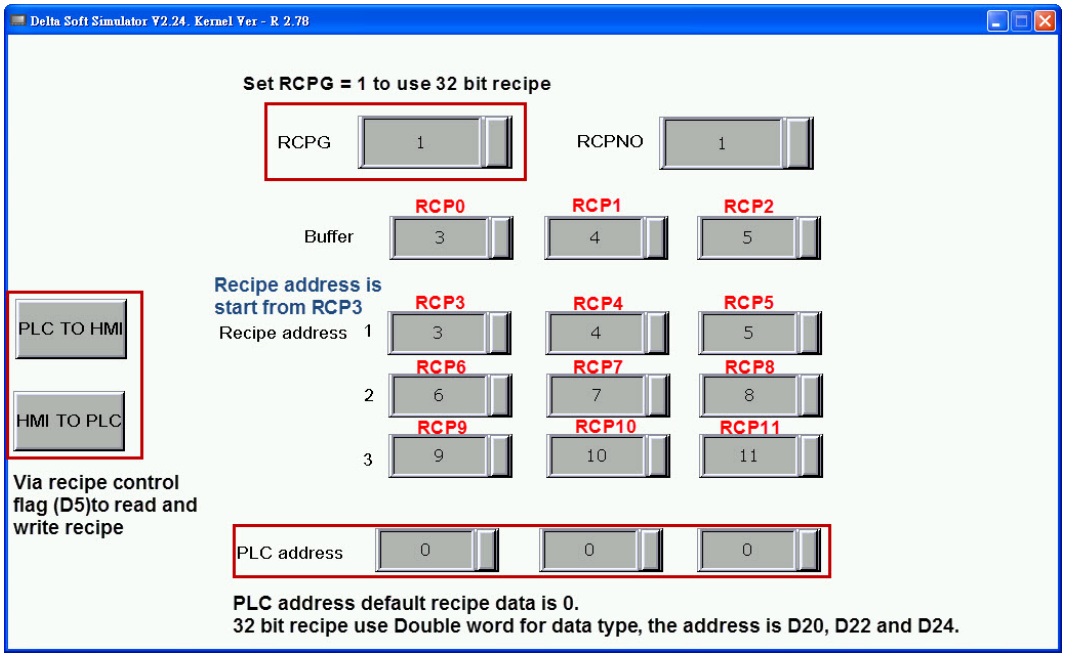


32 bits Recipe Example Table 23-2-1 32 bits recipe Example	
Execution Results	➢ After creation of all elements, perform the compilation and download the screen data and recipe to HMI.  The recipe grouping is set to 0 by default after the download, indicating that the data displayed is 16 bits Recipe data. The user must change the setting of the recipe grouping to 1 to display 32 bits recipe data.   The recipe data will be displayed in the created RCP0~RCP11 with reference to the selected recipe grouping. The RCP0~RCP2 created are the recipe buffers and the RCPs for the first group of recipe data are actually

32 bits Recipe Example

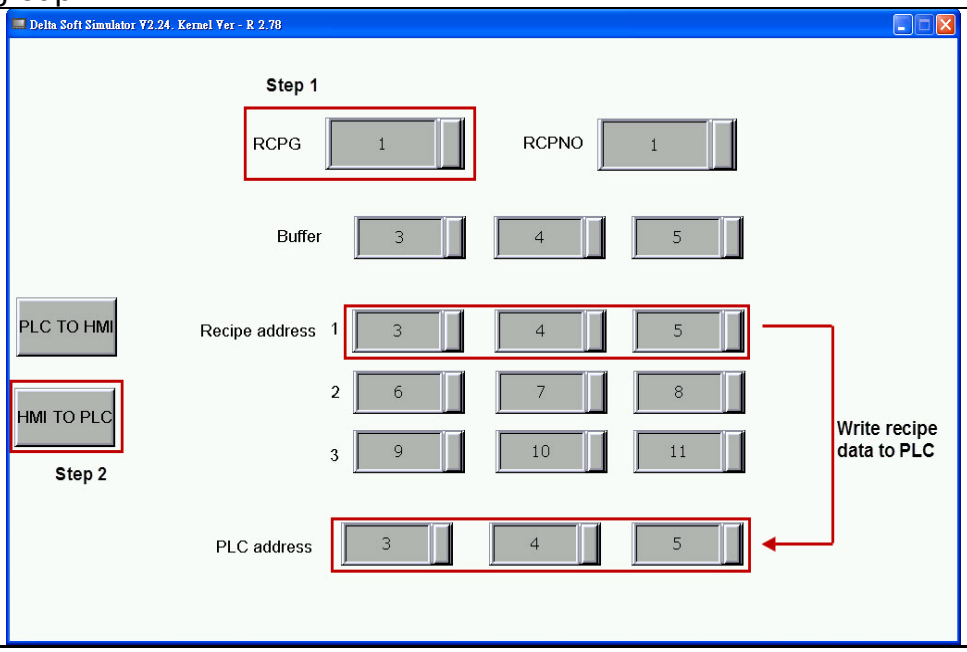
Table 23-2-1 32 bits recipe Example

RCP3~RCP11.



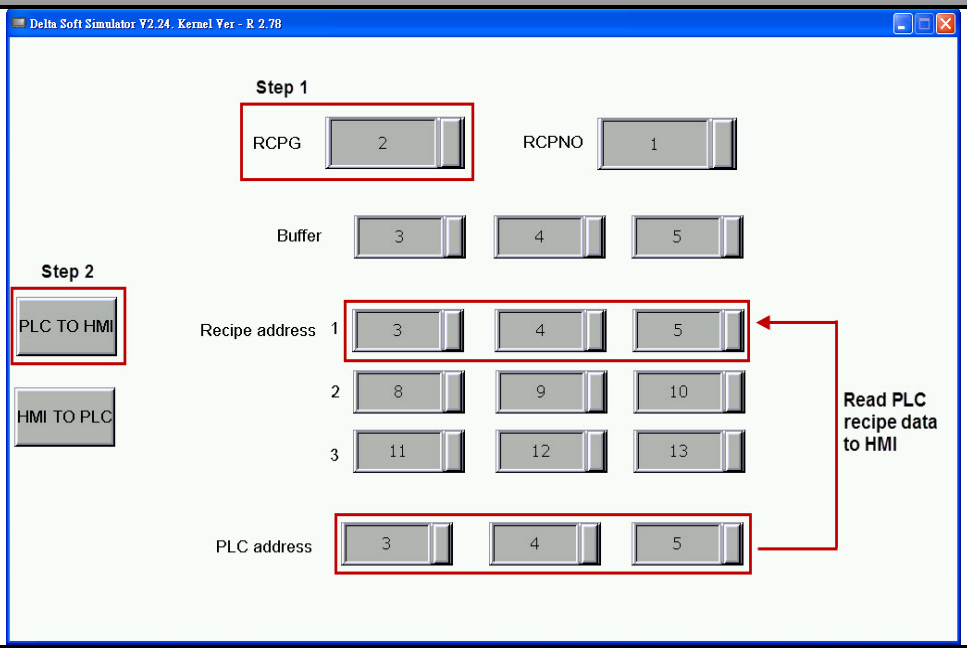
Activate the Recipe Write button and the recipe data of the selected group will be written to PLC. Activate the Recipe Read button and the recipe data that were written to the PLC will be read back to HMI with reference to the selected recipe group. The recipe data will be changed to match the content of the selected group.

Recipe Read



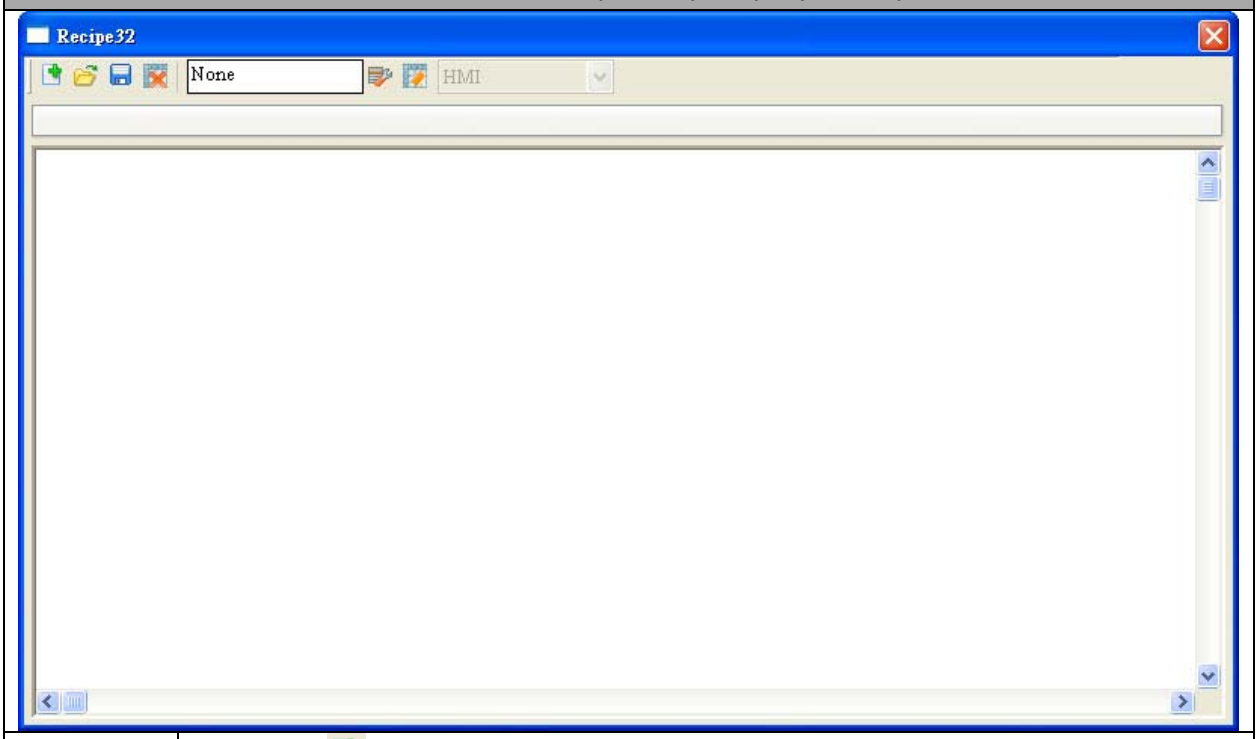
32 bits Recipe Example

Table 23-2-1 32 bits recipe Example

	Recipe Write	

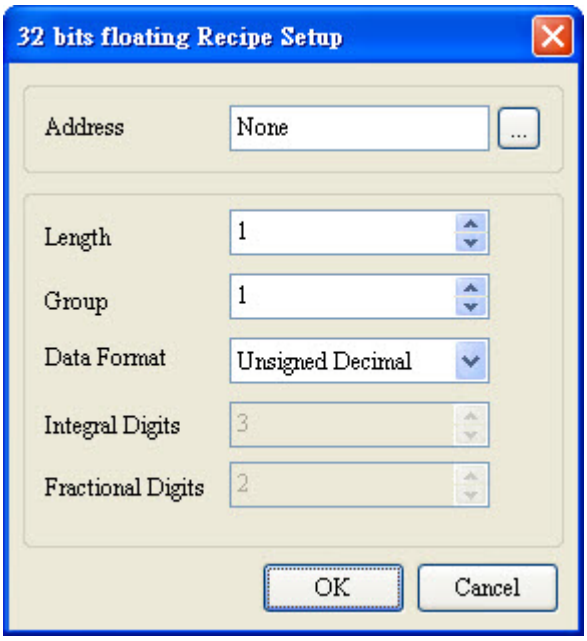
32 bits Recipe Setup Property Description

Table 23-2-2 32 bits Recipe Setup Property Description



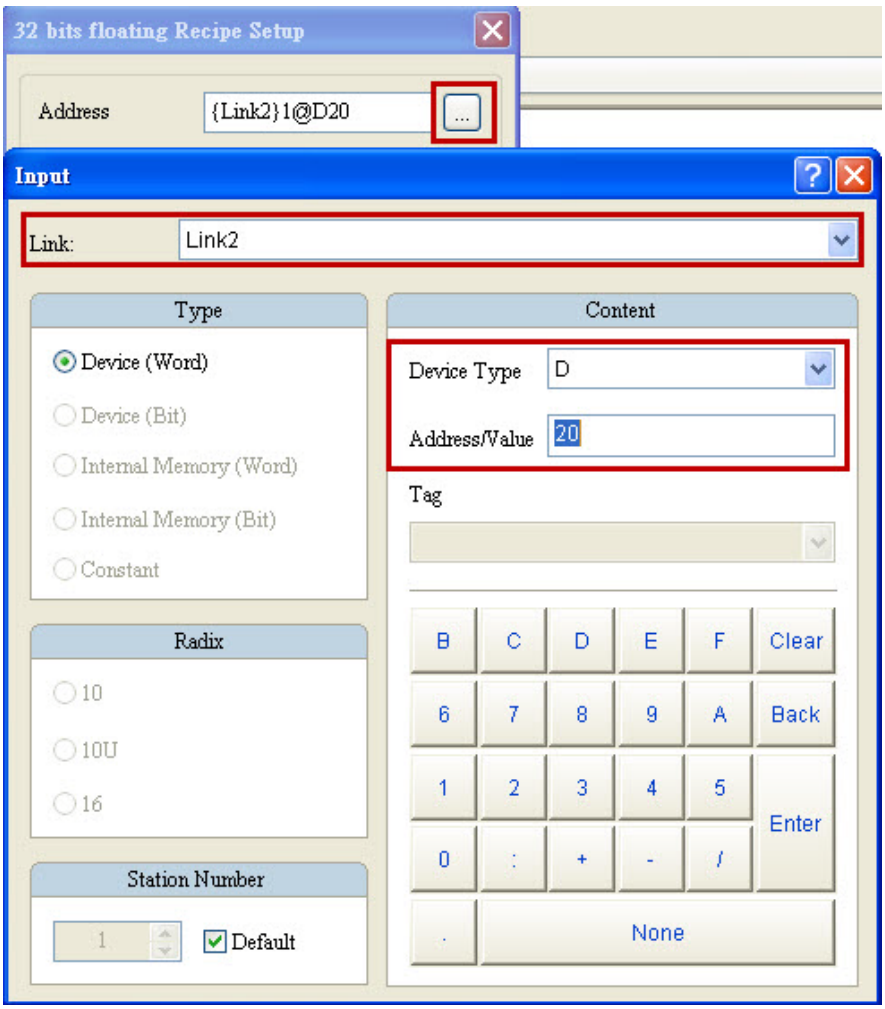
Add

- The must be clicked to add 32 bits recipe data in order to enter the 32 Bits Recipe Setup window.



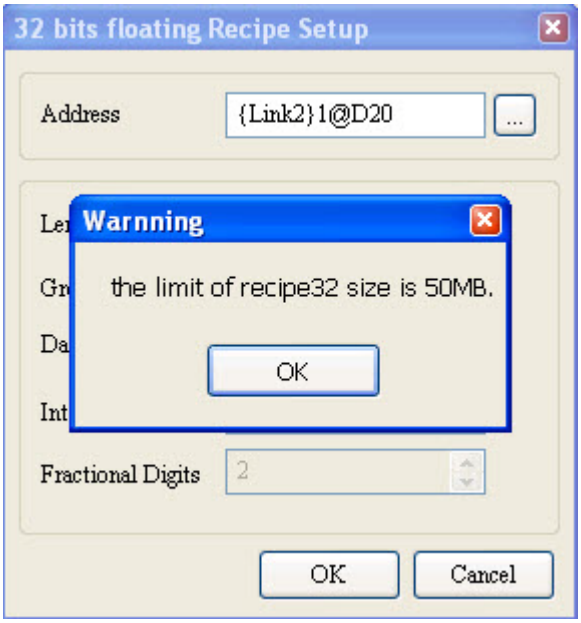
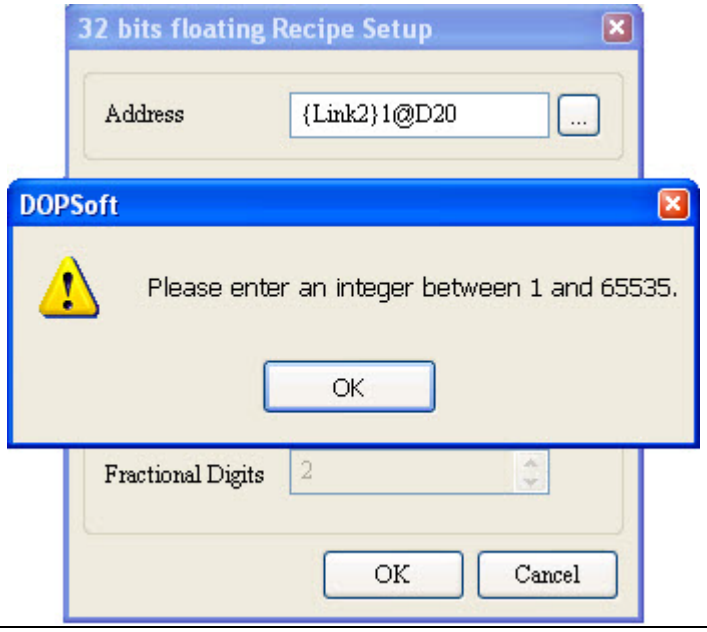
- The user can operate to add up to 255 32 bits recipe data records.

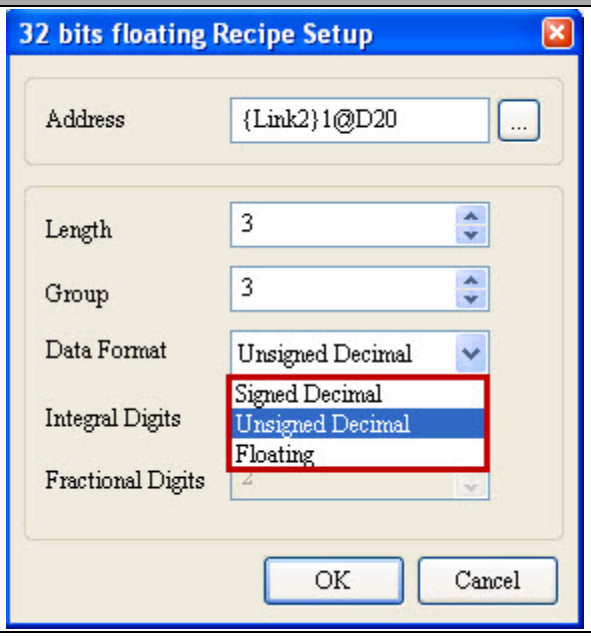
Address	➢ Selects the address of internal memory or controller register. ➢ Selects link name or element type. Please refer to 5-1 Button of Chapter 05 for details.

32 bits Recipe Setup Property Description Table 23-2-2 32 bits Recipe Setup Property Description		
		➢ The same address is shared by all 32 bits recipes regardless of the number of groups. 

32 bits Recipe Setup Property Description

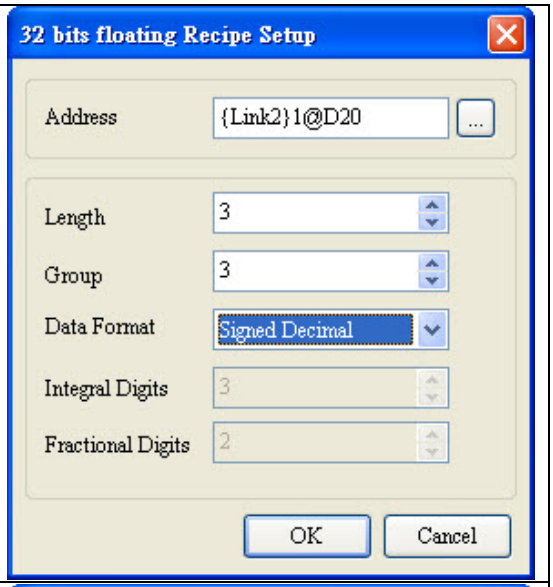
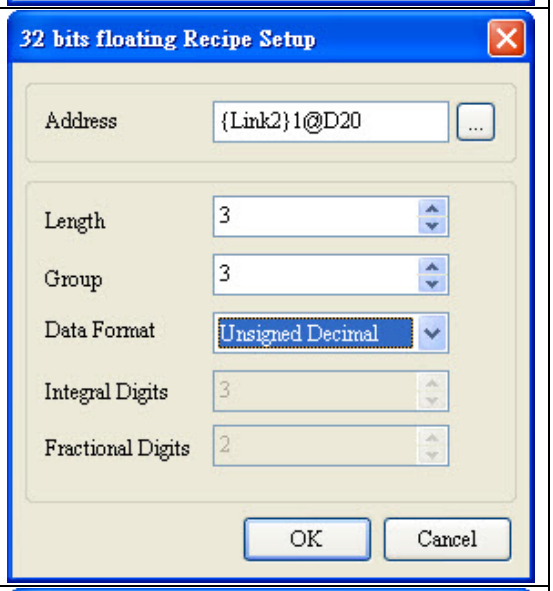
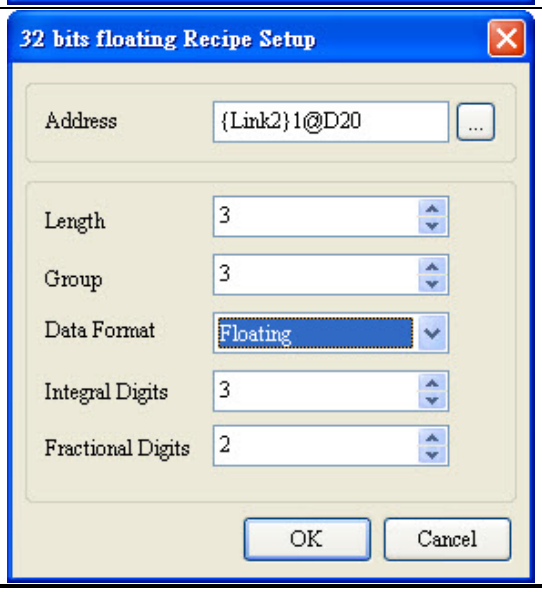
Table 23-2-2 32 bits Recipe Setup Property Description

	Length	➢ The user enters the length and group sizes of the recipe in the Length and Group fields, respectively. The L*G size of the recipe should not be greater than 50MB. 
	Group	➢ The Length and Group cannot be set to 0. If any of the values is set to 0, an error message will appear to warn the user. 
	Data Format	➢ The Data Format supports Signed Decimal, Unsigned Decimal and Floating.

32 bits Recipe Setup Property Description Table 23-2-2 32 bits Recipe Setup Property Description		
		

32 bits Recipe Setup Property Description

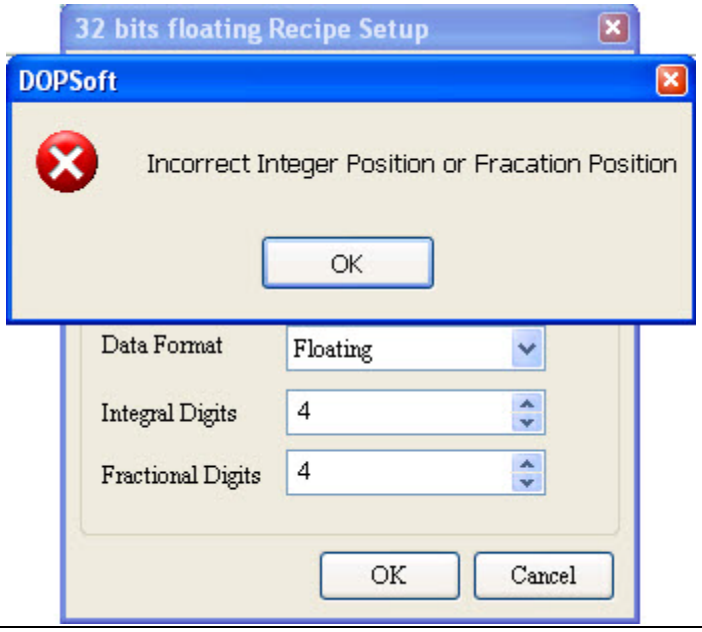
Table 23-2-2 32 bits Recipe Setup Property Description

Integer Digits	➢ Floating must be selected as the data format to set the integer and decimal places.	
	Signed Decimal	
Fractional Digits	**Unsigned Decimal**	
	Floating	

32 bits Recipe Setup Property Description

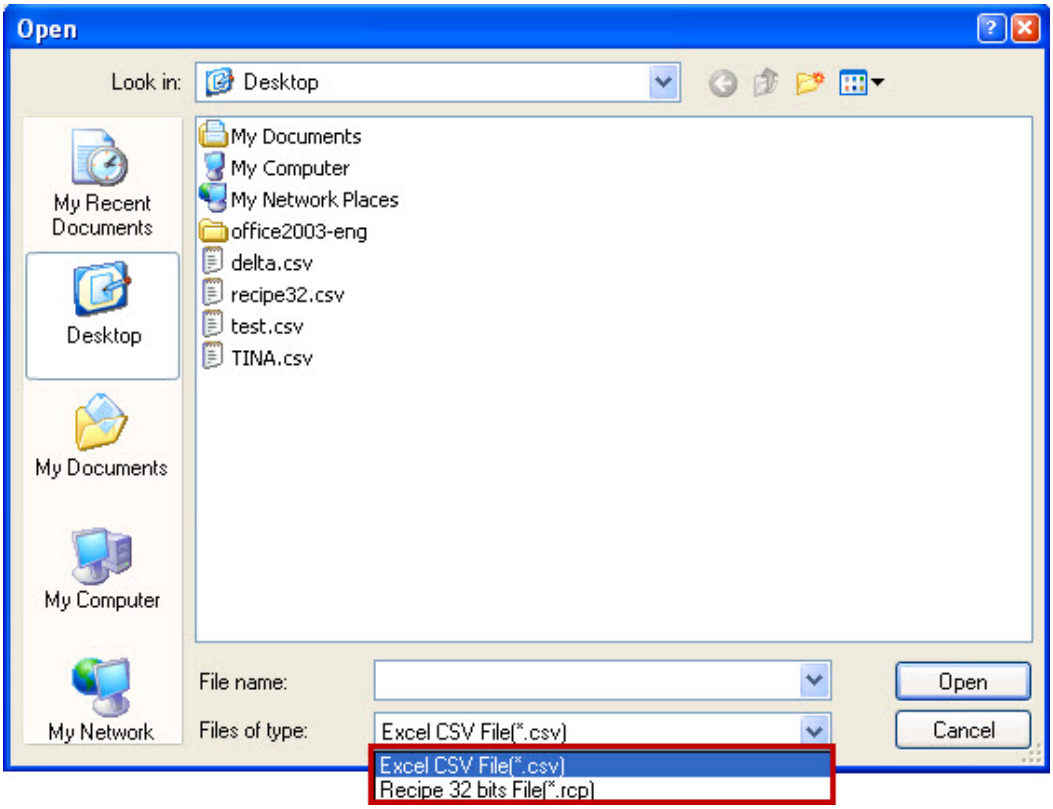
Table 23-2-2 32 bits Recipe Setup Property Description

➢ The sum of the integer and decimal places can only support 7 digits with Floating as the data format. If there are more than 7 digits, a warning message will appear to remind the user.



Open

➢ The [Open] function provides CSV and RCP file formats for the user to import the recipe.

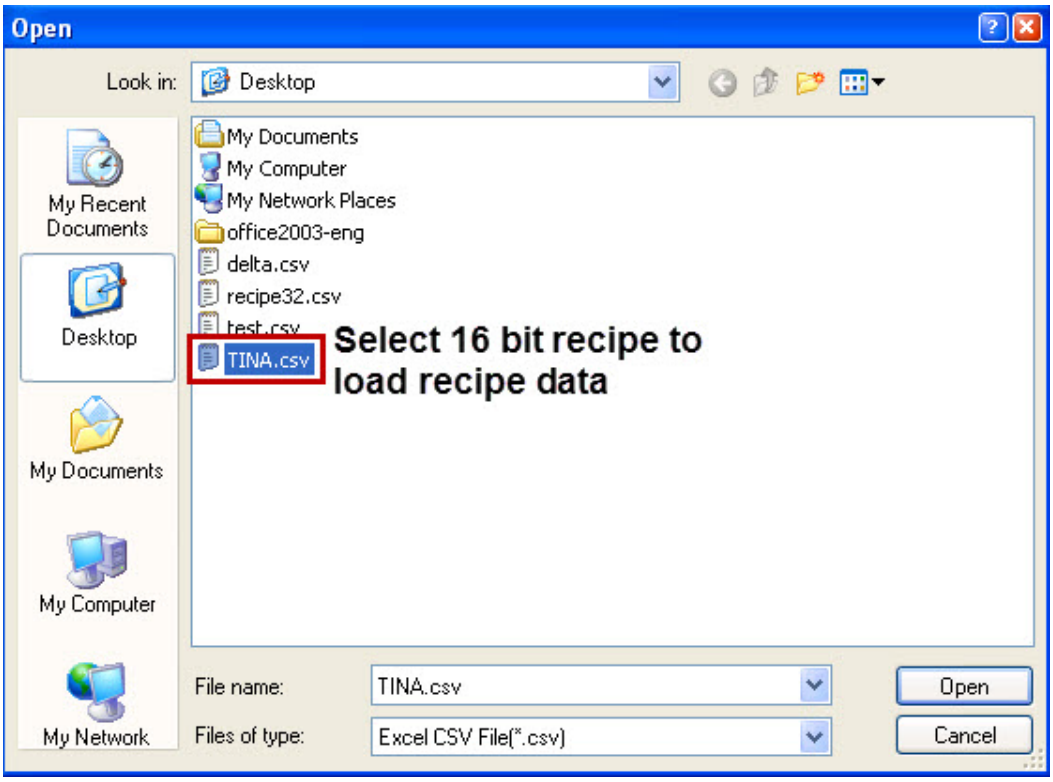


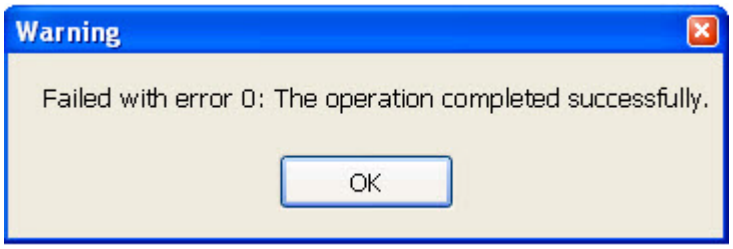
➢ The opened and imported recipe file only provides the content of the recipe data. The address of the recipe does not support loading the

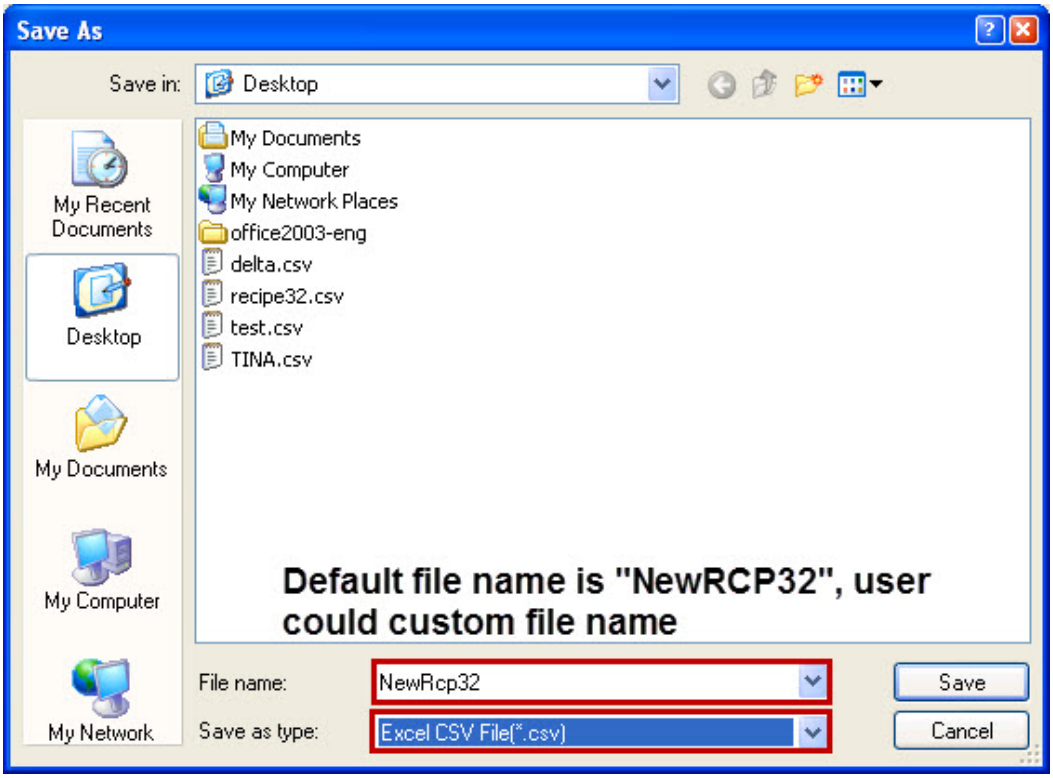
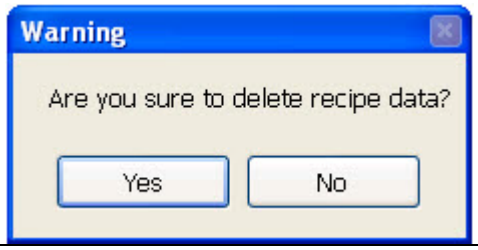
32 bits Recipe Setup Property Description

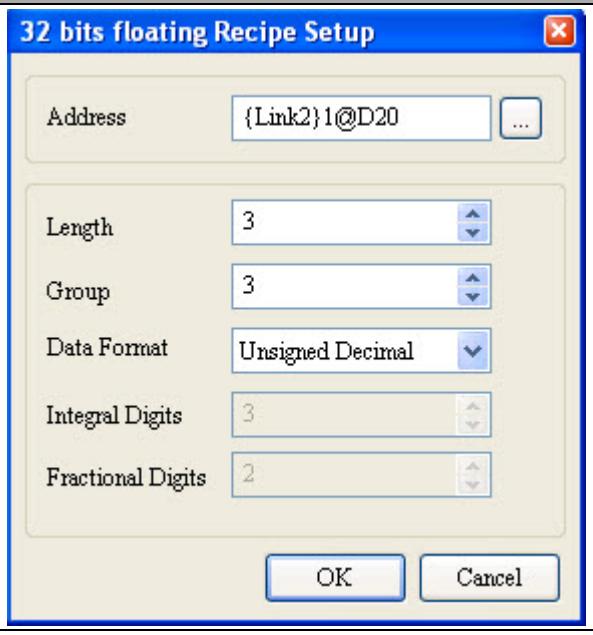
Table 23-2-2 32 bits Recipe Setup Property Description

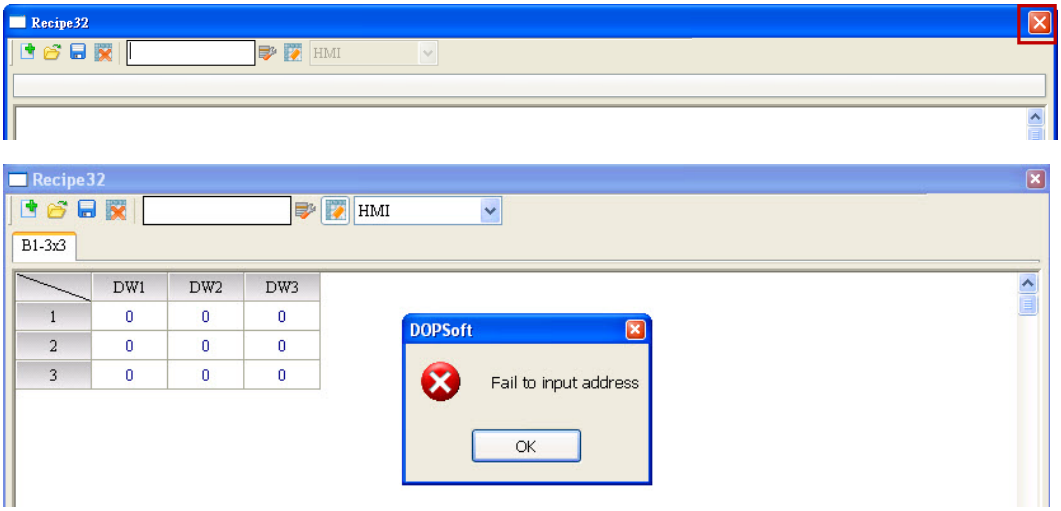
address that was set up previously. If a 16-bit RCP or CSV recipe file is opened as a 32 bits recipe, the data loaded will not be displayed normally and an error message will appear.





32 bits Recipe Setup Property Description Table 23-2-2 32 bits Recipe Setup Property Description	
Save	➢ The [Save] function enables the user to save the current 32 bits recipe. Unlike the Open function, the Save function only supports CSV file format.  ➢ The recipe data that the user saved does not support the recipe address set up by the Save function.
Remove	➢ The [Remove] function is used to remove 32 bits recipe data. When executing the Remove function, a popup window will appear asking the user to conform the removal. 
Setup	➢ The [Setup] function is enabled and operable only when there are data in the 32 bits recipe. This function enables the user to change the length and group sizes as well as data format.

32 bits Recipe Setup Property Description Table 23-2-2 32 bits Recipe Setup Property Description		
		

32 bits Recipe Setup Property Description Table 23-2-2 32 bits Recipe Setup Property Description	
$66	➢ This field is used to enter the recipe address. The user can also use the Add function to enter and set the address.
Retained Area	➢ The [ ] option must be enabled to set the retained area. ➢ The retained area can be HMI, USB Disk or SD Card. ➢ When HMI is selected as the retained area, the data will be recorded in HMI SRAM in case of power-off.
X on the Recipe 32 Window	➢ This function is used to exit the editing window of the recipe data. The data will be saved no matter whether they are changed or not. The recipe address will also be checked for its correctness when pressing X. 

23-3 Indirect Recipe Index Register (*RCP)

Indirect recipe index register can be used by 16 bits and 32 bits register.
Indirect recipe index register (*RCP n) acquires the value from RCP n first. Regard this value as the new address. Then, access the value from the new address. For example, RCP1 = 3, RCP3 = 99, so *RCP1= 99. See figure 23-3-1.

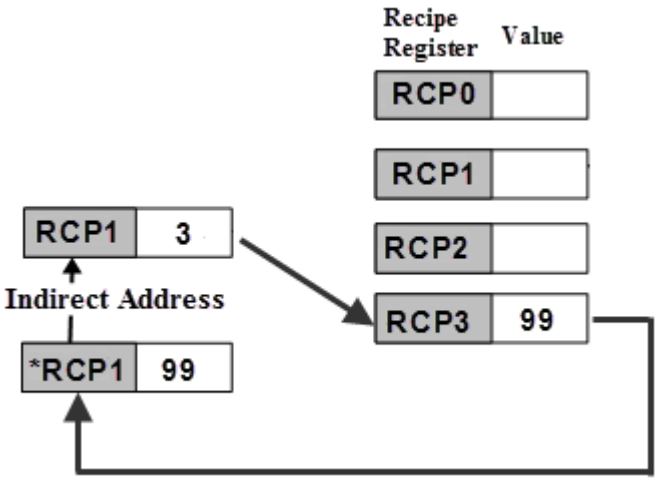


Figure 23-3-1 Recipe Index

The accessing range of indirect recipe index register:

Access Type	Element Type	Access Range
Word	*RCPn	RCP0~RCP65535
Note: n = Word (0-65535)		

Address accessing range provided by *RCP is limited according to the recipe size created by users. Assuming the recipe size is length 3* group 3, then address of RCP is range from *RCP0 to *RCP11. When creating address *RCP12, a warning message will pop up. Please see figure below:

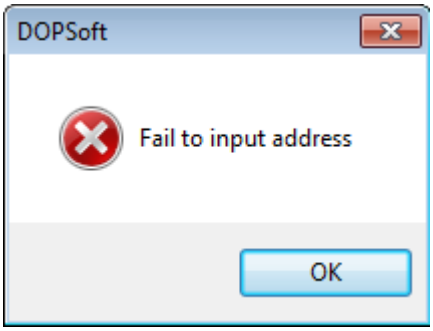
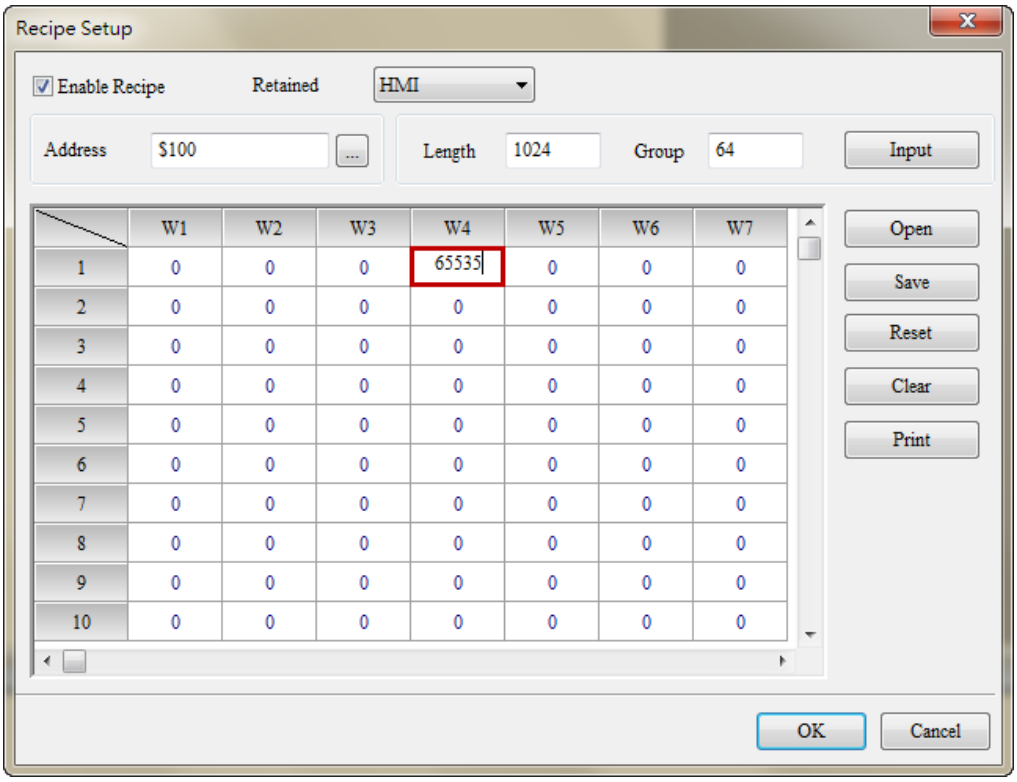
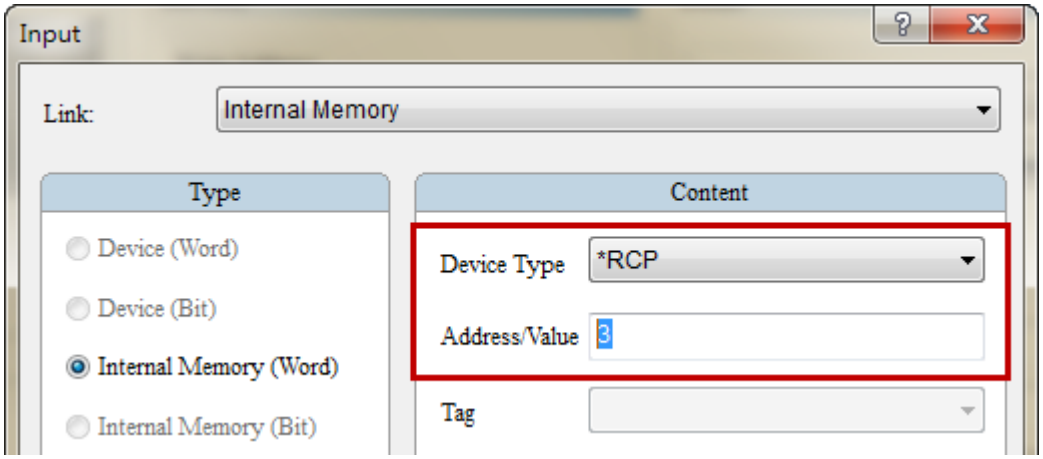
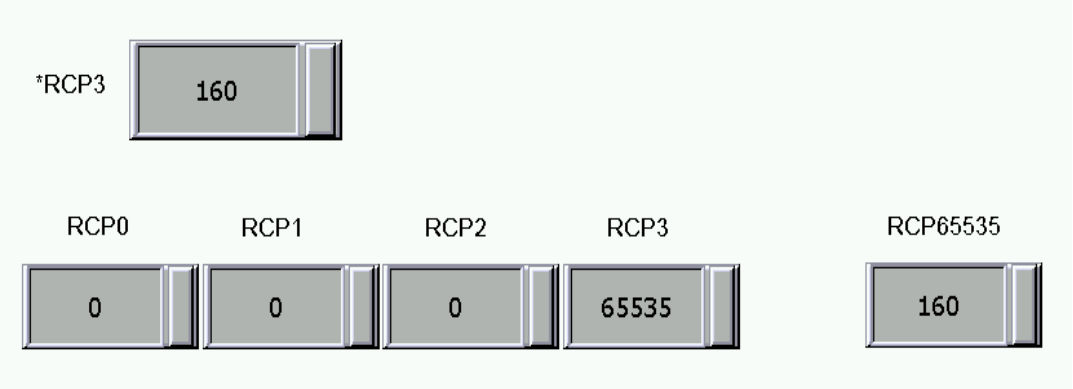


Figure 23-3-2 Indirect Recipe Index Register Configuration

Following will introduce the example of indirect recipe index.

Example of Indirect Recipe Index Register Table 23-3-1 Example of indirect recipe index register	
Sets16 bits recipe	➢ Step1: Create 16 bits recipe (length-1024; group-64) and set RCP3 to 65535. 
Create Numeric Entry Element	➢ Step2: Create numeric entry element and select the device type as *RCP, then enter 3 to address.  ➢ Step 3: Create numeric entry element and select the device type as RCP, then enter 3 to address. ➢ Step 4: Create numeric entry element and select the device type as RCP, then enter 65535 to address. ➢ Step 5: Create Clock macro command *RCP3 = *RCP3 + 1.

Example of Indirect Recipe Index Register Table 23-3-1 Example of indirect recipe index register	
Result	➢ After executing compiling, download it to HMI. Value of *RCP3 and RCP65535 will be increased simultaneously. 

23-4 Enhance Recipe

During production process, sometimes information with character format is needed. Thus, enhance recipe which can record character format (String)/numeric format is provided. Its supported data type is Word or Double Word and its data format can be BCD, Signed Decimal, Unsigned Decimal, Hex, Floating and Char. Among them, the read length of Char format can up to 32 Words (= 64 bits).

The setting method of its control area is the same as 16 bits / 32 bits recipe, but applying different addresses. When reading or writing the recipe, users have to specify the recipe number and recipe group before reading/writing one group of recipes.

NOTE：

✓ B04S211, B05S100, B05S101, B07S201 and B07S211 do not support Enhance Recipe function.

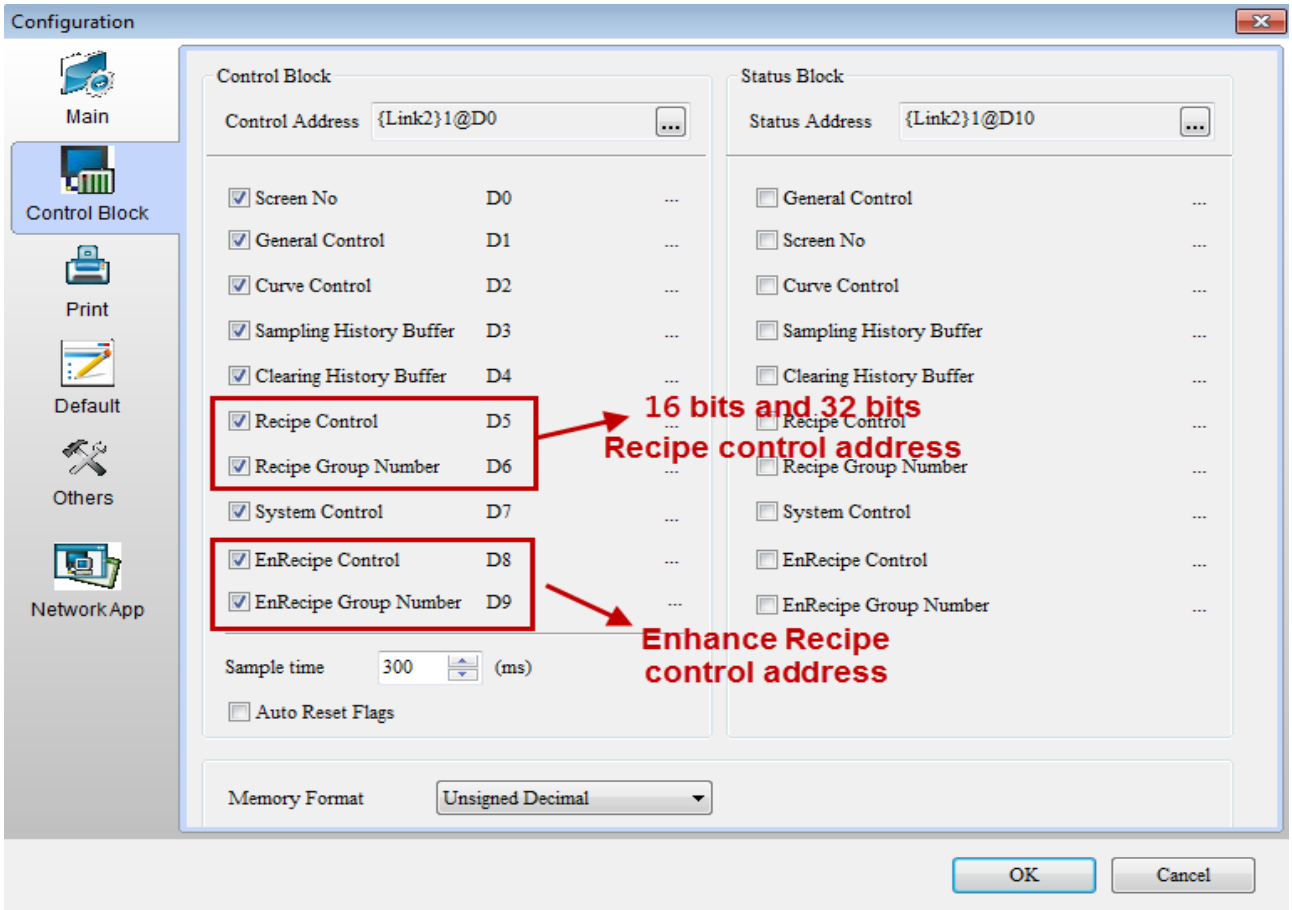


Figure 23-4-1 Using enhance recipe address in control area

Enhance recipe has its own register, including ENRCP, ENRCPNO, ENRCPG and *ENRCP.

ENRCP	Enhance recipe register
ENRCPNO	Enhance recipe number register
ENRCPG	Enhance recipe group register
*ENRCP	Enhance indirect recipe index register

Followings will introduce features of each register that mentioned above.

■ Enhance Recipe Number Register (ENRCPNO)

ENRCPNO is used to specify the group for the Enhance Recipe. Read/write of the recipe means to read/write a group of recipes according to the group assignment in the recipe number register. When the first group of recipes is selected, ENRCPNO = 1; when the fourth group of recipes is selected, ENRCPNO = 4.

NOTE:

✓ The recipe number register does not provide the non-volatile function, and the data in the register cannot be maintained when HMI is powered off.

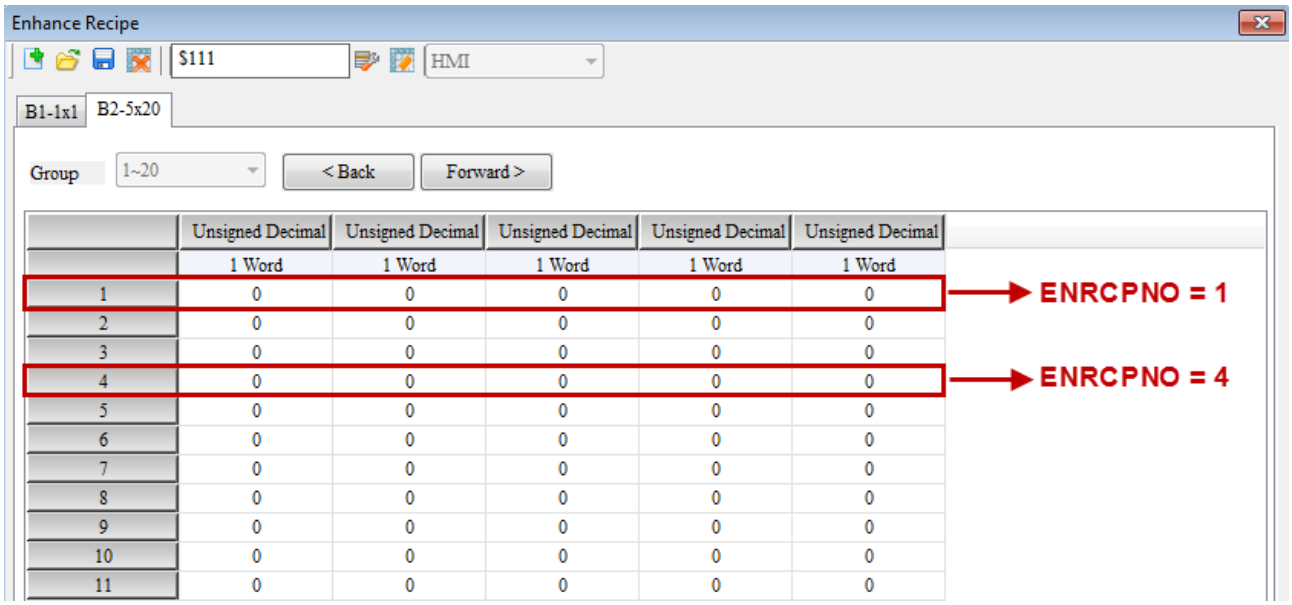


Figure 23-4-2 Enhance Recipe Number Editing Screen

■ Enhance Recipe Register (ENRCP)

A recipe buffer is provided in HMI and configured in the utmost front of the register. This buffer is used to store the recipe of the group that the user selected. The length of the buffer is equal to the length of the selected recipe, indicating that the recipe buffer occupies a number of registers equal to L. The number of the registers that a recipe form occupies is L * (G+1), where G+1 stands for the additional register for the buffer. With the recipe buffer, the user only needs to switch between the groups to check the currently specified recipe parameter. When the selected recipe group (ENRCPNO) is 1, the recipe value of Group 1 will be displayed in the recipe buffer (i.e. ENRCPNO = 1 in the figure below).

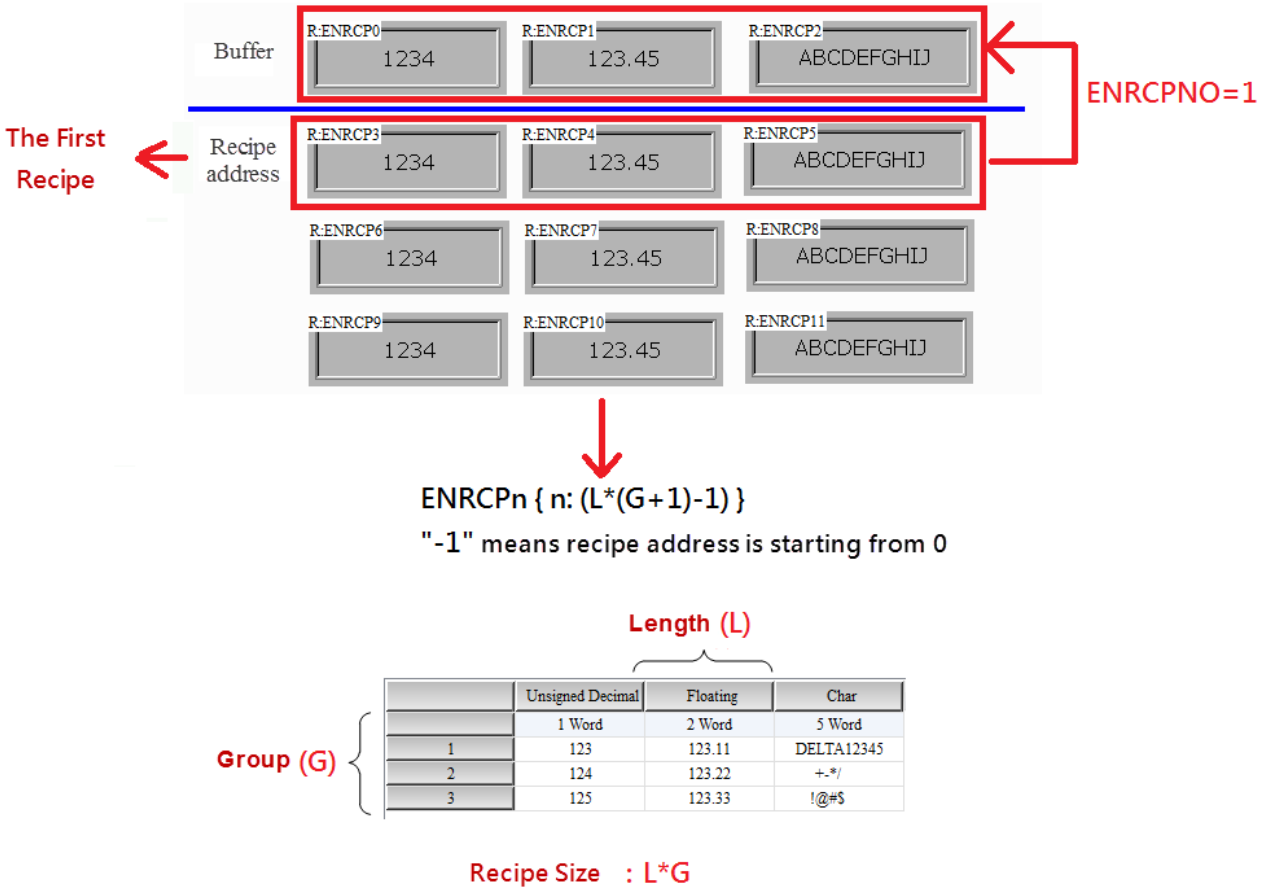


Figure 23-4-3 Enhance Recipe Buffer Area Configuration

■ Enhance Recipe Group Register（ENRCPG）

ENRCPG is used to specify enhance recipe group. Up to 255 groups of enhance recipe data can be created. ENRCPG 1~255 (RCPG 1~255) must be used to call enhance recipe data. If enhance recipe is activated, the default value of recipe group is 1.

When the first group of recipes in the first grouping is selected, ENRCPG = 1 and ENRCPNO = 1; when the third group of recipes in the second grouping is selected, ENRCPG = 3 and ENRCPNO = 2.

NOTE:

✓ The recipe number register does not provide the non-volatile function, and the data in the register cannot be maintained when HMI is powered off.

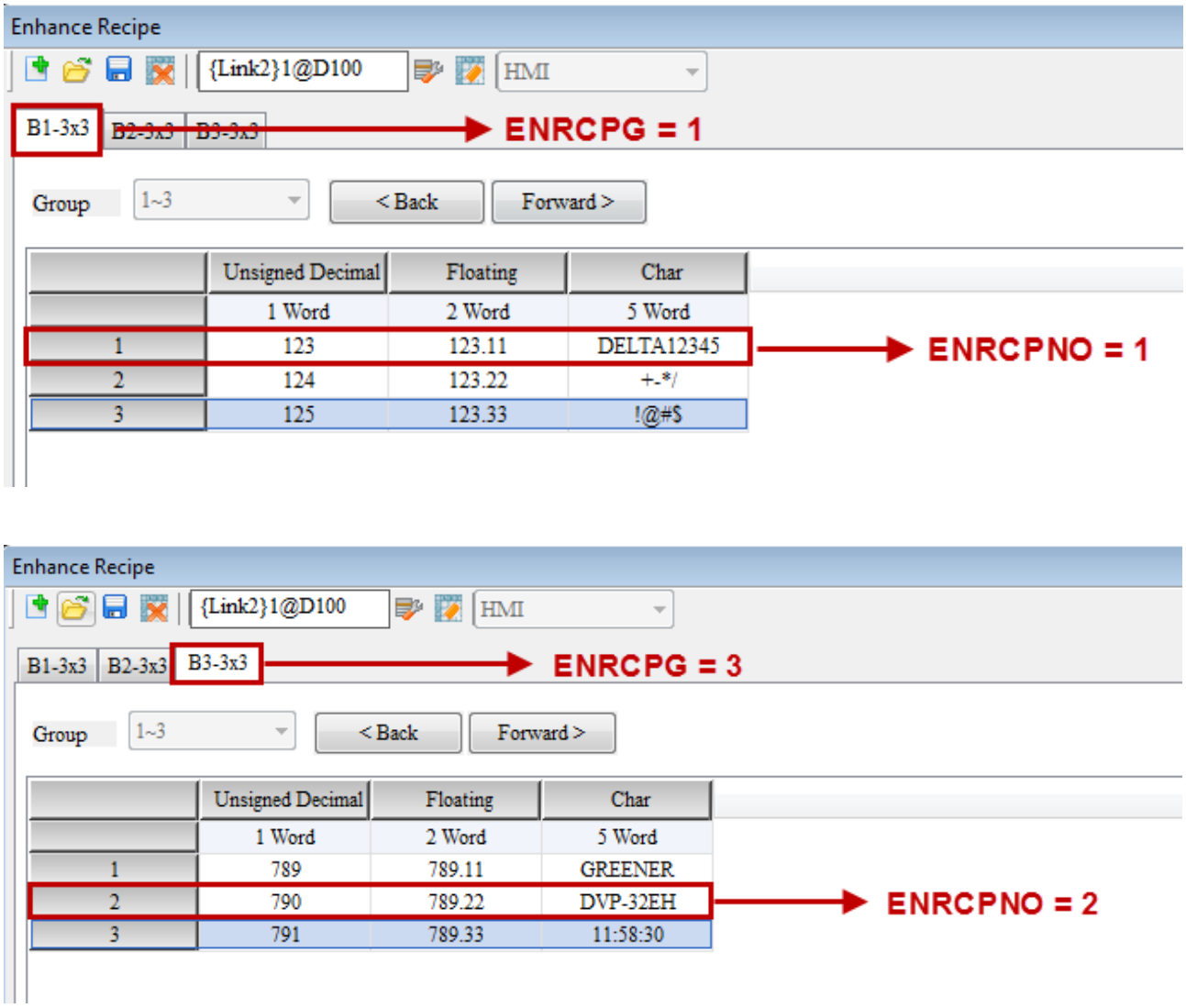
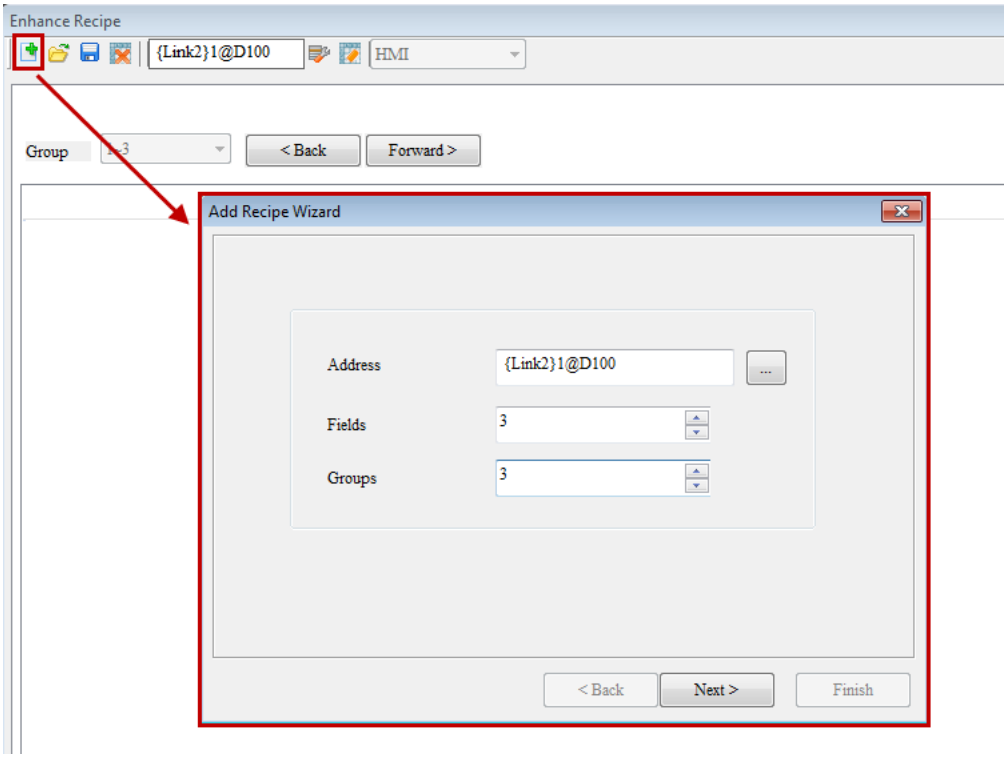


Figure 23-4-4 Recipe Group Editing Screen

■ Enhance Recipe Size Limit

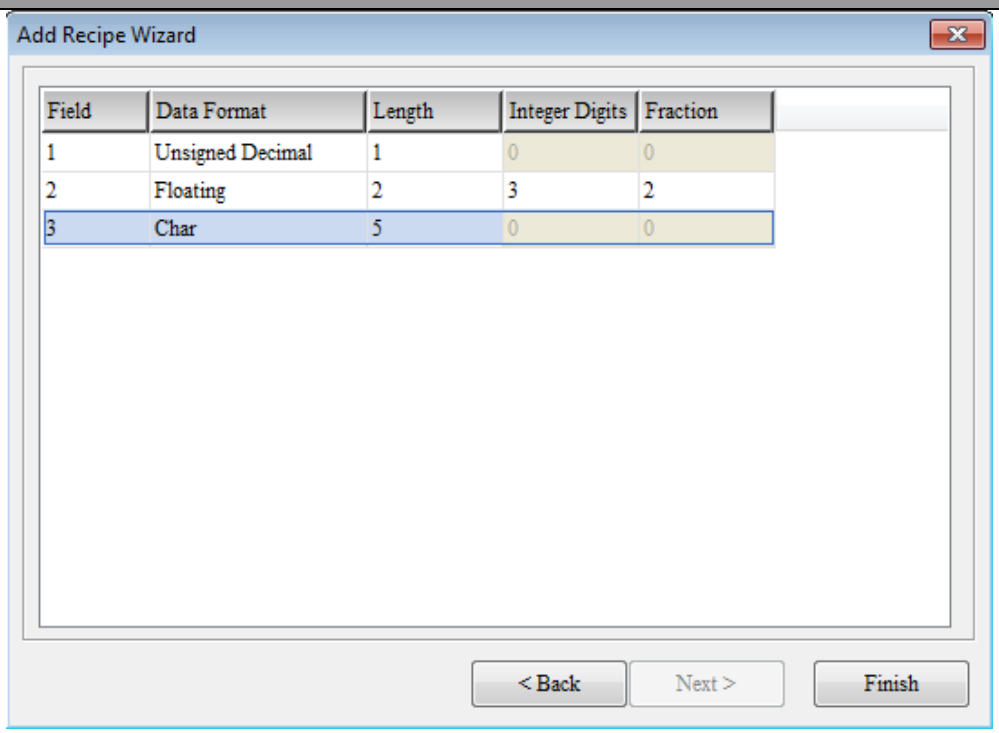
If the retained area is set to USB Disk or SD Card, the recipe size limit is Fields 256 X Groups 10000; if the retained area is set in HMI, the editing size of enhance recipe is determined by the specification of flash memory.

Please refer to table 23-4-1 below for example of enhance recipe.

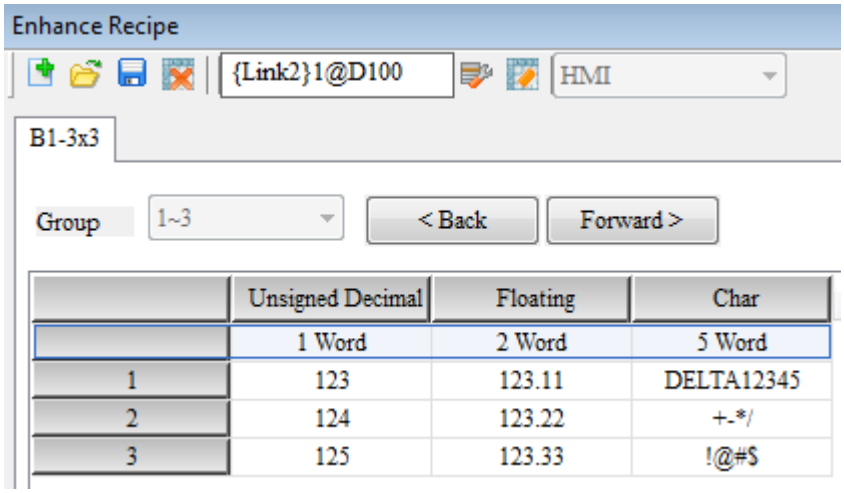
Example of Enhance Recipe Table 23-4-1 Example of enhance recipe	
Setup Enhance Recipe	➢ Step 1: Enter【Option】→【Enhance Recipe】。 ● Click to Add Recipe Wizard.  ● Set the recipe address as {Link2}1@D100. ● Setup field length 3 and group 3 of the first recipe. Field and group number cannot be 0. ● Setup different value format and read length base on different fields. The first field sets Unsigned Decimal format and the read length is 1. The second field sets Floating format and the read length is 2. Set its integer digits to 3 and fractional digits to 2. The third field sets Char format and the read length is 5.

Example of Enhance Recipe

Table 23-4-1 Example of enhance recipe

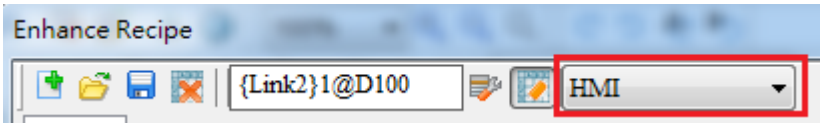


- Step 2: Click “Finish” and enter recipe data. See as below:



- Step 3: Activate enhance recipe function.

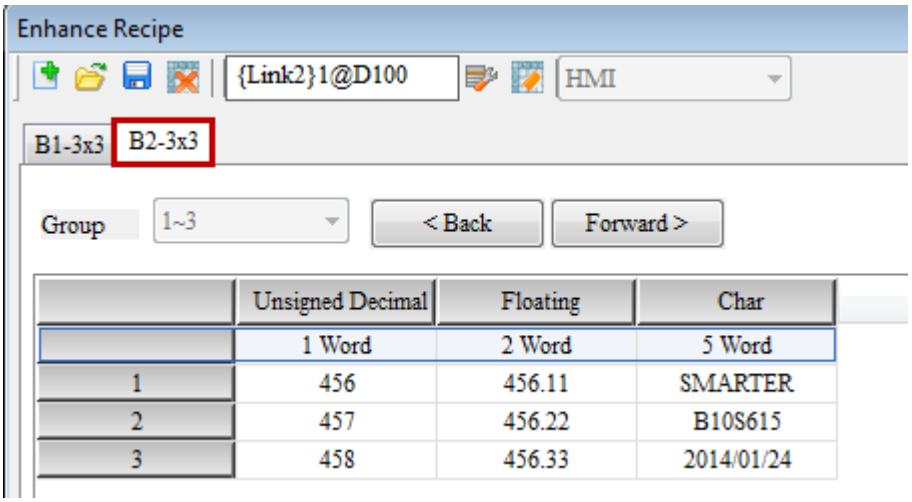
- Step 4: Set retained area as HMI.



- Step 5: Repeat Step 1 and Step 2 to set length 3 and group 3. The recipe data is shown as below:

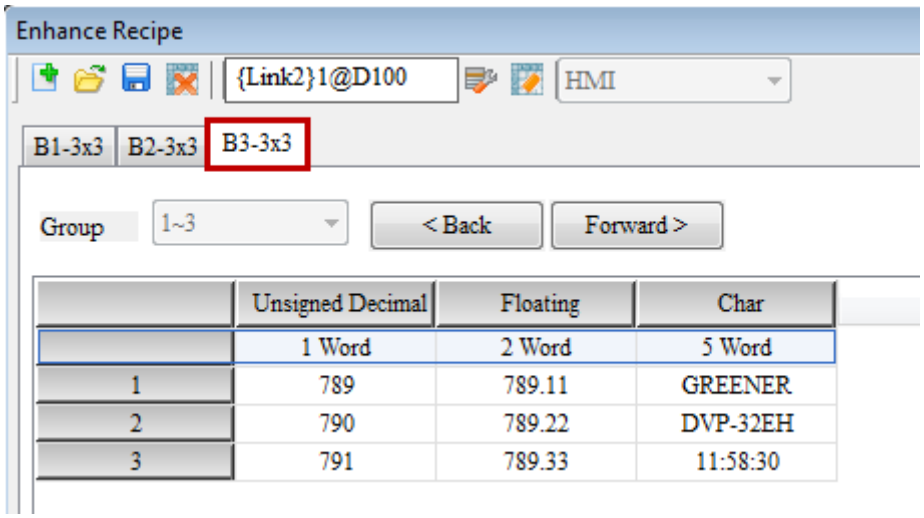
Example of Enhance Recipe

Table 23-4-1 Example of enhance recipe

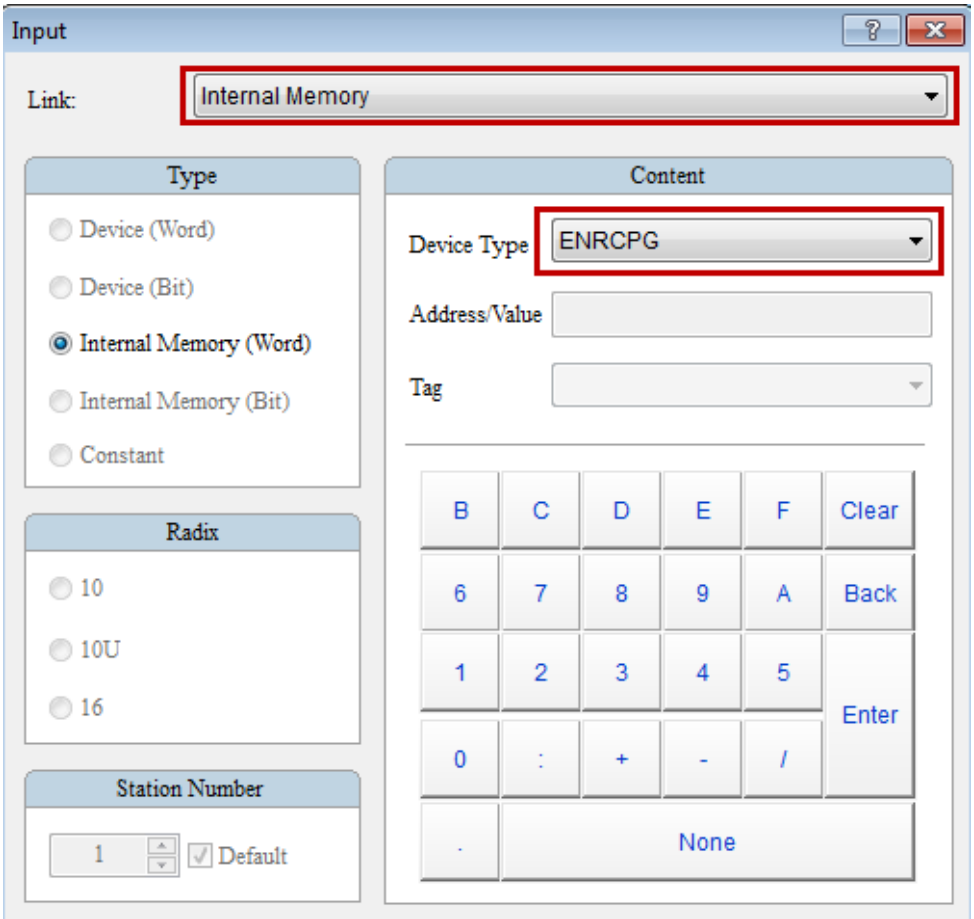


	Unsigned Decimal	Floating	Char
	1 Word	2 Word	5 Word
1	456	456.11	SMARTER
2	457	456.22	B10S615
3	458	456.33	2014/01/24

➢ Step 6: Repeat Step 1 and Step 2 to set length 3 and group 3. The recipe data is shown as below:

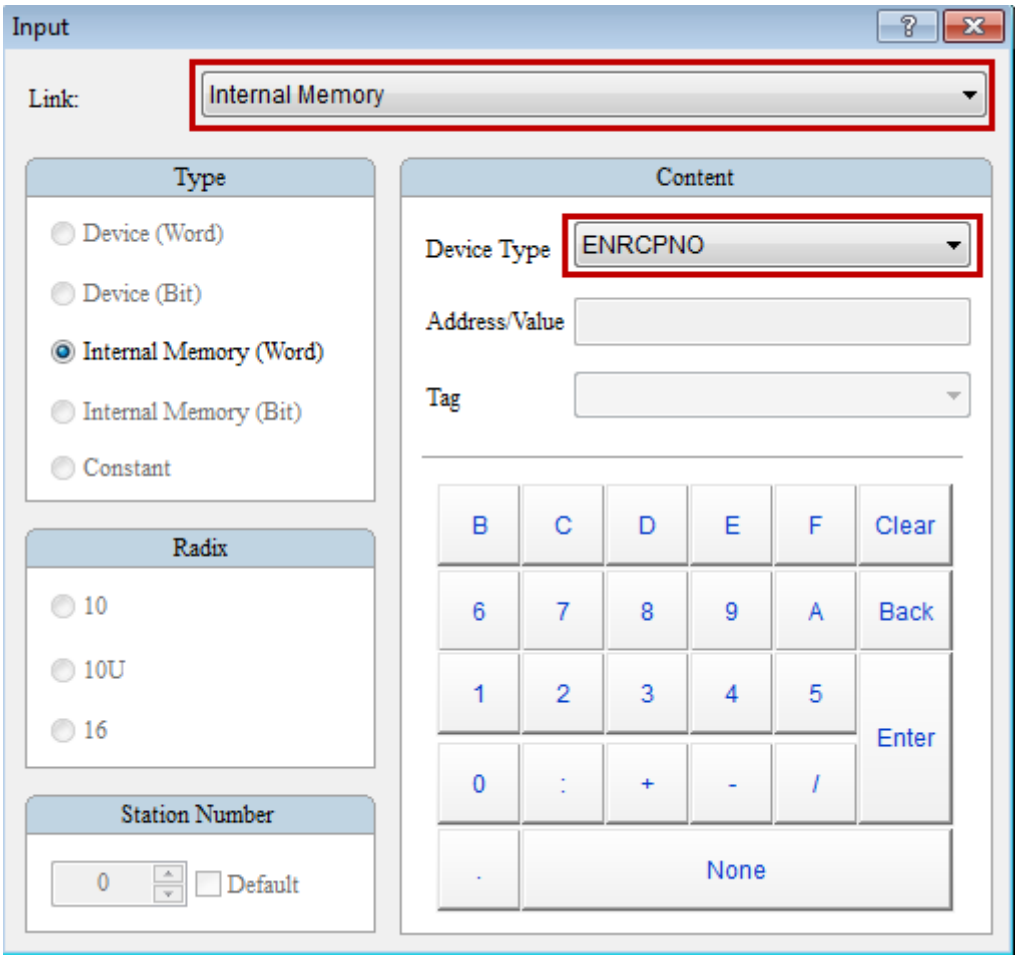


	Unsigned Decimal	Floating	Char
	1 Word	2 Word	5 Word
1	789	789.11	GREENER
2	790	789.22	DVP-32EH
3	791	789.33	11:58:30

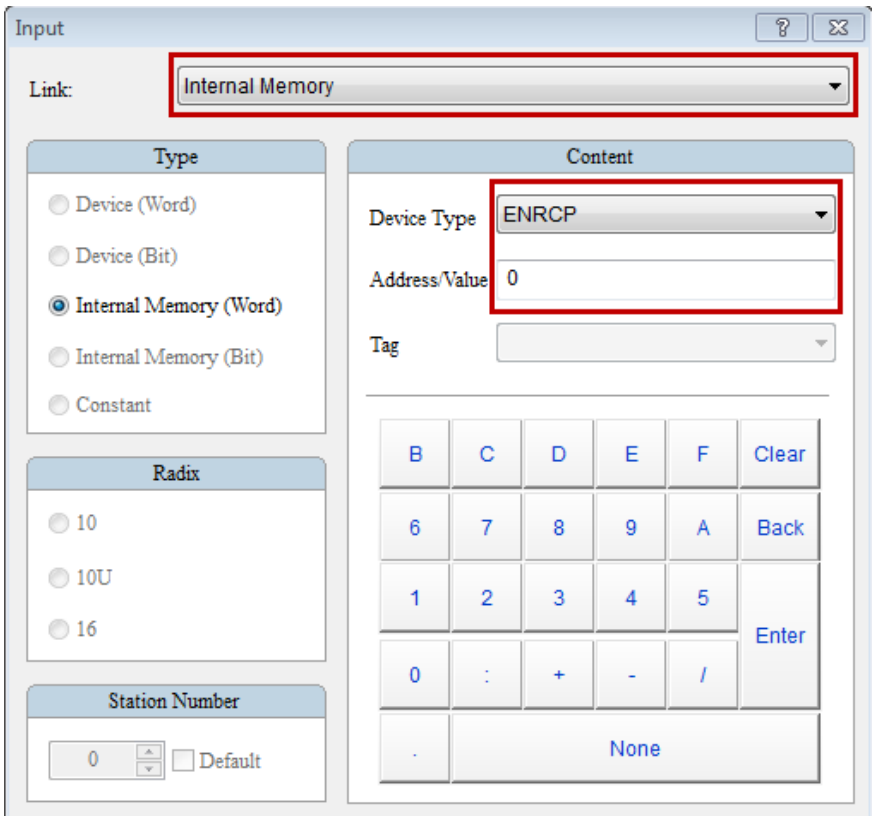
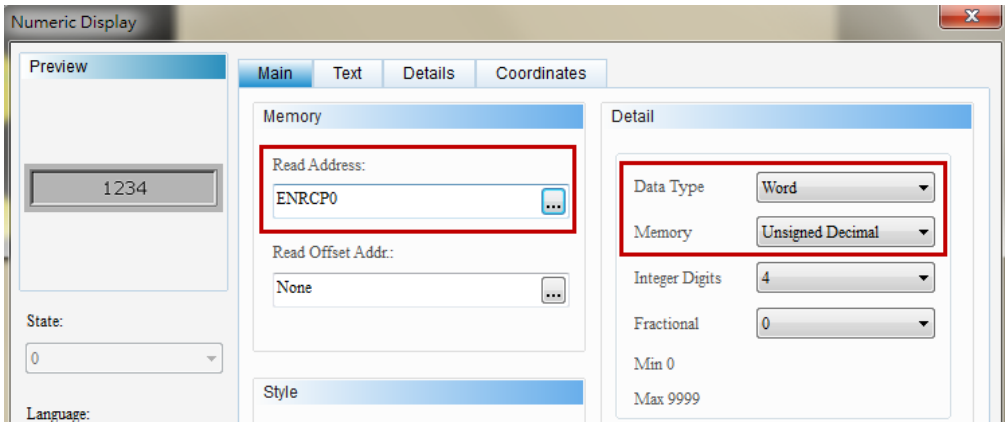
Example of Enhance Recipe Table 23-4-1 Example of enhance recipe	
Create Numeric Entry Element	➢ Create one numeric entry element. Set the Write Address to Internal Memory. Choose ENRCPG as device type, which is used for selection of enhance recipe grouping.  ➢ The following is displayed when the creation is completed. ➢ Create one numeric entry element. Set the Write Address as Internal Memory. Choose RCPNO as device type, which is used for selection of recipe grouping.

Example of Enhance Recipe

Table 23-4-1 Example of enhance recipe

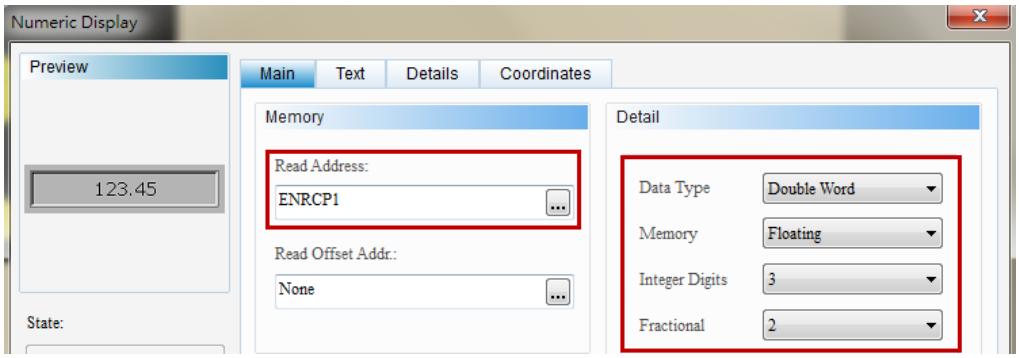


➢ The following is displayed when the creation is completed.

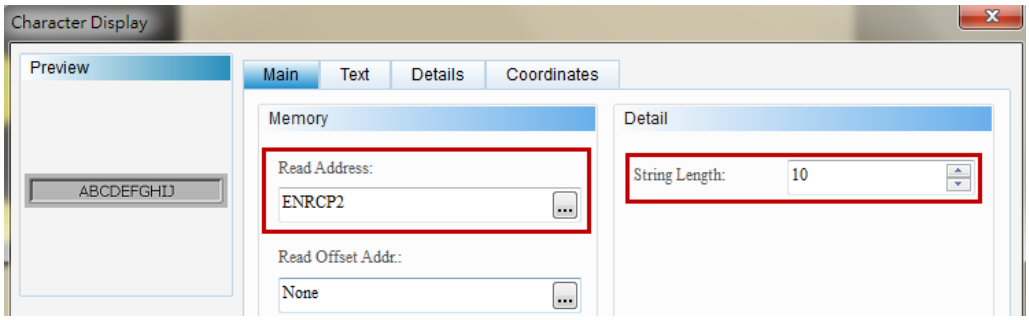
Example of Enhance Recipe Table 23-4-1 Example of enhance recipe	
Create Numeric Display Element	➢ Step 1: Before the numeric display element is created to display enhance recipe register, users can use the recipe register formula [(L*(G+1)-1) }] to gain the number that n in ENRCPn represents. Put the size of the recipe (L*G = 3 x 3) in the formula to gain ENRCPn = ENRCP0~ENRCP11. ➢ Step 2: Create 1 numeric display element and set the Read Address to Internal Memory ENRCP0. Setup the presentation method according to field 1 of recipe table. Data type is Word and memory is Unsigned Decimal.   ➢ Step 3: Create a numeric display element and set its read address as ENRCP1 of Internal Memory. Setup its presentation method base on recipe field 2. Data type is Double Word and memory format is floating. Then, set the integer digits to 3, fractional to 2.

Example of Enhance Recipe

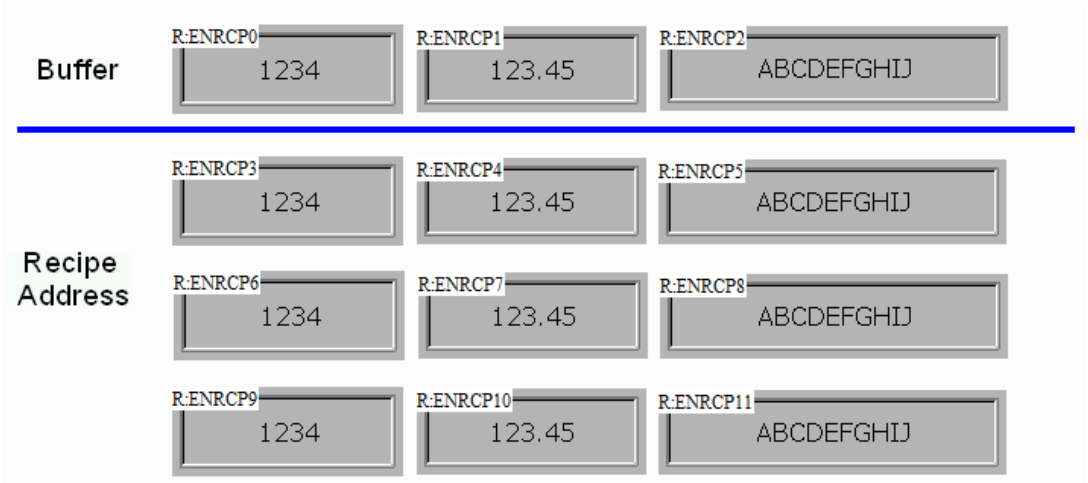
Table 23-4-1 Example of enhance recipe



- Step 4: Create one character display element. Set the Read Address to ENRCP2 of Internal Memory. Setup its presentation method base on recipe field 3. And set the string length to 10 (The length of 1 word can store two bits.)



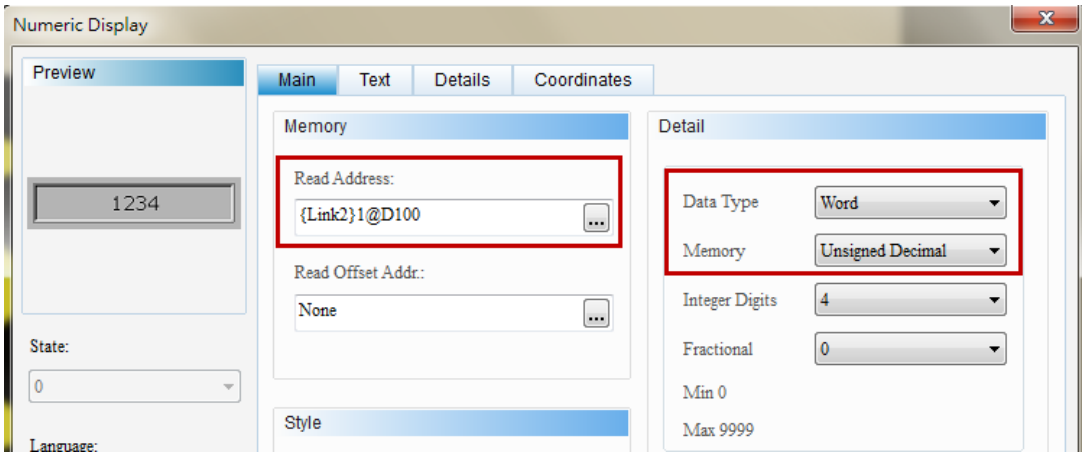
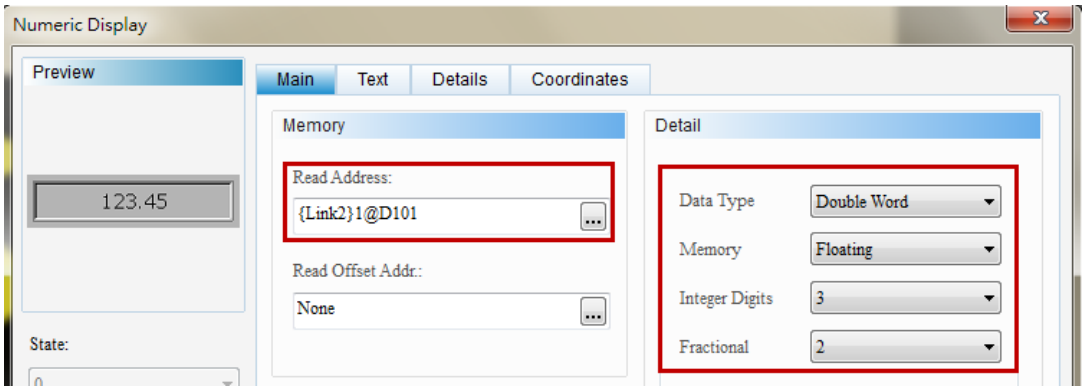
- Step 5: Repeat Step2 ~ Step4 and so on. The display element is range from ENRCP3 to ENRCP11. Then, setup the memory format.
- The following is displayed when the creation is completed.



NOTE:

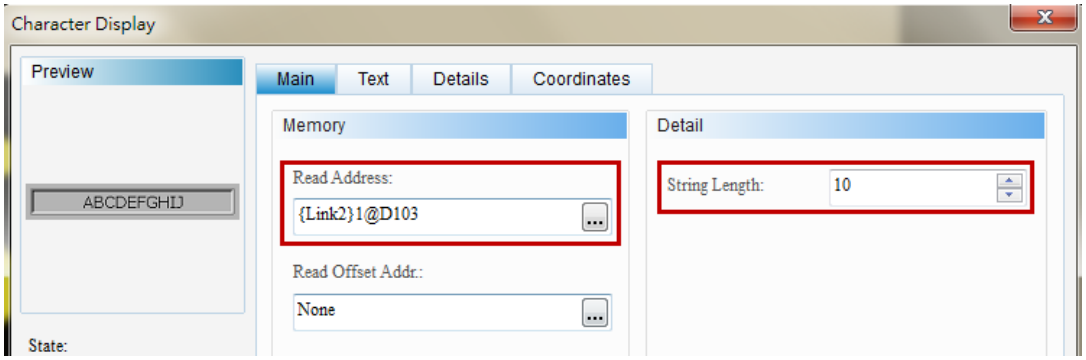
- ✓ ENRCP0 ~ ENRCP2 are the buffer areas of recipe. The actual recipe data is ENRCP3 ~ ENRCP11. Please refer to Figure 23-4-3 Enhance

Example of Enhance Recipe Table 23-4-1 Example of enhance recipe	
	Recipe Buffer area configuration for further details.

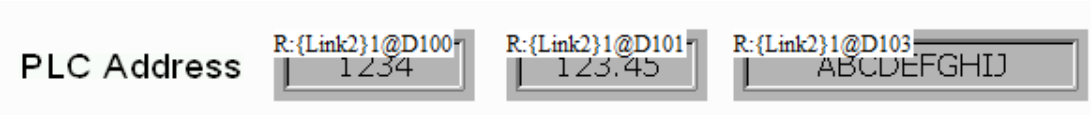
Example of Enhance Recipe Table 23-4-1 Example of enhance recipe	
Create Numeric Display Element	➢ Create a numeric display element and refers to the address set by enhance recipe. When reading or writing PLC recipe, it will display the change of data. Each field length of enhance recipe is not fixed. Thus, users have to setup PLC address base on the recipe table. For example, first field of the recipe table is in Unsigned Decimal format and its read length is 1. So, the read address is set to D100, data type is Word and memory format is Unsigned Decimal.  ➢ Create a numeric display element. Its read address is D101, data type is Double Word and memory format is floating. Its integer digits is set to 3 and fractional is 2.  ➢ Create a character display element and set the string length to 10.

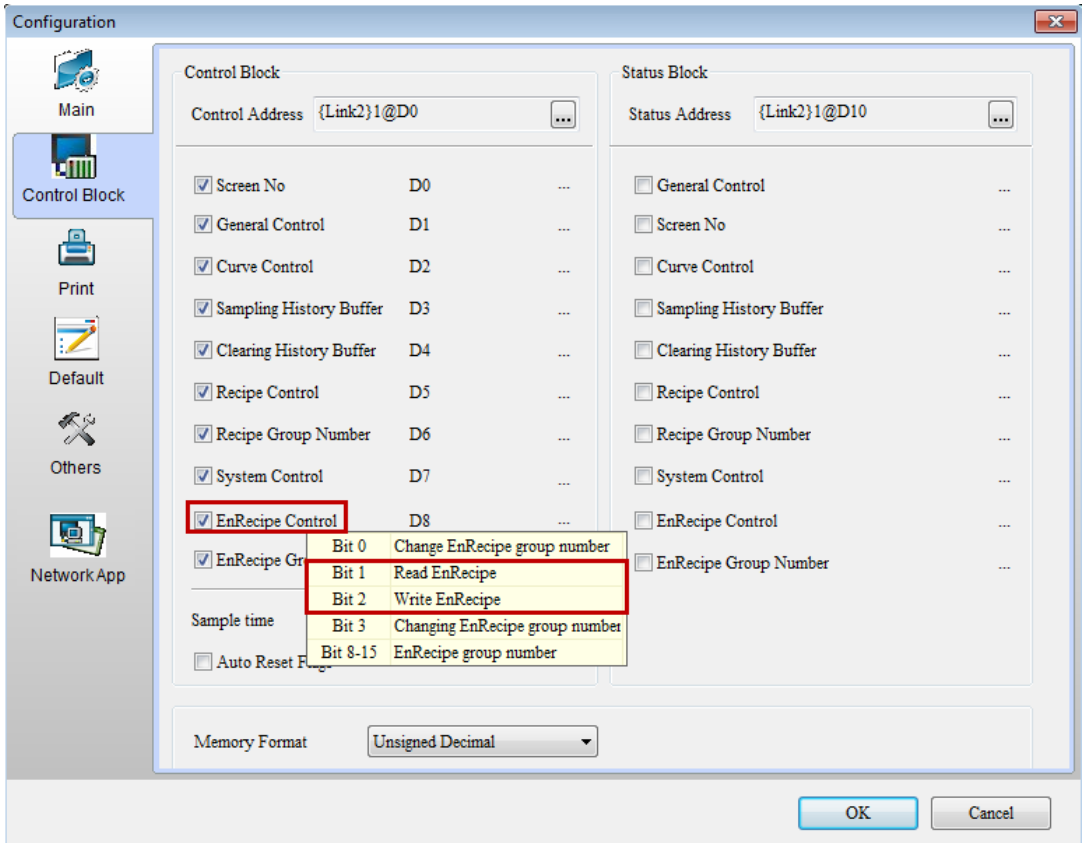
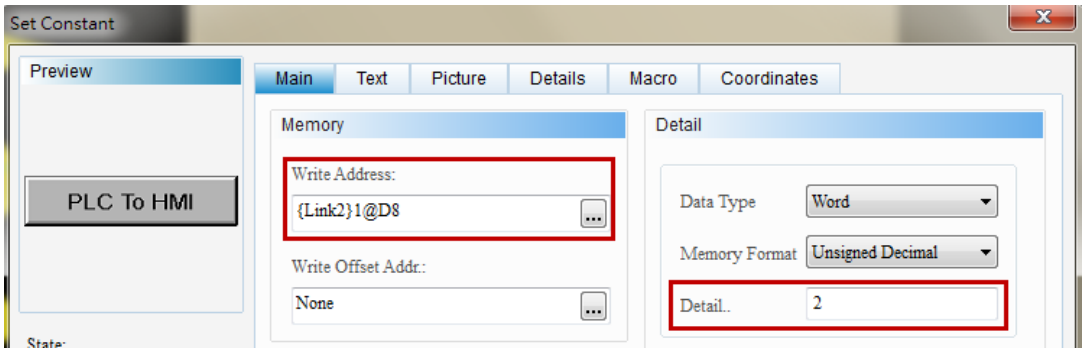
Example of Enhance Recipe

Table 23-4-1 Example of enhance recipe



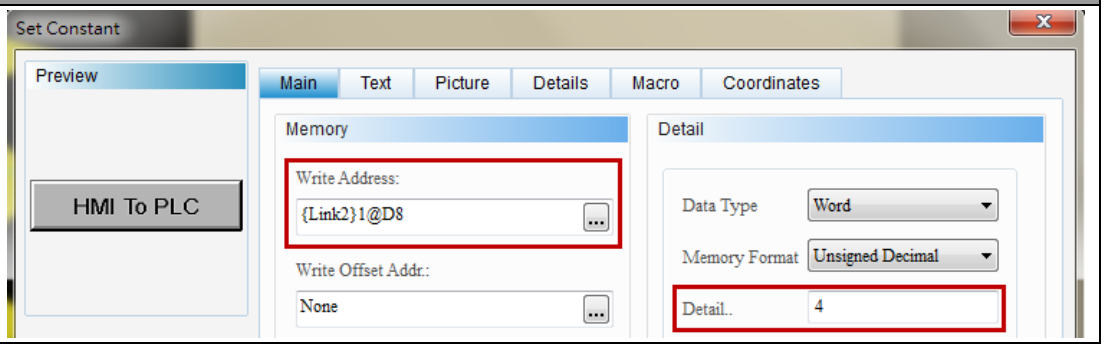
➢ The following is displayed when the creation is completed.

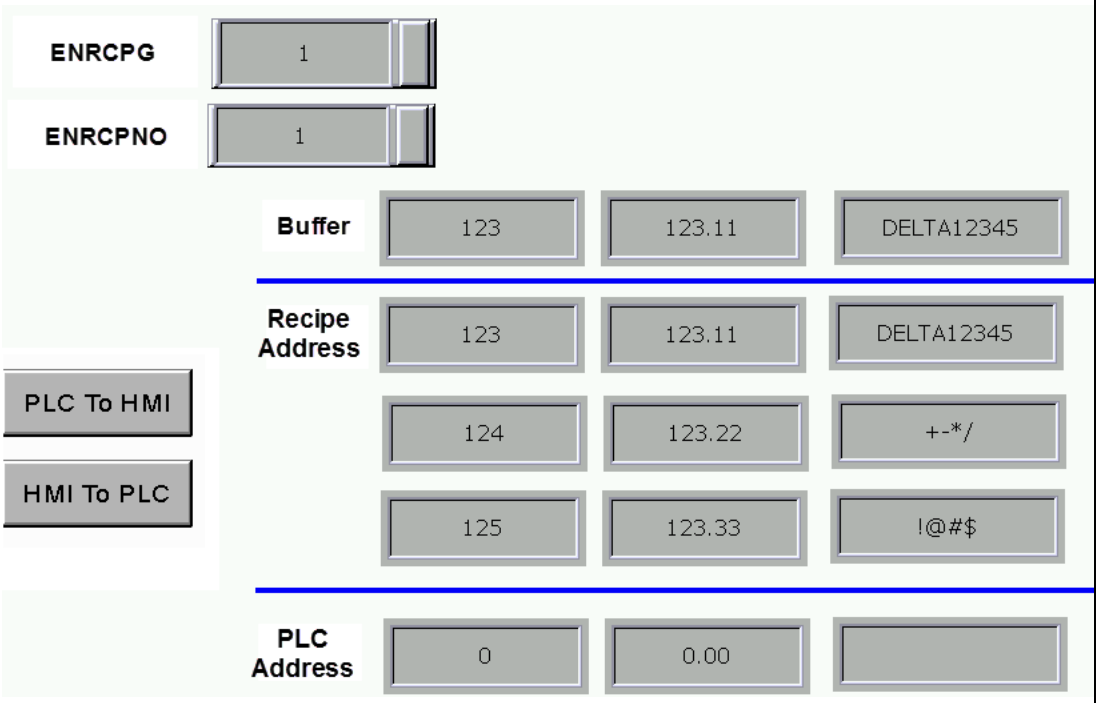


Example of Enhance Recipe Table 23-4-1 Example of enhance recipe	
Set Recipe Control Flag in Control Block	➢ Enter [Options] → [Configuration....] → [Control Block] and check the [EnRecipe Control] flag. Set the Control Address in the Control Block to define Enhance Recipe Control address. After the setting is completed, click [OK] to leave the Configuration Window. 
Create Set Constant Button Element	➢ Create 2 set constant buttons. Set the Write Address to D8 and the setting value to 2 and 4, respectively, corresponding to Bit 1 and Bit 2 of the Enhance Recipe Control flag D8. This setup is used for read and write of the recipe. 

Example of Enhance Recipe

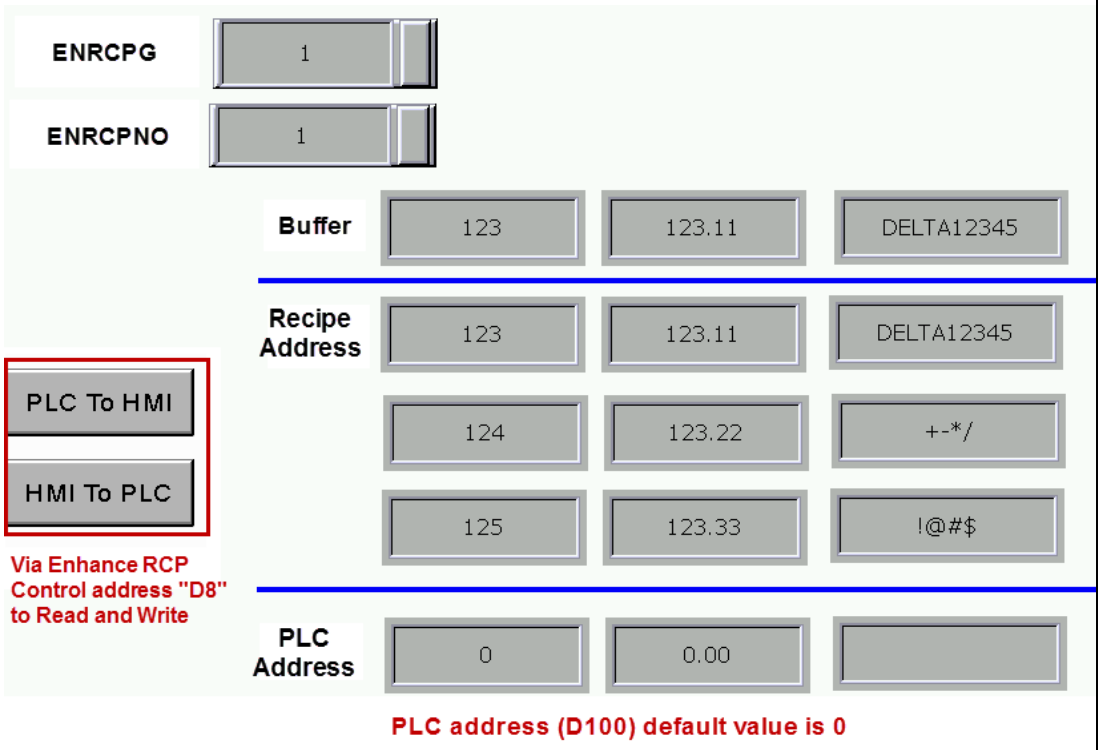
Table 23-4-1 Example of enhance recipe



Example of Enhance Recipe Table 23-4-1 Example of enhance recipe	
Result	➢ After creation of all elements, perform the compilation and download the screen data and recipe to HMI. After enhance recipe number is loading into HMI, its default value is 1. To display different number, users can select different enhance recipe number according to different demands.  The recipe data will be displayed in the created ENRCP0~ENRCP11 with reference to the selected recipe group. The ENRCP0~ENRCP2 created are the recipe buffers and the start address for the first group of recipe data are ENRCP3.

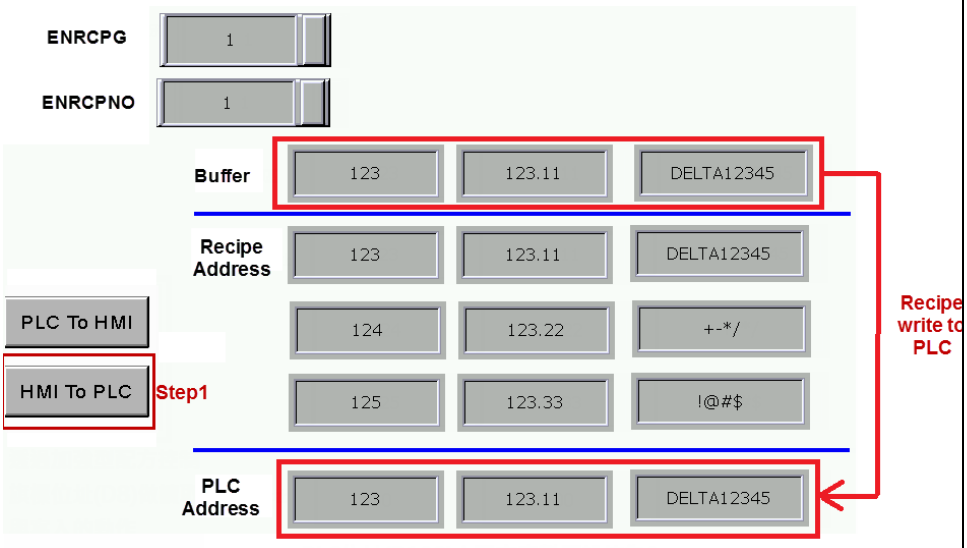
Example of Enhance Recipe

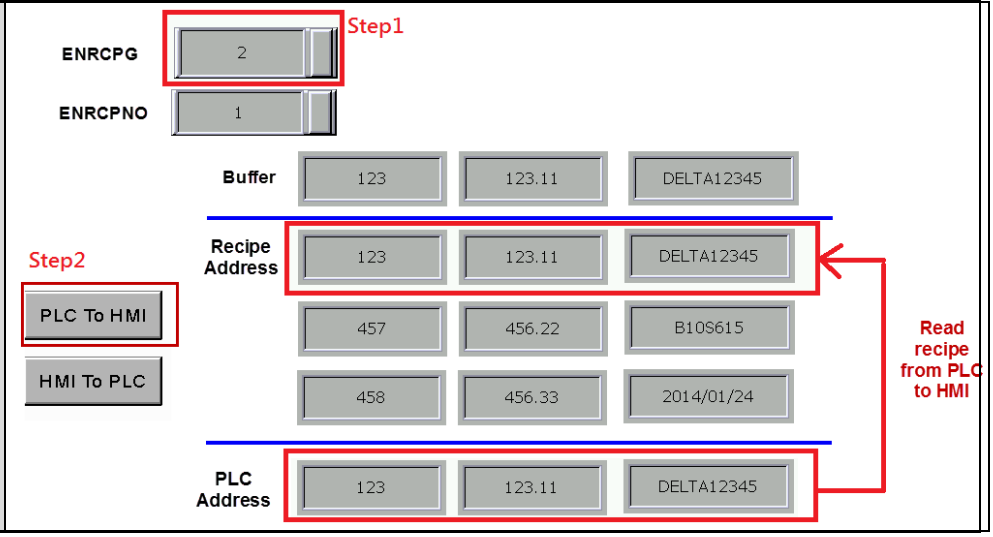
Table 23-4-1 Example of enhance recipe



Activate “HMI to PLC” button and the recipe data of the selected group will be written to PLC. Activate “PLC to HMI” button and the recipe data that were written to the PLC will be read back to HMI with reference to the selected enhance recipe group. The recipe data will be changed to match the content of the selected group.

Recipe Write (HMI to PLC)

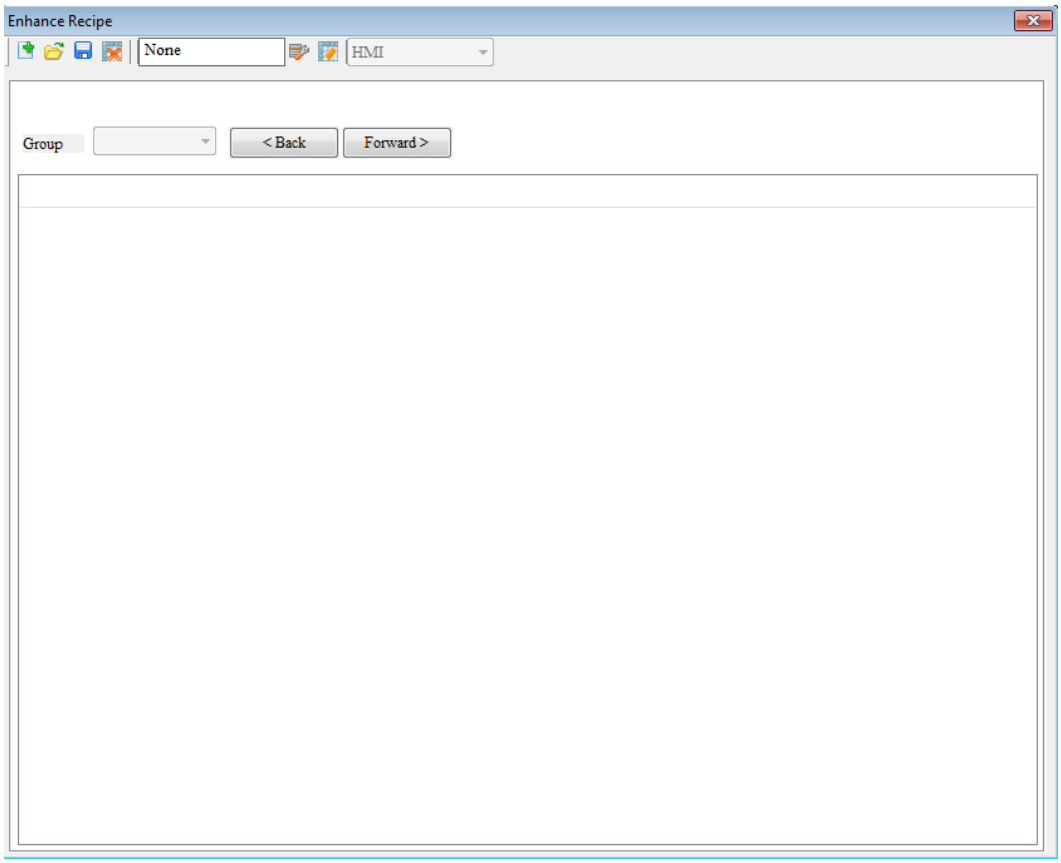


Example of Enhance Recipe Table 23-4-1 Example of enhance recipe		
	Recipe Read (PLC to HMI)	

Followings will introduce the property set by enhance recipe.

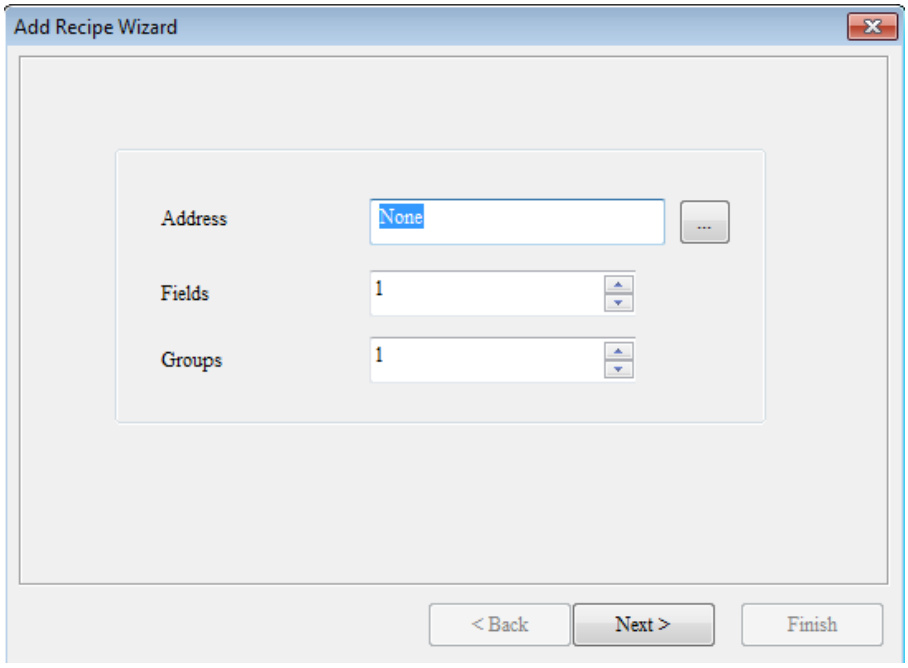
Property Set by Enhance Recipe

Table 23-4-2 Property set by enhance recipe



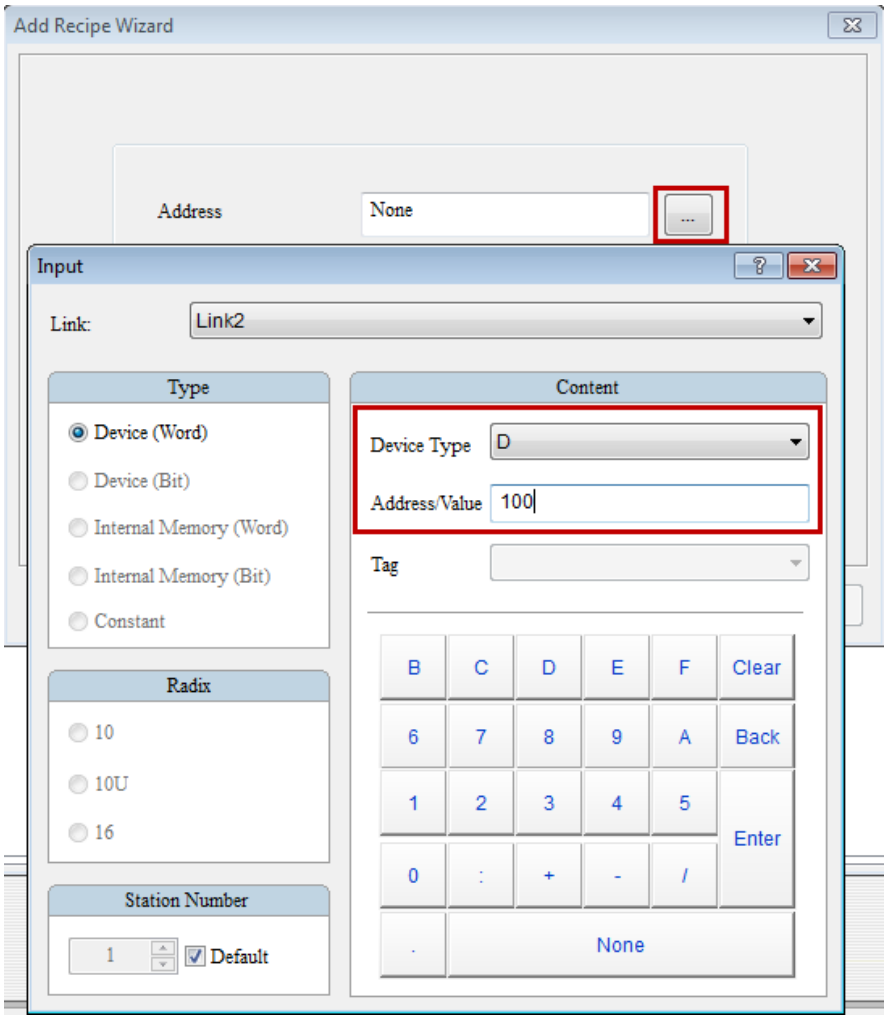
Add

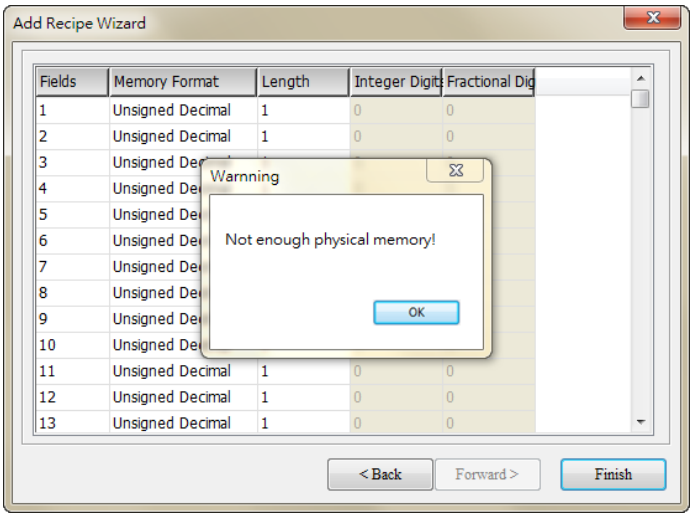
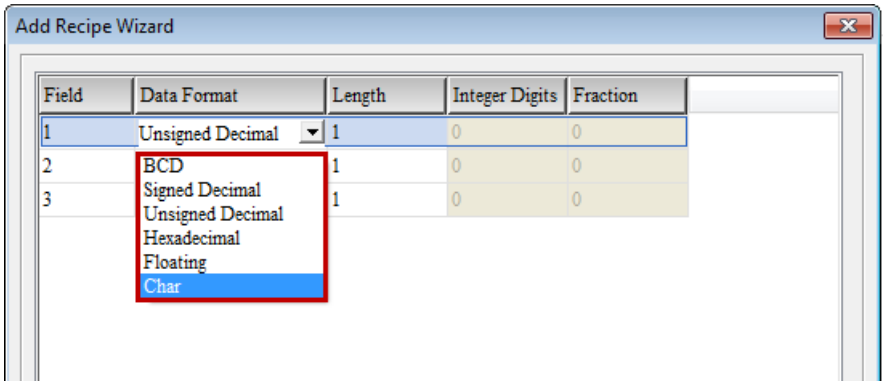
- Go to enhance recipe window, please click to add enhance recipe data.



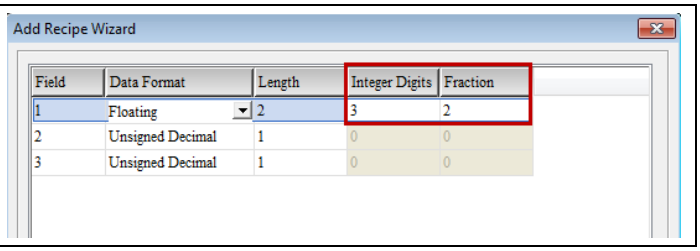
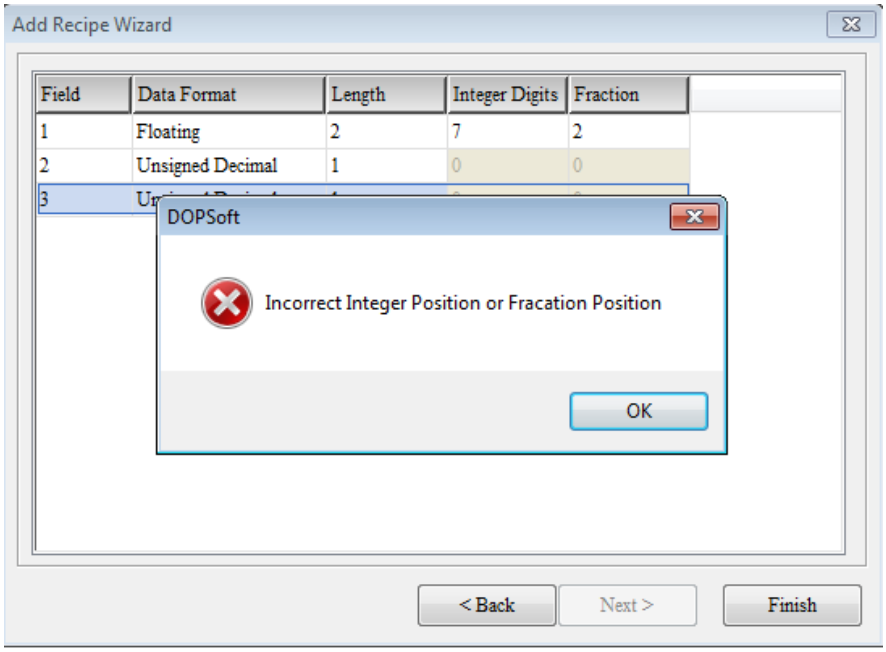
- Through , users can add 255 groups of enhance recipe data.

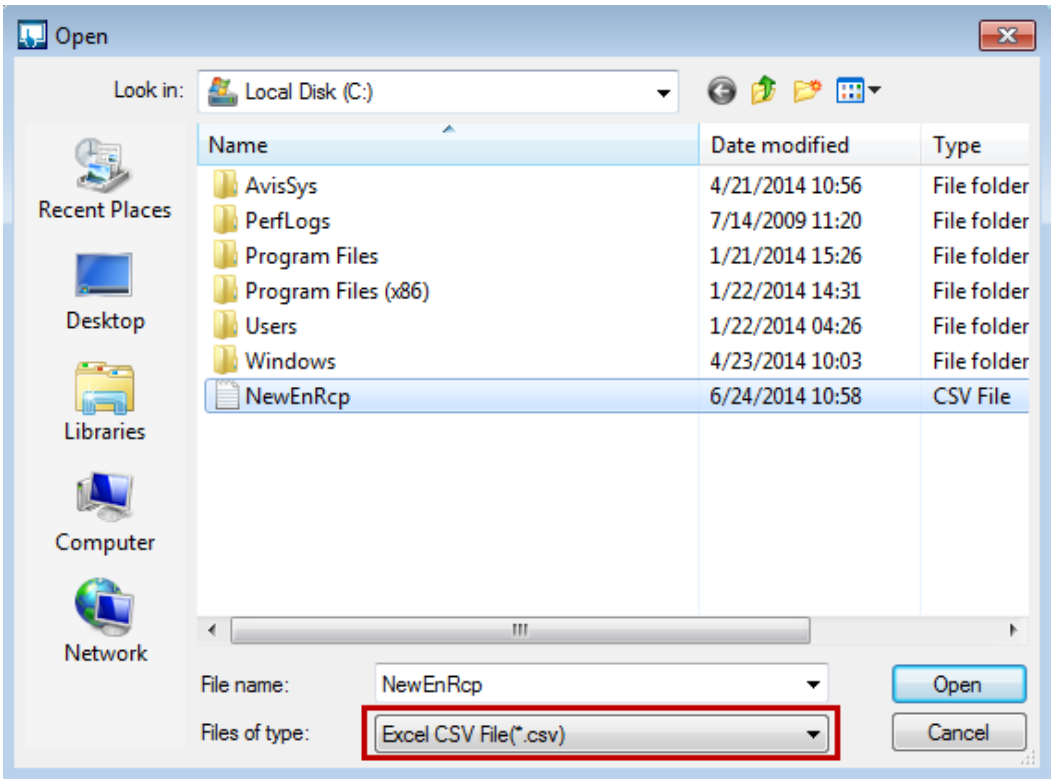
Address	➢ Choose internal memory or control address. ➢ Select the connection name (Link) or device type. Please

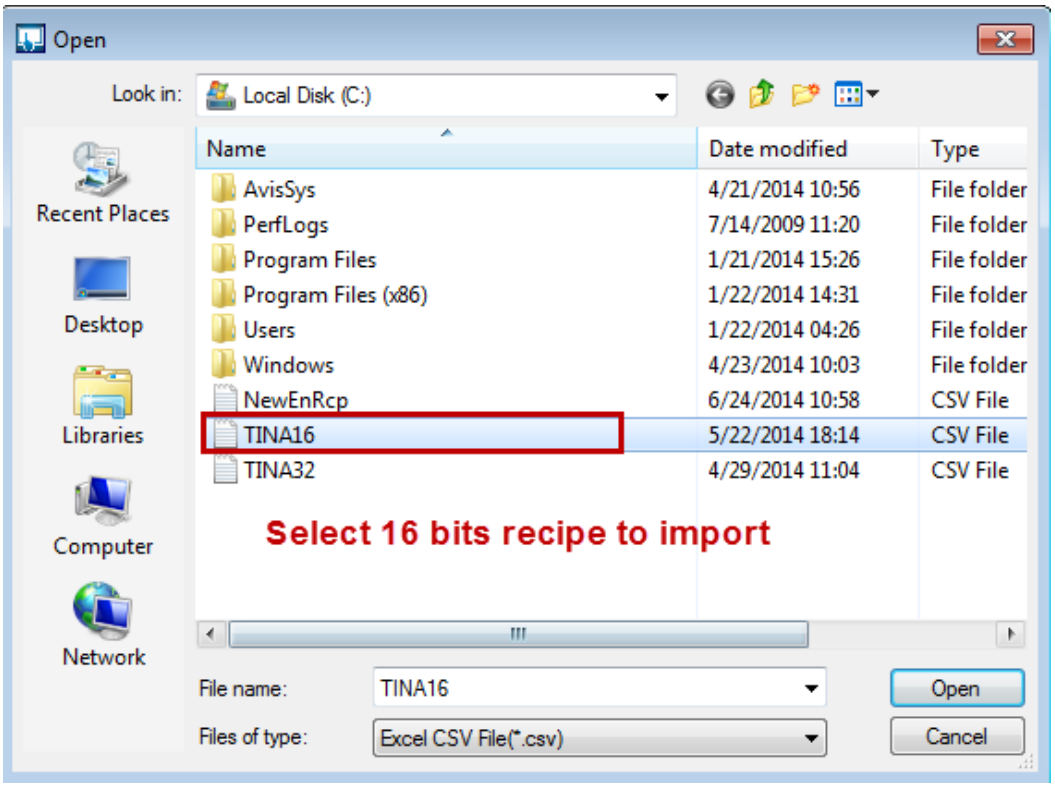
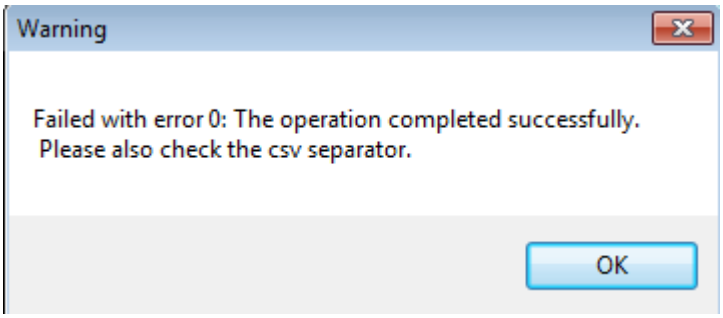
Property Set by Enhance Recipe Table 23-4-2 Property set by enhance recipe		
		refer to 5-1, Button Element. ➢ Addresses set by enhance recipe share one memory address, regardless the group number of recipe. 

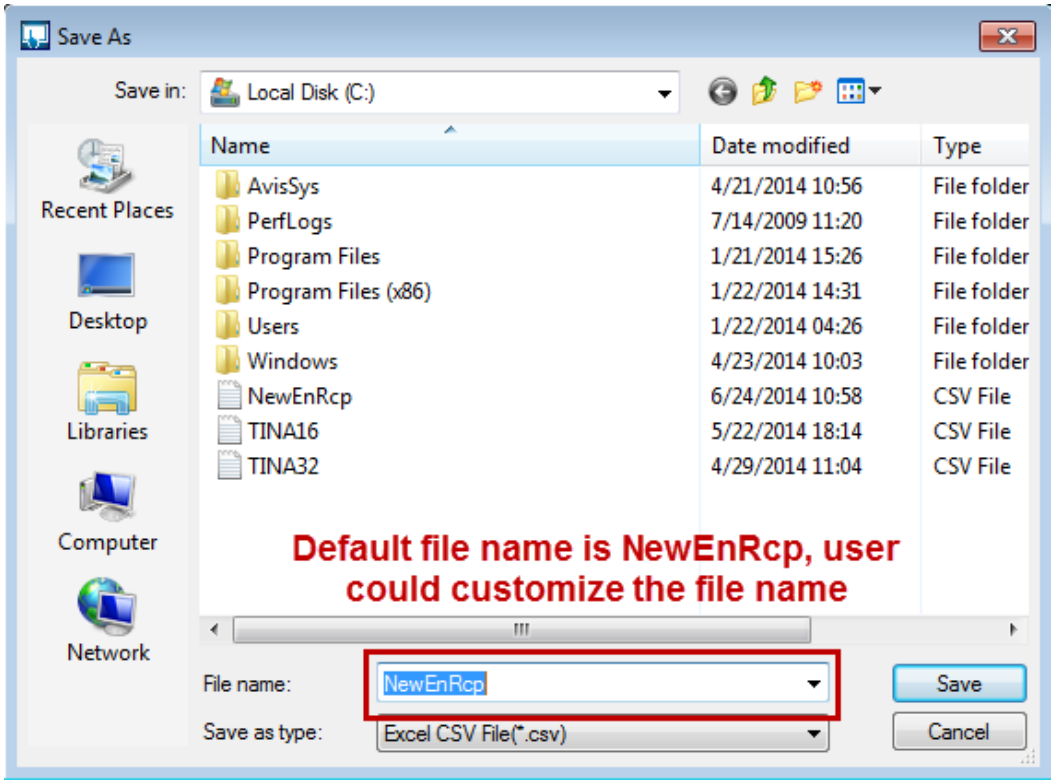
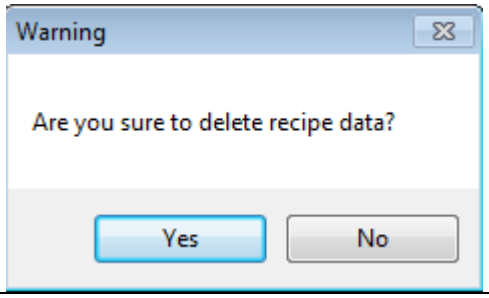
Property Set by Enhance Recipe Table 23-4-2 Property set by enhance recipe		
	Field	➢ Field and group represent the recipe length and group that users enter, respectively. Recipe field size cannot exceed 256X10000. 
	Group	➢ Field and group number cannot be 0. Once one of the value is 0, the system will set the value to the minimum, 1.
	Data Format	➢ Data format is divided into BCD, Signed Decimal, Unsigned Decimal, Hex, Floating and Char.  NOTE: ✓ If selecting Char as the data format, the character set as separator cannot be used as its content. Otherwise, it might cause data error or fail to import the data.
	Read Length	➢ Limit of read length varies with different data formats. ➢ If selecting BCD, Signed Decimal, Unsigned Decimal or Hex as the data format, the read length can be 1 (means Word) or 2 (means Double Word).

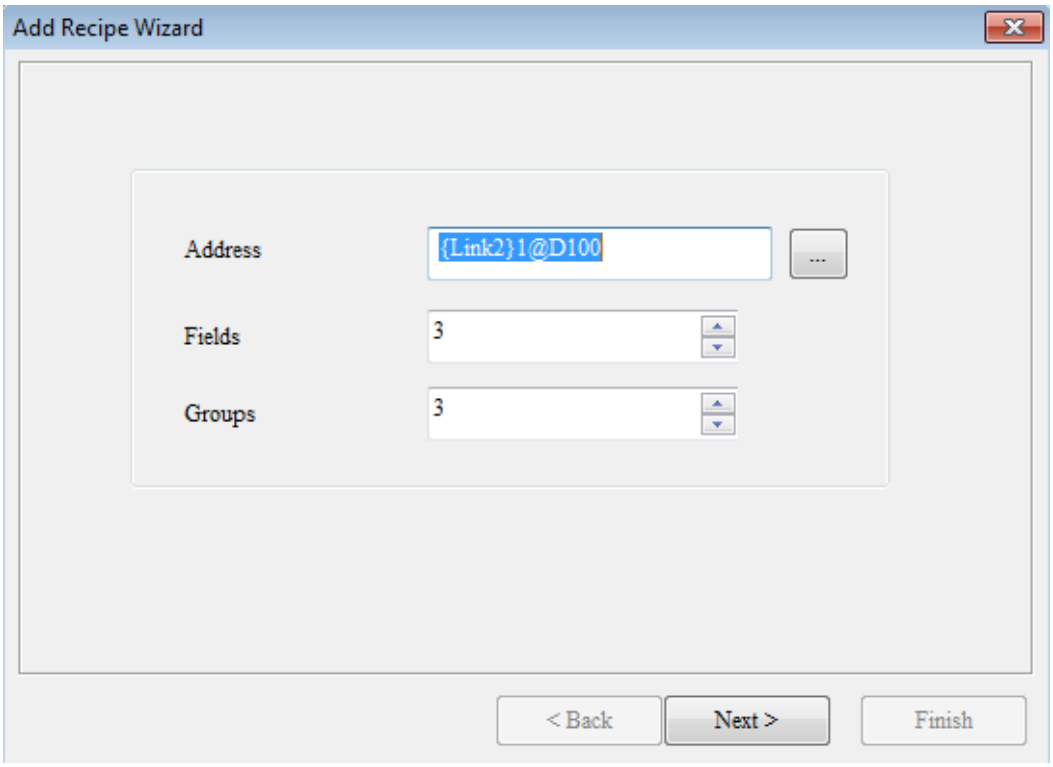
Property Set by Enhance Recipe Table 23-4-2 Property set by enhance recipe		
		➢ If selecting Floating as the data format, the read length only can be 2 (means Double Word). ➢ If selecting Char as the data format, the read length is range from 1 to 32. It can support up to 32 Words (which is 64 bits). When setting up recipe data, if it still has spare space, the system will automatically enter the blank string.

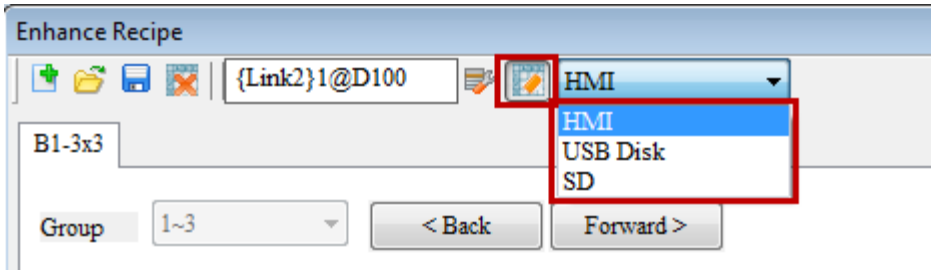
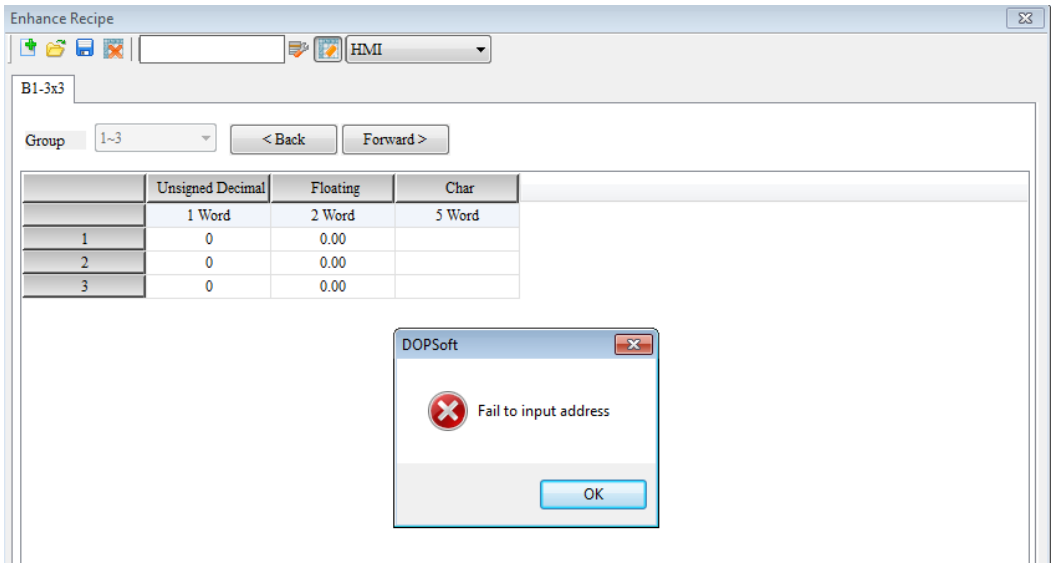
Property Set by Enhance Recipe Table 23-4-2 Property set by enhance recipe		
	Integer Digits	➢ Only when the data format is floating, can users setup integer digits and fraction. **Floating**  ➢ When the data format is floating, integer digits and fraction only support 7 digits in total. If exceeding the range, a warning message will pop up. 
	Fraction	
Open	➢ 【Open】function supports CSV file format for users to select and import the recipe.	

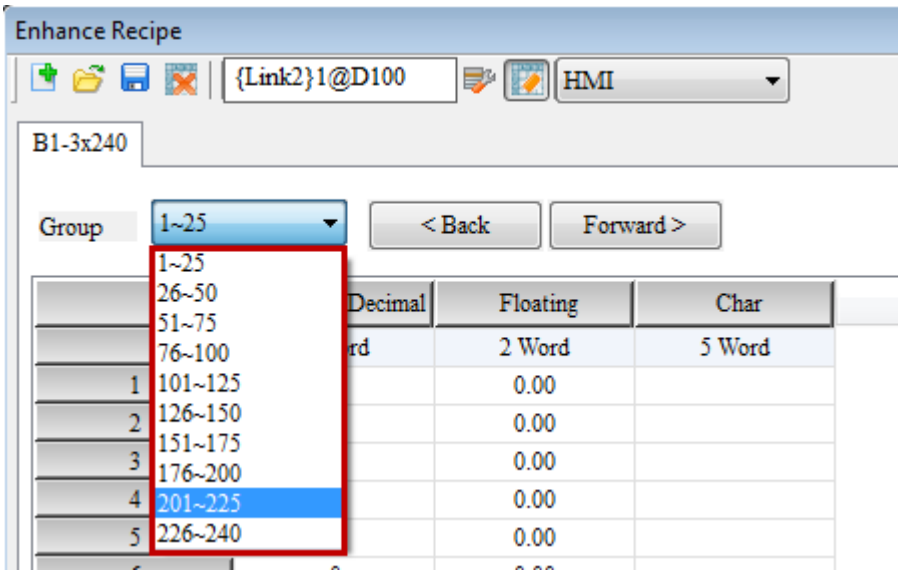
Property Set by Enhance Recipe Table 23-4-2 Property set by enhance recipe	
	 ➢ The opened and imported recipe file provides recipe contents only. Its address does not support 16 or 32 bits recipe. If the CSV file of 16 bits recipe or 32 bits recipe is opened by enhance recipe, it might be unable to display recipe data and a pop-up message will prompt to show error.

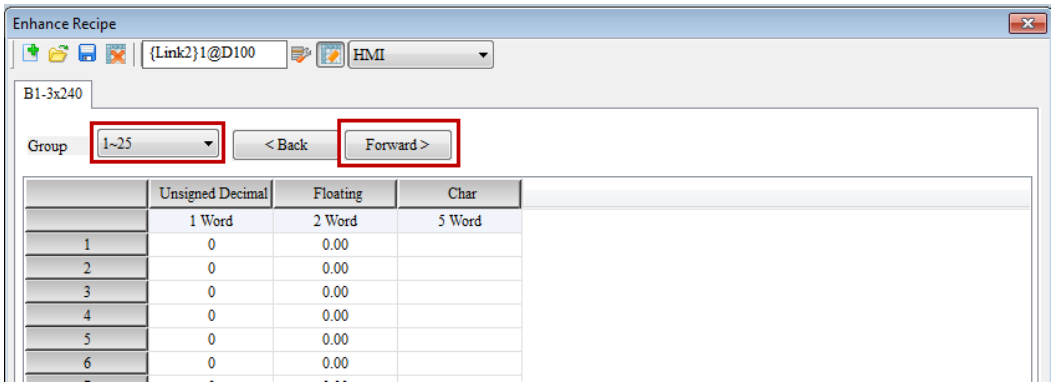
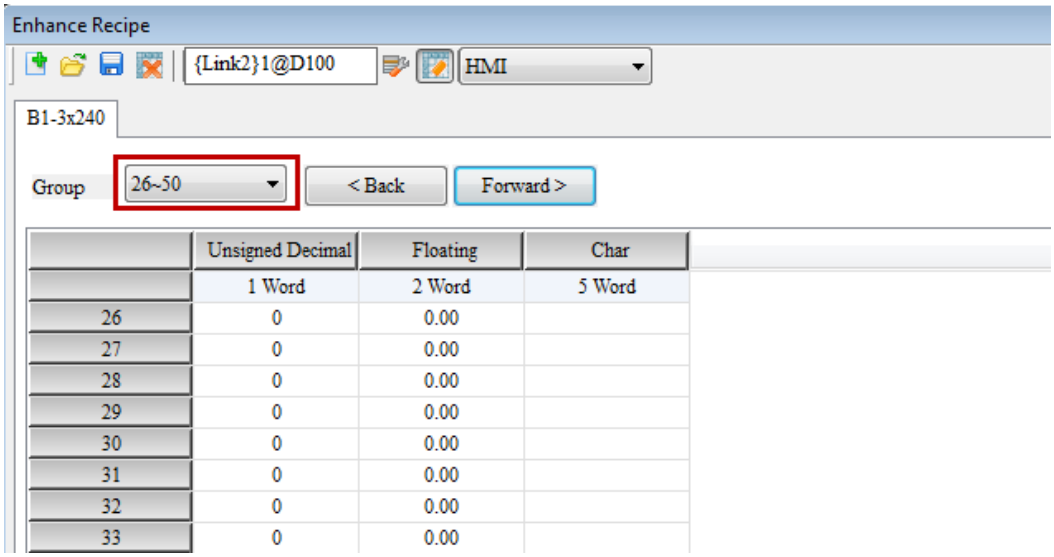
Property Set by Enhance Recipe Table 23-4-2 Property set by enhance recipe	
	 

Property Set by Enhance Recipe Table 23-4-2 Property set by enhance recipe	
Save As	➢ 【Save As】function can save the current enhance recipe. The supported file format is the same as the Open function, CSV only. 
Delete	➢ 【Delete】 function deletes 32 bits recipe data. When executing this function, a warning message will pop up and ask if users are sure to delete the data. 
Setting	➢ Only when recipe data exists in enhance recipe, can the user use 【Setting】to change the content of field, group and data format.

Property Set by Enhance Recipe Table 23-4-2 Property set by enhance recipe	
	

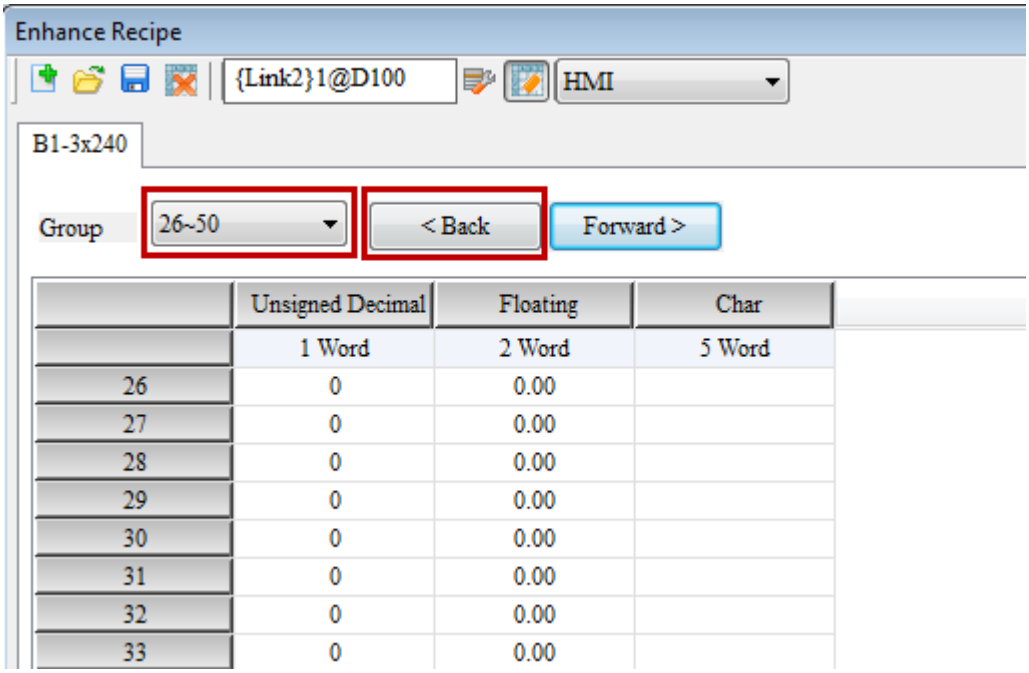
Property Set by Enhance Recipe Table 23-4-2 Property set by enhance recipe	
$66	➢ Set recipe address. Users can self enter recipe address in this field. Or users can setup address through “Add” function.
Data Retained	➢ Before setting retained area, please activate 【 】 first.  ➢ Retained area includes HMI, USB Disk and SD Card. ➢ If choose to save the data in HMI, it means when the power is off, the data will be recorded in SRAM of HMI.
X in Enhance Recipe Window	➢ This function stores the data anyway when complete editing recipe data and will judge if the recipe address is wrong. 
Groups 1~25	➢ The recipe table displays 25 groups of recipe data in one page. Users can quickly select the recipe group.

Property Set by Enhance Recipe Table 23-4-2 Property set by enhance recipe	
	

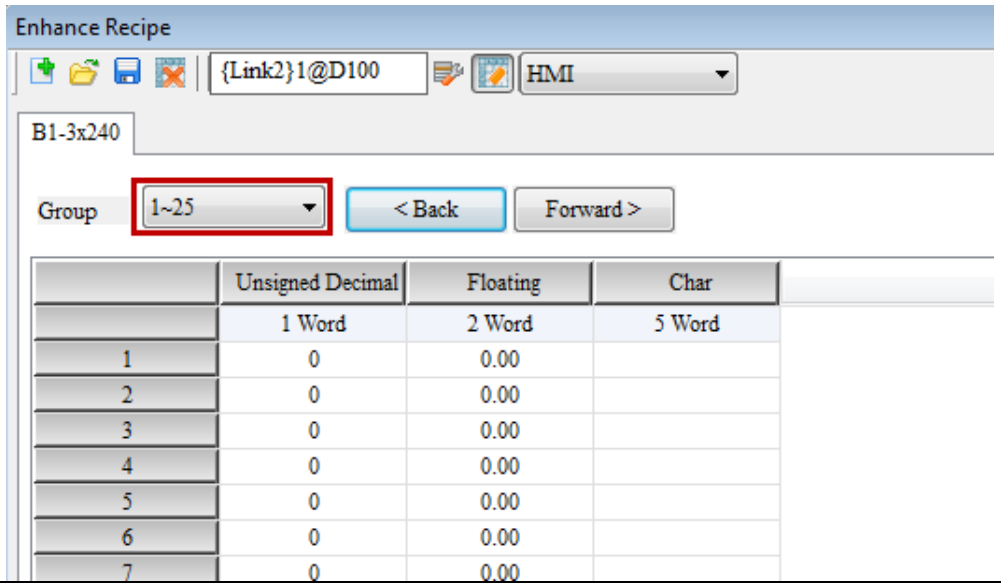
Property Set by Enhance Recipe Table 23-4-2 Property set by enhance recipe	
Forward >	➢ The recipe table displays 25 groups of recipe data in one page. 【Forward】 button enables users to quickly view forward 25 recipe data. ➢ Following figure shows recipe data from group 1 to 25. Click 【Forward】, the displayed recipe data becomes group 26 to 50.  
< Back	➢ The recipe table displays 25 groups of recipe data in one page. 【Back】button enables users to quickly view previous 25 recipe data. ➢ Following figure shows recipe data from group 26 to 50. Click【Back】, the displayed recipe data becomes group 1 to 25.

Property Set by Enhance Recipe

Table 23-4-2 Property set by enhance recipe



	Unsigned Decimal	Floating	Char
	1 Word	2 Word	5 Word
26	0	0.00	
27	0	0.00	
28	0	0.00	
29	0	0.00	
30	0	0.00	
31	0	0.00	
32	0	0.00	
33	0	0.00	



	Unsigned Decimal	Floating	Char
	1 Word	2 Word	5 Word
1	0	0.00	
2	0	0.00	
3	0	0.00	
4	0	0.00	
5	0	0.00	
6	0	0.00	
7	0	0.00	

23-5 Enhance Indirect Recipe Index Register (*ENRCP)

The enhance indirect recipe index register is used to specify the enhance recipe register.

*ENRCPn acquires the value from ENRCPn and regards it as the new address. Then, access the value from new address. For example, if ENRCP1 = 3 and ENRCP3 = 99, then *ENRCP1= 99. See figure 23-5-1.

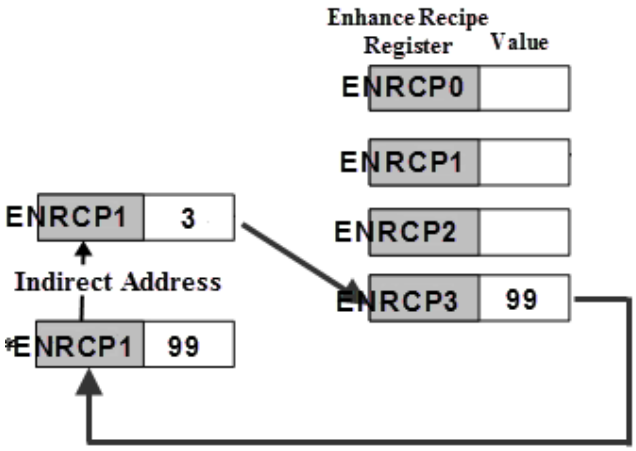


Figure 23-5-1 Enhance Indirect Recipe Index

Accessing range of enhance recipe index register:

Access Type	Element Type	Access Range
Word	*ENRCPn	ENRCP0~ENRCP65535
Note: n = Word (0-65535)		

Address accessing range provided by *ENRCP is limited according to the recipe size created by users. Assuming the recipe size is length 3*group 3, then address of ENRCP is range from *ENRCP0 to *ENRCP11. When creating address of *ENRCP12, a warning message will pop up. See the figure below.

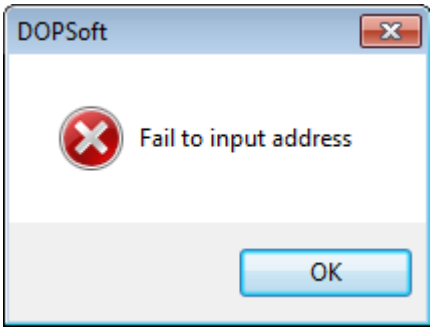
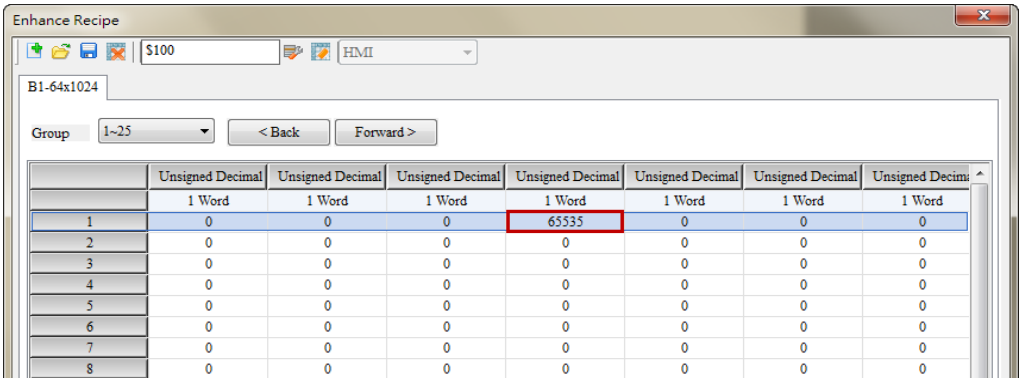
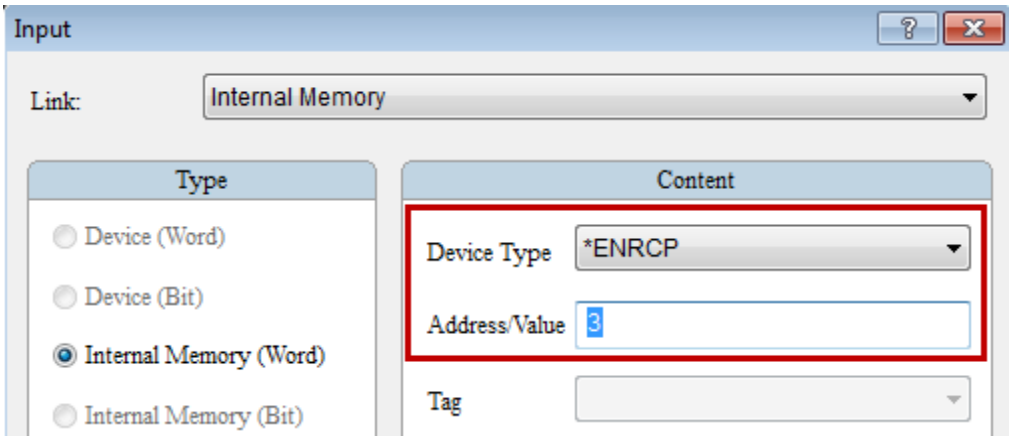
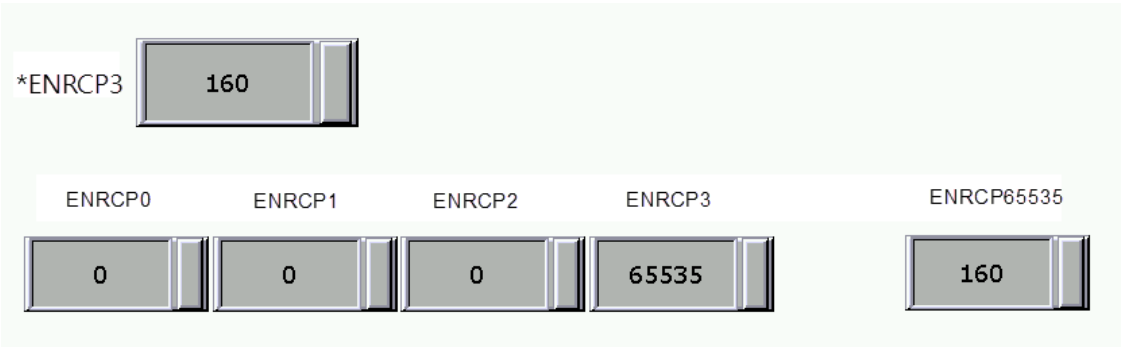


Figure 23-5-2 Enhance indirect recipe index register configuration

Followings will introduce the example of enhance indirect recipe index.

Example of Enhance Indirect Recipe Index Register

Table 23-5-1 Example of enhance recipe index register

Set Enhance Recipe	➢ Step 1: Create the Enhance Recipe (Fields set to 64 and Groups set to 1024) and set ENRCP3 to 65535. 
Create Numeric Entry Element	➢ Step 2: Create numeric entry element and select its memory address as "*ENRCP" "3".  ➢ Step 3: Create numeric entry element and select its memory address as "ENRCP" "3". ➢ Step 4: Create numeric entry element and select its memory address as "ENRCP" "65535". ➢ Step 5: Create Clock macro command *ENRCP3 = *ENRCP3+1.
Result	➢ Compile the screen and download it to HMI. Value of *ENRCP3 and ENRCP65535 will be increased simultaneously. 

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Chapter 24 Macro

This chapter mainly covers the types of macros and macro commands supported by DOPSoft and how to configure macro commands.

◆ Macro types:

Type of Macro	ON Macro
	OFF Macro
	Before Execute Macro
	After Execute Macro
	Screen Open Macro
	Screen Close Macro
	Screen Cycle Macro
	Submacro
	Initial Macro
	Background Macro
	Clock Macro

Table 24-1-1 Types of Macros

DOPSoft provides a list of macro commands for users to perform various operations. They are grouped based on their natures, including the following categories: Arithmetic, Logical, Data transfer, Data conversion, Comparison, Flow control, Bit setting, Communication and Drawing, File Access, and Other macros.

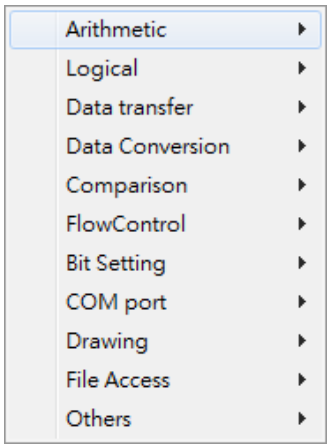


Figure 24-1-1 Categories of Macro Commands

24-1 Types of Macros

Macros consist of independent commands processing procedures written by users. Each macro supports 512 lines of commands and the table below outlines the main features of each type of macro.

Macro Type	Feature
ON Macro	➢ Executed once after ON Macro is triggered. ➢ Only available for ON Button, OFF Button, Maintained Button and Momentary Button
OFF Macro	➢ Executed once after OFF Macro is triggered. ➢ Only available for ON Button, OFF Button, Maintained Button and Momentary Button.
Before Execute Macro	➢ After users touch the onscreen button element, this macro will be executed first before all other procedures programmed for this button element. If the state of the button is not changed by user touches, then this macro will not be executed (ex. Commands of external controllers or other macro commands). ➢ Available for all button elements and input elements.
After Execute Macro	➢ After users touched the onscreen button element, this macro will be executed first before all other procedures programmed for this button element. If the state of the button is not changed by user touches, then this macro will not be executed (ex. Commands of external controllers or other macro commands). ➢ Available for all button elements and input elements.
Screen Open Macro	➢ Executed only once after users open a screen.
Screen Close Macro	➢ Executed only once after users close a screen.
Screen Cycle Macro	➢ Executed continuously. If screen open macro is used, then it will be executed first before this macro.
Sub Macro	➢ One Submacro supports a maximum of 512 submacros and 512 statements can be written within each submacro. ➢ A submacro is similar to a subprogram found in other programming languages. Users can put repeated functions or procedures into a submacro and call it when necessary.
Initial Macro	➢ First executed macro after a HMI system is initialized and this macro is only executed once.
Background Macro	➢ Continuously executed during HMI operations. Whether it is executed one line or several lines at a time (does not stop after the first sequence), this macro will continue to be executed and repeated from the first line after it reaches the last line.
Clock Macro	➢ Continuously executed during HMI operations. This macro will finish executing all commands within the macro rather than one

	line or several lines at once.

Table 24-1-2 Features of Macro

24-1-1 ON Macro/OFF Macro

On button and off button will only become available after ON button, OFF button, Maintained button, or Momentary button are created.
When a user touches the onscreen button and changes the state to on, the HMI will execute the ON Macro. When the user touches the onscreen button and changes the button state to off, the HMI will execute the OFF Macro. If the button state is not changed by touching the screen button elements (ex. by commands of external controllers or other macros), then On/Off Macro will not be executed.

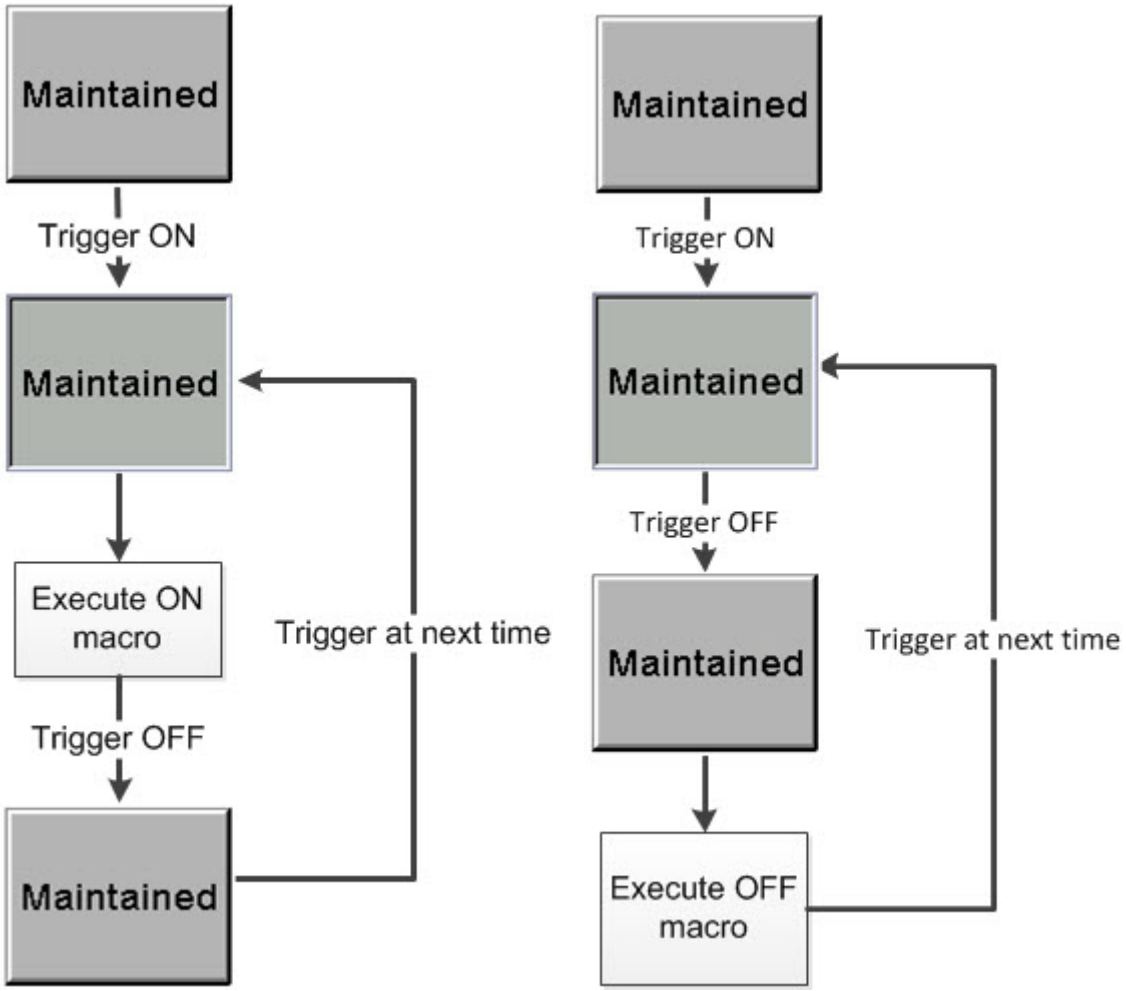


Figure 24-1-1-1 ON/OFF Macro Flowchart

24-1-2 Before Execute Macro

This macro only becomes available after onscreen elements established are button elements or input elements. When users press the onscreen button element, this macro will be executed first before all other procedures programmed for this button element. If the state of the button is not changed by user touches, then this macro will not be executed (ex. Commands of external controllers or other macro commands).

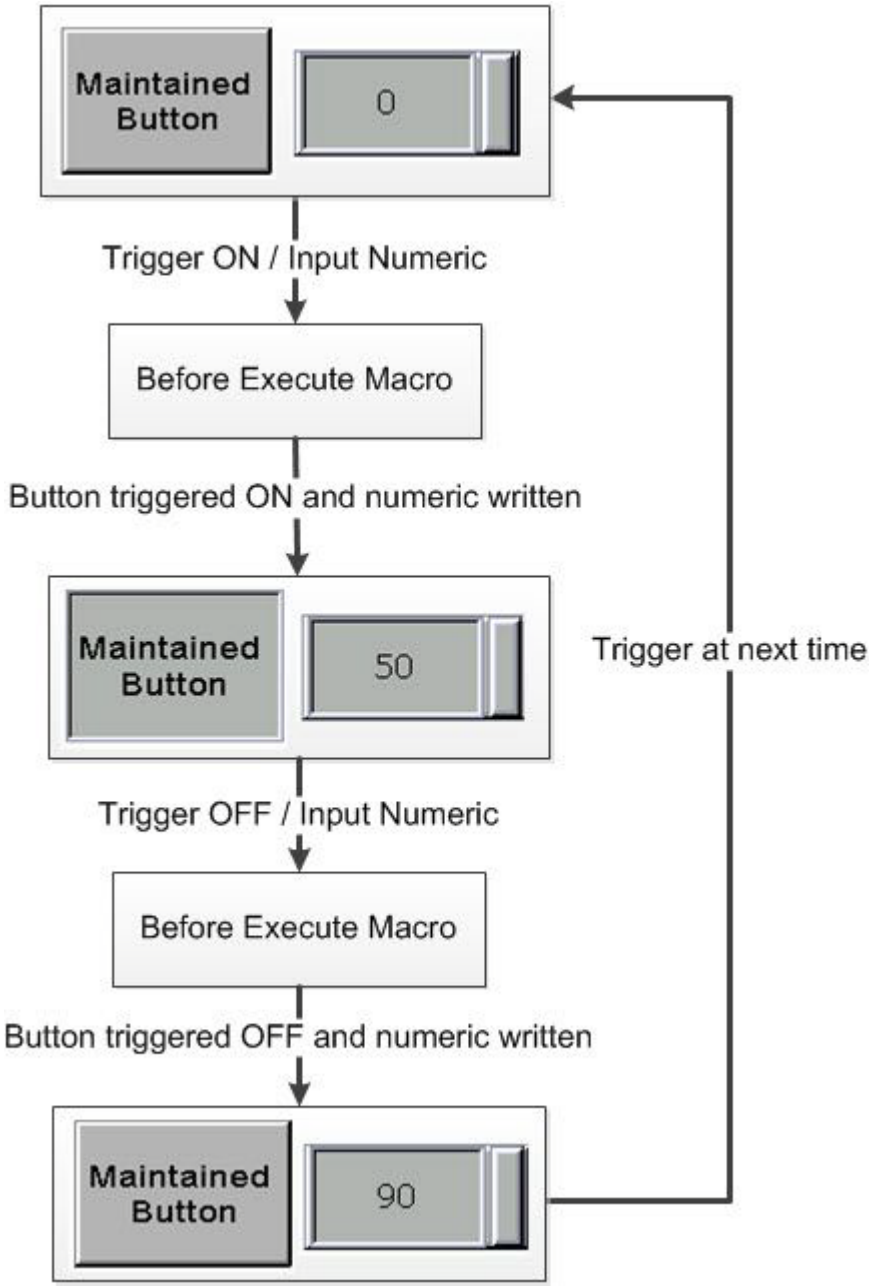


Figure 24-1-2-1 Before Execute Macro Flowchart

24-1-3 After Execute Macro

This macro only becomes available after onscreen elements established are button elements or input elements. When users press the onscreen button element, this macro will be executed first before all other procedures programmed for this button element. If the state of the button is not changed by user touches, then this macro will not be executed (ex. Commands of external controllers or other macro commands).

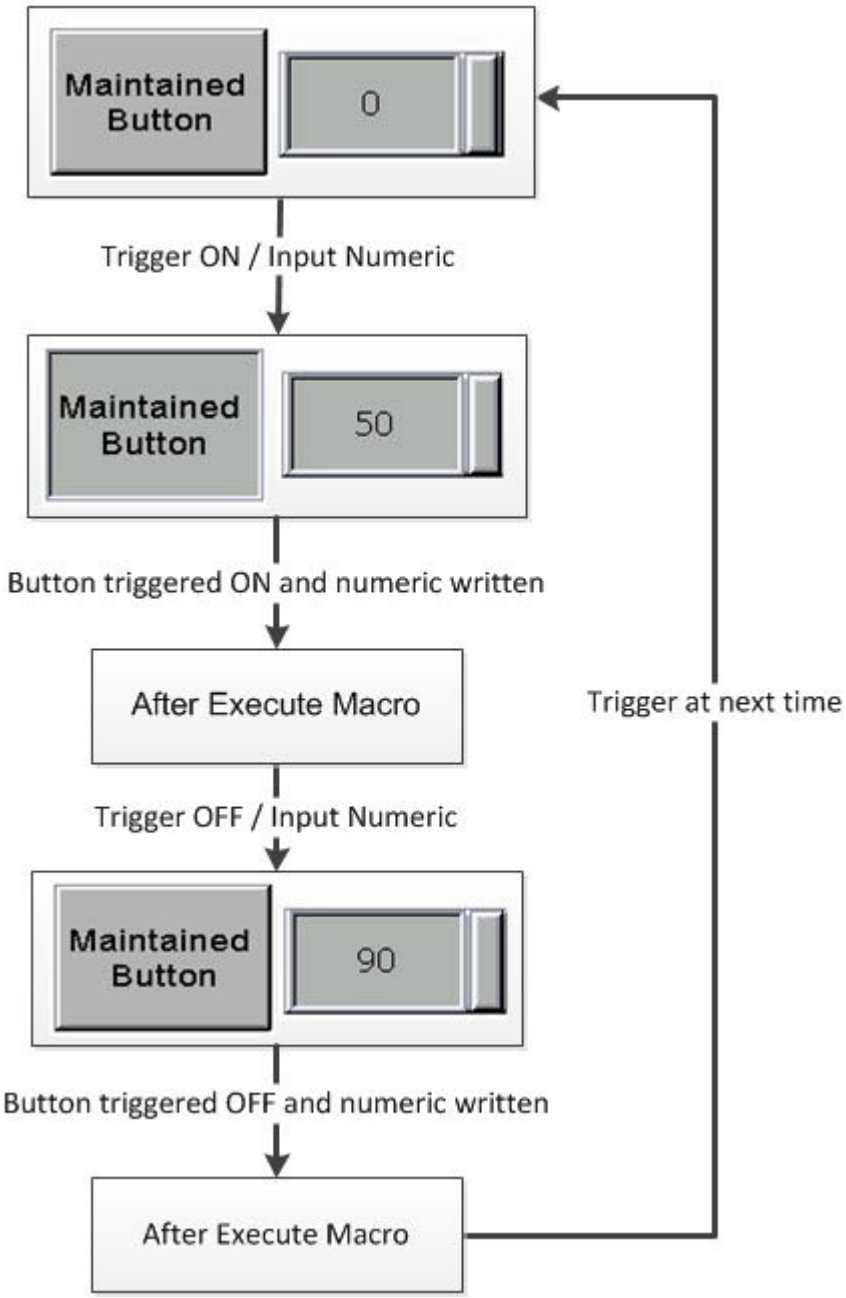


Figure 24-1-3-1 After Execute Macro Flowchart

24-1-4 Screen Open Macro

The Screen Open Macro can be edited by going into [Screen] → [Screen Open Macro].

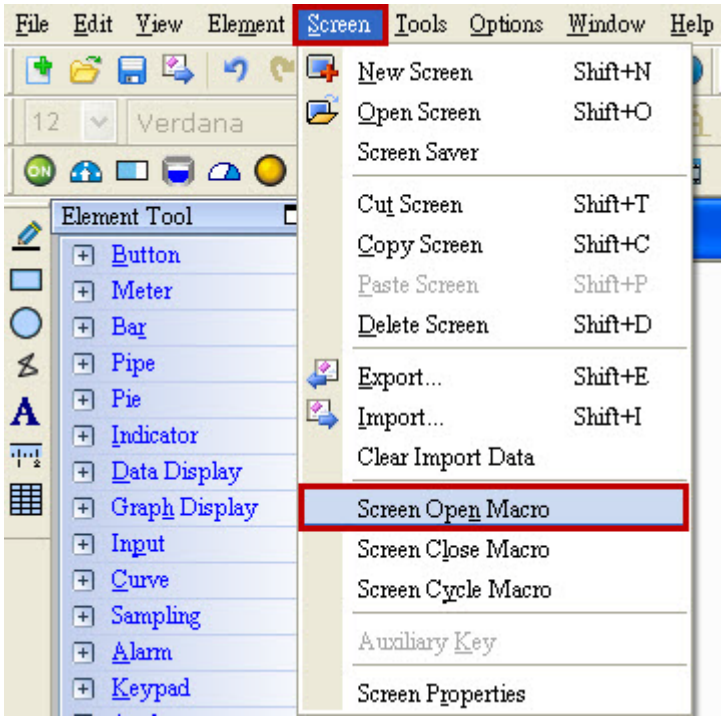


Figure 24-1-4-1 Screen Open Macro

Each screen created within DOPSoft contains a Screen Open Macro and it is executed each time a screen is opened or switched to another. Other macros or commands are executed after the Screen Open Macro.

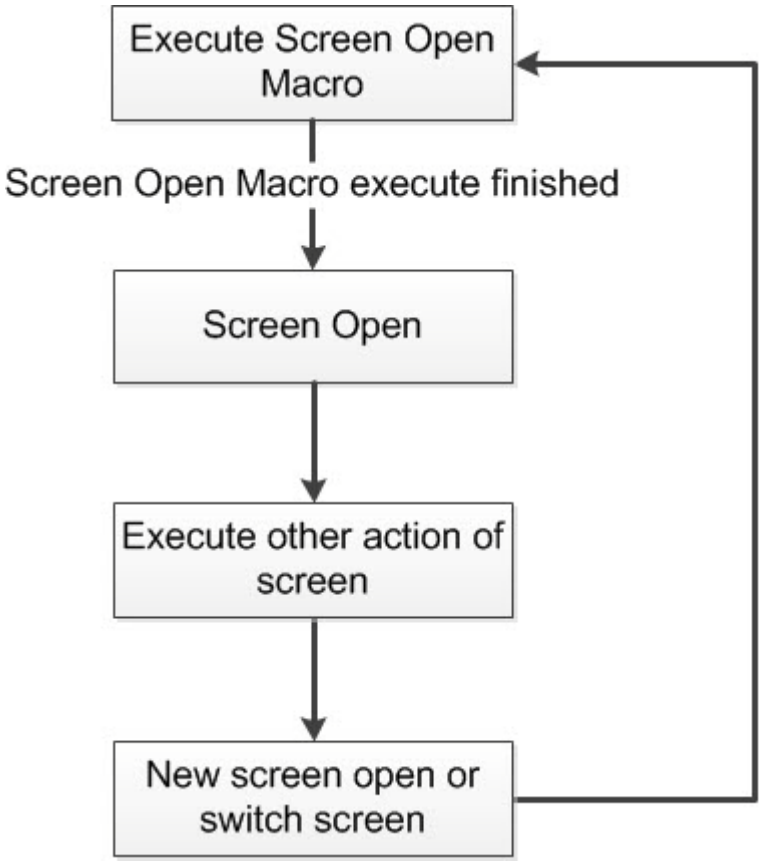


Figure 24-1-4-2 Screen Open Macro Flowchart

24-1-5 Screen Close Macro

The Screen Close Macro can be edited by going into [Screen] → [Screen Close Macro].

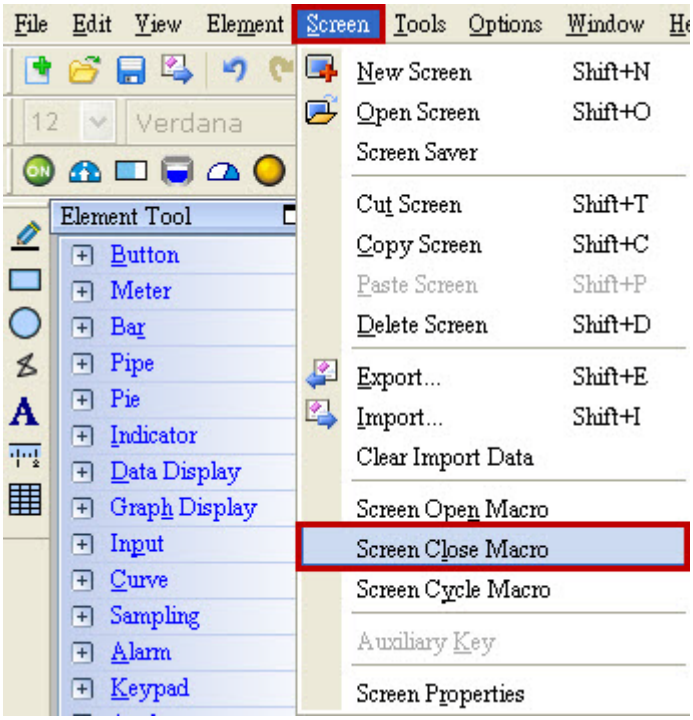


Figure 24-1-5-1 Screen Close Macro

Each screen created within DOPSoft contains a Screen Close Macro and it is executed each time a screen is closed or switched to another. Other macros or commands are executed after the Screen Close Macro.

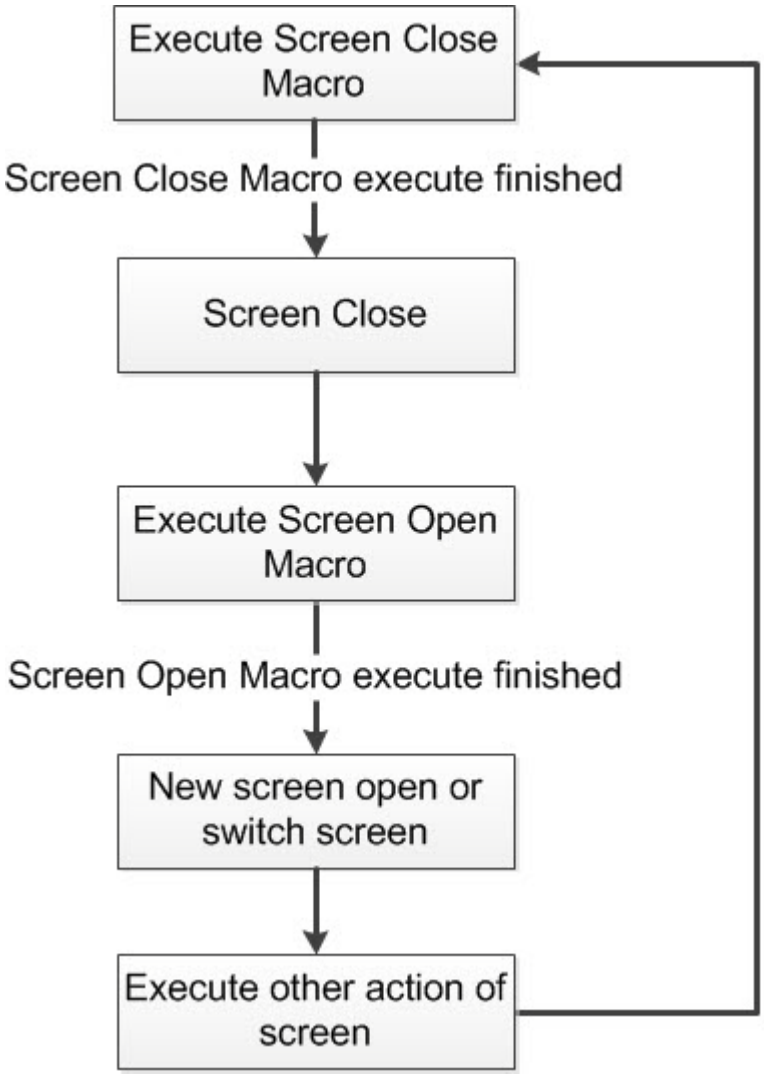


Figure 24-1-5-2 Screen Close Macro Flowchart

24-1-6 Screen Cycle Macro

The Screen Cycle Macro can be edited by going into [Screen] → [Screen Cycle Macro].

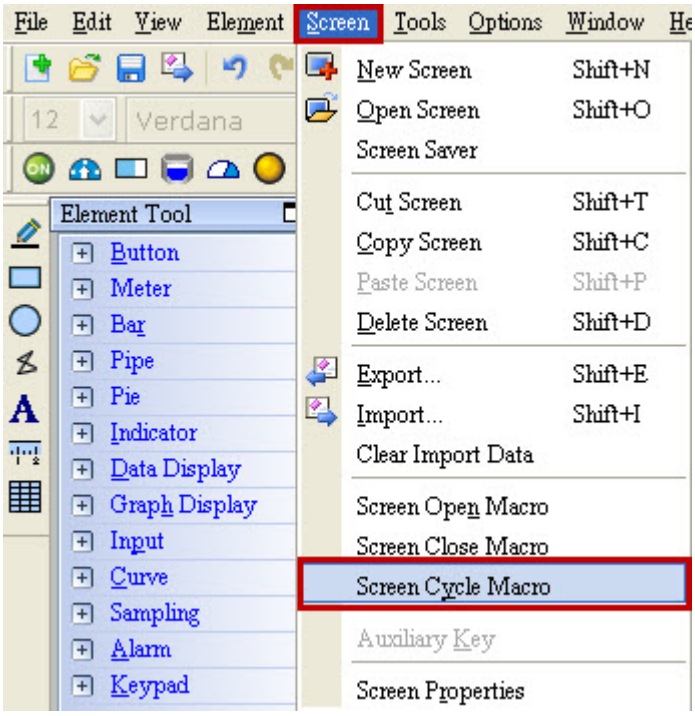


Figure 24-1-6-1 Screen Cycle Macro

Each screen created within DOPSoft contains a Screen Cycle Macro and it is executed, based on the preset delay duration, after the Screen Open Macro. Users can double click on the screen to set the macro cycle delay in the screen properties dialog window. The delay duration refers to how long it will takes before executing the Screen Cycle Macro again. The default unit is 100ms.

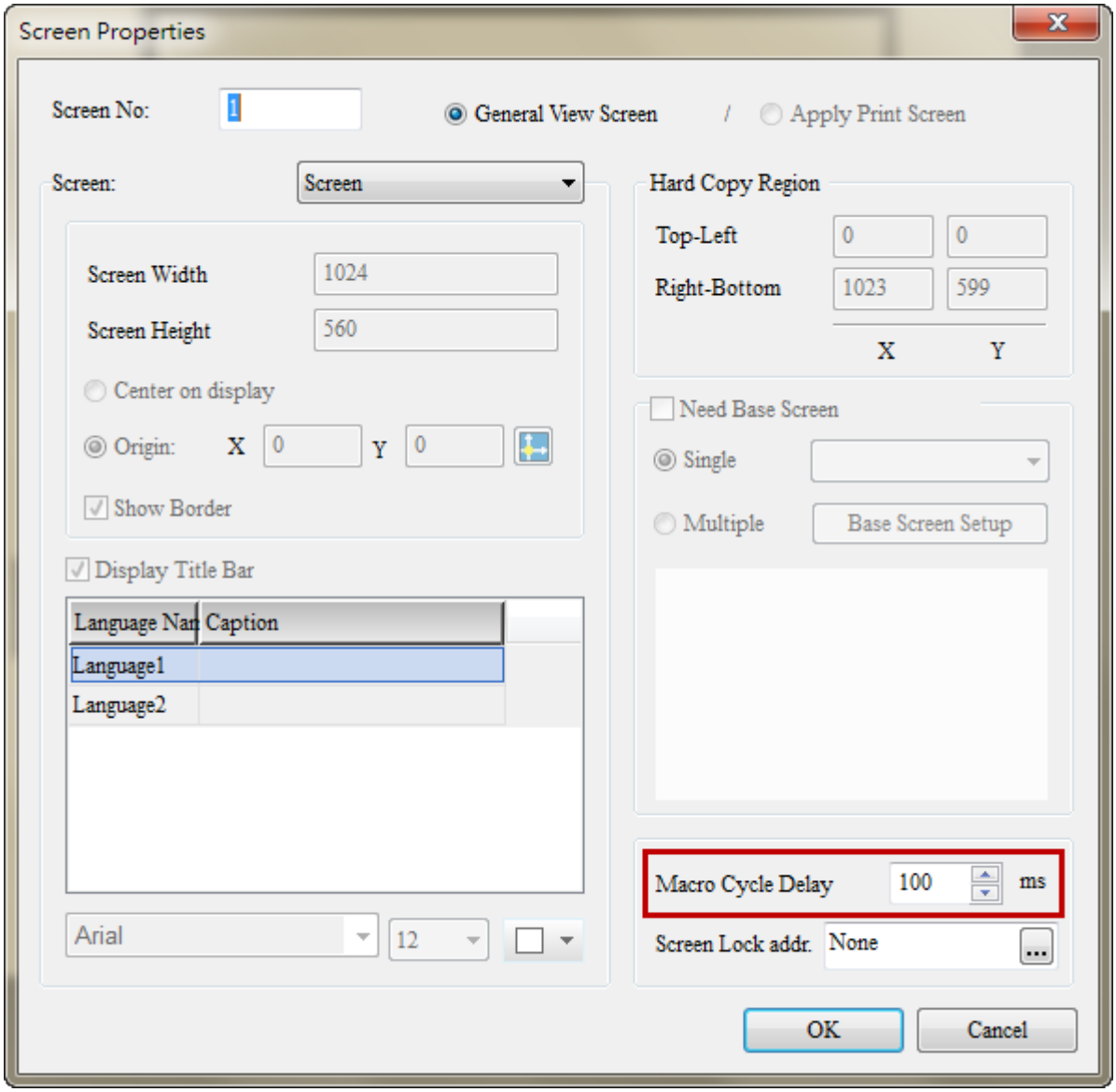


Figure 24-1-6-1 Setting of Macro Cycle Delay

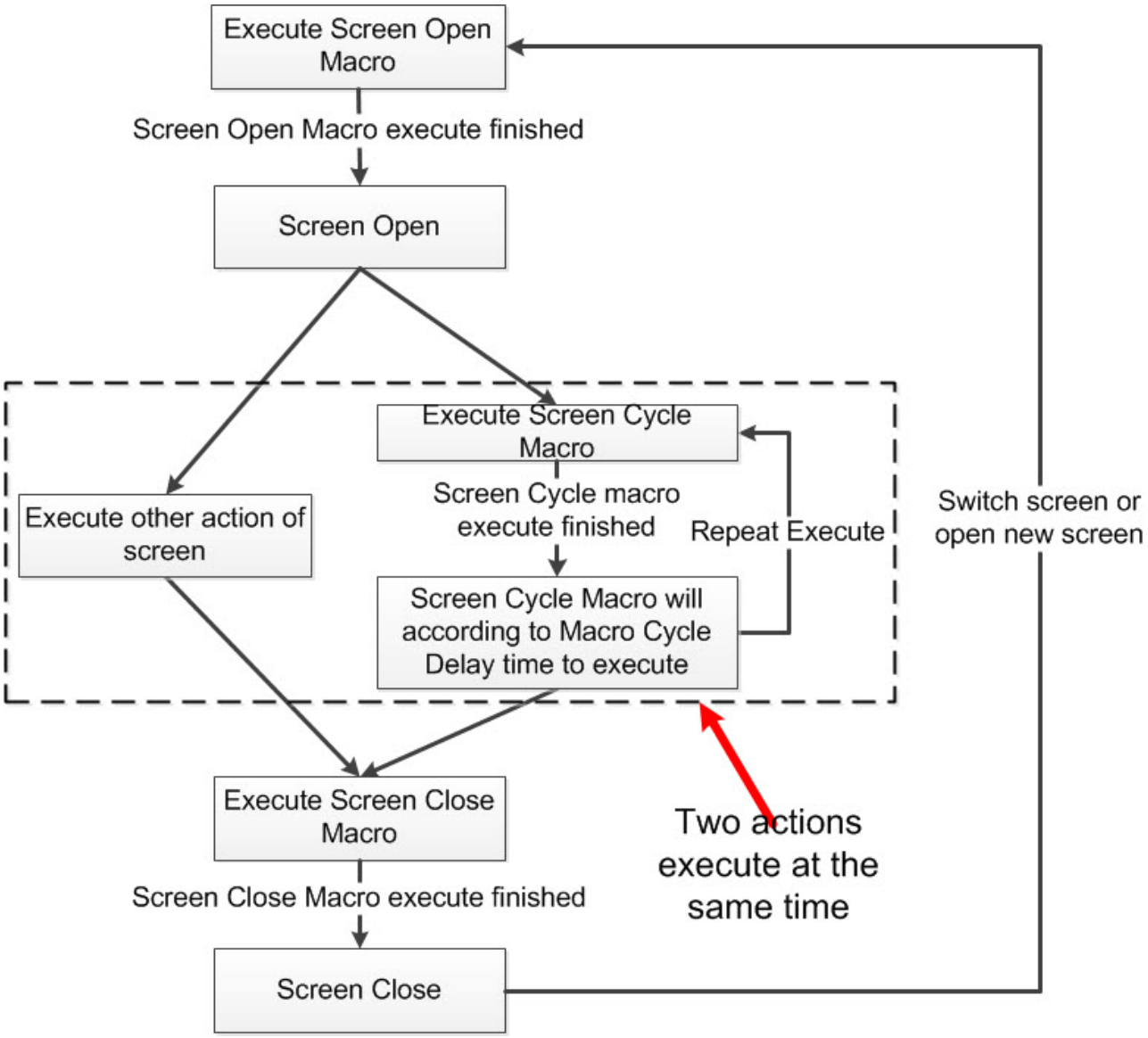


Figure 24-1-6-2 Screen Cycle Macro Flowchart

24-1-7 Sub-macro

The Submacro can be edited by going into [Options] → [Submacro].

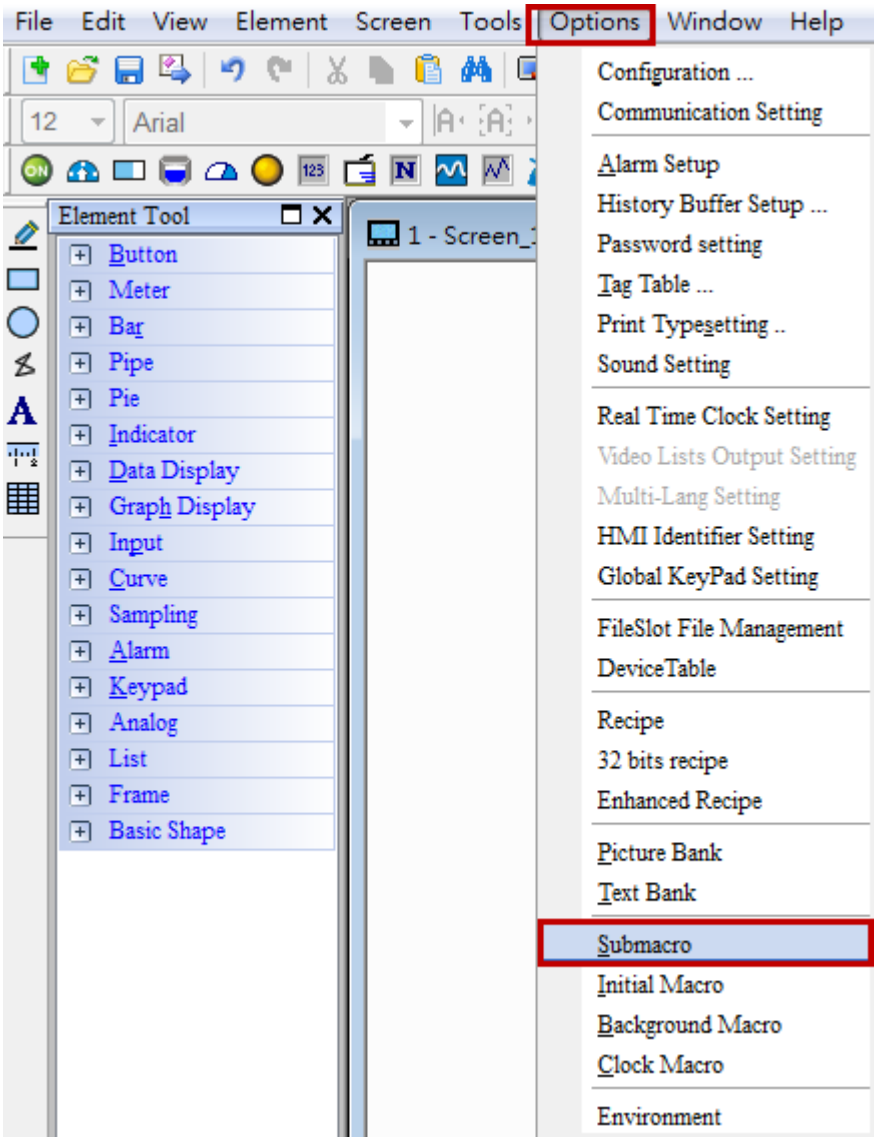


Figure 24-1-7-1 Sub-macro

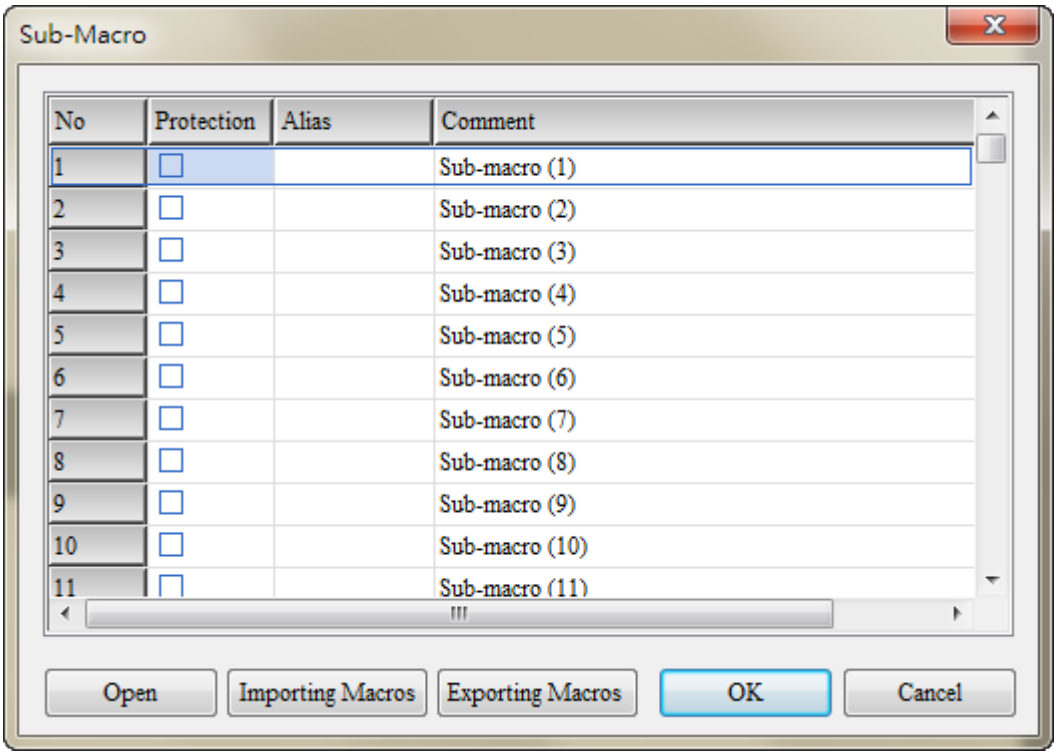


Figure 24-1-7-2 Sub-macro Configuration Dialog Window

One Sub-macro supports a maximum of 512 submacros (identified by their number from 1 ~ 512). A submacro is similar to a subprogram found in other programming languages. Users can put repeated functions or procedures into a submacro and call it when necessary. This not only saves time to write repeated macro codes but is also easier to maintain.

NOTE:

✓ Only six sub-macros can be used within one submacro.

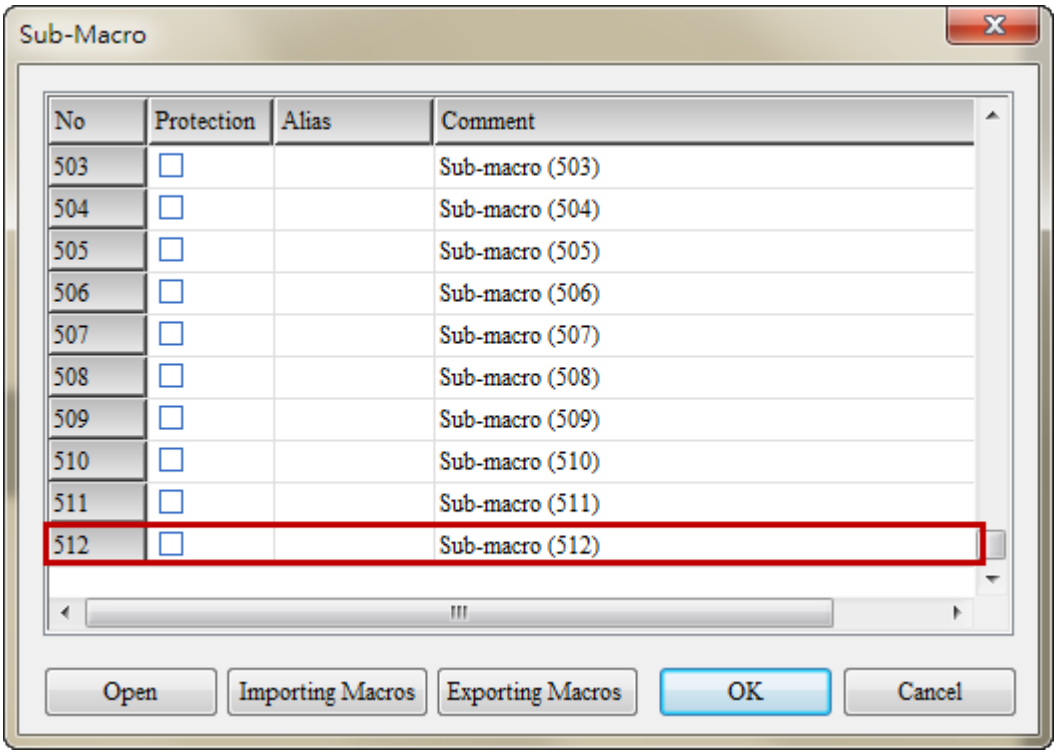


Figure 24-1-7-3 Sub-macro Screenshot I

Users can call a submacro by its NO or its alias given by users. The name of a submacro can be either numerical value, English, or Chinese characters, and a maximum of 64 characters are allowed for the name.

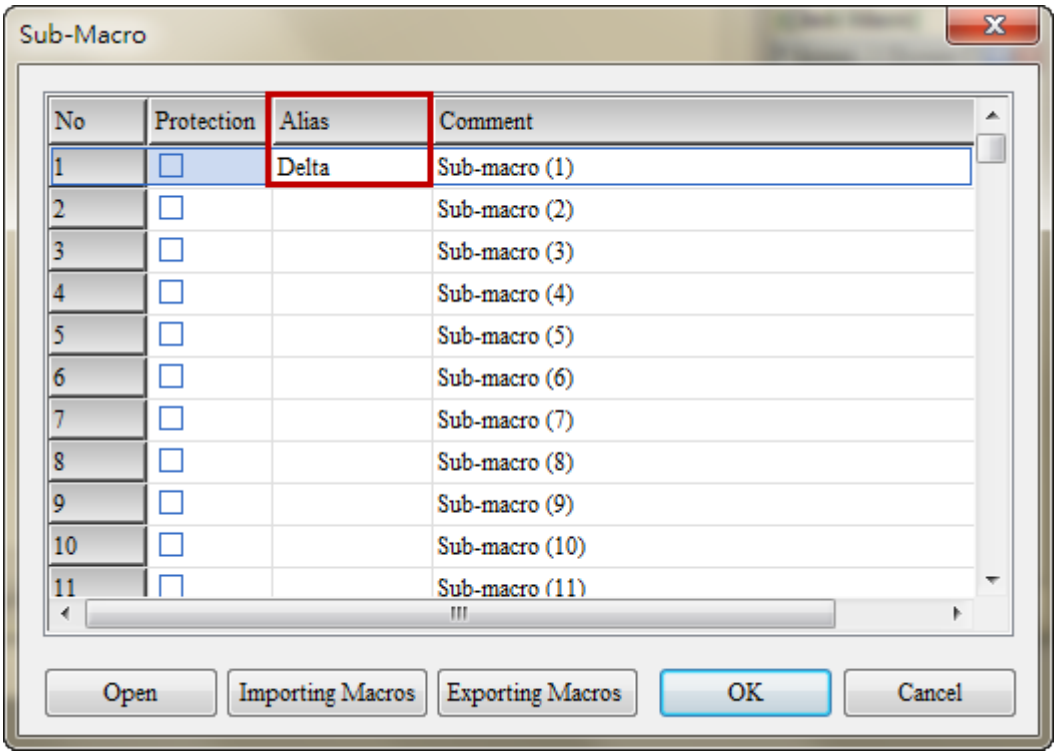


Figure 24-1-7-4 Sub-macro Screenshot II

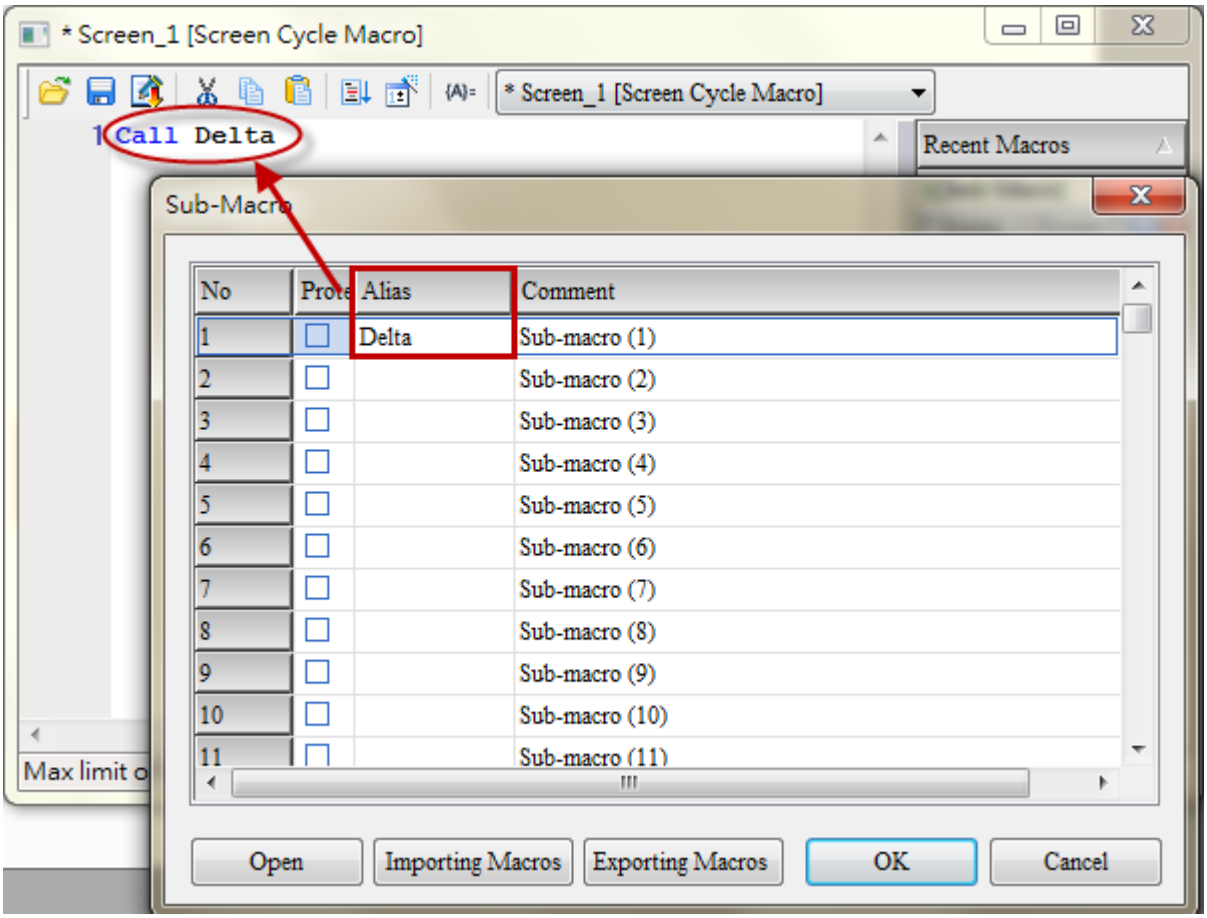


Figure 24-1-7-5 Sub-macro Screenshot III

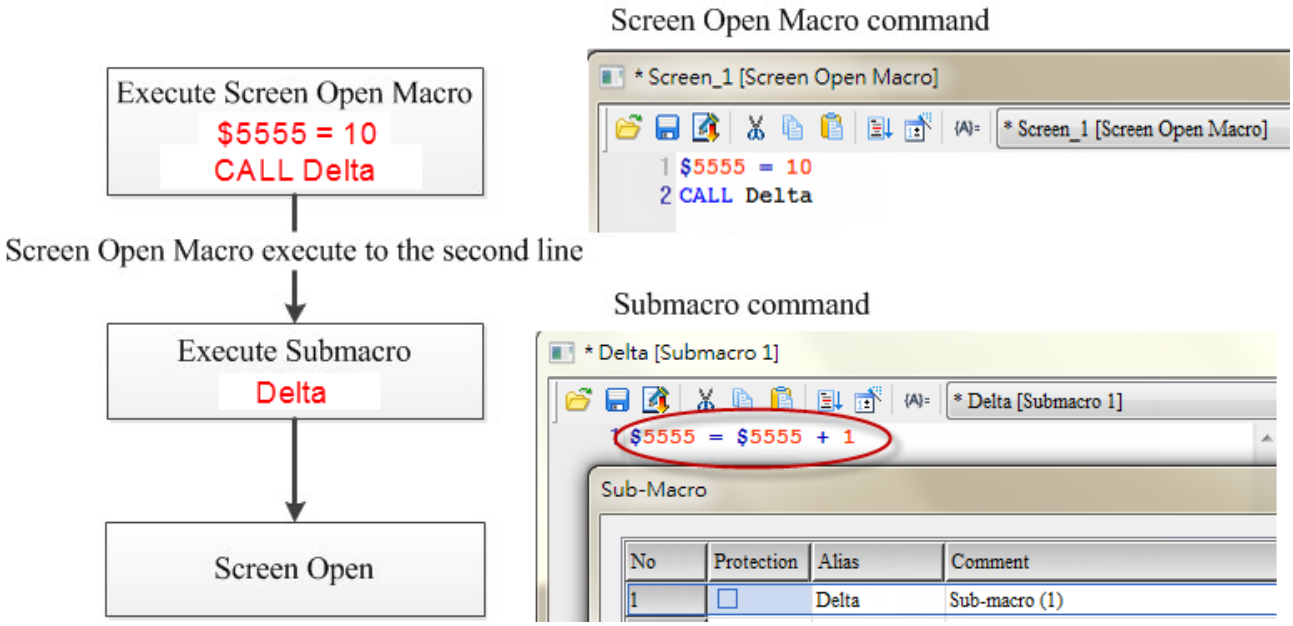


Figure 24-1-7-6 Sub-macro Flowchart

Sub-macro also provides the function of password protection. Users can encrypt each sub-macro.

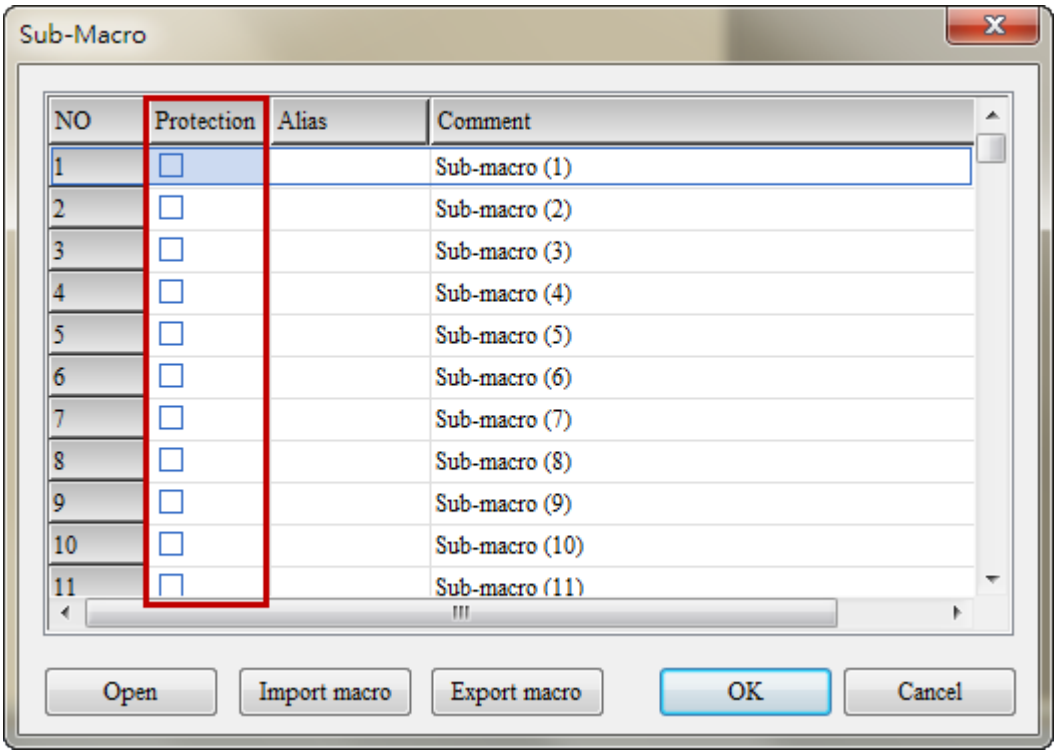


Figure 24-1-7-7 Protection from sub-macro

When check “protection” function, users will be asked to enter the password.
If sub-macro (1) has been encrypted, users have to enter the password to decrypt it and edit sub-macro (1).

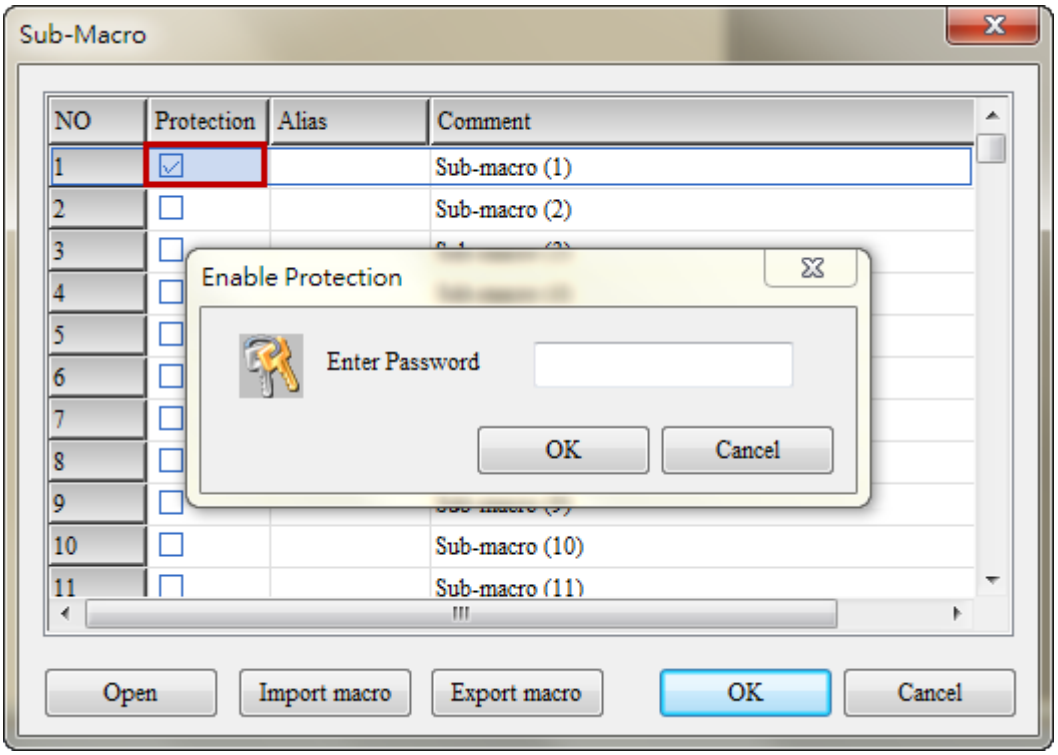


Figure 24-1-7-8 Sub-macro encryption

To disable the protection function, users will be asked to enter the password that just set for sub-macro (1).

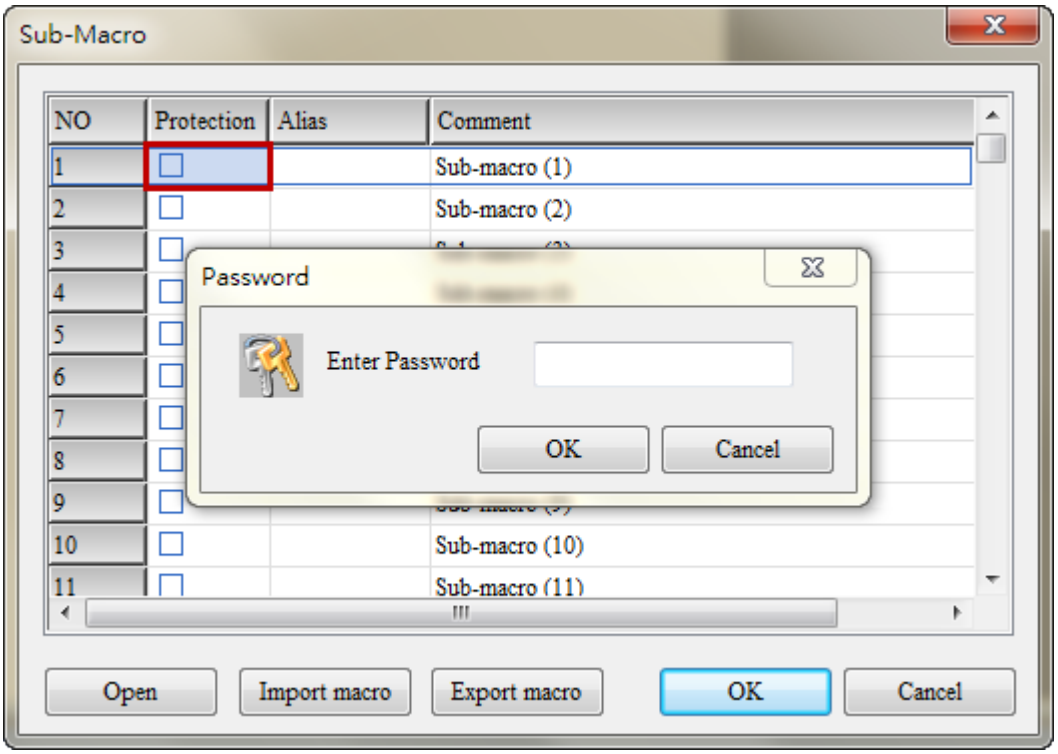
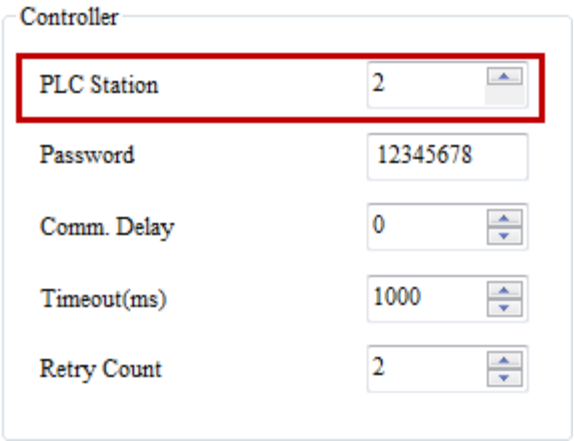
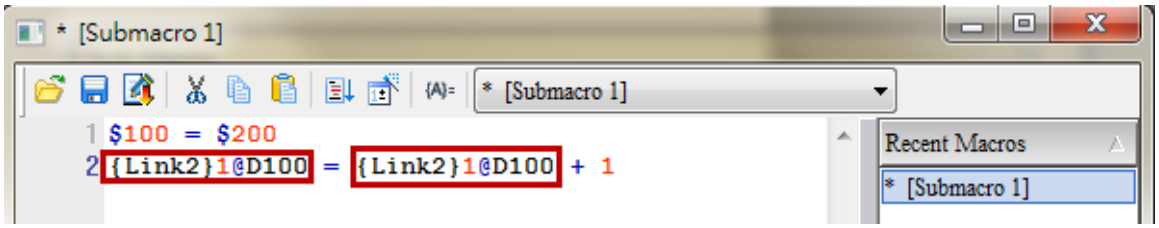
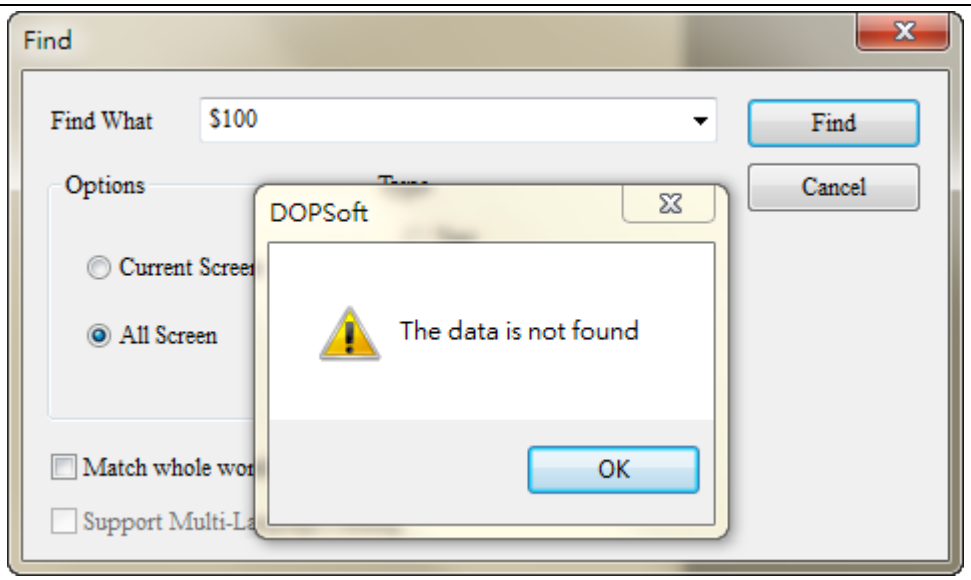
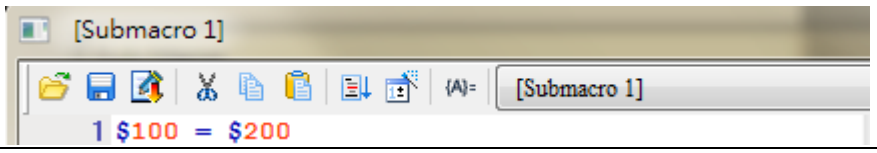
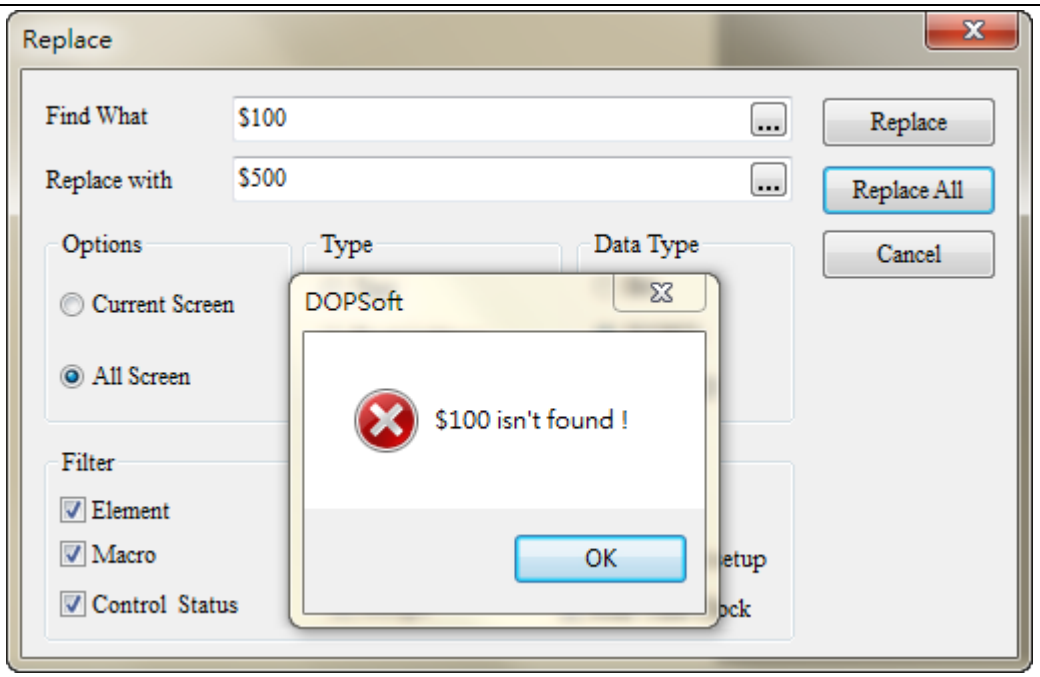
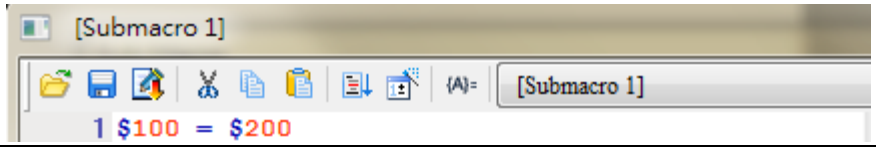


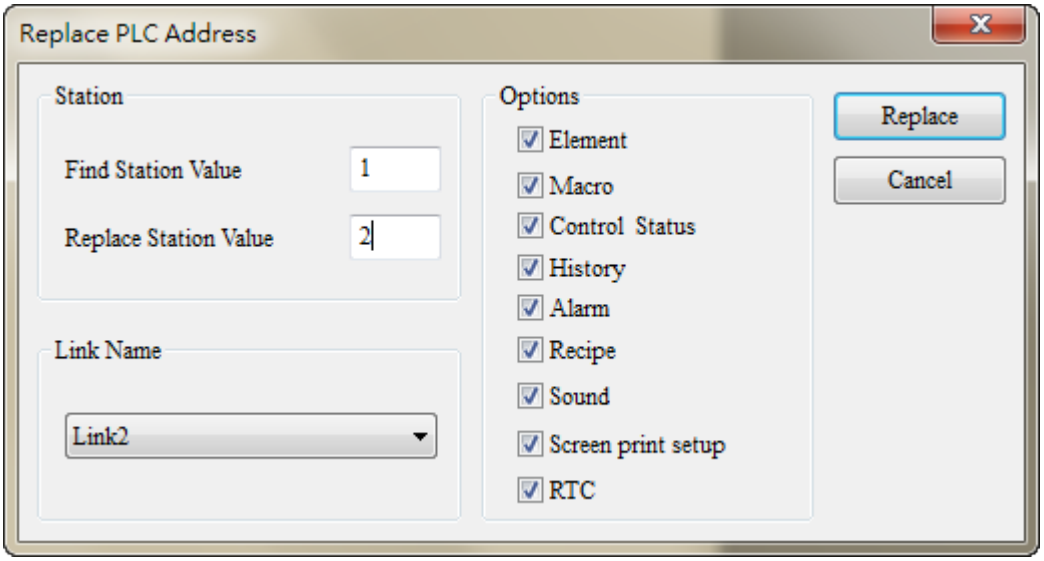
Figure 24-1-7-9 Sub-macro decryption

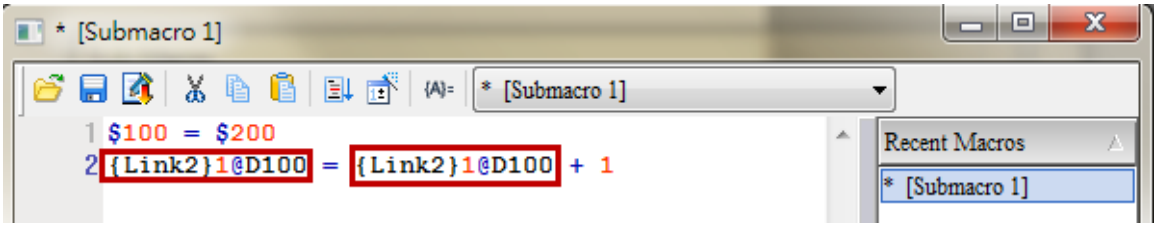
When the sub-macro is set with protection, functions that would be influenced are shown as below:

(1)	If the protected sub-macro is set with station number for communication, it will be failed to change the station number.
	➢ If the station number of the protected sub-macro is 1, change the default station number of PLC to 2, and then check the protected sub-macro. You will find that the station number has to be 1, which is unchangeable.  
(2)	If $100 is set in the protected macro, $100 cannot be found when searching the address.
	 
(3)	If $100 is set in the protected macro, $100 cannot be replaced by $500 when executing Replace function.

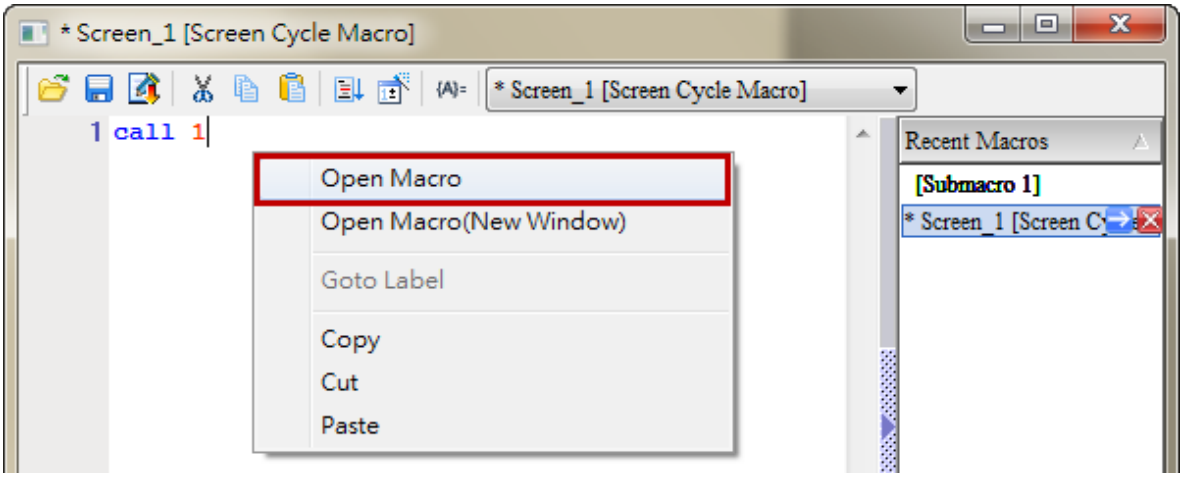
<table>
<tr><td></td><td>


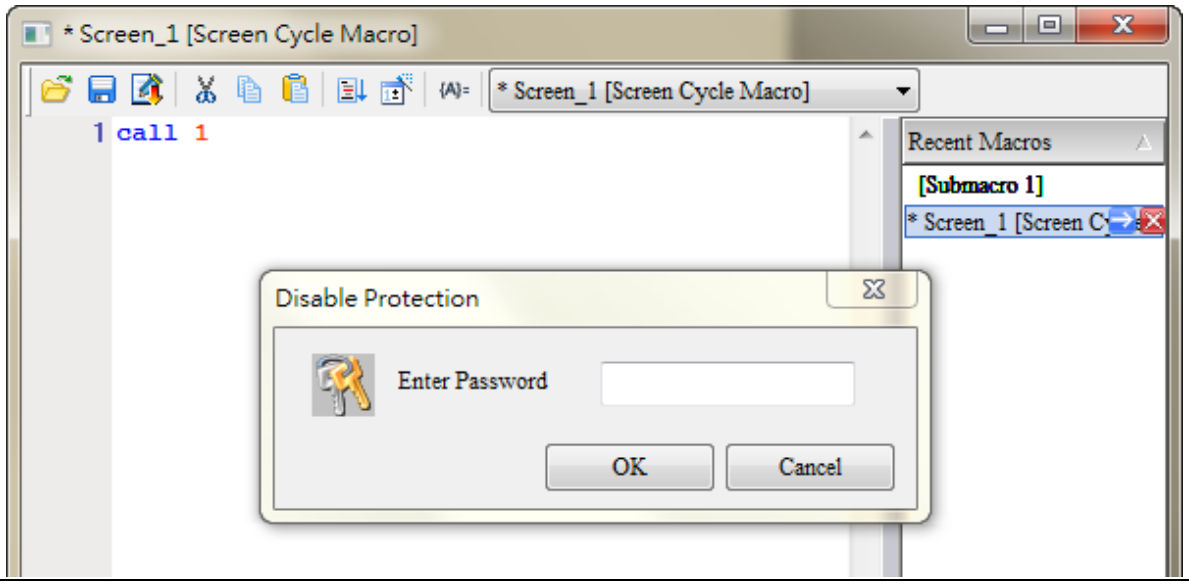


</td></tr>
<tr><td rowspan="2">(4)</td><td>If the station number of the protected sub-macro is 1, it cannot be changed to 2 when executing the function of Replace Station Value.</td></tr>
<tr><td>


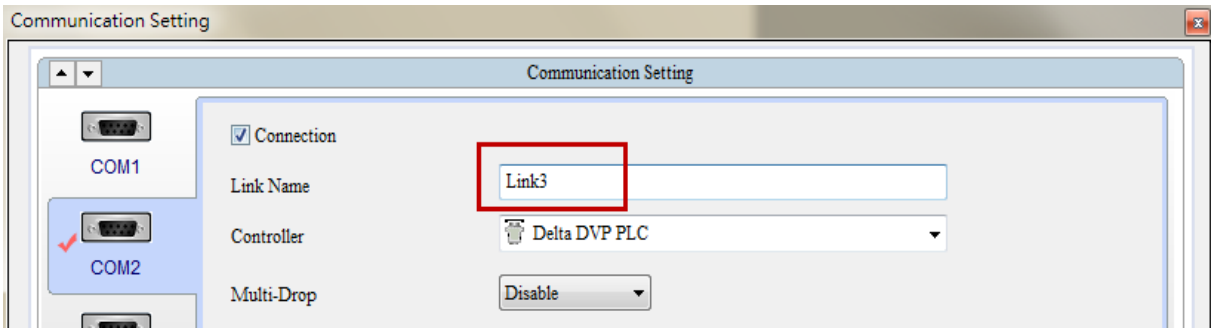


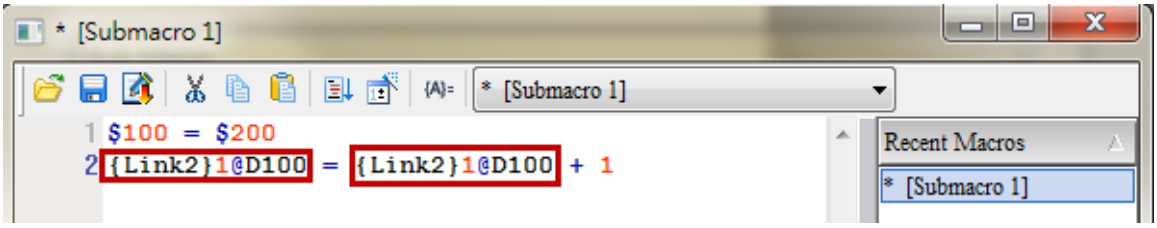
</td></tr>
<tr><td>(5)</td><td>Assuming that Call command is included in macro, right click to open sub-macro window. If it is protected, users will be asked to enter the password.</td></tr>
</table>





(6) Change the Link Name to Link3. In protected sub-macro, Link2 cannot be changed to Link3.





24-1-8 Initial Macro

The Initial Macro can be edited by going into [Options] → [Initial Macro].

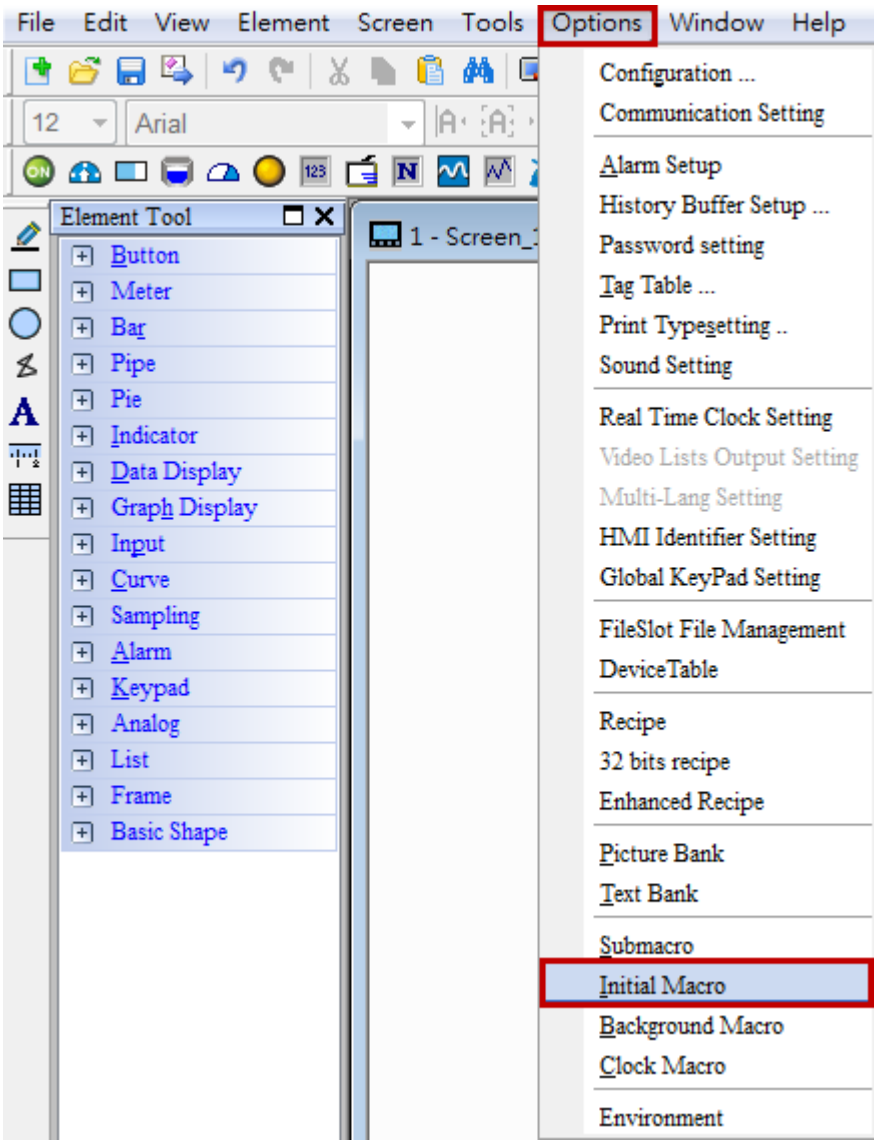


Figure 24-1-8-1 Initial Macro

The Initial Macro is the first macro to be executed right after the HMI starts up, and hence, users can write common HMI initial values into this macro.

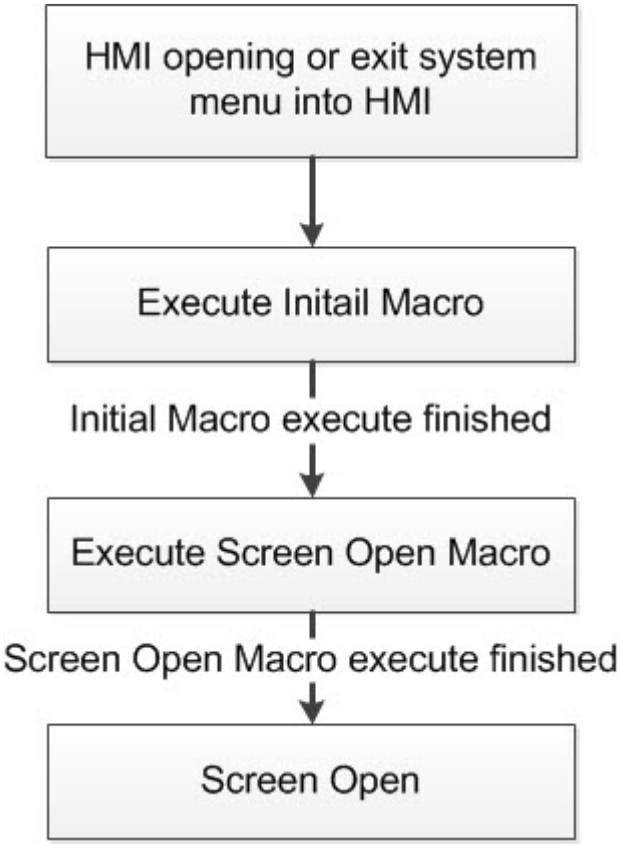


Figure 24-1-8-2 Initial Macro Flowchart

24-1-9 Background Macro

The Background Macro can be edited by going into [Options] → [Background Macro].

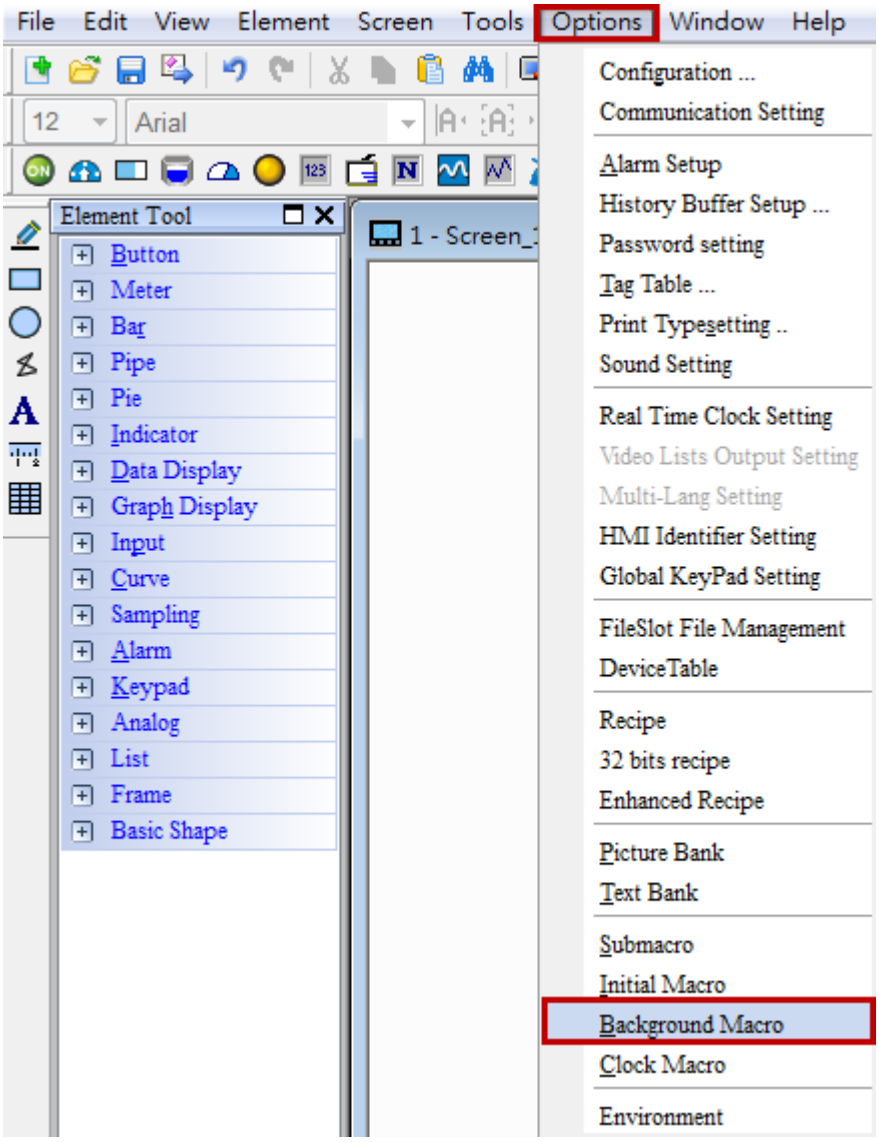


Figure 24-1-9-1 Background Macro

The Background Macro will be continuously executed during HMI operations. Whether it is executed one line or several lines at a time (does not stop after the first sequence), this macro will continue to be executed and repeat from the first line after it reaches the last line. To define the number of lines to be executed each time, please go to [Options] → [Configuration…] to set the [Background macro update cycle] and the maximum number of lines for each update cycle is 512.

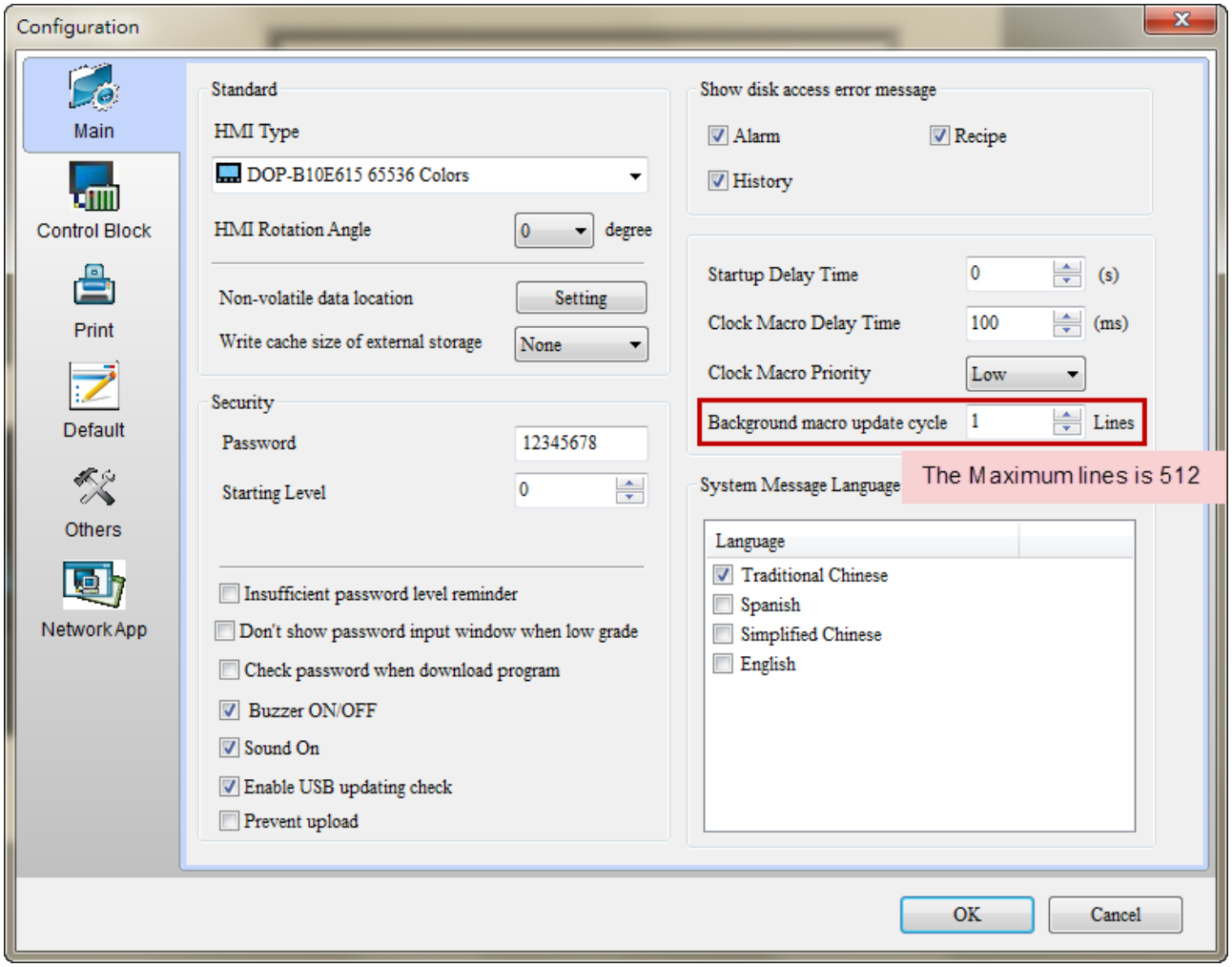


Figure 24-1-9-2 Background Macro Update Cycle

Suppose there are 10 elements created onscreen and 6 macro commands are written within the Background Macro. If the background macro update cycle is set to 3, then the flow of the process is shown below:

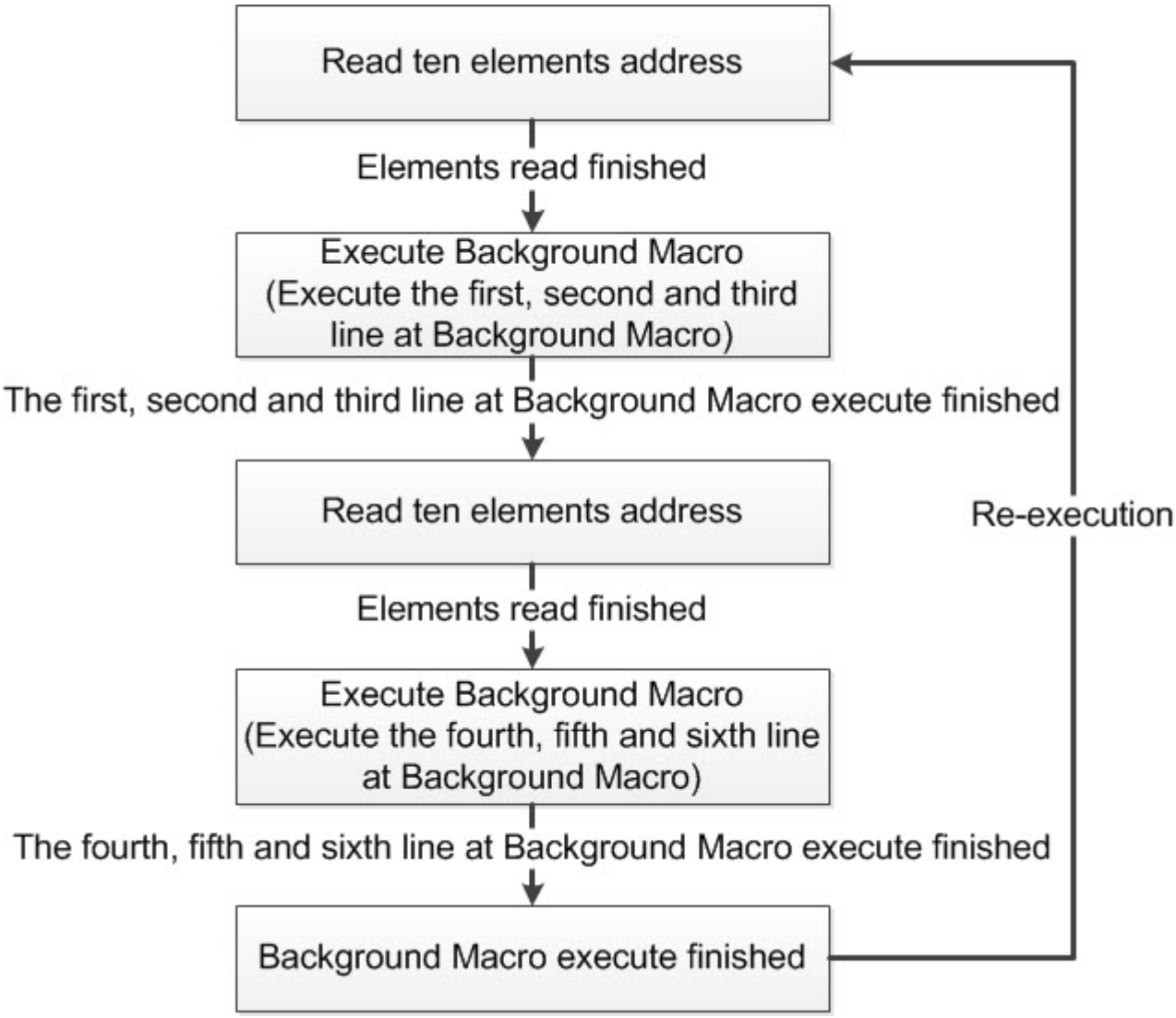


Figure 24-1-9-3 Background Macro Flowchart

24-1-10 Clock Macro

The Clock Macro can be edited by going into [Options] → [Clock Macro].

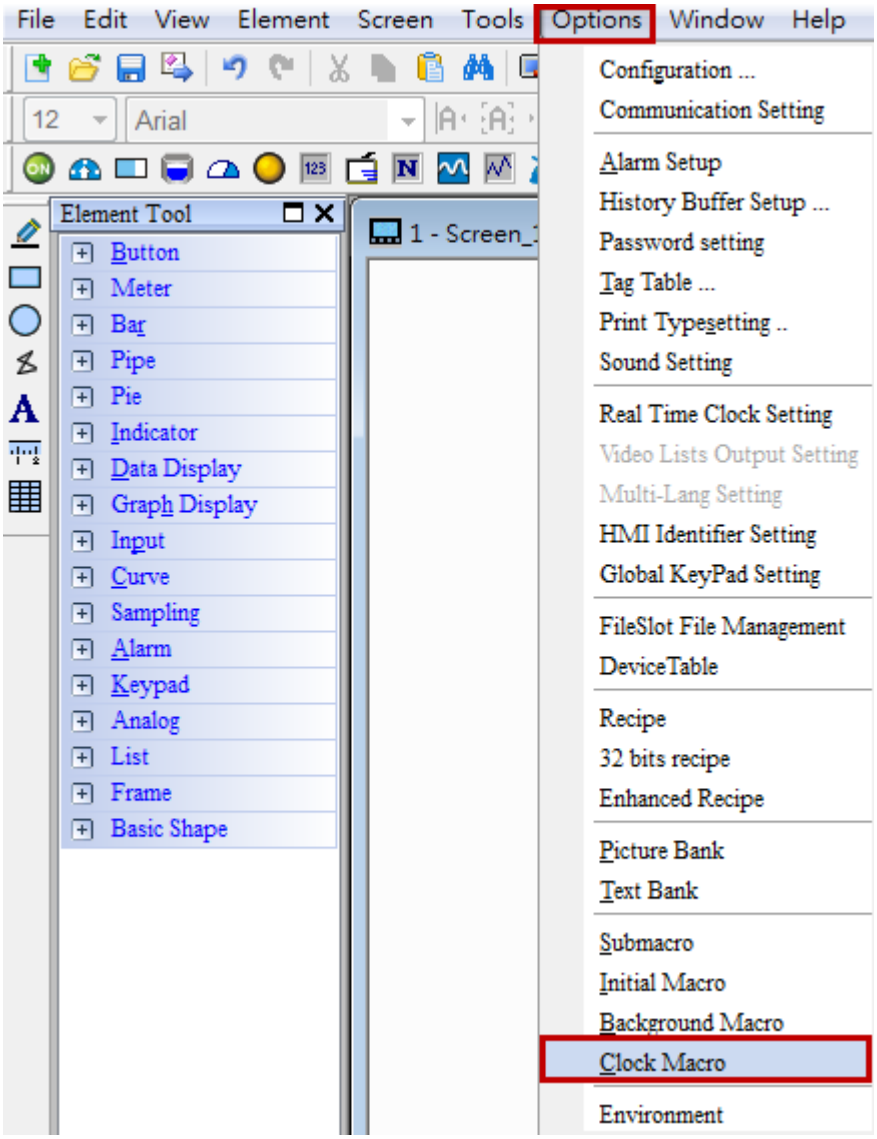


Figure 24-1-10-1 Clock Macro

The Clock Macro will be continuously executed during HMI operations. Unlike the Background Macro, the Clock Macro will finish executing all commands within the macro rather than one line or several lines at once. Similar to the Screen Cycle Macro, the Clock Macro also repeats its executions based on the Clock Macro Delay Time. Users can configure the delay time by going to [Options] → [Configuration…] to set the [Clock Macro Delay Time]. So that each time the Clock Macro is executed, it will wait until the macro delay time is completely elapsed. The default Clock Macro Delay Time is 100ms and the maximum time length is 65535ms.

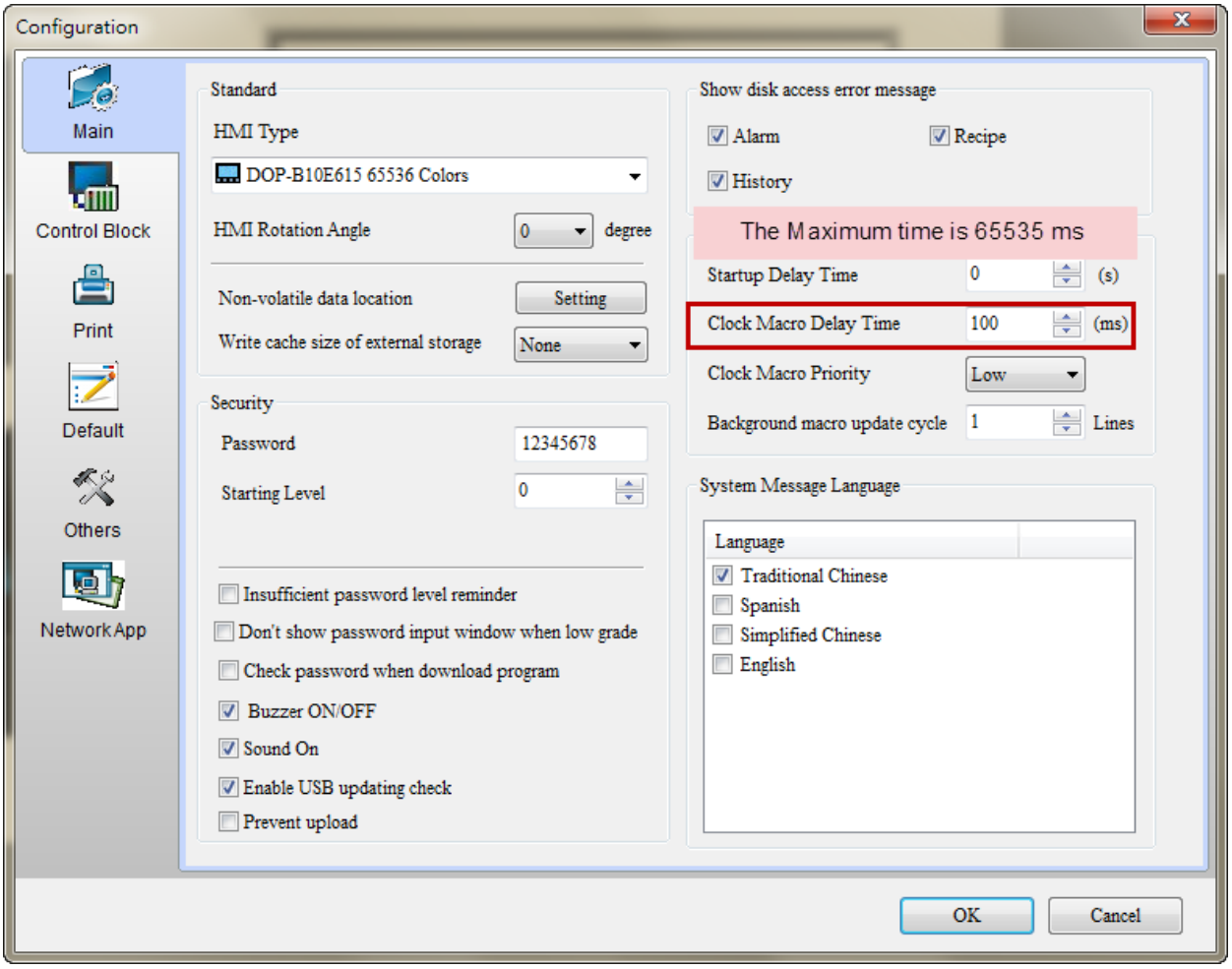


Figure 24-1-10-2 Clock Macro Delay Time

Three levels of priority (high, medium, and low) are also available for users to configure the priority of the Clock Macro. The order of priority can ensure the accurate delay time of Clock Macro.

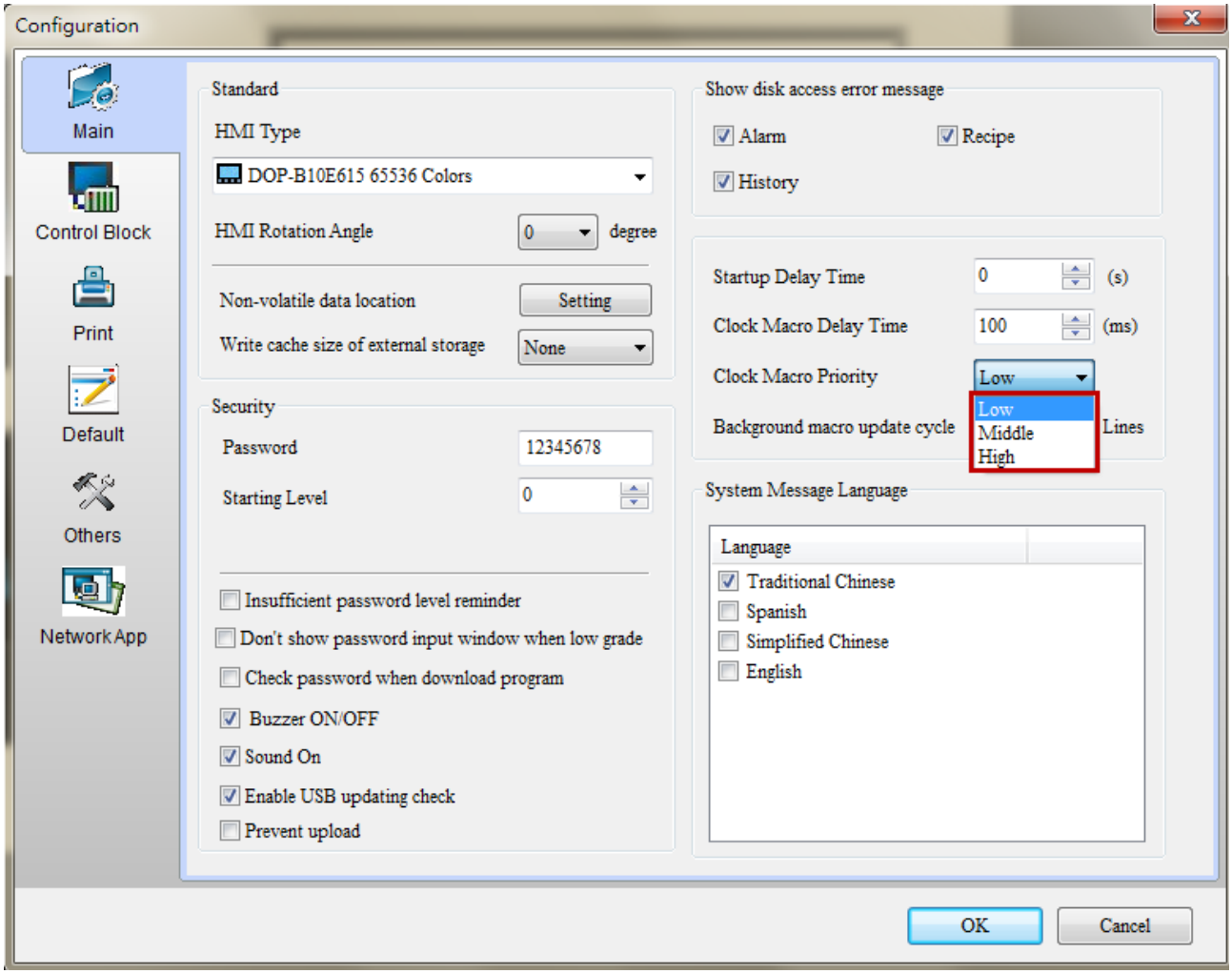


Figure 24-1-10-3 Clock Macro Priority

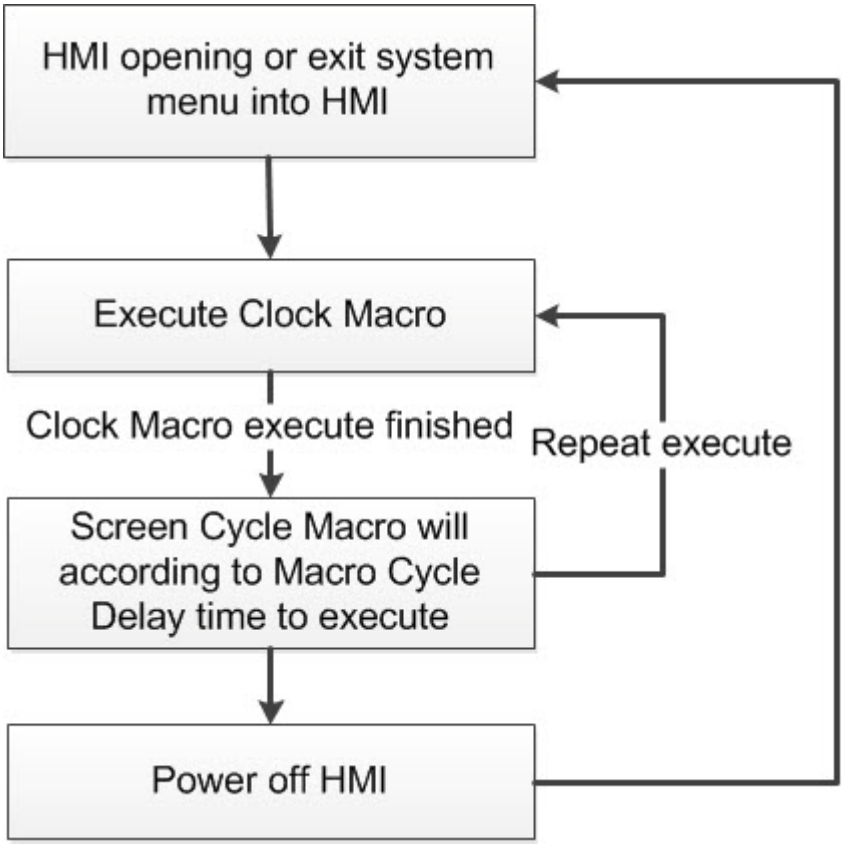


Figure 24-1-10-4 Clock Macro Flowchart

24-2 Macro Editing Window

After choosing a desired Macro, users can start to edit a Macro. Please note that each macro is capable of handling 512 lines of commands and only 640 bytes of characters are allowed on each line. Only 10 most recently edited macros will be displayed in the box on the top right side of the editing area. If there are more than 10 macros opened recently, then the first macro will be closed and the new Macro will be listed instead. Suppose the first Macro has been modified before it is closed, then a dialog box will pop up to ask the user to save the update of the macro before adding in the new macro.

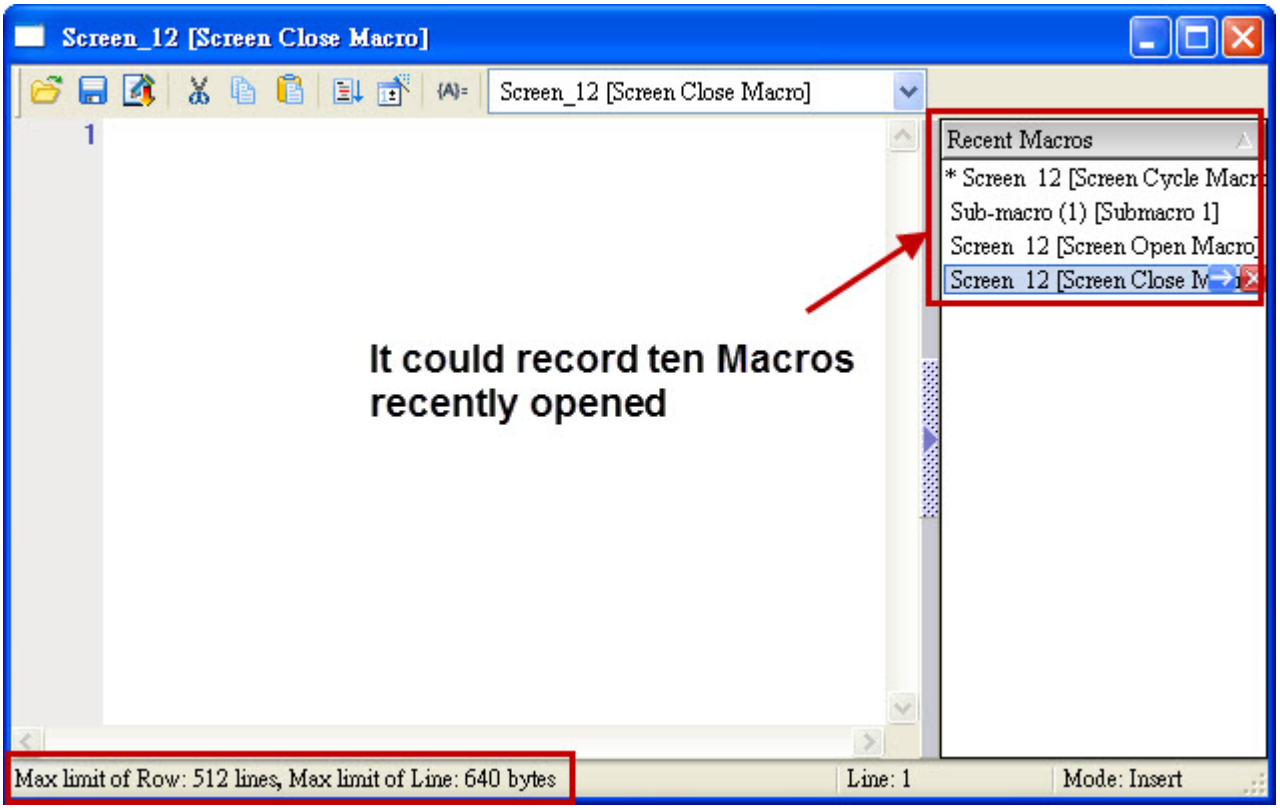


Figure 24-2-1 Macro Editing Window

The toolbar within the editing window is also available for users to design and edit macro commands.

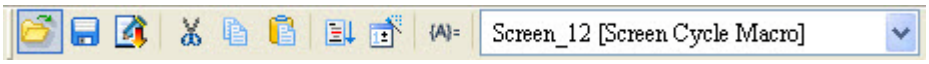
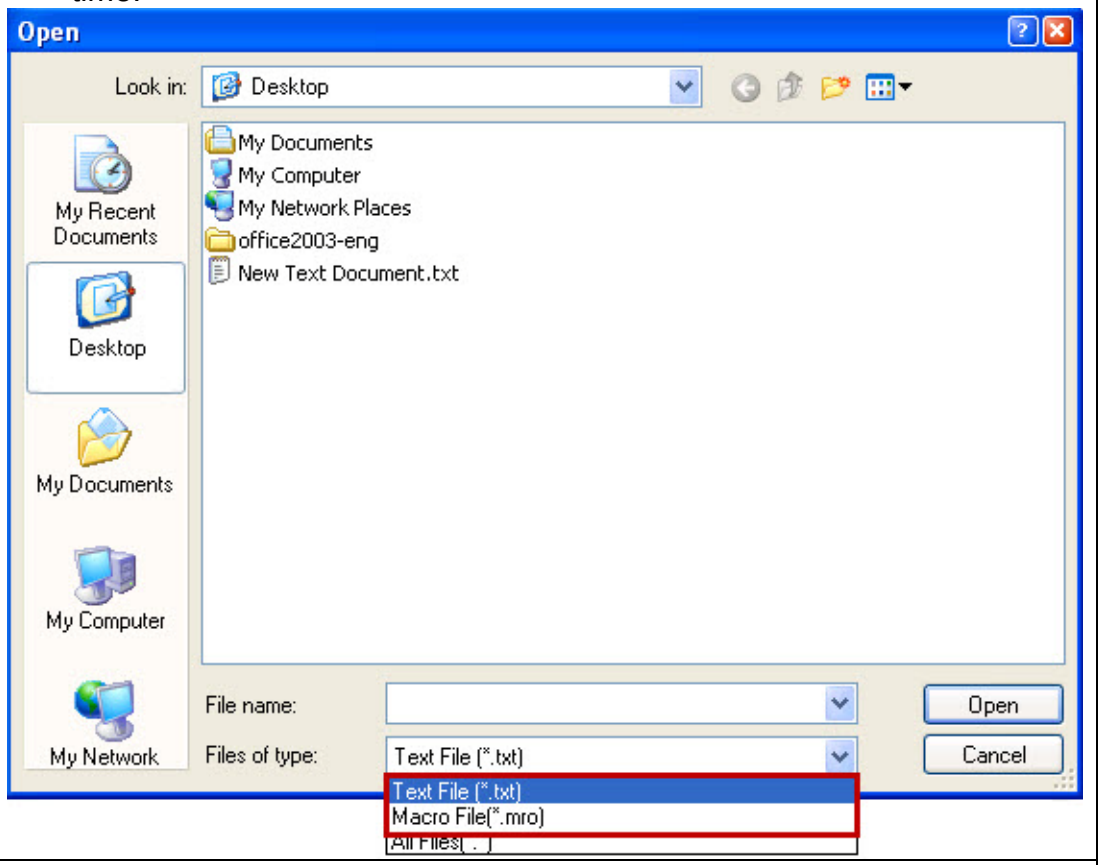


Figure 24-2-2 Macro Toolbar

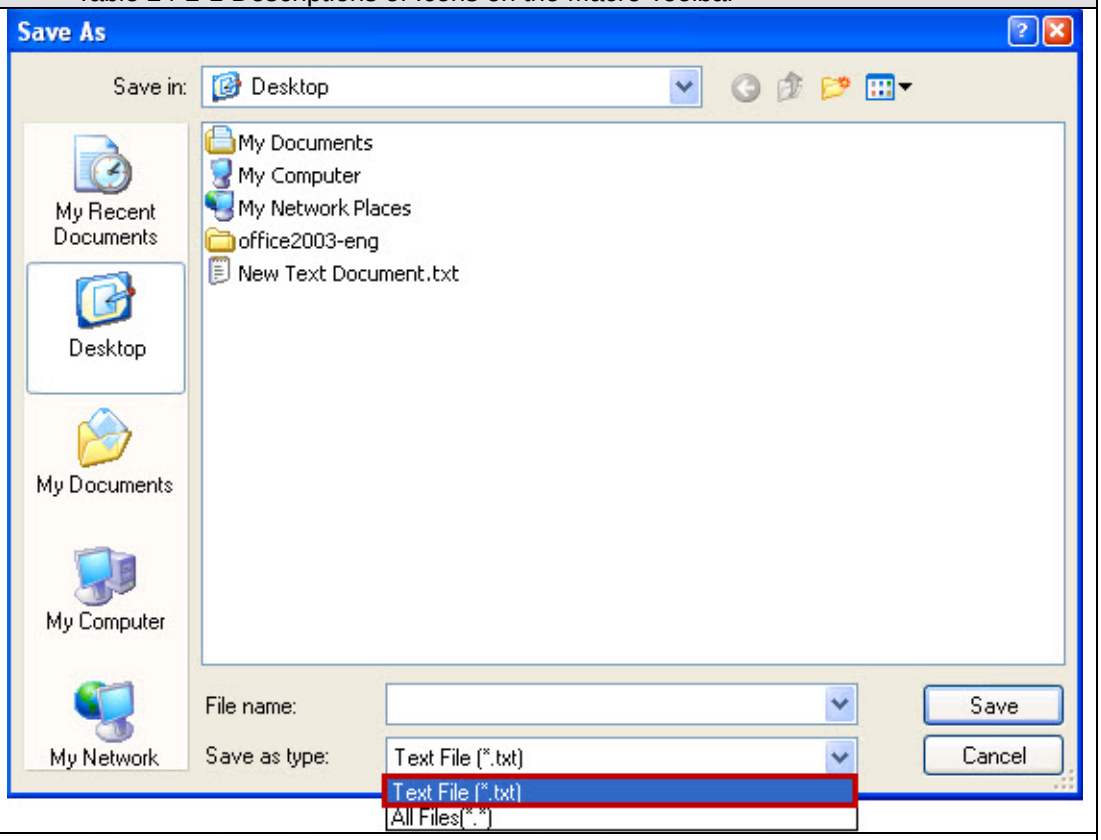
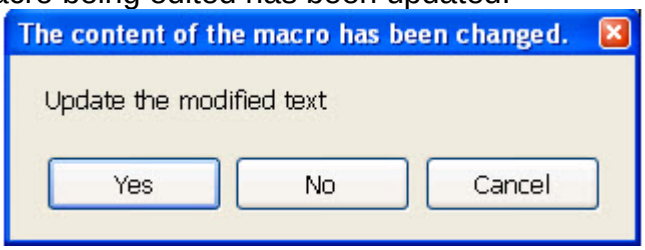
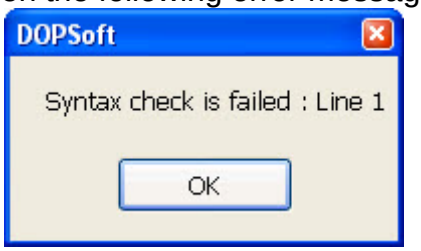
Functions of each icon on the Macro Toolbar are explained in the following table.

Functions of Macro Toolbar Icons Table 24-2-1 Descriptions of Icons on the Macro Toolbar		
Icon	**Function**	**Content Description**
	Open	➢ Open is equivalent to import. Two file formats are available: txt and mro.

Functions of Macro Toolbar Icons Table 24-2-1 Descriptions of Icons on the Macro Toolbar		
		Users can choose to directly import previously edited macros to save time. 
	Save	➢ Save is equivalent to Export, but only the txt file format is supported. Users can save the edited macro as a backup or for use of other screens.

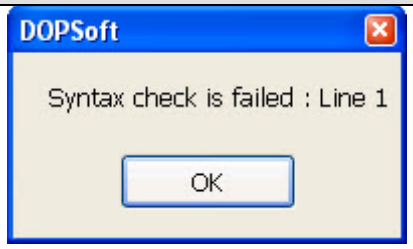
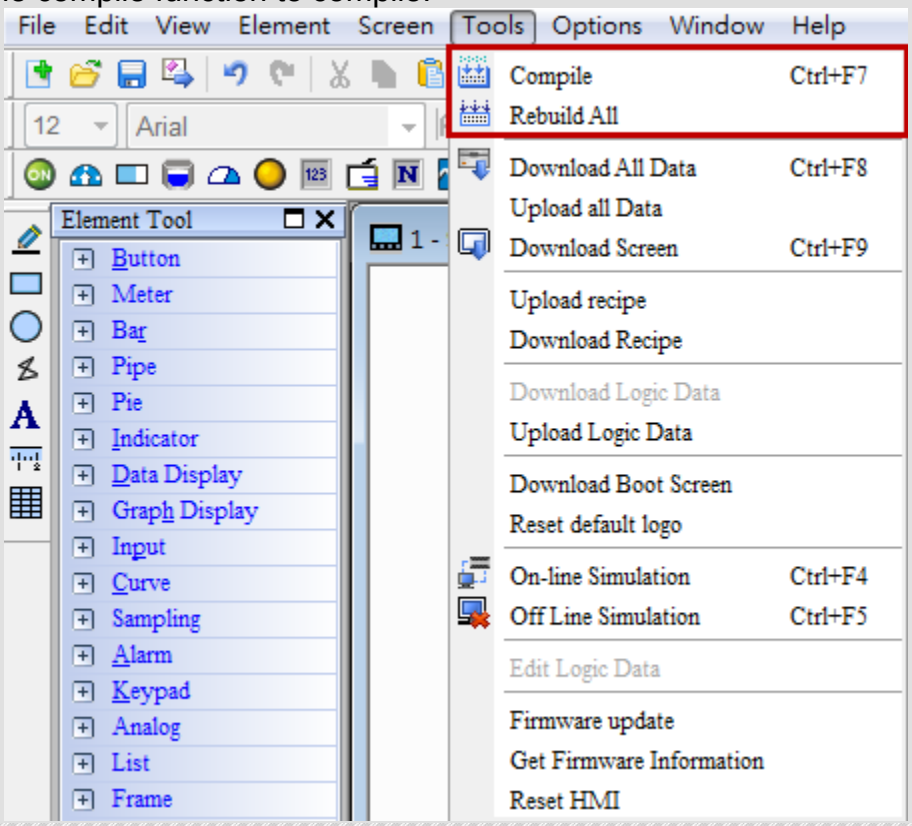
Functions of Macro Toolbar Icons

Table 24-2-1 Descriptions of Icons on the Macro Toolbar

		
	Update	➢ This function will refresh the updated macro and check if the syntaxes are correct. If this button is not executed before exiting the current Macro editing window (click the exit button), the users will be prompted that the macro being edited has been updated.  ➢ Syntax check will be performed after clicking the update button. If there is a syntax error, then the following error message will pop up. 
	Cut Copy Paste	➢ Cut, Copy and Paste are used the same way as Microsoft Office and users can also choose to perform these operations through hotkeys (Cut: Ctrl + X; Copy: Ctrl + C; Paste: Ctrl + V).
	Syntax Check	➢ Syntax Check will check if macro commands are written correctly. If there is a syntax error, then the following error message will pop up.

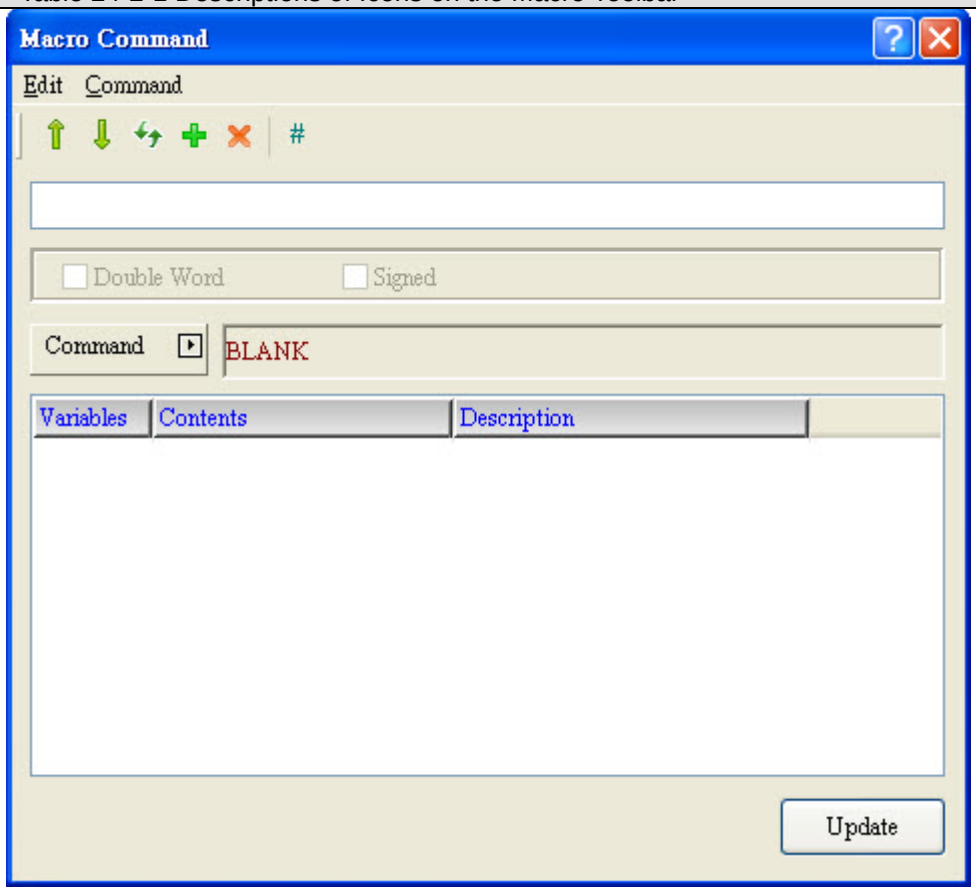
Functions of Macro Toolbar Icons

Table 24-2-1 Descriptions of Icons on the Macro Toolbar

		 NOTE: ✓ Syntax Check is not equivalent to compiling macros. Please consider the compile function to compile. 
	Macro Wizard	➢ The purpose of the wizard is for users to more easily edit and type in Macro commands and this will also eliminate typos.

Functions of Macro Toolbar Icons

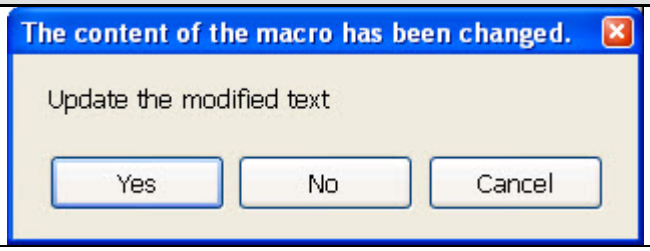
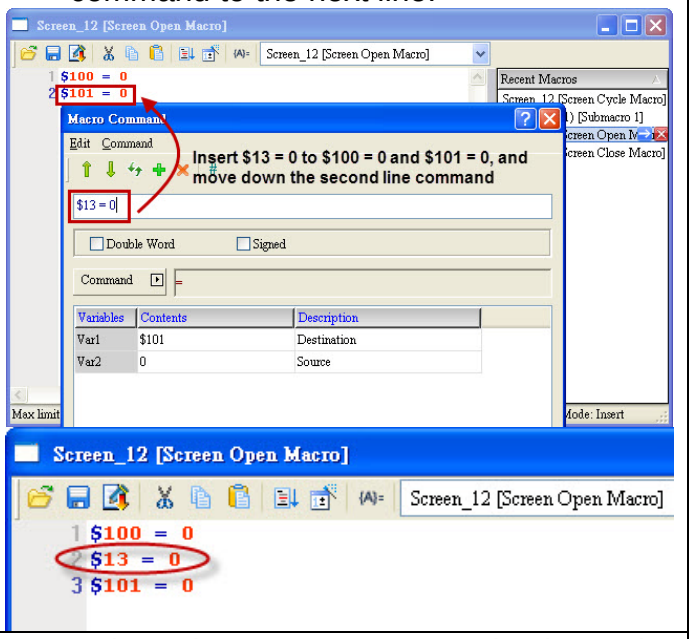
Table 24-2-1 Descriptions of Icons on the Macro Toolbar



Edit	Previous	➢ The previous icon will move the mouse cursor to the last line and the next icon will move the mouse cursor to the next line. ➢ Via these two icons, users can choose which line within the macro to move to.
	Next	
	Update	➢ This function will refresh the updated macro and check if the syntaxes are correct. If syntax errors are detected, then the error messages shown below will pop up for user notification. ➢ If this icon is not executed before exiting the current Macro editing window (click the exit icon), the users will be prompted whether to refresh the updated macro.

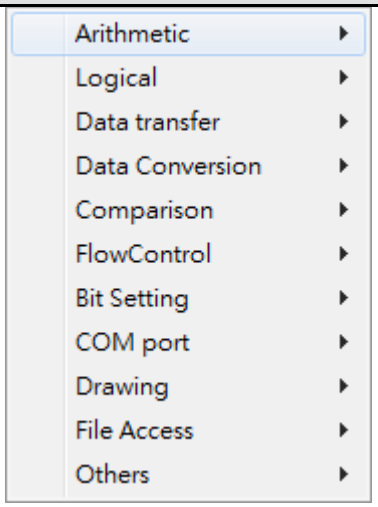
Functions of Macro Toolbar Icons

Table 24-2-1 Descriptions of Icons on the Macro Toolbar

				
			Insert	➢ Insert a new macro command. This icon will replace the macro command where the cursor is located with the newly inserted command and move the current macro command to the next line. 
			Delete	➢ Delete the macro command where the mouse cursor is located. If the deleted command is not on the last line within the macro, then the lines below the deleted commands will move up. NOTE : ✓ If no macro command exists where the mouse cursor is located, then nothing will happen.
			Comment	➢ Comment helps users to manage macros, improve program readability and simplify code maintenance tasks. Users only need to insert the symbol # or click # button within the macro wizard ([Edit] → [Comment]) to comment on the program. NOTE: ✓ Comments within the macro will not be executed.
		Commands	➢ These are macro functions and they are grouped into the following categories:	

Functions of Macro Toolbar Icons

Table 24-2-1 Descriptions of Icons on the Macro Toolbar

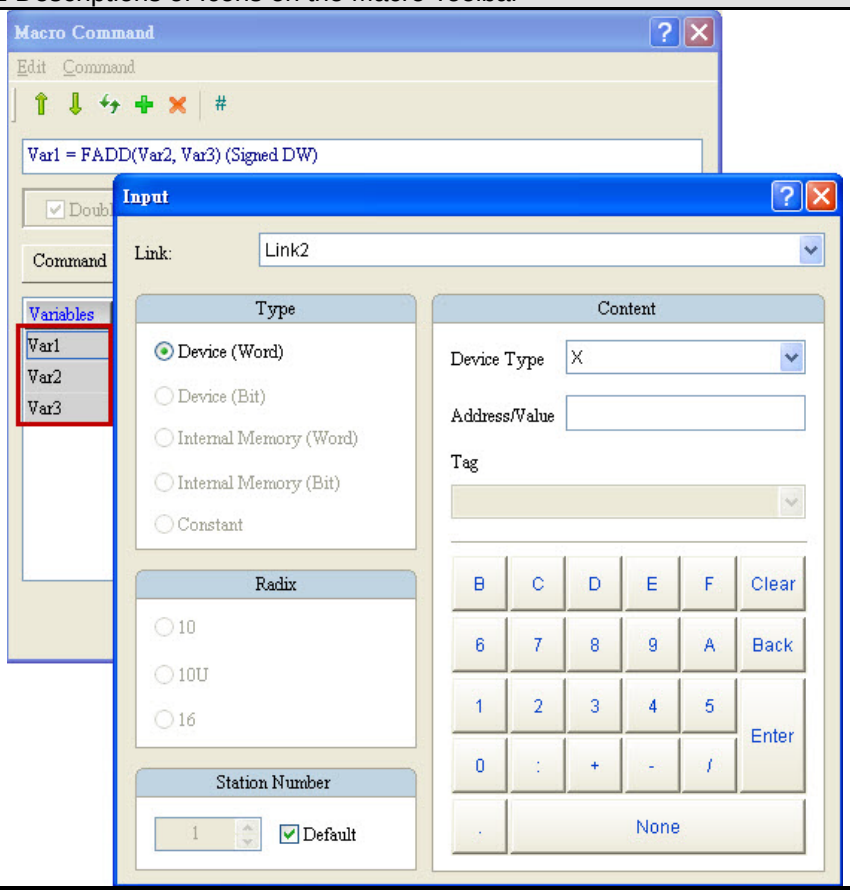
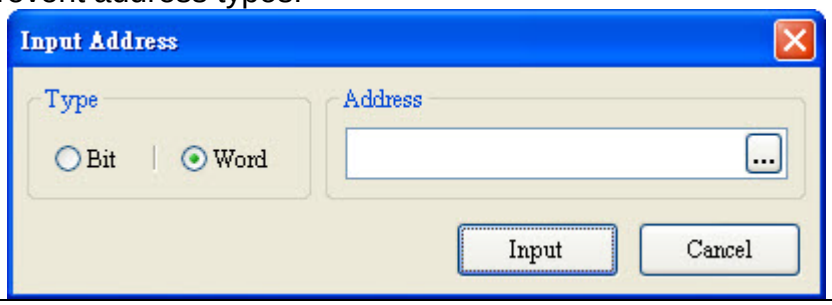
<table>
<tr><td></td><td></td><td></td><td></td><td>


➢ For detailed introductions on the commands, please refer to 24-3 Macro Commands.
</td></tr>
<tr><td></td><td></td><td></td><td>Double Word

Signed</td><td>
➢ 32 bit or signed number operations are supported by macro commands. If Signed is checked, then the command will be executed as a signed number, or else the command will be executed as an unsigned number. If Double Word is check, then the command will be executed as a 32 bit command, or else the command will be executed as a Double Word command, or 16 bit command.
<table>
<tr><td>Unsigned</td><td>Unsigned number</td></tr>
<tr><td>Signed</td><td>Signed number</td></tr>
<tr><td>WORD</td><td>16 bit data</td></tr>
<tr><td>DW（DOUBLE WORD, DWORD）</td><td>32 bit data</td></tr>
</table>
NOTE:
✓ For the Double Word data type, then each memory address will take two registers.
</td></tr>
<tr><td></td><td></td><td></td><td>Command</td><td>
➢ Command is equivalent to the [Command] icon in the Macro Wizard dialog window and they both are used for users to choose their desired macro command.
➢ For detailed explanations please refer to 24-3 Macro Commands.
</td></tr>
<tr><td></td><td></td><td></td><td>Variable</td><td>
➢ This function provide variables used in macro commands and users can directly click the variable button to configure relevant parameters.
</td></tr>
</table>

Functions of Macro Toolbar Icons

Table 24-2-1 Descriptions of Icons on the Macro Toolbar

			
{A}=	Input Address	➢ Users can enter memory addresses used in the macro via this function to prevent address typos. 	

24-3 Macro Commands

Based on the nature of macro commands, they are divided into the following ten categories: Arithmetic, Logical, Data transfer, Data conversion, Comparison, Flow control, Bit setting, Communication and Drawing and Other. If select HMC and PS models, users can choose the macro command of industrial application (e-CAM) which is shown as below.

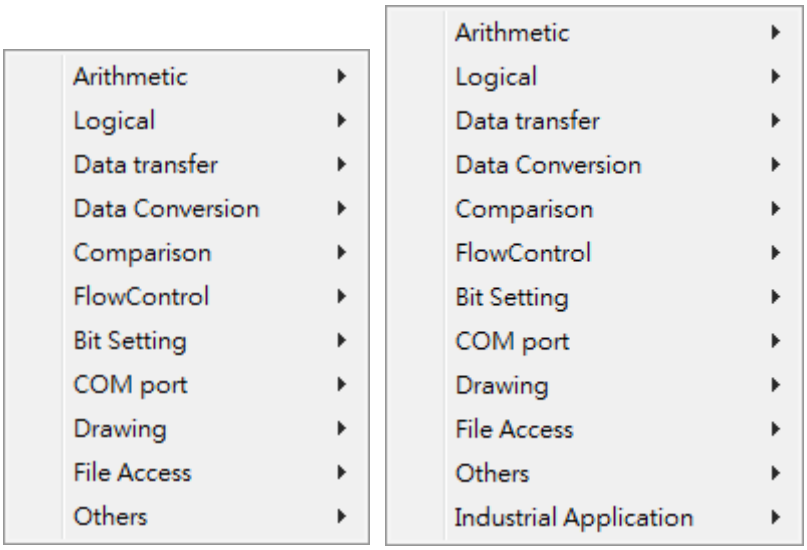


Figure 24-3-1 Type of Macro Commands

All supported macro commands are listed below:

Category	Function	Expression	Description
Arithmetic	+	Var1 = Var2 + Var3	Addition
	-	Var1 = Var2 - Var3	Subtraction
	*	Var1 = Var2 * Var3	Multiplication
	/	Var1 = Var2 / Var3	Division
	%	Var1 = Var2 % Var3	Get Reminder
	MUL64	Var1 = MUL64(Var2, Var3) (Signed DW)	64 bit Multiplication
	ADDSUMW	Var1 = ADDSUMW(Var2, Var3)	Repeated Addition
	FADD	Var1 = FADD(Var2, Var3) (Signed DW)	Floating Point Addition
	FSUB	Var1 = FSUB(Var2, Var3) (Signed DW)	Floating Poiont Subtraction
	FMUL	Var1 = FMUL(Var2, Var3) (Signed DW)	Floating Point Multiplication
	FDIV	Var1 = FDIV(Var2, Var3) (Signed DW)	Floating Point Division
	FMOD	Var1 = FMOD(Var2, Var3) (Signed DW)	Floating Point Reminder
	SIN	Var1 = SIN(Var2) (Signed DW)	Sine Function
	COS	Var1 = COS(Var2) (Signed DW)	Cosine Function

Category	Function	Expression	Description
	TAN	Var1 = TAN(Var2) (Signed DW)	Tangent Function
	COT	Var1 = COT(Var2) (Signed DW)	Cotangent Function
	SEC	Var1 = SEC(Var2) (Signed DW)	Secant Function
	CSC	Var1 = CSC(Var2) (Signed DW)	Cosecant Function
Logical	|	Var1 = Var2 | Var3	Bitwise OR Operation
	&&	Var1 = Var2 && Var3	Bitwise AND Operation
	^	Var1 = Var2 ^ Var3	Bitwise XOR Operation
	NOT	Var1 = NOT Var2	Bitwise NOT Operation
	<<	Var1 = Var2 << Var3	SHL(Bitwise Left-shift Operation)
	>>	Var1 = Var2 >> Var3	SHR(Bitwise Right-shift Operation)
Data transfer	MOV	Var1 = Var2	Data Moving Operand
	BMOV	BMOV(Var1, Var2, Var3)	Move in Block
	ArrayCopy	Var1 = ArrayCopy(Var2, Var3, Var4, Var5, Var6)	Copy Array
	FILL	FILL(Var1, Var2, Var3)	Fill in the Block
	FILLASC	FILLASC(Var1, " ")	String to ASCII Conversion
	STRCAT	Var1 = STRCAT(Var2, Var3, Var4)	Connect String
	FMOV	Var1 = FMOV(Var2) (Signed DW)	Move floating point data
Data conversion	BCD	Var1 = BCD(Var2)	Decimal to BCD Conversion
	BIN	Var1 = BIN(Var2)	BCD to Decimal Conversion
	TODWORD	Var1 = TODWORD(Var2)	WORD to Double WORD Conversion
	TOWORD	Var1 = TOWORD(Var2, Var3)	BYTE to Word Conversion
	TOBYTE	Var1 = TOBYTE(Var2, Var3)	Word to Byte Conversion
	SWAP	SWAP(Var1, Var2, Var3)	Swap between high bit and low bit of WORD
	XCHG	XCHG(Var1, Var2, Var3)	Data Exchange
	MAX	Var1 = MAX(Var2, Var3)	Get Maximum value
	MIN	Var1 = MIN(Var2, Var3)	Get Minimum value
	TOHEX	Var1 = TOHEX(Var2)	Convert 4 ASCII characters to a four digit integer in hexadecimal format

Category	Function	Expression		Description
	TOASC	Var1 = TOASC(Var2)		Convert hexadecimal integers into 4 Words ASCII characters
	FCNV	Var1 = FCNV(Var2) (Signed DW)		Conversion of integer into floating point value
	ICNV	Var1 = ICNV(Var2) (Signed DW)		Conversion from integer to floating point value
	SPRINTF	Var1 = SPRINTF(Var2, "%u", Var4)		Format String
Comparison	IF…THEN GOTO	IF ==	IF Var1 == Var2 THEN GOTO LABEL Var3	If …. Goto a certain label identifier and continue subsequent executions
		IF !=	IF Var1 != Var2 THEN GOTO LABEL Var3	
		IF >	IF Var1 > Var2 THEN GOTO LABEL Var3	
		IF >=	IF Var1 >= Var2 THEN GOTO LABEL Var3	
		IF <	IF Var1 < Var2 THEN GOTO LABEL Var3	
		IF <=	IF Var1 <= Var2 THEN GOTO LABEL Var3	
		IF AND == 0	IF (Var1 && Var2) == 0 THEN GOTO LABEL Var3	
		IF AND != 0	IF (Var1 && Var2) != 0 THEN GOTO LABEL Var3	
		IF == ON	IF Var1 == ON THEN GOTO LABEL Var2	
		IF == OFF	IF Var1 == OFF THEN GOTO LABEL Var2	
		IFB == ON	IFB Var1 == ON THEN GOTO LABEL Var2	
		IFB == OFF	IFB Var1 == OFF THEN GOTO LABEL Var2	
	IF…THEN CALL	IF ==	IF Var1 == Var2	Macro

Category	Function	Expression		Description
		CALL	THEN CALL Var3	If… Then Call a Submacro
		IF != CALL	IF Var1 != Var2 THEN CALL Var3	
		IF > CALL	IF Var1 > Var2 THEN CALL Var3	
		IF >= CALL	IF Var1 >= Var2 THEN CALL Var3	
		IF < CALL	IF Var1 < Var2 THEN CALL Var3	
		IF <= CALL	IF Var1 <= Var2 THEN CALL Var3	
		IF AND == 0 CALL	IF (Var1 && Var2) == 0 THEN CALL Var3	
		IF AND != 0 CALL	IF (Var1 && Var2) != 0 THEN CALL Var3	
		IF == ON CALL	IF Var1 == ON THEN CALL Var2	
		IF == OFF CALL	IF Var1 == OFF THEN CALL Var2	
	IF…	IF ==	IF Var1 == Var2	Logical Comparison
		IF !=	IF Var1 != Var2	
		IF >	IF Var1 > Var2	
		IF >=	IF Var1 >= Var2	
		IF <	IF Var1 < Var2	
		IF <=	IF Var1 <= Var2	
		IF AND == 0	IF (Var1 && Var2) == 0	
		IF AND != 0	IF (Var1 && Var2) != 0	
		IF == ON	IF Var1 == ON	
		IF == OFF	IF Var1 == OFF	
	ELSEIF…	ELSEIF ==	ELSEIF Var1 == Var2	Logical Comparison
		ELSEIF !=	ELSEIF Var1 != Var2	
		ELSEIF >	ELSEIF Var1 > Var2	
		ELSEIF >=	ELSEIF Var1 >= Var2	
		ELSEIF <	ELSEIF Var1 < Var2	
		ELSEIF <=	ELSEIF Var1 <= Var2	
		ELSEIF AND == 0	ELSEIF (Var1 && Var2) == 0	
		ELSEIF AND != 0	ELSEIF (Var1 && Var2) != 0	
		ELSEIF ==	ELSEIF Var1 ==	

Category	Function	Expression		Description
		ON	ON	
		ELSEIF == OFF	ELSEIF Var1 == OFF	
	ELSE	ELSE		Logical Comparison
	ENDIF	ENDIF		Logical Comparison
	FCMP	Var1 = FCMP(Var2, Var3) (Signed DW)		Comparison of Floating Point Data
Flow control	GOTO	GOTO LABEL Var1		Label Identifier for the current process to unconditionally jump to
	LABEL	LABEL Var1		Label Identifier
	CALL	CALL Var1		Call Sub-macro
	RET	RET		Exit Sub-macro
	FOR	FOR Var1		Loop
	NEXT	NEXT		
	END	END		End Macro
Bit setting	BITON	BITON Var1		Set Bits to On
	BITOFF	BITOFF Var1		Set Bits Off
	BITNOT	BITNOT Var1		Set Bits to Inverse State (ON→OFF; OFF→ON)
	GETB	Var1 = GETB Var2		Acquire Bit State
Communication	INITCOM	Var1 = INITCOM(Var2, Var3, Var4, Var5, Var6, Var7, Var8)		COM Port Initialization
	ADDSUM	Var1 = ADDSUM(Var2, Var3)		Checksum Calculation through Addition
	XORSUM	Var1 = XORSUM(Var2, Var3)		Checksum Calculation through XOR Operation
	PUTCHARS	Var1 = PUTCHARS(Var2, Var3, Var4)		Output Character by Com Port
	GETCHARS	Var1 = GETCHARS(Var2, Var3, Var4)		Character Acquisition through Com Port
	SELECTCOM	SELECTCOM(Var1)		Com Port Selection
	CLEARCOMBUFFER	CLEARCOMBUFFER(Var1, Var2)		Com Port Buffer Clearance
	CHRCHKSUM	Var1 = CHRCHKSUM("Var2", Var3, Var4)		Calculation of String Length and Checksum
	LOCKCOM	Var1 = LOCKCOM(Var2, Var3)		Lock Com Port
	UNLOCKCOM	UNLOCKCOM(Var1)		Unlock Com Port
	STATIONCHK	Var1 = STATIONCHK(Var2, Var3)		Check COM Port Status
	STATIONON	STATIONON(Var1, Var2)		Set Station On
	STATIONOFF	STATIONOFF(Var1, Var2)		Set Station Off
	IPON	Var1 = IPON(Var2, Var3, Var4,		Enable IP Address

Category	Function	Expression	Description
		Var5, Var6)	
	IPOFF	Var1 = IPOFF(Var2, Var3, Var4, Var5, Var6)	Disable IP Address
	IPCHANGE	Var1 = IPCHANGE(Var2, Var3, Var4, Var5, Var6, Var7)	Change PLC IP address and Port.
Drawing	RECTANGLE	RECTANGLE(Var1)	Draw Rectangle
	LINE	LINE(Var1)	Draw Line
	POINT	POINT(Var1)	Draw Point
	CIRCLE	CIRCLE(Var1)	Draw Ellipse
File Access	FileSlotRead	Var1 = FileSlotRead(Var2, Var3, Var4, Var5)	Read Files
	FileSlotWrite	Var1 = FileSlotWrite(Var2, Var3, Var4, Var5)	Write Files
	FileSlotRemove	Var1 = FileSlotRemove(Var2)	Remove Files
	FileSlotGetLength	Var1 = FileSlotGetLength(Var2, Var3)	Accessing File Length
	FileSlotExport	Var1 = FileSlotEXPORT(Var2, Var3, Var4, Var5)	Export Files
	FileSlotImport	Var1 = FileSlotIMPORT(Var2, Var3, Var4, Var5)	Import Files
Other	Time Tick	Var1 = TIMETICK	Acquire System up duration from System Startup to Present
	GETLASTERROR	Var1 = GETLASTERROR	Get Last Error Value
	Comment	#	Make Comment
	Delay	Delay(Var1)	System Delay
	GETSYSTEMTIME	Var1 = GETSYSTEMTIME	Acquire System Time
	SETSYSTEMTIME	SETSYSTEMTIME(Var1)	Set System Time
	GETHISTORY	Var1 = GETHISTORY（Var2, Var3, Var4, Var5, Var6）	Acquire Historical Log
	EXPORT	EXPORT(Var1)	Export Report to an External Device
	EXRCP16	Var1 = EXRCP16(Var2, Var3)	Export 16 bit Equation
	IMRCP16	Var1 = IMRCP16(Var2, Var3)	Import 16 bit Equation
	EXRCP32	Var1 = EXRCP32(Var2, Var3)	Export 32 bit Equation
	IMRCP32	Var1 = IMRCP32(Var2, Var3)	Import 32 bit Equation
	EXENRCP	Var1 = EXENRCP(Var2, Var3)	Export Enhance Recipe Equation
	IMENRCP	Var1 = IMENRCP(Var2, Var3)	Import Enhance Recipe Equation

Category	Function	Expression	Description
	EXHISTORY	Var1 = EXHISTORY(Var2, Var3, Var4)	Export History Data
	EXALARM	Var1 = EXALARM(Var2, Var3)	Export Alarm Information
	DISKFORMAT	Var1 = DISKFORMAT(Var2)	Format Disk
	BMPCAPTURE	Var1 = BMPCAPTURE(Var2)	Screen Capture
	PLCDOWNLOAD	Var1 = PLCDOWNLOAD(Var2, Var3, Var4, Var5, Var6)	Via HMI to download DVP or ISP file to PLC
	GetCircleCenter	Var1 = GetCircleCenter(Var2, Var3)	Calculate the Coordinate of Circle Center
Industrial Application	ECAM	Var1 = ECAM(Var2, Var3, Var4, Var5) (DW)	E-Cam Table

24-3-1 Arithmetic Operation

Arithmetic operations are divided into integer operations and floating point operations and relevant macro usages are detailed below.

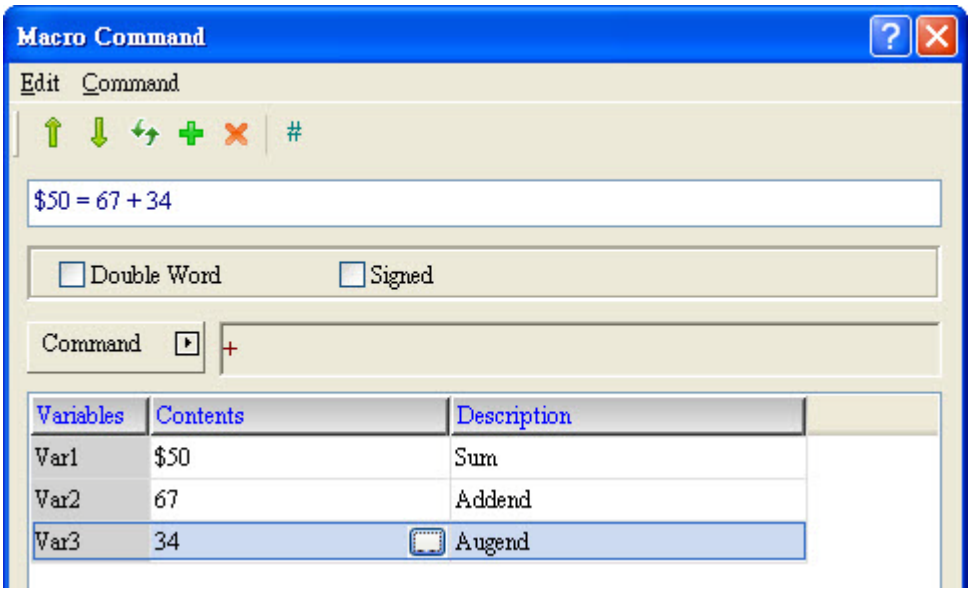
Figure 24-3-1-1 Arithmetic Operation

■ + (Addition)

Expression	What Variables Represent		NOTE
Var 1 = Var 2 + Var 3 (W) Var 1 = Var 2 + Var 3 (DW) Var 1 = Var 2 + Var 3 (Signed W) Var 1 = Var 2 + Var 3 (Signed DW)	Var 1	Sum	W: Word DW: Double Word Signed: Signed Number
	Var 2	Addend	
	Var 3	Augend	
	Expression Explanation		
	Add Var 2 to Var 3 and save the result in in Var 1.		

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎	◎	
Var 2	◎	◎	◎
Var 3	◎	◎	◎

Example
➢ Var 1 is an internal memory address and Var 2 and Var 3 are both constants.



➢ Use addition command for $50 = 67 + 34, it will perform 67 + 34 and put results to $50. Therefore $50 will display 101.

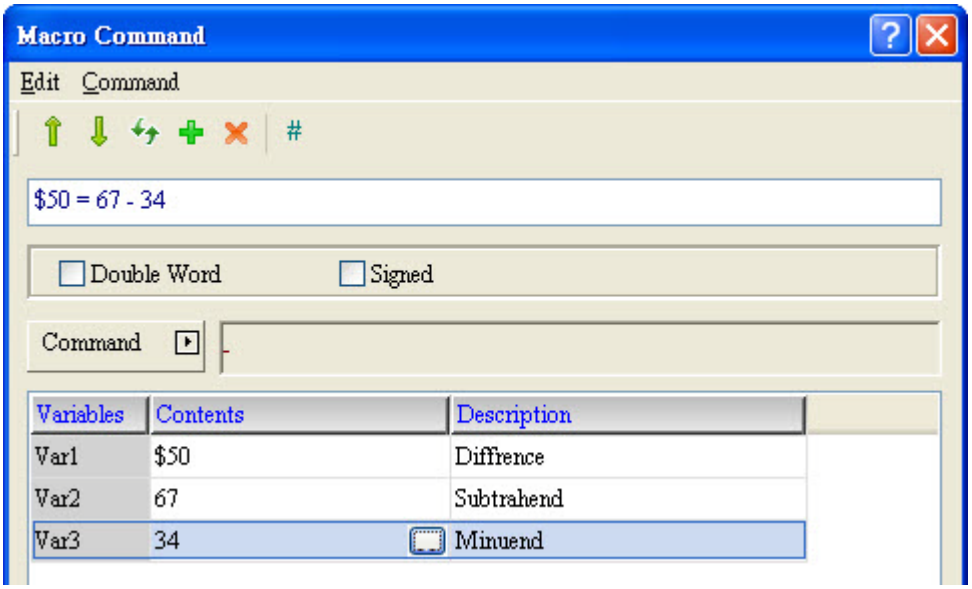
■ - (Subtraction)

Expression	What Variables Represent		NOTE
Var 1 = Var 2 - Var 3 (W) Var 1 = Var 2 - Var 3 (DW) Var 1 = Var 2 - Var 3 (Signed W) Var 1 = Var 2 - Var 3 (Signed DW)	Var 1	Difference	W: Word DW: Double Word Signed: Signed number
	Var 2	Subtrahend	
	Var 3	Minuend	
	Expression Explanation		
	Substract Var 2 from Var 3 and save the result in Var 1.		

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎	◎	
Var 2	◎	◎	◎
Var 3	◎	◎	◎

Example

➢ Var 1 is an internal memory address and Var 2 and Var 3 are both constants.



➢ Use subtraction command for $50 = 67 - 34, it will perform 67 - 34 and put results to $50. Therefore $50 will display 33.

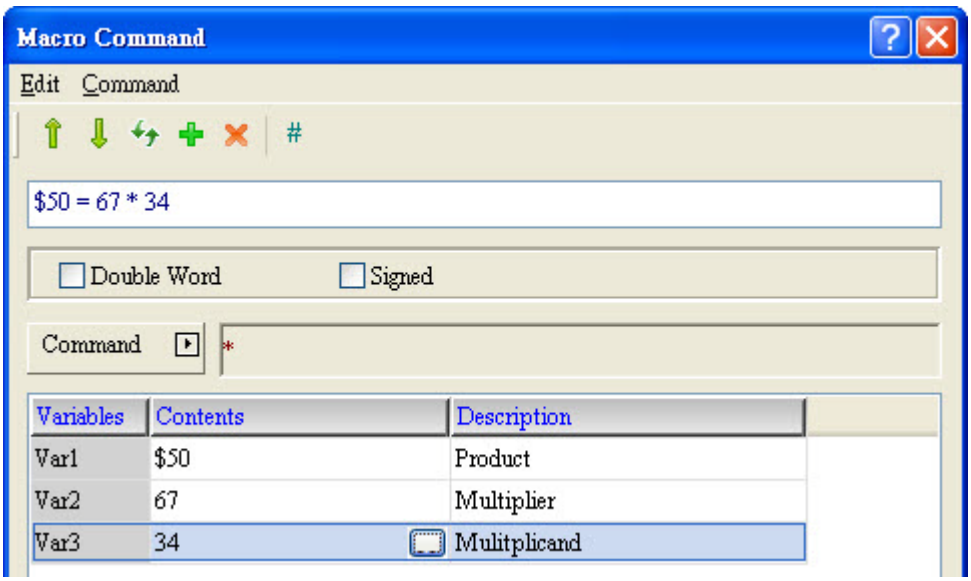
■ * (Multiplication)

Expression	What Variables Represent		NOTE
Var 1 = Var 2 * Var 3 (W) Var 1 = Var 2 * Var 3 (DW) Var 1 = Var 2 * Var 3 (Signed W) Var 1 = Var 2 * Var 3 (Signed DW)	Var 1	Product	W : Word DW : Double Word Signed : Signed number
	Var 2	Multiplier	
	Var 3	Multiplicand	
	Expression Explation		
	Multiply Var 2 and Var 3 and save the result in Var 1.		

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎	◎	
Var 2	◎	◎	◎
Var 3	◎	◎	◎

Example

➢ Var 1 is an internal memory address and Var 2 and Var 3 are both constants.



➢ Use multiplication command for $50 = 67 * 34, it will perform 67 * 34 and put results to $50. Therefore $50 will display 2278.

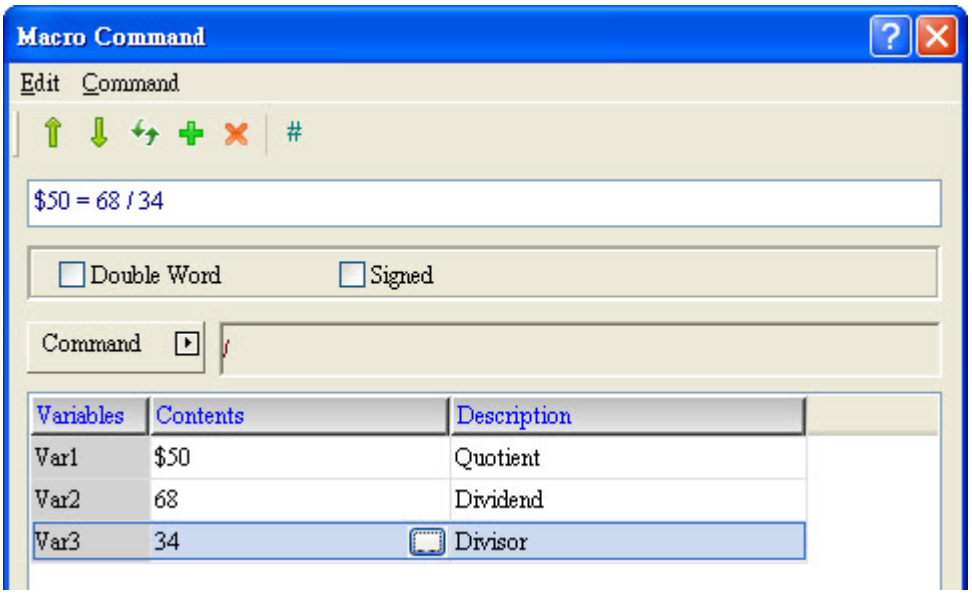
■ / (Division)

Expression	What Variables Represent		NOTE
Var 1 = Var 2 / Var 3 (W) Var 1 = Var 2 / Var 3 (DW) Var 1 = Var 2 / Var 3 (Signed W) Var 1 = Var 2 / Var 3 (Signed DW)	Var 1	Quotient	W: Word DW: Double Word Signed: Signed number
	Var 2	Dividend	
	Var 3	Divisor	
	Expression Explanation		
	Divide Var 2 by Var 3, and save the result (Quotient) in Var 1.		

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎	◎	
Var 2	◎	◎	◎
Var 3	◎	◎	◎
Note: Var 3 can not be 0			

Example

➢ Var 1 is an internal memory address, and Var 2 and Var 3 are both constants.



➢ Use division command for $50 = 68 / 34, it will perform 68 / 34 and put results to $50. Therefore $50 will display 2.

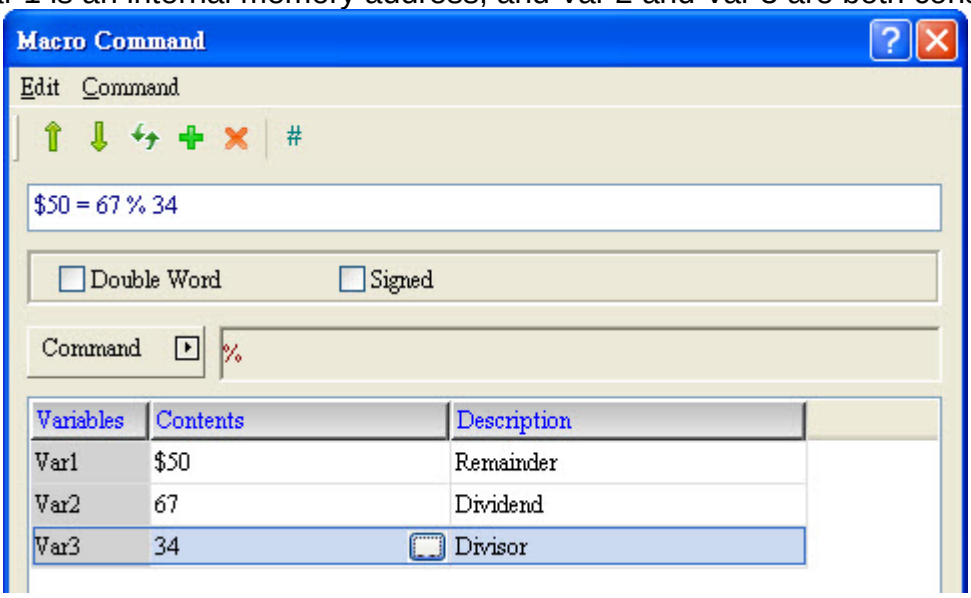
■ % (Get Reminder)

Expression	What Variables Represent		NOTE
Var 1 = Var 2 % Var 3 (W) Var 1 = Var 2 % Var 3 (DW) Var 1 = Var 2 % Var 3 (Signed W) Var 1 = Var 2 % Var 3 (Signed DW)	Var 1	Reminder	W: Word DW: Double Word Signed: Signed number
	Var 2	Dividend	
	Var 3	Divisor	
	Expression Explanation		
	Divide Var 2 by Var 3, and save the result (reminder) in Var 1.		

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎	◎	
Var 2	◎	◎	◎
Var 3	◎	◎	◎
Note: Var 3 can not be 0			

Example

➢ Var 1 is an internal memory address, and Var 2 and Var 3 are both constants.



➢ Use get reminder command for $50 = 67 % 34, it will perform 67 % 34 and put results to $50. Therefore $50 will display 33.

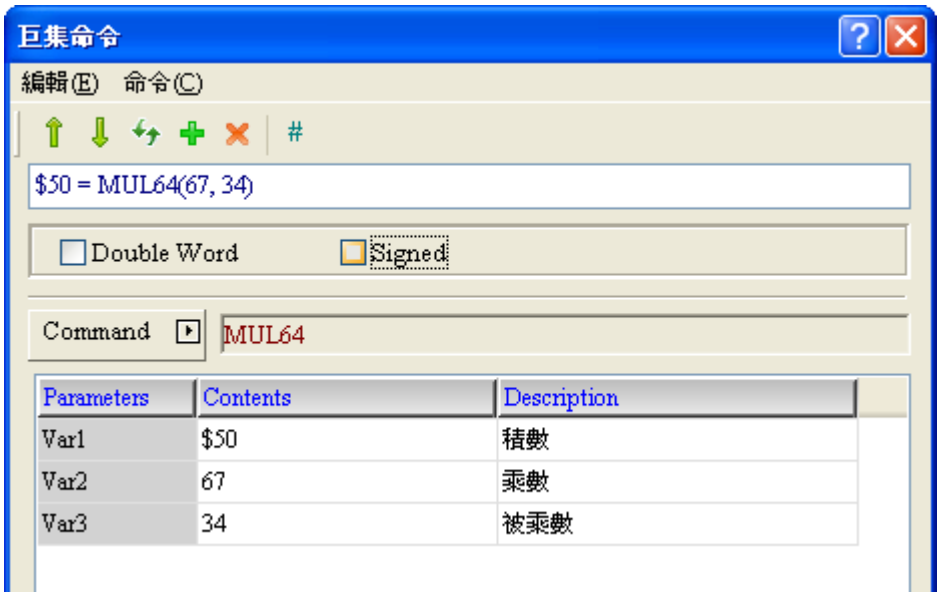
■ MUL64 (64 bit Multiplication)

Expression	What Variables Represent		NOTE
Var1 = MUL64 (Var2, Var3) (W) Var1 = MUL64 (Var2, Var3) (DW) Var1 = MUL64 (Var2, Var3) (Signed W) Var1 = MUL64 (Var2, Var3) (Signed DW)	Var 1	Product	W : Word DW : Double Word Signed : Signed number
	Var 2	Multiplier	
	Var 3	Multiplicand	
	Expression Explanation		
	Multiply Var 2 and Var 3, and save the result in Var 1.		

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎	◎	
Var 2	◎	◎	◎
Var 3	◎	◎	◎

Example

- Var 1 is an internal memory address, and Var 2 and Var 3 are both constants.
- If checked Double Word, please also set data type of element for Double Word.



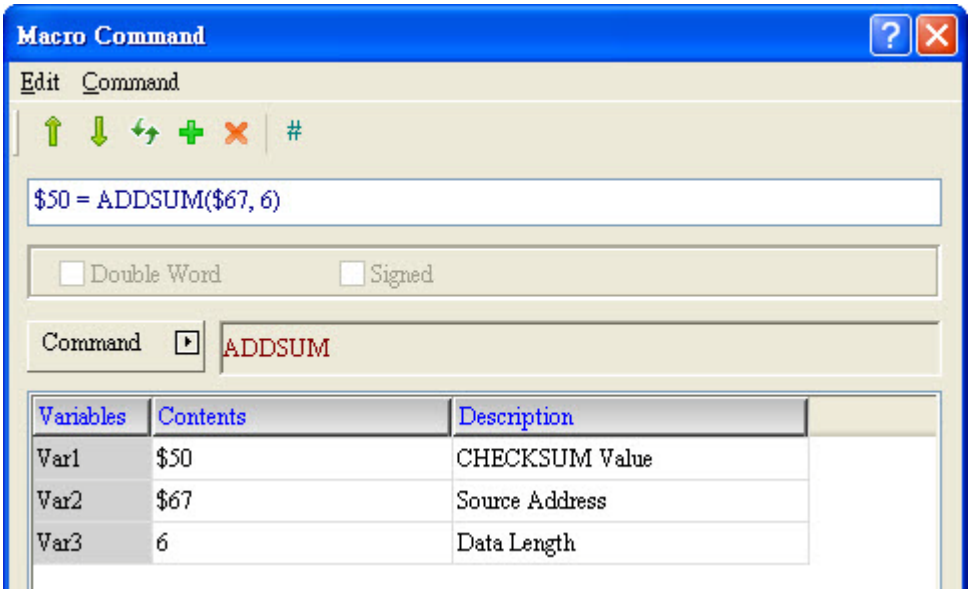
- Use MUL64 command for $50 =MUL64(67 , 34), it will perform MUL64(67 , 34) and put results to $50. Therefore $50 will display 2278.

■ ADDSUMW (Repeated Addition)

Expression	What Variables Represent		NOTE
Var 1 = ADDSUMW (Var 2, Var 3) (W) Var 1 = ADDSUMW (Var 2, Var 3) (DW)	Var 1	Result of repeated addition	W : Word DW : Double Word
	Var 2	Starting address	
	Var 3	Length of repeated addition to be performed since the first item	
	Expression Explanation		
	Repeatedly add from Var 2 to later variables (until length specified in Var 3), and save the result in Var 1.		
Note: Repeated addition is performed with a rate of 2 bits from the starting address if selecting Double World; repeated addition is performed with a rate of 1 bit from the starting address if selecting Word.			

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎	◎	
Var 2	◎	◎	◎
Var 3	◎	◎	◎

Example
➢ Var 1 and Var 2 are both internal memory addresses, and Var 3 is a constant. Please tick the Double Word box. ➢ Add up the values contained within the memory address of $0 forward for a length of 5 with an interval of 2 in between, and variables added: $0, $2, $4, $6 and $8.



- Input value for $0 = 1, $2 = 2, $4 = 3, $6 = 4 and $8 = 5, and then perform accumulation to $50. Therefore $50 will display 15.

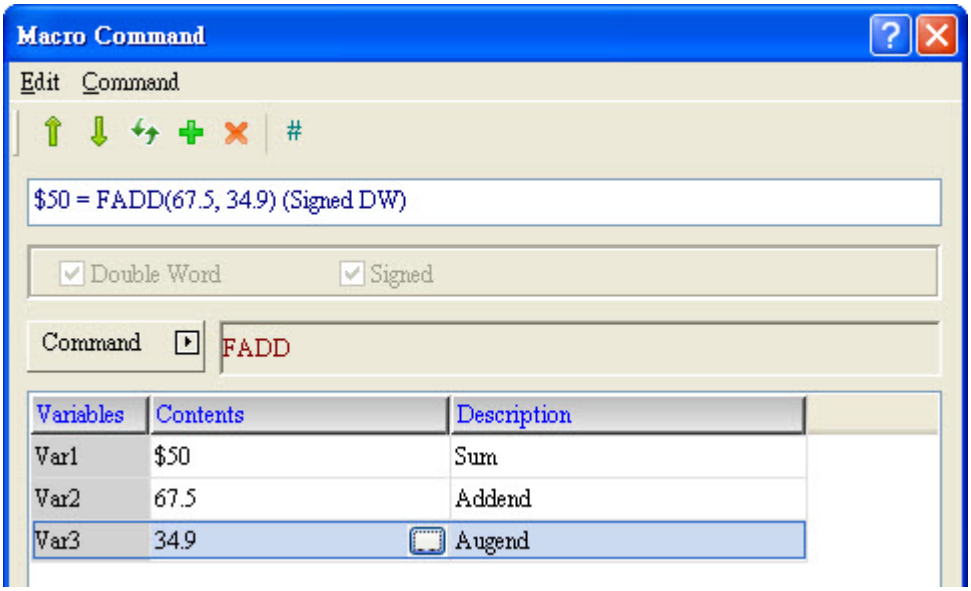
■ FADD (Floating Point Addition)

Expression	What Variables Represent		NOTE
Var 1 = FADD (Var 2, Var 3) (Signed DW)	Var 1	Sum	DW : Double Word Signed : Signed number
	Var 2	Addend	
	Var 3	Augend	
	Expression Explanation		
	Multiply Var 2 and Var 3, and save and the result in Var 1.		

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎	◎	
Var 2	◎	◎	◎
Var 3	◎	◎	◎

Example

➢ Var 1 is an internal memory address, and Var 2 and Var 3 are both constants.



➢ Use FADD command for $50 = FADD (67.5, 34.9), it will perform FADD (67.5, 34.9) and put results to $50. Therefore $50 will display 102.4.

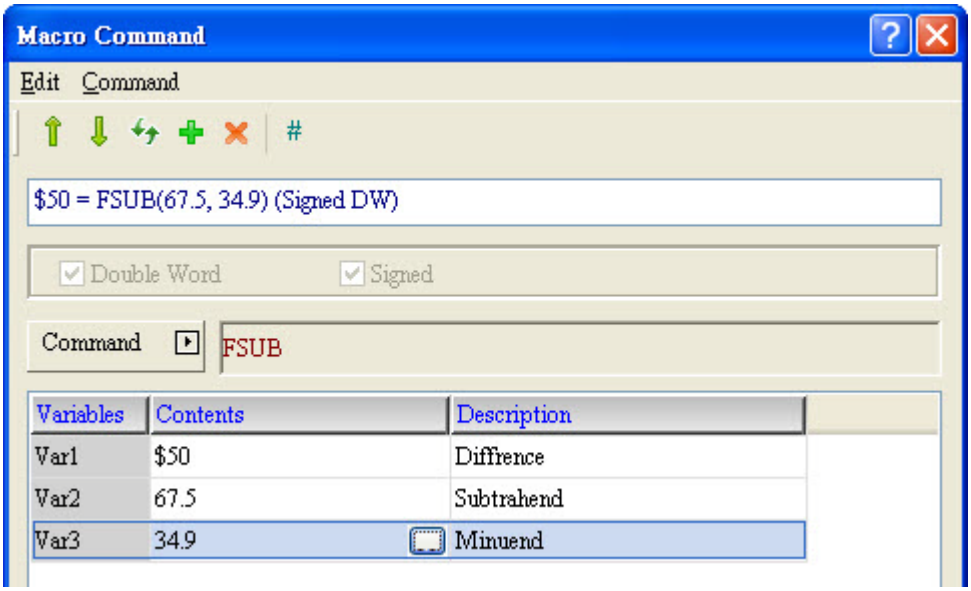
■ FSUB (Floating Point Subtraction)

Expression	What Variables Represent		NOTE
Var 1 = FSUB (Var 2, Var 3) (Signed DW)	Var 1	Difference	DW : Double Word Signed : Signed number
	Var 2	Subtrahend	
	Var 3	Minuend	
	Expression Explanation		
	Subtract Var 2 from Var 3 and save the result in Var 1.		

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎	◎	
Var 2	◎	◎	◎
Var 3	◎	◎	◎

Example

➢ Var 1 is an internal memory address, and Var 2 and Var 3 are constants.



➢ Use FSUB command for $50 = FSUB (67.5, 34.9), it will perform FSUB (67.5, 34.9) and put results to $50. Therefore $50 will display 32.6.

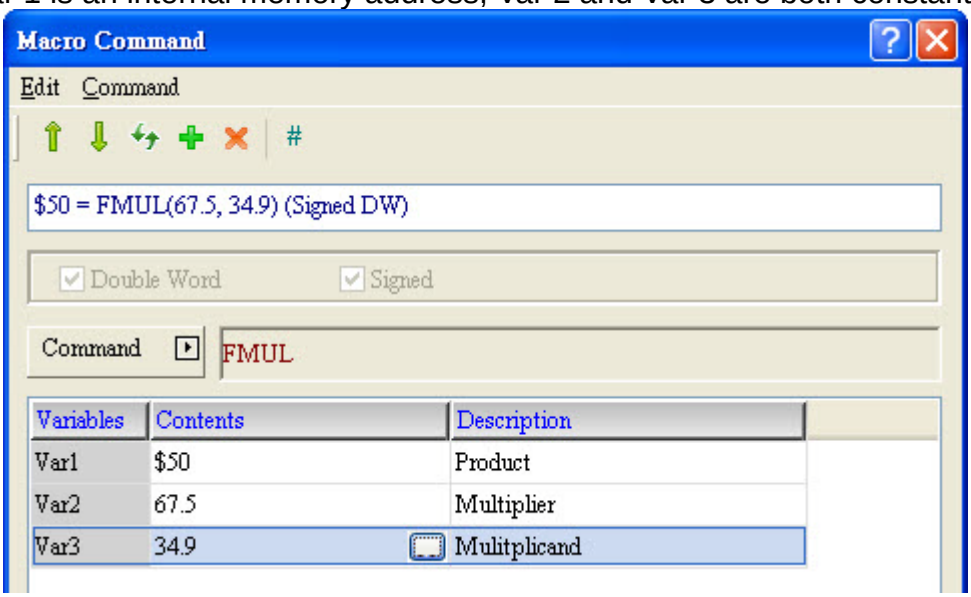
■ FMUL (Floating Point Multiplication)

Expression	What Variables Represent		NOTE
Var 1 = FMUL (Var 2, Var 3) (Signed DW)	Var 1	Product	DW : Double Word Signed : Signed number
	Var 2	Multiplier	
	Var 3	Multiplicand	
	Expression Explanation		
	Multiply Var 2 and Var 3 and save the result in Var 1.		

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎	◎	
Var 2	◎	◎	◎
Var 3	◎	◎	◎

Example

➢ Var 1 is an internal memory address, Var 2 and Var 3 are both constants.



➢ Use FMUL command for $50 = FMUL (67.5, 34.9), it will perform FMUL (67.5, 34.9) and put results to $50. Therefore $50 will display 2455.75.

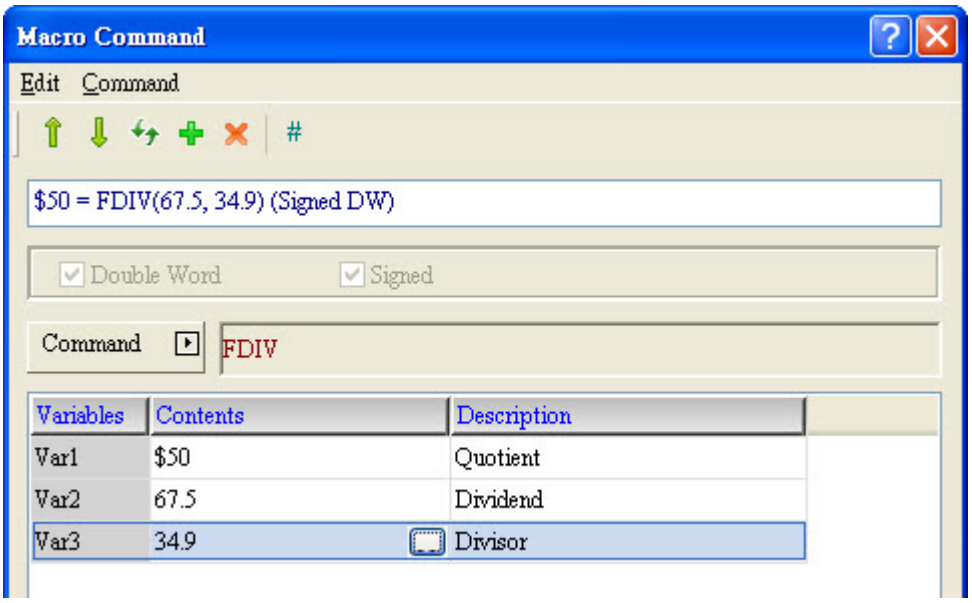
■ FDIV (Floating Point Division)

Expression	What Variables Represent		NOTE
Var 1 = FDIV (Var 2, Var 3) (Signed DW)	Var 1	Quotient	DW : Double Word Signed : Signed number
	Var 2	Dividend	
	Var 3	Divisor	
	Expression Explanation		
	Divide Var 2 by Var 3, and save the result (Quotient) in Var 1.		

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎	◎	
Var 2	◎	◎	◎
Var 3	◎	◎	◎

Example

➢ Var 1 is an internal memory address, Var 2 and Var 3 are both constants.



➢ Use FDIV command for $50 = FDIV (67.5, 34.9), it will perform FDIV (67.5, 34.9) and put results to $50. Therefore $50 will display 1.934.

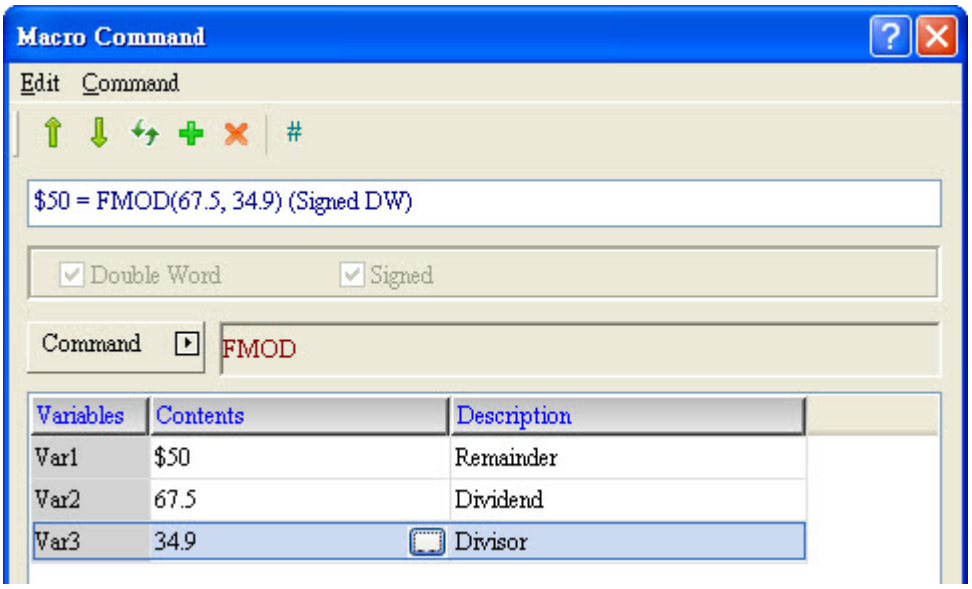
■ FMOD (Floating Point Reminder)

Expression	What Variables Represent		NOTE
Var 1 = FMOD (Var 2, Var 3) (Signed DW)	Var 1	Reminder	DW : Double Word Signed : Signed number
	Var 2	Dividend	
	Var 3	Divisor	
	Expression Explanation		
	Divide Var 2 by Var 3, and save the result (reminder) in Var 1.		

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎	◎	
Var 2	◎	◎	◎
Var 3	◎	◎	◎

Example

➢ Var 1 is an internal memory address, Var 2 and Var 3 are constants.



➢ Use FMOD command for $50 = FMOD (67.5, 34.9), it will perform FMOD (67.5, 34.9) and put results to $50. Therefore $50 will display 32.6.

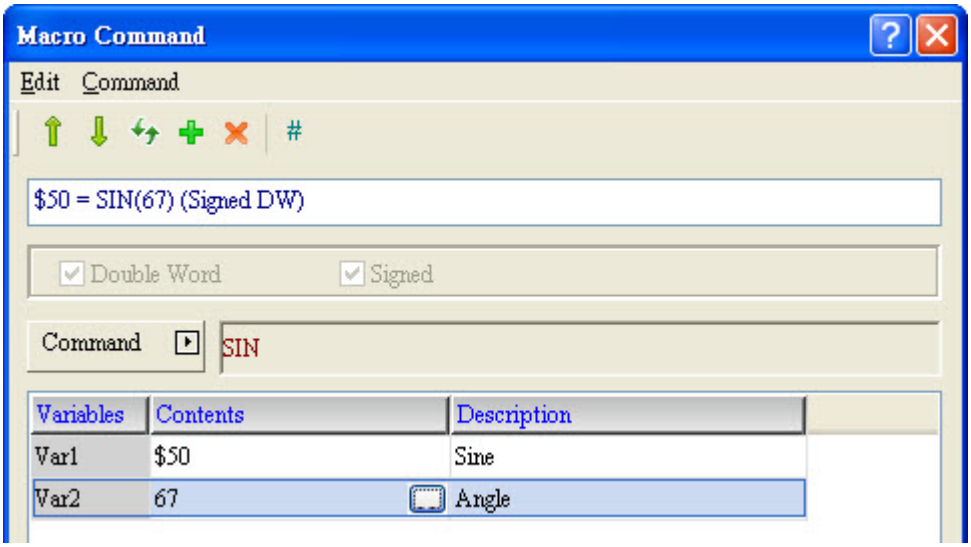
■ SIN (Sine Function)

Expression	What Variables Represent		NOTE
Var 1 = SIN (Var 2) (Signed DW)	Var 1	Sine	DW : Double Word Signed : Signed number
	Var 2	angle (in radians)	
	Expression Explanation		
	Perform the sine function operation on Var 2, and store the remainder in Var 1.		
*Data type of Var 1 must be Floating Point. *Data type of Var 2 must be Signed Decimal and can not have decimal places.			

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		
Var 2	◎		◎

Example

➢ Var 1 is an internal memory address and Var 2 is a constant.



➢ Use SIN command for $50 = SIN (67), it will perform SIN (67) and put results to $50. Therefore $50 will display 0.921。

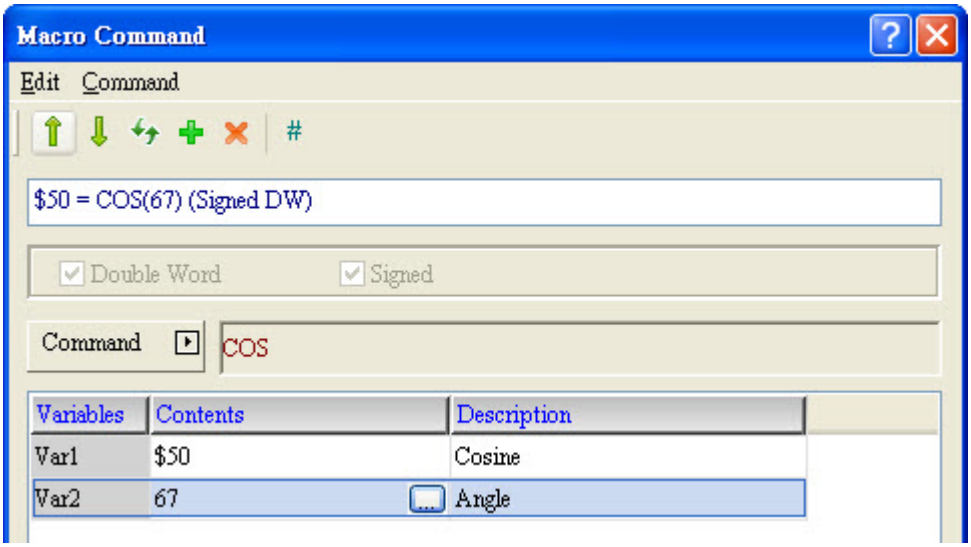
■ COS (Cosine Function)

Expression	What Variables Represent		NOTE
Var 1 = COS (Var 2) (Signed DW)	Var 1	Cosine	DW : Double Word Signed : Signed number
	Var 2	Angle (in radians)	
	Expression Explanation		
	Perform the cosine function operation on Var 2, and store the remainder in Var 1.		
*Data type of Var 1 must be Floating Point. *Data type of Var 2 must be Signed Decimal and can not have decimal places.			

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		
Var 2	◎		◎

Example

➢ Var 1 is an internal memory address, and Var 2 is a constant.



➢ Use COS command for $50 = COS (67), it will perform COS (67) and put results to $50. Therefore $50 will display 0.391.

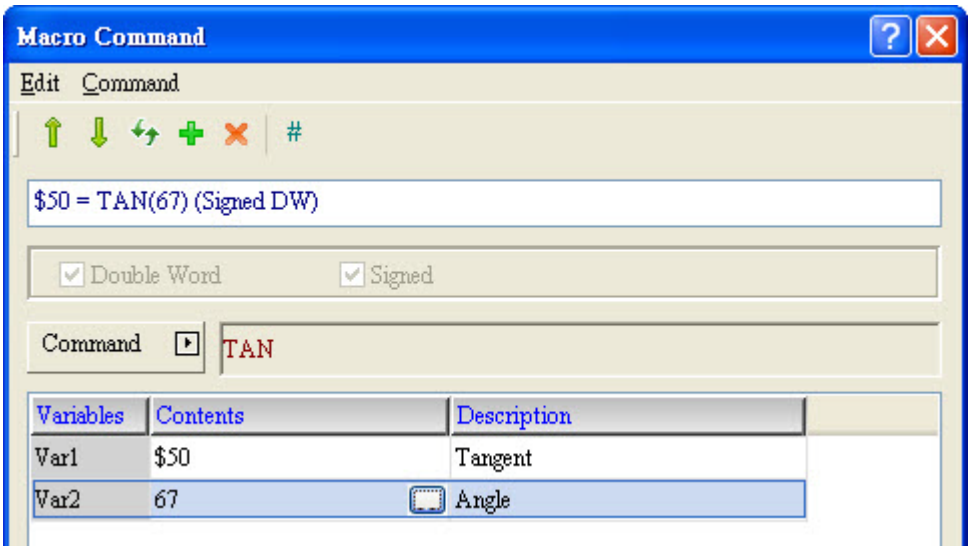
■ TAN (Tangent Function)

Expression	What Variables Represent		NOTE
Var 1 = TAN (Var 2) (Signed DW)	Var 1	Tangent	DW : Double Word Signed : Signed number
	Var 2	angle (in radians)	
	Expression Explanation		
	Perform the tangent function operation on Var 2, and store the remainder in Var 1.		
*Data type of Var 1 must be Floating Point. *Data type of Var 2 must be Signed Decimal and can not have decimal places.			

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		
Var 2	◎		◎

Example

➢ Var 1 is an internal memory address, and Var 2 is a constant.



➢ Use TAN command for $50 = TAN (67), it will perform TAN (67) and put results to $50. Therefore $50 will display 2.356.

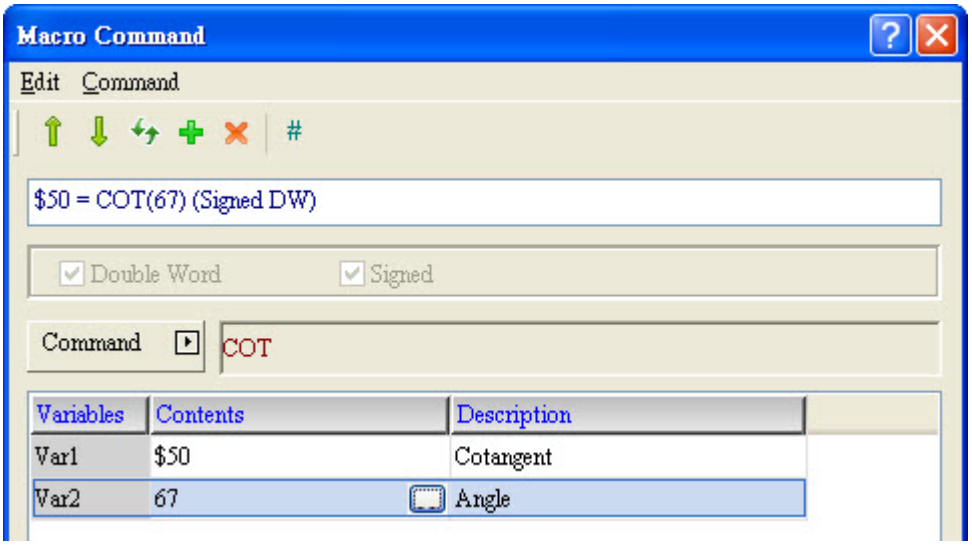
■ COT (Cotangent Function)

Expression	What Variables Represent		NOTE
Var 1 = COT (Var 2) (Signed DW)	Var 1	Cotangent	DW : Double Word Signed : Signed number
	Var 2	angle (in radians)	
	Expression Explanation		
	Perform the cotangent function operation on Var 2, and store the remainder in Var 1.		
*Data type of Var 1 must be Floating Point. *Data type of Var 2 must be Signed Decimal and can not have decimal places.			

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		
Var 2	◎		◎

Example

➢ Var 1 is an internal memory address, and Var 2 is a constant.



➢ Use COT command for $50 = COT (67), it will perform COT (67) and put results to $50. Therefore $50 will display 0.424.

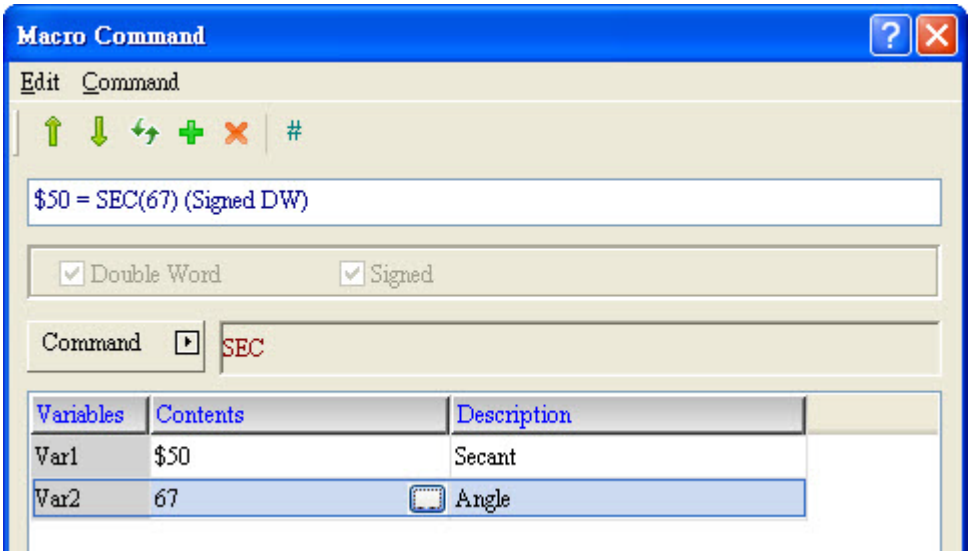
■ SEC (Secant Function)

Expression	What Variables Represent		NOTE
Var 1 = SEC (Var 2) (Signed DW)	Var 1	Secant	DW : Double Word Signed : Signed number
	Var 2	angle (in radians)	
	Expression Explanation		
	Perform the secant function operation on Var 2, and store the remainder in Var 1.		
*Data type of Var 1 must be Floating Point. *Data type of Var 2 must be Signed Decimal and can not have decimal places.			

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		
Var 2	◎		◎

Example

➢ Var 1 is an internal memory address, and Var 2 is a constant.



➢ Use SEC command for $50 = SEC (67), it will perform SEC (67) and put results to $50. Therefore $50 will display 2.559.

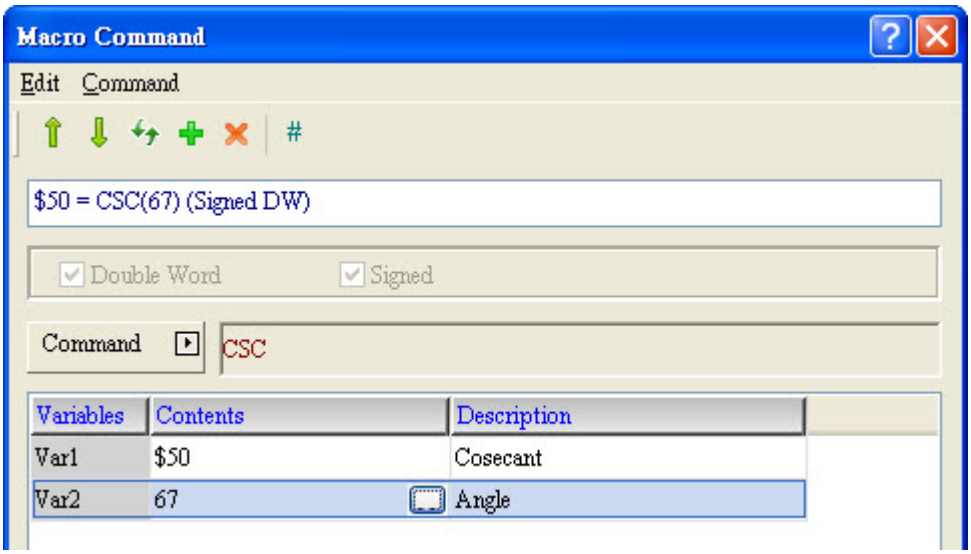
■ CSC (Cosecant Function)

Expression	What Variables Represent		NOTE
Var 1 = CSC (Var 2) (Signed DW)	Var 1	Cosecant	DW : Double Word Signed : Signed number
	Var 2	angle (in radians)	
	Expression Explanation		
	Perform the cosecant function operation on Var 2, and store the remainder in Var 1.		
*Data type of Var 1 must be Floating Point. *Data type of Var 2 must be Signed Decimal and can not have decimal places.			

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		
Var 2	◎		◎

Example

➢ Var 1 is an internal memory address, and Var 2 is a constant.



➢ Use CSC command for $50 = CSC (67), it will perform CSC (67) and put results to $50. Therefore $50 will display 1.086.

24-3-2 Logical Operation

Logical operations include six operators and relevant macro usages are detailed below.

Figure 24-3-2-1 Logical Operations

■ | (Bitwise OR Operation)

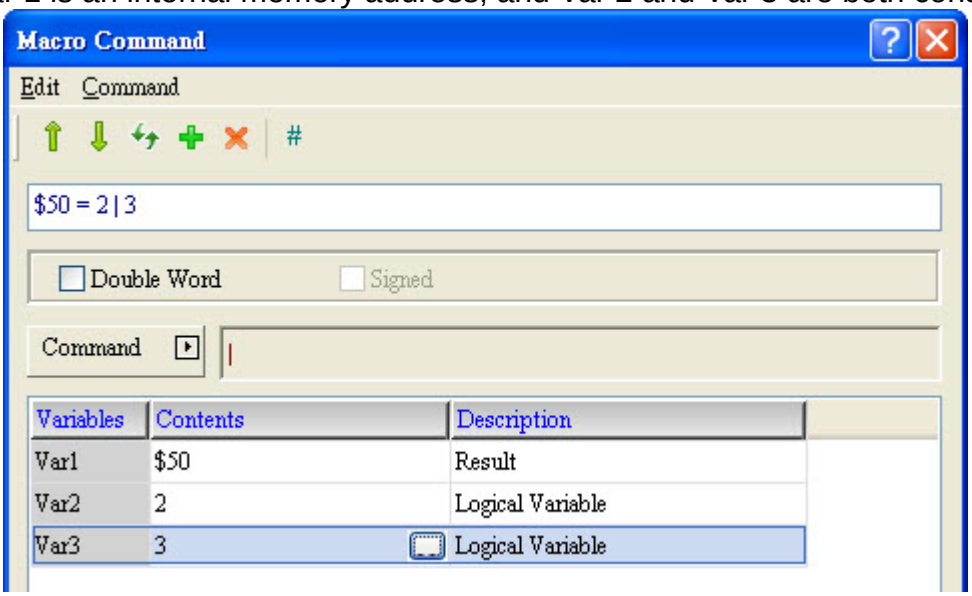
Bitwise OR Operation characteristic	
Operator	**Result**
0 OR 0	0
0 OR 1	1
1 OR 0	1
1 OR 1	1

Expression	What Variables Represent		NOTE
Var 1 = Var 2 | Var 3 (W) Var 1 = Var 2 | Var 3 (DW)	Var 1	Result of OR operation	W : Word DW : Double Word
	Var 2	Logical operand	
	Var 3	Logical operand	
	Expression Explanation		
	Perform the Bitwise OR operation on Var 2 and Var 3 and save the result Var 1.		

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎	◎	
Var 2	◎	◎	◎
Var 3	◎	◎	◎

Example

- Var 1 is an internal memory address, and Var 2 and Var 3 are both constants.



- This command will transfer values for Var 2 and Var 3 to binary like 2 = 0010, 3 = 0011, and then bitwise OR operator with 0010 and 0011. After bitwise OR operator to get the result is 0011 and equals to 3.

	Binary	Value
	0010	2
| (OR Operator)	0011	3
	0011	3

■ && (Bitwise AND Operation)

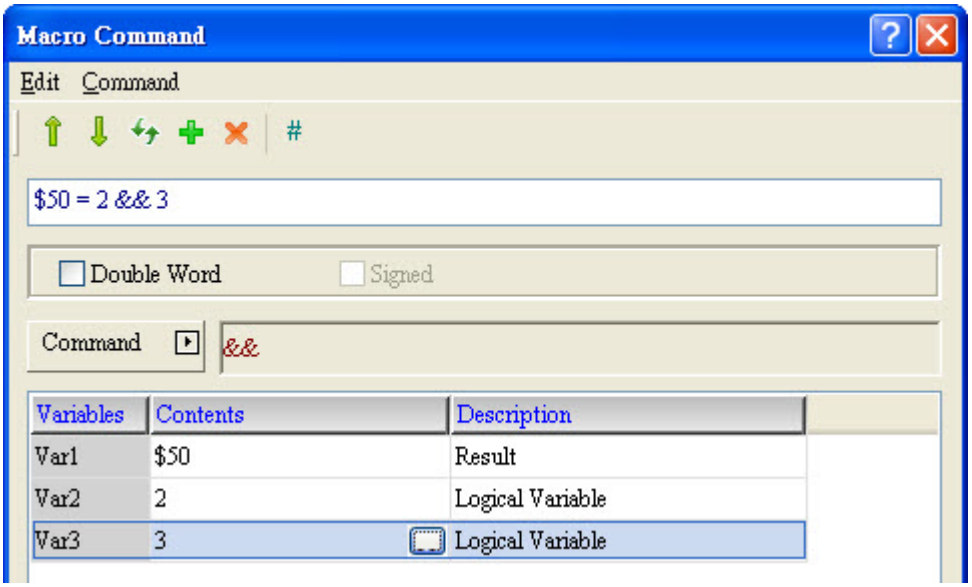
Bitwise AND Operation characteristic	
Operator	**Result**
0 OR 0	0
0 OR 1	0
1 OR 0	0
1 OR 1	1

Expression	What Variables Represent		NOTE
Var 1 = Var 2 && Var 3 (W) Var 1 = Var 2 && Var 3 (DW)	Var 1	Result of Bitwise AND operation	W : Word DW : Double Word
	Var 2	Logical Operand	
	Var 3	Logical Operand	
	Expression Explanation		
	Perform the Bitwise AND operation on Var 2 and Var 3 and save the result Var 1.		

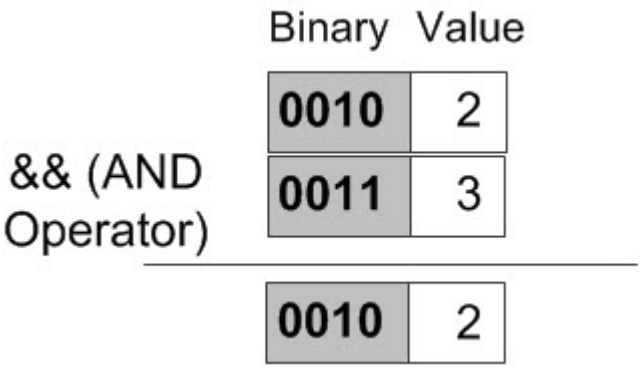
Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎	◎	
Var 2	◎	◎	◎
Var 3	◎	◎	◎

Example

- Var 1 is an internal memory address, and Var 2 and Var 3 are both constants.



- This command will transfer values for Var 2 and Var 3 to binary like 2 = 0010, 3 = 0011, and then bitwise AND operator with 0010 and 0011. After bitwise AND operator to get the result is 0010 and equals to 2.



■ ^ (Bitwise XOR Operation)

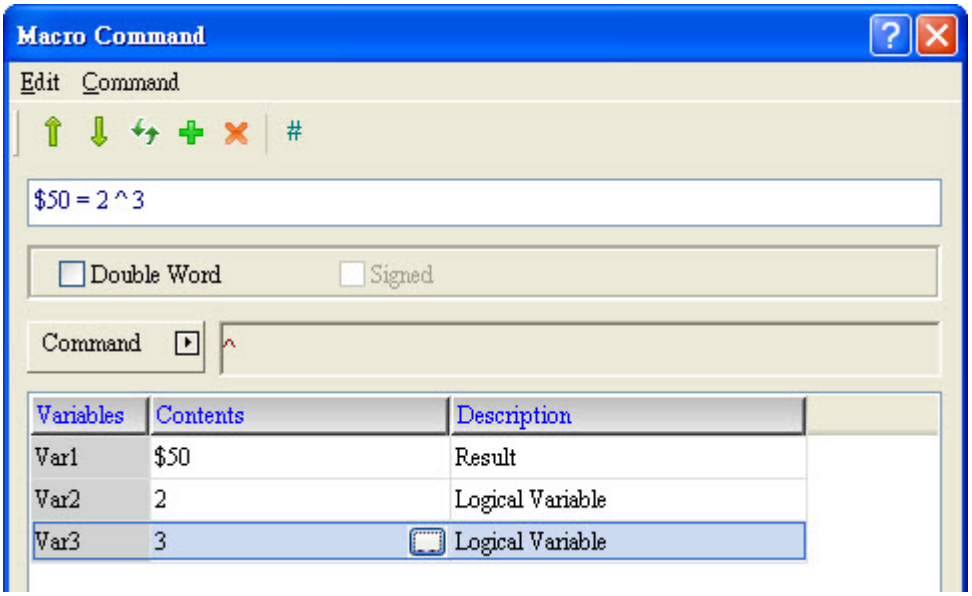
Bitwise XOR Operation characteristic	
Operator	**Result**
0 OR 0	0
0 OR 1	1
1 OR 0	1
1 OR 1	0

Expression	What Variables Represent		NOTE
Var 1 = Var 2 ^ Var 3 (W) Var 1 = Var 2 ^ Var 3 (DW)	Var 1	Result of Bitwise XOR operation	W : Word DW : Double Word
	Var 2	Logical Operand	
	Var 3	Logical Operand	
	Expression Explanation		
	Perform the Bitwise XOR operation on Var 2 and Var 3 and save the result Var 1.		

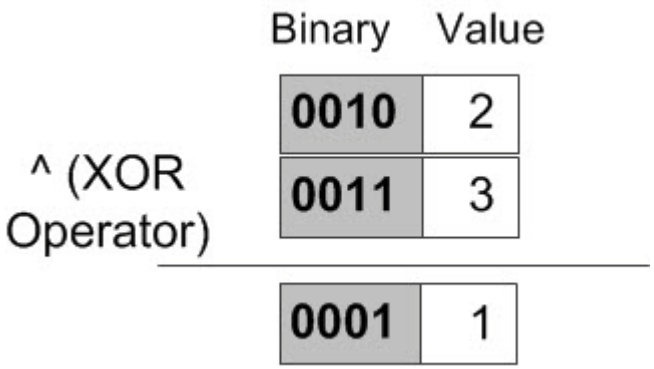
Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎	◎	
Var 2	◎	◎	◎
Var 3	◎	◎	◎

Example

- Var 1 is an internal memory address, and Var 2 and Var 3 are both constants.



- This command will transfer values for Var 2 and Var 3 to binary like 2 = 0010, 3 = 0011, and then bitwise XOR operator with 0010 and 0011. After bitwise XOR operator to get the result is 0001 and equals to 1.



■ NOT (Bitwise NOT Operation)

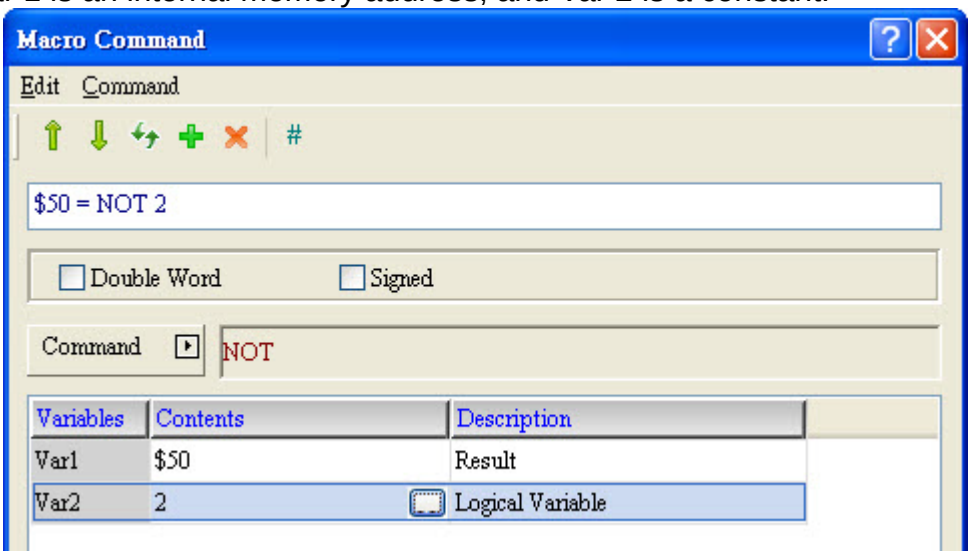
Bitwise NOT Operation characteristic	
Operator	**Result**
NOT 0	1
NOT 1	0

Expression	What Variables Represent		NOTE
Var 1 = NOT Var 2 (W) Var 1 = NOT Var 2 (DW) Var 1 = NOT Var 2 (Signed W) Var 1 = NOT Var 2 (Signed DW)	Var 1	Result of Bitwise NOT Operation	W : Word DW : Double Word Signed : Signed number
	Var 2	Logical Operand	
	Expression Explanation		
	Perform the Bitwise NOT operation on Var 2 and save the result in Var 1.		

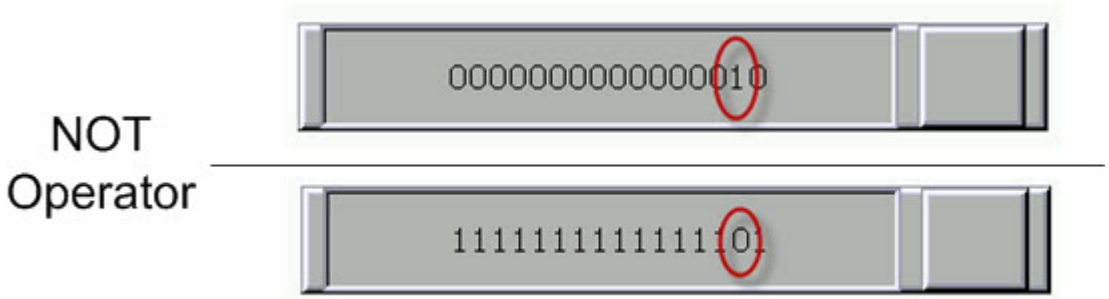
Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎	◎	
Var 2	◎	◎	◎

Example

- Var 1 is an internal memory address, and Var 2 is a constant.



- This command will transfer values for Var 2 to binary like 2 = 0000000000000010, and then bitwise NOT operator with 0000000000000010. After bitwise NOT operator to get the result is 1111111111111101.



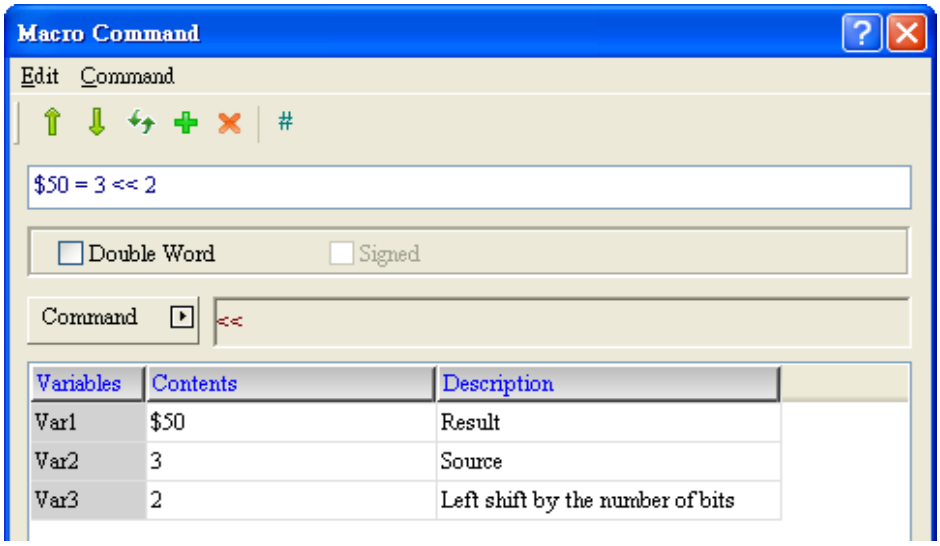
■ << (SHL Bitwise Left-shift Operation)

Expression	What Variables Represent		NOTE
Var 1 = Var 2 << Var 3 (W) Var 1 = Var 2 << Var 3 (DW)	Var 1	Result of left-shifted value	W : Word DW : Double Word
	Var 2	Source Address for the left-shift operation	
	Var 3	Numbers of bits to shift	
	Expression Explanation		
	Left-shift Var 2 by Var 3 bits and save the result in Var 1.		

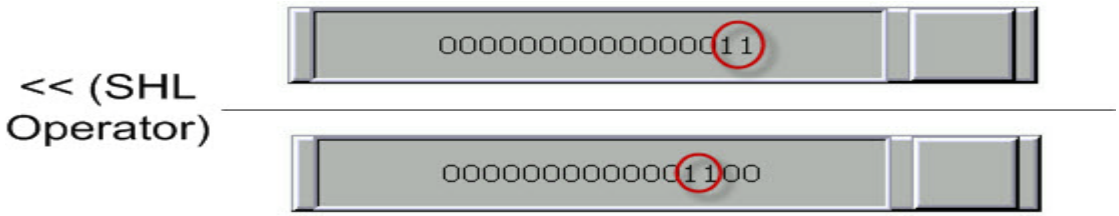
Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎	◎	
Var 2	◎	◎	◎
Var 3	◎	◎	◎

Example

➢ Var 1 and Var 2 are both internal memory addresses, and Var 3 is a constant.



➢ This command will transfer values for Var 2 to binary like 3 = 0000000000000011, and then bitwise left-shift two bits with 0000000000000011. After bitwise left-shift operator to get the result is 0000000000001100.



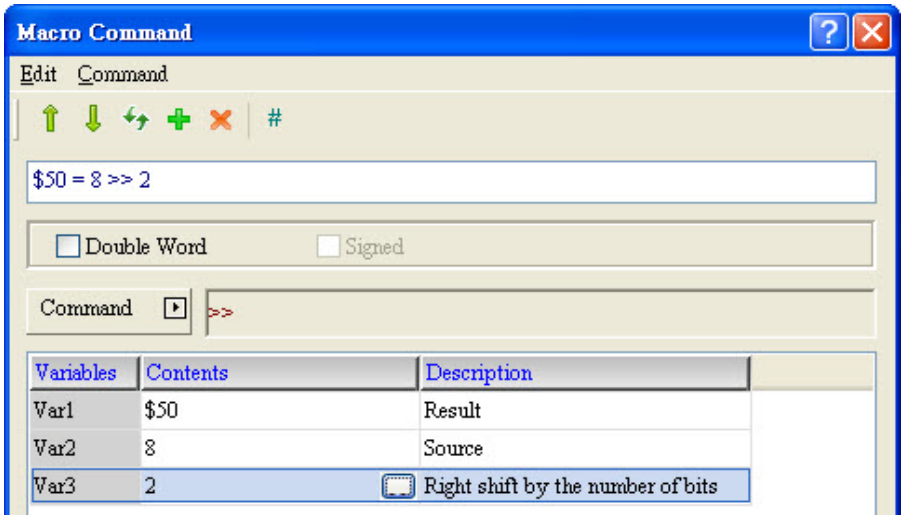
■ >> (SHR Bitwise Right-shift Operation)

Expression	What Variables Represent		NOTE
Var 1 = Var 2 >> Var 3 (W) Var 1 = Var 2 >> Var 3 (DW)	Var 1	Result of right-shifted value	W : Word DW : Double Word
	Var 2	Source Address for the right-shift operation	
	Var 3	Number of bits to shift	
	Expression Explanation		
	Right-shift Var 2 by Var 3 bits and save the result in Var 1.		

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎	◎	
Var 2	◎	◎	◎
Var 3	◎	◎	◎

Example

➢ Var 1 and Var 2 are both internal memory addresses, and Var 3 is a constant.



➢ This command will transfer values for Var 2 to binary like 8 = 0000000000001000, and then bitwise right-shift two bits with 0000000000001000. After bitwise right-shift operator to get the result is 0000000000000010.

24-3-3 Data Transfer

There are six commands for data transfer and they are detailed below:

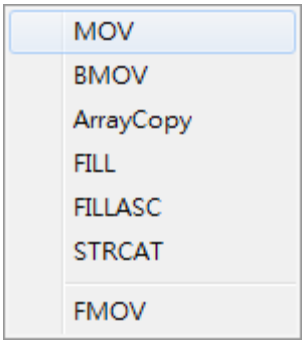


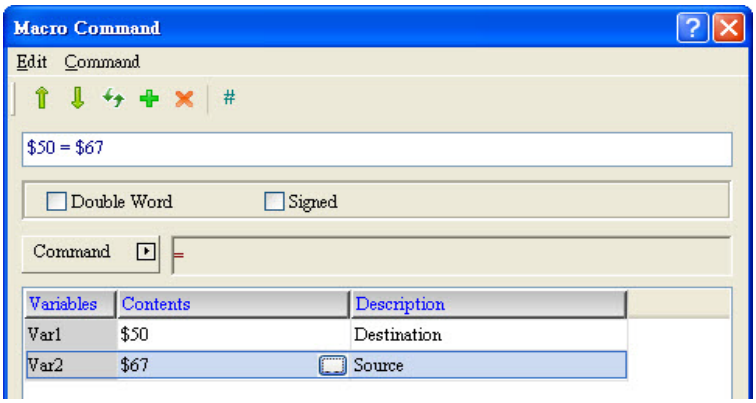
Figure 24-3-3-1 Data Transfer

■ MOV (Data Moving Operand)

<table>
<tr><th>Expression</th><th colspan="2">Context</th><th>NOTE</th></tr>
<tr><td rowspan="4">Var 1 = Var 2 (W)
Var 1 = Var 2 (DW)
Var 1 = Var 2 (Signed W)
Var 1 = Var 2 (Signed DW)</td><td>Var 1</td><td>Destination Address</td><td rowspan="4">W : Word
DW : Double Word
Signed : Signed number</td></tr>
<tr><td>Var 2</td><td>Source Data</td></tr>
<tr><th colspan="2">Expression Explanation</th></tr>
<tr><td colspan="2">Copy source data contained in Var 2 to Var 1, and data contained in Var 2 will not change.</td></tr>
</table>

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎	◎	
Var 2	◎	◎	◎

Example
➢ Var 1 is an internal memory address, and Var 2 is a constant.



➢ Use MOV command for $50 = $67, it will perform move with input value at $67 to $50. If input value is 34 at $67, therefore $50 will display 34.

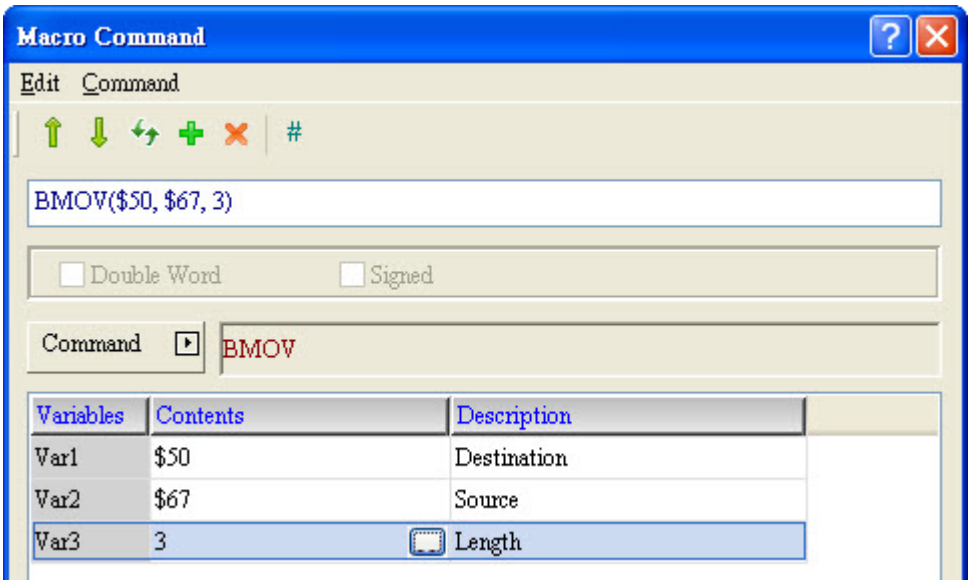
■ BMOV (Move in Block)

Expression	What Variables Represent		NOTE
BMOV (Var 1, Var 2, Var 3) (W)	Var 1	Destination Address	W : Word
	Var 2	Source Data Address	
	Var 3	Word Data Length	
	Expression Explanation		
	Bulk-copy the entire block with the range specified in Var 3 from Var 2 to Var 1.		

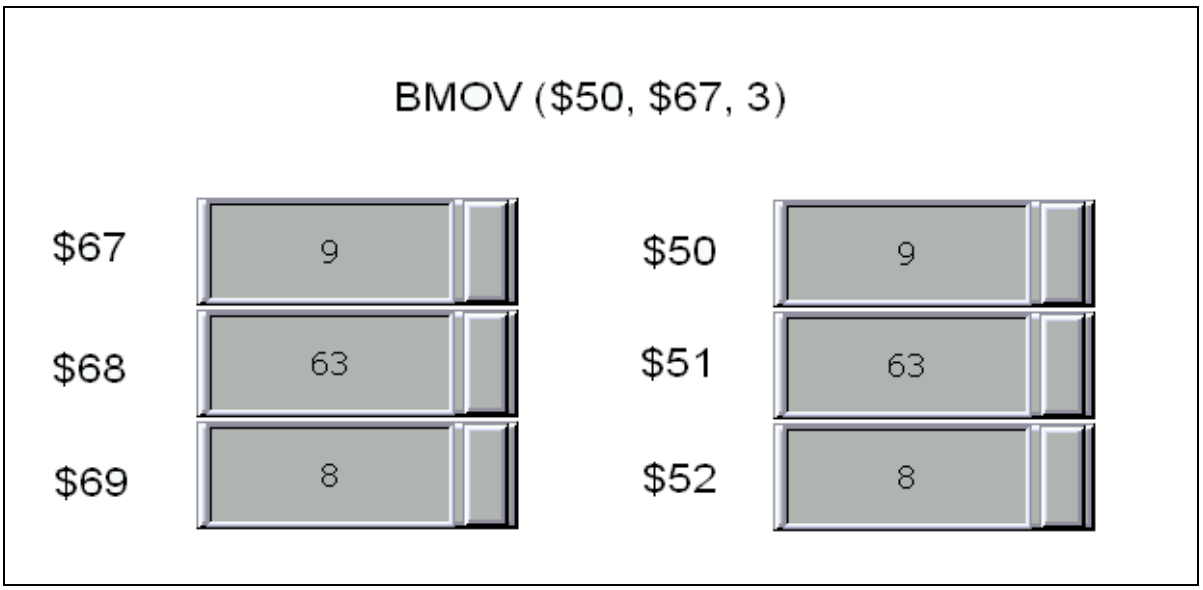
Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎	◎	
Var 2	◎	◎	
Var 3	◎		◎

Example

➢ Var 1 and Var 2 are both internal memory addresses, and Var 3 is a constant.



➢ It will perform move 3 data length from $67 to $50. Therefore when input value at $67, $68, $69 will move data to $50, $51, $52.


BMOV ($50, $67, 3)
$67
9
$68
63
$69
8
$50
9
$51
63
$52
8

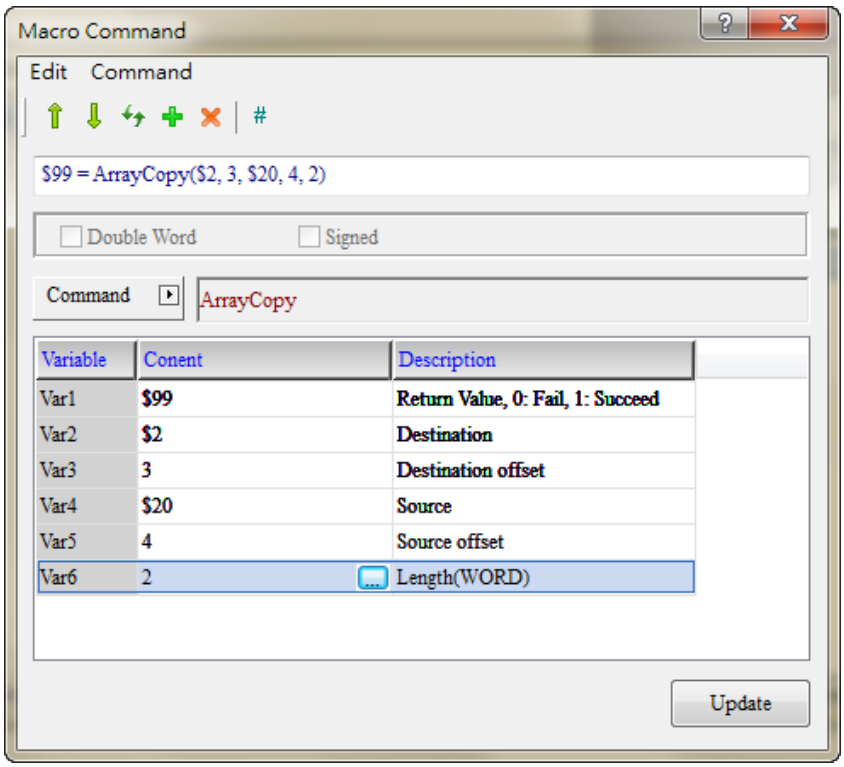
■ ArrayCopy (Copy Array)

Expression	What Variables Represent			NOTE
Var 1 = ArrayCopy (Var 2, Var 3, Var 4, Var 5, Var 6)	Var 1	Returned Value		
		Failure	0	
		Success	1	
	Var 2	Target Address		
	Var 3	Target Offset Amount		
	Var 4	Source Address		
	Var 5	Source Offset Amount		
	Var 6	Moving Length (unit: WORD)		
	Expression Explanation			
	Copy one section of consecutive address to another section.			

Variable	Memory Usage			
	Internal Memory	**PLC Register**	**String**	**Constant**
Var 1	◎			
Var 2	◎	◎		
Var 3	◎	◎		◎
Var 4	◎	◎		
Var 5	◎	◎		◎
Var 6	◎	◎		◎

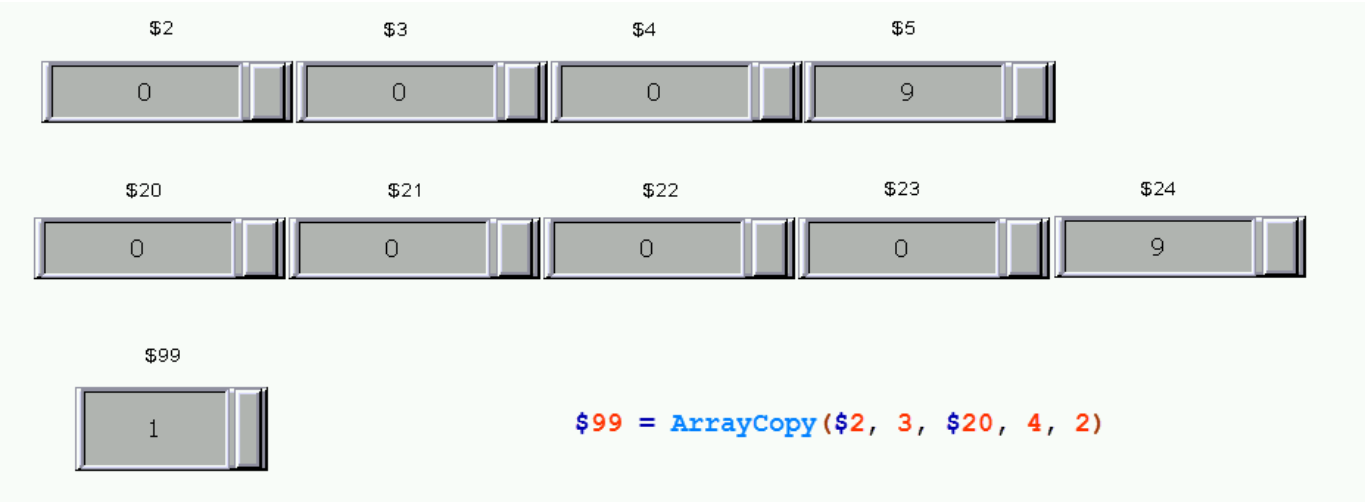
Example

➢ $99 = ArrayCopy ($2, 3, $20, 4, 2)



Address	$0	$1	$2	$3	$4	$5	$6	7	…	$19	$20	$21	$22	$24	$24	$25	$26	…
Offset			+0	+1	+2	+3					+0	+1	+2	+3	+4			…

Copy the offset amount (4, the representative address is $24) specified by source address ($20) to the offset amount (3, the representative address is $5) specified by target address $2. See the figure below:



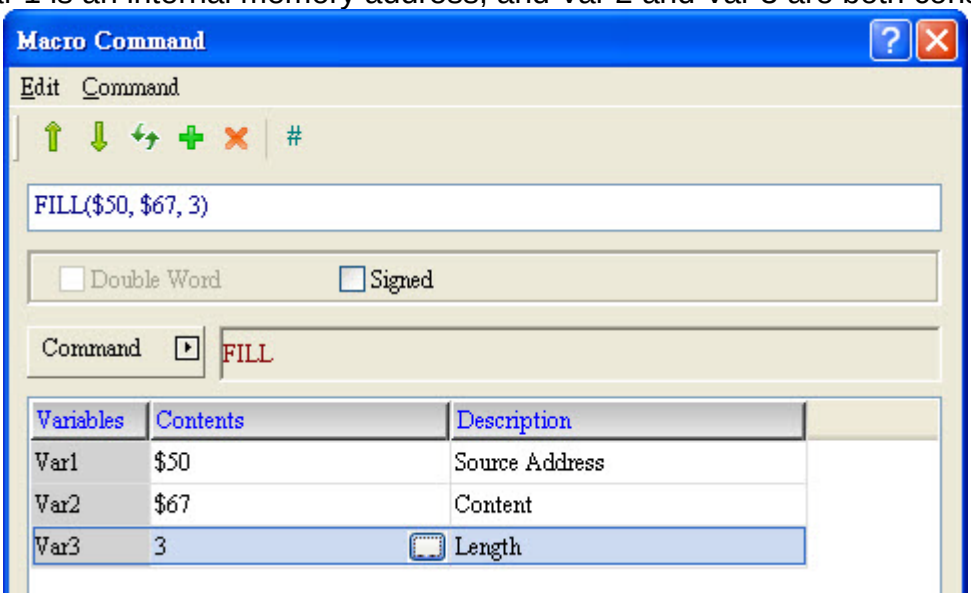
■ FILL (Fill in the Block)

Expression	What Variables Represent		NOTE
FILL (Var 1, Var 2, Var 3) (W) FILL (Var 1, Var 2, Var 3) (Signed W)	Var 1	Destination Address of the Source Data	W : Word
	Var 2	Source value	
	Var 3	Length	
	Expression Explanation		
	Copy the value contained in Var 2 to a number of variables starting from Var 1. (the number of variable is specified in Var 3)		

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎	◎	
Var 2	◎	◎	◎
Var 3	◎	◎	◎

Example

➢ Var 1 is an internal memory address, and Var 2 and Var 3 are both constants.



➢ Input value at $67 and will fill the value for 3 data length from $50, $51 and $52.

FILL ($50, $67, 3)
$67
69
$50
69
$51
69
$52
69

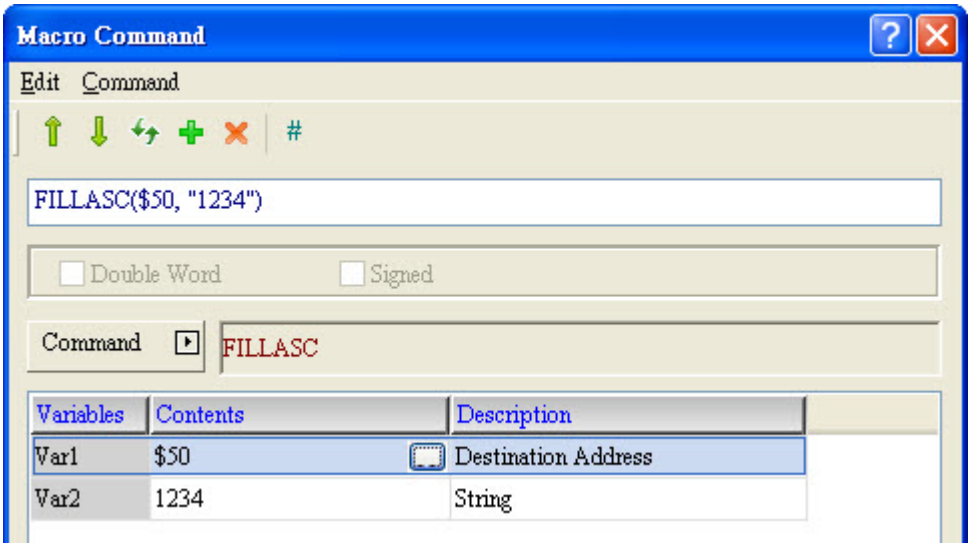
■ FILLASC (String to ASCII Conversion)

Expression	What Variables Represent		NOTE
FILLASC (Var 1, "Var 2") (W)	Var 1	Destination address for the string	W : Word
	Var 2	String	
	Expression Explanation		
	Convert the Var 2 text string into corresponding ASCII values and save them in Var 1.		

Variable	Memory Usage			
	Internal Memory	PLC Register	Constant	String
Var 1	◎	◎		
Var 2				◎

Example

➢ Var 1 is an internal memory address, and Var 2 is a text string.



➢ The result after conversion: $50 = 3241H, $51 = 3433H.

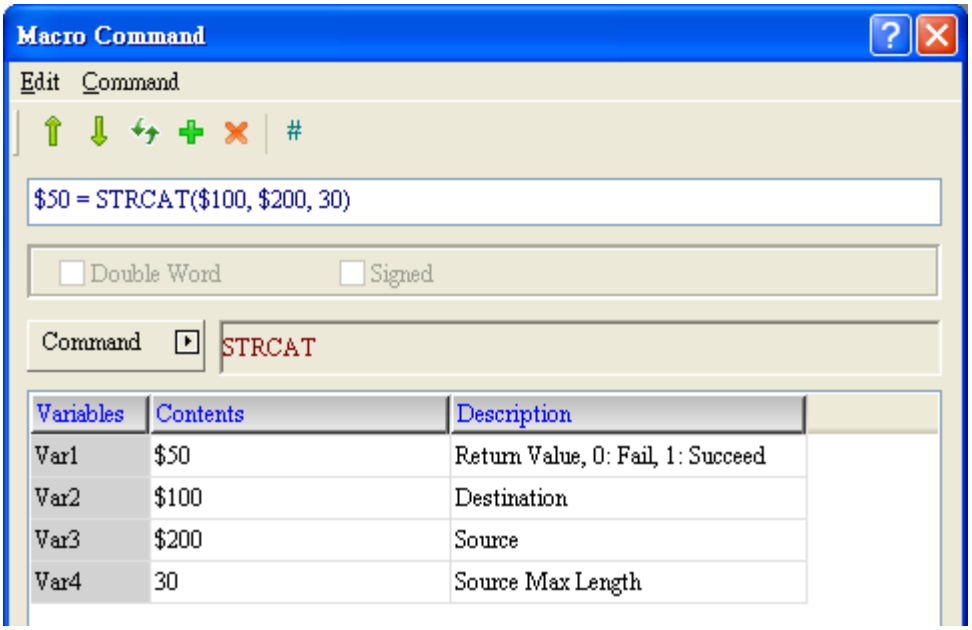
■ STRCAT (connect strings)

<table>
<tr><th>Expression</th><th colspan="3">What Variables Represent</th><th>NOTE</th></tr>
<tr><td rowspan="8">Var 1 = STRCAT (Var 2, Var 3, Var 4)</td><td rowspan="3">Var 1</td><td colspan="2">Returned Value</td><td rowspan="8"></td></tr>
<tr><td>Failure</td><td>0</td></tr>
<tr><td>Success</td><td>1</td></tr>
<tr><td>Var 2</td><td colspan="2">Target address</td></tr>
<tr><td>Var 3</td><td colspan="2">Source address</td></tr>
<tr><td>Var 4</td><td colspan="2">Total length of the target string.
(Unit: Char)</td></tr>
<tr><td colspan="3">Expression Explanation</td></tr>
<tr><td colspan="3">Connect the string from the source address with the string from the target address.</td></tr>
</table>

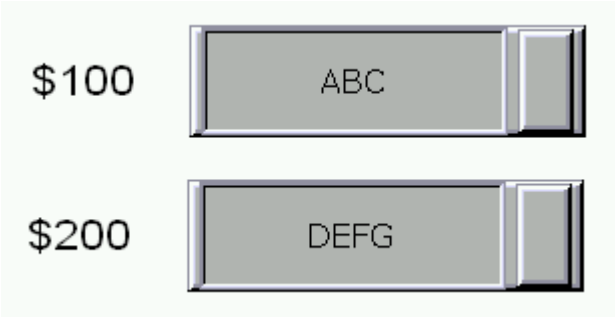
Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		
Var 2	◎		
Var 3	◎		
Var 4	◎		◎

Example

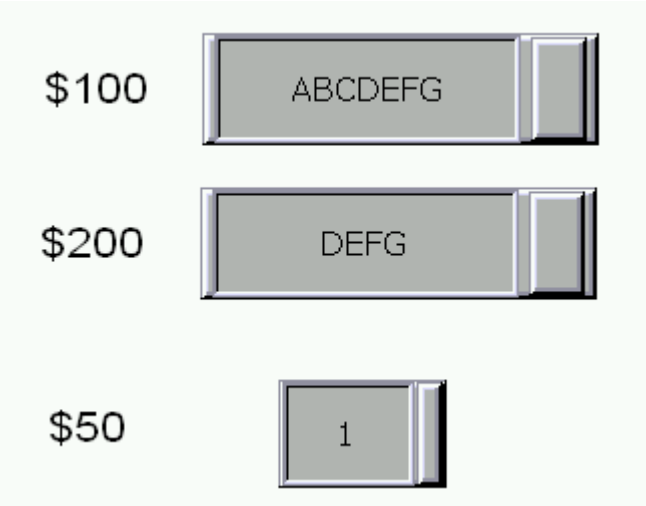
- Var 1 is an internal memory address, Var 2 and Var 3 are strings and Var 4 is a constant.



- Create the numeric entry element and set the address to $50. Also, create the character entry element with the address of $100 and $200.
- Then, please enter the following values.



- The result after conversion: $100 = ABCDEFG; $50 = 1.



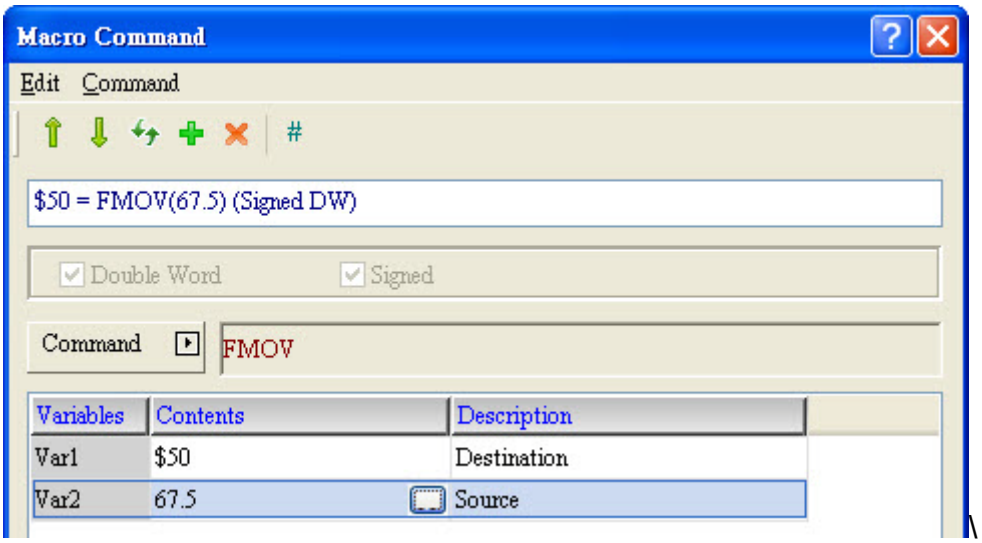
■ FMOV (Move floating point data)

Expression	What Variables Represent		NOTE
Var 1 = FMOV (Var 2) (Signed DW)	Var 1	Destination Address	DW : Double Word Signed : Signed number
	Var 2	Source data address	
	Expression Explanation		
	Copy floating point source data contained in Var 2 to Var 1, and the floating point contained in Var 2 will not change.		

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎	◎	
Var 2	◎	◎	◎

Example

➢ Var 1 is an internal memory address and Var 2 is a constant.



➢ Put 67.5 floating data to $50, therefore $50 will display 67.5.

24-3-4 Data Conversion

Data conversion operations are performed with commands for data type conversion, maximum and minimal values and data swap, and their usages are detailed below:

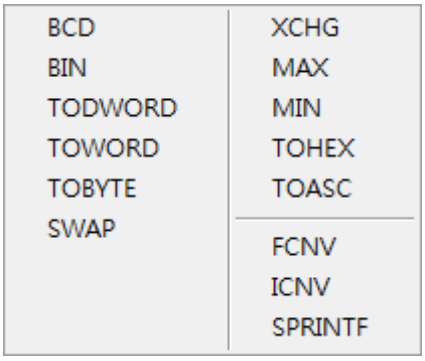


Figure 24-3-4-1 Data Conversion

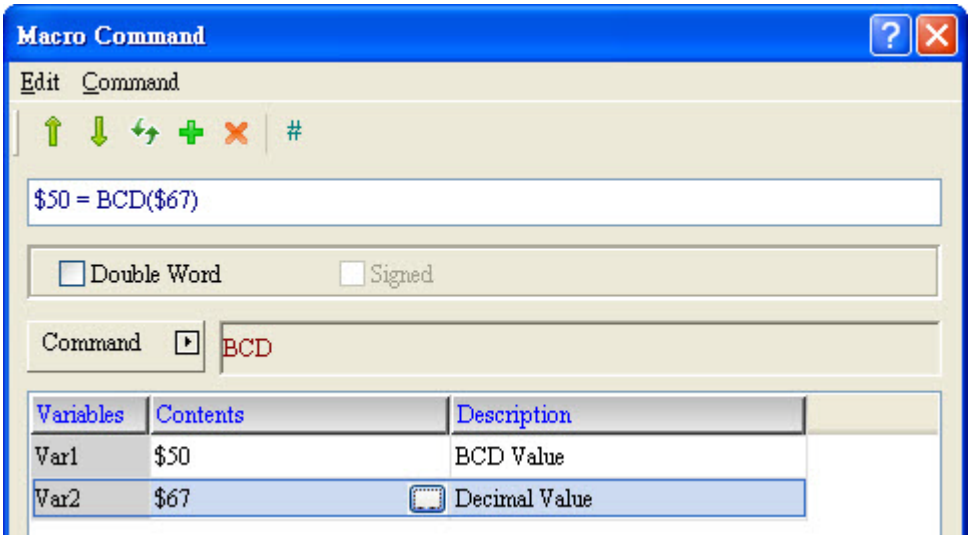
■ BCD (Decimal to BCD Conversion)

Expression	What Variables Represent		NOTE
Var 1 = BCD (Var 2) (W) Var 1 = BCD (Var 2) (DW)	Var 1	BCD type data	W : Word DW : Double Word
	Var 2	Decimal type data	
	Expression Explanation		
	Convert decimal data stored in Var 2 into BCD data and save the converted data in Var 1.		

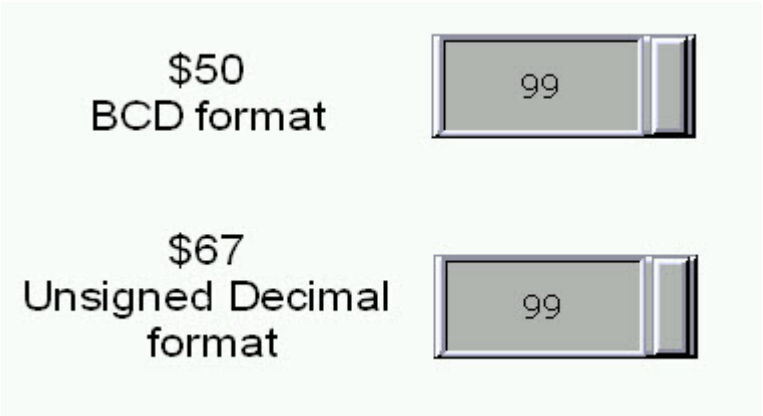
Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		
Var 2	◎		

Example

- Var 1 and Var 2 are internal memory addresses.



- Transfer Unsigned Decimal format with $67 to BCD format with $50.



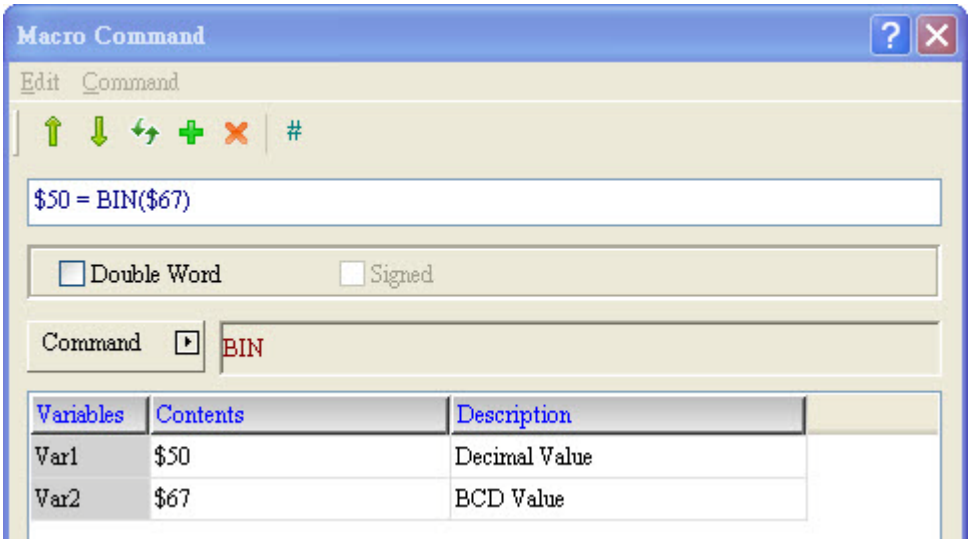
■ BIN (BCD to Decimal Conversion)

Expression	What Variables Represent		NOTE
Var 1 = BIN (Var 2) (W) Var 1 = BIN (Var 2) (DW)	Var 1	Decimal type data	W : Word DW : Double Word
	Var 2	BCD type data	
	Expression Explanation		
	Convert BCD data stored in Var 2 into decimal data and save the converted data in Var 1.		

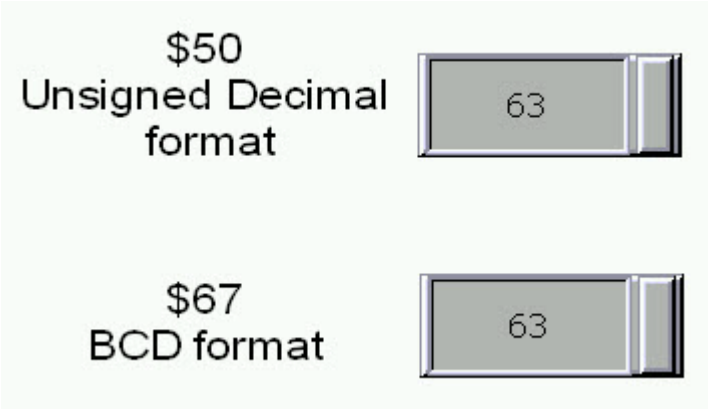
Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		
Var 2	◎		

Example

➢ Var 1 and Var 2 are internal memory addresses.



➢ Transfer BCD format with $67 to Unsigned Decimal format with $50.



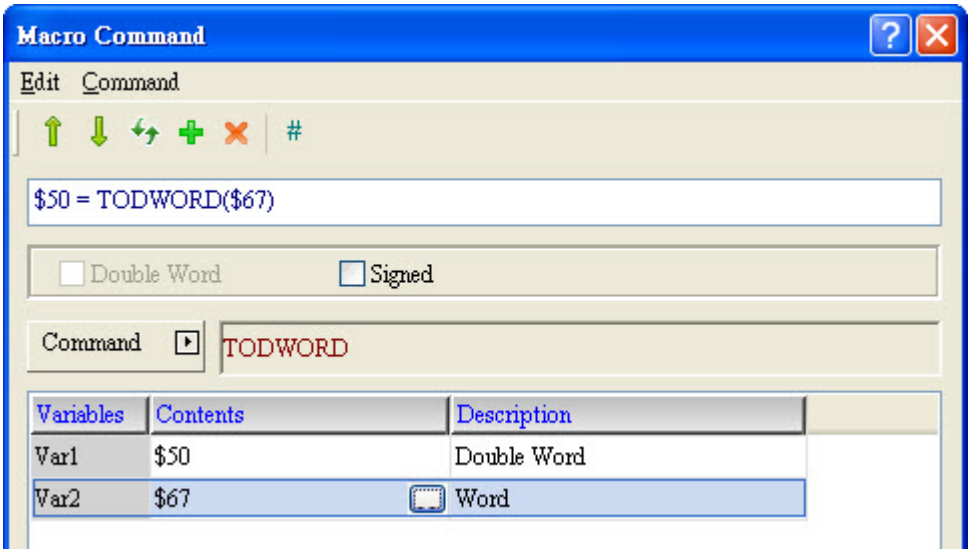
■ TODWORD (WORD to Double WORD Conversion)

Expression	What Variables Represent		NOTE
Var 1 = TODWORD (Var 2) (W) Var 1 = TODWORD (Var 2) (Signed W)	Var 1	Double Word type data	W : Word
	Var 2	Word type data	
	Expression Explanation		
	Convert Word data stored in Var 2 into Double Word data and save the converted data in Var 1.		

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		
Var 2	◎		

Example

➢ Var 1 and Var 2 are internal memory addresses.



➢ Convert the Word data originally stored in $67 into Double Word data and store it in $50. Since the converted data is a Double Word data, it actually takes up two addresses from $50 to $51.

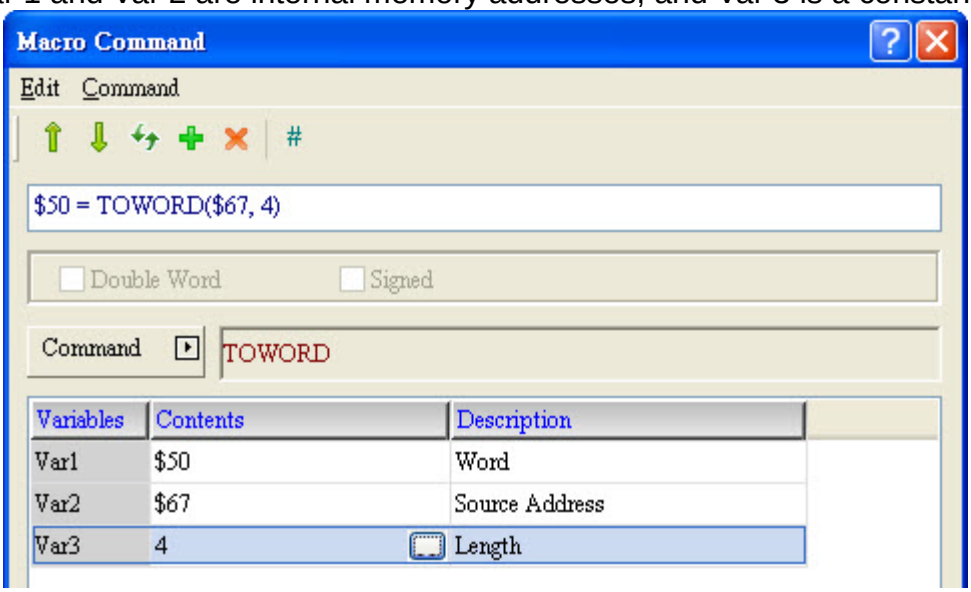
■ TOWORD (BYTE to Word Conversion)

Expression	What Variables Represent		NOTE
Var 1 = TOWORD (Var 2, Var 3) (W)	Var 1	Word type data	W : Word
	Var 2	Starting Address of the Source Data	
	Var 3	Length	
	Expression Explanation		
	Convert BYTE data (number of byte is Var 3) from Var 2 to WORD value and store the result in Var 1. The high byte will be filled with 0.		
* As Var 2 is in word data type, each word stored in Var 2 can be converted in to two words. * Please note that the first and last byte of the converted WORD will be exchanged.			

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		
Var 2	◎		
Var 3	◎		◎

Example

➢ Var 1 and Var 2 are internal memory addresses, and Var 3 is a constant.



➢ Convert the 4 consecutive bytes in $67 into the word type and save them into $50.

➢ Both $50 and $67 are set to the Hex data type.

➢ If $67 = AB67H and $68 = 9A62H, then after conversion using the TOWORD command, then the result is: $50 = 67H, $51 = ABH, $52 = 62H and $53 = 9AH.

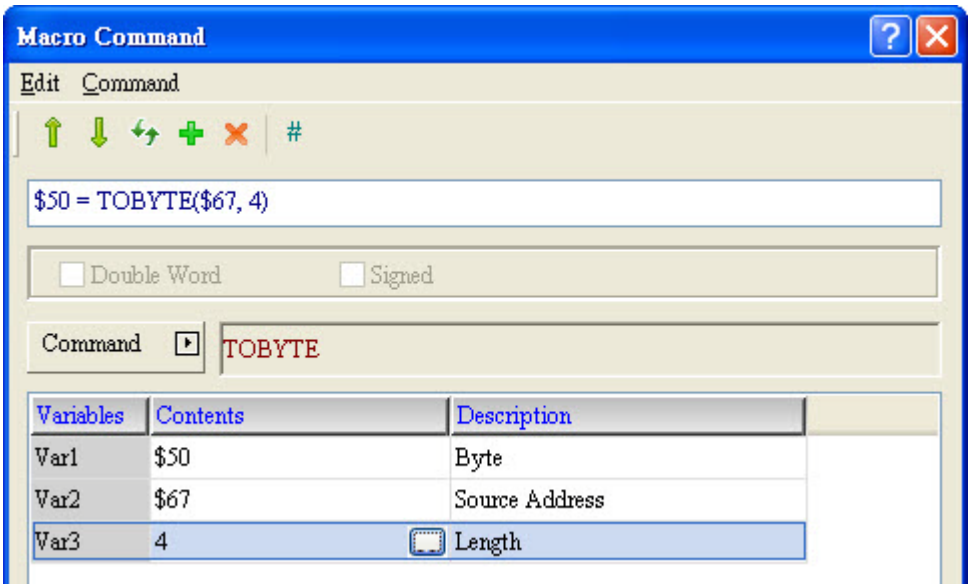
■ TOBYTE (Word to Byte Conversion)

Expression	What Variables Represent		NOTE
Var 1 = TOBYTE (Var 2, Var 3) (W)	Var 1	BYTE type data	W : Word
	Var 2	Starting Address of the Source Data	
	Var 3	Length	
	Expression Explanation		
	Convert Word data (number of word is Var 3) from low-byte of Var 2 to Byte data (discard high-byte of Var 2) and store the result in Var 1.		
* Please note that the first and last byte of the converted WORD will be exchanged.			

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		
Var 2	◎		
Var 3	◎		◎

Example

➢ Var 1 and Var 2 are internal memory addresses, and Var 3 is a constant.



➢ Convert the 4 consecutive words in $67 into the byte type and save them into $50.

➢ Both $50 and $67 are set to the Hex data type.

➢ If $67 = 12H, $68 = 76H, $69 = 24H and $70 = ABH, then after conversion using the TOBYTE command, the result is: $50 = 7612H、$51 = AB24H.

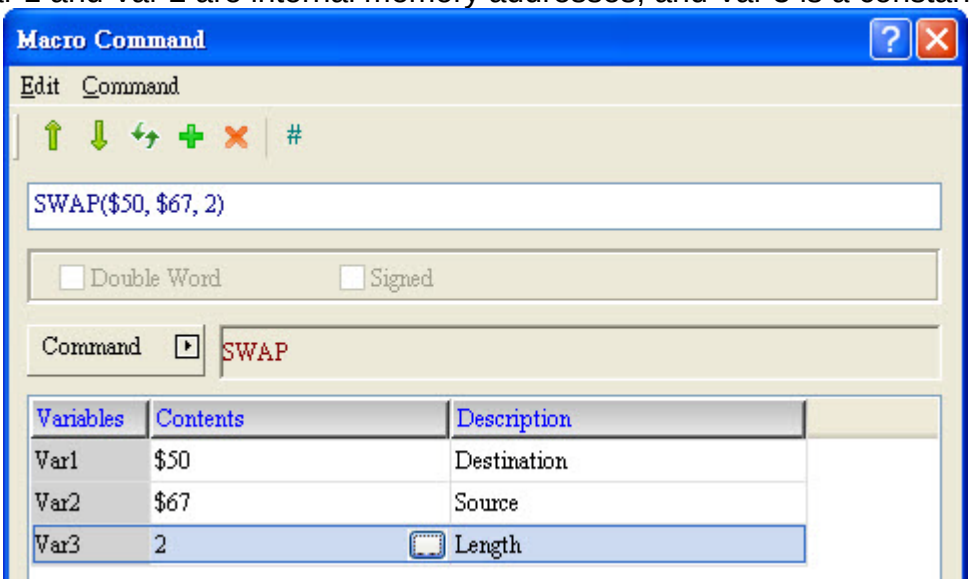
■ SWAP (Swap between highbit and lowbit of WORD)

Expression	What Variables Represent		NOTE
SWAP (Var 1, Var 2, Var 3) (W)	Var 1	Starting Address of the Destination Data	W : Word
	Var 2	Starting Address of the Source Data	
	Var 3	Length	
	Expression Explanation		
	Swap between the high-byte and low-byte of Var 2 until the Var 2 + Var 3 item, and store the result in the starting position of Var 1 forward.		

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		
Var 2	◎		
Var 3	◎		◎

Example

- Var 1 and Var 2 are internal memory addresses, and Var 3 is a constant.



- Swap between the high-byte and low-byte of value stored in $67 and save the swapped result in $50.
- Both $50 and $67 are set to the Hex data type.
- If 67 = 5612H and $68 = B724H, then after executing the SWAP command to swap the high-byte and low-byte of values stored within $67 and save them into $50 and $51, the result will be $50=1256H, $51 = 24B7H.

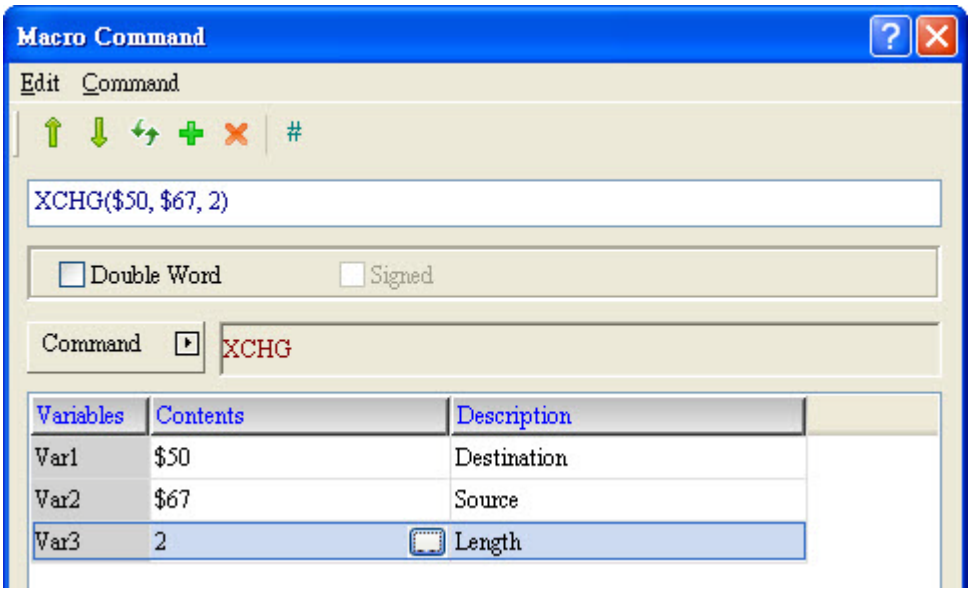
■ XCHG (Data Exchange)

Expression	What Variables Represent		NOTE
XCHG (Var 1, Var 2, Var 3) (W) XCHG (Var 1, Var 2, Var 3) (DW)	Var 1	Starting Address of the Destination Data	W : Word DW : Double Word
	Var 2	Starting Address of the Source Data	
	Var 3	Length	
	Expression Explanation		
	Exchange between values stored in Var 2 and Var 1 based on the length specified in Var 3.		

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		
Var 2	◎		
Var 3	◎		◎

Example

➢ Var 1 and Var 2 are internal memory addresses, and Var 3 is a constant.



➢ Exchange between 2 bytes of data stored in $67 and $50.

➢ Both $50 and $67 are Hex data type.

➢ If $67 = 1244H, $68 = 5678H, $50 = ABCDH and $51 = EFDCH, then after executing SCHG to exchange between values stored in $67 and $68, and $50 and $51, then the result will be $67 = ABCDH, $68 = EFDCH, $50 = 1244H and $51 = 5678H.

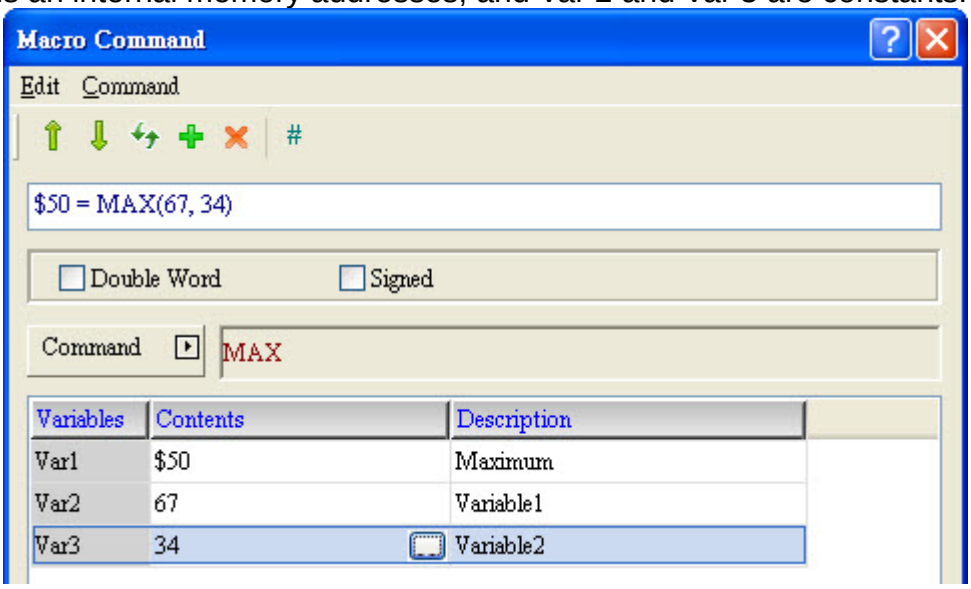
■ MAX (Get Maximum Value)

Expression	What Variables Represent		NOTE
Var 1 = MAX (Var 2, Var 3) (W) Var 1 = MAX (Var 2, Var 3) (DW) Var 1 = MAX (Var 2, Var 3) (Signed W) Var 1 = MAX (Var 2, Var 3) (Signed DW)	Var 1	Maximum value	W : Word DW : Double Word
	Var 2	Variable 1	
	Var 3	Variable 2	
	Expression Explanation		
	Get the maximum value between Var 2 and Var 3 and store the result in Var 1.		

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		
Var 2	◎		◎
Var 3	◎		◎

Example

➢ Var 1 is an internal memory addresses, and Var 2 and Var 3 are constants.



➢ Maximize (67, 34) and put the maximum value to $50. Therefore $50 will display 67.

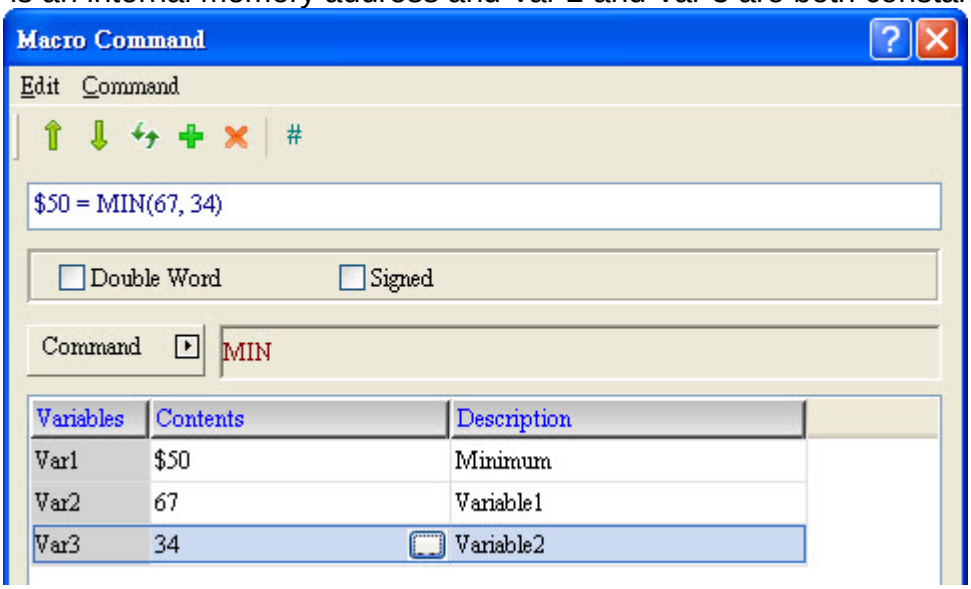
■ MIN (Get Minimum Value)

Expression	What Variables Represent		NOTE
Var 1 = MIN (Var 2, Var 3) (W) Var 1 = MIN (Var 2, Var 3) (DW) Var 1 = MIN (Var 2, Var 3) (Signed W) Var 1 = MIN (Var 2, Var 3) (Signed DW)	Var 1	Minimum Value	W : Word DW : Double Word
	Var 2	Variable1	
	Var 3	Variable2	
	Expression Explanation		
	Get the minimum value between Var 2 and Var 3 and store the result in Var 1.		

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		
Var 2	◎		◎
Var 3	◎		◎

Example

➢ Var 1 is an internal memory address and Var 2 and Var 3 are both constants.



➢ Minimize (67, 34) and put the minimum value to $50. Therefore $50 will display 34.

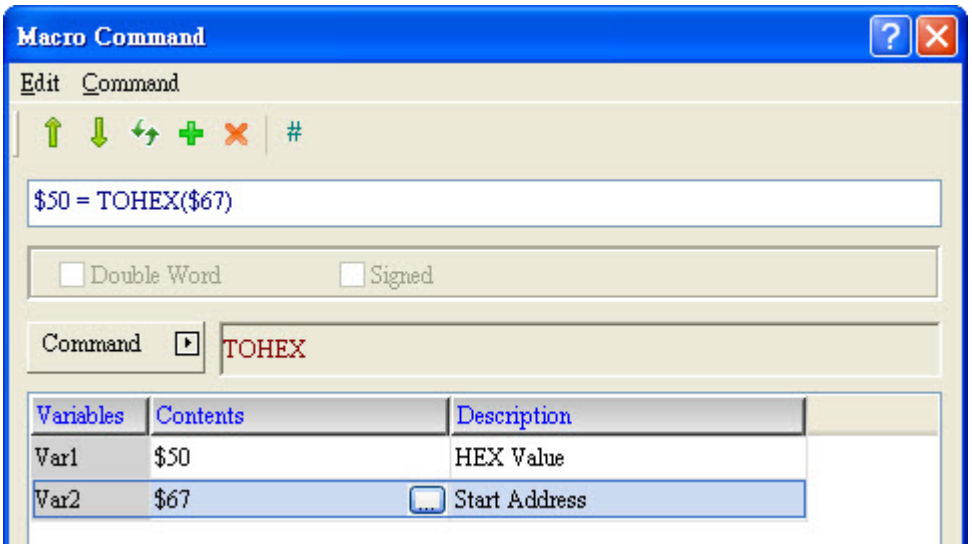
■ TOHEX (**Conversion of 4 ASCII characters to four digit HEX integer**)

Expression	What Variables Represent		NOTE
Var 1 = TOHEX (Var 2) (W)	Var 1	Hexadecimal value	W : Word
	Var 2	Starting ASCII Address	
	Expression Explanation		
	Convert the ASCII characters of Var 2 (4 WORDS) to the HEX value and store the result in Var 1.		

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		
Var 2	◎		

Example

➢ Var 1 and Var 2 are all internal memory addresses.



➢ Convert the ASCII characters of $67 (4 WORDS) to the HEX value and store the result in $50.

➢ Both $50 and $67 are set to the Hex data type.

➢ If $67 = 31H, $68 = 32H, $69 = 33H and $70 = 34H, then after using the TOHEX command to convert the ASCII characters stored in these four variables into HEX data type and store them in $50, then the result is: $50 = 1244H.

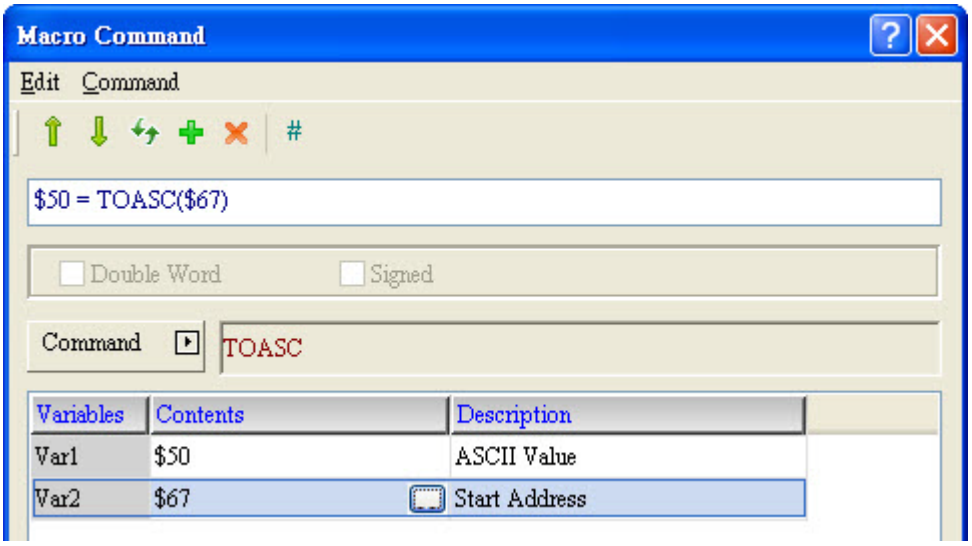
■ TOASC (Conversion of HEX integers into ASCII characters)

Expression	What Variables Represent		NOTE
Var 1 = TOASC (Var 2) (W)	Var 1	ASCII Value	W : Word
	Var 2	Starting hexadecimal address	
	Expression Explanation		
	Convert Var 2 in HEX format to the ASCII (4 WORDS) characters and store the result in Var 1.		

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		
Var 2	◎		

Example

➢ Var 1 and Var 2 are internal memory addresses



➢ Convert the HEX values of $67 into ASCII characters (4 WORDS) and store the result in $50.

➢ Both $50 and $67 are set to the Hex data type.

➢ If $67 = 1244H, then after using the TOASC command to convert the HEX value stored in $67 into ASCII characters and stored in these four variables into $50, $51, $52 and $53, then the result is: $50 = 31H, $51 = 32H, $52 = 33H, $53 = 34H.

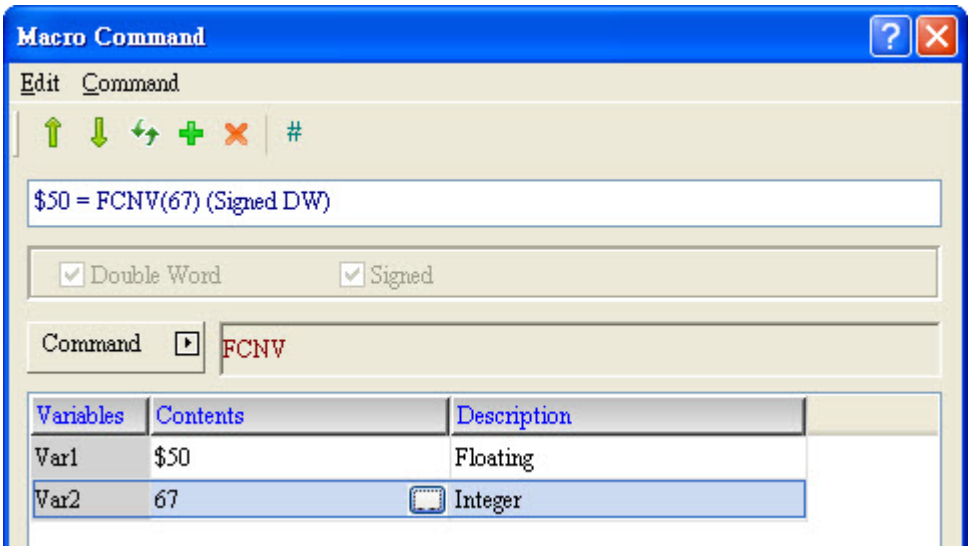
■ FCNV (Conversion of integer into floating point value)

Expression	What Variables Represent		NOTE
Var 1 = FCNV (Var 2) (Signed DW)	Var 1	Floating point value	DW : Double Word Signed : Signed number
	Var 2	Integer value	
	Expression Explanation		
	Convert the value in Var 2 (integer) to floating point value and store in Var 1.		

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		
Var 2	◎		◎

Example

➢ Var 1 and Var 2 are internal memory addresses.



➢ Convert $67 (integer value) into the floating point value and save it in $50.

➢ $50 is set to floating point data type and the integer to Double Word data type.

➢ The result is $50 = 67.0.

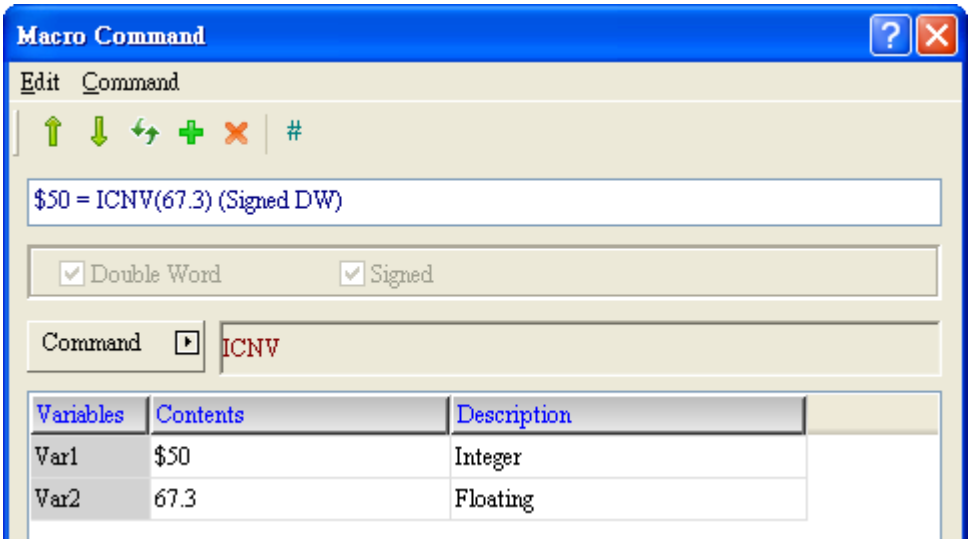
■ ICNV (Conversion from integer to floating point value)

Expression	What Variables Represent		NOTE
Var 1 = ICNV (Var 2) (Signed DW)	Var 1	Integer value	DW : Double Word Signed : Signed number
	Var 2	Floating point value	
	Expression Explanation		
	Convert the value in Var 2 (floating point value) into an integer and store it in Var 1.		

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		
Var 2	◎		◎

Example

➢ Var 1 and Var 2 are internal memory addresses.



➢ Convert 67.3 (floating point value) into the integer and save it in $50.

➢ $50 is set to Unsigned Decimal and the integer to Word data type.

➢ The result is $50 = 67.

■ SPRINTF (Format String)

<table>
<tr><th>Expression</th><th colspan="3">What Variables Represent</th><th>NOTE</th></tr>
<tr><td rowspan="11">Var 1 = SPRINTF (Var 2, "%u", Var 4) (DW)

Var 1 = SPRINTF (Var 2, "%u", Var 4, …, Var 24) (DW) (Note 2)</td><td rowspan="3">Var 1</td><td colspan="2">Returned Value</td><td rowspan="11">DW = Double Word</td></tr>
<tr><td>Failure</td><td>0</td></tr>
<tr><td>Success</td><td>1</td></tr>
<tr><td>Var 2</td><td colspan="2">Fill in the target address of string</td></tr>
<tr><td>Var 3</td><td colspan="2">String Content (Note 1)</td></tr>
<tr><td>Var 4</td><td colspan="2">Value 1</td></tr>
<tr><td>…</td><td colspan="2">…</td></tr>
<tr><td>Var 24</td><td colspan="2">Value 20</td></tr>
<tr><th colspan="3">Expression Explanation</th></tr>
<tr><td colspan="3">Fill in the string content then the target address according to Var 2</td></tr>
</table>

Note 1: The supported string formats are shown as below:

%d：signed integer

%u：unsigned integer

%c：ASCII character

%x：value in hexadecimal

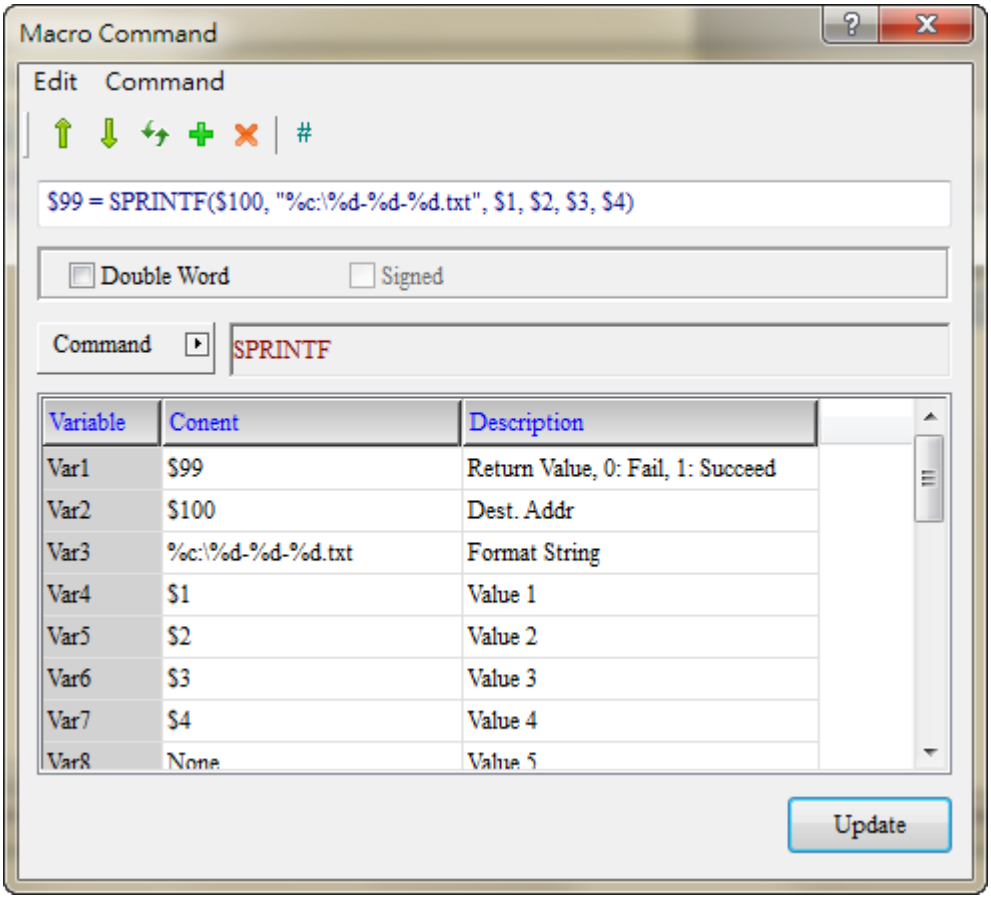
Note 2: It supports up to 20 variables

Note 3: The fill in number should be identical with the value number.

Variable	Memory Usage			
	Internal Memory	PLC Register	String	Constant
Var 1	◎			
Var 2	◎	◎		
Var 3			◎	
Var 4	◎	◎		◎
…	…	…		…
Var 24	◎	◎		◎

Example

➢ $99 = SPRINTF($100, "%c:\%d-%d-%d.txt", $1, $2, $3, $4)



Create numeric entry element: $1, $2, $3, $4. Then, enter the value which shown as below:

$1 = 68 (represents D in ASCII code)

$2 = 2012

$3 = 12

$4 = 21

Create character entry element and set its address to $100. After execution, the screen will show as below:

24-3-5 Comparison

Comparison is performed with such commands as If…Then Goto, If…Then Call, If and Elseif and they are detailed below.

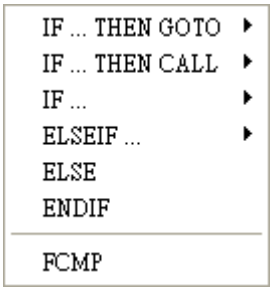
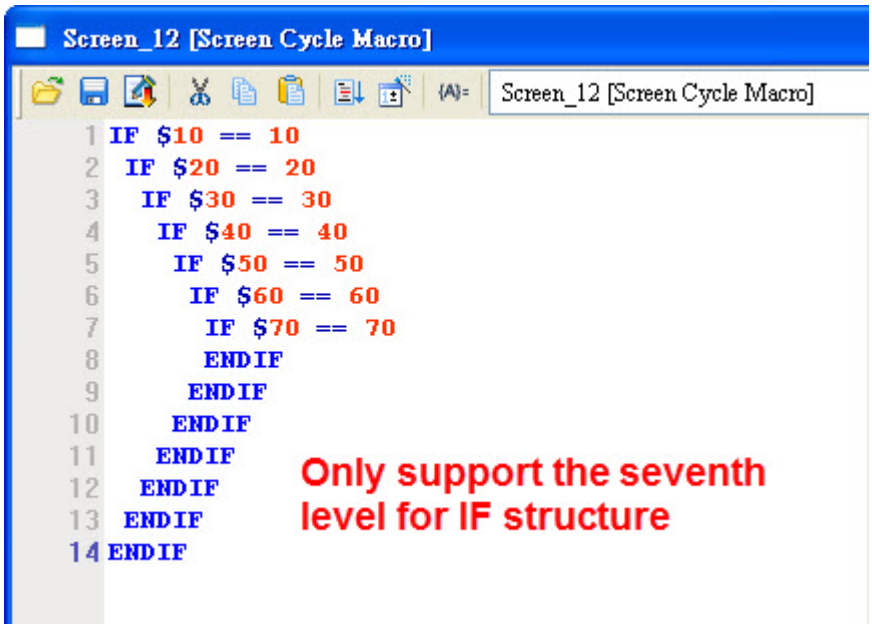


Figure 24-3-5-1 Comparison

NOTE：

✓ IF…structures only support 7 levels.



- IF…THEN GOTO (If …. Goto a certain label identifier and continue subsequent executions)

IF ==	IF AND == 0
IF !=	IF AND != 0
IF >	IF == ON
IF >=	IF == OFF
IF <	IFB == ON
IF <=	IFB == OFF

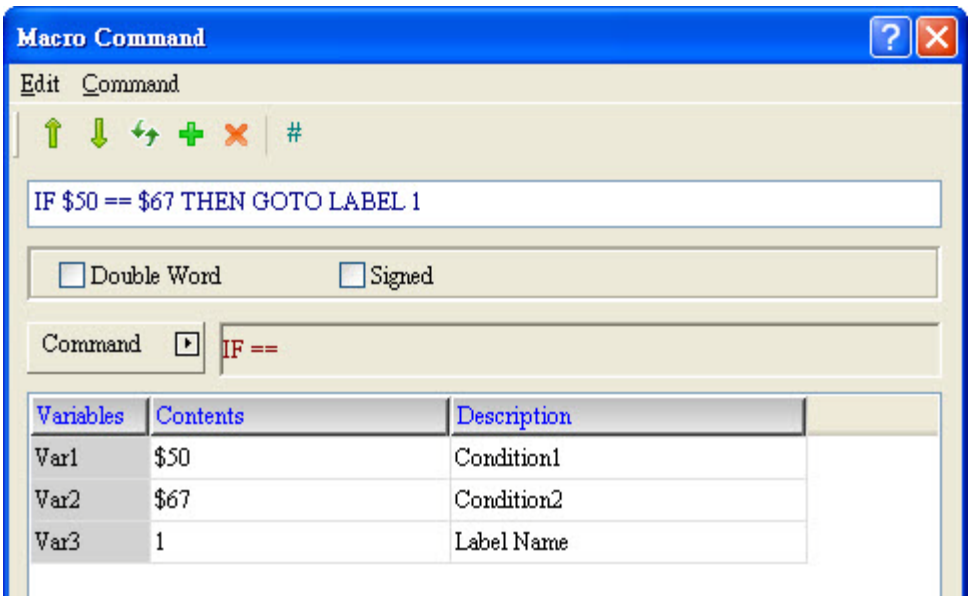
- There are twelve commands in the category of If…Then Goto Macro, and they are introduced below.

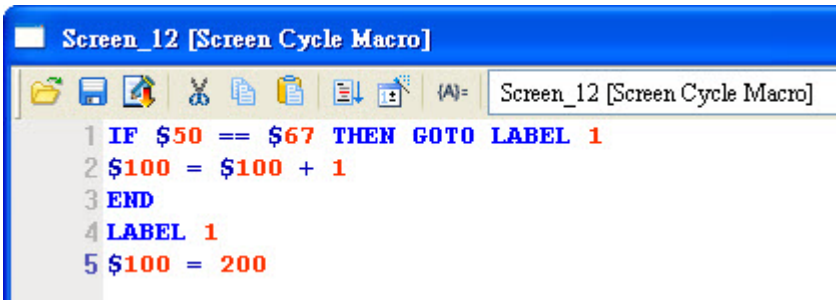
<table>
<tr><th colspan="4">(1) IF ==</th></tr>
<tr><th>Expression</th><th colspan="2">What Variables Represent</th><th>NOTE</th></tr>
<tr><td rowspan="5">IF Var 1 == Var 2 THEN GOTO LABEL Var 3 (W)
IF Var 1 == Var 2 THEN GOTO LABEL Var 3 (DW)
IF Var 1 == Var 2 THEN GOTO LABEL Var 3 (Signed W)
IF Var 1 == Var 2 THEN GOTO LABEL Var 3 (Signed DW)</td><td>Var 1</td><td>Condition 1</td><td rowspan="5">W : Word
DW : Double Word
Signed : Signed number</td></tr>
<tr><td>Var 2</td><td>Condition 2</td></tr>
<tr><td>Var 3</td><td>Label identifier</td></tr>
<tr><th colspan="2">Expression Explanation</th></tr>
<tr><td colspan="2">If condition 1 equals condition 2 then GOTO and execute Label Var 3.</td></tr>
</table>

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		◎
Var 2	◎		◎
Var 3			◎

Example

- Var 1 and Var 2 are both internal memory addresses, and Var 3 is a constant.





- If $50 equals $67 (value comparison), then execute LABEL1 ($100 = 200); otherwise, execute $100 = $100 + 1.

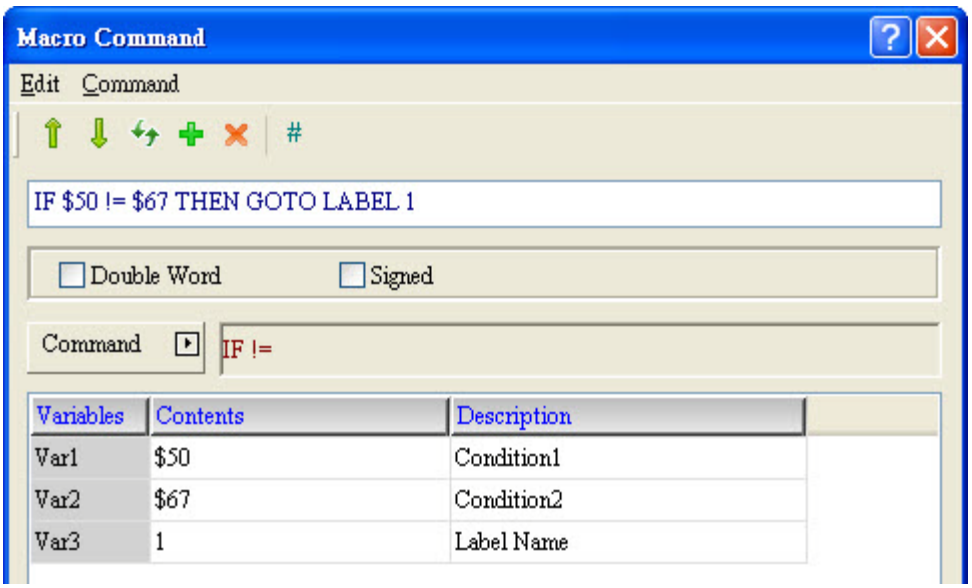
(2) IF !=

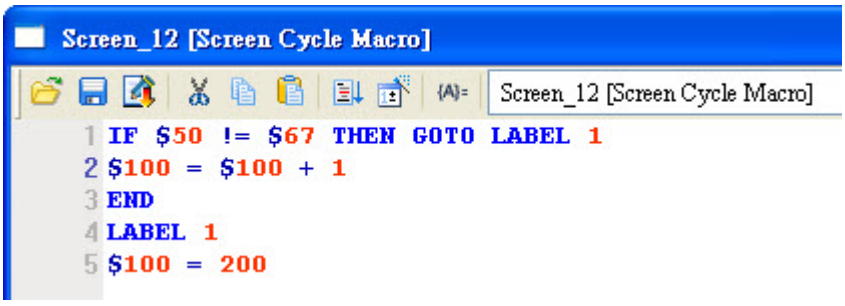
Expression	What Variables Represent		NOTE
IF Var 1 != Var 2 THEN GOTO LABEL Var 3 (W) IF Var 1 != Var 2 THEN GOTO LABEL Var 3 (DW) IF Var 1 != Var 2 THEN GOTO LABEL Var 3 (Signed W) IF Var 1 != Var 2 THEN GOTO LABEL Var 3 (Signed DW)	Var 1	Condition 1	W : Word DW : Double Word Signed : Signed number
	Var 2	Condition 2	
	Var 3	Label identifier	
	Expression Explanation		
	If condition 1 does not equal to condition 2 then GOTO and execute Label Var 3.		

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		◎
Var 2	◎		◎
Var 3			◎

Example

➢ Var 1 and Var 2 are both internal memory addresses, and Var 3 is a constant.





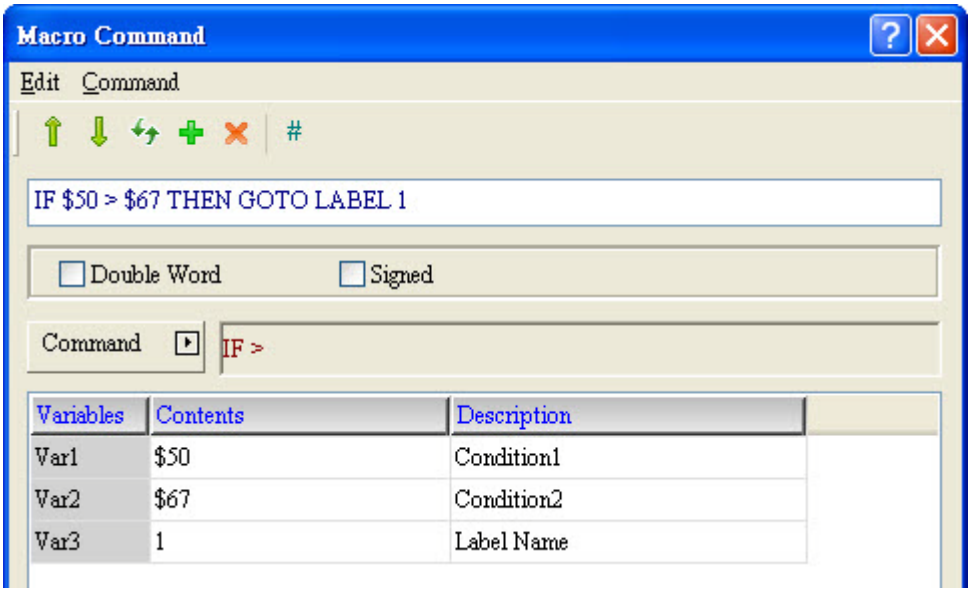
➢ If $50 does not equal to $67 (value comparison), then execute LABEL1 ($100 = 200); otherwise, execute $100 = $100 + 1.

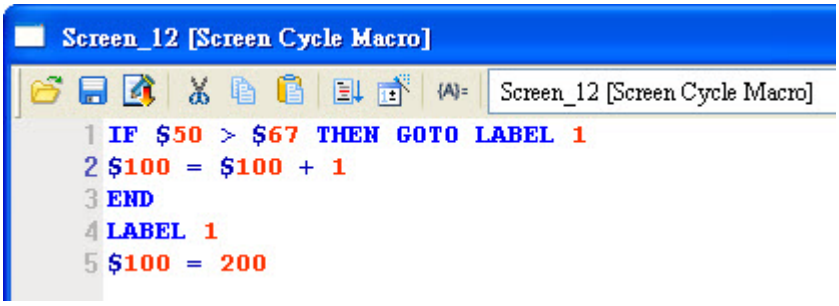
<table>
<tr><th colspan="4">(3) IF ></th></tr>
<tr><th>Expression</th><th colspan="2">What Variables Represent</th><th>NOTE</th></tr>
<tr><td rowspan="5">IF Var 1 > Var 2 THEN GOTO LABEL Var 3 (W)
IF Var 1 > Var 2 THEN GOTO LABEL Var 3 (DW)
IF Var 1 > Var 2 THEN GOTO LABEL Var 3 (Signed W)
IF Var 1 > Var 2 THEN GOTO LABEL Var 3 (Signed DW)</td><td>Var 1</td><td>Condition 1</td><td rowspan="5">W : Word
DW : Double Word
Signed : Signed number</td></tr>
<tr><td>Var 2</td><td>Condition 2</td></tr>
<tr><td>Var 3</td><td>Label identifier</td></tr>
<tr><td colspan="2">Expression Explanation</td></tr>
<tr><td colspan="2">If condition 1 is larger than condition 2 then GOTO and execute Label Var 3.</td></tr>
</table>

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		◎
Var 2	◎		◎
Var 3			◎

Example

➢ Var 1 and Var 2 are both internal memory addresses, and Var 3 is a constant.





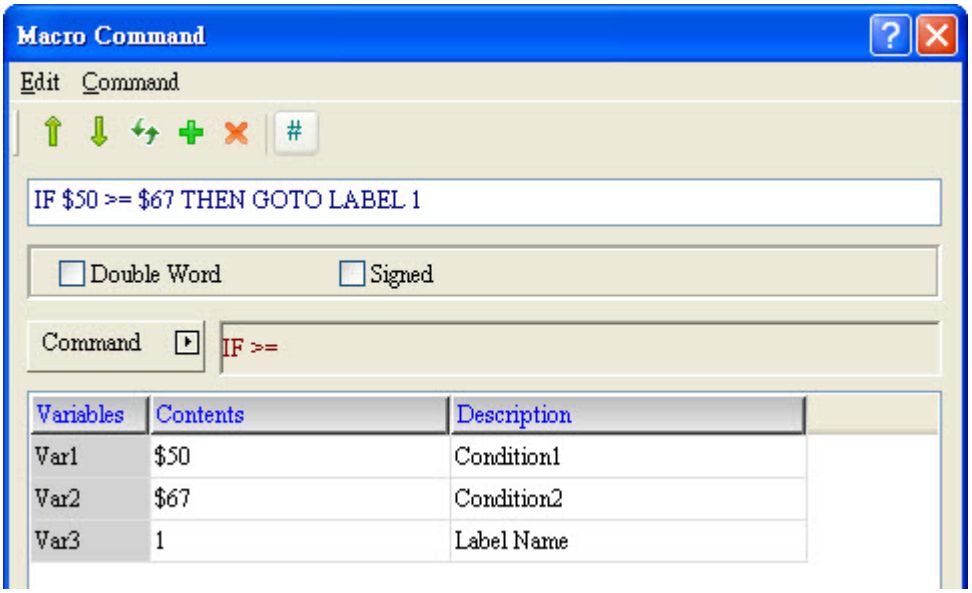
➢ If $50 is larger than $67 (value comparison), then execute LABEL1 ($100 = 200); otherwise, execute $100 = $100 + 1.

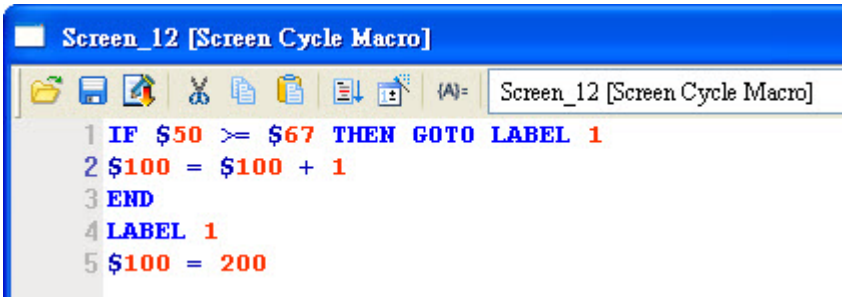
(4) IF >=			
Expression	**What Variables Represent**		**NOTE**
IF Var 1 >= Var 2 THEN GOTO LABEL Var 3 (W) IF Var 1 >= Var 2 THEN GOTO LABEL Var 3 (DW) IF Var 1 >= Var 2 THEN GOTO LABEL Var 3 (Signed W) IF Var 1 >= Var 2 THEN GOTO LABEL Var 3 (Signed DW)	Var 1	Condition 1	W : Word DW : Double Word Signed : Signed number
	Var 2	Condition 2	
	Var 3	Label identifier	
	Expression Explanation		
	If condition 1 is larger than or equals to condition 2 then GOTO and execute Label Var 3.		

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		◎
Var 2	◎		◎
Var 3			◎

Example

- Var 1 and Var 2 are both internal memory addresses, and Var 3 is a constant.





- If $50 is larger than or equals to $67 (value comparison), then execute LABEL1 ($100 = 200); otherwise, execute $100 = $100 + 1.

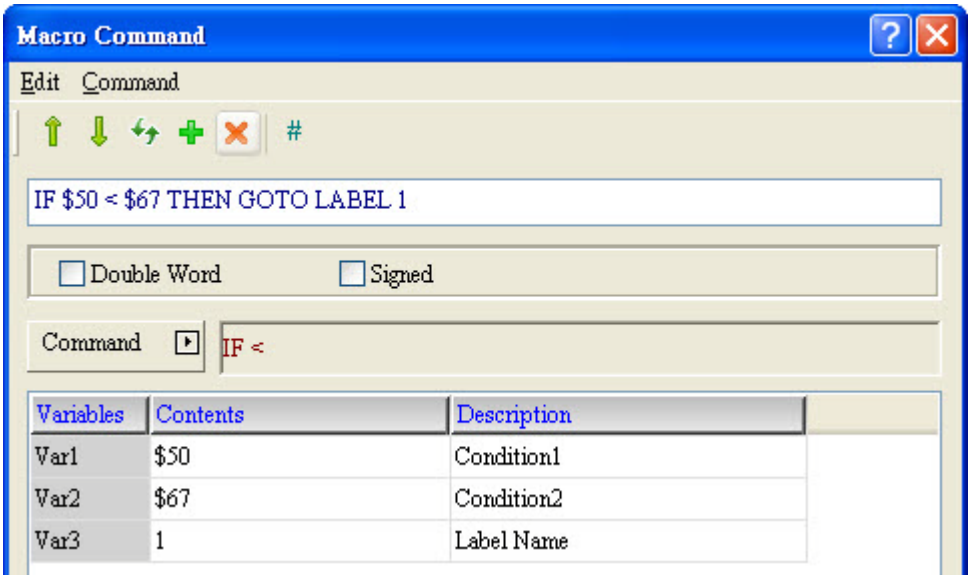
(5) IF <

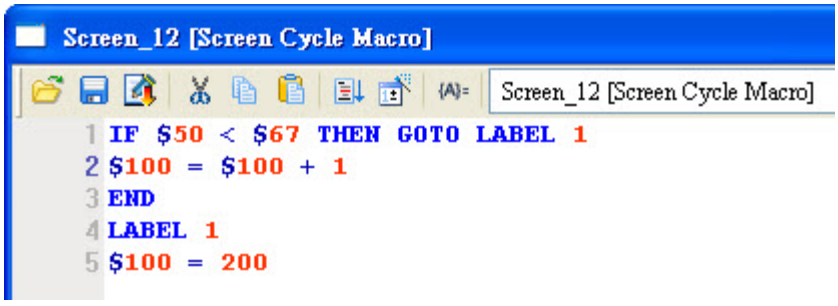
Expression	What Variables Represent		NOTE
IF Var 1 < Var 2 THEN GOTO LABEL Var 3 (W) IF Var 1 < Var 2 THEN GOTO LABEL Var 3 (DW) IF Var 1 < Var 2 THEN GOTO LABEL Var 3 (Signed W) IF Var 1 < Var 2 THEN GOTO LABEL Var 3 (Signed DW)	Var 1	Condition 1	W : Word DW : Double Word Signed : Signed number
	Var 2	Condition 2	
	Var 3	Label identifier	
	Expression Explanation		
	If condition 1 is smaller than condition 2 then GOTO and execute Label Var 3.		

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		◎
Var 2	◎		◎
Var 3			◎

Example

➢ Var 1 and Var 2 are both internal memory addresses, and Var 3 is a constant.





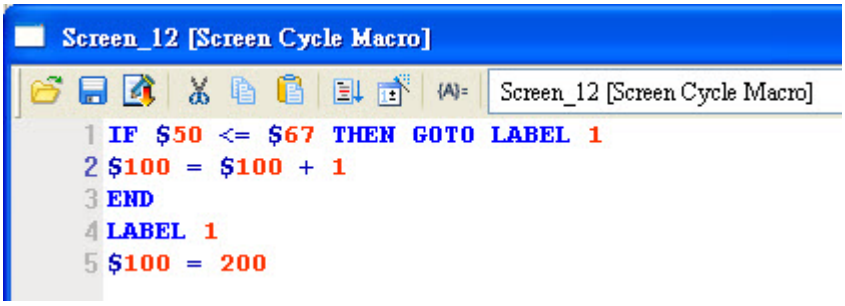
➢ If $50 is smaller than $67 (value comparison), then execute LABEL1 ($100 = 200); otherwise, execute $100 = $100 + 1.

(6) IF <=			
Expression	**What Variables Represent**		**NOTE**
IF Var 1 <= Var 2 THEN GOTO LABEL Var 3 (W) IF Var 1 <= Var 2 THEN GOTO LABEL Var 3 (DW) IF Var 1 <= Var 2 THEN GOTO LABEL Var 3 (Signed W) IF Var 1 <= Var 2 THEN GOTO LABEL Var 3 (Signed DW)	Var 1	Condition 1	W : Word DW : Double Word Signed : Signed number
	Var 2	Condition 2	
	Var 3	Label identifier	
	Expression Explanation		
	If condition 1 is smaller than or equals to condition 2 then GOTO and execute Label Var 3.		

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		◎
Var 2	◎		◎
Var 3			◎

Example

➢ Var 1 and Var 2 are both internal memory addresses, and Var 3 is a constant.

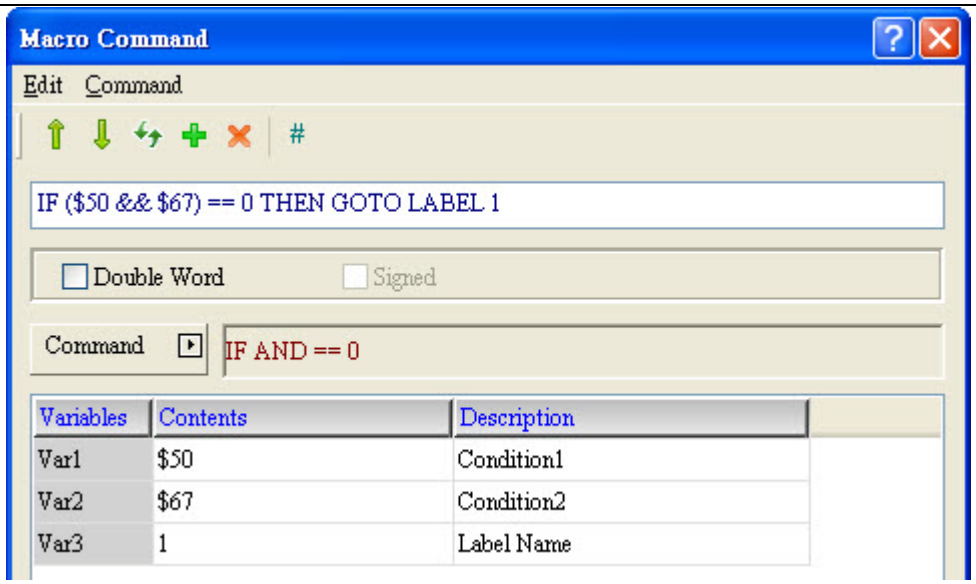


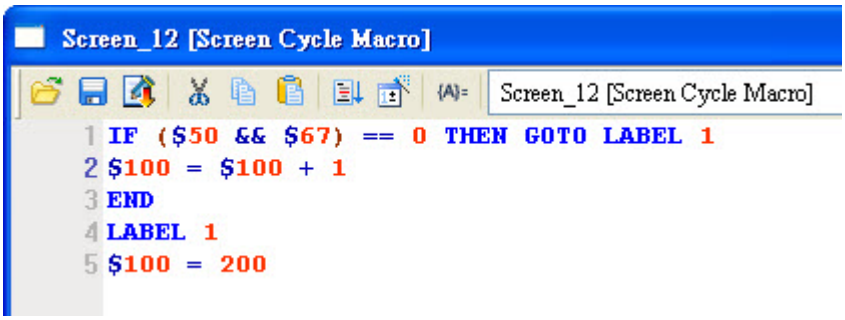
- If $50 is smaller or equals to $67 (value comparison), then execute LABEL1 ($100 = 200); otherwise, execute $100 = $100 + 1.

(7) IF AND == 0			
Expression	**What Variables Represent**		**NOTE**
IF (Var 1 && Var 2) == 0 THEN GOTO LABEL Var 3 (W) IF (Var 1 && Var 2) == 0 THEN GOTO LABEL Var 3 (DW)	Var 1	Condition 1	W : Word DW : Double Word
	Var 2	Condition 2	
	Var 3	Label identifier	
	Expression Explanation		
	If the result of Bitwise AND Operation between condition 1 equals condition 2 is 0, then GOTO and execute Label Var 3.		

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		◎
Var 2	◎		◎
Var 3			◎

Example
- Var 1 and Var 2 are both internal memory addresses, and Var 3 is a constant.





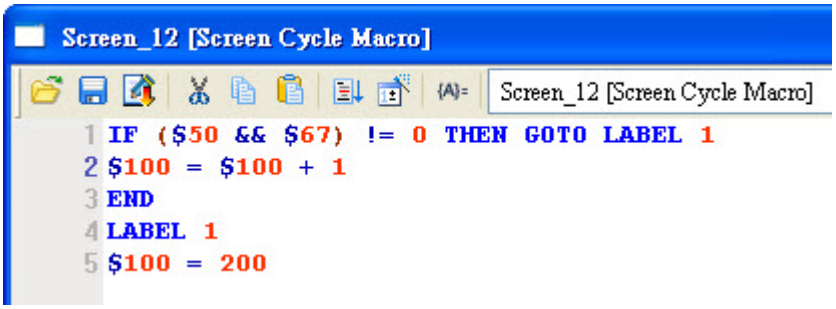
➢ If the result of Bitwise AND operation between $50 and $67 is 0, then execute LABEL1 ($100 = 200); otherwise, execute $100 = $100 + 1.

(8) IF AND != 0			
Expression	**What Variables Represent**		**NOTE**
IF (Var 1 && Var 2) != 0 THEN GOTO LABEL Var 3 (W) IF (Var 1 && Var 2) != 0 THEN GOTO LABEL Var 3 (DW)	Var 1	Condition 1	W : Word DW : Double Word
	Var 2	Condition 2	
	Var 3	Label identifier	
	Expression Explanation		
	If the result of Bitwise AND Operation between condition 1 equals condition 2 does not equal to 0, then GOTO and execute Label Var 3.		

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		◎
Var 2	◎		◎
Var 3			◎

Example

- Var 1 and Var 2 are both internal memory addresses, and Var 3 is a constant.



- If the result of Bitwise AND operation between $50 and $67 does not equal to 0, then execute LABEL1 ($100 = 200); otherwise, execute $100 = $100 + 1.

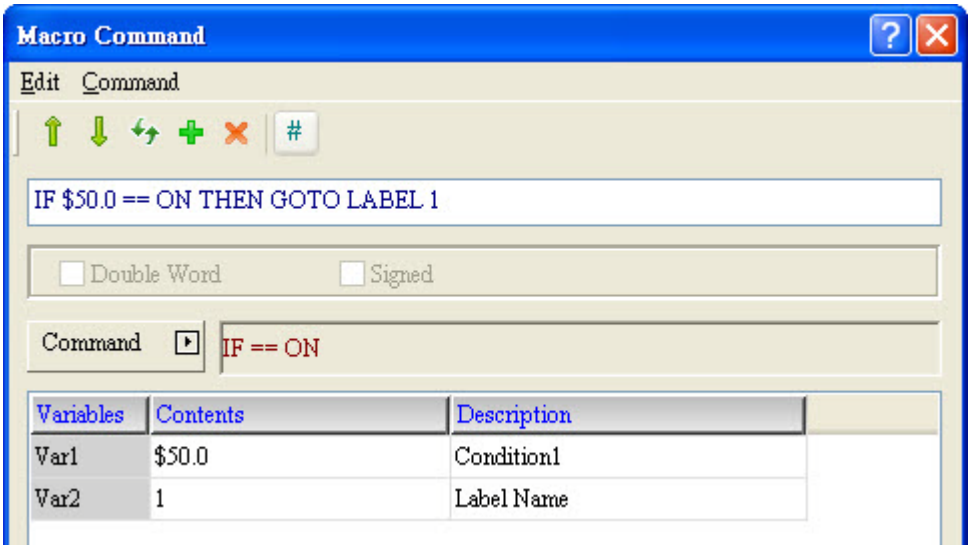
(9) IF == ON

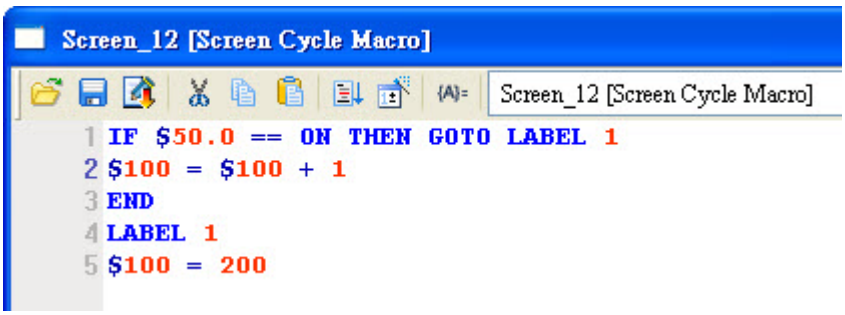
Expression	What Variables Represent		NOTE
IF Var 1 == ON THEN GOTO LABEL Var 2 (W)	Var 1	Condition 1	W : Word
	Var 2	Label identifier	
	Expression Explanation		
	If condition 1 is ON, then GOTO and execute LABEL Var 2.		

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎ (Can only be Bit)		
Var 2			◎

Example

➢ Var 1 is an internal memory address, and Var 2 is a constant.





➢ If $50.0 is ON, then execute LABEL1 ($100 = 200); otherwise, execute $100 = $100 + 1.

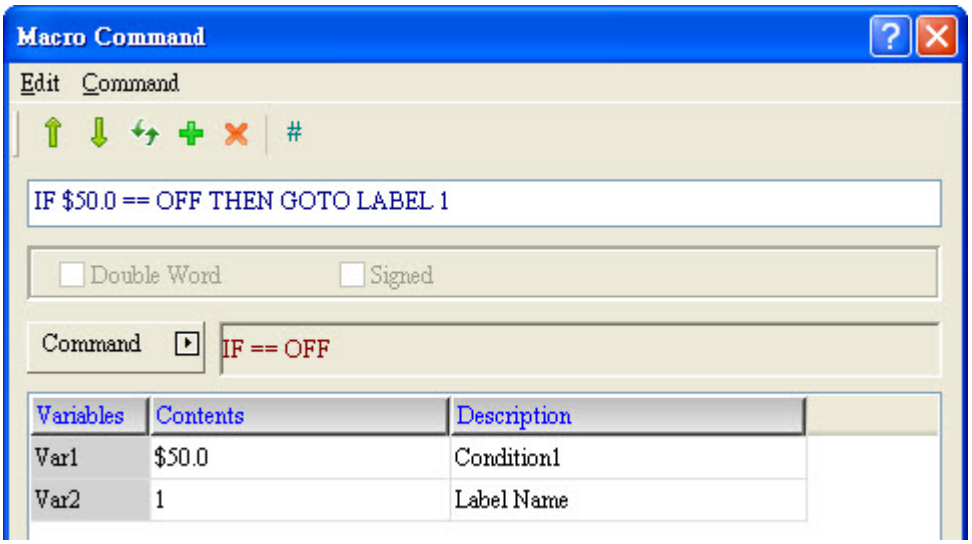
(10) IF == OFF

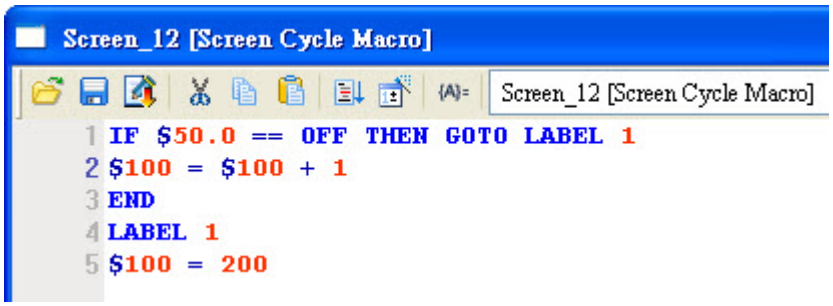
Expression	What Variables Represent		NOTE
IF Var 1 == OFF THEN GOTO LABEL Var 2 (W)	Var 1	Condition 1	W : Word
	Var 2	Label identifier	
	Expression Explanation		
	If condition 1 is OFF, then GOTO and execute LABEL Var 2.		

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎ (Can only be Bit)		
Var 2			◎

Example

➢ Var 1 is an internal memory address, and Var 2 is a constant.





➢ If $50.0 is OFF, then execute LABEL1 ($100 = 200); otherwise, execute $100 = $100 + 1.

(11) IFB == ON

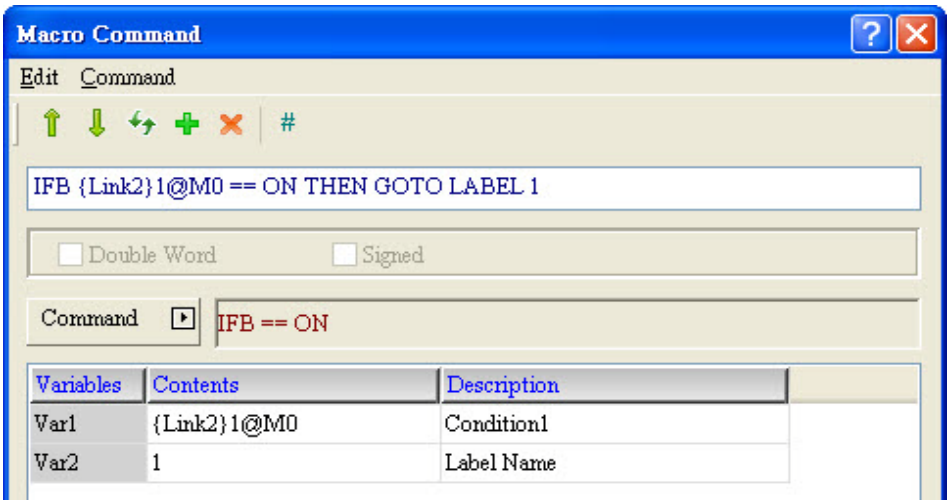
Expression	What Variables Represent		NOTE
IFB Var 1 == ON THEN GOTO LABEL Var 2 (W)	Var 1	Condition 1	W : Word
	Var 2	Label identifier	
	Expression Explanation		
	If condition 1 is ON, then GOTO and execute LABEL Var 2.		

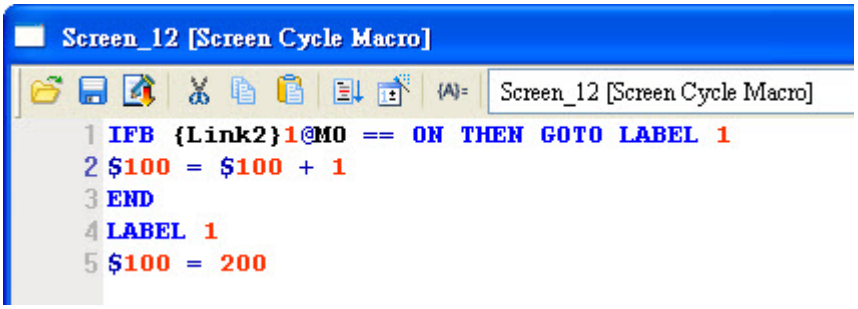
* in the command IFB == ON, the Bit address of Var 1 can support the external PLC Register.

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎ (Can only be Bit)	◎ (Can only be Bit)	
Var 2			◎

Example

➢ Var 1 is a PLC Register address, and Var 2 is a constant.





➢ If M0 is ON, then execute LABEL1 ($100 = 200); otherwise, execute $100 = $100 + 1.

(12) IFB == OFF

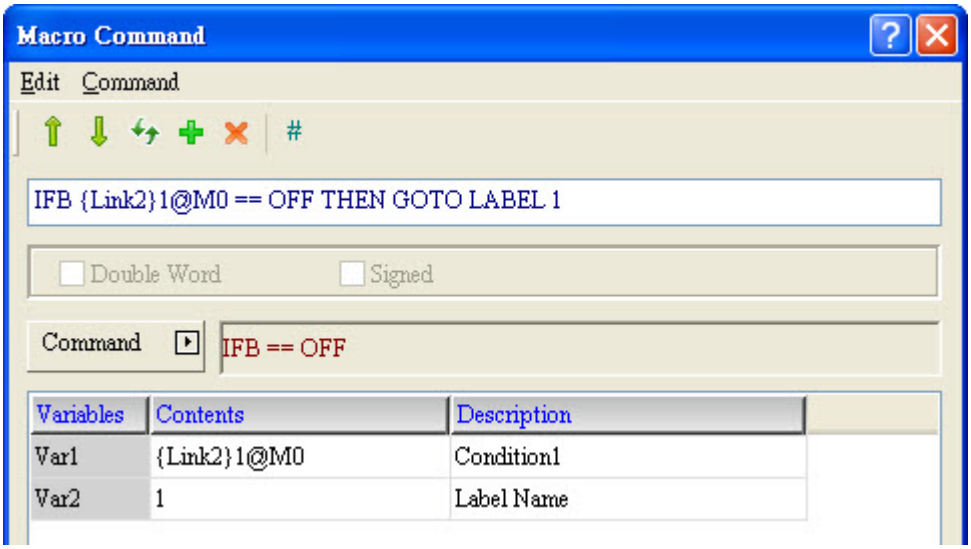
Expression	What Variables Represent		NOTE
IFB Var 1 == OFF THEN GOTO LABEL Var 2 (W)	Var 1	Condition 1	W : Word
	Var 2	Label identifier	
	Expression Explanation		
	If condition 1 is OFF, then GOTO and execute LABEL Var 2.		

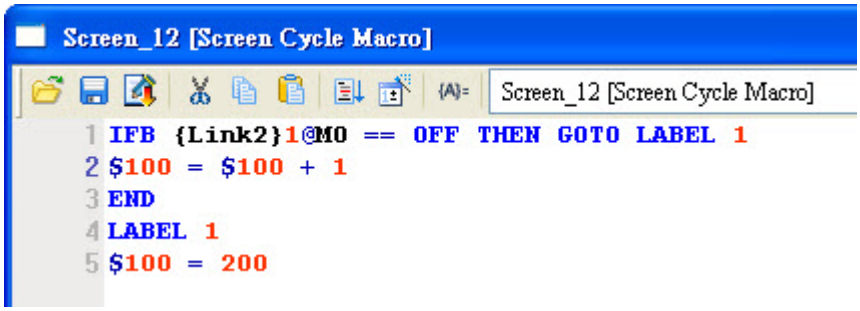
* in the command IFB == ON, the Bit address of Var 1 can support the external PLC Register.

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎ (Can only be Bit)	◎ (Can only be Bit)	
Var 2			◎

Example

➢ Var 1 is a PLC Register address, and Var 2 is a constant.





➢ If M0 is OFF, then execute LABEL1 ($100 = 200); otherwise, execute $100 = $100 + 1.

■ IF…THEN CALL (If… Then Call a Submacro)

```
IF == CALL
IF != CALL
IF > CALL
IF >= CALL
IF < CALL
IF <= CALL
IF AND == 0 CALL
IF AND != 0 CALL
IF == ON CALL
IF == OFF CALL
```

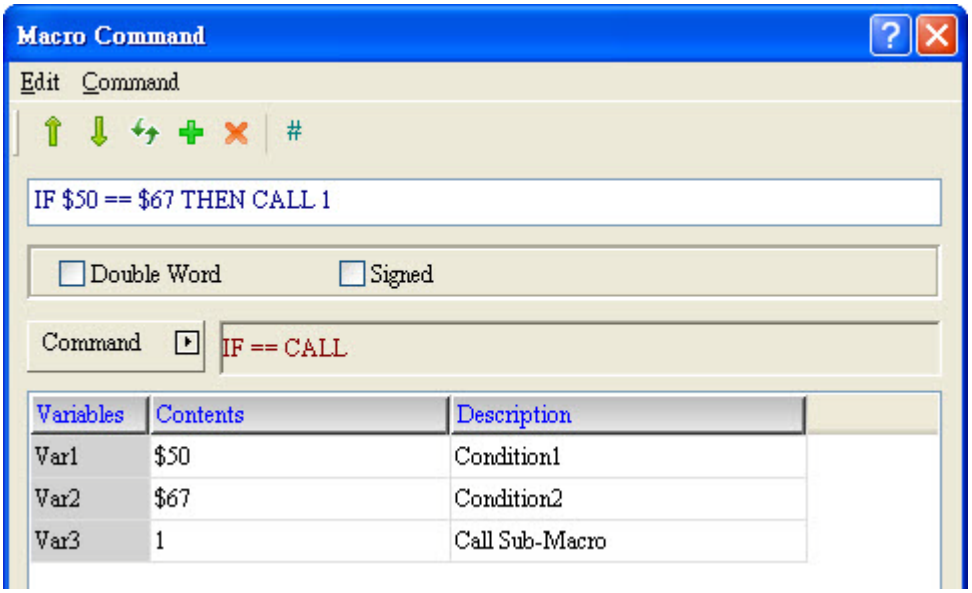
➢ There are 10 commands in the category of If…Then Call Macro, and they are introduced below.

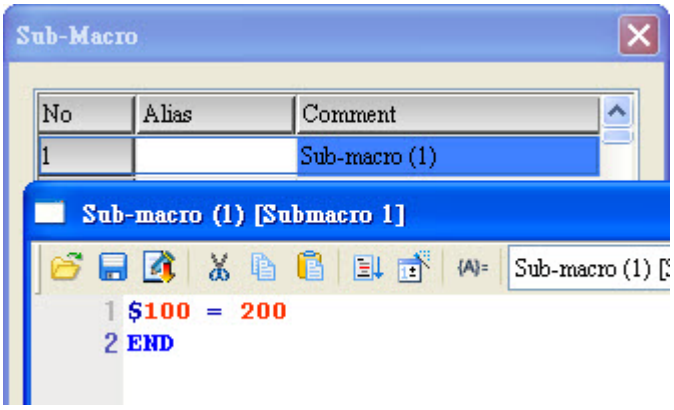
(1) IF ==			
Expression	**What Variables Represent**		**NOTE**
IF Var 1 == Var 2 THEN CALL Var 3 (W) IF Var 1 == Var 2 THEN CALL Var 3 (DW) IF Var 1 == Var 2 THEN CALL Var 3 (Signed W) IF Var 1 == Var 2 THEN CALL Var 3 (Signed DW)	Var 1	Condition 1	W : Word DW : Double Word Signed : Signed number
	Var 2	Condition 2	
	Var 3	Label identifier	
	Expression Explanation		
	If condition 1 equals to condition 2, then call Var 3 (a sub-macro label).		

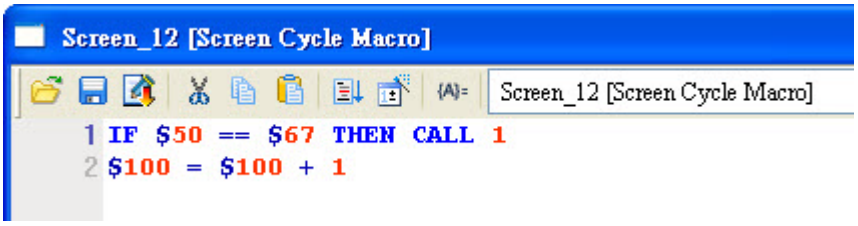
Variable	**Memory Usage**		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		◎
Var 2	◎		◎
Var 3			◎

Example

- Var 1 and Var 2 are internal memory addresses, and Var 3 is a constant.







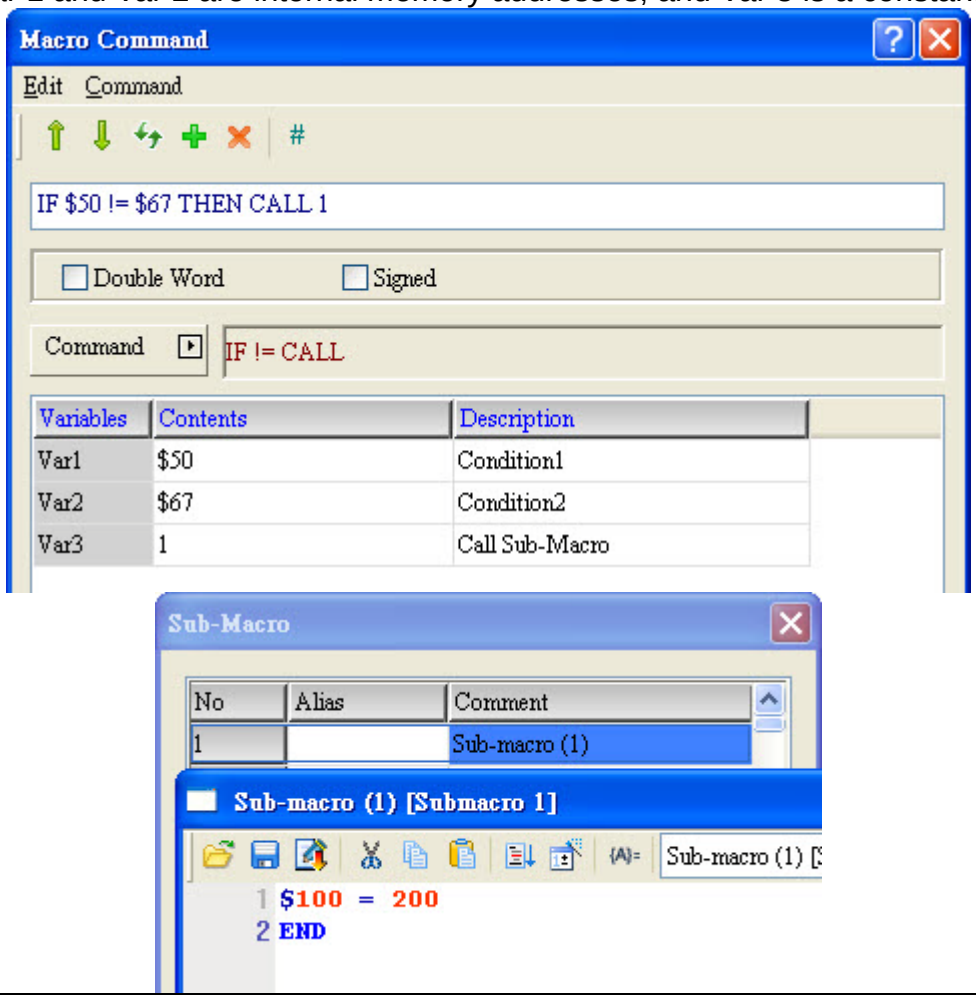
- If $50.0 equals to $67 (value comparison), then call the submacro labeled 1 ($100 = 200); otherwise, execute $100 = $100 + 1.

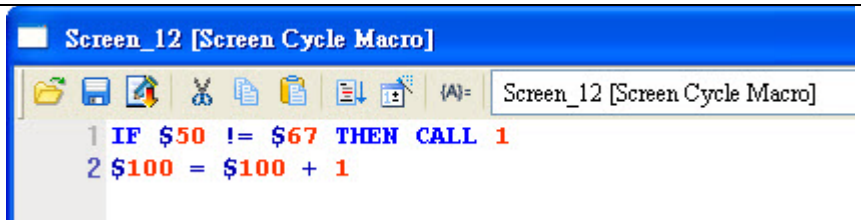
(2) IF !=			
Expression	**What Variables Represent**		**NOTE**
IF Var 1 != Var 2 THEN CALL Var 3 (W) IF Var 1 != Var 2 THEN CALL Var 3 (DW) IF Var 1 != Var 2 THEN CALL Var 3 (Signed W) IF Var 1 != Var 2 THEN CALL Var 3 (Signed DW)	Var 1	Condition 1	W : Word DW : Double Word Signed : Signed number
	Var 2	Condition 2	
	Var 3	Label identifier	
	Expression Explanation		
	If condition 1 does not equal to condition 2, then call Var 3 (a sub-macro label).		

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		◎
Var 2	◎		◎
Var 3			◎

Example

➢ Var 1 and Var 2 are internal memory addresses, and Var 3 is a constant.





➢ If $50.0 does not equal to $67 (value comparison), then call the submacro labeled 1 ($100 = 200); otherwise, execute $100 = $100 + 1.

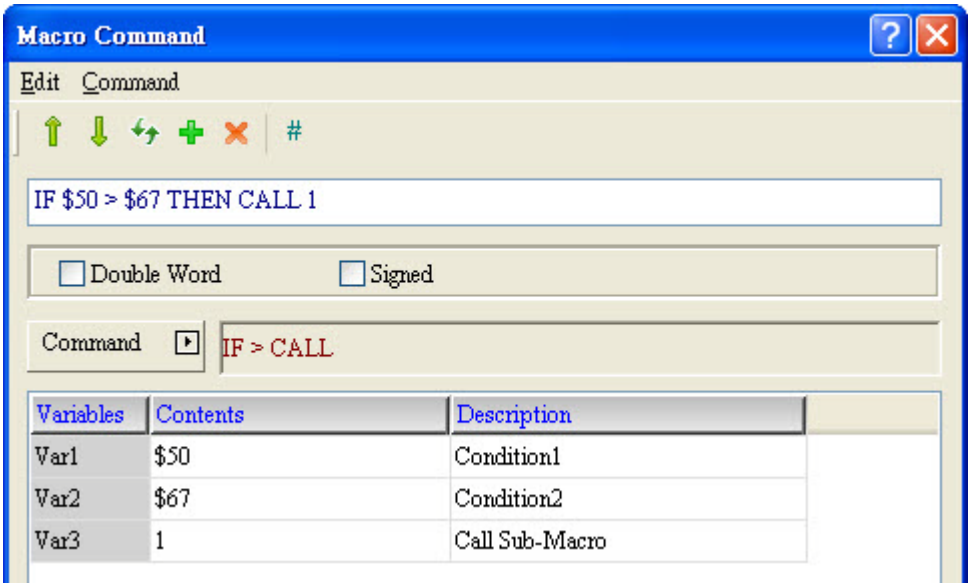
(3) IF >

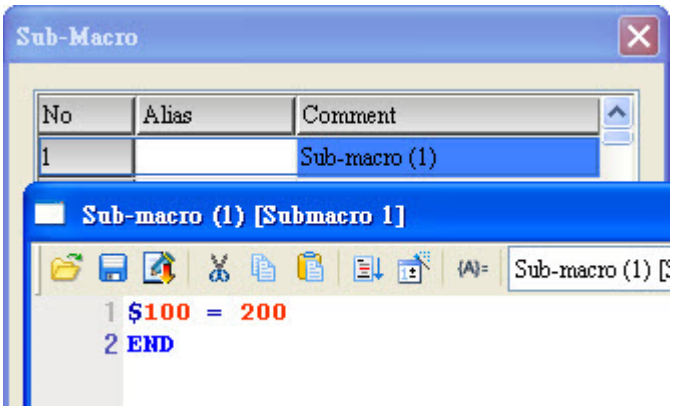
Expression	What Variables Represent		NOTE
IF Var 1 > Var 2 THEN CALL Var 3 (W) IF Var 1 > Var 2 THEN CALL Var 3 (DW) IF Var 1 > Var 2 THEN CALL Var 3 (Signed W) IF Var 1 > Var 2 THEN CALL Var 3 (Signed DW)	Var 1	Condition 1	W : Word DW : Double Word Signed : Signed number
	Var 2	Condition 2	
	Var 3	Label identifier	
	Expression Explanation		
	If condition 1 is larger than condition 2, then call Var 3 (a sub-macro label).		

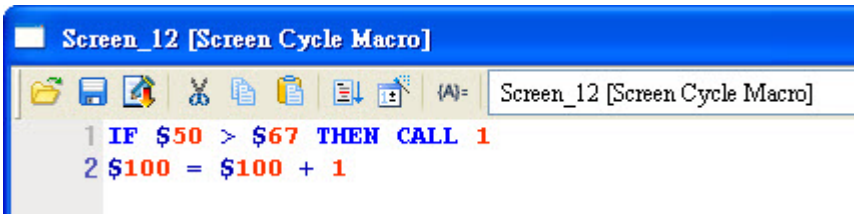
Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		◎
Var 2	◎		◎
Var 3			◎

Example

➢ Var 1 and Var 2 are internal memory addresses, and Var 3 is a constant.







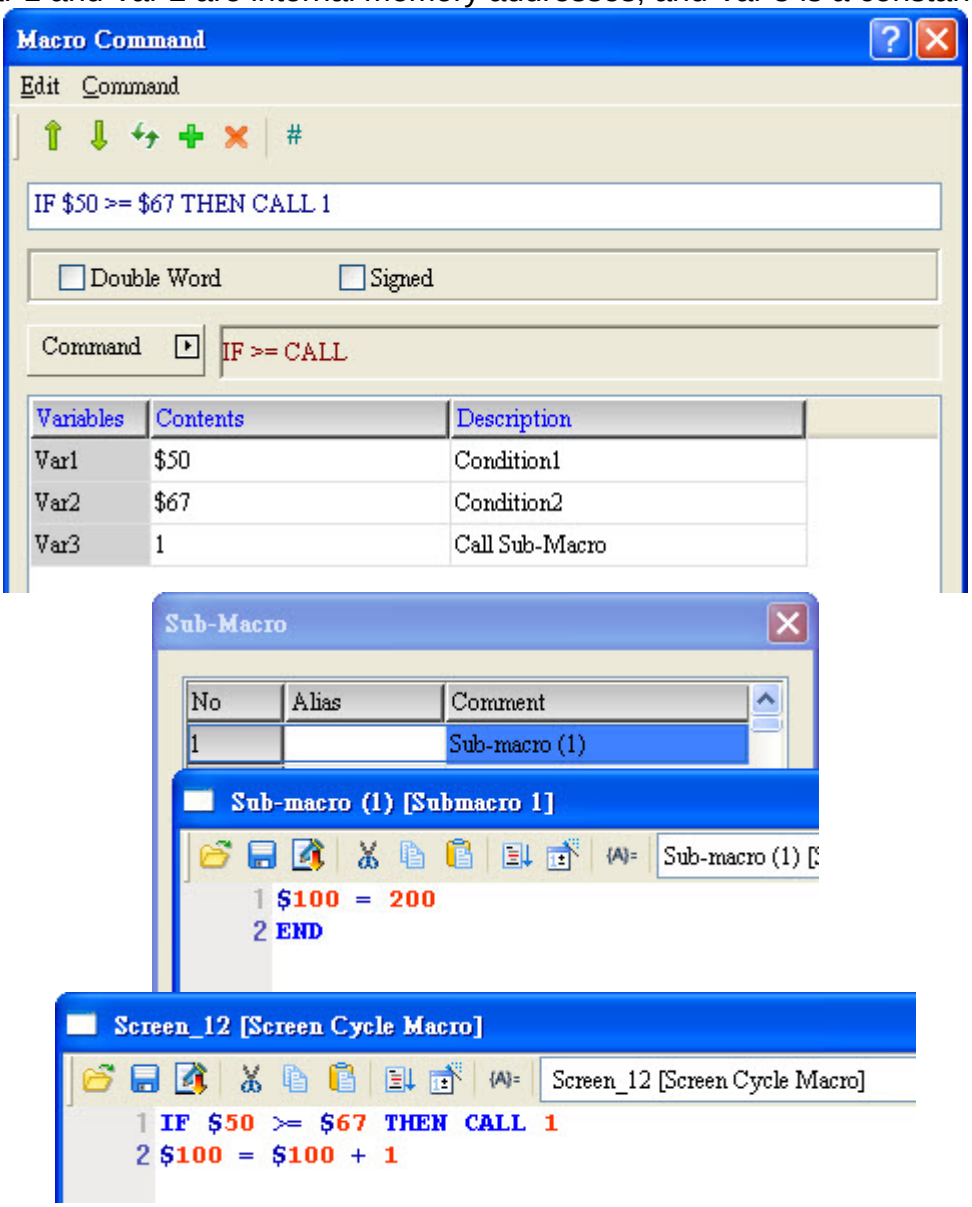
➢ If $50.0 is larger than $67 (value comparison), then call the submacro labeled 1 ($100 = 200); otherwise, execute $100 = $100 + 1.

(4) IF >=			
Expression	**What Variables Represent**		**NOTE**
IF Var 1 >= Var 2 THEN CALL Var 3 (W) IF Var 1 >= Var 2 THEN CALL Var 3 (DW) IF Var 1 >= Var 2 THEN CALL Var 3 (Signed W) IF Var 1 >= Var 2 THEN CALL Var 3 (Signed DW)	Var 1	Condition 1	W : Word DW : Double Word Signed : Signed number
	Var 2	Condition 2	
	Var 3	Label identifier	
	Expression Explanation		
	If condition is larger or equals to condition 2, then call Var 3 (a sub-macro label).		

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		◎
Var 2	◎		◎
Var 3			◎

Example

- Var 1 and Var 2 are internal memory addresses, and Var 3 is a constant.



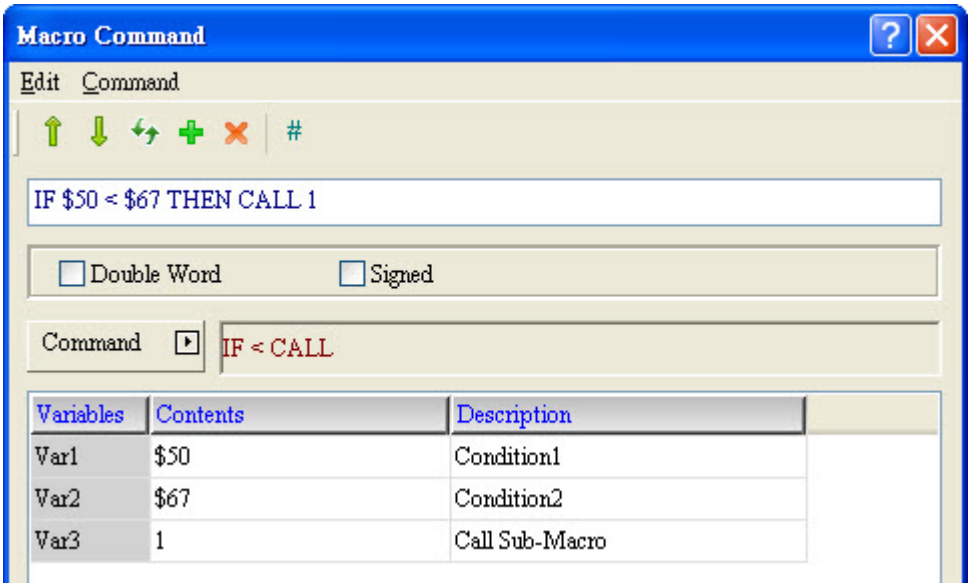
- If $50 is larger than or equals to $67 (value comparison), then call the submacro labeled 1 ($100 = 200); otherwise, execute $100 = $100 + 1.

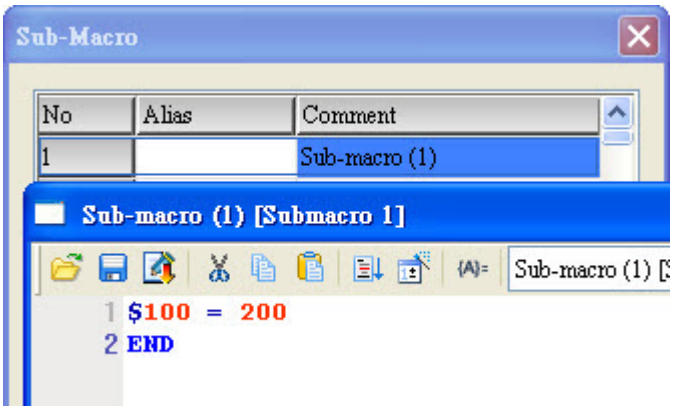
(5) IF <			
Expression	**What Variables Represent**		**NOTE**
IF Var 1 < Var 2 THEN CALL Var 3 (W) IF Var 1 < Var 2 THEN CALL Var 3 (DW) IF Var 1 < Var 2 THEN CALL Var 3 (Signed W) IF Var 1 < Var 2 THEN CALL Var 3 (Signed DW)	Var 1	Condition 1	W : Word DW : Double Word Signed : Signed number
	Var 2	Condition 2	
	Var 3	Label identifier	
	Expression Explanation		
	If condition 1 is smaller than condition 2, then call Var 3 (a sub-macro label).		

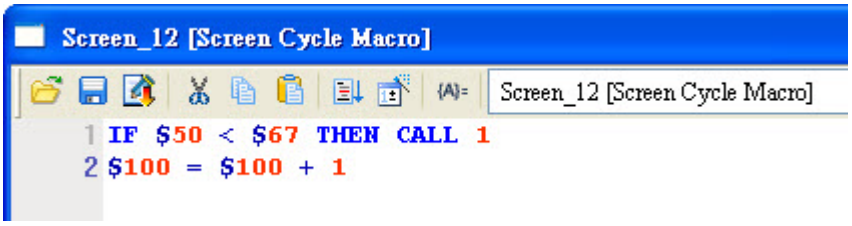
Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		◎
Var 2	◎		◎
Var 3			◎

Example

➢ Var 1 and Var 2 are internal memory addresses, and Var 3 is a constant.







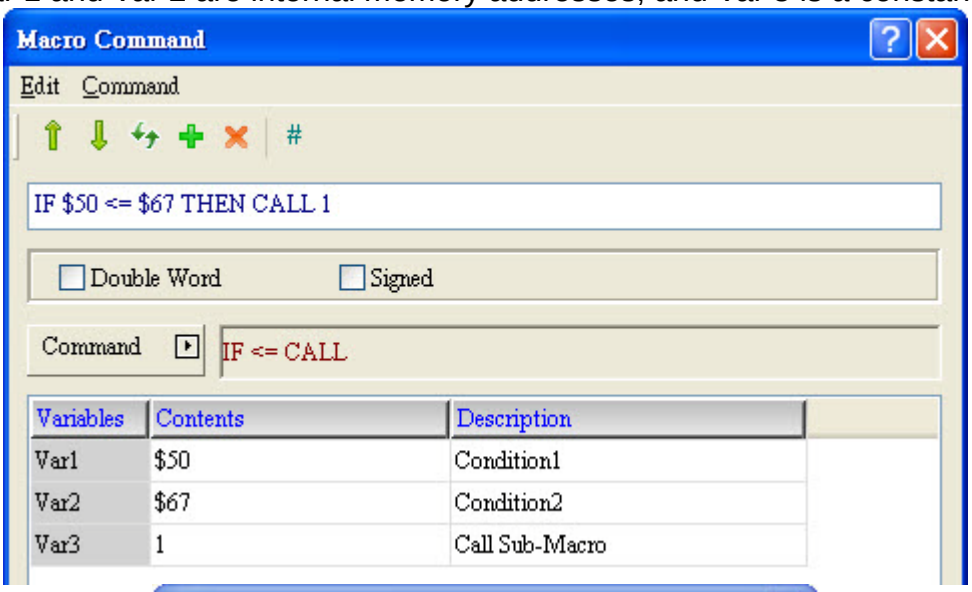
- If $50 is smaller than $67 (value comparison), then call the submacro labeled 1 ($100 = 200); otherwise, execute $100 = $100 + 1.

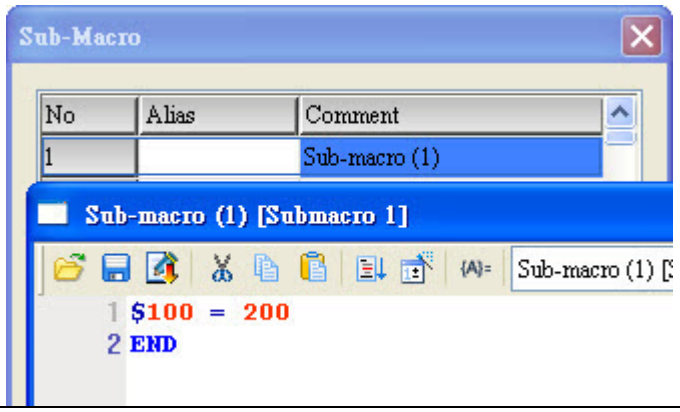
(6) IF <=			
Expression	**What Variables Represent**		**NOTE**
IF Var 1 <= Var 2 THEN CALL Var 3 (W) IF Var 1 <= Var 2 THEN CALL Var 3 (DW) IF Var 1 <= Var 2 THEN CALL Var 3 (Signed W) IF Var 1 <= Var 2 THEN CALL Var 3 (Signed DW)	Var 1	Condition 1	W : Word DW : Double Word Signed : Signed number
	Var 2	Condition 2	
	Var 3	Label identifier	
	Expression Explanation		
	If condition 1 is smaller than or equals to condition 2, then call Var 3 (a sub-macro label).		

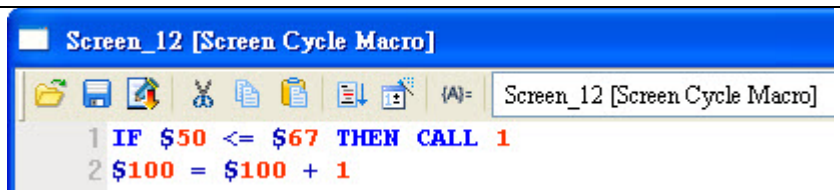
Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		◎
Var 2	◎		◎
Var 3			◎

Example

➢ Var 1 and Var 2 are internal memory addresses, and Var 3 is a constant.







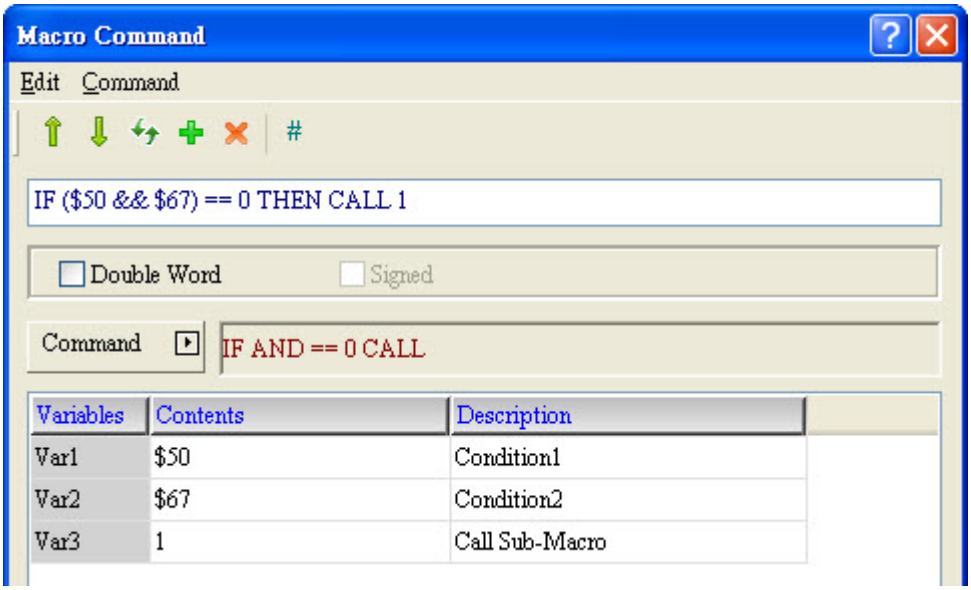
➢ If $50 is smaller than or equals to $67 (value comparison), then call the submacro labeled 1 ($100 = 200); otherwise, execute $100 = $100 + 1.

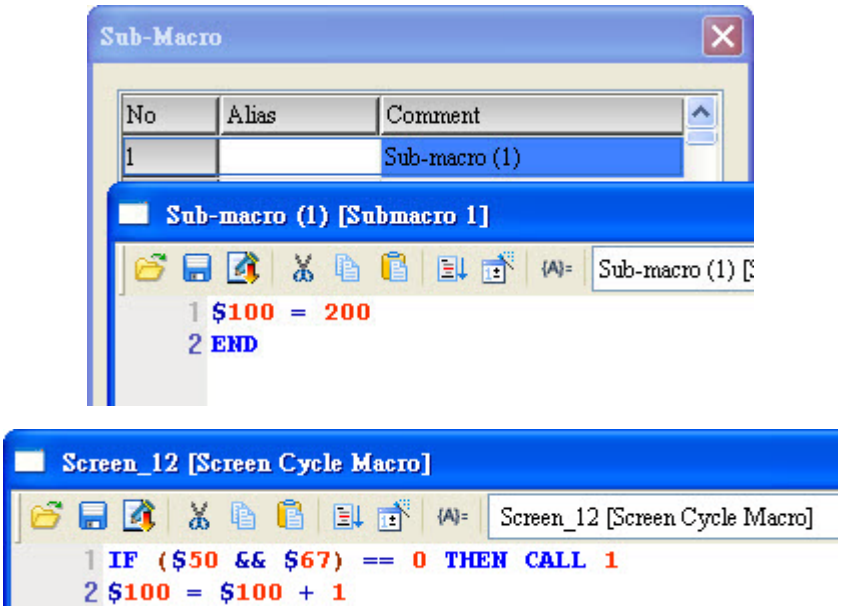
(7) IF AND == 0			
Expression	**What Variables Represent**		**NOTE**
IF (Var 1 && Var 2) == 0 THEN CALL Var 3 (W) IF (Var 1 && Var 2) == 0 THEN CALL Var 3 (DW)	Var 1	Condition 1	W : Word DW : Double Word
	Var 2	Condition 2	
	Var 3	Label identifier	
	Expression Explanation		
	If the result of Bitwise AND Operation between condition 1 and condition 2 is 0, then call the submacro labeled with Var 3.		

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		◎
Var 2	◎		◎
Var 3			◎

Example

➢ Var 1 and Var 2 are both internal memory addresses, and Var 3 is a constant.





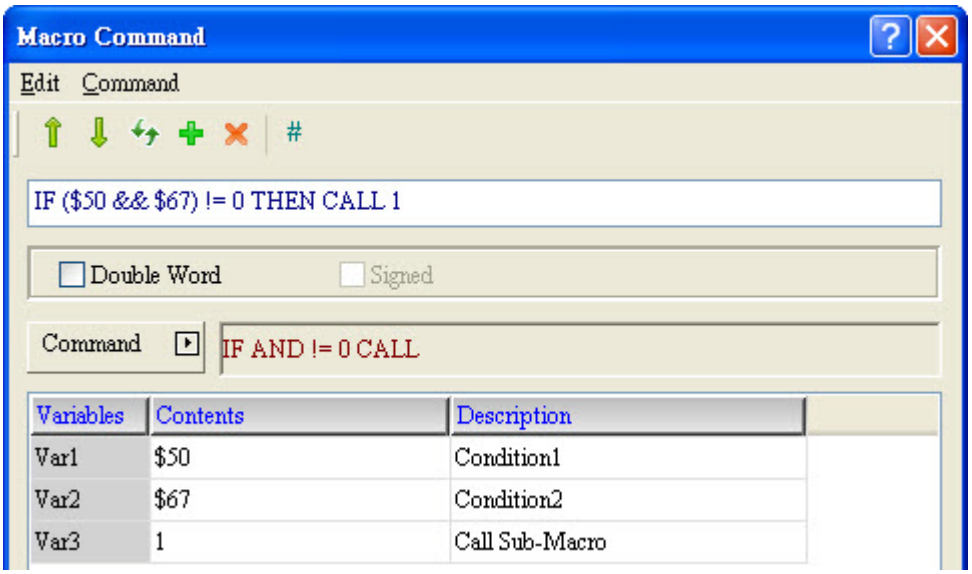
➢ If the result of Bitwise AND operation between $50 and $67 is 0, then call the submacro labeled 1 ($100 = 200); otherwise, execute $100 = $100 + 1.

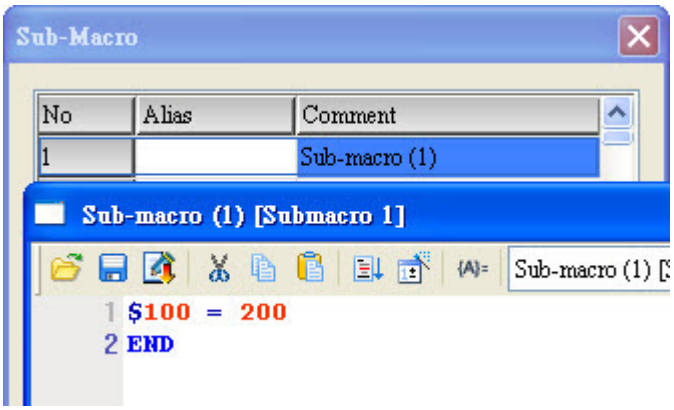
(8) IF AND != 0			
Expression	**What Variables Represent**		**NOTE**
IF (Var 1 && Var 2) != 0 THEN CALL Var 3 (W) IF (Var 1 && Var 2) != 0 THEN CALL Var 3 (DW)	Var 1	Condition 1	W : Word DW : Double Word
	Var 2	Condition 2	
	Var 3	Label identifier	
	Expression Explanation		
	If the result of Bitwise AND Operation between condition 1 and condition 2 is not 0, then call the submacro labeled with Var 3.		

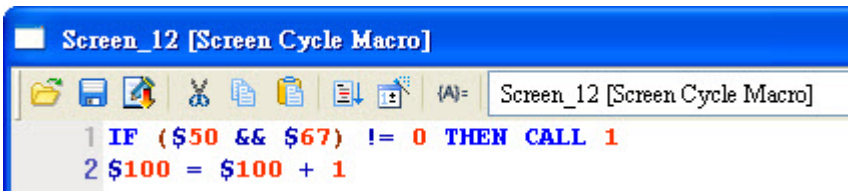
Variable	**Memory Usage**		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		◎
Var 2	◎		◎
Var 3			◎

Example

- Var 1 and Var 2 are both internal memory addresses, and Var 3 is a constant.







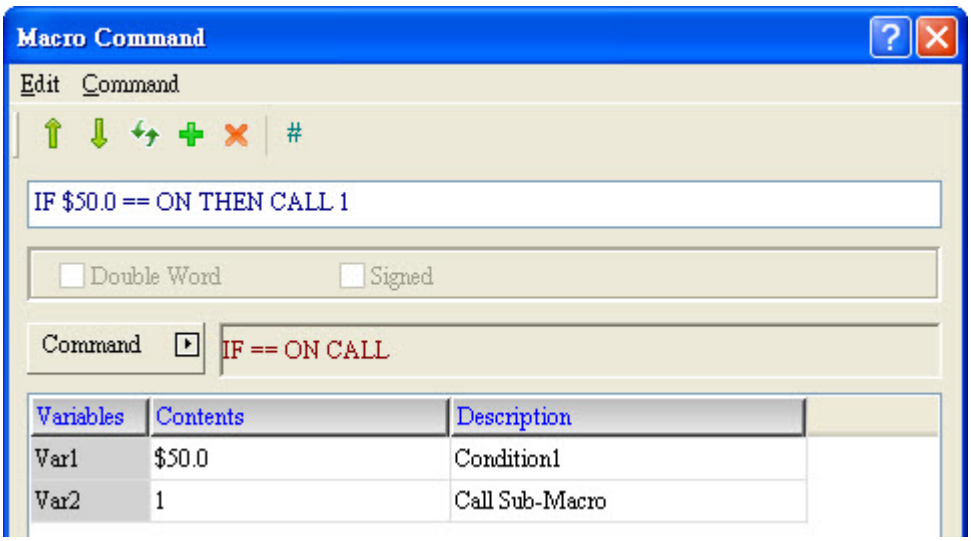
- If the result of Bitwise AND operation between $50 and $67 is not 0, then call the submacro labeled 1 ($100 = 200); otherwise, execute $100 = $100 + 1.

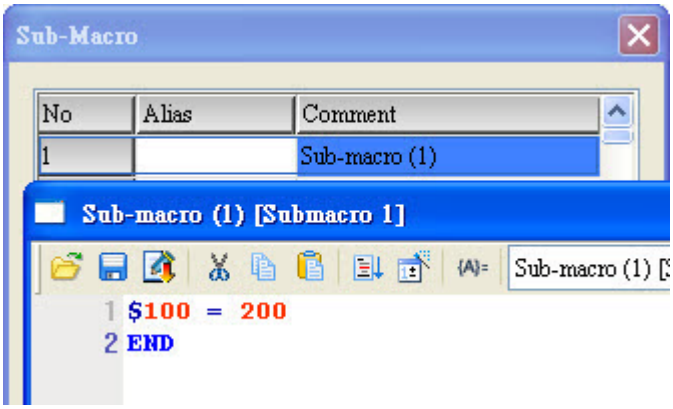
(9) IF == ON			
Expression	**What Variables Represent**		**NOTE**
IF Var 1 == ON THEN CALL Var 2 (W)	Var 1	Condition 1	W : Word
	Var 2	Label identifier	
	Expression Explanation		
	If condition 1 is ON, then call the submacro labeled with Var 2.		

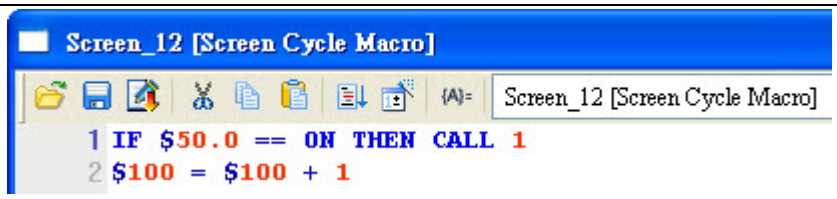
Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎ (Can only be Bit)		
Var 2			◎

Example

➢ Var 1 is the internal memory address, and Var 2 is a constant.







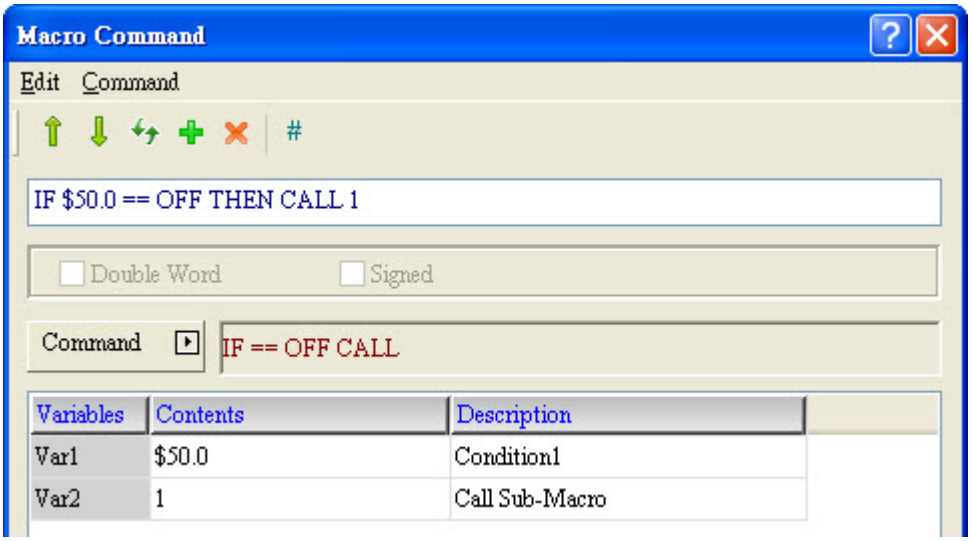
➢ If $50.0 is ON, then call the submacro labeled 1 ($100 = 200); otherwise, execute $100 = $100 + 1.

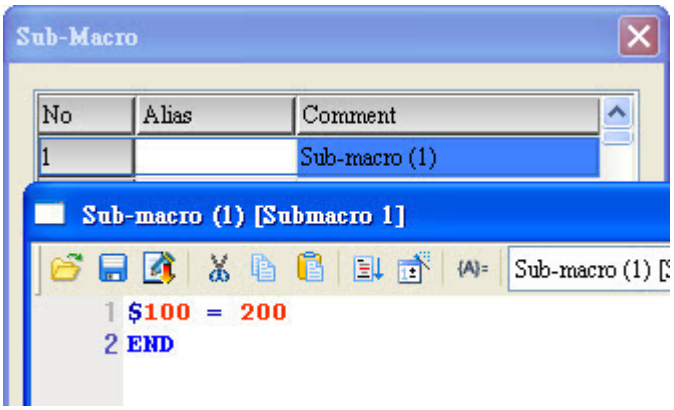
(10) IF == OFF			
Expression	**What Variables Represent**		**NOTE**
IF Var 1 == OFF THEN CALL Var 2 (W)	Var 1	Condition 1	W : Word
	Var 2	Label identifier	
	Expression Explanation		
	If condition 1 is OFF, then call the submacro labeled with Var 2.		

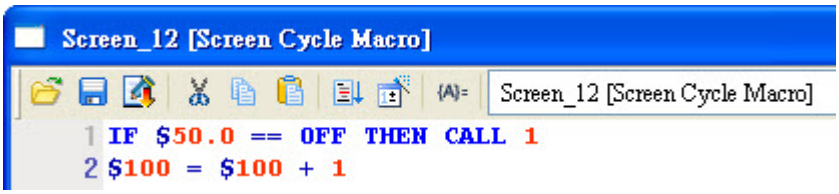
Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎ (Can only be bit)		
Var 2			◎

Example

➢ Var 1 is the internal memory address, and Var 2 is a constant.







- If $50.0 is OFF, then call the submacro labeled 1 ($100 = 200); otherwise, execute $100 = $100 + 1.

■ IF…(If…)

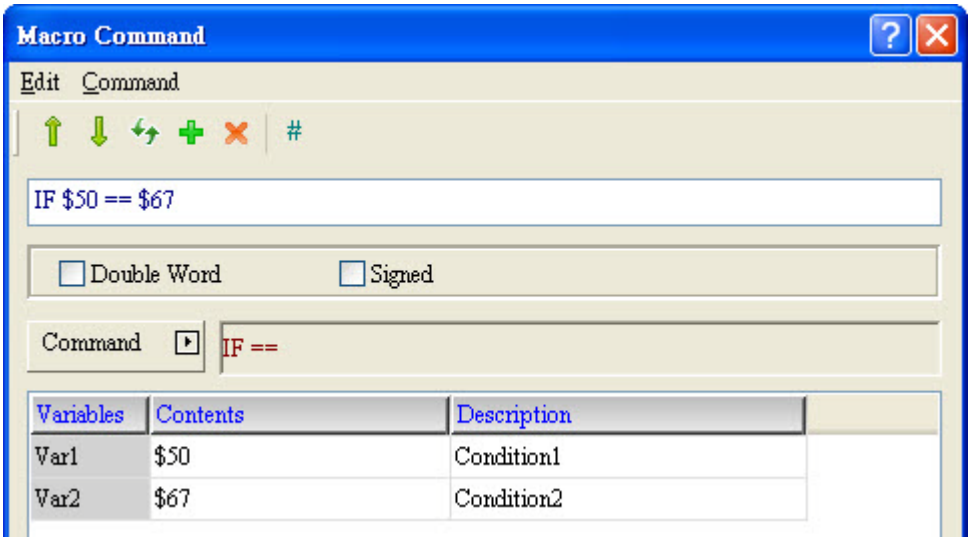
```
IF ==
IF !=
IF >
IF >=
IF <
IF <=
IF AND ==0
IF AND !=0
IF ==ON
IF ==OFF
```

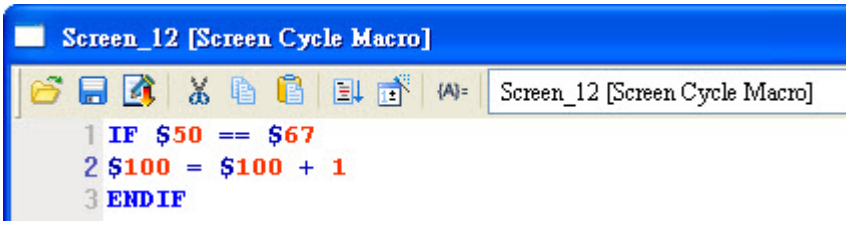
➢ There are 10 commands in the category of If… Macro, and they are introduced below.

(1) IF ==			
Expression	**What Variables Represent**		**NOTE**
IF Var 1 == Var 2 (W) IF Var 1 == Var 2 (DW) IF Var 1 == Var 2 (Signed W) IF Var 1 == Var 2 (Signed DW)	Var 1	Condition 1	W : Word DW : Double Word Signed : Signed number
	Var 2	Condition 2	
	Expression Explanation		
	If condition 1 equals to condition 2, then execute…		
*ENDIF is required at end of the IF Macro, or error messages will pop up during compile.			

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		◎
Var 2	◎		◎
Var 3			◎

Example
➢ Var 1 and Var 2 are both internal memory addresses, and Var 3 is a constant.





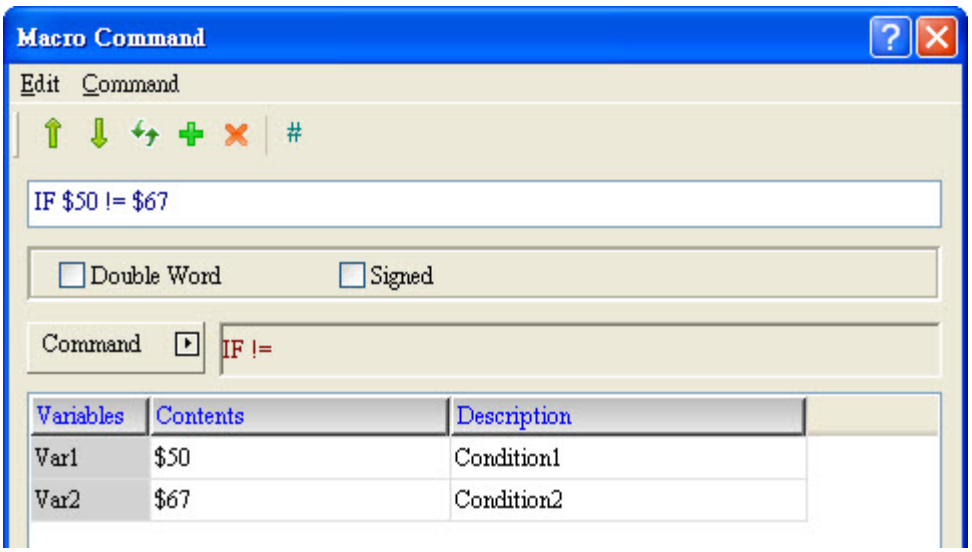
➢ If $50 equals to $67 (value comparison), then execute $100 = $100+1; if $50 is larger or smaller than $67, then do not execute $100 = $100 + 1.

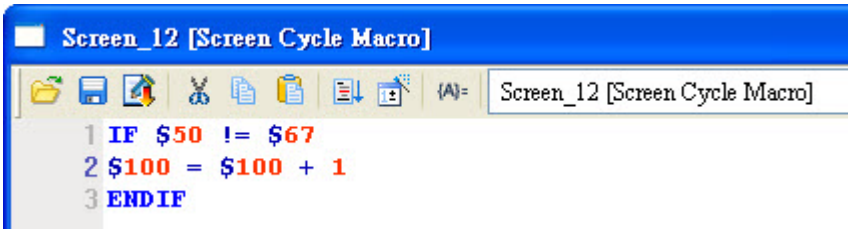
(2) IF !=			
Expression	**What Variables Represent**		**NOTE**
IF Var 1 != Var 2 (W) IF Var 1 != Var 2 (DW) IF Var 1 != Var 2 (Signed W) IF Var 1 != Var 2 (Signed DW)	Var 1	Condition 1	W : Word DW : Double Word Signed : Signed number
	Var 2	Condition 2	
	Expression Explanation		
	If condition 1 does not equal to condition 2, then execute…		
*ENDIF is required at end of the IF Macro, or error messages will pop up during compile.			

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		◎
Var 2	◎		◎
Var 3			◎

Example

- Var 1 and Var 2 are both internal memory addresses, and Var 3 is a constant.





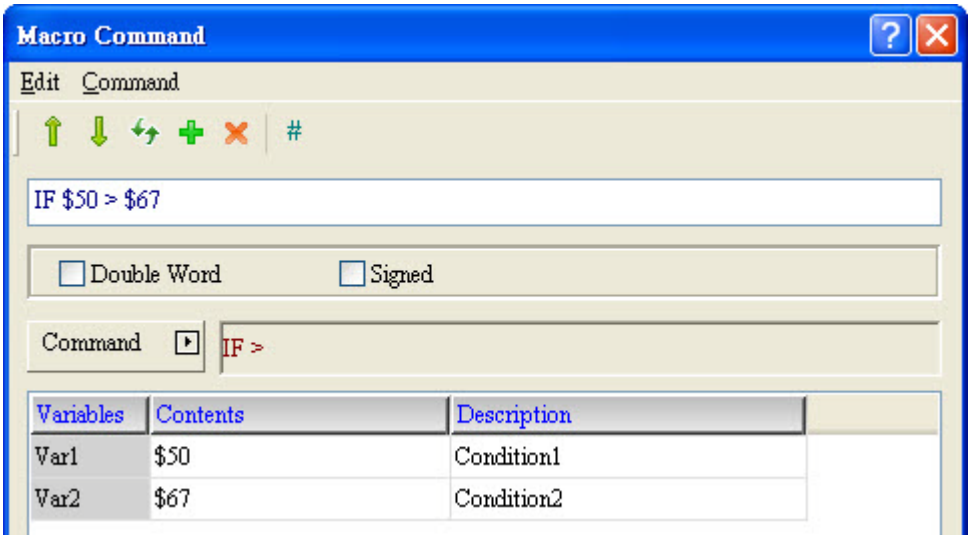
- If $50 does not equal to $67 (value comparison), then execute $100 = $100+1; otherwise, do not execute $100 = $100 + 1.

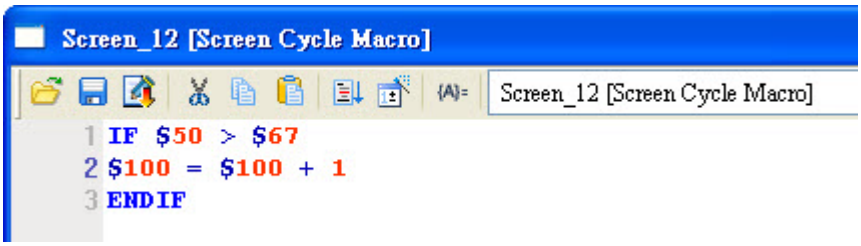
(3) IF >			
Expression	**What Variables Represent**		**NOTE**
IF Var 1 > Var 2 (W) IF Var 1 > Var 2 (DW) IF Var 1 > Var 2 (Signed W) IF Var 1 > Var 2 (Signed DW)	Var 1	Condition 1	W : Word DW : Double Word Signed : Signed number
	Var 2	Condition 2	
	Expression Explanation		
	If condition 1 is larger than condition 2, then execute…		
*ENDIF is required at end of the IF Macro, or error messages will pop up during compile.			

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		◎
Var 2	◎		◎
Var 3			◎

Example

➢ Var 1 and Var 2 are both internal memory addresses, and Var 3 is a constant.





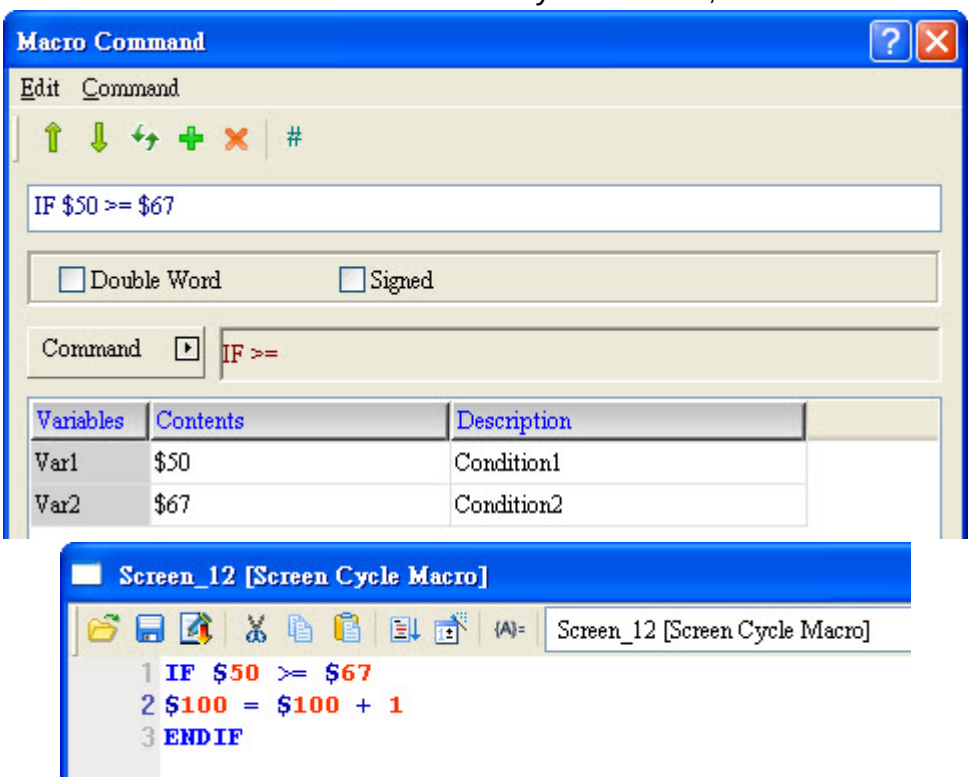
➢ If $50 is larger than $67 (value comparison), then execute $100 = $100+1; otherwise, do not execute $100 = $100 + 1.

(4) IF >=			
Expression	**What Variables Represent**		**NOTE**
IF Var 1 >= Var 2 (W) IF Var 1 >= Var 2 (DW) IF Var 1 >= Var 2 (Signed W) IF Var 1 >= Var 2 (Signed DW)	Var 1	Condition 1	W : Word DW : Double Word Signed : Signed number
	Var 2	Condition 2	
	Expression Explanation		
	If condition 1 is larger than or equals to condition 2, then execute…		
*ENDIF is required at end of the IF Macro, or error messages will pop up during compile.			

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		◎
Var 2	◎		◎
Var 3			◎

Example

- Var 1 and Var 2 are both internal memory addresses, and Var 3 is a constant.

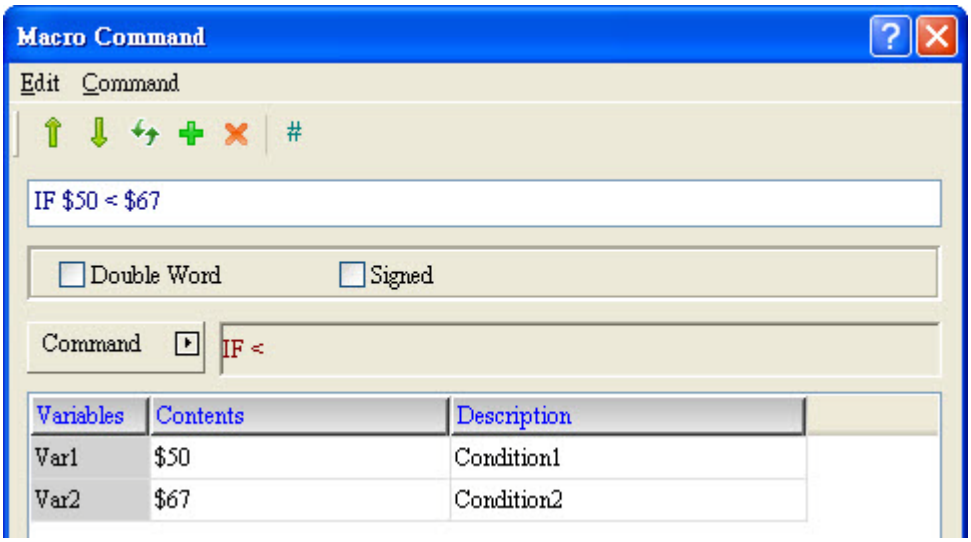


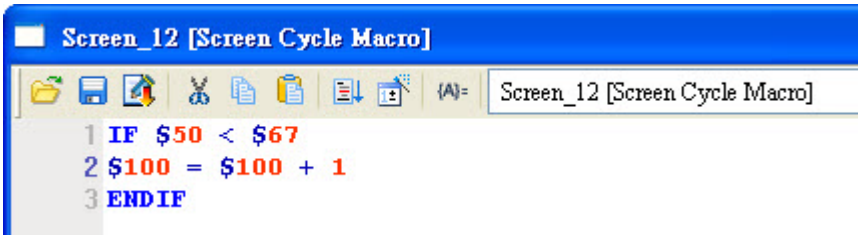
- If $50 is larger than or equal to $67 (value comparison), then execute $100 = $100+1; otherwise, do not execute $100 = $100 + 1.

(5) IF <			
Expression	**What Variables Represent**		**NOTE**
IF Var 1 < Va r2 (W) IF Var 1 < Var 2 (DW) IF Var 1 < Var 2 (Signed W) IF Var 1 < Var 2 (Signed DW)	Var 1	Condition 1	W : Word DW : Double Word Signed : Signed number
	Var 2	Condition 2	
	Expression Explanation		
	If condition 1 is smaller than condition 2, then execute…		
*ENDIF is required at end of the IF Macro, or error messages will pop up during compile.			

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		◎
Var 2	◎		◎
Var 3			◎

Example
➢ Var 1 and Var 2 are both internal memory addresses, and Var 3 is a constant.





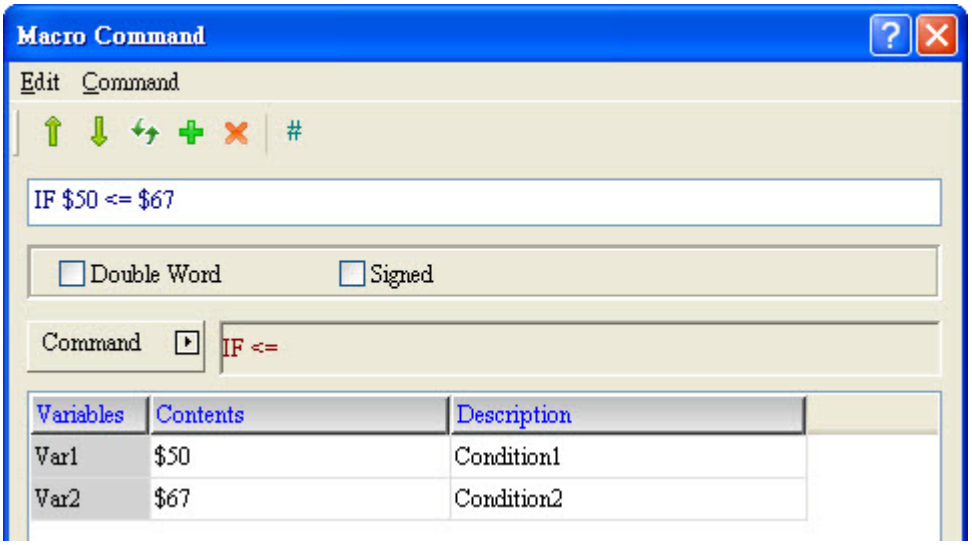
➢ If $50 is smaller than $67 (value comparison), then execute $100 = $100+1; otherwise, do not execute $100 = $100 + 1.

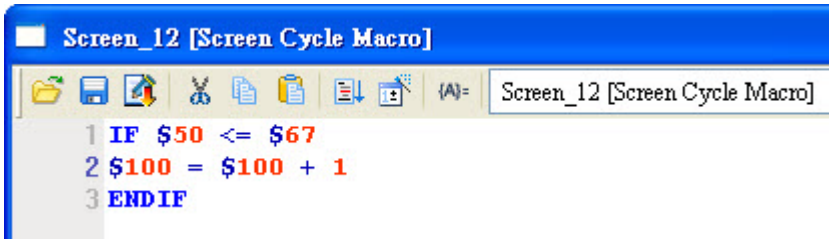
(6) IF <=			
Expression	**What Variables Represent**		**NOTE**
IF Var 1 <= Var 2 (W) IF Var 1 <= Var 2 (DW) IF Var 1 <= Var 2 (Signed W) IF Var 1 <= Var 2 (Signed DW)	Var 1	Condition 1	W : Word DW : Double Word Signed : Signed number
	Var 2	Condition 2	
	Expression Explanation		
	If condition 1 is smaller than or equals to condition 2, then execute…		
*ENDIF is required at end of the IF Macro, or error messages will pop up during compile.			

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		◎
Var 2	◎		◎
Var 3			◎

Example

- Var 1 and Var 2 are both internal memory addresses, and Var 3 is a constant.





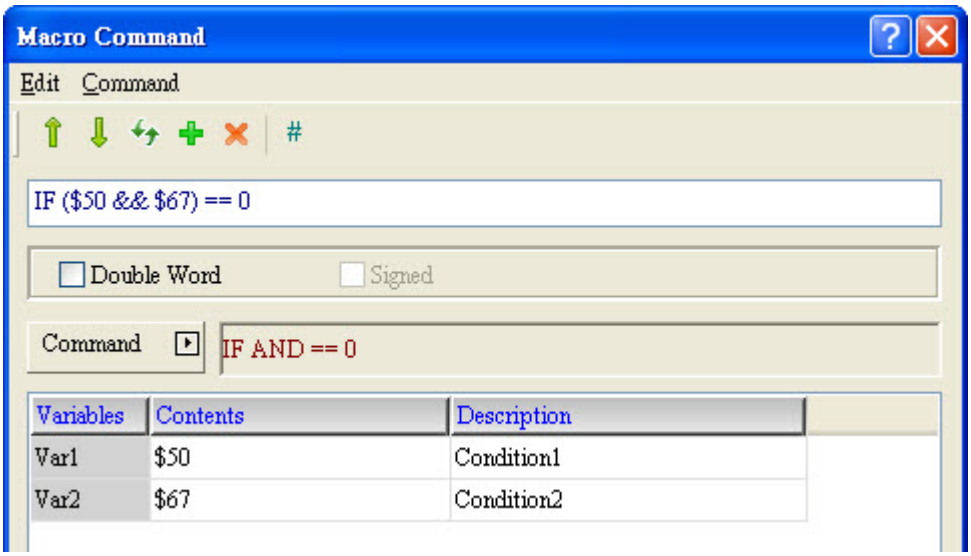
- If $50 is smaller than or equals to $67 (value comparison), then execute $100 = $100+1; otherwise, do not execute $100 = $100 + 1.

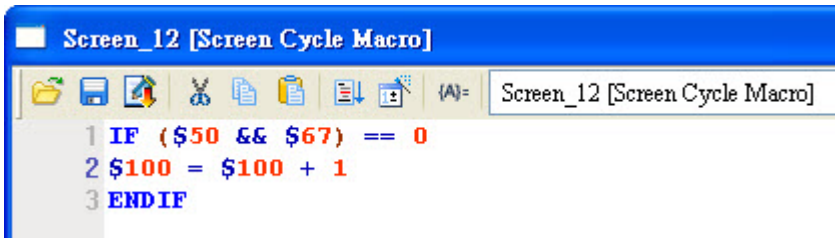
(7) IF AND == 0			
Expression	**What Variables Represent**		**NOTE**
IF (Var 1 && Var 2) == 0 (W) IF (Var 1 && Var 2) == 0 (DW)	Var 1	Condition 1	W : Word DW : Double Word
	Var 2	Condition 2	
	Expression Explanation		
	If the result of Bitwise AND Operation between condition 1 and condition 2 is 0, then execute ...		

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		◎
Var 2	◎		◎

Example

➢ Var 1 and Var 2 are both internal memory addresses.





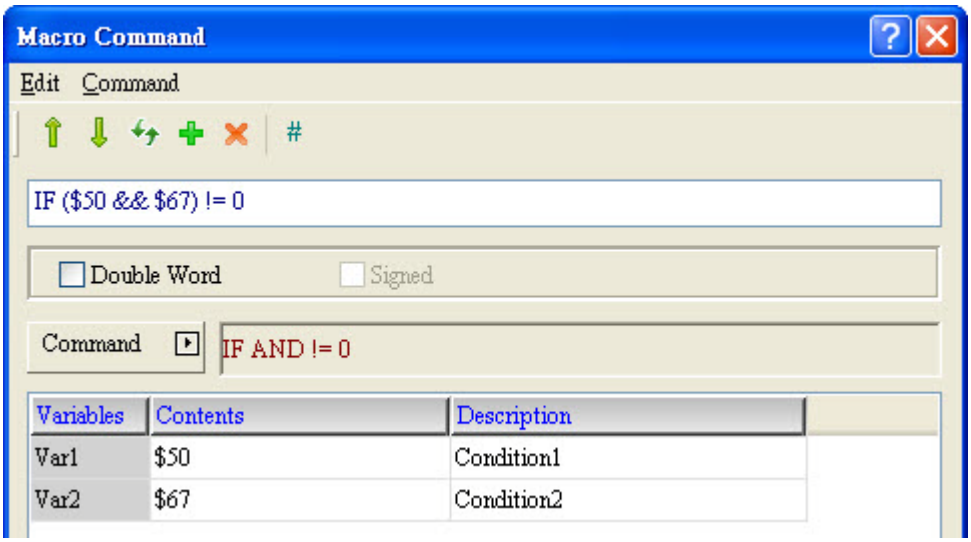
➢ If the result of Bitwise AND Operation between $50 and $67 is 0, then execute $100 = $100+1; otherwise, do not execute $100 = $100 + 1.

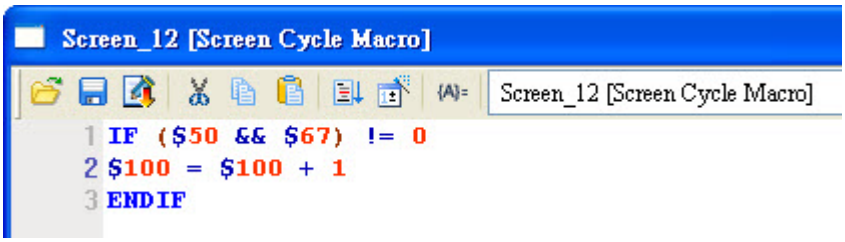
(8) IF AND != 0			
Expression	**What Variables Represent**		**NOTE**
IF (Var 1 && Var 2) != 0 (W) IF (Var 1 && Var 2) != 0 (DW)	Var 1	Condition 1	W : Word DW : Double Word
	Var 2	Condition 2	
	Expression Explanation		
	If the result of Bitwise AND Operation between condition 1 and condition 2 is not 0, then execute ...		

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		◎
Var 2	◎		◎

Example

- Var 1 and Var 2 are both internal memory addresses.



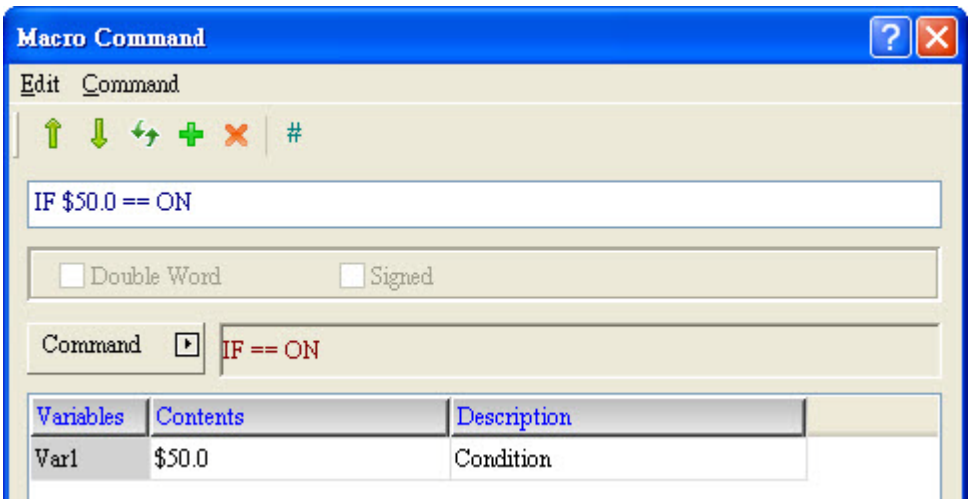


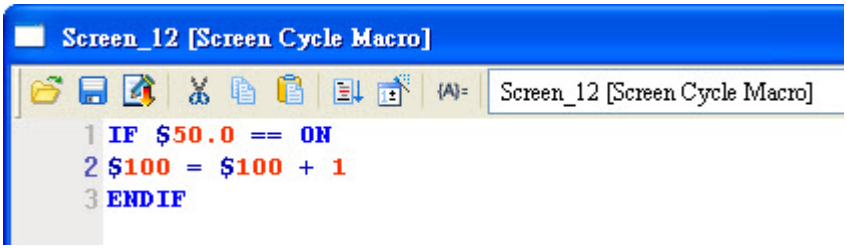
- If the result of Bitwise AND Operation between $50 and $67 is not 0, then execute $100 = $100+1; otherwise, do not execute $100 = $100 + 1.

(9) IF == ON			
Expression	**What Variables Represent**		**NOTE**
IF Var 1 == ON (W)	Var 1	Condition 1	W : Word
	Expression Explanation		
	If condition 1 is ON, then execute…		

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎ (Can only be Bit)		

Example
➢ Var 1 is an internal memory address.





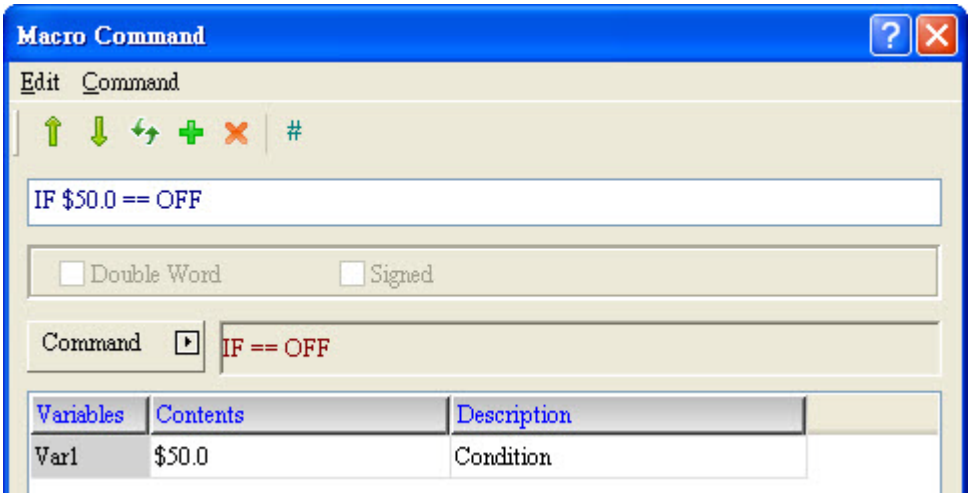
➢ If $50.0 is ON, then execute $100 = $100 + 1; otherwise, do not execute $100 = $100 + 1.

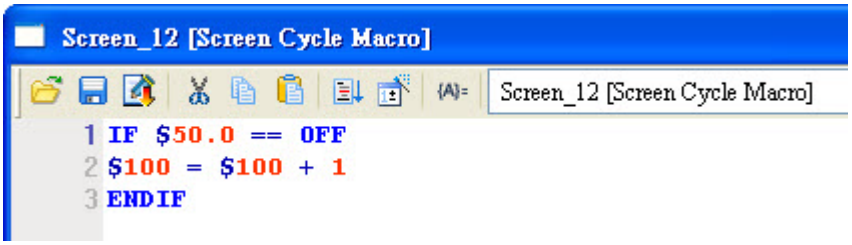
(10) IF == OFF			
Expression	**What Variables Represent**		**NOTE**
IF Var 1 == OFF (W)	Var 1	Condition 1	W : Word
	Expression Explanation		
	If condition 1 is OFF, then execute…		

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎ (Can only be Bit)		

Example

- Var 1 is an internal memory address.





- If $50.0 is OFF, then execute $100 = $100 + 1; otherwise, do not execute $100 = $100 + 1.

■ ELSEIF… (Else…)

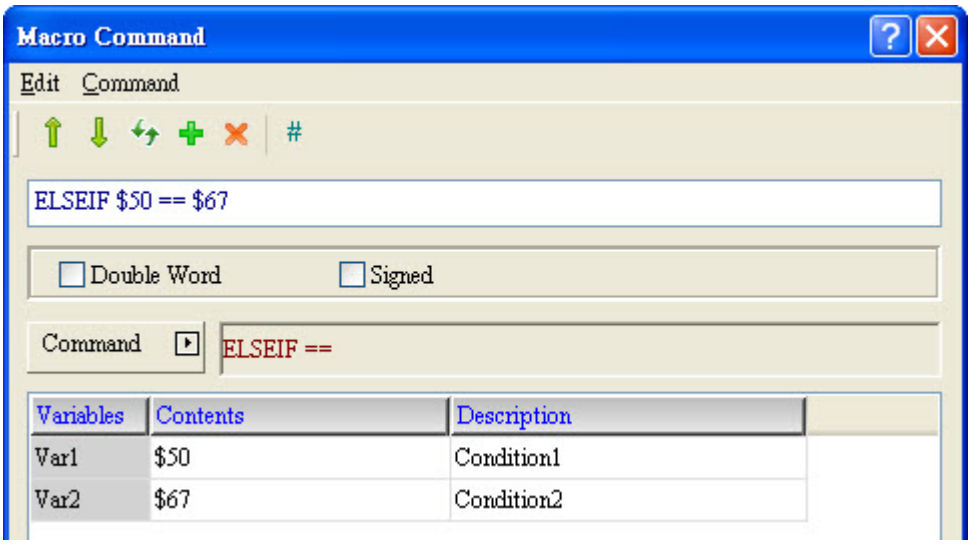
```
ELSEIF ==
ELSEIF !=
ELSEIF >
ELSEIF >=
ELSEIF <
ELSEIF <=
ELSEIF AND ==0
ELSEIF AND !=0
ELSEIF == ON
ELSEIF == OFF
```

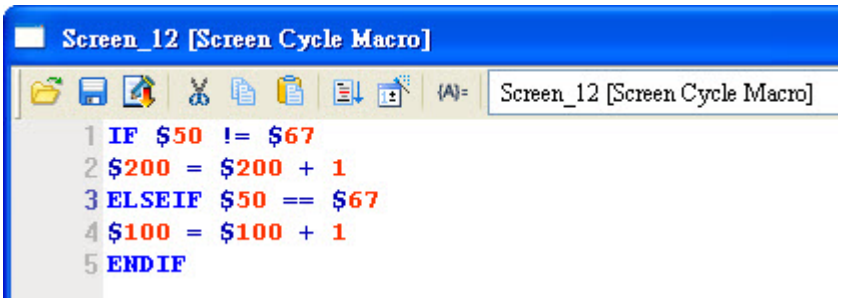
➢ There are 10 commands in the category of ELSEIF …Macro, and they are introduced below:

(1) ELSEIF ==			
Expression	**What Variables Represent**		**NOTE**
ELSEIF Var 1 == Var 2 (W) ELSEIF Var 1 == Var 2 (DW) ELSEIF Var 1 == Var 2 (Signed W) ELSEIF Var 1 == Var 2 (Signed DW)	Var 1	Condition 1	W : Word DW : Double Word Signed : Signed number
	Var 2	Condition 2	
	Expression Explanation		
	Or else, if condition 1 equals to condition 2, then execute…		
*IF…ENDIF is required to pair up with ELSEIF Macro commands, or error messages will pop up during compile.			

Variable	**Memory Usage**		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		◎
Var 2	◎		◎

Example
➢ Var 1 and Var 2 are both internal memory addresses.





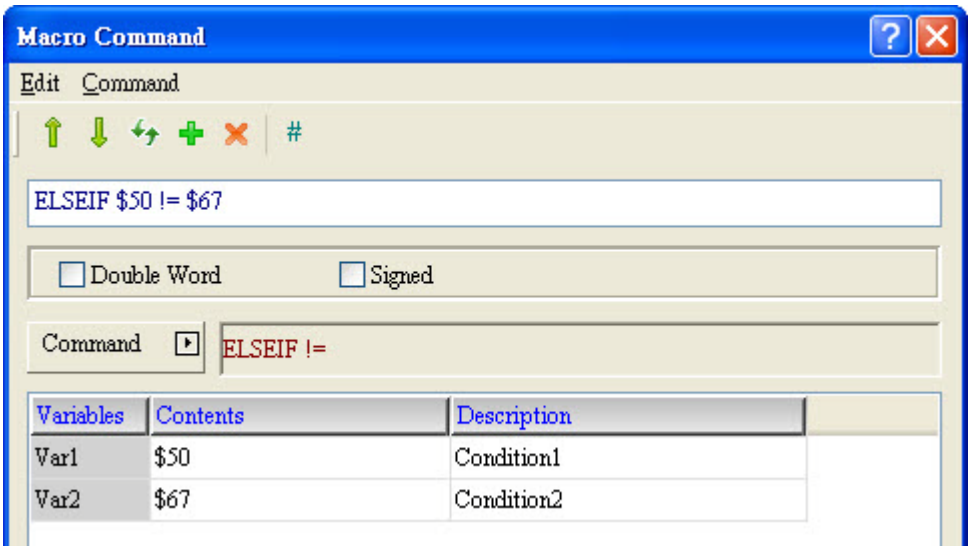
➢ If $50 does not equal to $67 (value comparison), then execute $200 = $200+1; otherwise, then execute $100 = $100 + 1.

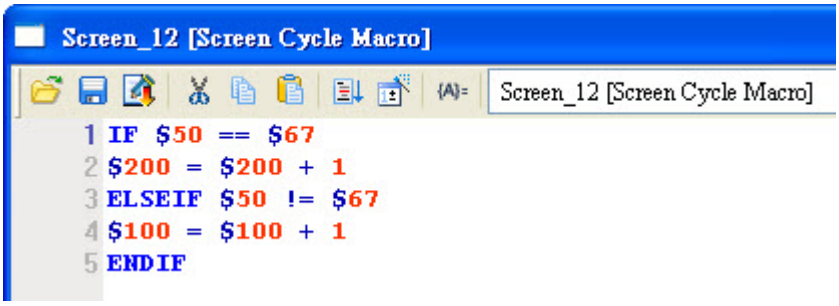
(2) ELSEIF !=			
Expression	**What Variables Represent**		**NOTE**
ELSEIF Var 1 != Var 2 (W) ELSEIF Var 1 != Var 2 (DW) ELSEIF Var 1 != Var 2 (Signed W) ELSEIF Var 1 != Var 2 (Signed DW)	Var 1	Condition 1	W : Word DW : Double Word Signed : Signed number
	Var 2	Condition 2	
	Expression Explanation		
	Or else, if condition 1 does not equal to condition 2, then execute…		
*IF…ENDIF is required to pair up with the ELSEIF Macro commands, or error messages will pop up during compile.			

Memory Usage			
Variable	**Internal Memory**	**PLC Register**	**Constant**
Var 1	◎		◎
Var 2	◎		◎

Example

- Var 1 and Var 2 are both internal memory addresses.





- If $50 equals to $67 (value comparison), then execute $200 = $200+1; otherwise, then execute $100 = $100 + 1.

(3) ELSEIF >

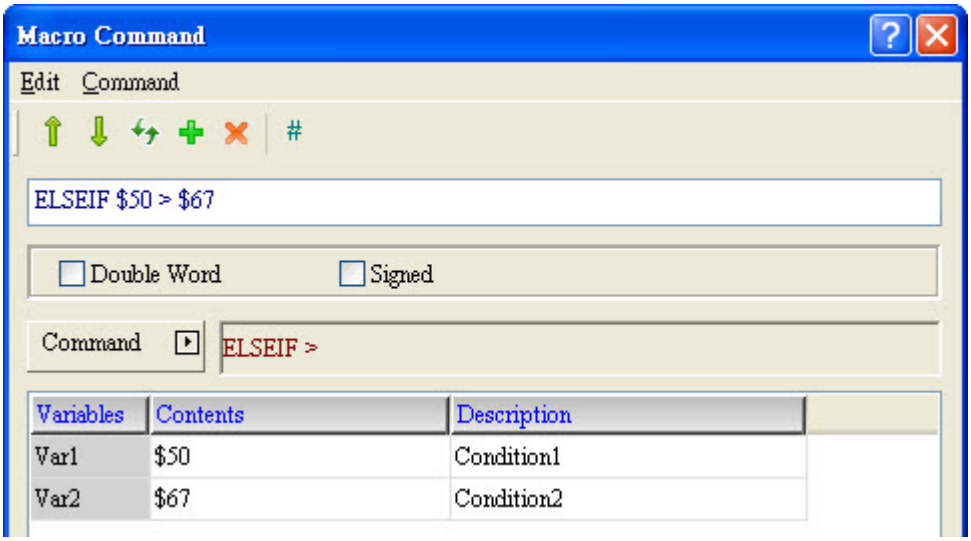
Expression	What Variables Represent		NOTE
ELSEIF Var 1 > Var 2 (W) ELSEIF Var 1 > Var 2 (DW) ELSEIF Var 1 > Var 2 (Signed W) ELSEIF Var 1 > Var 2 (Signed DW)	Var 1	Condition 1	W : Word DW : Double Word Signed : Signed number
	Var 2	Condition 2	
	Expression Explanation		
	Or else, if condition 1 is larger than condition 2, then execute…		

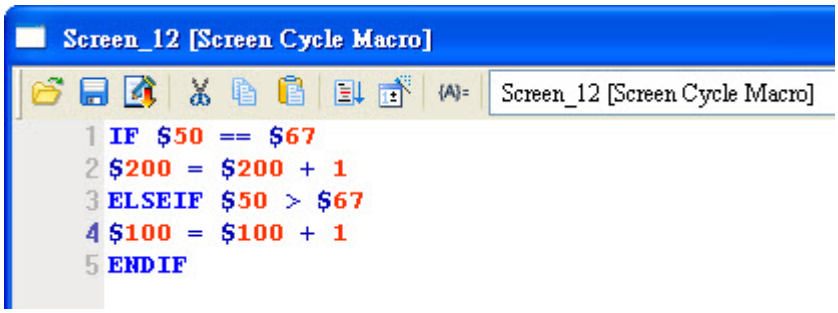
*IF…ENDIF is required to pair up with the ELSEIF Macro commands, or error messages will pop up during compile.

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		◎
Var 2	◎		◎

Example

➢ Var 1 and Var 2 are both internal memory addresses.





➢ If $50 equals to $67 (value comparison), then execute $200 = $200+1; or else if $50 is larger than $67, then execute $100 = $100 + 1.

(4) ELSEIF >=

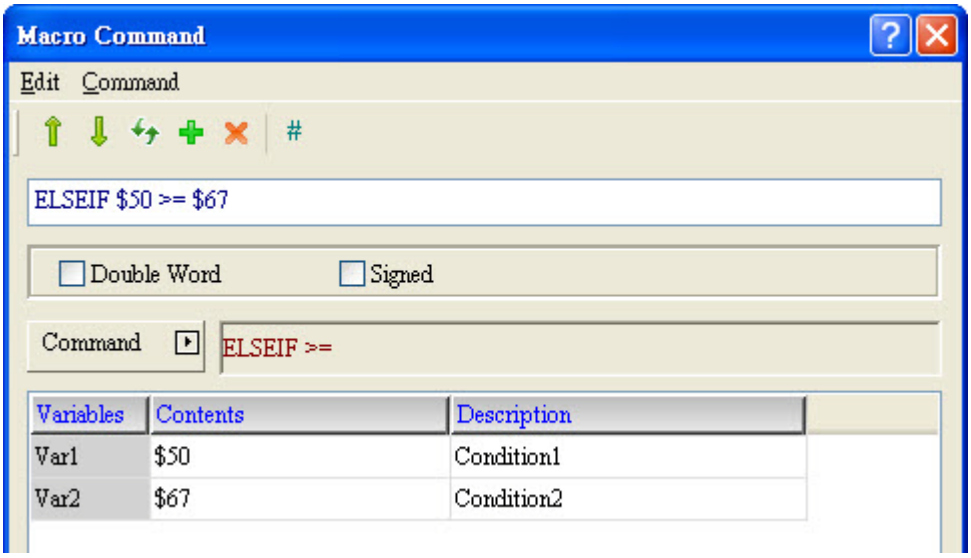
Expression	What Variables Represent		NOTE
ELSEIF Var 1 >= Var 2 (W) ELSEIF Var 1 >= Var 2 (DW) ELSEIF Var 1 >= Var 2 (Signed W) ELSEIF Var 1 >= Var 2 (Signed DW)	Var 1	Condition 1	W : Word DW : Double Word Signed : Signed number
	Var 2	Condition 2	
	Expression Explanation		
	Or else, if condition 1 is larger than or equals to condition 2, then execute…		

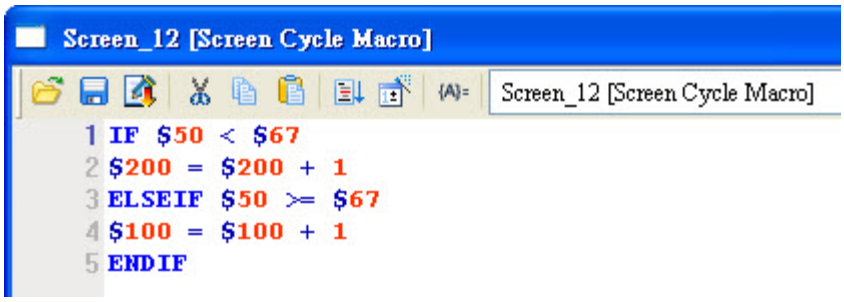
*IF…ENDIF is required to pair up with the ELSEIF Macro commands, or error messages will pop up during compile.

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		◎
Var 2	◎		◎

Example

- Var 1 and Var 2 are both internal memory addresses.





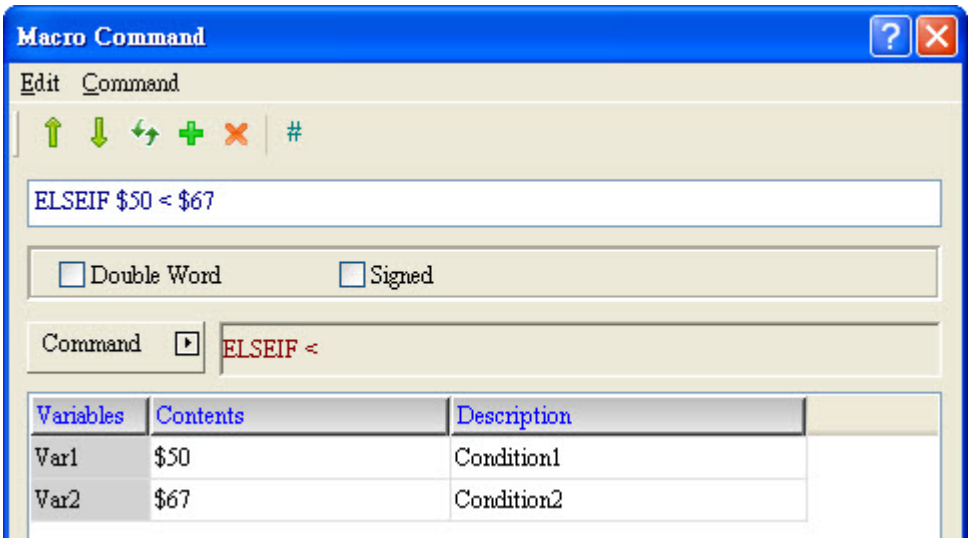
- If $50 is smaller than $67 (value comparison), then execute $200 = $200+1; otherwise, execute $100 = $100 + 1.

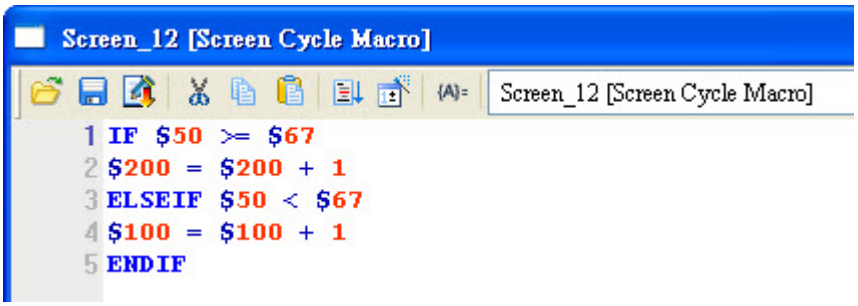
(5) ELSEIF <			
Expression	**What Variables Represent**		**NOTE**
ELSEIF Var 1 < Var 2 (W) ELSEIF Var 1 < Var 2 (DW) ELSEIF Var 1 < Var 2 (Signed W) ELSEIF Var 1 < Var 2 (Signed DW)	Var 1	Condition 1	W : Word DW : Double Word Signed : Signed number
	Var 2	Condition 2	
	Expression Explanation		
	Or else, if condition 1 is smaller than condition 2, then execute…		
*IF…ENDIF is required to pair up with the ELSEIF Macro commands, or error messages will pop up during compile.			

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		◎
Var 2	◎		◎

Example

➢ Var 1 and Var 2 are both internal memory addresses.





➢ If $50 is larger than or equals to $67 (value comparison), then execute $200 = $200+1; or else if $50 is larger than $67, then execute $100 = $100 + 1.

(6) ELSEIF <=

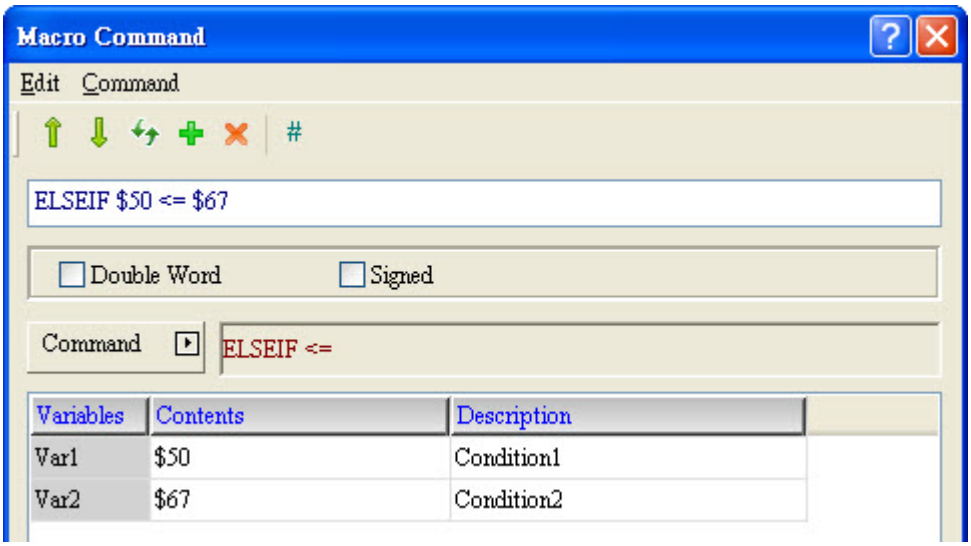
Expression	What Variables Represent		NOTE
ELSEIF Var 1 <= Var 2 (W) ELSEIF Var 1 <= Var 2 (DW) ELSEIF Var 1 <= Var 2 (Signed W) ELSEIF Var 1 <= Var 2 (Signed DW)	Var 1	Condition 1	W : Word DW : Double Word Signed : Signed number
	Var 2	Condition 2	
	Expression Explanation		
	Or else, if condition 1 is smaller than or equals to condition 2, then execute…		

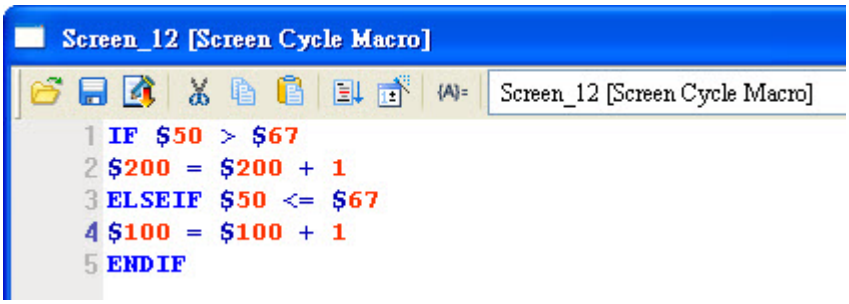
*IF…ENDIF is required to pair up with the ELSEIF Macro commands, or error messages will pop up during compile.

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		◎
Var 2	◎		◎

Example

➢ Var 1 and Var 2 are both internal memory addresses.





➢ If $50 is larger than $67 (value comparison), then execute $200 = $200+1; otherwise, execute $100 = $100 + 1.

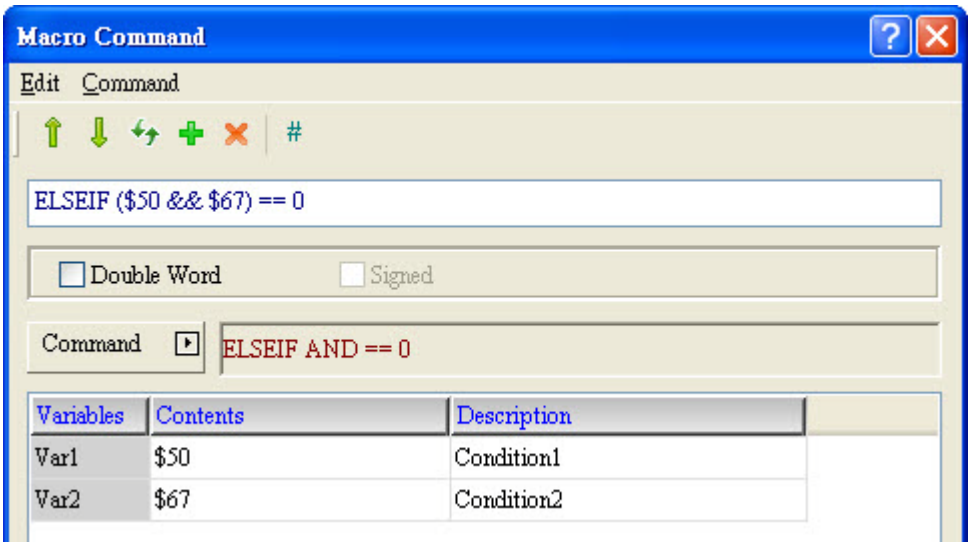
(7) ELSEIF AND == 0

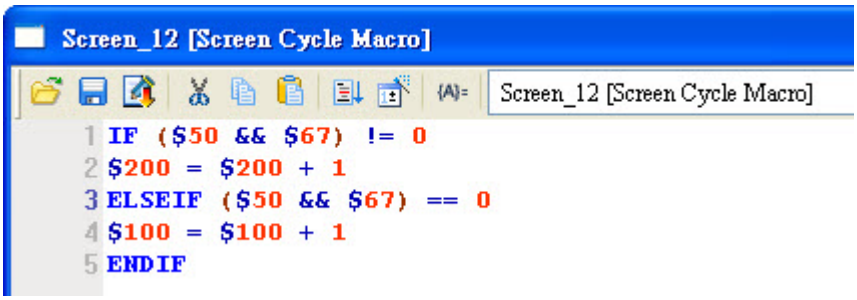
Expression	What Variables Represent		NOTE
ELSEIF (Var 1 && Var 2) == 0 (W) ELSEIF (Var 1 && Var 2) == 0 (DW)	Var 1	Condition 1	W : Word DW : Double Word
	Var 2	Condition 2	
	Expression Explanation		
	Or else, if the result of Bitwise AND Operation between condition 1 and condition 2 is 0, then execute…		

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		◎
Var 2	◎		◎

Example

➢ Var 1 and Var 2 are both internal memory addresses.





➢ If the result of Bitwise AND Operation between $50 and $67 is not 0, then execute $200 = $200+1; otherwise, execute $100 = $100 + 1.

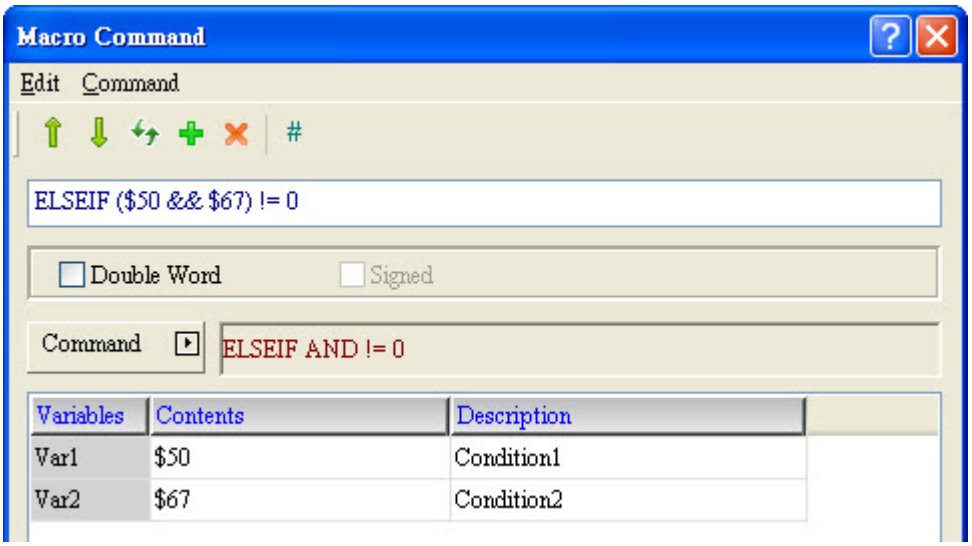
(8) ELSEIF AND != 0

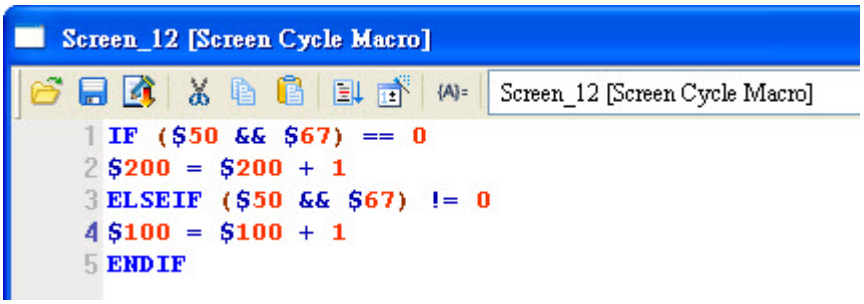
Expression	What Variables Represent		NOTE
ELSEIF (Var 1 && Var 2) != 0 (W) ELSEIF (Var 1 && Var 2) != 0 (DW)	Var 1	Condition 1	W : Word DW : Double Word
	Var 2	Condition 2	
	Expression Explanation		
	Or else, if the result of Bitwise AND Operation between condition 1 and condition 2 is not 0, then execute…		

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		◎
Var 2	◎		◎

Example

➢ Var 1 and Var 2 are both internal memory addresses.





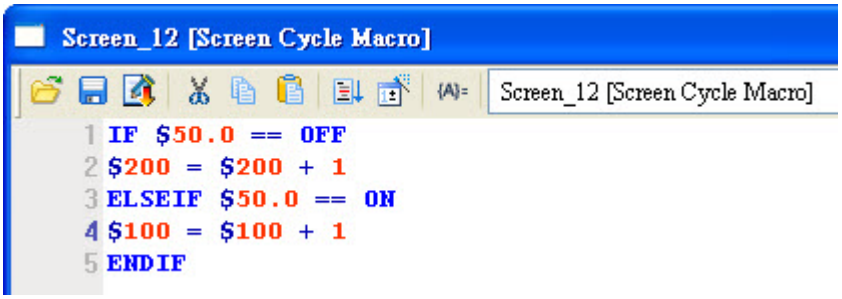
➢ If the result of Bitwise AND Operation between $50 and $67 is 0, then execute $200 = $200+1; otherwise, execute $100 = $100 +1.

(9) ELSEIF == ON			
Expression	What Variables Represent		NOTE
ELSEIF Var 1 == ON (W)	Var 1	Condition 1	W : Word
	Expression Explanation		
	Or else, if condition 1 is ON, then execute…		

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎ (Can only be Bit)		

Example

➢ Var 1 is the internal memory address.



➢ If $50.0 is OFF, then execute $200 = $200 + 1; if $50.0 is ON, then execute $100 = $100 + 1.

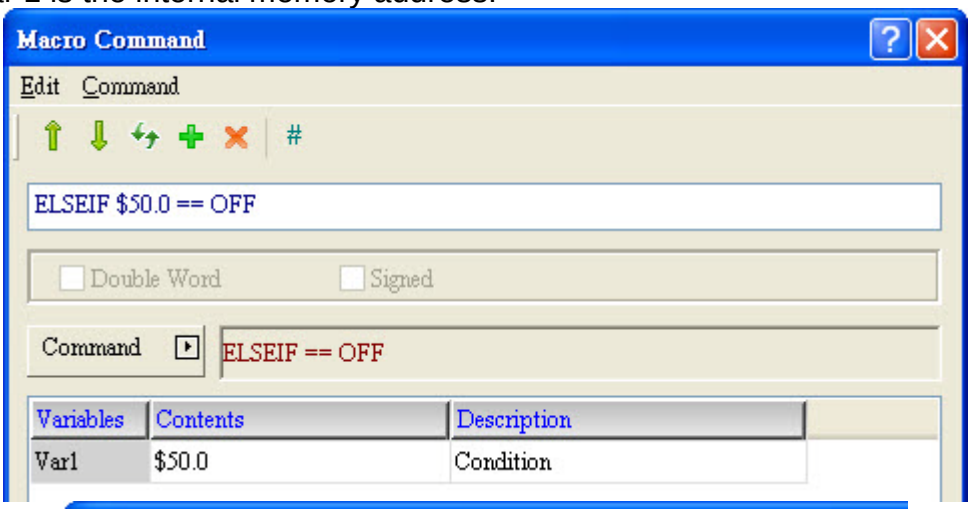
(10) ELSEIF == OFF

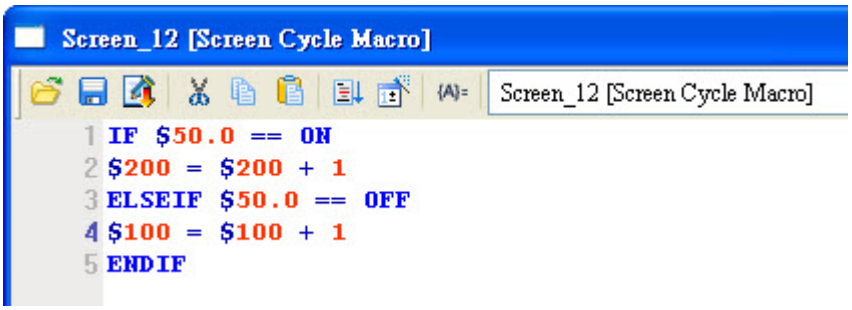
Expression	What Variables Represent		NOTE
ELSEIF Var 1 == OFF (W)	Var 1	Condition 1	W : Word
	Expression Explanation		
	Or else, if condition 1 is OFF, then execute…		

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎ (Can only be Bit)		

Example

- Var 1 is the internal memory address.

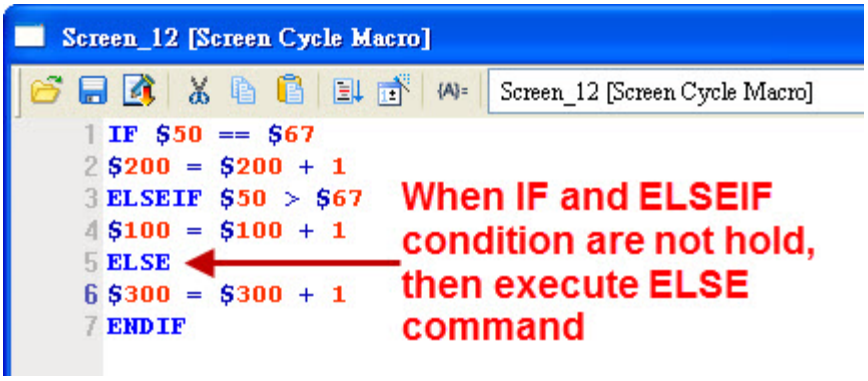




- If $50.0 is ON, then execute $200 = $200 + 1; if $50.0 is OFF, then execute $100 = $100 + 1.

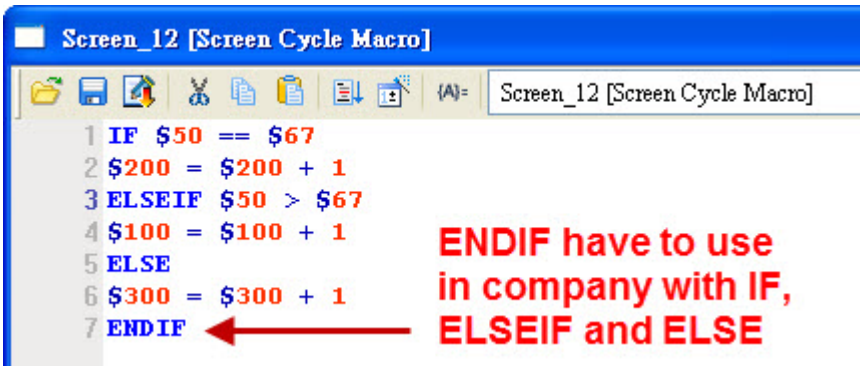
■ ELSE

The Else command is used to execute other procedures when either the If or Elseif statement is not true. Else needs to pair up with If and Endif, or error messages will pop up during compile.



■ ENDIF

ENDIF is primarily used to pair up with commands such as If…, Else, and Eseif…

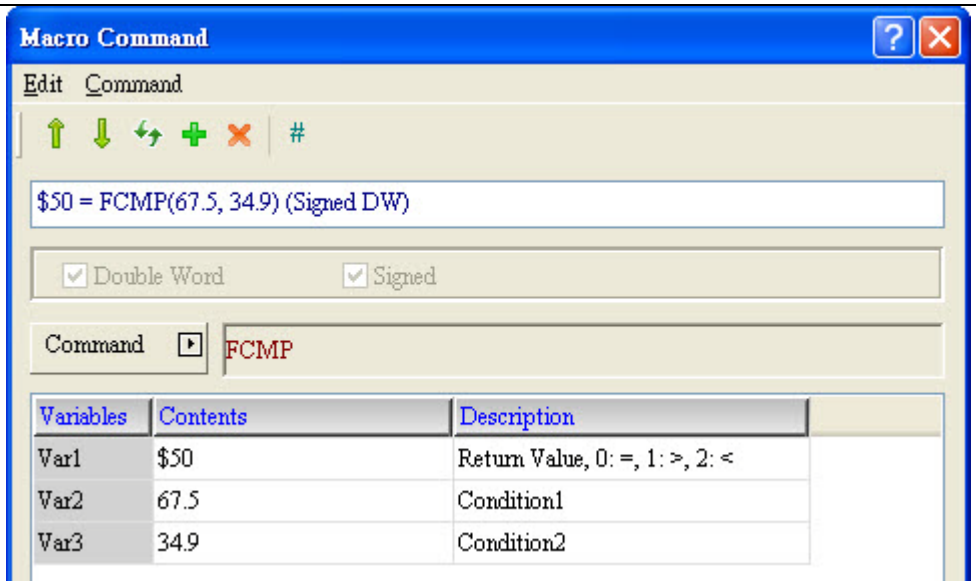


■ FCMP (Comparison of Floating Point Data)

Expression	What Variables Represent			NOTE
Var 1 = FCMP(Var 2, Var 3) (Signed DW)	Var 1	Returned the compared result.		DW : Double Word Signed : Signed number
		=	0	
		>	1	
		<	2	
	Var 2	Condition 1		
	Var 3	Condition 2		
	Expression Explanation			
	Compare Var 2 and Var 3 and save the result in Var 1.			

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		
Var 2	◎		◎
Var 3	◎		◎

Example
➢ Var 1 is an internal memory address, and Var 2 and Var 3 are constants.



- Compare with Var 2 and Var 3 value, and return value of 0, 1, 2. Due to 67.5 is greater than 34.9, so return value for 1. The $50 will display value for 1.

24-3-6 Flow Control

There are seven commands for flow control: GOTO, LABEL, CALL, RET, FOR, NEXT and END and with them, users can control the sequence of a program being executed. Their usages are detailed below.

Figure 24-3-6-1 Flow Control

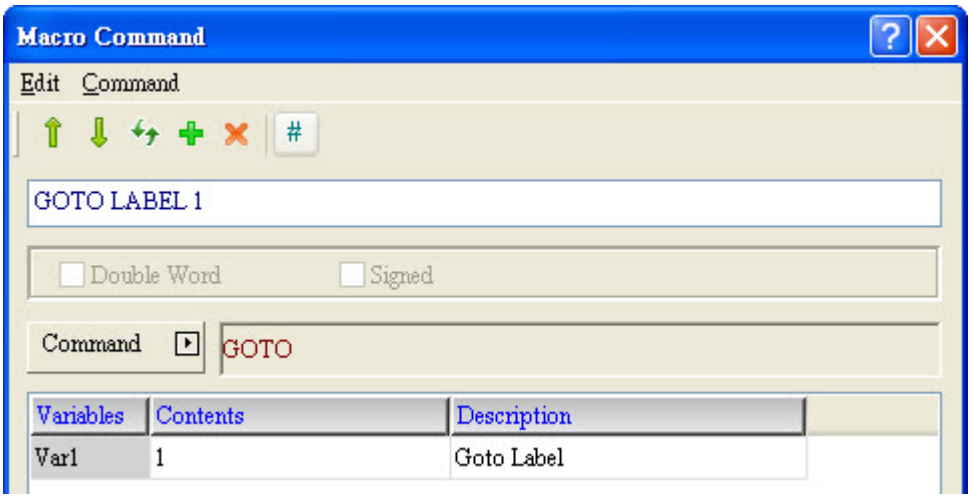
■ GOTO LABEL (label identifier for the current process to unconditionally jump to)

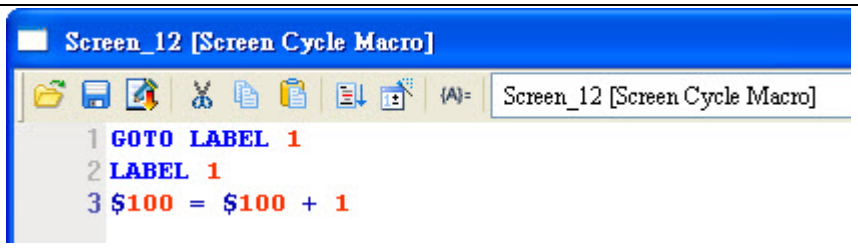
Expression	What Variables Represent		NOTE
GOTO LABEL Var 1 (W)	Var 1	Label identifier for the current process to jump to	W : Word
	Expression Explanation		
	A designated identifier for the current process to directly jump to.		

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1			◎

Example

➢ Var 1 can only be Constant.





➢ Directly jump to Label 1 and the expression marked by Label 1 is $100 = $100 + 1.

■ LABEL (Label Identifier)

Expression	What Variables Represent		NOTE
LABEL Var 1 (W)	Var 1	Label identifier for the current process to jump to	W : Word
	Expression Explanation		
	A designated identifier for the current process to directly jump to.		
* Each label has to have its unique label name and no identical label name is allowed for another label within the same macro.			

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1			◎

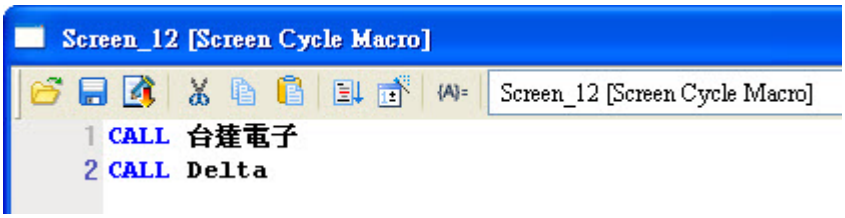
Example

➢ Var 1 can only be Constant.

■ CALL (Call Sub-macro)

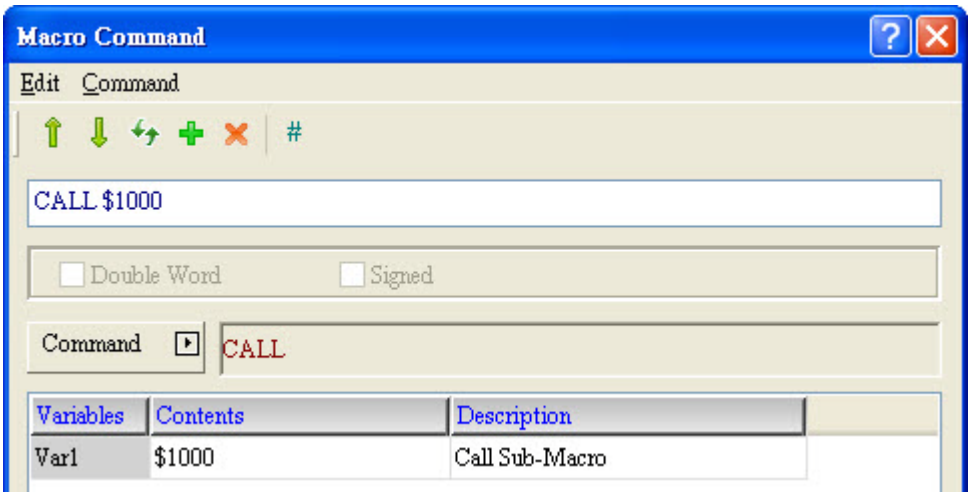
Expression	What Variables Represent		NOTE
CALL Var 1 (W)	Var 1	Sub-macro ID (1~512)	W : Word
	Expression Explanation		
	A designated identifier for the current process to directly jump to.		

* Var 1 supports both Chinese and English names, but in such case, please manually enter the alias of the macro. The macro wizard only supports a submacro ID.



Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		◎

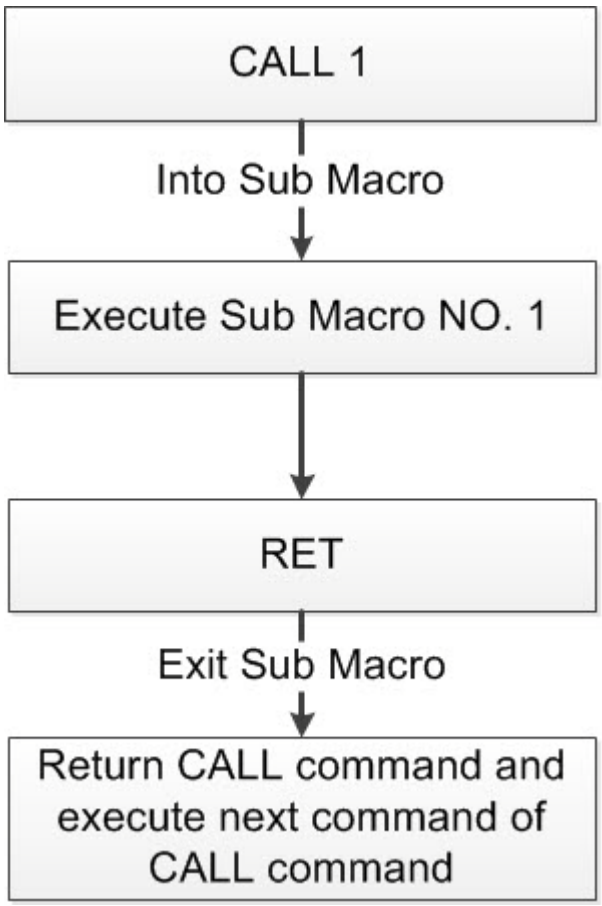
Example
➢ Var 1 is an internal memory address.



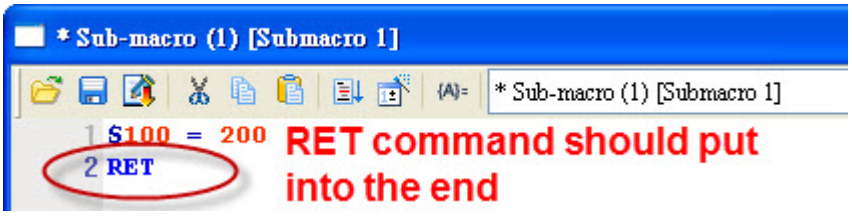
➢ Users can enter submacro ID via $1000, or an internal memory address, to execute commands within a macro.

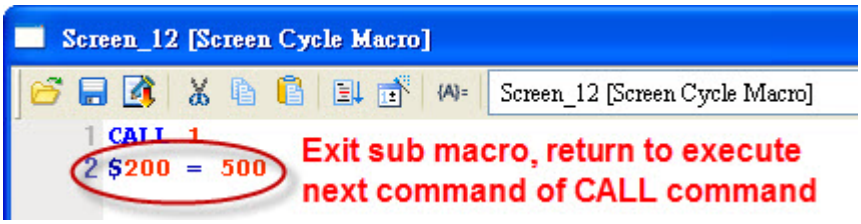
■ RET (Exit Sub-macro)

Expression	Expression Explanation	NOTE
RET	Exit a submacro and return back to the next line right after a sub-macro.	RET needs to be at the last line of a submacro and needs to pair up with the Call command.



Example
➢ RET needs to be at end of a macro





■ FOR, NEXT (Loop)

Expression	What Variables Represent		NOTE
FOR Var 1 (W)	Var 1	Number of loops	W : Word
	Expression Explanation		
	Statement to run the loop “Var 1” times		

Expression	Expression Explanation	NOTE
NEXT	Need to pair up with “For”	

*multiple layers are possible (up to a maximum of three loops).

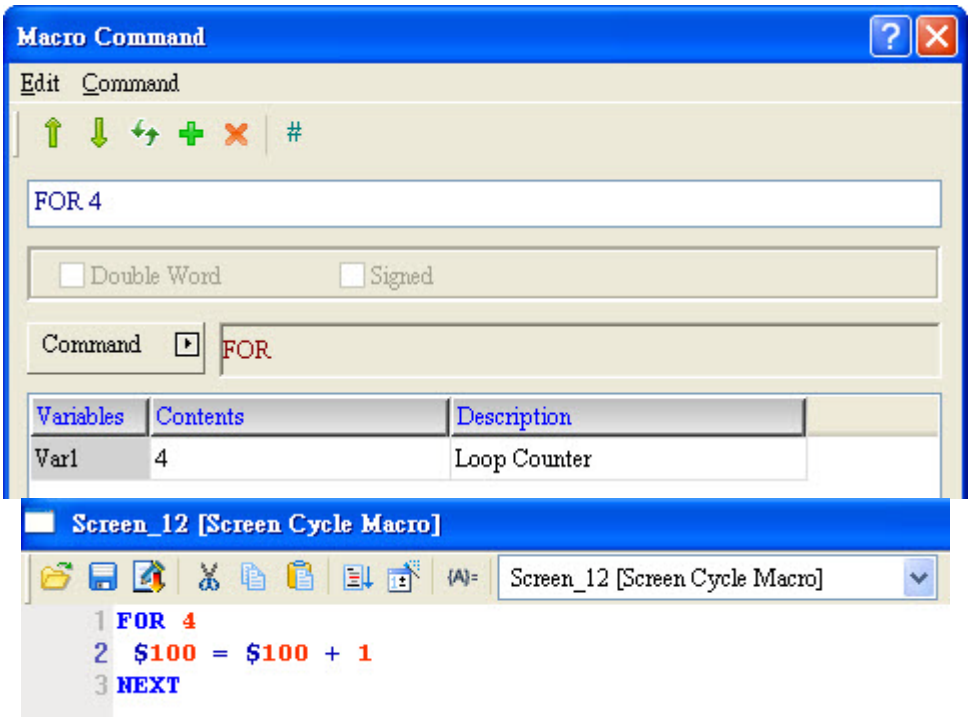
Screen_12 [Screen Cycle Macro]

```
1  FOR 4
2   $50 = $50 + 1
3    FOR 4
4     $50 = $50 + 1
5      FOR 4
6       $50 = $50 + 1
7        FOR 4
8         $50 = $50 + 1
9          FOR 4
10          $50 = $50 + 1
11           FOR 4
12            $50 = $50 + 1
13             FOR 4
14              $50 = $50 + 1
15               FOR 4
16                $50 = $50 + 1
17                 FOR 4
18                  $50 = $50 + 1
19                   FOR 4
20                    $50 = $50 + 1
21                   next
22                 next
23               next
24             next
25           next
26         next
27       next
28     next
29   next
30 next
```

FOR ... NEXT command only support ten levels structure

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		◎

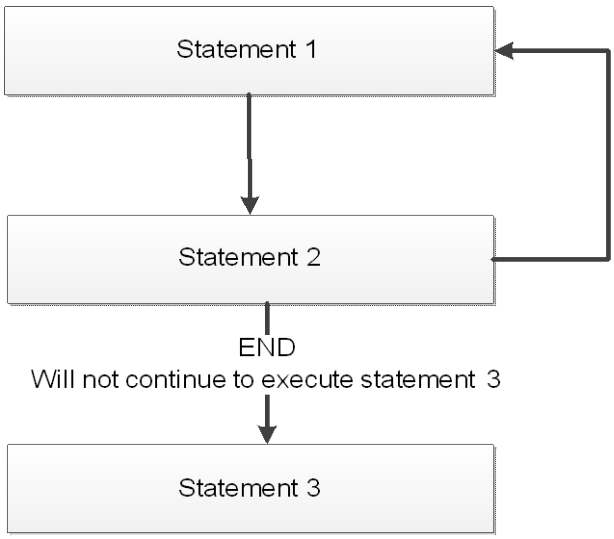
Example
➢ Var 1 is a constant.



➢ For 4 means to execute the statement "$100 = $100 + 1" four times and hence, the result is 4.

■ END (End Macro)

Expression	Expression Explanation	NOTE
END	End a macro.	If END command is used in a submacro, it indicates the program will not execute the next statement within the macro that the submacro belongs to.



Example

➢ Below END command will not execute.

Screen_12 [Screen Cycle Macro]

```
1  $300 = $300 + 1
2  $301 = $300 % 10
3
4  IF $350 == 3
5    $312 = 2
6    $313 = 0
7  ELSEIF $350 == 2
8    $312 = 0
9    $313 = 2
10 ENDIF
11 END
12 IF $301 == 0
13   IF $311 == 2
14     $310 = $310 - 5
15   ENDIF
16   IF $312 == 2
17     $320 = $320 + 5
18   ENDIF
19   IF $313 == 2
20     $330 = $330 + 5
21   ENDIF
22   IF $345 == 1
23     $340 = $340 + 10
24     $342 = $342 - 10
25   ELSEIF $345 == 2
26     $340 = $340 - 10
27     $342 = $342 + 10
28   ENDIF
29 ENDIF
```

It didn't execute below the END command

➢ If the END command is at the end of a submacro, it indicates the program will not execute the next statement within the macro the submacro belongs to.

Sub-macro (1) [Submacro 1]

```
1 $100 = 200
2 END
```

It will not return to original command to execute

Screen_12 [Screen Cycle Macro]

```
1 CALL 1
2 $100 = 500
```

This command cannot be executed

24-3-7 Bit Settings

Four commands are available for Bit settings. With these commands, users can set the ON/OFF or inverse status of a bit, or display the value of a bit. These commands are detailed below.

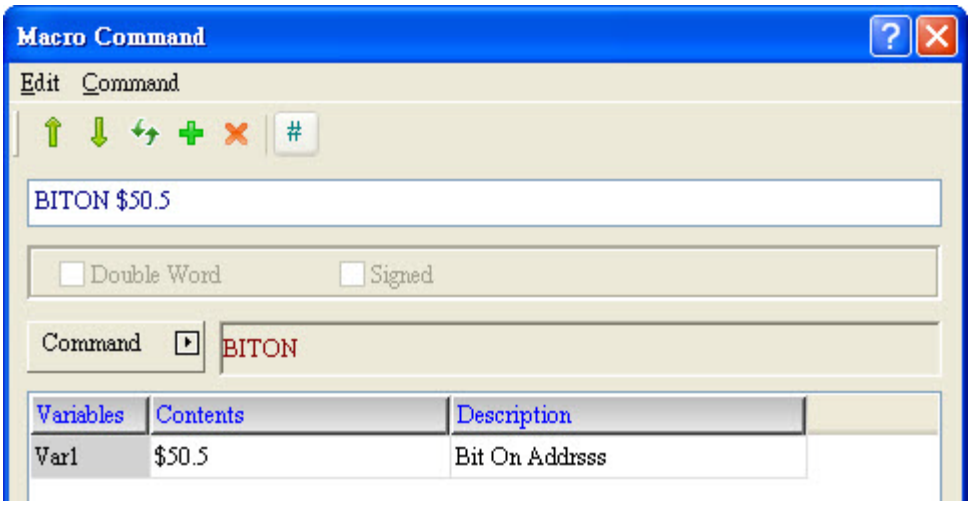
Figure 24-3-7-1 Bit Settings

■ BITON (Set Bits to ON)

Expression	What Variables Represent		NOTE
BITON Var 1 (W)	Var 1	Set the state of the bit	W : Word
	Expression Explanation		
	Set the nth bit to ON (N as denoted by Var 1).		

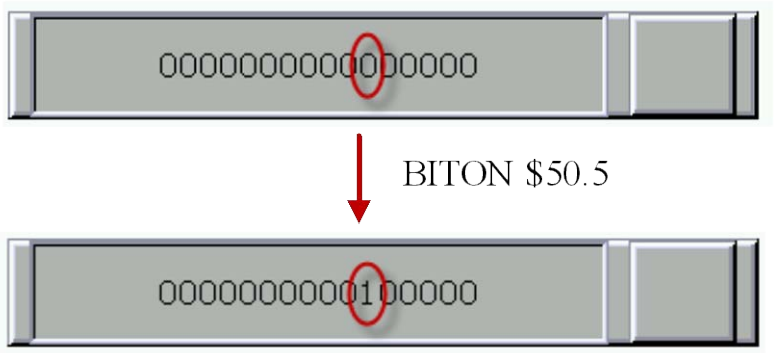
Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎ (Can only be Bit)	◎ (Can only be Bit)	

Example
➢ Var 1 is an internal memory address.



➢ Set $50 to be the variable to set the bit and data type to be binary. When

executing BITON $50.5, then the fifth bit will be set to ON.



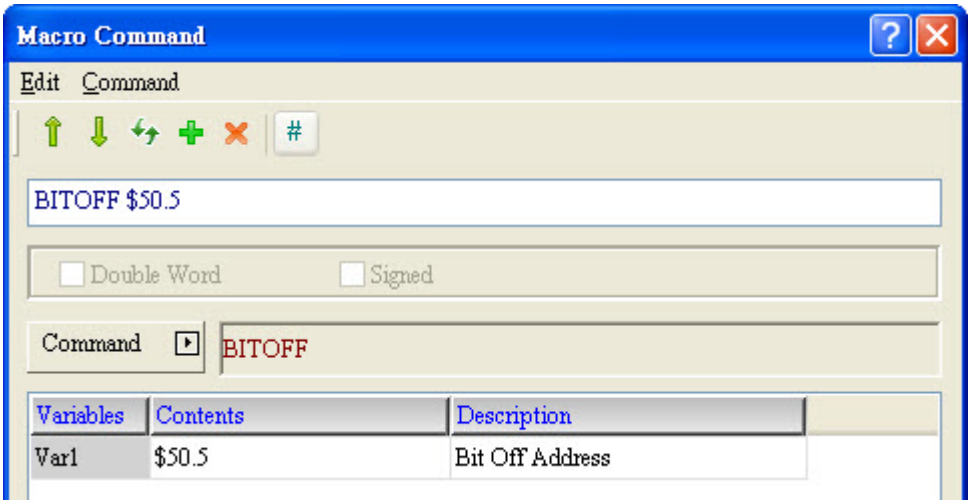
■ BITOFF (Set Bits to OFF)

Expression	What Variables Represent		NOTE
BITOFF Var 1 (W)	Var 1	Set the state of the bit	W : Word
	Expression Explanation		
	Set the nth bit to OFF (N as denoted by Var 1).		

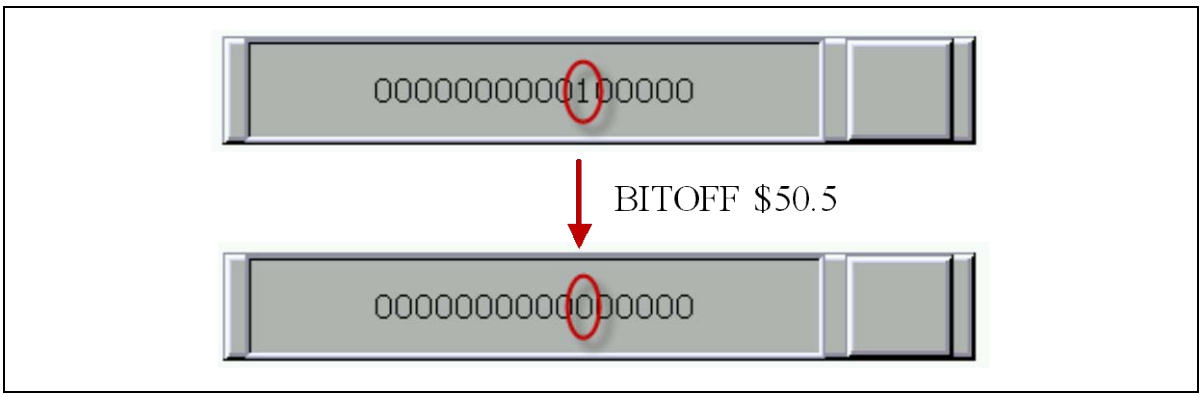
Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎ (Can only be Bit)	◎ (Can only be Bit)	

Example

➢ Var 1 is an internal memory address.



➢ Set $50 to be the variable to set the bit and data type to be binary. When executing BITOFF $50.5, then the fifth bit will be set to OFF.



■ BITNOT (Set the bit to inverse state, ON→OFF, OFF→ON)

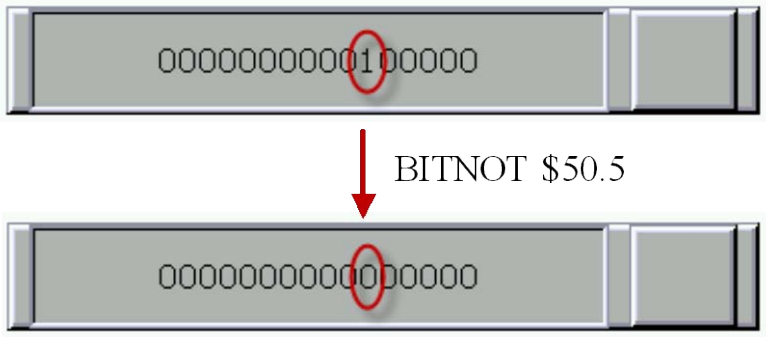
Expression	What Variables Represent		NOTE
BITNOT Var 1 (W)	Var 1	Set the state of the bit	W : Word
	Expression Explanation		
	Set the nth bit to its inverse state: ON→OFF or OFF→ON (N as denoted by Var 1).		

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎ (Can only be bit)	◎ (Can only be bit)	

Example

➢ Var 1 is an internal memory address.

➢ Set $50 to be the variable to set the bit and data type to be binary. When executing BITNOT $50.5, then the fifth bit will be set from ON to OFF.



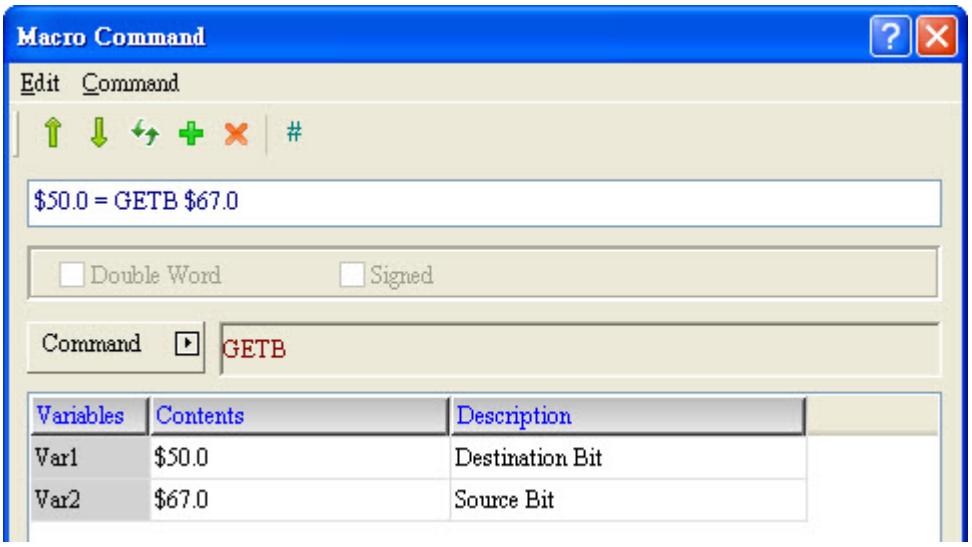
■ GETB (Acquire Bit State)

Expression	What Variables Represent		NOTE
(Var 1) = GETB (Var 2) (W)	Var 1	Set the state of the bit	W : Word
	Expression Explanation		
	Get n^{th} bit value and store it in Var 1(N as denoted by Var 2).		

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎ (Can only be bit)	◎ (Can only be bit)	
Var 2	◎ (Can only be bit)	◎ (Can only be bit)	

Example

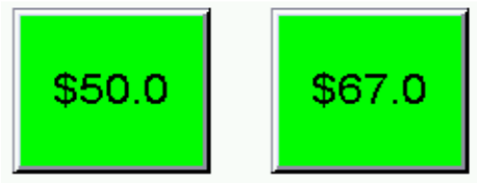
- Var 1 and Var 2 are both internal memory addresses.



- Set $50 to be the variable to set the bit and data type to be binary.
- Set $50.0 and $67.0 to be the ON button. When executing $50.0 = GETB

$67.0 and push the $67.0 button, then $50.0 will be triggered to be ON.

$50.0 = GETB($67.0)



24-3-8 COM Port

COM Port macros are used to control com ports and they are detailed below.

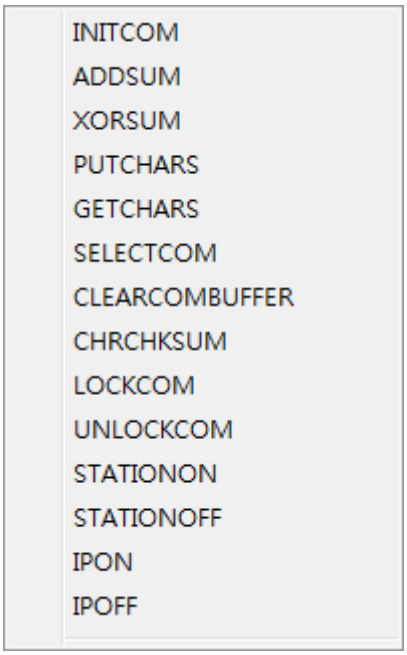


Figure 24-3-8-1 COM Port

■ INITCOM (COM Port Initialization)

<table>
<tr><th>Expression</th><th colspan="2">What Variables Represent</th><th>NOTE</th></tr>
<tr><td rowspan="12">Var 1 = INITCOM (Var 2, Var 3, Var 4, Var 5, Var 6, Var 7, Var 8) (W)</td><td rowspan="3">Var 1</td><td>Returned result</td><td rowspan="12">W : Word</td></tr>
<tr><td>0 : Failure</td></tr>
<tr><td>1 : Successful</td></tr>
<tr><td>Var 2</td><td>Com Port</td></tr>
<tr><td>Var 3</td><td>Interface</td></tr>
<tr><td>Var 4</td><td>Data Bit</td></tr>
<tr><td>Var 5</td><td>Parity</td></tr>
<tr><td>Var 6</td><td>Stop Bit</td></tr>
<tr><td>Var 7</td><td>Baud Rate</td></tr>
<tr><td>Var 8</td><td>Flow Control</td></tr>
<tr><td colspan="2">Expression Explanation</td></tr>
<tr><td colspan="2">Initialize com ports, open com ports, set the protocol (Var 2 ~ Var 8) and return the result of initialization back to Var 1.</td></tr>
</table>

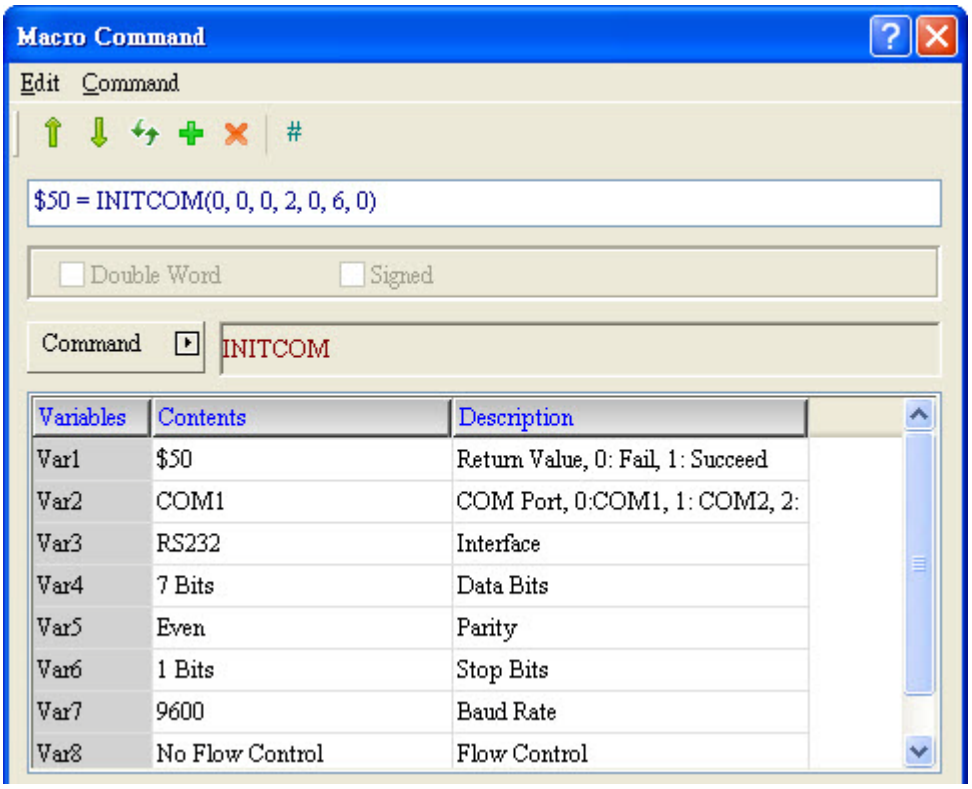
Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		

Parameter Setup			
Variable	Parameter	Parameter Details	Corresponding Codes
Var 2	Com Port	COM 1	0
		COM 2	1
		COM 3	2
Var 3	Interface	RS242	0
		RS422	1
		RS485	2
Var 4	Data Bit	7 Bits	0
		8 Bits	1
Var 5	Parity	None	0
		Old	1
		Even	2
Var 6	Stop Bit	1 Bits	0
		2 Bits	1
Var 7	Baud Rate	300	0
		600	1
		900	2
		1200	3
		2400	4
		4800	5
		9600	6
		14400	7
		19200	8
		28800	9
		38400	10
		57600	11
		115200	12

Var 8	Flow Control	No Flow Control	0
		CTS RTS Flow Control	1
		DTR DSR Flow Control	2
		Xon Xoff Flow Control	3

Notes about Flow Control		
No Flow Control		Flow control function is disabled.
Flow Control		The transmission speed and communication validity are enhanced during communication due to new transmission technology, such as compress immediately, debug,…etc. But the new technology also makes the transmission speed between HMI and PC will be longer than the actual transmission speed. Therefore, ensure the data security and transmit complete data between computer and HMI, when transmitting data through serial communication port, the flow control is necessary.
Flow Control	**CTS / RTS Flow Control**	Flow control for hardware. It uses handshaking signal to control receiving and sending data. The control is achieved via internal modem or external modem that connects to HMI by connecting cable.
	DSR / DTR Flow Control	It is flow control for hardware also. It is used when PC and HMI is connected by cable directly.
	Xon / Xoff Flow Control	It is flow control for software. It is only used for 2400bps modem. The control method is to generate control code by software and add it in the transmission data.

Example
➢ Var 1 is an internal memory address



➢ After execute INITCOM command, it will return to 0 or 1 value to $50.

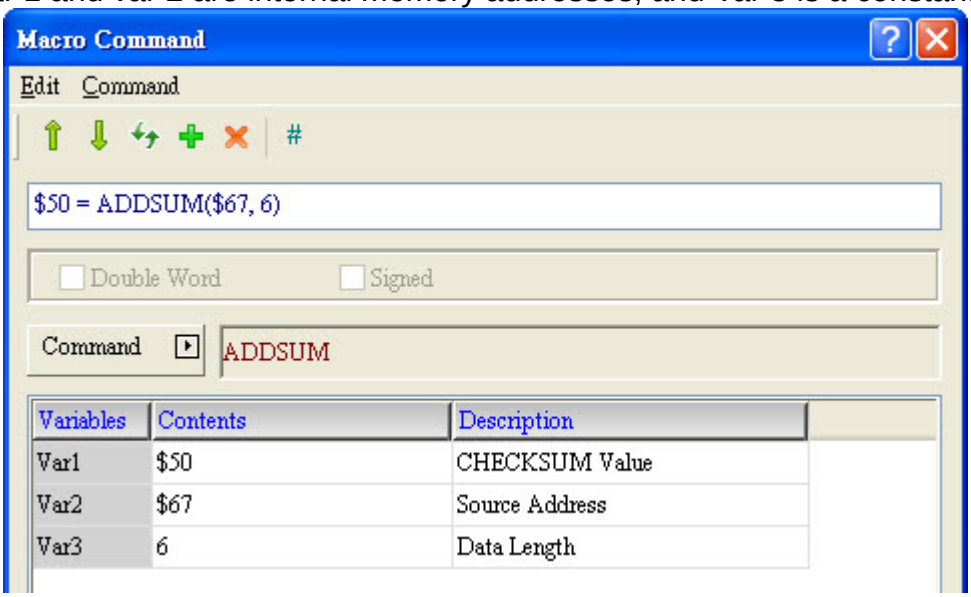
■ ADDSUM (Checksum Calculation through Addition)

Expression	What Variables Represent		NOTE
Var 1 = ADDSUM (Var 2, Var 3) (W)	Var 1	Checksum	W : Word
	Var 2	Starting address of the source data	
	Var 3	Data length	
	Expression Explanation		
	Calculate the checksum using addition. Var1 stores the calculated checksum value, Var2 stores the starting address for data to be calculated and Var3 stores the length of data.		
* the checksum value calculated through ADDSUM is based on BYTE. If the data length is 6, it must be divided by 2 for the correct length is 3.			

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		
Var 2	◎		
Var 3	◎		◎

Example

- Var 1 and var 2 are internal memory addresses, and Var 3 is a constant.



- After addition, the three consecutive bytes (6 / 2 = 3), starting from the address stored in $67, will be stored in $50.
- The expression means $67 + $68 + $69 = $50.

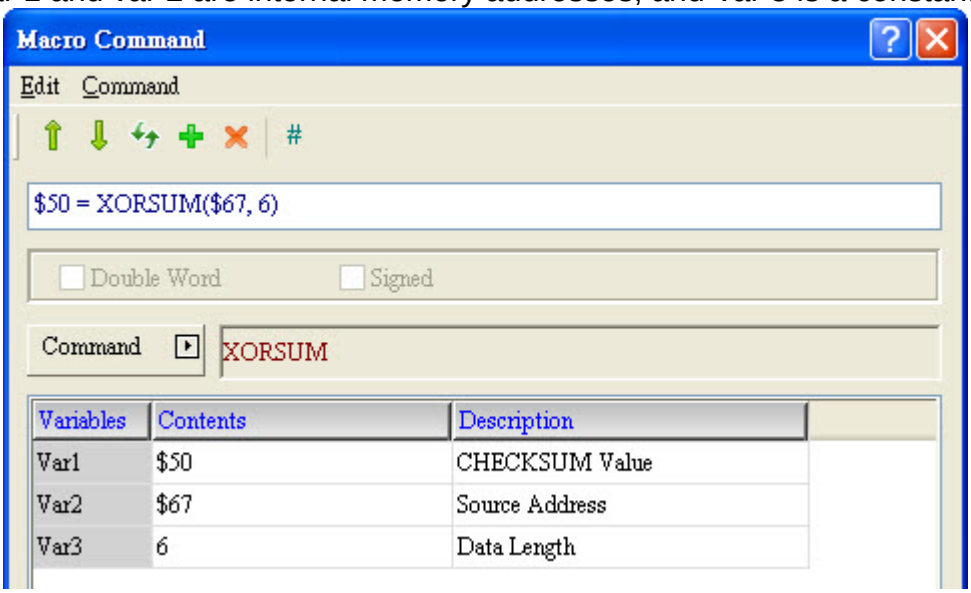
■ XORSUM (Checksum Calculation through XOR Operation)

Expression	What Variables Represent		NOTE
Var 1 = XORSUM (Var 2, Var 3) (W)	Var 1	Checksum	W : Word
	Var 2	Starting Address of the Source Data	
	Var 3	Data Length	
	Expression Explanation		
	Calculate the checksum using XOR operations. Var1 stores the calculated checksum, Var2 stores the starting address for data to be calculated and Var3 stores the length of the data.		
*the checksum value calculated through XORSUM is based on BYTE. If the data length is 6, it must be divided by 2 for the correct length is 3.			

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		
Var 2	◎		
Var 3	◎		◎

Example

- Var 1 and var 2 are internal memory addresses, and Var 3 is a constant.



- After XOR operations, the three consecutive bytes (6 / 2 = 3), starting from the address stored in $67, will be stored in $50.
- The expression means $67 + $68 + $69 = $50.

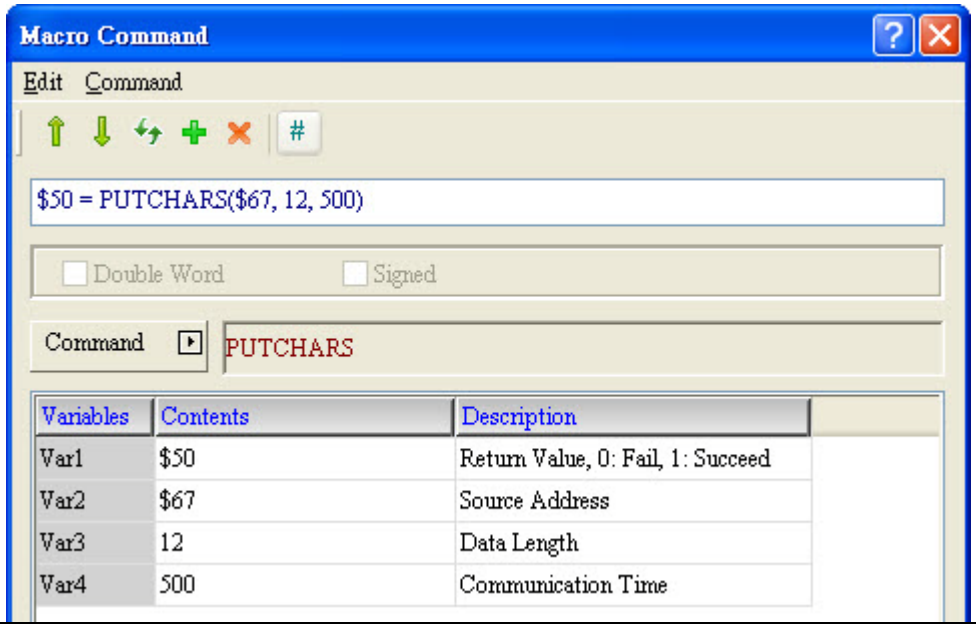
■ PUTCHARS (Output Character by Com Port)

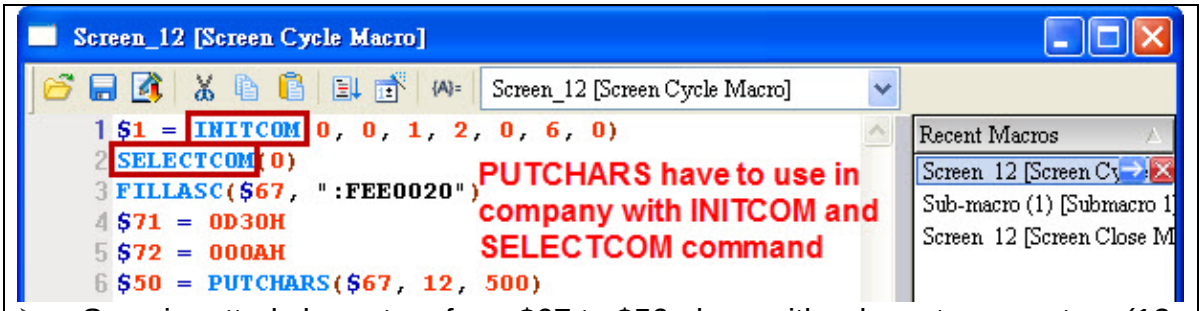
Expression	What Variables Represent			NOTE
Var 1 = PUTCHARS (Var 2, Var 3, Var 4) (W)	Var 1	Returned result		W : Word
		Failure	0	
		Successful	1	
	Var 2	Starting address of the source data		
	Var 3	Data length		
	Var 4	Duration of data transmission		
	Expression Explanation			
	Send in data (including starting address stored in Var 2, data length specified in Var 3, and required transmission duration saved in Var 4) via selected communication ports and save the returned value in Var 1.			
*PUTCHARS much be paired up with INITCOM and SELECTCOM. *Var 3 is Byte format.				

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		
Var 2	◎		
Var 3	◎		◎
Var 4	◎		◎

Example

➢ Var 1 and var 2 are internal memory addresses, and Var 3 and Var 4 are constants.





➢ Save inputted characters from $67 to $50 along with relevant parameters (12 consecutive characters; transmission duration: 500; and returned value: 0 or 1).

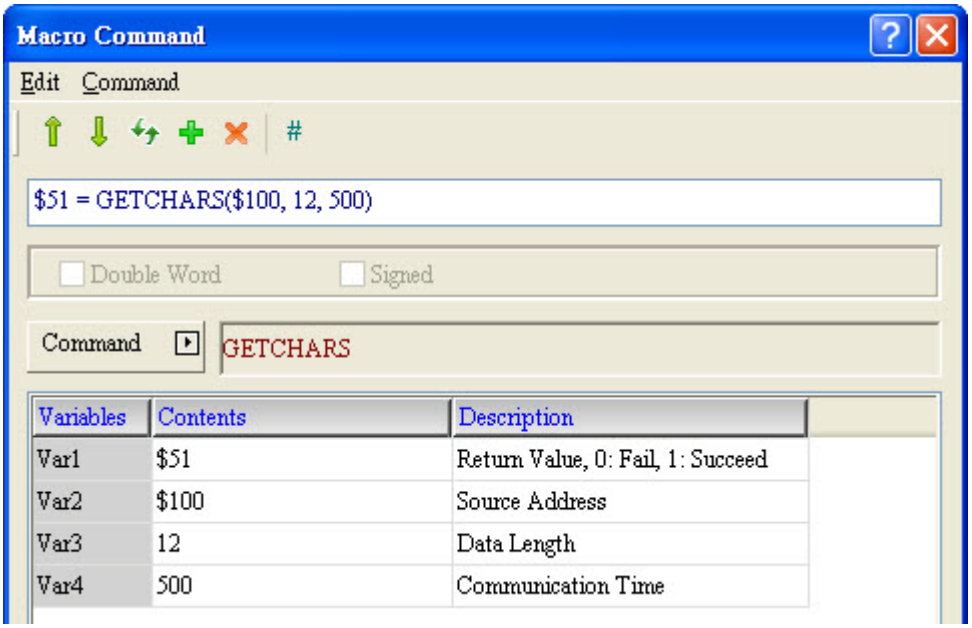
■ GETCHARS (Character Acquisition through Com Port)

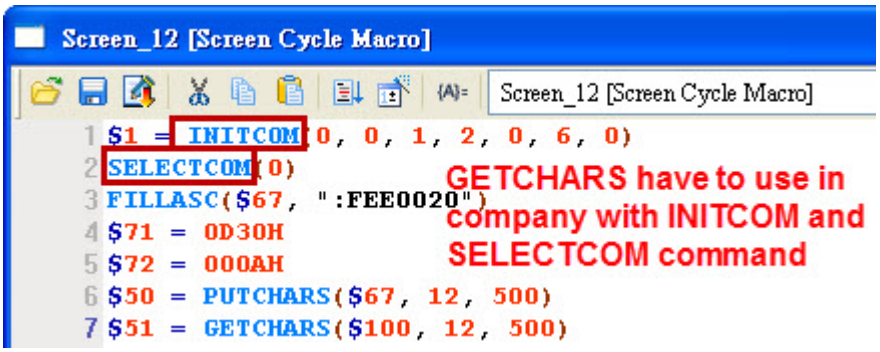
Expression	What Variables Represent			NOTE
Var 1 = GETCHARS (Var 2, Var 3, Var 4) (W)	Var 1	Returned result		W : Word
		Failure	0	
		Successful	1	
	Var 2	Starting address of the source data		
	Var 3	Data length		
	Var 4	Duration of data transmission		
	Expression Explanation			
	Send in data (including starting address stored in Var 2, data length specified in Var 3, and required transmission duration saved in Var 4) via selected communication ports and save the returned value in Var 1.			
*GETCHARS much be paired up with INITCOM and SELECTCOM. *Var 3 is Byte format.				

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		
Var 2	◎		
Var 3	◎		◎
Var 4	◎		◎

Example

- Var 1 and var 2 are internal memory addresses, and Var 3 and Var 4 are constants.





- Save received characters from $100 to $51 along with relevant parameters (12 consecutive characters; transmission duration: 500; and returned value: 0 or 1).

■ SELECTCOM (Com Port Selection)

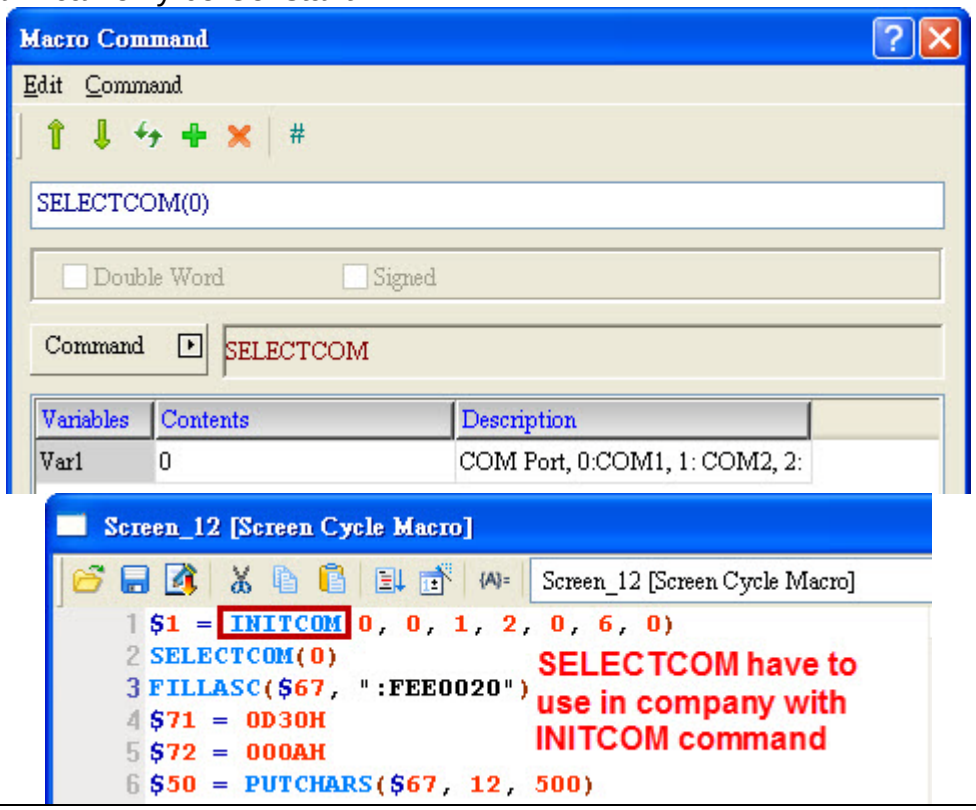
Expression	What Variables Represent			NOTE
SELECTCOM (Var 1) (W)	Var 1	COM 1	0	W : Word
		COM 2	1	
		COM 3	2	
	Expression Explanation			
	Send in acquired characters (including starting address stored in Var 2, data length specified in Var 3, and required transmission duration saved in Var 4) via selected communication ports and save the returned value in Var 1.			

*SELECTCOM much be paired up with INITCOM.
*The designated com port can not be the same as the com port used by the system. All communication commands will be processed via the COM port the user selects after executing this command. Therefore, the Selectcom command of a particular macro does not support other macros and there will be no interference between different macros.

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1			◎

Example

➢ Var 1 can only be Constant.



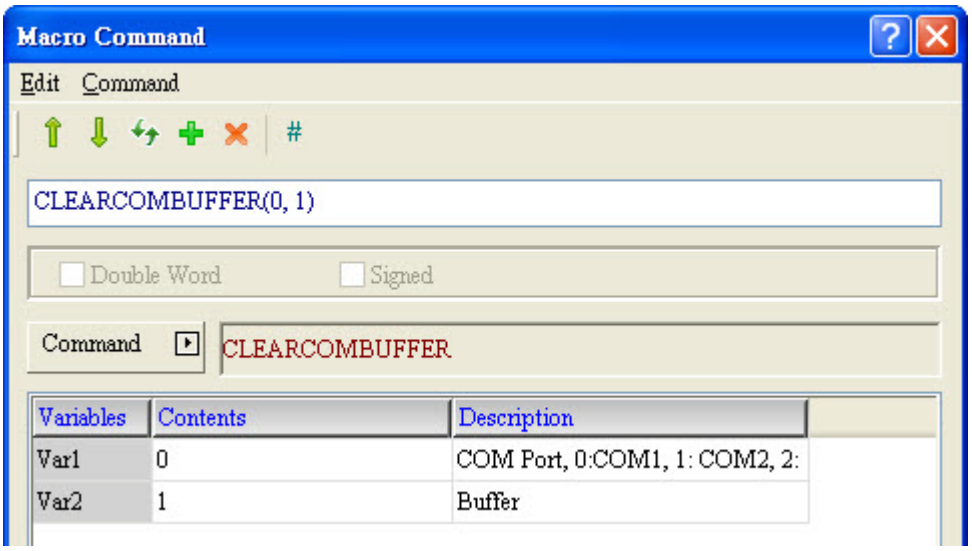
■ CLEARCOMBUFFER (Com Port Buffer Clearance)

Expression	What Variables Represent			NOTE
CLEARCOMBUFFER (Var 1, Var 2) (W)	Var 1	COM 1	0	W : Word
		COM 2	1	
		COM 3	2	
	Var 2	Receiving buffer	0	
		Transmitting buffer	1	
	Expression Explanation			
	Clear the buffer for the Nth Com Port (N as denoted by Var 1).			

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1			◎
Var 2			◎

Example

➢ Var 1 and var 2 can only be Constant.



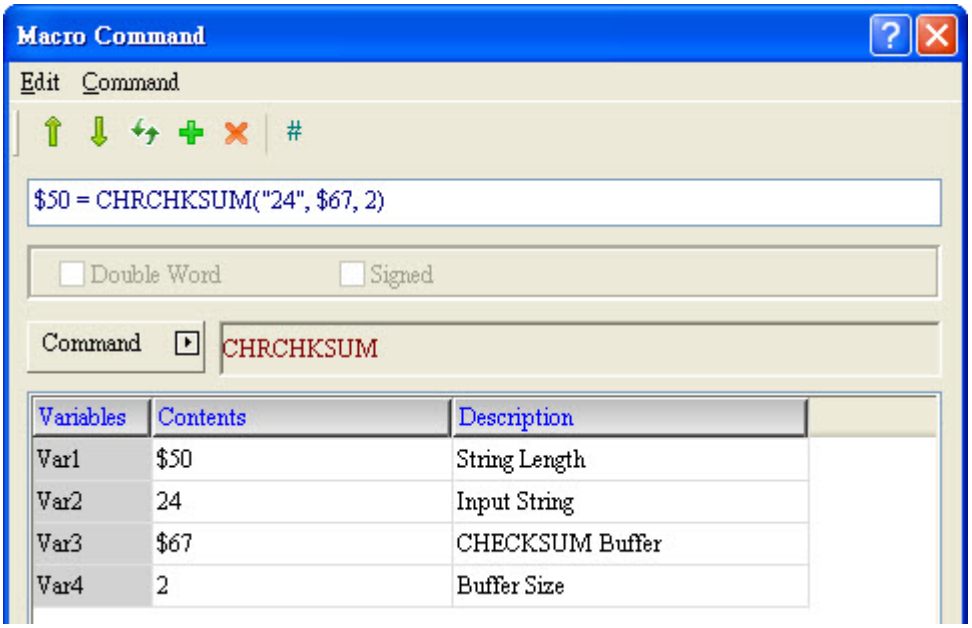
■ CHRCHKSUM (Calculation of String Length and Checksum)

<table>
<tr><th>Expression</th><th colspan="4">What Variables Represent</th><th>NOTE</th></tr>
<tr><td rowspan="7">Var 1 = CHRCHKSUM ("Var 2", Var 3, Var 4) (W)</td><td>Var 1</td><td colspan="3">String length</td><td rowspan="7">W : Word</td></tr>
<tr><td>Var 2</td><td colspan="3">Inputted string</td></tr>
<tr><td>Var 3</td><td colspan="3">Memory address to store string</td></tr>
<tr><td rowspan="2">Var 4</td><td rowspan="2">Format to display the checksum</td><td>1 Byte</td><td>1</td></tr>
<tr><td>2 Bytes (Word)</td><td>2</td></tr>
<tr><th colspan="4">Expression Explanation</th></tr>
<tr><td colspan="4">Calculate the string length and checksum and save them in Var 1</td></tr>
<tr><td colspan="6">* the string length for string stored in Var 1 will be different based on the format set in Var 4.
* if the inputted string is “345” and Var 4 is set to 2, then the Var 1 string length will be 5; or else if Var 4 is set to 1, then the Var 1 string length will be 4. (based on BYTE)</td></tr>
</table>

Variable	Memory Usage			
	Internal Memory	PLC Register	String	Constant
Var 1	◎			
Var 2			◎	
Var 3	◎			
Var 4				◎ (Can only be 1 and 2)

Example

➢ **Example 1:**



$50 = CHRCHECKSUM ("24" , $67, 2)

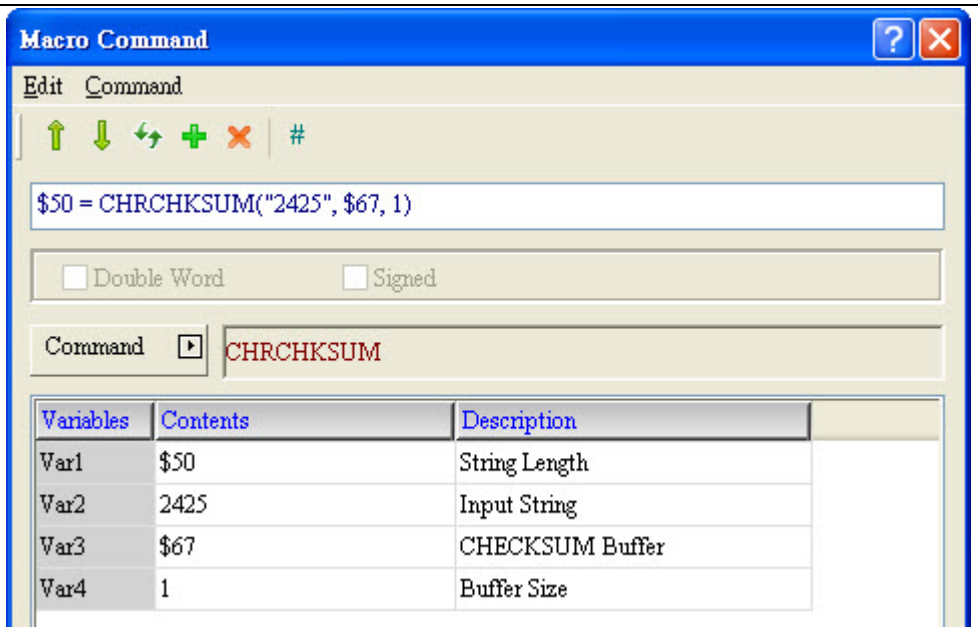
String length $50		Address to store string length $67		Checksum of the stored string length $68	
4	=	0X34	0X32	0X66	0X00

0X34
+ 0X32
0X66

Low Byte	High Byte

2 means the checksum takes 2 bytes to display

➢ **Example 2:**



$50 = CHRCHECKSUM ("2425" , $67, 1)

String length		Address to store string length				Checksum of the stored string length	
$50		$67		$68		$69	
5	=	0X34	0X32	0X35	0X32	0XCD	

0X34
0X32
0X35
+ 0X32
0XCD

Low Byte	High Byte

1 means the checksum takes 1 byte to display

■ LOCKCOM / UNLOCKCOM (Lock Com Port/Unlock Com Port)

Expression	What Variables Represent			NOTE
Var 1 = LOCKCOM (Var 2, Var 3) (W)	Var 1	Returned result		W : Word
		Failure	0	
		Successful	1	
	Var 2	COM 1	0	
		COM 2	1	
		COM 3	2	
	Var 3	Time out value		
	Expression Explanation			
	Lock Com Port			
UNLOCKCOM (Var 1) (W)	Var 1	COM 1	0	
		COM 2	1	
		COM 3	2	
	Expression Explanation			
	Unlock Com Port			

* If Lockcom is set to continuously wait without limit (or Var 3 = 0), it indicates that the Lockcom will be executed twice within the same macro and this will cause the HMI to become unresponsive.
* When the communication commands are used in different macros, such as Screen Cycle Macro, Clock Macro, Background Macro, Run Pre-action/Post-action Macro (ON/OFF Macro) and Screen Open/Close Macro, the different macros may have interferences and cause error results. The solution to this issue is to add the LOCKCOM and UNLOCKCOM commands before and after communication commands, and this is to ensure that communication will not be interrupted for other purposes and preserve integrity of transmitted messages.

Memory Usage (LOCKCOM)			
Variable	**Internal Memory**	**PLC Register**	**Constant**
Var 1	◎		
Var 2			◎
Var 3			◎

Memory Usage (UNLOCKCOM)			
Variable	**Internal Memory**	**PLC Register**	**Constant**
Var 1			◎

Followings are the examples describe the situations when properly applying, improperly applying and misapplying LOCKCOM / UNLOCKCOM macro command.

Example of Applying LOCKCOM / UNLOCKCOM (correctly use)

Background Macro	On Macro	Screen Cycle Macro
$50 = LOCKCOM(0,500) $51 = PUTCHARS($67, 3, 300) UNLOCKCOM(0)	$50 = LOCKCOM(0,500) $51 = GETCHARS($67, 3, 300) UNLOCKCOM(0)	$50 = LOCKCOM(0,500) $51 = PUTCHARS($67, 3, 300) UNLOCKCOM(0)

Assuming that communication commands are executed in three macros, if LOCKCOM (0, 500) is executed in Background macro, it means COM 1 is locked at the moment. Since COM1 has been locked by Background macro, On Macro and Screen Cycle macro will stop when executing to LOCKCOM (0, 500). LOCKCOM (0, 500) in On Macro or Xcreen Cycle macro can be executed until COM 1 is released (when Background macro executes UNLOCKCOM(0)). This could avoid data transmission and receiving error.

Example of Applying LOCKCOM / UNLOCKCOM (improperly use)

On Macro	Screen Cycle Macro
$51 = GETCHARS($67, 3, 300)	$50 = LOCKCOM(0,500) $51 = PUTCHARS($67, 3, 300) UNLOCKCOM(0)

Assuming that communication commands are executed in two macros, if LOCKCOM (0, 500) is executed in Screen Cycle Macro, it means COM 1 is locked at the moment. However, On Macro is not locked by LOCKCOM, which means it still can execute GETCHARS command. It does not have to wait until UNLOCKCOM command is executed by Screen Cycle Macro. This would result in data transmission and receiving error. Please avoid the situation that mentioned above.

Example of Applying LOCKCOM / UNLOCKCOM (misapplying)

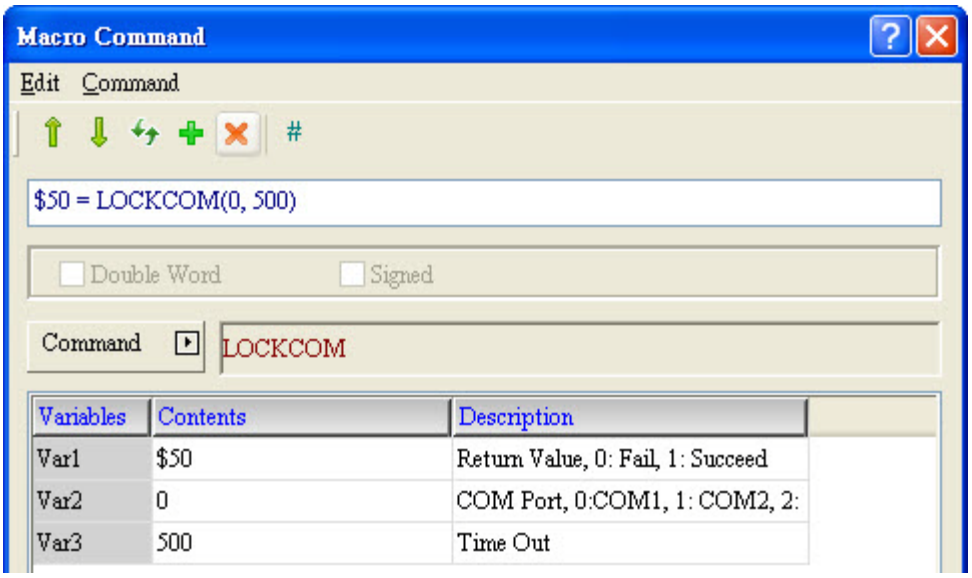
Background Macro	On Macro
$50 = LOCKCOM(0, 500) $51 = PUTCHARS($67, 3, 300)	UNLOCKCOM(0)

Assuming that COM port is locked in Background Macro and is used to transmit data,

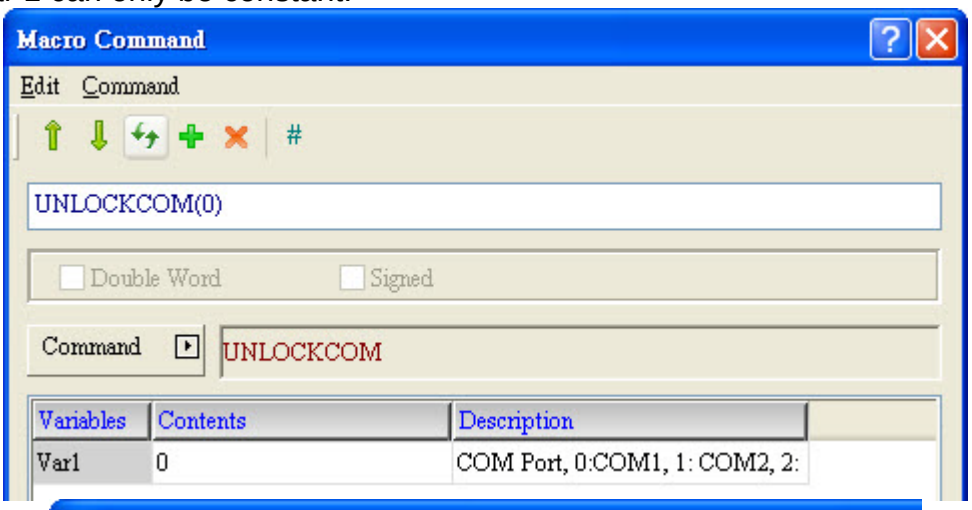
but COM Port cannot be unlocked in On Macro. This means commands to lock and unlock COM Port cannot be separated.

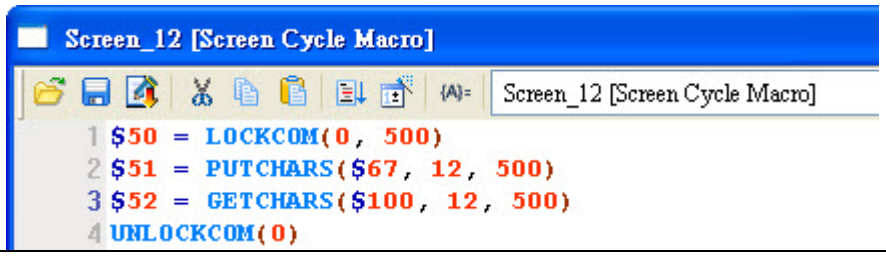
Example

- Var 1 is an internal memory address, and Var 2 and Var 3 can only be Constant



- Var 1 can only be constant.





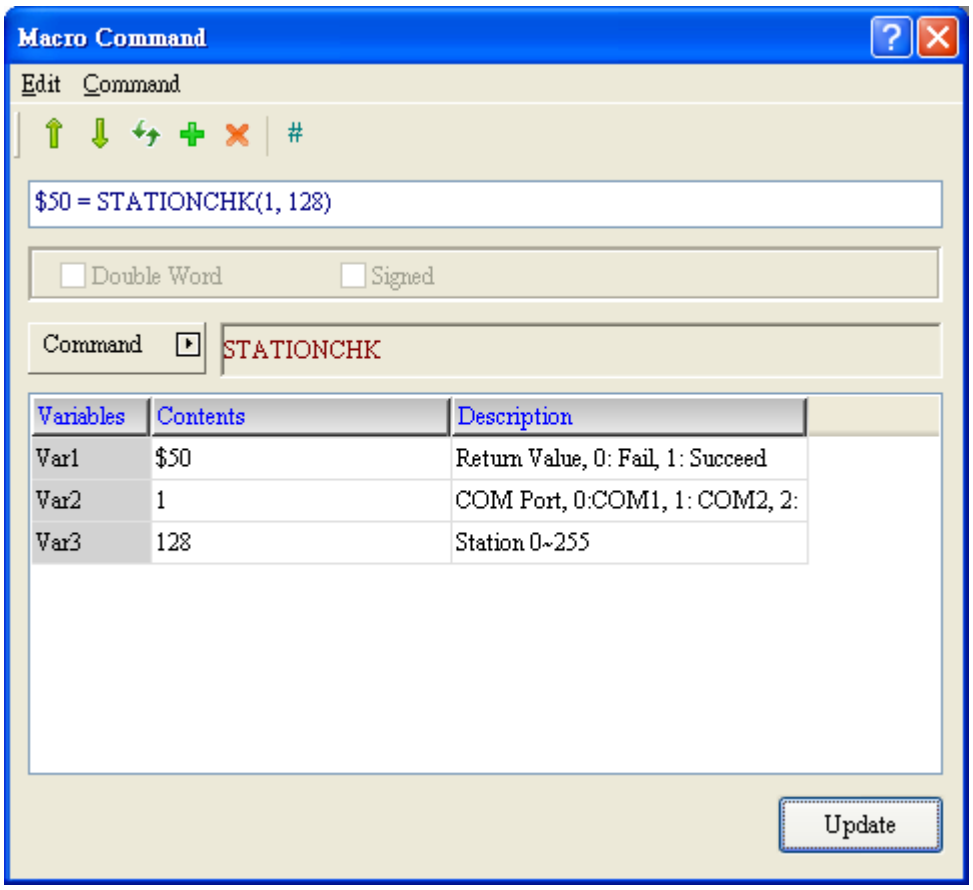
■ STATIONCHK (Check the communication of COM)

<table>
<tr><th>Expression</th><th colspan="3">What Variables Represent</th><th>NOTE</th></tr>
<tr><td rowspan="8">Var 1 = STATIONCHK (Var 2, Var 3) (W)</td><td rowspan="3">Var 1</td><td colspan="2">Returned Value</td><td rowspan="8">W：Word</td></tr>
<tr><td>Failure</td><td>0</td></tr>
<tr><td>Success</td><td>1</td></tr>
<tr><td rowspan="3">Var 2</td><td>COM 1</td><td>0</td></tr>
<tr><td>COM 2</td><td>1</td></tr>
<tr><td>COM 3</td><td>2</td></tr>
<tr><td>Var 3</td><td colspan="2">Station number</td></tr>
<tr><td colspan="3">Expression Explanation</td></tr>
<tr><td colspan="3">It can help to check the communication of COM.</td></tr>
<tr><td colspan="5">Note 1: This command can assess parameters in internal memory but it will not influence the communication.</td></tr>
</table>

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		
Var 2	◎		◎
Var 3	◎		◎

Example

- Var 1 is the internal memory and Var 2 and Var 3 are constants.

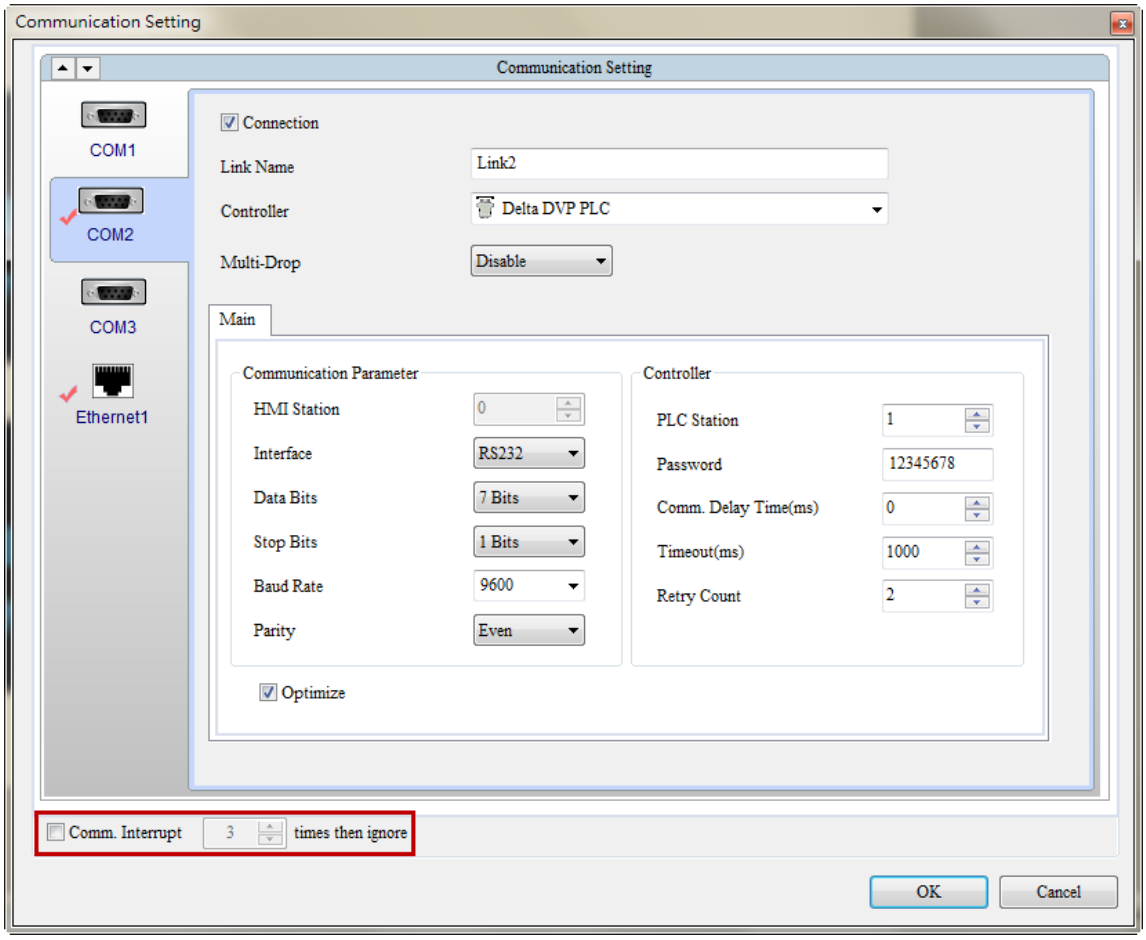


- When executing this macro, if the communication between COM2 and station 128 of PLC is normal, then the returned value will be $50 = 1. However, if the communication is abnormal, the returned value will be $50 = 0.

■ STATIONON (Set Station On)

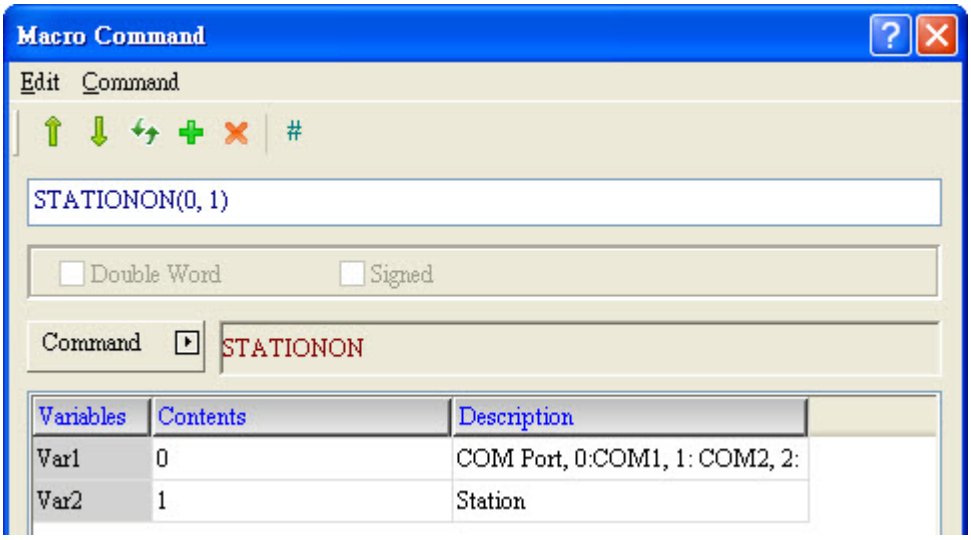
Expression	What Variables Represent			NOTE
STATIONON (Var 1, Var 2) (W)	Var 1	COM 1	0	W : Word
		COM 2	1	
		COM 3	2	
	Var 2	Station ID		
	Expression Explanation			
	Enable the Nth Com Port of Kth station and so that HMI can communicate with the controller of the Kth station (N^{th}: denoted in Var 1; K^{th}: denoted in Var 2)			

* The STATIONON macro command cannot be used when the "Comm. Interrupt XXX times then ignore" box is ticked [Options] → [Communication Setting].



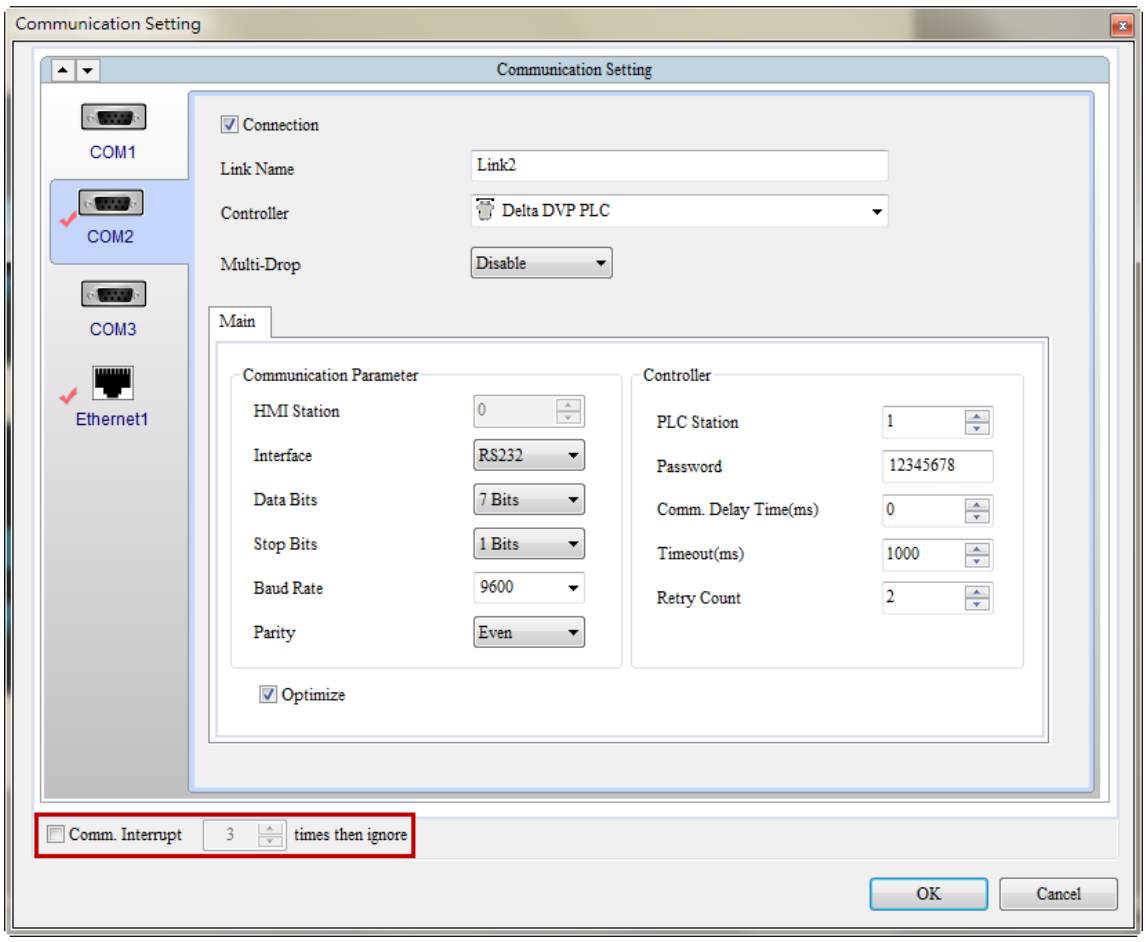
Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		◎
Var 2	◎		◎

Example
➢ Var 1 and Var 2 are constants and open Com 1 of Station #1.



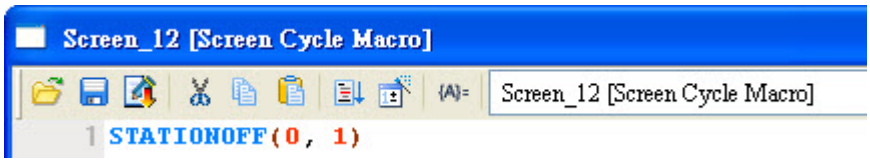
■ STATIONOFF (Set Station Off)

Expression	What Variables Represent			NOTE
STATIONOFF (Var 1, Var 2) (W)	Var 1	COM 1	0	W : Word
		COM 2	1	
		COM 3	2	
	Var 2	Station ID		
	Expression Explanation			
	Disable the Nth Com Port of Kth station and so that HMI cannot communicate with the controller of the Kth station (N^{th}: denoted in Var1; K^{th}: denoted in Var2).			
* The STATIONOFF macro command cannot be used when the “Comm. Interrupt XXX times then ignore” box is ticked [Options] → [Communication Setting].				



Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		◎
Var 2	◎		◎

Example
➢ Var 1 and Var 2 are constants and open Com 1 of Station #1.

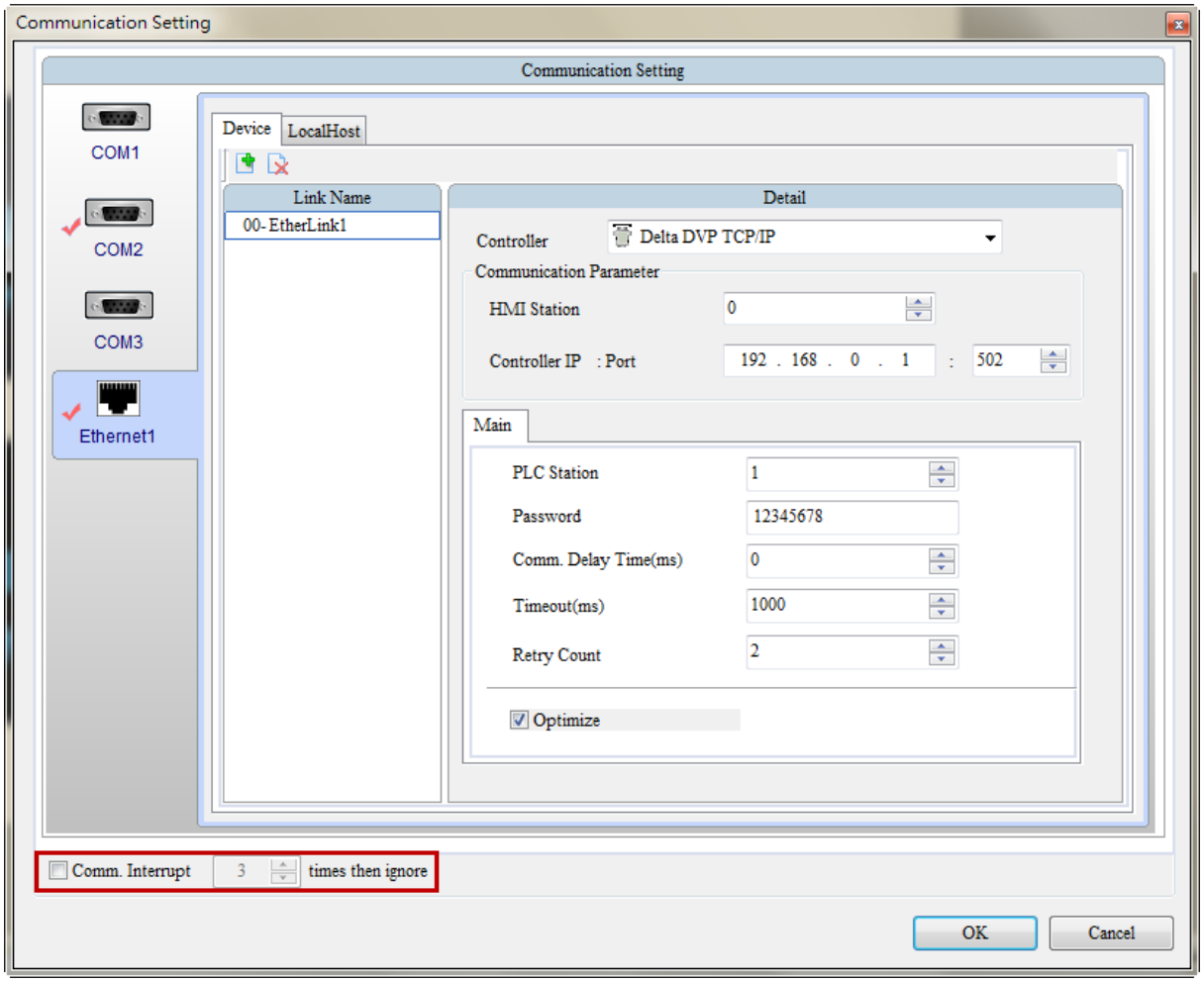


■ IPON (IP Address Activate)

Expression	What Variables Represent			NOTE
Var 1 = IPON (Var 2, Var 3, Var 4, Var 5, Var 6) (W)	Var 1	Returned Value		W：Word
		Failure	0	
		Success	1	
	Var 2	IP1		
	Var 3	IP2		
	Var 4	IP3		
	Var 5	IP4		
	Var 6	Port		
	Expression Explanation			
	Activate IP Var 2, Var 3, Var 4, Var 5 and Port Var 6. Then, HMI can communicate with the controller.			

Note 1：Var 6 cannot be used. When it is not using, all Port under this IP will be activated.

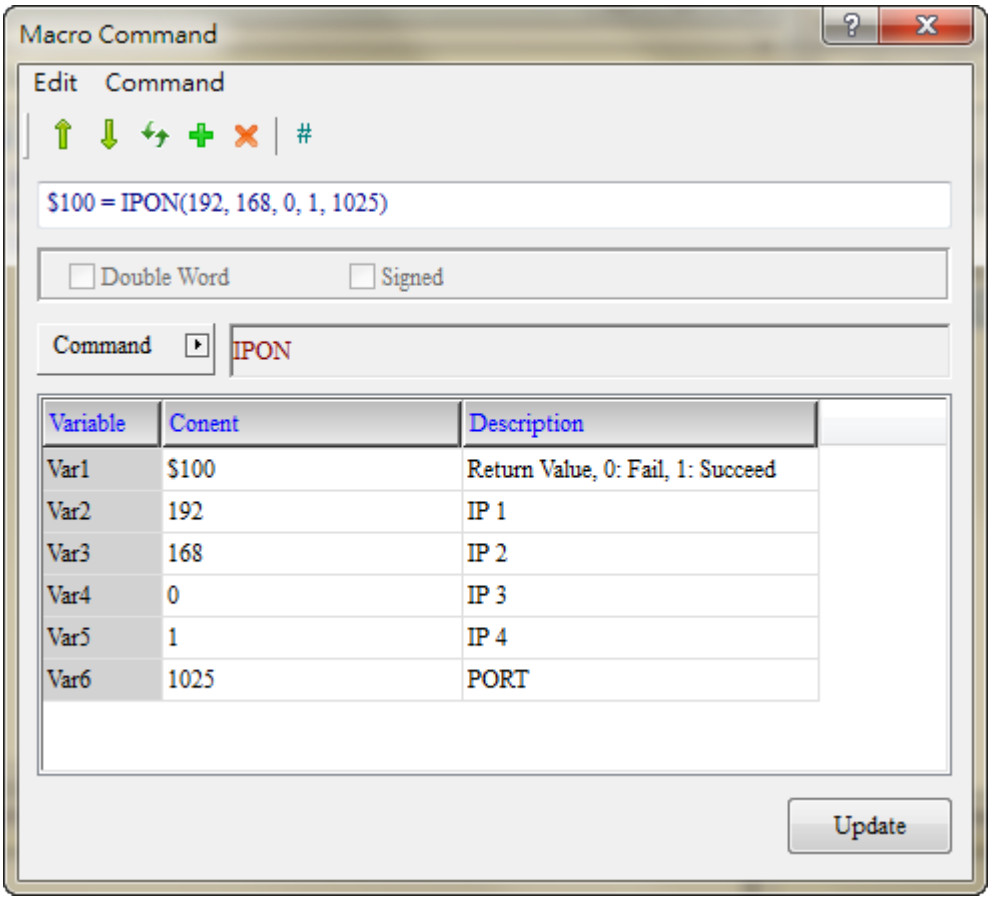
Note 2：IPON macro cannot be used with Communication Interrupt under 【Option】→【Communication Setting】.



Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		
Var 2	◎	◎	◎
Var 3	◎	◎	◎
Var 4	◎	◎	◎
Var 5	◎	◎	◎
Var 6	◎	◎	◎

Example

- Var 1 is internal register while Var 2 ~ Var 6 are constants. Activate IP 192.168.0.1 Port：1025.

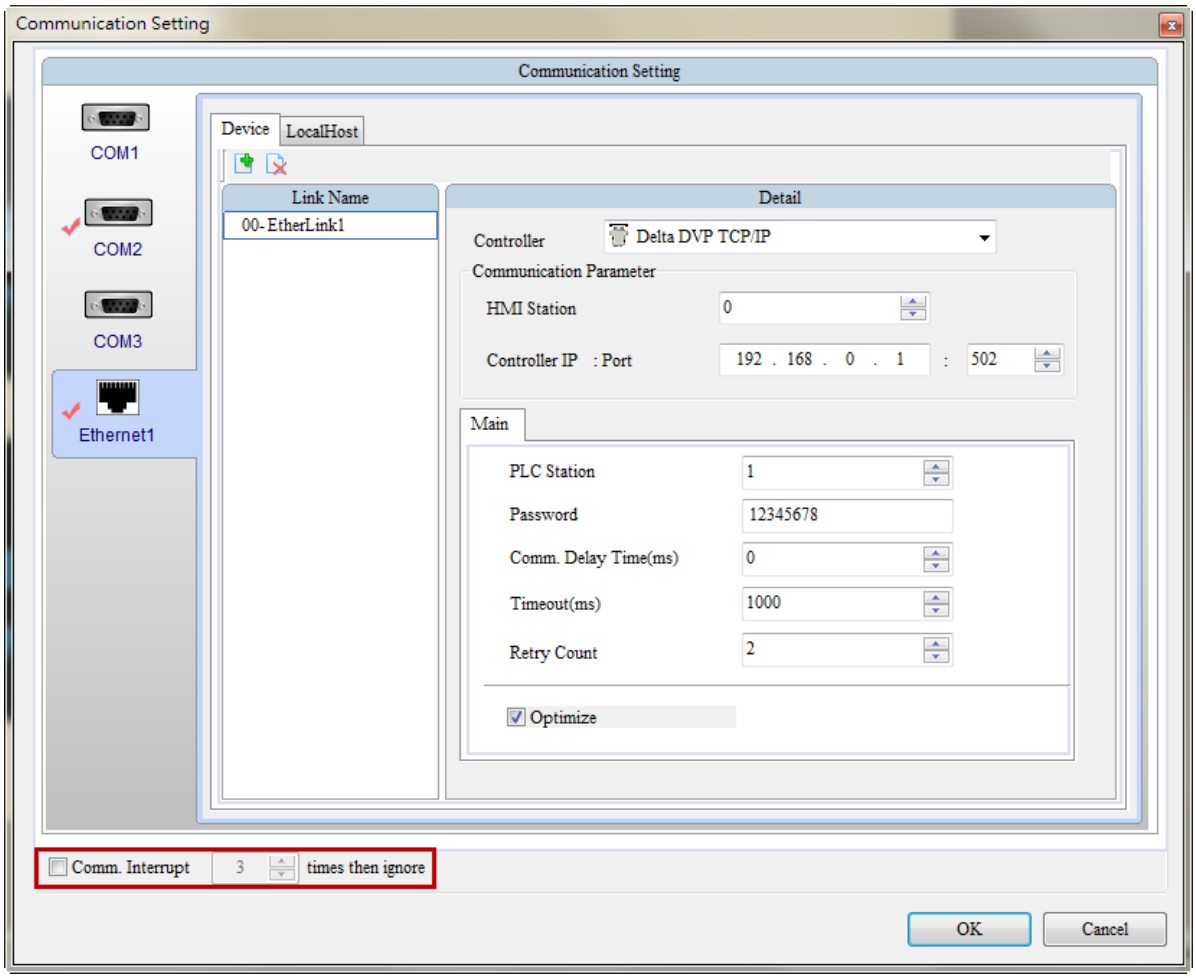


- If not using Var 6, then **$100 = IPON (192, 168, 0, 1).** To enable all port in IP 192.168.0.1.

■ IPOFF (Disable IP address)

Expression	What Variables Represent			NOTE
Var 1 = IPOFF (Var 2, Var 3, Var 4, Var 5, Var 6) (W)	Var 1	Returned Value		W：Word
		Failure	0	
		Success	1	
	Var 2	IP1		
	Var 3	IP2		
	Var 4	IP3		
	Var 5	IP4		
	Var 6	Port		
	Expression Explanation			
	Close IP Var 2, Var 3, Var 4, Var 5 and Port Var 6. Then, HMI will be unable to communicate with the controller of that station.			

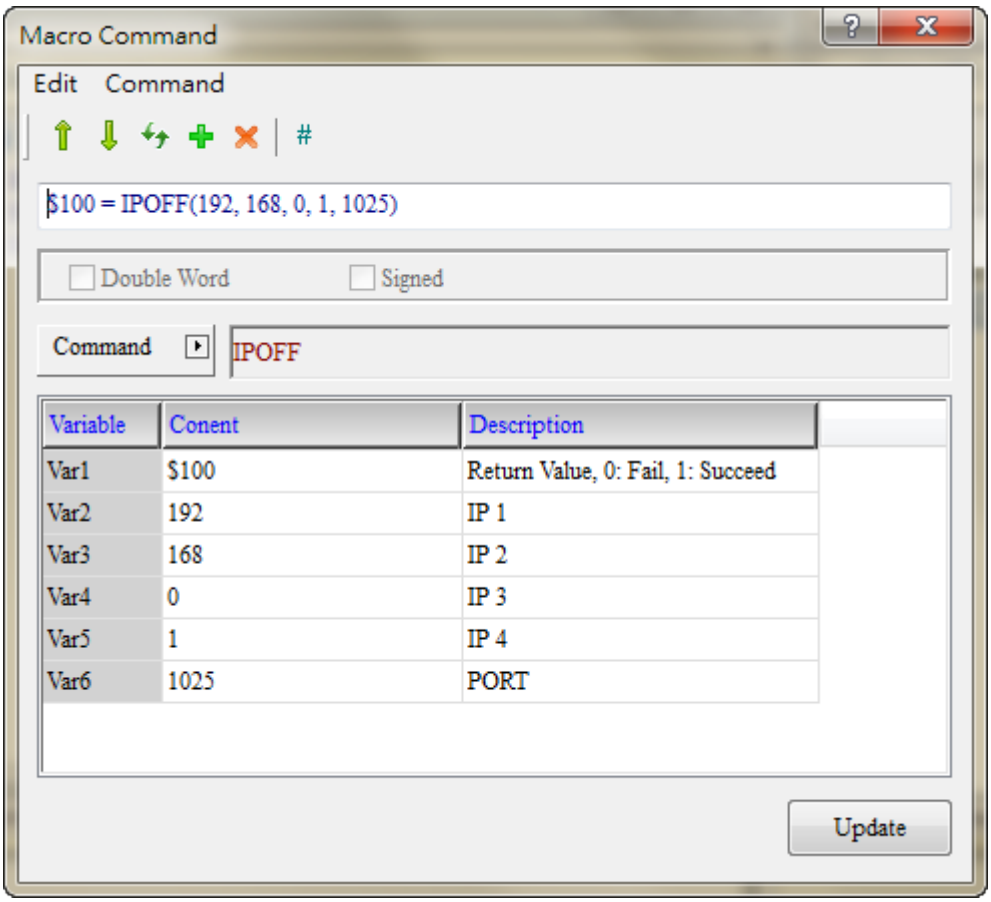
Note 1: Var 6 is not necessary. When it is not using, all Ports under the IP will be closed.
Note 2: IPOFF macro cannot be used with Communication Interrupt under 【Option】→【Communication Setting】.



Variables	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		
Var 2	◎	◎	◎
Var 3	◎	◎	◎
Var 4	◎	◎	◎
Var 5	◎	◎	◎
Var 6	◎	◎	◎

Example Description

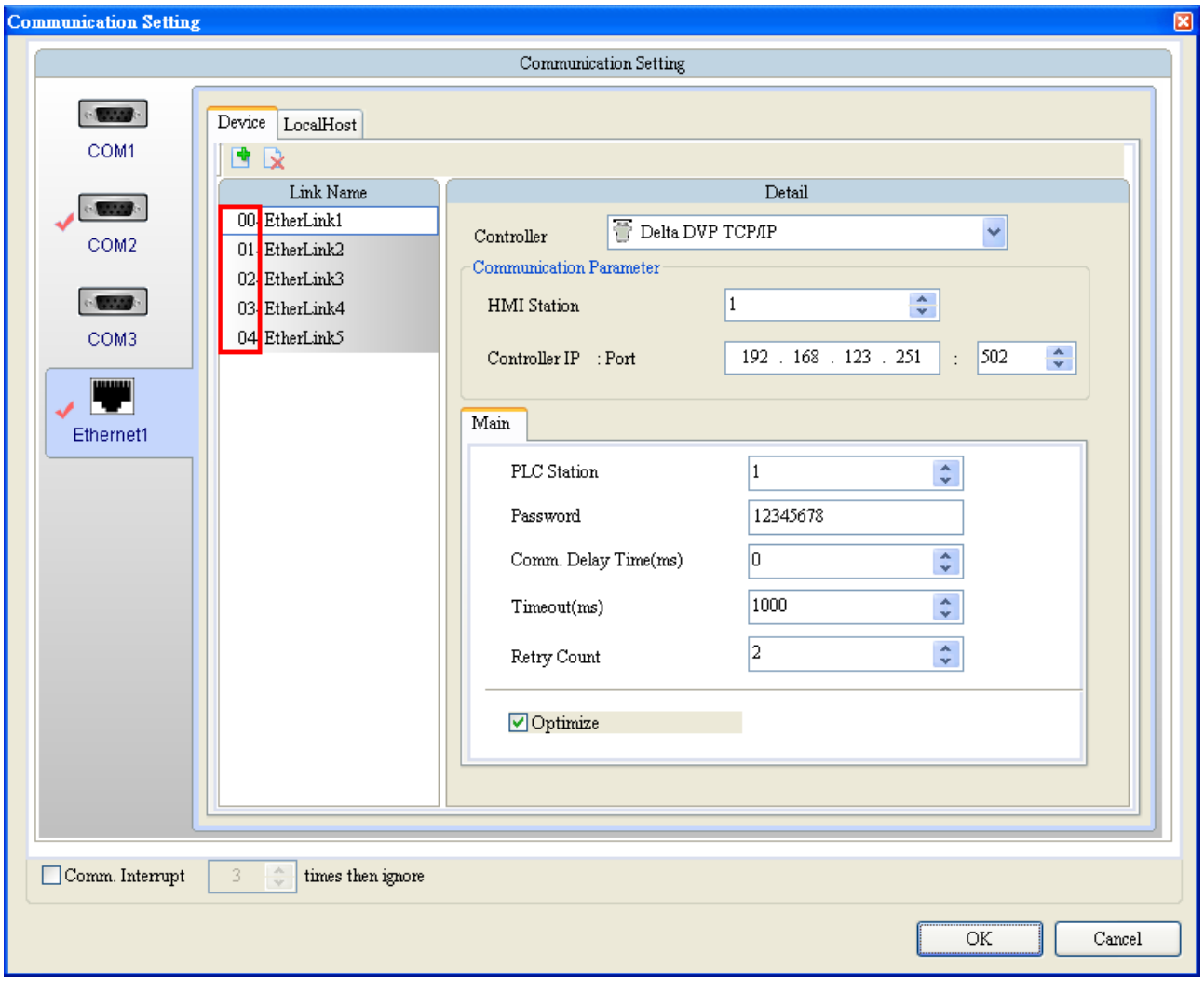
- Var 1 is internal register. Var 2 ~ Var 6 are constants. Close IP 192.168.0.1 Port：1025.



- If not use Var 6, **$100 = IPOFF (192, 168, 0, 1)**, close all ports in IP 192.168.0.1.

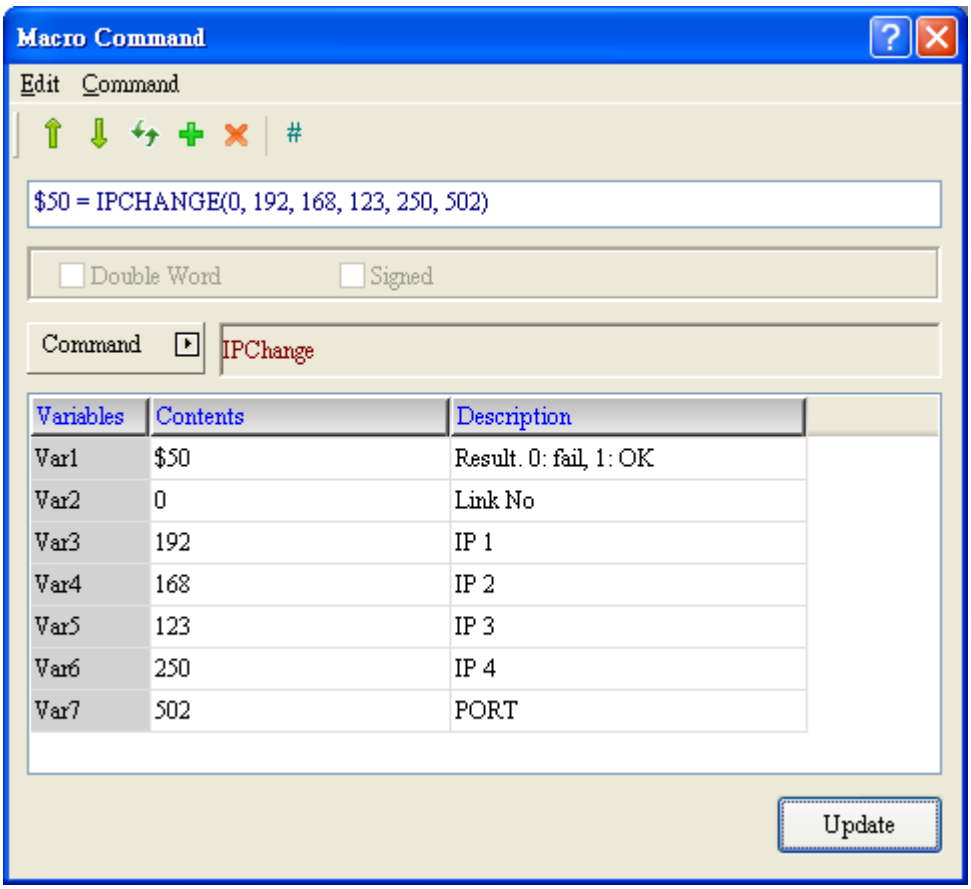
■ IPCHANGE (Change the IP and communication port of the controller)

<table>
<tr><th>Expression</th><th colspan="3">What Variables Represent</th><th>NOTE</th></tr>
<tr><td rowspan="12">Var 1 = IPCHANGE (Var 2, Var 3, Var 4, Var 5, Var 6, Var 7) (W)</td><td rowspan="3">Var 1</td><td colspan="2">Returned Value</td><td rowspan="12">W: Word</td></tr>
<tr><td>Failure</td><td>0</td></tr>
<tr><td>Success</td><td>1</td></tr>
<tr><td>Var 2</td><td colspan="2">Link No</td></tr>
<tr><td>Var 3</td><td colspan="2">IP1</td></tr>
<tr><td>Var 4</td><td colspan="2">IP2</td></tr>
<tr><td>Var 5</td><td colspan="2">IP3</td></tr>
<tr><td>Var 6</td><td colspan="2">IP4</td></tr>
<tr><td>Var 7</td><td colspan="2">Port</td></tr>
<tr><td colspan="3">Expression Explanation</td></tr>
<tr><td colspan="3">Change the IP setting of PLC, Var3.Var4.Var5.Var6 and Port Var7 so that HMI can change the Link information and re-connect to another PLC.</td></tr>
<tr><td colspan="5">Note 1: Link No. starts from zero.</td></tr>
</table>



Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		
Var 2	◎	◎	◎
Var 3	◎	◎	◎
Var 4	◎	◎	◎
Var 5	◎	◎	◎
Var 6	◎	◎	◎
Var 7	◎	◎	◎

Example
➢ Var 1 is the internal memory and Var 2 ~ Var7 are constants.



➢ Change the IP of PLC to 192.168.123.250 and Port to 502.

24-3-9 Drawing

HMI supports a list of drawing commands, including Rectangle, Line, Point and Circle for users to draw different graphics. They are detailed below.

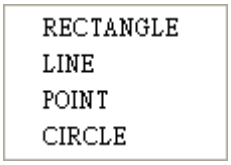


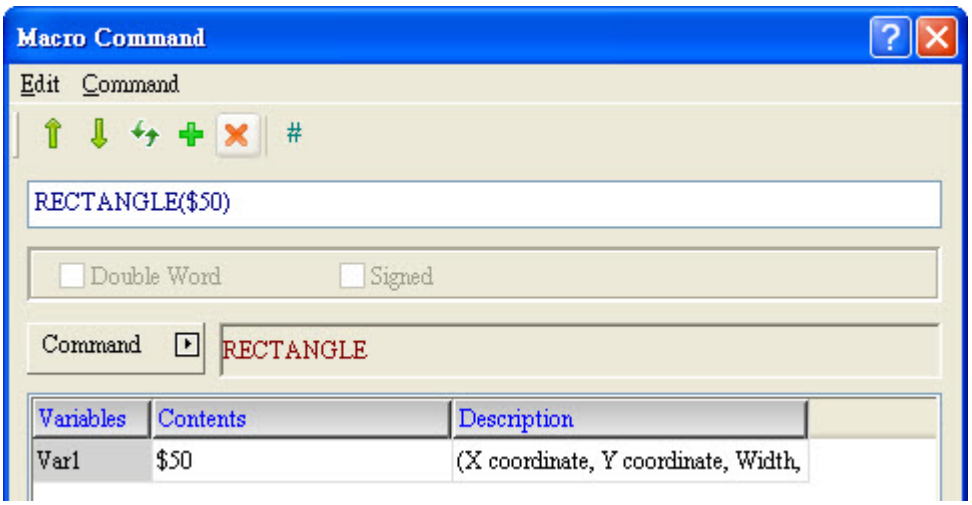
Figure 24-3-9-1 Drawing

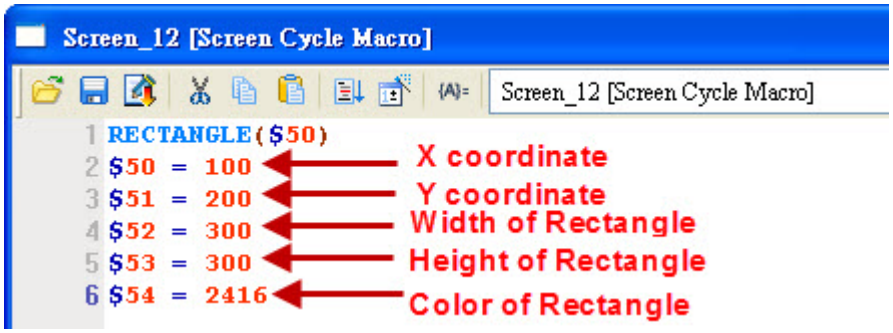
■ RECTANGLE (Draw Rectangle)

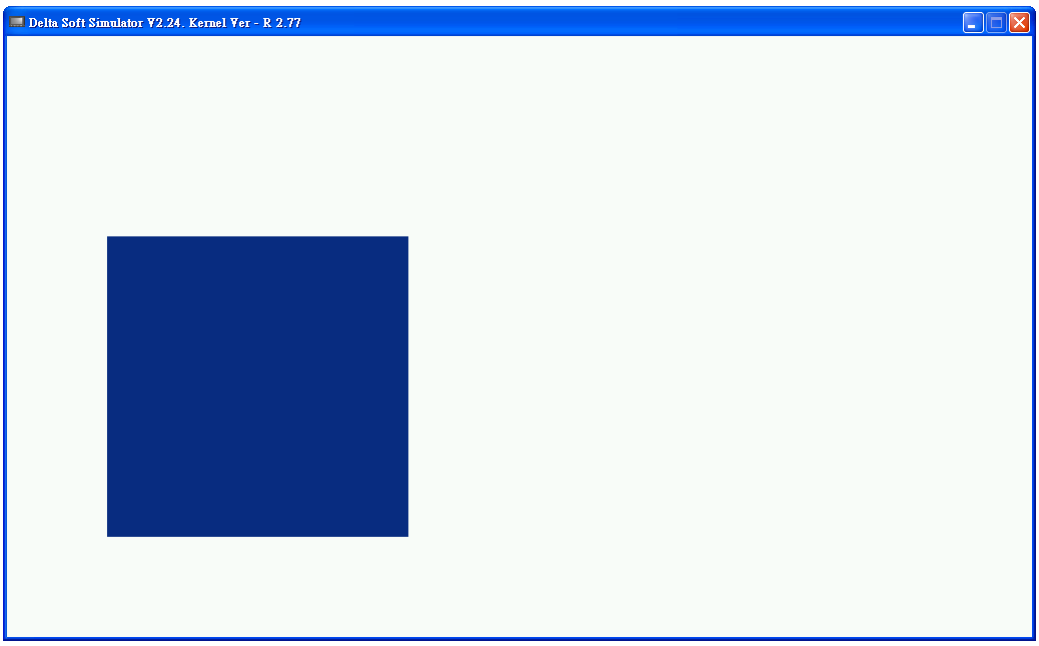
<table>
<tr><th>Expression</th><th colspan="2">What Variables Represent</th><th>NOTE</th></tr>
<tr><td rowspan="7">RECTANGLE (Var 1) (W)</td><td>Var 1</td><td>upper-left X-coordinate</td><td rowspan="7">W : Word</td></tr>
<tr><td>Var 1 + 1</td><td>upper-left Y-coordinate</td></tr>
<tr><td>Var 1 + 2</td><td>width of the rectangle</td></tr>
<tr><td>Var 1 + 3</td><td>height of the rectangle</td></tr>
<tr><td>Var 1 + 4</td><td>color of the rectangle</td></tr>
<tr><th colspan="2">Expression Explanation</th></tr>
<tr><td colspan="2">Continuous addresses to draw a rectangle.</td></tr>
</table>

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		

Example
➢ Var 1 is an internal memory address.


Macro Command
Edit Command
#
RECTANGLE($50)
Double Word
Signed
Command
RECTANGLE
Variables
Contents
Description
Var1
$50
(X coordinate, Y coordinate, Width,


Screen_12 [Screen Cycle Macro]
Screen_12 [Screen Cycle Macro]
1 RECTANGLE($50)
2 $50 = 100
3 $51 = 200
4 $52 = 300
5 $53 = 300
6 $54 = 2416
X coordinate
Y coordinate
Width of Rectangle
Height of Rectangle
Color of Rectangle


Delta Soft Simulator V2.24. Kernel Ver - R 2.77

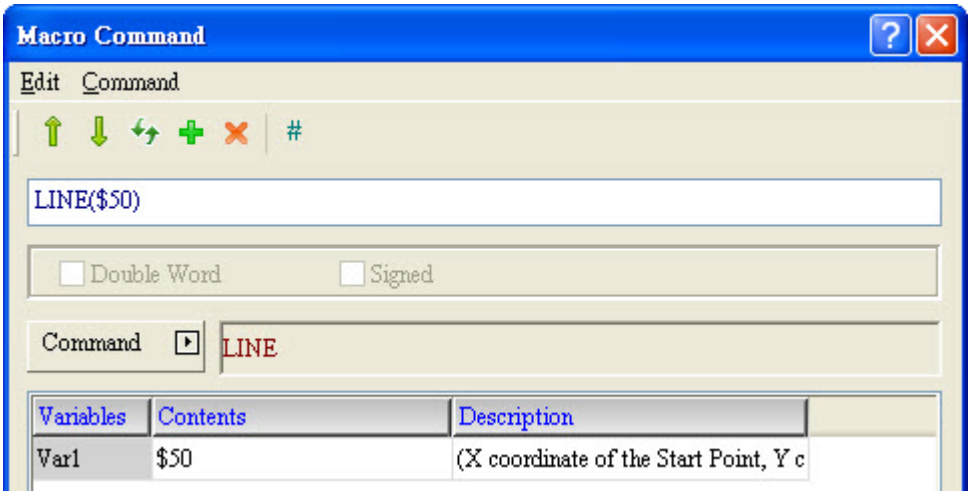
■ LINE (Draw Line)

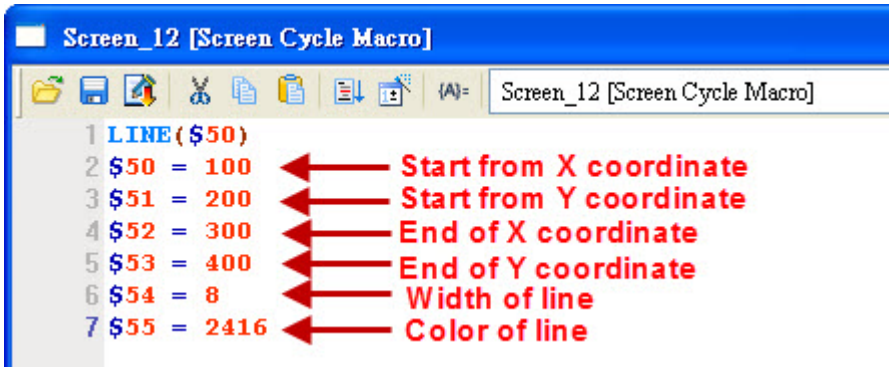
Expression	What Variables Represent		NOTE
LINE (Var 1) (W)	Var 1	Starting X-coordinate	
	Var 1 + 1	Starting Y-coordinate	W : Word
	Var 1 + 2	Ending X-coordinate	
	Var 1 + 3	Ending Y-coordinate	
	Var 1 + 4	Width of the line	
	Var 1 + 5	Color of the line	
	Expression Explanation		
	Continuous addresses to draw a line.		

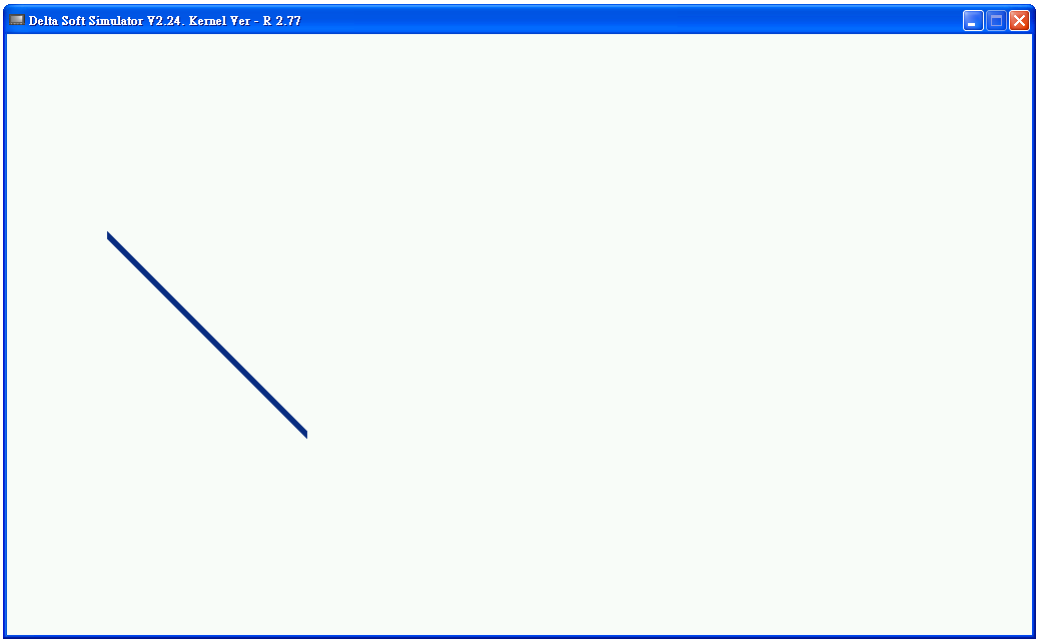
Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		

Example

➢ Var 1 is an internal memory address.






Delta Soft Simulator V2.24. Kernel Ver - R 2.77

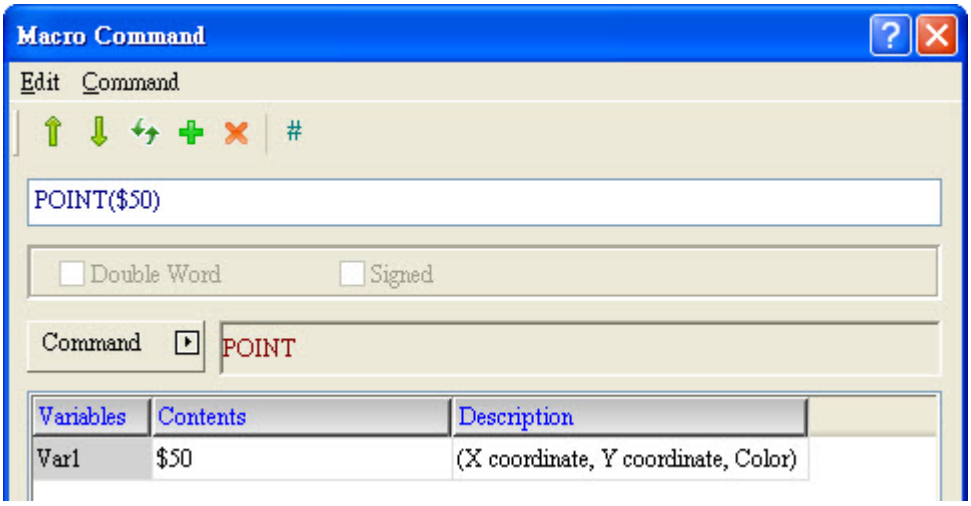
■ POINT (Draw Point)

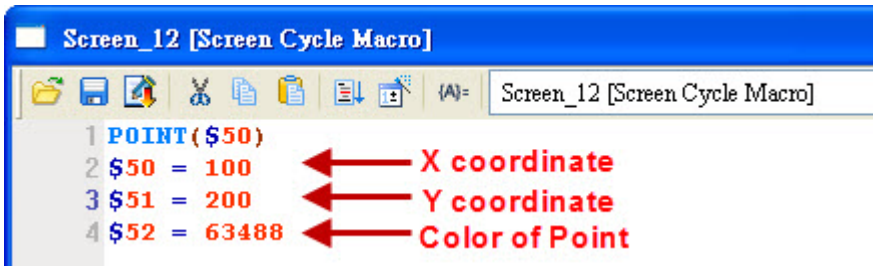
Expression	What Variables Represent		NOTE
POINT (Var 1) (W)	Var 1	X-coordinate	
	Var 1 + 1	Y-coordinate	W : Word
	Var 1 + 2	Color of the point	
	Expression Explanation		
	Continuous addresses to draw a point.		

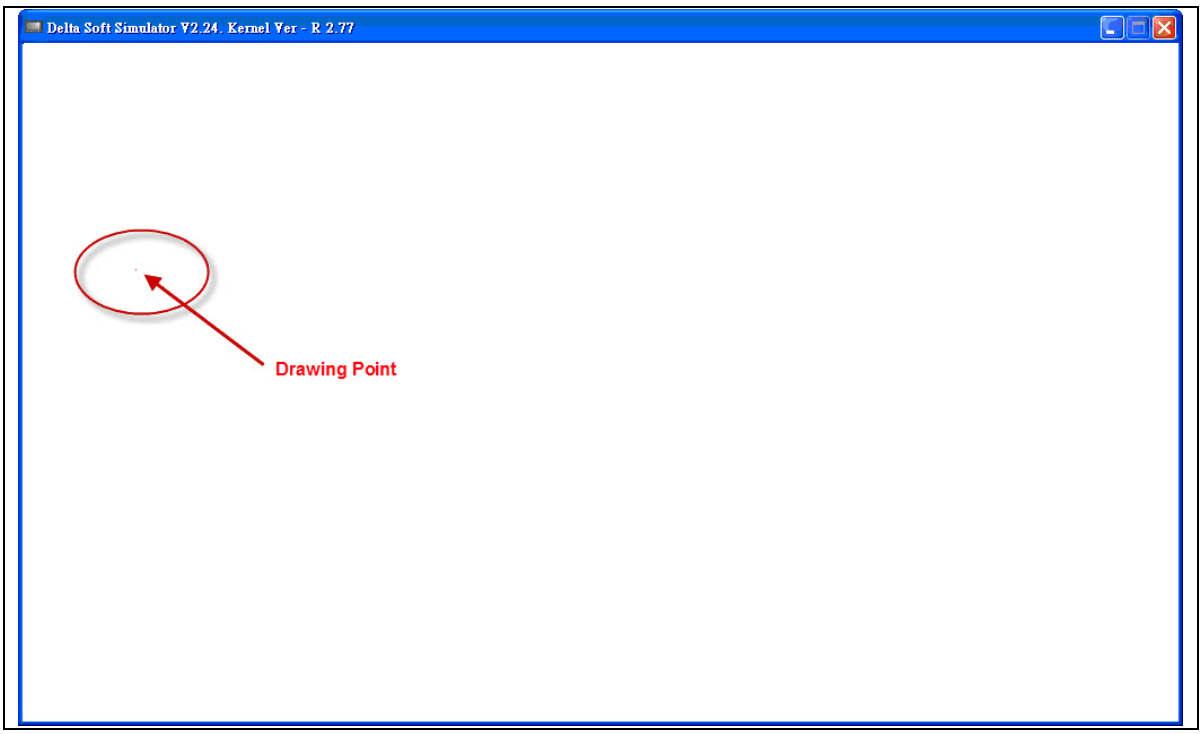
Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		

Example

➢ Var 1 is an internal memory address.





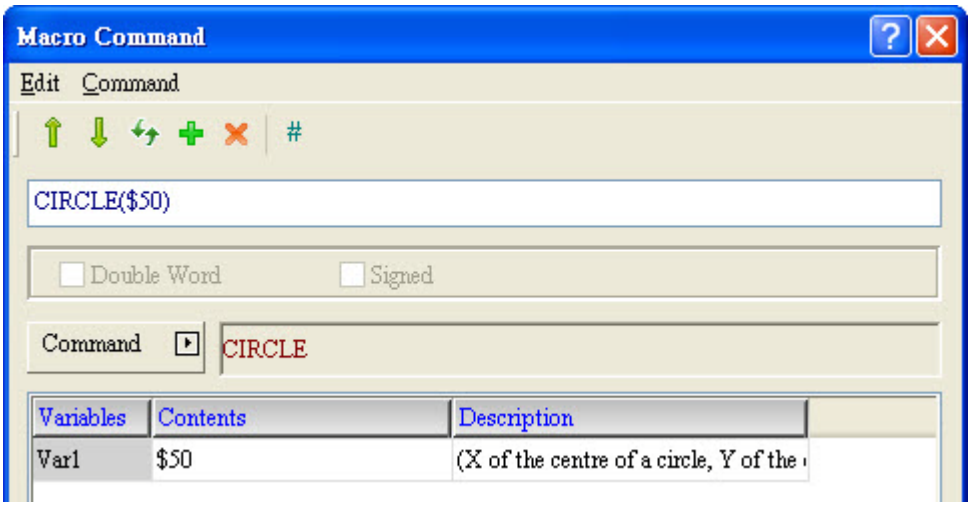


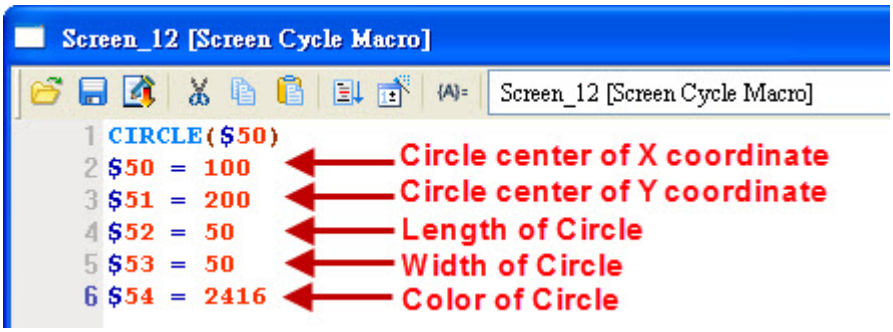
■ CIRCLE (Draw Ellipse)

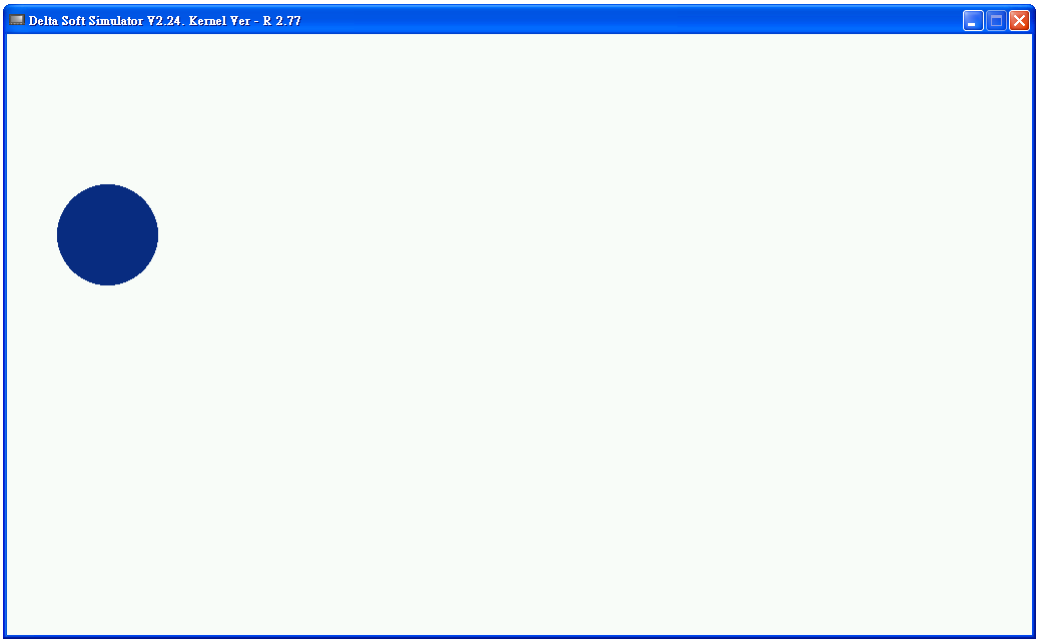
Expression	What Variables Represent		NOTE
CIRCLE (Var 1) (W)	Var 1	X-coordinate of the center of the ellipse	W : Word
	Var 1 + 1	Y-coordinate of the center of the ellipse	
	Var 1 + 2	length of the ellipse	
	Var 1 + 3	width of the ellipse	
	Var 1 + 4	color of the ellipse	
	Expression Explanation		
	Continuous addresses to draw a point.		

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		

Example
➢ Var 1 is an internal memory address.


Macro Command
Edit Command
#
CIRCLE($50)
Double Word
Signed
Command
CIRCLE
Variables
Contents
Description
Var1
$50
(X of the centre of a circle, Y of the


Screen_12 [Screen Cycle Macro]
Screen_12 [Screen Cycle Macro]
1 CIRCLE($50)
2 $50 = 100
3 $51 = 200
4 $52 = 50
5 $53 = 50
6 $54 = 2416
Circle center of X coordinate
Circle center of Y coordinate
Length of Circle
Width of Circle
Color of Circle


Delta Soft Simulator V2.24. Kernel Ver - R 2.77

24-3-10 File Access

The related commands of File Access include FileSlotRead, FileSlotWrite, FileSlotRemove, FileSlotGetLength, FileSlotExport and FileSlotImport. Please refer to the followings for further descriptions.

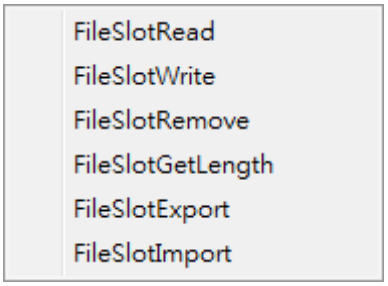


Figure 24-3-10-1 File Access

■ FileSlotRead (Read the File)

<table>
<tr><th>Expression</th><th colspan="3">What Variables Represent</th><th>NOTE</th></tr>
<tr><td rowspan="9">Var 1 = FileSlotRead (Var 2, Var 3, Var 4, Var 5) (W)</td><td rowspan="3">Var 1</td><td colspan="2">Returned Value</td><td rowspan="9">W：Word</td></tr>
<tr><td>Failure</td><td>0</td></tr>
<tr><td>Success</td><td>1</td></tr>
<tr><td>Var 2</td><td colspan="2">FileSlot ID</td></tr>
<tr><td>Var 3</td><td colspan="2">Target Address</td></tr>
<tr><td>Var 4</td><td colspan="2">Start address of FileSlot content (DW)</td></tr>
<tr><td>Var 5</td><td colspan="2">Word data length</td></tr>
<tr><td colspan="3">Expression Explanation</td></tr>
<tr><td colspan="3">Read FileSlot content of Var 2, whose starting address is specified by Var 4 and data length specified by Var 5 to the target address which is specified by Var 3. Then, return the value to Var 1.</td></tr>
<tr><td colspan="5">Note: If the specified FileSlot file does not exist, please use FileSlotWrite command to create the file first.</td></tr>
</table>

Variables	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		
Var 2	◎	◎	◎
Var 3	◎	◎	
Var 4	◎	◎	◎
Var 5	◎	◎	◎

■ FileSlotWrite (Write the File)

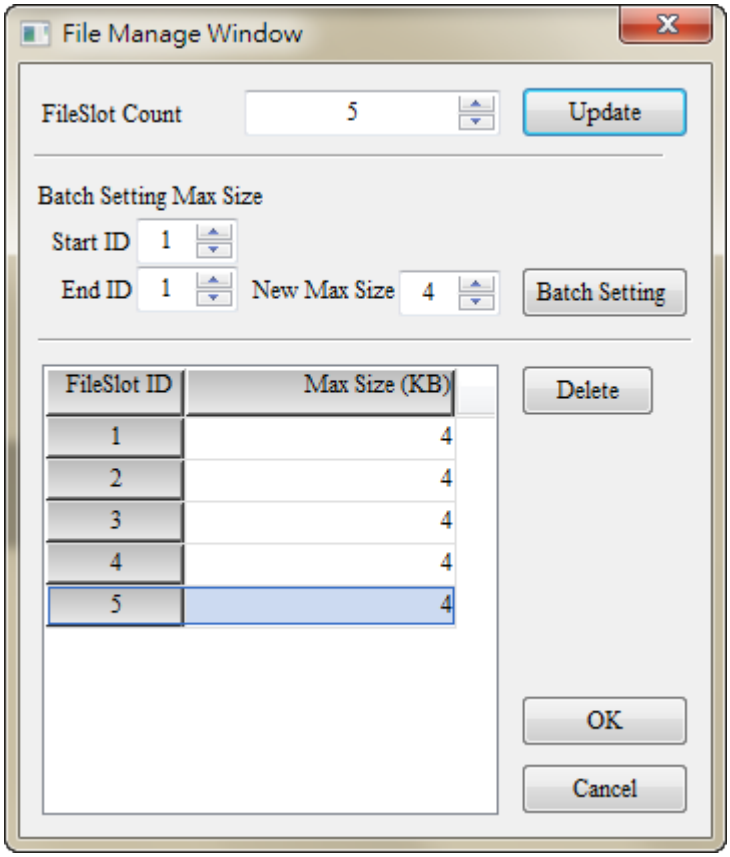
Expression	What Variables Represent			NOTE
Var 1 = FileSlotWrite (Var 2, Var 3, Var 4, Var 5) (W)	Var 1	Returned Value		W：Word
		Failure	0	
		Success	1	
	Var 2	FileSlot ID		
	Var 3	Source Address		
	Var 4	Start position of FileSlot content (DW)		
	Var 5	Word data length		
	Expression Explanation			
	Read Var 5 Word starting from Var 3 and regard Var 4 as start address to write FileSlot of Var 2. Then, return the result to Var 1.			

Variables	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		
Var 2	◎	◎	◎
Var 3	◎	◎	
Var 4	◎	◎	◎
Var 5	◎	◎	◎

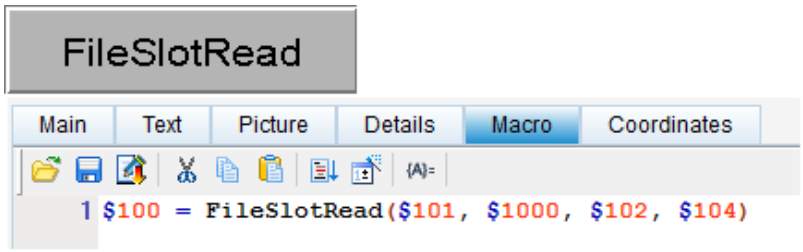
Example

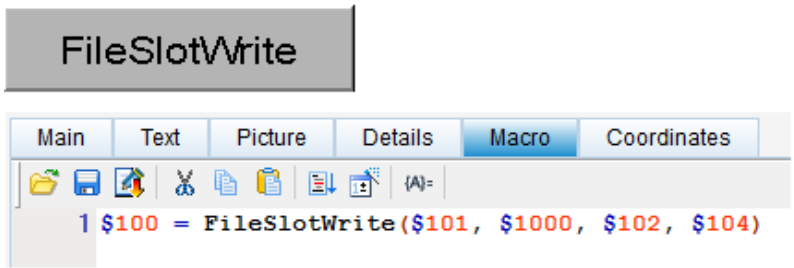
➢ Use FileSlotWrite to create the file. Then, use FileSlotRead to access the data. See the descriptions below:

Step 1: Enter 【Option】→【File Manage】 to setup FileSlot.

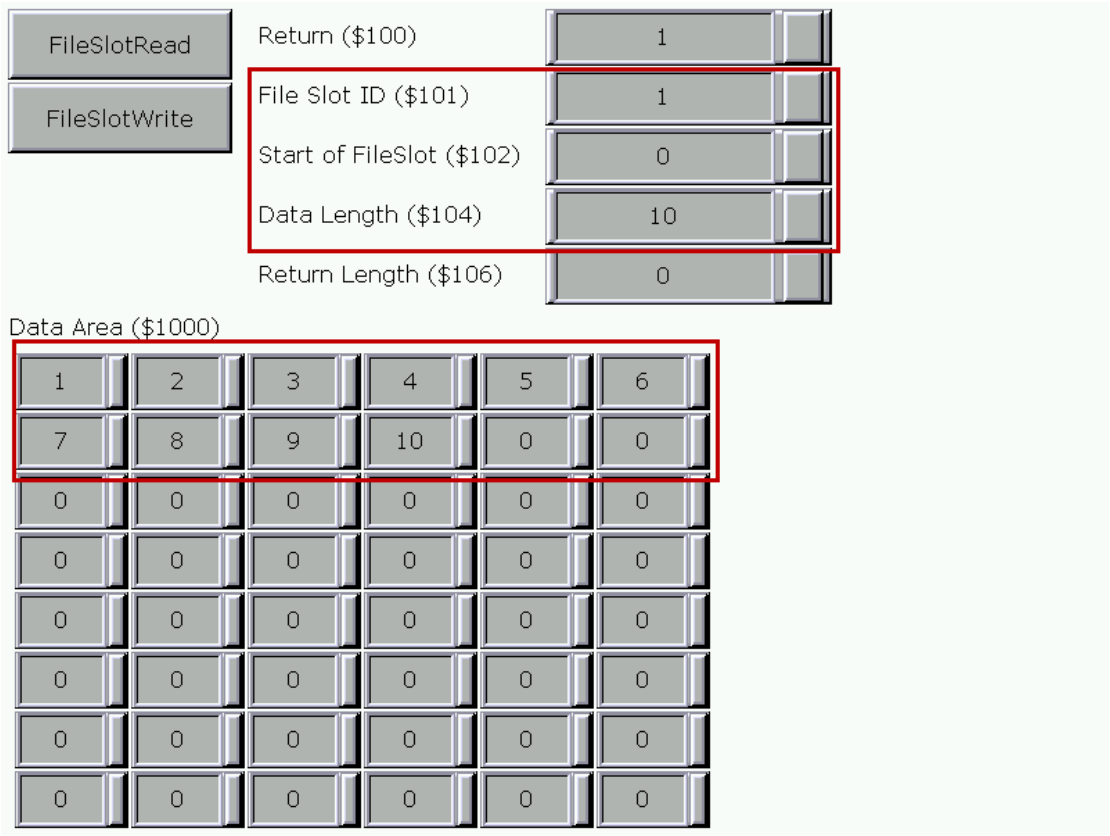


Step 2: Create two momentary buttons and compile ON macro.

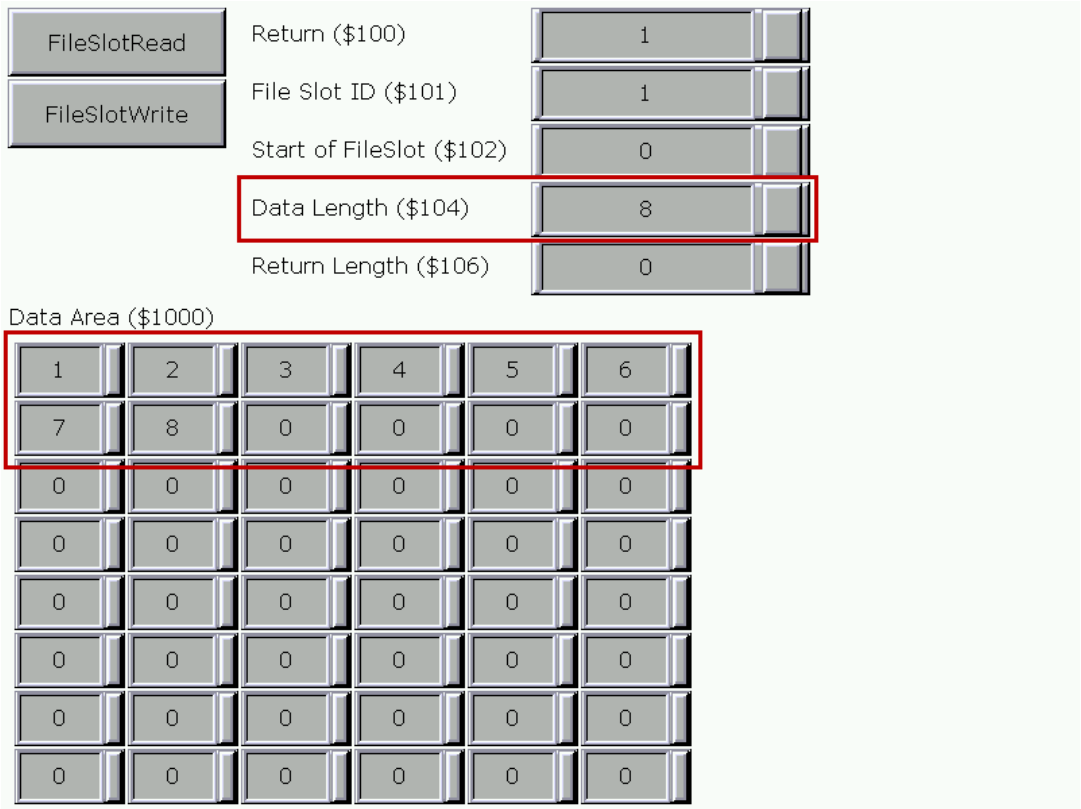




Step 3: Compile the screen and download it to HMI. Regard $1000 as start address to edit 10 Words. Set $101 to 1, $102 to 0 and $104 to 10. When FileSlotWrite is triggered, data of $1000 ~ $1009 will be written into the FileSlot whose ID is 1 and start to write from address 0.



Step 4: Reset the data of $1000 ~ $1009 to 0. Set $104 to 8. When FileSlotRead is triggered, the FileSlot whose ID is 1 will be written into $1000 ~ $1007 from the 8th Word starting with the 0th address.



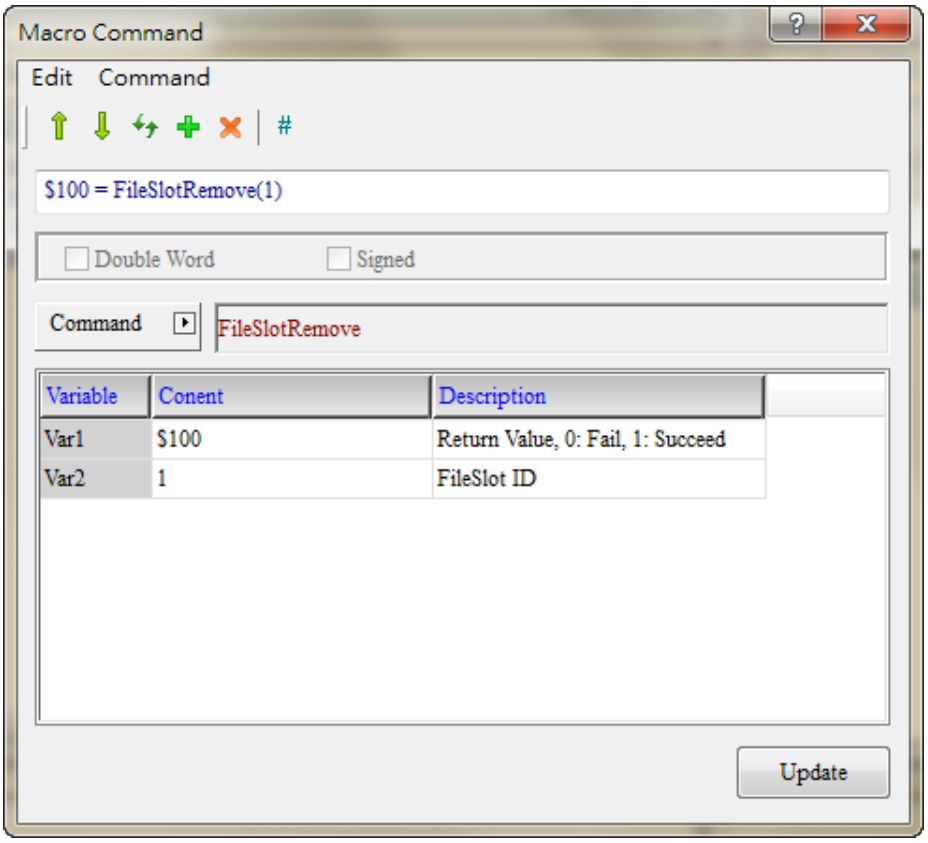
■ FileSlotRemove (Remove the File)

Expression	What Variables Represent			NOTE
Var 1 = FileSlotRemove (Var 2) (W)	Var 1	Returned Value		W：Word
		Failure	0	
		Success	1	
	Var 2	FileSlot ID		
	Expression Explanation			
	Remove FileSlot of Var 2 and return the result to Var 1.			

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		
Var 2	◎	◎	◎

Example

➢ Var 1 is internal memory and Var 2 is the constant. Remove FileSlot whose ID is 1 (Var 2) and save the returned value in $100 (Var 1).



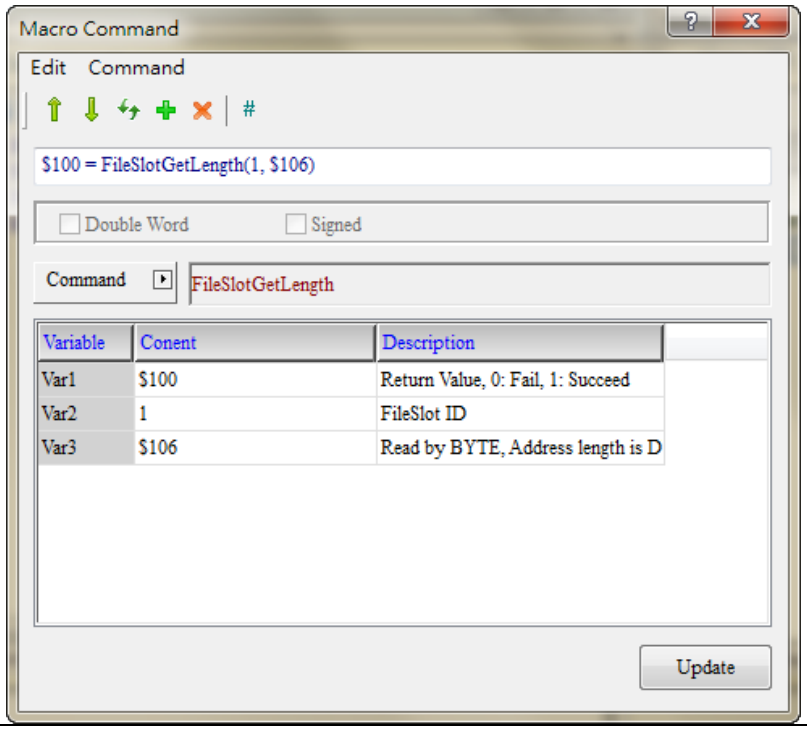
■ FileSlotGetLength (Read the file length)

Expression	What Variables Represent			NOTE
Var 1 = FileSlotGetLength (Var 2, Var 3) (W)	Var 1	Returned Value		W：Word
		Failure	0	
		Success	1	
	Var 2	FileSlot ID		
	Var 3	Returned Value of FileSlot Length (DW)		
	Expression Explanation			
	Save the FileSlot length of Var 2 in Var 3 and return the result to Var 1.			
Note: The unit of accessing length is BYTE.				

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		
Var 2	◎	◎	◎
Var 3	◎	◎	

Example

➢ Var 1 and Var 3 are internal memory and Var 2 is constant. Acquire the length of FileSlot whose ID is 1 (Var2) and save it in $106. Then, save the returned value in $100 (Var 1). If the FileSlot length is 10 Words, the value returned to $106 is 20 (BYTE).



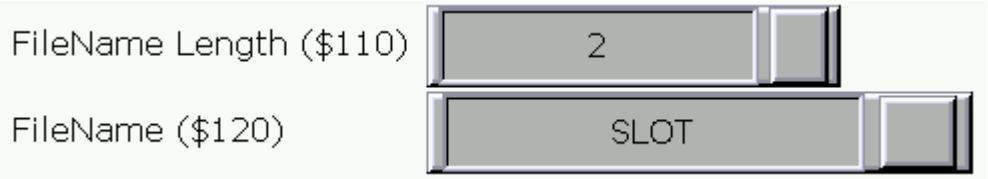
■ FileSlotExport (Export the File)

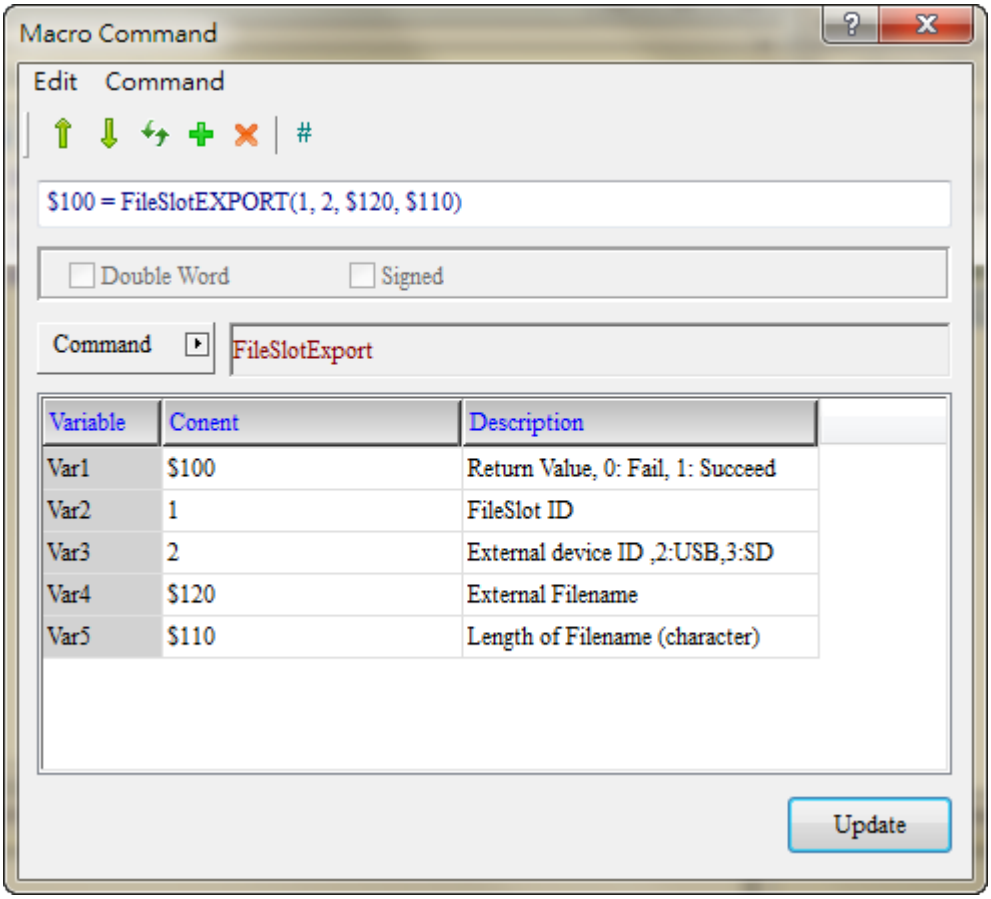
Expression	What Variables Represent				NOTE
Var 1 = FileSlotExport (Var 2, Var 3, Var 4, Var 5) (W)	Var 1	Returned Value			W：Word
		Failure	0		
		Success	1		
	Var 2	FileSlot ID			
	Var 3	File Export Device	USB Disk	2	
			SD Card	3	
	Var 4	Exported File Name			
	Var 5	Length of Exported File Name			
	Expression Explanation				
	Export Var 2 FileSlot to external storage device, Var 3 and its file name is Var 4. Then, return the result to Var 1.				

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		
Var 2	◎	◎	◎
Var 3	◎	◎	◎
Var 4	◎	◎	
Var 5	◎	◎	◎

Example

➢ Var 1, Var 4 and Var 5 are internal memory while Var 2 and Var 3 are constants. Export FileSlot ID 1 (Var 2) to USB Disk (Var 3), the length of file name is 2 (Var 5) and its file name is Slot (Var 4). Then, save the returned value in $100 (Var 1).




Macro Command
Edit
Command
#
$100 = FileSlotEXPORT(1, 2, $120, $110)
Double Word
Signed
Command
FileSlotExport
Variable
Conent
Description
Var1
$100
Return Value, 0: Fail, 1: Succeed
Var2
1
FileSlot ID
Var3
2
External device ID ,2:USB,3:SD
Var4
$120
External Filename
Var5
$110
Length of Filename (character)
Update

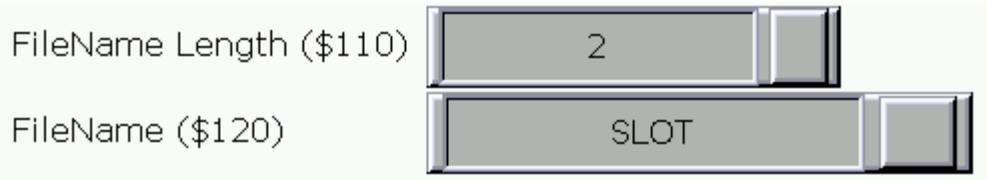
■ FileSlotImport (Import the File)

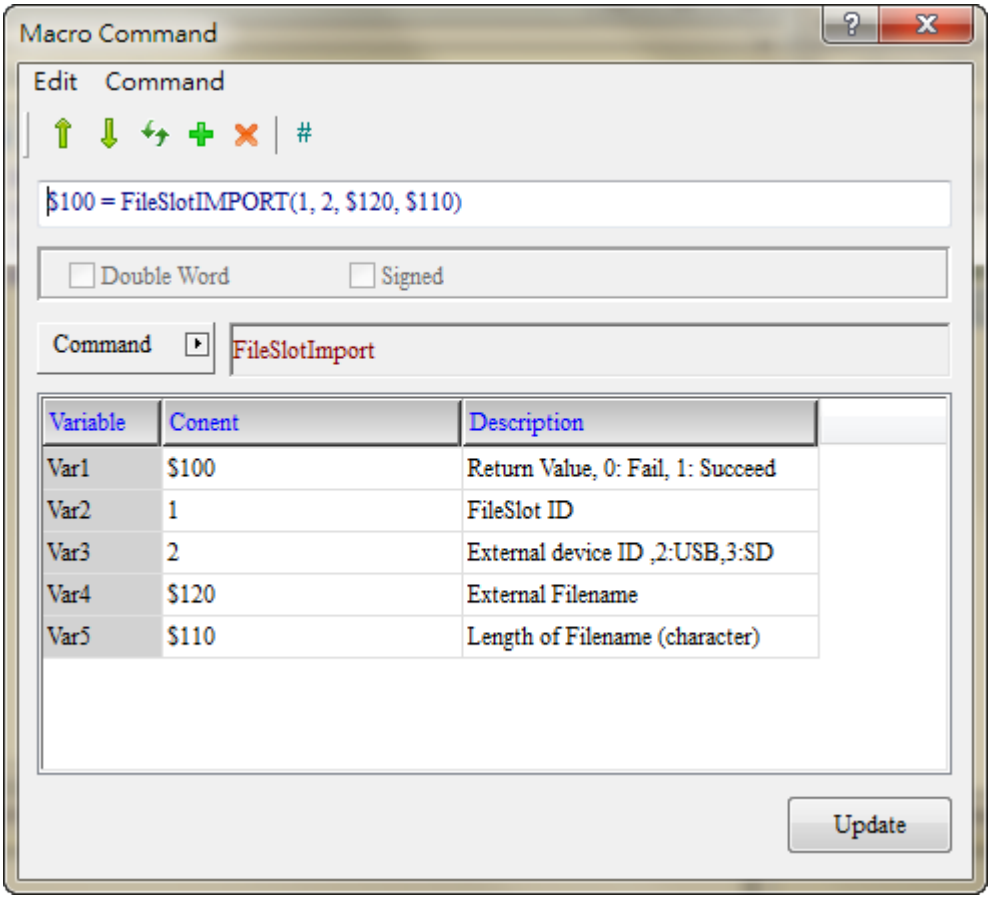
Expression	What Variables Represent				NOTE
Var 1 = FileSlotImport (Var 2, Var 3, Var 4, Var 5) (W)	Var 1	Returned Value			W：Word
		Failure		0	
		Success		1	
	Var 2	FileSlot ID			
	Var 3	File Import Device	USB Disk	2	
			SD Card	3	
	Var 4	Imported File Name			
	Var 5	Length of Imported File Name			
	Expression Explanation				
	Import the file names Var 4 from external storage device Var 3 to FileSlot of Var 2. Then, return the result to Var 1.				

Variables	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		
Var 2	◎	◎	◎
Var 3	◎	◎	◎
Var 4	◎	◎	
Var 5	◎	◎	◎

Example

➢ Var 1, Var 4 and Var 5 are internal memory while Var 2 and Var 3 are constants. Import the file named Slot (Var 4) with file name length as 2 (Var 5) from USB Disks (Var 3) to FileSlot ID 1 (Var 2). Then, save the returned value in $100 (Var 1).




Macro Command
Edit
Command
#
$100 = FileSlotIMPORT(1, 2, $120, $110)
Double Word
Signed
Command
FileSlotImport
Variable
Conent
Description
Var1
$100
Return Value, 0: Fail, 1: Succeed
Var2
1
FileSlot ID
Var3
2
External device ID ,2:USB,3:SD
Var4
$120
External Filename
Var5
$110
Length of Filename (character)
Update

24-3-11 Others

Others macro commands include TIME TICK, Comment, Delay, GETSYSTEMTIME、SETSYSTEMTIME, EXPORT, EXRCP, IMRCP, EXENRCP, IMENRCP. Users can acquire system setup time, import and export equations with these commands and they are detailed below.

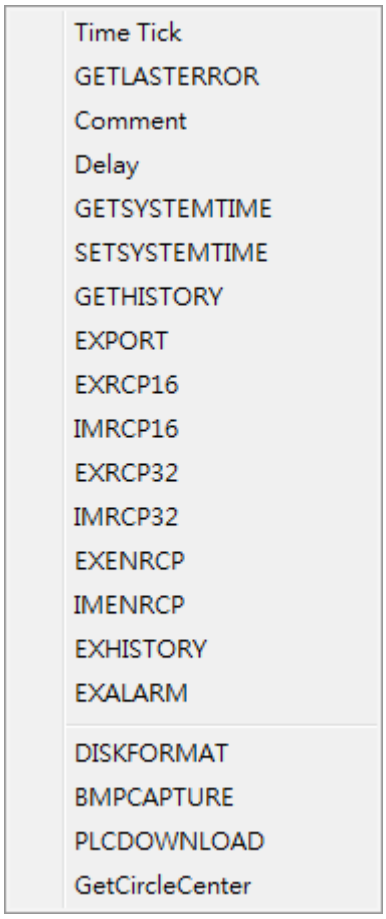


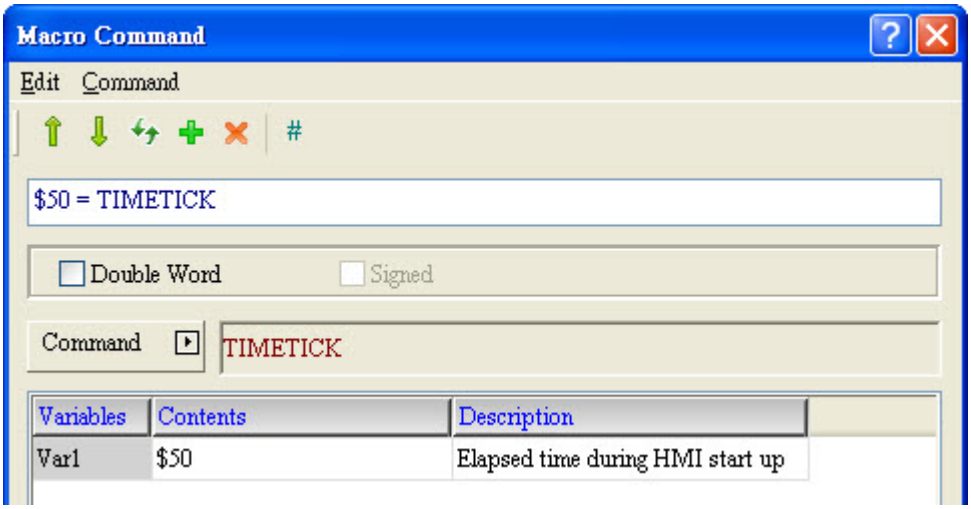
Figure 24-3-11-1 Others

■ Time Tick (Acquire System up duration from System Startup to Present)

Expression	What Variables Represent		NOTE
Var 1 = TIMETICK (W) Var 1 = TIMETICK (DW)	Var 1	TIMETICK from system startup to present	W : Word DW : Double Word
	Expression Explanation		
	Calculate system up duration from system startup time to present and save it in Var 1 (in ms).		

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		

Example
➢ Var 1 is an internal memory address and save the system up duration in $50.

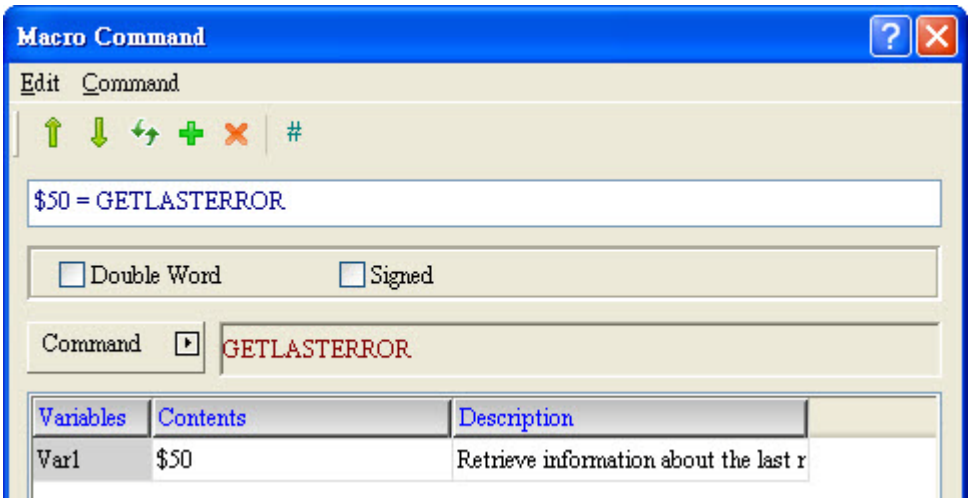


■ GETLASTERROR (Get Last Error Value)

Expression	What Variables Represent		NOTE
Var 1 = GETLASTERROR (W) Var 1 = GETLASTERROR (DW) Var 1 = GETLASTERROR (Signed W) Var 1 = GETLASTERROR (Signed DW)	Var 1	Last error value	W : Word DW : Double Word Signed : Signed number
		1 : Successful	
		Negative value: error (for details on the negative value please refer to 24-4 Macro Error Codes)	
	Expression Explanation		
	Acquire the last error value and save the result in Var 1.		

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		

Example
➢ Var 1 is an internal memory address and save the last error value in $50.



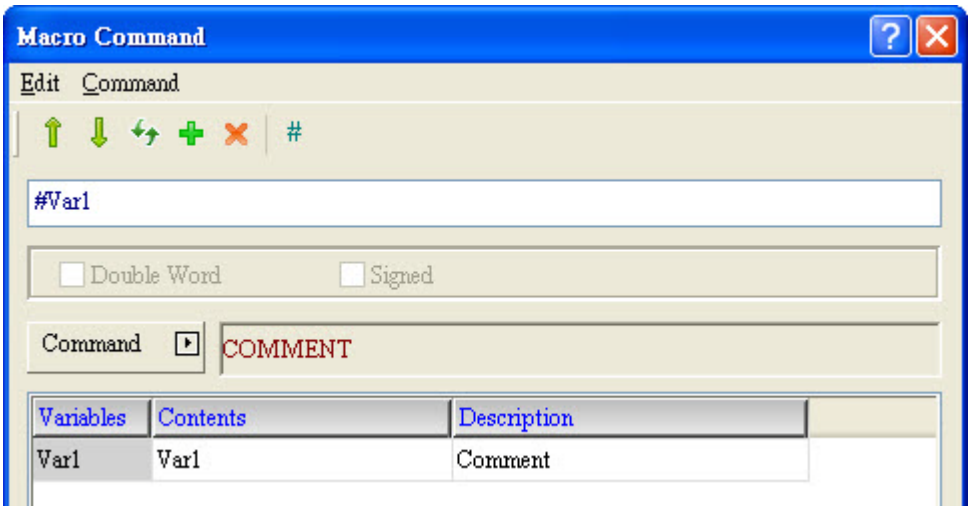
■ COMMENT (Make Comment)

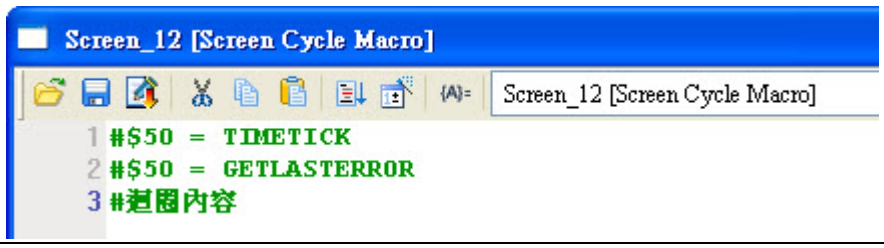
Expression	What Variables Represent		NOTE
#Var 1 (W)	Var 1	Description of the macro	W : Word
	Expression Explanation		
	Mark Var 1 as a comment		

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎		

Example

➢ Put # in front of a statement to make it a comment; or type in a description for a macro and put # in front of the macro description.





■ Delay (System Delay)

Expression	What Variables Represent		NOTE
Delay (Var 1) (W)	Var 1	Delay time length	W : Word
	Expression Explanation		
	Set the system to delay for a duration(in ms) specified in Var 1 before executing the next command		

* Since the HMI is a multiplexer system, a default system delay may occur. If this command is set, then the delay duration will become longer due to multiplexing operations and the condition that setting the time forward will not happen.

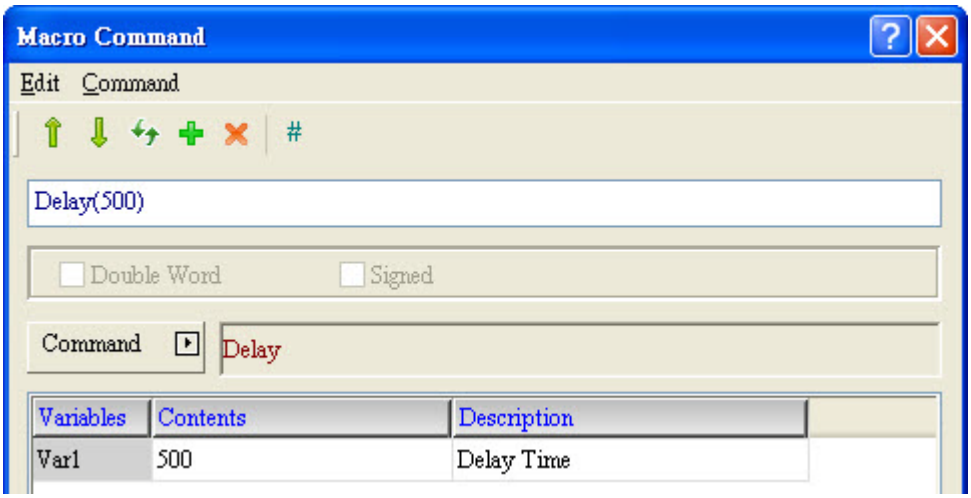
* Please note that long delay duration may cause the HMI to respond slowly.

* When executing this command, the HMI will suspend all current operations and resume them after the delay duration is over.

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		◎

Example

➢ Var 1 is a constant and set the delay to 500 ms.



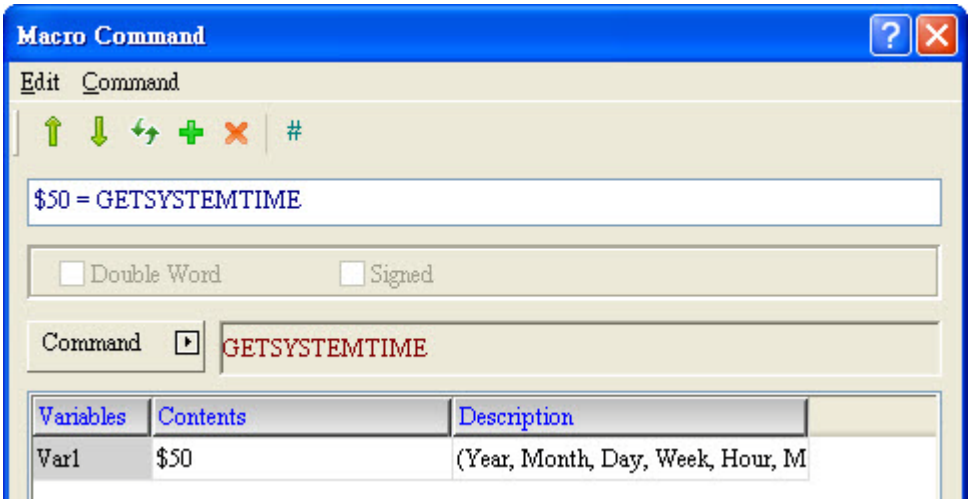
■ GETSYSTEMTIME (Acquire System Time)

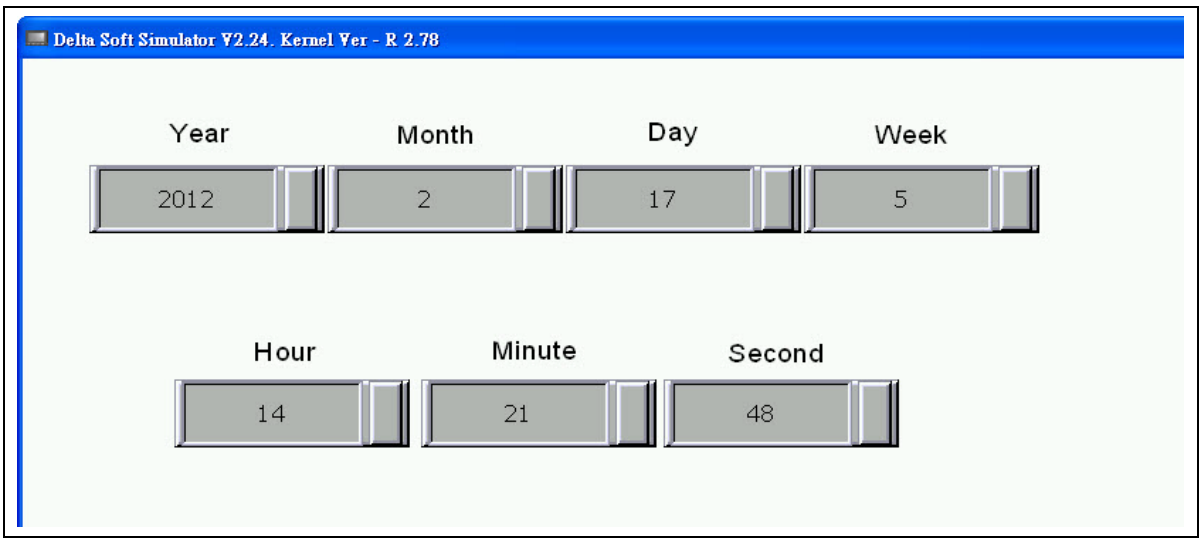
Expression	What Variables Represent		NOTE
Var 1 = GETSYSTEMTIME (W)	Var 1	Year	W : Word
	Var 1 + 1	Month	
	Var 1 + 2	Day	
	Var 1 + 3	Week	
	Var 1 + 4	Hour	
	Var 1 + 5	Minute	
	Var 1 + 6	Second	
	Expression Explanation		
	Acquire system time with 7 address (in Words) from Var 1 to Var 7.		

Memory Usage			
Variable	**Internal Memory**	**PLC Register**	**Constant**
Var 1	◎		

Example

➢ Var 1 is an internal memory address and save the current system time to $50 ~ $57.



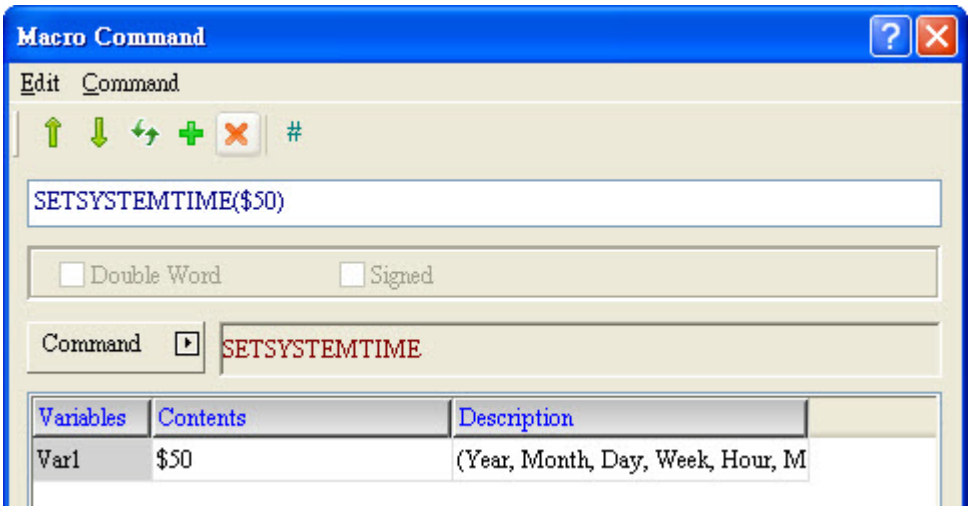


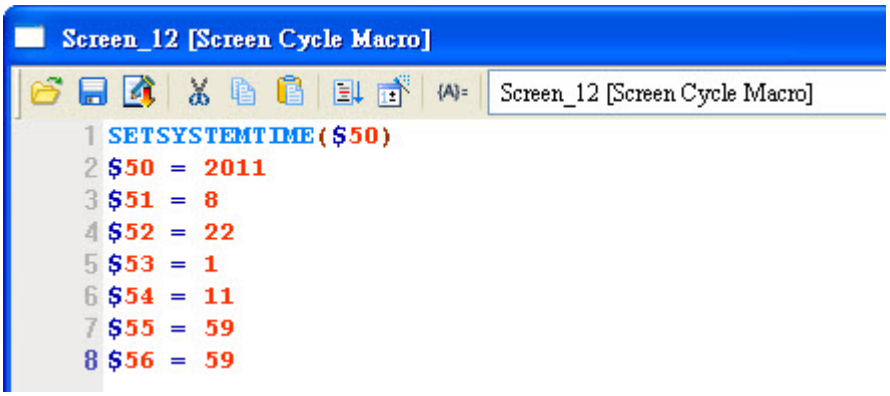
■ SETSYSTEMTIME (Set System Time)

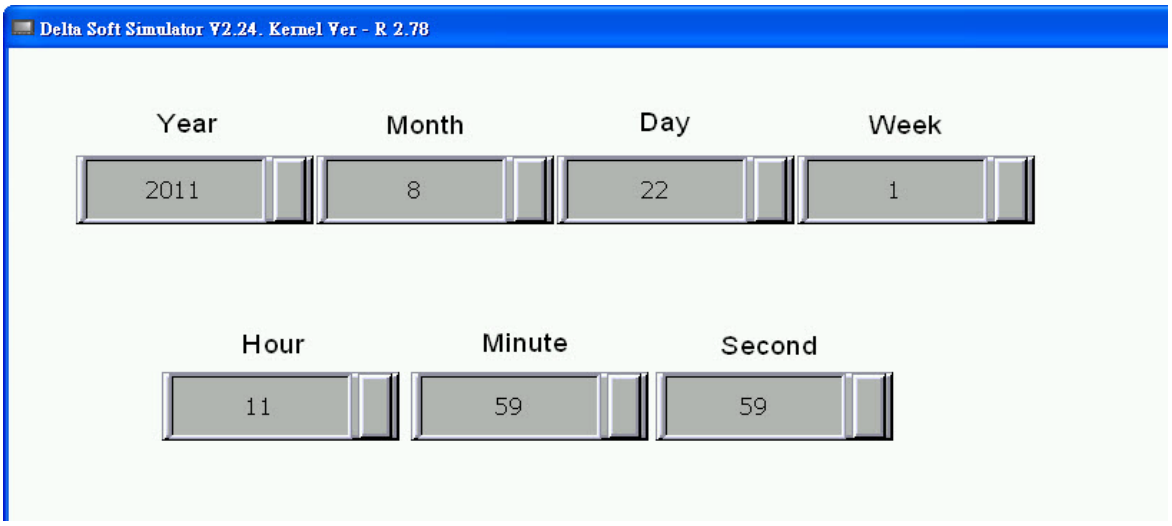
Expression	What Variables Represent		NOTE
Var 1 = SETSYSTEMTIME (W)	Var 1	Year	W : Word
	Var 1 + 1	Month	
	Var 1 + 2	Day	
	Var 1 + 3	Week	
	Var 1 + 4	Hour	
	Var 1 + 5	Minute	
	Var 1 + 6	Second	
	Expression Explanation		
	Set system time with 7 address (in Words) from Var 1 to Var 7.		

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		

Example
➢ Var 1 is an internal memory address. Set and save the current system time to $50 ~ $57.


Macro Command
Edit Command
#
SETSYSTEMTIME($50)
Double Word
Signed
Command
SETSYSTEMTIME
Variables
Contents
Description
Var1
$50
(Year, Month, Day, Week, Hour, M


Screen_12 [Screen Cycle Macro]
Screen_12 [Screen Cycle Macro]
1 SETSYSTEMTIME($50)
2 $50 = 2011
3 $51 = 8
4 $52 = 22
5 $53 = 1
6 $54 = 11
7 $55 = 59
8 $56 = 59

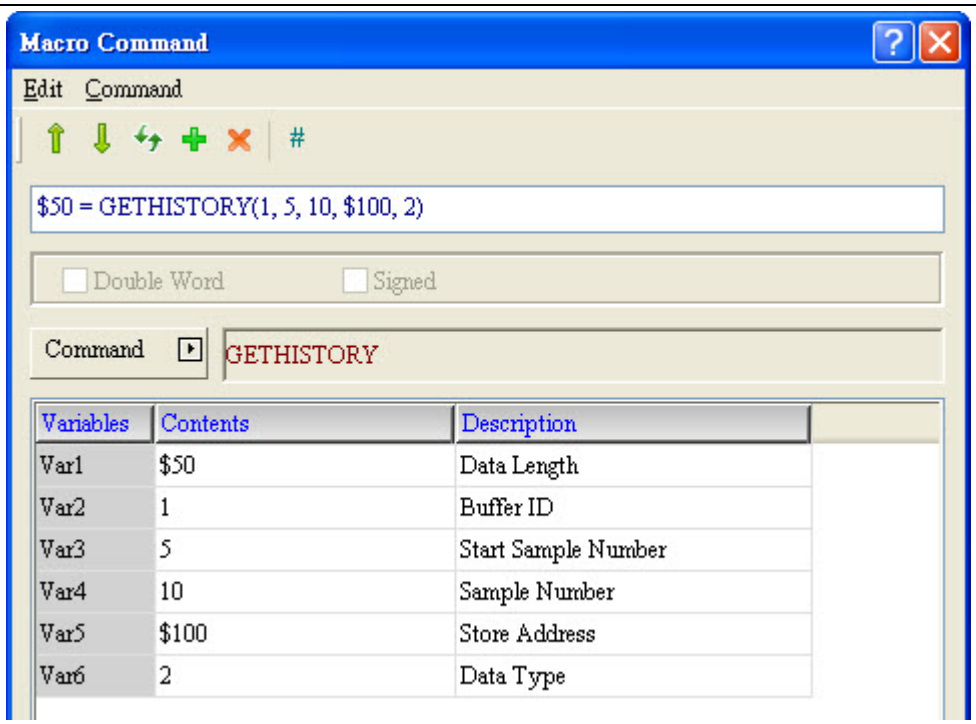

Delta Soft Simulator V2.24. Kernel Ver - R 2.78
Year
Month
Day
Week
2011
8
22
1
Hour
Minute
Second
11
59
59

■ GETHISTORY (Acquire Historical Log)

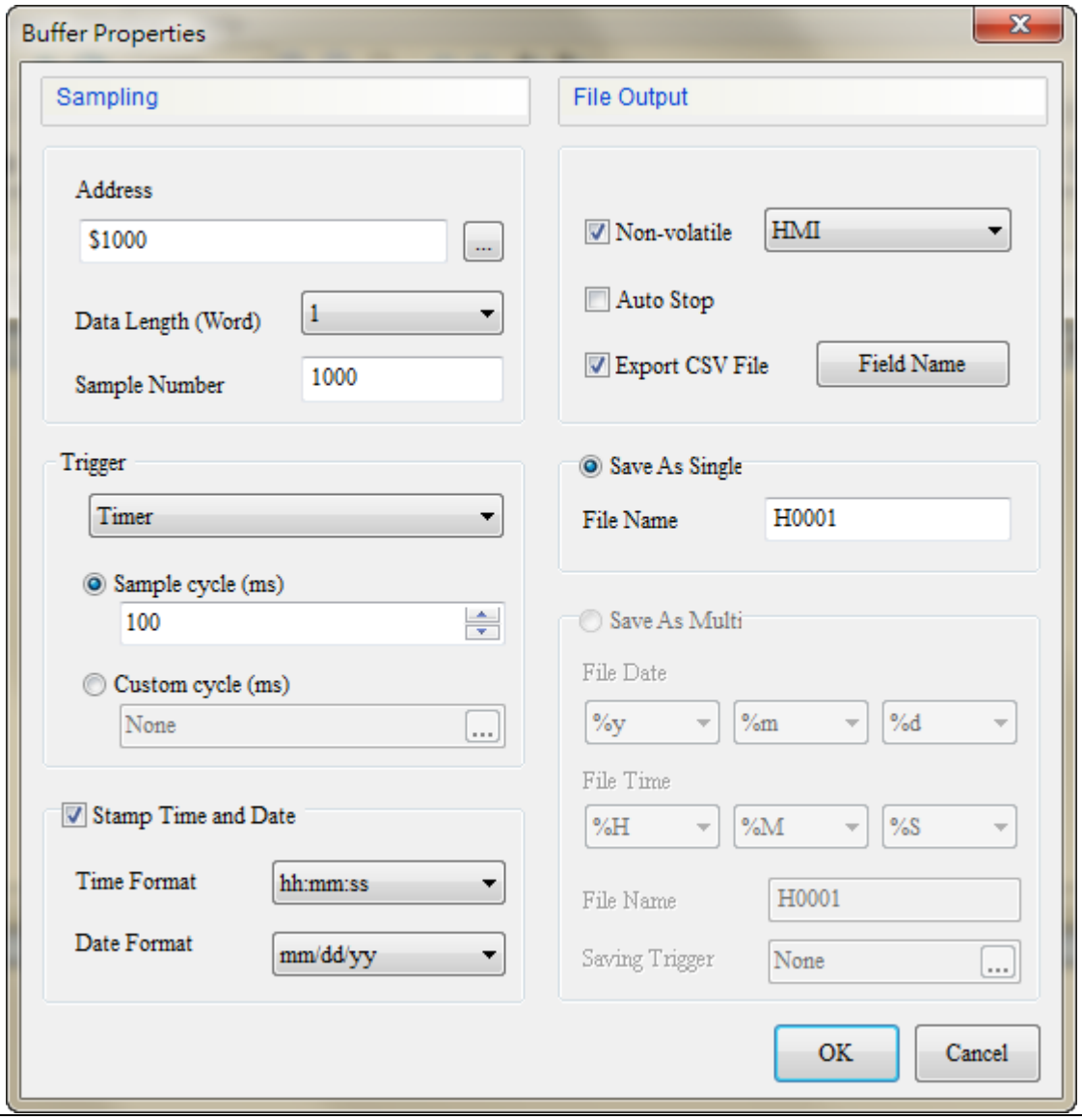
<table>
<tr><th>Expression</th><th colspan="4">What Variables Represent</th><th>NOTE</th></tr>
<tr><td rowspan="9">Var 1 = GETHISTORY (Var 2, Var 3, Var 4, Var 5, Var 6) (W)</td><td>Var 1</td><td colspan="3">Store data length</td><td rowspan="9">W : Word</td></tr>
<tr><td>Var 2</td><td colspan="3">Store ID for history buffer</td></tr>
<tr><td>Var 3</td><td colspan="3">Store starting address for sampling</td></tr>
<tr><td>Var 4</td><td colspan="3">Store the number of record accessing point</td></tr>
<tr><td>Var 5</td><td colspan="3">Store the data storage address</td></tr>
<tr><td rowspan="3">Var 6</td><td rowspan="3">Data Type</td><td>Data</td><td>0</td></tr>
<tr><td>Time</td><td>1</td></tr>
<tr><td>Data and Time</td><td>2</td></tr>
<tr><th colspan="5">Expression Explanation</th></tr>
<tr><td colspan="5">Acquire historical log.</td></tr>
<tr><td colspan="6">* it is recommended to set Var 1, Var 3 and Var 4 as Double Word. If using consecutive addresses in Word, then data may be overwritten and result may be affected.</td></tr>
</table>

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		
Var 2	◎		◎
Var 3	◎		◎
Var 4	◎		◎
Var 5	◎	◎	
Var 6	◎		◎

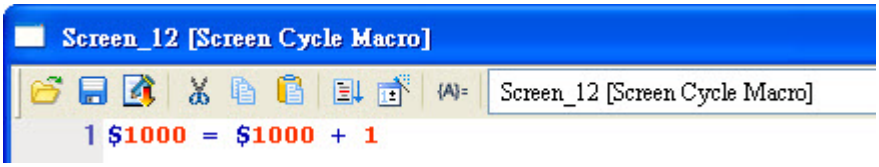
Example
➢ Var 1 and Var 5 are an internal memory addresses, and Var 2, Var 3, Var 4 and Var 6 are constants. Set the ID for the history buffer as 1(Var 2), sample 10 records (Var 3) starting from the 5th record (Var 2), Set the data type to 2 (Var 6), including time and data, and save it to consecutive addresses of $100 (Var 5) and save the data length into $50 (Var 1).



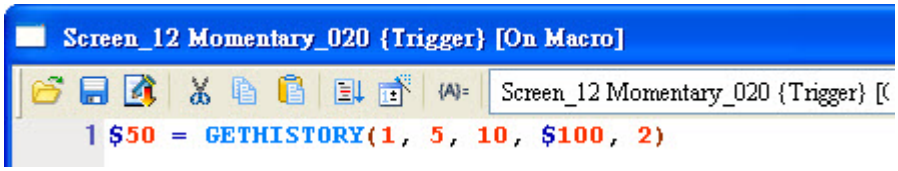
➢ Set $1000 as the record accessing address for sampling history buffers.

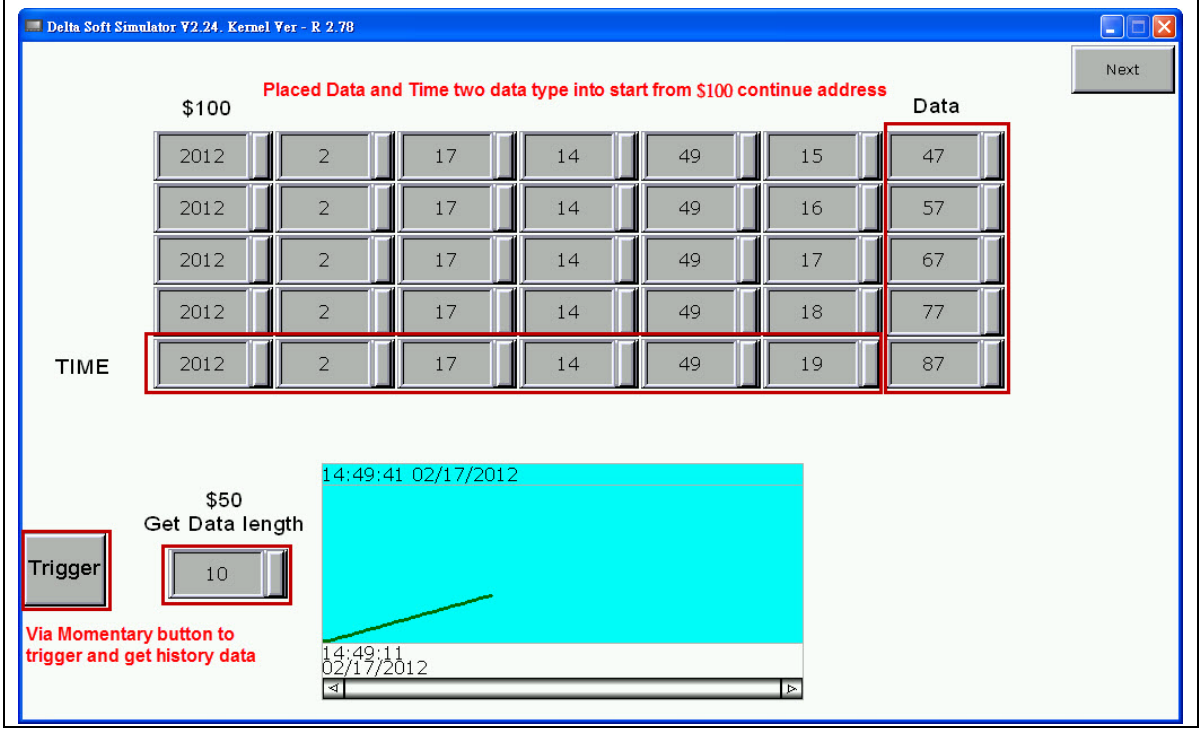


➢ Edit Screen Cycle Macro to repeatedly adding history records to $1000.



➢ Edit ON Macro and set GETHISTORY as shown below.



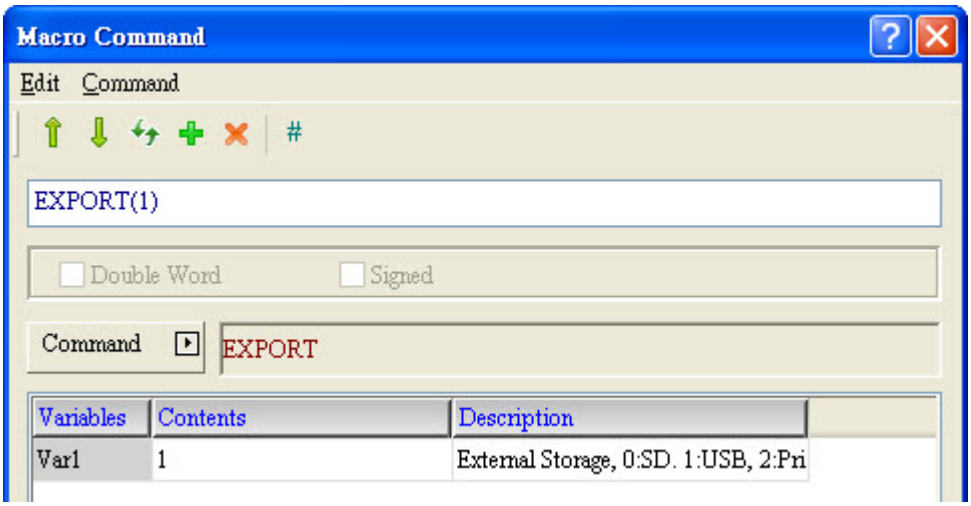


■ EXPORT (Export Report to an External Device)

Expression	What Variables Represent				NOTE
EXPORT (Var 1) (W)	Var 1	Device to export a report	SD Card	0	W : Word
			USB Disk	1	
			Printer	2	
	Expression Explanation				
	Delay for a duration specified in Var 1 to resume the next command (in ms).				

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		◎

Example
➢ Var 1 is a constant. Export the report to a USB Disk.



■ EXRCP16/EXRCP32 (Export 16 bit Equation/32 bit Equation)

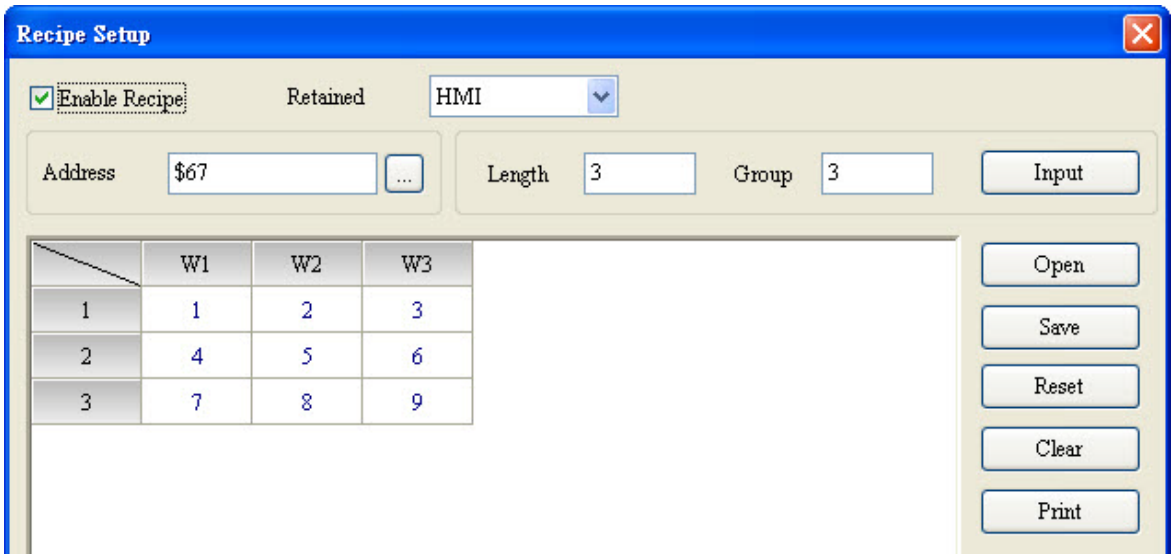
<table>
<tr><th>Expression</th><th colspan="4">What Variables Represent</th><th>NOTE</th></tr>
<tr><td rowspan="8">Var 1 = EXRCP16 (Var 2, Var 3) (W)
Var 1 = EXRCP32 (Var 2, Var 3) (W)</td><td rowspan="3">Var 1</td><td colspan="3">Returned Value</td><td rowspan="8">W : Word</td></tr>
<tr><td>Failure</td><td colspan="2">0</td></tr>
<tr><td>Successful</td><td colspan="2">1</td></tr>
<tr><td>Var 2</td><td colspan="3">File name of the exported 16 bit equation</td></tr>
<tr><td rowspan="2">Var 3</td><td rowspan="2">Storage device the equation is exported to</td><td>SD Card</td><td>2</td></tr>
<tr><td>USB Disk</td><td>3</td></tr>
<tr><td colspan="4">Expression Explanation</td></tr>
<tr><td colspan="4">Export and save 16 bit (or 32 bit) equations to Var 3 and save the returned result to Var 1.</td></tr>
<tr><td colspan="6">Note: The exported file is saving to root in the storage device.</td></tr>
</table>

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎	◎	
Var 2	◎	◎	
Var 3	◎	◎	◎

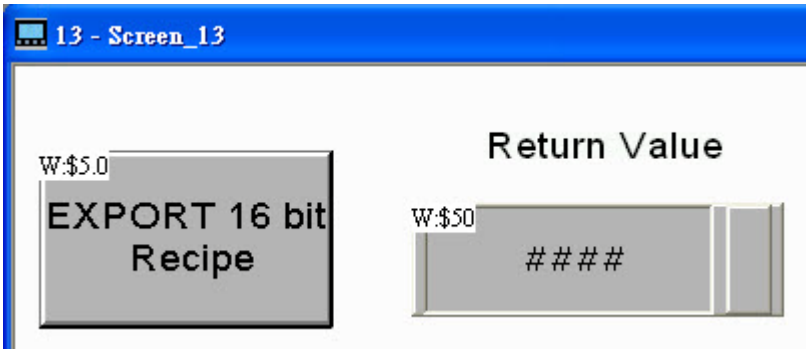
Example

- The below example illustrates how to export a 16 bit equation and for a 32 bit equation, the exporting steps are the same.
- Export a 16 bit equation to a USB Disk and file name is tina.

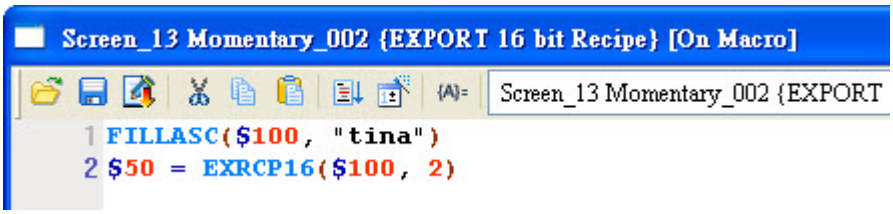
Step 1: go to equation setup dialog box to set up an equation [Options] → [Equation].



Step 2: create a maintained button ($5.0) and variable ($50).

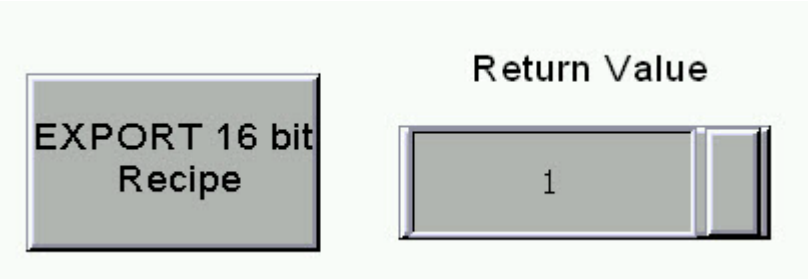


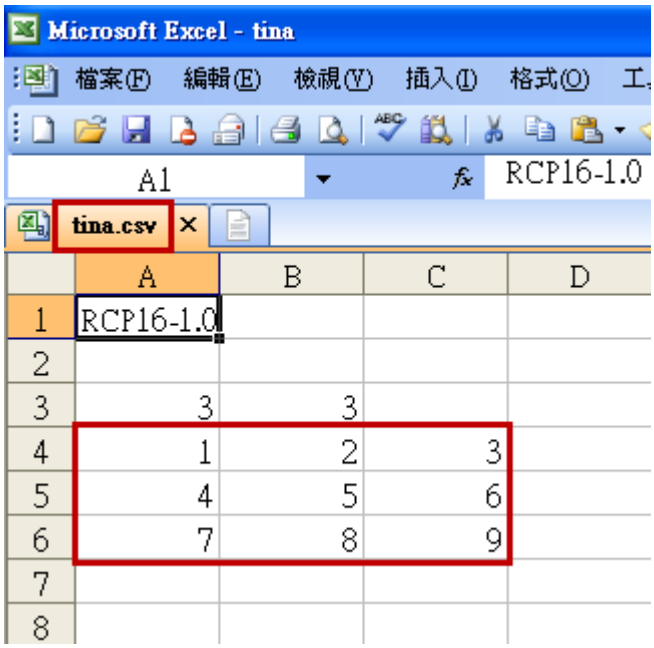
Step 3: enter into the button and create an ON Macro shown below. Put the tina string into $100 and export the data to a USB Disk, using the command EXRCP16, and name the file tina.



Step 4: edit the elements within the editing area and download the equation to the HMI. Trigger the $5.0 button and then $50 will display 1, indicating it is successful

and export the 16 bit equation to the designated USB Disk.





■ IMRCP16/IMRCP32 (Import 16 bit Equation/32 bit Equation)

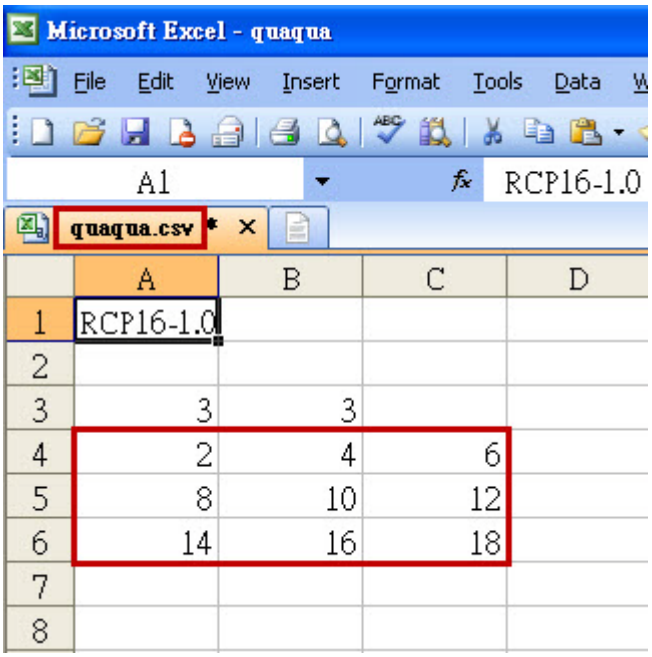
Expression	What Variables Represent				NOTE
Var 1 = IMRCP16 (Var 2, Var 3) (W) Var 1 = IMRCP32 (Var 2, Var 3) (W)	Var 1	Returned Value			W : Word
		Failure	0		
		Successful	1		
	Var 2	File name of the imported 16 bit equation			
	Var 3	Storage device the equation is imported from	SD Card	2	
			USB Disk	3	
	Expression Explanation				
	From Var 3 to import 16 bit (or 32 bit) equations and returned result to Var 1.				

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎	◎	
Var 2	◎	◎	
Var 3	◎	◎	◎

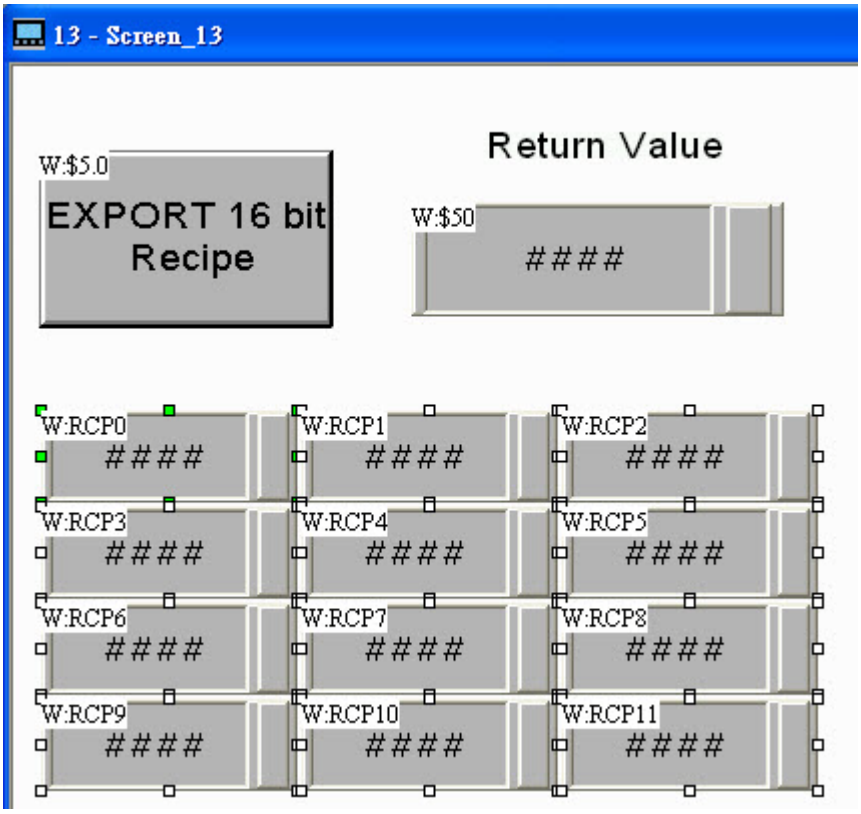
Example

- The below example illustrates how to import a 16 bit equation, and for a 32 bit equation, the importing steps are the same.
- Import a 16 bit equation to a USB Disk and file name is quaqua.

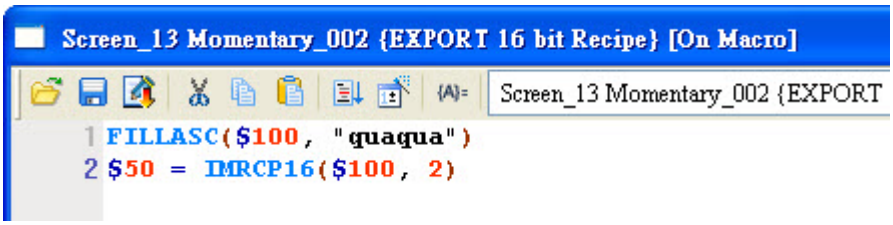
Step 1: Modify and save the equation to the USB Disk.



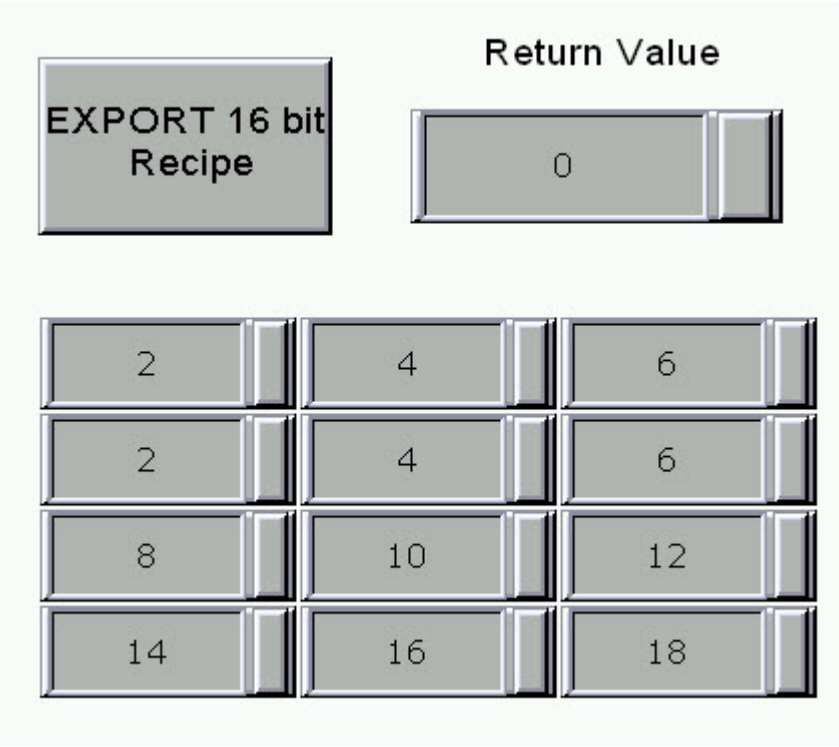
Step 2: create a maintained button ($5.0), variable ($50), and addresses for storing equations RCP0~RCP11.



Step 3: enter into the button and create an ON Macro shown below. Put the quaqua string into $100 and import the data to a USB Disk, using the command IMRCP16.



Step 4: edit the elements within the editing area and download the equation to the HMI. Trigger the $5.0 button and then $50 will display 1, indicating it is successful and import the 16 bit equation to the HMI. The equation data will replaced by the quaqua equation just imported.


EXPORT 16 bit Recipe
Return Value
0
2
4
6
2
4
6
8
10
12
14
16
18

■ EXENRCP (Export Enhance Recipe Equation)

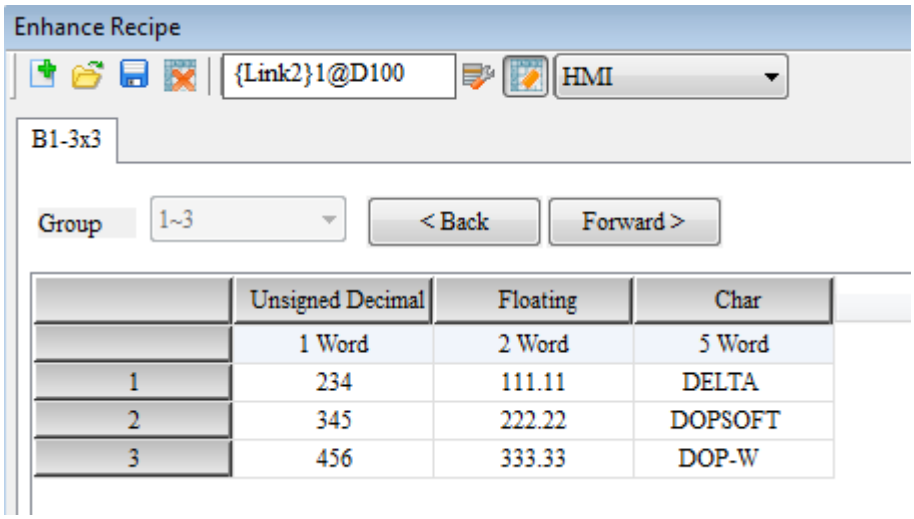
<table>
<tr><th>Expression</th><th colspan="4">What Variables Represent</th><th>NOTE</th></tr>
<tr><td rowspan="8">Var 1 = EXENRCP (Var 2, Var 3) (W)</td><td rowspan="3">Var 1</td><td colspan="3">Returned Value</td><td rowspan="8">W : Word</td></tr>
<tr><td>Failure</td><td colspan="2">0</td></tr>
<tr><td>Successful</td><td colspan="2">1</td></tr>
<tr><td>Var 2</td><td colspan="3">File name of the exported enhance recipe equation</td></tr>
<tr><td rowspan="2">Var 3</td><td rowspan="2">Storage device the equation is exported to</td><td>USB Disk</td><td>2</td></tr>
<tr><td>SD Card</td><td>3</td></tr>
<tr><td colspan="4">Expression Explanation</td></tr>
<tr><td colspan="4">Export and save 16 bit (or 32 bit) equations to Var 3 and save the returned result to Var 1.</td></tr>
<tr><td colspan="6">Note: The exported file is saving to root in the storage device.</td></tr>
</table>

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎	◎	
Var 2	◎	◎	
Var 3	◎	◎	◎

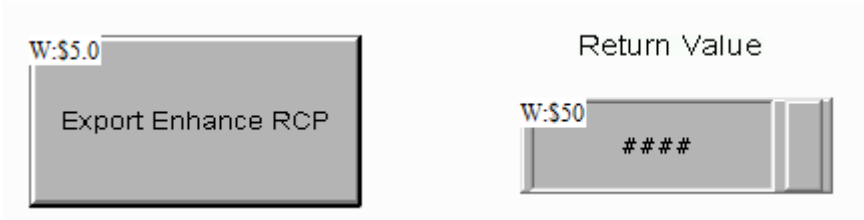
Example

➢ Export the enhance recipe data to USB Disk and name it as tina.

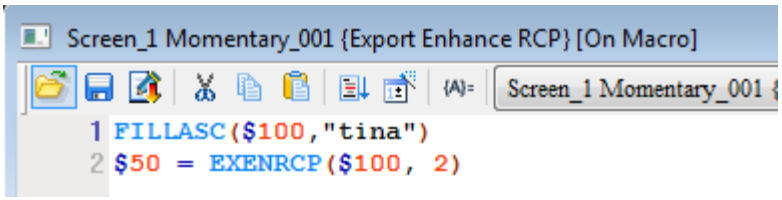
Step 1: Enter【Option】→【Enhance Recipe】 to setup enhance recipe data.



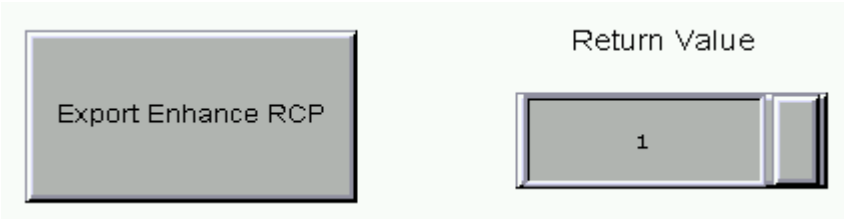
Step 2: Create momentary button ($5.0) and numeric entry element ($50).



Step 3: Go to Screen of Momentary Button to edit On macro. Please see as below. Place “tina” to $100. Then, export the enhance recipe to USB Disk whose file name is tina.



Step 4: Compile the screen and download the recipe data to HMI. When $5.0 button is triggered, $50 will display 1, which means the enhance recipe is exported successfully. Then, export the enhance recipe data to USB Disk.



tina.csv

	A	B	C	D	E
1	ENRCP-1.0				
2	3	3			
3	2	1	0	0	
4	5	2	3	2	
5	8	5	0	0	
6	234	111.11	DELTA		
7	345	222.22	DOPSOFT		
8	456	333.33	DOP-W		
9					

Note: Please refer to the followings for the definition of each field.

Format	Definition of DOPSoft
BCD	0
Signed Decimal	1
Unsign Decimal	2
Hexdecimal	3
Binary	4
Floating	5
Char	8

Descriptions of each cell in exported CSV file are shown as below:

A-1 : Version ENRCP-1.0
A-2 : File Number 3
B-2 : Group Number 3
A-3 : Numeric Format of the 1st Field 2 (Unsigned Decimal)
B-3 : Numeric Length of the 1st Field 1 (Word)
C-3 : Integer Digits of the 1st Field 0
D-3 : Fractional Digits of the 1st Field 0
A-4 : Numeric Format of the 2nd Field 5 (Floating)
B-4 : Numeric Length of the 2nd Field 2 (Word)
C-4 : Integer Digits of the 2nd Field 3
D-4 : Fractional Digits of the 2nd Field 2
A-5 : Numeric Format of the 3rd Field 8 (Char)
B-5 : Numeric Length of the 2nd Field 5 (Word)
C-5 : Integer Digits of the 3rd Field 0
D-5 : Fractional Digits of the 3rd Field 0

■ IMENRCP (Import Enhance Recipe Equation)

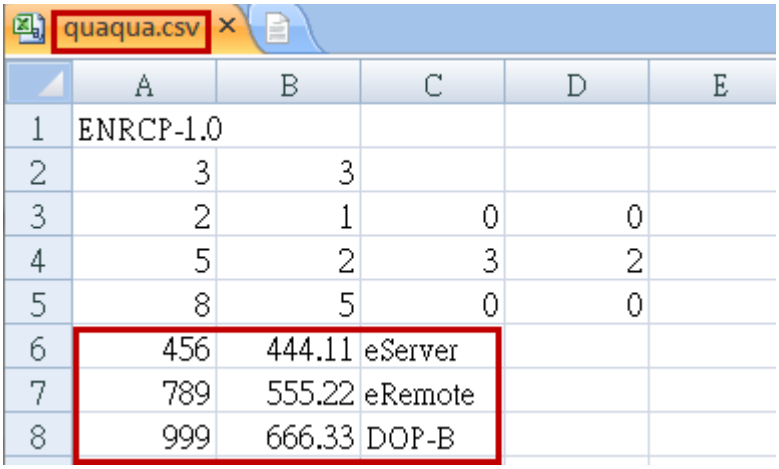
<table>
<tr><th>Expression</th><th colspan="4">What Variables Represent</th><th>NOTE</th></tr>
<tr><td rowspan="8">Var 1 = IMENRCP (Var 2, Var 3) (W)</td><td rowspan="3">Var 1</td><td colspan="3">Returned Value</td><td rowspan="8">W : Word</td></tr>
<tr><td>Failure</td><td colspan="2">0</td></tr>
<tr><td>Successful</td><td colspan="2">1</td></tr>
<tr><td>Var 2</td><td colspan="3">File name of the imported enhance recipe equation</td></tr>
<tr><td rowspan="2">Var 3</td><td rowspan="2">Storage device the equation is imported from</td><td>USB Disk</td><td>2</td></tr>
<tr><td>SD Card</td><td>3</td></tr>
<tr><td colspan="4">Expression Explanation</td></tr>
<tr><td colspan="4">From Var 3 to import enhance recipe equations and returned result to Var 1.</td></tr>
</table>

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎	◎	
Var 2	◎	◎	
Var 3	◎	◎	◎

Example

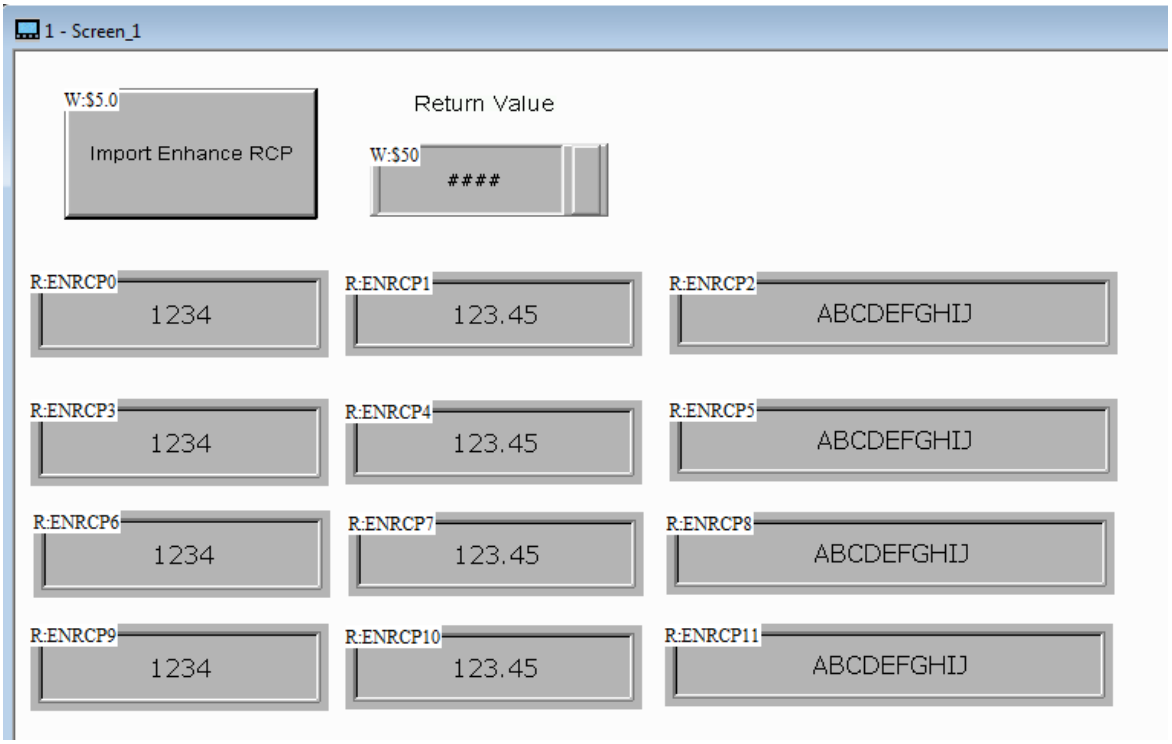
➢ Import the enhance recipe data from USB Disk to HMI and its file name is quaqua.

Step 1: Refer to the following figure that uses EXCEL to create recipe file. Its file name is quaqua.csv and is saved in USB Disk.

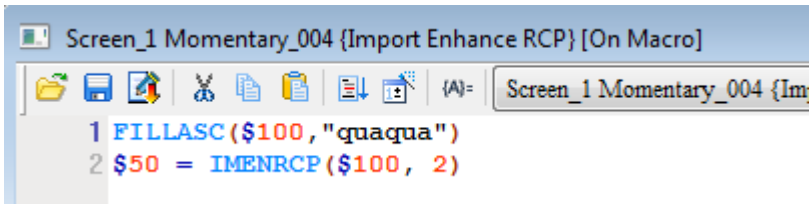


	A	B	C	D	E
1	ENRCP-1.0				
2	3	3			
3	2	1	0	0	
4	5	2	3	2	
5	8	5	0	0	
6	456	444.11	eServer		
7	789	555.22	eRemote		
8	999	666.33	DOP-B		

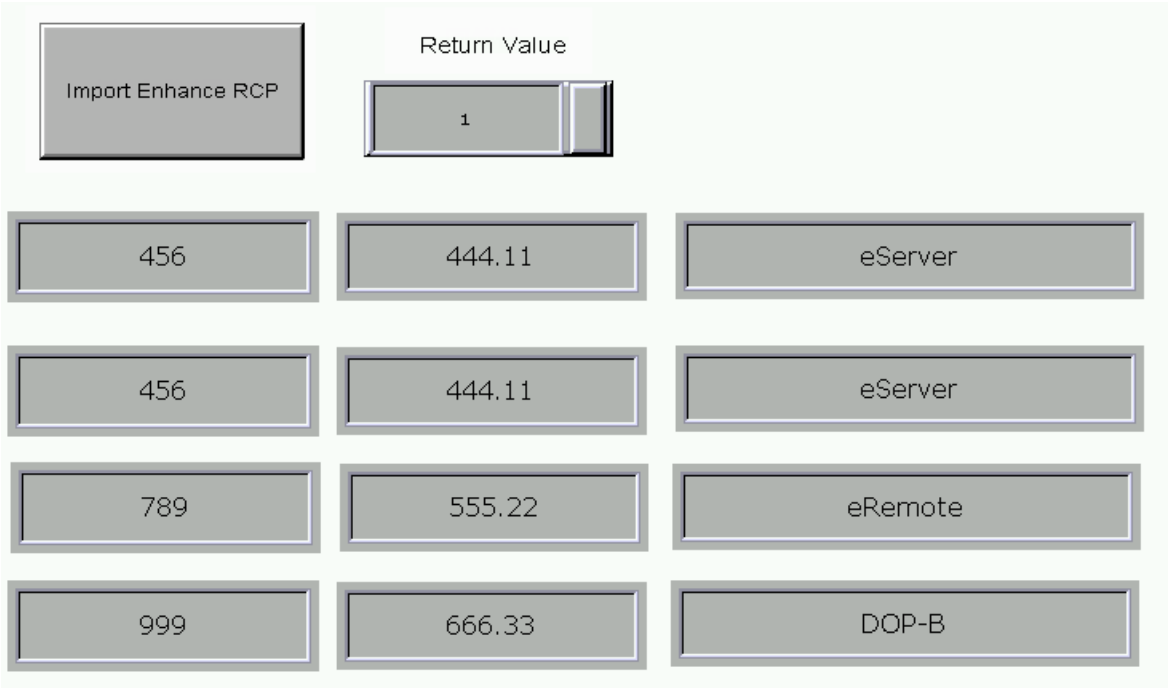
Step 2: Create momentary button ($5.0), numeric entry element ($50) and recipe address RCP0 ~ RCP11.



Step 3: Enter Screen of Momentary Button to edit On macro. Please see as below. Place quaqua to $100 and import the enhance recipe data from USB Disk.



Step 4: Compile the screen and download recipe data to HMI. When $5.0 button is triggered, $50 will display 1, which means the enhance recipe is imported successfully. Then, import the enhance recipe data to HMI. The data will be changed as the one of quaqua recipe data.



■ EXHISTORY (Export Historical Data)

<table>
<tr><th>Expression</th><th colspan="4">What Variables Represent</th><th>NOTE</th></tr>
<tr><td rowspan="9">Var 1 = EXHISTORY (Var 2, Var 3, Var 4)</td><td rowspan="3">Var 1</td><td colspan="3">Returned Value</td><td rowspan="9"></td></tr>
<tr><td colspan="2">Failure</td><td>0</td></tr>
<tr><td colspan="2">Success</td><td>1</td></tr>
<tr><td>Var 2</td><td colspan="3">Historical Buffer Area ID</td></tr>
<tr><td>Var 3</td><td colspan="3">Exported File Name</td></tr>
<tr><td rowspan="2">Var 4</td><td rowspan="2">External Storage Device</td><td>USB Disk</td><td>2</td></tr>
<tr><td>SD Card</td><td>3</td></tr>
<tr><td colspan="4">Expression Explanation</td></tr>
<tr><td colspan="4">Export the historical data to external storage device.</td></tr>
</table>

Note 1: In buffer area property setting,『output to CSV file』has to be checked.

Note 2: When the buffer area ID is 0, it means all historical buffer areas are exported. If 3 historical buffer areas are opened, 3 files will be exported and the file name will be『Exported File 1.csv』,『 Exported File 2.csv』 and『 Exported File 3.csv』, repectively. If the area ID is not 0, it means the exported historical buffer area ID is specified. When it exports one file, the file name will be『Exported File.csv』.

Note 3: When the file is exported,『.csv』will be added as the filename extension automatically. Characters such as『\』,『/』,『:』,『*』,『?』,『”』,『<』,『>』 and 『|』cannot be included in file name.

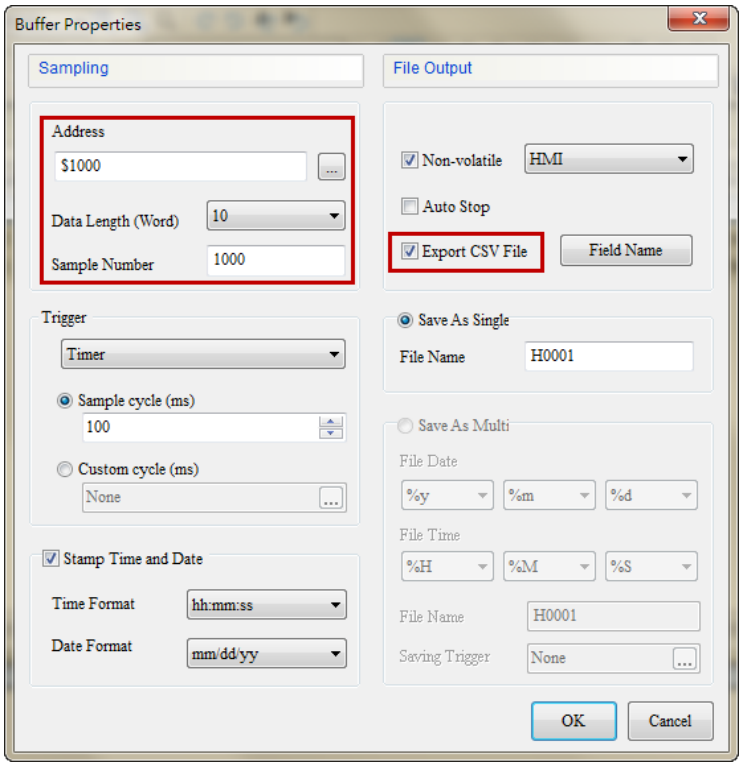
If x00 is included in the string, the string will be judged as finish.

Variables	Memory Usage			
	Internal Memory	PLC Register	String	Constant
Var 1	◎	◎		
Var 2	◎	◎		◎
Var 3	◎	◎		
Var 4	◎	◎		◎

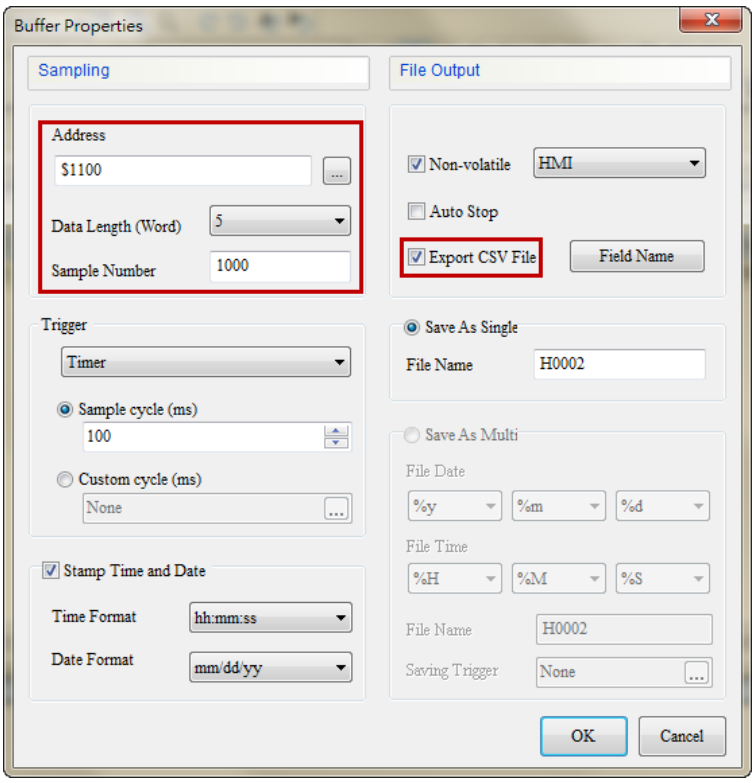
Example

- Step 1: Setup three historical buffer areas. See the setting below:

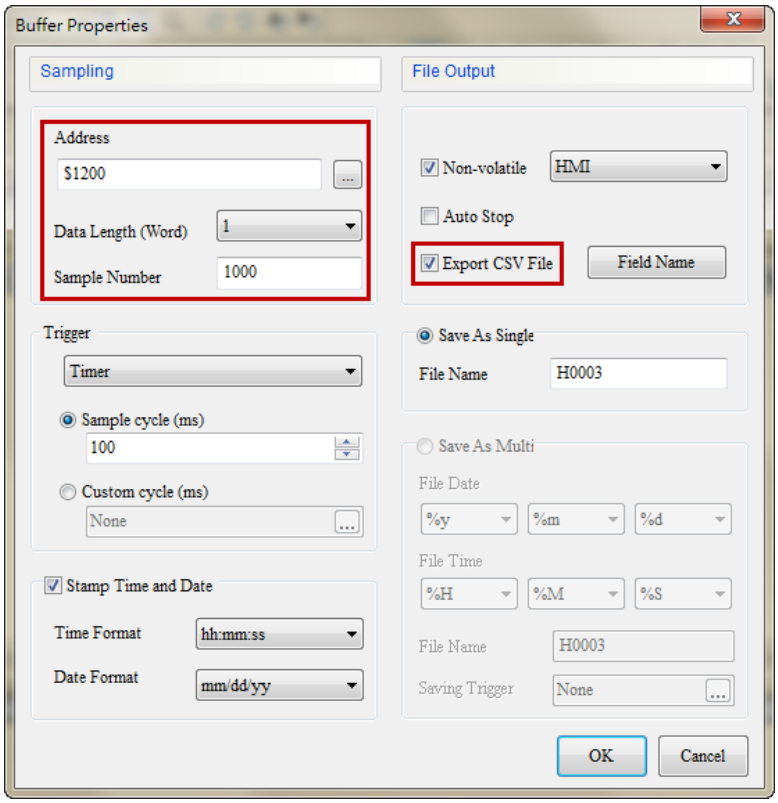
  (1) Historical Buffer Area 1: Set Address to $ 1000, Data Length to 10 and check “Export CSV file”.



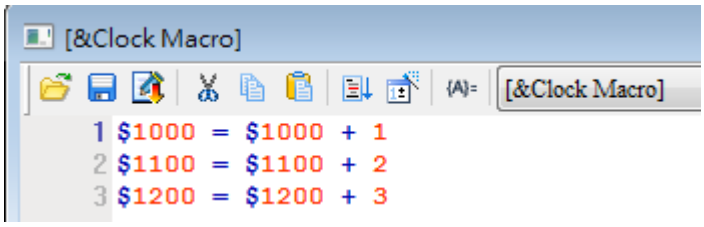
  (2) Historical Buffer Area 2: Set Address to $ 1100, Data Length to 5 and check “Export CSV file”.



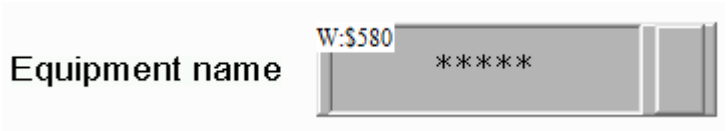
(3) Historical Buffer Area 3: Set Address to $ 1200, Data Length to 1 and check “Export CSV file”.



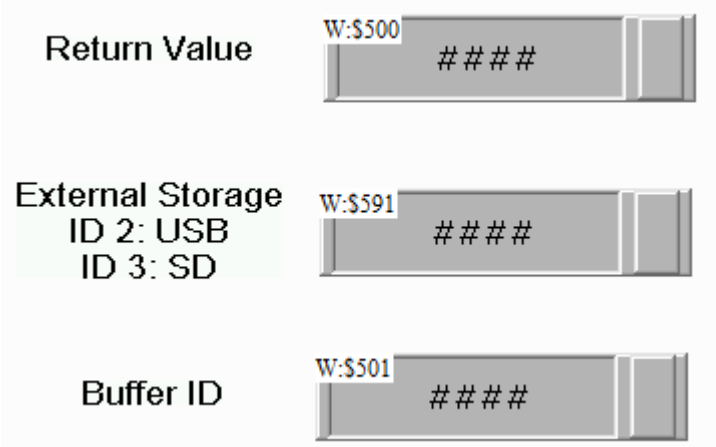
Step 2: Add historical data in Clock Macro.



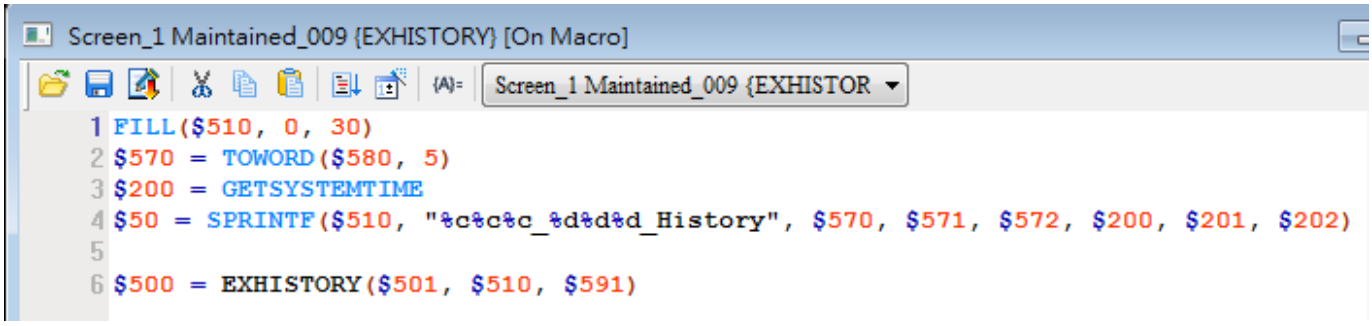
Step 3: Create character entry element and set its address as $580, string length as 5.



Step 4: Create 3 numeric entry elements and set their address as $500, $591 and $501.



Step 5: Create maintained button element, set the address to $100.0 and add On Macro.



Description of macro command:

Line 1: Clear $510 ~ $539

Line 2: Convert $580 (String of Equipment Name) to word by the unit of byte.

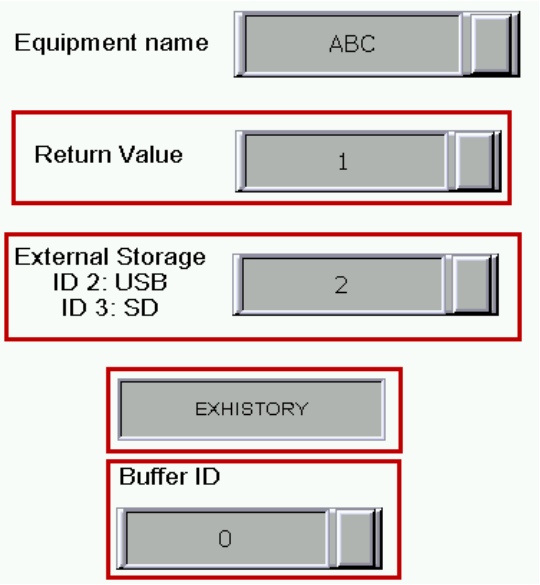
Line 3: Move the system time to $200 ~ $206 (year, month, day, week, hour, minute, second).

Line 4: Add『_year, month, day』 and 『_History』 to 『three words of equipment name』to form a serial string and specify $510 as start address.

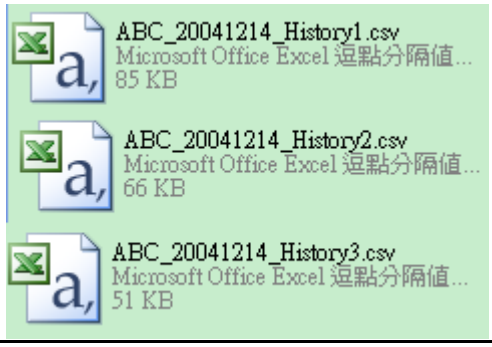
Line 6: Export the historical data to the specified external device and file name.

Step 6: Download the editing screen to HMI and insert USB Disk to the port of HMI.

Step 7: Enter the Equipment name as『ABC』 and choose 2 for External Storage Device, which means USB is applied. Set buffer area ID to 0 (export all) then press『EXHISTORY』. When it is completed, the returned value becomes 1.



Step 8: Remove USB. And the exported files are shown as below:


ABC_20041214_History1.csv
Microsoft Office Excel 逗點分隔值...
85 KB
ABC_20041214_History2.csv
Microsoft Office Excel 逗點分隔值...
66 KB
ABC_20041214_History3.csv
Microsoft Office Excel 逗點分隔值...
51 KB

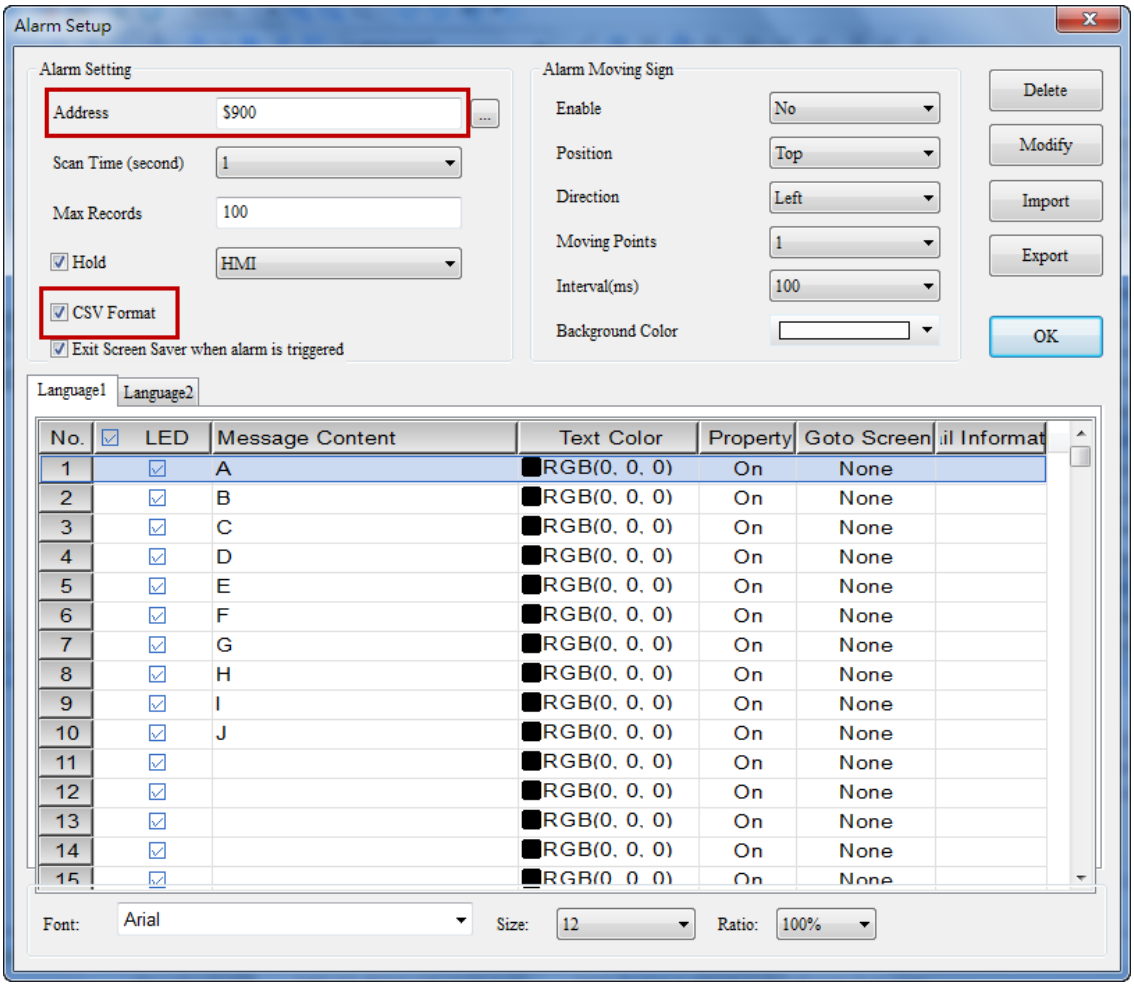
■ EXALARM (Export the Alarm)

<table>
<tr><th>Expression</th><th colspan="4">What Variable Represent</th><th>NOTE</th></tr>
<tr><td rowspan="8">Var 1 = EXALARM (Var 2, Var 3)</td><td rowspan="3">Var 1</td><td colspan="3">Returned Value</td><td rowspan="8"></td></tr>
<tr><td colspan="2">Failure</td><td>0</td></tr>
<tr><td colspan="2">Success</td><td>1</td></tr>
<tr><td>Var 2</td><td colspan="3">Exported File Name</td></tr>
<tr><td rowspan="2">Var 3</td><td rowspan="2">External Storage Device</td><td>USB Disk</td><td>2</td></tr>
<tr><td>SD Card</td><td>3</td></tr>
<tr><td colspan="4">Expression Explanation</td></tr>
<tr><td colspan="4">Export the alarm information to external storage device.</td></tr>
<tr><td colspan="6">Note 1: In Alarm setting, please check『output to CSV file』.
Note 2: When the file is exported,『.csv』will be added as the filename extension automatically. Characters such as『\』,『/』,『:』,『*』,『?』,『”』,『<』,『>』 and 『|』cannot be included in file name.
If x00 is included in the string, the string will be judged as finish.</td></tr>
</table>

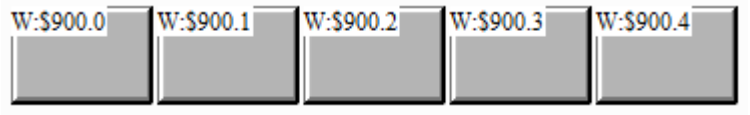
Variables	Memory Usage			
	Internal Memory	PLC Register	String	Constant
Var 1	◎	◎		
Var 2	◎	◎		
Var 3	◎	◎		◎

Example

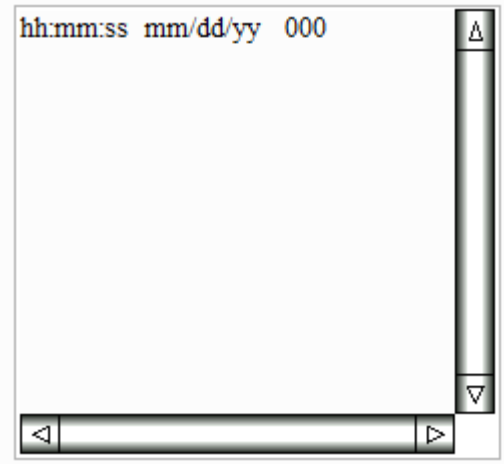
➢ Step 1: The setting of Alarm is shown as below. The Address is set as $900. Please check "CSV Format".



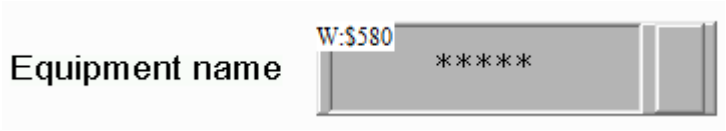
Step 2: Create maintained element for triggering alarms. The address is set as $900.0, $900.1, $900.2, $900.3 and $900.4 in sequence.



Step 3: Create Historical Alarm Table to show the current historical alarms.

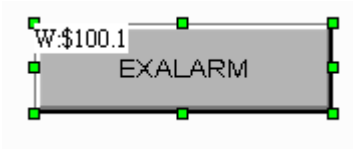


Step 4: Create character entry element and set its address as $580 and string length as 5.



Step 5: Create two numeric entry elements and set their address as $500 and $591, respectively.

Step 6: Create maintained button element and set its address as $100.1. Then, add On Macro.



Screen_1 Maintained_016 {EXALARM} [On Macro]

Screen_1 Maintained_016 {EXALARM

```
1 FILL($510, 0, 30)
2 $570 = TOWORD($580, 5)
3 $200 = GETSYSTEMTIME
4 $50 = SPRINTF($510, "%c%c%c_%d%d%d_Alarm", $570, $571, $572, $200, $201, $202)
5
6 $500 = EXALARM($510, $591)
```

See below for the descriptions of macro commands:

Line 1: Clear $510 ~ $539.

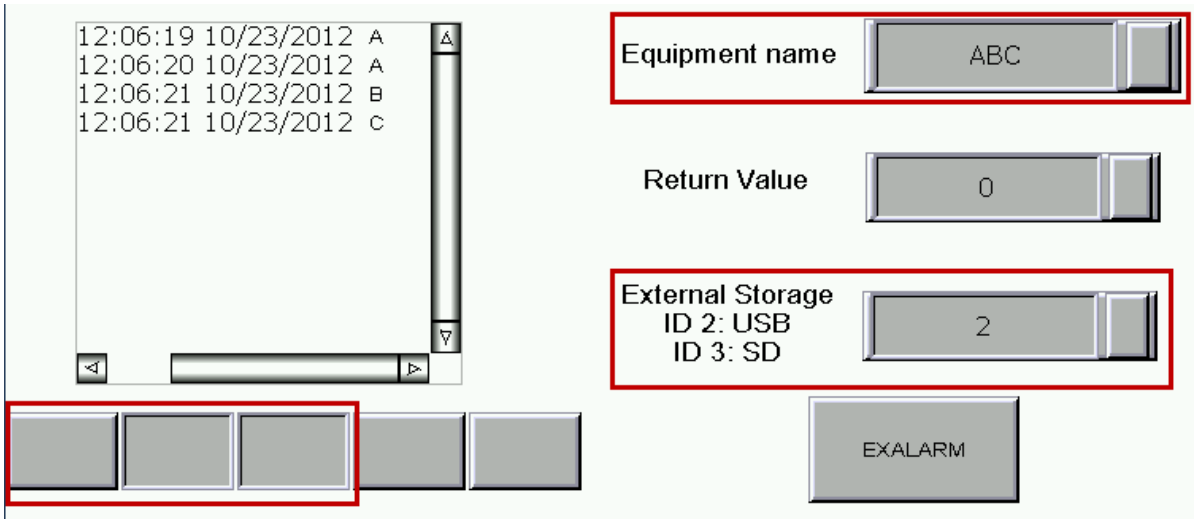
Line 2: Convert $580 (String of Equipment Name) to word by the unit of byte.

Line 3: Move the system time to $200 ~ $206 (year, month, day, week, hour, minute, second).

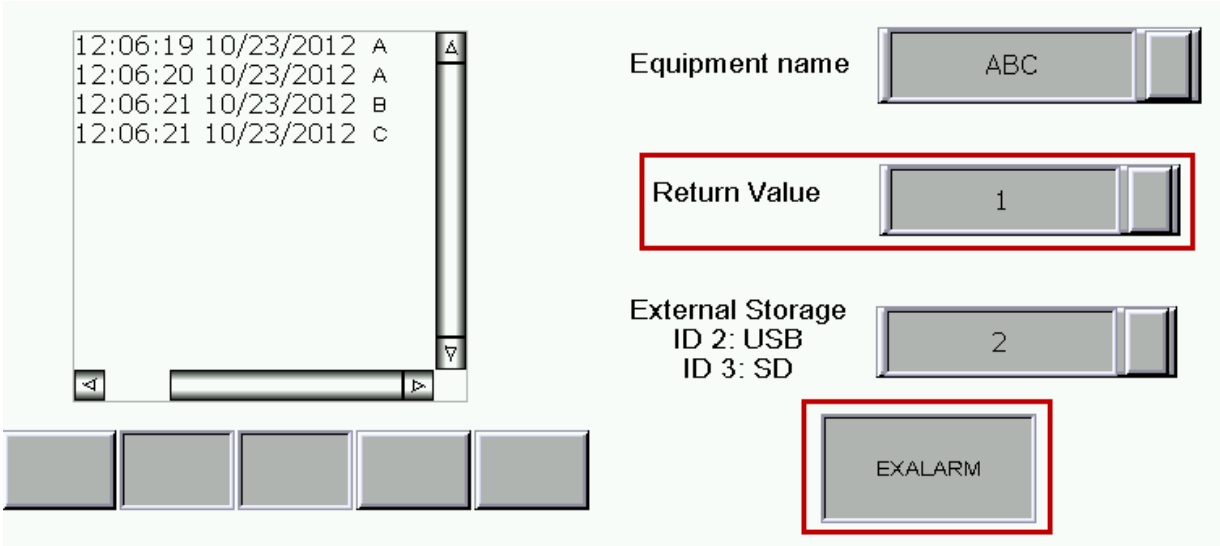
Line 4: Add『_year, month, day』 and 『_Alarm』 to 『three words of equipment name』to form a serial string and specify $510 as start address.
Line 6: Export the historical alarm to the specified external device and file name.

Step 7: Download the editing screen to HMI and insert USB Disk to the port of HMI.

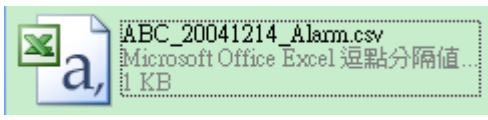
Step 8: Trigger the alarm and enter 『ABC』 as the equipment name on the screen. Select 『2』 for external storage device, which means USB is applying.



Step 9: Press『EXALARM』button. When it is complete, the returned value will return to 1.



Step 10: Remove USB. And the file exported from USB will be shown as below:



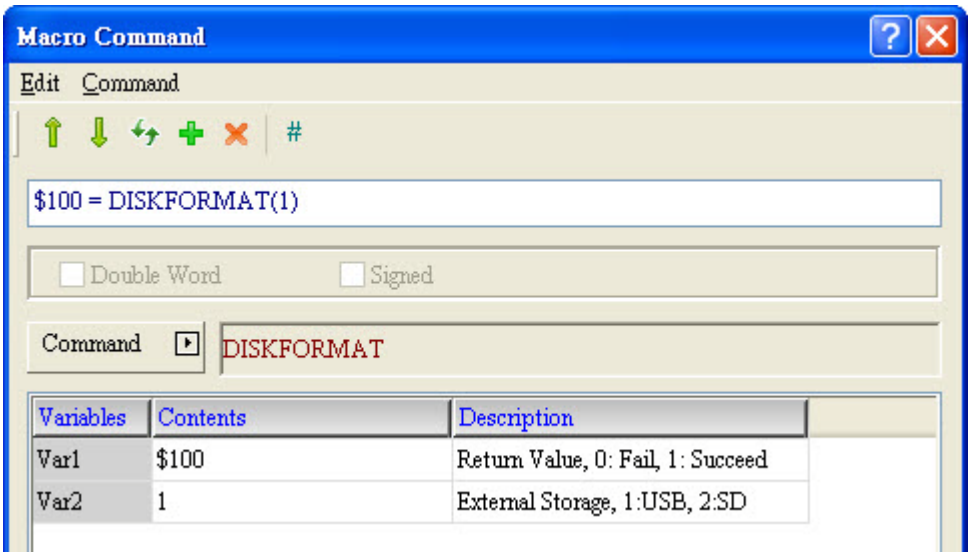
■ DISKFORMAT (Format Disk)

Expression	What Variables Represent				NOTE
Var 1 =DISKFORMAT (Var 2) (W)	Var 1	Returned Value	Successful	0	W : Word
			Failure	1	
	Var 2	External storage device	SD Card	1	
			USB Disk	2	
	Expression Explanation				
	Select the desired device to be formatted as specified in Var 2 and save the returned value in Var 1.				

Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎	◎	
Var 2	◎	◎	◎

Example

➢ Var 1 is an internal memory address and Var 2 is a constant. Format the USB Disk and save the returned value in $100.



■ BMPCAPTURE (Screen Capture)

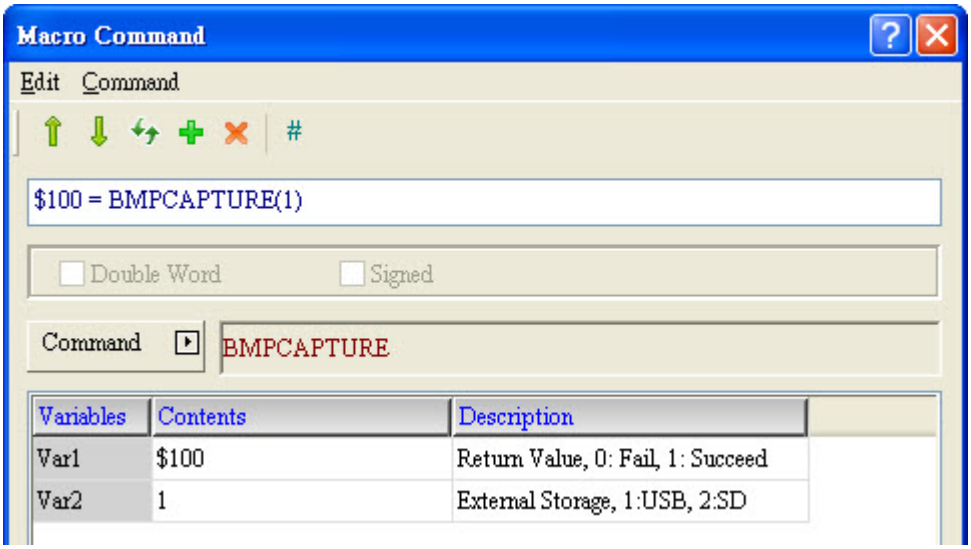
Expression	What Variables Represent				NOTE
Var 1 = BMPCAPTURE (Var 2) (W)	Var 1	Returned Value	Successful	0	W : Word
			Failure	1	
	Var 2	External storage device	SD Card	1	
			USB Disk	2	
	Expression Explanation				
	Save the snapshot into the device specified in Var 2 and the returned value to Var 1.				

* Use BMPCAPTURE to export file is save as .bmp format.
* Export path is under the root and save folder as named for currently year, month and date, save file as named for Hour, minute and second.

Variable	Memory Usage		
	Internal Memory	**PLC Register**	**Constant**
Var 1	◎	◎	
Var 2	◎	◎	◎

Example

➢ Var 1 is an internal memory address and Var 2 is a constant. Save the snapshot to the USB Disk and the returned value in $100.



■ PLCDOWNLOAD

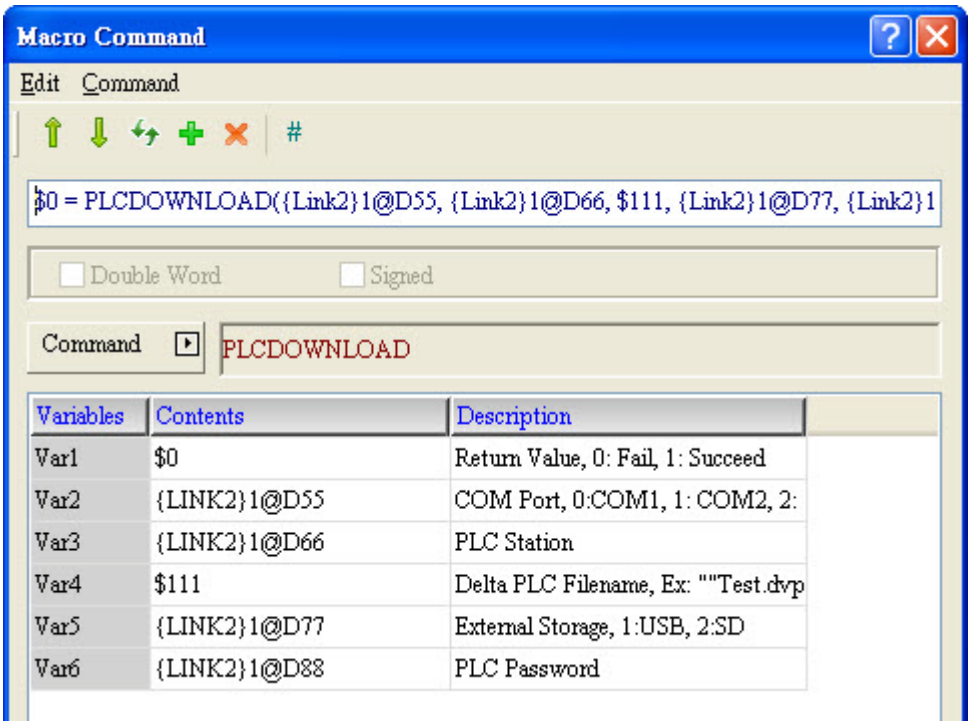
Command	What Variables Represent				NOTE
Var 1 = PLCDOWNLOAD (Var 2, Var 3, Var 4, Var 5, Var 6) (W)	Var 1	Return Value	Failed	0	W：Word
			Success	1	
	Var 2	COM Port	COM1	0	
			COM2	1	
			COM3	2	
	Var 3	PLC Station number			
	Var 4	DELTA PLC file name For example like delta.dvp, delta.isp			
	Var 5	External Storage	SD Card	1	
			USB Disk	2	
	Var 6	PLC Password			
	Expression Explanation				
	Download PLC file to PLC				

* Only support Delta PLC.
* File format support .dvp and .isp.
* Please use Character entry element for PLC Password with Var 6.

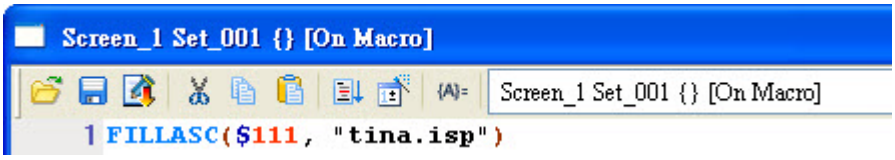
Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎	◎	
Var 2	◎	◎	◎
Var 3	◎	◎	◎
Var 4	◎	◎	
Var 5	◎	◎	◎
Var 6	◎	◎	

Example

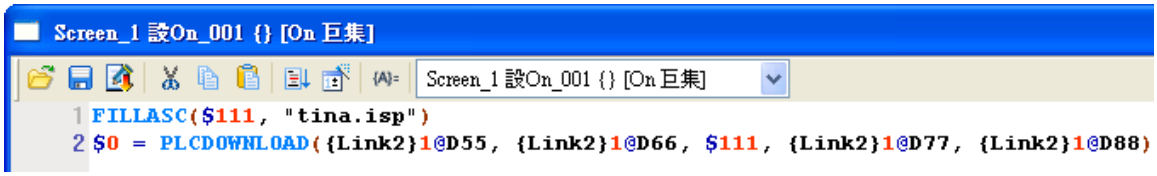
- Please save downloaded ISP file to USB Disk or SD card then return value to $0.



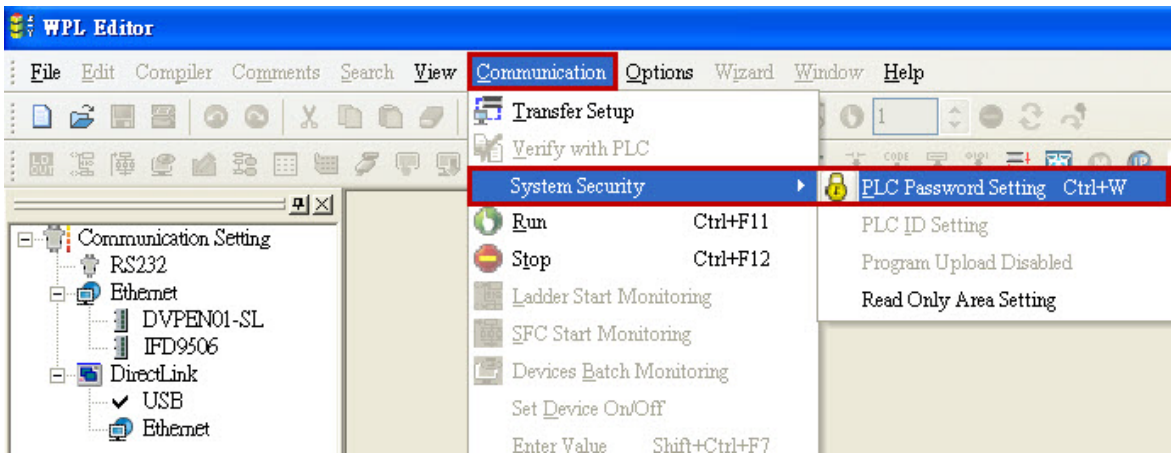
- Var 4 means PLC file name. So it has to use another command “FILLASC”and set file name string to some address.



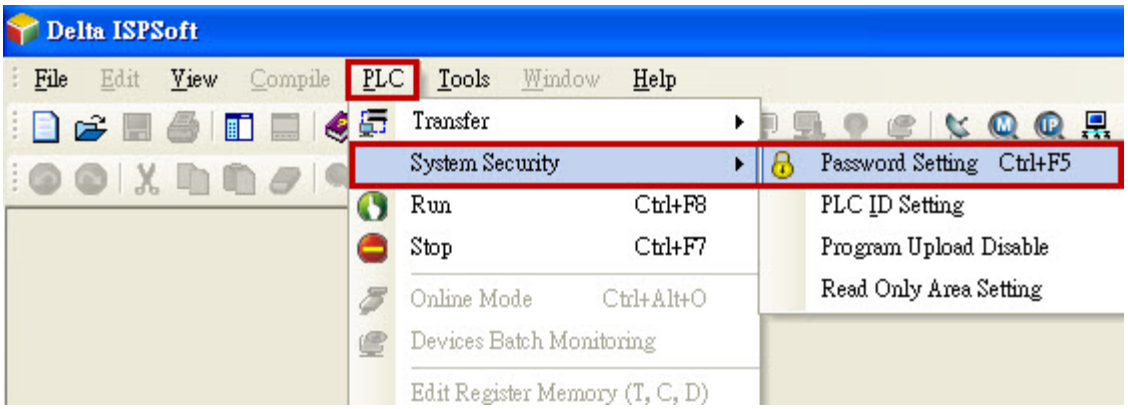
- Then use the address $111 on Var 4 of PLCDOWNLOAD macro command.



- Var 6 means PLC Password, and it has to set password by WPL or ISP software. After setting, it could use Character Entry element to input password and download PLC file to PLC.
  - WPL Password setting



- ISP Password setting



Password Setting
Password (4 Characters)
OK
Cancel
Confirmation
Enable Limited Time:
UnLock

■ GetCircleCenter (Calculate the Coordinate of Circle Center)

Expression	What Variable Represent			NOTE
Var 1 = GetCircleCenter (Var 2, Var 3)	Var 1	Returned Value		DW = Double Word
		Failure	0	
		Success	1	
	Var 2	Enter the calculated three coordinates (Note 1)		
	Var 3	Circle center coordinate that is complete calculation (Note 2)		
	Expression Explanation			
	Enter the three coordinates to calculate circle center coordinate (Note 3)			

Note 1: Enter the calculated three coordinates:
Set 3 points as P1(x1, y1), P2(x2, y2) and P3(x3, y3). Each point has the length of DW.
Assume that Var2 is $100, then:
x1: LOW WORD is saved in $100 and HIGH WORD is saved in $101.
y1: LOW WORD is saved in $102 and HIGH WORD is saved in $103
x2: LOW WORD is saved in $104 and HIGH WORD is saved in $105
y2: LOW WORD is saved in $106 and HIGH WORD is saved in $107
x3: LOW WORD is saved in $108 and HIGH WORD is saved in $109
y3: LOW WORD is saved in $110 and HIGH WORD is saved in $111

Note 2: Circle center coordinate that is complete calculation:
Assume the coordinate of circle center is P4 (x4, y4) and each point has the length of DW. If Var3 is $200, then:
x4: LOW WORD is saved in $200 and HIGH WORD is saved in $201
y4: LOW WORD is saved in $202 and HIGH WORD is saved in $203

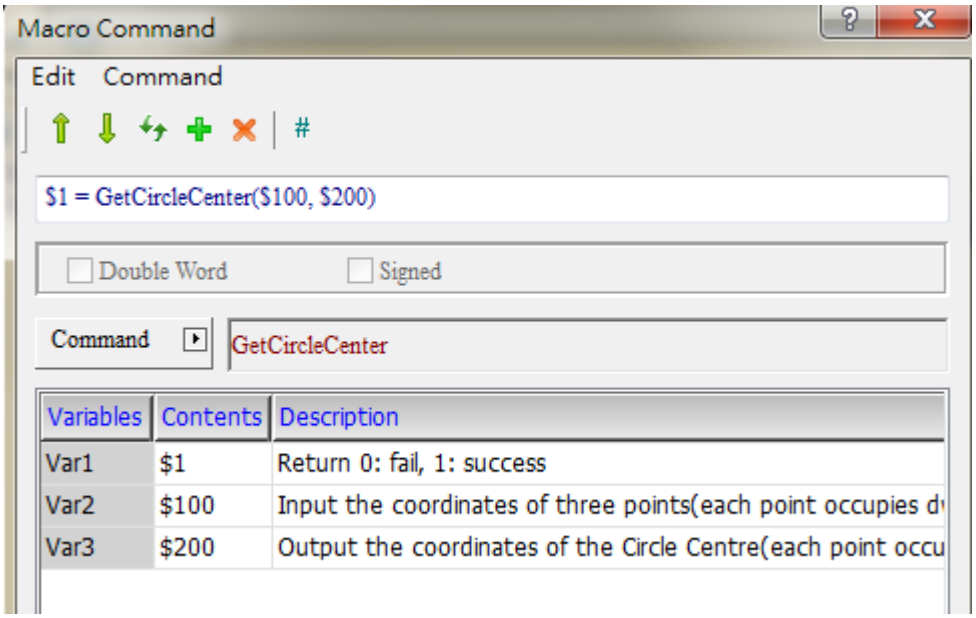
Note 3：Calculation formula:
$x = \triangle x / \triangle$
$y = \triangle y / \triangle$
Among them, $\triangle = 2(xa - xb) * (yc - yb) - 2(ya - yb) * (xc - xb)$
$\triangle x = (yc - yb) * (xa^2 + ya^2 - xb^2 - yb^2) - (ya - yb) * (xc^2 + yc^2 - xb^2 - yb^2)$
$\triangle y = (xa - xb) * (xc^2 + yc^2 - xb^2 - yb^2) - (xc - xb) * (xa^2 + ya^2 - xb^2 - yb^2)$

Variables	Memory Usage		
	Internal Memory	PLC Register	Constant
Var 1	◎		
Var 2	◎		
Var 3	◎		

Example

➢ **Example:**

$1 = GetCircleCenter ($100, $200)



Step 1: Create $1 numeric entry element and the unit is Word.

Step 2: Create $100, $102, $104, $106, $108, $110 numeric entry element and the unit is Double Word. Please enter the following value, respectively.

$100 = 0

$102 = 0

$104 = 100

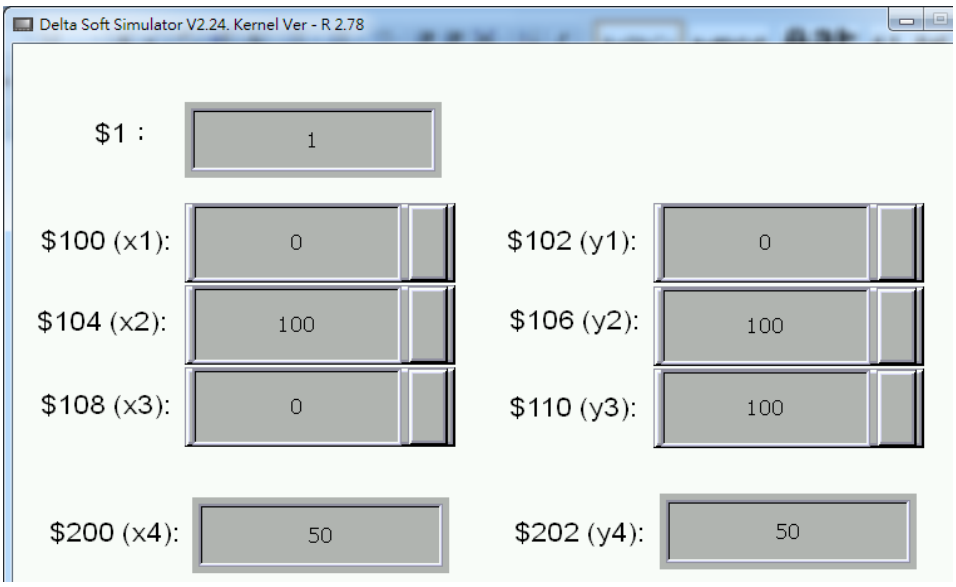
$106 = 100

$108 = 0

$110 = 100

Step 3: Create $200 and $202 numeric entry element. The unit is Double Word.

After Macro is executed, the screen will be shown as below:


Delta Soft Simulator V2.24. Kernel Ver - R 2.78
$1 :
1
$100 (x1):
0
$102 (y1):
0
$104 (x2):
100
$106 (y2):
100
$108 (x3):
0
$110 (y3):
100
$200 (x4):
50
$202 (y4):
50

24-3-12 Industrial Application

Industrial application provides ECAM macro to create E-Cam curve. Please refer to the followings for further description:

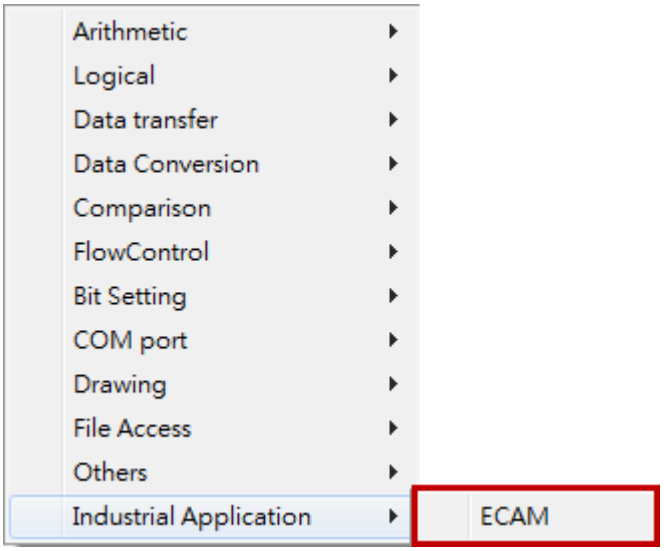


Figure 24-3-12-1 E-CAM Macro

■ ECAM

Expression	What Variable Represent		NOTE
Var 1 = ECAM (Var 2, Var 3, Var 4, Var 5) (DW)	Var 1	Returned Value	DW：Double Word
	Var 2	Address of E-Cam curve algorithm mode	
	Var 3	Start address of E-Cam parameter input	
	Var 4	Start address of E-Cam curve output	
	Var 5	Address of E-Cam curve output	

Memory Usage			
Variables	**Internal Memory**	**PLC Register**	**Constant**
Var 1	◎		
Var 2			◎
Var 3	◎		
Var 4	◎		
Var 5	◎		
Detailed Command Description			
Var1: Returned value Everytime when curve calculation is complete, x1234000 will increase 1.			

In curve calculation, Var1 will be cleared to 0.

If the curve cannot be calculated, it will return the error code. See the descriptions below:

Error Code	Causes
0	No error
1	E-Cam table type error
2	Command type error
3	Input parameter error
4	E-Cam area number exceeds the range
5	Space in data array is not enough (ASDA-A2 series provides 800DW)
6	Input degree exceeds the range, reduce the degree of synchronous area or S-curve area
7	Cutting length exceeds the suggested range. Please enter the recommended cutting length (L) or speed compensation rate.
8	Speed compensation exceeds the range
9	E-gear ratio exceeds the specified range
10	The printing range is larger than roller circumference
11	Initial speed is < 0
12	Time procedure is in error
13	The cutter diameter is too small
14	Operation of cutter may be in error

Var2: Address of E-Cam curve algorithm mode

Use this address to select E-Cam curve algorithm mode。

Input Value	E-Cam Curve Creation Method
1	Rotary shear - Adjustable sealing zone
2	Printer machine
3	Rotary shear – cos compensation

Var3: Start address of E-Cam parameter input

Different E-cam curve creation methods requires different number of parameters. Var3 is used to setup the start address of E-Cam parameter. Please refer to the following table for further information:

E-Cam curve creation method	Input address	Parameters
Rotary shear - Adjustable sealing zone	n	E-Cam area number, P5_82_MIN ~ P5_82_MAX
	n+2	Deceleration ratio: Numerator (nGA)
	n+4	Deceleration ratio: Denominator) (nGB)

	n+6	Knife number (nKnife)
	n+8	Knife diameter (d1) Unit: mm x 100
	n+10	Cutting length (L) Unit: mm x 100
	n+12	Speed compensation (dVcp) -50.00% ~ 50.00% x 100
	n+14	Angle in acceleration area (ns2) Unit: degree
	n+16	Angle in synchronous area (ns3) Unit: degree
	n+18	Angle in S-Curve area (nsS) Unit: degree
	n+20	E-gear ratio (numerator) (P1-44)
	n+22	E-gear ratio (denominator) (P1-45)
Printer Machine	n	E-Cam area number, P5_82_MIN ~ P5_82_MAX
	n+2	Deceleration ratio: Numerator (nGA)
	n+4	Deceleration ratio: Denominator) (nGB)
	n+6	Printing range (dPL) Unit: mm x 100
	n+8	Blank range (dBL) Unit: mm x 100
	n+10	Roller diameter (dd1) Unit: mm x 100
	n+12	Roller diameter of master (dd2) Unit: mm x 100
	n+14	Angle in waiting area (Deg1) Unit: degree
	n+16	Angle in S-Curve area (DegS) Unit: degree
	n+18	Angle in synchronous area (DegA) Unit: degree
	n+20	E-gear ratio (numerator) (P1-44)
	n+22	E-gear ratio (denominator) (P1-45)
Rotary shear – cos compensation	n	E-Cam area number, P5_82_MIN ~ P5_82_MAX
	n+2	Deceleration ratio: Numerator (nGA)
	n+4	Knife number
	n+6	Knife diameter (mm) x 100
	n+8	Product cut length (mm) x 100
	n+10	Speed compensation (master axis) Unit: %
	n+12	Lead constant speed area Unit: count number
	n+14	Cut thickness D(mm) x 100
	n+16	Cut height H(mm) x 100
	n+18	E-gear ratio (numerator) (P1-44)

	n+20	E-gear ratio (denominator) (P1-45)
	n+22	Speed ratio (conveyor 2: conveyor 1)
	n+24	S (curve level): 1 ~ 4 levels

Var4: Start address of E-cam curve output

After calculation, the E-cam curve outputs to the start address of Var4. Please refer to Var5 for its output length.

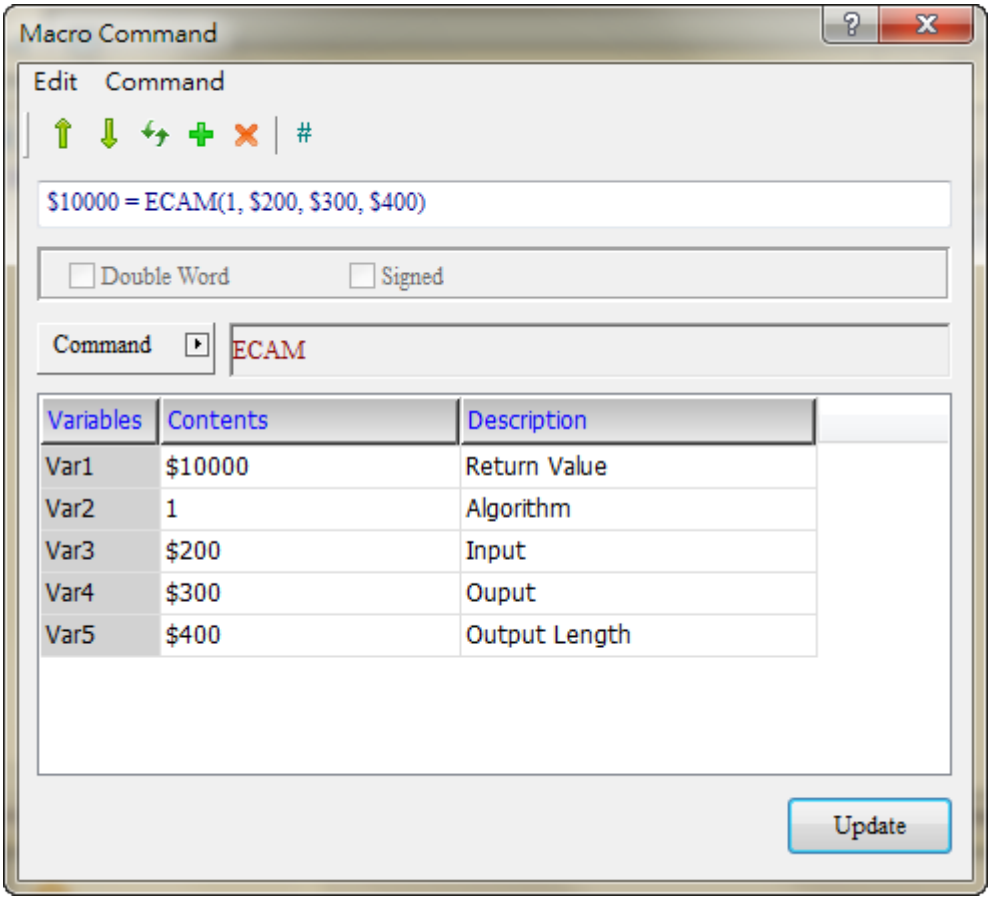
Var5: Address of E-cam curve output length

After calculation, if the E-cam output length is 100, it will take 200-word long address. (For E-cam funciton, the unit is Double Word.)

NOTE: Please be aware of address overlap when applying E-Cam funciton. E-Cam curve of ASDA-A2 can create up to 721 areas. Thus, the E-cam value will take 1422 words at most. If Var4 (start adress of E-Cam curve output) is set to $0, it is suggested to reserve $0~$1441 for E-cam use only.

Example

1. Create a momentary button and set its address as $0.0. Write **$10000 = ECAM(1, $200, $400, $300)** in On Macro.



Var2 = 1. It indicates that this macro command calculate the E-Cam curve for rotary shear-adjustable sealing zone.

Parameters that is required by macro algorithm starting from $200 use 12 Double Words (= 24 Words) and take $200-$223 as the memory address.

$200	E-Cam area number, P5_82_MIN ~ P5_82_MAX
$202	Reduction ratio (numerator) (nGA)
$204	Reduction ratio (denominator) (nGB)
$206	Knife number (nKnife)
$208	Knife diameter (d1) Unit: mm x 100
$210	Cutting length (L) Unit: mm x 100
$212	Speed compensation, (dVcp) -50.00% ~ 50.00% x 100
$214	Angle in acceleration area (ns2) Unit: degree
$216	Angle in synchronous area (ns3) Unit: degree
$218	Angle in S-Curve area (nsS) Unit: degree
$220	E-gear ratio (numerator) (P1-44)

$222	E-gear ratio (denominator) (P1-45)

After calculation, E-Cam parameters will be outputted to the address starting from $400 to $1841 at most.
(In A2 system, one E-cam curve can be divided up to 721 parts. One part takes one double word. Thus, it will take 721*2 =1442 Words. And its memory address is from $400 to $1841.)
The actual curve will be outputted to $300.

2. Create one E-cam curve element on the screen. See below for its address setting:

E-CAM Curve Element	E-CAM Macro	Address
Read Buffer Address	Var4	$400
Read Size Address	Var5	$300
Read Start Address	Var1	$10000

3. Create one E-cam sketch element. See below for its address setting:

E-CAM Sketch Element	E-CAM Macro	Address
Read Buffer Address	Var4	$400
Read Size Address	Var5	$300
Read Start Address	Var1	$10000

4. Create 12 numeric entry elements on the screen. Unit is Double Word. See below for its address setting:

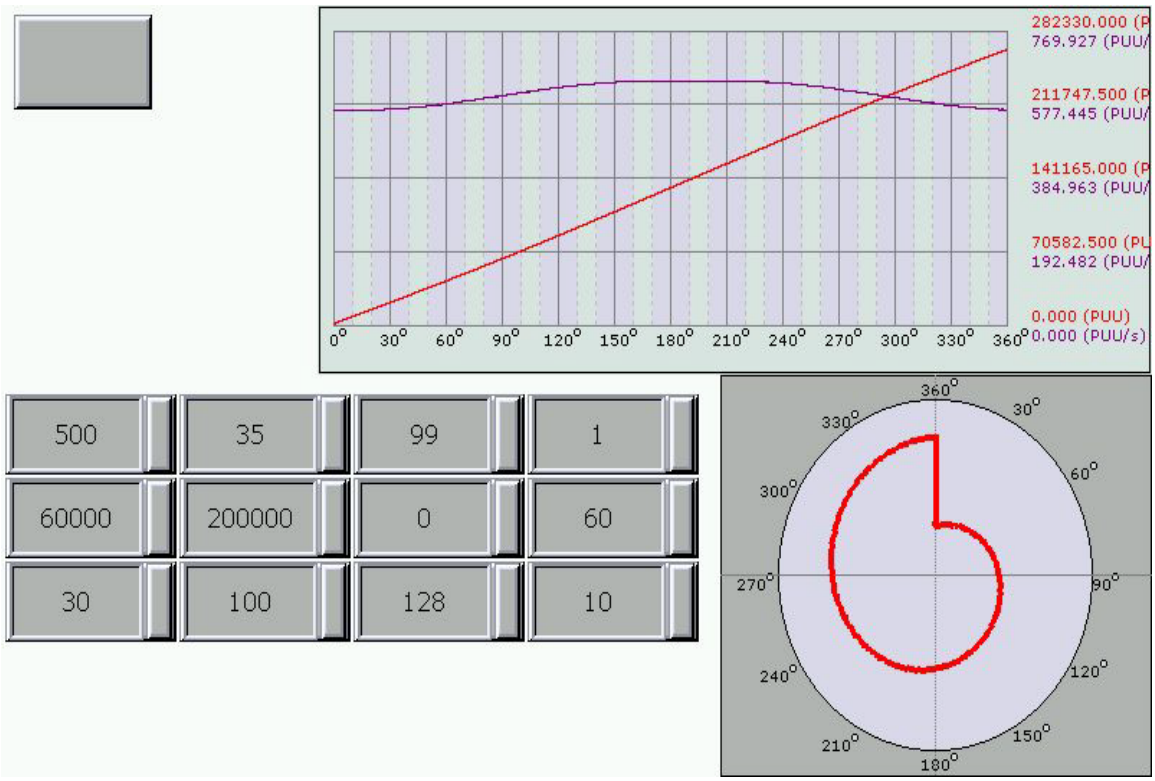
$200	E-Cam area number, P5_82_MIN ~ P5_82_MAX
$202	Reduction ratio (numerator) (nGA)
$204	Reduction ratio (denominator) (nGB)
$206	Knife number (nKnife)
$208	Knife diameter (d1) Unit: mm x 100
$210	Cutting length (L) Unit: mm x 100
$212	Speed compensation, (dVcp) -50.00% ~ 50.00% x 100
$214	Angle in acceleration area (ns2) Unit: degree
$216	Angle in synchronous area (ns3) Unit: degree
$218	Angle in S-Curve area (nsS) Unit: degree
$220	E-gear ratio (numerator) (P1-44)
$222	E-gear ratio (denominator) (P1-45)

5. When downloading to HMI, please fill in the following value in sequence:

$200	500
$202	35

$204	99
$206	1
$208	60000
$210	200000
$212	0
$214	60
$216	30
$218	100
$220	128
$222	10

6. Press momentary button $0.0. The E-cam curve will be generated as below:



24-4 Macro Error Messages

Users may accidently type in incorrect syntaxes or typos within macros. To help users quickly locate error Macro codes, the HMI system will display error codes in the output field during the coding process and also prompt error messages during complies to remind users about these errors.

➢ Error Message During Editing

Number	Number name	Trouble shooting
-100	LABEL cannot be found	There is no such LABEL required by the GOTO command
-101	Recursion occurred	This error message indicates that recursion has occurred, and errors of this sort mostly happen in sub-macros. The reason is that a sub-macro is called by itself within the same sub-macro, either directly or indirectly. Basically, the recursion technique can not be used within a submacro, but if this is unavoidable, please consider Goto or For (infinite loop) instead.
-102	More than 10 nested FOR used	This error message is to remind users not to use more than 10 nested FOR commands. The purpose is to prevent excessive uses of the FOR command and avoid memory insufficiency. If necessary, please consider GOTO or IF instead.
-103	Submacro does not exist	This error message indicates that the sub-macro called upon does not exist. As an example, the code “CALL 5” is intended to call a sub-macro 5, but the user somehow does not write sub-macro 5 in the program. To avoid unpredictable consequences due to this kind of mistakes (typos or forgot to add the corresponding sub-macro), this error message is hence displayed to remind the users.
-104	Number of NEXT is less than	Next and For are paired operands and must

	the number of FOR	be used together. This error message indicates that the number of NEXT and FOR does not match. The program can not proceed to the next For if there is one NEXT missing.
-105	Number of FOR is less than the number of NEXT	Next and For are paired operands and must be used together. This error message indicates that the number of NEXT and FOR does not match. The program can not proceed to the next For if there is one extra NEXT.
-106	Repeated LABEL	This error message indicates that there is one duplicated LABEL within the same macro. This will generate unpredictable consequences since there are two sequences for the same GOTO. To avoid this kind of mistakes, this error message is hence displayed.
-107	There is RET in Macro	This error message indicates that is a RET command in the macro. The RET command is reserved for the submacro to return back to the macro. Should there be a need to end a macro, please consider END instead.

➢ HMI Macro Error Messages

Users can read error messages via macro commands. However, if a correct command is executed before the error message is read, then the previous error message will be overwritten (changed). Macro error messages will not be changed, however, while a different macro is being executed.

Number	Number name	Trouble shooting
-10	GOTO error	This message means that there is a GOTO error for the macro that is currently being executed.
-11	Stack overflow	This message indicates that the stack for the macro currently executed is full. This may be caused by using too many sub-macros or executing multiple macros at the same time. This message is a mechanism avoiding memory insufficiency.

-12	Empty Sub-macro	This message indicates that calling a sub-macro has failed. Since the Call command identifies a sub-macro through its ID stored in an internal memory address, if that address does contain the corresponding ID for the sub-macro, and then there will be no sub-macro to be upon.
-13	Data Read Error	This message indicates an error has occurred during the data reading process. Although there is a possibility the error is due to incorrect data stored in a specific internal memory address, most of the time it is the problem of an external controller that has caused this read error.
-14	Data Write Error	This message indicates an error has occurred during the data writing process. Although there is a possibility the error is due to incorrect data stored in a specific internal memory address, most of the time it is the problem of an external controller that has caused this write error.
-15	Divisor is 0	This error message indicates that the devisor is identified as 0 during the division or reminder operations.
-16	Data process error with BCD format	This error message indicates when execute BCD macro command have some error with data process.
-17	Data process error with convert ASCII to HEX format	This error message indicates when execute TOHEX macro command have some error with covert ASCII to HEX format.
-18	NEXT OFFSET error	This error message indicates when macro have data error will cause execute next command error.
-19	Character command error	This error message indicates when execute FILLASC will have error.
-20	Data process error with BIN format	This error message indicates when execute BIN macro command have some error with data process.
-21	Sub macro data error	This error message indicates when macro

		have data error will cause call sub macro error.
-22	FOR Loop have OFFSET error	This error message indicates when macro have data error will cause execute FOR macro error.
-24	INITIAL ERROR	This error message indicates when execute INITCOM command will have error.
-24	Memory allocation error	This error message indicates HMI memory is not enough to execute macro commands.
-25	COM Port error	This error message indicates COM Port has error and will cause execute related about COM Port macro failed.
-26	Print Port error	This error message indicates select incorrect Print Port when execute print action.
-27	Read value error	This error message indicates over range when read macro parameter.
-28	IF ELSE ENDIF error	This error message indicates when execute IF ELSE ENDIF macro command have error.
-29	Pen width setting error	This error message indicates set incorrect pen width of draw macro.
-30	History data error	This error message indicates when execute GETHISTORY macro command have error.
-31	Export error	This error message indicates when execute EXPORT macro command have error.
-32	Disk reading error	This error message indicates external or internal storage have error will cause execute related about EXPORT and DISKFORMAT macro command error.
-33	Print error	This error message indicates when execute macro command to print have error.
-34	IF ELSE ENDIF stack over flow	This error message indicates stack over flow when execute IF ELSE ENDIF macro command.
-35	Password error	This error message indicates input password error when execute related password confirm macro.
-36	Password lock error	This error message indicates password exceed input limitation when execute related password confirm macro.

-37	ID password identify error	This error message indicates ID password error when execute related ID password confirm macro.
-38	Syntax error	This error message indicates after download PLC program have syntax error.
-39	Connection failed or no response	This error message indicates when download PLC program and detect connection failed or no response.

Explanation about PLC file error includes DVP and ISP file format.		
-40	File name not support	This error message indicates not support file name when execute macro to open PLC file.
-41	Version not support	This error message indicates not support version when execute macro to open PLC file.
-42	Open file error	This error message indicates open file failed when execute macro to open PLC file.
-43	File Handle error	This error message indicates file point error when execute macro to open PLC file.
-44	File reading error	This error message indicates cannot reading when execute macro to open PLC file.
-45	File Seek error	This error message indicates cannot move file content when execute macro to open PLC file.
-46	File writing error	This error message indicates cannot writing when execute macro to open PLC file.
-47	File remove error	This error message indicates remove file failed when execute macro to remove file.
-48	File Rename error	This error message indicates file rename failed when execute macro to rename file.
-49	File length error	This error message indicates file length error when execute macro.
-50	File data error	This error message indicates file data error when execute macro.

Contents

25-1 Multi-language Setup 2

Chapter 25 Multi-language

This chapter describes the multi-languages that the DOPSoft software provides and how to use the multi-language function.

The multi-language function supports up to 32 languages and all these languages can be set up individually. The multi-language setup example is described below.

25-1 Multi-language Setup

Enter [Options] → [Configuration....] → [Others] → [Language] to set multi-langauage parameters.

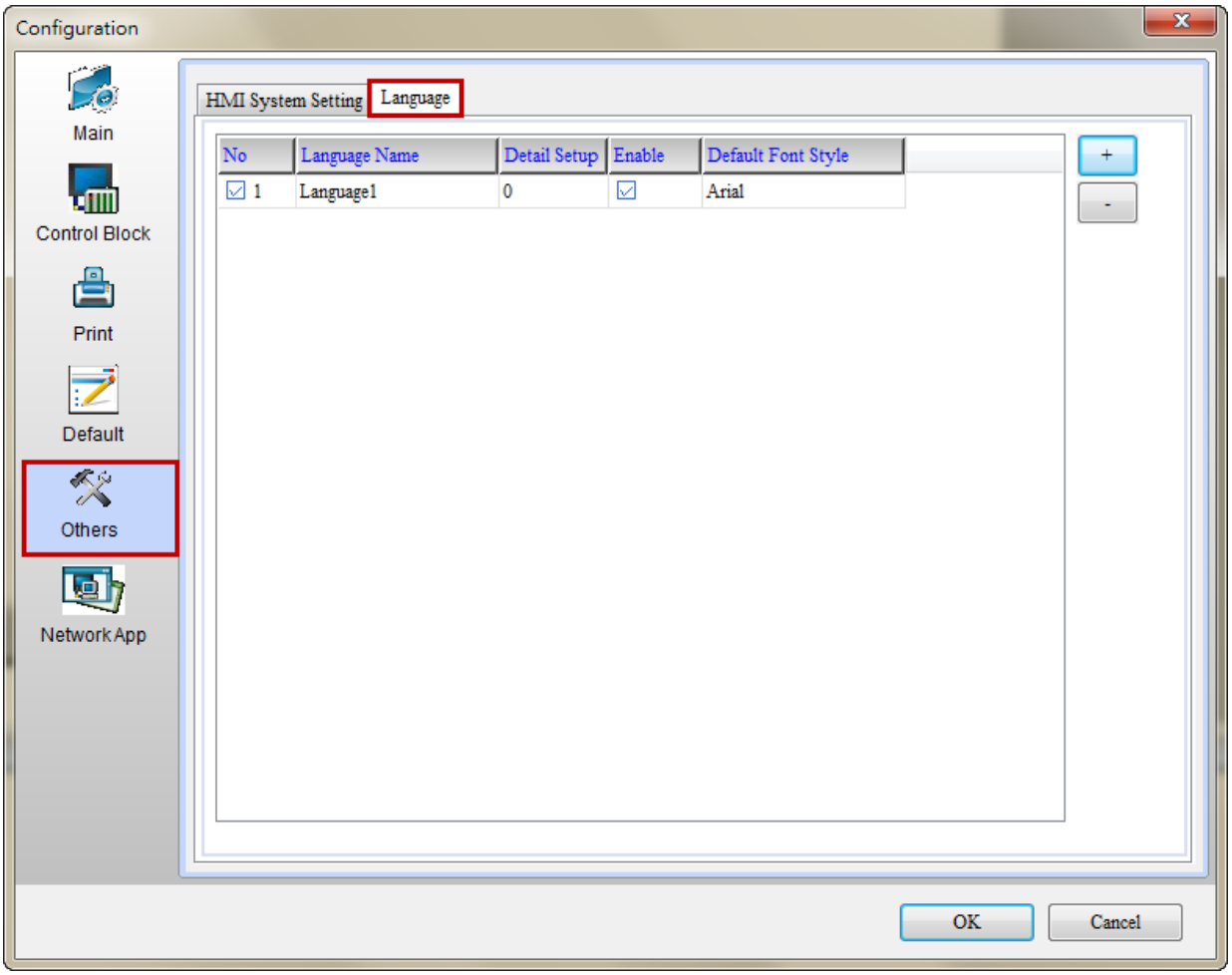
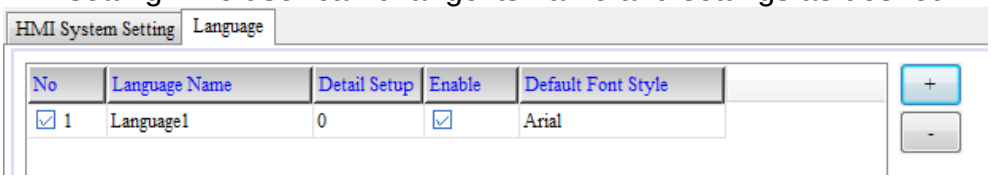
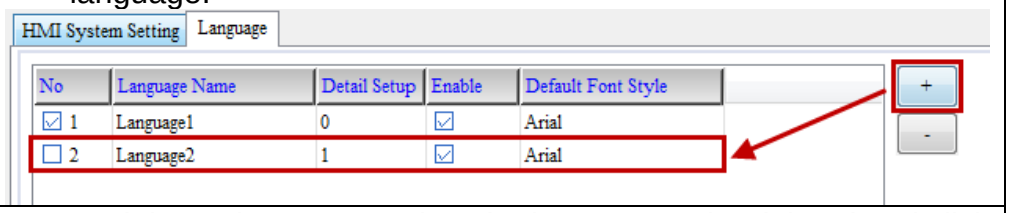
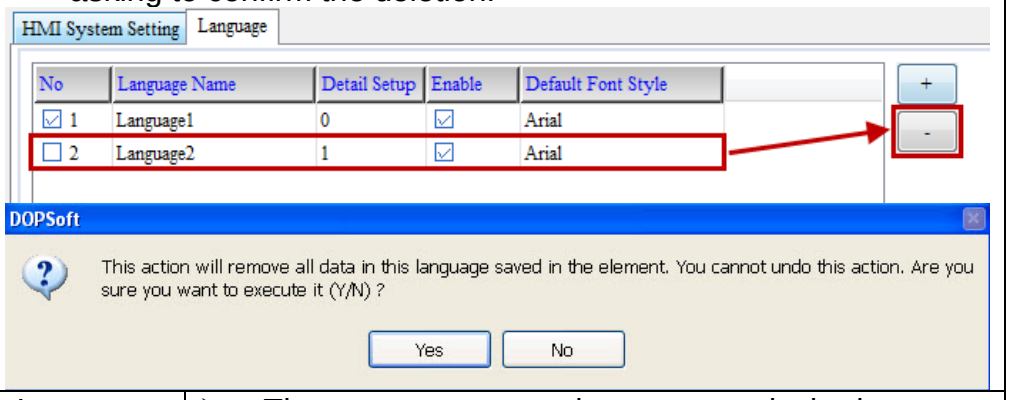
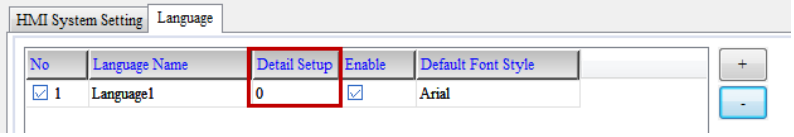
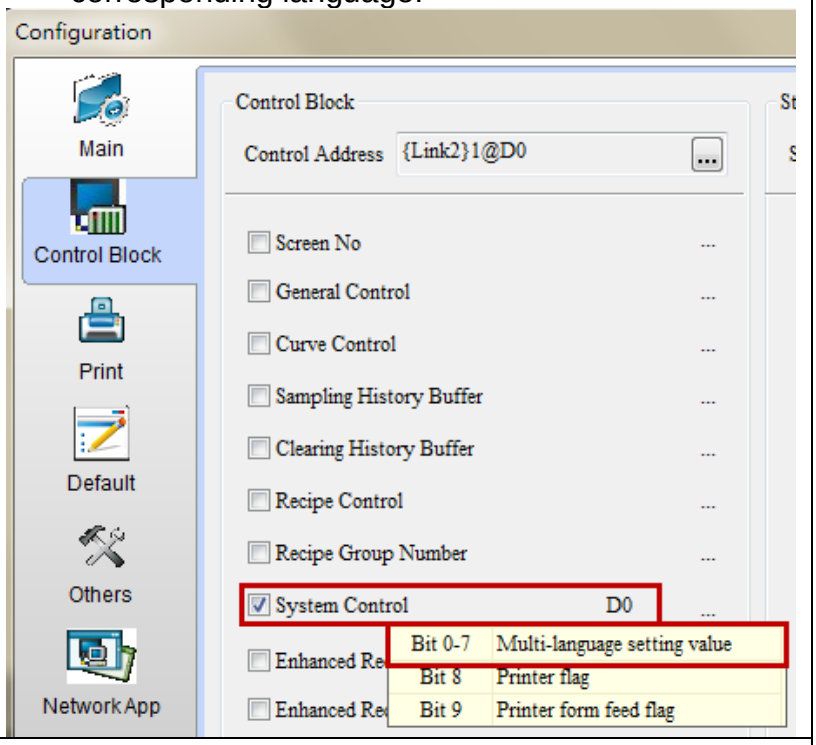
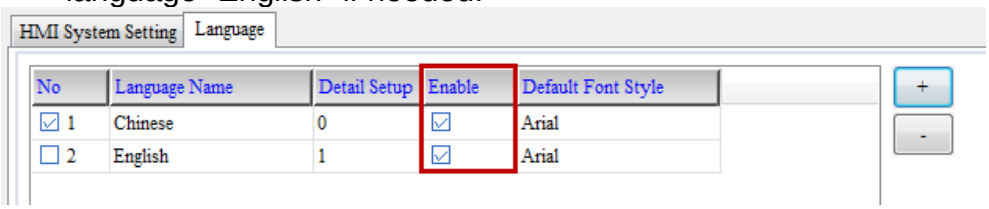


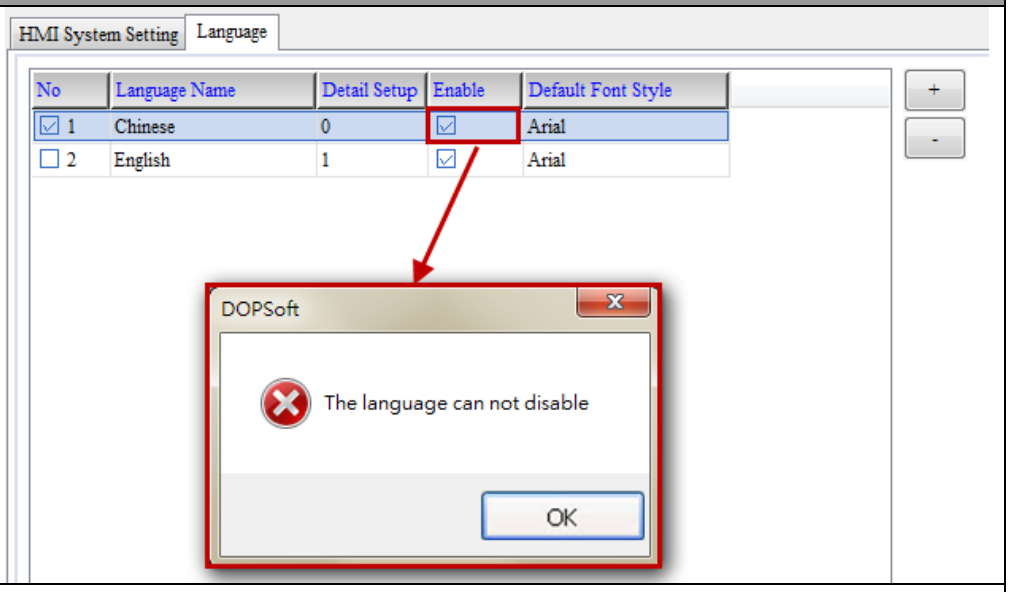
Figure 25-1-1 Multi-language Setup Interface

Multi-language Setup Table 25-1-1 Multi-language Setup		
Add +	➢ The Multi-language Setup function allows the user to add, modify and delete the language settings. [Language 1] is the default setting. The user can change its name and settings as desired.  ➢ The user can click the ＋ button on the right side to add a new language.  	
Delete -	➢ To delete a language, select the language to be deleted and click the – button on the right side to delete the selected language. When executing the delete function, a popup window will appear asking to confirm the deletion.  	
Modify	Language Name	➢ The user can name a language as desired or as defined for the country concerned.

Multi-language Setup Table 25-1-1 Multi-language Setup		
	Setting	➢ The Setting column is used to switch between languages.  ➢ The software switches the language to the corresponding setting using the [System Control] in the [Control Block]. The [Language Change] in the button element is used to switch the setting to the corresponding language. 
Enable	➢ The user can determine whether to enable added languages. As shown in the figure below, the user can enable the added No. 2 language “English" if needed.  ➢ If the user attempts to uncheck the [Enable] for [Language 1], a popup warning message will appear to inform the user that this language cannot be disabled.	

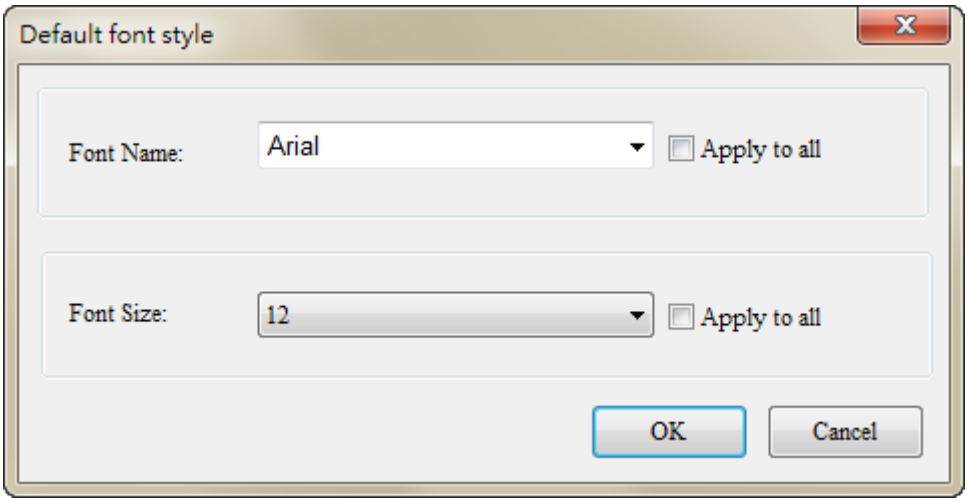
Multi-language Setup

Table 25-1-1 Multi-language Setup



Default Font Style

- Default font style provides users customize the font name and font size to apply to all elements.

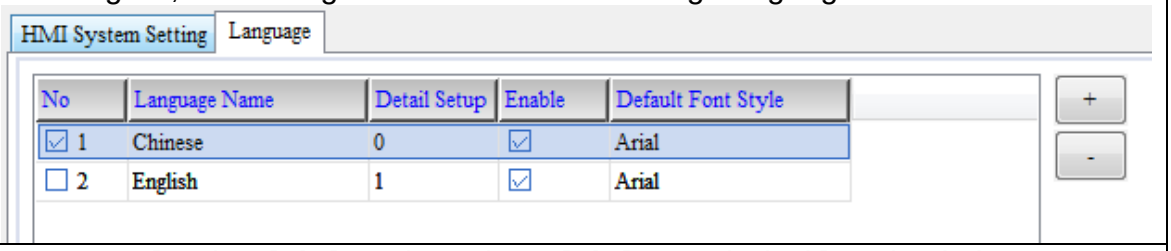
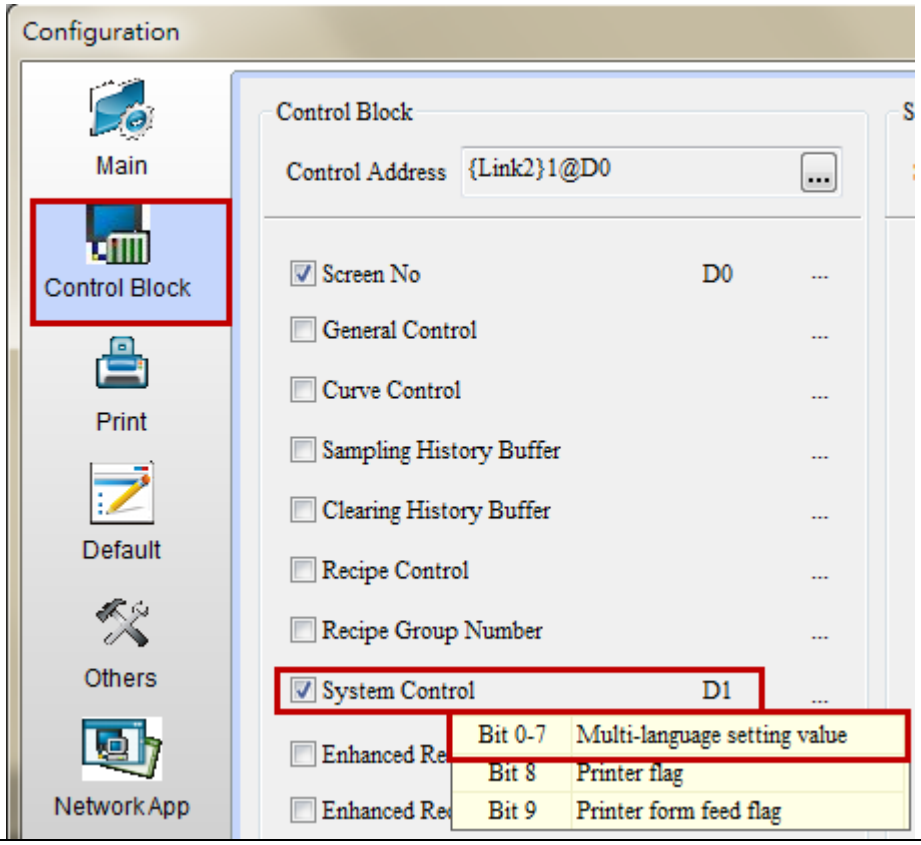


- When users only choose one of two options, the result only suitable for after apply and after that create new element.
- When users choose both options, the result suitable for already existed elements and new elements.

NOTE：

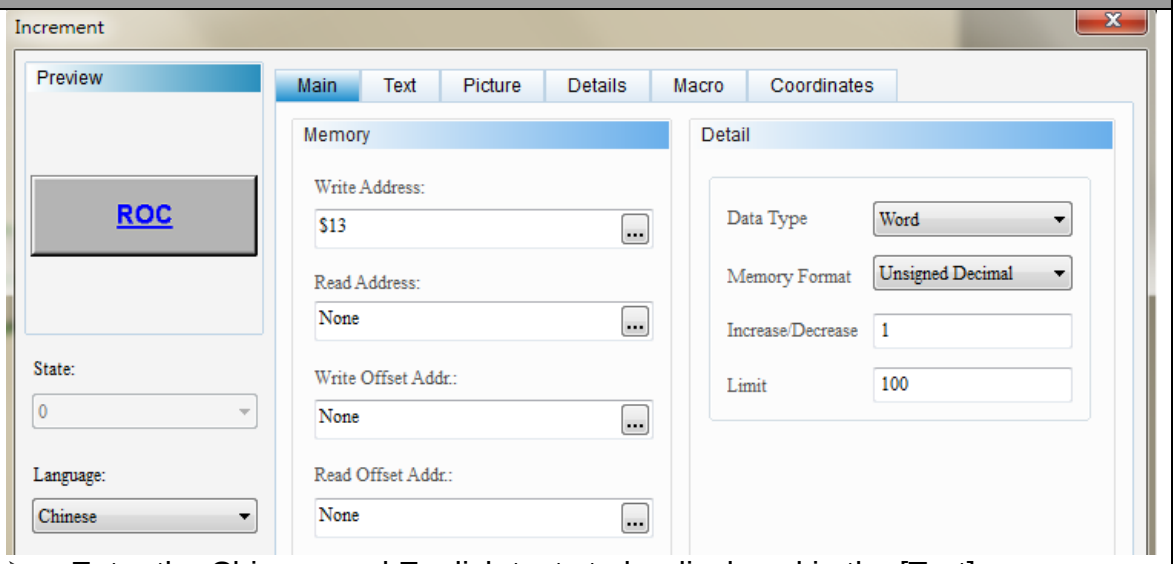
✓ Only could input text element suitable for apply font name and font size function.

■ Multi-language Example

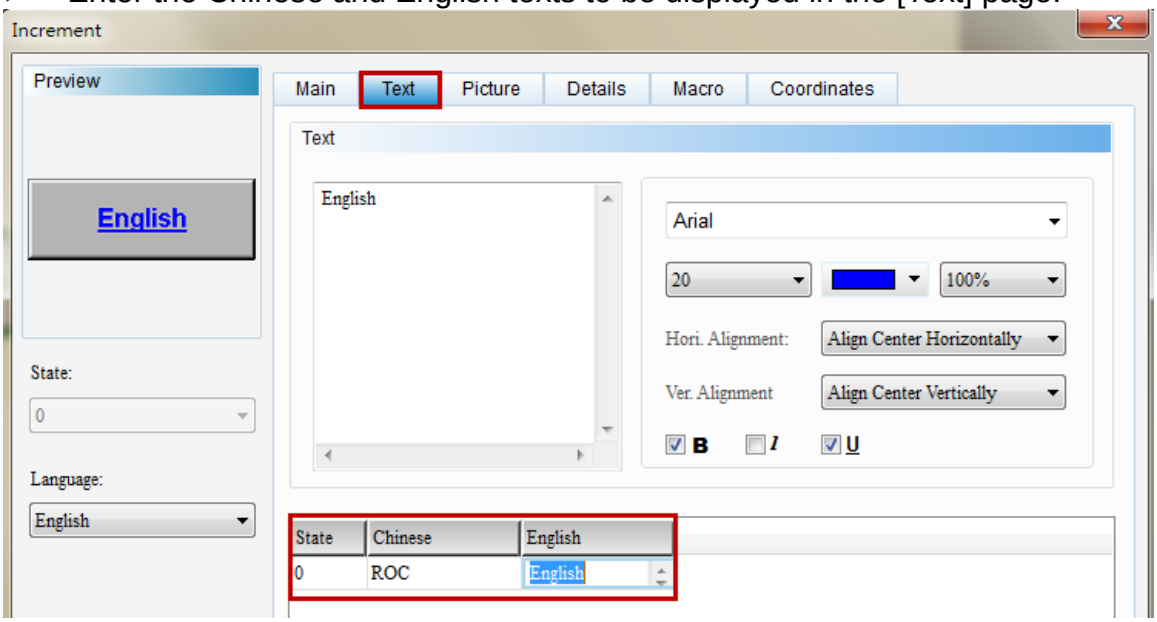
Multi-language Example Table 25-1-2 Multi-language Example	
Step1	➢ Enter [Options] → [Configuration....] → [Others] to add a language named English, and change the name of the existing Language 1 to Chinese. 
Step2	➢ Enter [Options] → [Configuration....] → [Control Block] to check the System Control. 
Step3	➢ Create an increment button and set the Write Address to $13. Set the other required parameters.

Multi-language Example

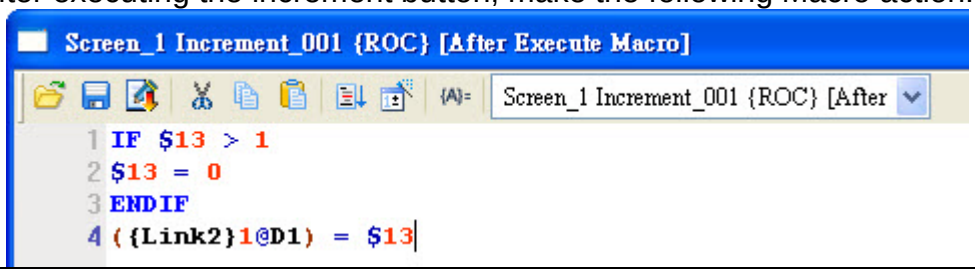
Table 25-1-2 Multi-language Example



➢ Enter the Chinese and English texts to be displayed in the [Text] page.

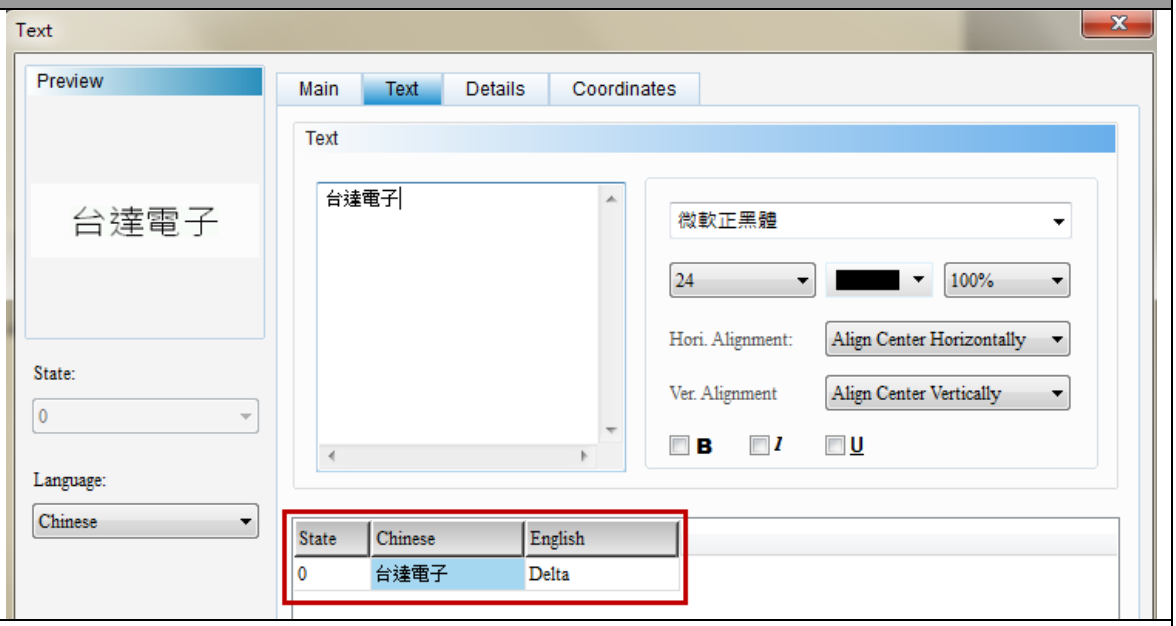


➢ After executing the increment button, make the following Macro action.



Step4

➢ Create a static text. Enter the Chinese and English texts to be displayed in the [Text] page.

Multi-language Example Table 25-1-2 Multi-language Example	
	
Step5	➢ Execute Compile and download the screen to HMI.

Multi-language Example Table 25-1-2 Multi-language Example	
Step6	➢ After the download, click the ROC button to switch the language to English. The static text changes to Delta. **Before Switch** **After Switch**

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Chapter 26 Print Setup

This chapter describes the print function that the DOPSsoft software provides, including screen print and routine print (hard copy). Connection to the HMI print function using the Pictbridge driver is also described in this chapter.

Selection of a printer driver is required to set the screen print and routine print. The user can enter [Options] → [Configuration] → [Print] page to select the printer to be used.

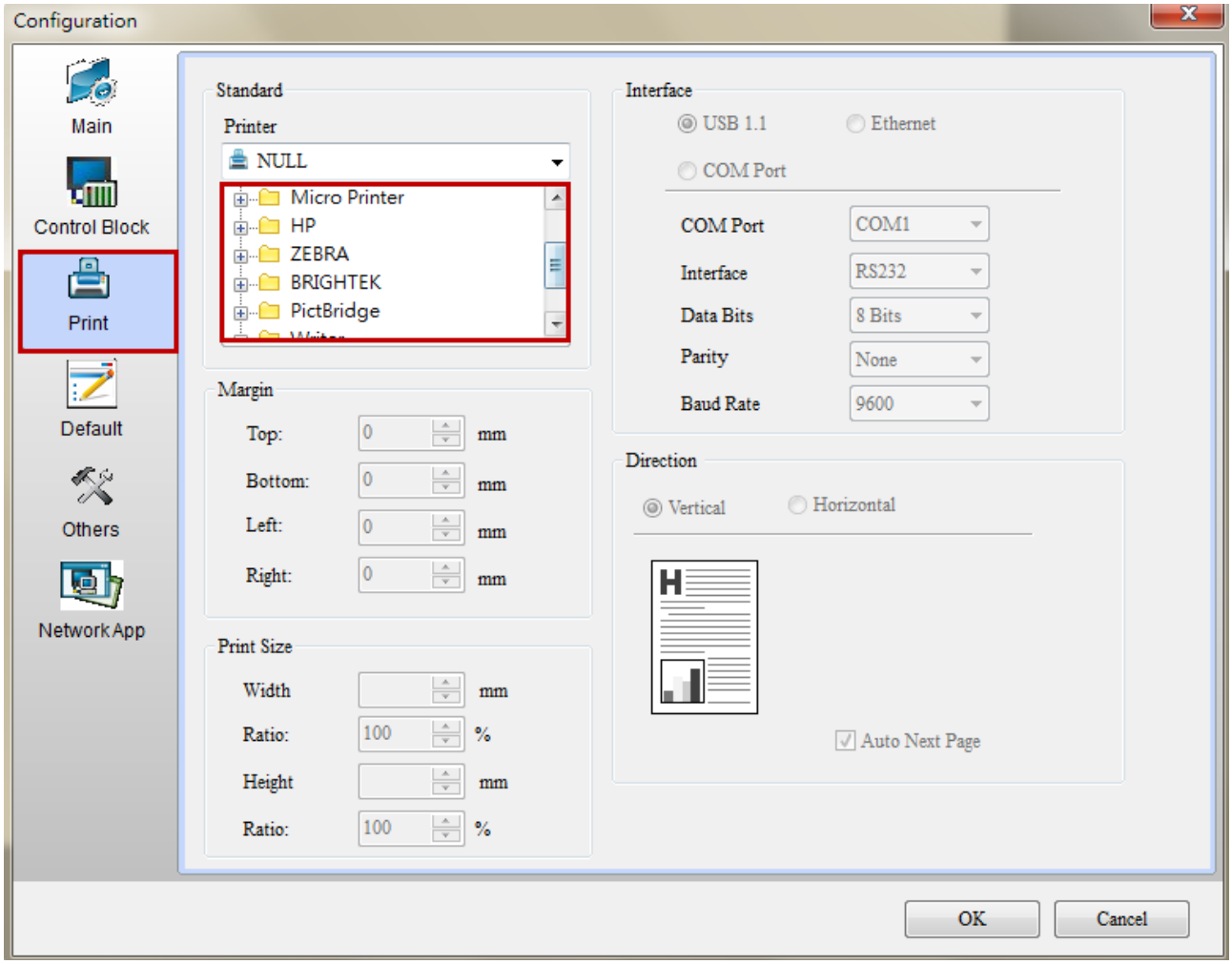
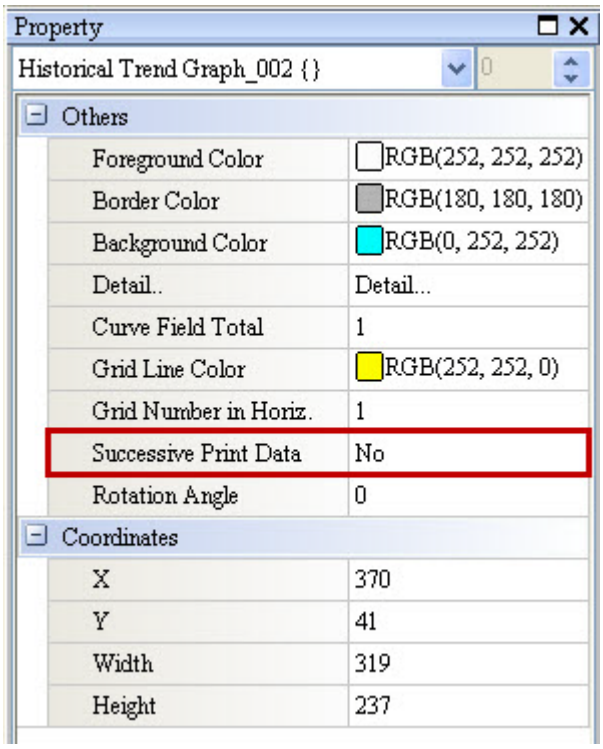
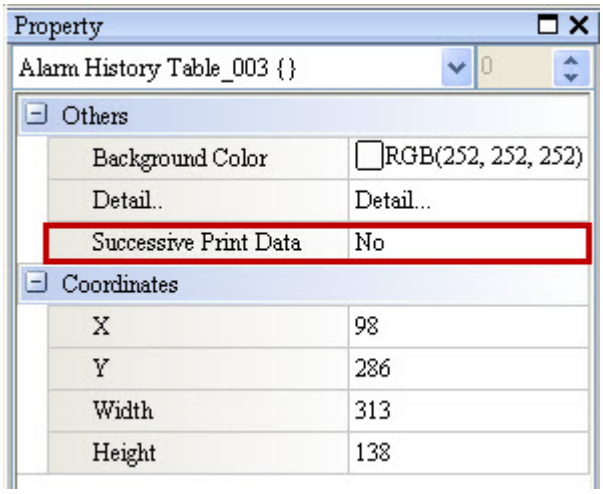


Figure 26-1-1 Printer Driver

The print function provides the [Continuous Printing] option, but it is available only when the printer to be used has been selected, and applicable only to the sampling element, alarm display element and curve element (excl. chart element). When the current screen is printed out and the data recorded in the element are not completly sampled on the screen, the user can use this option to print the rest of the data continuously until the sampling is completed.





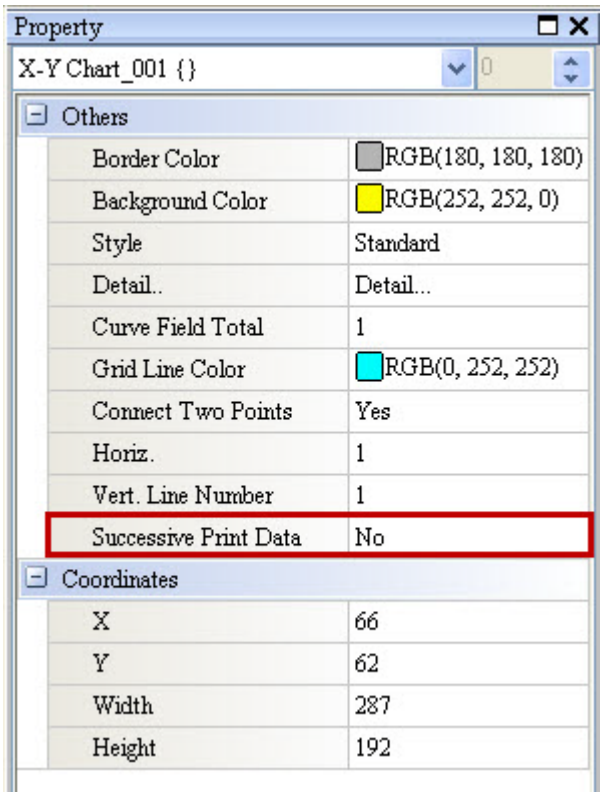


Figure 26-1-2 Continuous Printing

26-1 Screen Print Setup

The screen print setup function enables the user to set the layout, execute multi-page printing and print history data.
The following instructions must be observed before executing the print typesetting.

- ✓ **The screen specified by the Goto Screen should not be the print screen.**
- ✓ **Cannot change to the print screen via goto screen or control area command.**
- ✓ **The print screen should not be the default screen.**
- ✓ **The print screen should not be the base screen.**
- ✓ **The print screen should not be the sub-screen.**
- ✓ **The print screen should not be the screen saver screen.**

The print typesetting provides [Print All] and [Custom Print] options.

- ◆ With the [Print All] option selected, all 4 screen that the user dragged to the Print Screen on the right side for printing will be printed out. Historical data can also be printed out using this option. The user can select the screen to be printed, set the layout of the screen or delete the screen not to be printed.

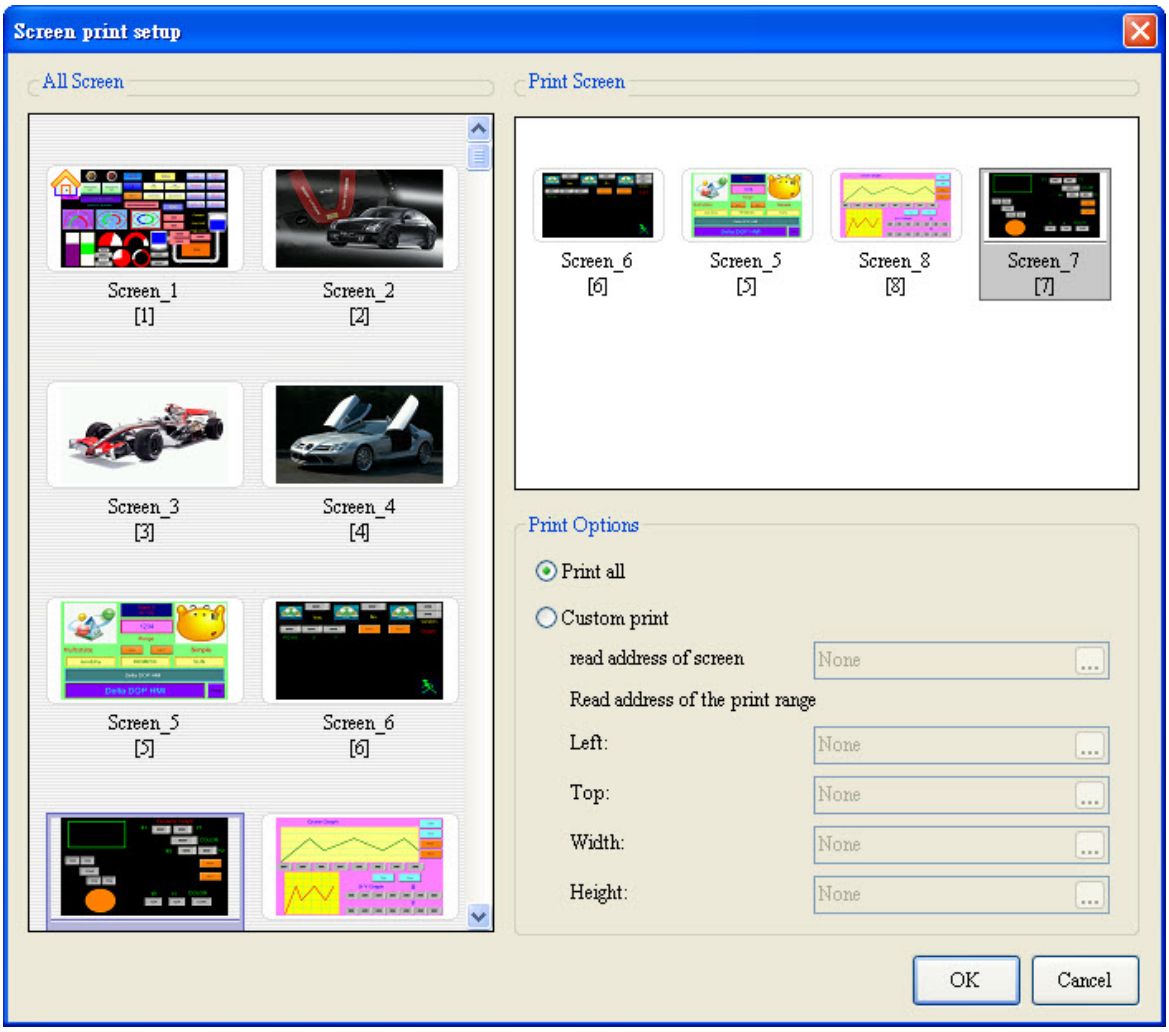


Figure 26-1-3 Print Typesetting Screen

◆ With the [Custom Print] option selected, the user can specify the screen to be printed. For this, the user can set the Read Address of Screen and the height (Height), width (Width), the X coordinate of the start point (Left) and the Y coordinate of the start point (Top) within the print range. This option can be used in conjunction with the print flag in the control area and the Report List button.

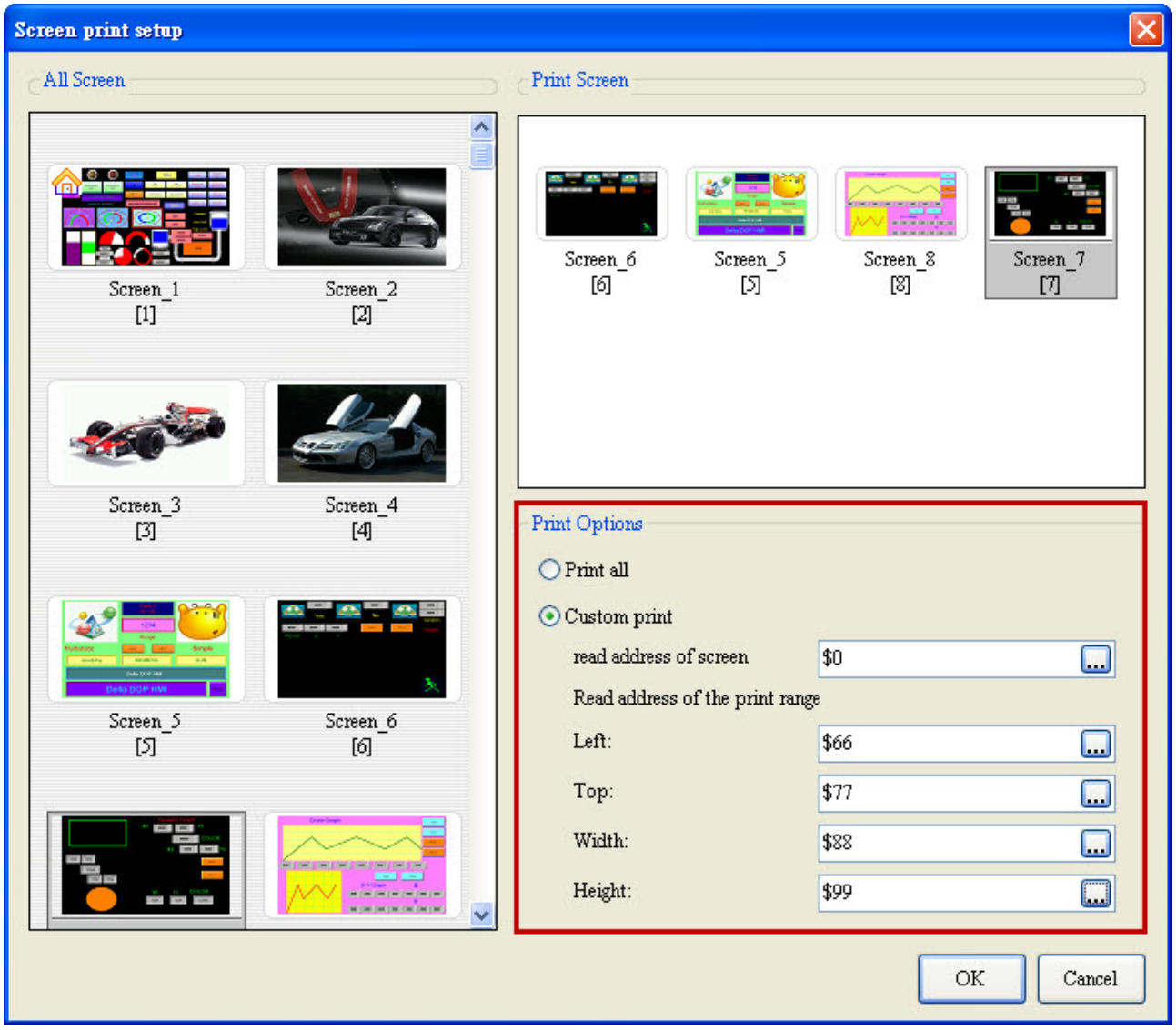


Figure 26-1-4 Custom Print Screen

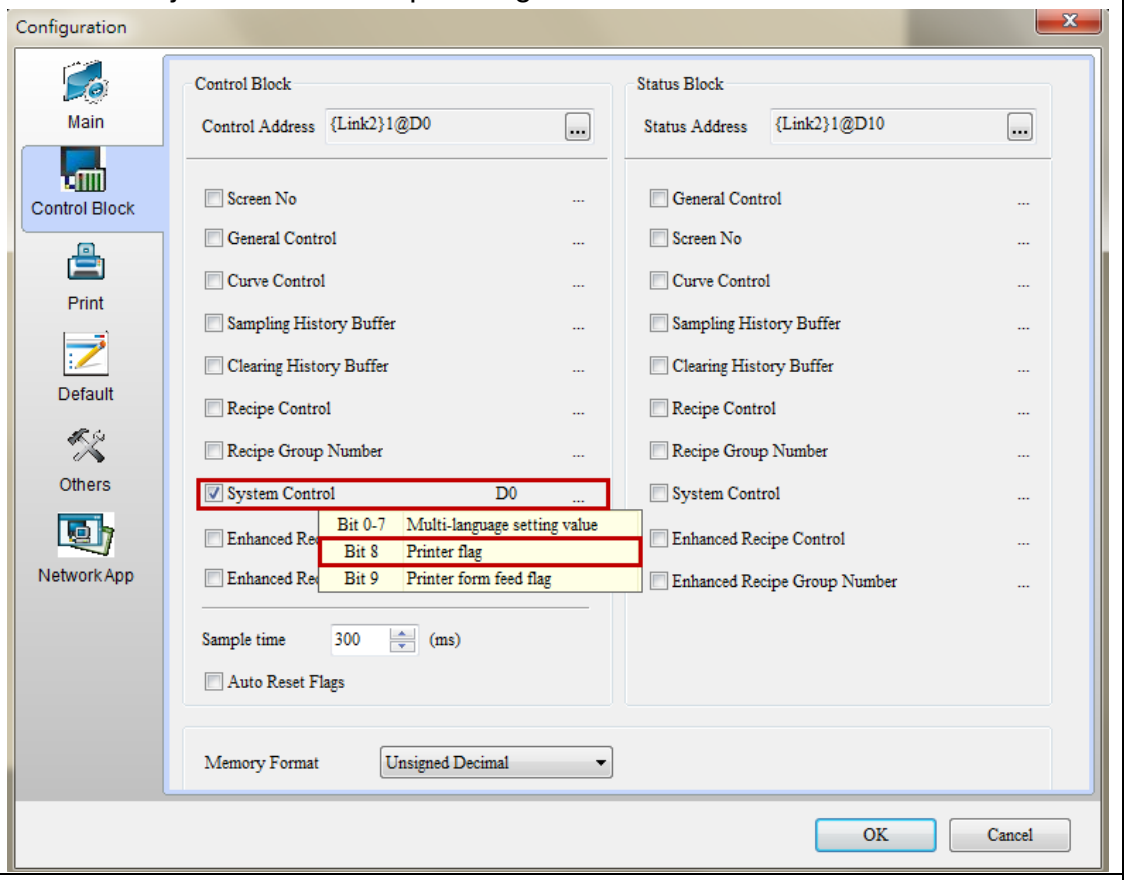
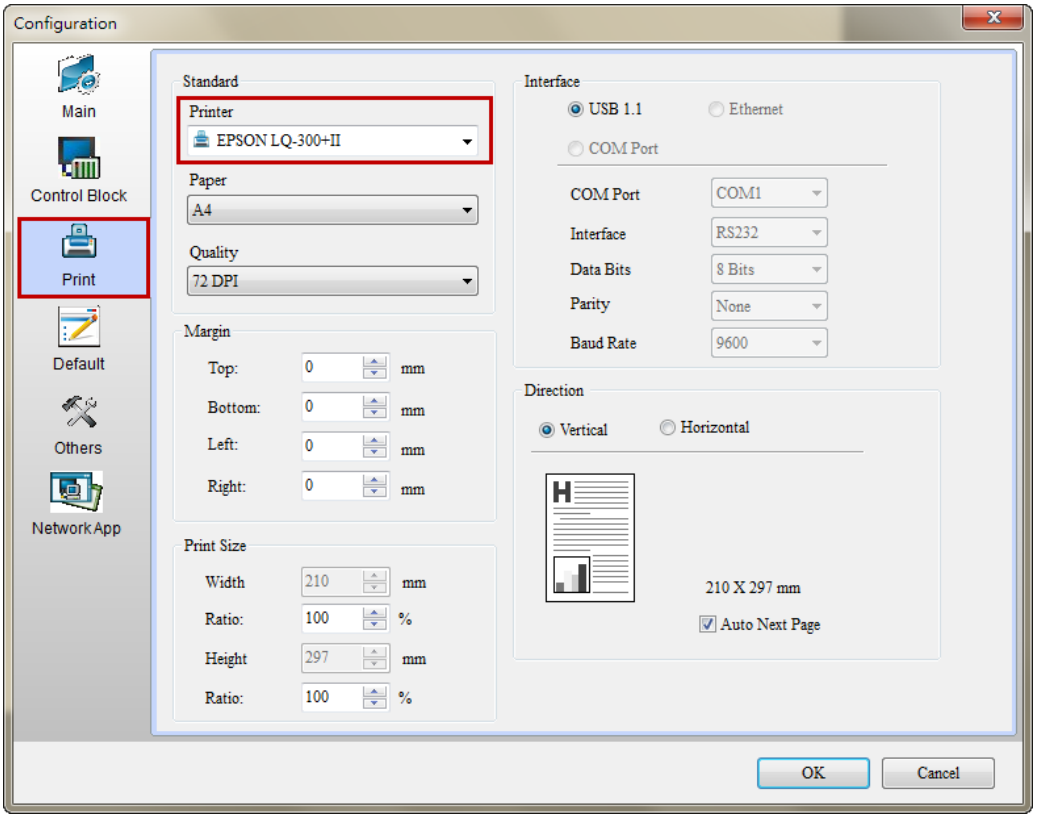
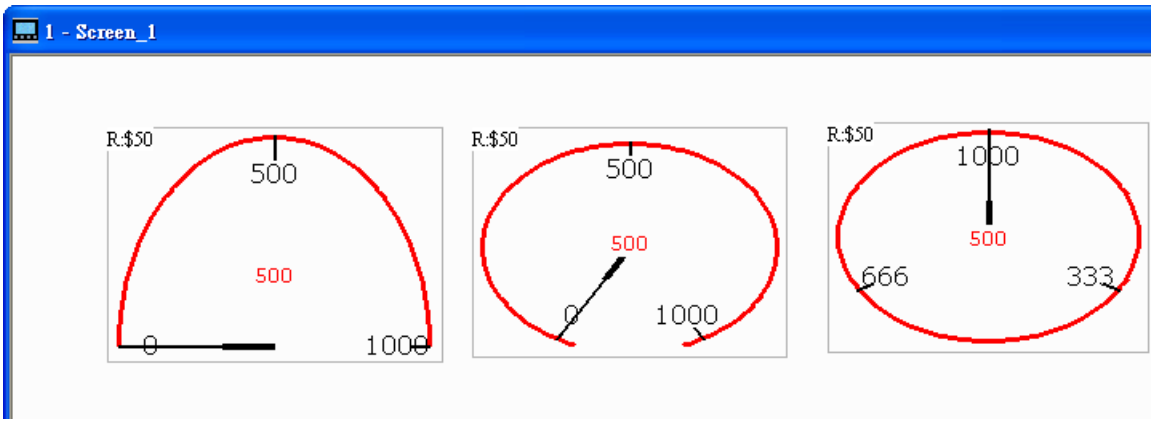
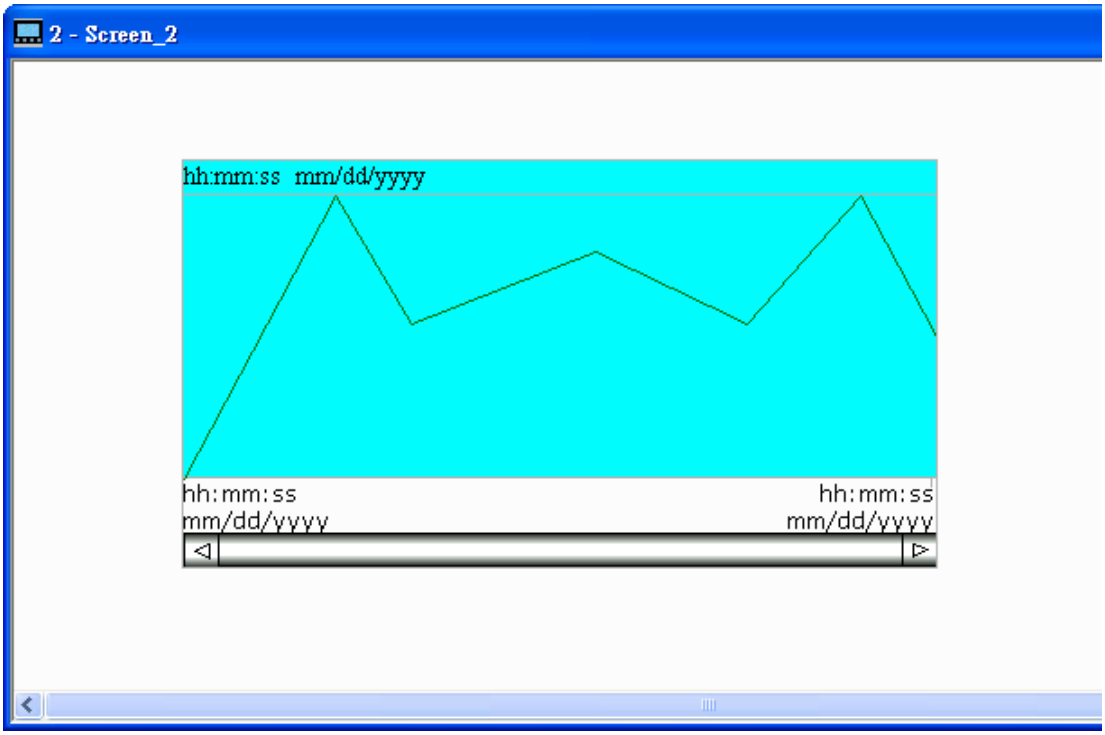
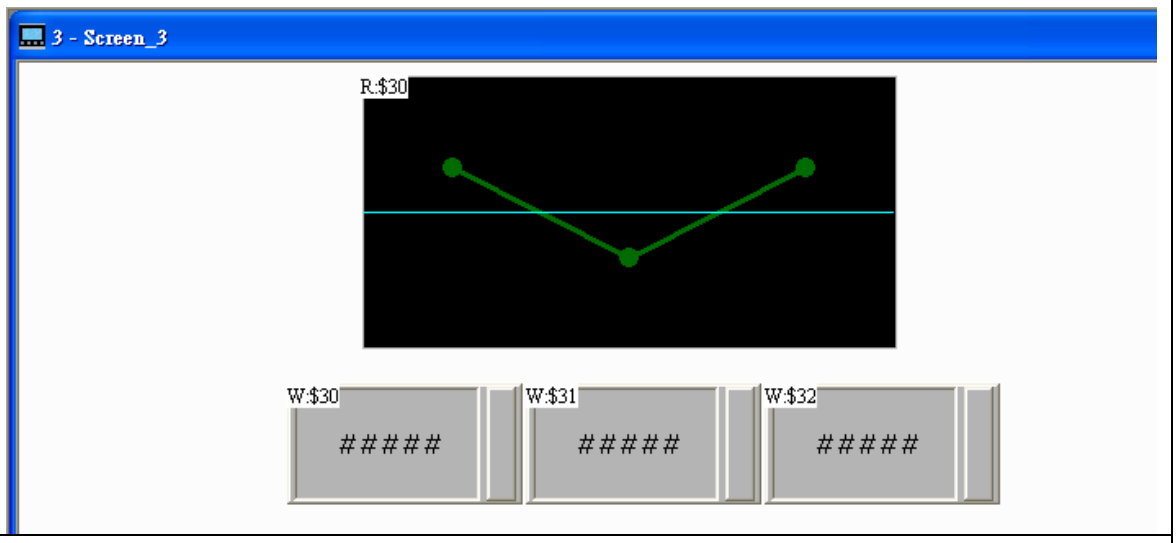
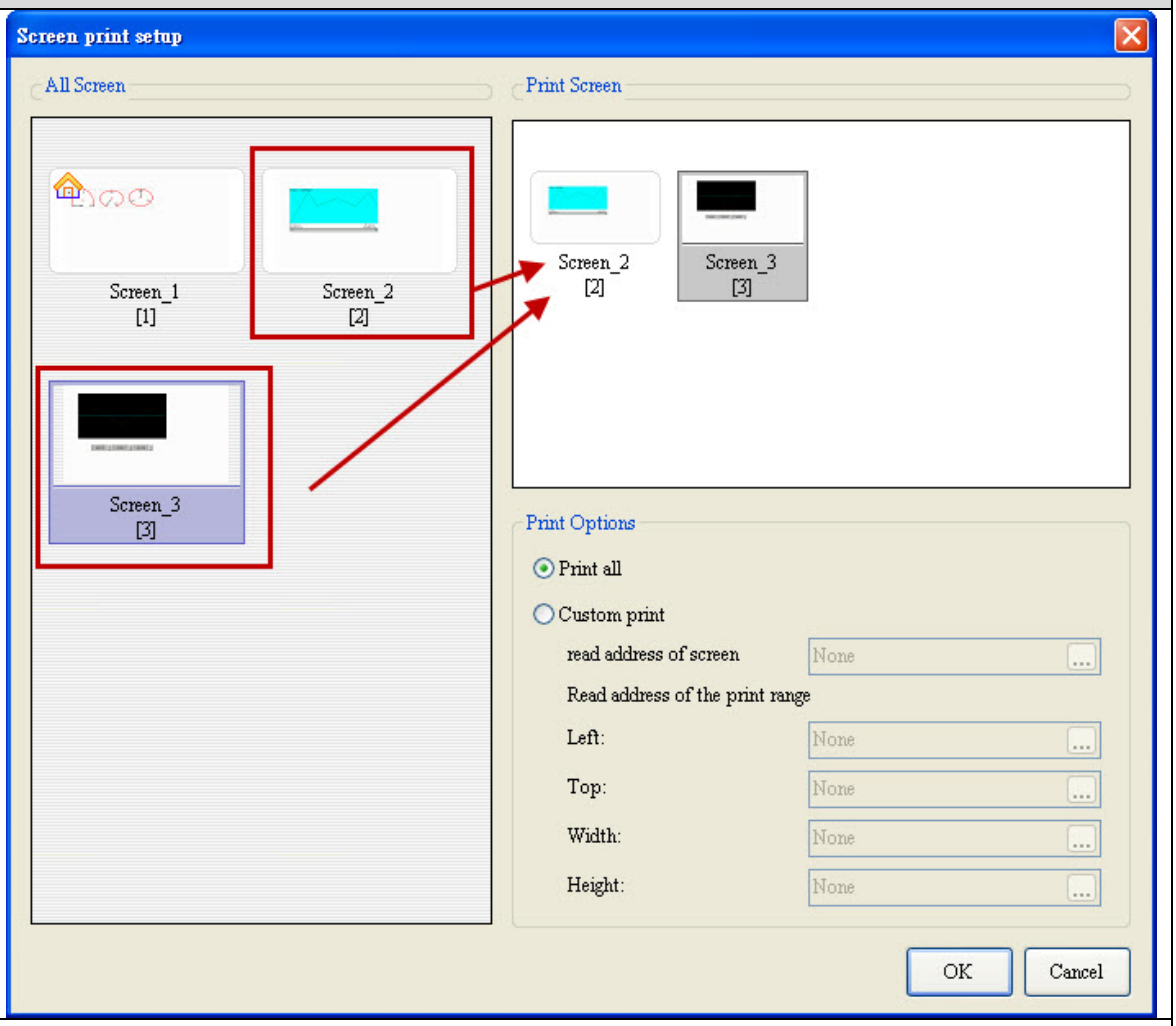
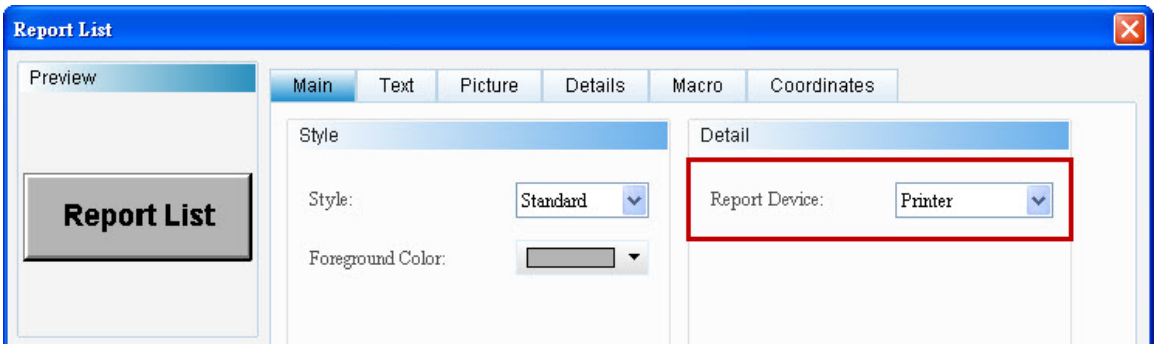
Read Address of Screen	The user can enter the screen number in the Read Address of Screen field. It is set up individually on the screen to be printed. When 0 is entered, all screens set up in the Screen Print will be printed out. This address can be used in conjunction with the print flag in the contol area. 
Left	Set the X coordinate of the start point within the print range.
Top	Set the Y coordinate of the start point within the print range.
Width	Set the width within the print range.
Height	Set the height within the print range.

Table 26-1-1 Custom Print Setting Screen

■ Screen Print Setup Example

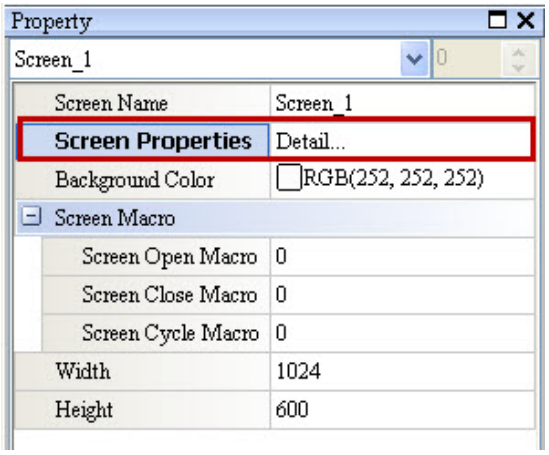
Screen Print Setup Example Table 26-1-2 Screen Print Setup Example	
Step1	➢ Create a new project. Select EPSON LQ-300+II as the printer and add 3 new screens.  ➢ Create 3 instrument elements on the first screen.  ➢ Create a history trend chart on the second screen and set the Continuous Printing to Yes.

Screen Print Setup Example Table 26-1-2 Screen Print Setup Example	
	 ➢ Create a chart element and three numeric elements on the third screen. 
Step2	➢ Enter [Options] → [Print Typesetting] to drag the second and third screens to the Print Screen window on the right side. Click OK to leave the Screen Print Setup screen.

Screen Print Setup Example Table 26-1-2 Screen Print Setup Example	
	
Step3	➢ Create a Report List button and select Printer as the output device. 
Step4	➢ Execute Compile, connect to the EPSON LQ-300+II printer and download the screen to HMI.
Step5	➢ After the download, click the Report List button to print out the Screen Print Setup screen you set up previously. It takes more time for HMI to print out the data if many pages are to be printed or there are many sampling data set for printing.

26-2 Routine Print (Hard Copy)

Ths Hard Copy function enables the user to print out the screen currently executed on HMI. Only one page can be printed out at a time. This function is only available on General View Screen rather than Screen Print (or Apply Print) Screen. If the data under editing is for screen print, the system will process it using the [Screen Print Setup] function and the Hard Copy function will fail. Click the blank area on the editing screen to enter [Screen Properties] and set up Hard Copy functions. The General View Screen is used for Hard Copy, while the Apply Print Screen is used for Screen Print.



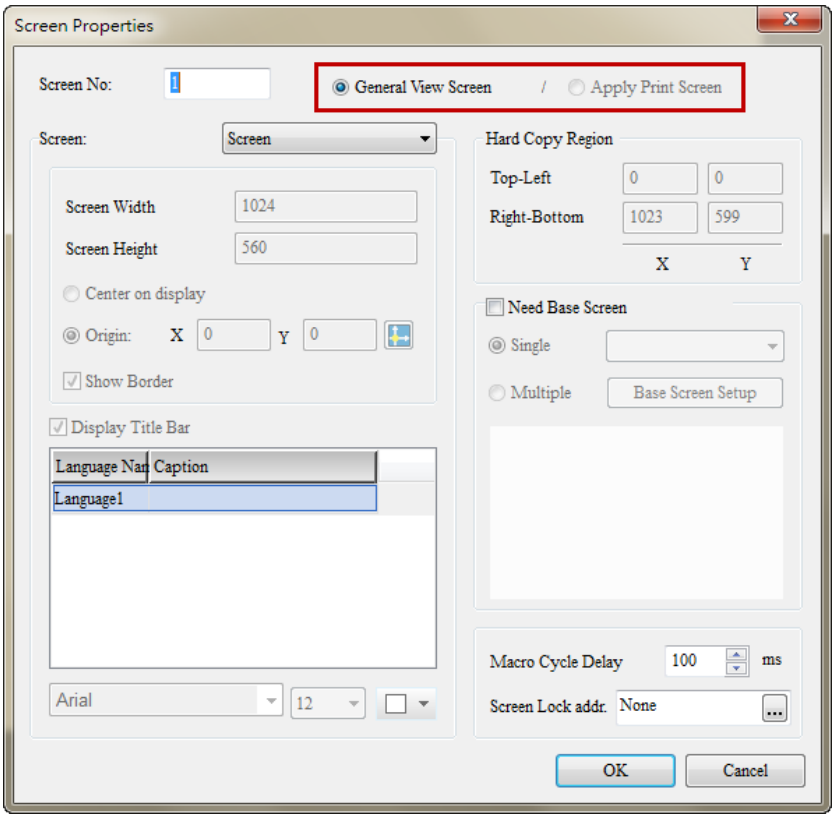


Figure 26-2-1 Screen Properties

If the user did not select any printer, the Hard Copy Region in the [Screen Properties] will show Disable and the setting function in this region is not available to the user.

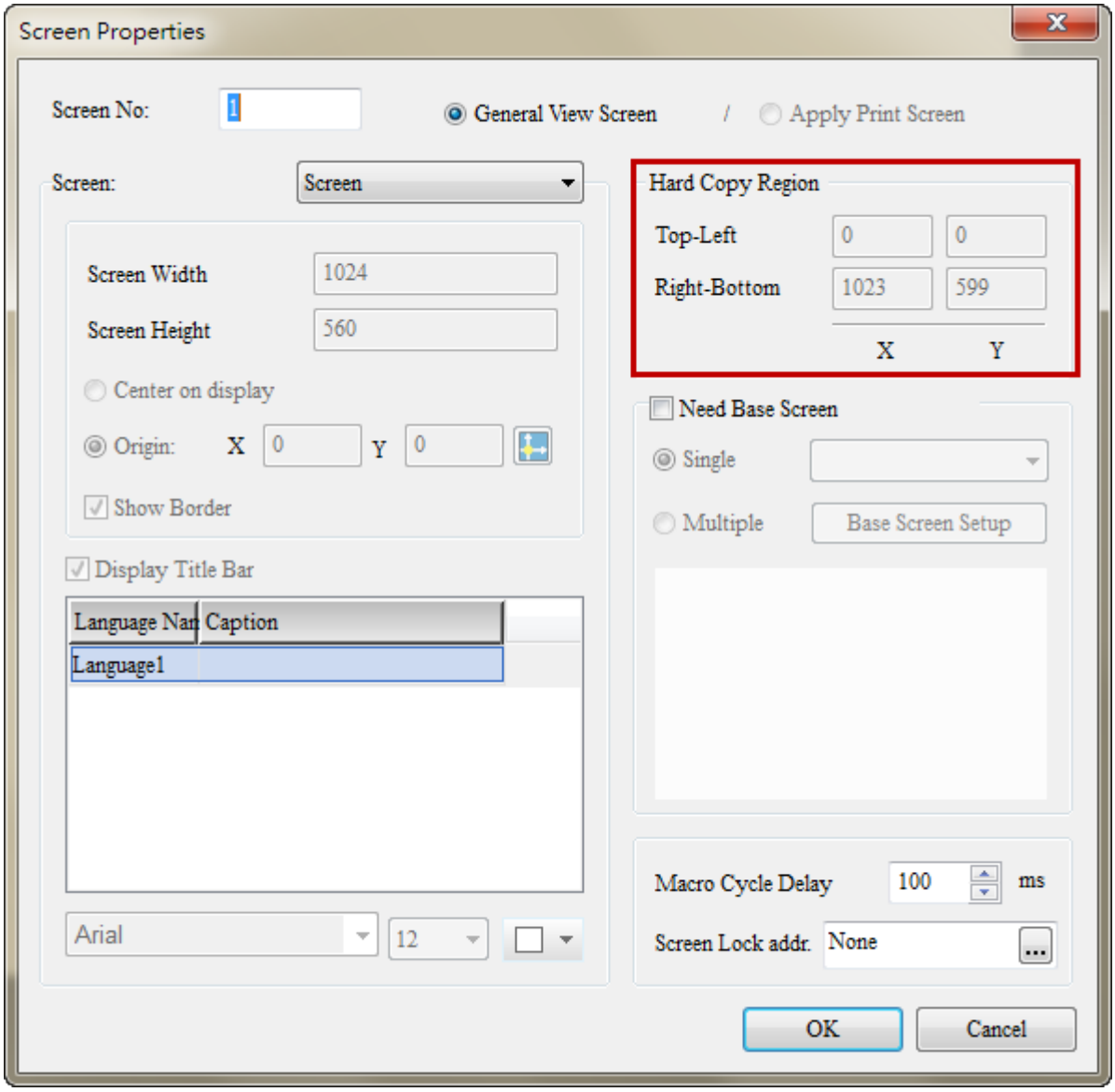


Figure 26-2-2 Hard Copy Region Unavailable

◆ Hard Copy Region

When the printer to be used has been selected, the user can complete the Top_Leftand Right_Bottom fields to define the screen size to be printed.

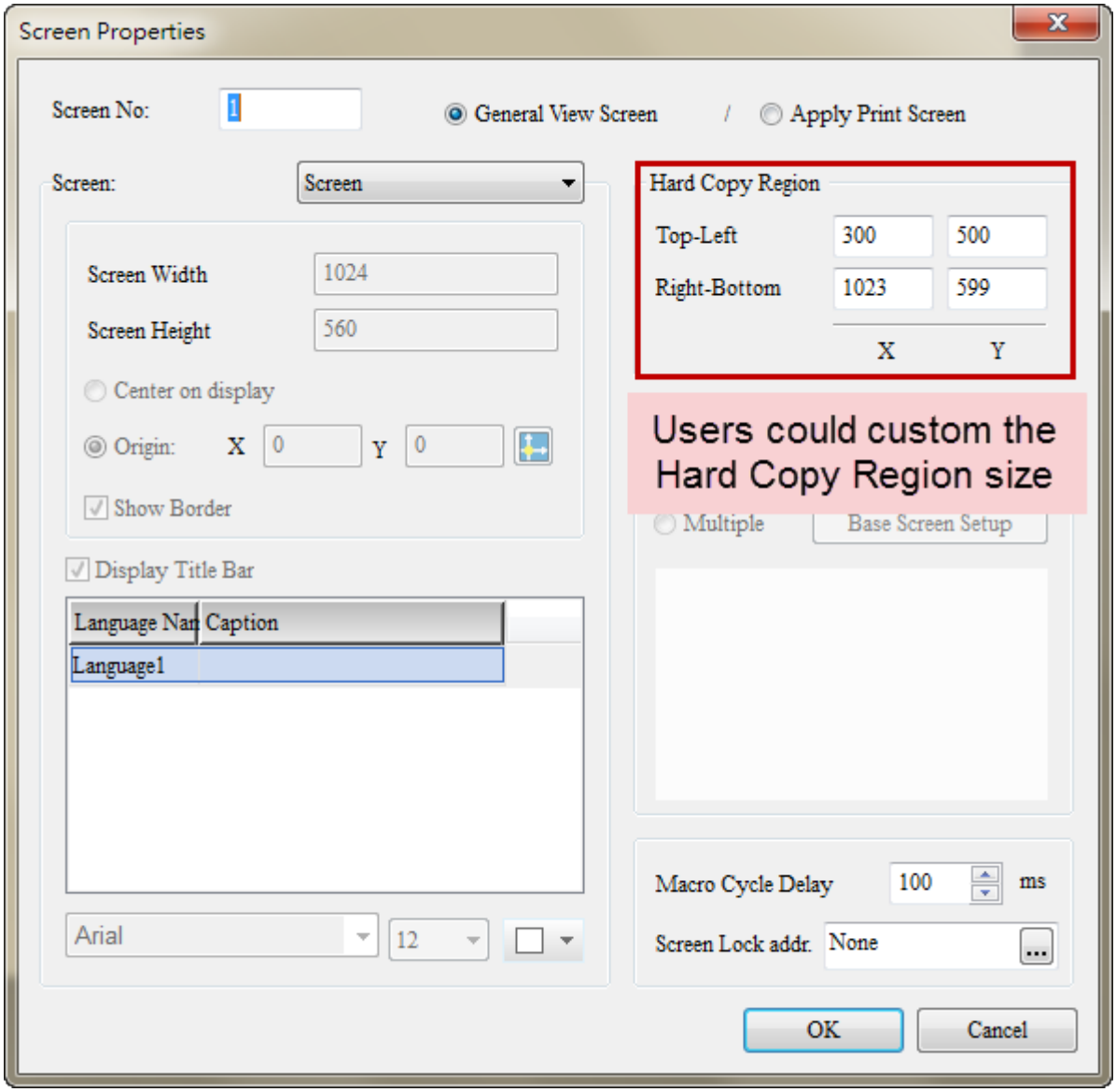
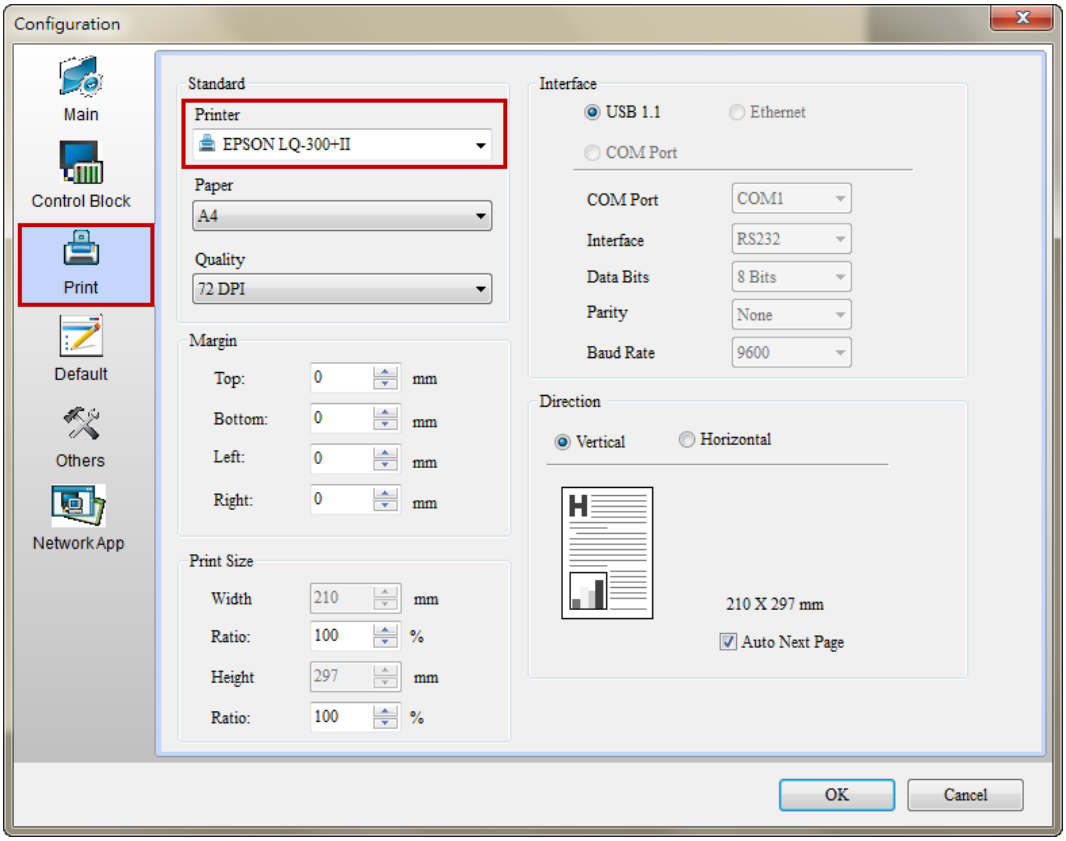
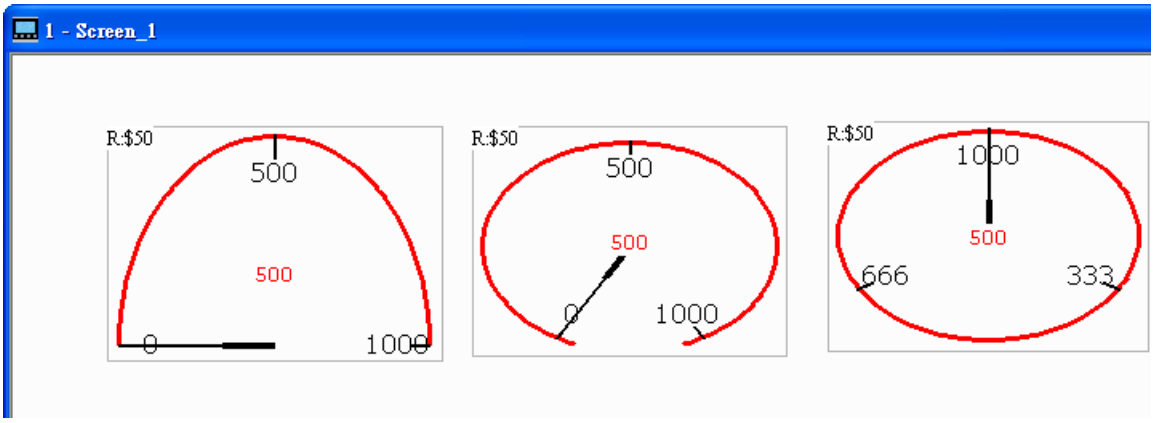
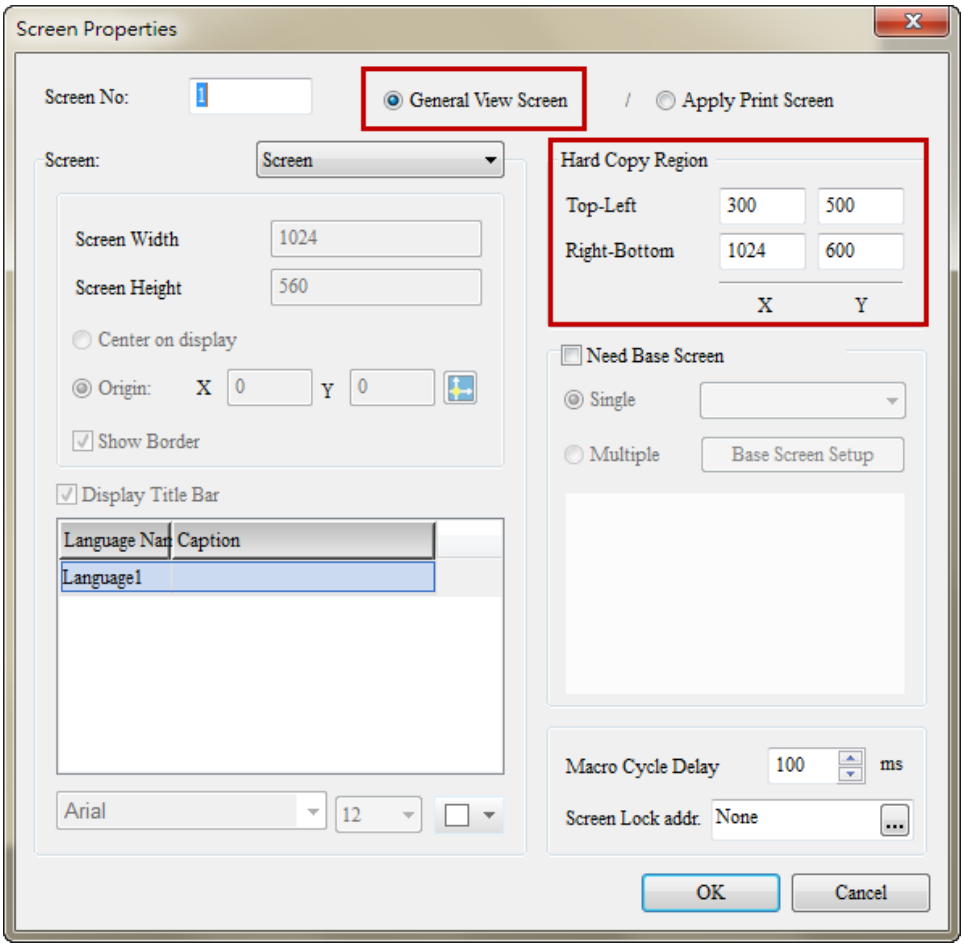
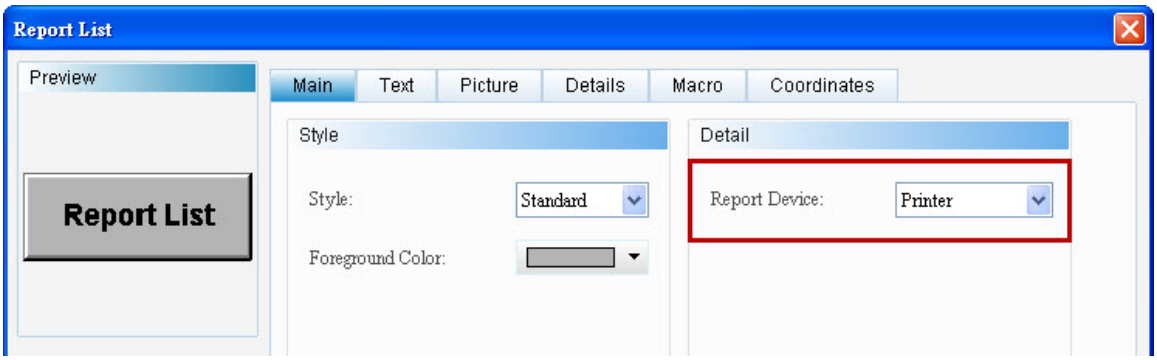


Figure 26-2-3 Hard Copy Region Coordinate

■ Hard Copy Print Range

Hard Copy Example Table 26-2-1 Hard Copy Example	
Step1	➢ Create a new project. Select EPSON LQ-300+II as the printer and add 1 new screen.  ➢ Create 3 instrument elements on the new screen. 
Step2	➢ Click the blank area on the screen to enter [Screen Properties]. Set this screen to [General View Screen] and set the print range in the Hard Copy Region.

Hard Copy Example Table 26-2-1 Hard Copy Example	
	
Step3	➢ Create a Report List button and select Printer as the output device. 
Step4	➢ Execute compile, connect to the EPSON LQ-300+II printer and download the screen to HMI.
Step5	➢ After the download, click the Report List button to print out the content displayed on the current screen.

26-3 How to use PictBridge to connect HMI

The DOPSsoft software provides the generic printer driver [PictBridge]. All models that have the PictBridge logo support HMI connection and printing function. In the [PictBridge] structure, the printer is the Host and the HMI is the Slave. Both can be connected for printing using a USB cable. The printers on the market that support PictBridge are currently HP, Canon and EPSON.

Figure 26-3-1 PictBridge LOGO

Figure 26-3-2 PictBridge and HMI connection

At the Slave end, the user only needs to enter [Options] → [Configuration] → [Print] and select PictBridge to connect to the printer that supports the PictBridge driver.

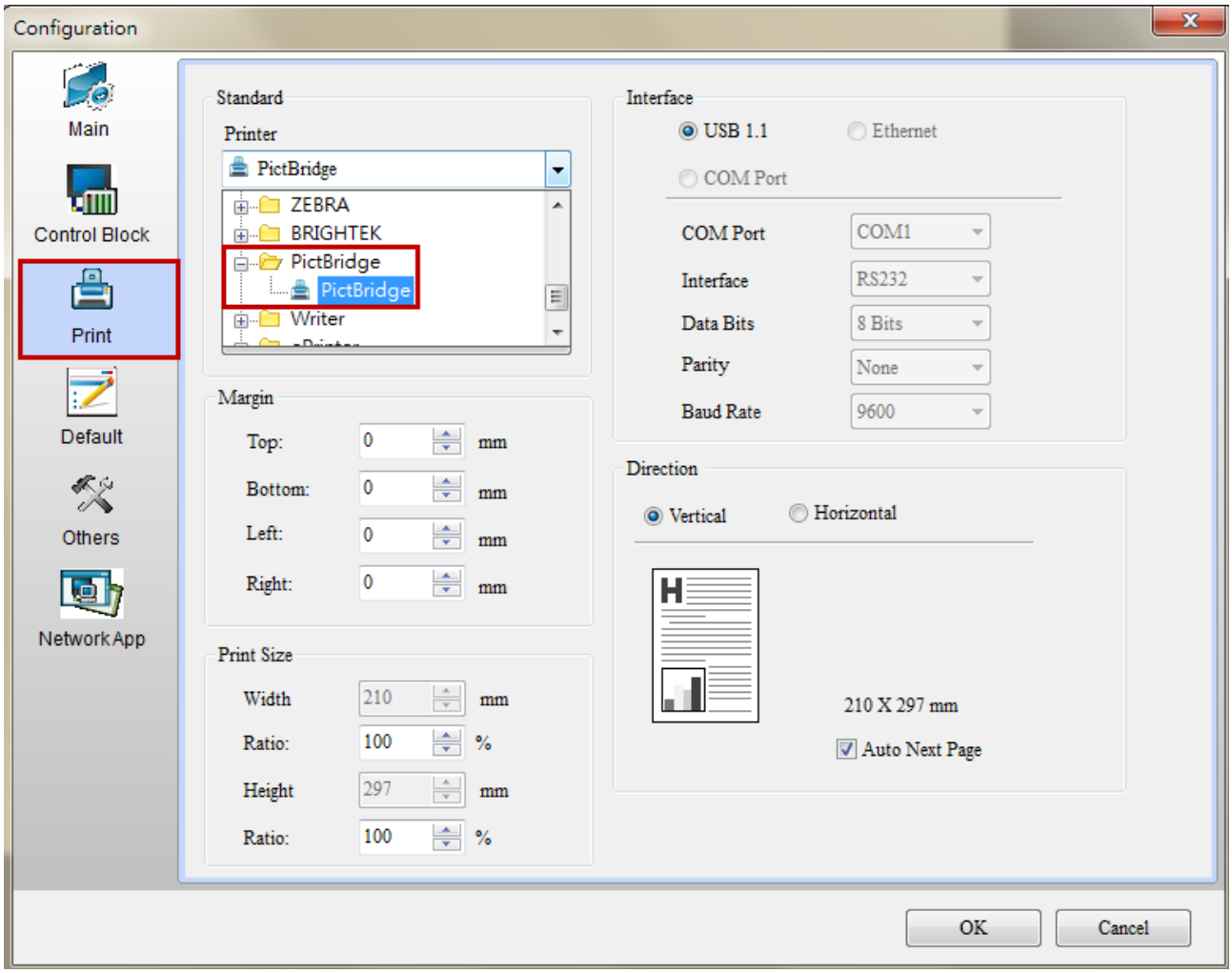


Figure 26-3-3 PictBridge Driver

Support PictBridge printer for HMI Model type as below table：

Support PictBridge Model	B03S210
	B03S211
	B03E211
	B05S111
	B07S401K
	B07S411K
	B07S410
	B07S411
	B07E411
	B07S415
	B07PS415
	B07E415
	B07S515
	B07PS515
	B07E515
	B08S515
	B08E515
	B10S411
	B10S511
	B10E515
	B10PE515
	B10S615
	B10E615
	B10VS511
Not Support PictBridge Model	B04S211
	B05S100
	B05S101
	B07S201
	B07S211

Table 26-3-1 Support PictBridge printer for HMI Model type

26-4 How to use USBWriter and SDWriter to connect with HMI to print

DOPSoft allows users to use the external devices, such as USB Drive or SD Card as the output device. When applying this function, the HMI will output the data as the figure file and store it in the USB Drive or SD Card.

In HMI setting, please go to [Options] → [Configuration] → [Print] to select UsbWriter so that the USB Drive will be regarded as the output device. Select SdWriter to regard SD Card as the output device.

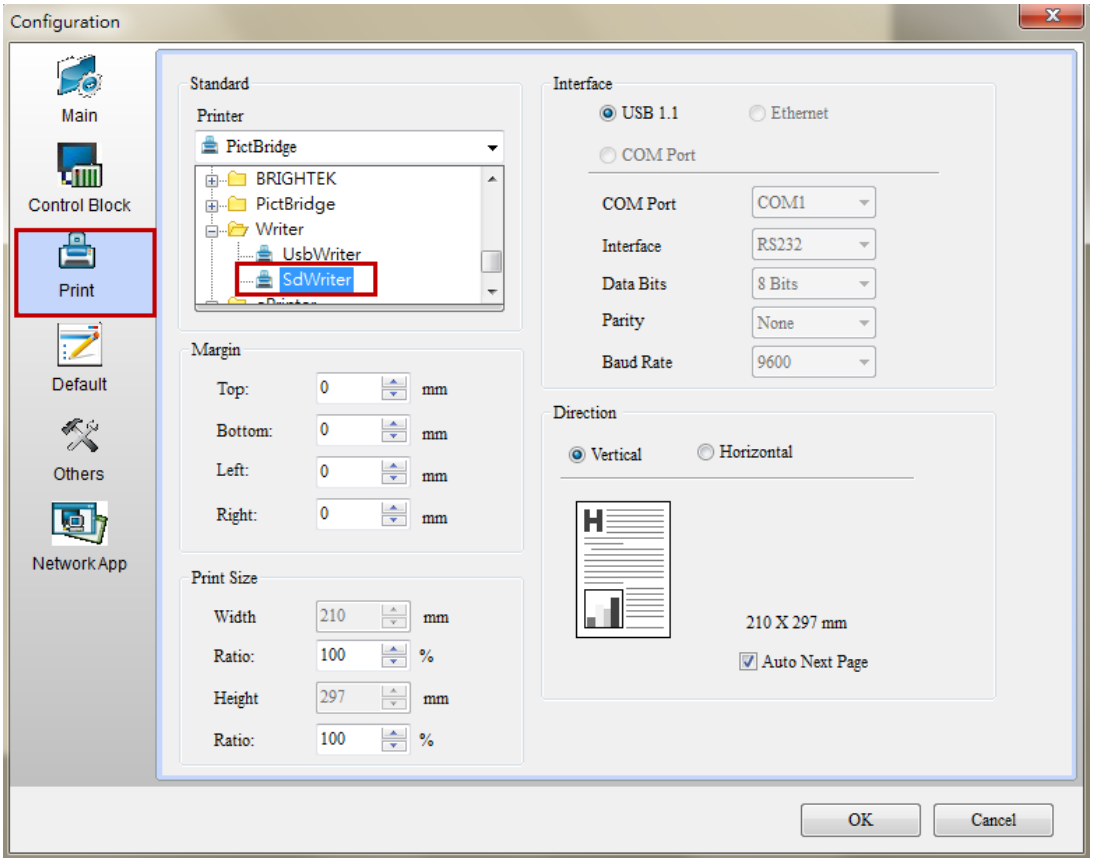


Figure 26-4-1 UsbWriter/SdWriter

Create a Report list element on the screen and select [Printer] for Report Device.

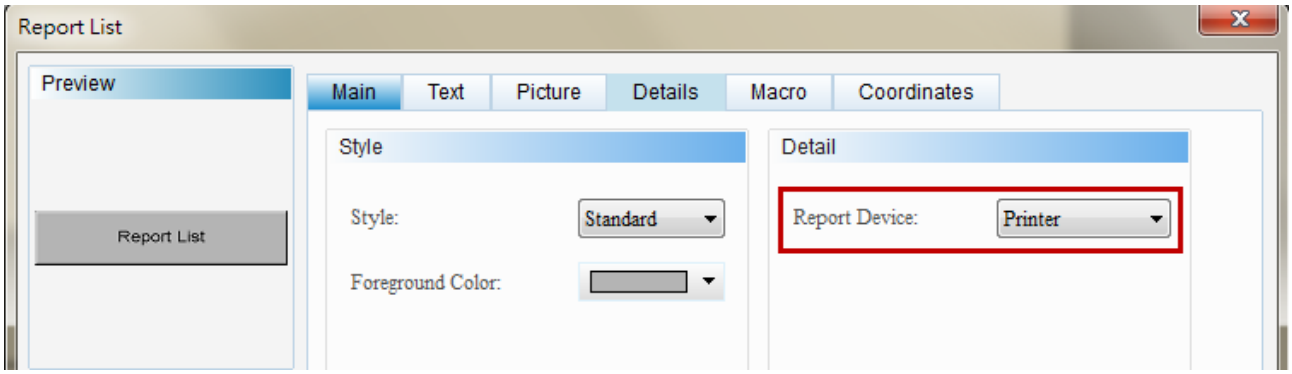
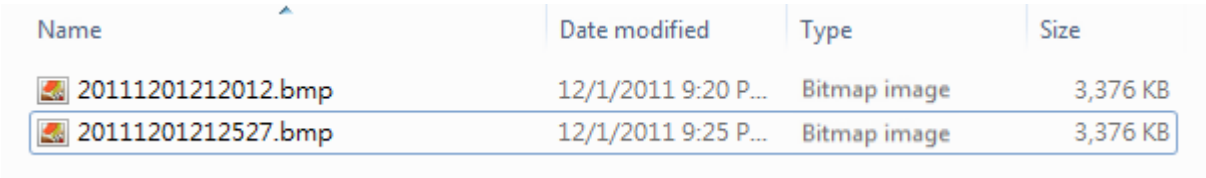


Figure 26-4-2 Setting of report device

When you print the data, the HMI will generate .bmp files, see as below. The HMI will name the filename according to the time it prints. Please note that the printing time is determined by the external device. Do not remove the external device when the printing is not complete.



Name	Date modified	Type	Size
20111201212012.bmp	12/1/2011 9:20 P...	Bitmap image	3,376 KB
20111201212527.bmp	12/1/2011 9:25 P...	Bitmap image	3,376 KB

Figure 26-4-3 The file generated by UsbWriter/SdWriter

26-5 Error code of Printer

When printer occur error after user execute print, could use as below table display error code to clarify what happened with current printer.

Code	Code definition	Reason	Troubleshooting
-2	ERROR_PRINT_PORT ✓ Printer Port error	USB, Parallel port, COM port error.	Please check the transport port correct or not.
-3	ERROR_MEMORY_NULL ✓ Memory allocation error	HMI memory is not enough to deal with data.	Please delete some data or change to have more capacity memory HMI model to print.
-4	ERROR_USB ✓ Printer cannot print with some error	Printer has malfunctioned to occur cannot print.	The malfunction reason maybe has no ink, jam. Please print again after troubleshooting.
-5	ERROR_USB_NOT_SELECT ✓ Printer open failed	Print has already connected, but cannot recognize device.	Printer driver cannot connect with HMI. Please contact agent or R&D.
-6	ERROR_USB_PAPER ✓ Printer cannot print without paper	Printer has no paper.	Please supply paper to print.
-7	ERROR_USB_NOT_CONNECT ✓ Connect printer failed	USB cable did not connect printer.	Please check USB cable connect with printer actually.
-8	ERROR_USB_OPEN ✓ Fail to open USB	When it starts printing, it is failed to open USB.	Please activate HMI again. If it is still unable to print, please contact with RD.
-9	ERROR_USB_CLOSE ✓ USB close failed	When finished print, close USB failed.	Please restart HMI. If it still cannot print, please contact with R&D.
-11	ERROR_NOT_OK ✓ Printer did not initial	Printer started up will initialize, it prints at this moment, and printer will display this	Some printer will have a long time to initialize, please waiting for complete then execute

		error message.	print.
-14	PRINTER ERROR ✓ Printing error	CTS pin status error	Please check if CTS communication pin is firmly connected. If it is still unable to print, please contact with RD.

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Chapter 27 Electronic Cam Elements

This chapter mainly describes the electronic cam curve function provided in the DOPSoft. However, the electronic cam (E-CAM) elements are available for PS models and HMC Series. The electronic cam elements can be used to build the E-CAM curve in DOPSoft directly. The users can download the E-CAM curve to the data array in ASDA-A2 servo system to change the required E-CAM curve more quickly. Please refer to the following sections for how they are operated and configured.

There are several ways to create E-CAM Curve with DOPSoft:

1. Curve Creation Macro	Rotary Shear – Adjustable Sealing Zone
	Indirect Printing
	Rotary Shear – cos Compensation
2. Cubic Curve Creation (Manually Table Filling Creation)	

Table 27-1-1 E-CAM Curve Creation

If DOP-B07PS415 or DOP-B07PS515 or HMC08 or HMC07 is connected, please right-click the mouse to open the Element Tool first, as shown in Figure 27-1-1.

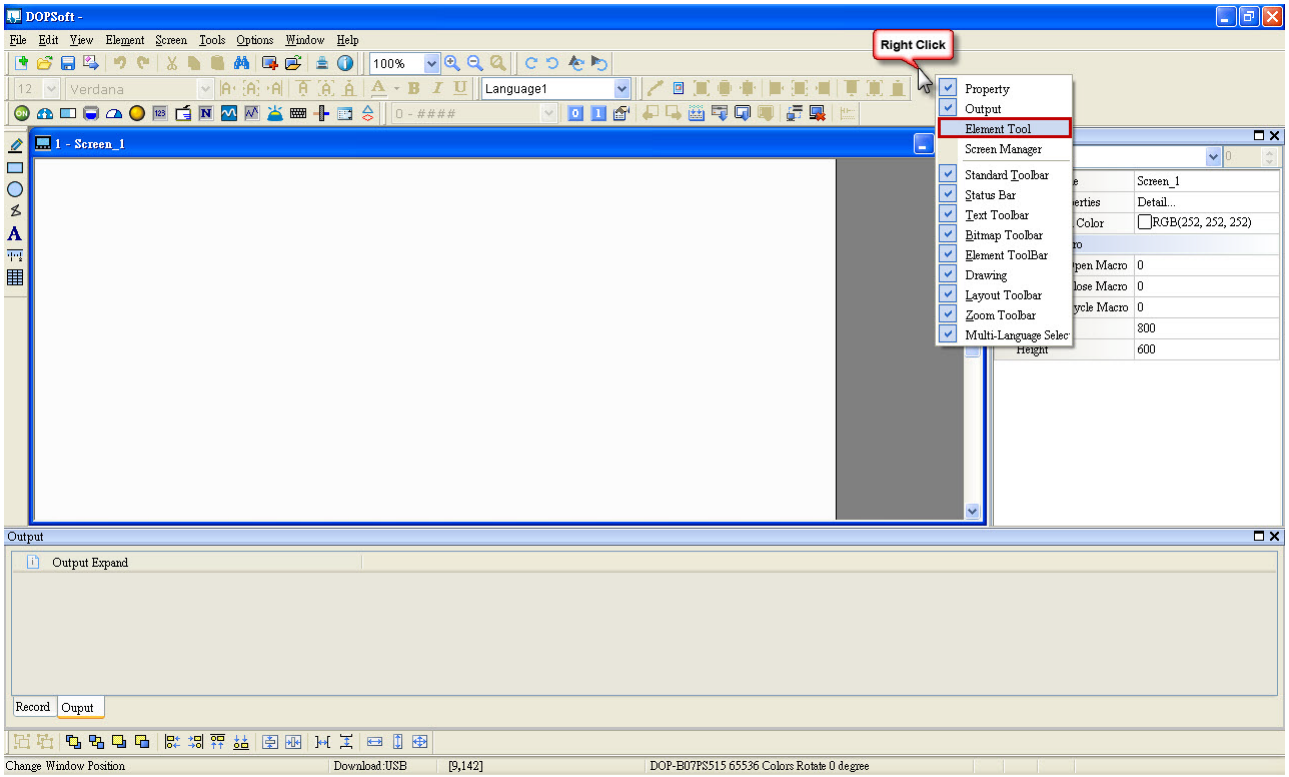


Figure 27-1-1 Method to select Element Tool

After opening the Element Tool, select the Element Bank and enter into the E-CAM folder which provides the available E-CAM elements. After entering into the E-CAM folder, there are several E-CAM elements can be used to create an E-CAM table and curve.

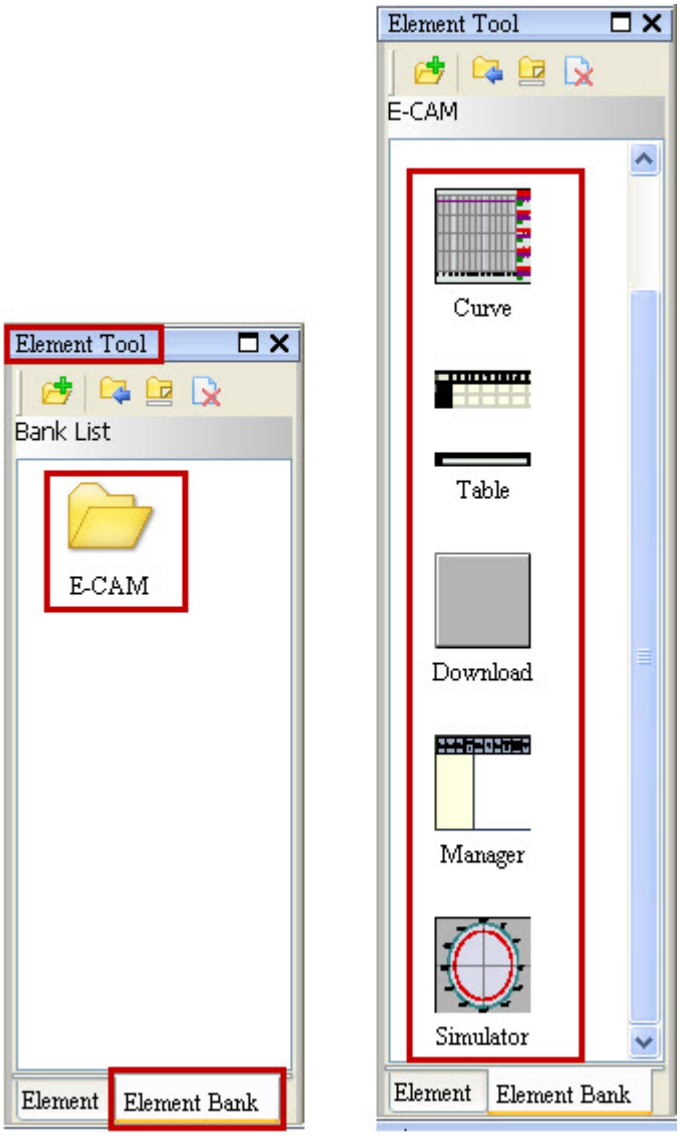


Figure 27-1-2 E-CAM Element Bank

◆ E-CAM Element Classification:

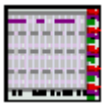
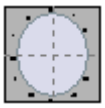
	E-CAM Curve - Display Element	All E-CAM elements cannot be used in one project at the same time. One project can use one E-CAM element only.
	E-CAM Curve – Table Element	
	E-CAM Curve – Download Element	
	E-CAM Curve – Simulation Element	
	E-CAM Curve- Cubic Curve Element (Manually Table Filling Creation Element)	

Table 27-1-2 Electronic Cam Element Classification

NOTE：

✓ The data length of E-CAM macros and the related E-CAM elements use the Double Word format.

✓ DOPSoft simulator can not do the simulation of E-CAM macros and the related E-CAM elements. The users must download the macros and elements into the HMI and perform the simulation on HMI.

27-1 Electronic Cam (E-CAM) Elements

27-1-1 E-CAM Curve

The function of this element is used to display the E-CAM curve.

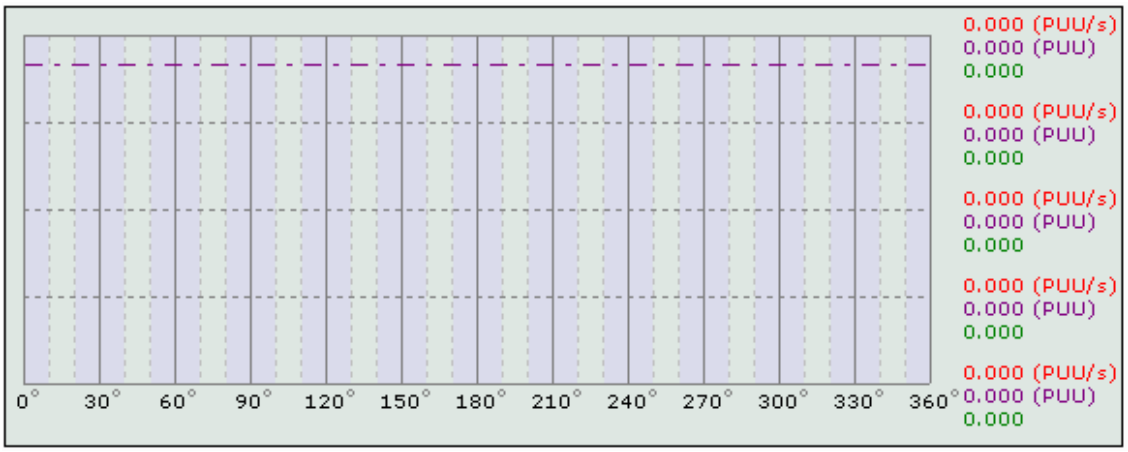


Figure 27-1-1-1 E-CAM Curve

Double-click the E-CAM curve element item to call out the following Element Properties page. There are three addresses needed to be set: Read Buffer Address, Read Size Address and Read Start Address.

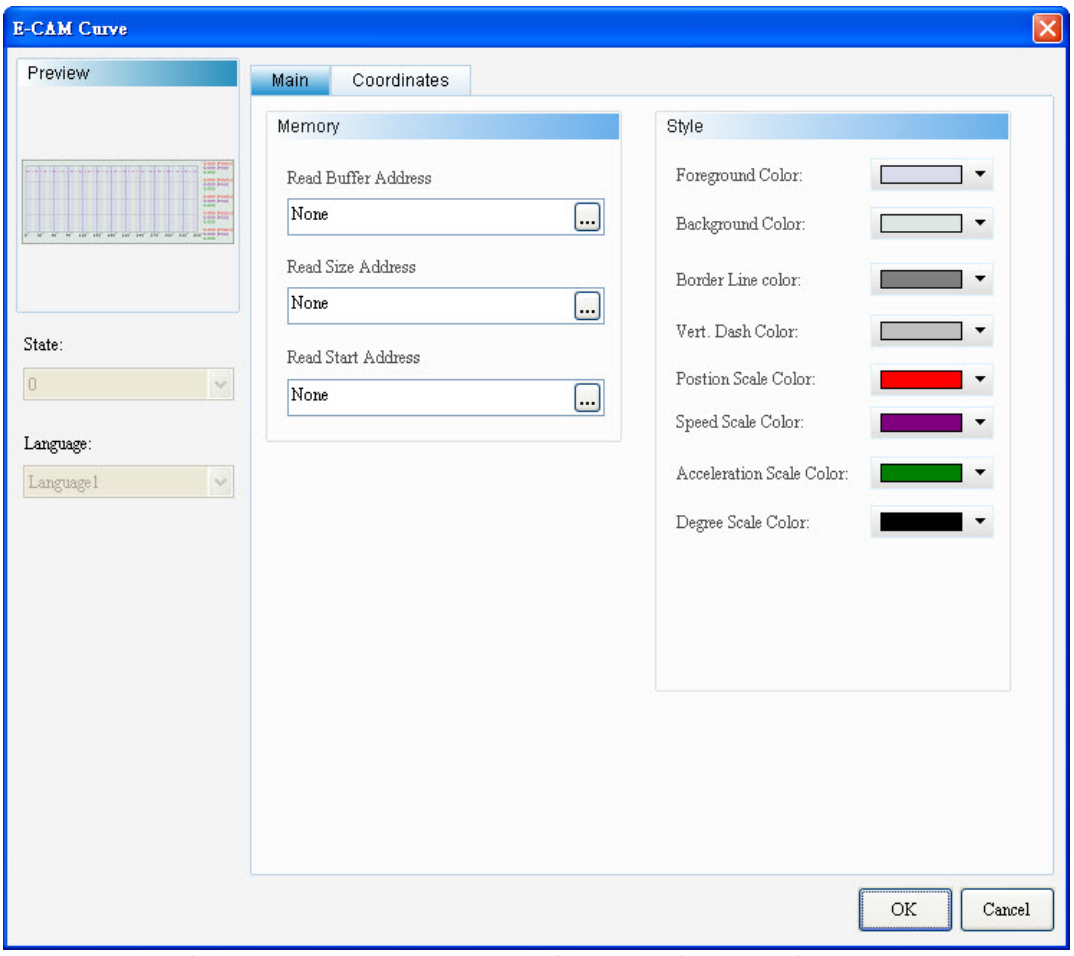


Figure 27-1-1-2 E-CAM Curve Element Main Properties Page

The data of these three addresses should be the same as the addresses of E-CAM macros or E-CAM Cubic Curve Element (Manually Table Filling Creation Element). Please refer to the following table:

E-CAM Curve Element	**E-CAM Macro**	**E-CAM Cubic Curve Element**
Read Buffer Address	Var4	Read Buffer Address
Read Size Address	Var5	Read Size Address
Read Start Address	Var1	Read Start Address

27-1-2 E-CAM Table

The function of this element is used to display the E-CAM curve in table format.

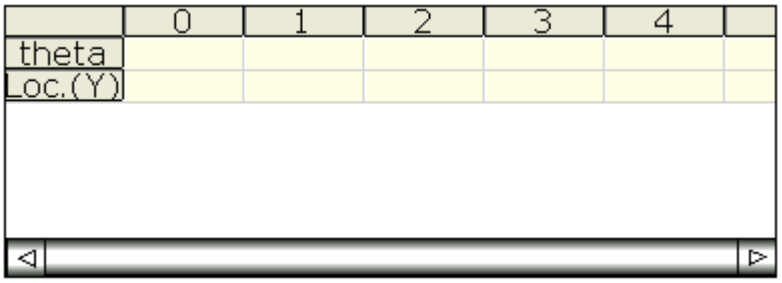


Figure 27-1-2-1 E-CAM Table

Double-click the E-CAM Table Element item to call out the following Element Properties page. There are three addresses needed to be set: Read Buffer Address, Read Size Address and Read Start Address.

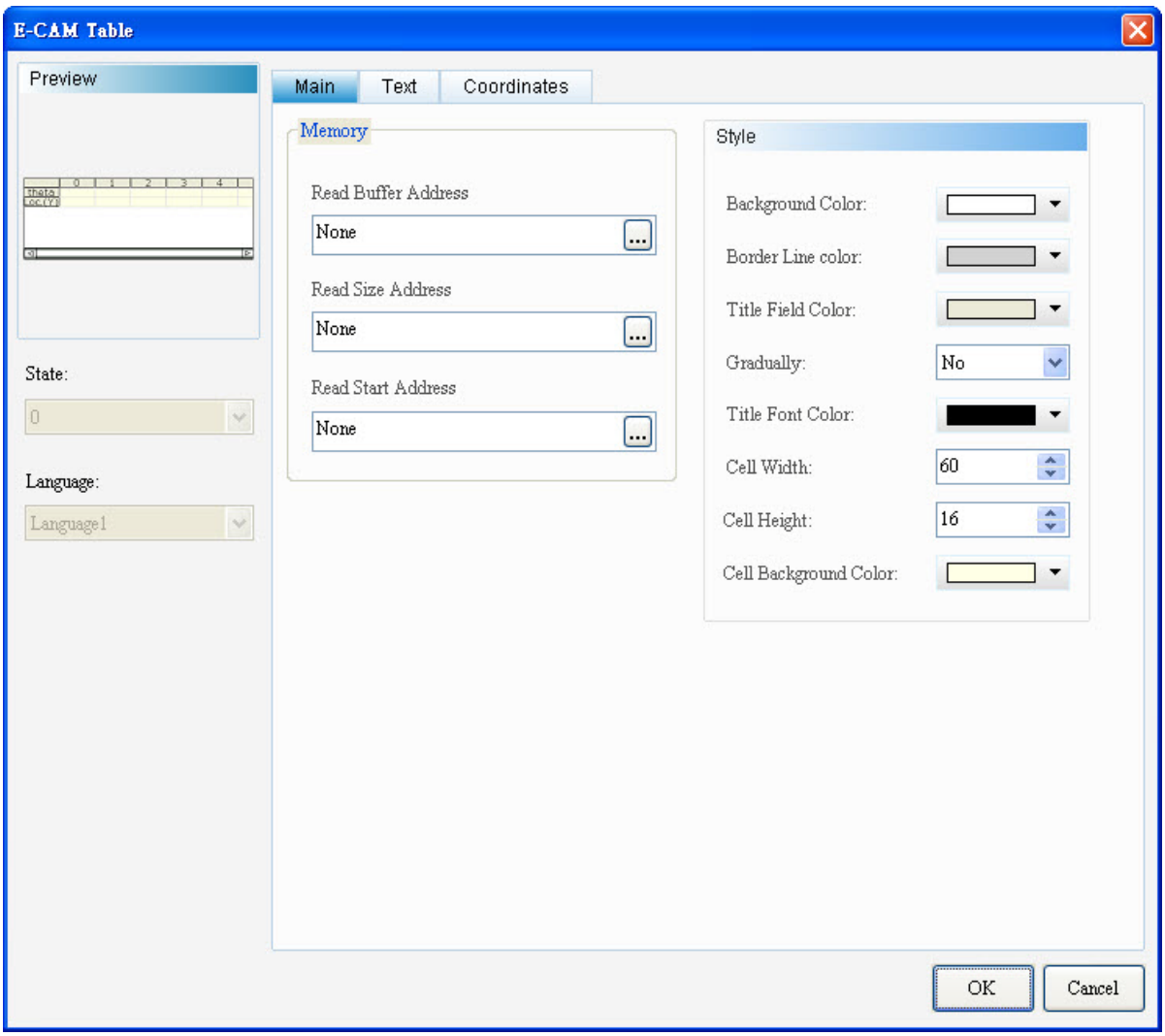


Figure 27-1-2-2 E-CAM Table Element Main Properties Page

The data of these three addresses should be the same as the addresses of E-CAM macros or E-CAM Cubic Curve Element (Manually Table Filling Creation Element). Please refer to the following table:

E-CAM Curve Element	E-CAM Macro	E-CAM Cubic Curve Element
Read Buffer Address	Var4	Read Buffer Address
Read Size Address	Var5	Read Size Address
Read Start Address	Var1	Read Start Address

27-1-3 E-CAM Simulator

The function of this element is used to simulate the circuit of the E-CAM curve.

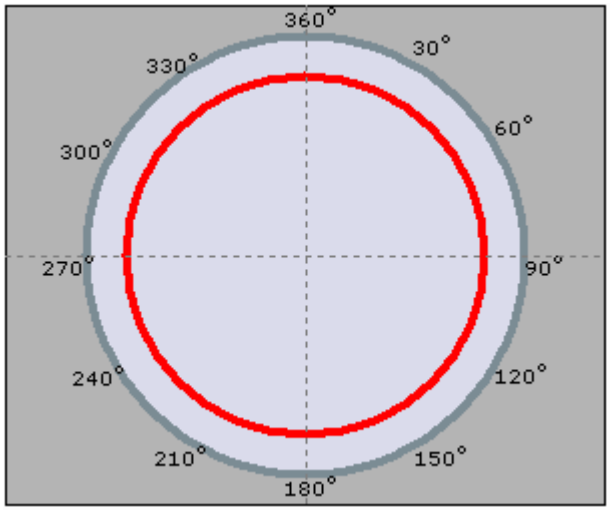


Figure 27-1-3-1 E-CAM Simulator

Double-click the E-CAM Simulator Element item to call out the following Element Properties page. There are three addresses needed to be set: Read Buffer Address, Read Size Address and Read Start Address.

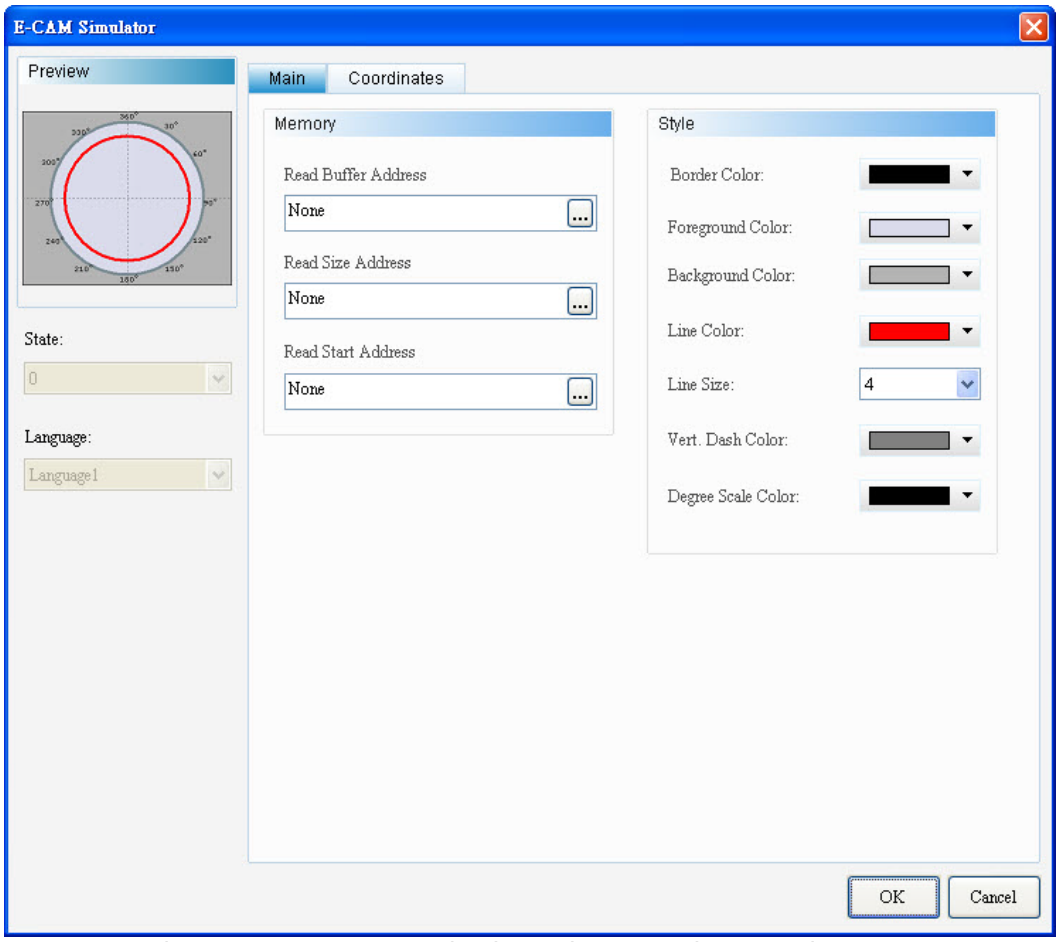


Figure 27-1-3-2 E-CAM Simulator Element Main Properties Page

The data of these three addresses should be the same as the addresses of E-CAM macros or E-CAM Cubic Curve Element (Manually Table Filling Creation Element). Please refer to the following table:

E-CAM Curve Element	E-CAM Macro	E-CAM Cubic Curve Element
Read Buffer Address	Var4	Read Buffer Address
Read Size Address	Var5	Read Size Address
Read Start Address	Var1	Read Start Address

27-1-4 E-CAM Download Button

The function of this element is used to download the E-CAM curve made by DOPSoft to ASDA-A2 servo system.

Figure 27-1-4-1 E-CAM Download Button

Double-click the E-CAM Simulator Element item to call out the following Element Properties page. There are three addresses needed to be set: Read Buffer Address, Read Size Address, Read Start Address, Station Number and COM port.

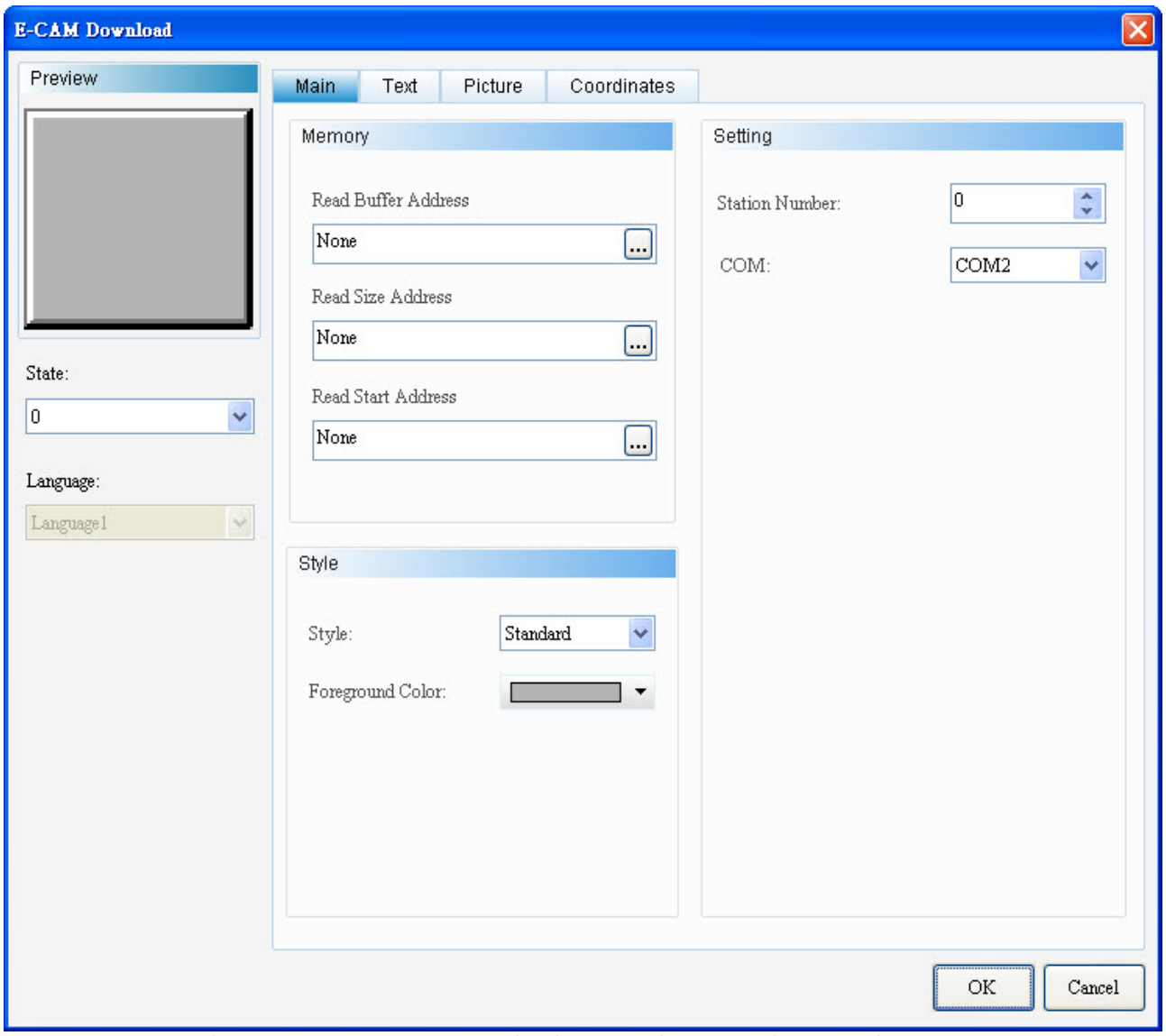


Figure 27-1-4-2 E-CAM Download Button Element Main Properties Page

The data of Read Buffer Address, Read Size Address and Read Start Address these three addresses should be the same as the addresses of E-CAM macros or E-CAM Cubic Curve Element (Manually Table Filling Creation Element). Please refer to the following table:

E-CAM Curve Element	E-CAM Macro	E-CAM Cubic Curve Element
Read Buffer Address	Var4	Read Buffer Address
Read Size Address	Var5	Read Size Address
Read Start Address	Var1	Read Start Address

The Station Number is used to configure the station number of ASDA-A2 servo drive. The COM port is used to configure the COM port for the communication between HMI and ASDA-A2 servo drive.

Before using E-CAM download button, please configure and complete the associated communication parameters first. Please note that the connected COM port between HMI and ASDA-A2 servo drive must be the same as the COM port in the DOPSoft communication setting properties page. For example, if the connected COM port is COM2, the COM port in the DOPSoft communication setting properties page must be selected as COM2 as well.

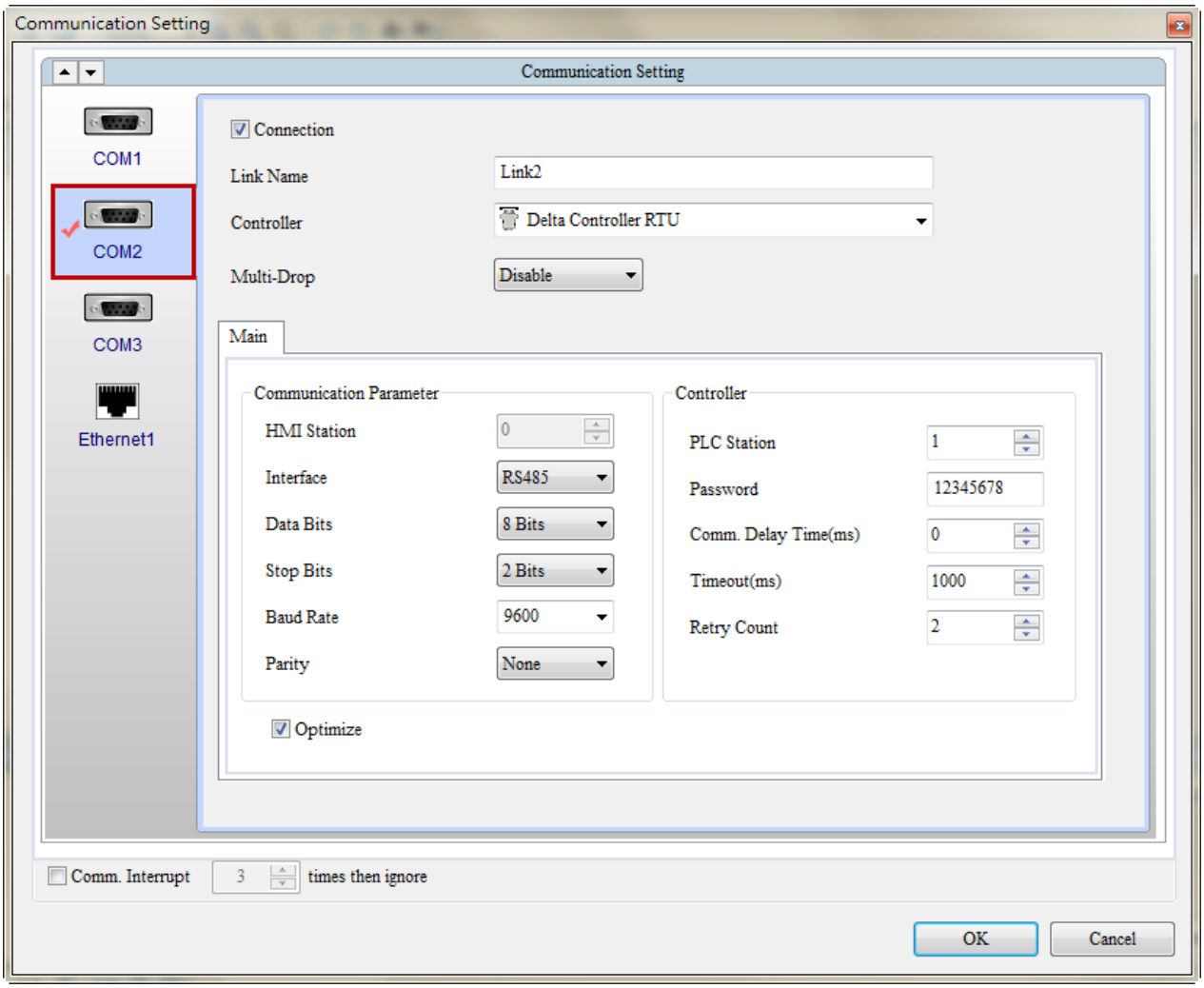


Figure 27-1-4-3 Communication Setting Properties Page of E-CAM Download Button Element

27-1-5 E-CAM Cubic Curve Creation (Manually Table Filling Creation)

DOPSoft provides the function of E-CAM Cubic Curve Creation and allows the users to create an E-CAM cubic curve manually. This is a very useful tool to make an E-Cam cubic curve quickly. However, when using this function to create an E-CAM curve, the E-CAM cubic curve data (*.ecm) cannot be saved in the DOPSoft. The external storage device such as SD card or USB disk is required for saving the E-CAM cubic curve data.

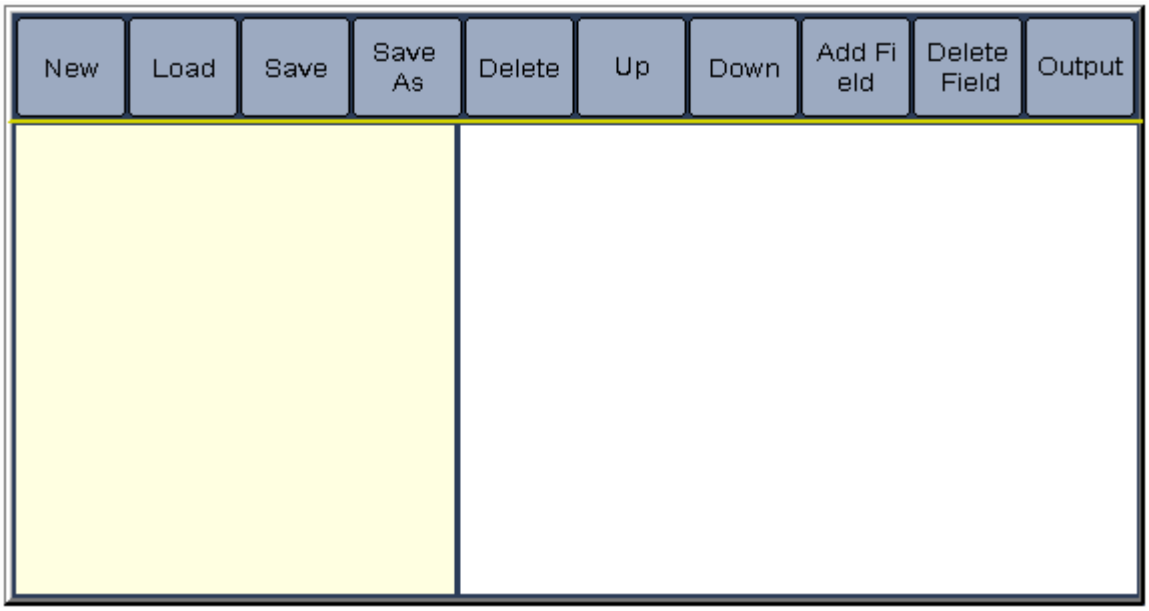


Figure 27-1-5-1 E-CAM Cubic Curve Creation Element

Double-click the E-CAM Cubic Curve Creation Element item to call out the following Element Properties page. There are three addresses needed to be set: Read Buffer Address, Read Size Address and Read Start Address.

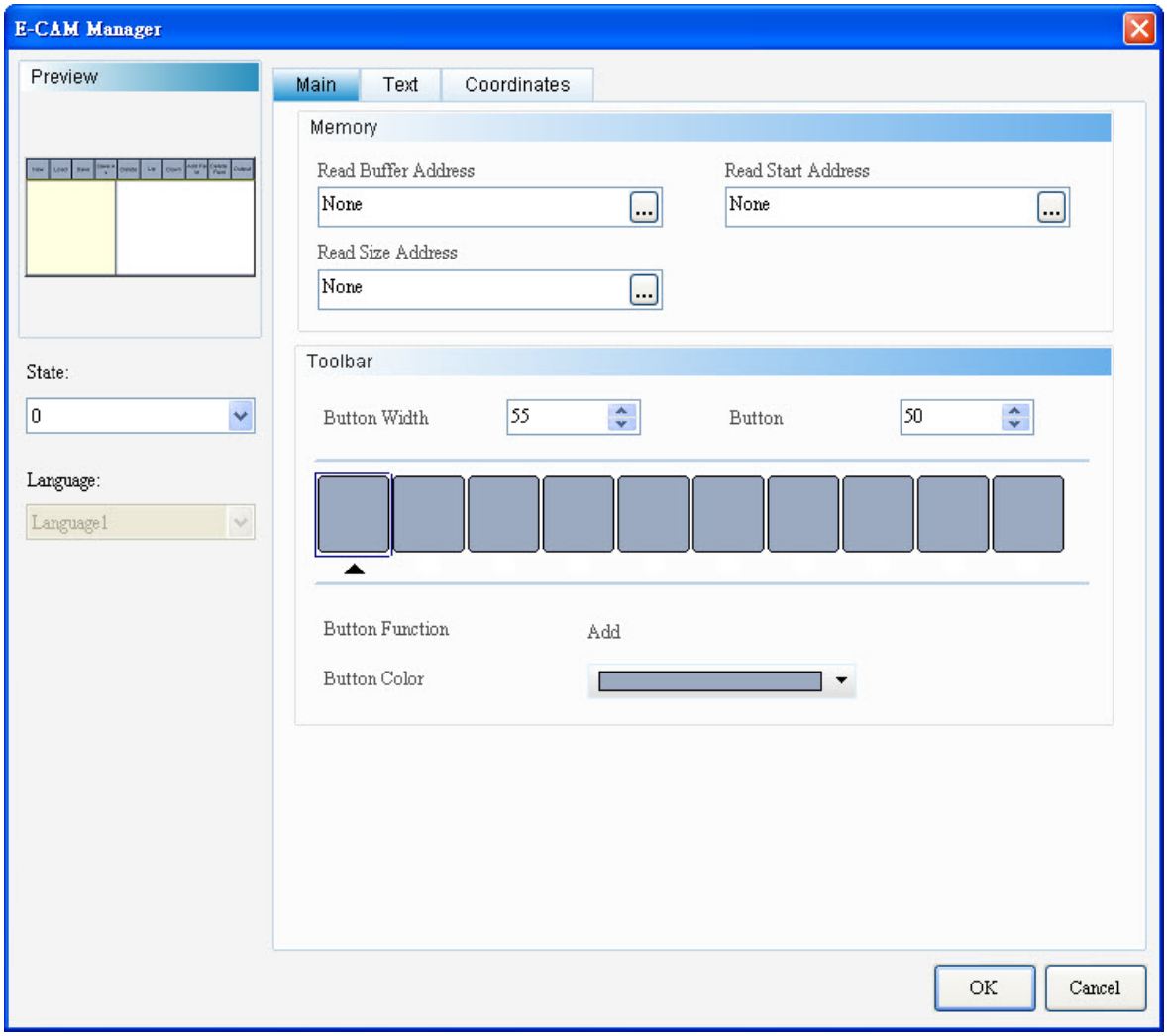


Figure 27-1-5-2 E-CAM Cubic Curve Creation Element Main Properties Page

No.	Property	Function
(1)	File Management Button	New: Add a new file Load: Load a file Save: Save a file Save As: Save a file as a new file Delete: Delete a file
(2)	Curve Editing Button	Up: Move column up Down: Move column down Add Filed: Add a column Delete Filed: Delete a column Output: Output the curve
(3)	File Manager	
(4)	Curve Editing Area	

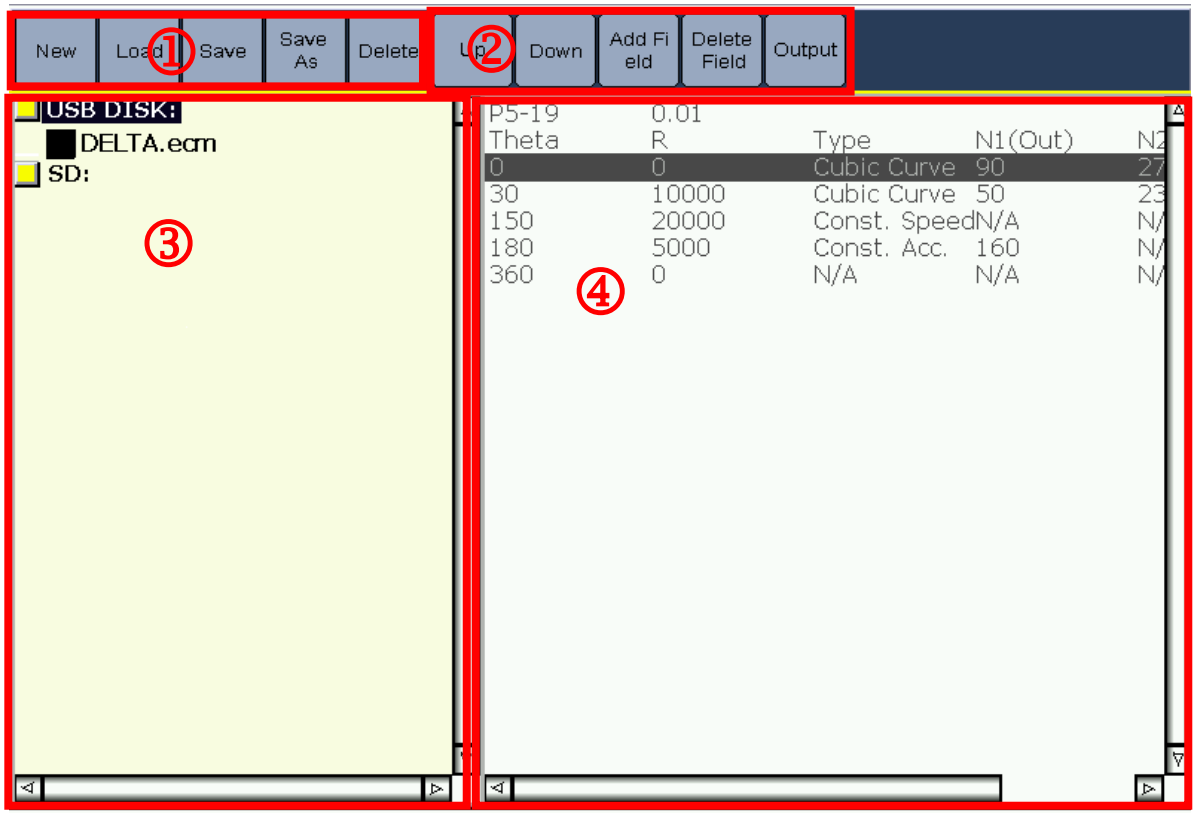


Figure 27-1-5-3 E-CAM Cubic Curve Creation Element Function Page

Example:

1. Create an E-CAM cubic curve creation element on Screen 1 and set the relevant parameters as follows:

E-CAM Cubic Curve Creation Element	Address
Read Buffer Address	$400
Read Size Address	$300
Read Start Address	$10000

2. Add a Screen 2.

3. Create an E-CAM curve element on Screen 2 and set the relevant parameters as follows:

E-CAM Curve Element	Address
Read Buffer Address	$400
Read Size Address	$300
Read Start Address	$10000

4. Create an E-CAM simulator element on Screen 2 and set the relevant parameters as follows:

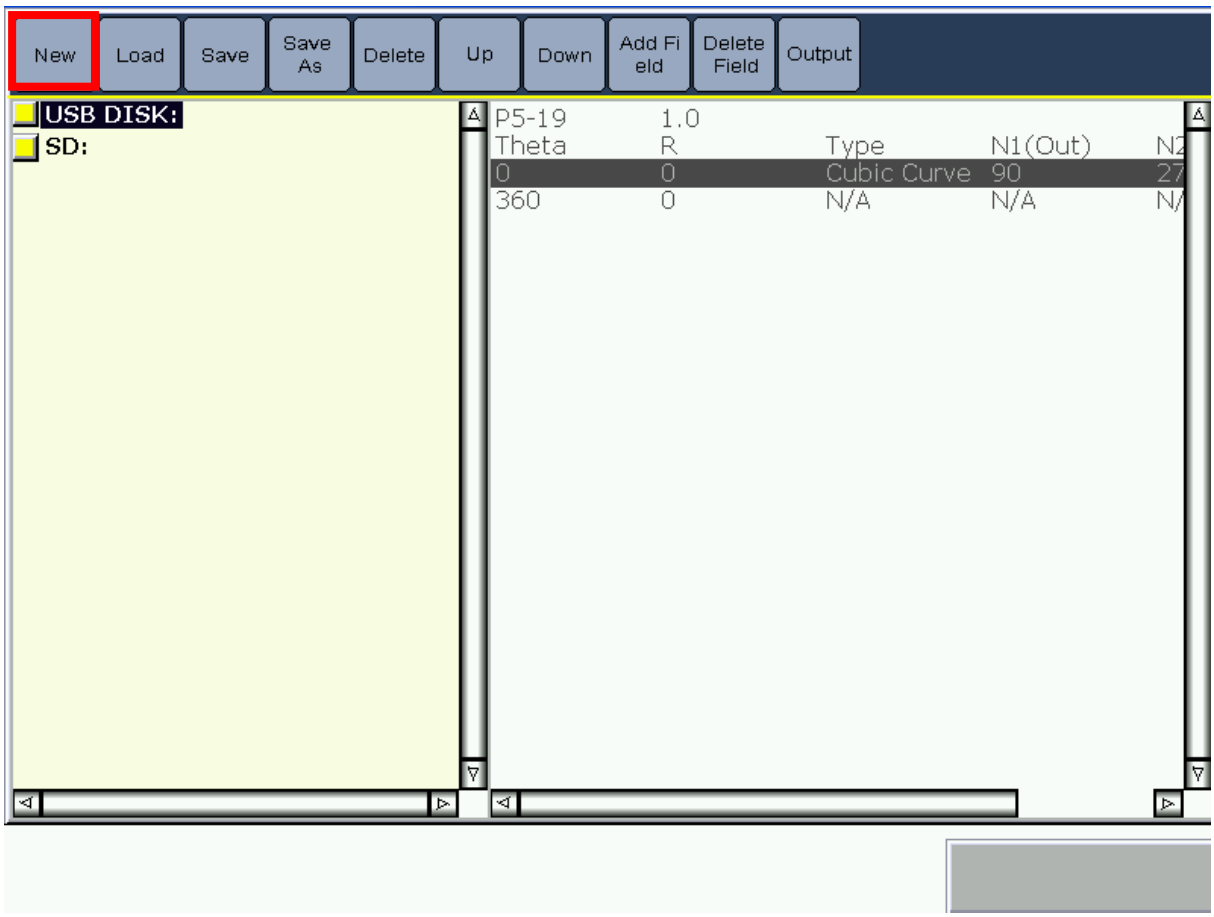
E-CAM Simulator Element	Address
Read Buffer Address	$400
Read Size Address	$300
Read Start Address	$10000

5. Create a Goto Screen button on Screen 2. Setting its function is to switch to Screen 1.

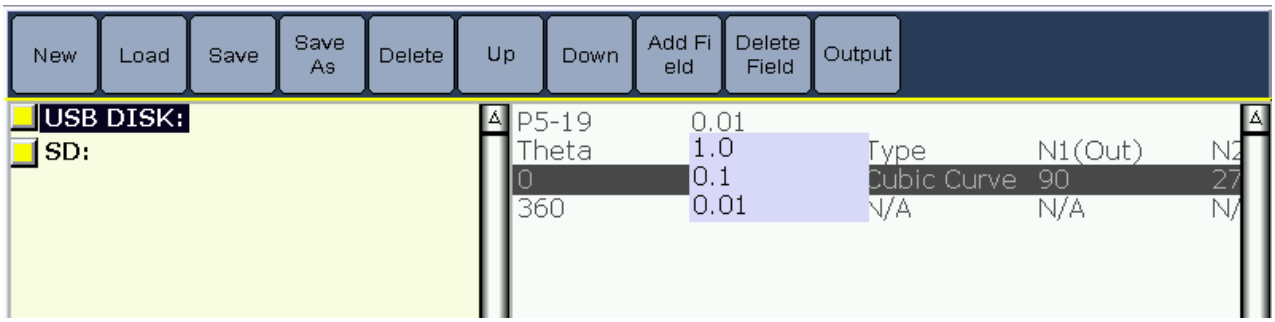
6. Create a Goto Screen button on Screen 1. Setting its function is to switch to Screen 2.

7. Download the screen to HMI. Then, connect a SD card or USB disk to the HMI. In this example, a USB disk is connected.

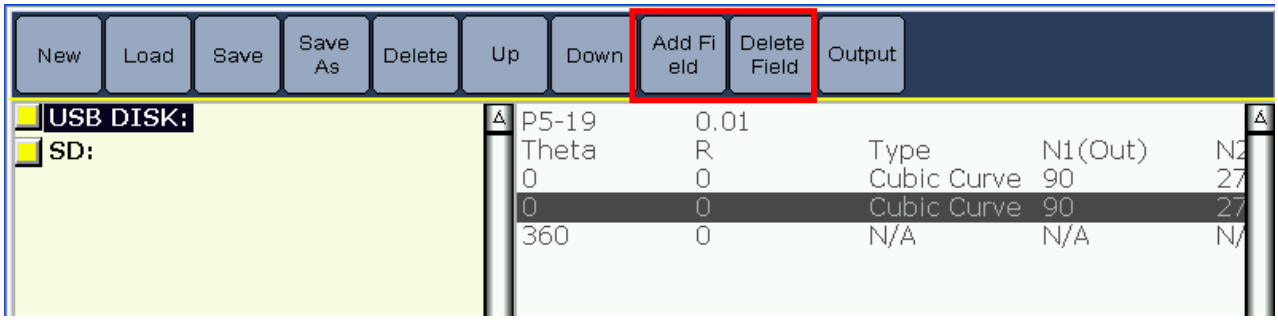
8. Press the E-CAM element to open the element function page and press “New” to create a new file.



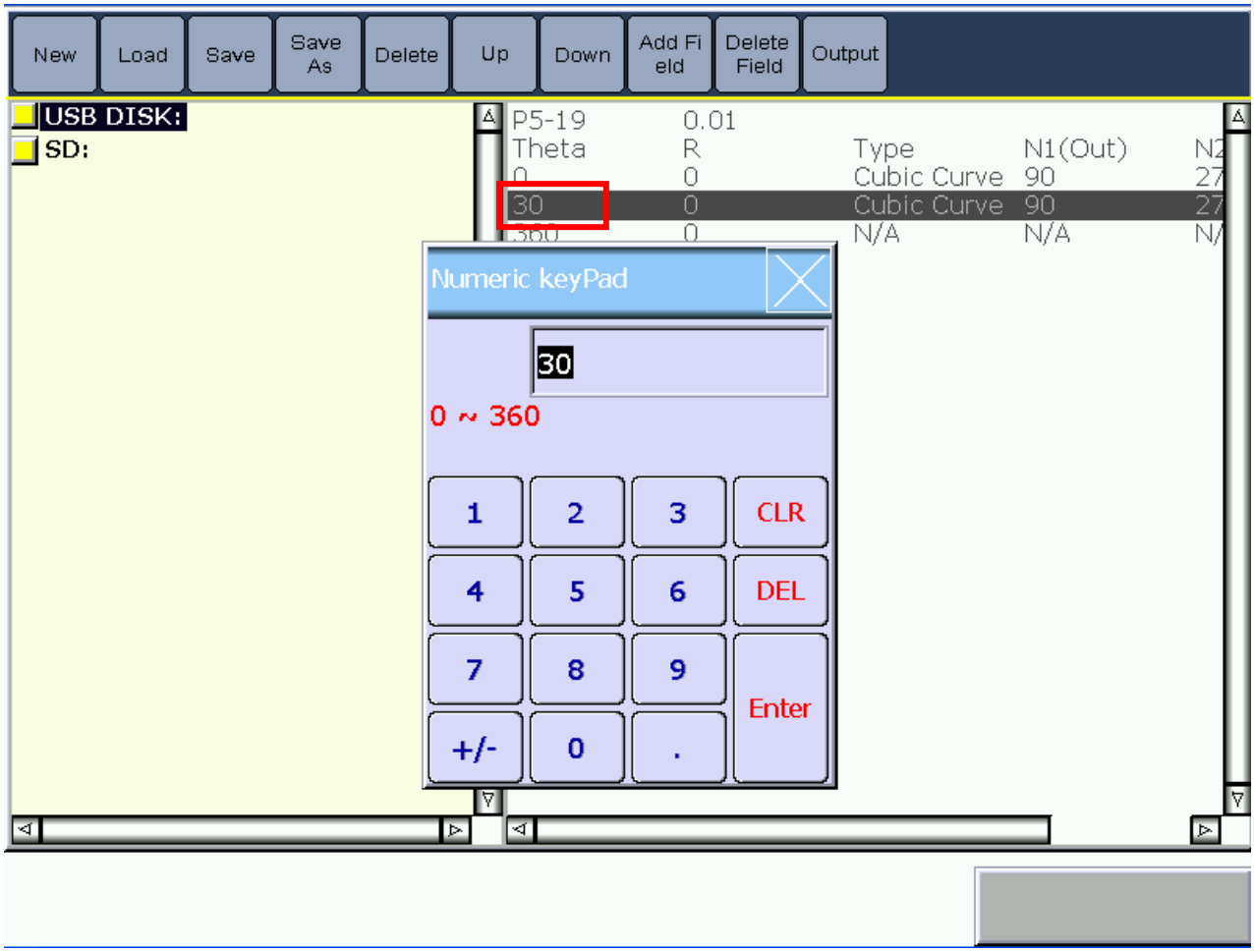
9. Select parameter P5-19 to set the E-Cam cubic curve scaling.



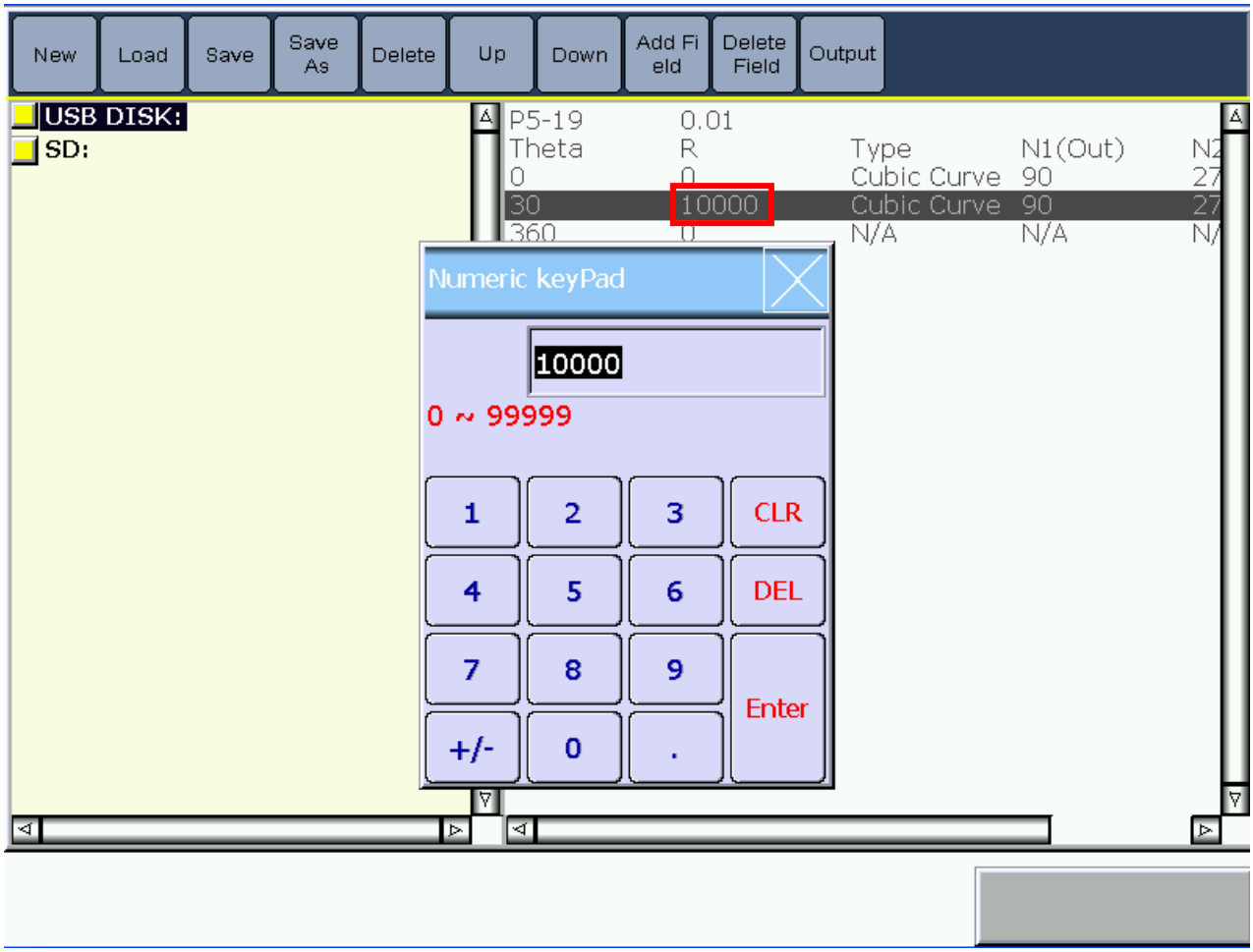
10. Use “Add Field” or “Delete Field” to add or delete a column of the data.



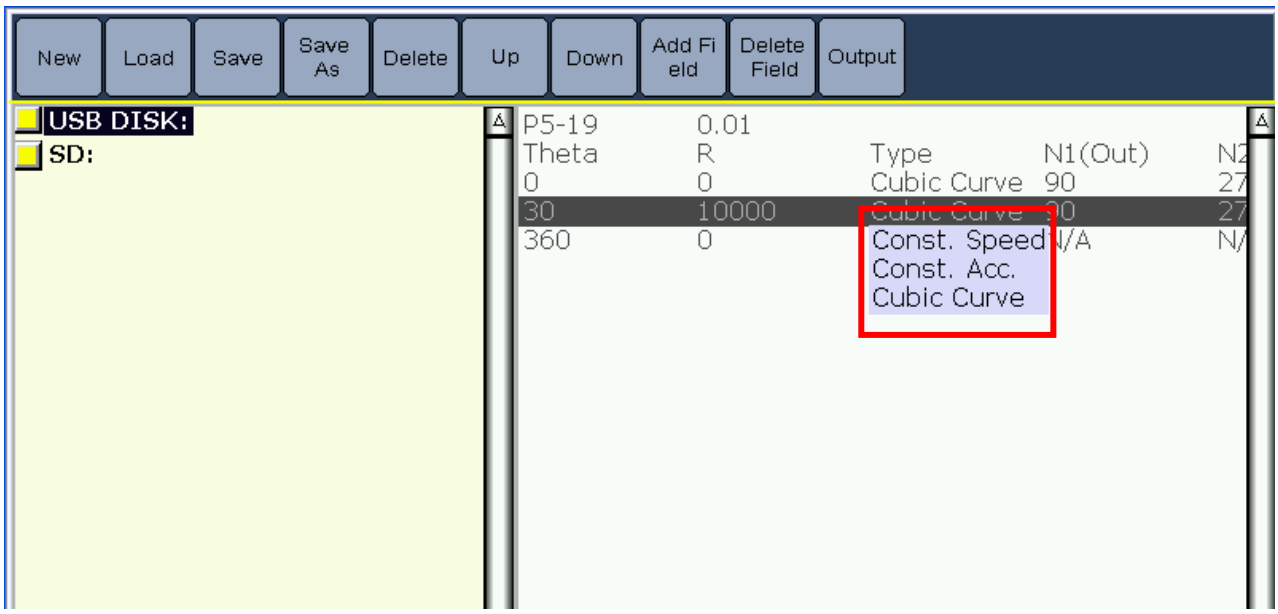
11. The degree of E-CAM curve can be set in the column of Theta.



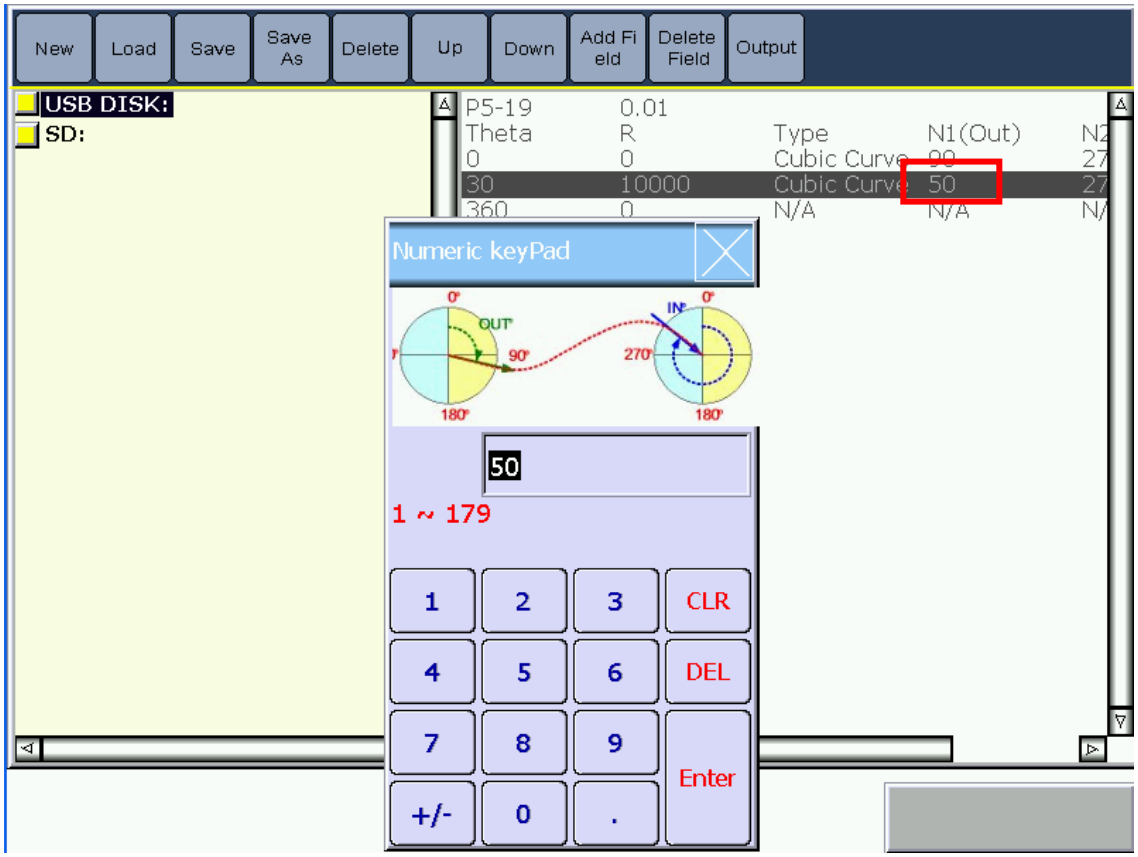
12. The position of E-CAM curve can be set in the column of R.

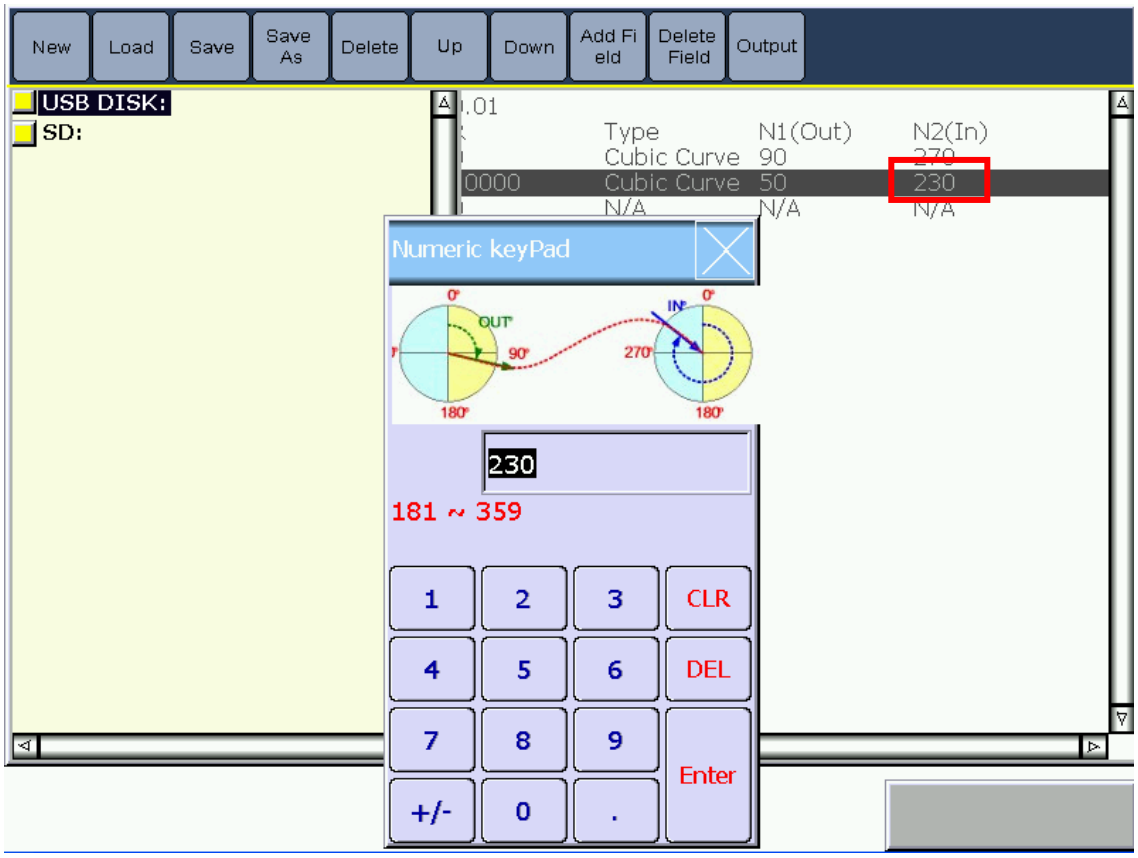


13. In the column of Type, there are three types of E-CAM cubic curve: Const. Speed, Const. Acc. and Cubic Curve for selection.

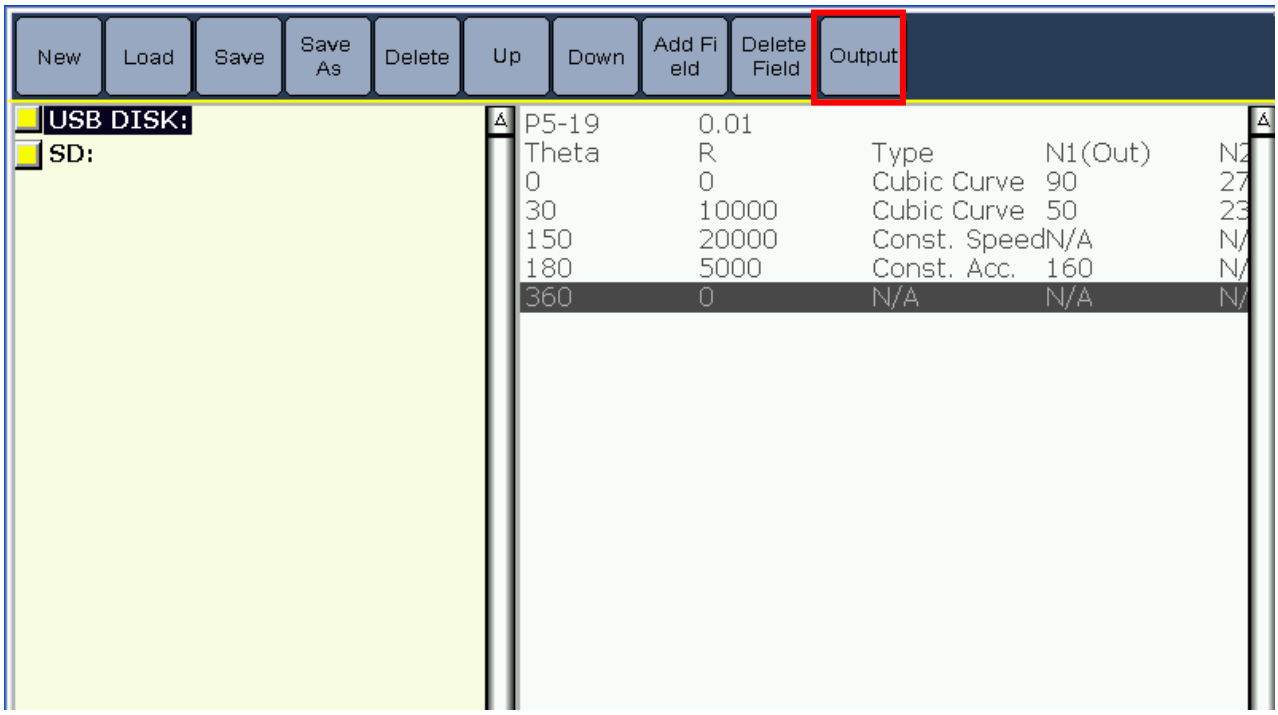


14. If Const. Acc. is selected, the degree N1(start degree) is required and must be set. If Cubic Curve is selected, the degree N1 (start degree) and the degree N2 (end degree) are required and must be set.

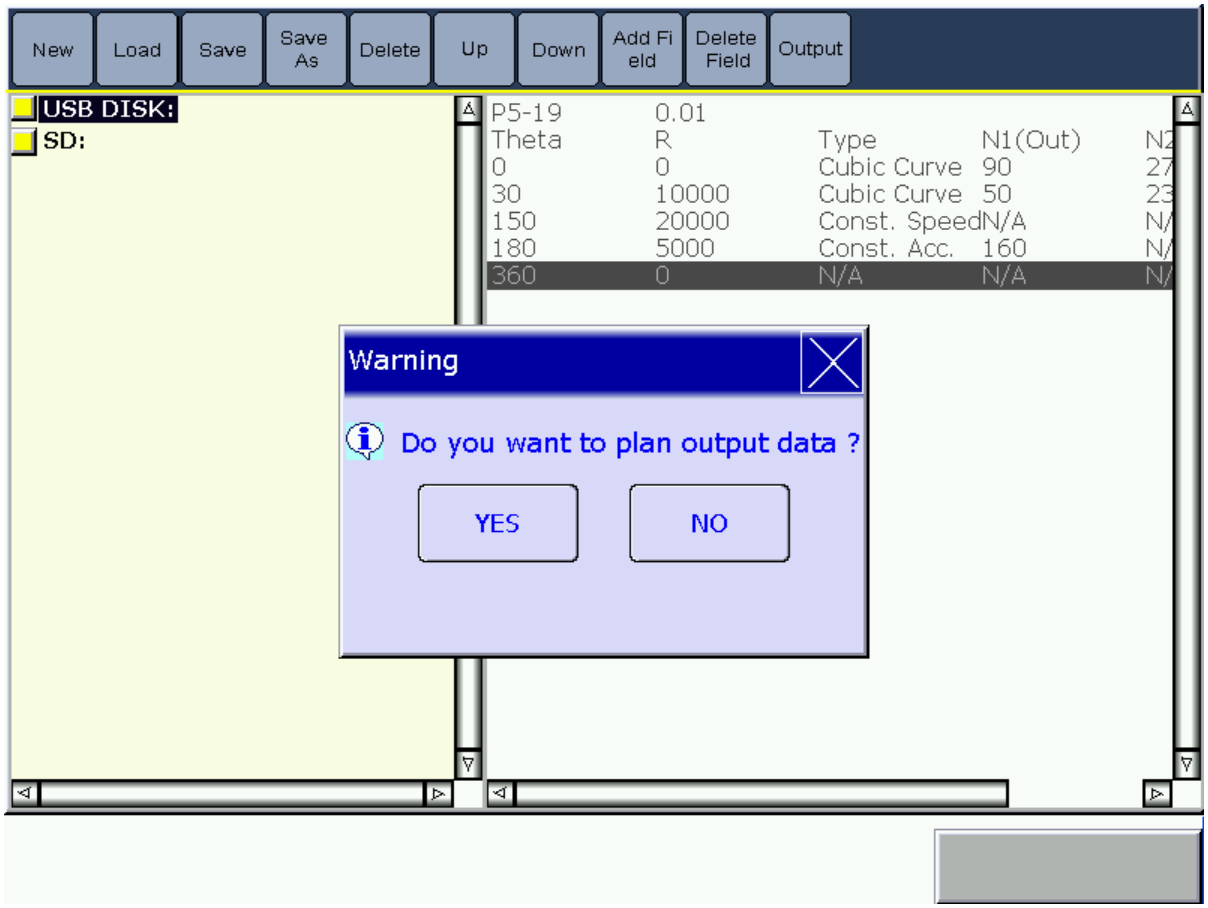


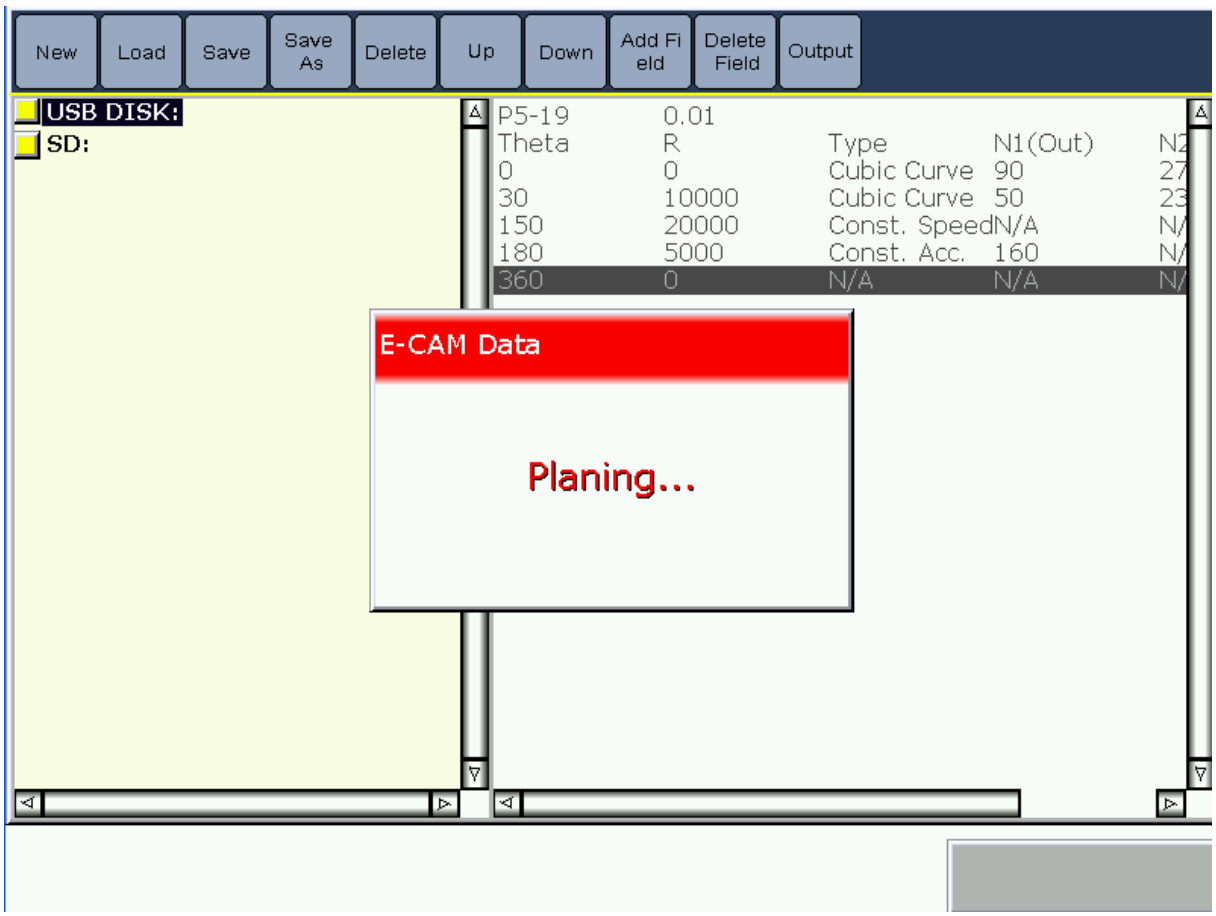


15. Complete the necessary parameters and settings according to the required conditions, and then press Output button.

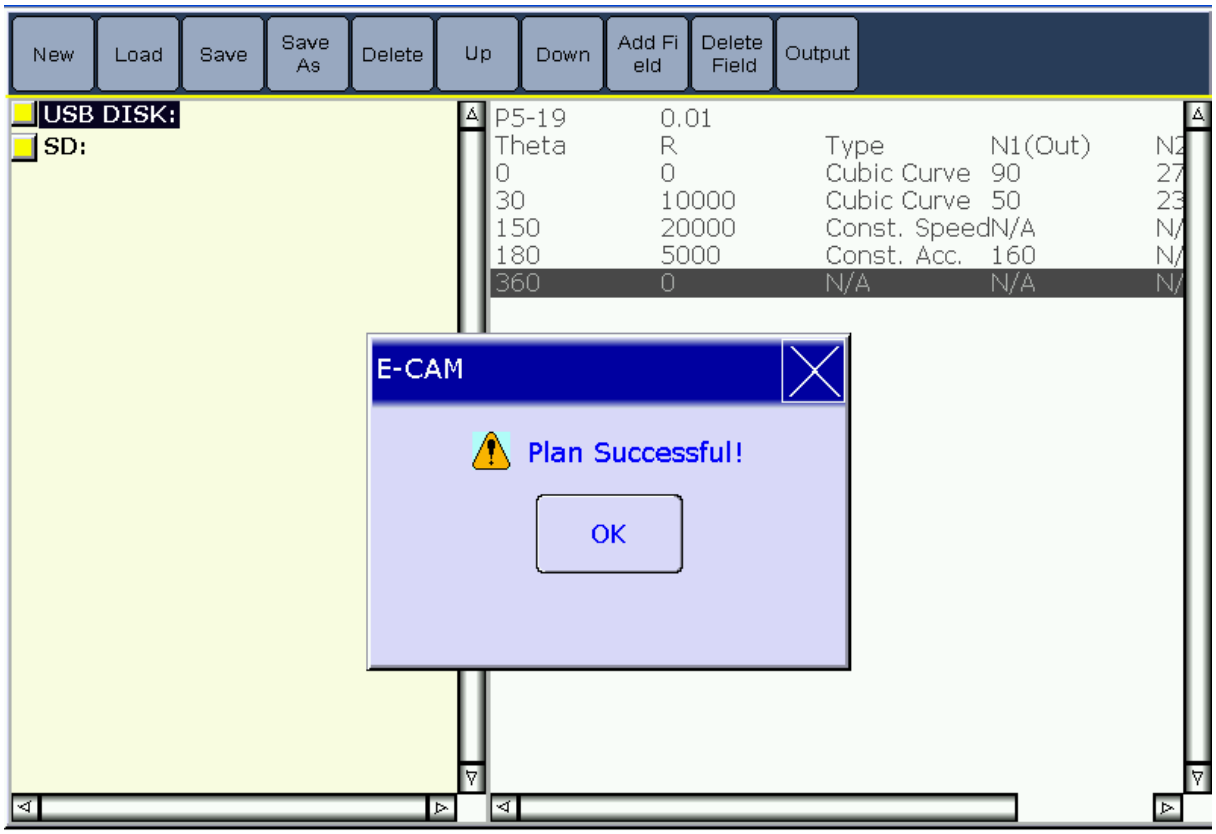


16. The HMI will ask if the users want to output the data or not. After pressing YES, the system will start to output the data and plan an E-CAM cubic curve.

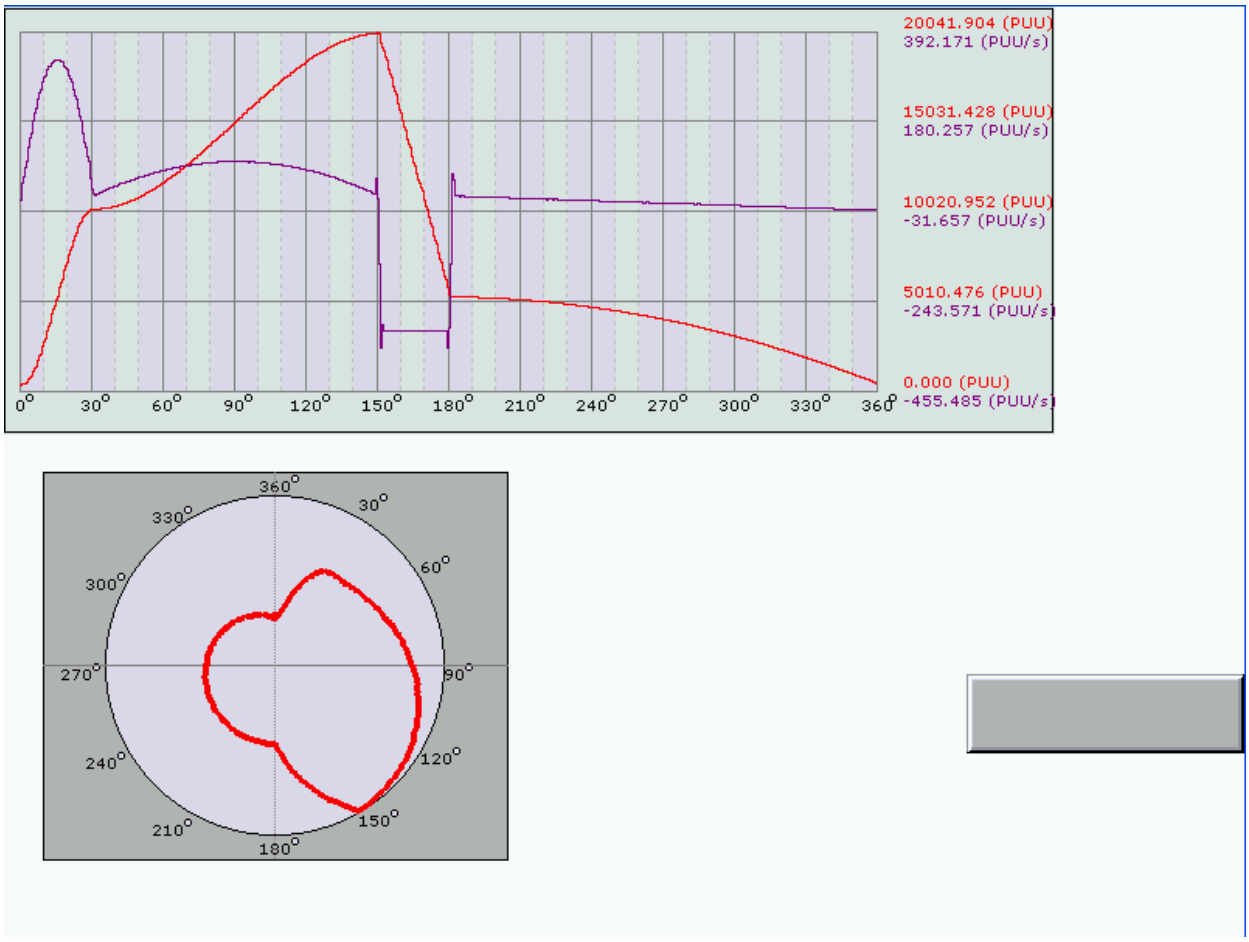




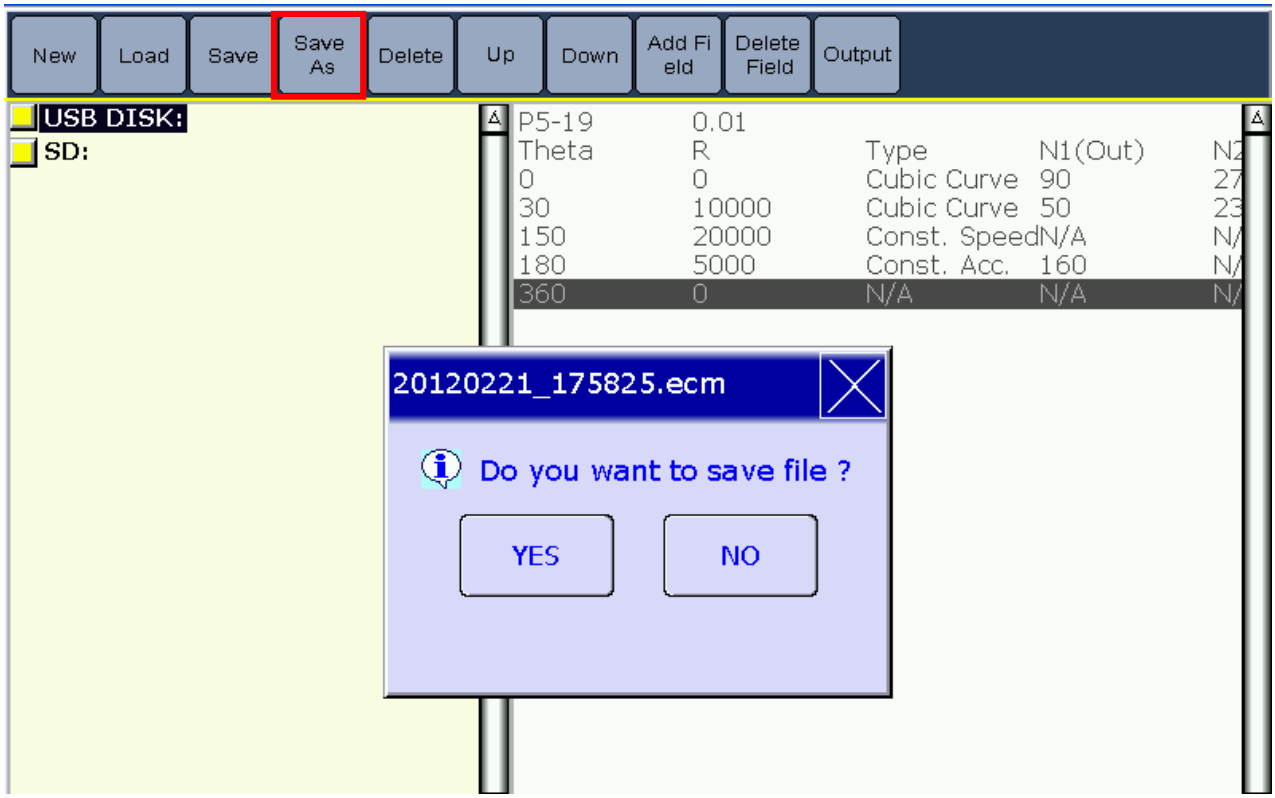
17. After all the data has been output and calculated, a successful message will appear on the screen.



18. Press the Goto button and press the E-CAM curve element and E-CAM simulator element to display the generated E-CAM curve.

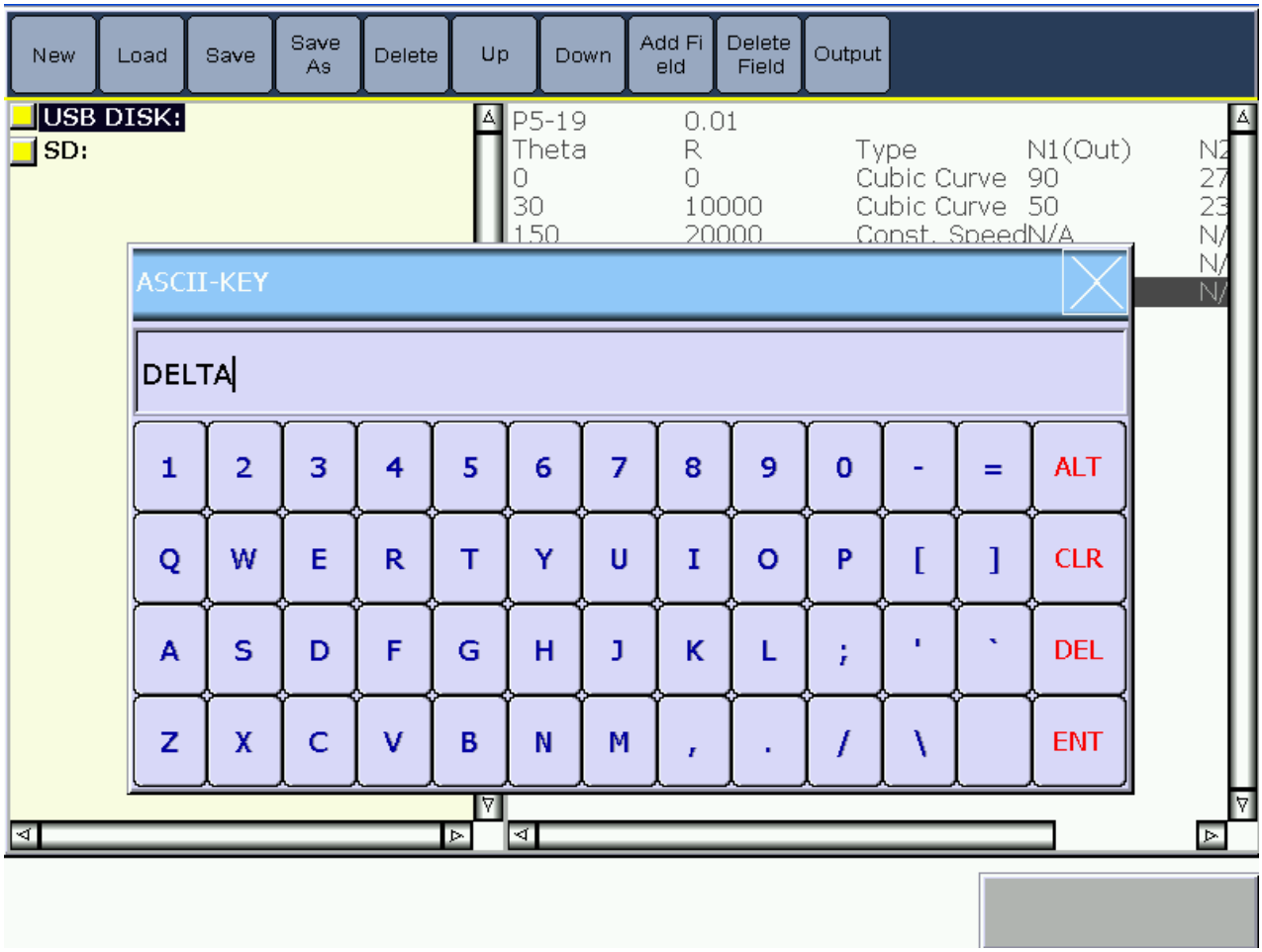


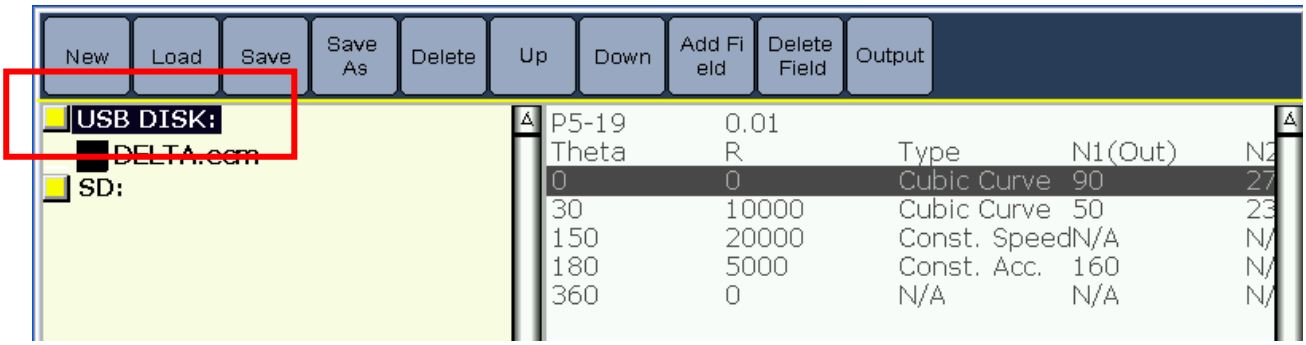
19. If there is no problem, go to previous page and press “Save As” to save the file.



The users can use the system default file name or define the file name by themselves.

When saving the file, it is no need to input the extension file name. The HMI will add the extension file name, i.e. DELTA.ecm automatically after the file is saved.





27-2 Using Macro to Create an E-CAM Curve

DOPSoft also provides E-CAM Marco function for creating an E-CAM curve. Please refer to the descriptions in the following section.

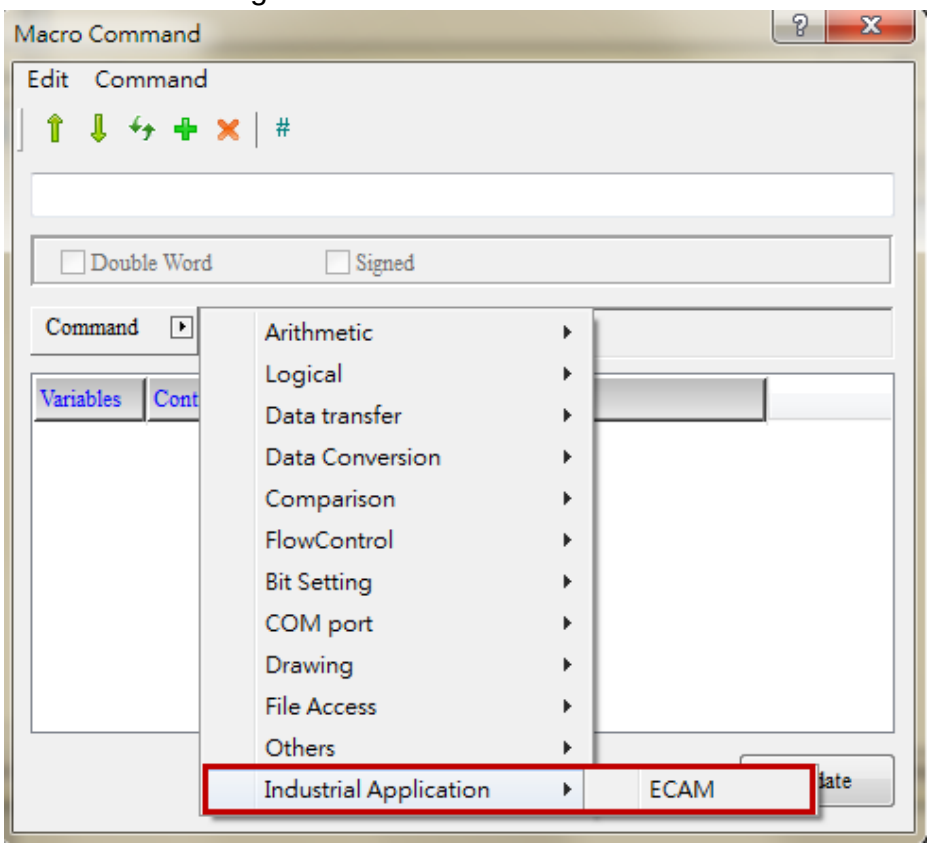


Figure 27-2-1 E-CAM Macro

■ **ECAM (E-CAM Curve Creation)**

Expression	What Variables Represent		NOTE
Var 1 = ECAM (Var 2, Var 3, Var 4, Var 5) (DW)	Var 1	Returned result	DW : Double Word
	Var 2	Address of E-CAM curve algorithm mode	
	Var 3	Starting address of E-CAM parameter input	
	Var 4	Starting address of E-CAM curve output	
	Var 5	Address of E-CAM curve output length	

Memory Usage			
Variable	**Internal Memory**	**PLC Register**	**Constant**
Var 1	◎		
Var 2			◎
Var 3	◎		

Var 4	◎		
Var 5	◎		

Explanation of ECAM

Var 1: Returned result

After each E-CAM curve calculation is complete, the value contained within Var 1 will be accumulated one by x1234000.

During each E-CAM curve calculation, the value contained within Var 1 will be cleared to 0.

If an E-CAM curve cannot be calculated, an error will occur and an error code will be sent back to the system. For the meaning of the error codes, please refer to the following table.

Error Code	Error Reason
0	No error
1	E-CAM table type error
2	Command type error
3	Input parameter error
4	Divisions for one curve exceeds the maximum number
5	Space in the data array is insufficient (ASDA-A2 series provides 800DW)
6	Input degree exceeds the allowable range. Please reduce the degree of zero speed zone or S-Curve area.
7	Cut ratio exceeds the recommended range. Please enter the recommended cut length (L) or speed compensation ratio
8	Speed compensation value exceeds the specified range
9	Electronic gear ratio exceeds the specified range
10	Product printing range is larger than the circumference of printing roller
11	Initial speed is less than 0
12	Time procedure is in error
13	Value of cutter diameter is too small
14	Operation of cutter may be in error.

Var 2: Selection of E-CAM curve creation method

Using this address to select E-CAM curve creation method.

Input Value	E-CAM Curve Creation Method
1	Rotary Shear – Adjustable Sealing Zone
2	Indirect Printing
3	Rotary Shear – cos Compensation

Var 3: Starting address of E-CAM parameter input

For different E-CAM curve creation method, the parameters are also different. Var 3 is used to set the starting address of E-CAM parameter input. Please refer to the table below for required input addresses and parameters.

E-CAM Curve Creation Method	Input Address	Parameters
Rotary Shear – Adjustable Sealing Zone	n	E-Cam Area Number P5_82_MIN ~ P5_82_MAX
	n+2	Deceleration Ratio: Numerator (nGA)
	n+4	Deceleration Ratio: Denominator (nGB)
	n+6	Knife Number (nKnife)
	n+8	Cut Diameter (d1) Units: mm x 100
	n+10	Cut Length (L) Units: mm x 100
	n+12	Speed Compensation (dVcp) -50.00% ~ 50.00% x 100
	n+14	Angle of Acceleration Area (ns2) Units: degree
	n+16	Angle of Sealing Zone (ns3) Units: degree
	n+18	Angle of S-Curve Area (nsS) Units: degree
	n+20	Electronic Gear Ratio: Numerator (P1-44)
	n+22	Electronic Gear Ratio: Denominator (P1-45)
Indirect Printing	n	E-Cam Area Number P5_82_MIN ~ P5_82_MAX
	n+2	Deceleration Ratio: Numerator (nGA)
	n+4	Deceleration Ratio: Denominator (nGB)
	n+6	Printing Range (dPL) Units: mm x 100
	n+8	Blank Range (dBL) Units: mm x 100
	n+10	Roller Diameter of Slave Axis (dd1) Units: mm x 100
	n+12	Roller Diameter of Master Axis (dd2) Units: mm x 100
	n+14	Degree of Waiting Area (Deg1) Units: degree
	n+16	Angle of S-Curve Area (DegS) Units: degree
	n+18	Increasing Angle of Sealing Zone Area (DegA) Units: degree
	n+20	Electronic Gear Ratio: Numerator (P1-44)
	n+22	Electronic Gear Ratio: Denominator (P1-45)
Rotary Shear – cos Compensation	n	E-Cam Area Number P5_82_MIN ~ P5_82_MAX
	n+2	Deceleration Ratio: Numerator (nGA)
	n+4	Number of Cutter
	n+6	Cut Diameter (mm) x 100
	n+8	Product Cut Length (mm) x 100
	n+10	Speed Compensation (Master Axis) Units: %
	n+12	Lead Constant Speed Area Units: Count Number
	n+14	Cut Thickness D(mm) x 100
	n+16	Cut Height H(mm) x 100
	n+18	Electronic Gear Ratio: Numerator (P1-44)
	n+20	Electronic Gear Ratio: Denominator (P1-45)
	n+22	Speed Ratio (Conveyer 2 : Conveyer 1)
	n+24	S (Curve Level): 1 ~ 4 levels

Var 4: Starting address of E-CAM curve output

Output the calculated E-CAM curve to the address which starts from Var 4. Output length refers to Var 5.

Var 5: Address of E-CAM curve output length

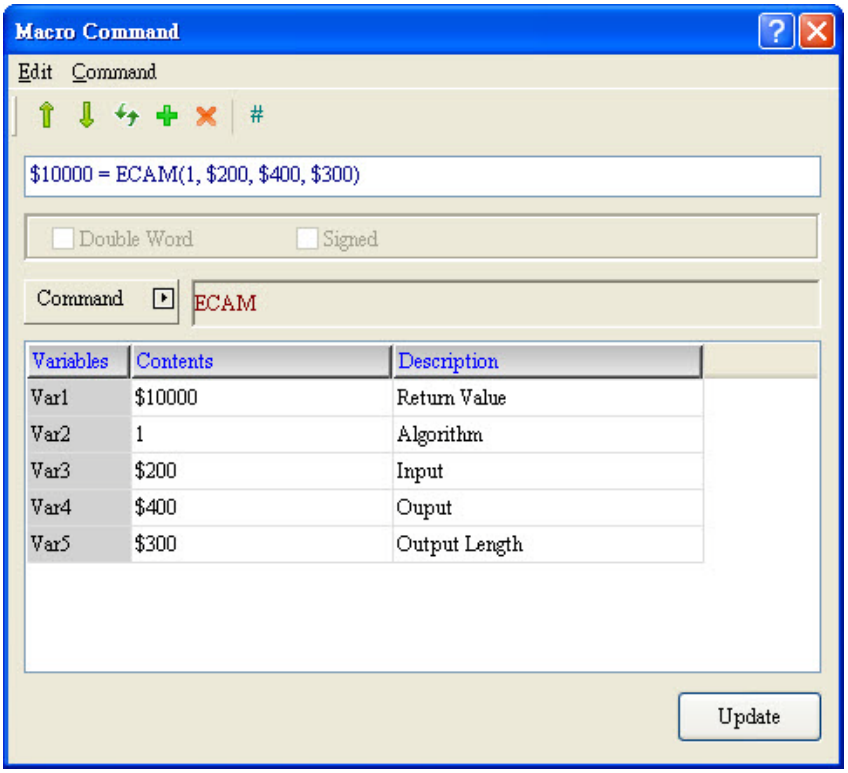
Var 5 represents total output length of calculated E-CAM curve. If output length is 100, it will occupy 200 addresses in Word. (E-CAM related function uses Double Word format)

NOTE:

✓ When using E-CAM related functions, it needs to pay attention if the address is overlapped or not. ASDA-A2 E-CAM curve provides up to 721 items for one single E-Cam curve. It indicates that up to 1442 Word will be occupied by E-CAM curve. Therefore, if Var 4 (Starting address of E-CAM curve output) is set to $0, it is recommended to reserve $0 ~ $1441 for E-CAM curve data.

Example:

1. Create a Maintained button which address is set to $0.0 and create an ON macro command as shown as: **$10000 = ECAM(1, $200, $400, $300)**



Var 2 = 1. It indicates that this macro command calculate the E-CAM curve for Rotary Shear – Adjustable Sealing Zone.

The parameters required by this macro command starts from address $200. 12 Double Word (24 Word) are used. The memory addresses can be used are $200 ~ $223.

$200	E-Cam Area Number P5_82_MIN ~ P5_82_MAX
$202	Deceleration Ratio: Numerator (nGA)
$204	Deceleration Ratio: Denominator (nGB)
$206	Knife Number (nKnife)
$208	Cut Diameter (d1) Units: mm x 100
$210	Cut Length (L) Units: mm x 100
$212	Speed Compensation (dVcp) -50.00% ~ 50.00% x 100
$214	Angle of Acceleration Area (ns2) Units: degree
$216	Angle of Sealing Zone (ns3) Units: degree
$218	Angle of S-Curve Area (nsS) Units: degree
$220	Electronic Gear Ratio: Numerator (P1-44)
$222	Electronic Gear Ratio: Denominator (P1-45)

The parameters of the calculated E-CAM curve will be output from the address that starts from $400. Max. occupied address is $1841.
ASDA-A2 provides up to 721 items for one single E-Cam curve. One item occupies one Double Word. Total 721 x 2 =1442 Word will be occupied. The memory address can be used are $400 ~ $1841.

The actual E-CAM curve will be output to $300.

2. Create an E-CAM curve element on the screen and set the relevant parameters as follows:

E-CAM Curve Element	E-CAM Macro	Address
Read Buffer Address	Var4	$400
Read Size Address	Var5	$300
Read Start Address	Var1	$10000

3. Create an E-CAM simulator element on the screen and set the relevant parameters as follows:

E-CAM Simulator Element	E-CAM Macro	Address
Read Buffer Address	Var4	$400
Read Size Address	Var5	$300
Read Start Address	Var1	$10000

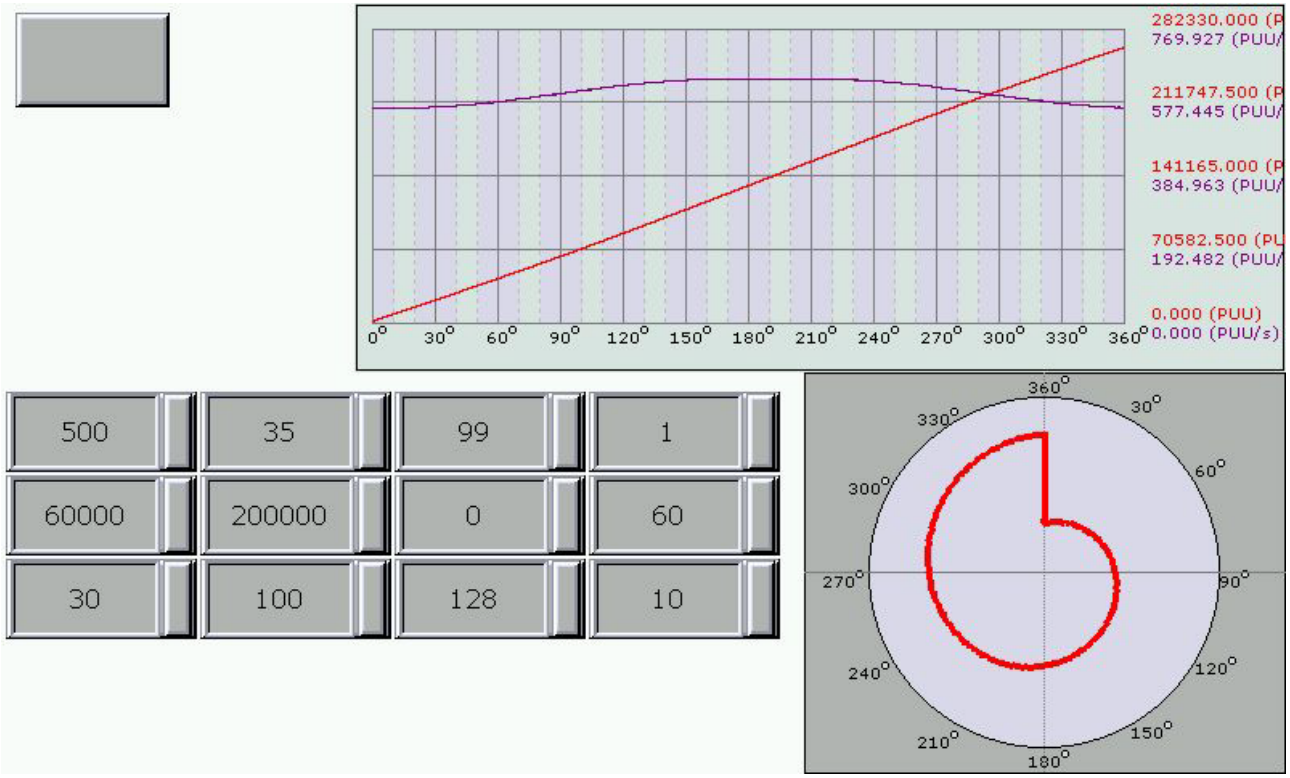
4. Create 12 numeric input elements on the screen and set the data length format as Double Word. Then, set the parameters of addresses as follows:

$200	E-Cam Area Number P5_82_MIN ~ P5_82_MAX
$202	Deceleration Ratio: Numerator (nGA)
$204	Deceleration Ratio: Denominator (nGB)
$206	Knife Number (nKnife)
$208	Cut Diameter (d1) Units: mm x 100
$210	Cut Length (L) Units: mm x 100
$212	Speed Compensation (dVcp) -50.00% ~ 50.00% x 100
$214	Angle of Acceleration Area (ns2) Units: degree
$216	Angle of Sealing Zone (ns3) Units: degree
$218	Angle of S-Curve Area (nsS) Units: degree
$220	Electronic Gear Ratio: Numerator (P1-44)
$222	Electronic Gear Ratio: Denominator (P1-45)

5. After downloading the above address settings into HMI, enter the following value into each address in order.

$200	500
$202	35
$204	99
$206	1
$208	60000
$210	200000
$212	0
$214	60
$216	30
$218	100
$220	128
$222	10

6. Press Maintained button which address is set to $0.0 and the following E-CAM curve will be generated on the screen.


282330.000 (P
769.927 (PUU/
211747.500 (P
577.445 (PUU/
141165.000 (P
384.963 (PUU/
70582.500 (PU
192.482 (PUU/
0.000 (PUU)
0.000 (PUU/s)
0° 30° 60° 90° 120° 150° 180° 210° 240° 270° 300° 330° 360°
500
35
99
1
60000
200000
0
60
30
100
128
10
360° 30° 60° 90° 120° 150° 180° 210° 240° 270° 300° 330°

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Chapter 28 G-CODE Elements

This section tells users the way to download G-CODE and its connection method.
Following lists the related information of G-CODE:

- **HMI: DOP-B07PS415 and DOP-B07PS515 models.**
- **PLC controller: Delta PM RTU, Delta 10MC ASCII and Delta AH Series PLC(Modbus).**
- **Format supported by G-Code file: NC file, FGC file and TXT file.**
- **Supported version of HMI firmware: Firmware 3.0090.**
- **Supported version of PLC firmware: All versions.**

NOTE:

- ✓ The file management element does not support non-G-Code filename extensions (.exe/.pdf/.csv/.dps/.jpg/.bmp/.mp3./dat) and cannot display the file content.
- ✓ The maximum size of the editing file for the G-Code file management element is 500K.
- ✓ Files over 500K can be displayed by G-Code file management but cannot be edited.
- ✓ G-Code file management element can open the file which is smaller than 10MB. However, it cannot open nor display the file that exceeds 10MB.
- ✓ When opening the G-Code file name is named in Chinese, the displaying will be gibberish. It can be read by G-Code file management element, but cannot be saved.
- ✓ The NC/FGC/TXT file cannot be opened by G-Code file management if the file contains illegal ASCII. (The legal ASCII code is 0x20~0x7E.)
- ✓ G-Code element does not support element rotation.
- ✓ As long as the G-Code file can be displayed by the file management element, it can be downloaded to the system.

◆ G-CODE element can be divided into three kinds by PLC controller.

G-CODE(10MC)	Manager(10MC)	G-CODE File Management
	Download(10MC)	G-CODE Download
	Keypad	G-CODE Keypad

G-CODE(20MC)	Manager(20MC)	G-CODE File Management
	Download(20MC)	G-CODE Download
	Keypad	G-CODE Keypad
G-CODE(20PM)	Manager(20PM)	G-CODE File Management
	Download(20PM)	G-CODE Download
	Keypad	G-CODE Keypad

Table 28-1-1 G-CODE Element

When users select model B07PS415 or B07PS515, the screen will show as below. Please right click the mouse and check Element Tool.

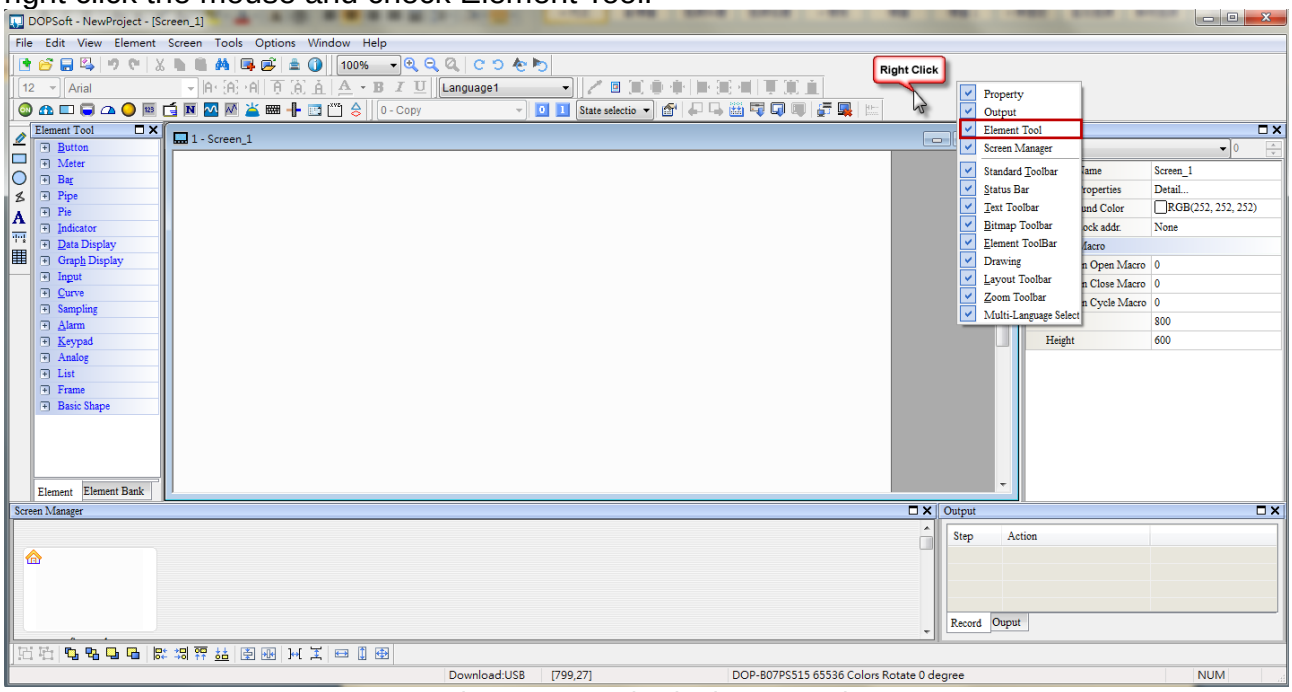


Figure 28-1-1 Check Element Tool

Then, go to Element Bank and select G-CODE file folder. You will see the supported elements.

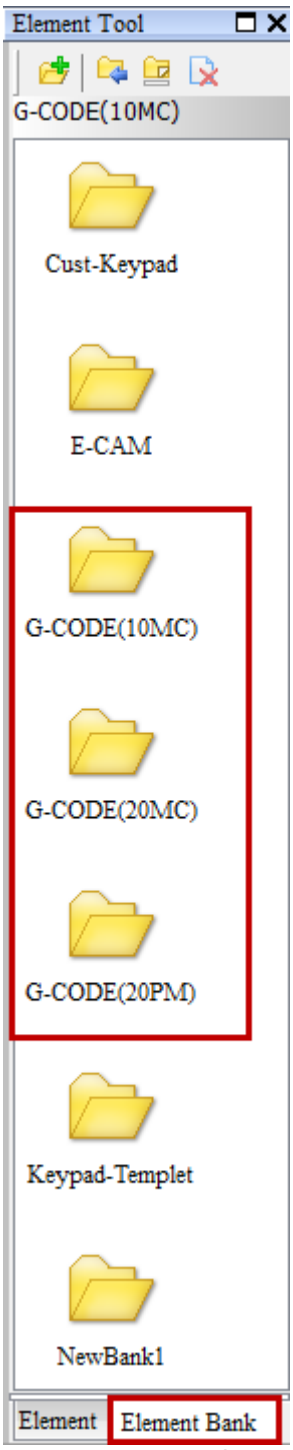


Figure 28-1-2 G-CODE Element Bank

10MC G-Code Connection Example

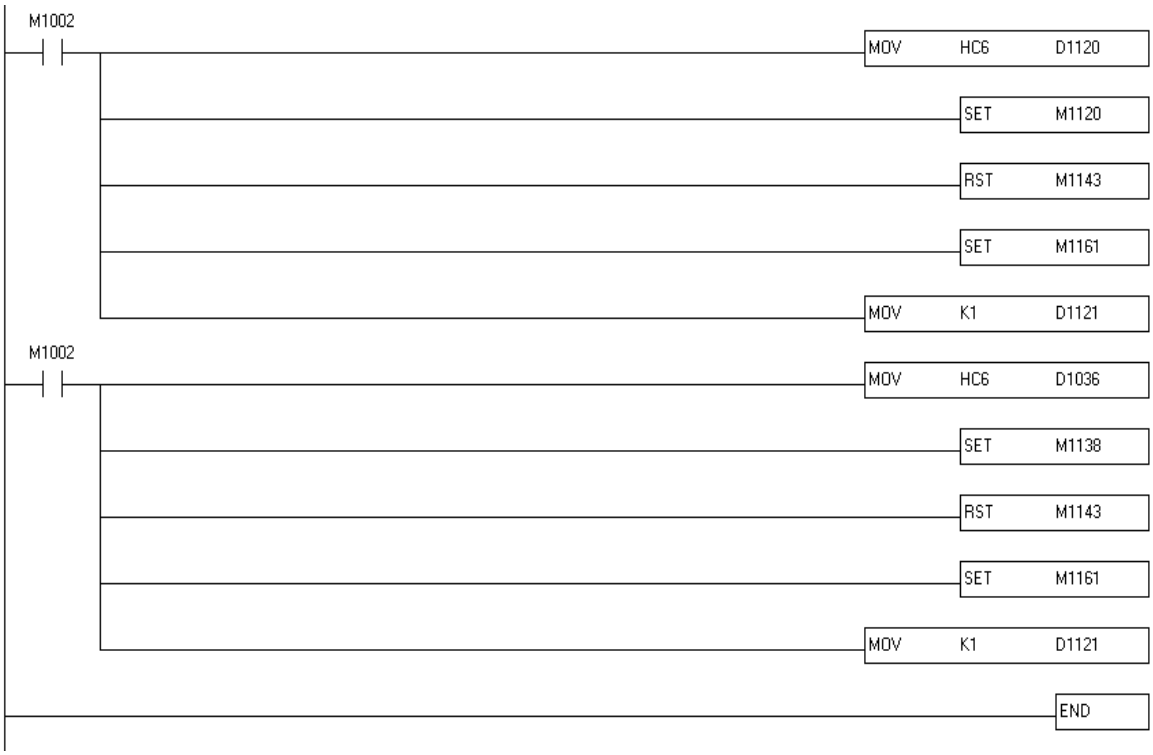
PLC Setting

- 10MC

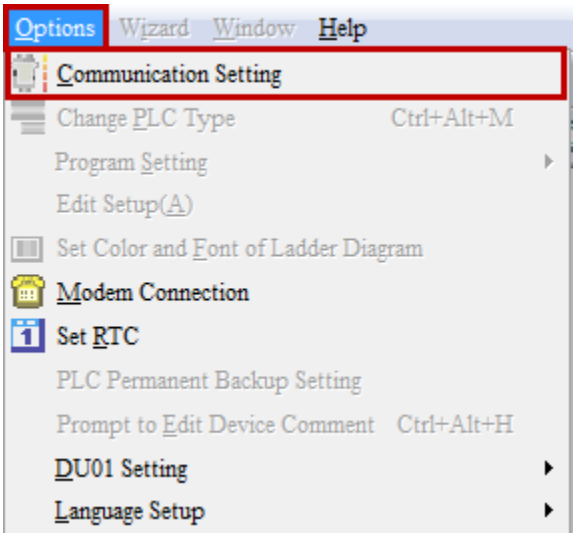
Before HMI connects to 10MC, the communication format of PLC module has to be set first. Then, it set the format of motion control module. Please set the communication format of PLC module first. Then set the format for motion control module.

✐ **WPLSoft is mainly used to set the communication format of PLC module.**

➢ Open WPLSoft and edit Ladder program that shows below. Set the communication format of COM1 and COM2 to 115200, 7, E, 1 and station number 1.

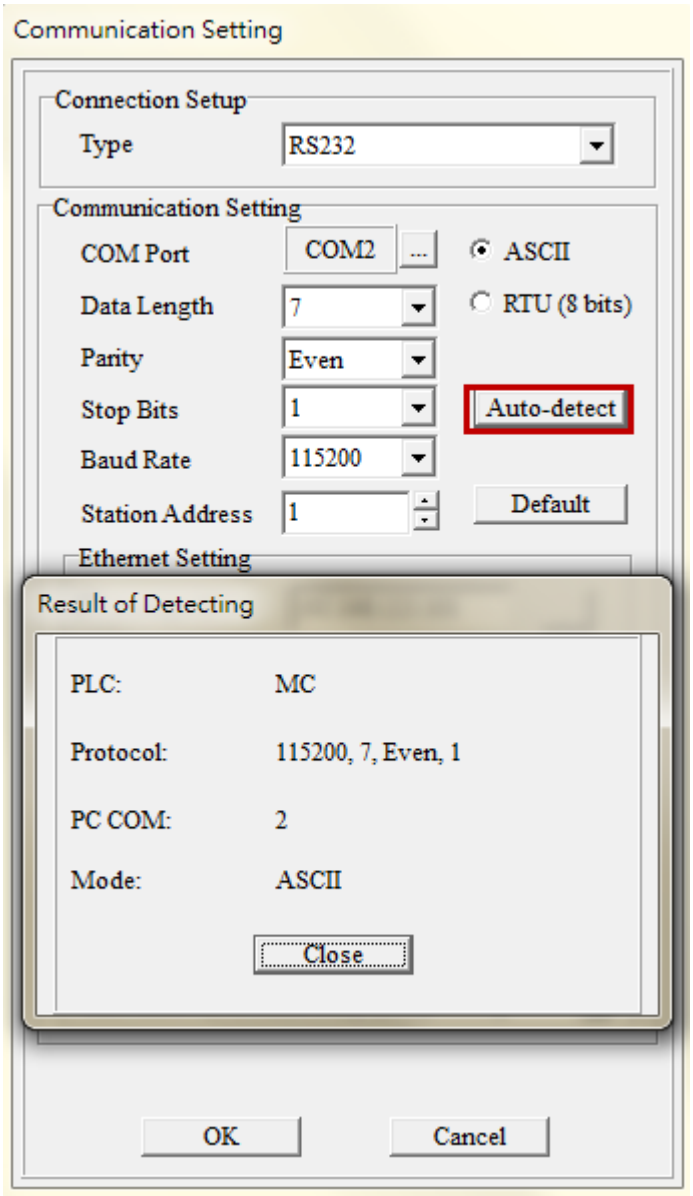


➢ Go to [Options] → [Communication Setting].

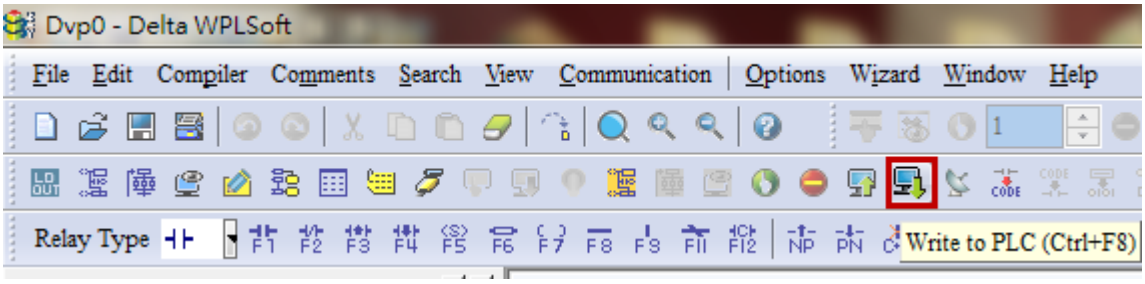


➢ Then, select RS232 as the type. Users can select [Auto-detect] to detect PLC

communication protocol. If the screen shows the result, it means the system is connected to the PLC.

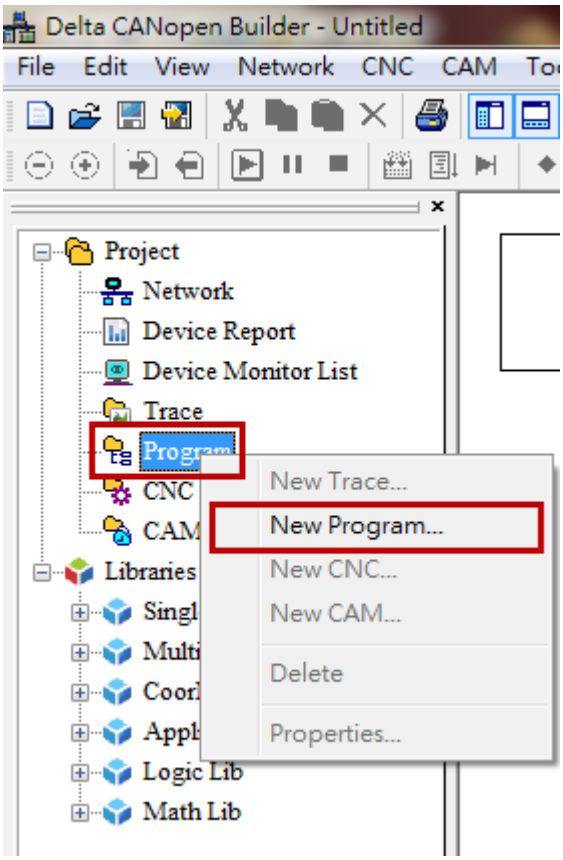


➢ Please download the edited file to the PLC.

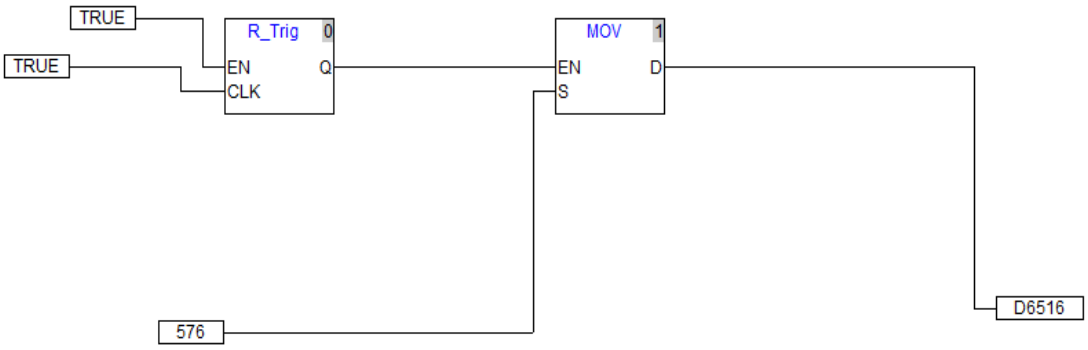


✎ **CanOpenBuilder is mainly used to set the communication format of motion control module.**

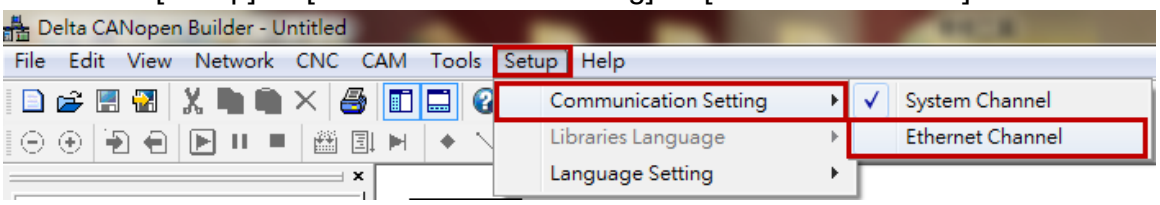
➢ Please open CanOpenBuilder and add one new program by selecting [New Program] on the left.



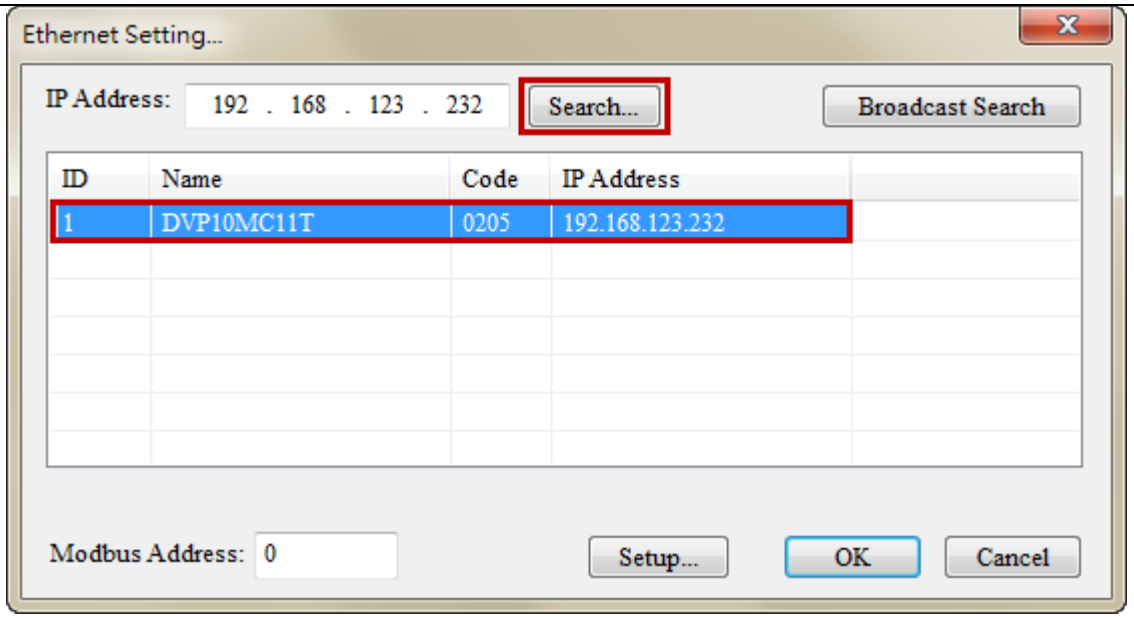
➢ Please edit the Ladder program that shows below.



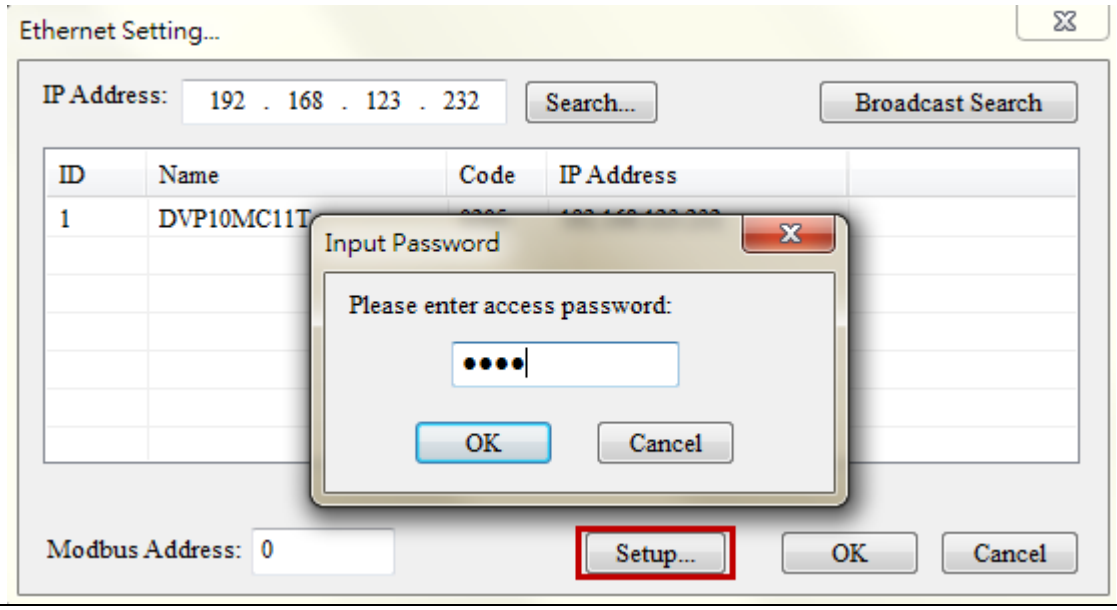
➢ Go to [Setup] → [Communication Setting] → [Ethernet Channel].

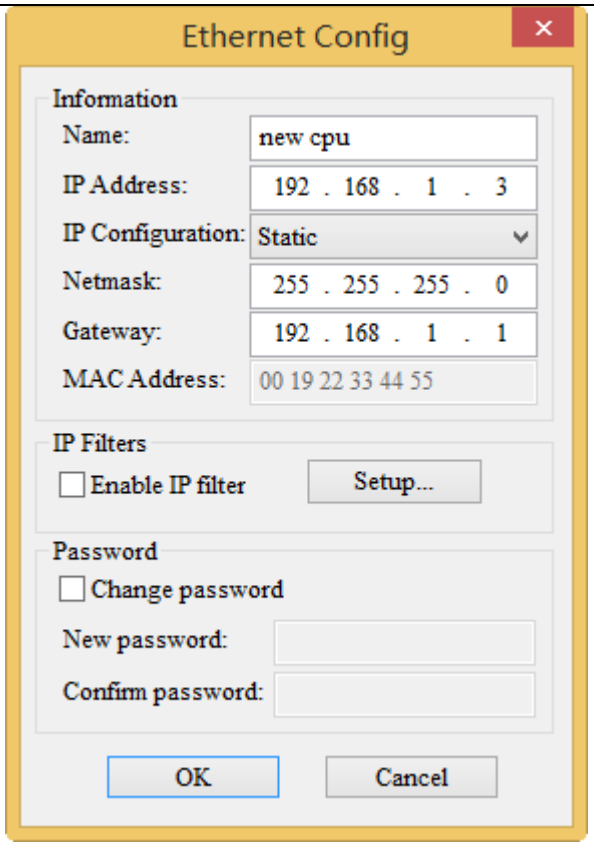


➢ Enter the IP in IP Address and click on [Search…]. You can find DVP10MC11T device. Select the device and click on [OK] to download the program.

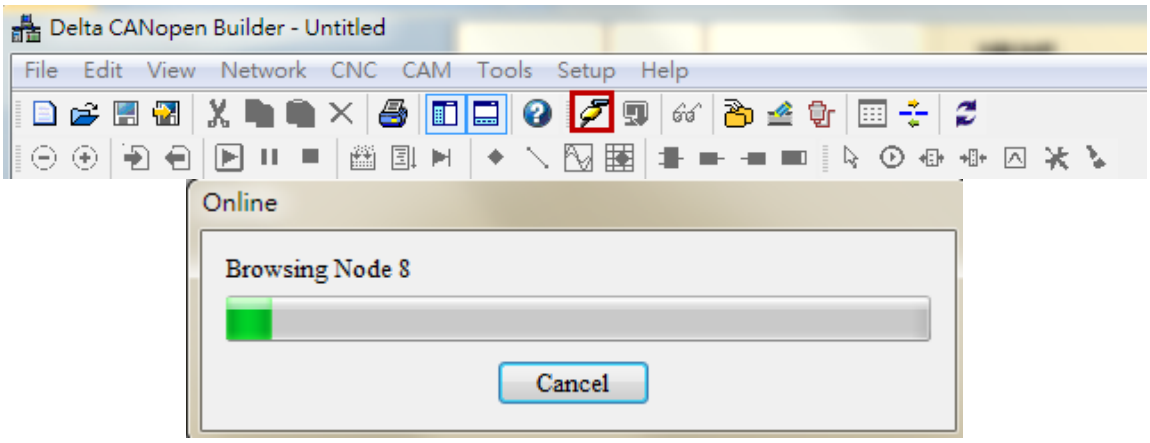


➢ If users wish to change IP address, please wait for the search result and click on [Setup…]. Then, enter the default password [0000].

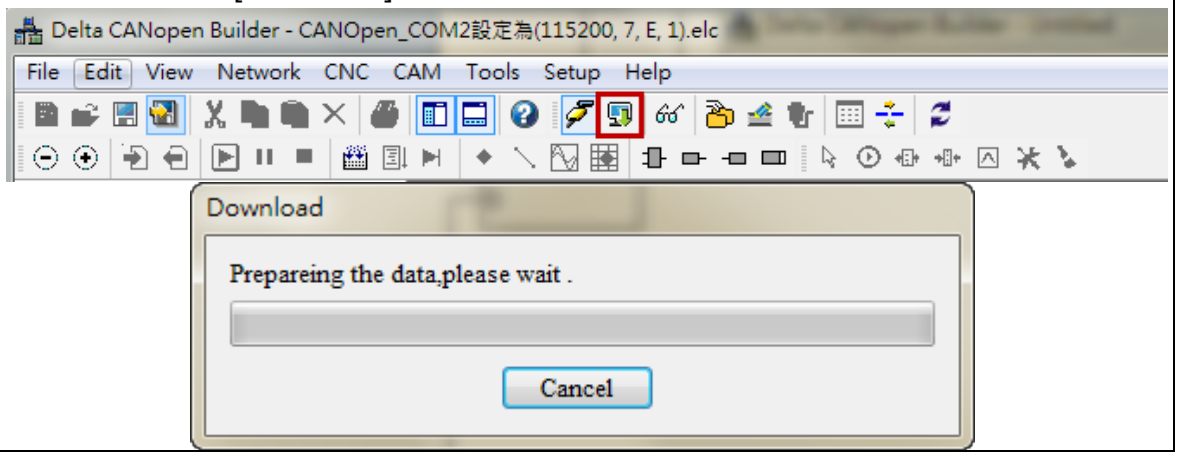




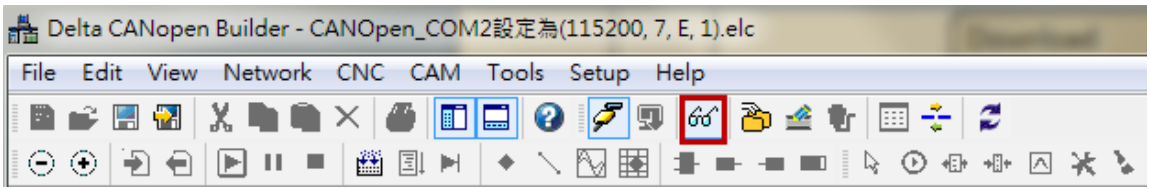
- When DVP10MC11T device is found, it means the connection is built. Click [Online], the screen will show the browsing node if the connection is built.



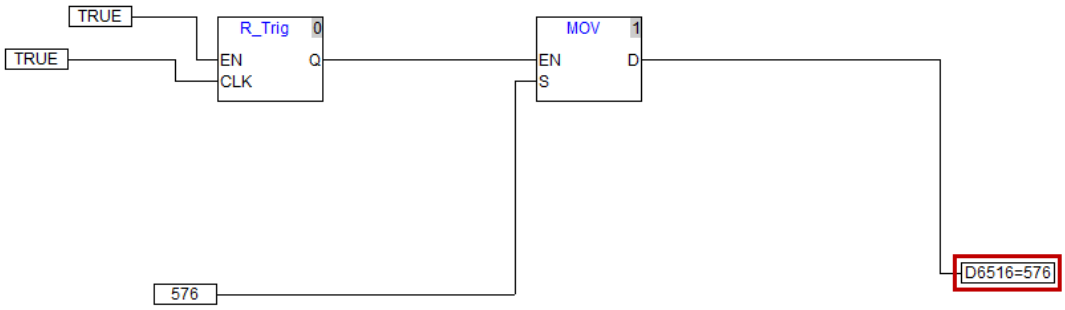
- Then, click [Download] to download the data to the scanned module.



➢ Now, users can monitor Ladder via the function of [Online Monitor].

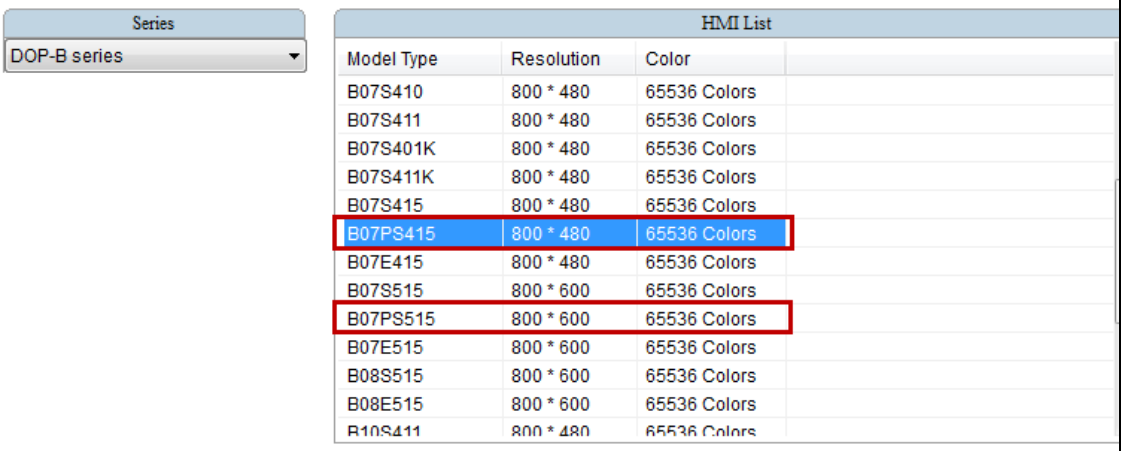


From the following figure, you can see the value of D6515 is set to 576. Since 576 (in decimal format) is transferred to binary format, the communication format becomes 115200, 7, E, 1. Users can change the value to 512 (with communication format of 9600, 7, E, 1) or use other value to change the format. Please refer to Delta_DVP-MC_O_TC_20120817.pdf (P.262) for further information of communication format setting.



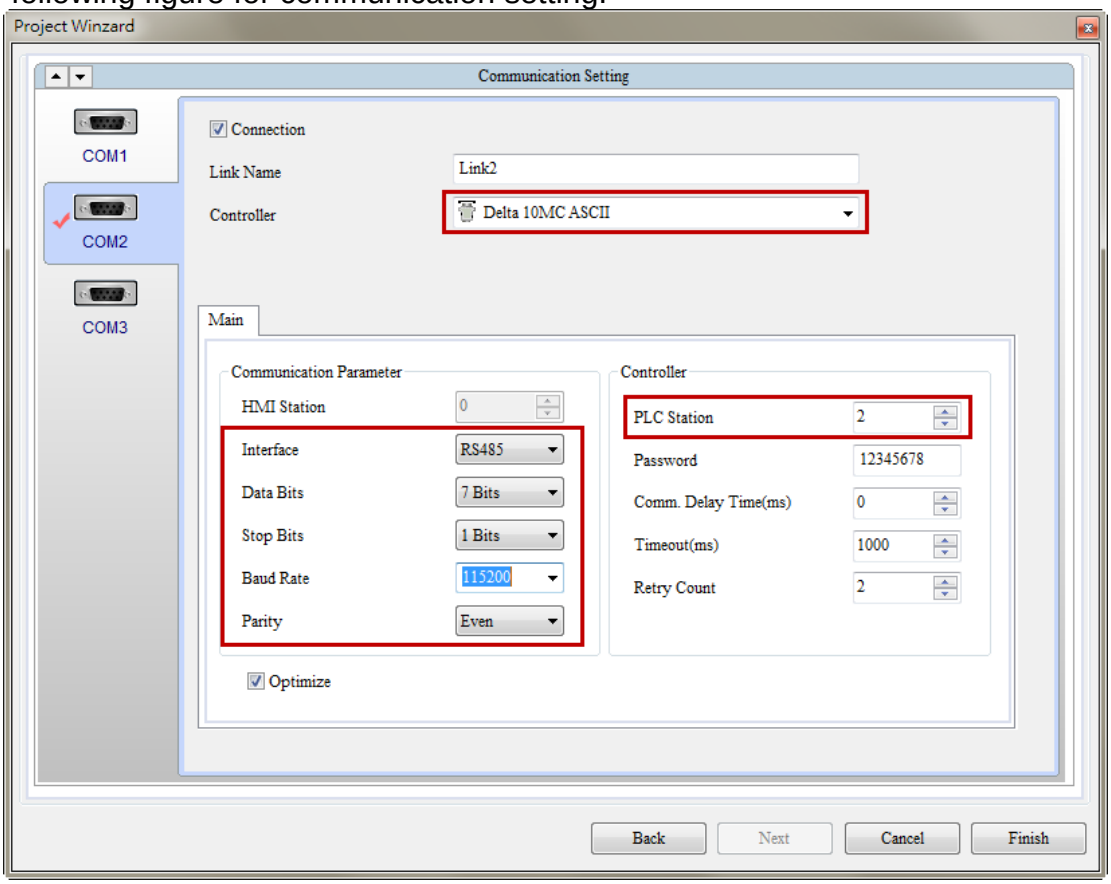
HMI Setting

- G-Code download function is available in DOP-B07PS415 and DOP-B07PS515 models only.

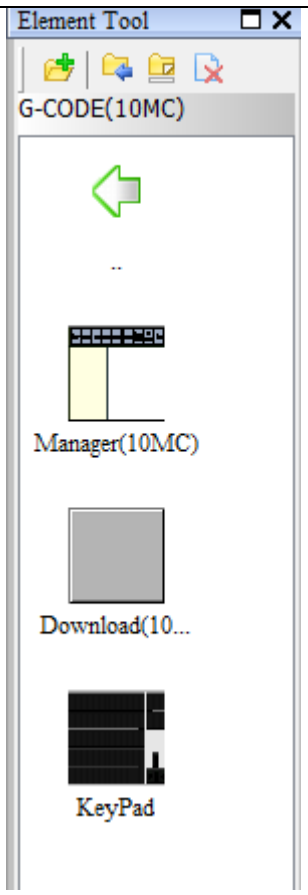


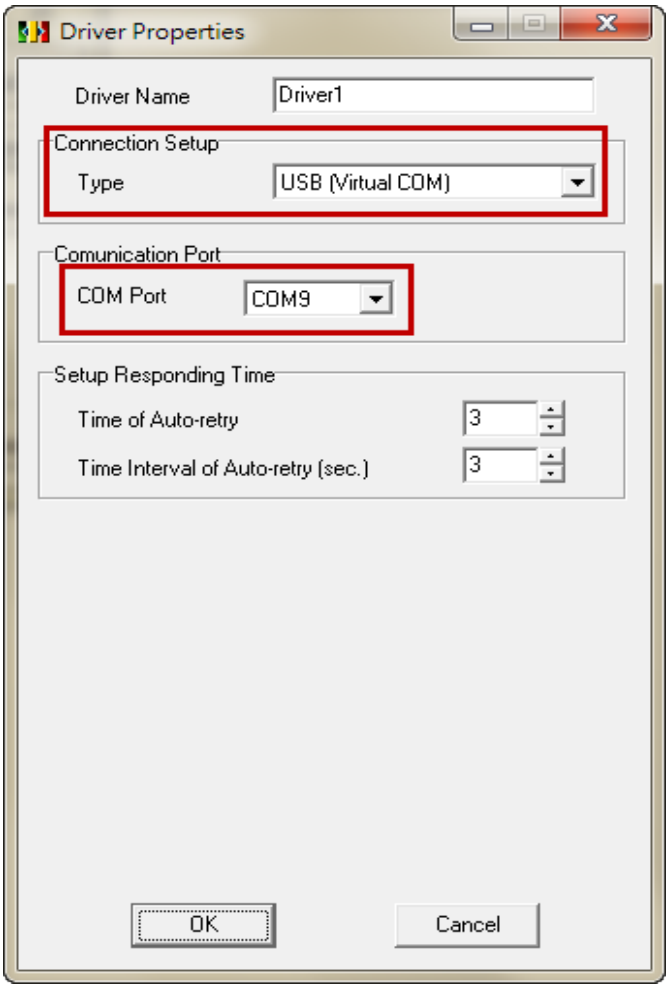
Model Type	Resolution	Color
B07S410	800 * 480	65536 Colors
B07S411	800 * 480	65536 Colors
B07S401K	800 * 480	65536 Colors
B07S411K	800 * 480	65536 Colors
B07S415	800 * 480	65536 Colors
B07PS415	800 * 480	65536 Colors
B07E415	800 * 480	65536 Colors
B07S515	800 * 600	65536 Colors
B07PS515	800 * 600	65536 Colors
B07E515	800 * 600	65536 Colors
B08S515	800 * 600	65536 Colors
B08E515	800 * 600	65536 Colors
B10S411	800 * 480	65536 Colors

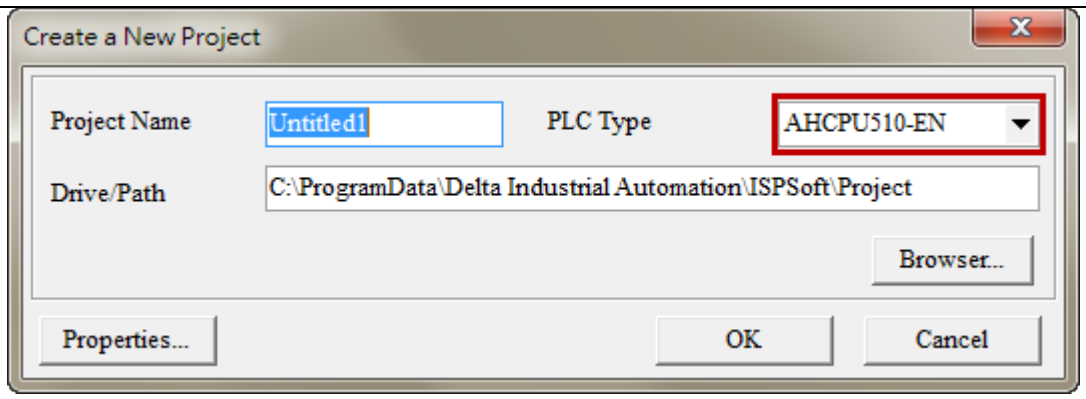
- Select the controller and communication setting.
  You have to select “Delta 10MC ASCII” as the controller. Refer to the following figure for communication setting.



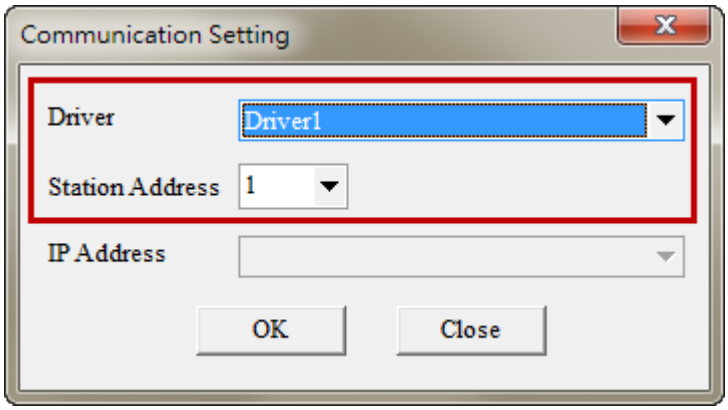
- Select Element Bank in the window of Element Tool. Go to G-CODE (10MC) file folder and select the file named Manager (10MC) and Download.


Element Tool
G-CODE(10MC)
..
Manager(10MC)
Download(10...
KeyPad

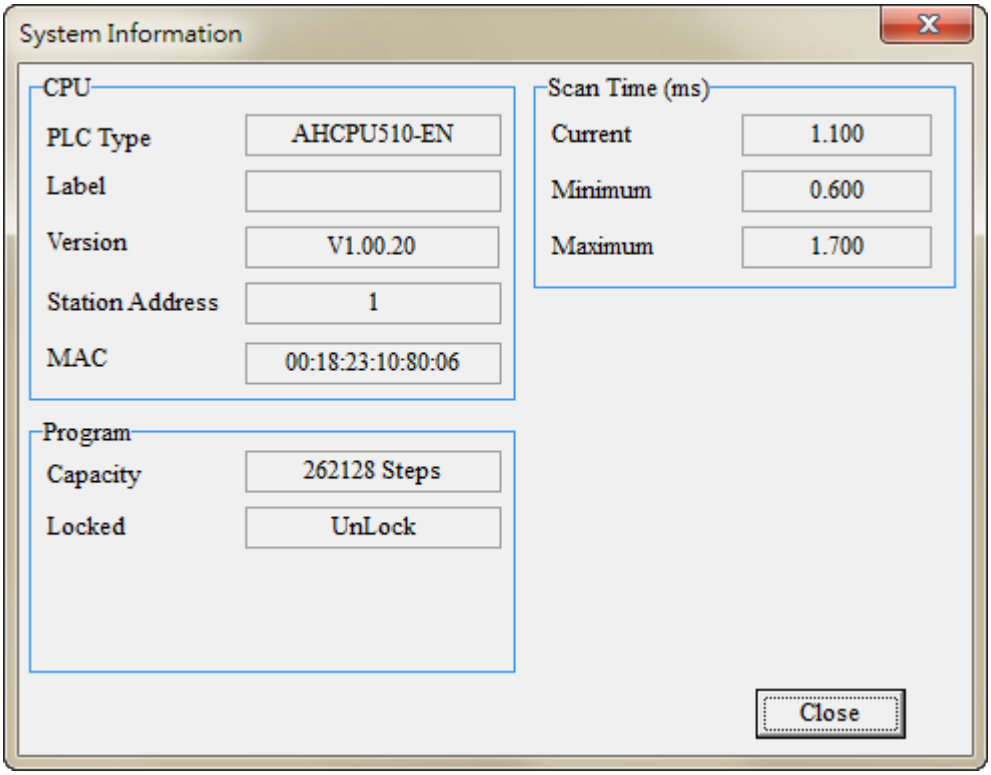
20MC G-Code Connection Example	
PLC Setting	● <u>ISPSoft</u> ✐ ISPSoft is used to set AH500. Here we use AH500 CPU510-EN as the example. ☞ <u>Setting of Mini USB Cable</u> ➢ Open ISPSoft first, then COMMGR. Add one Driver and name it as Driver1. ✓ Select USB (Virtual COM) for its Type. ✓ When your PC has the device driver, select COM 9 as COM Port. ✓ When the setting is complete, click on OK.  ➢ Please go to ISPSoft and create a new project. Select [AHCPU510-EN] for PLC type.



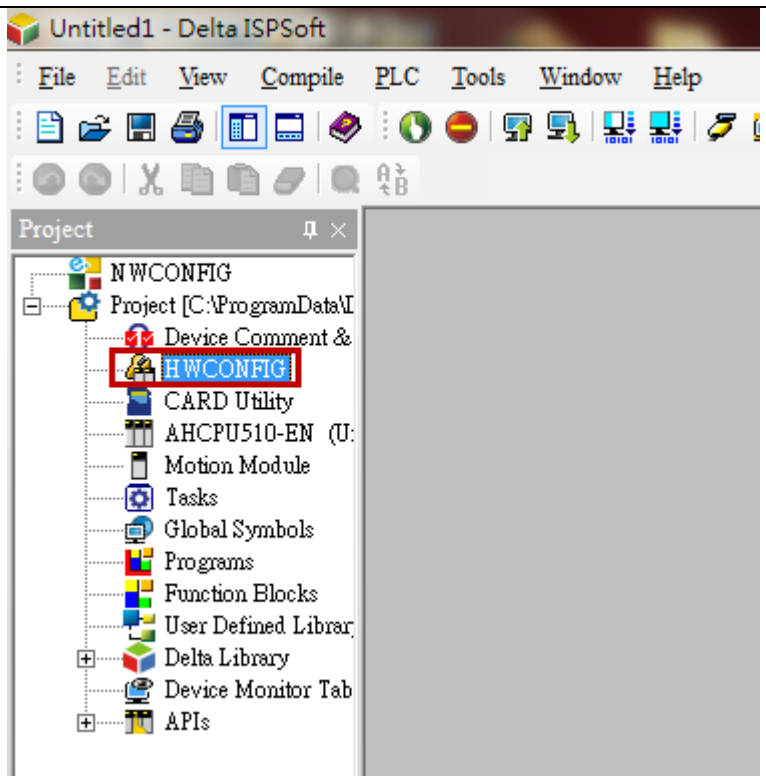
- Go to [Tool] → [Communication Setting]. Then, set Driver as [Driver 1].



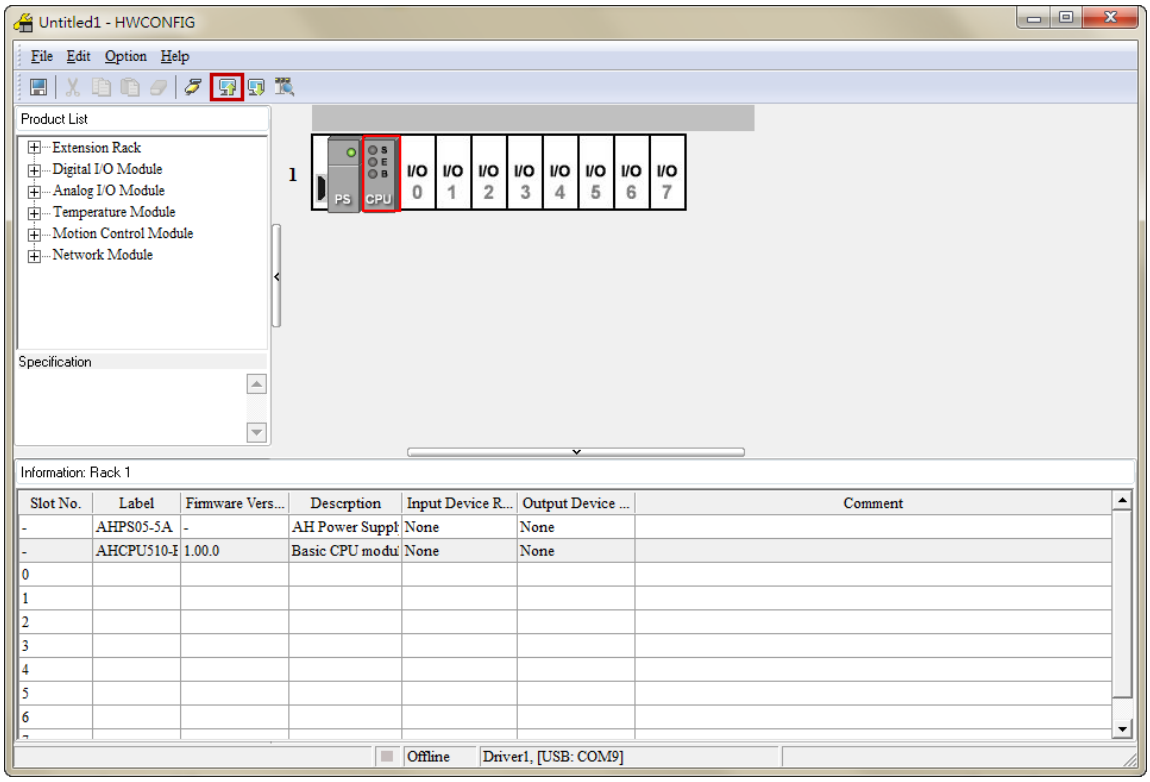
- Go to [PLC] → [System Information] and make sure the connection between PC and AH500 is built.



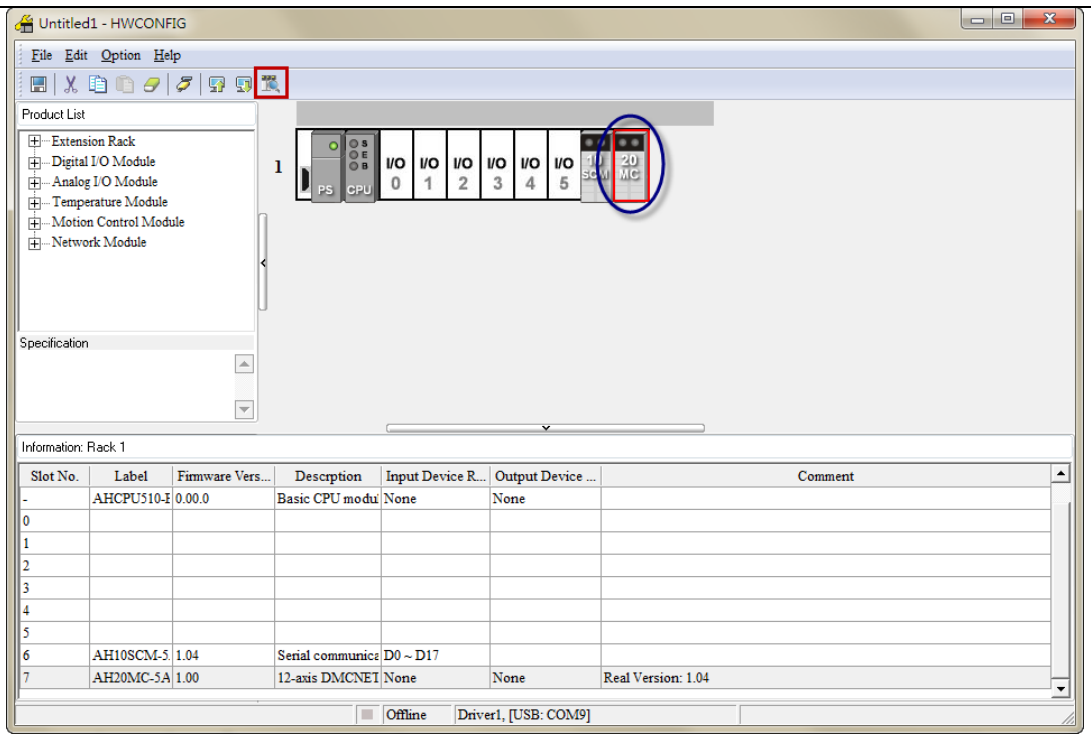
- When the connection is built, please double click on [HWCONFIG] for setting PLC baud rate or IP address.



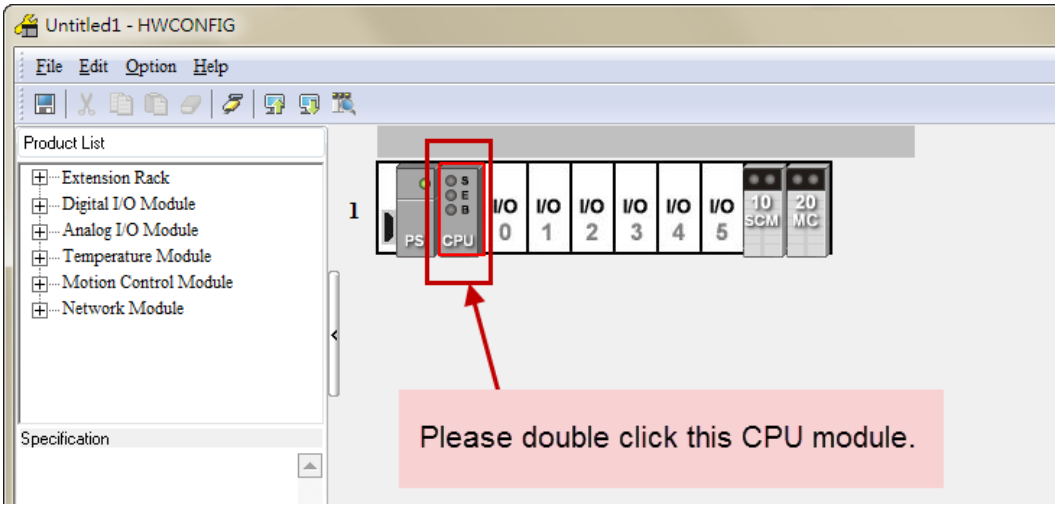
➢ Open HWCONFIG and [Upload] PLC hardware information.



➢ Then, please execute [IO scan]. It will detect 20MC module.

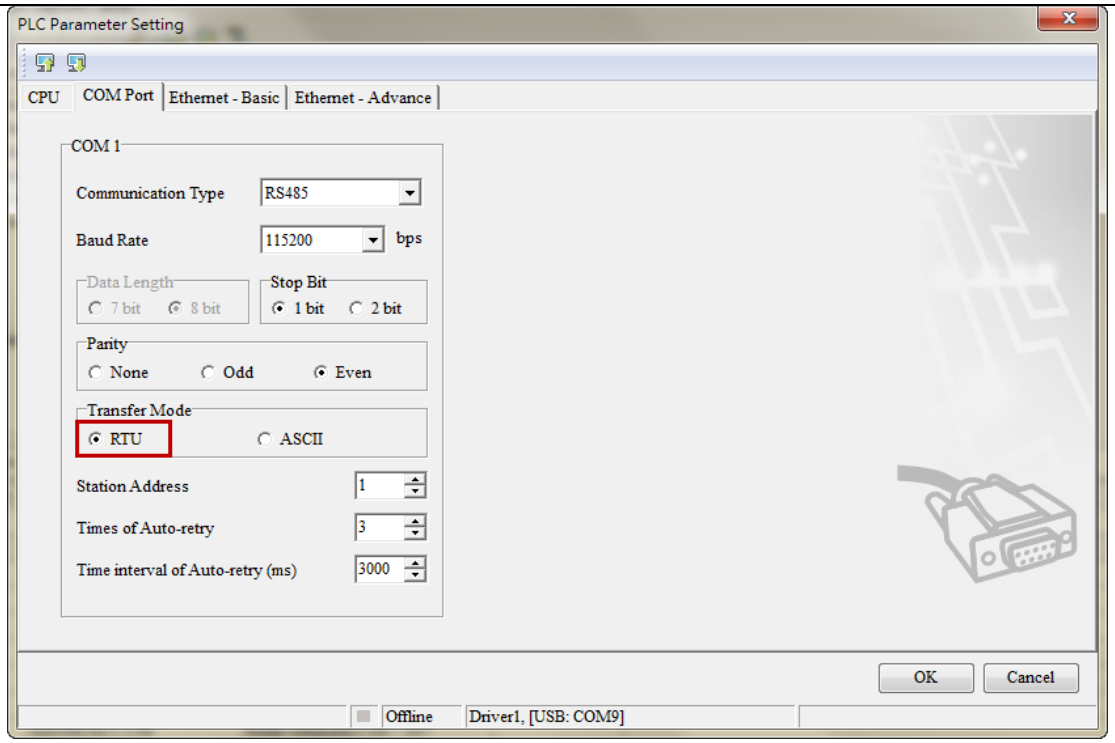


➢ Double click the CPU indicated below.



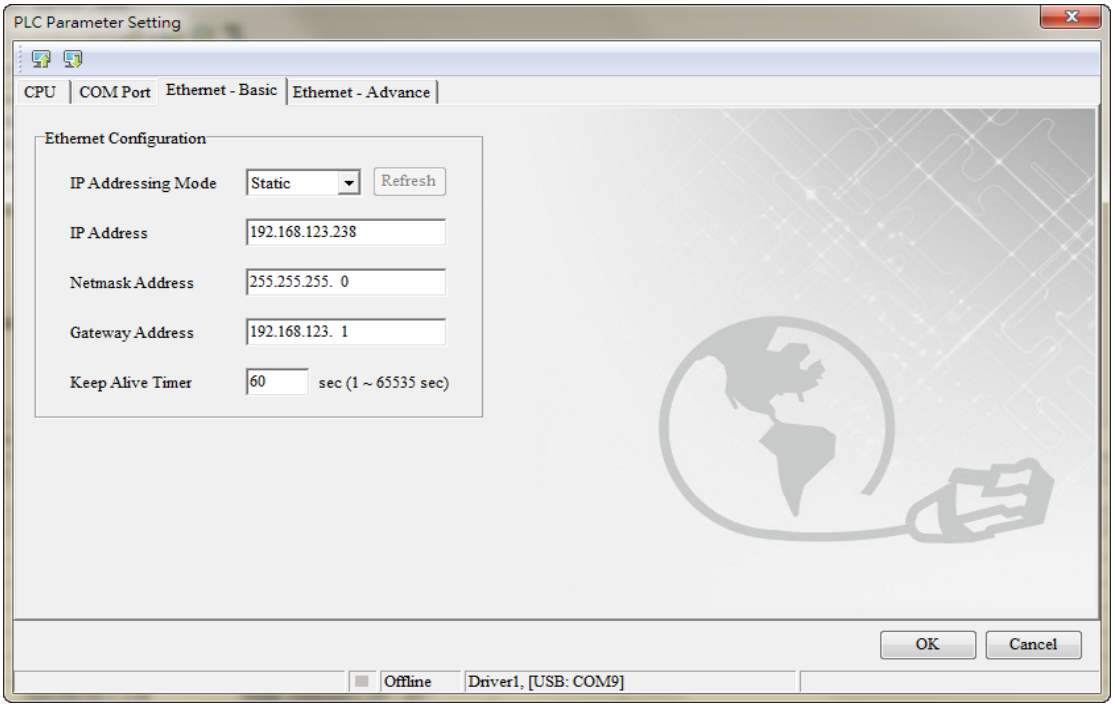
➢ Then, you can switch to COM Port to set the baud rate. **Please note that, 20MC can only apply RTU mode of communication.**

➢ In this example, the RTU communication format is set as RS485, 115200, 8, 1, E and the station number is 1.



➢ If the network IP is required, please switch to Ethernet - Basic.

✓ The default IP is 192.168.1.1.



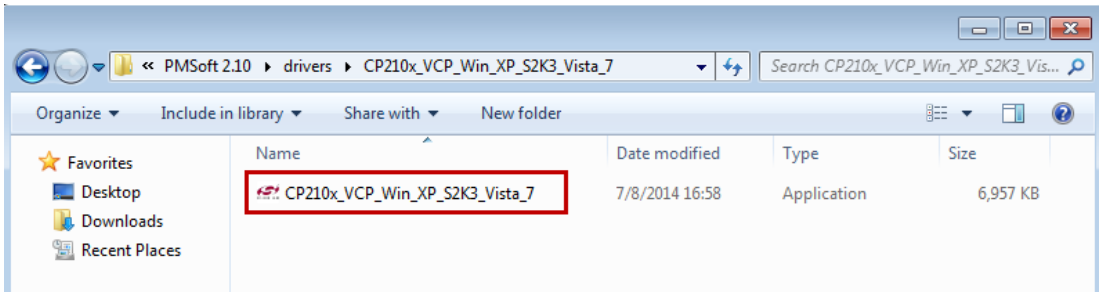
➢ When the setting is complete, please click [Download] to download the communication format that set above. Then, repower on AH500.

- <u>PMSoft</u>

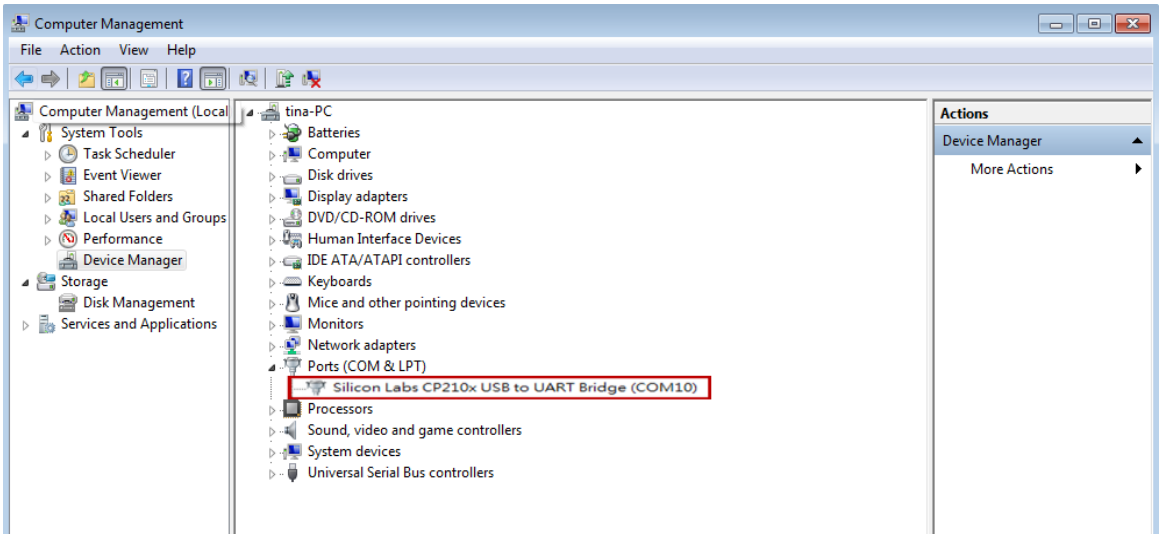
✎ PMSoft is used to set the communication format of 20MC.

✎ Before using Mini USB Cable to communicate with 20MC, please install ***CP210x_VCP_Win_XP_S2K3_Vista_7.exe*** from the following path <u>C:\Program Files (x86)\Delta Industrial Automation\PMSoft</u>

2.08\drivers\CP210x_VCP_Win_XP_S2K3_Vista_7.



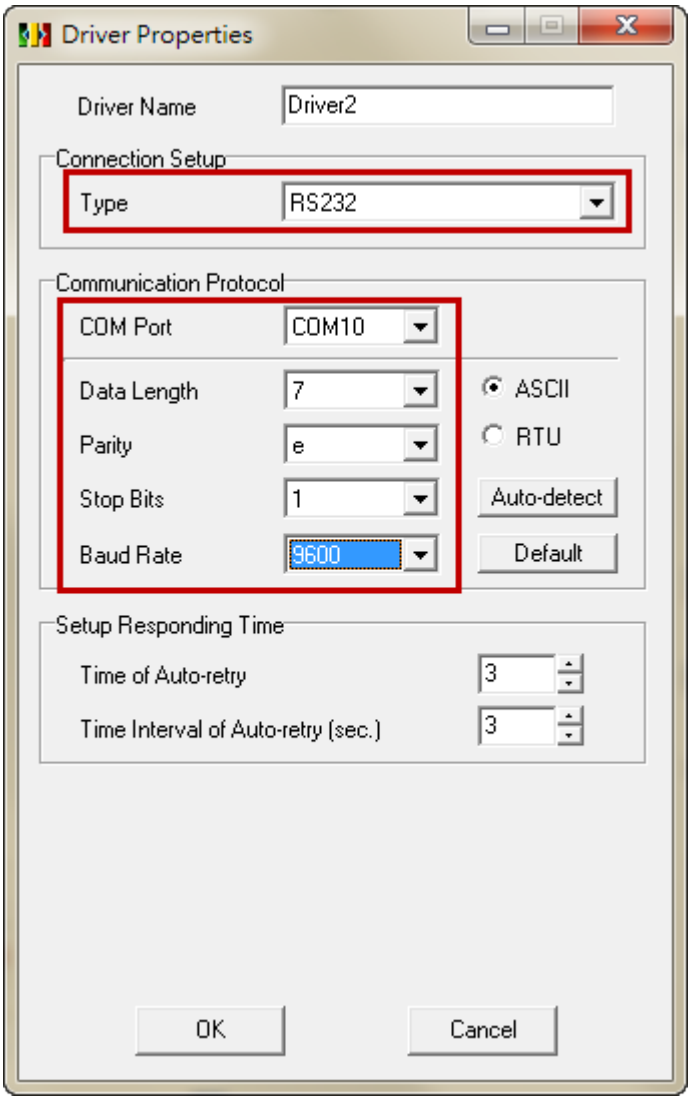
✎ After installing the driver, please go to Computer Management to make sure the connection is successfully built. If it does, the screen will show as below.



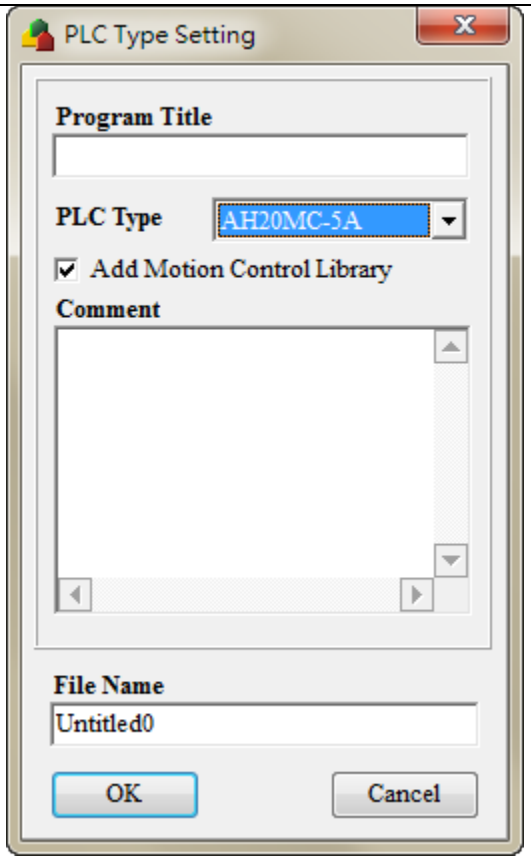
☞ Setting of 20MC Mini USB Cable

- ➢ Please open PMSoft first, then COMMGR. Add one Driver and name it as Driver2.
- ✓ Select RS232 for the Type.
- ✓ Select COM10 as COM Port ("Silicon Labs CP210x USB to UART Bridge Driver" displayed in the Computer Management).

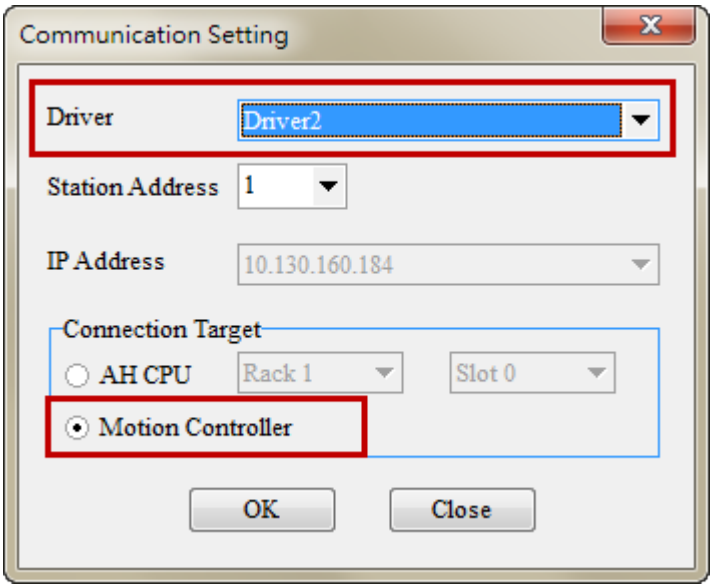
Note: Default of the baud rate is 9600, 7, E, 1 and the station number is 1, ASCII.



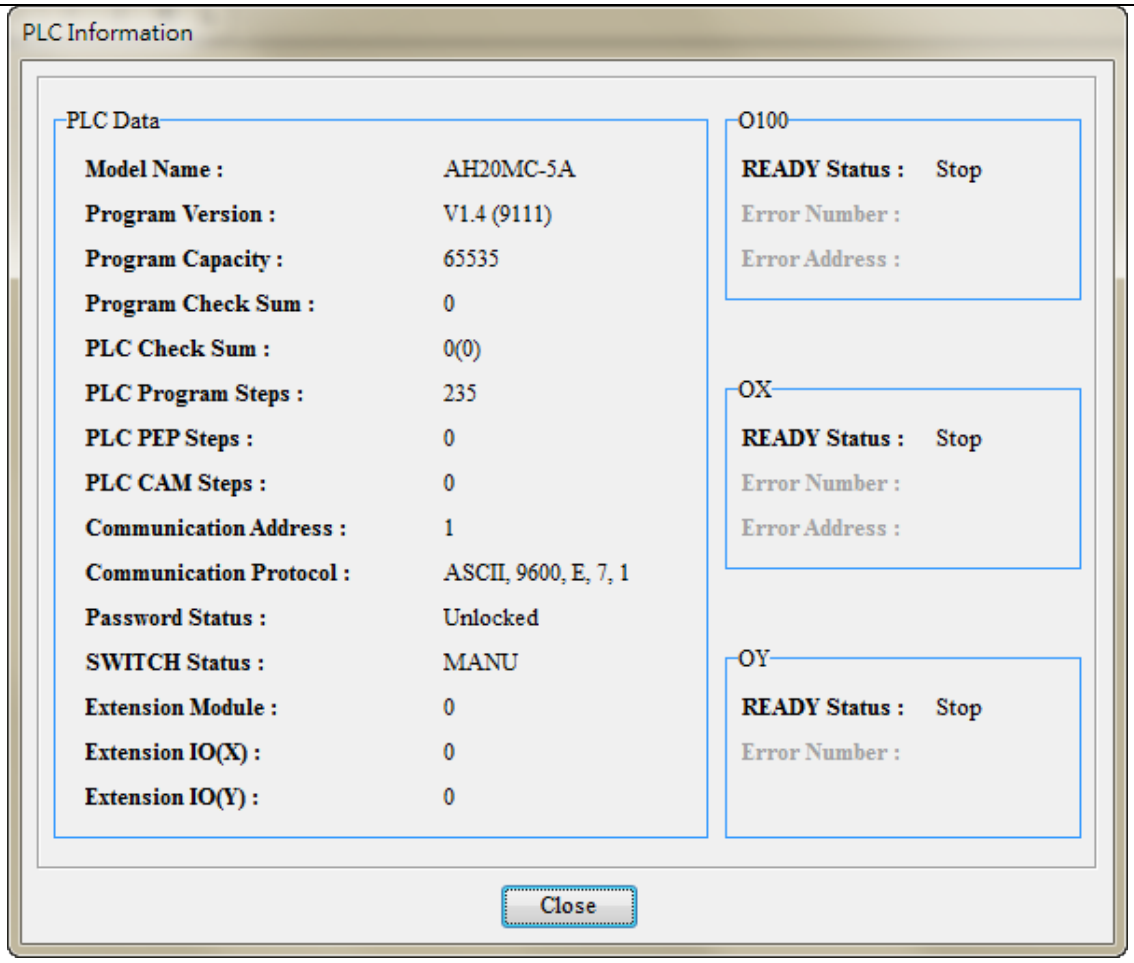
- Please return to PMSoft and create a new project. Select [AH20MC-5A] for PLC type.



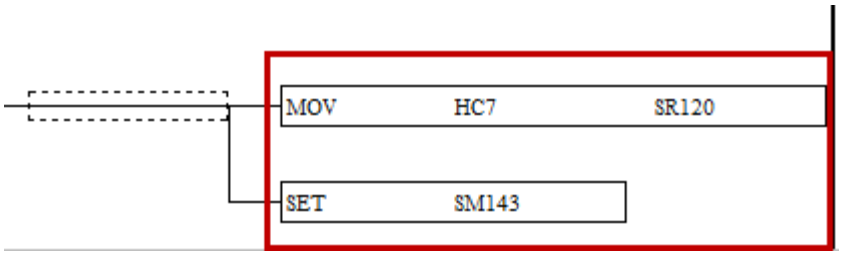
- Go to [Communication] → [Communication Setting] and set the Driver to [Driver 2].



- Go to [Communication] → [PLC Information] and make sure the connection with 20MC is successfully built.



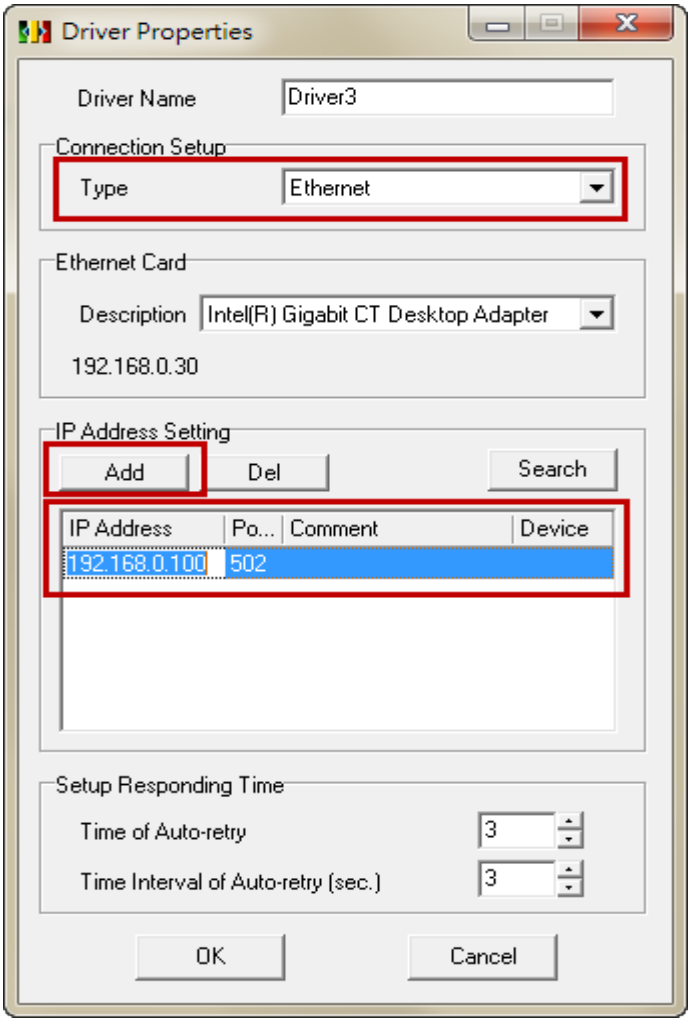
- When the connection is built, change the baud rate via the Ladder programming. Then, download the ladder program and re-power on AH500. Please refer to the related document for setting communication parameters.



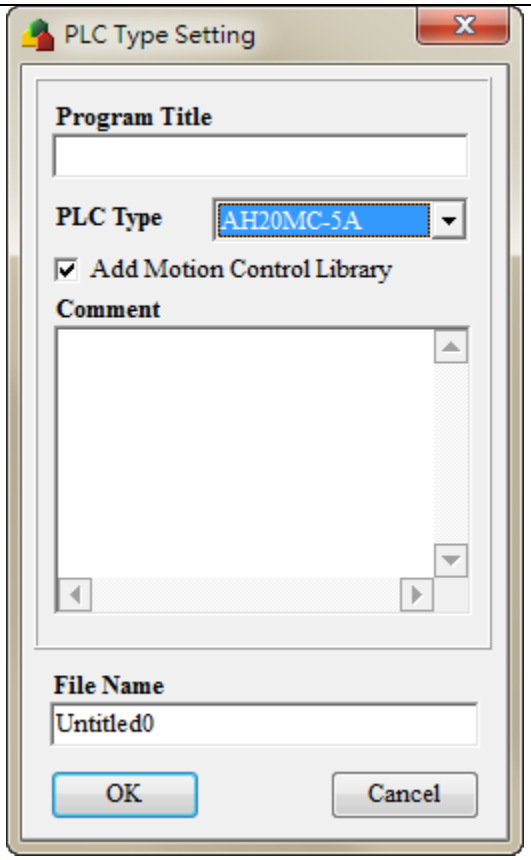
☞ <u>20MC Ethernet Setting</u>

- Please open PMSoft first, then COMMGR. Add one Driver and name it Driver3.
- ✓ Select Ethernet for the Type.
- ✓ Please click on Add to add one IP with the address of 192.168.0.100.

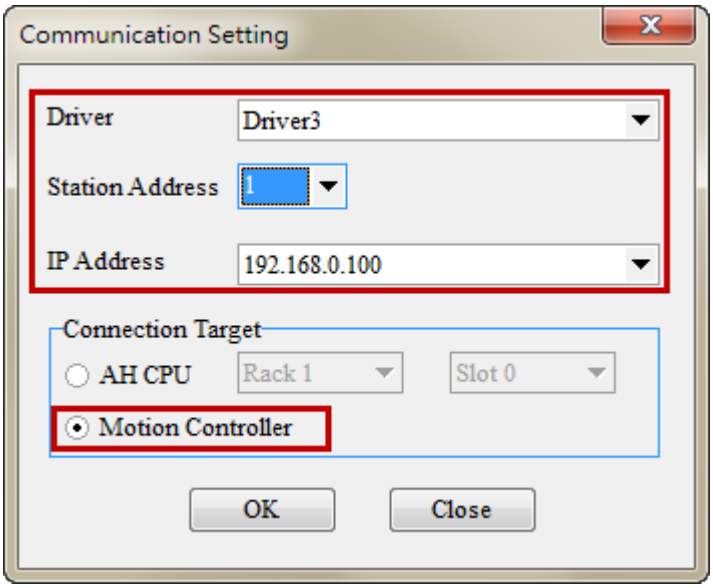
Note: The default setting of 20MC Ethernet IP is 192.168.0.100.
Note: In this example, PC is connected to 20MC. Thus, PC IP is 192.168.0.30.



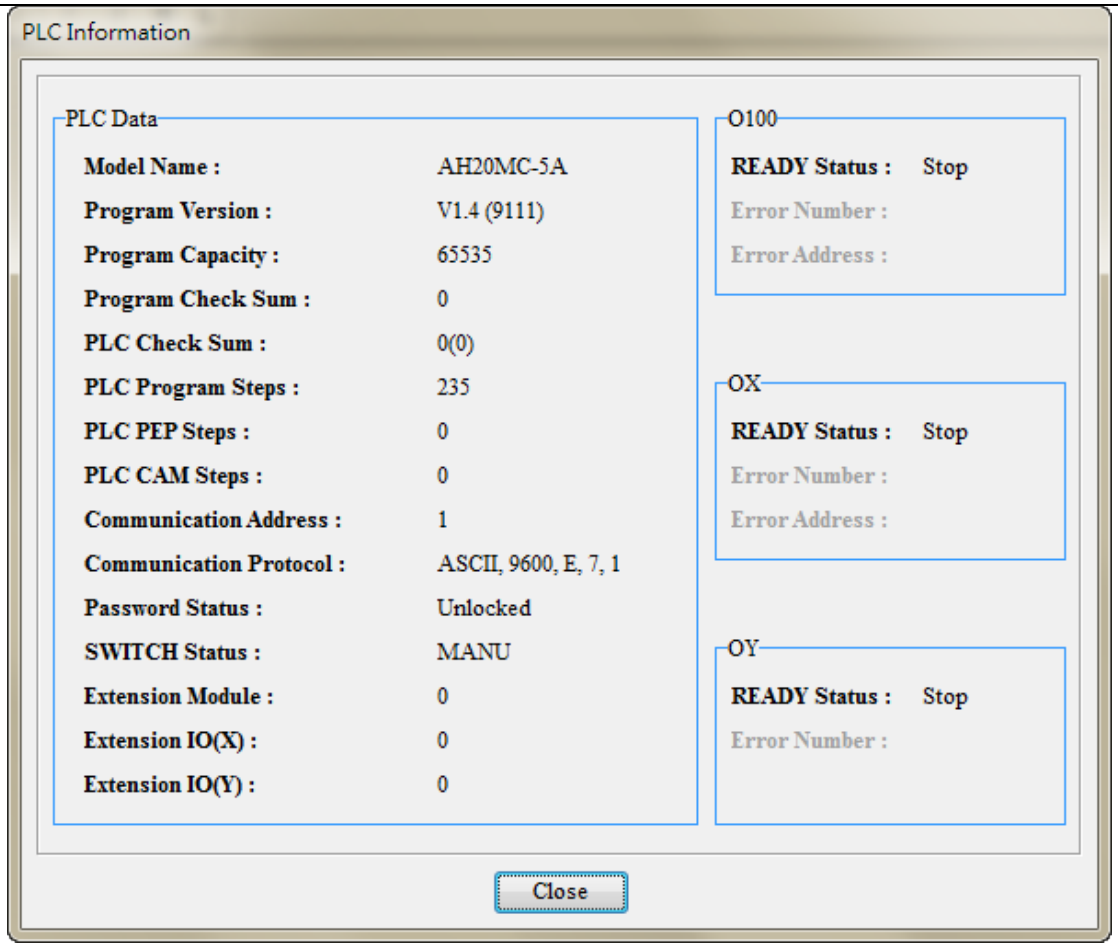
- Return to PMSoft and create a new project. Please select [AH20MC-5A] for PLC type.



- Go to [Communication] → [Communication Setting] and set Driver to [Driver 3].



- Go to [Communication] → [PLC Information] to make sure if the connection with 20MC is built.



- If you wish to change the Ethernet IP, please refer to the following document for further information.

P.504 of DELTA_IA-PLC_AH500_MCMdM_EN_20141201.pdf.

12.3 Introduction of Parameters

SR808 and SR809: Ethernet IP address

[Description]

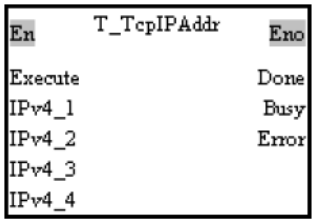
If users want to set the IP address of an AH500 series motion control module, two registers will used. The initial IP address of an AH500 series motion control module is 192.168.0.100.

SR809		SR808	
High byte	Low byte	High byte	Low byte
192	168	0	100

12.4 Communication Function of PMSoft

- Setting an Ethernet IP

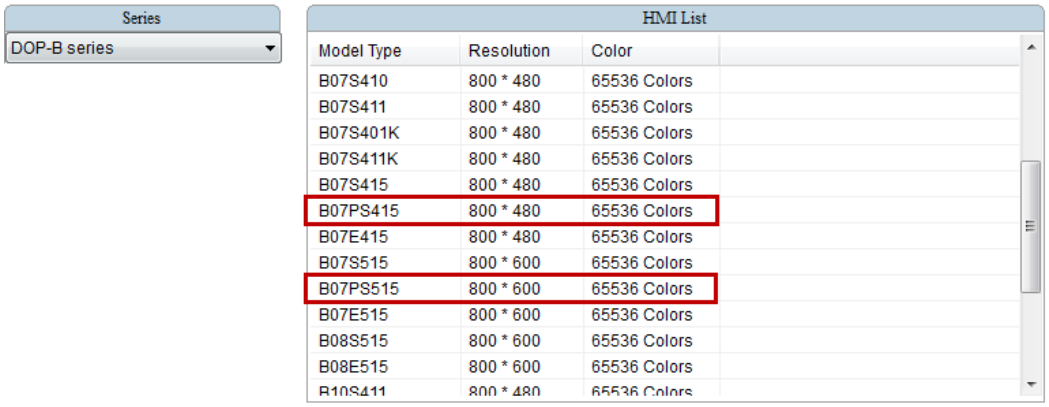
  The default Ethernet IP address of an AH500 series motion control module is 192.168.0.100. Users can change the Ethernet IP address of an AH500 series motion control module by means of SR808 and SR809. After an AH500 series motion control module is disconnected, its IP address will not be retained. Its IP address becomes 192.168.0.100 after it is supplied with power again. Alternatively, the users can set an IP address by means of a motion control function block. The motion control function block which can be used to set an IP address is shown below.



➢ Next, download the program and re-power on AH500.

HMI Setting

✎ For applying G-Code function, please select B07PS415 or B07PS515 model.



Model Type	Resolution	Color
B07S410	800 * 480	65536 Colors
B07S411	800 * 480	65536 Colors
B07S401K	800 * 480	65536 Colors
B07S411K	800 * 480	65536 Colors
B07S415	800 * 480	65536 Colors
B07PS415	800 * 480	65536 Colors
B07E415	800 * 480	65536 Colors
B07S515	800 * 600	65536 Colors
B07PS515	800 * 600	65536 Colors
B07E515	800 * 600	65536 Colors
B08S515	800 * 600	65536 Colors
B08E515	800 * 600	65536 Colors
B10S411	800 * 480	65536 Colors

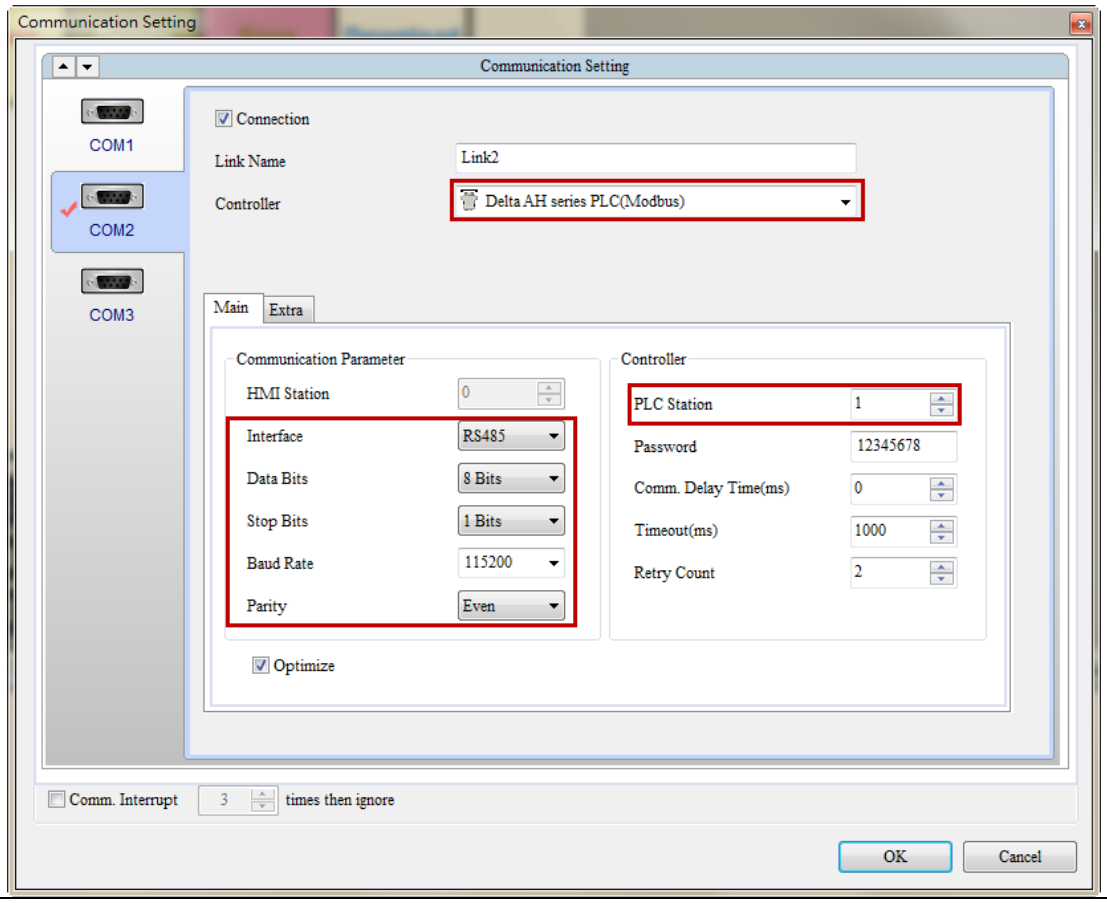
➢ Go to [Options] → [Communication Parameters] and see the setting for parameters below:

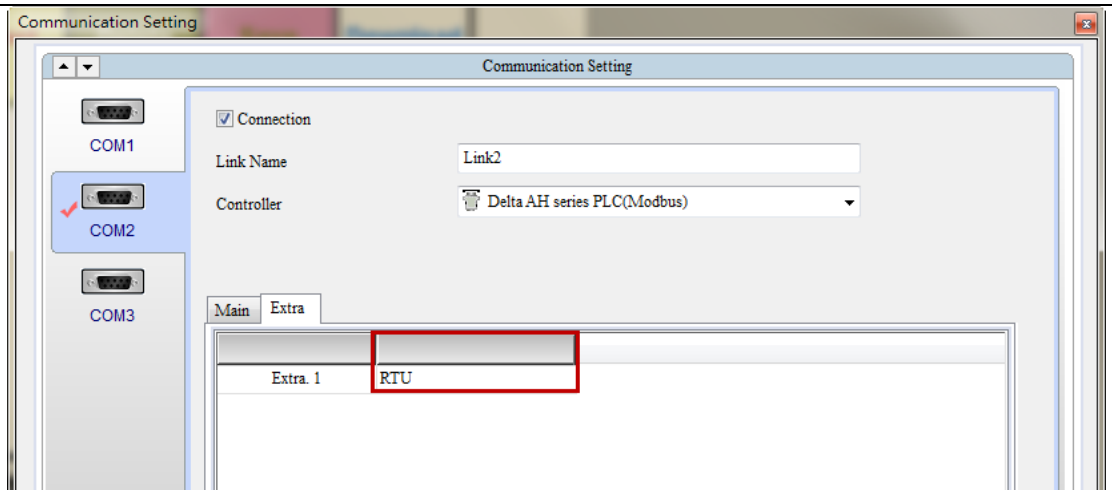
Controller: Delta AH Series PLC(Modbus)

PLC Station: 1

Communication Parameter: RS485 / 8 Bits / 1 Bits / 115200 / Even

Communication Format: Go to [Extra] tab and select RTU.





- When using COM from AH500 CPU510-EN or Ethernet for communication, please set the Transfer mode of 20 MC file management element and download button element to [ByPass]. BID is the Rack No. and SID is the Slot No. The physical Slot No. is 0, which means it should be 1 in the software setting.

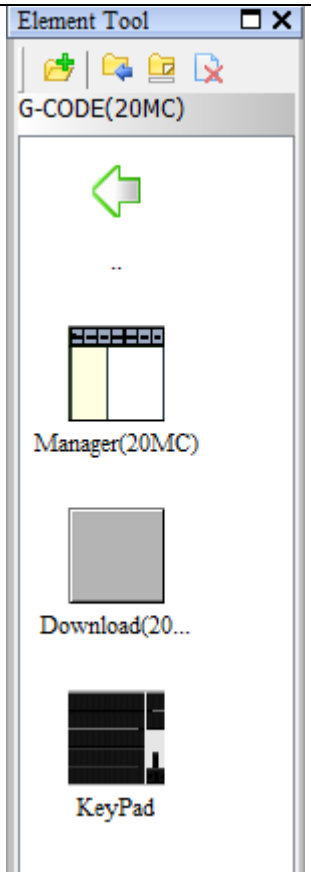
Station Number	1
COM Port	COM2
Transfer mode	ByPass
BID	1
SID	1

- If you use 20MC Ethernet communication, please set the Transfer mode to [Direct Mode].

Note: If you choose Ethernet, please change your PLC model to B10PE515.

Station Number	1
COM Port	COM2
Transfer mode	Direct Mode

- Then, select Element Bank in Element Tool and go to G-CODE (20MC) file folder to create the file management element and file download buttons. Please compile and download the screen to the HMI.



NOTE:

✓ Regardless of the transfer mode you chose, ByPass or Direct Mode, make sure the Micro SD card is inserted when downloading the G-Code file. Otherwise, CRC check error message will appear and shows download failure.

20PM G-Code Connection Example

PLC Setting

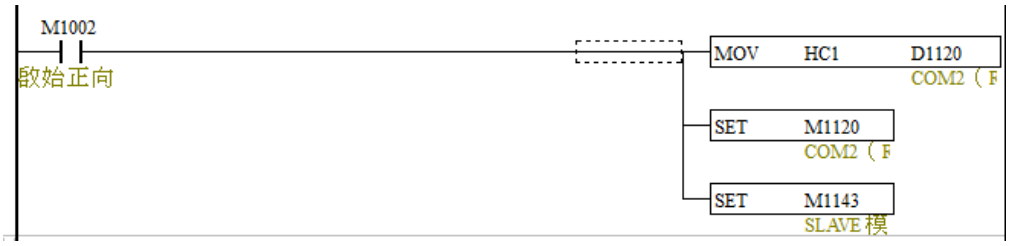
- 20PM

1 We use RS485 (PLC COM2, HMI COM2) as the communication in this example.

2 20 PM G-Code download functions can only be used in RTU communication mode. Users have to set 20PM communication mode first.

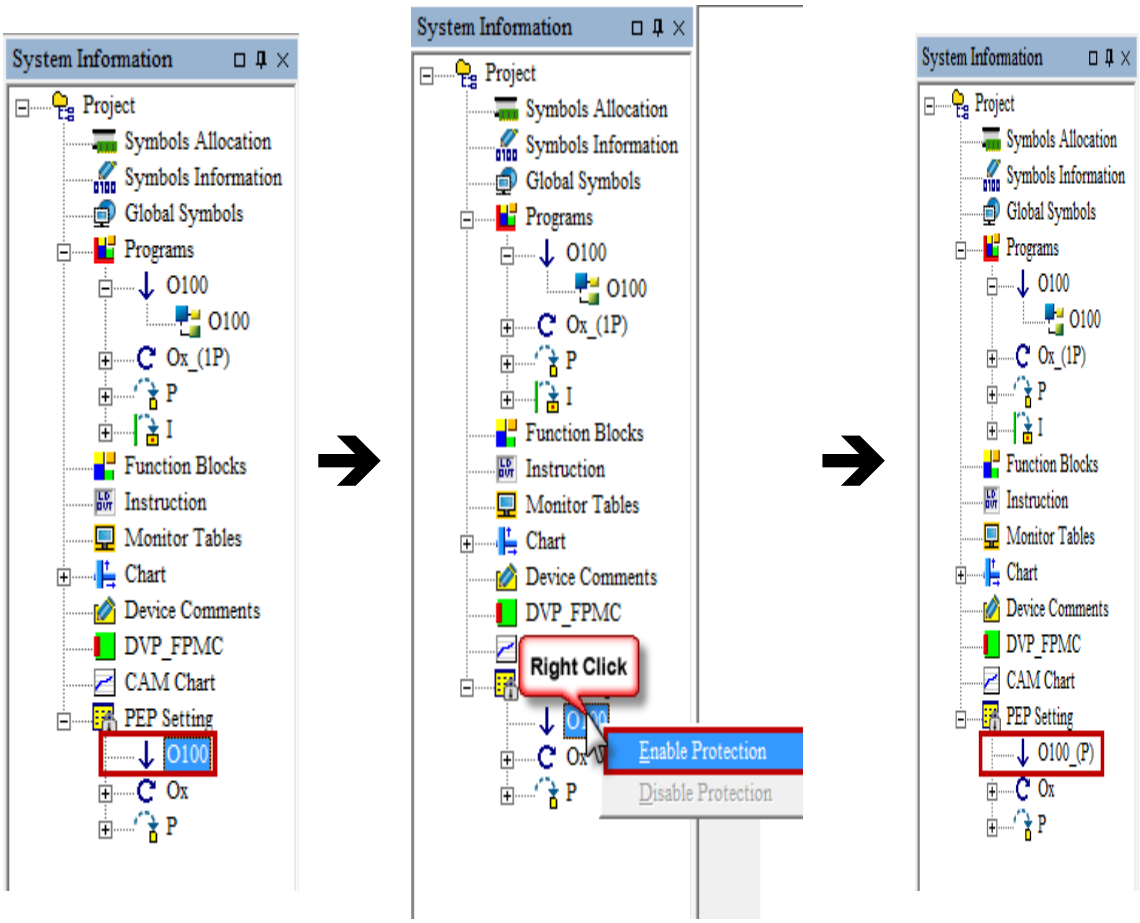
2.1 Start up PMSoft.

2.2 Enter the following command to set 20PM COM2 to (Modbus RTU, 115200, 8, N, 1).

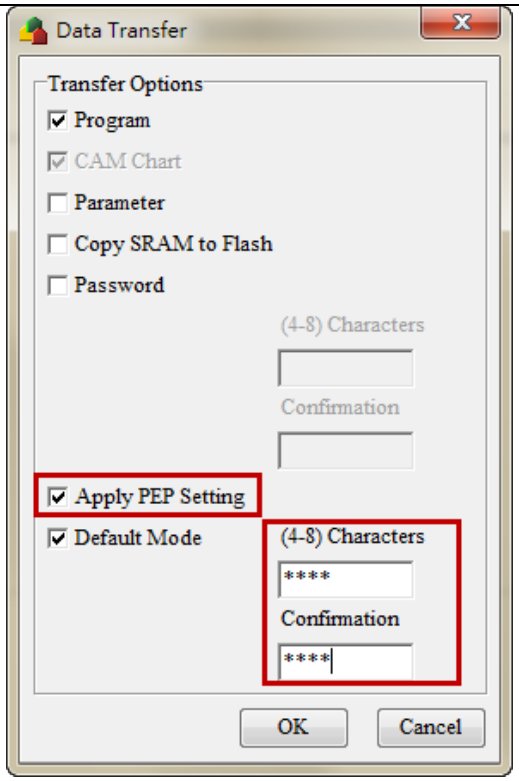


Note: In RTU mode, data length in communication parameter has to be 8, not 7. There is no need to set parity check and stop bit.

2.3 Before downloading the program, O100 program has to be set to PEP protection so that it will not be replaced by G-Code.



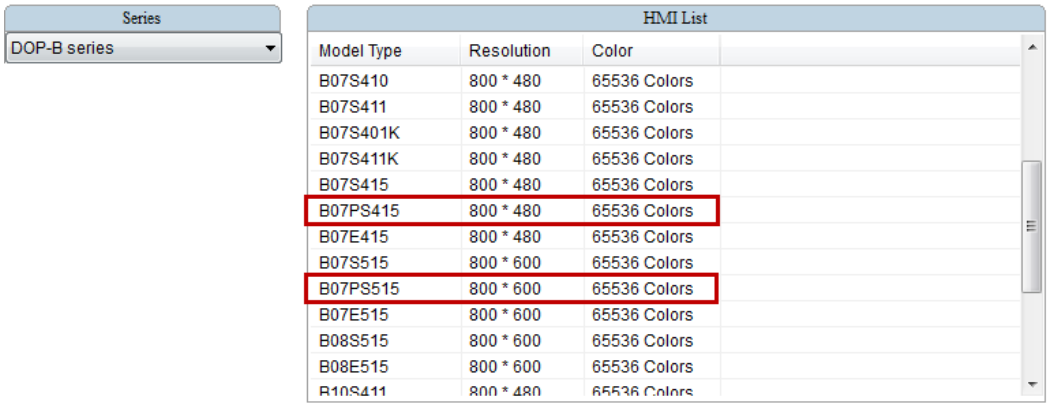
2.4 Then, check [Apply PEP Setting] and enter the password (4 ~ 8 characters).



2.5 Re-power on 20PM.

HMI Setting

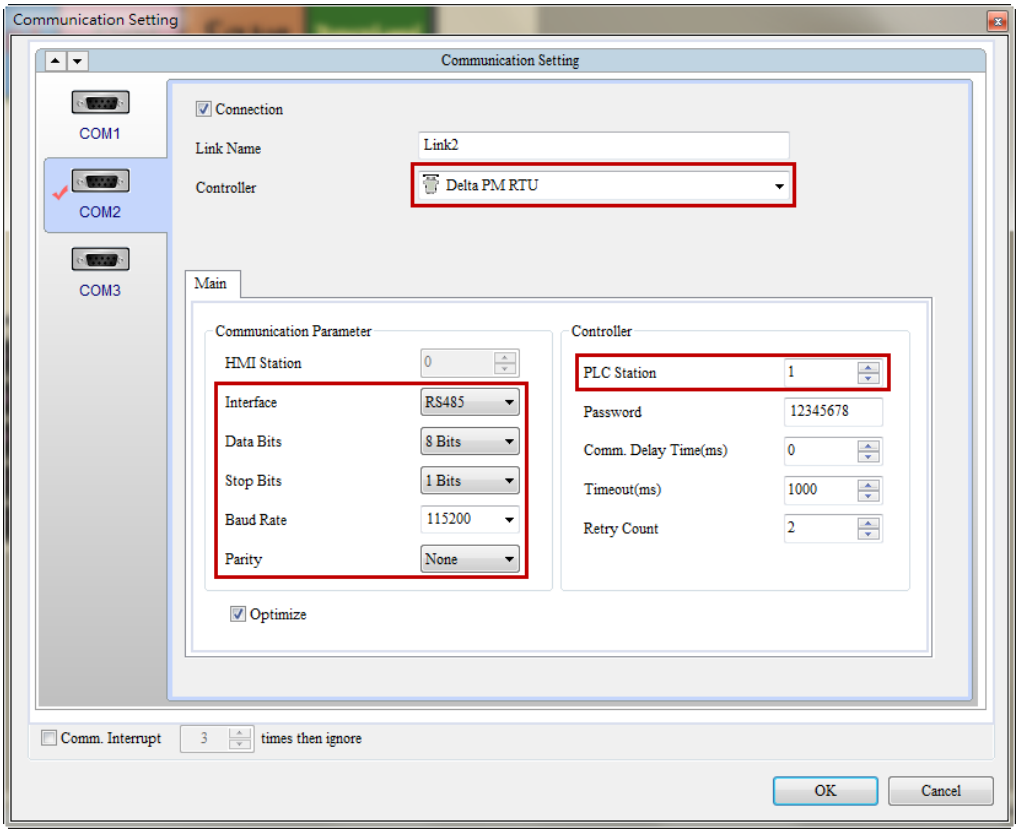
- G-Code download function is only supported by DOP-B07PS415 and DOP-B07PS515 models.



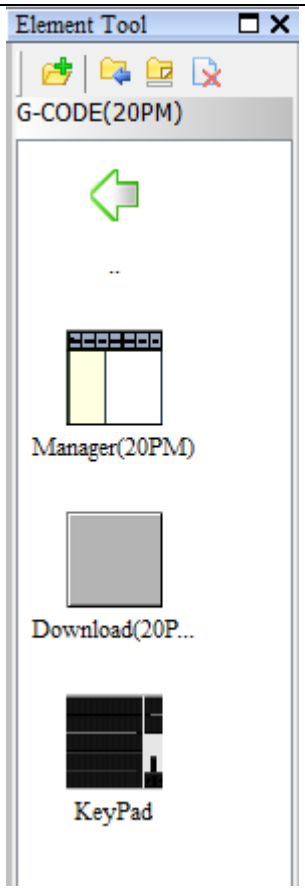
Model Type	Resolution	Color
B07S410	800 * 480	65536 Colors
B07S411	800 * 480	65536 Colors
B07S401K	800 * 480	65536 Colors
B07S411K	800 * 480	65536 Colors
B07S415	800 * 480	65536 Colors
B07PS415	800 * 480	65536 Colors
B07E415	800 * 480	65536 Colors
B07S515	800 * 600	65536 Colors
B07PS515	800 * 600	65536 Colors
B07E515	800 * 600	65536 Colors
B08S515	800 * 600	65536 Colors
B08E515	800 * 600	65536 Colors
B10S411	800 * 480	65536 Colors

- Select the controller and communication setting.

20PM: Select [Delta PM RTU] for Controller and see the following figure for setting the communication format.



- Select Element Bank in Element Tool and go to G-CODE (20PM) file folder to create file management element and file download buttons.


Element Tool
G-CODE(20PM)
..
Manager(20PM)
Download(20P...
KeyPad

28-1 G-CODE (10MC)

28-1-1 G-CODE (10MC) File Management

The editing function provided by this element includes Copy, Paste, Cut, Select, Delete and Save. Users also can download G-Code with this function, such as pause, stop, download and Step mode. G-Code (10MC) file management element can display the total line number of the file. It is allows to download G-Code by pressing the button. Start bit and pause bit are also available.

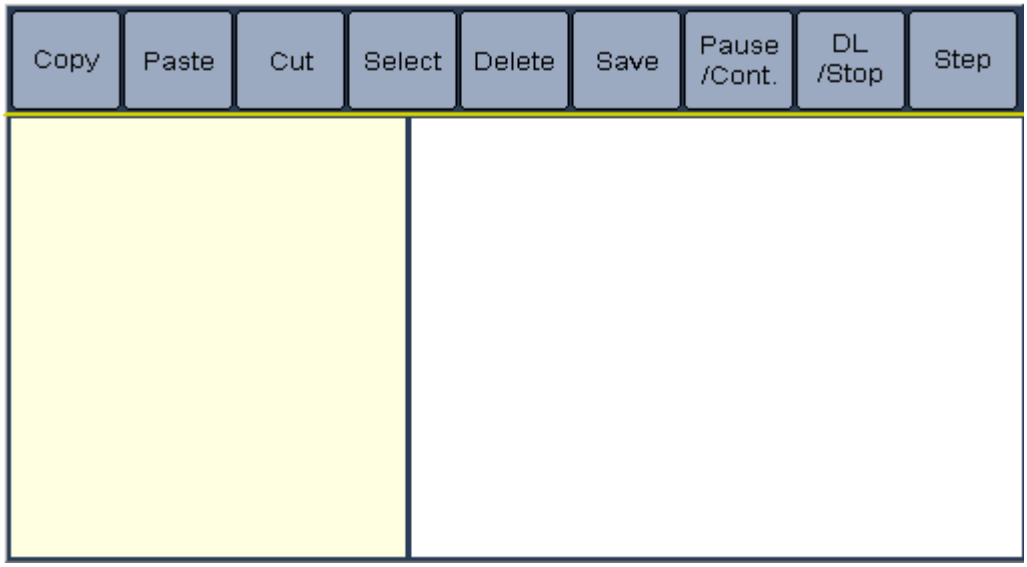
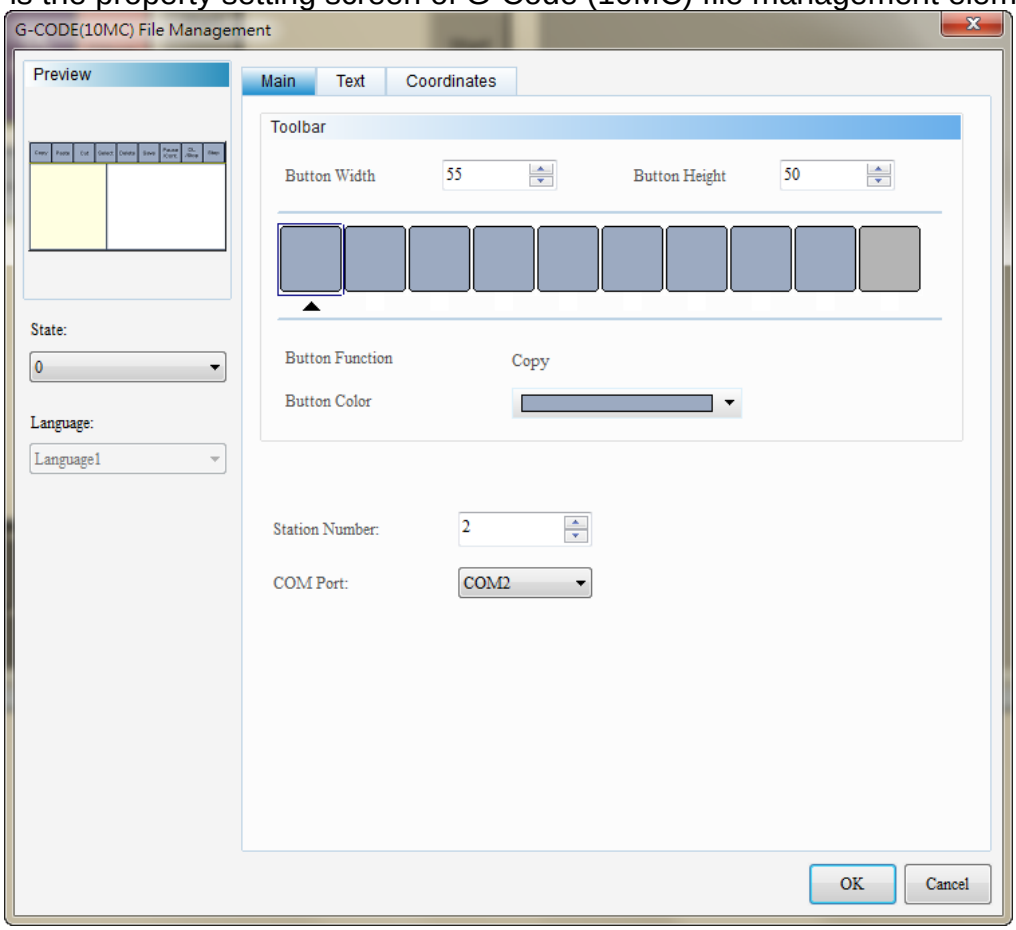


Figure 28-1-3 G-CODE (10MC) File Managment Element

NOTE:

1. If you download 10MC file in File mode, it can only transmit the syntax starting with N or G. Other than that, other syntax will be skipped by the HMI.
2. If you download 10MC file in Step mode, only the G-Code content starting with N will be transmitted. Thus, it is not suggested to transmit G-Code file that is not starting with N or G. Or transmission error might occur.

Following is the property setting screen of G-Code (10MC) file management element.



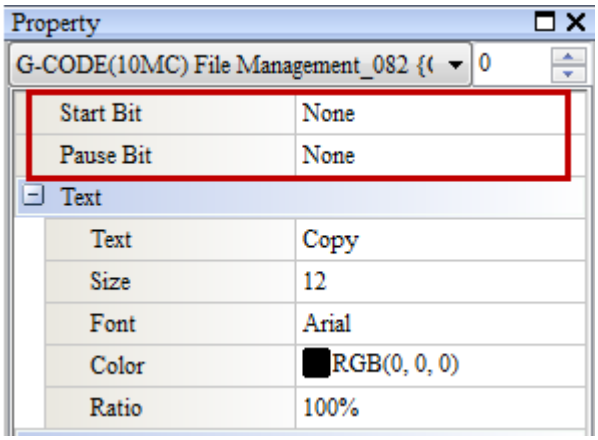


Figure 28-1-4 Property of G-Code (10MC) File Managment Element

G-Code(10MC) File Management	
Function Page	**Content Description**
Main	It sets the button height, button width, button color, station number and COM port.
Text	It sets the displayed text/font/size/color/format/scale/alignment.
Coordinates	It sets the X-Y coordinate, width and height of the element.
Property Window of G-Code(10MC) File Management	
Start bit	It sets the start bit for G-Code file download.
Pause bit	It sets the pause bit for G-Code file download.

Table 28-1-2 Functional page of G-Code (10MC) file management

◆ Main

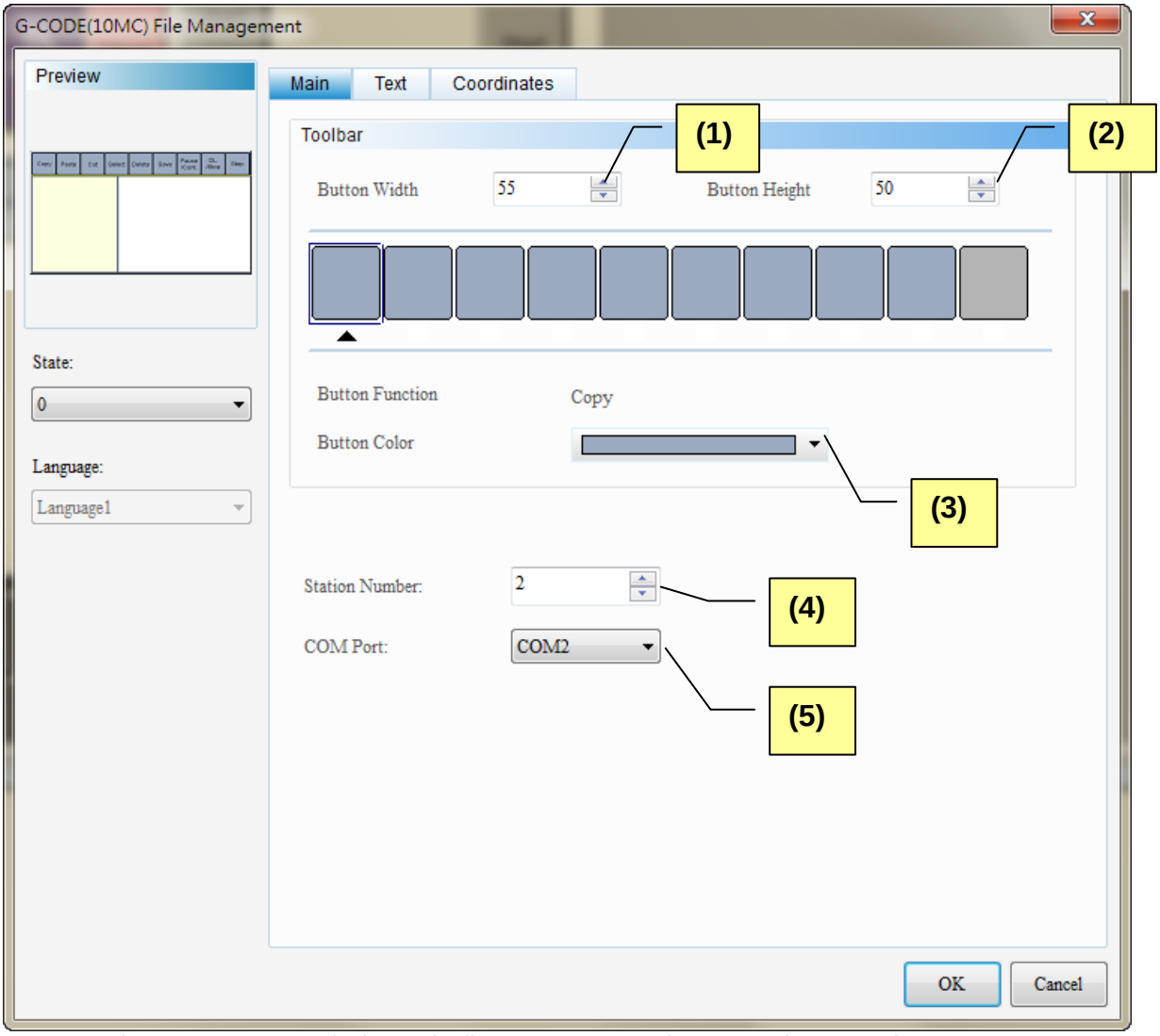
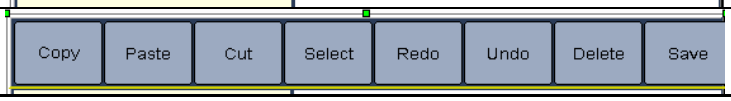
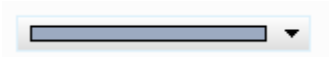
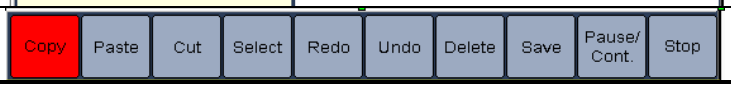
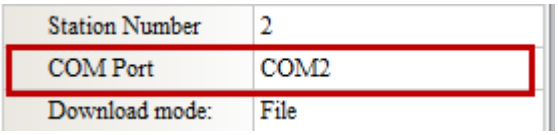
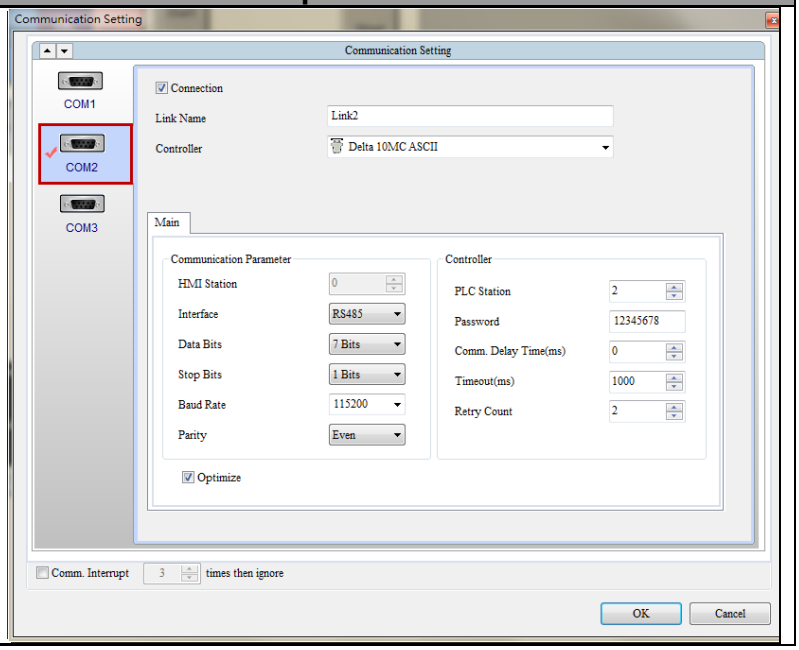


Figure 28-1-5 G-Code (10MC) File Management Element Main Properties Page

No.	Property	Description
(1)	Button Width	➢ Setup the button width in toolbar ➢ The default value is 55. Width is 55: Width is 70: 
(2)	Button Height	➢ Setup the button height in toolbar ➢ The default value is 50. Height is 50: Height is 70:
(3)	Button Color	➢ Setup the button color in toolbar ➢ The default color is  。 ➢ Each button color can be set individually. Button color Button color 
(4)	Station Number	➢ Set the controller station number, which ranges from 1 to 255.
(5)	COM Port	➢ The COM port is set to COM1, COM2, and COM3. ➢ The set COM port has to be identical to the one set by communication parameter. COM Port setting of G-Code file download element: 

No.	Property	Description	
		Set communication parameter	

- Property Window

No.	Property	Description
(1)	Start Bit	➢ It sets the Bit address of Start bit. ➢ This bit is valid only when the file download mode is File. It is used to enable G-Code file download. ➢ It provides controller and internal memory address. ➢ This bit and the bit in file download button should be set individually. When the start bit in file management element is $0.0 and the start bit in file download button is $0.0, users need to individually create the address for these two bits to control the activation of G-Code download.
(2)	Pause Bit	➢ It sets the Bit address of Pause bit. ➢ This bit is valid only when the file download mode is File. It is used to stop G-Code file download. ➢ It provides controller and internal memory address. ➢ This bit and the bit in file download button should be set individually. When the pause bit in the file management element is $1.0 and the pause bit in file download button is $3.0, users need to individually create the address for these two bits to deactivate G-Code download.

◆ Text

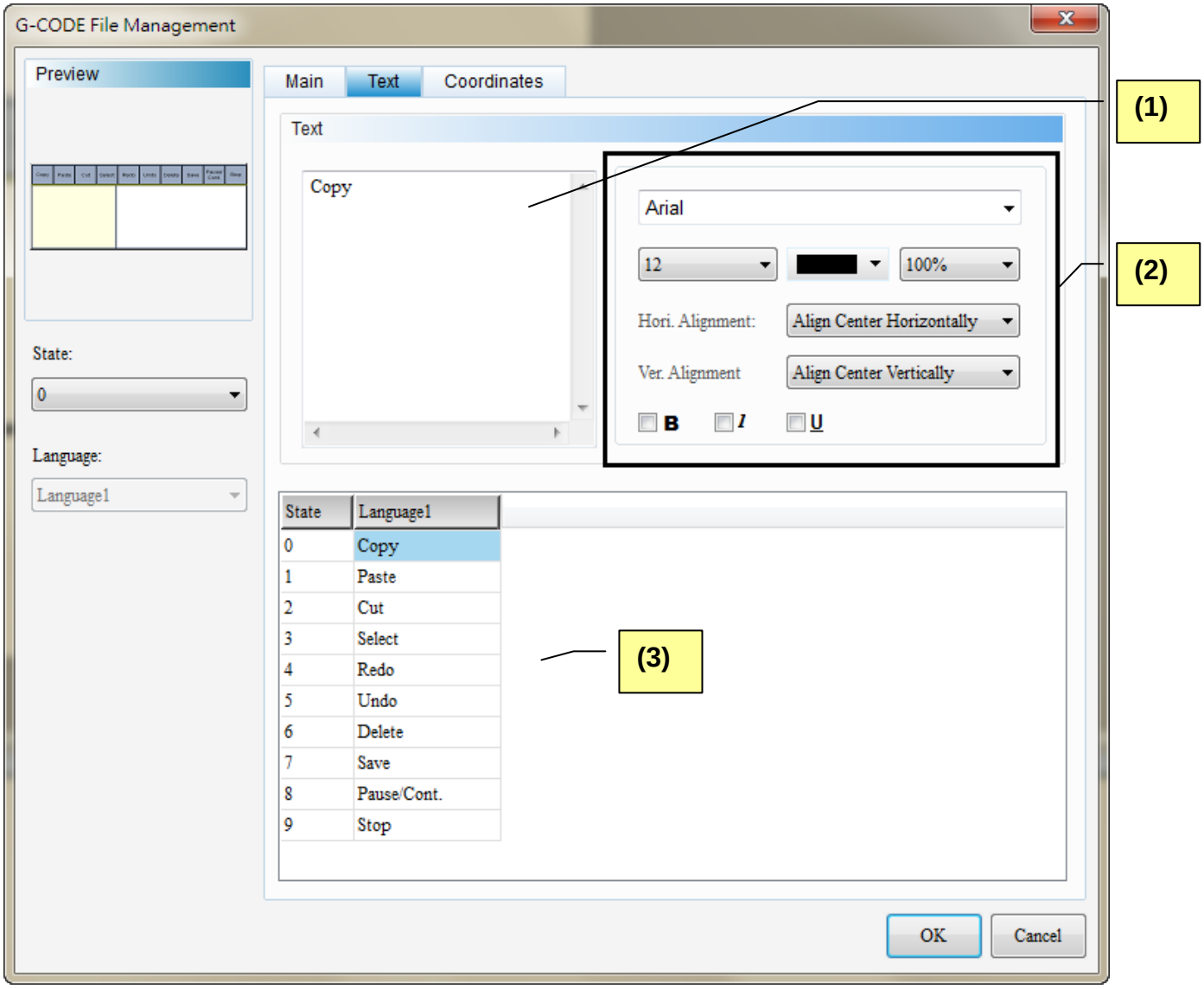
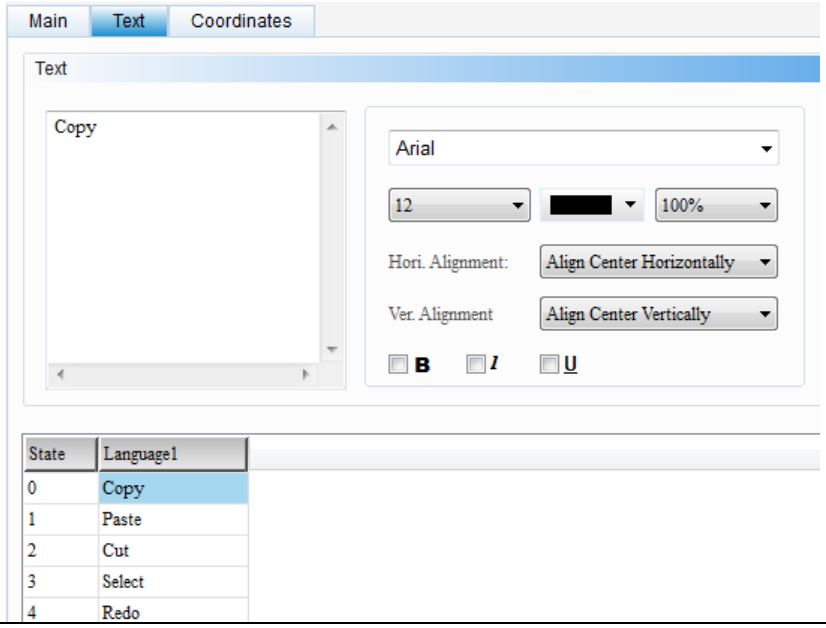
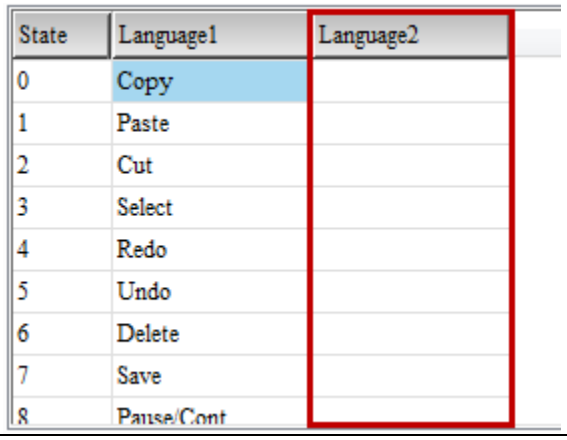


Figure 28-1-6 Text page of G-Code (10MC) file management

No.	Property	Description
(1)	Text	➢ Users can enter the text message in text box. 
(2)	Text related property	➢ The related property for users to set includes text font, text size, text color, scaling of the text, alignment method and bold/italic/underline. Please refer to the above figure.
(3)	Edit the text in multiple languages	➢ When adding data in multiple languages, users can edit multi-lingual text in this page. As shown in the figure, users can enter the text in another language in the column of Language2. 

◆ Coordinates

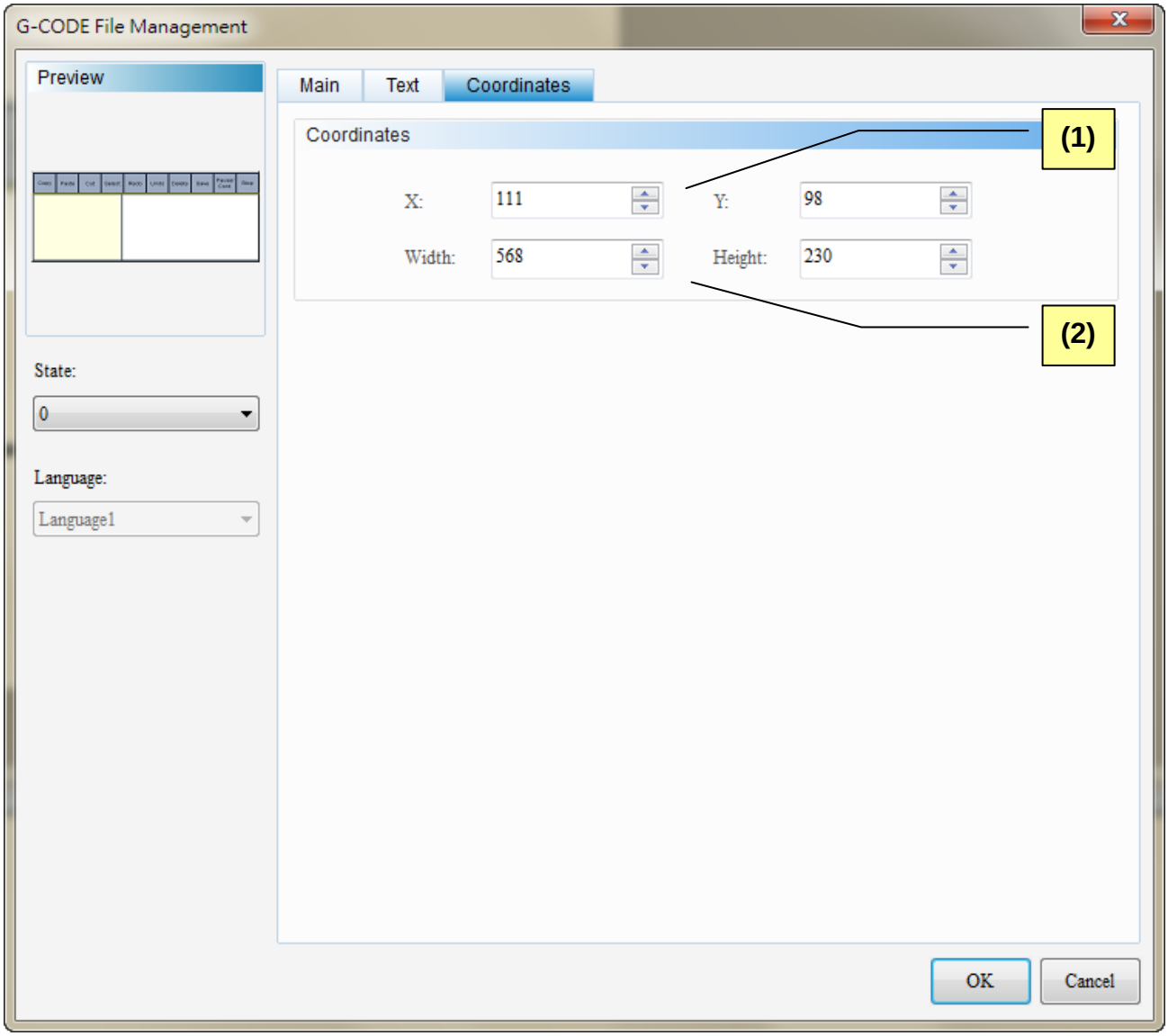


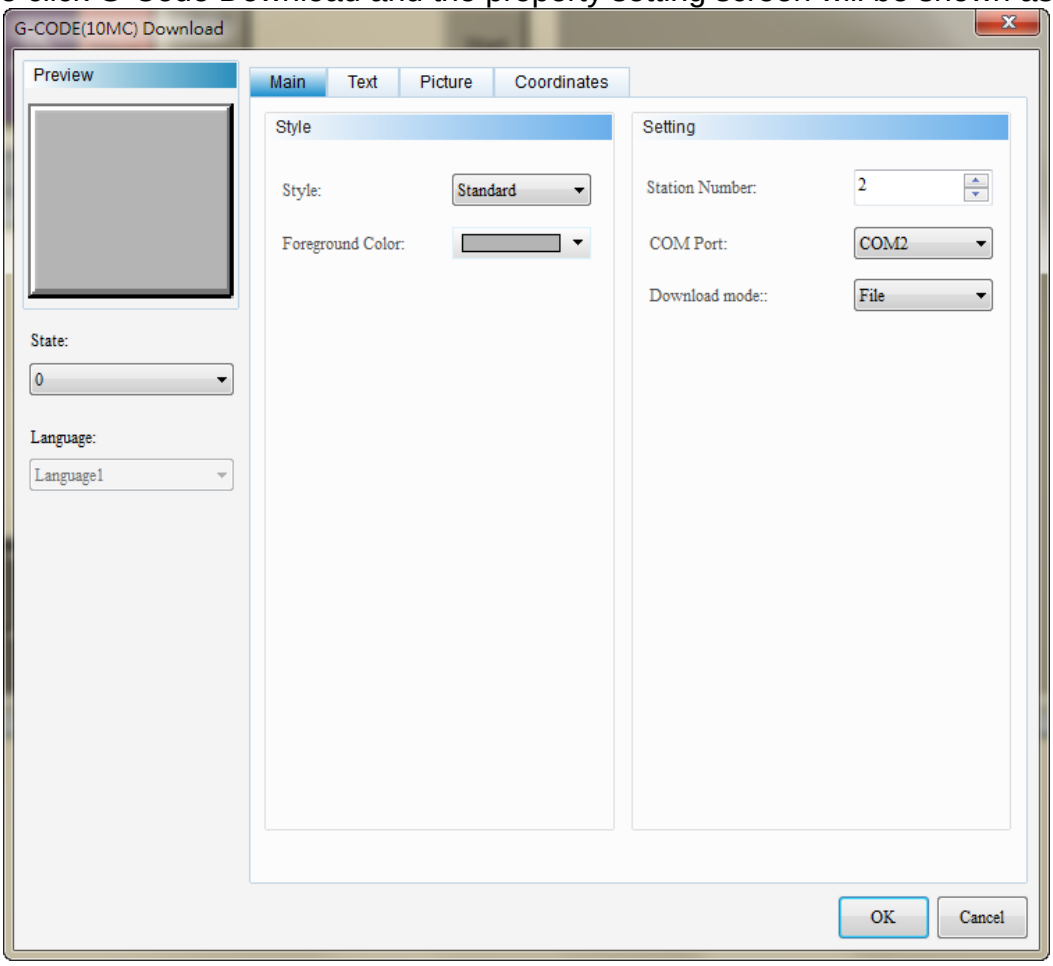
Figure 28-1-7 Coordinates page of G-Code (10MC) file management

No.	Property	Description
(1)	X- and Y-Value	➢ X coordinates in upper-left corner and Y coordinates in upper-left corner
(2)	Width, Height	➢ Element's width and height

28-1-2 G-CODE (10MC) Download

G-code file selected from the list of file manager can be downloaded to PLC by executing this element.

Double click G-Code Download and the property setting screen will be shown as below:



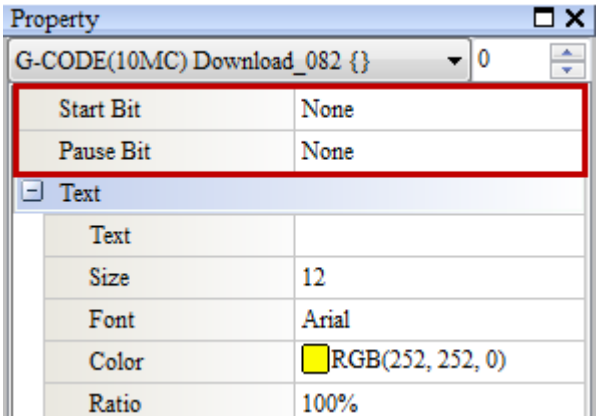


Figure 28-1-8 G-Code (10MC) file download properties

G-Code(10MC) File Download	
Function Page	**Content Description**
Main	It sets element style, foreground color, station number, COM port and download mode.
Text	It sets the text/font/size/color/format/scale/alignment.
Picture	It sets picture bank name, alignment, stretch mode and transparent color.
Coordinates	It sets the X-Y coordinate, width and height of the element.
Property Window of G-Code(10MC) File Download	
Start bit	It sets the start bit for G-Code file download.
Pause bit	It sets the pause bit for G-Code file download.

Table 28-1-3 Functional page of G-Code (10MC) file download

◆ Main

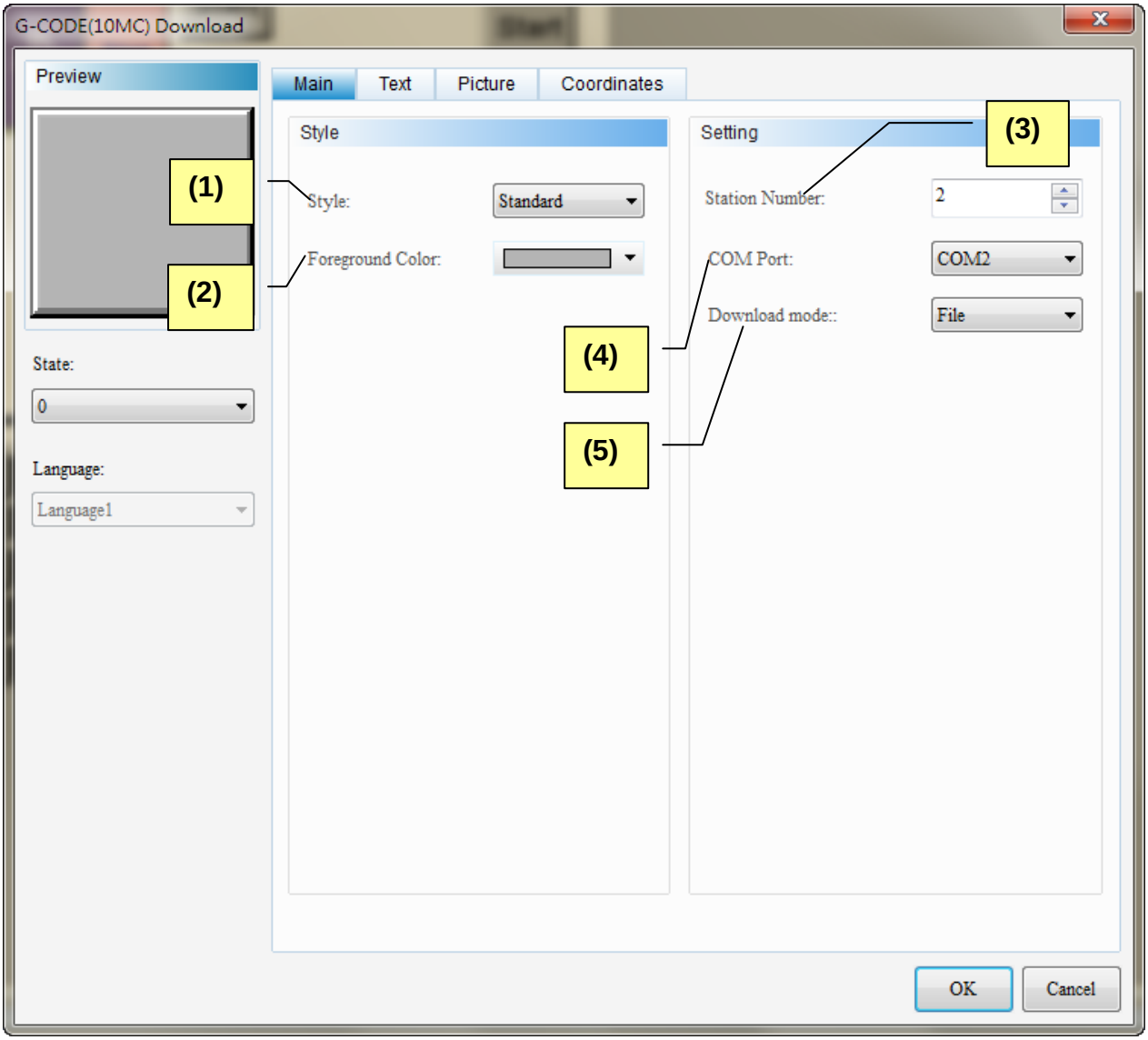
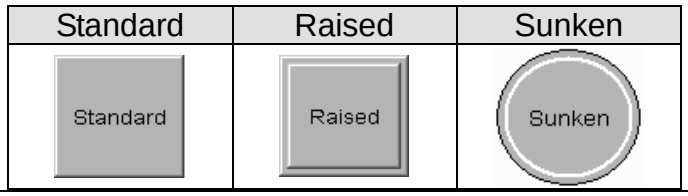
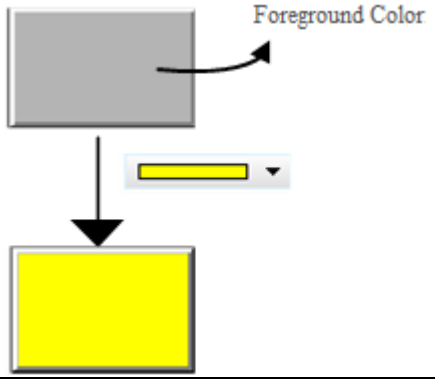
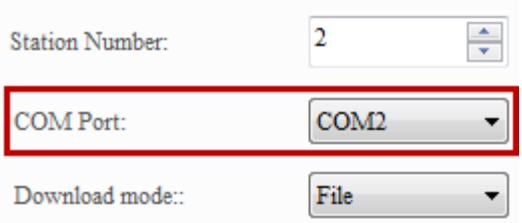
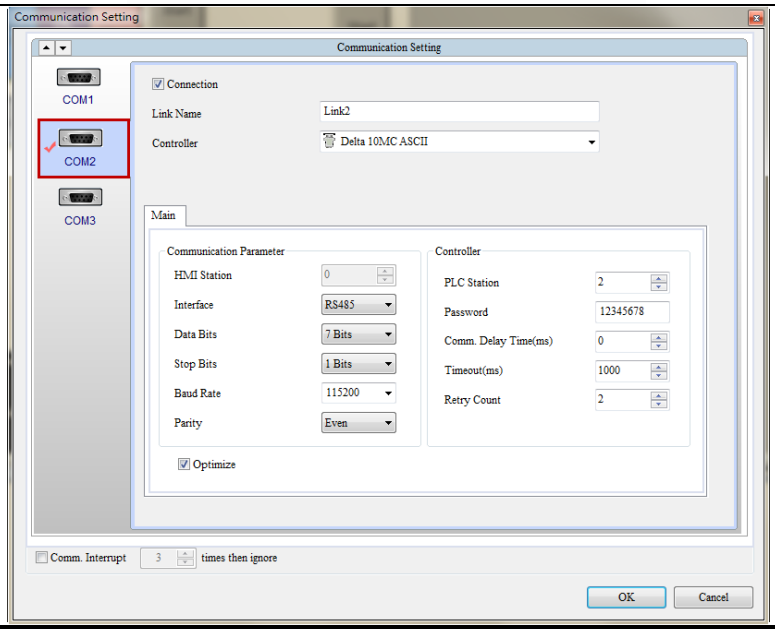
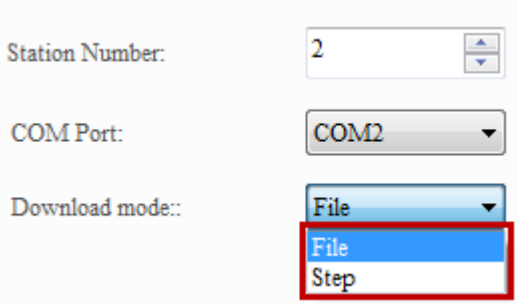


Figure 28-1-9 Main page of G-Code (10MC) file download

No.	Property	Description
(1)	Element Type	➢ Element type is divided into Standard, Raised and Sunken. Users can change the appearance of the element via this setting. 
(2)	Foreground Color	➢ It sets the foreground color. 
(3)	Station Number	➢ It sets controller's station number, which ranges from 1 to 255.
(4)	COM Port	➢ The set COM can be COM1, COM2 or COM3. ➢ The set COM must to be identical with the selected one of communication parameter. **COM setting for G-Code file download element**  **Setup module parameter** 
(5)	Download	➢ There are two download modes, File and Step.

No.	Property	Description
	Mode	 ➢ If you select 10MC controller, you can choose File or Step as the download mode. When using File mode, assuming G-Code file has 10 lines, the file will be entirely sent at a time. When using Step mode, the file will be sent by 10 times, one line for a time.

➢ Property Window

No.	Property	Description
(1)	Start bit	➢ It sets the Bit address of Start bit. ➢ This bit is valid only when the file download mode is File. It is used to enable G-Code file download. ➢ It provides controller and internal memory address. ➢ This bit and the bit in file download button should be set individually. When the start bit in file management element is $0.0 and the start bit in file download button is $0.0, users need to individually create the address for these two bits to control the activation of G-Code download.
(2)	Pause bit	➢ It sets the Bit address of Pause bit. ➢ This bit is valid only when the file download mode is File. It is used to stop G-Code file download. ➢ It provides controller and internal memory address. ➢ This bit and the bit in file download button should be set individually. When the pause bit in file management element is $1.0 and the pause bit in file download button is $3.0, users need to individually create the address for these two bits to deactivate G-Code download.

◆ Text

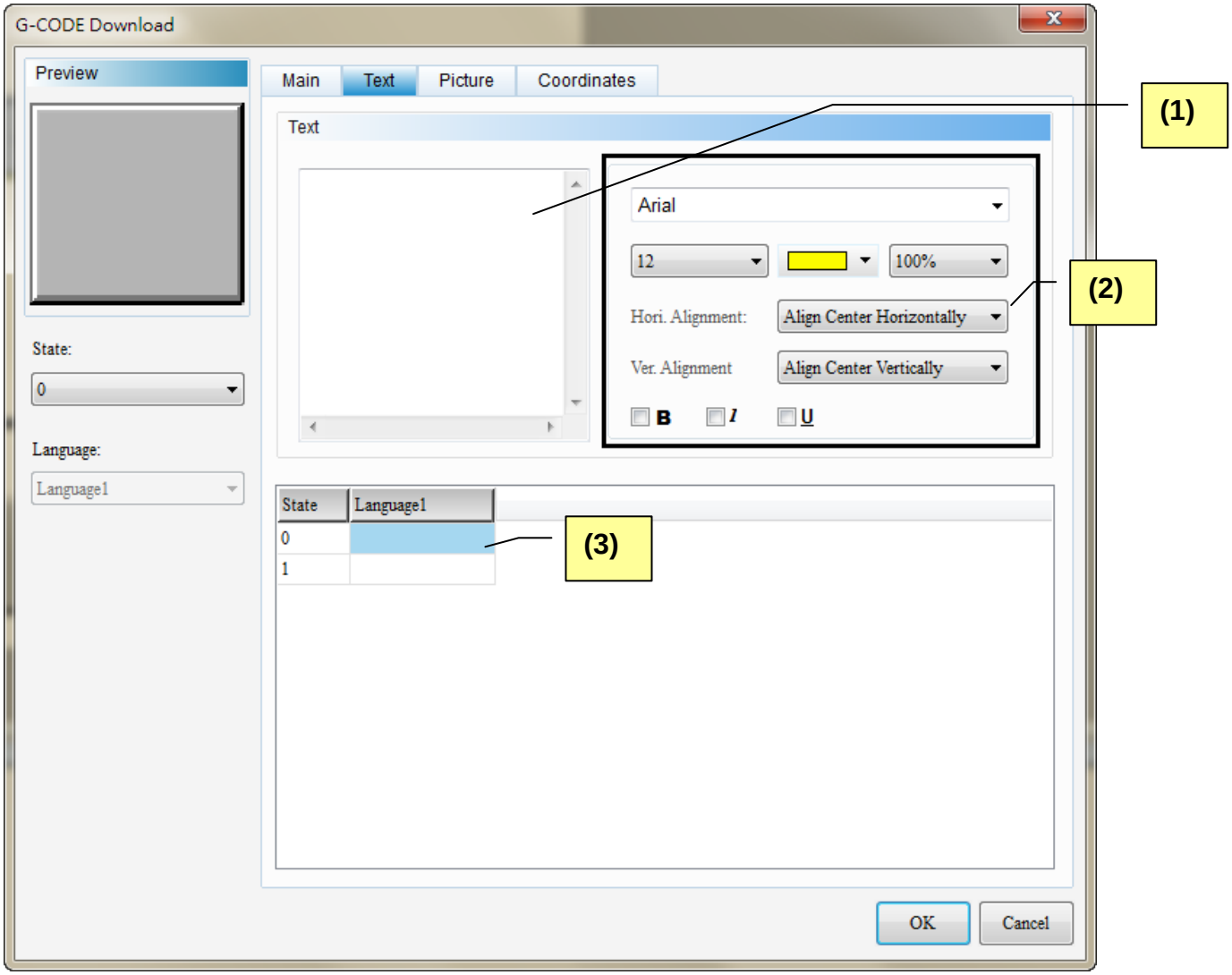
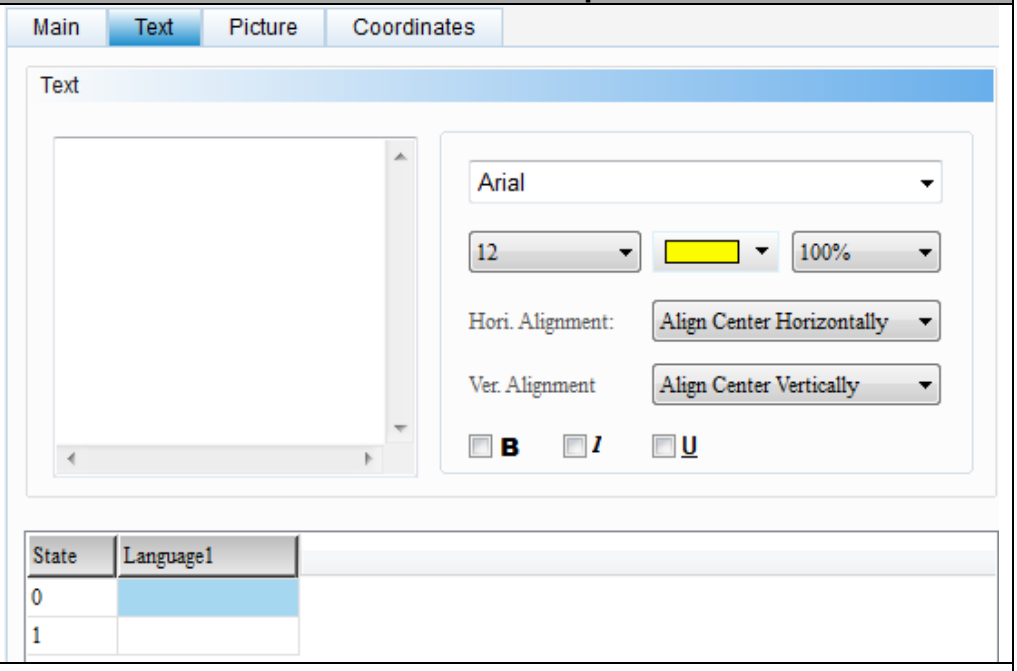
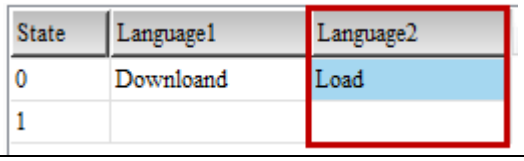


Figure 28-1-10 Text page of G-Code (10MC) file download

No.	Property	Function Description
(1)	Text	➢ Users can enter the text message in text box.

No.	Property	Function Description
		
(2)	Text related property	➢ The text related property includes text font, size, color, scaling, alignment type and bold/italic/underline. Please refer to the above figure for its setting.
(3)	Edit multilingual text	➢ If adding data in multiple languages, go to this page for editing. See the figure below. Users can edit the text in another language in column of Language2. 

◆ Picture

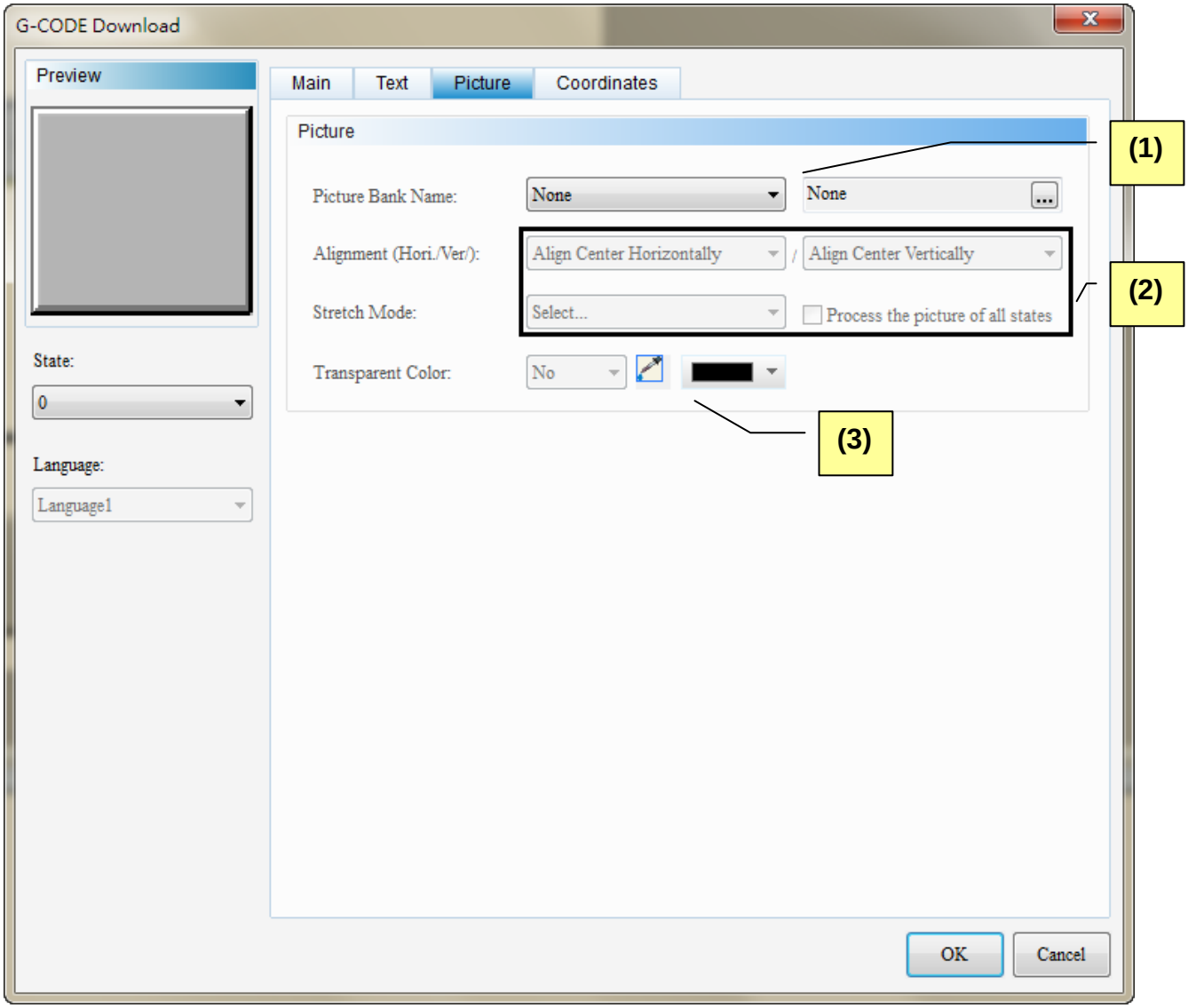
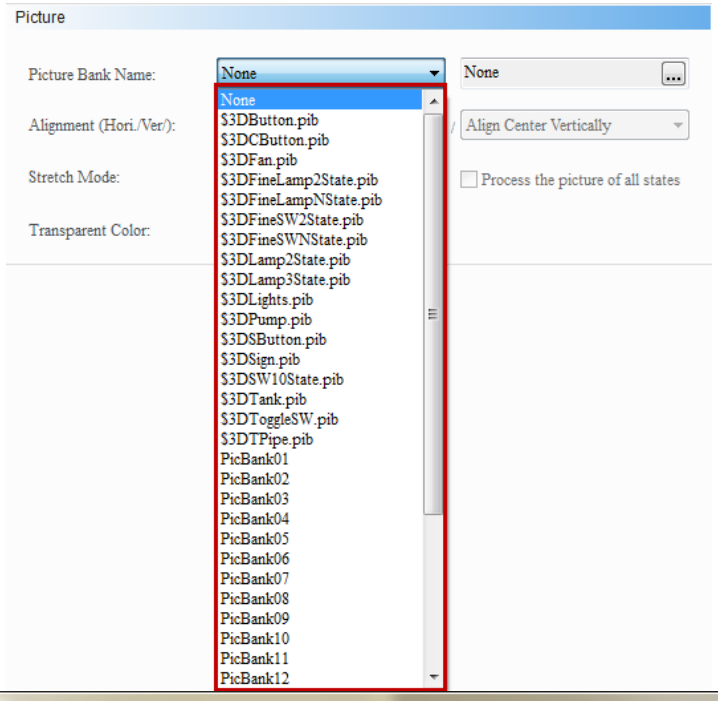
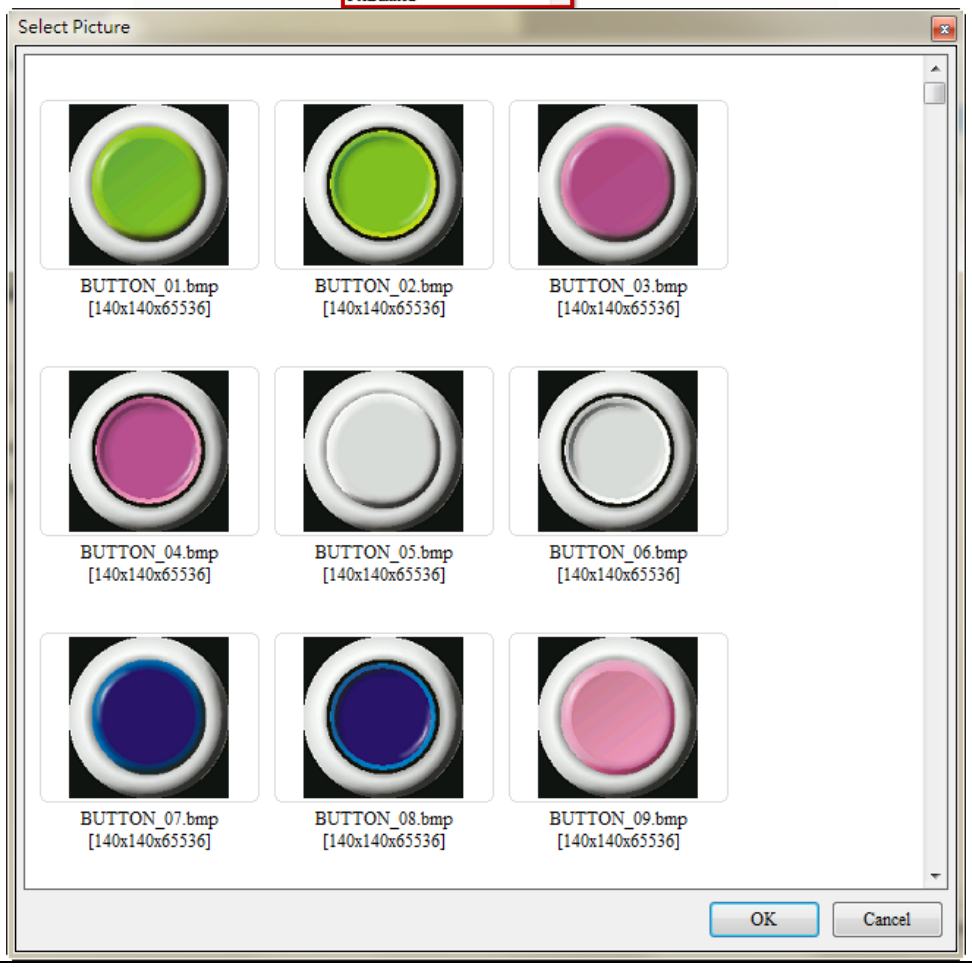
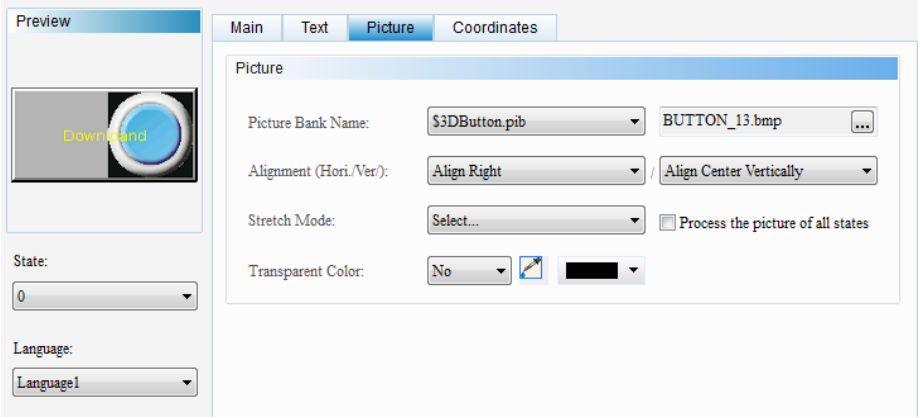
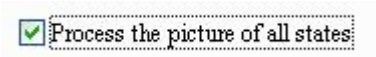
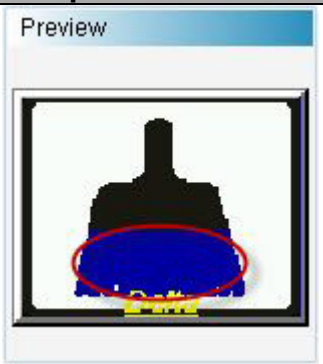


Figure 28-1-11 Picture page of G-Code (10MC) file download

No.	Property	Function Description
(1)	Picture Bank Name	➢ The default name of picture bank is none. If users desire to set up the picture display, please use the built-in picture bank from the drop-down list to select the picture.  

<table>
<tr><th>No.</th><th>Property</th><th>Function Description</th></tr>
<tr><td rowspan="2">(2)</td><td>Alignment (Hori. /Vert.)</td><td>➢ It sets the alignment type through this selection.
 
</td></tr>
<tr><td>Stretch Mode</td><td>➢ The stretch mode is divided into Whole, Keep Aspect Ratio and Actual Size.
<table>
<tr><th>Whole</th><th>Keep Aspect Ratio</th><th>Actual Size</th></tr>
<tr><td>The figure will fill in the whole displayed area.</td><td>The displayed figure will be scaling according to the aspect ratio.</td><td>Regardless the size of the element, the figure will be displayed with its actual size.</td></tr>
<tr><td>
</td><td>
</td><td>
</td></tr>
</table>
➢ If users check “Process the picture of all states”, it means the setting will be applied to all so that users do not have to set each figure individually.
 
</td></tr>
<tr><td>(3)</td><td>Transparent Color</td><td>➢ This function can specify any color in the picture as transparent color. When clicking this icon, , and select the orange part of the broom, the orange part will be identical to the foreground color.
</td></tr>
</table>

No.	Property	Function Description
		

◆ Coordinates

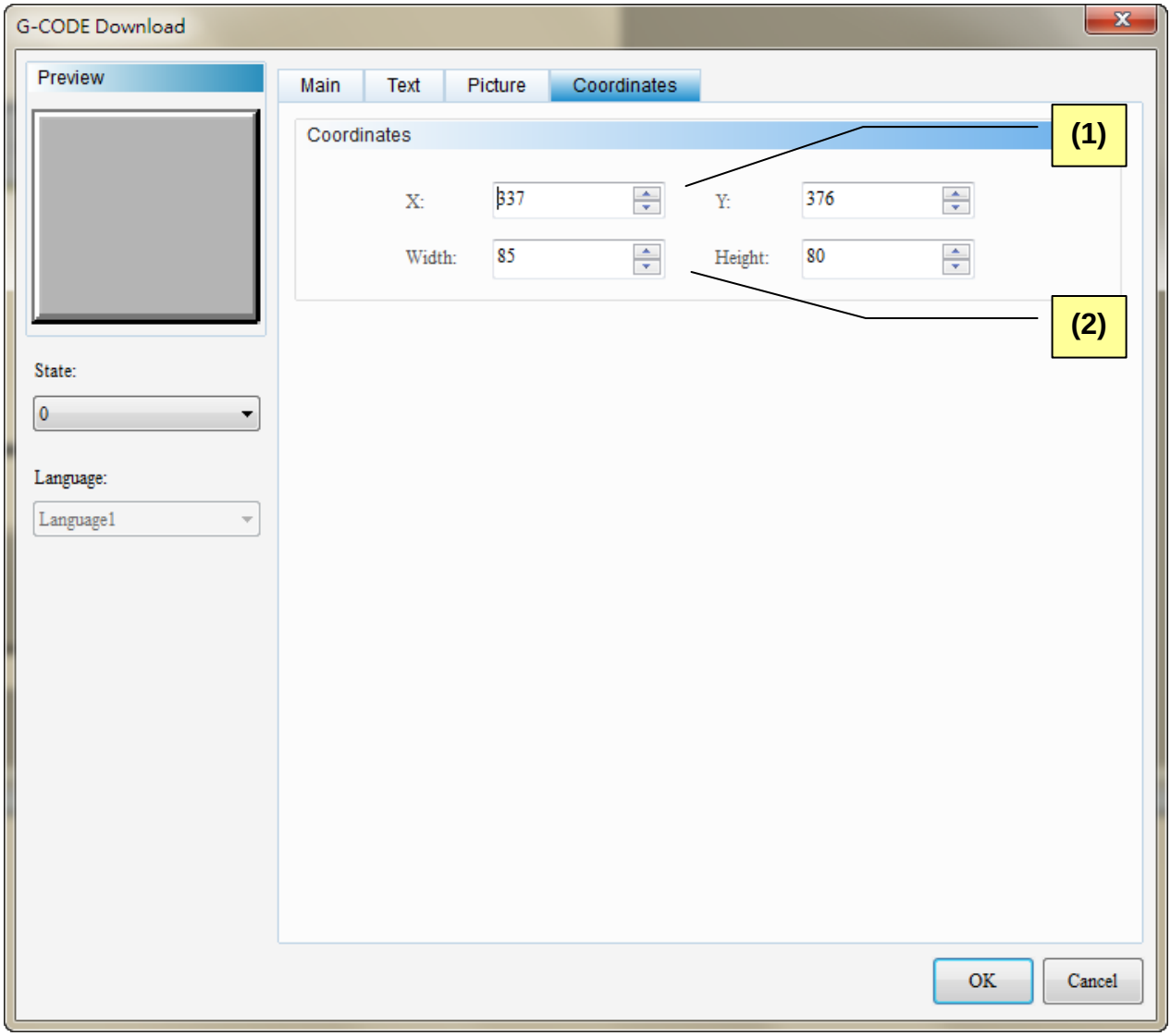


Figure 28-1-12 Coordinates page of G-Code (10MC) file download

No.	Property	Function Description
(1)	X- and Y-value	➢ X coordinates in upper-left corner and Y coordinates in upper-left corner.
(2)	Width and Height	➢ It sets the width and height of the element.

28-1-3 Error Code of 10MC

If any error occurs on HMI when downloading G-Code, users can know the causes from the displaying code and clear the alarm.
Note: Message of 01 and 08 will not show for now.

Code	Definition	Causes	Corrective Action
00	Invalid function code	The applied function code is not 7A.	Check if the function code is correct.
01	Success		
04	Invalid Command	The function code is incorrect. For example, only the station number and function code or function code is not 7A.	Check if the download data complies with the standard.
05	Overtime	This error occurs when PLC software is downloading the program.	
06	The packet length is illegal	Data length exceeds the range (200 bytes)	Check if the download data is correct.
07	Device busy	10MC is overload and cannot download G-Code	Download the current G-Code again.
08	The buffer area is full	The buffer area of G-Code is full.	Download the current G-Code again.

28-2 G-CODE (20MC)

28-2-1 G-CODE (20MC) File Management

The editing function provided by this element includes Copy, Paste, Cut, Select, Delete and Save. It also enables users to download G-Code. 20MC file management element only allows users to download. No pause or stop can be done by this element.

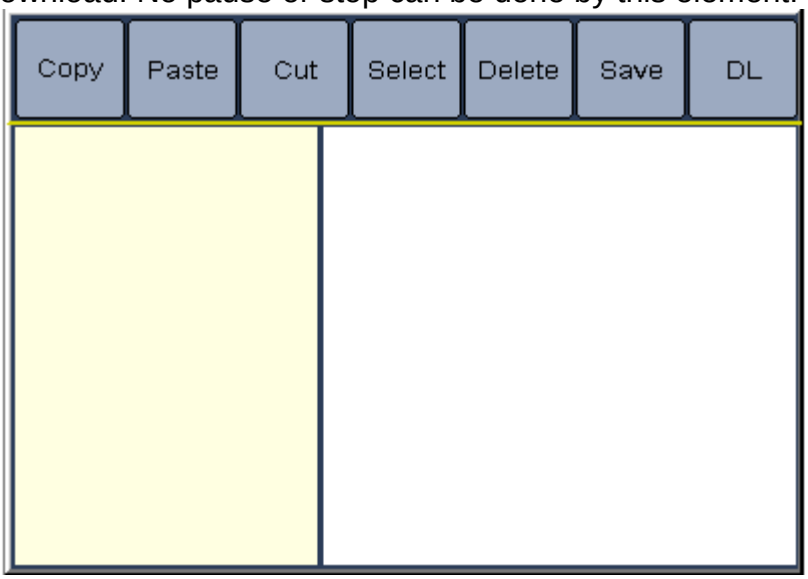


Figure 28-2-1 Element of G-CODE (20MC) File Managment

NOTE:

✓ Regardless of the transfer mode you chose, ByPass or Direct Mode, make sure the Micro SD card is inserted when downloading the G-Code file. Otherwise, CRC check error message will appear and shows download failure.

Double click G-Code (20MC) file management element and the property setting screen will be shown as below:

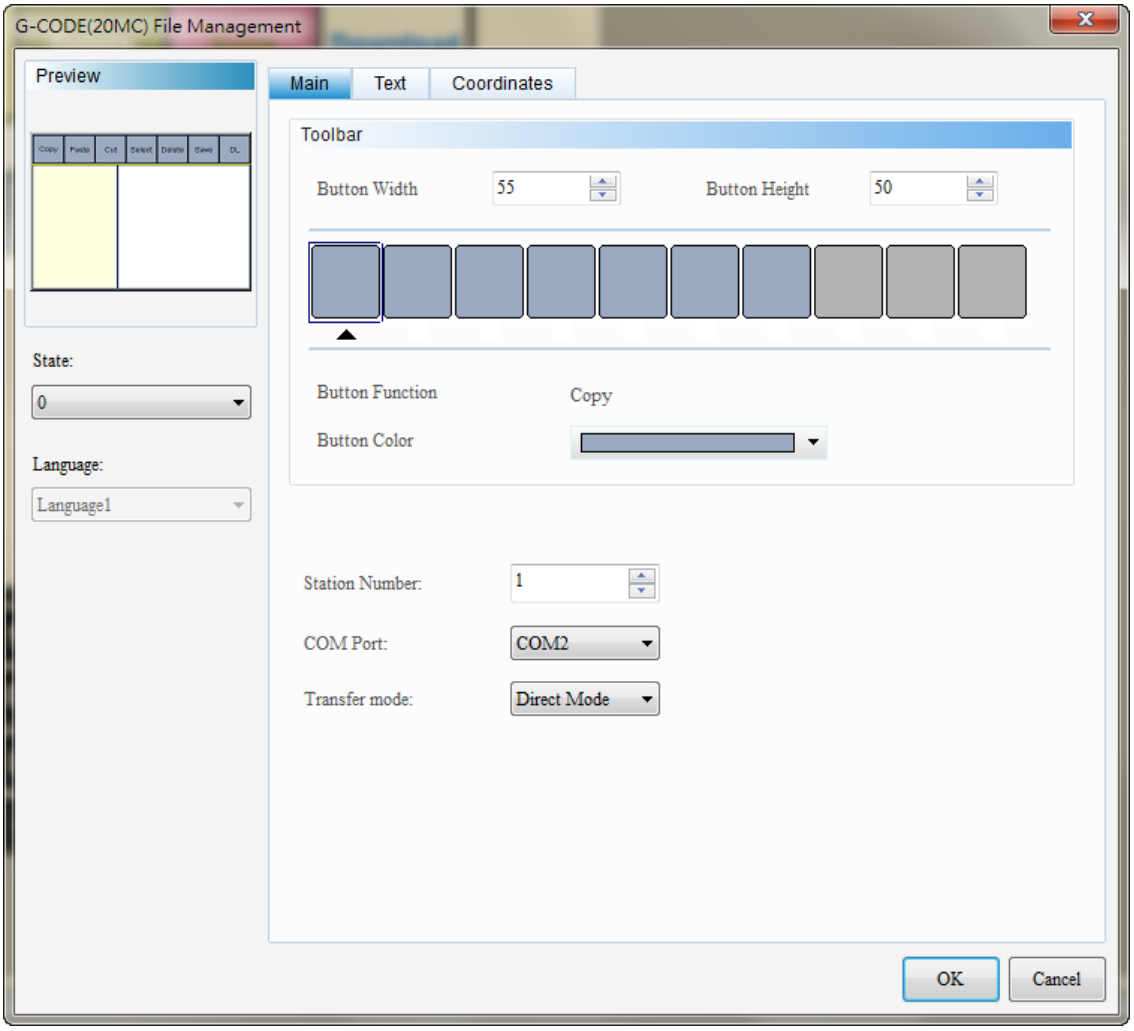


Figure 28-2-2 Property page of G-Code (20MC) file management

G-Code(20MC) File Management	
Function Page	**Content Description**
Main	It sets button height, button width, button color, station number, COM port and transfer mode.
Text	It sets the text/font/size/color/format/scale/alignment.
Coordinates	It sets the X-Y coordinate, width and height of the element.

Table 28-2-1 Functional page of G-Code (20MC) file management element

◆ Main

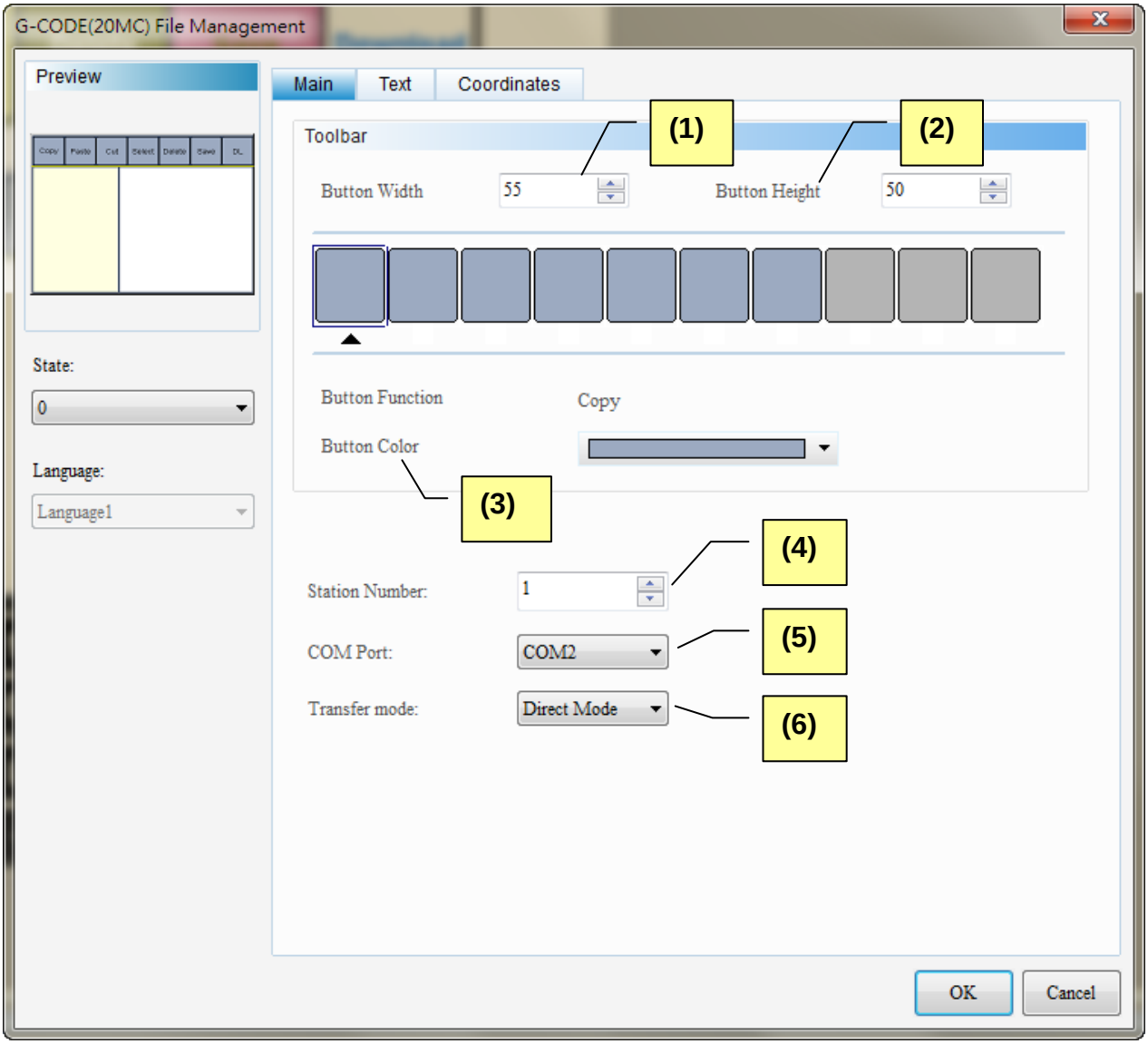
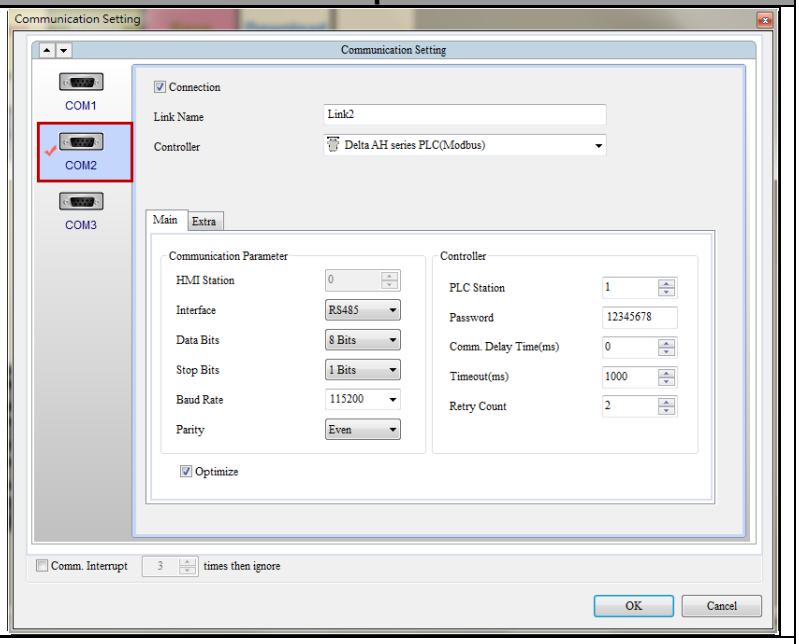
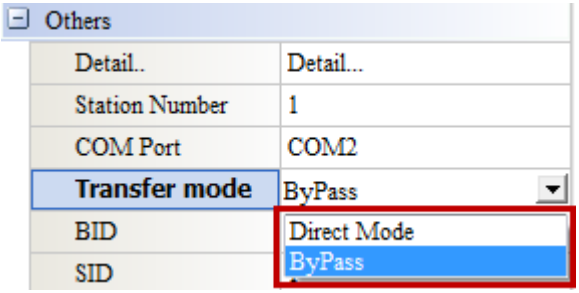
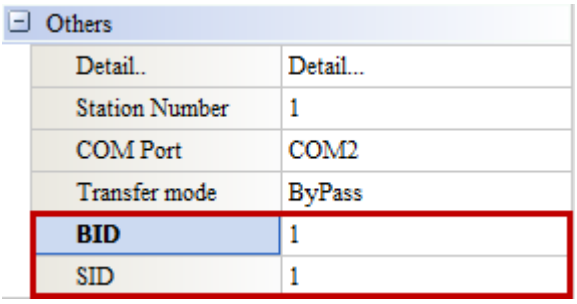


Figure 28-2-3 G-Code (20MC) file management element main property setting screen

No.	Property	Function Description
(1)	Button Width	➢ It sets the button width on toolbar. ➢ The default setting is 55 and the maximum is 100. Button width is 55 — Copy Paste Cut Select Delete Save DL Button width is 70 — Copy Paste Cut Select Delete Save DL
(2)	Button Height	➢ It sets the button height on toolbar. ➢ The default setting is 50 and the maximum is 100. Button height is 50 — Copy Paste Cut Select Delete Save DL Button height is 70 — Copy Paste Cut Select Delete Save DL
(3)	Button Color	➢ It sets the button color on toolbar. ➢ The default color is . ➢ Each button color can be individually set. Button color — Copy Paste Cut Select Delete Save DL Button color — Copy Paste Cut Select Delete Save DL
(4)	Station Number	➢ It sets the station number of the controller, which ranges from 1 to 255.
(5)	COM Port	➢ The COM Port can be set to COM1, COM2 or COM3. ➢ COM Port has to be set to the same as the one selected by communication parameter. COM Port setting of G-Code file download element. — Station Number: 1; COM Port: COM2; Transfer mode: Direct Mode

No.	Property	Function Description
		Set communication parameter 
(6)	Transfer mode	➢ The transfer mode of G-Code (20MC) file management element can be ByPass Mode and Direct Mode.  ➢ When you select ByPass as the transfer mode, you should set BID and SID number. BID number is Rack No. and SID number is Slot No. When the physical Slot No. is 0, the setting in the software should be 1.  ➢ If you use COM or Ethernet form AH500 CPU to download G-Code, please set the transfer mode of 20MC file management element and file download button to [ByPass]. ➢ If you directly use 20MC's Ethernet to download G-Code, please select [Direct Mode] as the transfer mode.

◆ Text

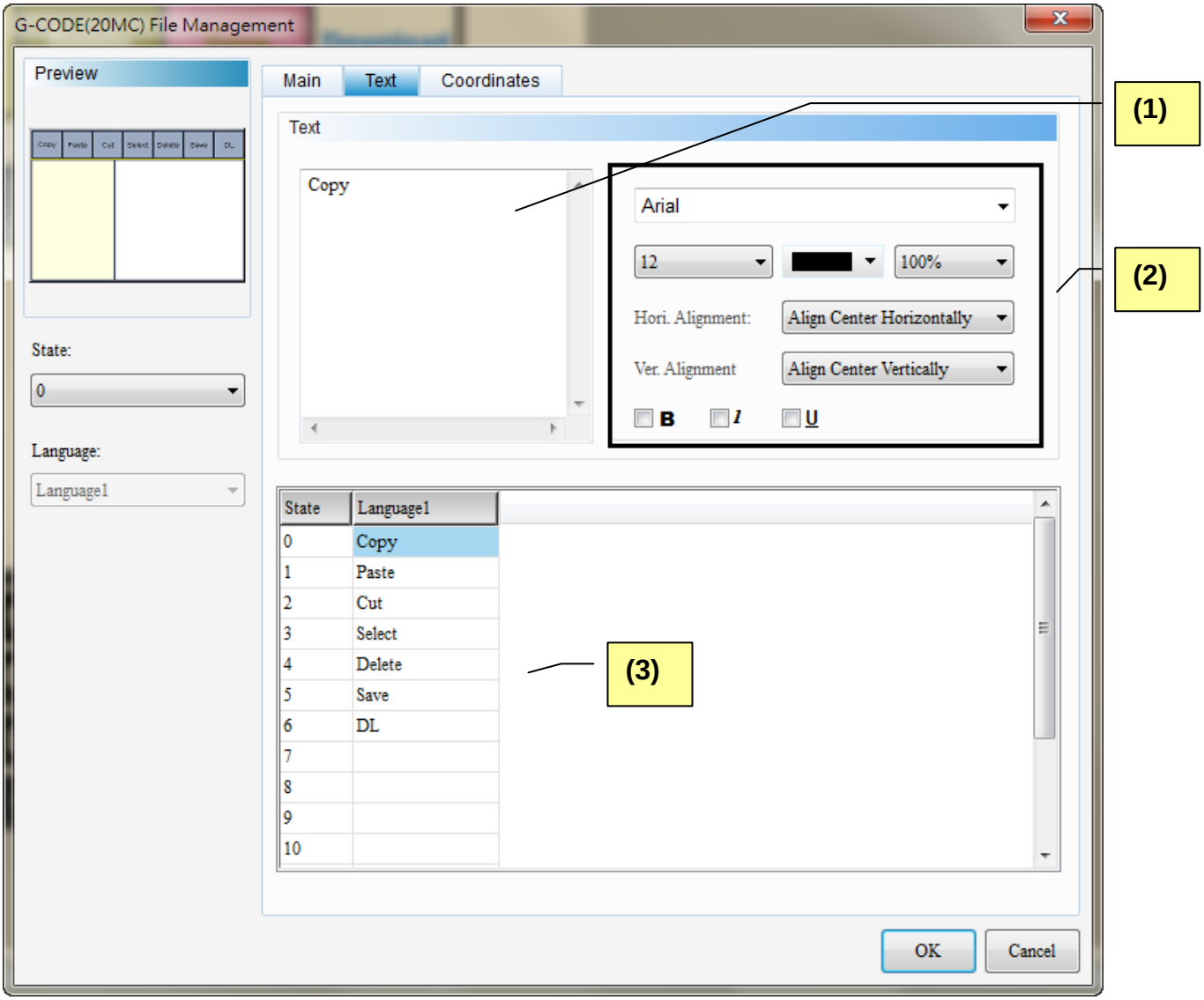
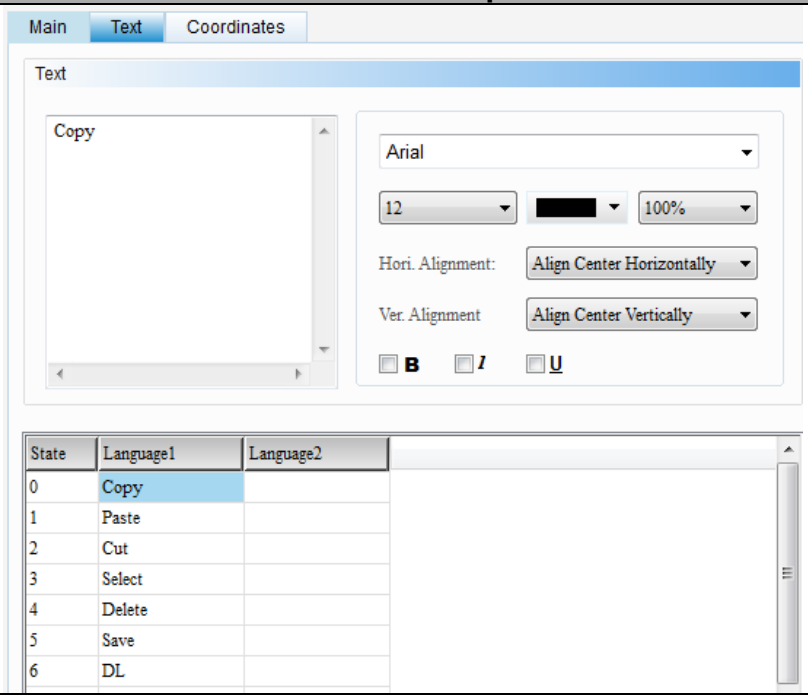
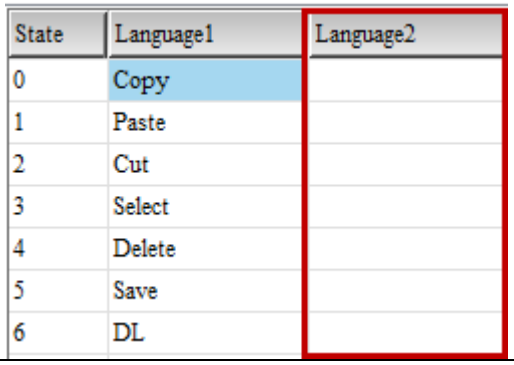


Figure 28-2-4 Text page of G-Code (20MC) file management

No.	Property	Function Description
(1)	Text	➢ Users can enter the text message in the text box.

No.	Property	Function Description
		
(2)	Text related property	➢ The text related property includes text font, size, color, scaling, alignment type and bold/italic/underline. Please refer to the above figure for its setting.
(3)	Edit multilingual text	➢ If adding data in multiple languages, go to this page for editing. See the figure below. Users can edit the text in another language in column of Language2. 

◆ Coordinates

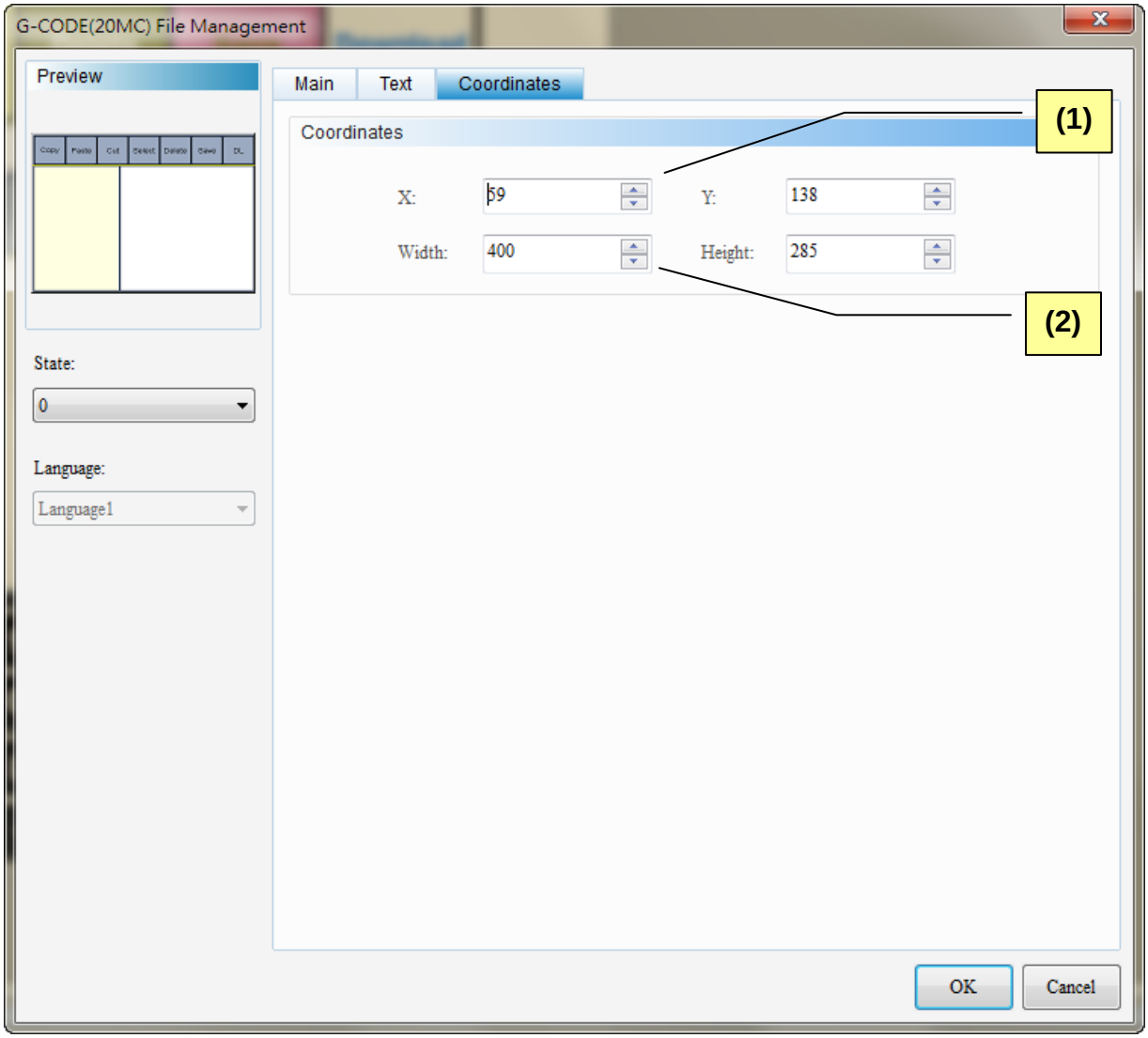


Figure 28-2-5 Coordinates page of G-Code (20MC) file management

No.	Property	Function Description
(1)	X- and Y-value	➢ X coordinates in upper-left corner and Y coordinates in upper-left corner.
(2)	Width and Height	➢ It sets the width and height of the element.

28-2-2 G-CODE (20MC) Download

This element can download the G-Code file from the list in the selected file management to 20MC.

Double click the G-Code file download element and the property setting screen will be shown as below:

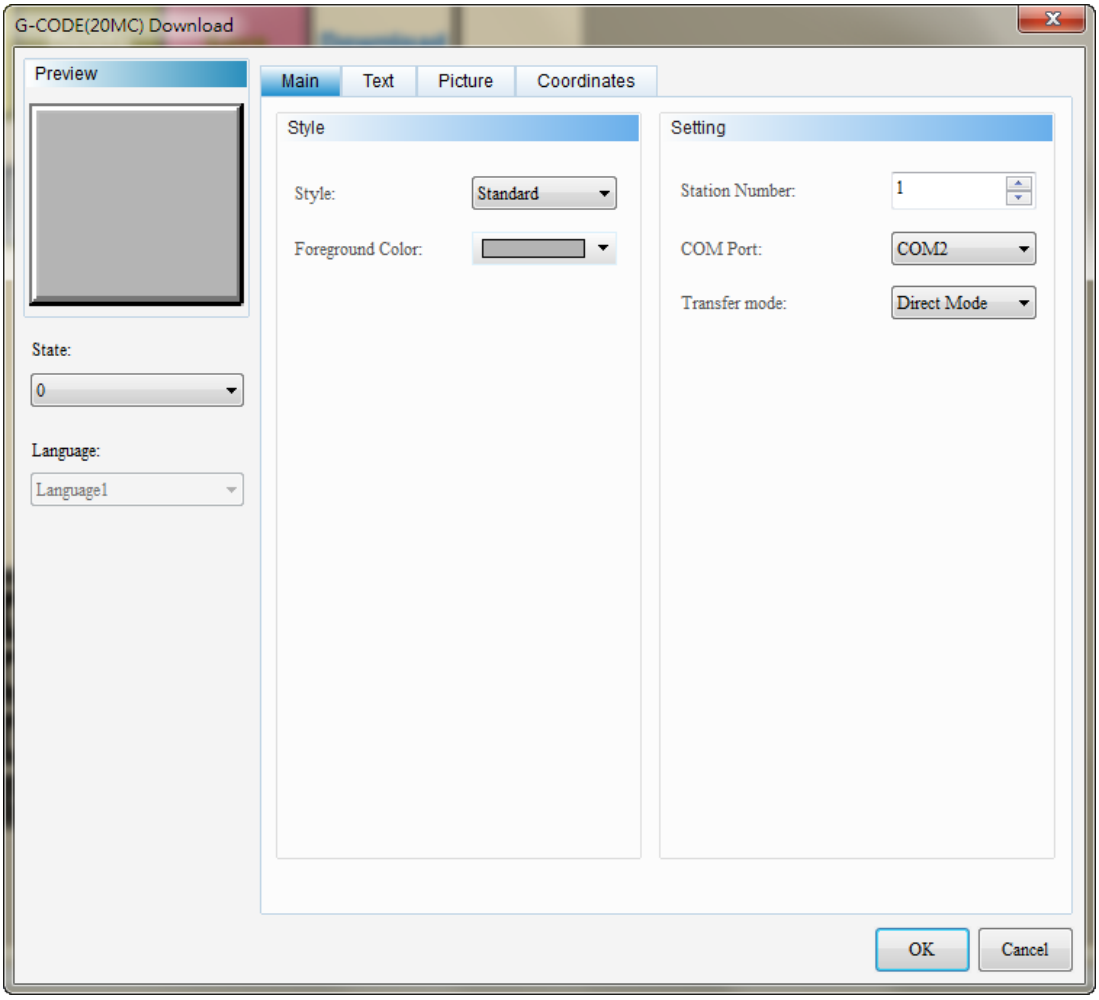


Figure 28-2-6 Property page of G-Code (20MC) file download

G-Code(20MC) File Download	
Function Page	**Content Description**
Main	It sets element style, foreground color, station number, COM port and transfer mode.
Text	It sets the text/font/size/color/format/scale/alignment.
Picture	It sets picture bank name, alignment, stretch mode and transparent color.
Coordinates	It sets the X-Y coordinate, width and height of the element.

Table 28-2-2 Functional page of G-Code (20MC) file download

◆ Main

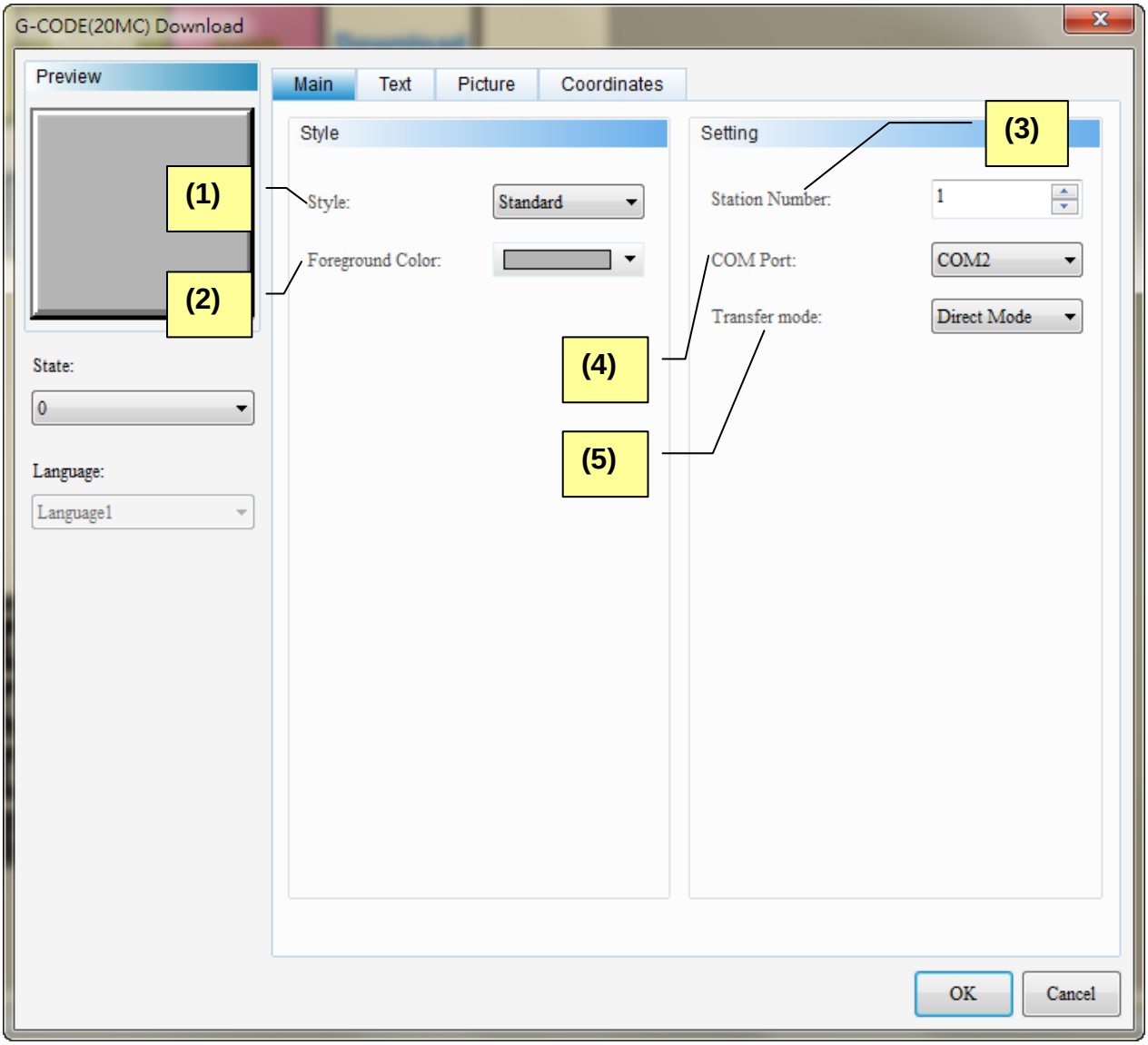
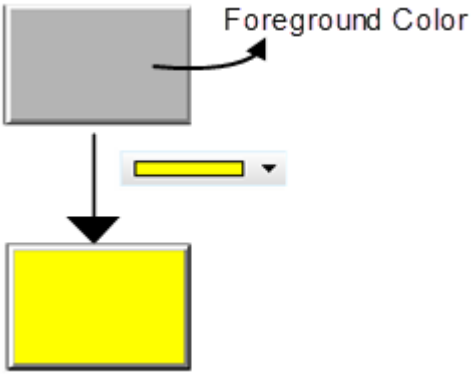
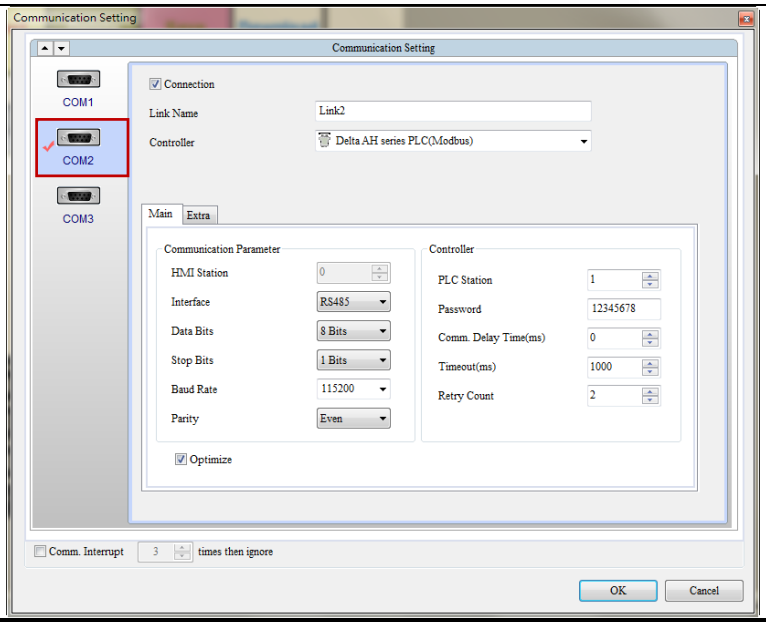
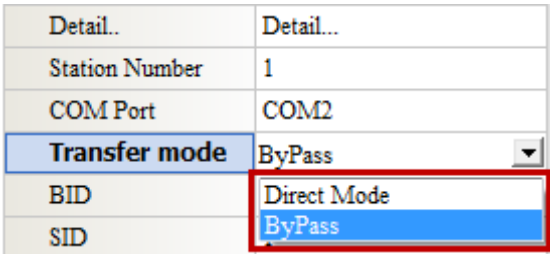
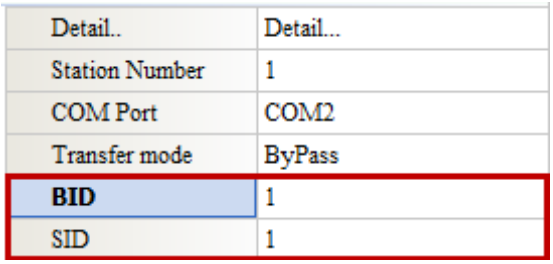


Figure 28-2-7 Main page of G-Code (20MC) file download

<table>
<tr><th>No.</th><th>Property</th><th>Function Description</th></tr>
<tr><td>(1)</td><td>Element style</td><td>➢ Element type is divided into Standard, Raised and Sunken. Users can change the appearance of the element via this setting.
<table>
<tr><th>Standard</th><th>Raised</th><th>Sunken</th></tr>
<tr><td>
</td><td>
</td><td>
</td></tr>
</table></td></tr>
<tr><td>(2)</td><td>Foreground color</td><td>➢ It sets the element’s foreground color.

</td></tr>
<tr><td>(3)</td><td>Station number</td><td>➢ It sets the controller’s station number, which ranges from 1 to 255.</td></tr>
<tr><td>(4)</td><td>COM Port</td><td>➢ The set COM can be COM1, COM2 or COM3.
➢ The set COM must to be identical with the selected one of communication parameter.
<table>
<tr><td>COM setting for G-Code file download element</td><td>
</td></tr>
<tr><td>Set communication parameter</td><td> 
</td></tr>
</table></td></tr>
</table>

No.	Property	Function Description
(5)	Transfer mode	➢ The transfer mode of G-Code (20MC) file management element can be ByPass Mode and Direct Mode.  ➢ When you select ByPass as the transfer mode, you should set BID and SID number. BID number is Rack No. and SID number is Slot No. When the physical Slot No. is 0, the setting in the software should be 1.  ➢ If you use COM or Ethernet form AH500 CPU to download G-Code, please set the transfer mode of 20MC file management element and file download button to [ByPass]. ➢ If you directly use 20MC's Ethernet to download G-Code, please select [Direct Mode] as the transfer mode.

◆ Text

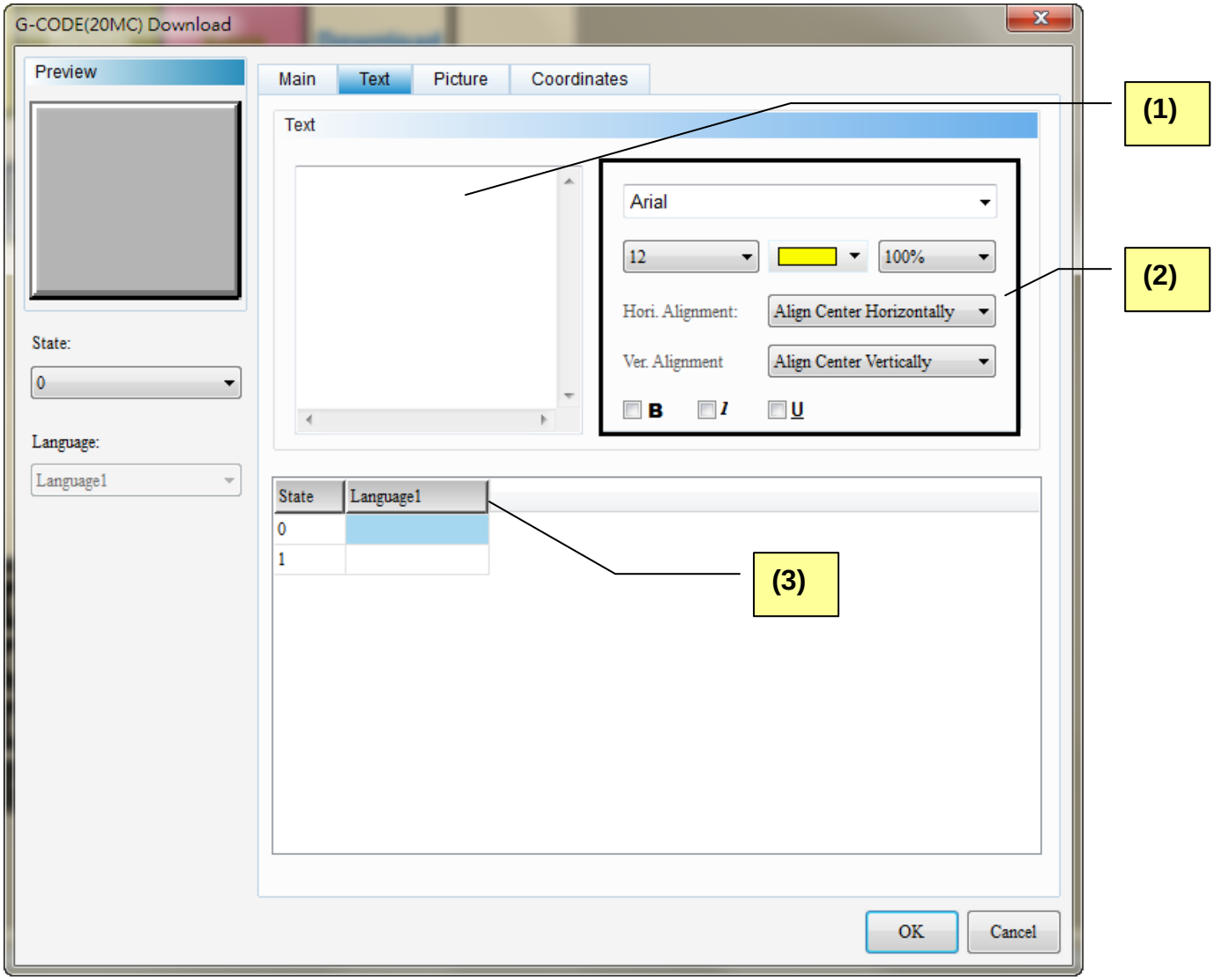
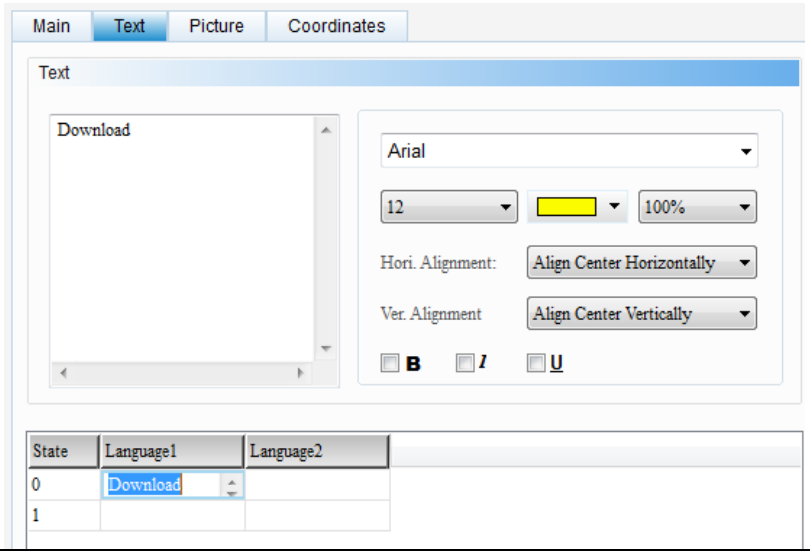
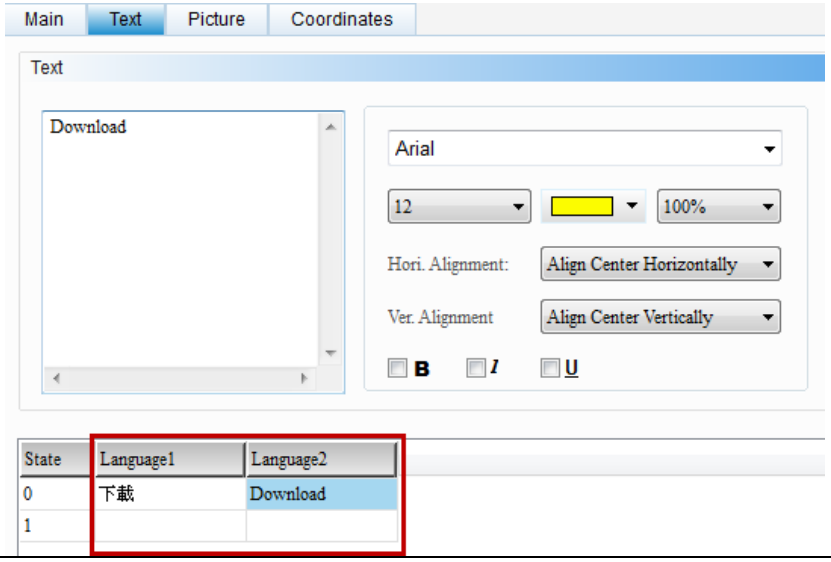


Figure 28-2-8 Text page of G-Code (20MC) file download

No.	Property	Function Description
(1)	Text	➢ Users can enter the text message in the text box. 
(2)	Text related	➢ The text related property includes text font, size, color, scaling,

No.	Property	Function Description
	property	alignment type and bold/italic/underline. Please refer to the above figure for its setting.
(3)	Edit multilingual text	➢ If adding data in multiple languages, go to this page for editing. See the figure below. Users can edit the text in another language in column of Language2. 

◆ Picture

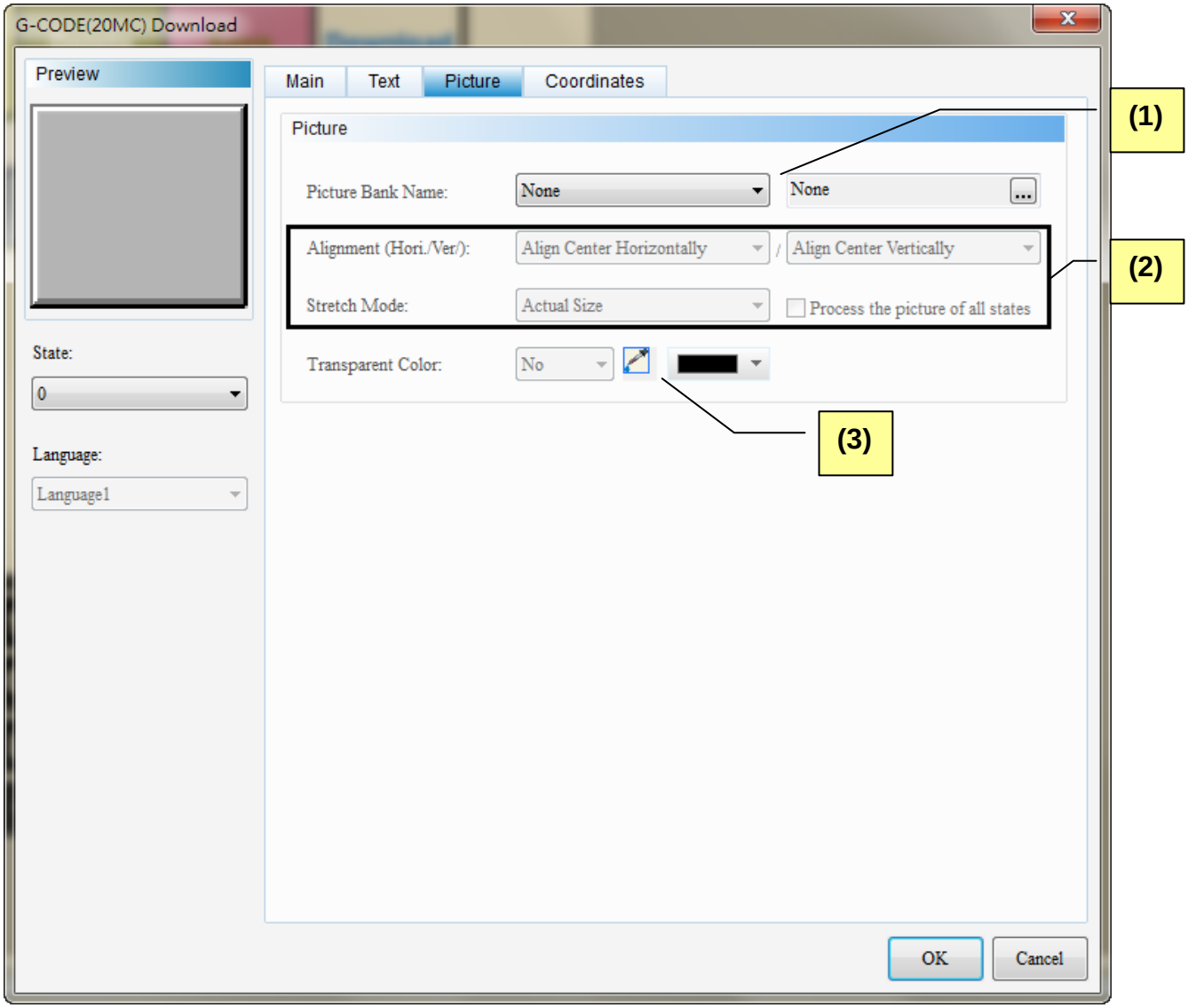
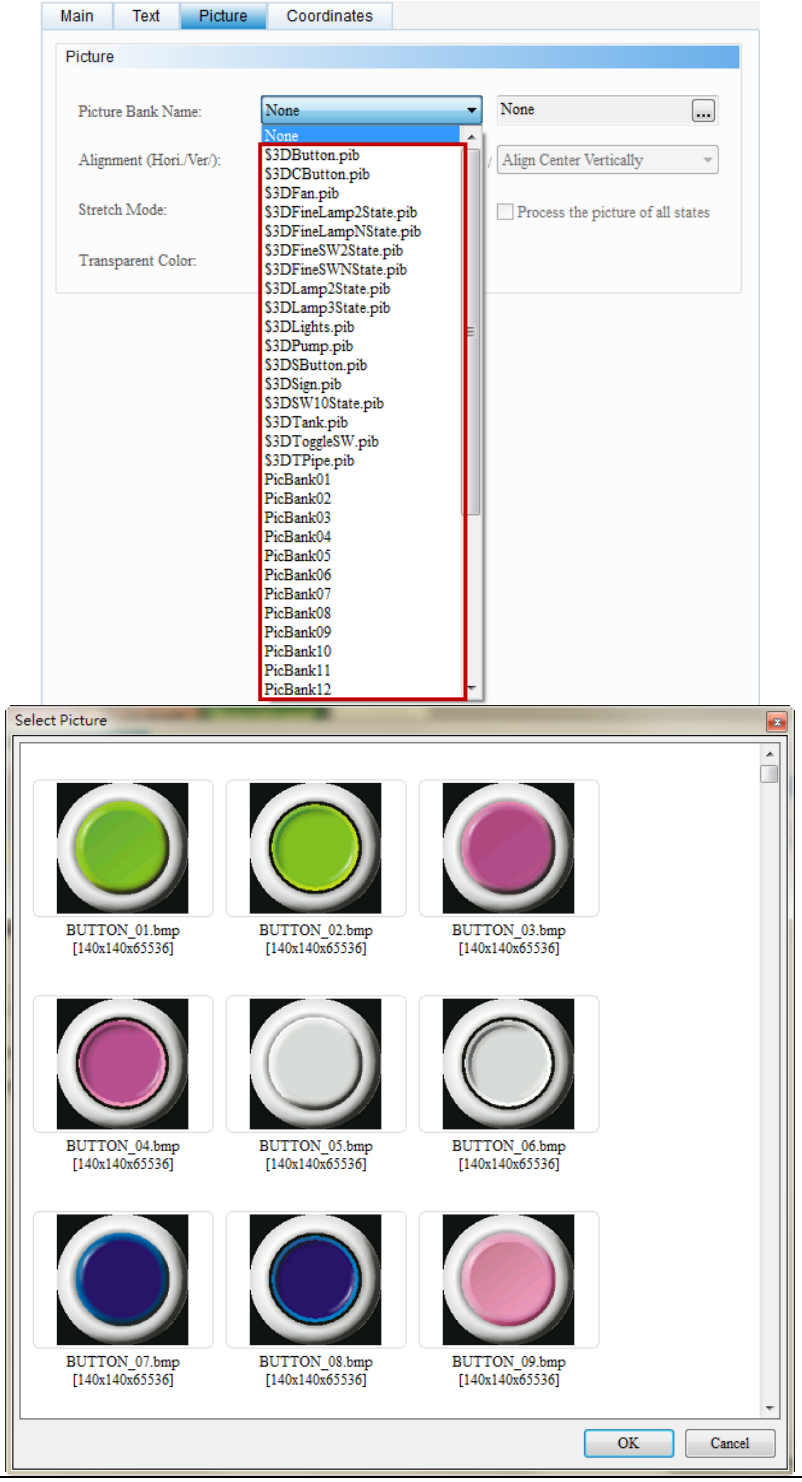
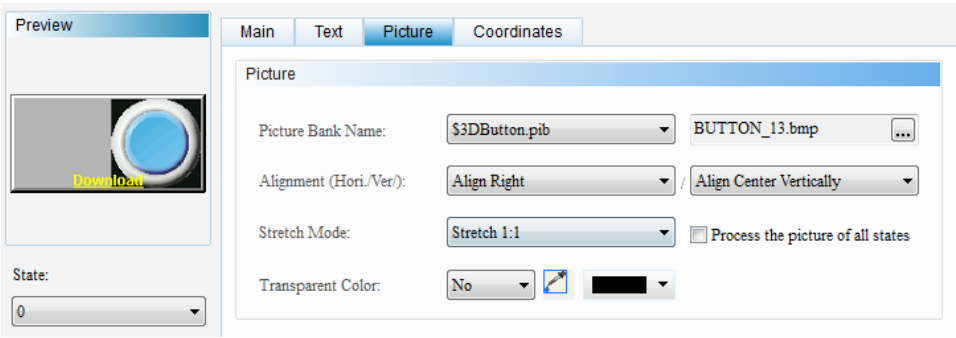
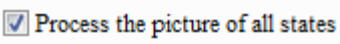
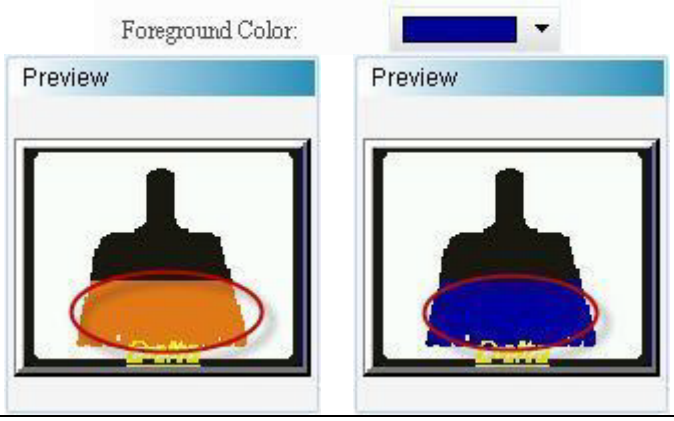


Figure 28-2-9 Picture page of G-Code (20MC) file download

No.	Property	Function Description
(1)	Picture bank name	➢ The default name of picture bank is none. If users desire to set up the picture display, please use the built-in picture bank from the drop-down list to select the picture. 

<table>
<tr><th>No.</th><th>Property</th><th>Function Description</th></tr>
<tr><td rowspan="2">(2)</td><td>Alignment (Hori. /Vert.)</td><td>➢ It sets the alignment type through this selection.
 

➢ The stretch mode is divided into Whole, Keep Aspect Ratio and Actual Size.
<table>
<tr><th>Whole</th><th>Keep Aspect Ratio</th><th>Actual Size</th></tr>
<tr><td>The figure will fill in the whole displayed area.</td><td>The displayed figure will be scaling according to the aspect ratio.</td><td>Regardless the size of the element, the figure will be displayed with its actual size.</td></tr>
<tr><td>
</td><td>
</td><td>
</td></tr>
</table>

➢ If users check “Process the picture of all states”, it means the setting will be applied to all so that users do not have to set each figure individually.
 
</td></tr>
<tr><td>Stretch Mode</td><td></td></tr>
<tr><td>(3)</td><td>Transparent Color</td><td>➢ This function can specify any color in the picture as transparent color. When clicking on this icon, and select the orange part of the broom, the orange part will be identical to the foreground color.
 
</td></tr>
</table>

◆ Coordinates

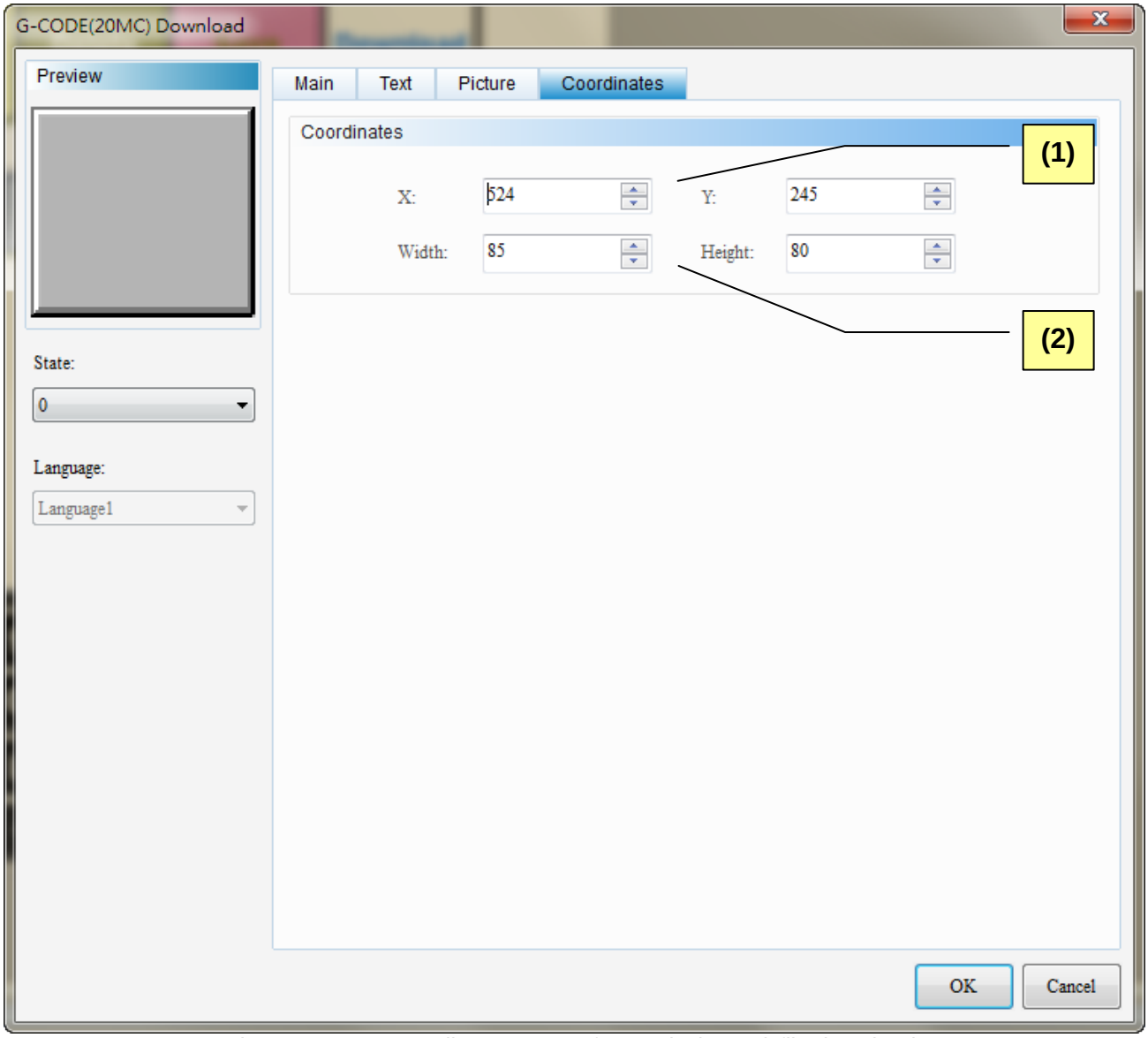


Figure 28-2-10 Coordinates page of G-Code (20MC) file download

No.	Property	Function Description
(1)	X- and Y-value	➢ X coordinates in upper-left corner and Y coordinates in upper-left corner.
(2)	Width and Height	➢ It sets the width and height of the element.

28-3 G-CODE (20PM)

28-3-1 G-CODE (20PM) File Management

The editing function provided by this element includes Copy, Paste, Cut, Select, Delete and Save. Users also can download G-Code via this function. 20PM file management element only allows users to download. No pause or stop can be done by this element.

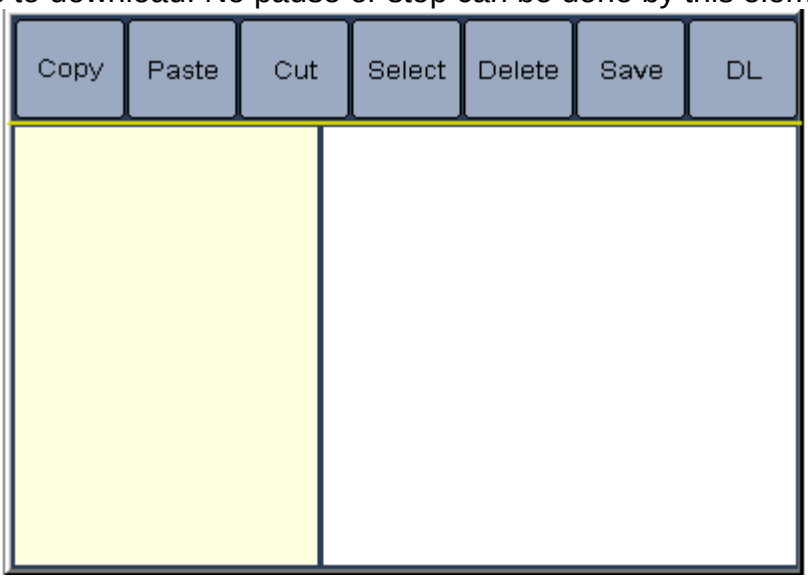


Figure 28-3-1 Element of G-CODE (20PM) file management

Double click the G-Code (20PM) file management element and the property setting screen will be shown as below:

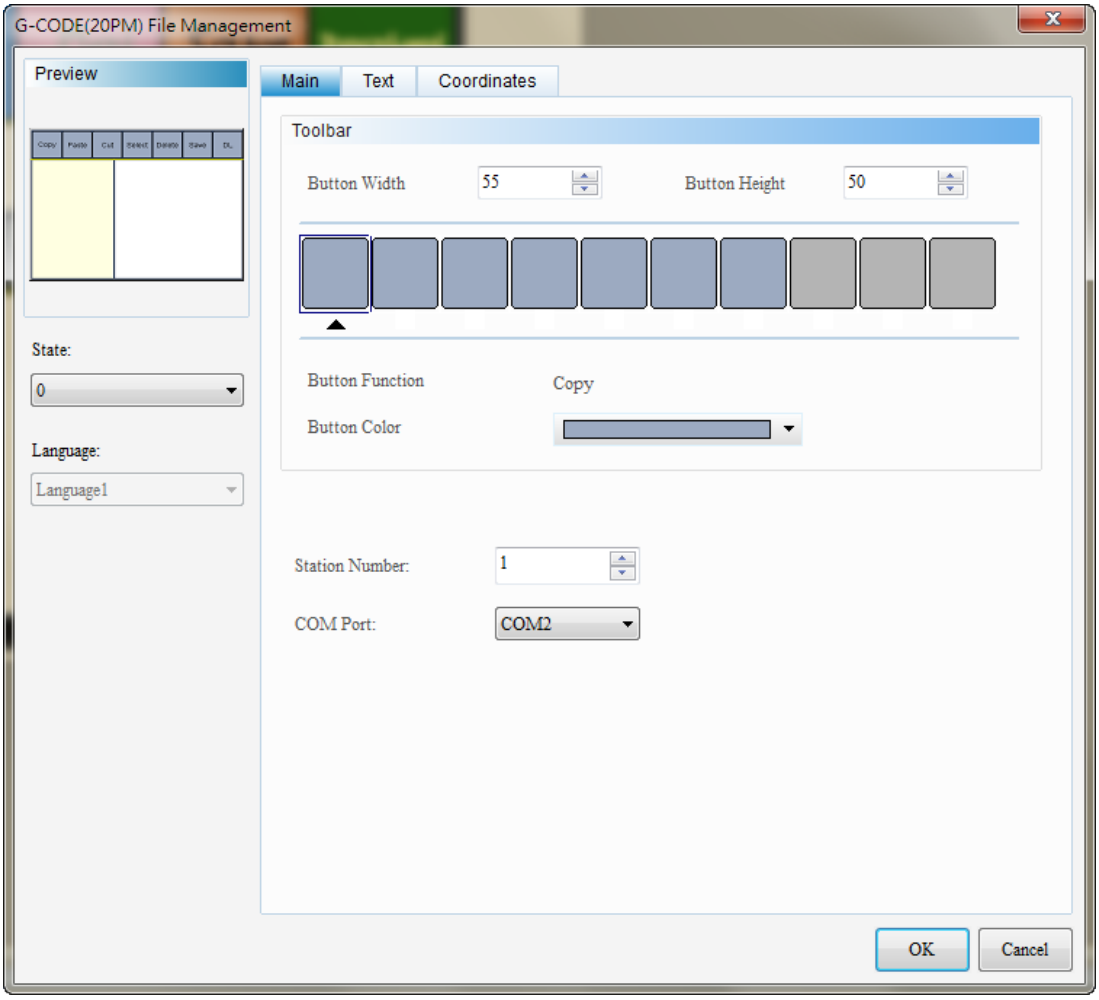


Figure 28-3-2 Property page of G-Code (20PM) file management

G-Code(20PM) File Management	
Function Page	**Content Description**
Main	It sets button height, button width, button color, station number, COM port and transfer mode.
Text	It sets the text/font/size/color/format/scale/alignment.
Coordinates	It sets the X-Y coordinate, width and height of the element.

Table 28-3-1 Functional page of G-Code (20PM) file management element

◆ Main

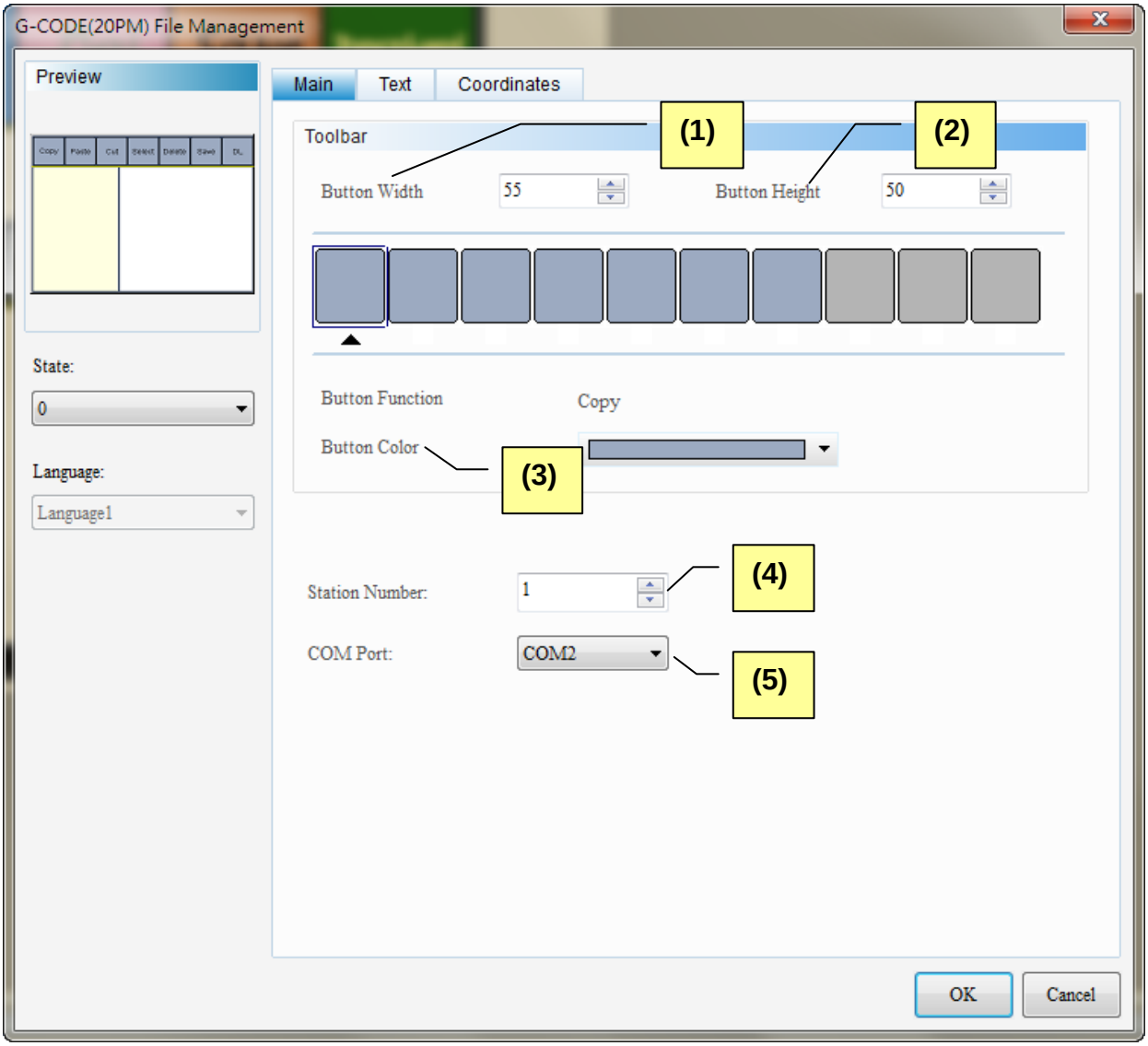
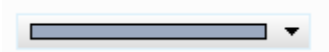
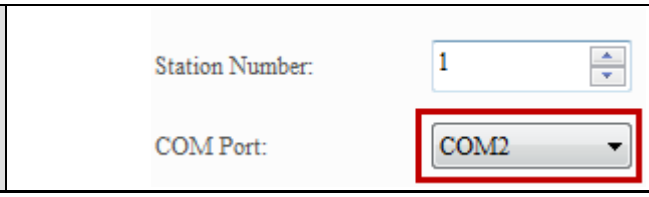
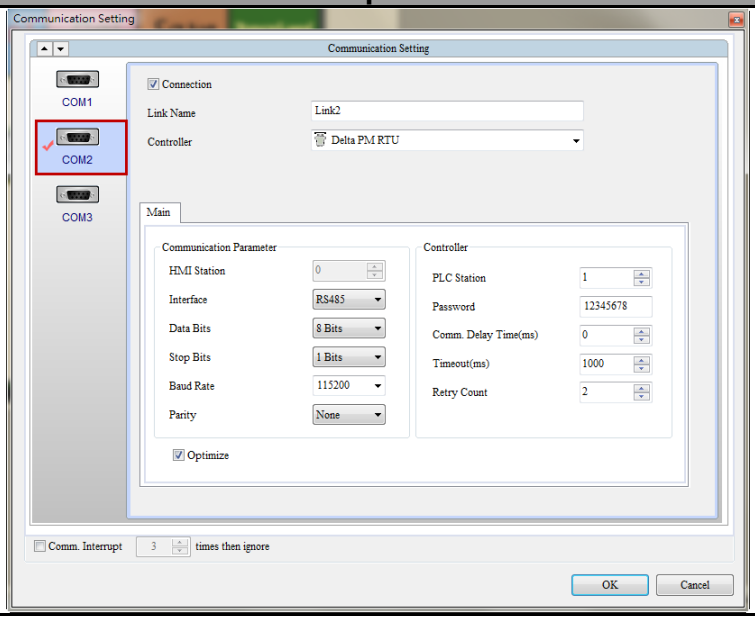


Figure 28-3-3 G-Code (20PM) file management element main property setting screen

No.	Property	Function Description
(1)	Button Width	➢ It sets the button width on toolbar. ➢ The default setting is 55 and the maximum is 100. Button width is 55: Button width is 70:
(2)	Button Height	➢ It sets the button height on toolbar. ➢ The default setting is 50 and the maximum is 100. Button height is 50: Button height is 70:
(3)	Button Color	➢ It sets the button color on toolbar. ➢ The default color is  . ➢ Each button color can be individually set. Button color Button color
(4)	Station Number	➢ It sets the station number of the controller, which ranges from 1 to 255.
(5)	COM Port	➢ The COM Port can be set to COM1, COM2 or COM3. ➢ COM Port has to be set to the same as the one selected by communication parameter. COM Port setting of G-Code file download element. 

No.	Property	Function Description		
		Set communication parameter		

◆ Text

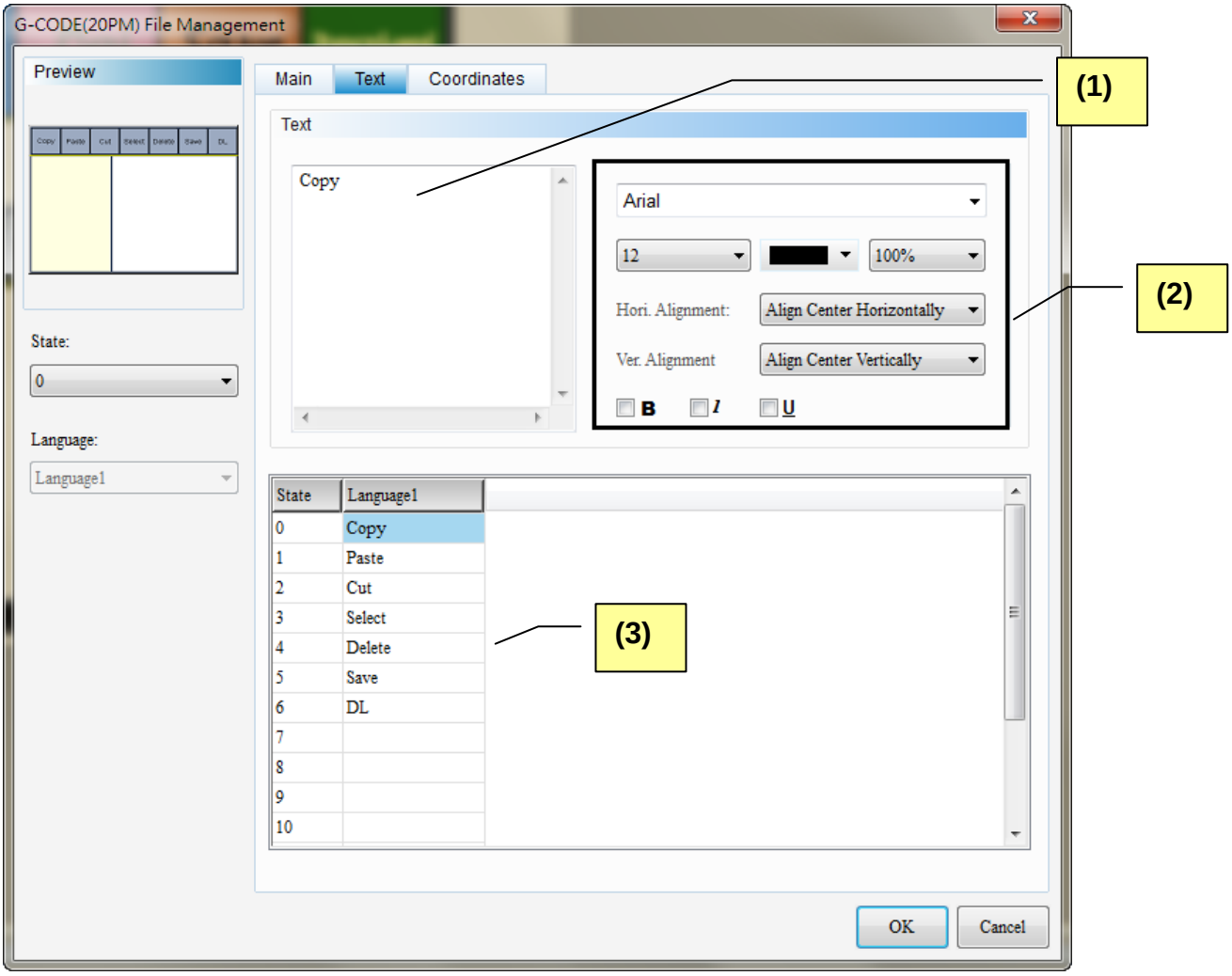
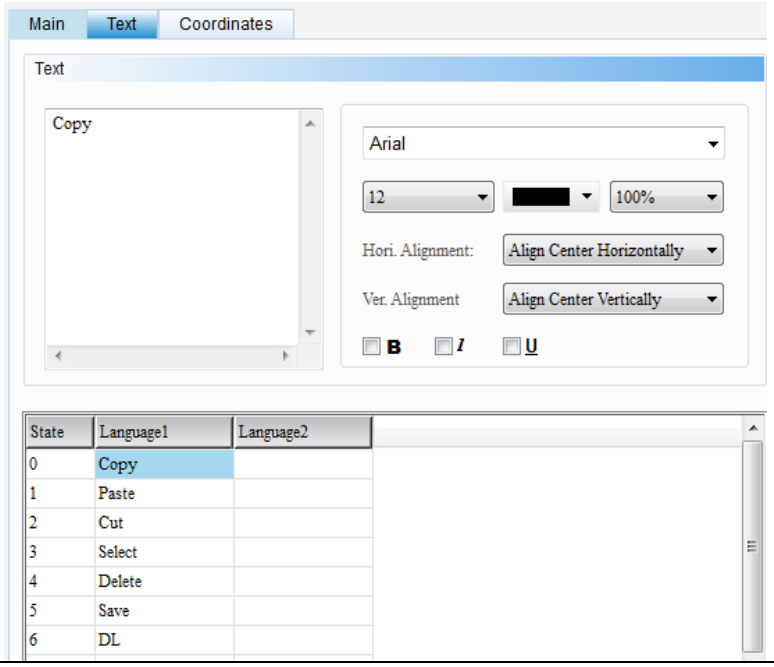


Figure 28-3-4 Text page of G-Code (20PM) file management

No.	Property	Function Description
(1)	Text	➢ Users can enter the text message in the text box. 

No.	Property	Function Description
(2)	Text related property	➢ The text related property includes text font, size, color, scaling, alignment type and bold/italic/underline. Please refer to the above figure for its setting.
(3)	Edit multilingual text	➢ If adding data in multiple languages, go to this page for editing. See the figure below. Users can edit the text in another language in column of Language2.

State	Language1	Language2
0	Copy	
1	Paste	
2	Cut	
3	Select	
4	Delete	
5	Save	
6	DL	

◆ Coordinates

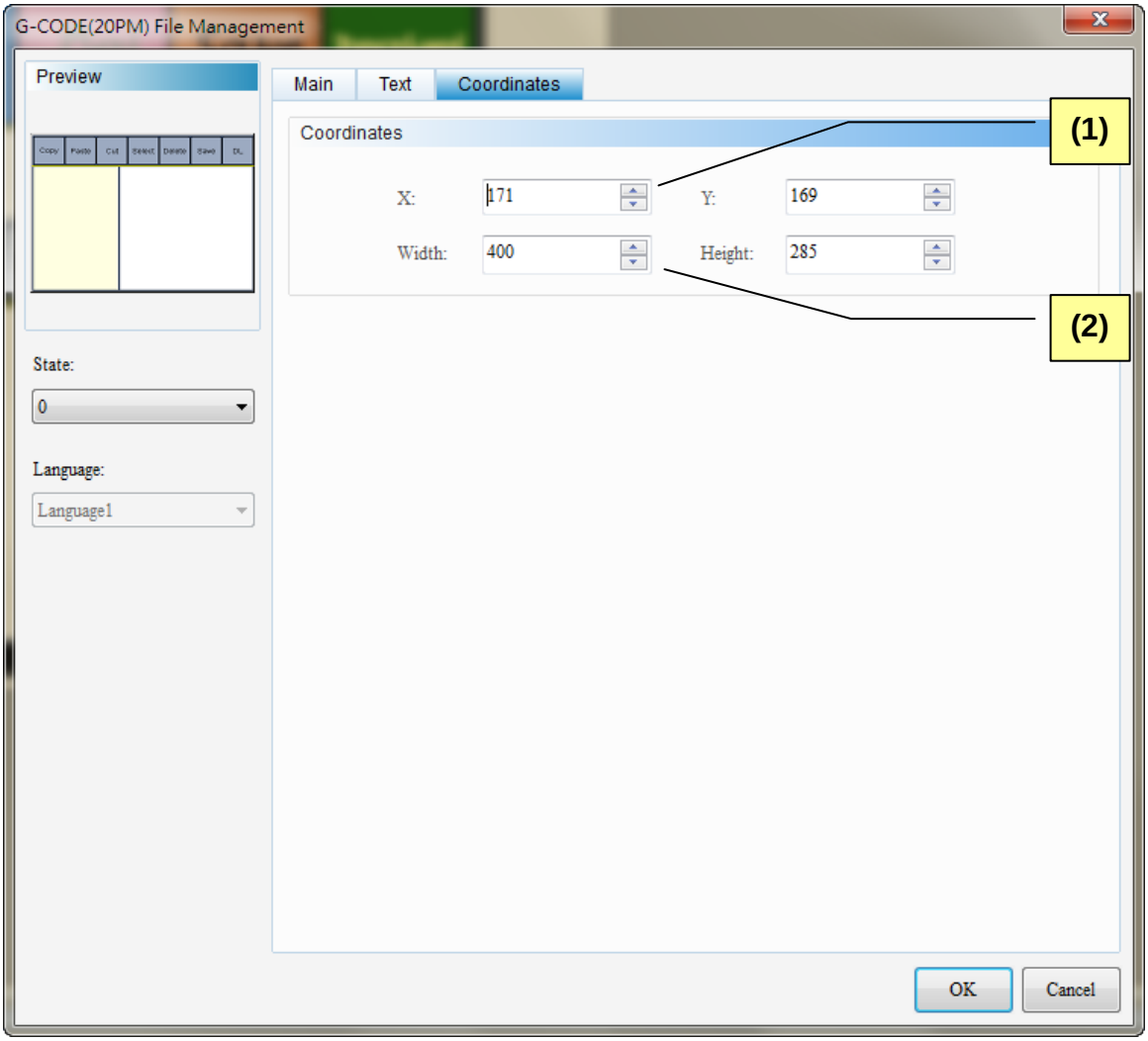


Figure 28-3-5 Coordinates page of G-Code (20PM) file management

No.	Property	Function Description
(1)	X- and Y-value	➢ X coordinates in upper-left corner and Y coordinates in upper-left corner.
(2)	Width and Height	➢ It sets the width and height of the element.

28-3-2 G-CODE (20PM) Download

This element can download G-Code file to 20PM from the list selected by file management.

Double click the G-Code (20PM) download element and the property setting screen will be shown as below:

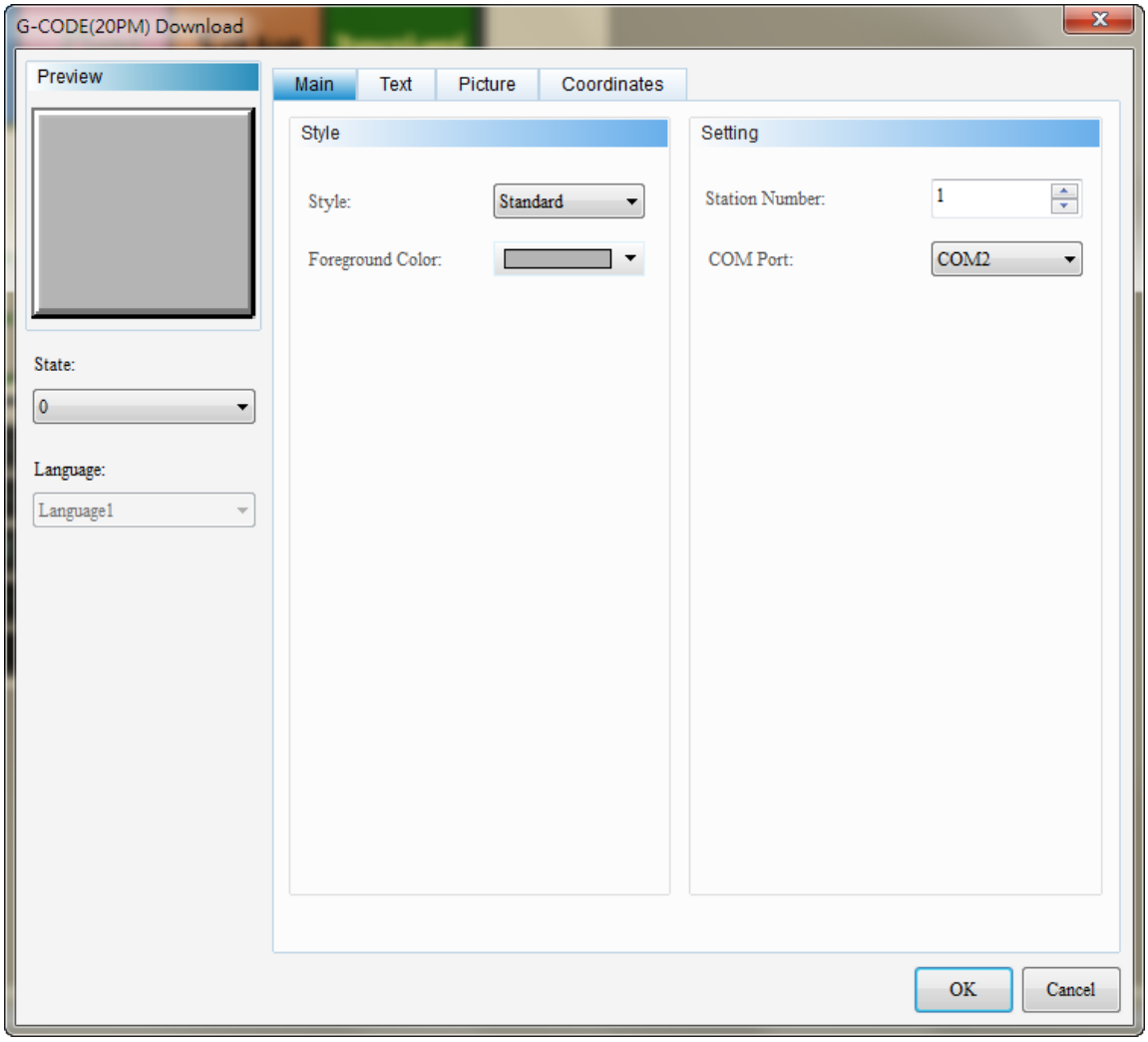


Figure 28-3-6 Property page of G-Code (20PM) file download

G-Code(20PM) File Download	
Function Page	**Content Description**
Main	It sets element style, foreground color, station number, COM port and transfer mode.
Text	It sets the text/font/size/color/format/scale/alignment.
Picture	It sets picture bank name, alignment, stretch mode, transparent color.
Coordinates	It sets the X-Y coordinate, width and height of the element.

Table 28-2-2 Functional page of G-Code (20PM) file download

◆ Main

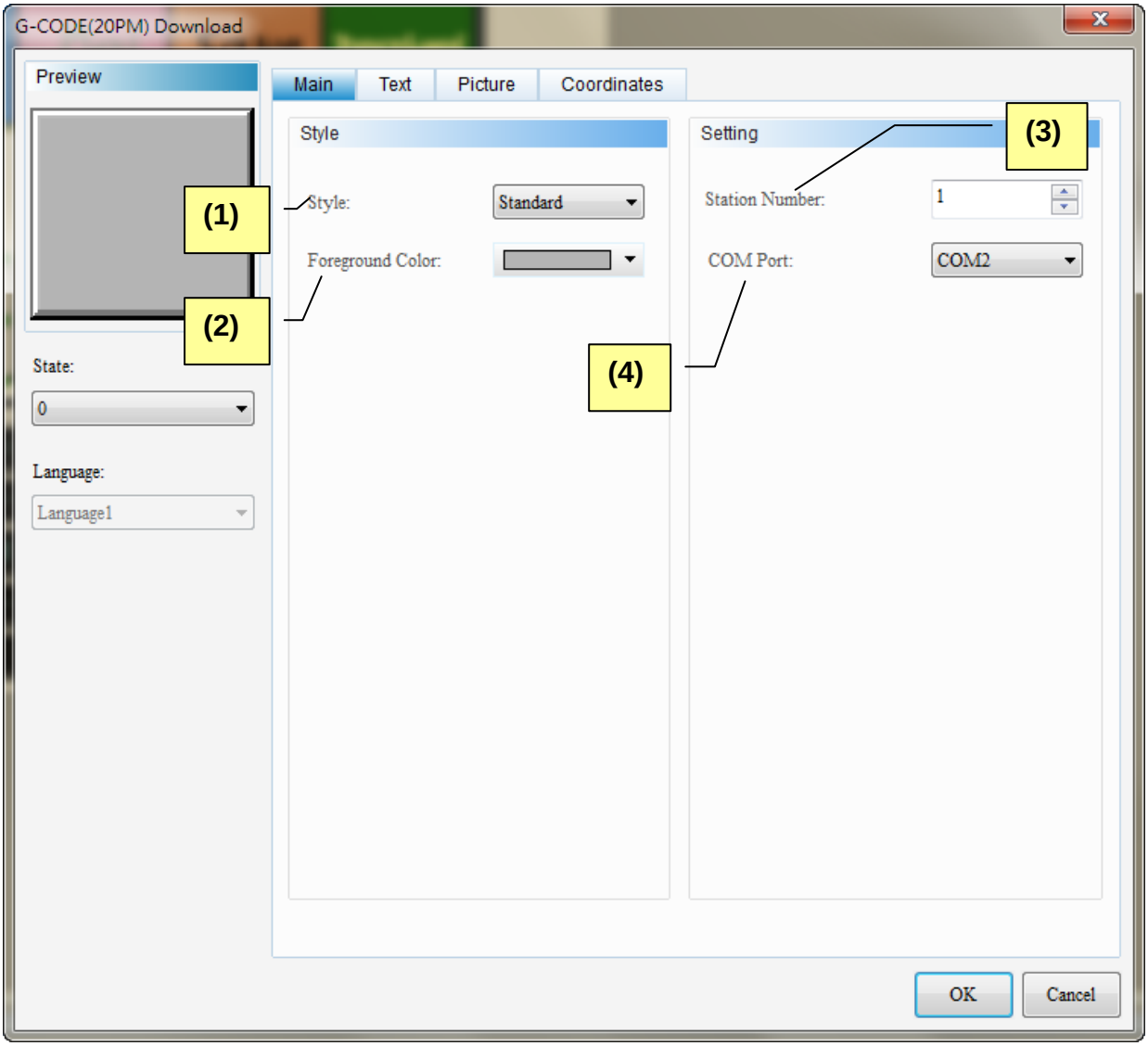
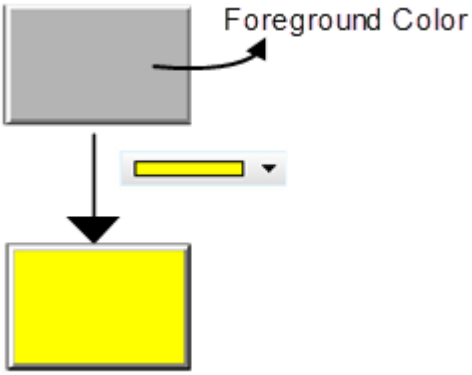
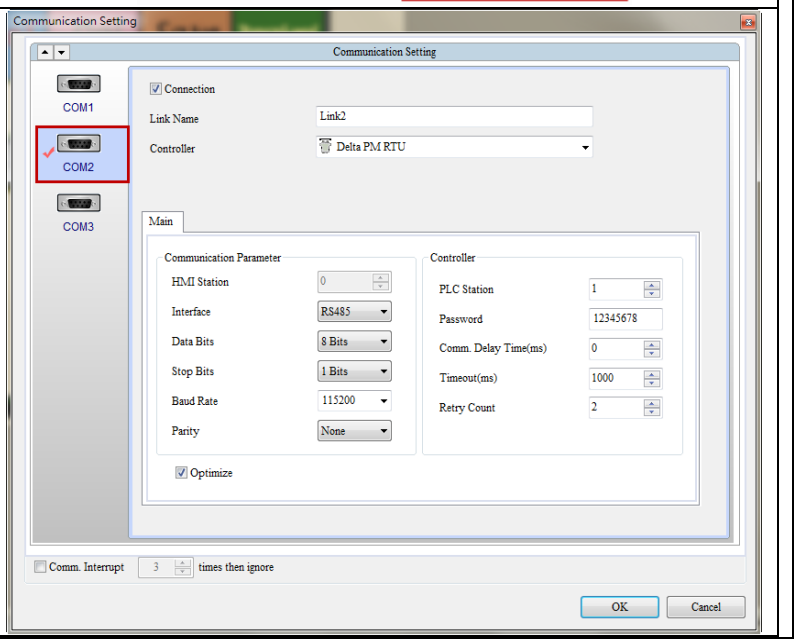


Figure 28-3-7 G-Code (20PM) file download element main property setting screen

<table>
<tr><th>No.</th><th>Property</th><th>Function Description</th></tr>
<tr><td>(1)</td><td>Element style</td><td>➢ Element style is divided into Standard, Raised and Sunken. Users can change the appearance of the element via this setting.
<table>
<tr><th>Standard</th><th>Raised</th><th>Sunken</th></tr>
<tr><td>
</td><td>
</td><td>
</td></tr>
</table></td></tr>
<tr><td>(2)</td><td>Foreground color</td><td>➢ It sets the element’s foreground color.

</td></tr>
<tr><td>(3)</td><td>Station number</td><td>➢ It sets the controller’s station number, which ranges from 1 to 255.</td></tr>
<tr><td>(4)</td><td>COM Port</td><td>➢ The set COM can be COM1, COM2 or COM3.
➢ The set COM must to be identical with the selected one of communication parameter.
<table>
<tr><td>COM setting for G-Code file download element</td><td>
</td></tr>
<tr><td>Set communication parameter</td><td> 
</td></tr>
</table></td></tr>
</table>

◆ Text

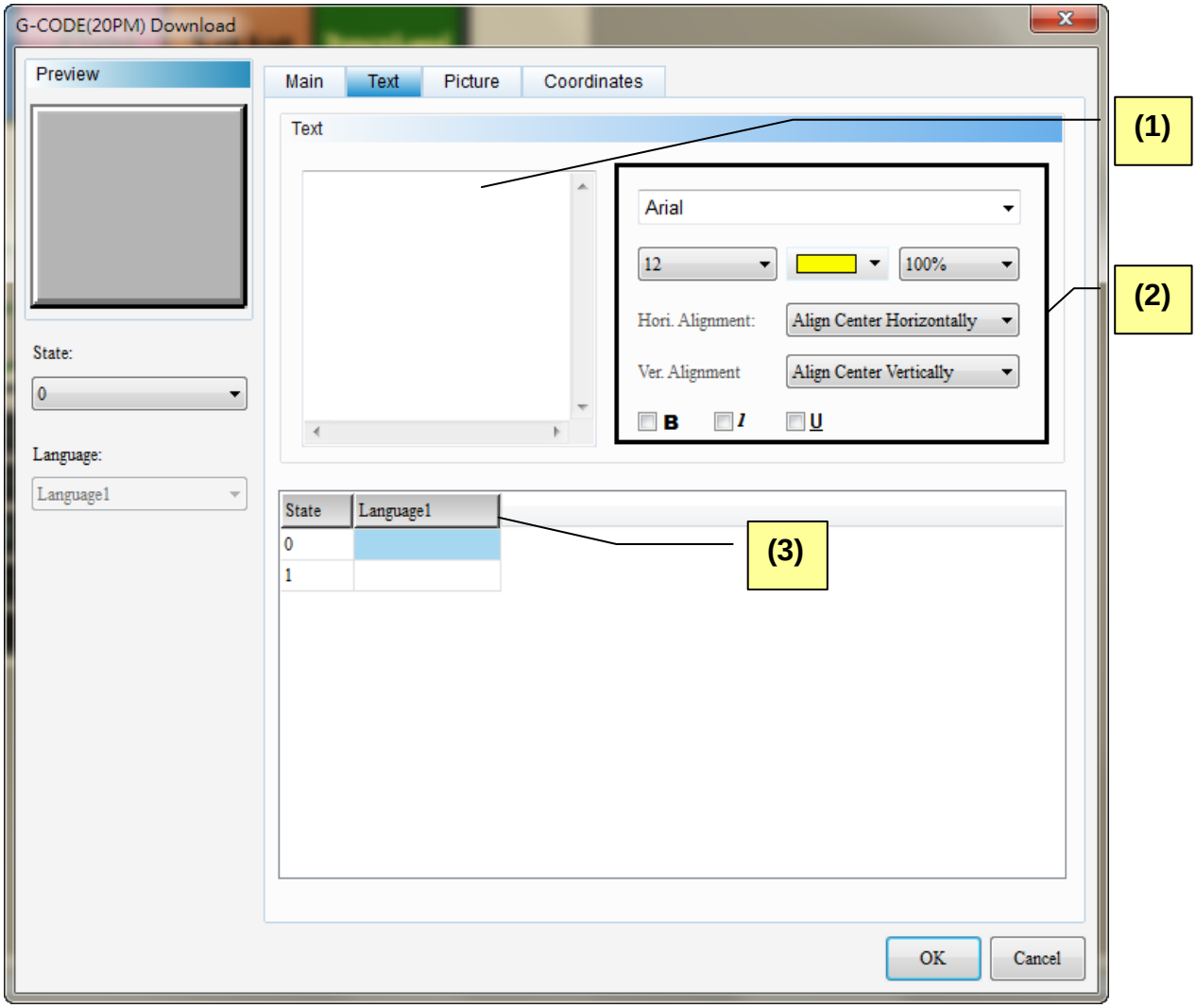
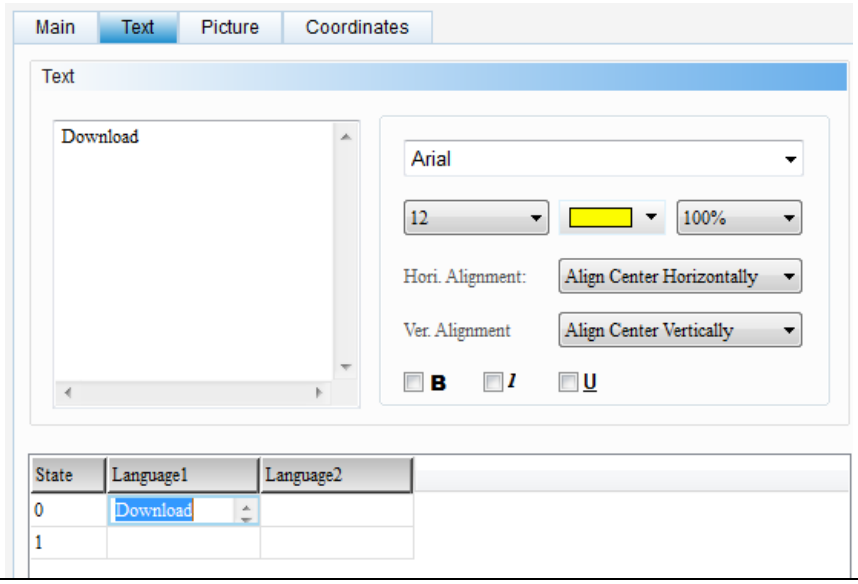
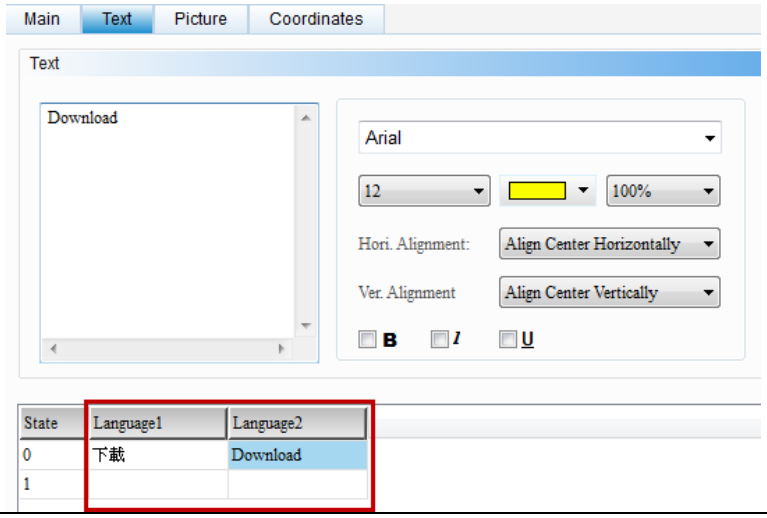


Figure 28-3-8 Text page of G-Code (20PM) file download

No.	Property	Function Description
(1)	Text	➢ Users can enter the text message in the text box. 
(2)	Text related	➢ The text related property includes text font, size, color, scaling, alignment type and bold/italic/underline. Please refer to the

No.	Property	Function Description
	property	above figure for its setting.
(3)	Edit multilingual text	➢ If adding data in multiple languages, go to this page for editing. See the figure below. Users can edit the text in another language in column of Language2. 

◆ Picture

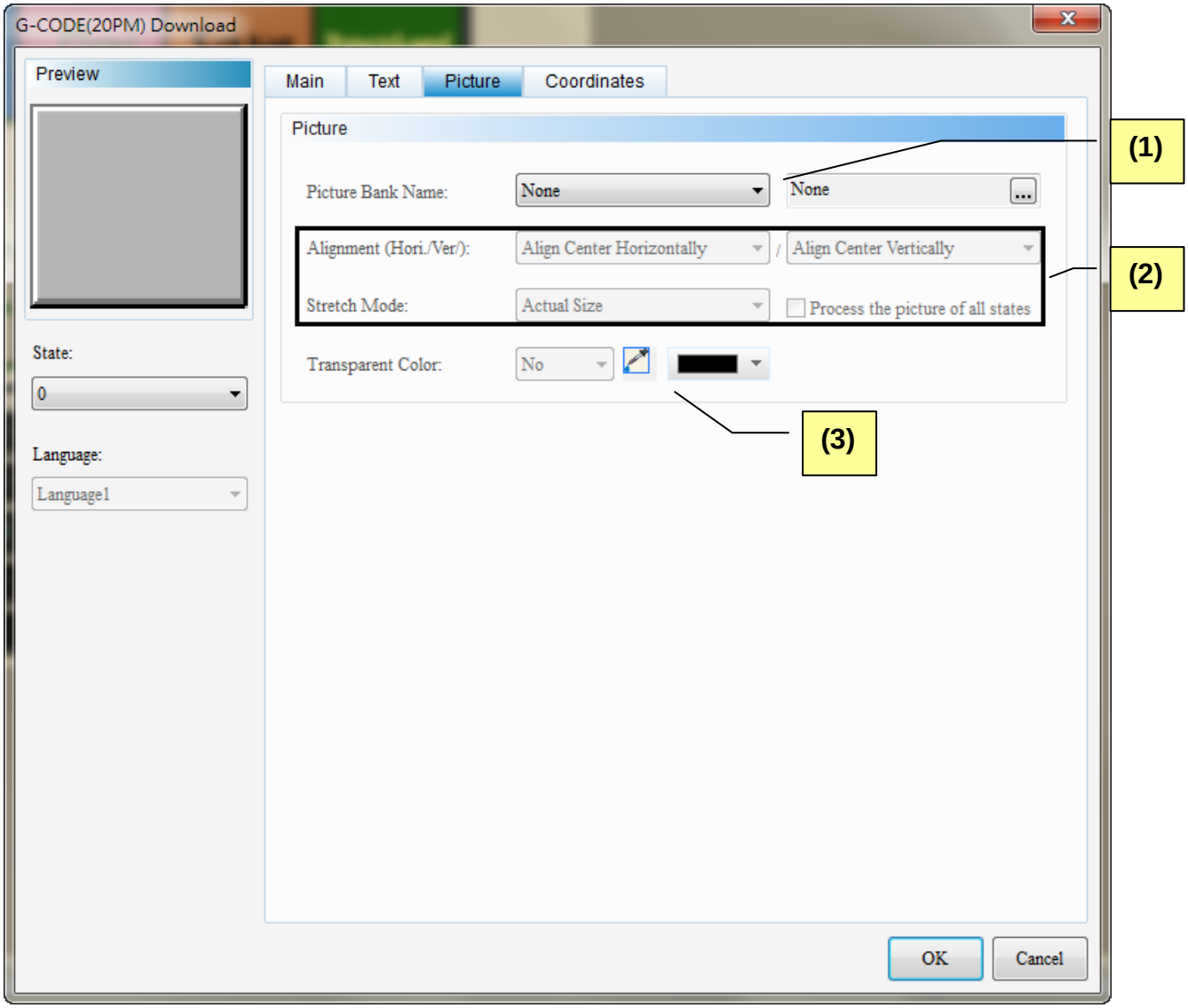
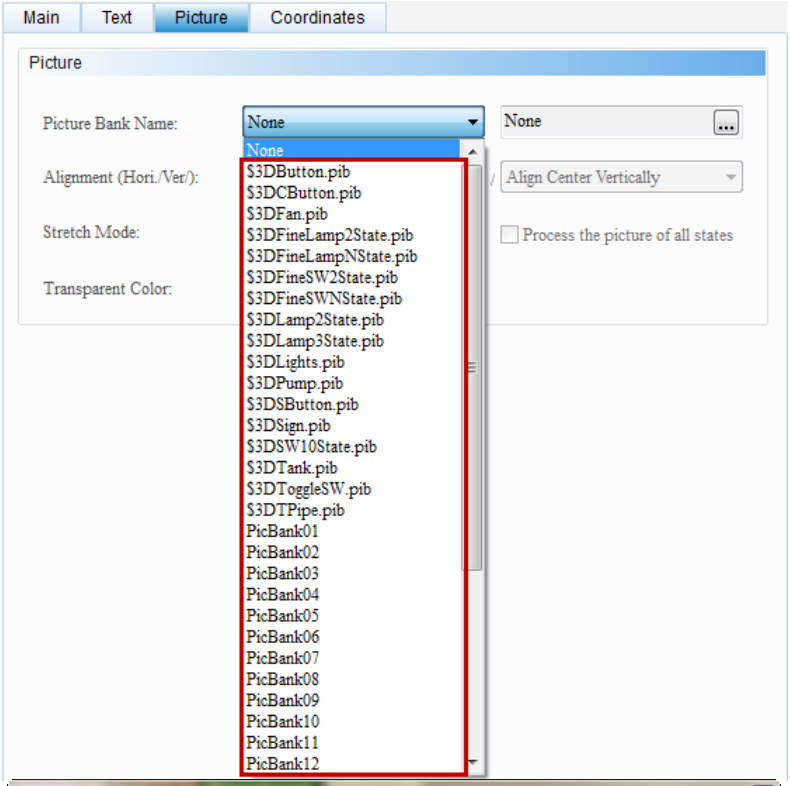
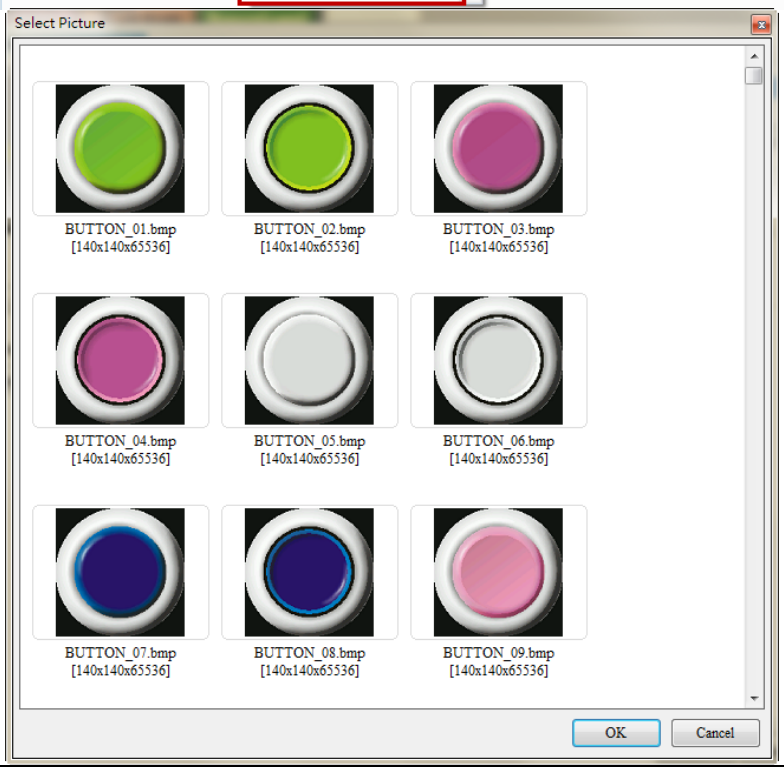
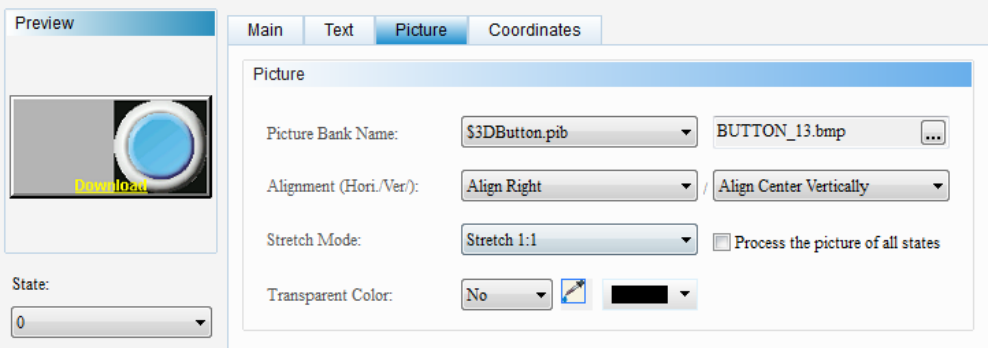
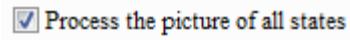
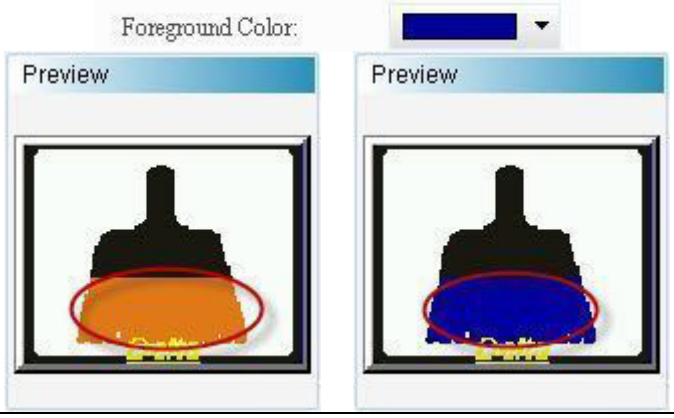


Figure 28-3-9 Picture page of G-Code (20PM) file download

No.	Property	Function Description
(1)	Picture bank name	➢ The default name of picture bank is none. If users desire to set up the picture display, please use the built-in picture bank from the drop-down list to select the picture.  

<table>
<tr><th>No.</th><th>Property</th><th>Function Description</th></tr>
<tr><td rowspan="2">(2)</td><td>Alignment (Hori. /Vert.)</td><td>➢ It sets the alignment type through this selection.
 

➢ The stretch mode is divided into Whole, Keep Aspect Ratio and Actual Size.
<table>
<tr><th>Whole</th><th>Keep Aspect Ratio</th><th>Actual Size</th></tr>
<tr><td>The figure will fill in the whole displayed area.</td><td>The displayed figure will be scaling according to the aspect ratio.</td><td>Regardless the size of the element, the figure will be displayed with its actual size.</td></tr>
<tr><td>
</td><td>
</td><td>
</td></tr>
</table>
➢ If users check “Process the picture of all states”, it means the setting will be applied to all so that users do not have to set each figure individually.
 
</td></tr>
<tr><td>(3)</td><td>Transparent Color</td><td>➢ This function can specify any color in the picture as transparent color. When clicking on this icon, and select the orange part of the broom, the orange part will be identical to the foreground color.
 
</td></tr>
</table>

◆ Coordinates

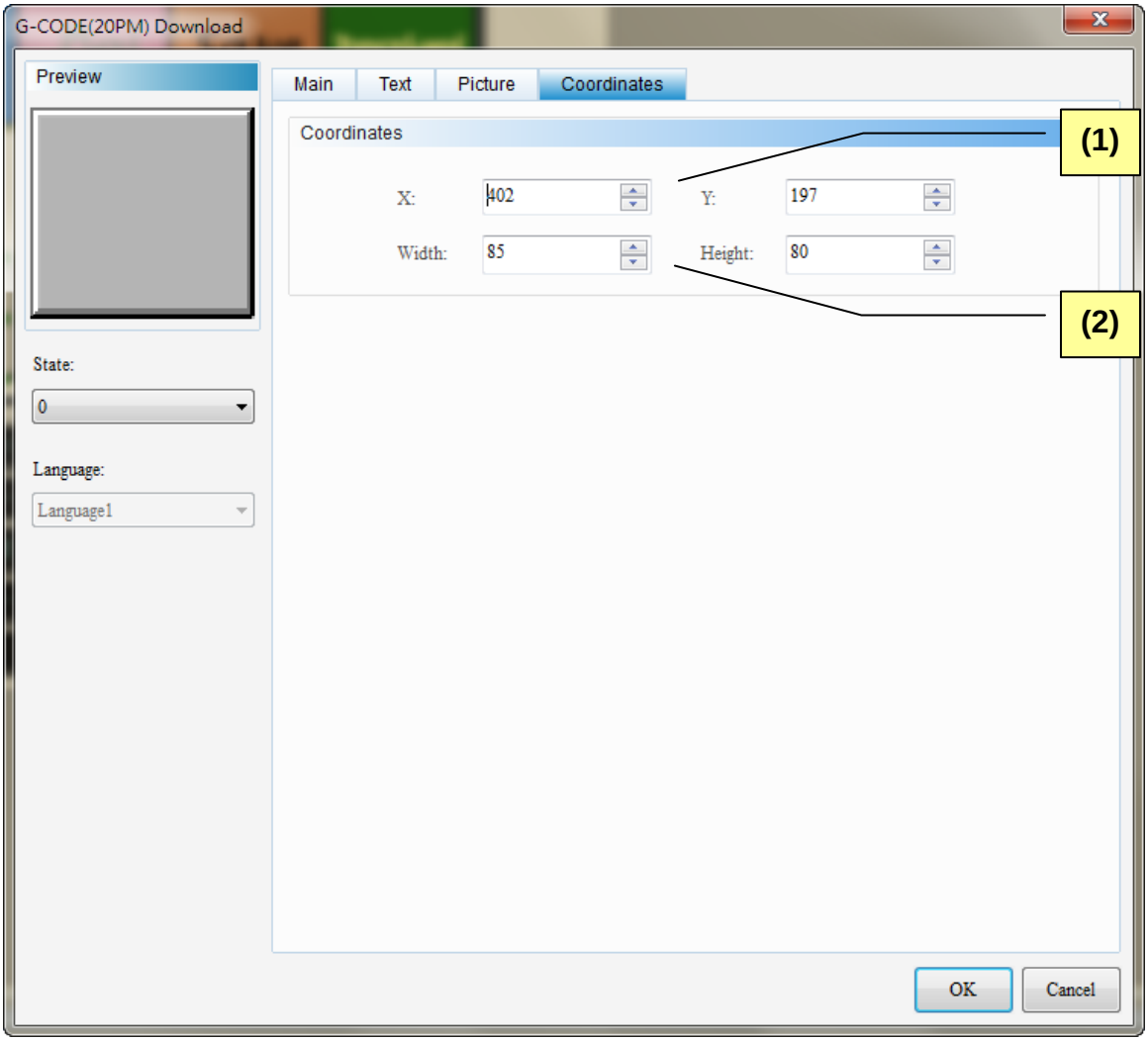


Figure 28-3-10 Coordinates page of G-Code (20PM) file download

No.	Property	Function Description
(1)	X- and Y-value	➢ X coordinates in upper-left corner and Y coordinates in upper-left corner.
(2)	Width and Height	➢ It sets the width and height of the element.

28-4 G-Code Keypad

G-Code enables users to edit G-Code file without connecting to external keypad, which saves the space and enhances the efficiency. This element supports G-Code editing and allows users to edit the entry element. Most functions are similar to KeyPad which described in Chapter 17. Please refer to Chapter 13 for element entry.

In Element Bank, G-Code (10MC), G-Code (20MC) and G-Code (20PM) folders all provides KeyPad elements.

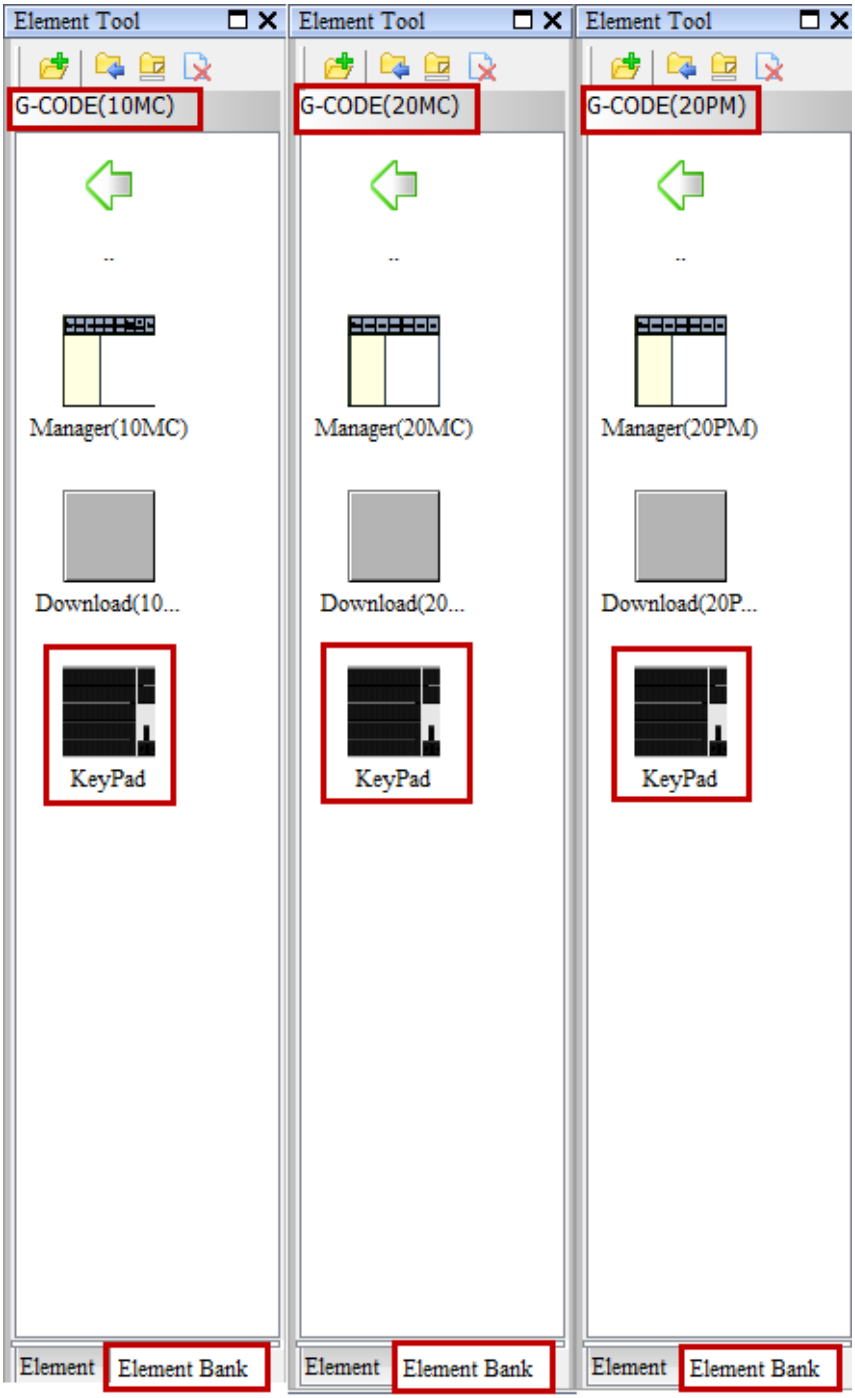


Figure 28-4-1 G-Code keypad

G-Code keypad element has two kinds of property settings, one is the rectangle element below the keypad and the other one is the font setting element displayed on the keypad. Double click the G-Code keypad element (rectangle) and the property setting screen will be shown as below:

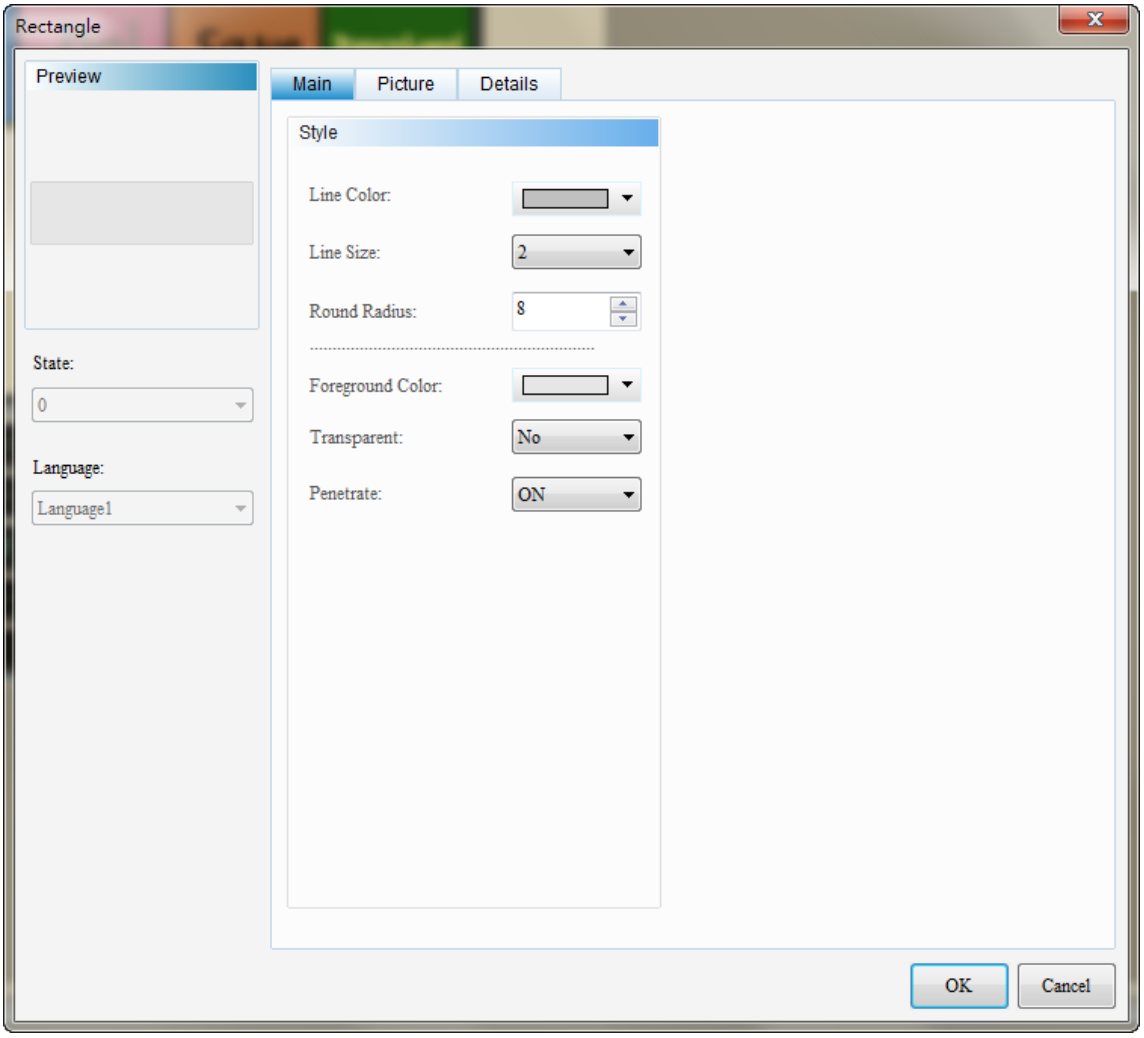


Figure 28-4-2 Property page of G-Code keypad (rectangle)

G-Code Keypad (Rectangle)	
Function Page	**Content Description**
Main	It sets line color, line size, round radius, foreground color and transparent.
Picture	It sets picture bank name, alignment (Hori/Ver.), stretch mode, and transparent color.
Details	Invisible address

Table 28-4-1 Functional page of G-Code keypad element (rectangle)

◆ Main

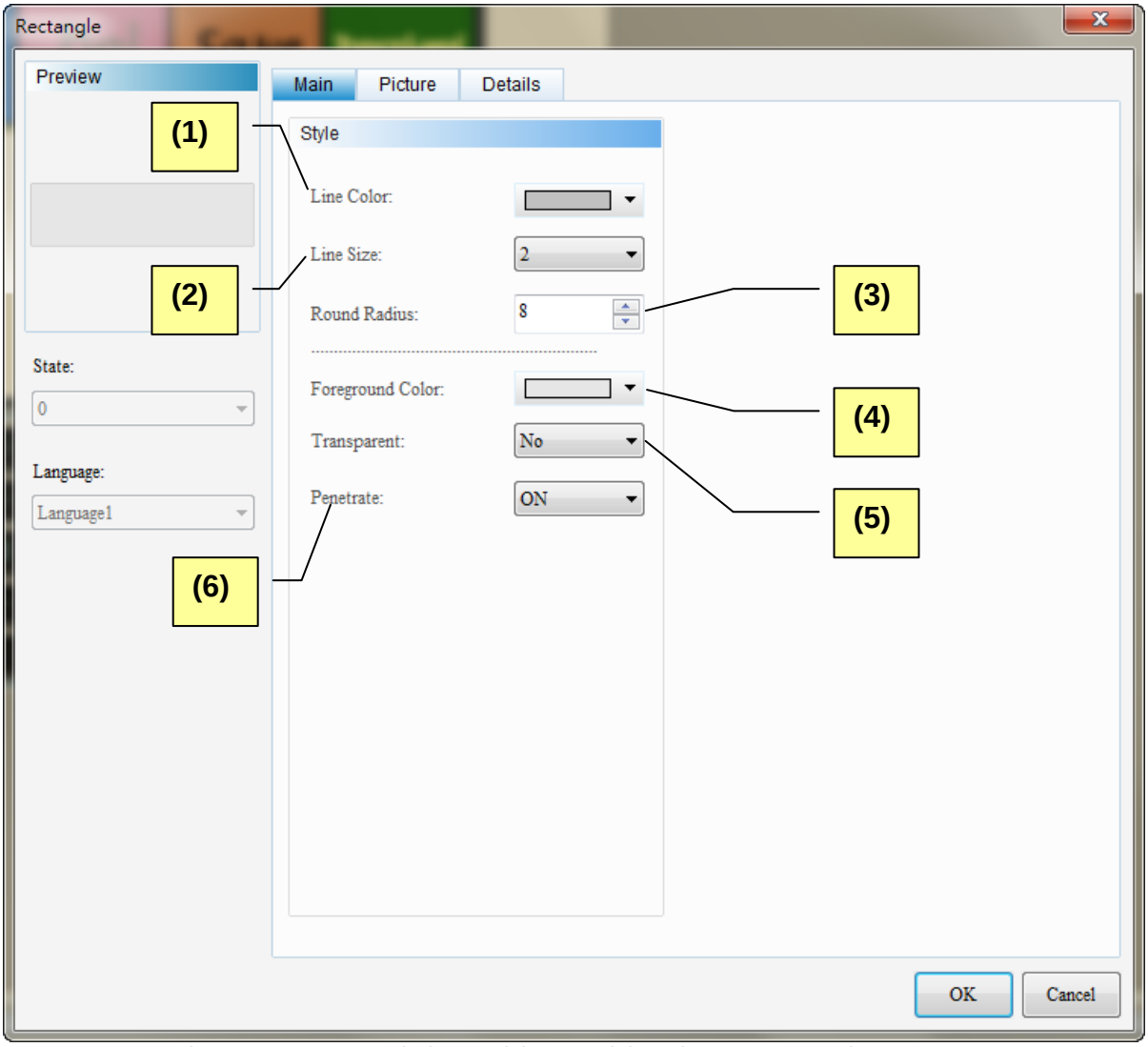
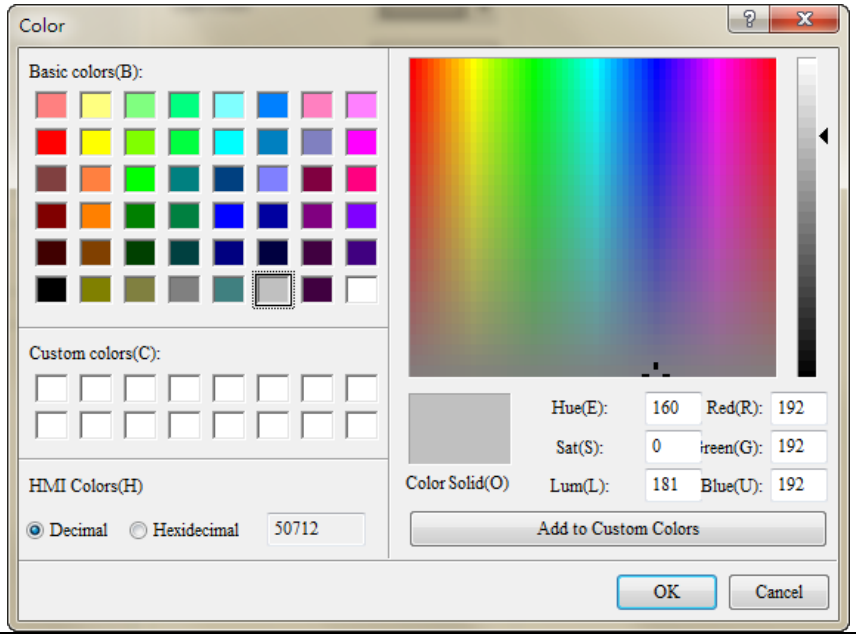
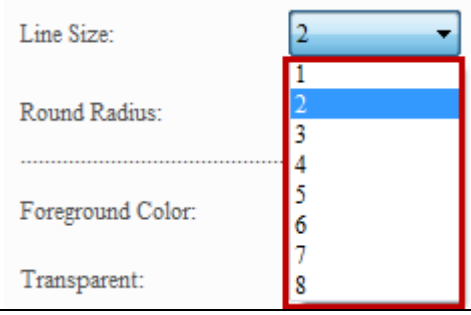
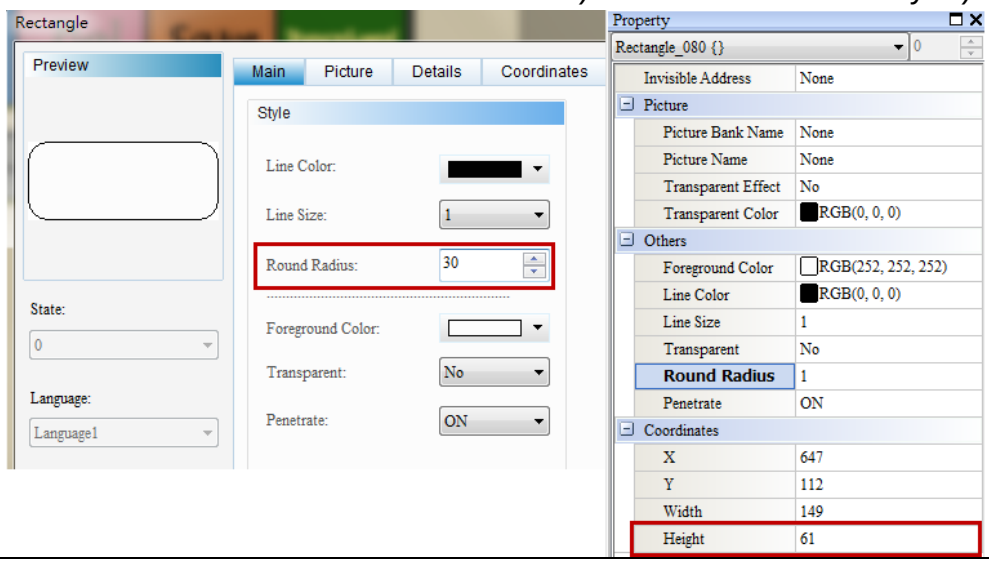
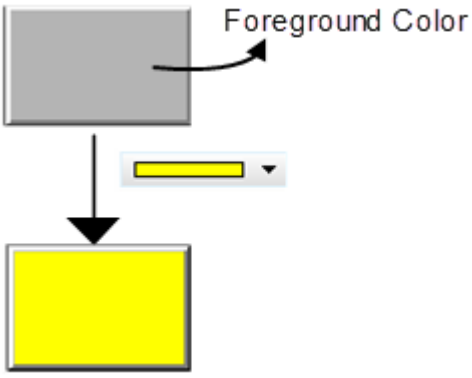
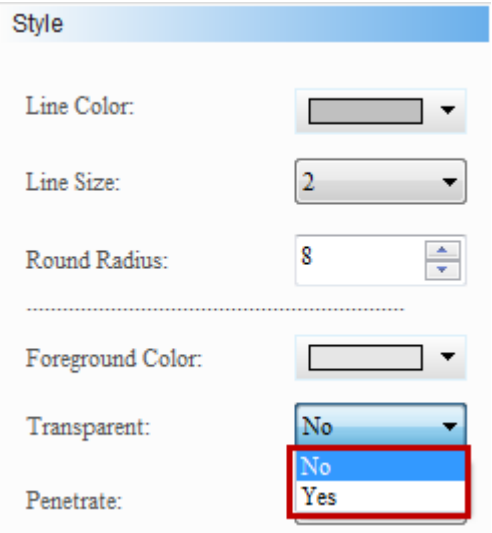
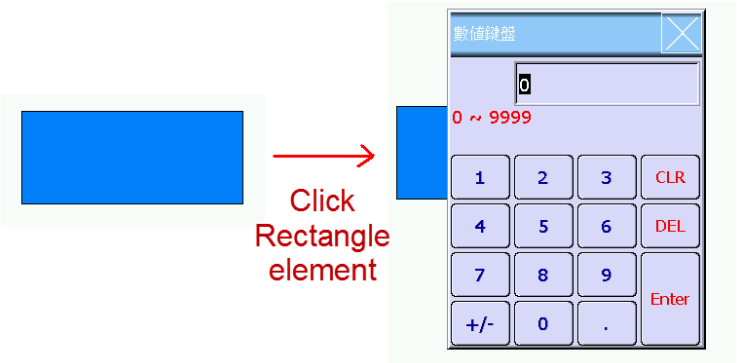
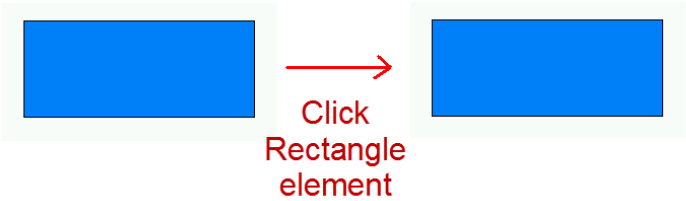


Figure 28-4-3 G-Code keypad (rectangle) main property setting screen

No.	Property	Function Description
(1)	Line color	➢ Users can define the line color. 
(2)	Line size	➢ Users can select the line size from 1 to 8. 
(3)	Round radius	➢ The maximum value of the round radius is determined by the element's width and height. (The minimum value is acquired from: take the minimum value of width or height (see which one is smaller and take the smallest one) and divide the value by 2.) 
(4)	Foreground color	➢ It can set the foreground color of the element.

No.	Property	Function Description
		
(5)	Transparent	➢ You can choose Yes or No for transparent.  ➢ Select Yes, it means the foreground color of the rectangle element is transparent and only shows the frame color. Select No, then it will show the foreground color. **Transparent: Yes** **Transparent: No**
(6)	Penetrate	➢ This function allows the user to click the element that overlapped with the rectangle. ➢ Please refer to the following example. Users need to create one numeric entry element first. Then, create a rectangle element which will be placed above the numeric element. **Penetrate: ON** ➢ Users can select the numeric entry element by pressing the rectangle.

No.	Property	Function Description		
				
		Penetrate: OFF	➢ Users cannot select the numeric entry element by pressing the rectangle. 	

◆ Picture

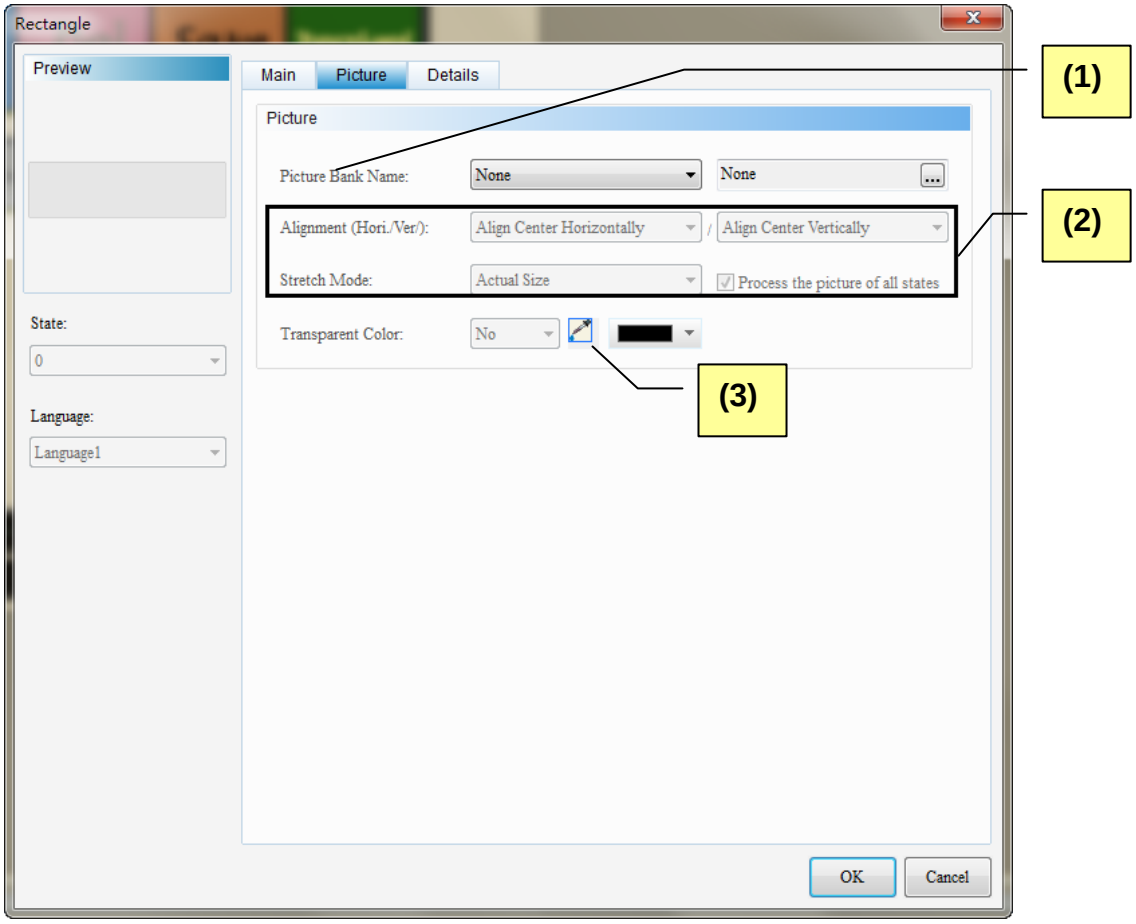
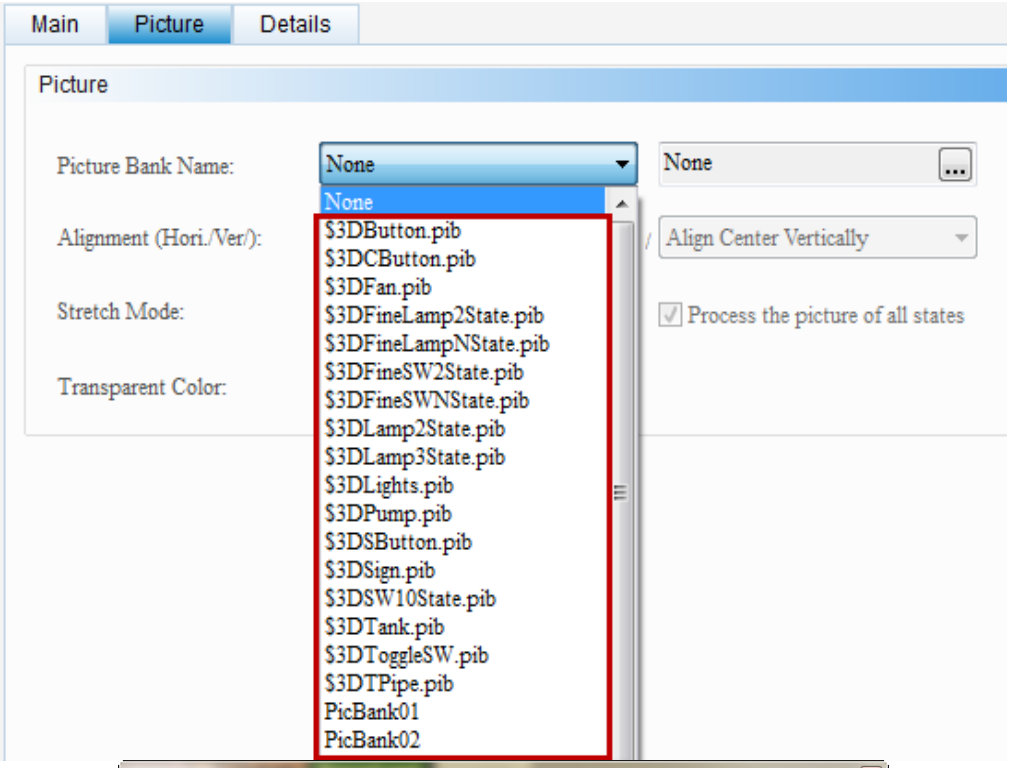
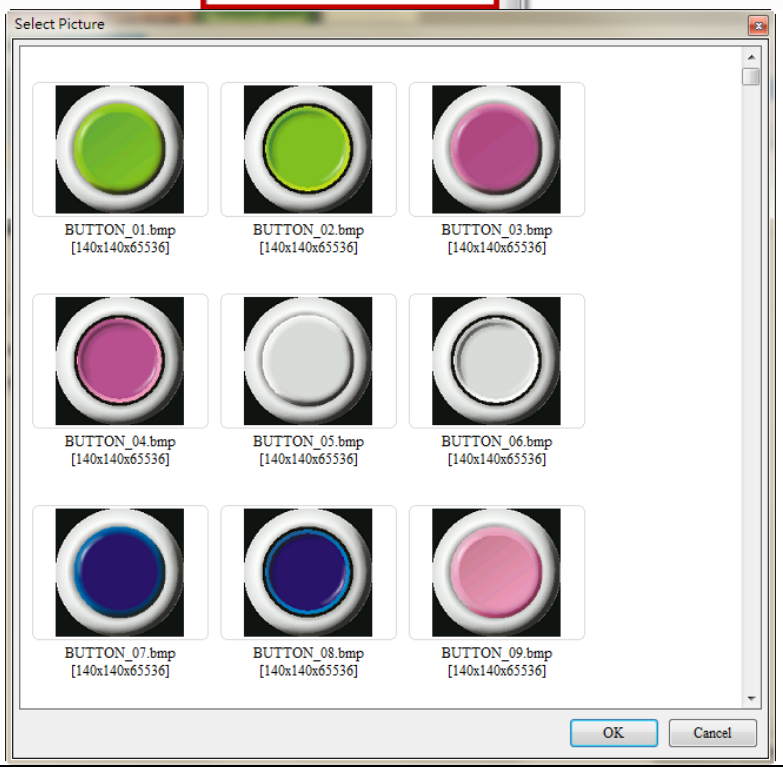
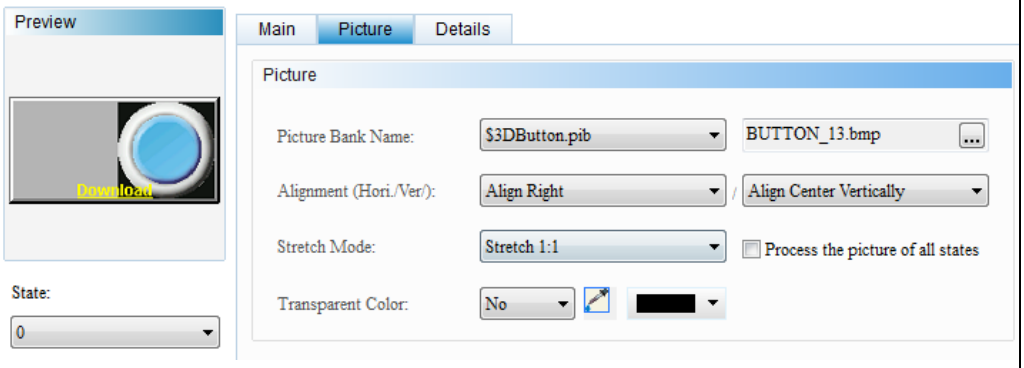
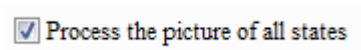
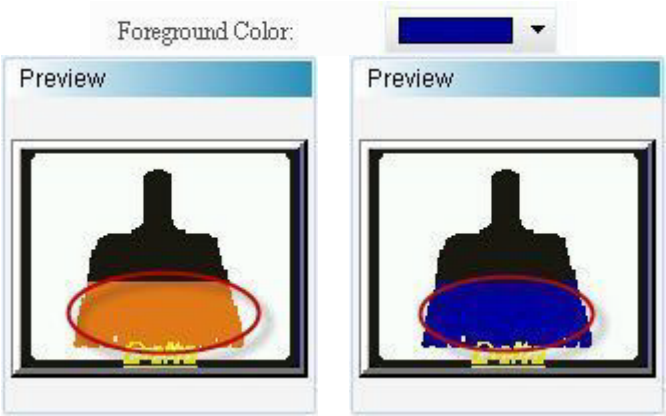


Figure 28-4-4 Picture page of G-Code keypad (rectangle)

No.	Property	Function Description
(1)	Picture bank name	➢ The default name of picture bank is none. If users desire to set up the picture display, please use the built-in picture bank from the drop-down list to select the picture.  

<table>
<tr><th>No.</th><th>Property</th><th>Function Description</th></tr>
<tr><td rowspan="2">(2)</td><td>Alignment (Hori. /Vert.)</td><td>➢ It sets the alignment type through this selection.
 

➢ The stretch mode is divided into Whole, Keep Aspect Ratio and Actual Size.
<table>
<tr><th>Whole</th><th>Keep Aspect Ratio</th><th>Actual Size</th></tr>
<tr><td>The figure will fill in the whole displayed area.</td><td>The displayed figure will be scaling according to the aspect ratio.</td><td>Regardless the size of the element, the figure will be displayed with its actual size.</td></tr>
<tr><td>
</td><td>
</td><td>
</td></tr>
</table>
➢ If users check “Process the picture of all states”, it means the setting will be applied to all so that users do not have to set each figure individually.
 
</td></tr>
<tr><td>Stretch Mode</td></tr>
<tr><td>(3)</td><td>Transparent Color</td><td>➢ This function can specify any color in the picture as transparent color. When clicking on this icon, and select the orange part of the broom, the orange part will be identical to the foreground color.
 
</td></tr>
</table>

◆ Details

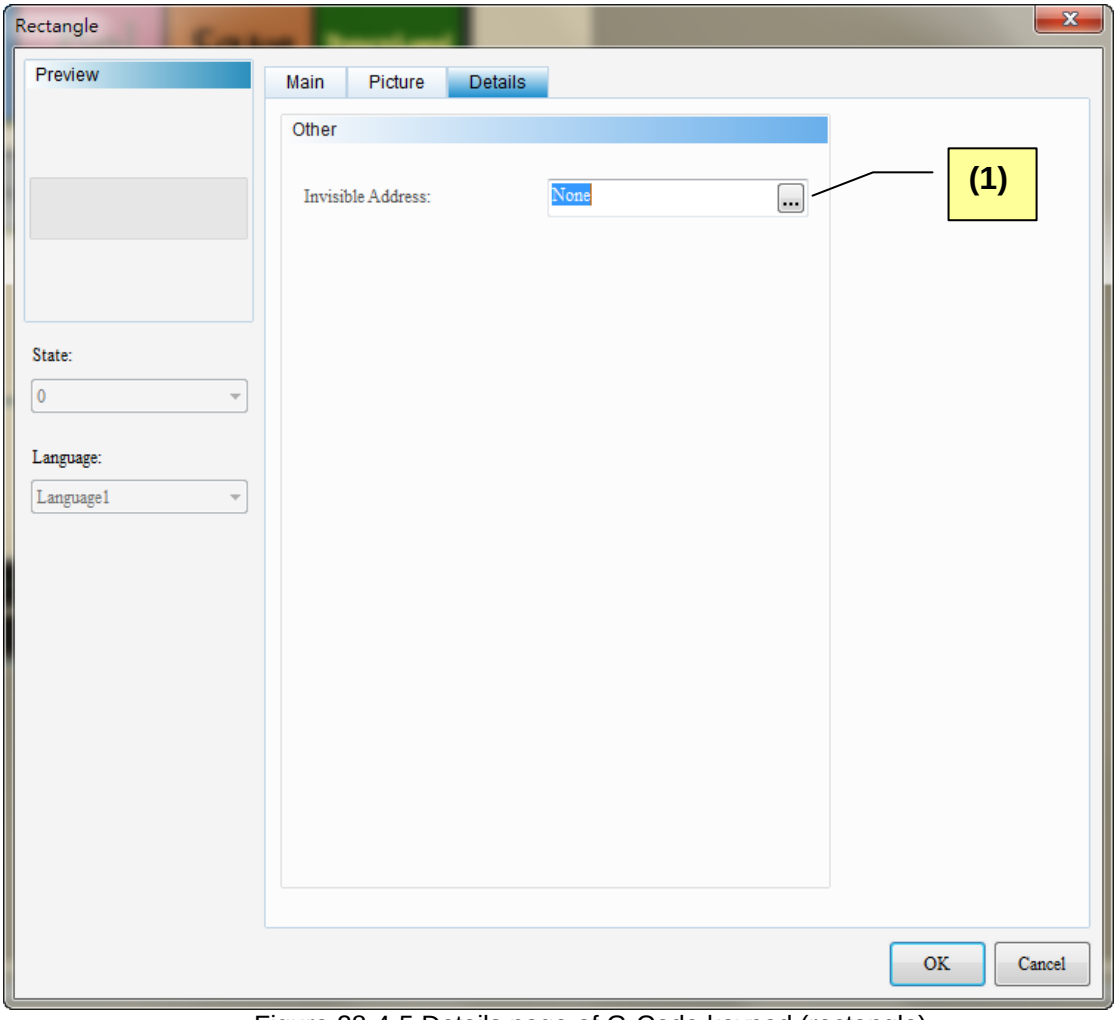
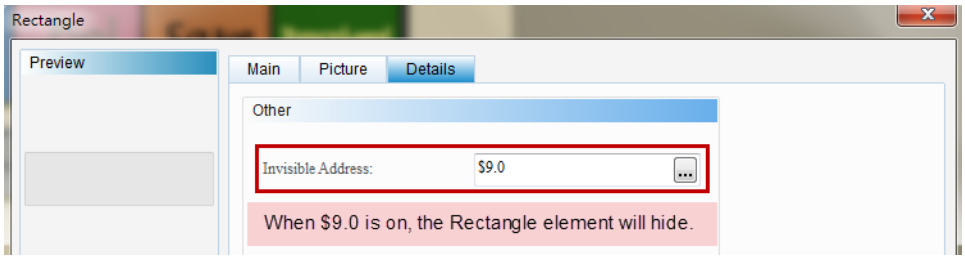


Figure 28-4-5 Details page of G-Code keypad (rectangle)

No.	Property	Function Description
(1)	Invisible address	➢ When this bit is on, the button element will be hidden and its function will be invalid. 

Double click the G-Code keypad and the setting screen will be shown as below:

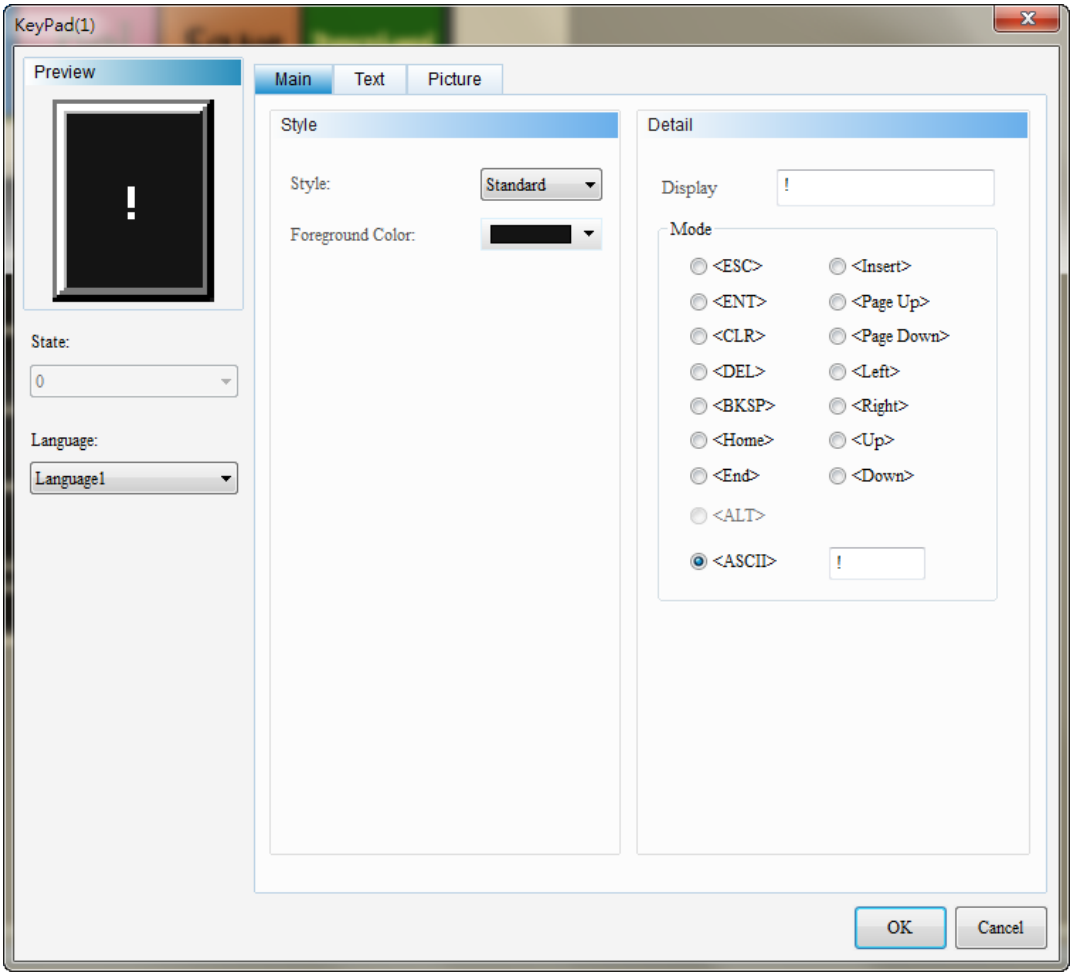


Figure 28-4-6 Property page of G-Code keypad

G-Code Keypad	
Function Page	**Content Description**
Main	It sets element style, foreground color, display, and mode.
Text	It sets the text/font/size/color/format/scale/alignment.
Picture	It sets picture bank name, alignment (Hori/Ver.), stretch mode, and transparent color.

Table 28-4-2 Functional page of G-Code keypad

◆ Main

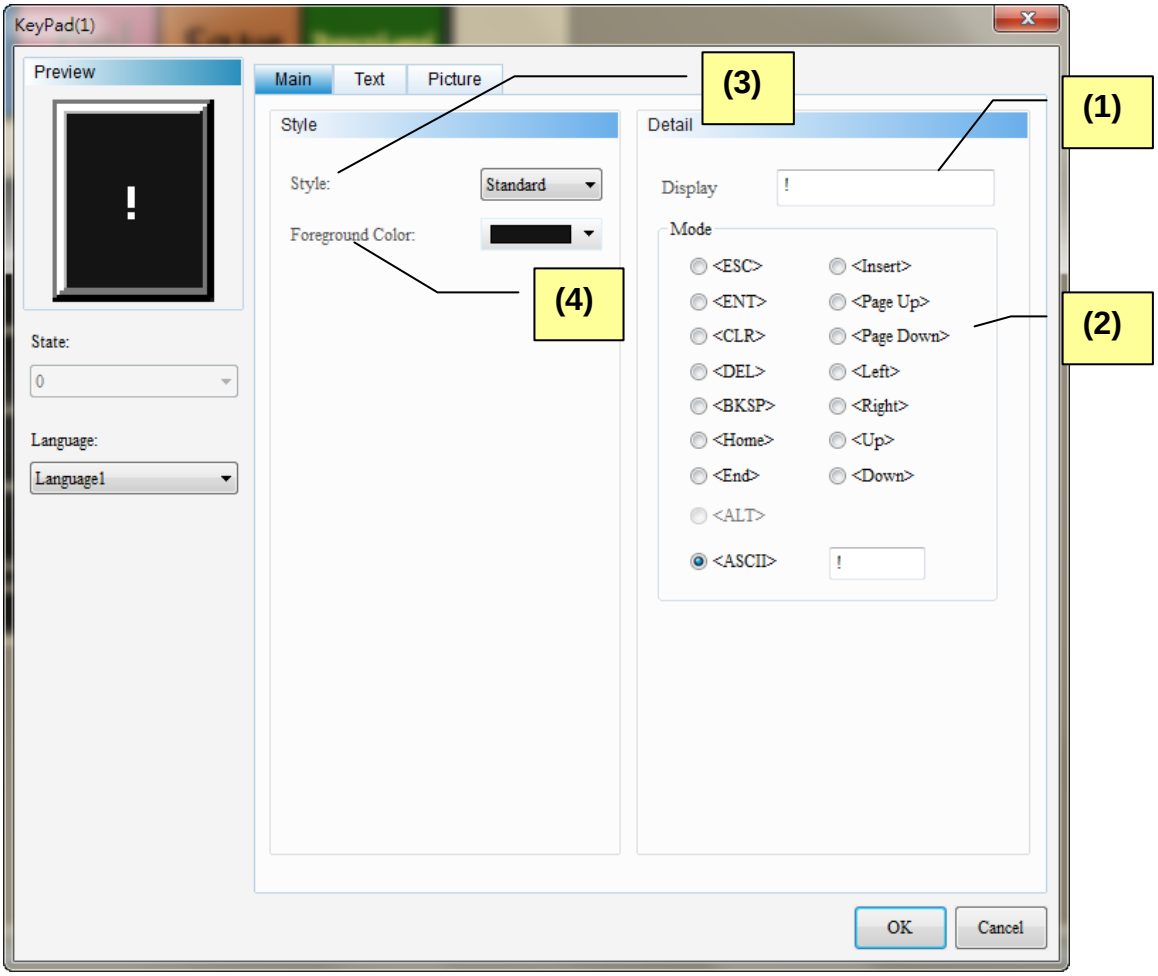
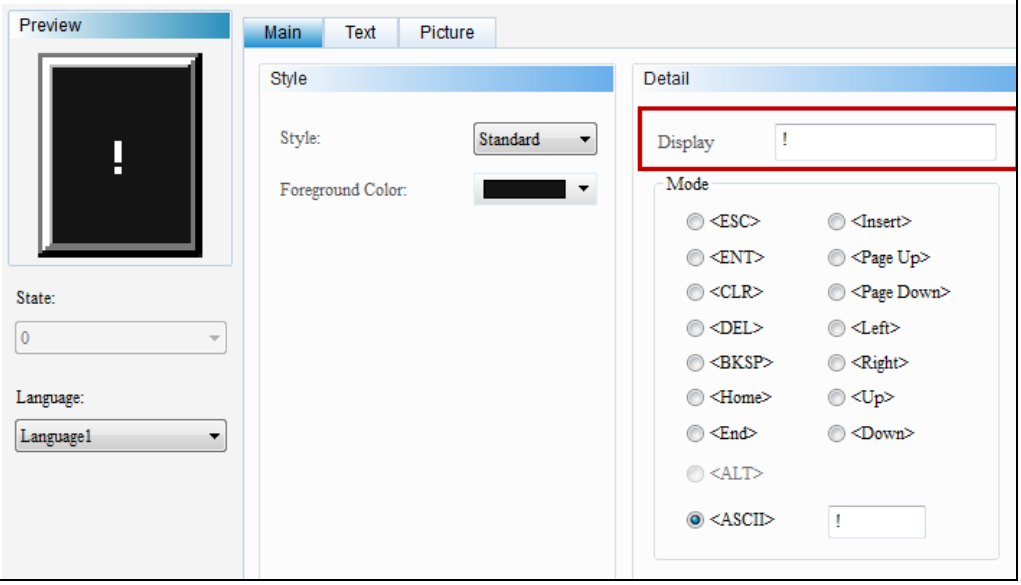
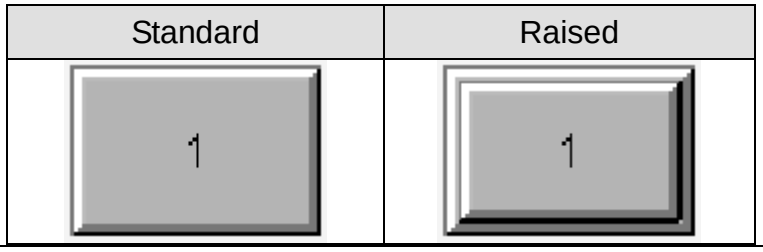
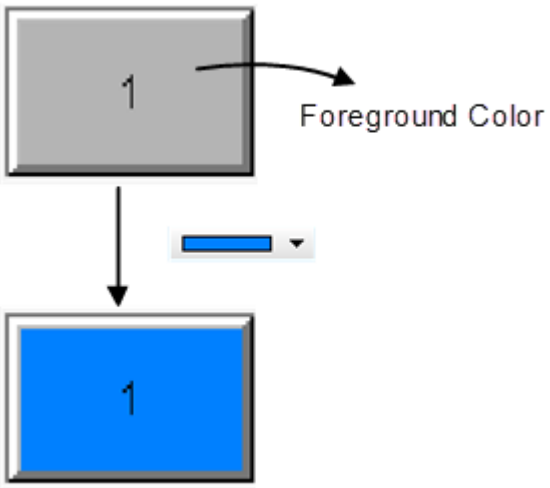


Figure 28-4-7 G-Code keypad (1) element main property setting screen

No.	Property	Function Description
(1)	Display	➢ When users click on one small block on the keypad (1) element, it will display the value of the block that you just selected. 

No.	Property	Function Description
(2)	Mode	➢ We provide 15 modes, including [ESC], [ENT], [CLR], [DEL], [BKSP], [Home], [End], [Insert], [Page Up], [Page Down], [Left], [Right], [Up], [Down] and [ASCII] for users to define the block. ◆ [ESC]: It means to cancel the text entry; if the keypad element is placed on subscreen, the subscreen will be closed when you press ESC. ◆ [ENT]: it means to enter. ◆ [CLR]: it means to clear the whole string. ◆ [DEL]: it means to delete one character. ◆ [BKSP]: it means to delete one character. (backspace). ◆ [Home]: it means the cursor will move to the beginning of the row. ◆ [End]: it means the cursor will move to the end of the row. ◆ [Insert]: it is the toggle key of inserting and replacing characters. ◆ [Page Up]: it means to go to the previous page. ◆ [Page Down]: it means to go to the next page. ◆ [Left]: it means the cursor will move to the left. ◆ [Right]: it means the cursor will move to the right. ◆ [Up]: it means the cursor will move to the previous row. ◆ [Down]: it means the cursor will move to the next row. ◆ [ASCII]: it means users can enter the specified character code.
(3)	Style	➢ The Style option provides Standard and Raised for selection. This setting allows the user to change the appearance of the element. 
(4)	Foreground color	➢ It can set the foreground color of the element.

No.	Property	Function Description
		

◆ Text

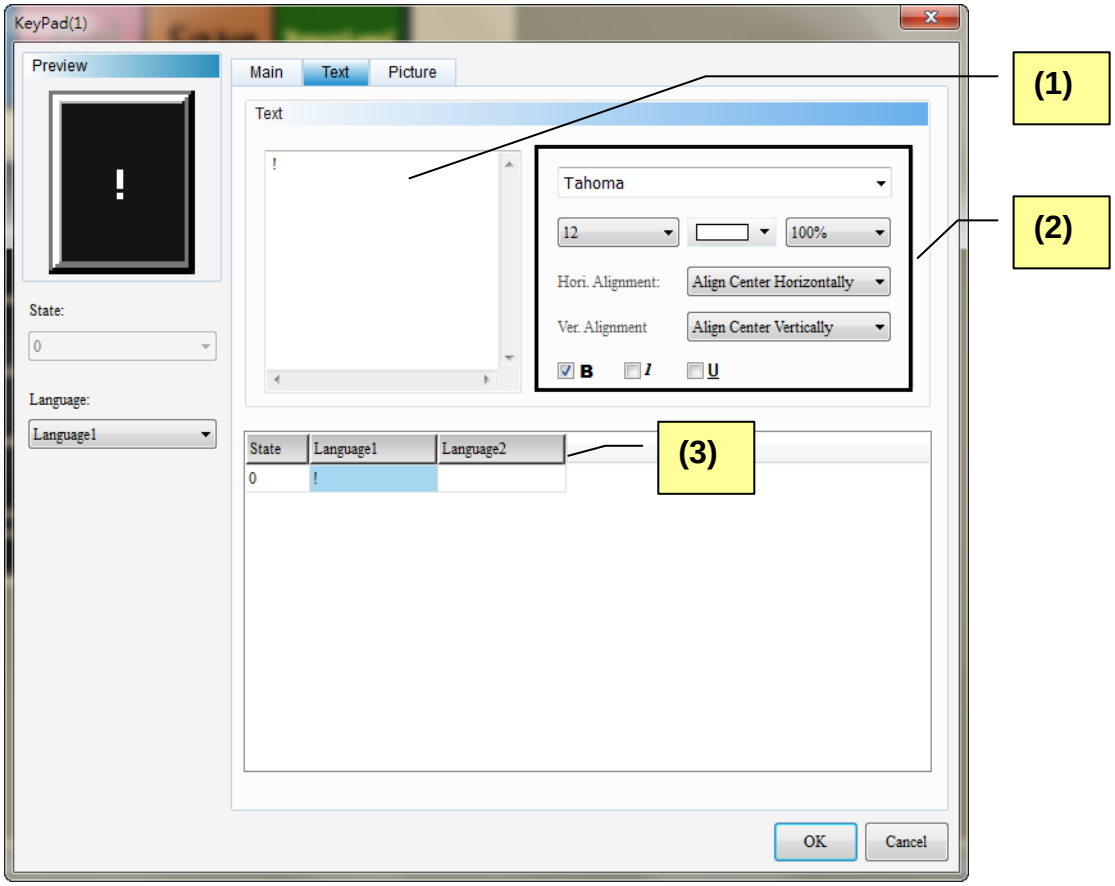
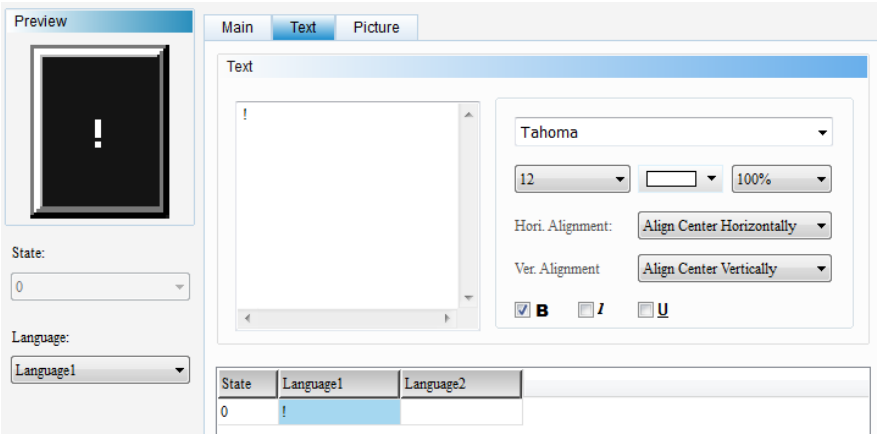
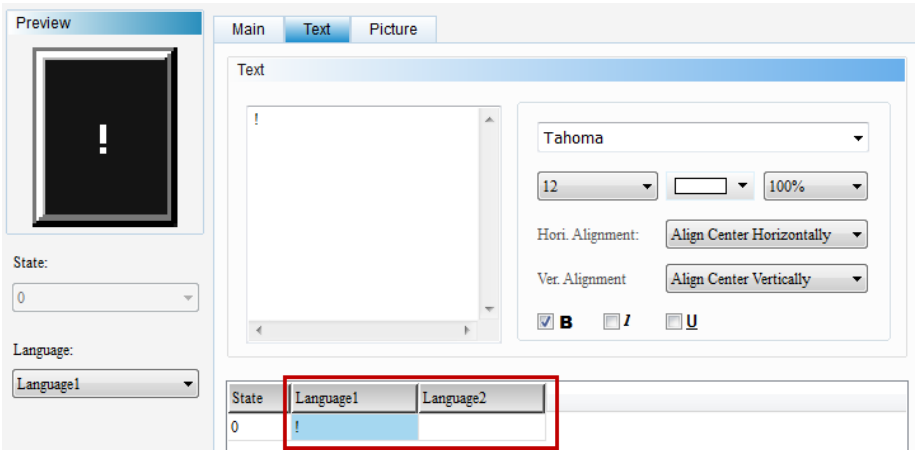


Figure 28-4-8 Text page of G-Code keypad (1)

No.	Property	Function Description
(1)	Text	➢ Users can enter the text message in the text box.  ➢ As long as the element allows users to enter the text, you can firstly select the element and then press the space key to edit the text.
(2)	Text related property	➢ The text related property includes text font, size, color, scaling, alignment type and bold/italic/underline. Please refer to the above figure for its setting.
(3)	Edit multilingual text	➢ If adding data in multiple languages, go to this page for editing. Users can edit the text in another language in column of

No.	Property	Function Description
		Language. See the figure below. Users can enter the text in English in English field. 

◆ Picture

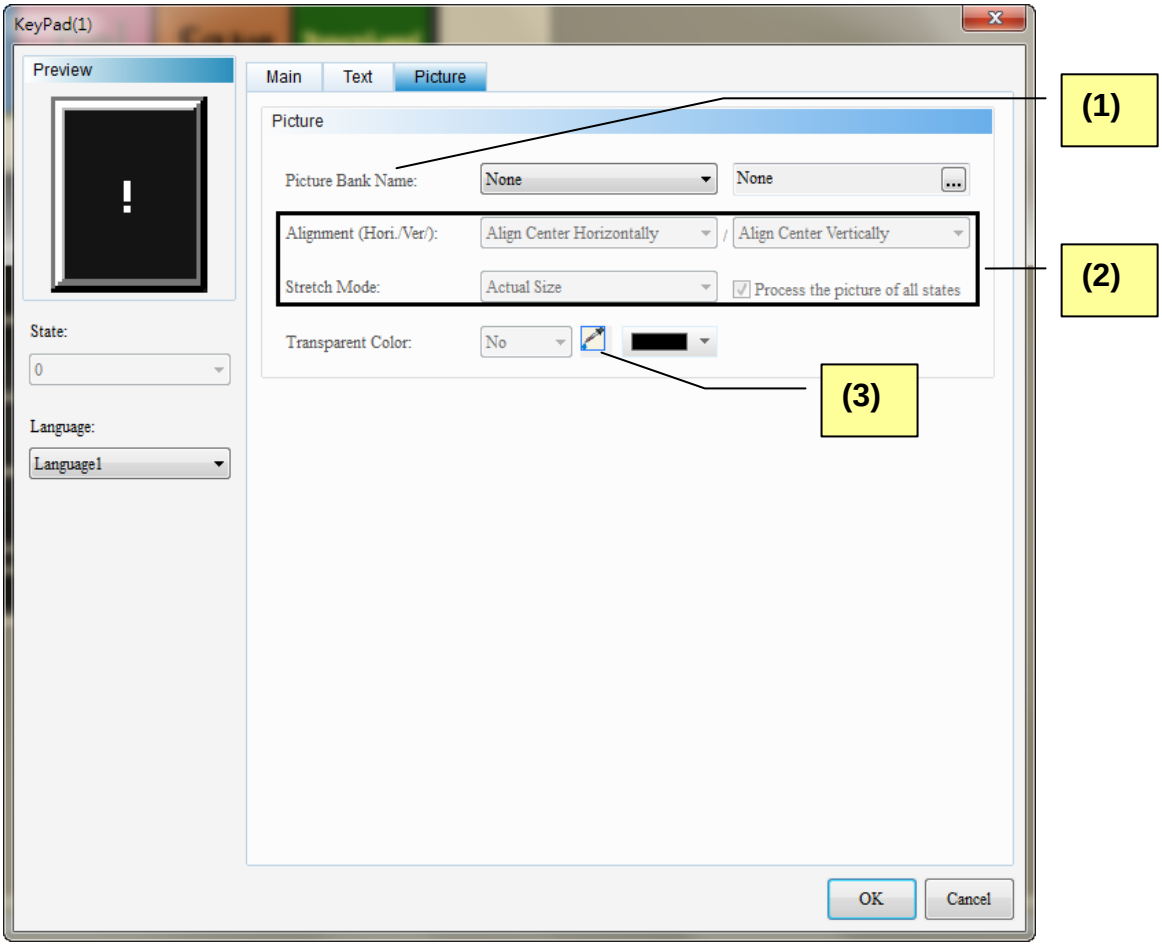
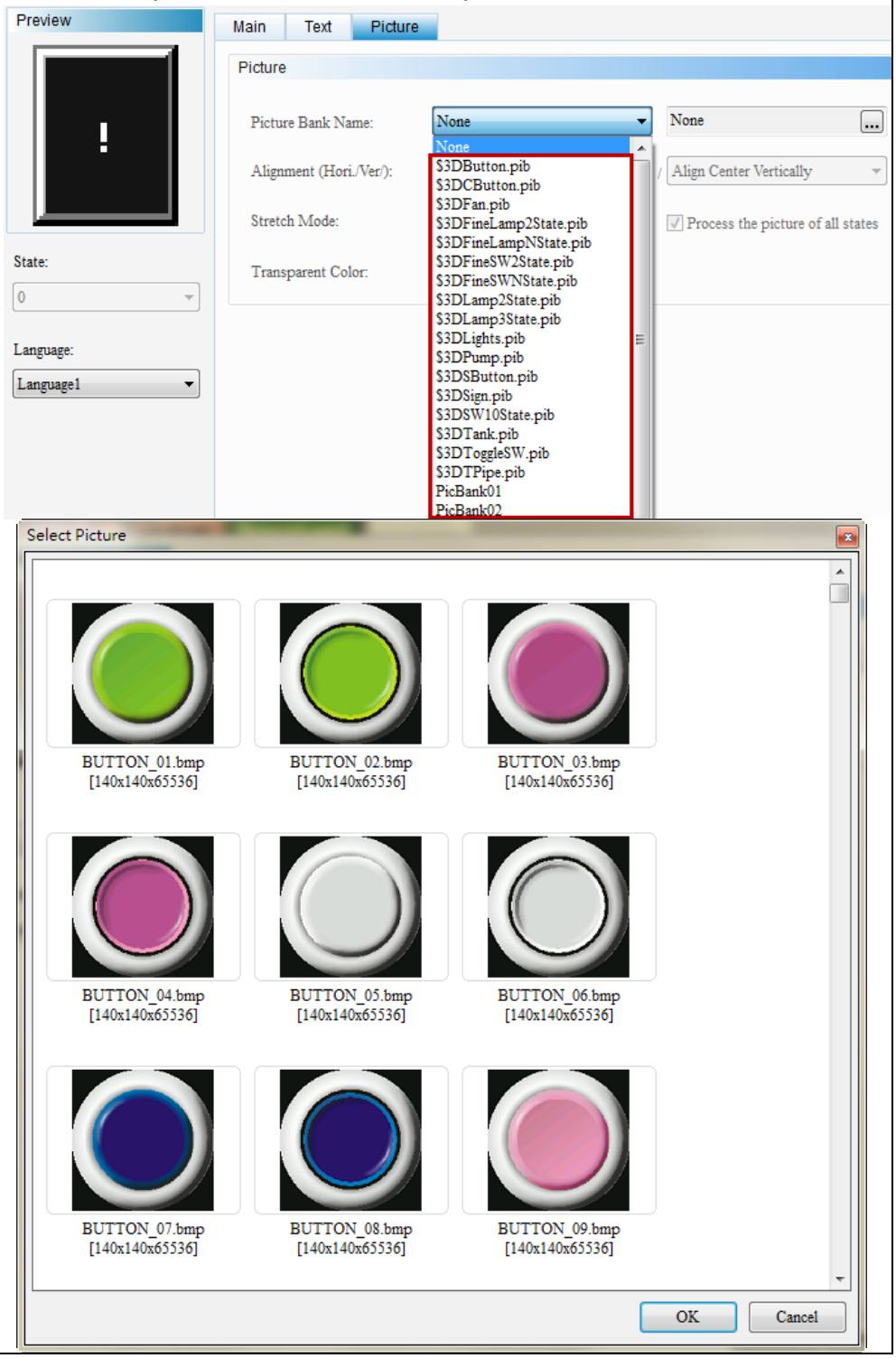
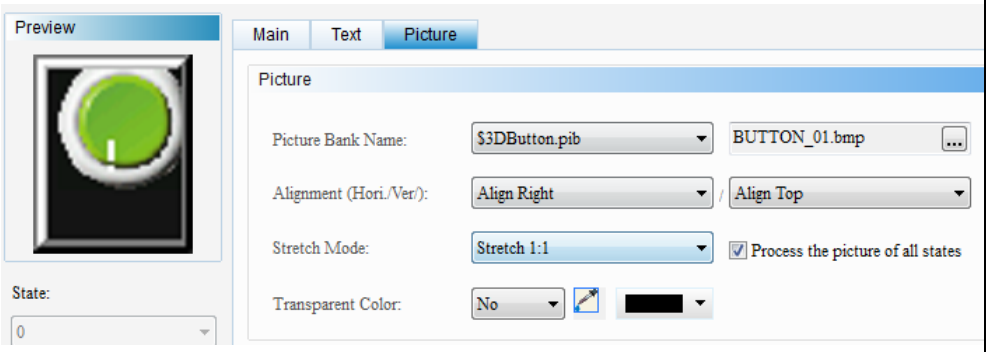
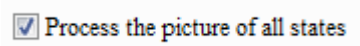
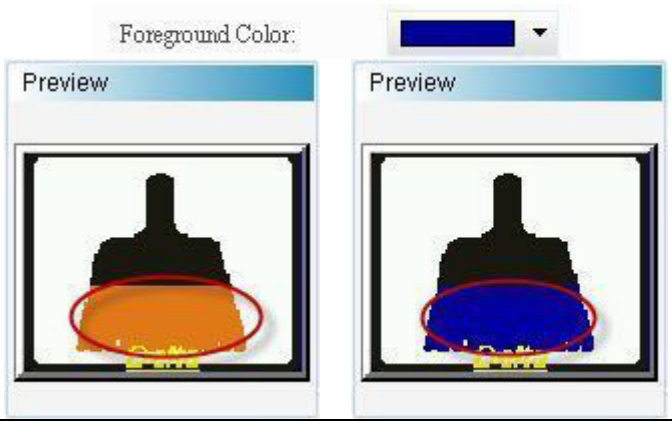


Figure 28-4-9 Picture page of G-Code keypad (1)

No.	Property	Function Description
(1)	Picture bank name	➢ The default name of picture bank is none. If users desire to set up the picture display, please use the built-in picture bank from the drop-down list to select the picture. 

<table>
<tr><th>No.</th><th>Property</th><th>Function Description</th></tr>
<tr><td rowspan="2">(2)</td><td>Alignment (Hori. /Vert.)</td><td>➢ It sets the alignment type through this selection.
 

➢ The stretch mode is divided into Whole, Keep Aspect Ratio and Actual Size.
<table>
<tr><th>Whole</th><th>Keep Aspect Ratio</th><th>Actual Size</th></tr>
<tr><td>The figure will fill in the whole displayed area.</td><td>The displayed figure will be scaling according to the aspect ratio.</td><td>Regardless the size of the element, the figure will be displayed with its actual size.</td></tr>
<tr><td>
</td><td>
</td><td>
</td></tr>
</table>
➢ If users check “Process the picture of all states”, it means the setting will be applied to all so that users do not have to set each figure individually.
 
</td></tr>
<tr><td>Stretch Mode</td></tr>
<tr><td>(3)</td><td>Transparent Color</td><td>➢ This function can specify any color in the picture as transparent color. When clicking on this icon, and select the orange part of the broom, the orange part will be identical to the foreground color.
 
</td></tr>
</table>

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Chapter 29 DOP-W Function

DOP-W series HMIs include DOP-W105B, DOP-W127B and DOP-W157B.
Before introducing W series HMI, following sections will briefly introduce how to enter the system screen and download the screen.

■ How to enter thesystem screen?

- Method 1: Open DOPSoft software and create the button of system directory. Download the screen to the HMI. And go to HMI system screen by clicking on system directory button.
- Method 2: Long press the blank space for 3 seconds. Then, you will hear a buzzer sound. Press the prompt window which shows the message of “Enter the system menu?” on the left-upper corner within one second.

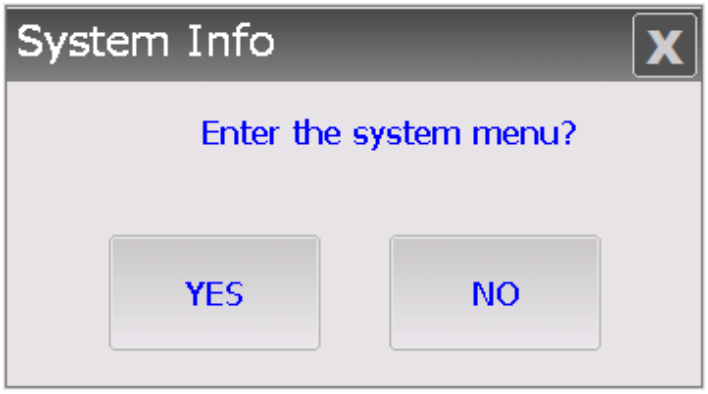


Figure 29-1 Prompt window for entering the system menu.

■ How to download the screen?

Users are unable to use USB download in W series HMIs. However, Ethernet or COM Port is available for uploading or downloading the screen. The upload/download default setting is USB. When using aDOP-W HMI, a message will pop up and ask if you are going to use Ethernet to download the screen.

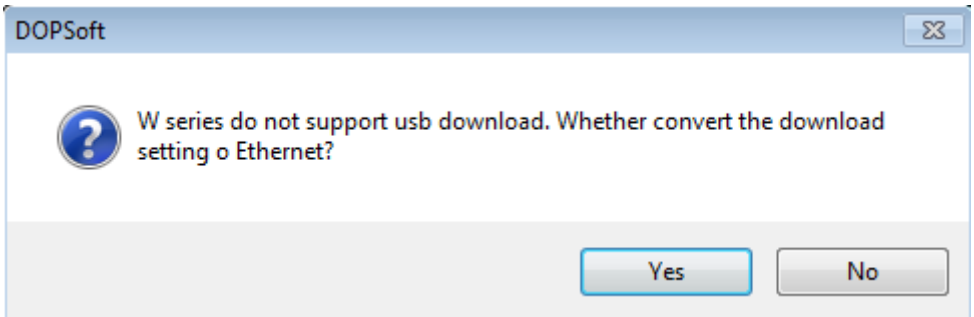


Figure 29-2 Whether to download / upload the file via Ethernet

Please select [Yes] to use Ethernet to upload/download. Then, go to [Options] → [Environment]. You will see the setting of Upload/Download has been switched to [Ethernet].

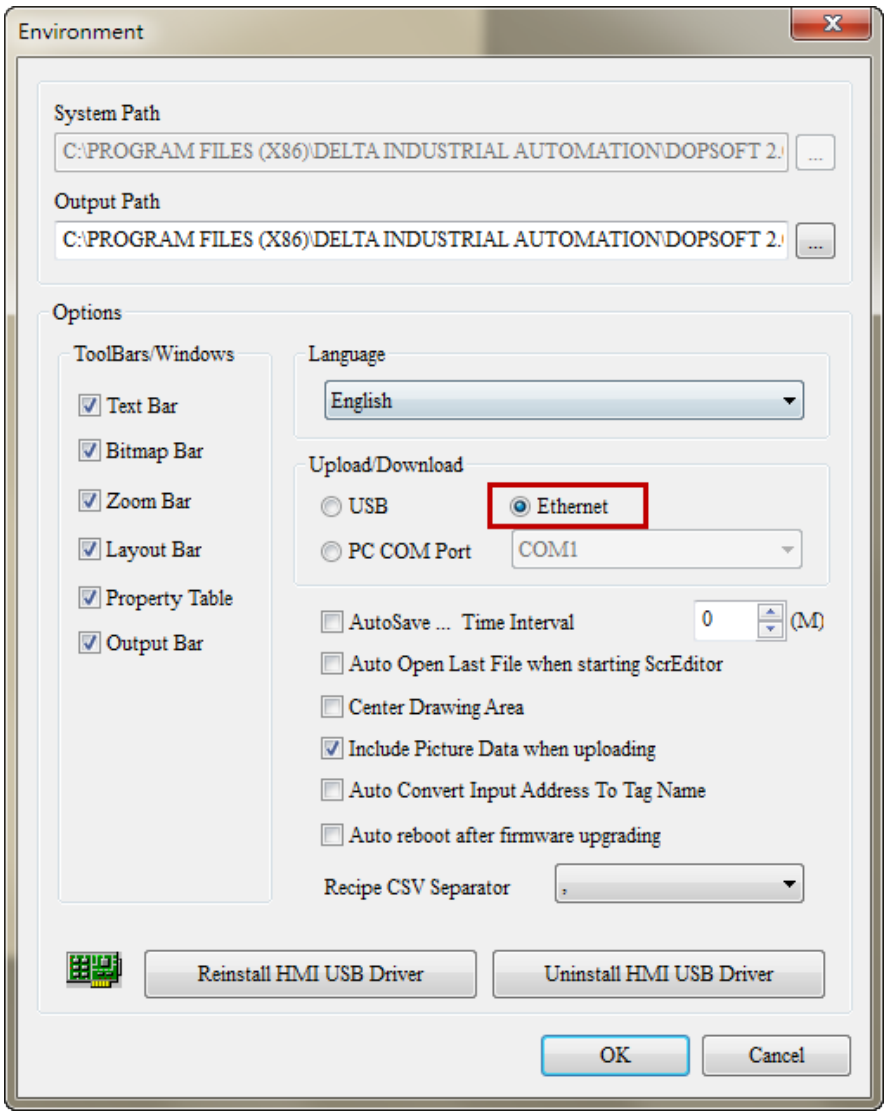


Figure 29-3 Environment setting

When you choose [Ethernet] as the download method, please go to system screen and set DHCP toOFF. Then, manually set the HMI's IP address. Otherwise, the HMI might be unable to be searched by the software and cause download error.

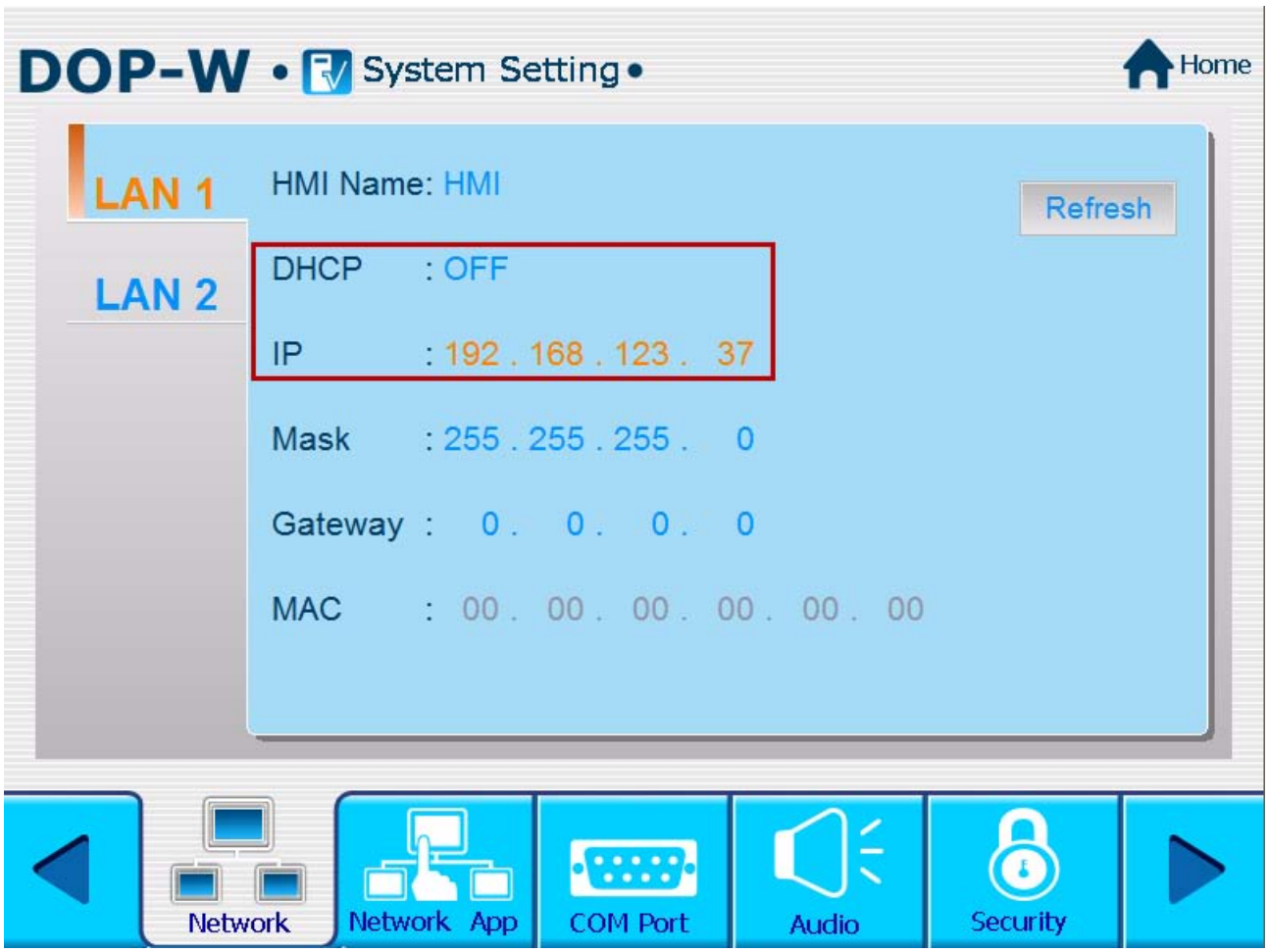


Figure 29-4 Setup IP address

W series HMIs provide two LAN ports for users to upload/download screens/recipes, acquire firmware serial number and recover the default value via the Internet. According to different applications, users also can configure two ports in two network segments.

USB upload/download function is invalid in Wseries HMIs. If the Ethernet IP address has not been initialized on account of HMI's abnormal status or the screen file cannot be opened, please go to the system directory → [System setting] → [Network] and click on the [Refresh] button on the right-upper corner. Then, the HMI will be able to acquire the IP address and upload/download screens.

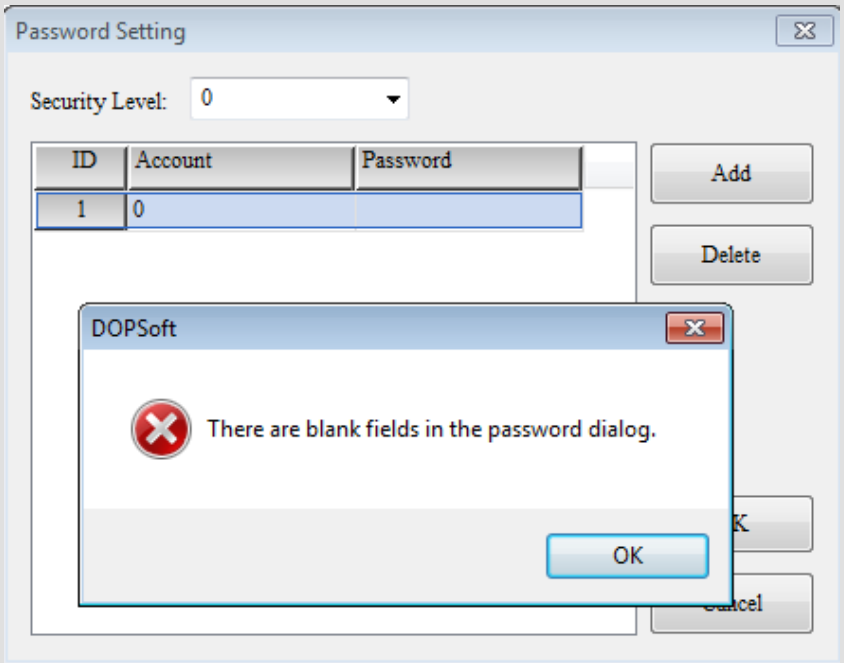
See the followings for the descriptions of W series HMI functions.

29-1 Password Setting

Password setting is used to distinguish the permission level of HMI, rangingfrom 0 to 7. Each level has its default password. DOP-W series HMI provides more than one accounts and passwords so that different users can log on at the same time.

NOTE:

✓ The password field cannot be blank.



✓ In the same permission level, it cannot have two identical account names. But users can use the same password for different accounts.

✓ The identical account name can be used in different levels. For example, the account name in level 0 is 123, users can still set the account name to 123 in level 1.

✓ The account and password can be set up to 24 characters.

✓ The account and password will only show capital letters.

Level 0	No protection function. Everyone can operate in this level.
Level1 ~ 7	Enter the correct password or you needa higher permission level to operate the system.
Level8	Enter the password for the highest permission level. This is also the protection password after saving the project, downloading the password authentication and formatting the system file.

Table 29-1 Table of permission level

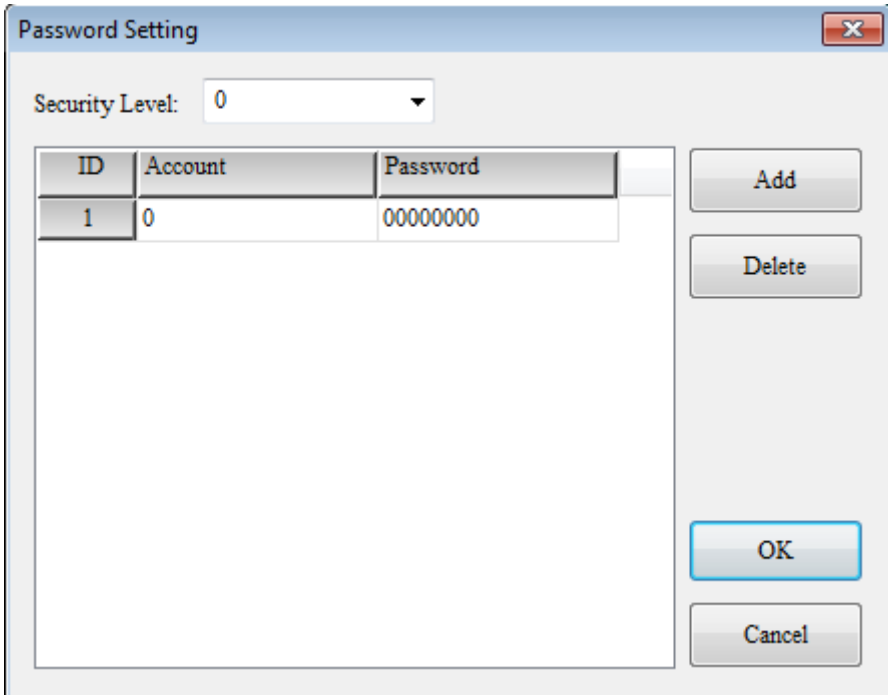
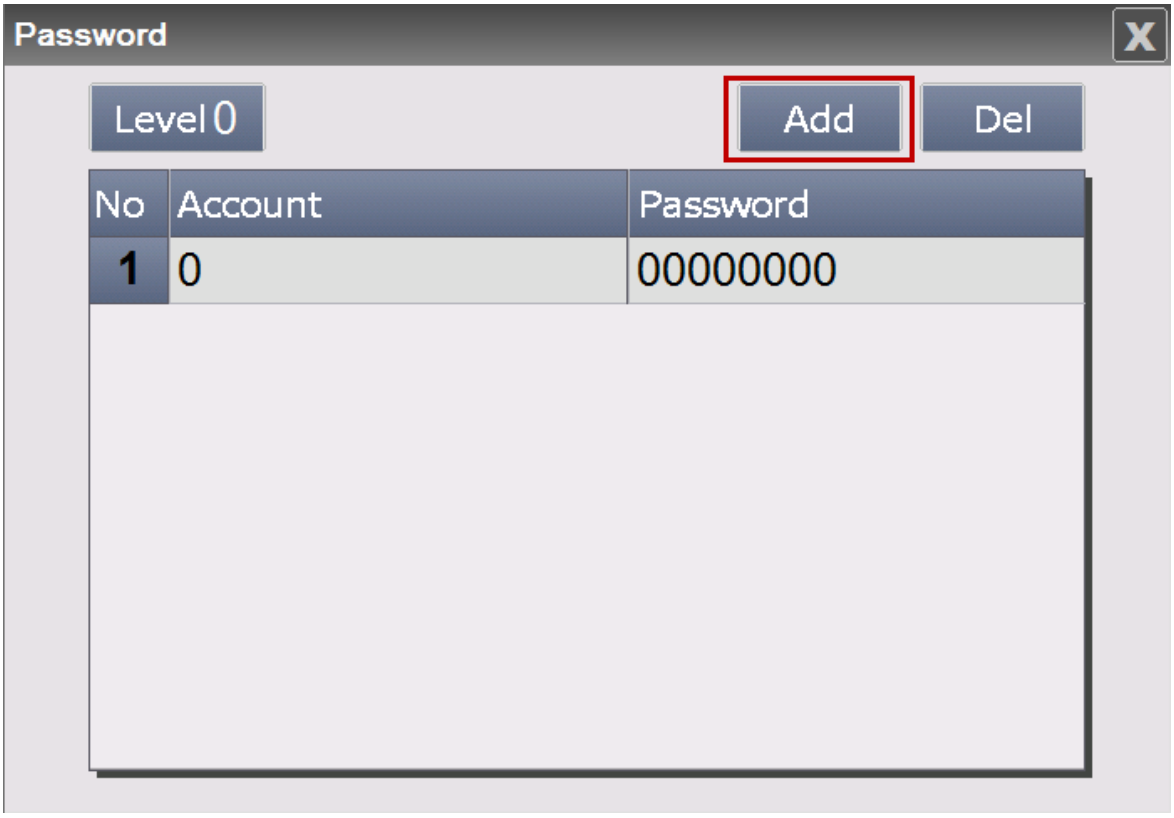


Figure 29-1-1 Edit the password table

When users are in the same permission level and wish to add the same account, the HMI will show a message of “Account Duplicate!”.



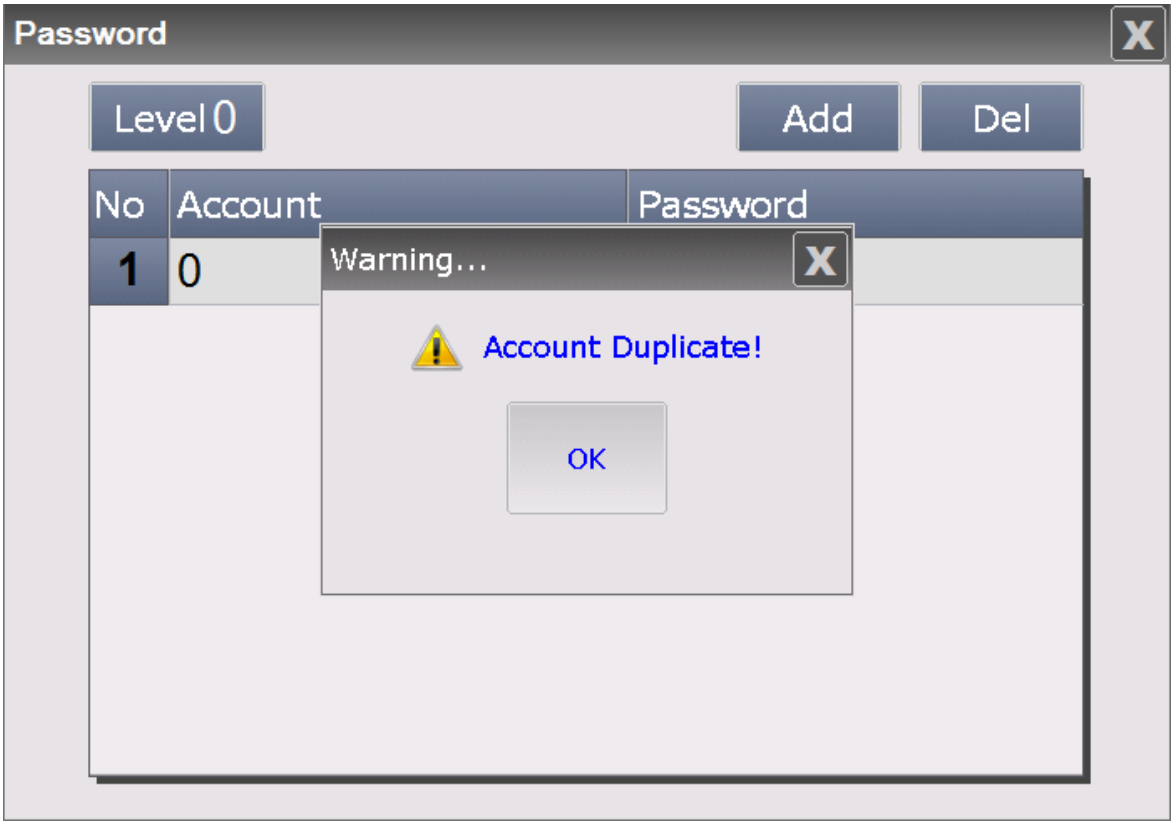


Figure 29-1-2 Account duplicate

Users can change the password and account information by pressing the button of [Password table].

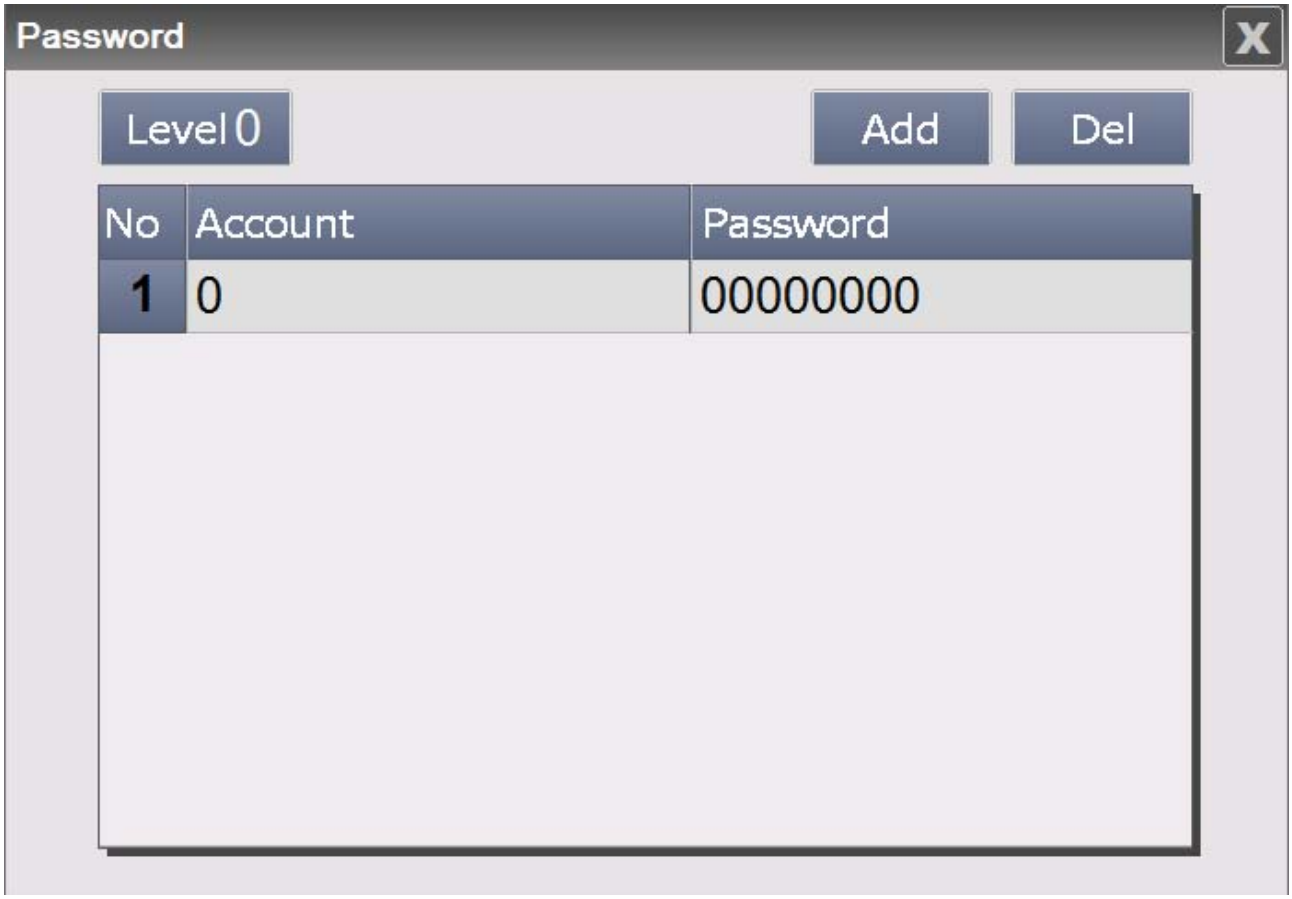


Figure 29-1-3 Button of setting password table

Users also can go to the system screen and select [System setting] → [Password] to change the password and accountinformation.

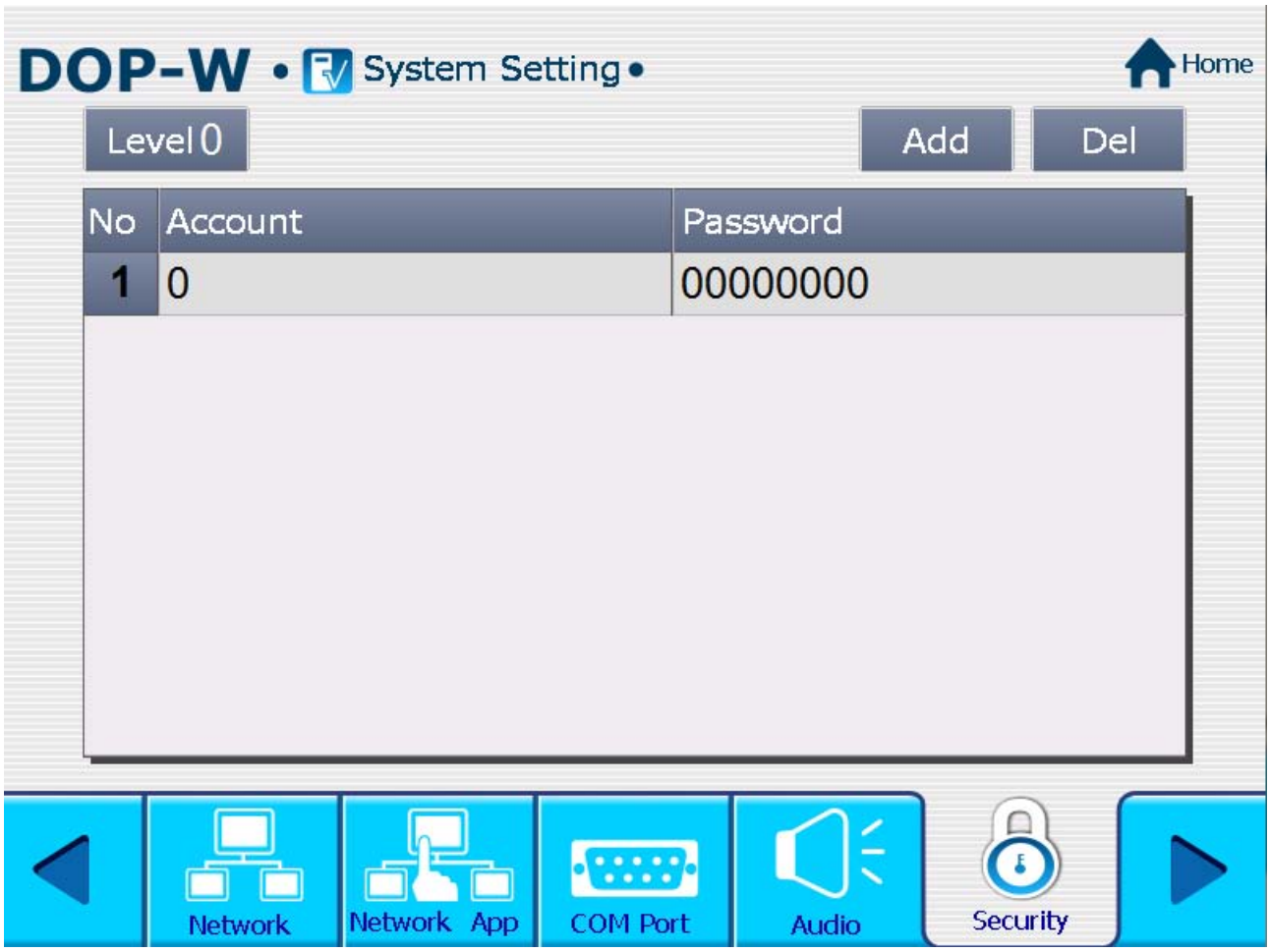


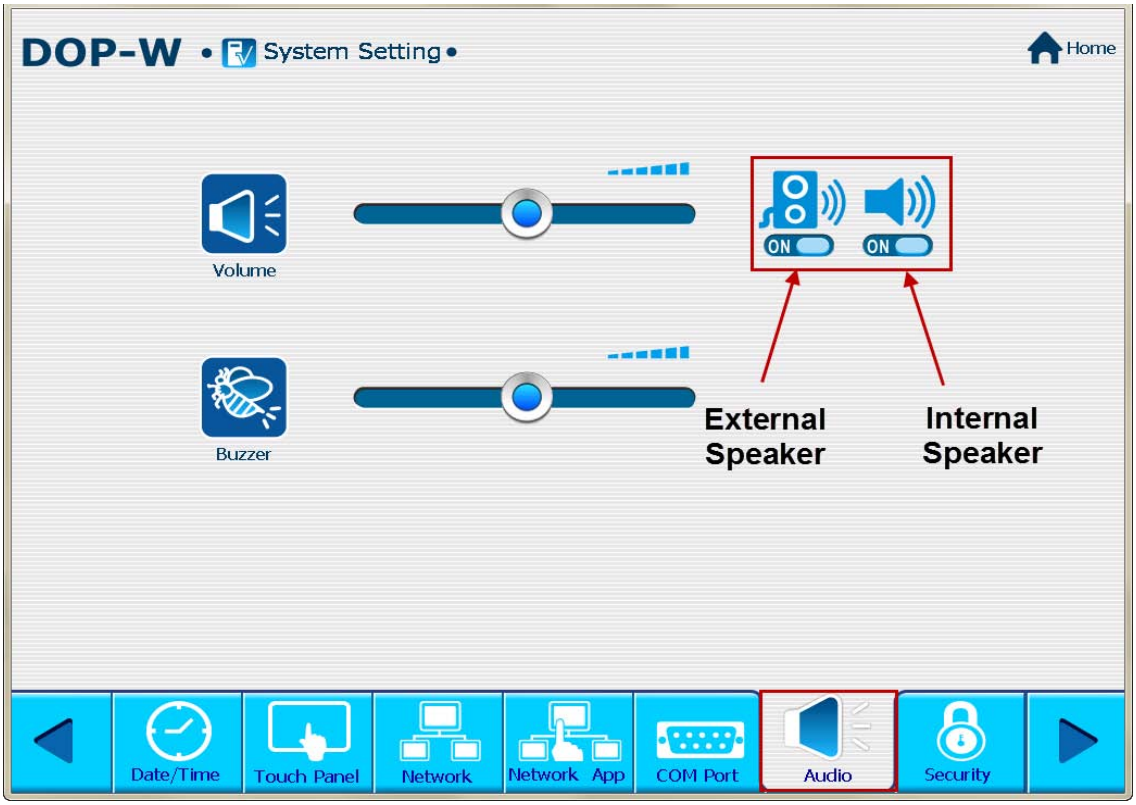
Figure 29-1-4 Password setting in the system directory

29-2 Video

W series HMIs provide a media player that enables users to play and maintain the demo videos. Each operator can therefore effectively complete their tasks. This function also can be used to introduce the standard operation procedure so that it can create a learning environment for users.

Users can directly select the video file that is going to be played or assign different videos according to the value in the Word register.

DOP-W127B and DOP-W157B have built-in front speakers and can connect external speakers. Users can adjust the sound generator for the external speakers and the switch of built-in speakers in [Volume] which can be found in the system directory.



NOTE:

- ✓ You can only create one video element in one screen.
- ✓ The video element cannot be created in sub-screen.
- ✓ The video element cannot be created in base screen.
- ✓ The video element does not support element rotation.
- ✓ The only supported video format is WMV.
- ✓ The video resolution is suggested to set to 640X480(included) or below.

Audio function can be divided into three main parts:

(1) Video list

(2) Control address

(3) Play list

(1) Video Lists Output Setting

With this function, users can add, delete, export the video and set the storage location for the video file.

Go to [Options] → [Video lists output setting] to add new video file.

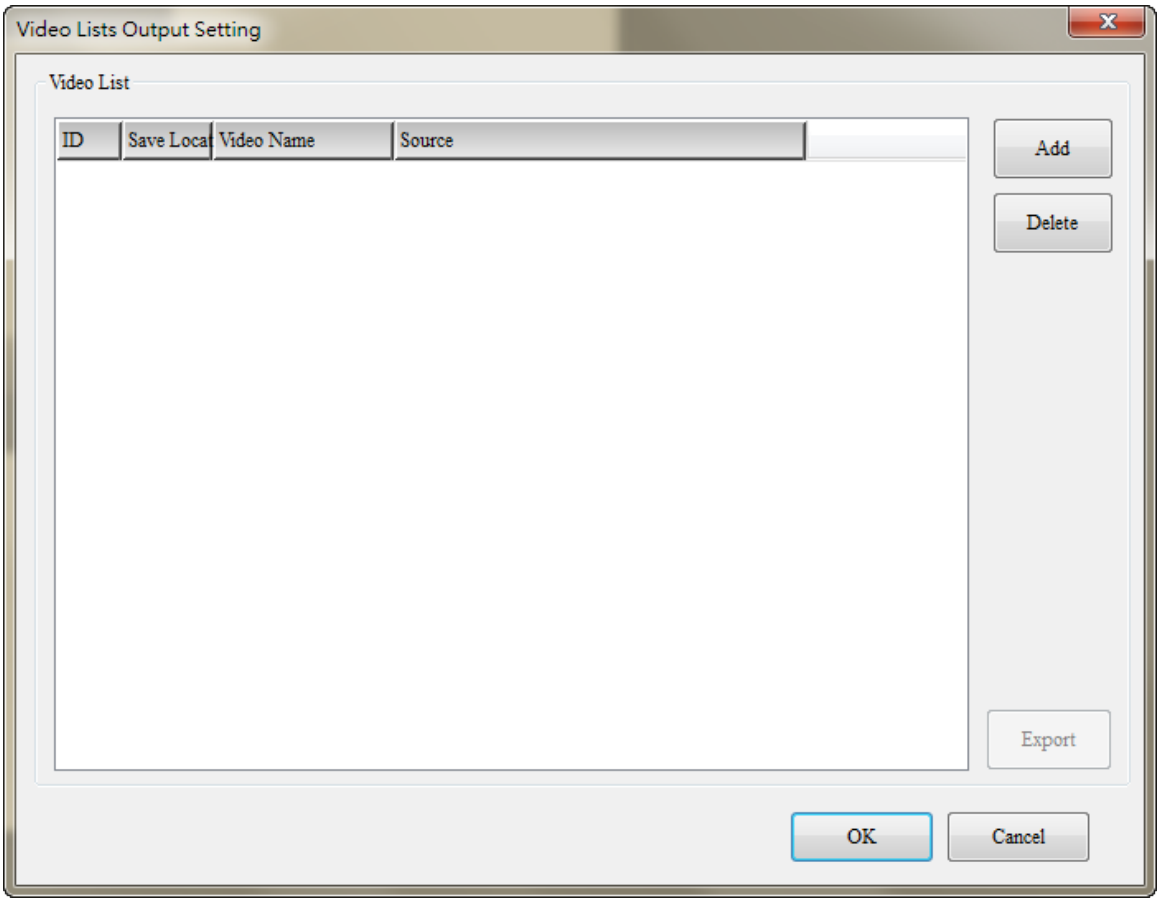


Figure 29-2-1 Video lists output setting

(2) Control Address

Control address is used to play and stop the video.

Go to [Element] → [Video] to add a new video element.

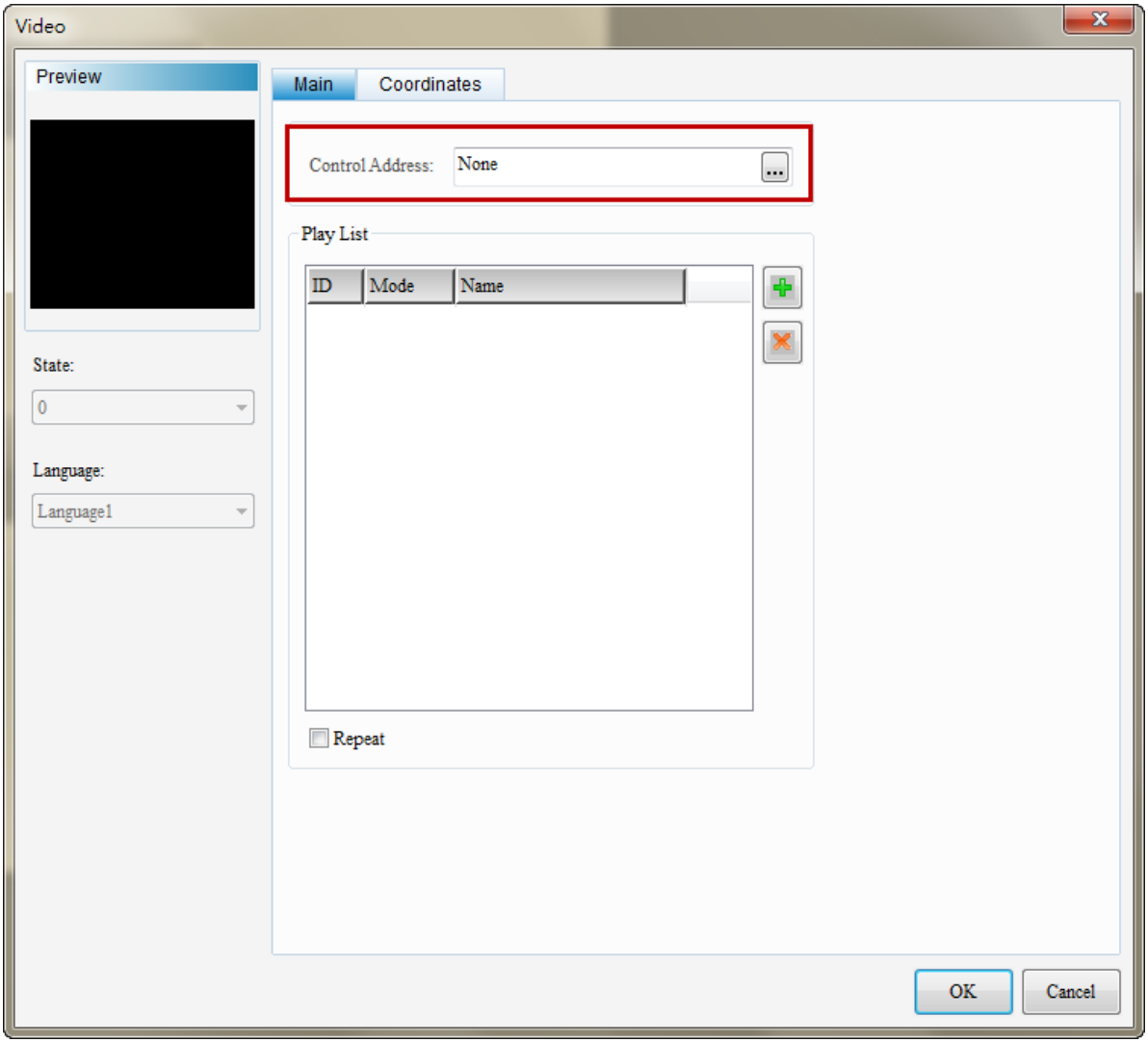


Figure 29-2-2 Control address

(3) Play List

Users can determine if the video should be played byspecifing a video file (File) or by setting the address to access the video number (Address).

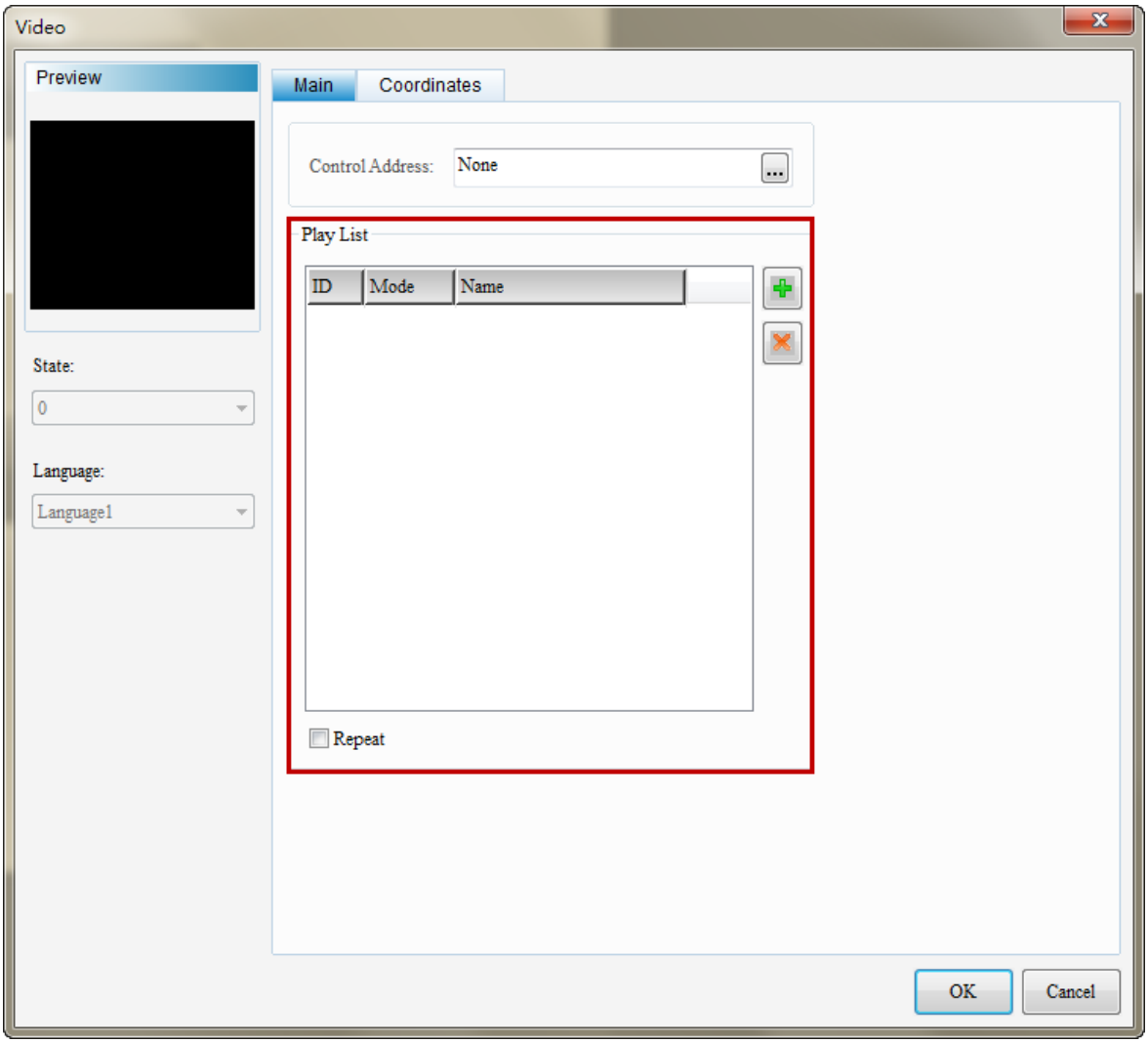
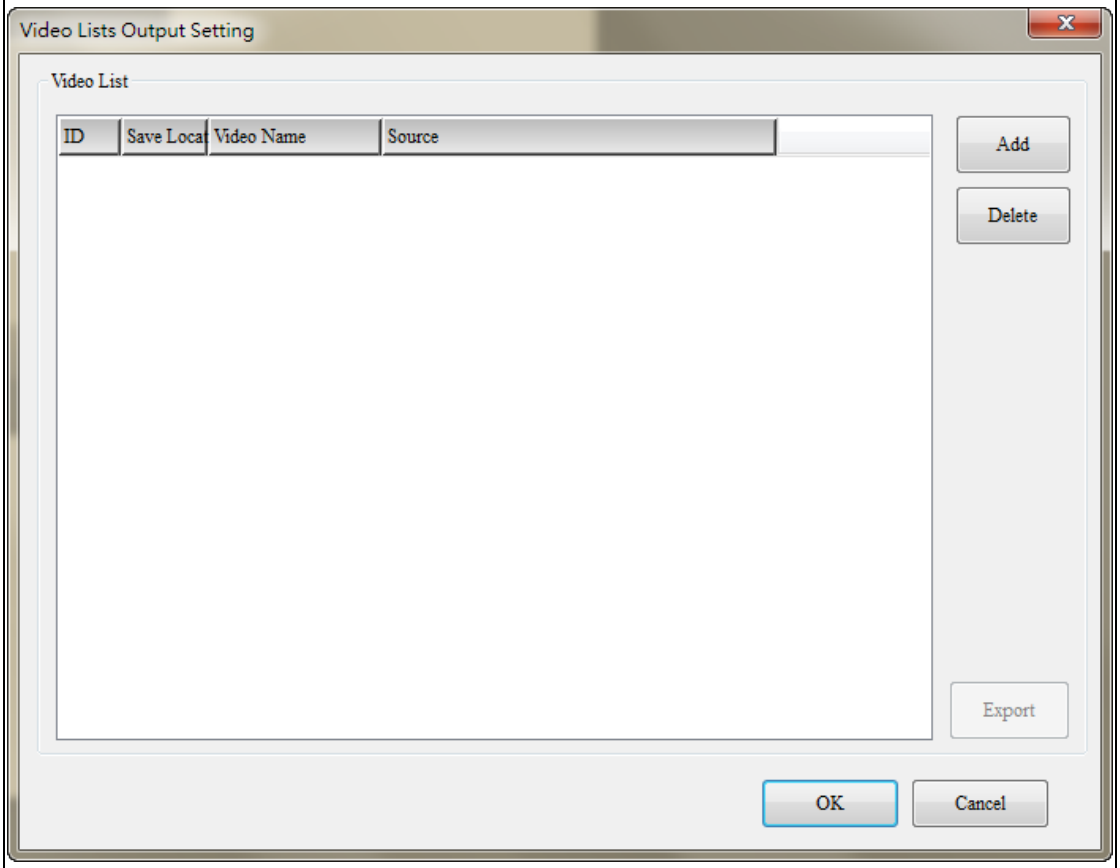


Figure 29-2-3 Play list

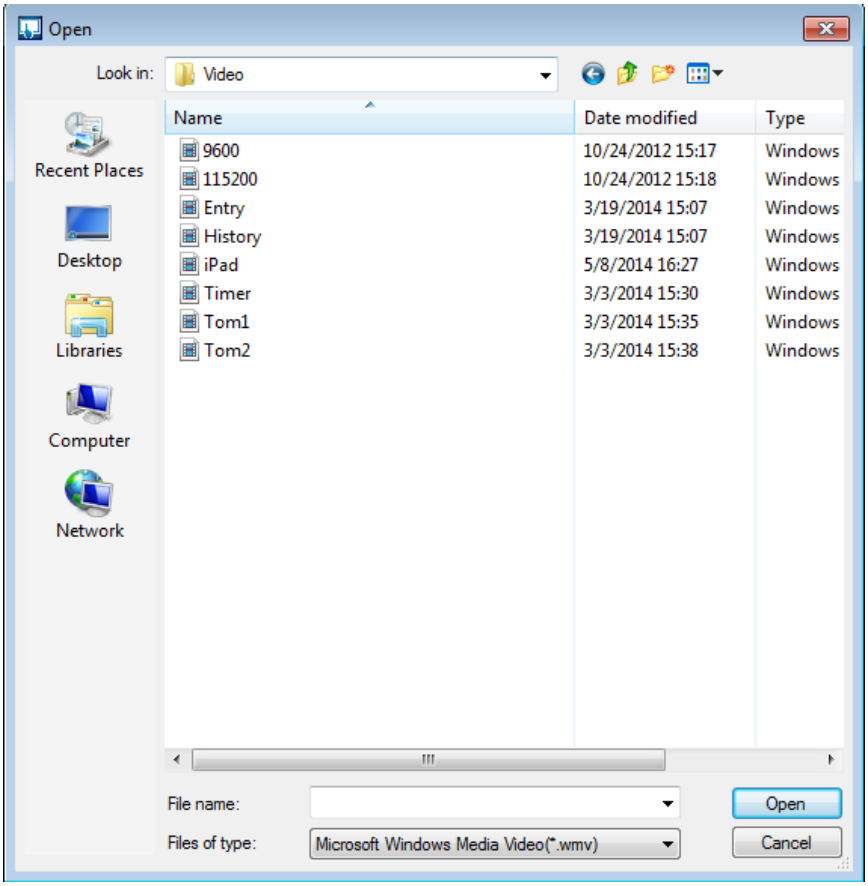
See the followings for detailed description of [Video list output setting], [Control address] and [Play list].

Video List Output Setting

Table 29-2-1 Video list output setting

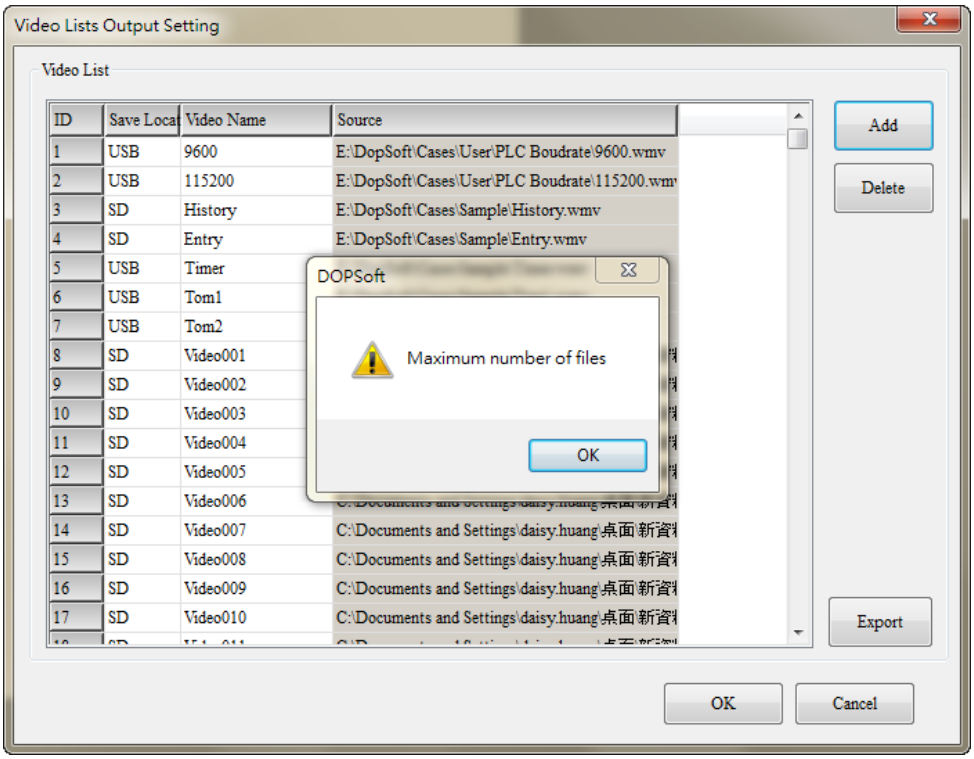


◆ Descriptions of adding / deleting / exporting buttons for the video

Video List Output Setting Table 29-2-1 Video list output setting	
Add	➢ Click on the added button, users will be required to select the video to be played.  ➢ Users can add up to 999 videos. (Range is from 1 to 999.) ➢ If users wish to add the 1000 videos, the following message will pop up as the reminder.

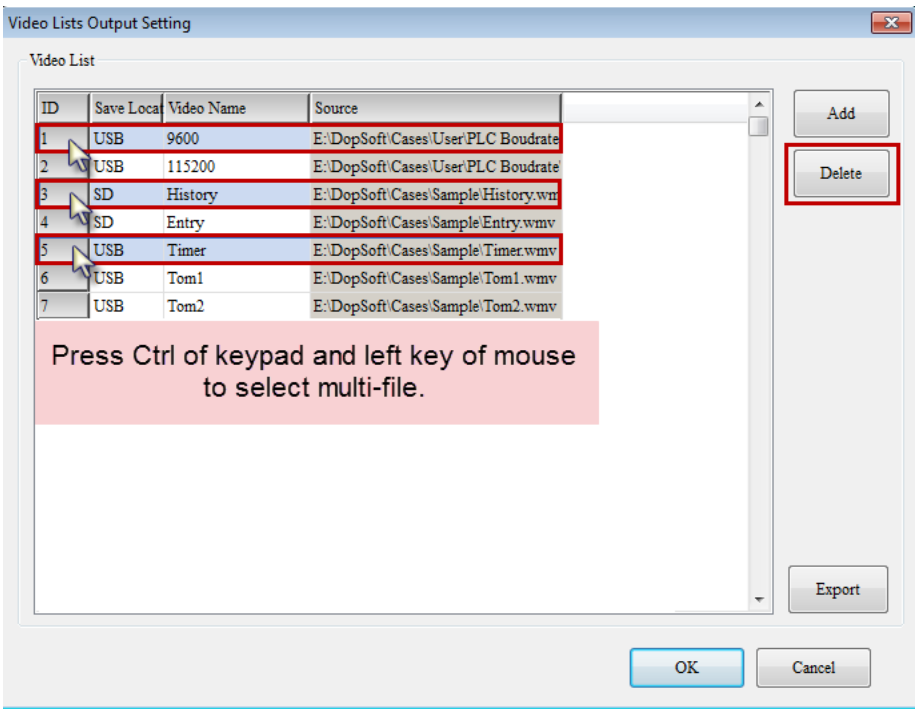
Video List Output Setting

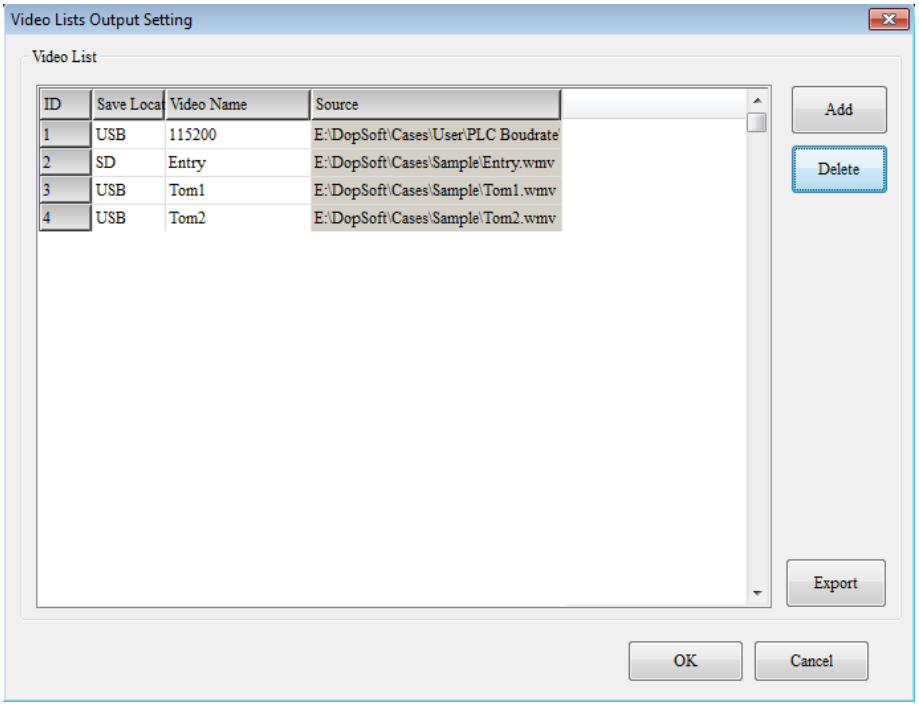
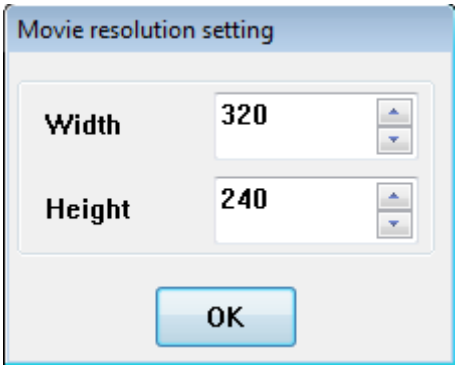
Table 29-2-1 Video list output setting



Delete

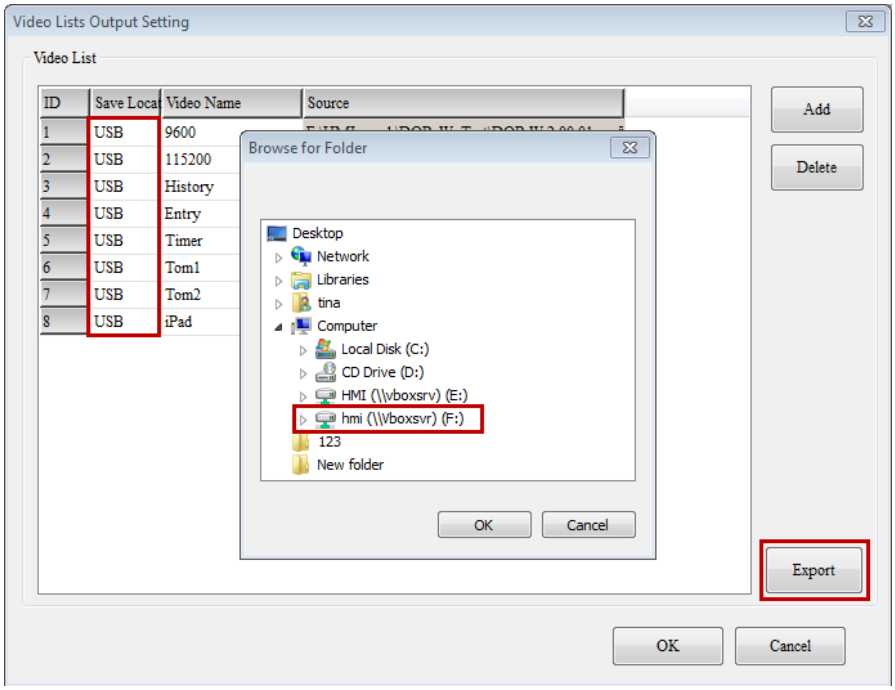
- Select an added video and you can choose to delete one of the files from the list.
- When you desire to delete multiple files, please select the file by using the SHIFT key + the left key on the mouse or the Ctrl key +the left key on the mouse. Then, click on delete to delete the file that you just selected.



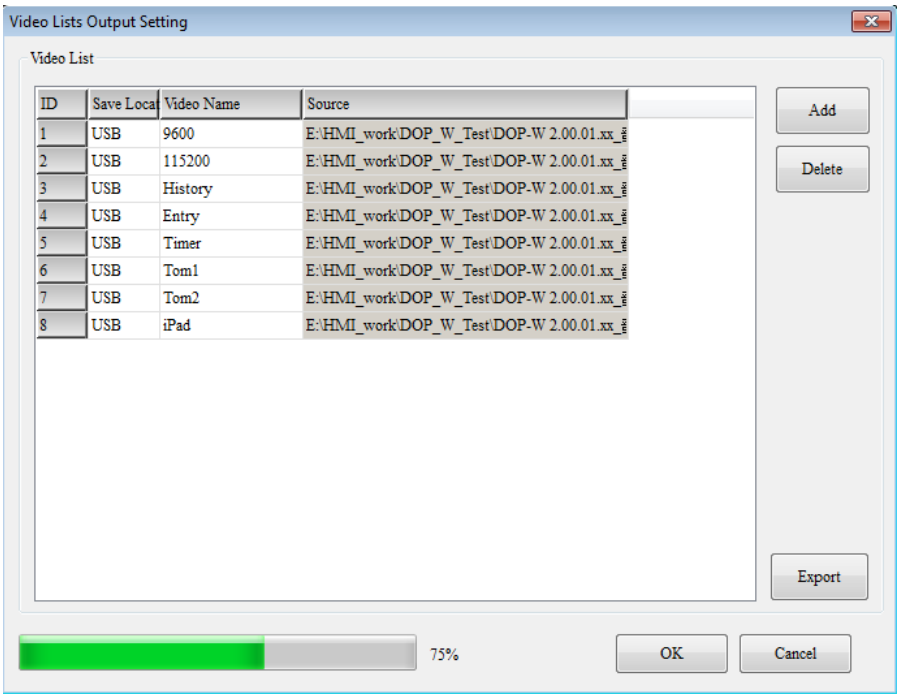
Video List Output Setting Table 29-2-1 Video list output setting	
	➢ The following figure shows the video list after the selected files are deleted. 
Export	➢ Before exporting the video, please select the storage location, USB or SD. ➢ When exporting the video, users can set its resolution. The default setting is 320x240 and the max. is 640x480.  ➢ Then, users will be required to select the storage device for saving the file. Please note that you have to choose the root directory as the storage location. That is to say, the video file cannot be stored under any file folder.

Video List Output Setting

Table 29-2-1 Video list output setting



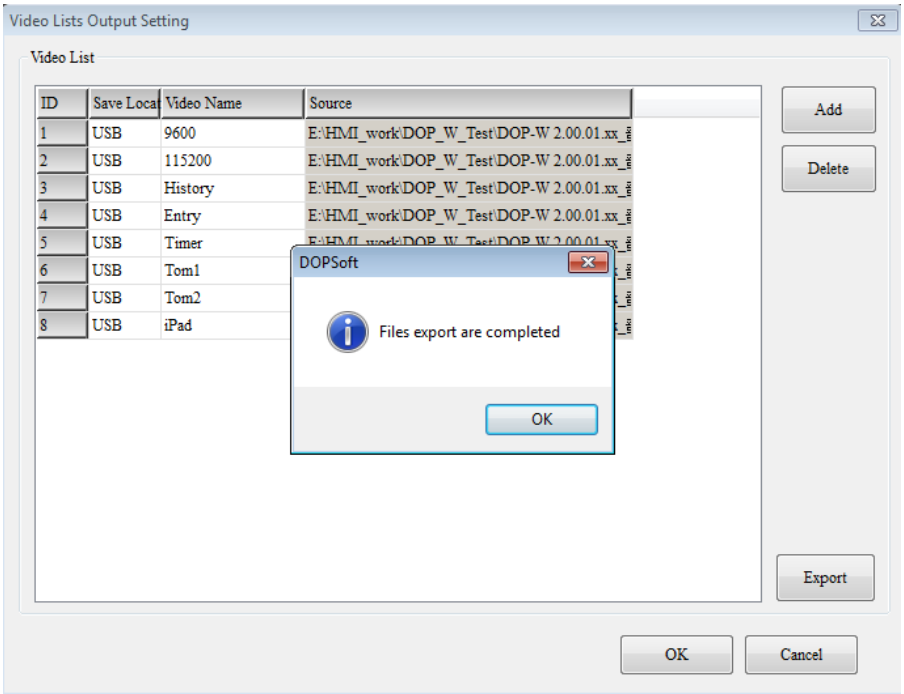
➢ Now, you can see the file is being exported.



➢ When it is complete, a message will pop up to inform that the file is successfully exported.

Video List Output Setting

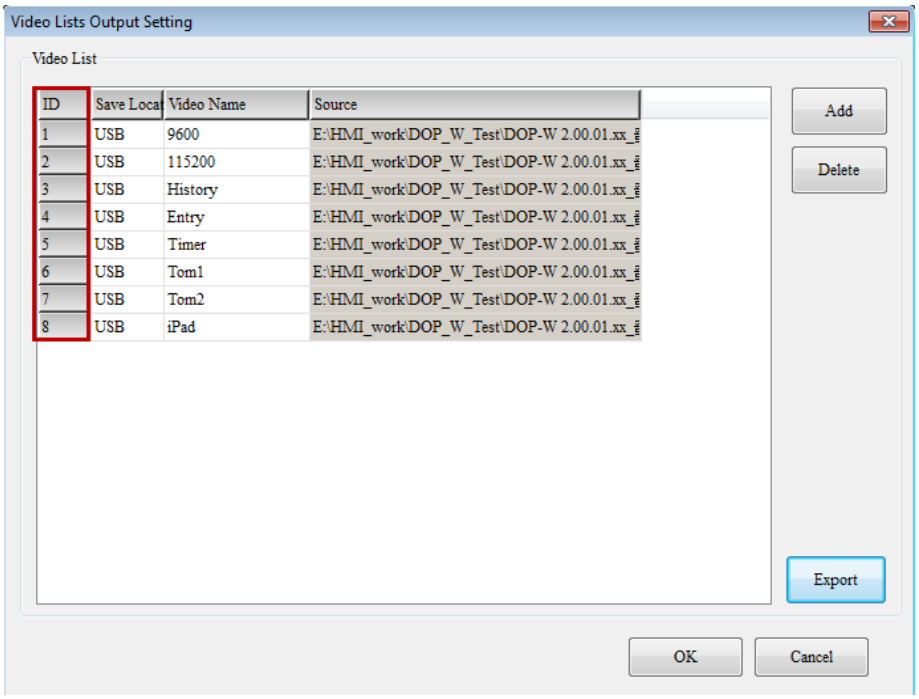
Table 29-2-1 Video list output setting



◆ Description of each function

ID

➢ ID is the main referable value when playing the video. When it accesses the Address value in the play list, the software will play the video according to the set memory address.

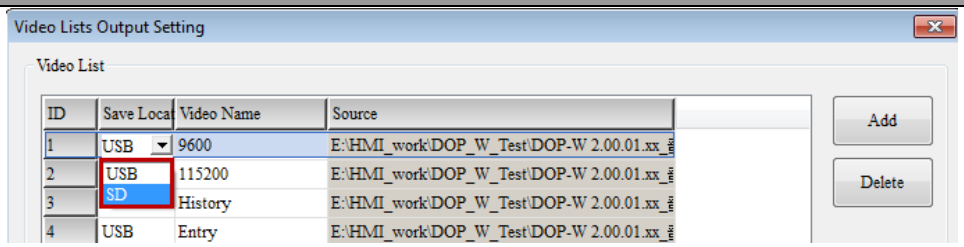
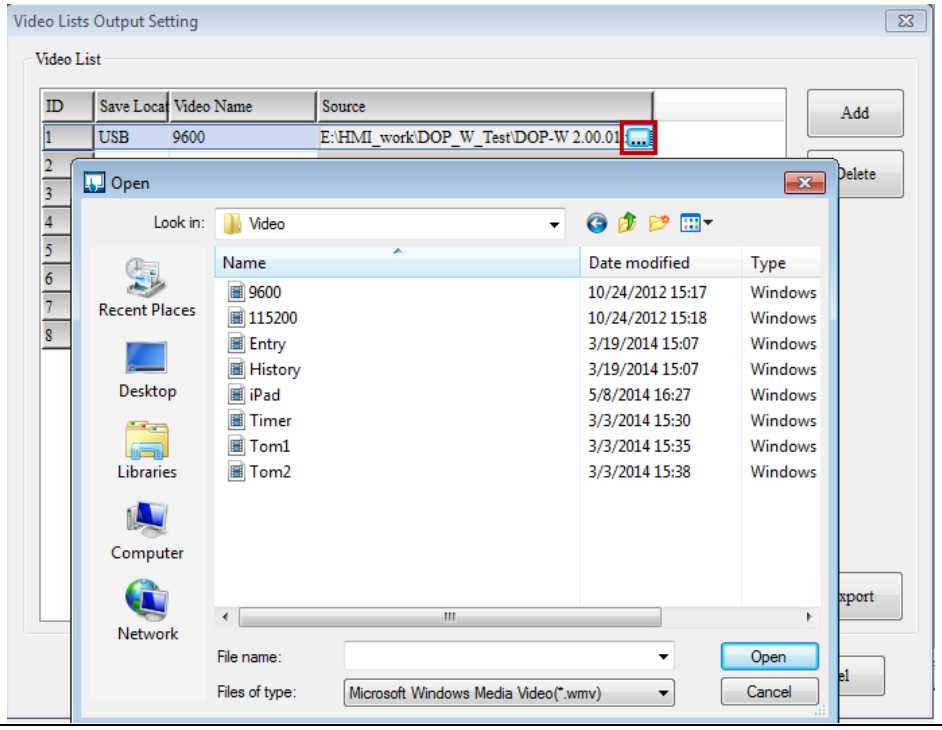


Save location

➢ The save location can be USB or SD. Users can change the save location. The default setting is SD.

Video List Output Setting

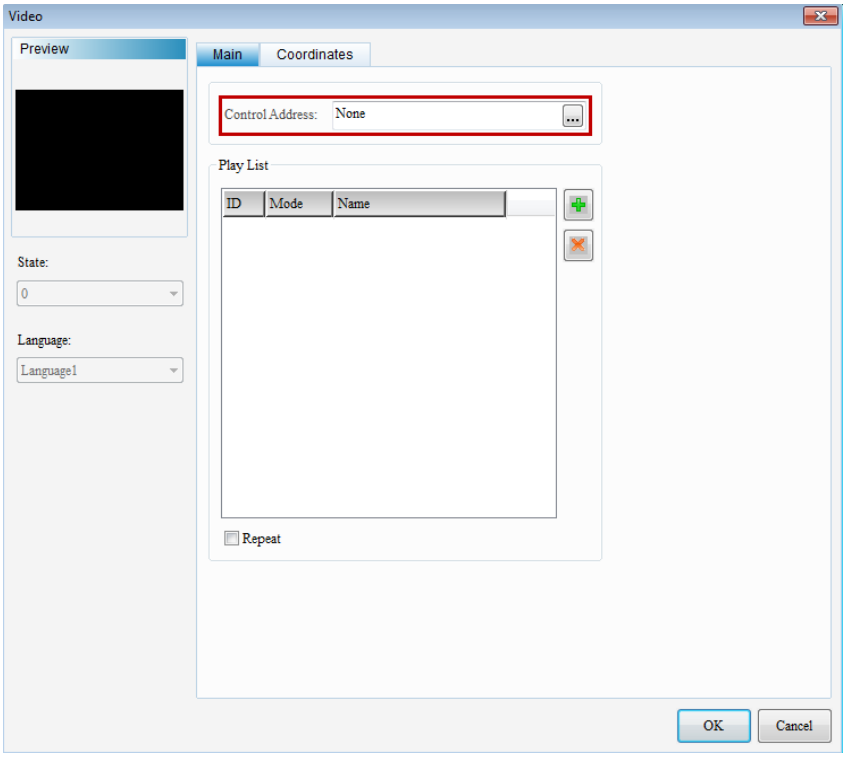
Table 29-2-1 Video list output setting

	
Video Name	➢ When the file is added to the video list, its name will be named as Video. And the first video will be named as Video001, then Video002, Video003 and so on.
Source	➢ This displays the address of the file after it is added to the list. The source of the video can be changed. 

Control Address

Table 29-2-2 Control Address

Select [Element] → [Video] to add a new video element.



- The control address can only set as Word format to play or stop the video.
- It can be a controller address or an internal memory address.

NOTE:

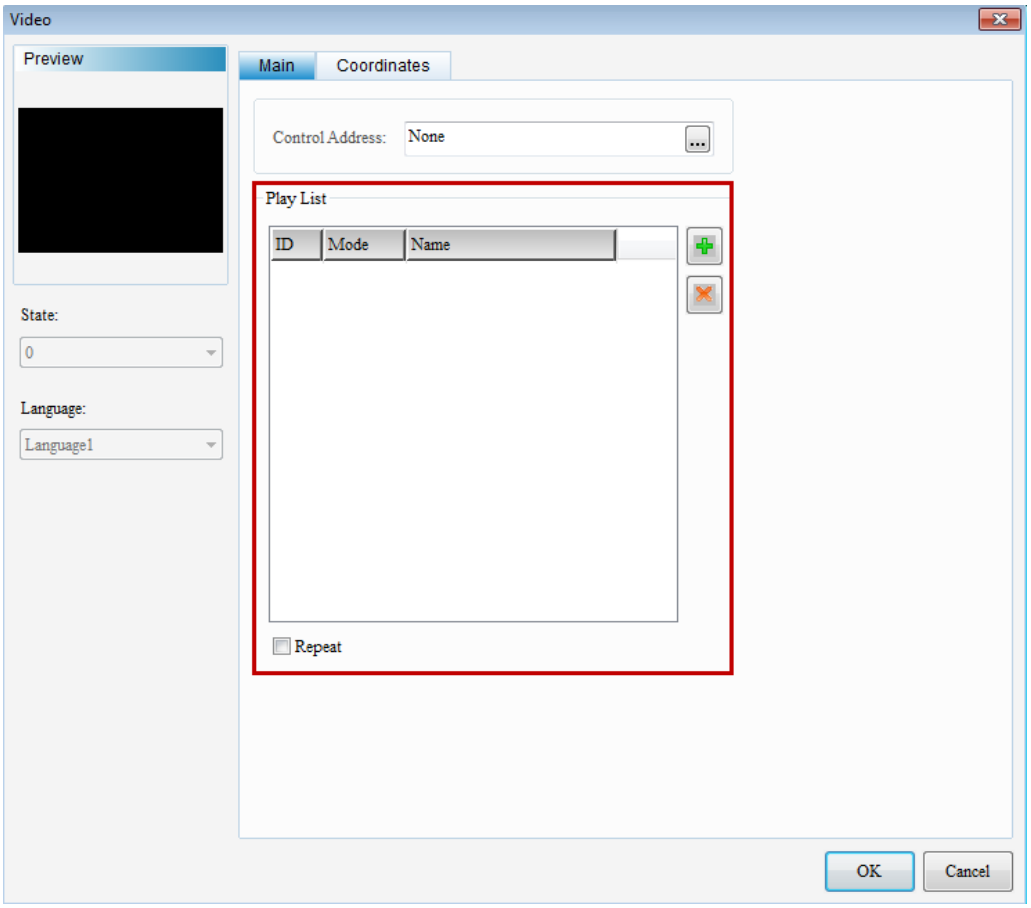
- ✓ If the control address is set to $200, it can also be set to the maintained button of $200.0 so that when users press the button of $200.0 can play the video and release to stop.

Control Address	Play	Stop
Controller Address (Link1@D100) (EtherLink1@D200)	**D100 = 1** **D200 = 1**	**D100 = 0** **D200 = 0**
Internal Memory Address ($200)	**$200 = 1**	**$200 = 0**

Play List

Table 29-2-3 Play List

Select [Element] → [Video] to add a new video element.



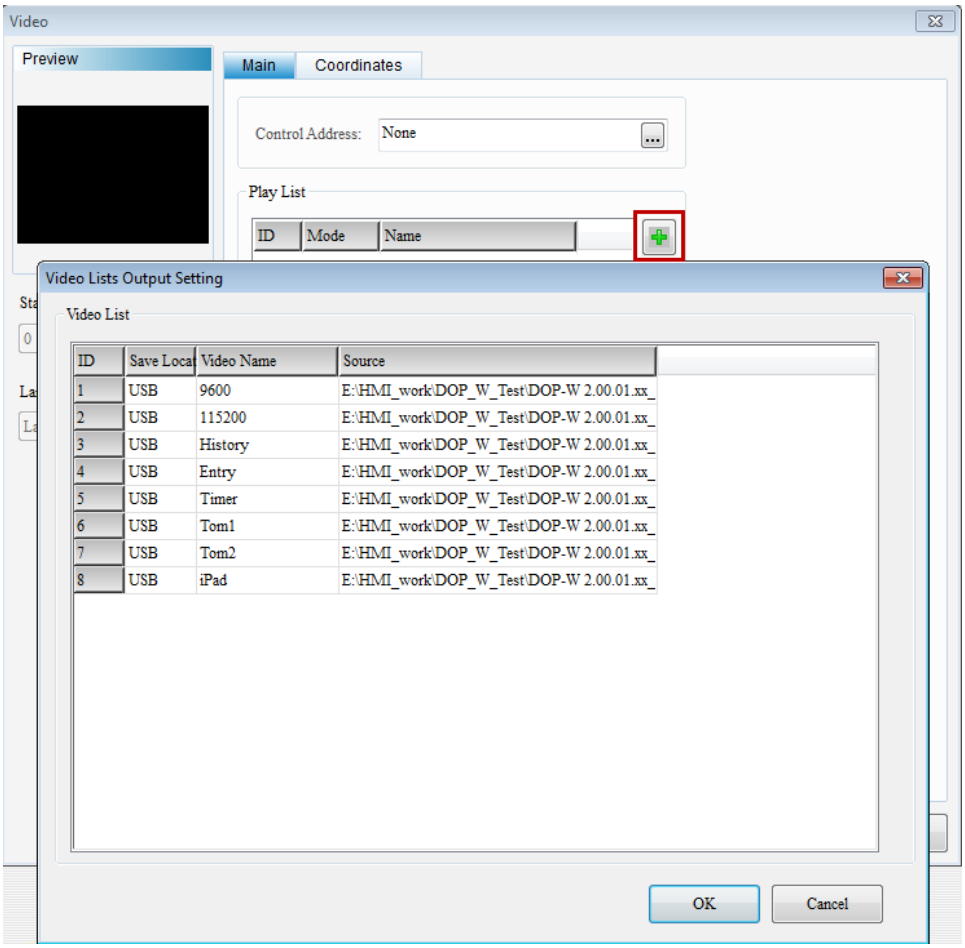
- The play list includes two functions,"Add into the play item" and Delete the play item".
- The accessing method is according to the added video.
- We have two accessing methods (modes), [File] and [Address].

Play List

Table 29-2-3 Play List

Add

➢ Click on the Add button , users will be required to select the file that is going to be added to the play list.



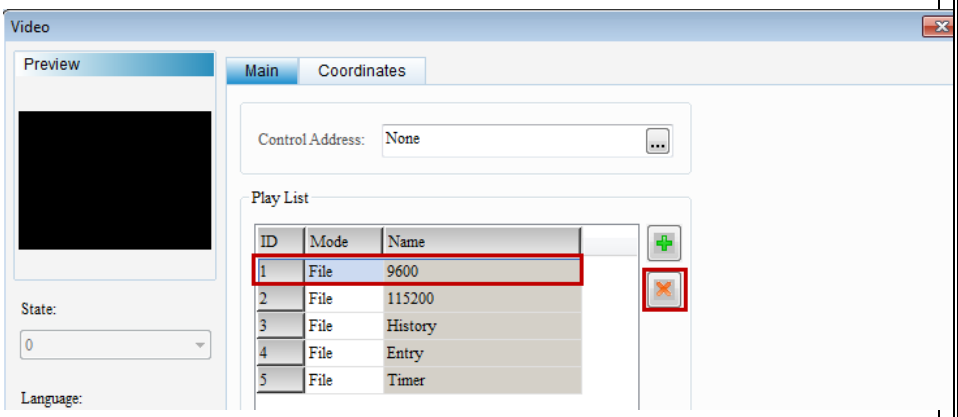
➢ The default accessing method is File. Users can determine whether to change the method to Address or just use File.

Delete

➢ Users can delete the unnecessary video from the play list.

Before

➢ Select the first file and click on Delete.

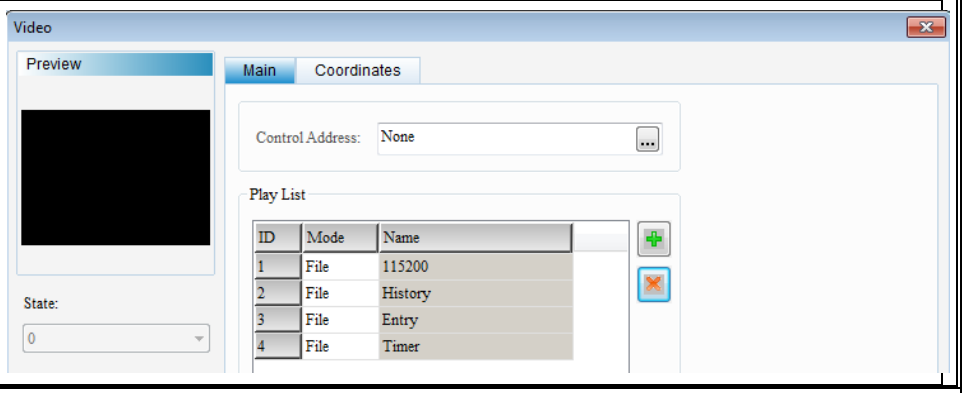


After

➢ Below shows the play list after the first file is deleted.

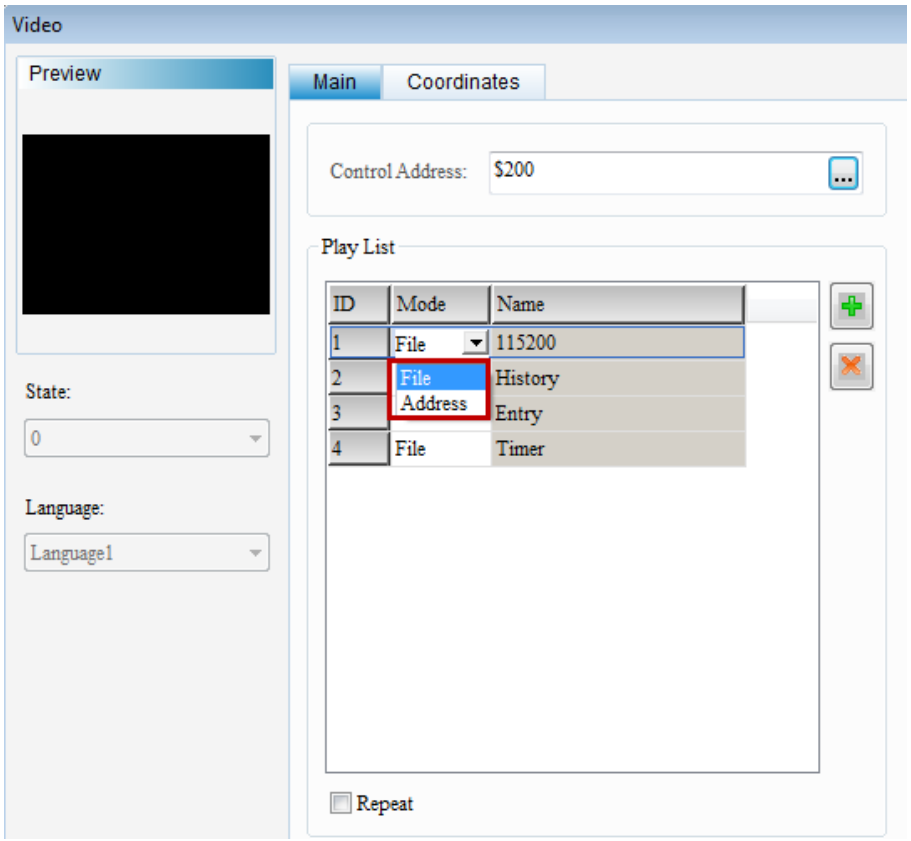
Play List

Table 29-2-3 Play List

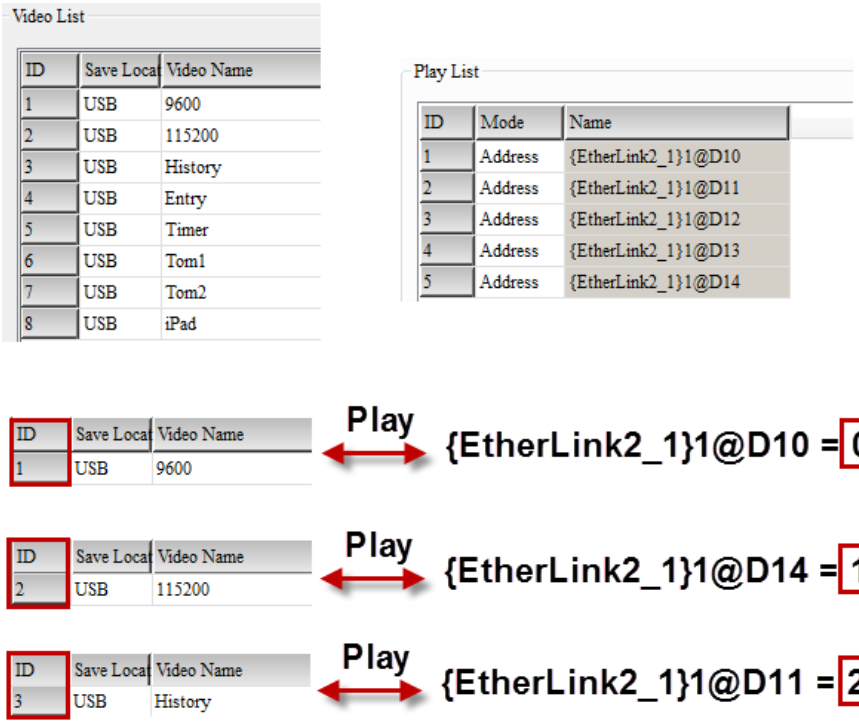
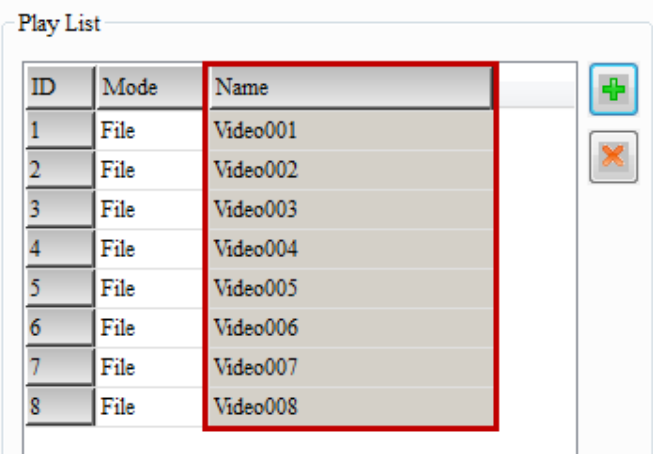


Accessing Method (Mode)

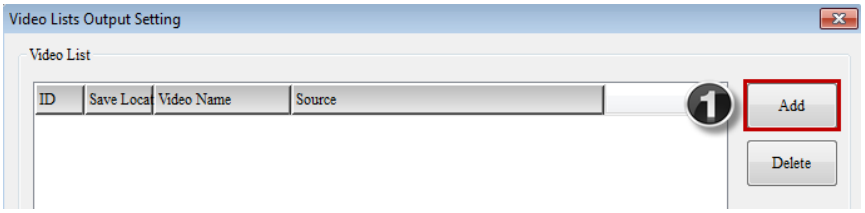
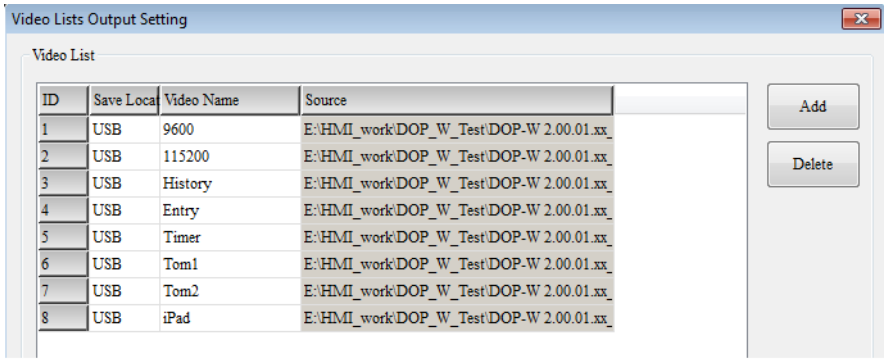
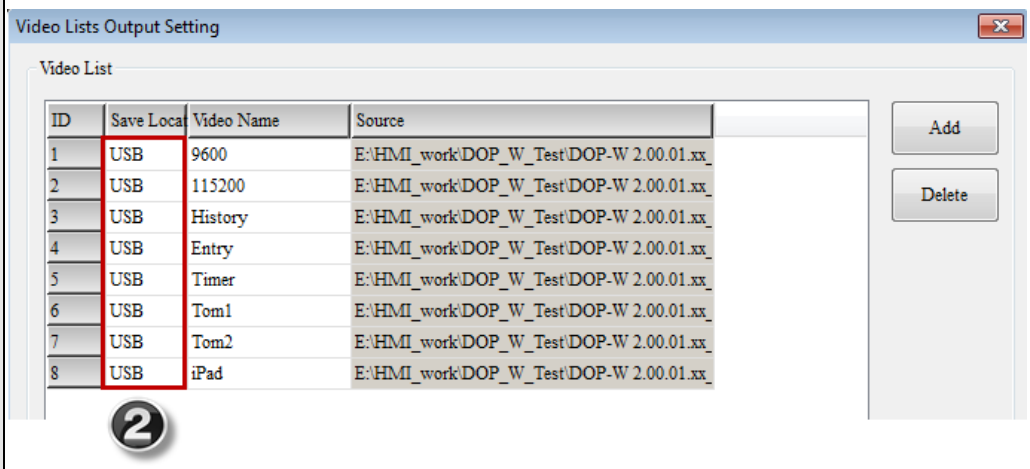
- We have two accessing methods (modes), [File] and [Address].
- [File]: Directly select the file that you wish to play from the video list and add it to the play list. When the control address is triggered, it will play the selected video.
- [Address]: Specify one register address. When the triggering condition is established, the input value of register will be read and the video will be played according to the corresponded ID from [Video lists output setting] → [Video list].



- Following shows the example of the ID corresponded by [Address].
- When the input value of the [Address] is 0, the corresponding ID in the video list is ID number 1. When the value is 1, then the ID number will

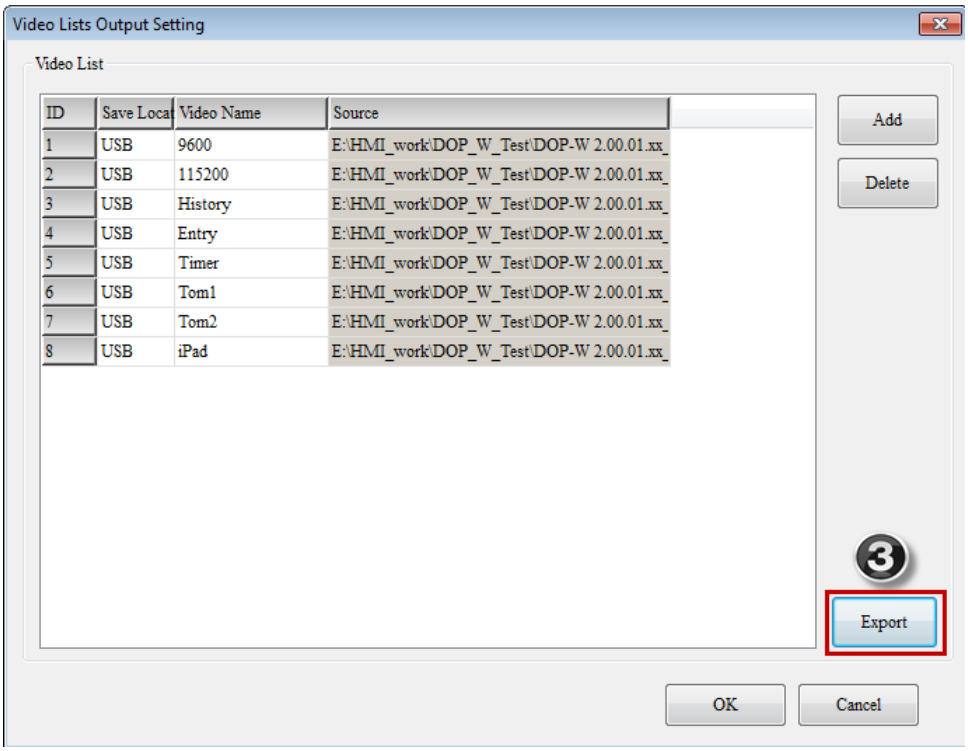
Play List Table 29-2-3 Play List	
	be 2. 
Name	➢ The name will be Video and a number starting from 001 (Video name + number), such as Video001 for the first one, Video002 for the second, Video003 for the third and so on. 
Repeat	➢ Regardless the mode (either File or Address) you use, when selecting Repeat to play the video, the video in the list will be played from the beginning to the end over and over. It will not stop until the stop element is triggered.

◆ Following is the example for describing the setting method when playing the video.

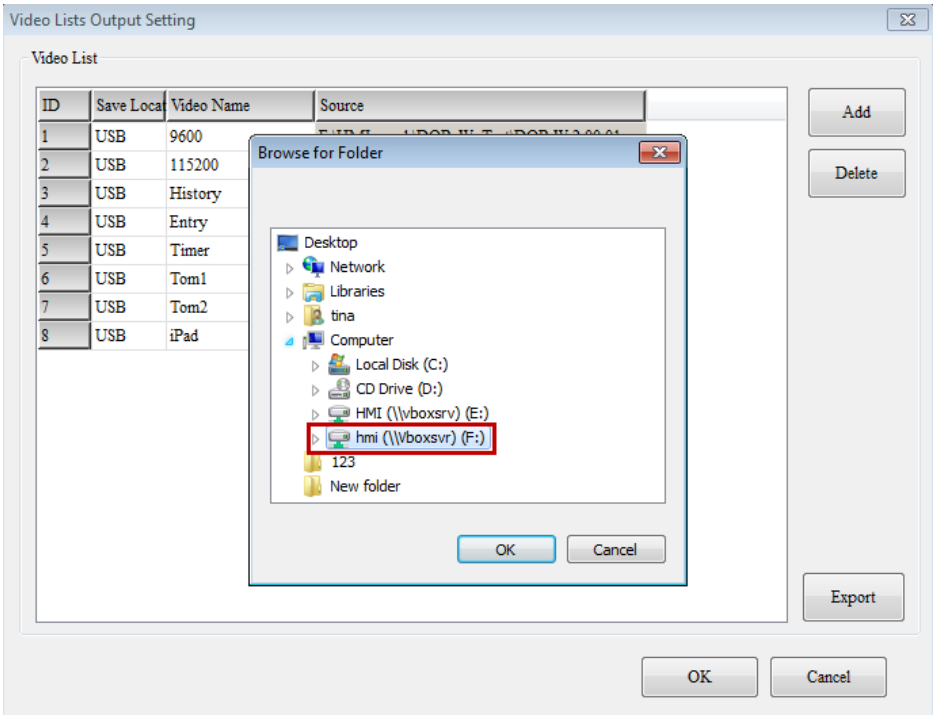
Exmaple of video play Table 29-2-4 Example of video play	
Video lists output setting	❶ Please select [Options] → [Video Lists Output Setting] .Click on [Add] and select the video that you wish to play.  Then, the screen will be shown as below.  ❷ Set the [Save location] to [USB].  ❸ Click [Export].

Exmaple of video play

Table 29-2-4 Example of video play



Then, set the resolution to 640X480 and select the storage device for the exported file.



Click [OK]. The video will be exported to the USB.

Video Element	❶ Please select [Element] → [Video] and create one video element. ❷ Double clickon the video element and set parameters which shown as below.

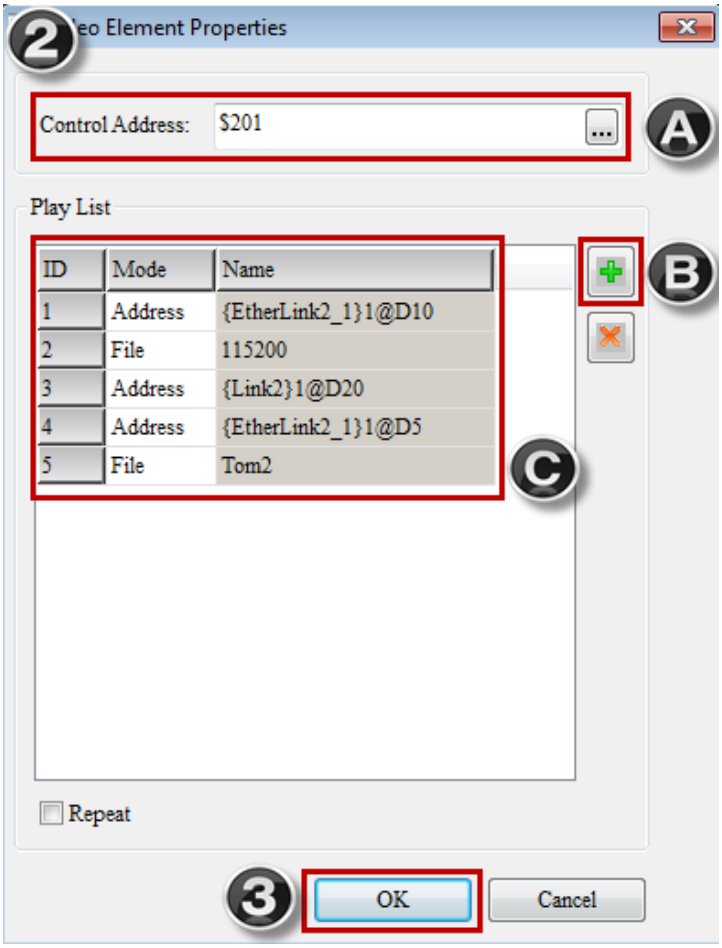
Exmaple of video play

Table 29-2-4 Example of video play

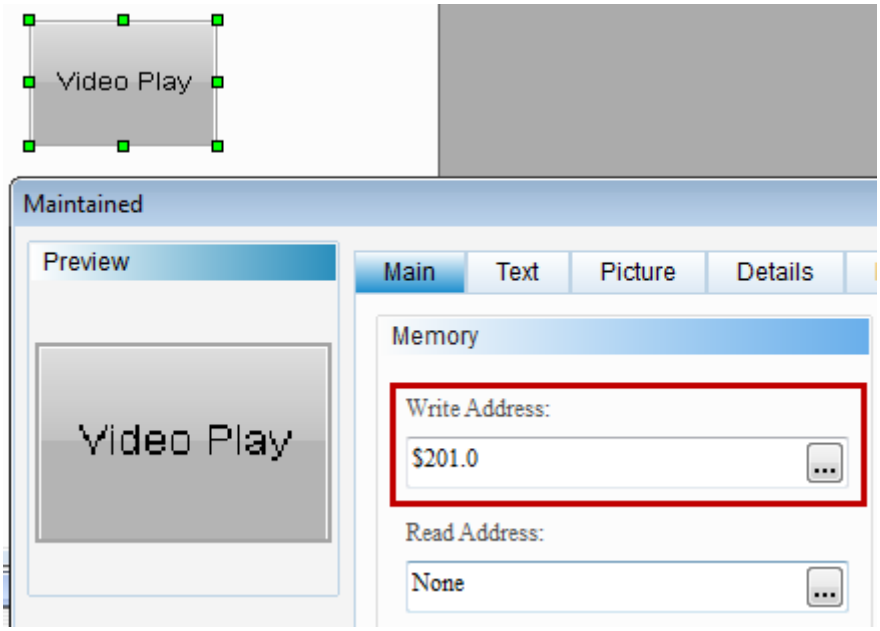
A. Set the control address: $201.

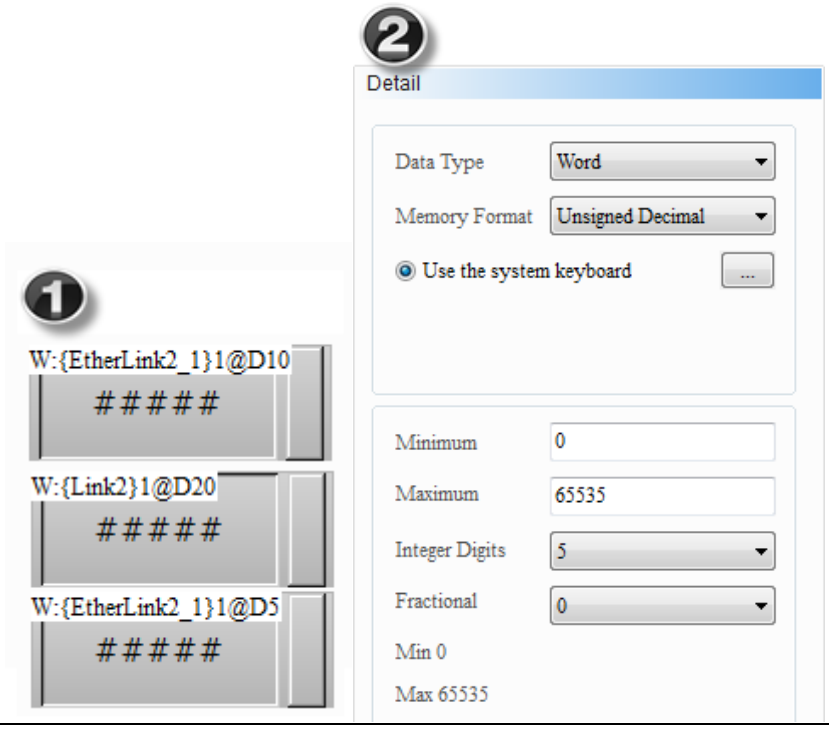
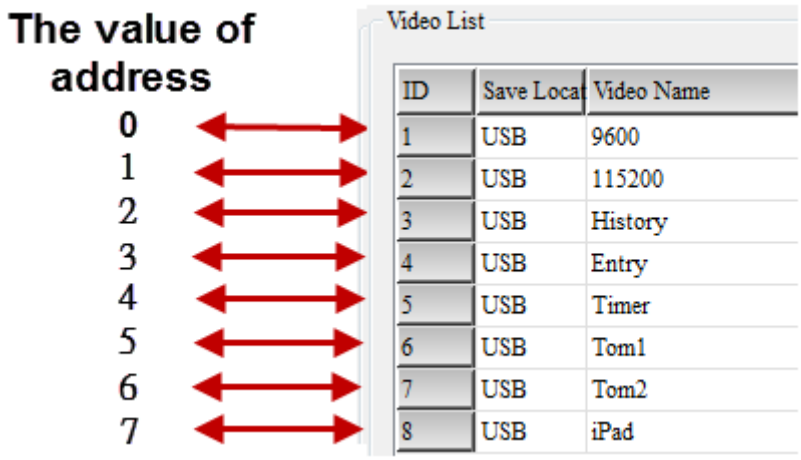
B. Click [ ] to add the selected file to the video list.

C. It is the play list after adding the video file.



❸ Then, click on [OK] to complete the setting.

Exmaple of video play Table 29-2-4 Example of video play	
Create the Maintained Button (Button for playing the video)	➢ Create a maintained button element and set the address to $201.0. 

Exmaple of video play Table 29-2-4 Example of video play	
Create the numeric entry element	❶ Create three numeric entry elements and set their address as **{EtherLink2_1}1@D10**, **{Link2}1@D20** and **{EtherLink2_1}1@D5** respectively. ❷ Set the data type to Word and memory format toUnsigned Decimal. The minimum value is 0 and the maximum value is 65535. 
Edit and Download the screen	➢ When the above setting is complete, please compile and download the screen to HMI. ➢ Before playing the video, please insert the USB storage device to the HMI.
Operate the HMI	❶ Please set **{EtherLink2_1}1@D10 = 2**, **{Link2}1@D20 = 6** and **{EtherLink2_1}1@D5 = 1** first.  **EtherLink2_1}1@D10 = 2** — Play the video named History.

Exmaple of video play Table 29-2-4 Example of video play		
	{Link2}1@D20 = 6	Play the video named Tom2.
	{EtherLink2_1}1@D5 = 1	Play the video named 115200.
	❷ Click on the play button ($201.0) to play the video. ❸ Click on the play button ($201.0) again to stop playing.	

29-3 Web Monitor

Web Monitor enables W series HMIs to write the value from the web to HMIs or to monitor the value on the web after it is written to the HMI.

29-3-1 HMI Setting

Go to [Options] → [Configuration] → [Network Application] and enable the function of [eRemote / eServer / Web Monitor]. Then, select [Setting] for [Web Monitor].
Users can set the network application and password. When you choose [All] for [Interface], it means you can use LAN1 or LAN2 to monitor HMI on webpage. The password of Realtime monitor setting is identical to eRemote / eServer. Users can also definedifferent passwords.

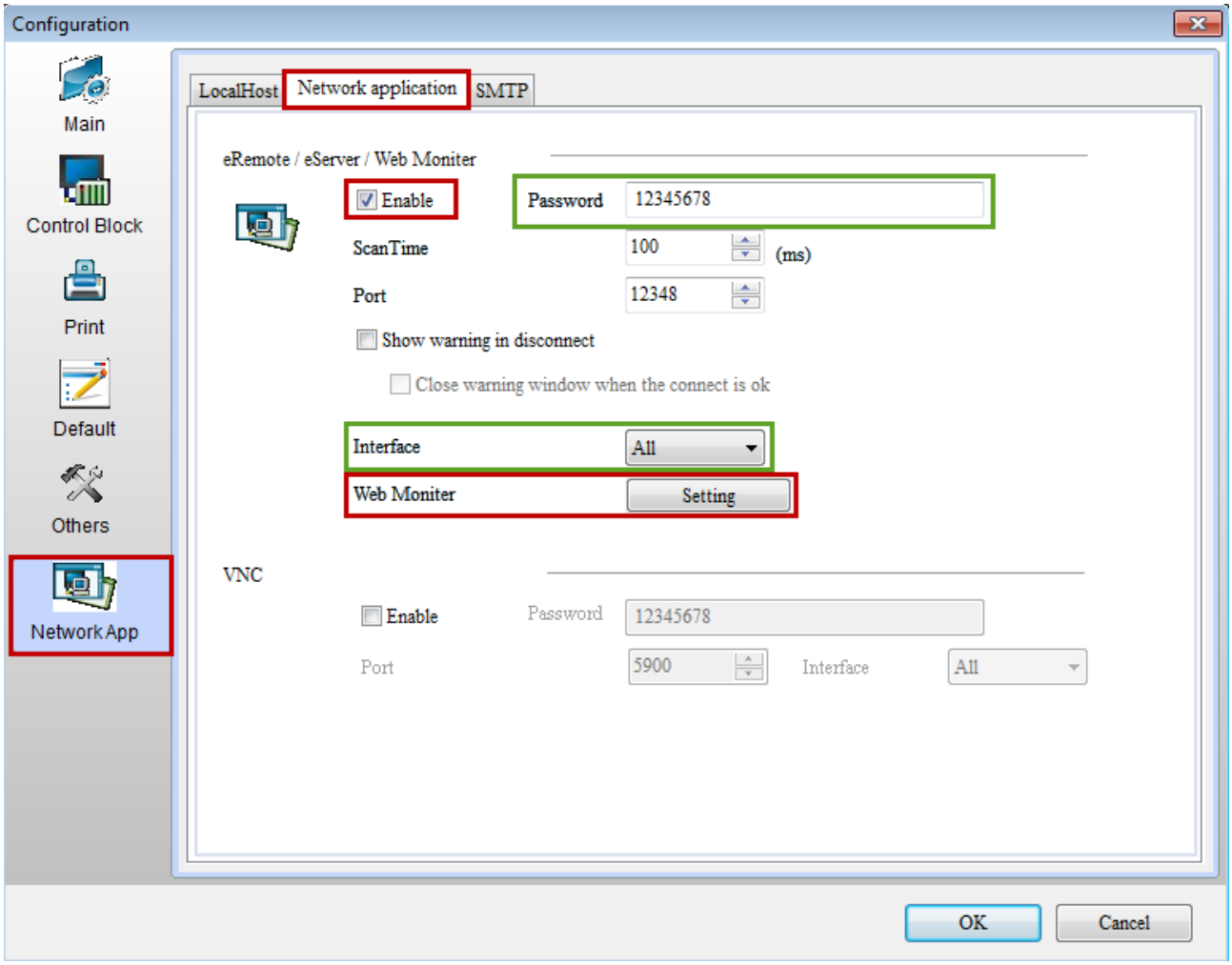


Figure 29-3-1 Network Application

Go to Realtime Monitor Settings, and you will find that multiple data formats are provided.The supported data format includes BCD, Signed Decimal, Unsigned Decimal,

Hex, Floating and Char. Each format can set the length which determines the unit, Word or Double Word. Users can select Word or Bit as the Address. It supports internal memory address and external PLC address.

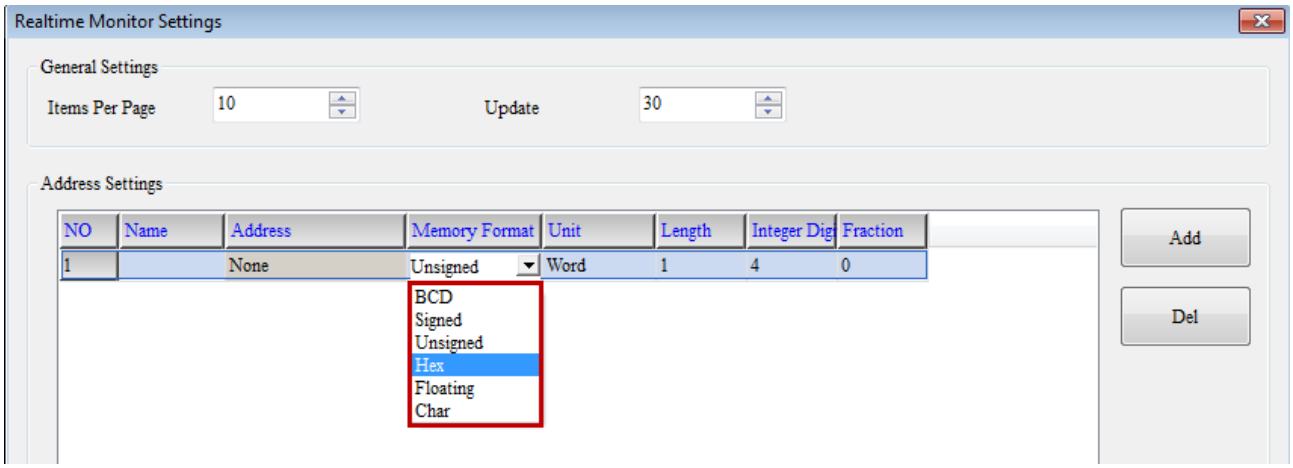


Figure 29-3-2 Realtime Monitor Settings

29-3-2 Web page Setting

Step 1: Please enter HMI IP in the web browser. And the [Windows CE Remote Management Tool] page will pop up. If already configure Remote management tool setup with Step 1 ~ Step 4, please skip Step 1 ~ Step 4 setting.

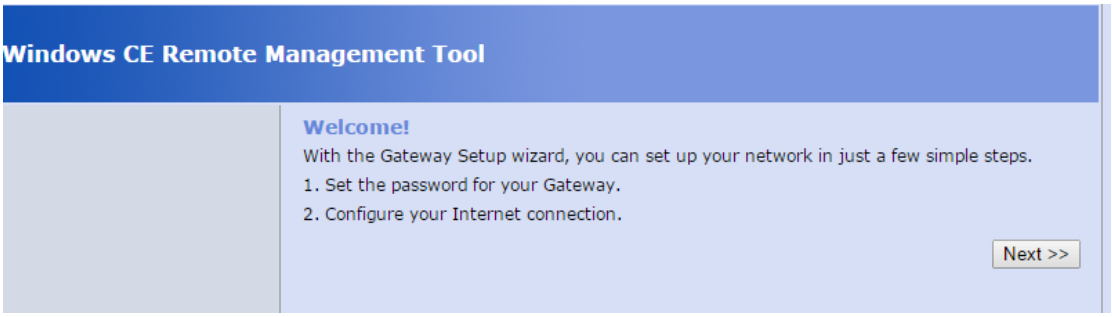


Figure 29-3-3 Windows CE Remote Management Tool

Step2: Click on Next. Enter the password and click on Next again.

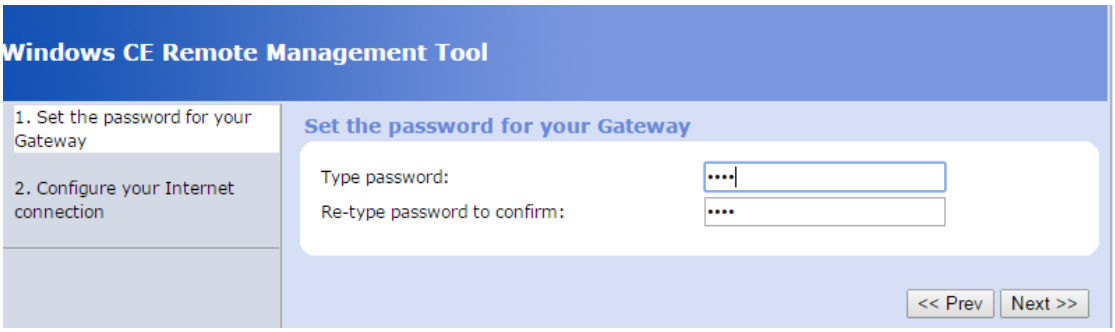


Figure 29-3-4 Enter the password

Step 3: Select the Internet connection type. We usually choose DHCP. Then, click on Finish.

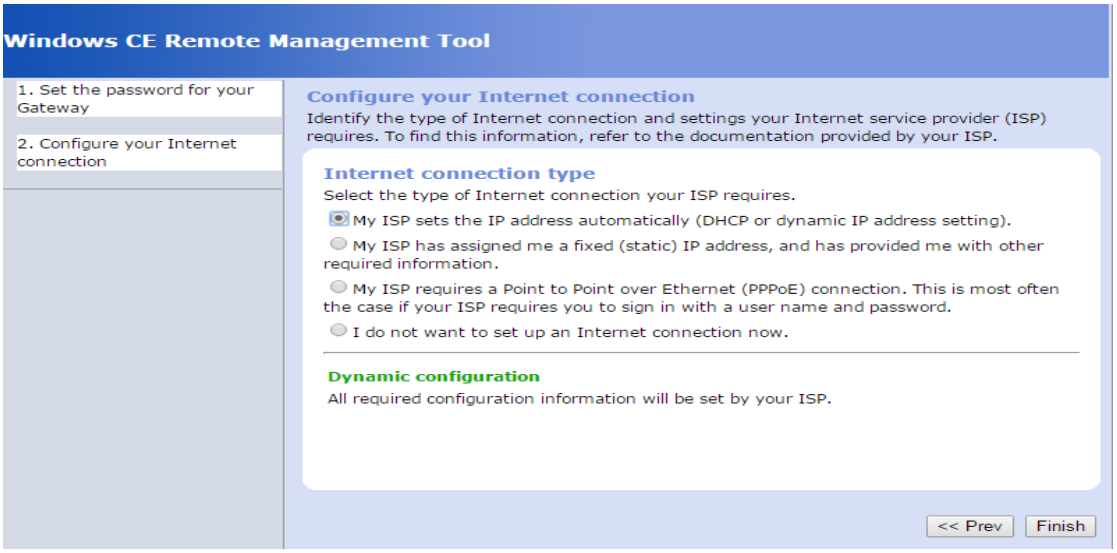


Figure 29-3-5 Select DHCP

Step 4: When the setting is complete, the screen will be shown as below.

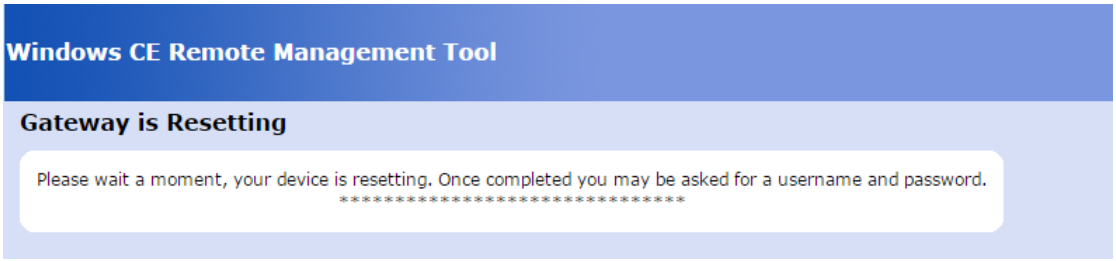


Figure 29-3-6 Windows CE Remote Management Tool setting is complete

Step 5: Make sure the function of Realtime Monitor Setting is enabled and the address is set. Then, enter **http://[HMIIP]/RemoteMon/** on web browser. You will see the following page. Please enter the password for Network application to log on.

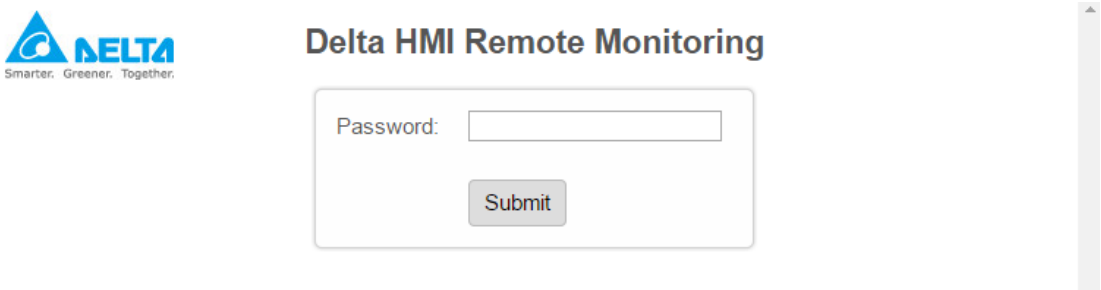


Figure 29-3-7 Log on page of realtime monitor settings

Step 6: Then, you can see the realtime monitoring address set in the software.

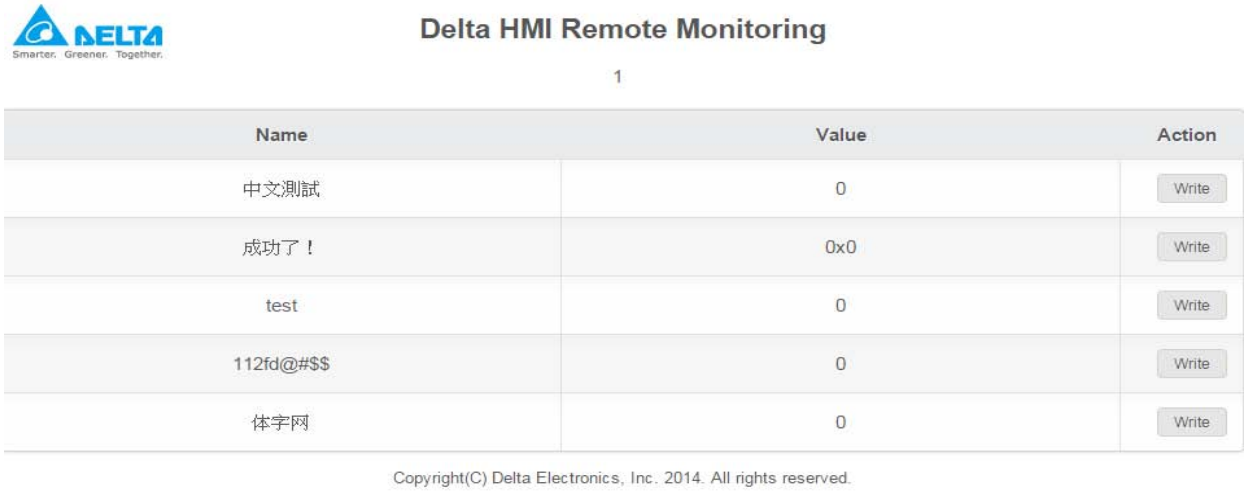


Figure 29-3-8 Screen of realtime monitor settings

Step 7: Click on the Write button of each monitoring address under Action field.

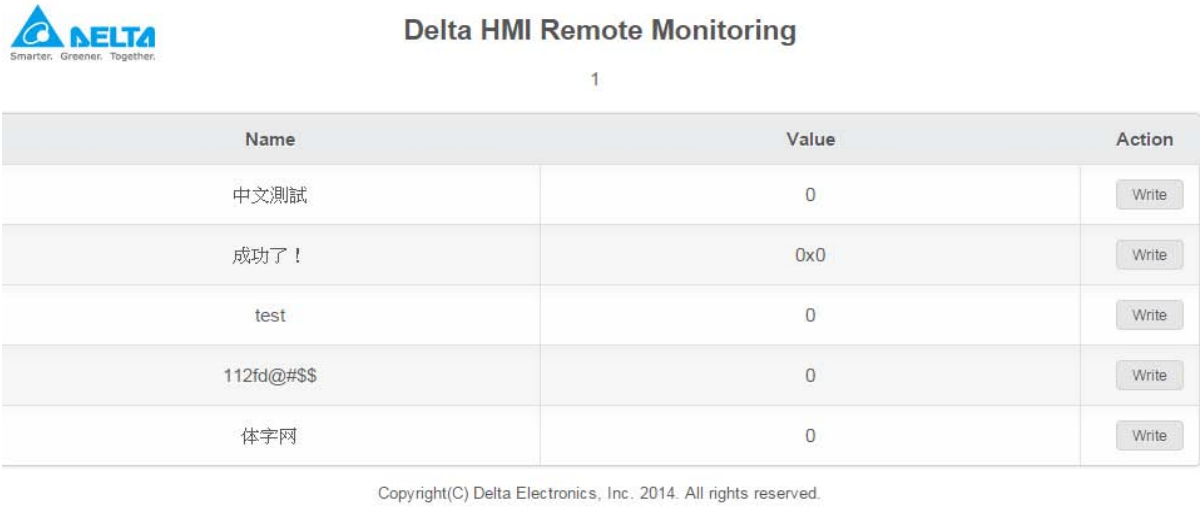


Figure 29-3-9 Screen of realtime monitor settings

Step 8: Enter the write-in value and click on the Write button. The value you just entered will be written to the monitoring I/O address. The web page will be updated after the refresh time.

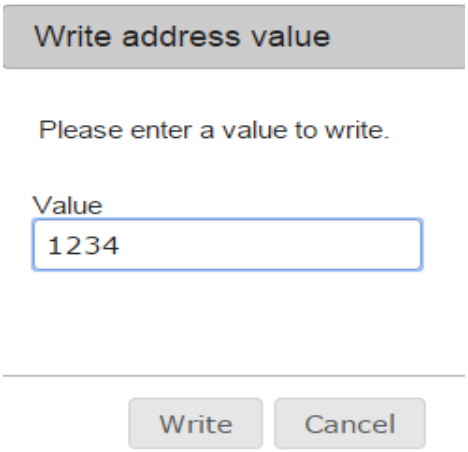


Figure 29-3-10 Enter the value in realtime monitor settings

29-4 VNC

VNC (Virtual Network Computing) is the software that users can apply to remotely monitor and operate W series HMIs. Through the Internet, this software can transmit the action of keypad and mouse and the real-time screen.

29-4-1 Introduction for HMI and VNC connection setting

☞ Example of creating HMI

Please open DOPSoft 2.00.01. W105B model is selected as the example here.

Create a new project and two numeric entry elements ($3, $6) in the screen.

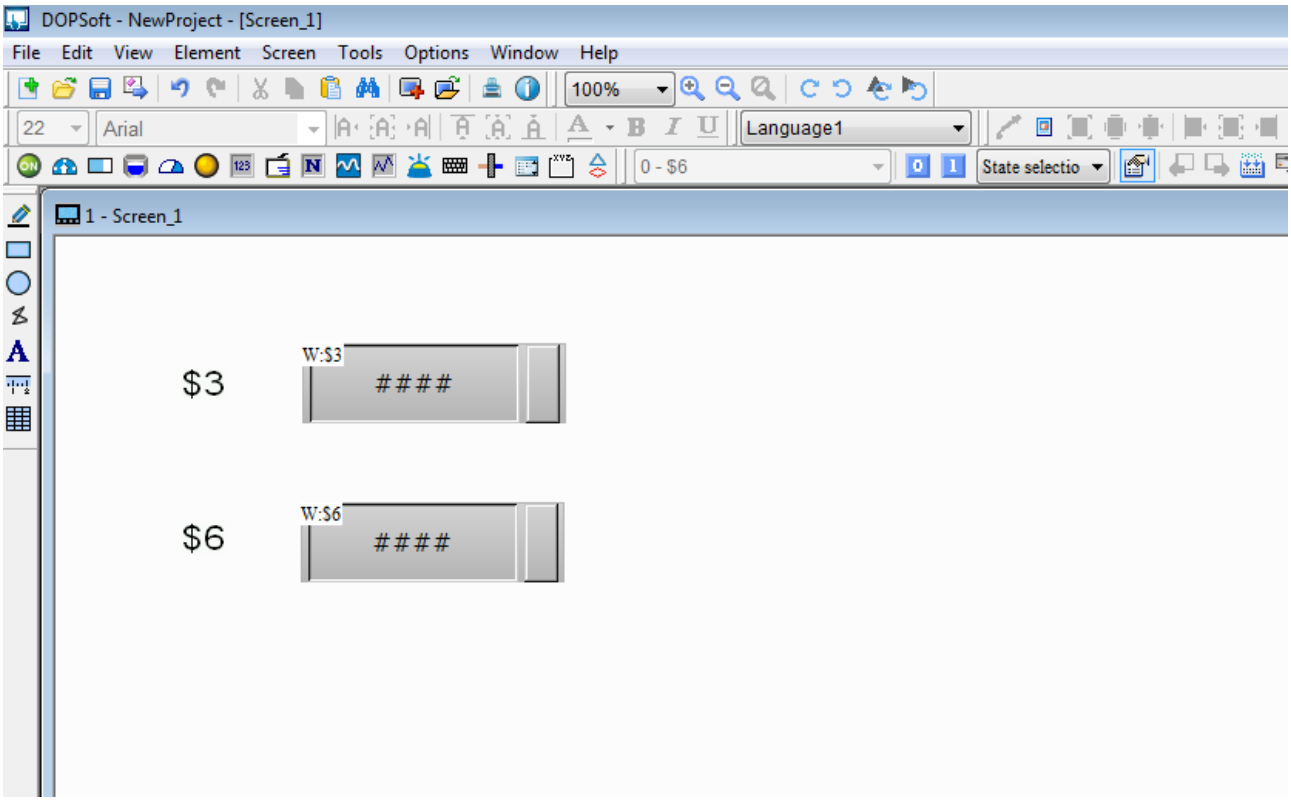


Figure 29-4-1 Example of creating HMI

Enter the following macros in Screen Cycle Macro

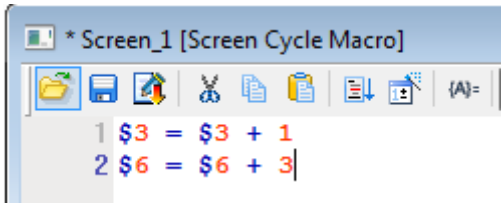


Figure 29-4-2 Screen Cycle Macro

Go to「Option」→「Configuration」→「Network application」 and enable [VNC].

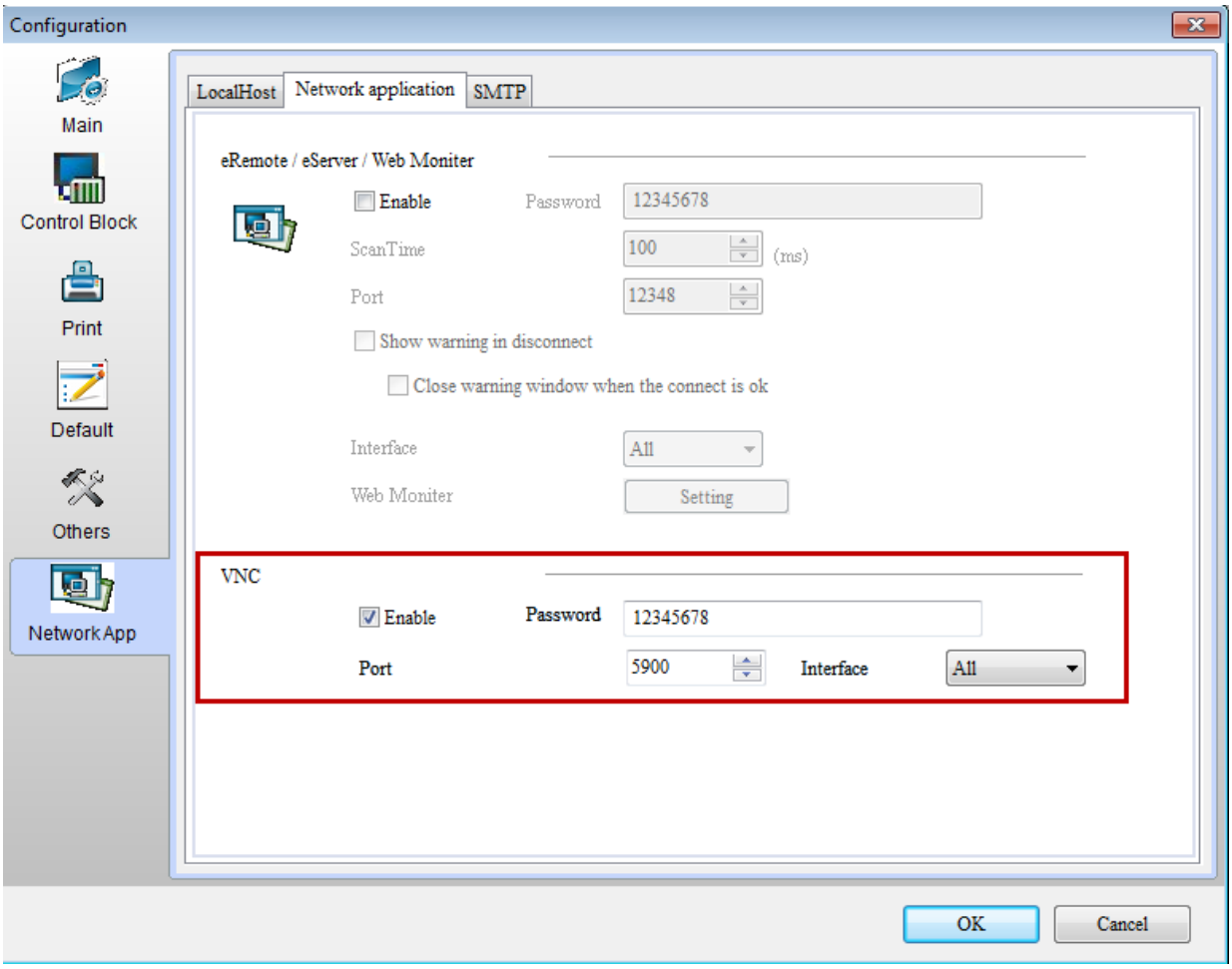


Figure 29-4-3 Check to enable VNC

Or you can go to [System Setting] → [Network App] under system directory, set [VNC] to on, complete password setting and select LAN1, LAN2 or All for VNC connection.

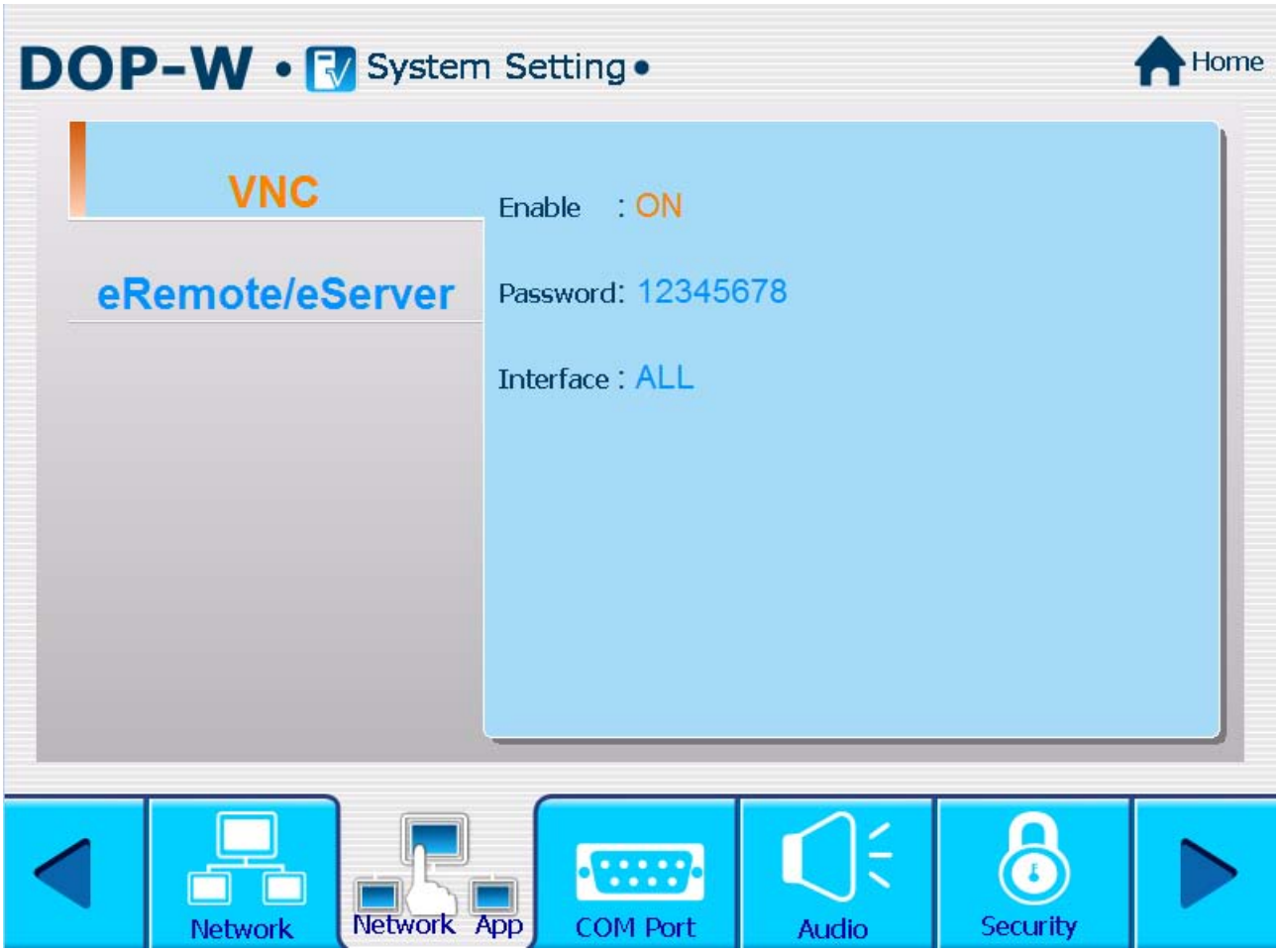


Figure 29-4-4 Enable VNC in system directory

When the above settings are complete, please compile and download all screens to the HMI.

29-4-2 VNC Setting

Following describes the connection method for three platforms:

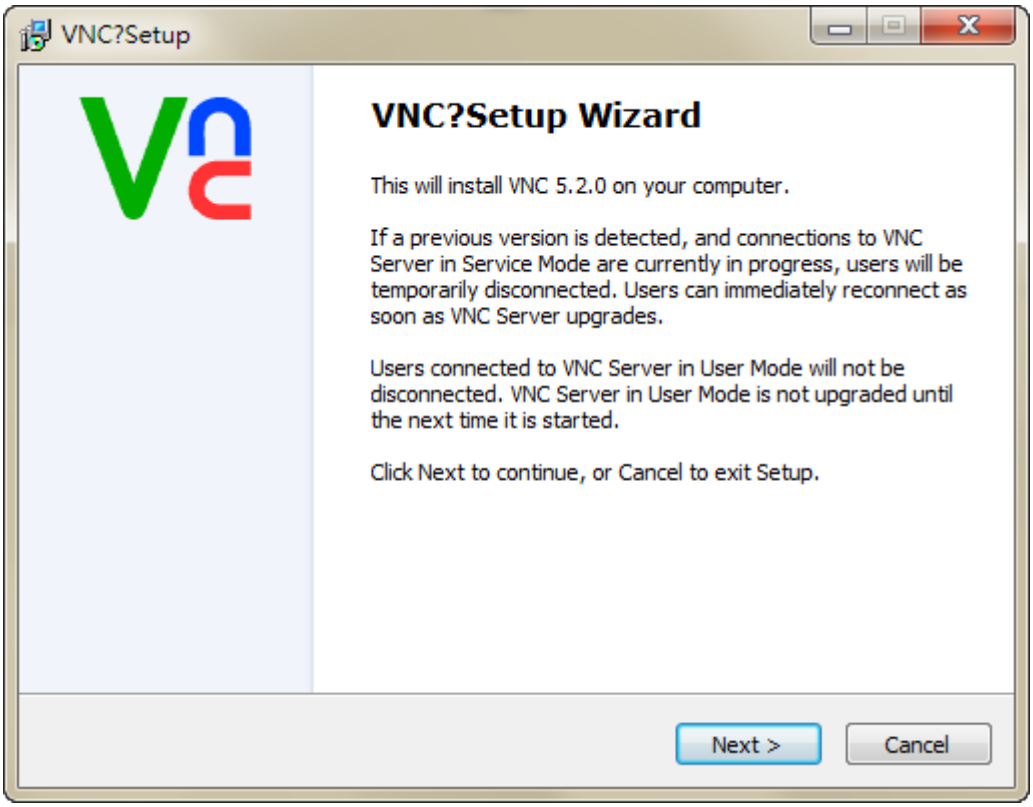
- PC Software
- Web Browser
- Android App / IOS App

29-4-2-1 PC Software

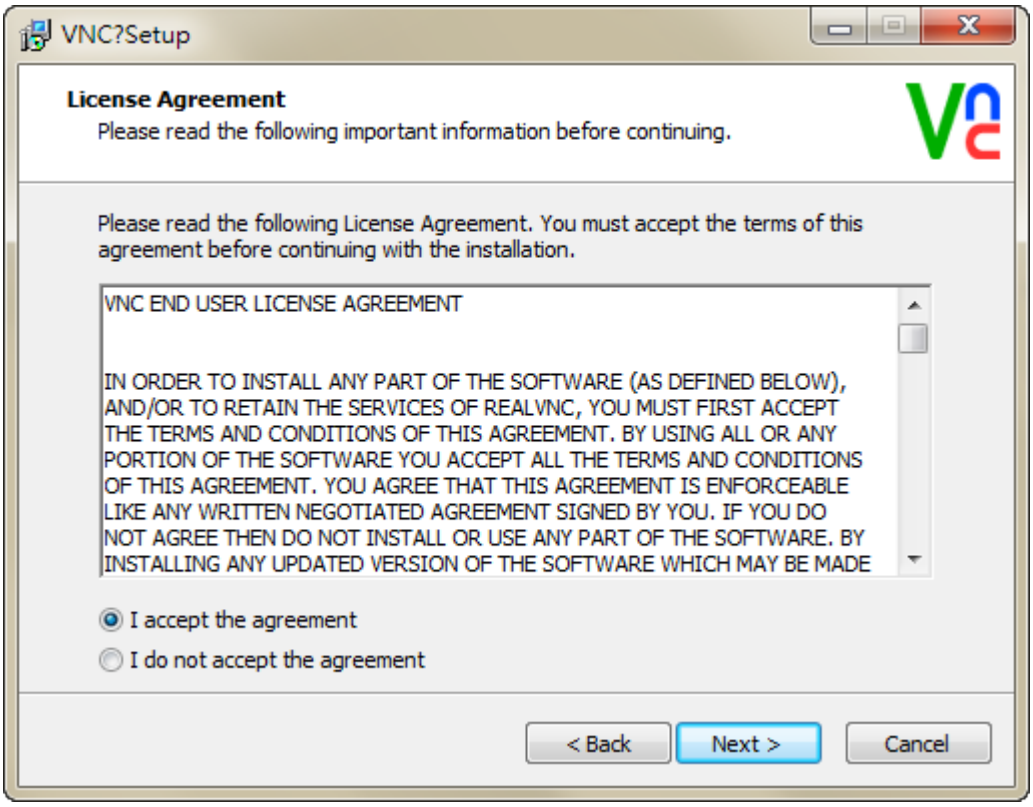
29-4-2-1-1 Software installation

Please go to the website (http://www.realvnc.com/download/vnc/latest/) to download VNC software and select VNC provided by the platform.

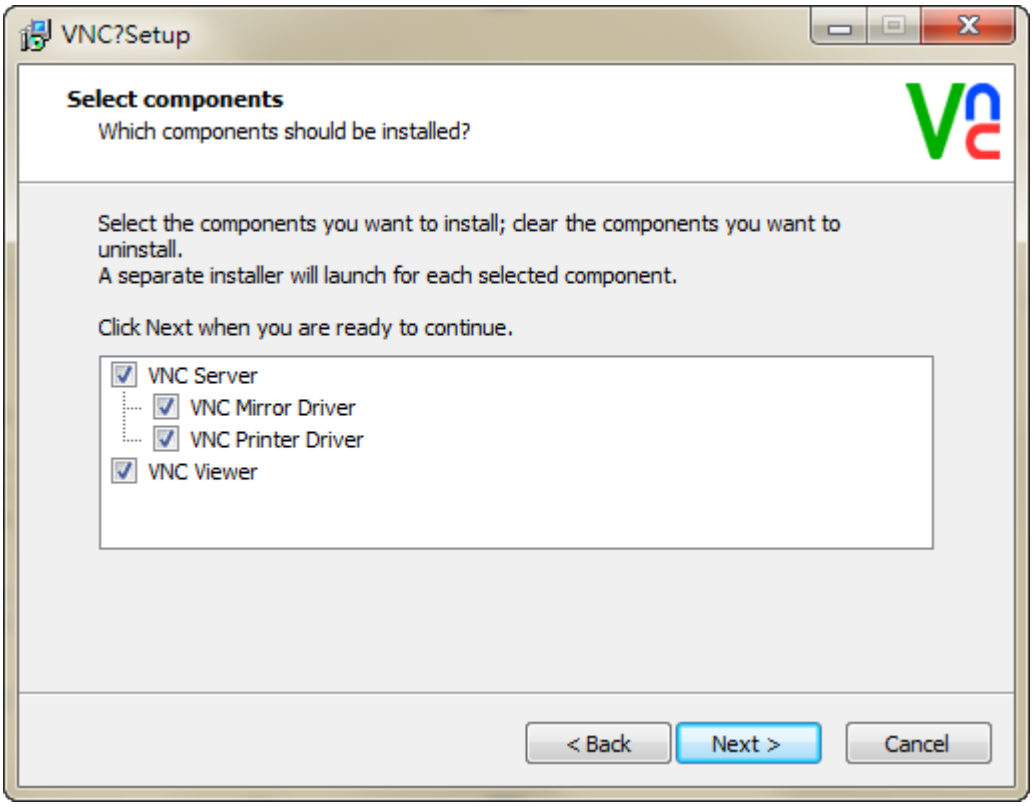
Then, click [Next] to install the software.



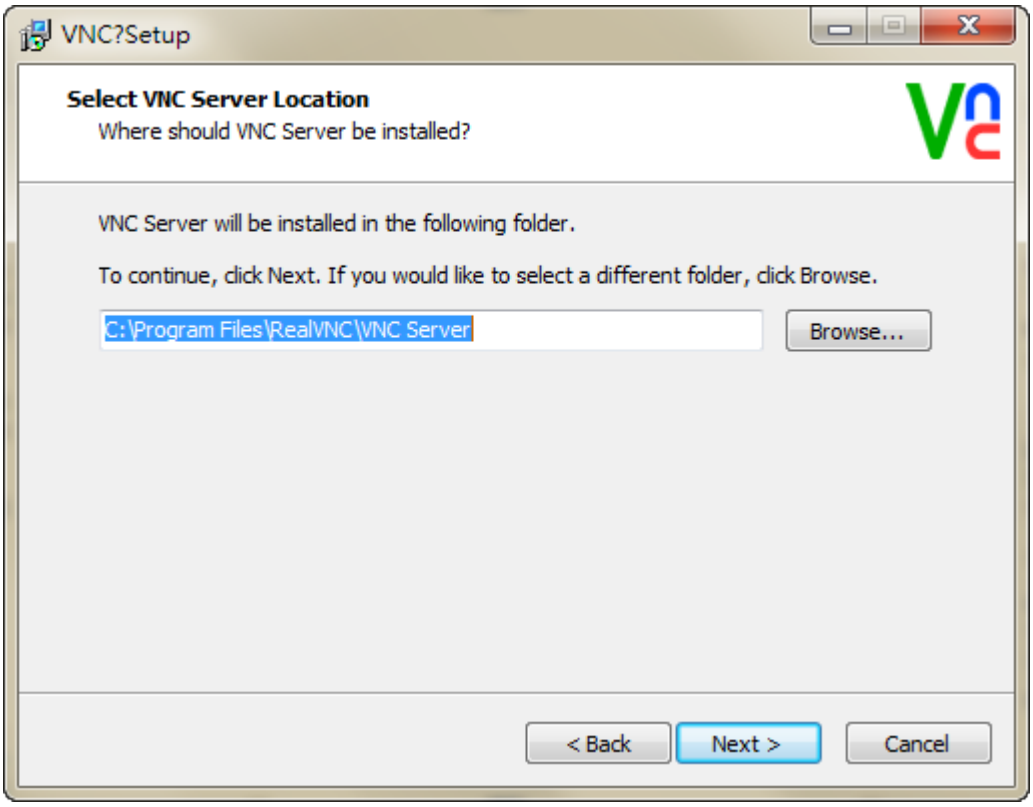
Select [I accept the agreement] and click on [Next].



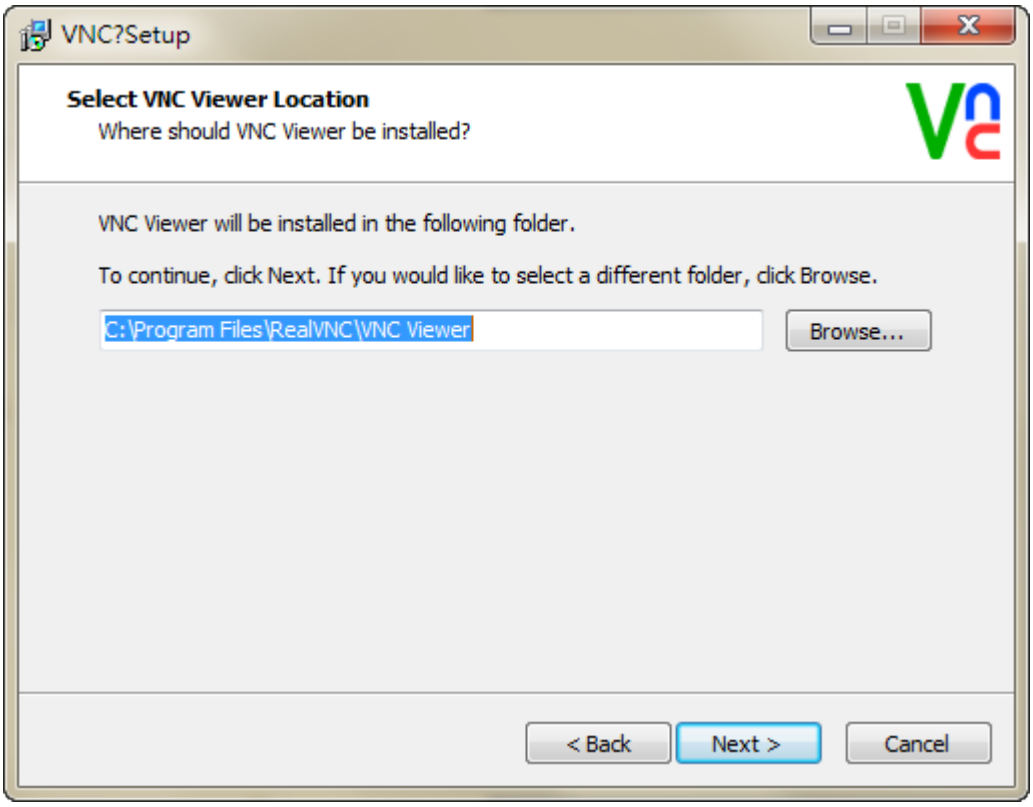
Please check all components and click [Next].



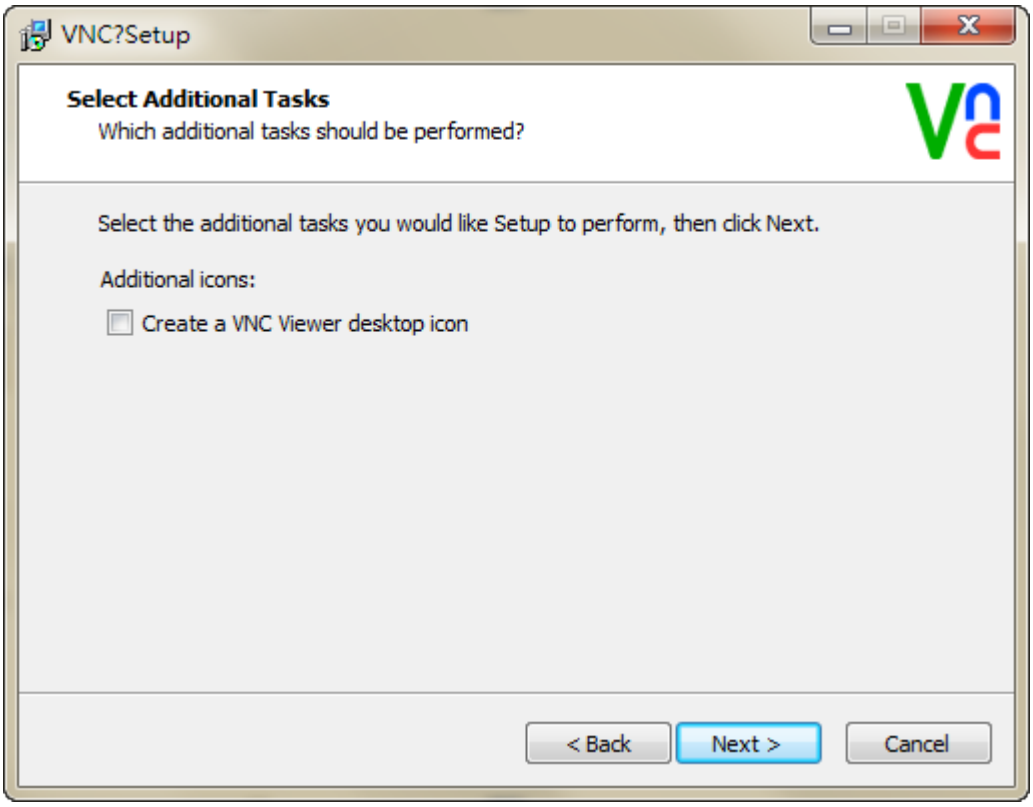
Select VNC Server location. If you do not change the location, please click [Next].



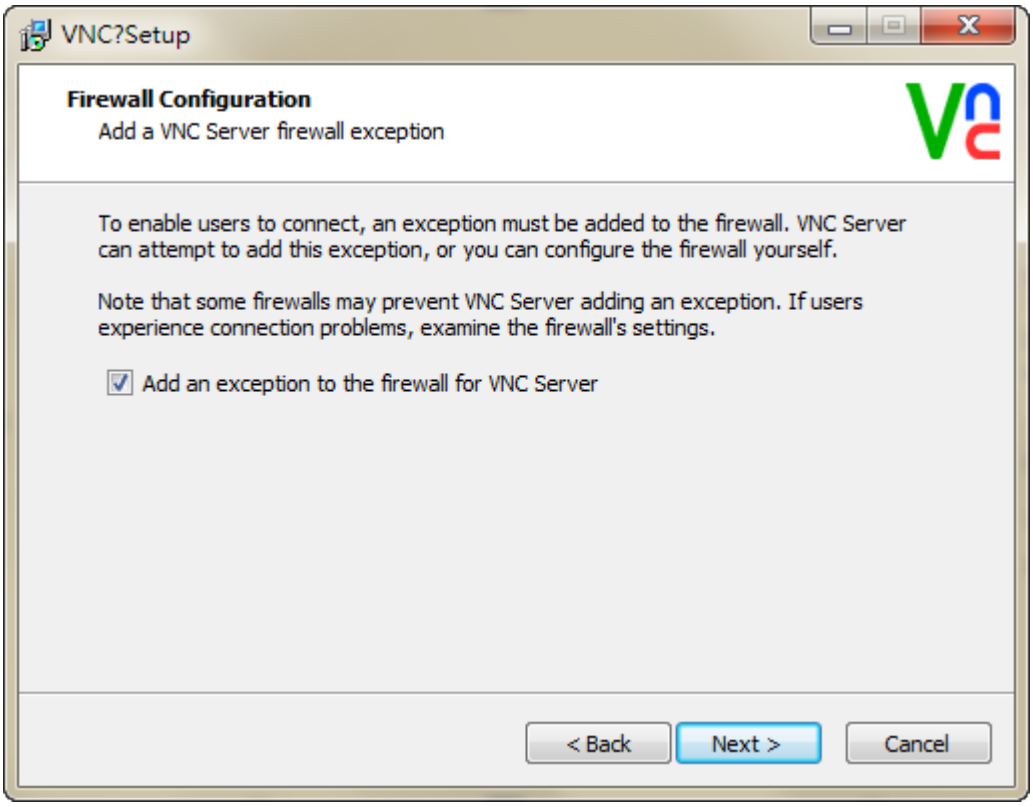
Select VNC Viewer location. If you do not change the location, please click [Next].



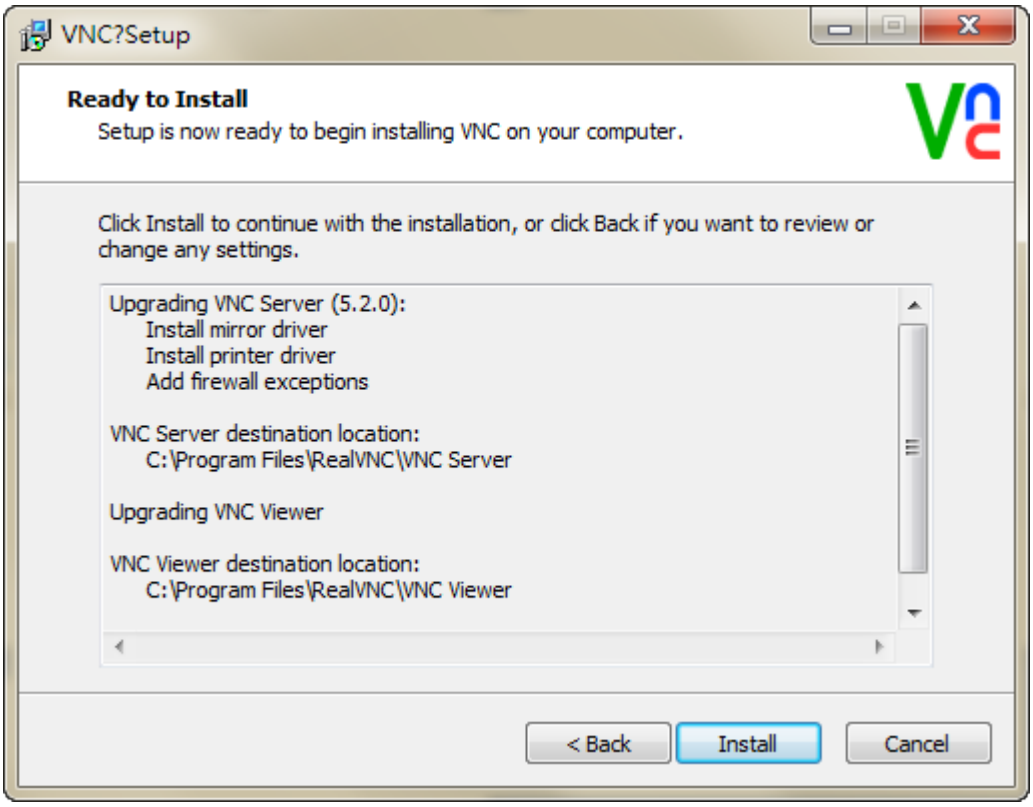
Users can determine whether to create a VNC Viewer desktop icon. And click [Next].



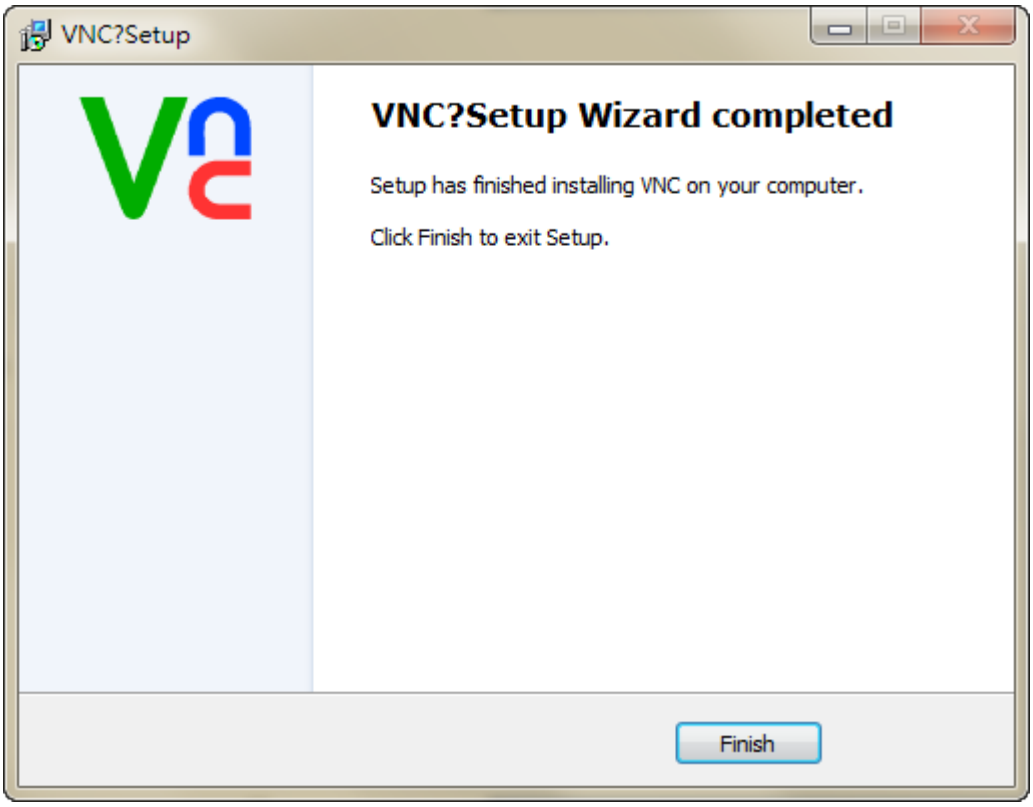
Please check “Add an exception to the firewall for VNC Server” and click [Next].



Click [Install] to install VNC.



Click [Finish] to exit steup.



29-4-2-1-2 Execute VNC Viewer

Please open VNC Viewer, complete the following settings and select [Connect].

- **VNC Server**: Please enter VNC Server IP Address and its communication port for connection. The IP Address is HMI's IP Address. The communication port is the one that can be set from [Options] → [Configuration] → [Network Application] in DOPSoft. In this example, HMI's IP Address is 192.168.123.26 and the communication port is 5900. If the communication port for software connection is changed to 5902, then when you use VNC Viewer, the connection port has to be changed to 5902 as well.
- **Encryption**: Please select [Let VNC Server choose].

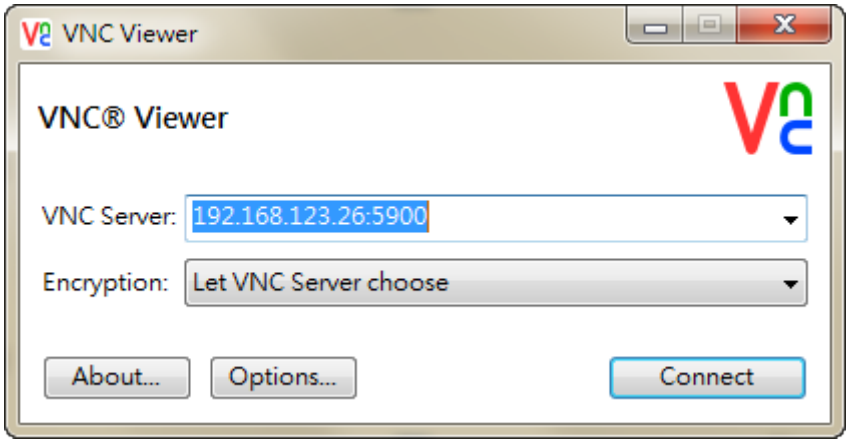


Figure 29-4-5 VNC Viewer connection window

When the connection is successfully built, the following window will pop up as the reminder that notifies users the connection address is unencrypted. If you want to ignore this message, just click [Don't warn me about this again] and click [Continue] to continue VNC Viewer connection.

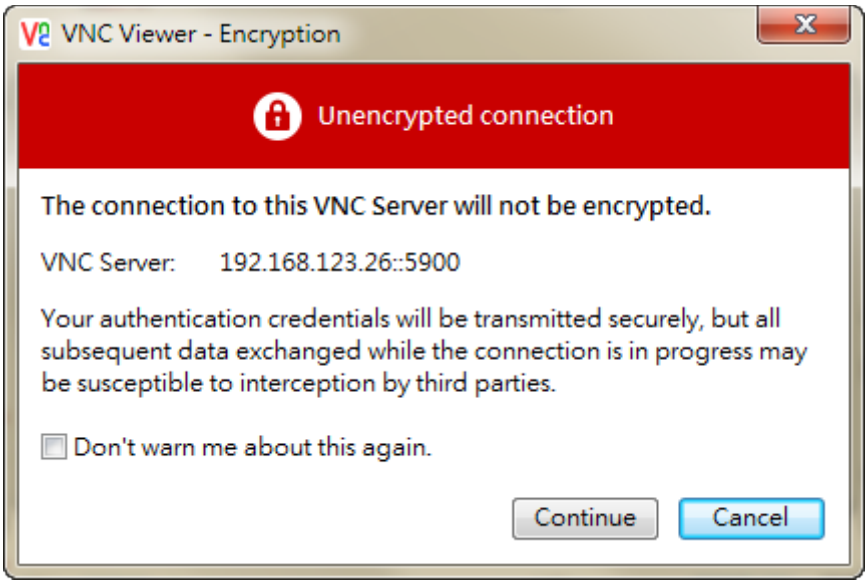


Figure 29-4-6 VNC Viewer encrypted connection

If it cannot build the connection, it means the IP Address does not exist or the VNC network connection is not enabled. Then, the following warning message will pop up.

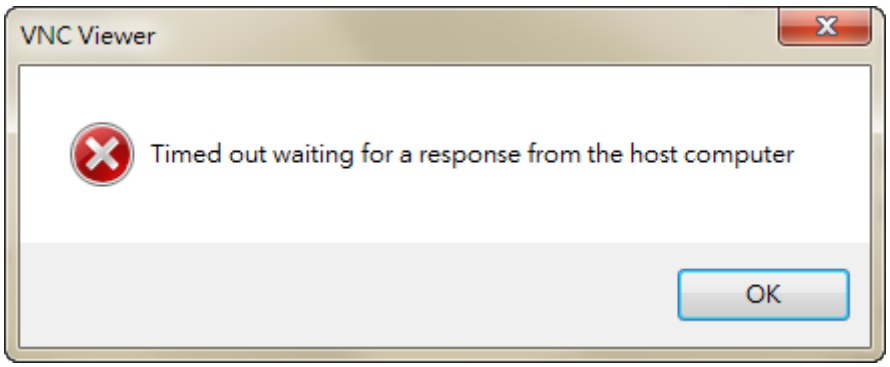


Figure 29-4-7 VNC Viewer connection error

When it is successfully connected, it will require users to enter the password for HMI and VNC Viewer connection. Please enter the VNC password for Network application which is introduced in 29-3-1. The default setting is 12345678.

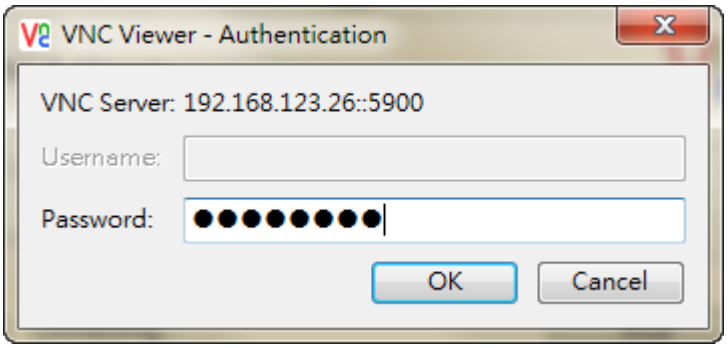


Figure 29-4-8 VNC Viewer – window for entering the password

Entering the wrong password, the following message will pop up.

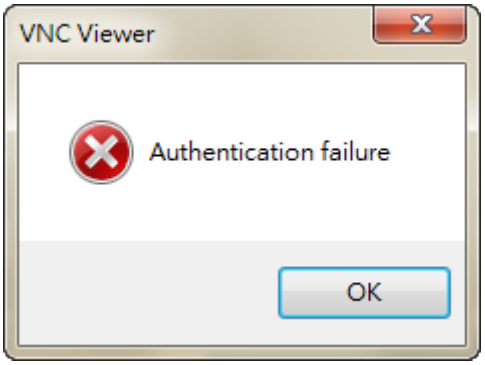


Figure 29-4-9 VNC Viewer – enter the wrong password

When the password is authenticated, you can start to remotely operate the HMI via VNC Viewer.

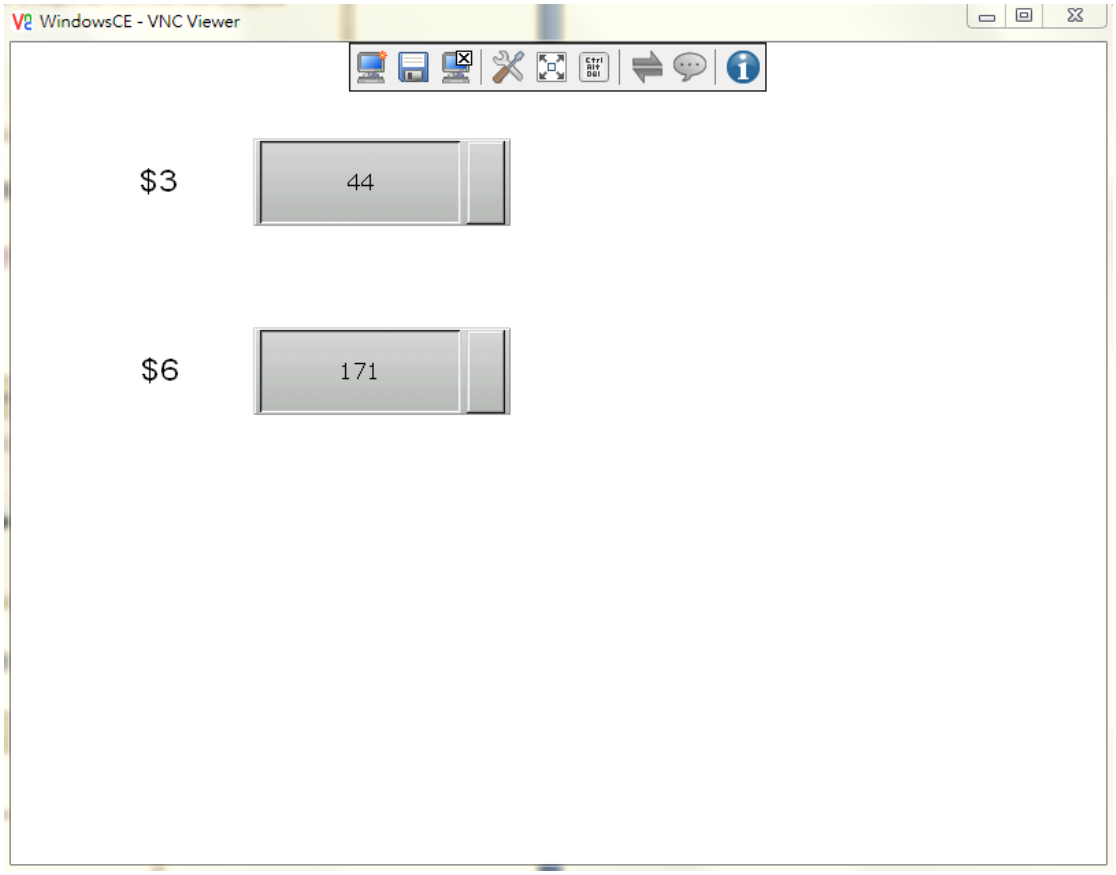


Figure 29-4-10 The HMI screen monitored by VNC Viewer

29-4-2-2 Web Browser

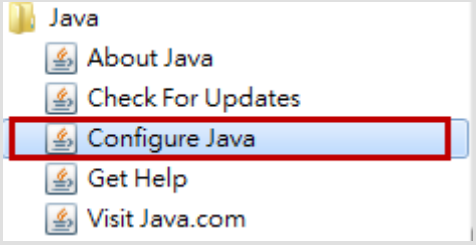
VNC Viewer also enables users to operate HMI on web page. To remotely connect to the HMI, users only need to enter HMI's IP Address on the browser and set the port to 5800. Even communication port is not set 5900 in DOPSoft, when use web browser to remote HMI, please have to set port as 5800.

NOTE:

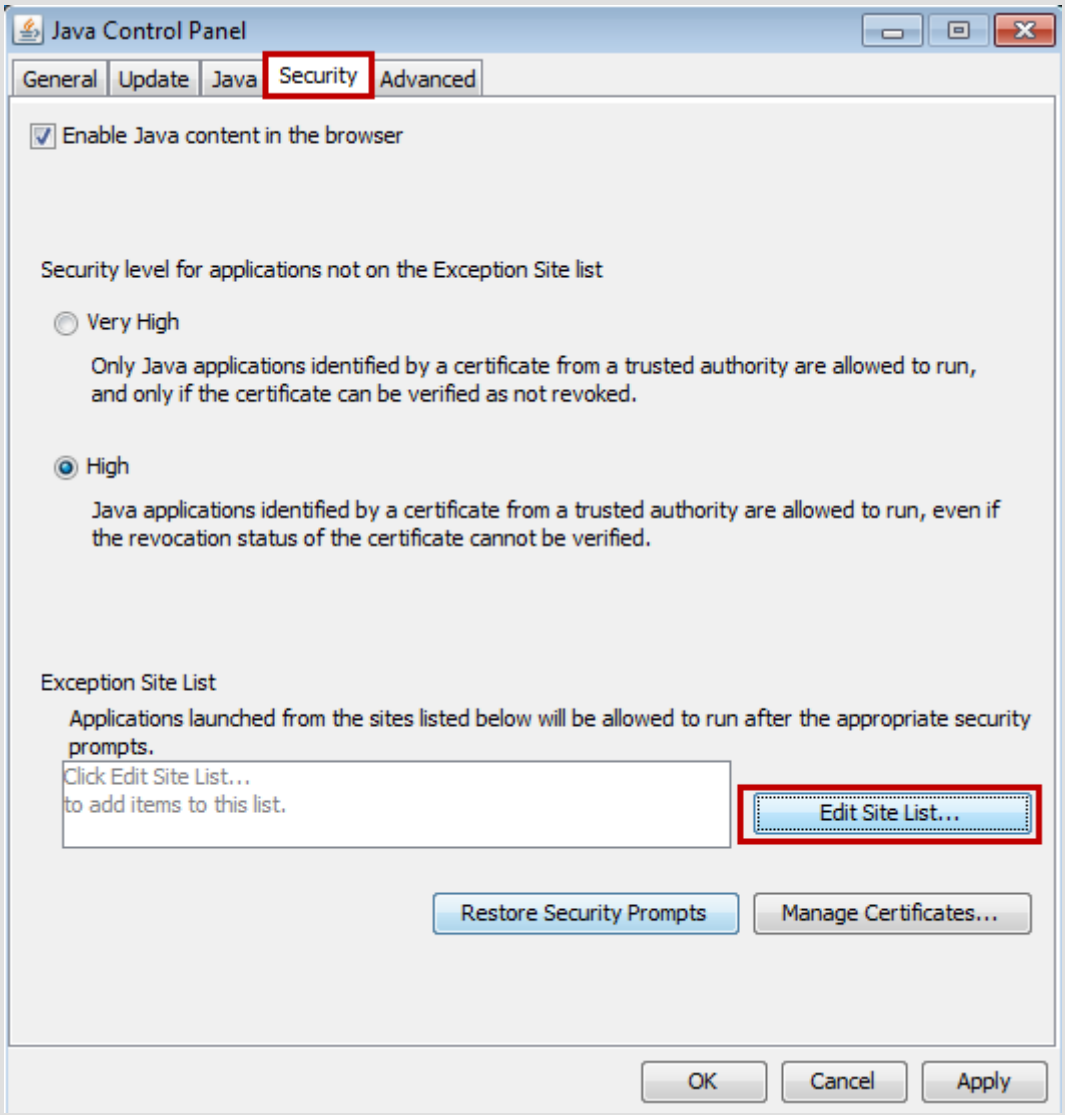
- ✓ Do not set the communication port to 5800. If you do so, the following message will pop up and ask you to change it.

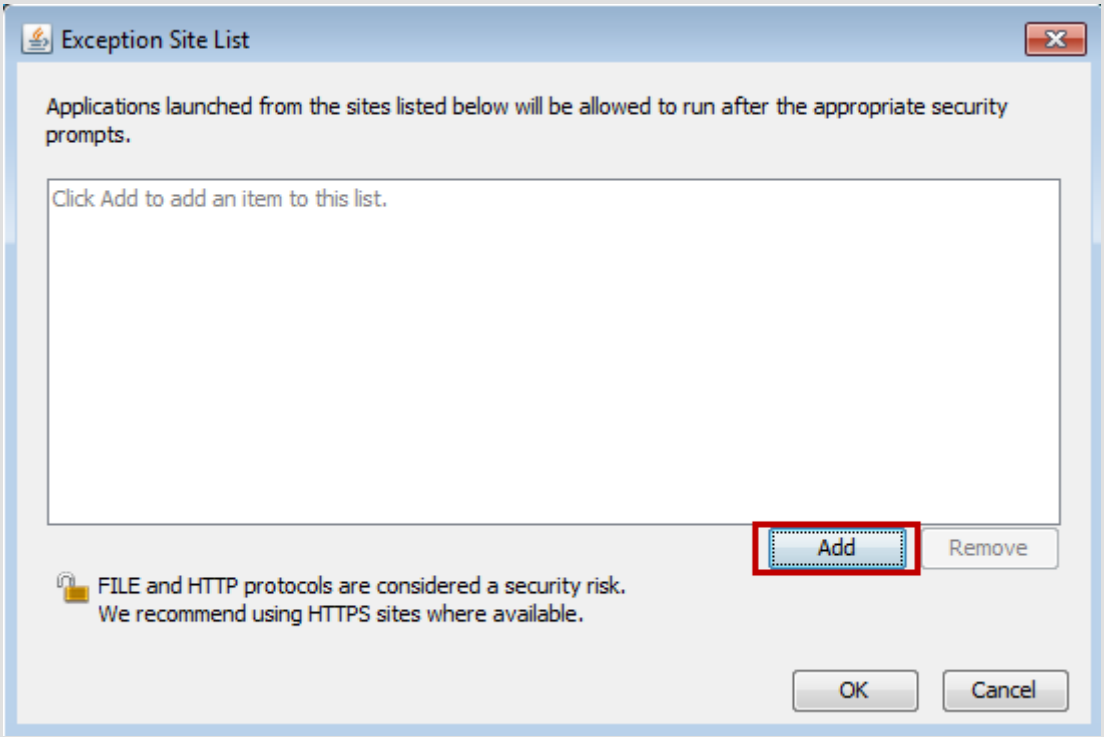
- ✓ The browse has to support and download JAVA installation.
- ✓ It is suggested to use version 1.7.0_45 (included) or below of JAVA.
- ✓ If JAVA version is above 1.7.0_45 and HMI firmware version below 3.0073, please follow as below instruction to set JAVA configuration.

Step1. Please execute the Configure Java.

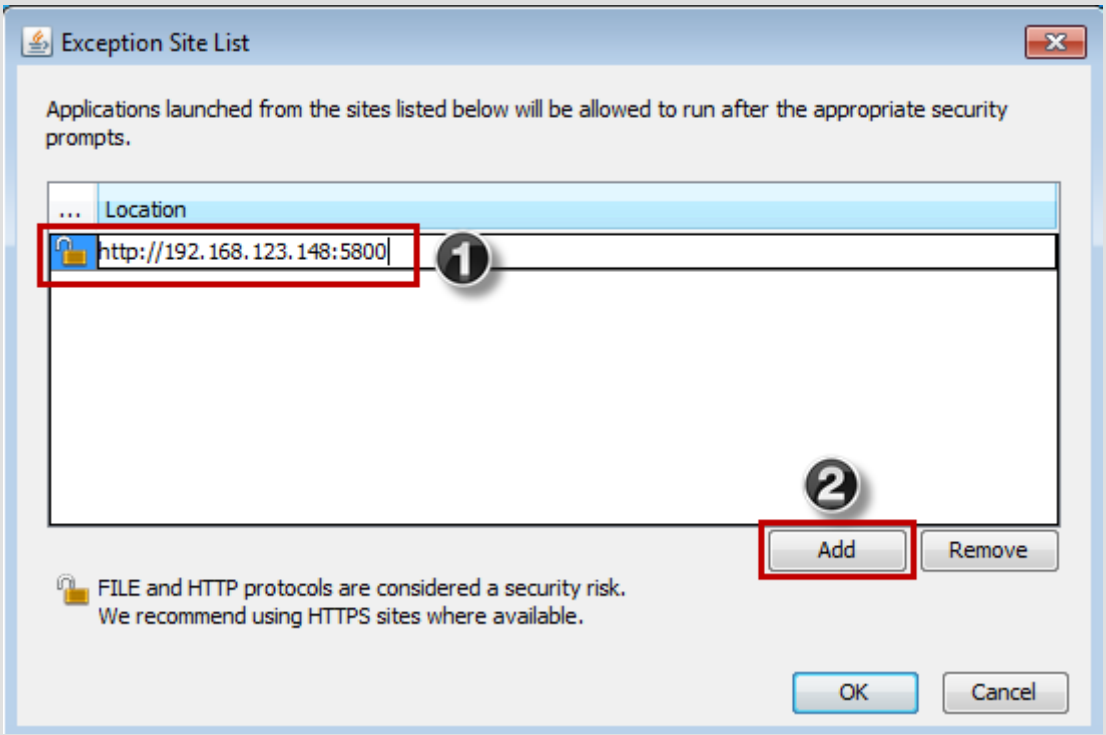


Step2. In [Security] page, click [Edit Site List] to add exception site list.

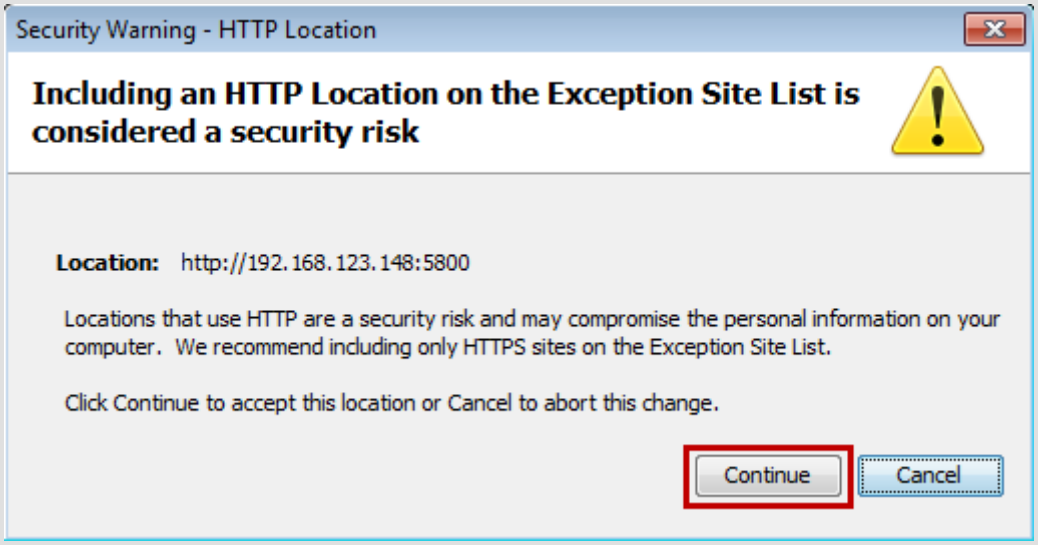

Java Control Panel
General
Update
Java
Security
Advanced
Enable Java content in the browser
Security level for applications not on the Exception Site list
Very High
Only Java applications identified by a certificate from a trusted authority are allowed to run, and only if the certificate can be verified as not revoked.
High
Java applications identified by a certificate from a trusted authority are allowed to run, even if the revocation status of the certificate cannot be verified.
Exception Site List
Applications launched from the sites listed below will be allowed to run after the appropriate security prompts.
Click Edit Site List...
to add items to this list.
Edit Site List...
Restore Security Prompts
Manage Certificates...
OK
Cancel
Apply

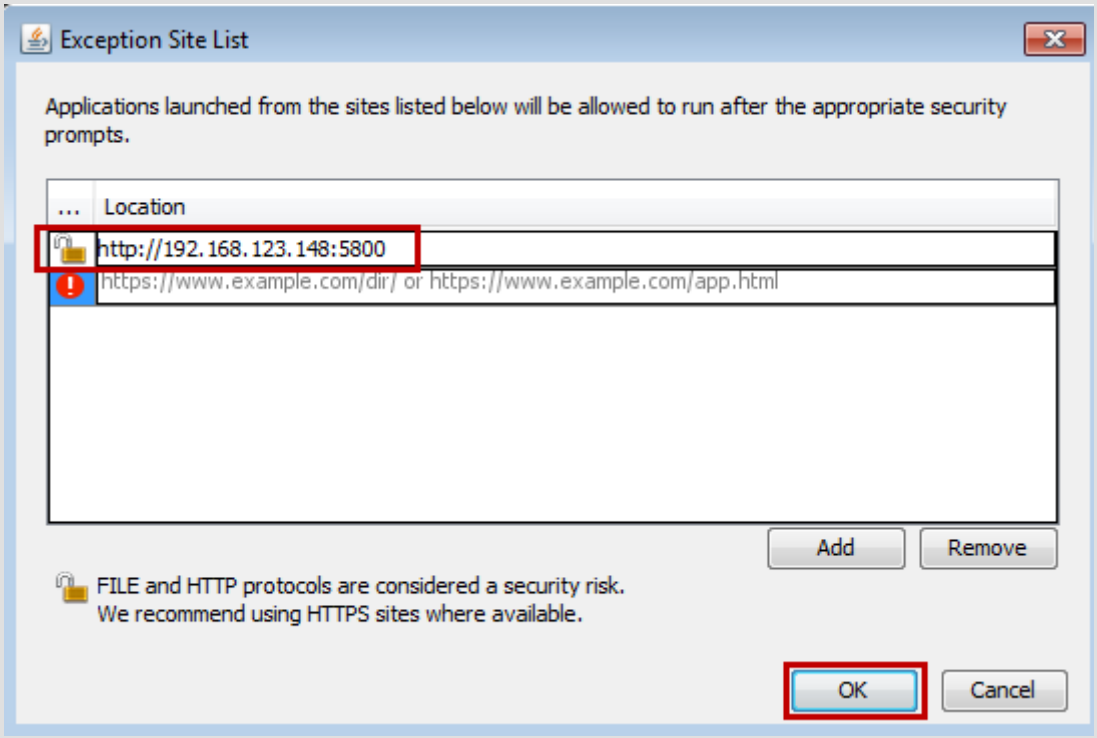

Exception Site List
Applications launched from the sites listed below will be allowed to run after the appropriate security prompts.
Click Add to add an item to this list.
Add
Remove
FILE and HTTP protocols are considered a security risk.
We recommend using HTTPS sites where available.
OK
Cancel

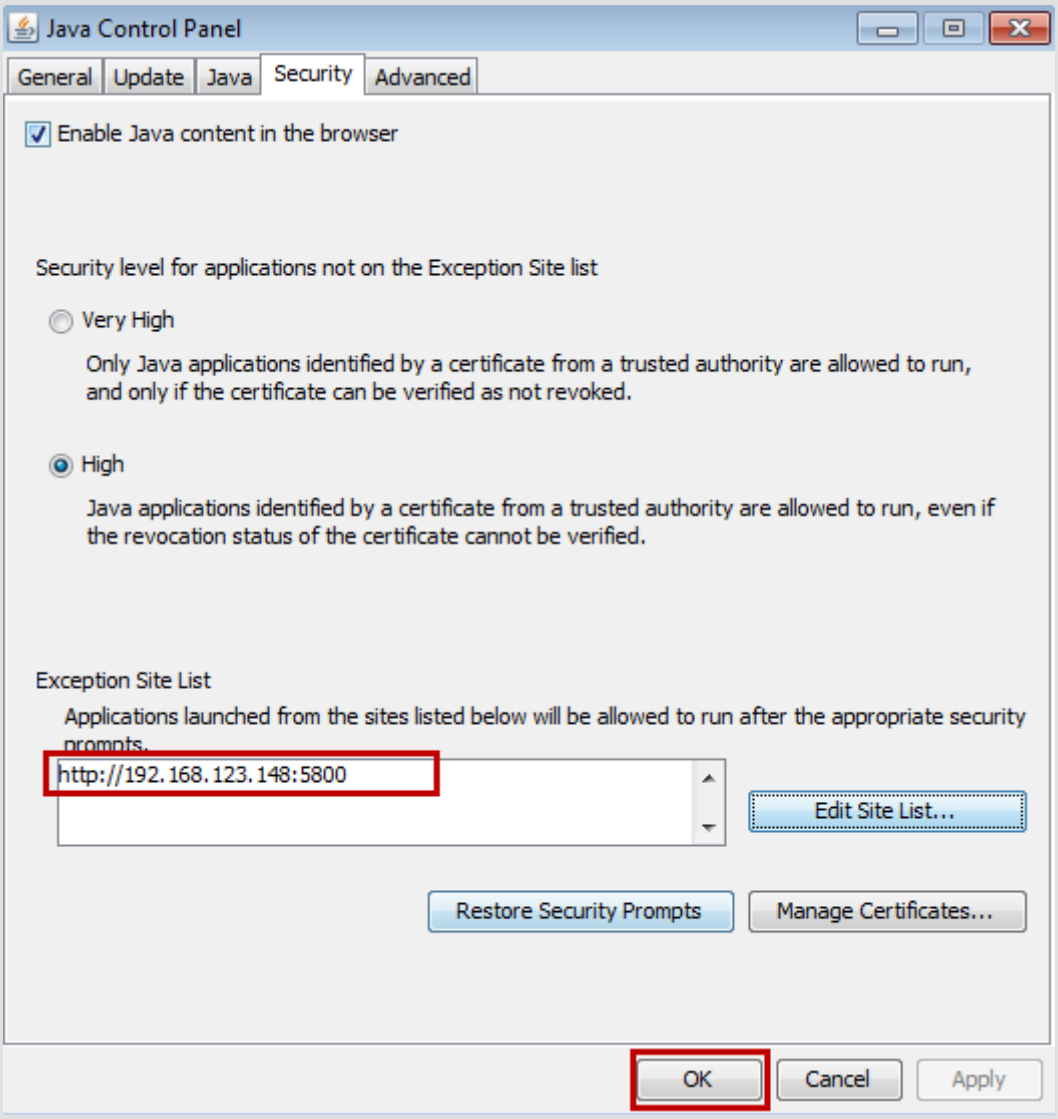
Step3. For example, input HMI IP address and port like [http://192.168.123.148:5800] and then click [Add].



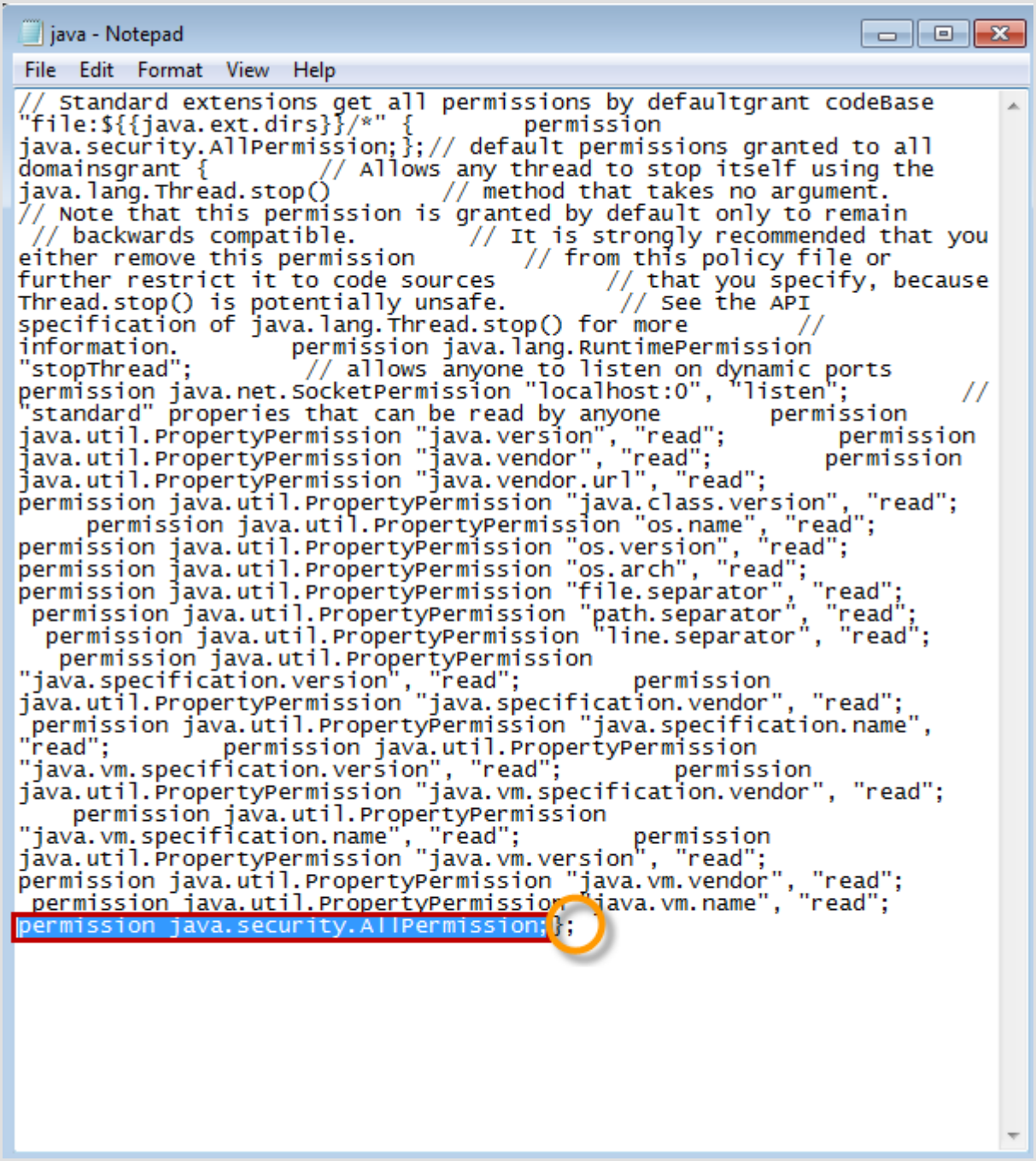
Step4. Click [Continue] to accept location, after click continue, the address should appear as following shown on the windows, click [OK] to finish setting.




Exception Site List
Applications launched from the sites listed below will be allowed to run after the appropriate security prompts.
...
Location
http://192.168.123.148:5800
https://www.example.com/dir/ or https://www.example.com/app.html
Add
Remove
FILE and HTTP protocols are considered a security risk.
We recommend using HTTPS sites where available.
OK
Cancel

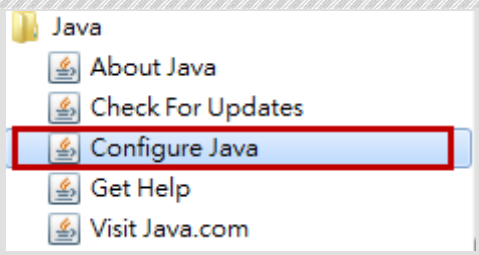

Java Control Panel
General
Update
Java
Security
Advanced
Enable Java content in the browser
Security level for applications not on the Exception Site list
Very High
Only Java applications identified by a certificate from a trusted authority are allowed to run, and only if the certificate can be verified as not revoked.
High
Java applications identified by a certificate from a trusted authority are allowed to run, even if the revocation status of the certificate cannot be verified.
Exception Site List
Applications launched from the sites listed below will be allowed to run after the appropriate security prompts.
http://192.168.123.148:5800
Edit Site List...
Restore Security Prompts
Manage Certificates...
OK
Cancel
Apply

Step5. Change your java.policy file in the following path: C:\Program Files (x86)\Java\jre1.8.0_65\lib\security\. Then, insert the string of [permission java.security.AllPermission;] before "};" in the end of this file.

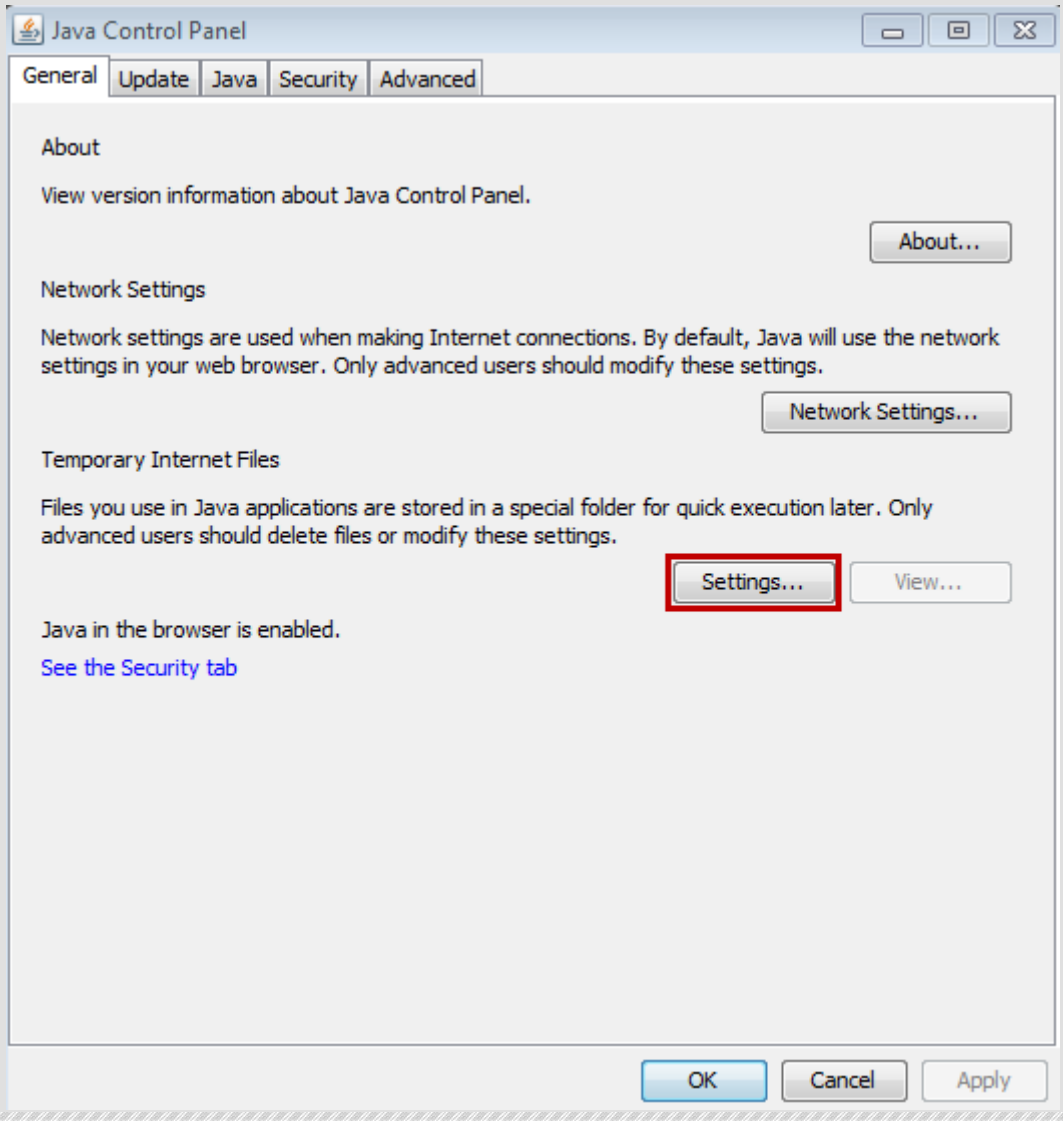


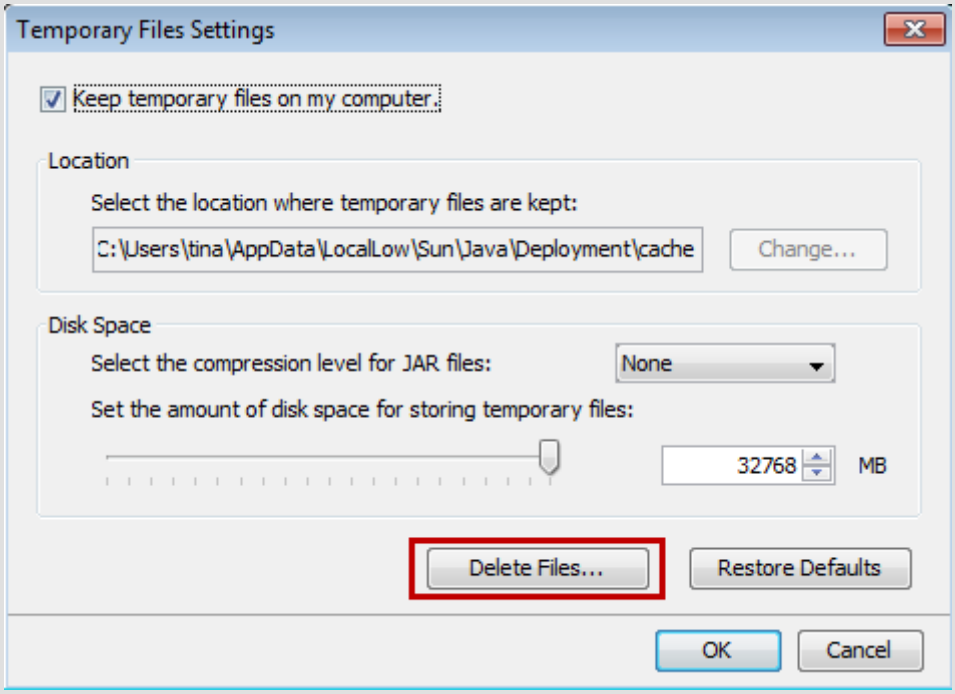
✓ If JAVA version is above 1.7.0_45 and HMI firmware version is 3.0073 or higher, please follow as below instruction to set JAVA configuration.

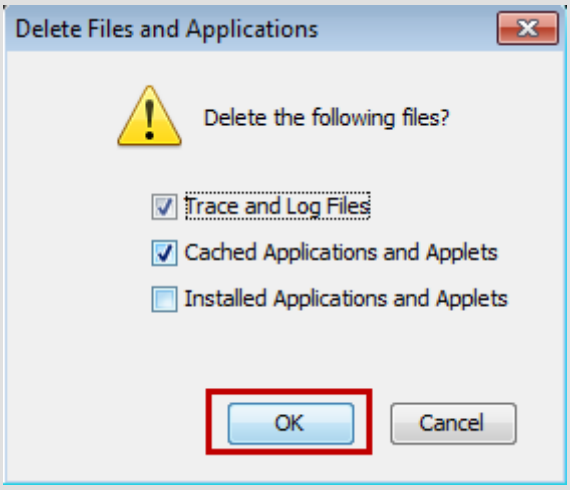
Step1. Please execute the Configure Java.



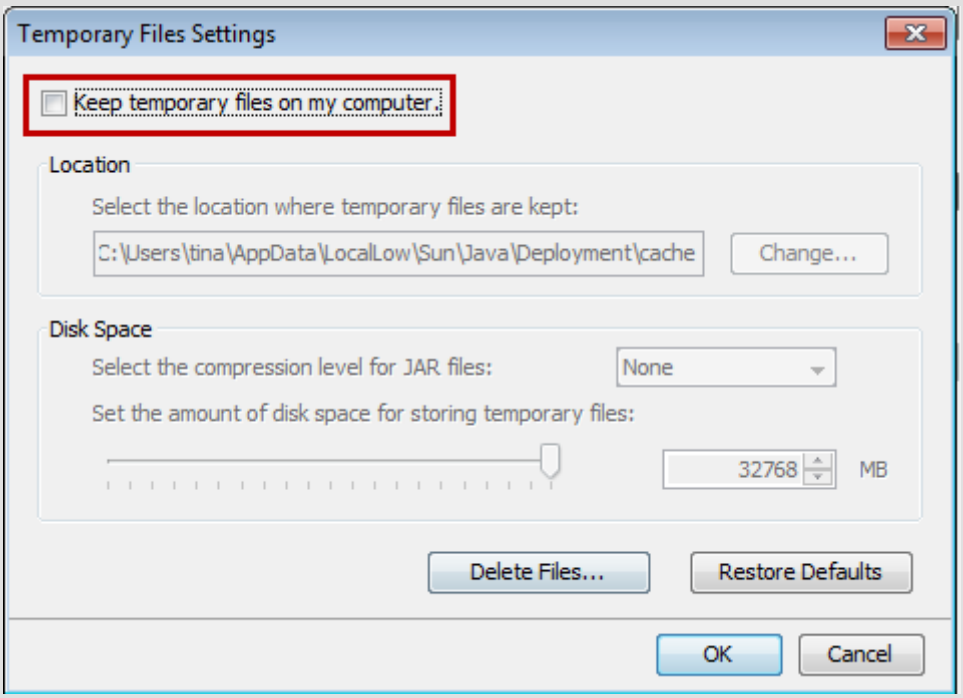
Step2. In [Genernal] Page, click Setting and delete the temporary file.



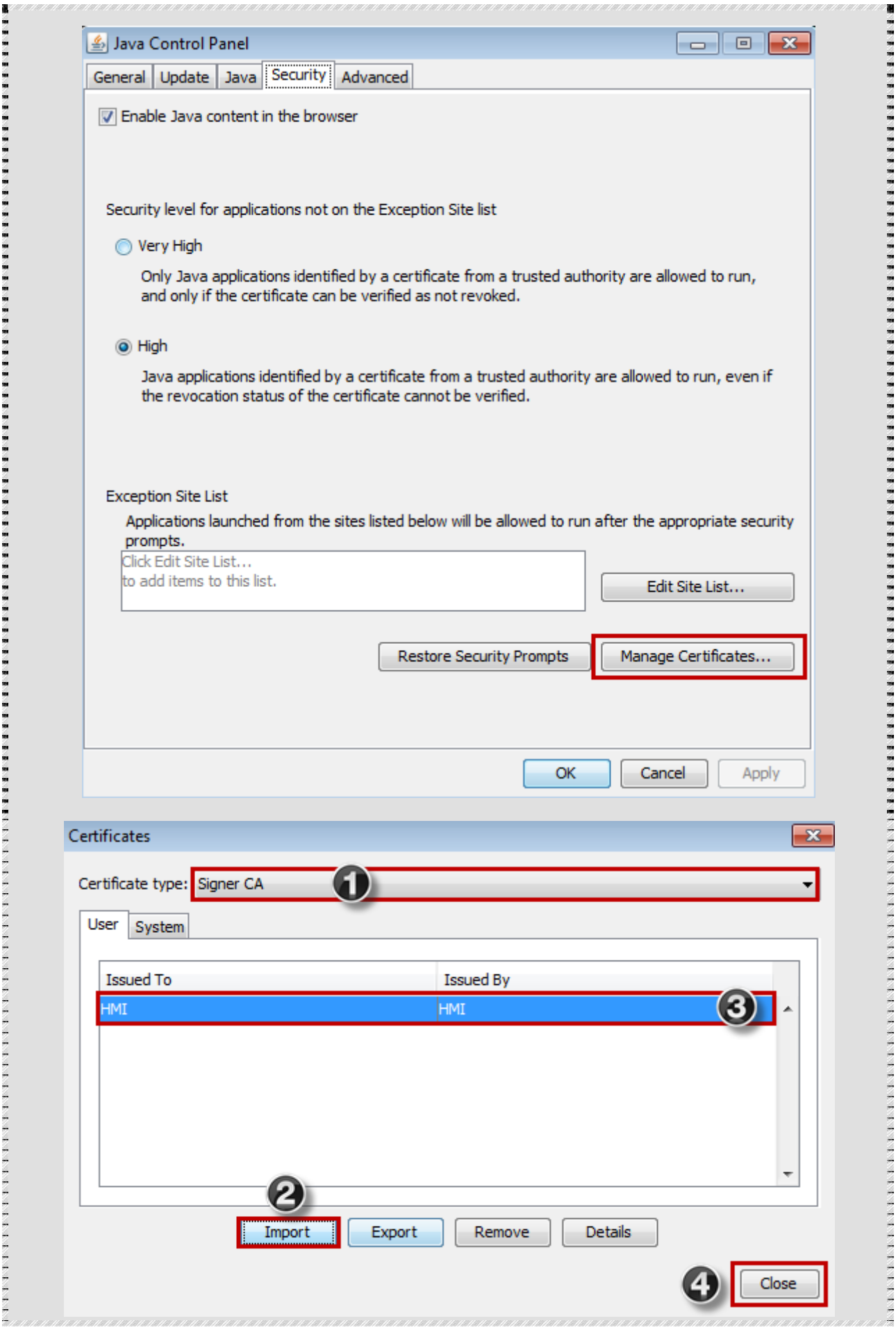


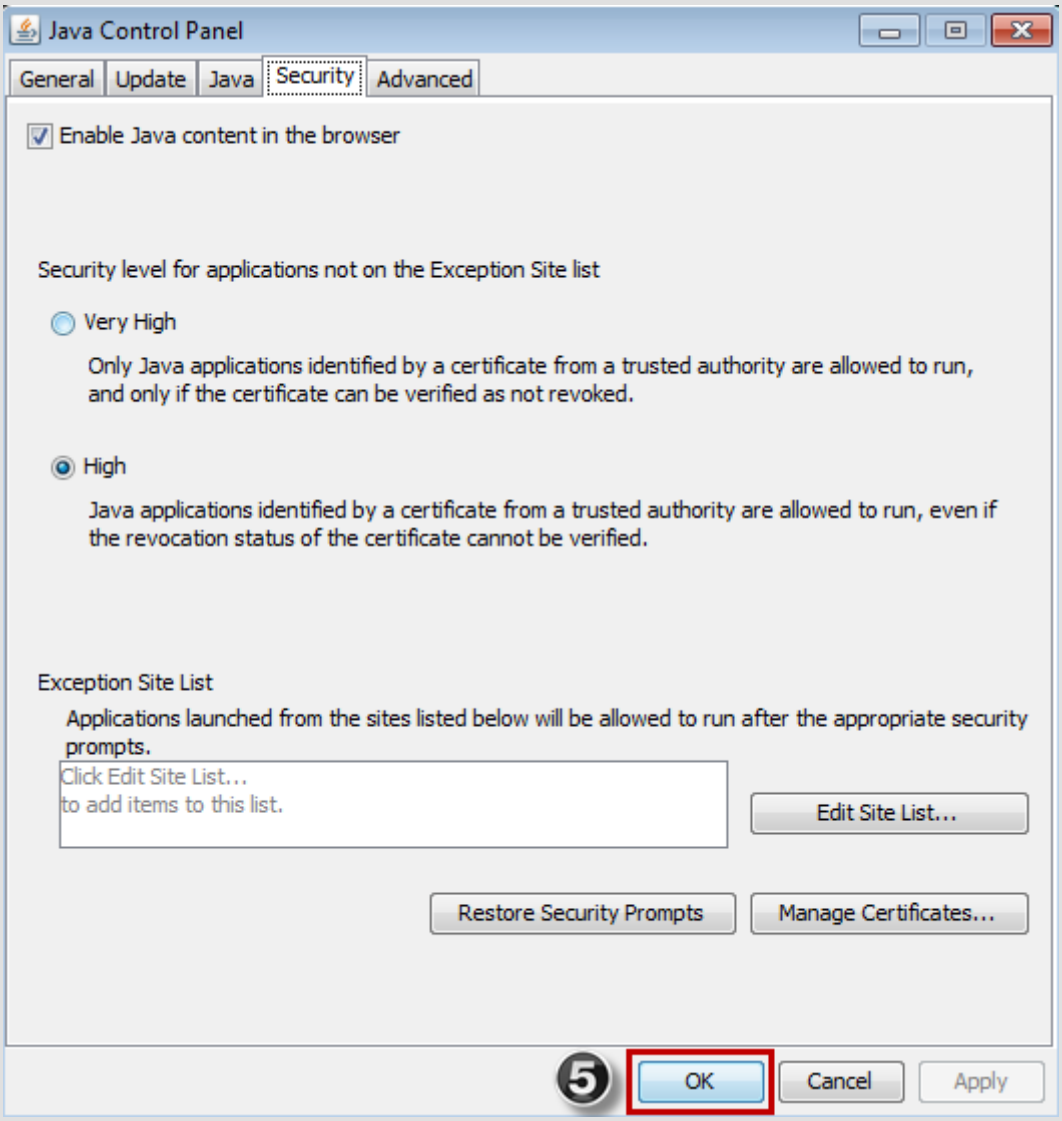


Step3. After delete temporary file, please disable [keep temporary files on my computer] option, and then click [OK] to finish the setting.

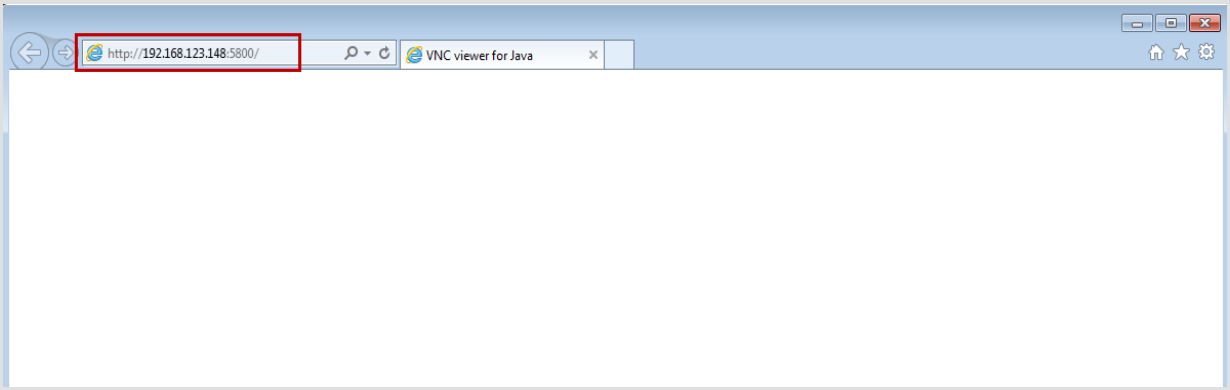


Step4. In [Security] page, click [Manage Certificates], choose Certificate type as [Signer CA] and clicke [Import], select name as “HMIVNC.csr” file. After import certificate file, click [Close] and return to Security page, click [OK].

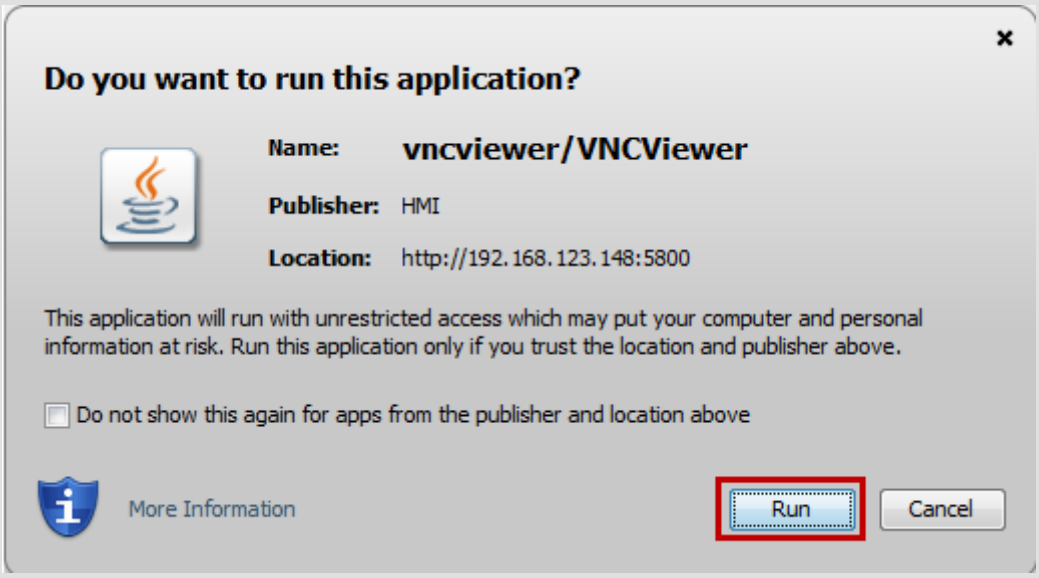

Java Control Panel
General
Update
Java
Security
Advanced
Enable Java content in the browser
Security level for applications not on the Exception Site list
Very High
Only Java applications identified by a certificate from a trusted authority are allowed to run, and only if the certificate can be verified as not revoked.
High
Java applications identified by a certificate from a trusted authority are allowed to run, even if the revocation status of the certificate cannot be verified.
Exception Site List
Applications launched from the sites listed below will be allowed to run after the appropriate security prompts.
Click Edit Site List...
to add items to this list.
Edit Site List...
Restore Security Prompts
Manage Certificates...
OK
Cancel
Apply
Certificates
Certificate type:
Signer CA
1
User
System
Issued To
Issued By
HMI
HMI
3
2
Import
Export
Remove
Details
4
Close



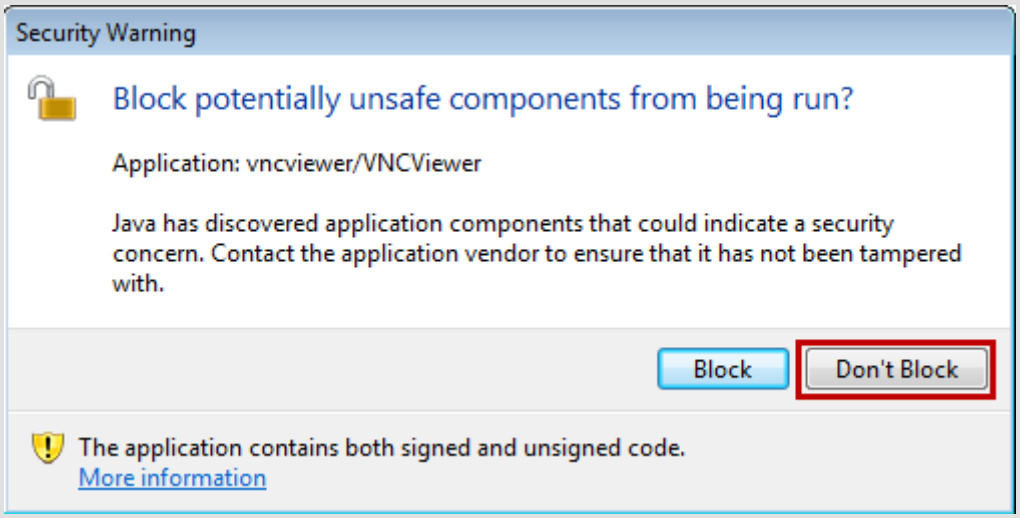
Step5. Open the IE browser, type http://192.168.123.148:5800.



Step8. After connected, it will display Security Warning windows, please click [Run].

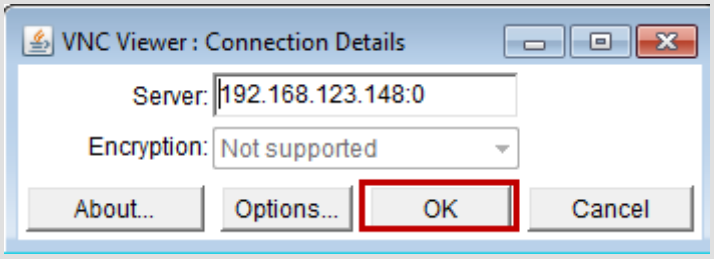


Step6. Click [Don't Block] to continue.

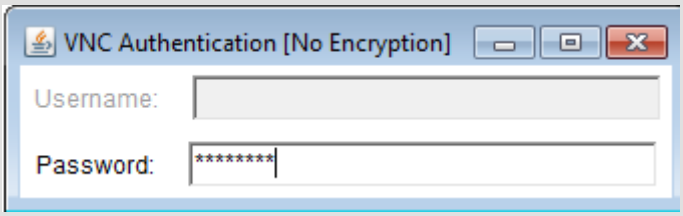


Step7. Click [Run] to allow application loading.

Step8. The VNC viewer will ask for connection, click [OK].



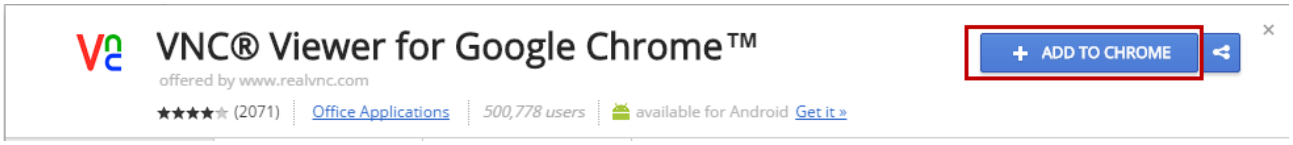
Step9. Enter Password with default setting like “12345678”, and then press Enter to remote HMI.



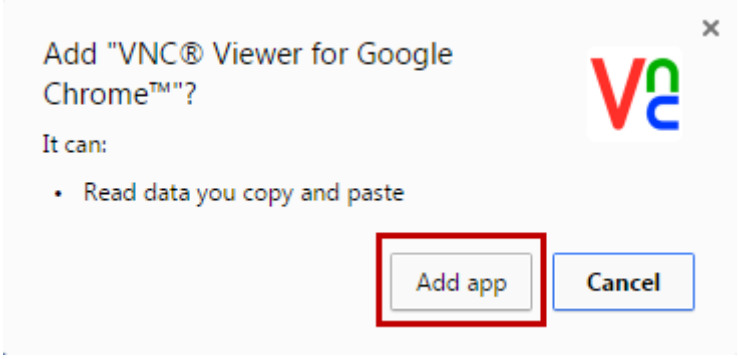
Step1: Please open your browser. In this example, we use Google Chrome as the browser.

- ☞ Use Google Chrome browser to open chrome web store in the following web address: https://chrome.google.com/webstore/category/apps

Then, please enter VNC search and download the app that shows below.



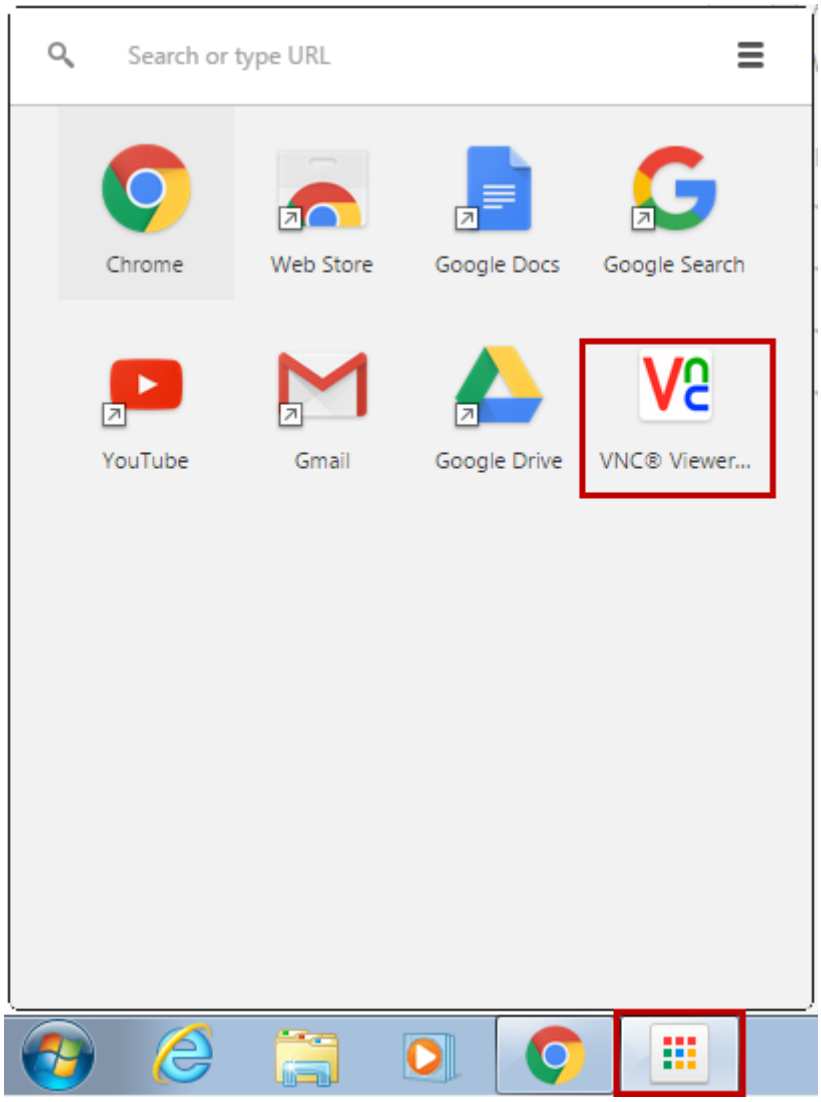
Click "+ ADD TO CHROME" and the screen will be shown as below. Please click "Add app".



- ☞ Enter http://192.168.123.26:5800/ for IE browser.
- ☞ Before usingFirefox browser, please set its network connection to not to use Proxy and Enter http://192.168.123.26:5800/ as the address.

You will be unable to open the webpage when entering the wrong IP Address.

When the installation is complete, your PC screen will show as below:



Please activate VNC Viewer application and enter the HMI's IP and Port in Address. Here we enter 192.168.123.66:5900 as the example. 192.168.123.66:5900 is the HMI's IP address. 5900 is the communicaiton port for DOPSoft. It can be set by [Options] > Configuration] > [Network]. If your software communication port is changed to 5902, when applying VNC Viewer for connection, you have to change your communication port to 5902.

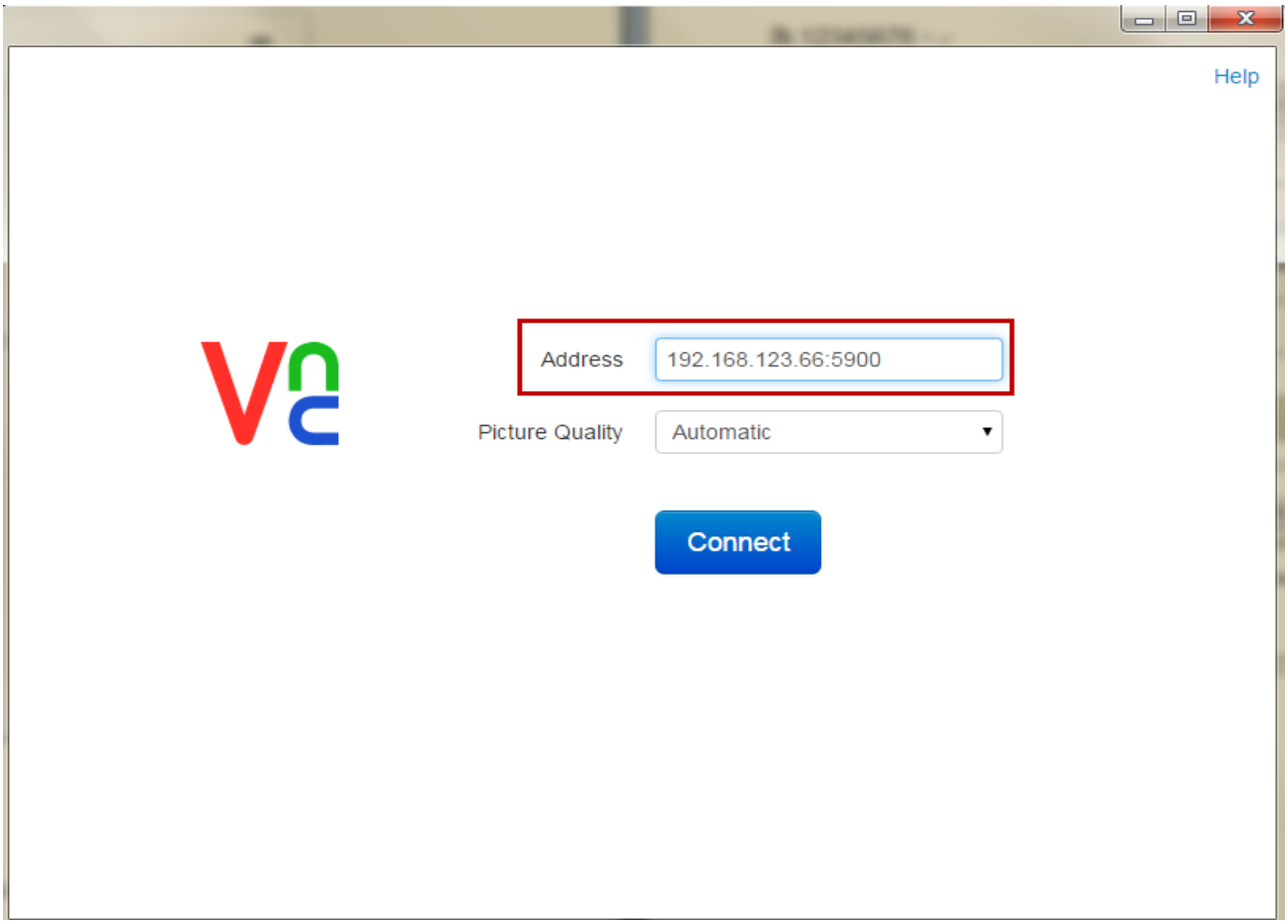


Figure 29-4-11 VNC Viewer for Google Chrome

Then, the screen will be shown as below. Please click “Connect”.

Figure 29-4-12 VNC Viewer connection security details

Step2: Please enter the VNC password for connecting with HMI. This password is the one for setting VNC network application. The default setting is 12345678.

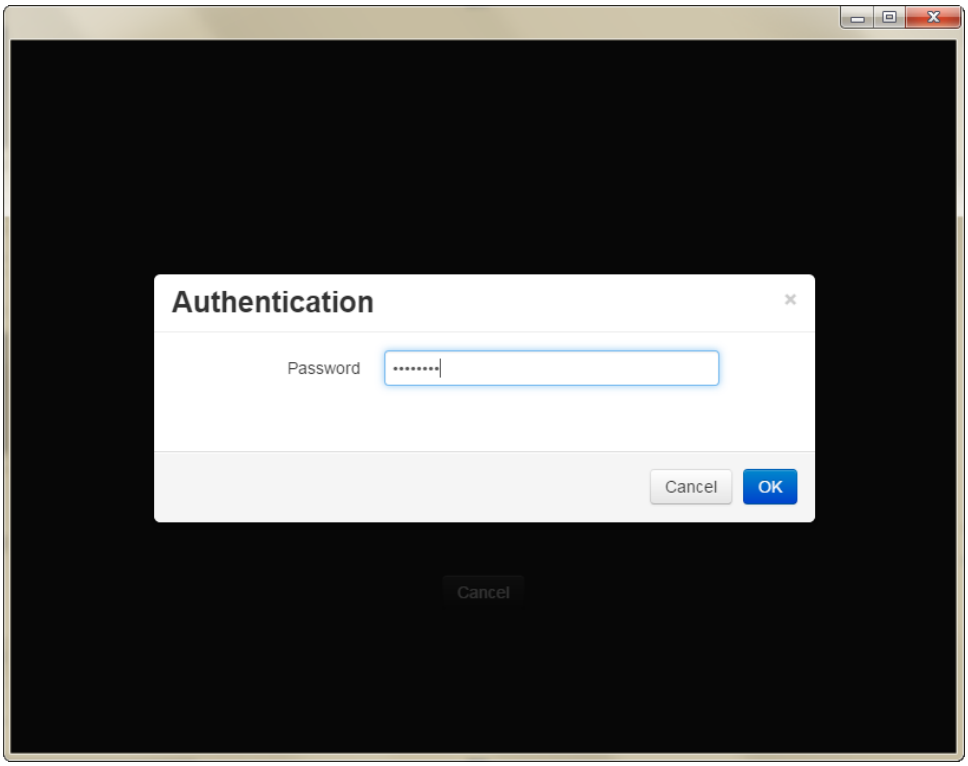


Figure 29-4-13 VNC Viewer – enter the password

Ifyou enter the wrong password, the following message will pop up.

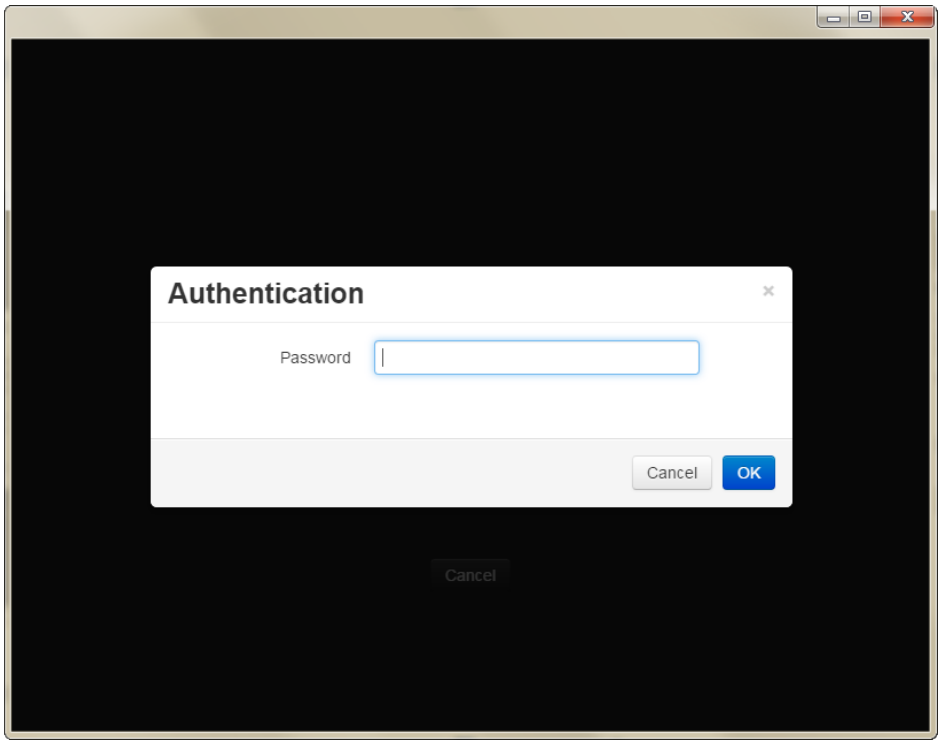


Figure29-4-14 VNC Viewer – enter the wrong password

Step3: Enter the correct password and you can operate the HMI on webpage.

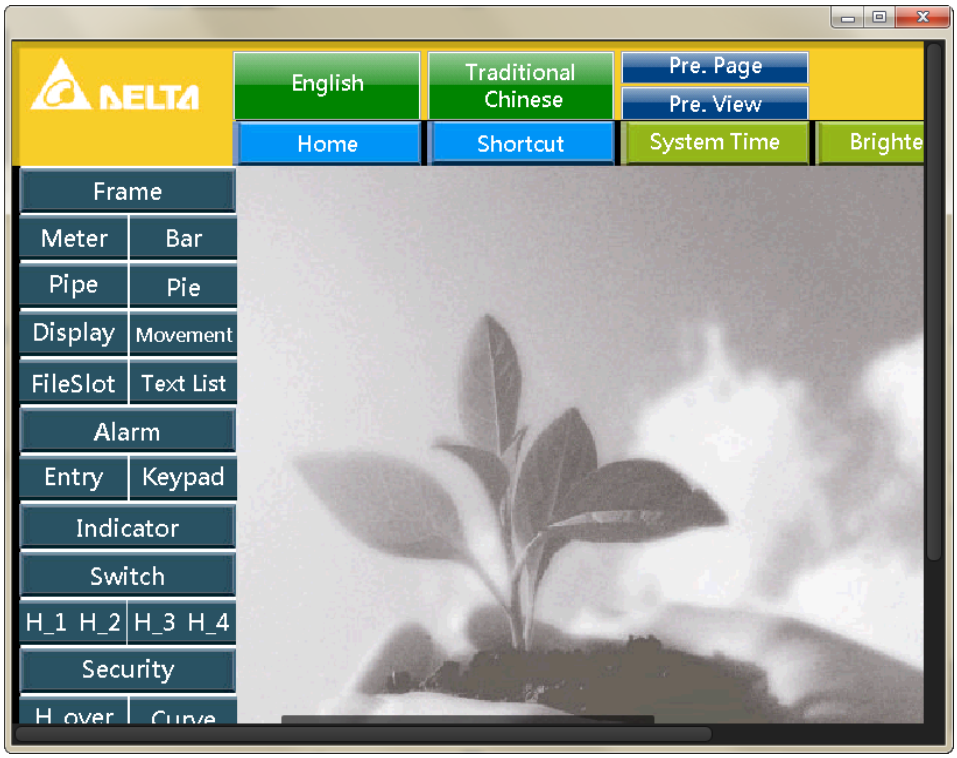


Figure 29-4-15 The HMI screen monitored by VNC Viewer

29-4-2-3 Android App / iOS App

☞ To use Android Smart Device, please go to Google Play store to download **VNC Viewer App**and complete the setting with the following instructions.

Step1: Click [+] on bottom-left corner to add new connection.

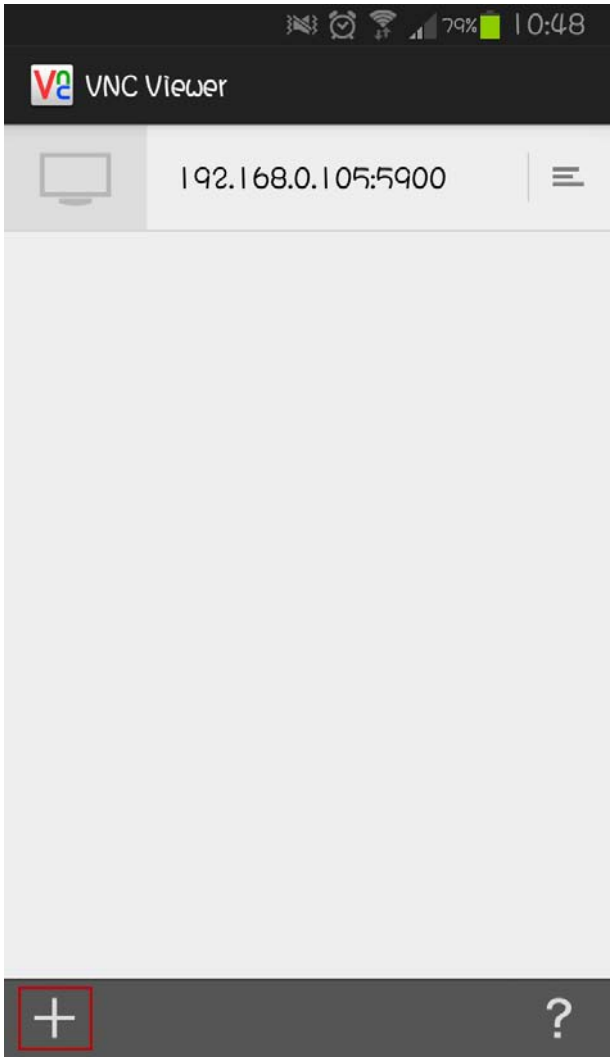


Figure 29-4-16 VNC Viewer APP – add new connection

Step2: Enter the IP Address and connection name.

(1) Here you should enter HMI's IP Address and connection port.

(2) This field is the connection name which can be defined by users.

(3) Do not check [Save Password].

(4) When the setting is complete, please click on the icon.

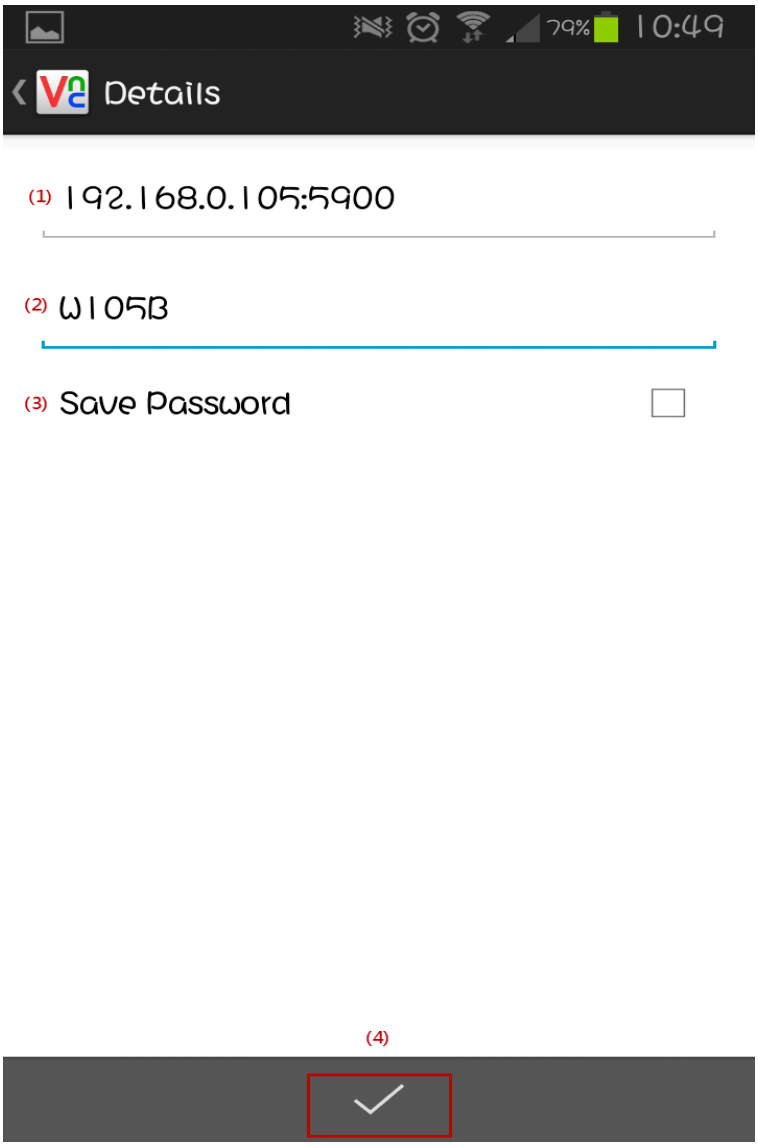


Figure 29-4-17 VNC Viewer APP – connection information

Step3: When the setting is complete, the screen will be shown as below. Please click [Connect].

Figure 29-4-18 VNC Viewer APP – connection setting is complete

When entering the wrong IP Address, it will show the following message.

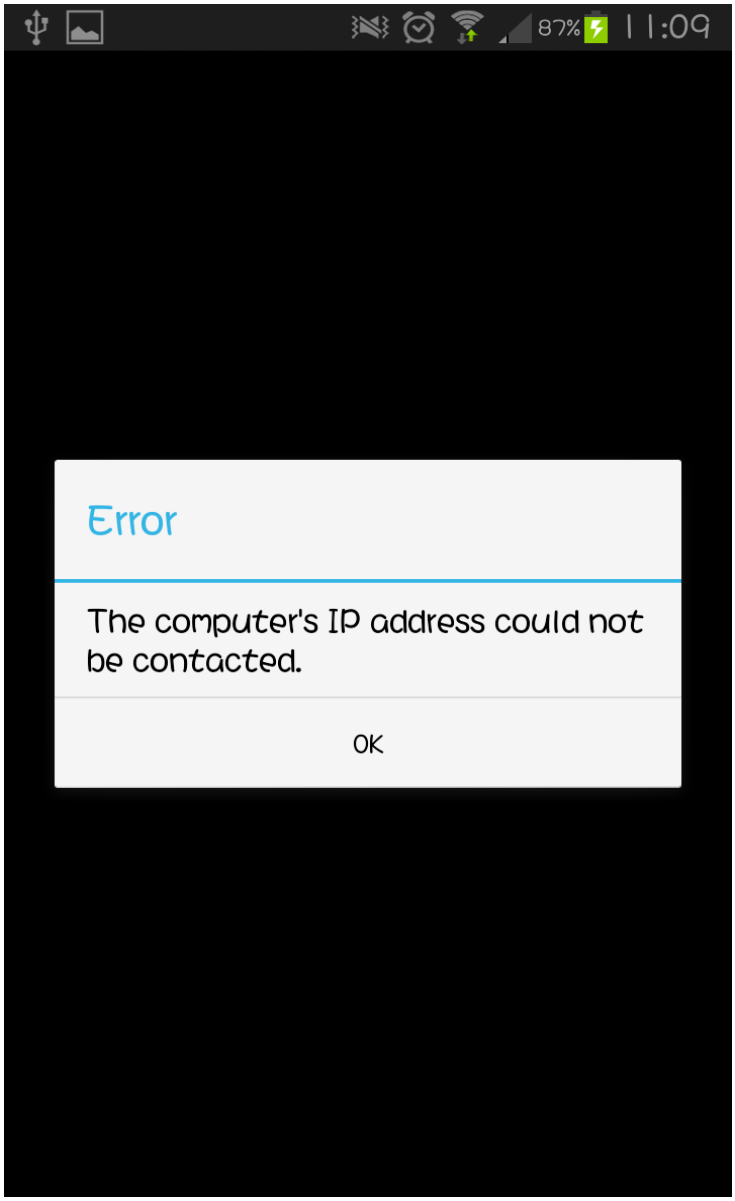


Figure 29-4-19 VNC Viewer APP – Incorrect IP address

Step4: Users will be required to enter the password for connecting to the HMI. This password is identical to the one for setting VNC network application. The default setting is 12345678.

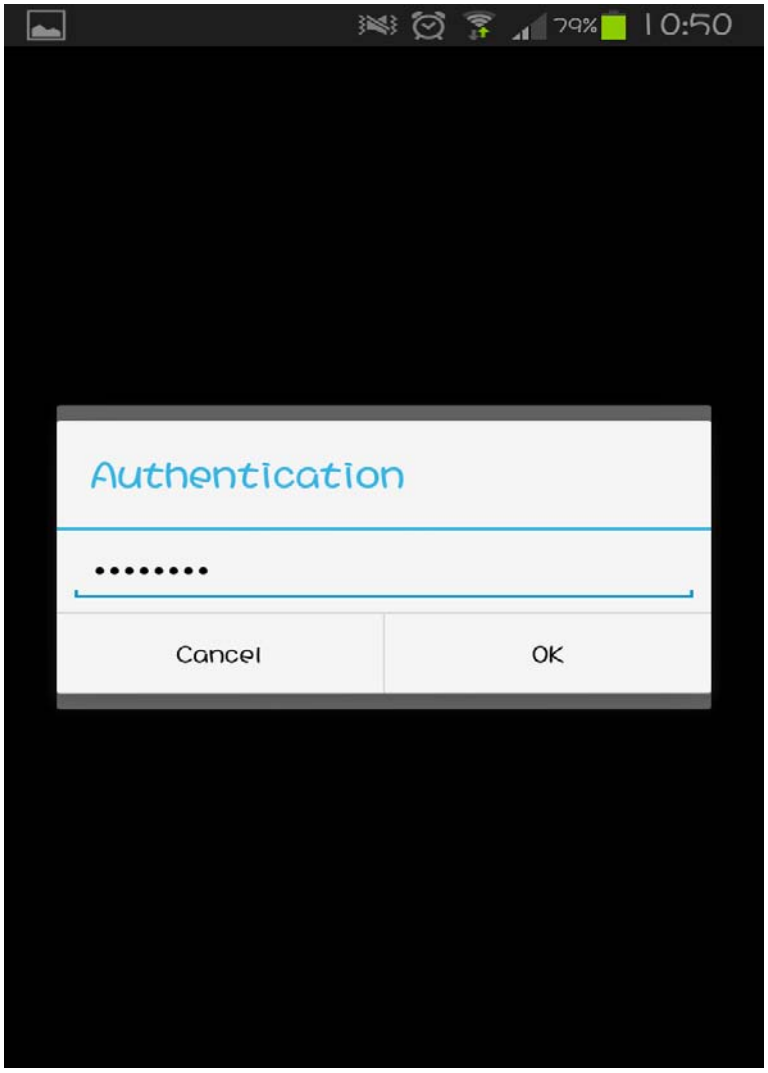


Figure 29-4-20 VNC Viewer APP – enter the password for connection

If entering the wrong password, the following message will pop up.

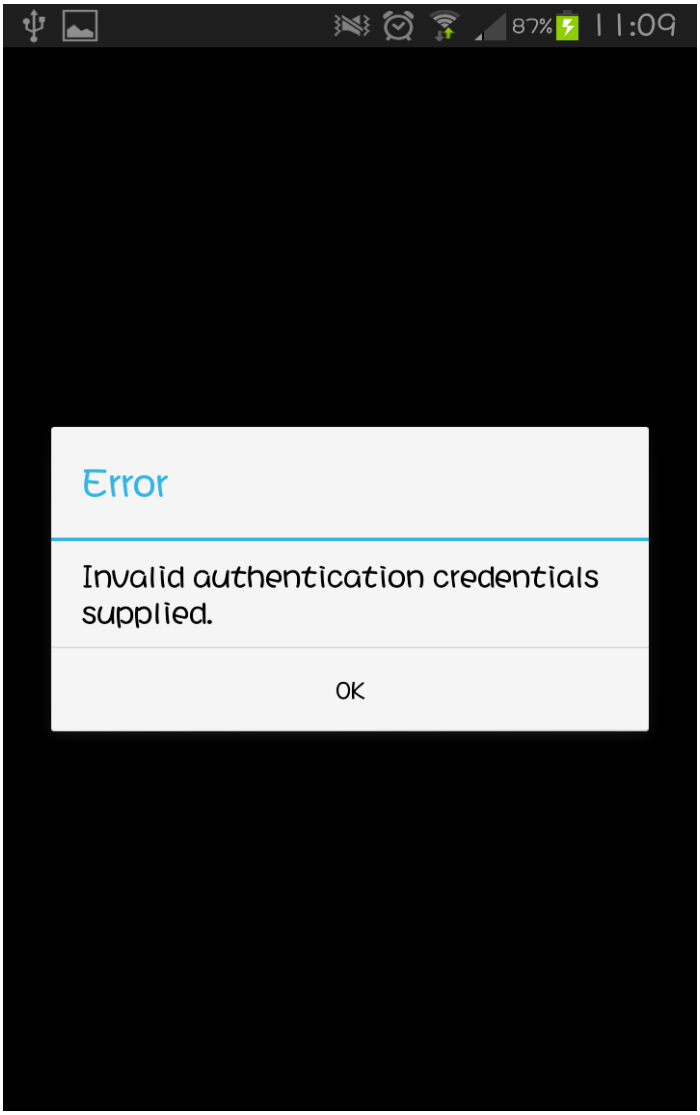


Figure 29-4-21 VNC Viewer APP – wrong password

Step5: Click OK to operate the HMI.

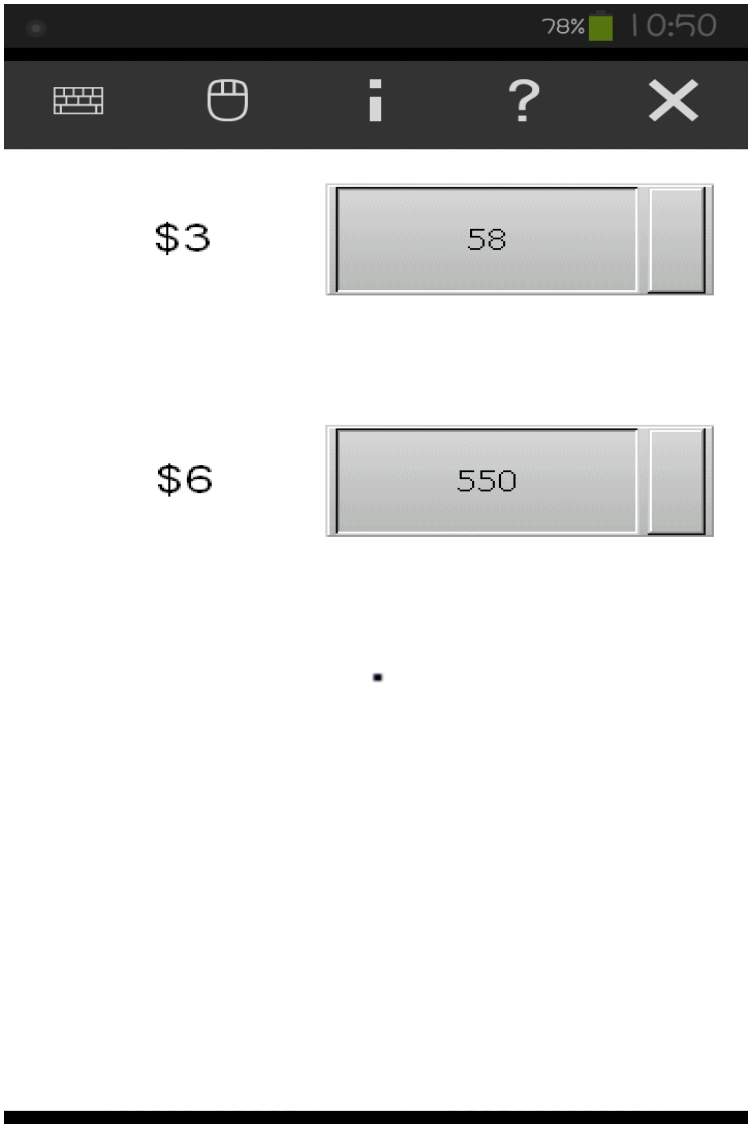


Figure 29-4-22 The HMI screen monitored via VNCViewer APP

☞ To use iOS Smart Device, please go to App Store to download **VNC Viewer App** and complete the setting with the following instructions.

Step1: Click [+] on top right corner to add new connection.

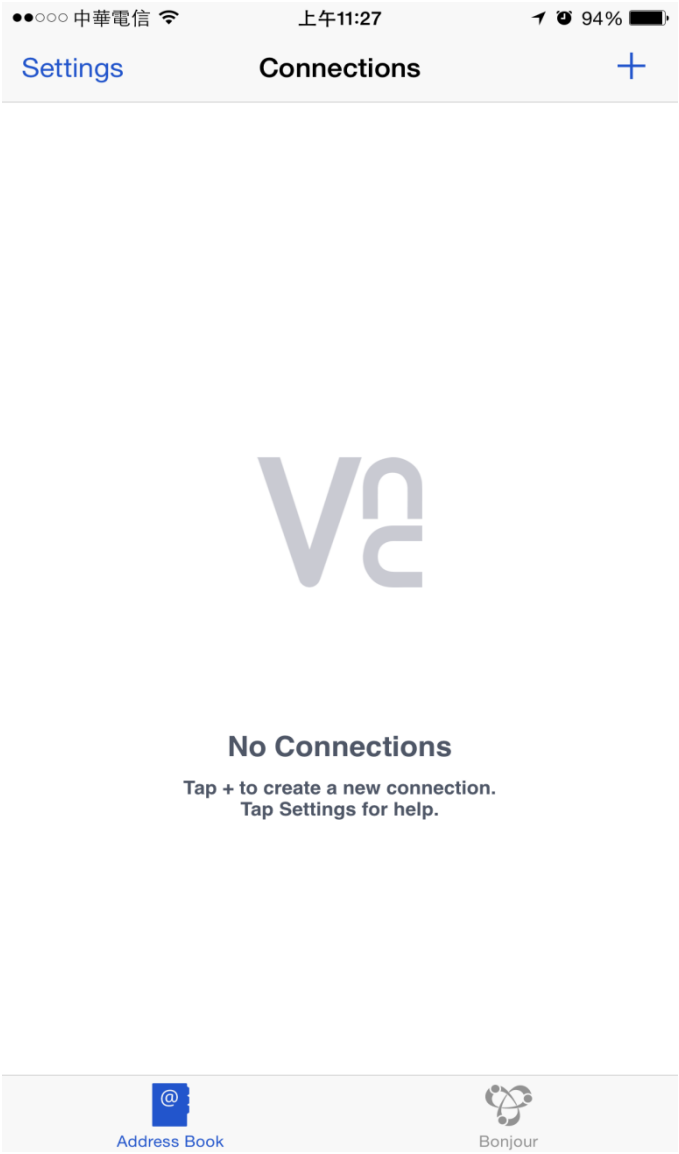


Figure 29-4-23 VNC Viewer APP (iOS) add new connection

Step2: Enter the IP Address and connection name.

(1) Here you should enter HMI's IP Address.

(2) This field is the connection name which can be defined by users.

(3) When the setting is complete, please click on Save.

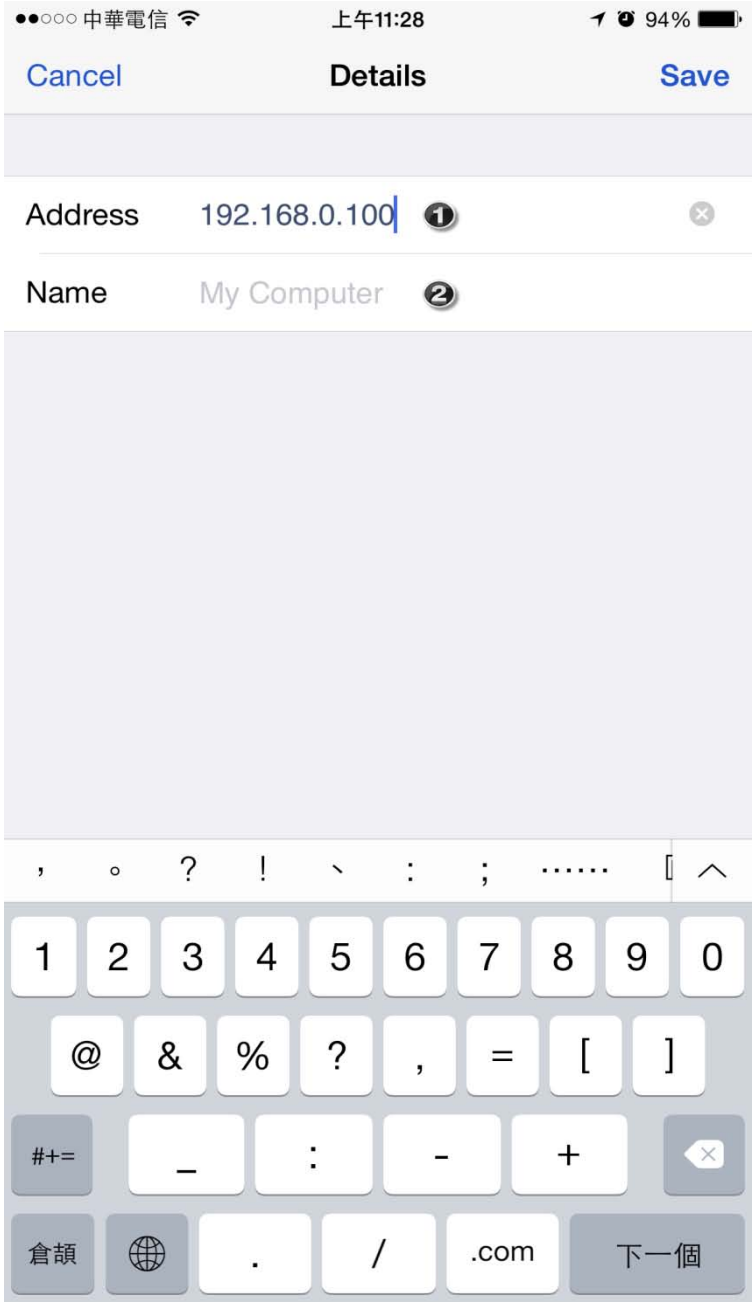


Figure 29-4-24 VNC Viewer APP (iOS) – connection information

Step3: When the setting is complete, the screen will be shown as below. Please click [Connect].

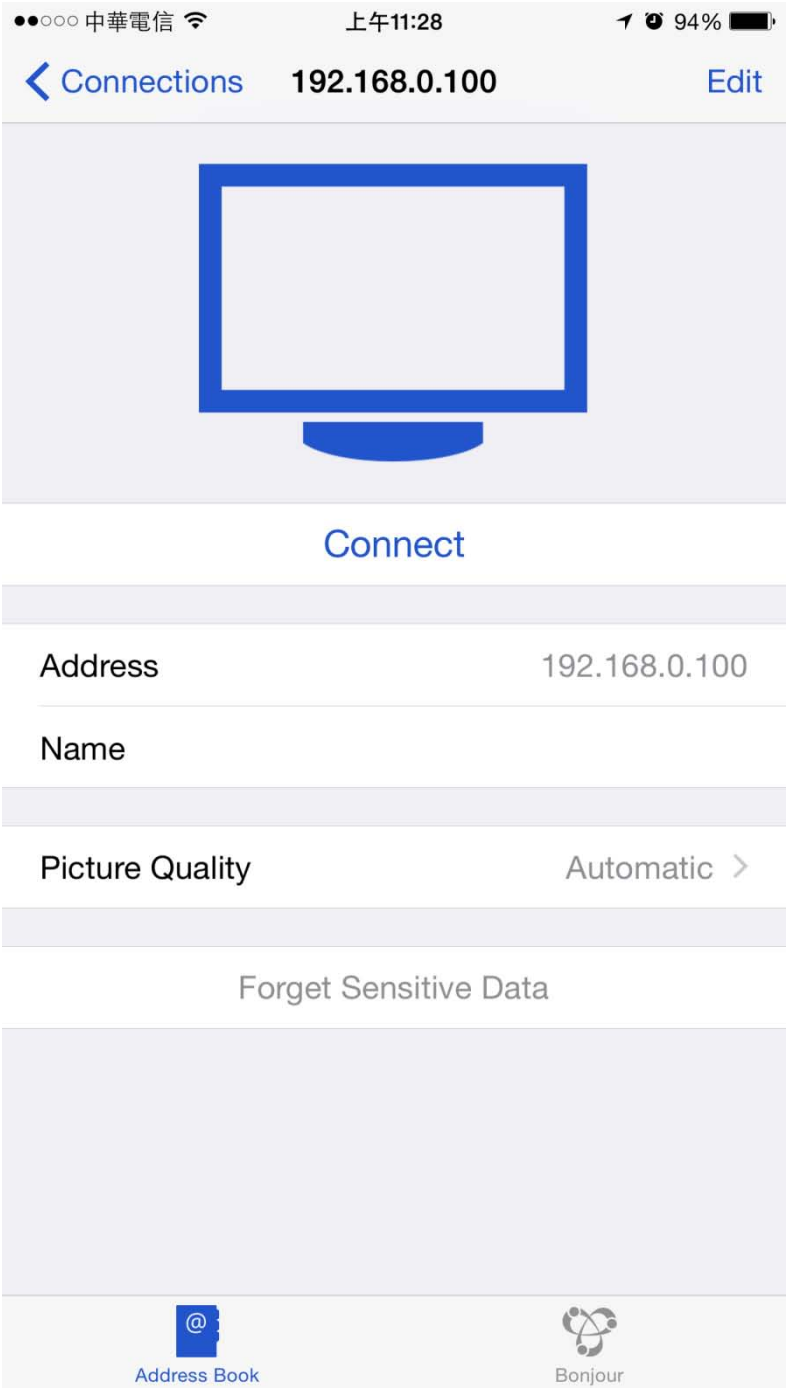


Figure 29-4-25 VNC Viewer APP (iOS) – connection setting is complete

Then, the following message will pop up. Please click [Connect] to continue the setting.

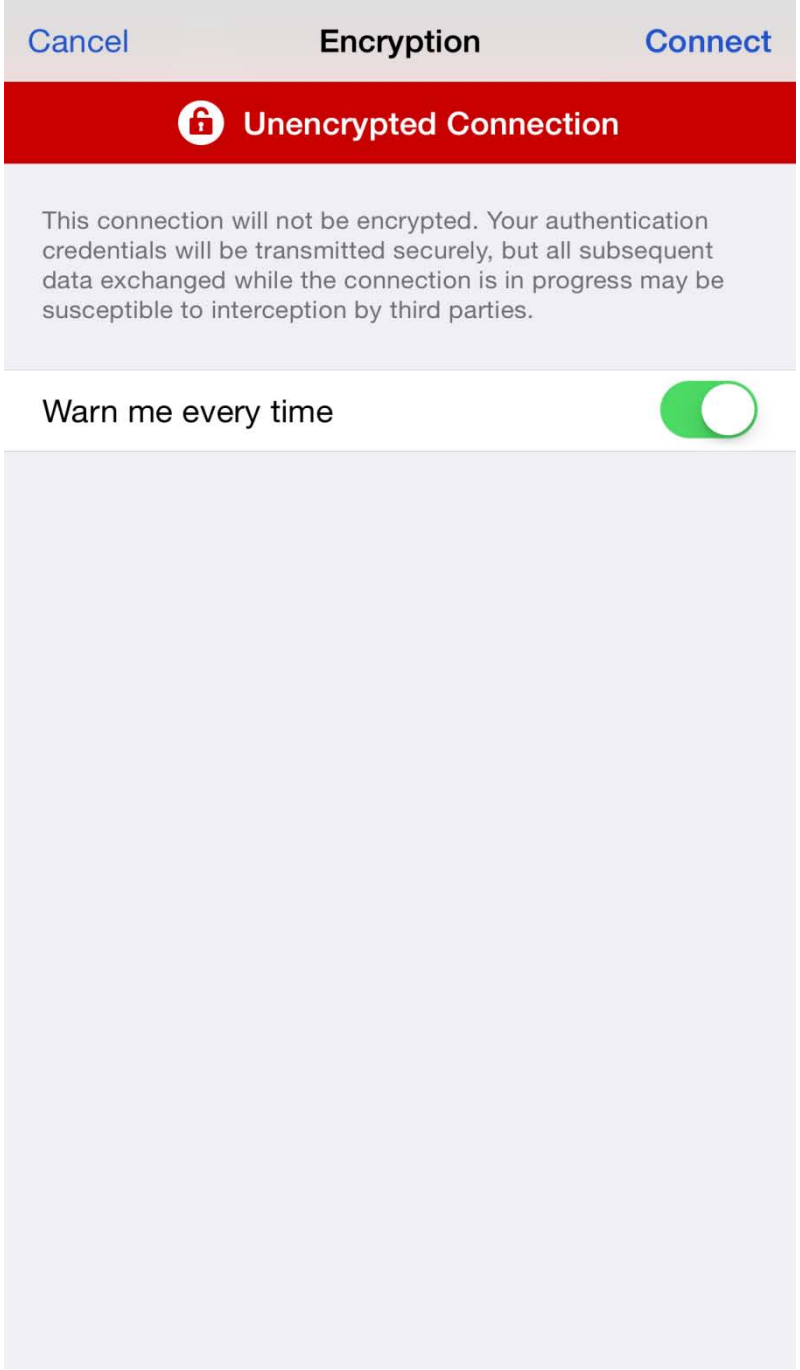


Figure 29-4-26 VNC Viewer APP (iOS) – encrypted connection

Step4: Users will be required to enter the password for connecting to the HMI. This password is identical to the one for setting VNC network application. The default setting is 12345678. Click [Done] to complete the setting.

Figure 29-4-27 VNC Viewer APP (iOS) – enter the password

Users will be asked to enter the password again if entering the wrong one.

Step5: Click on [OK] to operate the HMI.

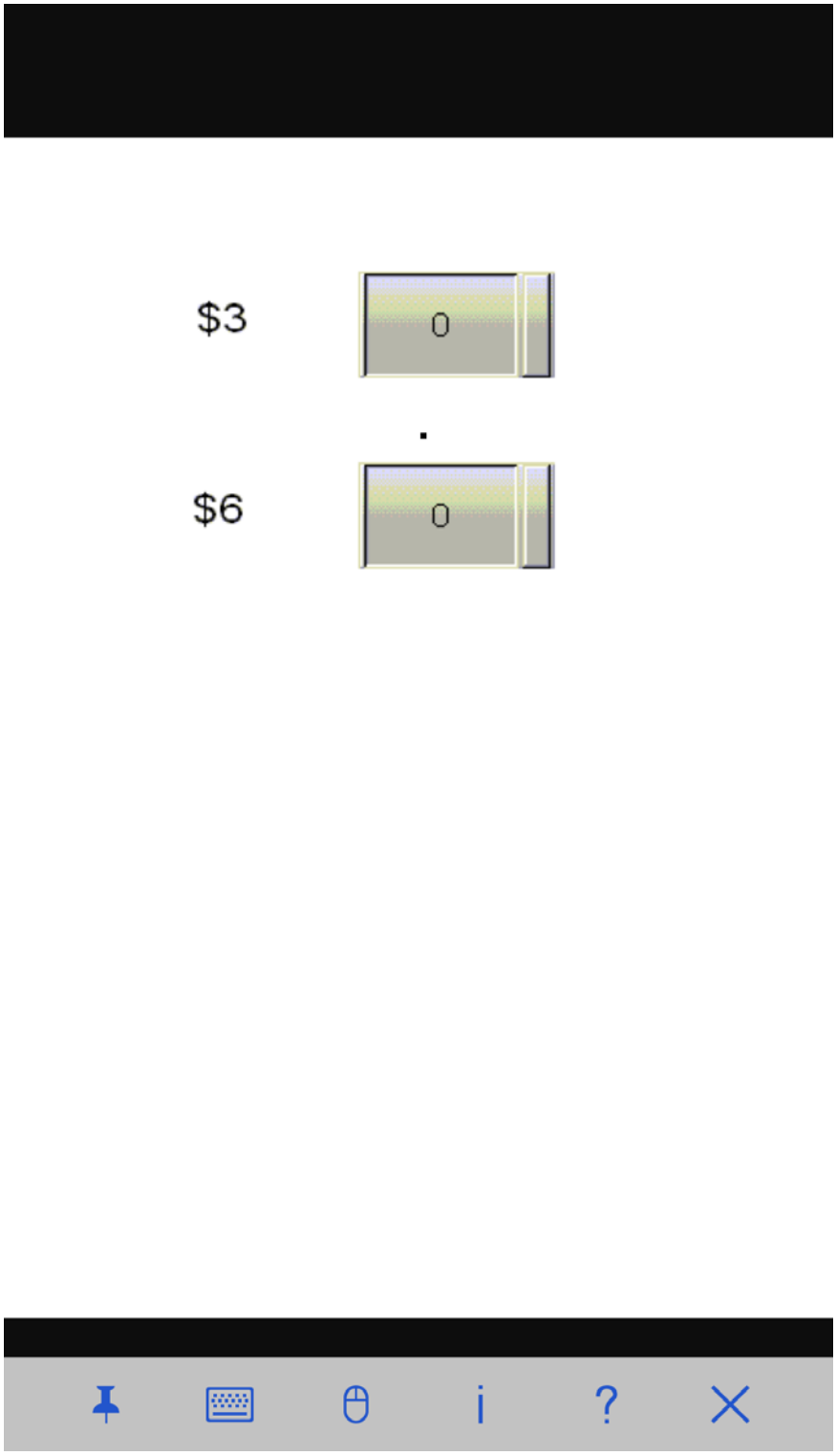


Figure 29-4-28 The HMI screen monitored via VNC Viewer APP (iOS)

Step6:Clicking [X] on bottom right corner will disconnect the connection between HMI and VNC.

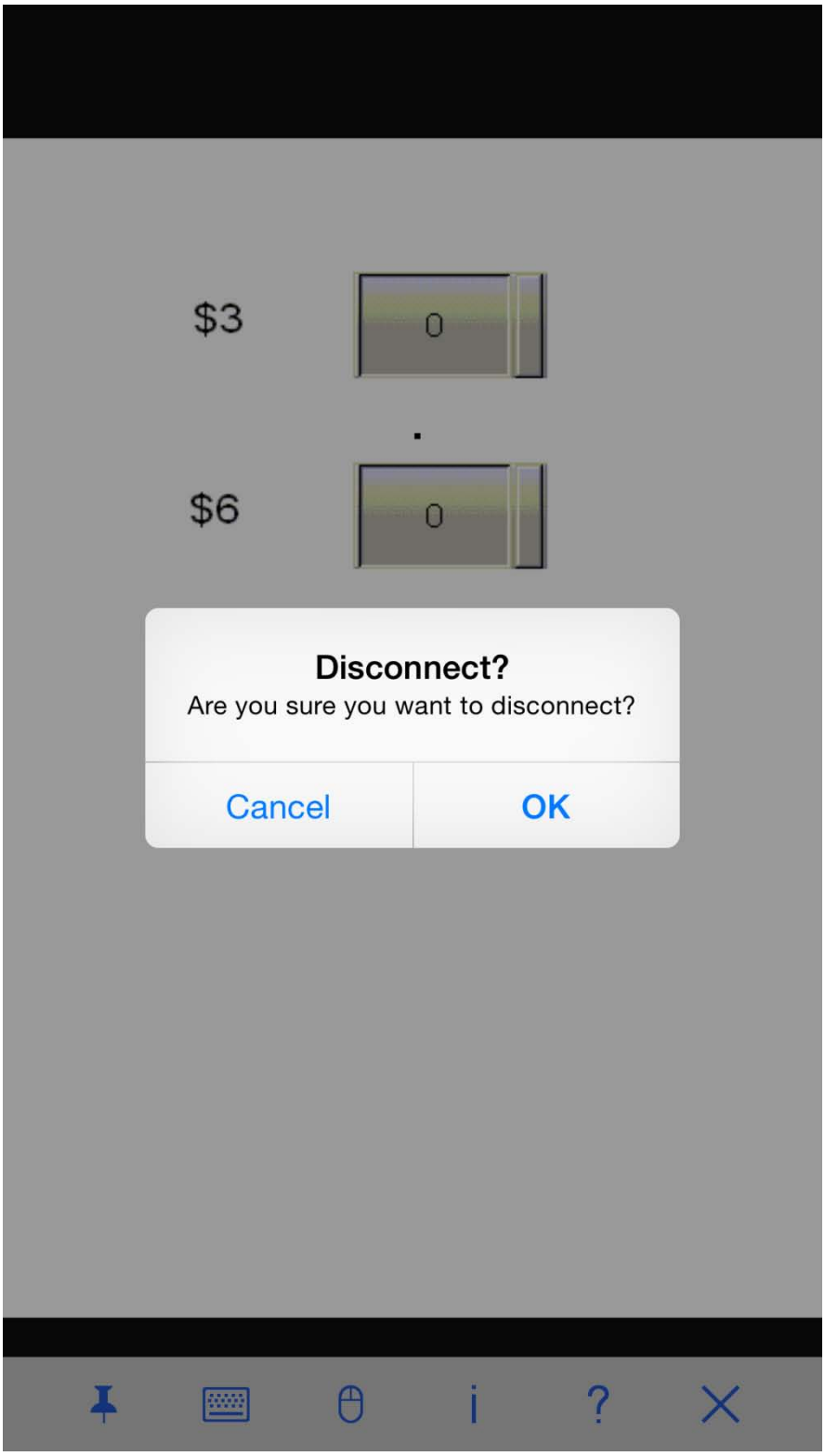


Figure 29-4-29 VNC Viewer APP (iOS) – disconnect the connection

29-4-3 VNC Viewer Detailed

After connecting, move the cursor to the top, a toolbar will appear which shown as below.

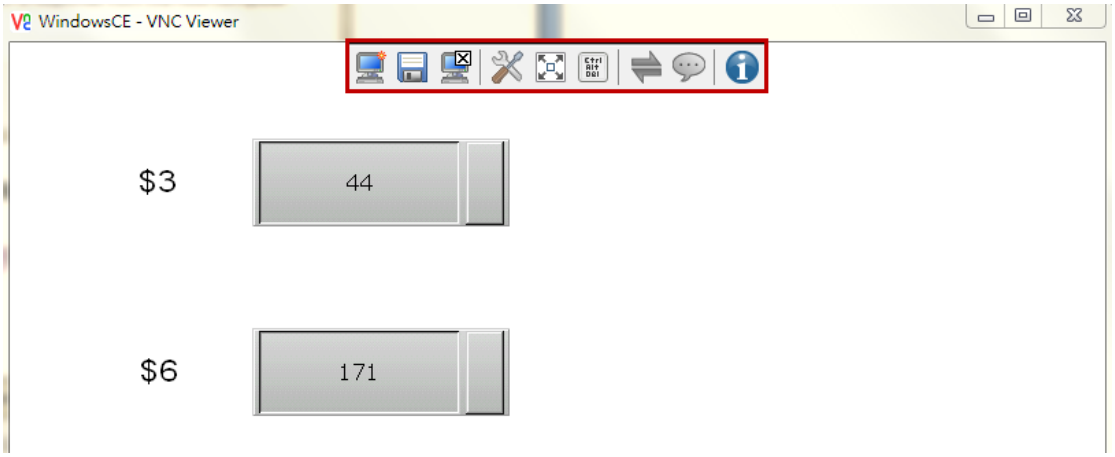
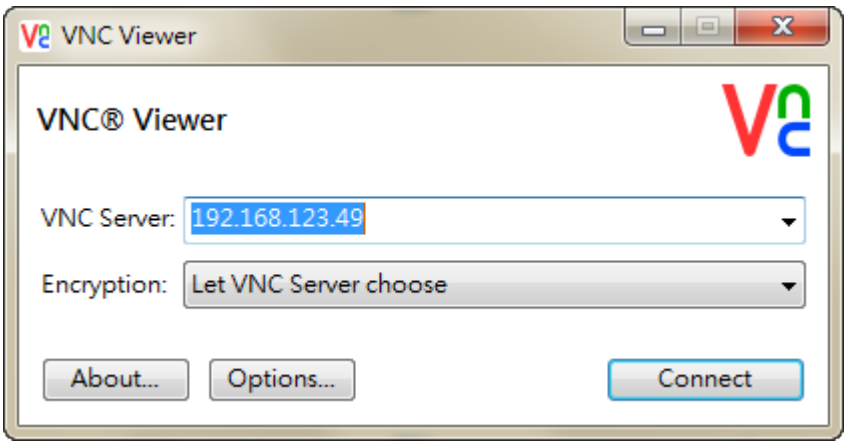


Figure 29-4-30 VNC Viewer toolbar description

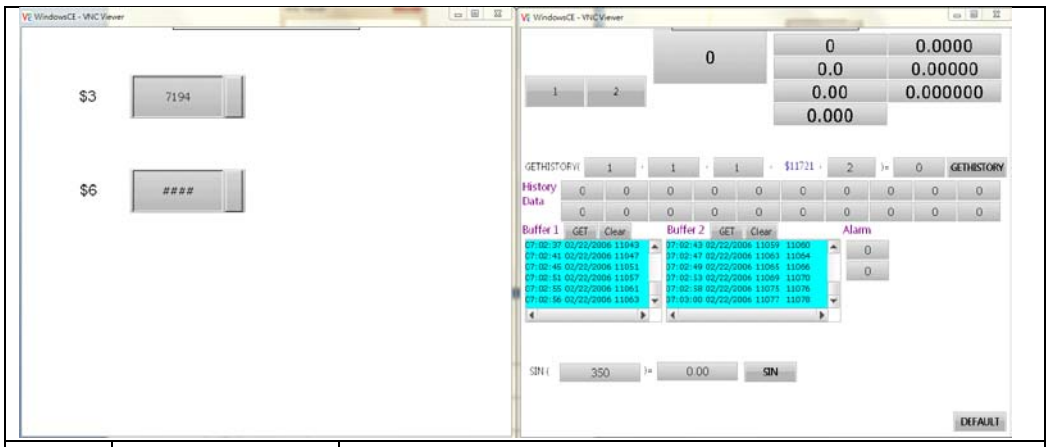
The following table describes the related functions of the toolbar.

	Create a new connection	You can remotely operate more than one HMIs by creating the new connection.

1. Click on and the following window will pop up. Users can enter the HMI's IP Address that wish to monitor.

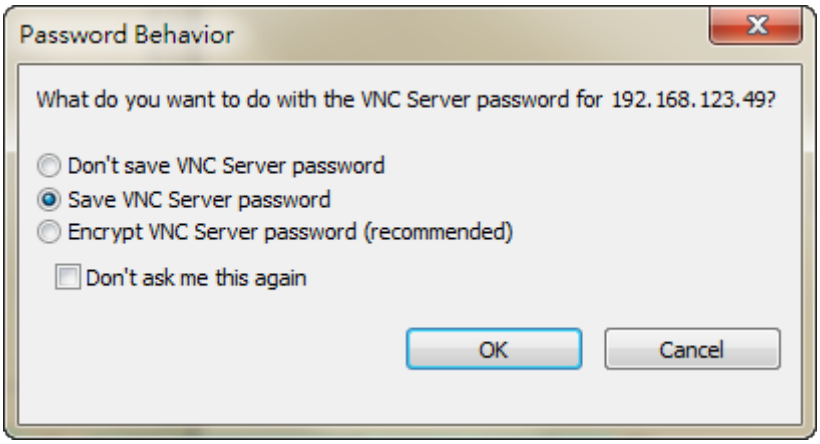


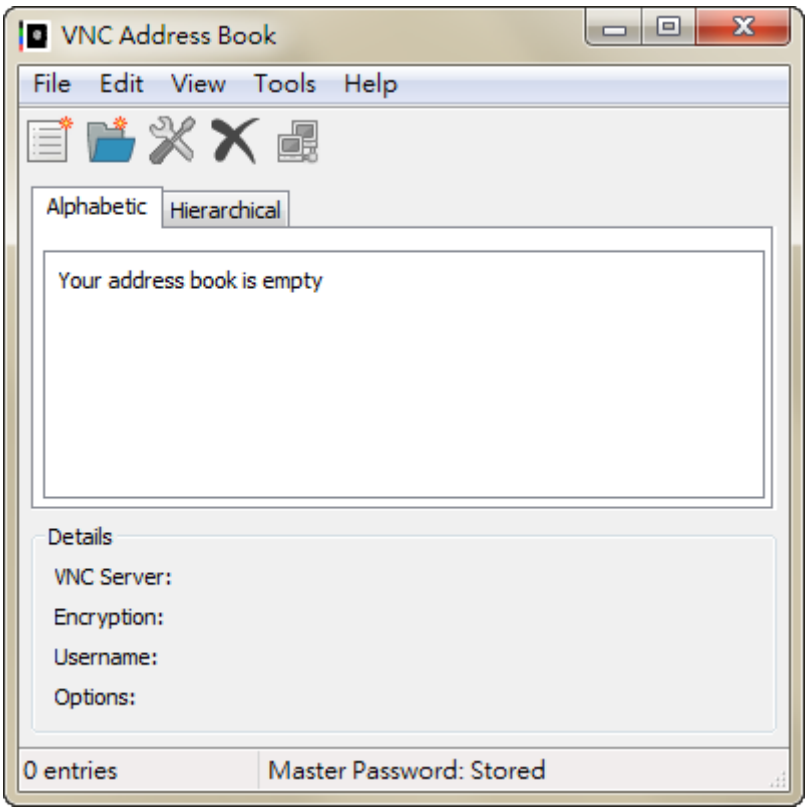
2. Now you can see VNC Viewer is remotely controlling two HMIs.



	Save the connection setting	This function can save the connection setting. Next time entering the IP address and password again is not required.

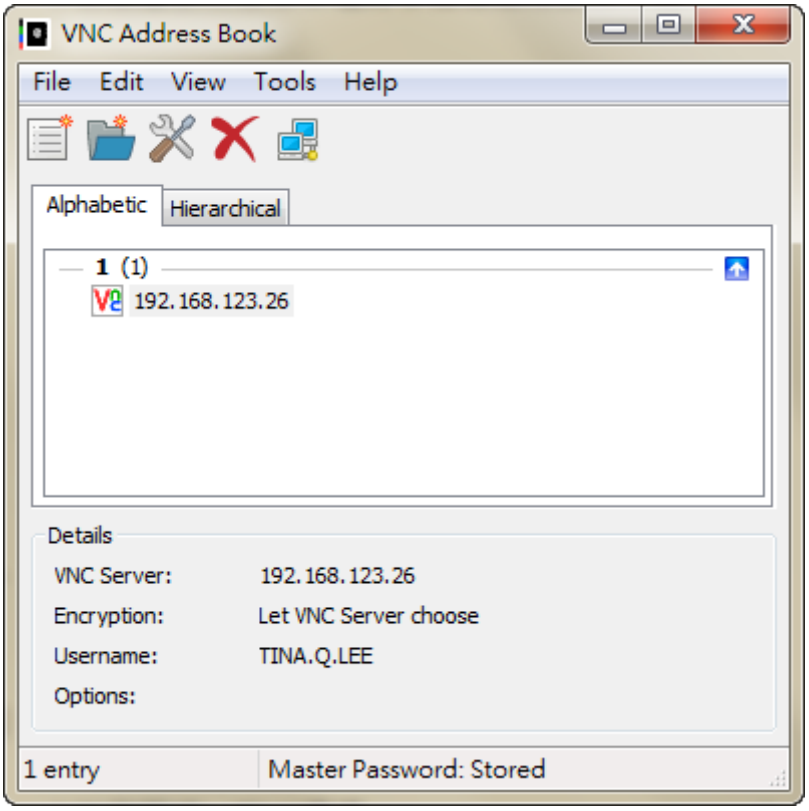
1. Click on , the following two windows will pop up.



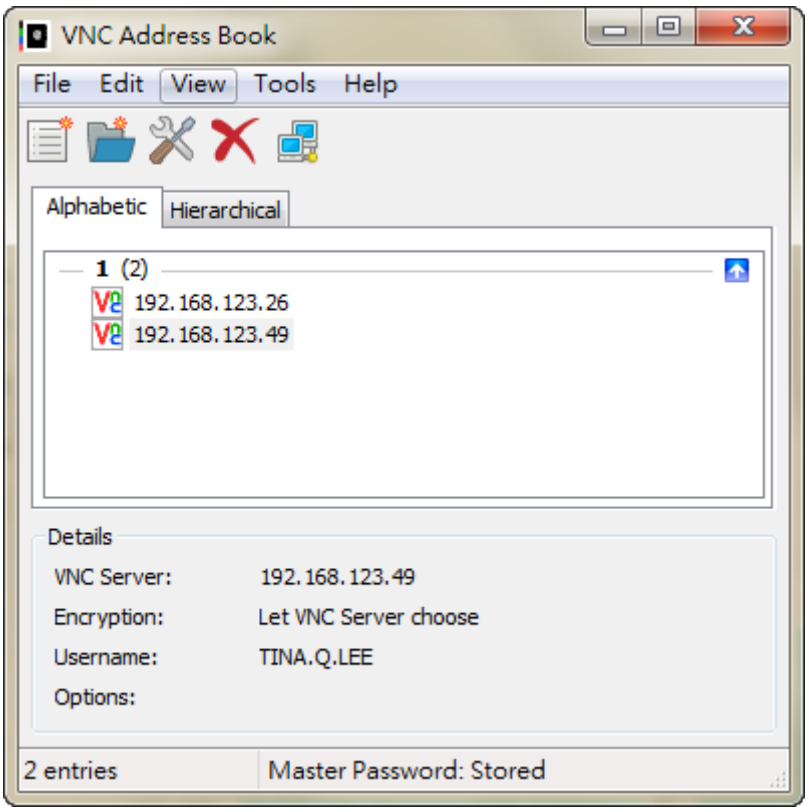


Please select [Save VNC Server Password] in Password Behavior screen and click OK to save this connection.

Then, this connection setting will be saved in VNC Address Book.



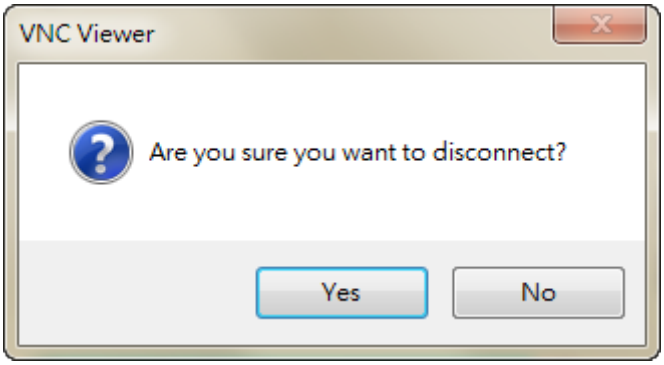
Users also can save multiple connection settings. Please see the figure below.



You only need to open VNC Address Book and select the IP Address for connection next time.

	Disconnect the connection	This function is for disconnecting the connection between HMI and VNC.

Click on and users will be asked if users are sure to disconnect the connection.

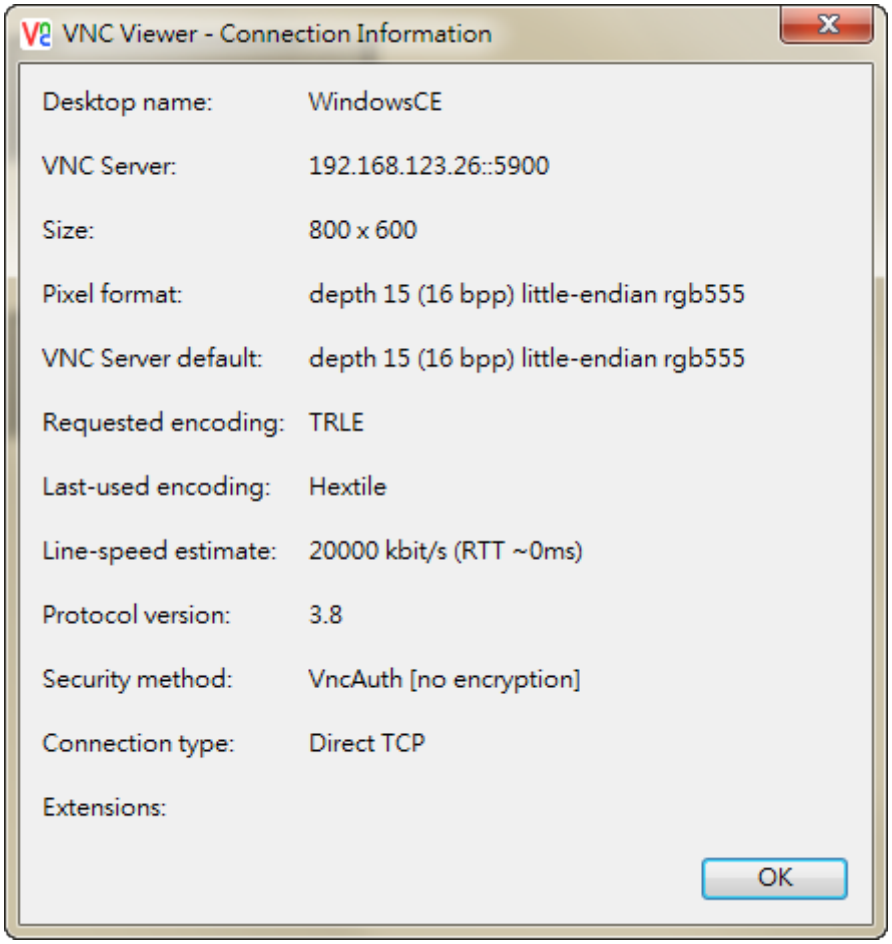


Select [Yes], the connection between HMI and VNC will be disconnected.

Select [No], VNC is still connected to the HMI.

	Advanced setting	It sets the display, input and connection parameters of VNC. This function is mainly for VNC. We usually use the default setting when connecting VNC and HMI. No furthersetting is

		needed.
	Full Screen	This function can display the connection screen in full screen mode.
	Connection Information	It shows the related information of VNC connection.



29-5 e-Printer

With e-Printer function, users can print from HMI without connecting to a physical printer, which saves the space and brings convenience. See the e-Printer framework below:

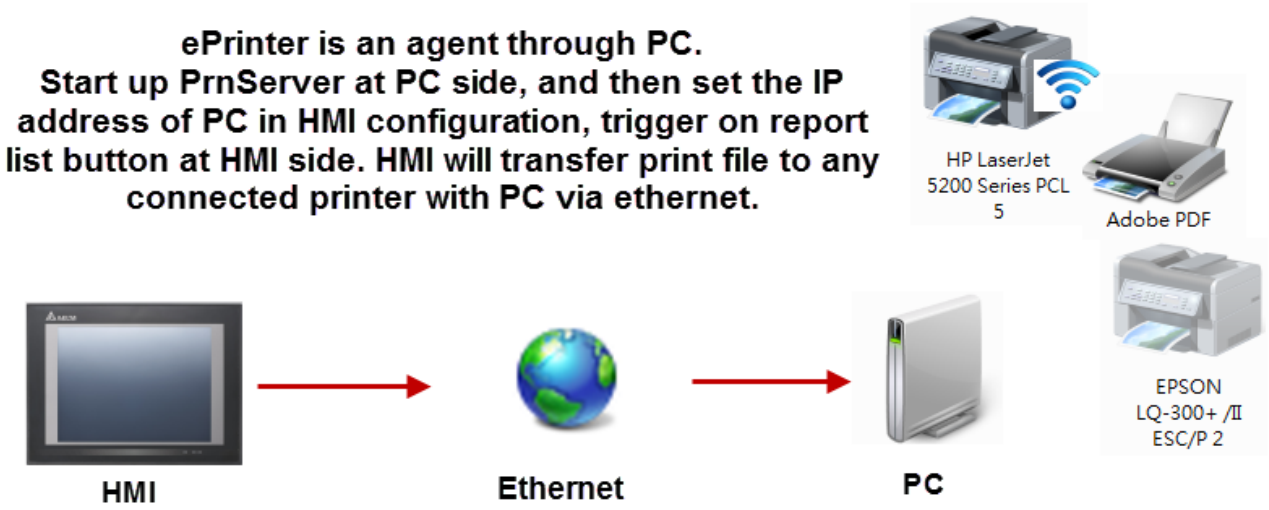


Figure 29-5-1 e-Printer framework

The function of e-Printer can be mainly divided into two parts. Following will firstly introduce PrnServer and then describe the setting of HMI and ePrinter so that users can print on the Internet.

29-5-1 PrnServer

PrnServer is an executable file (.exe). Users can print the file via the Internet by executing PrnServer.

PrnServer is located at C:\Program Files (x86)\Delta Industrial Automation\DOPSoft 2.00.04\PrnServer.exe on PC.

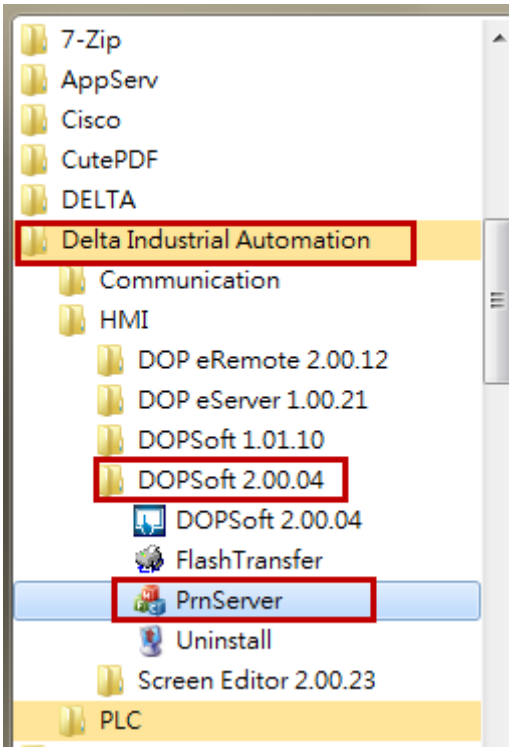


Figure 29-5-2 Execution path of e-Printer application

When the function is enabled, the screen will be shown as below.

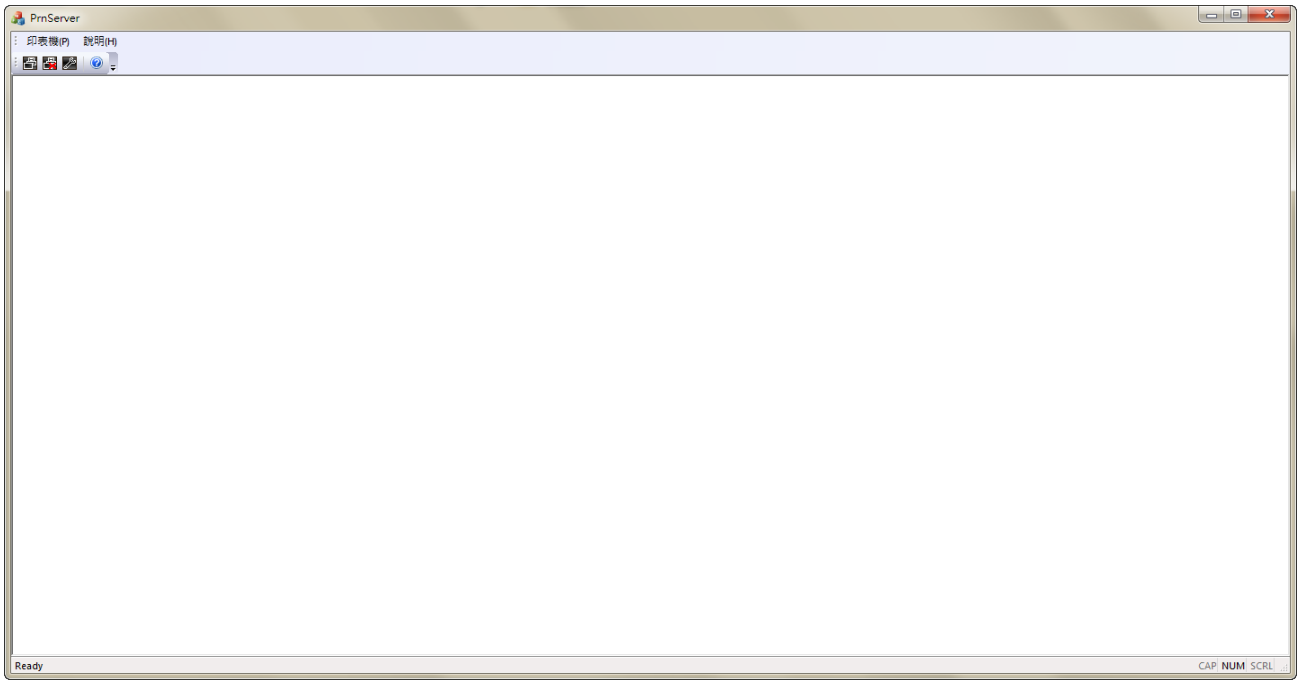
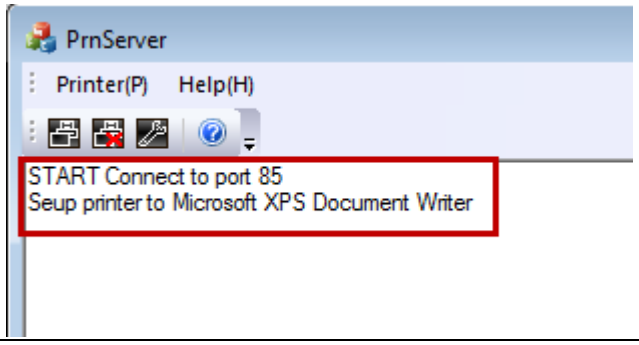
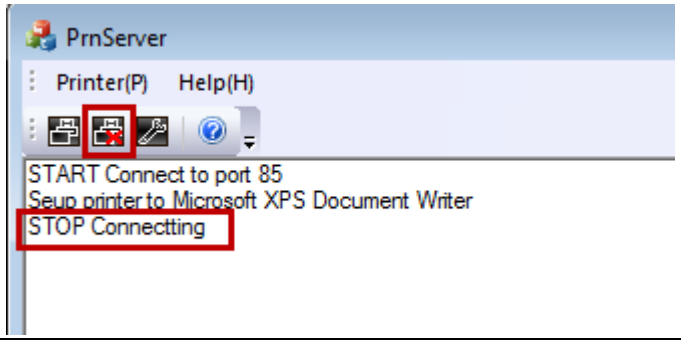
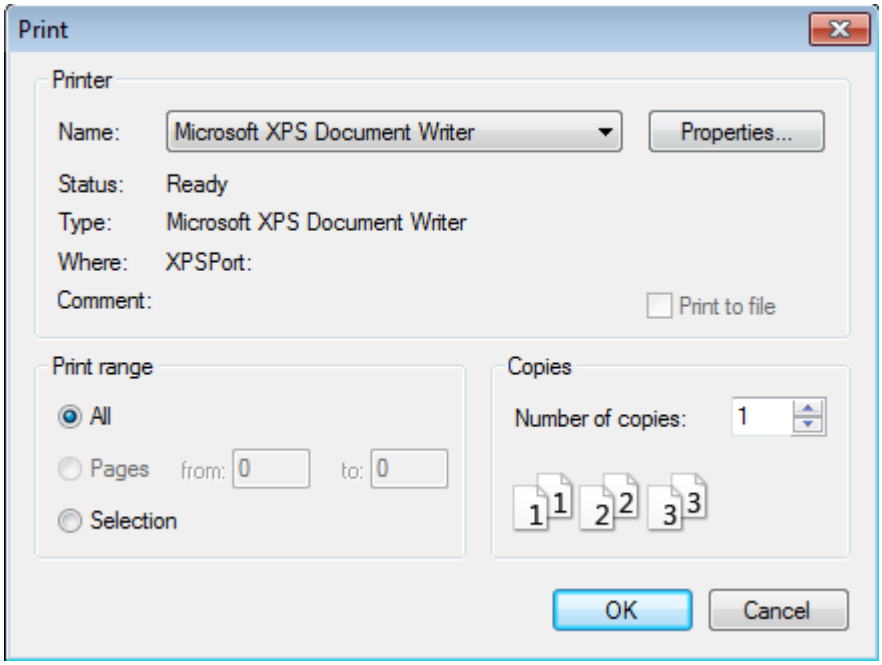
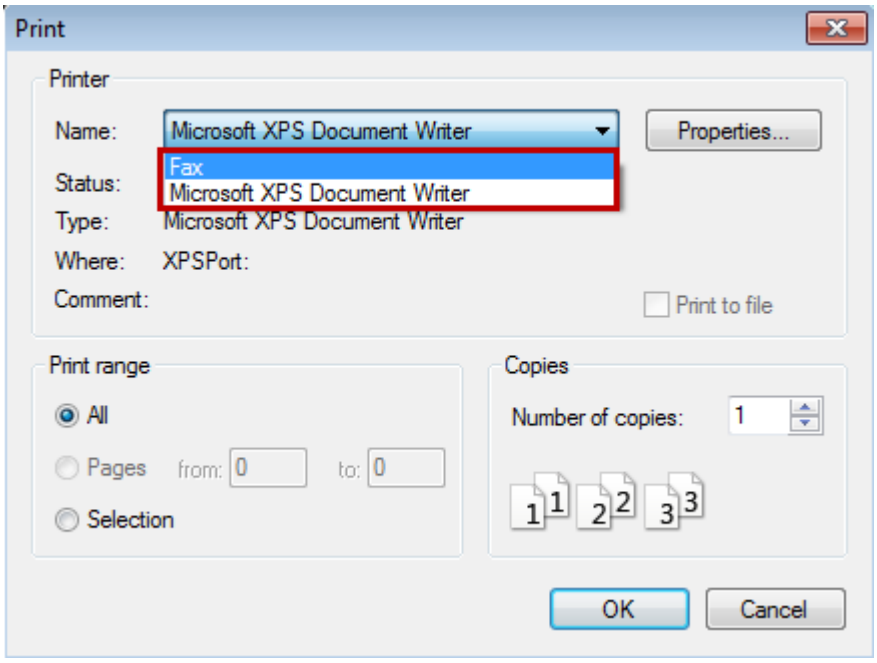
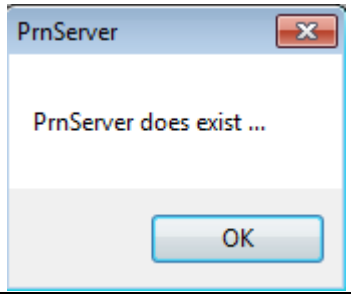
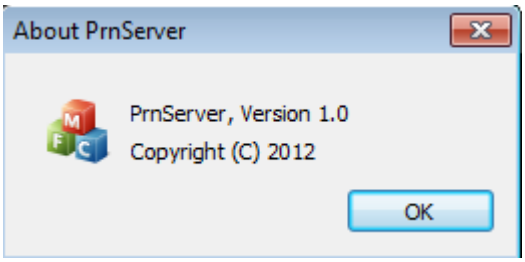


Figure 29-5-3 e-Printerscreen

The following table describes the related function of PrnServer.

Printer	Connection	➢ Before printing the file, users have to click on this icon to connect to the printer. ➢ The default connecting port is 85. It will automatically connect to the printer used by PC. 
	Disconnection	➢ When clicking on disconnection icon, PrnServer will display the message that shows below. 
	Setting	➢ It shows the related setting of the printer.  ➢ Users can change the printer here.

		
	Exit	➢ Click Exit to close the PrnServer. ➢ When no longer need to use the ePrinter, please click on Exit to disable the function. If you directly close PrnServerscreen , it will not disconnect the connection. When clicking on to exit and enable PrnServer again, the following message will pop up. 
Description	About	➢ It displays the current version of PrnServer. 

29-5-2 HMISetting

This section describes how to set ePrinter function in HMI screen and print out the file by HMI.

☞ Create a project

Please select W105B and set Printer as ePrinter.

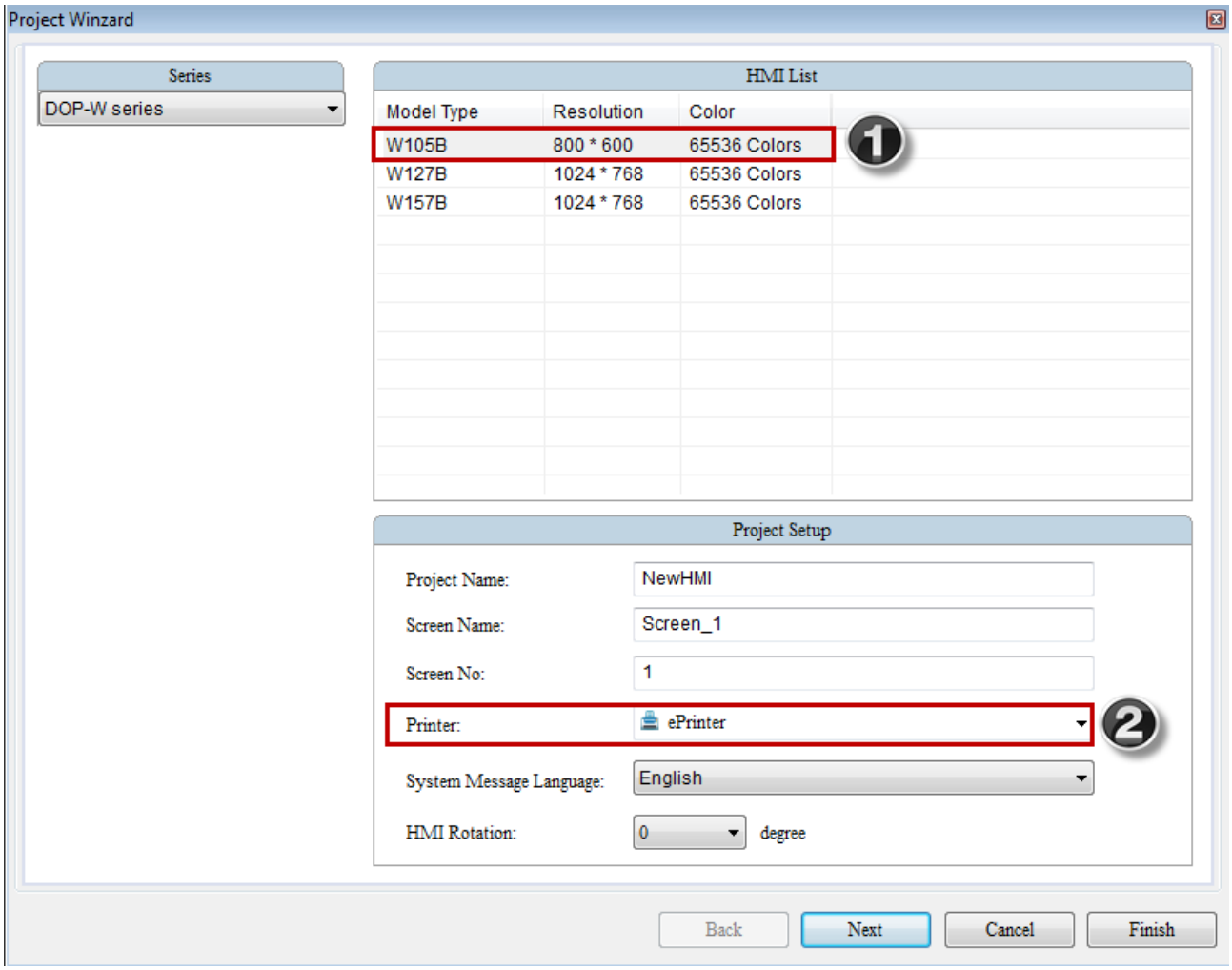
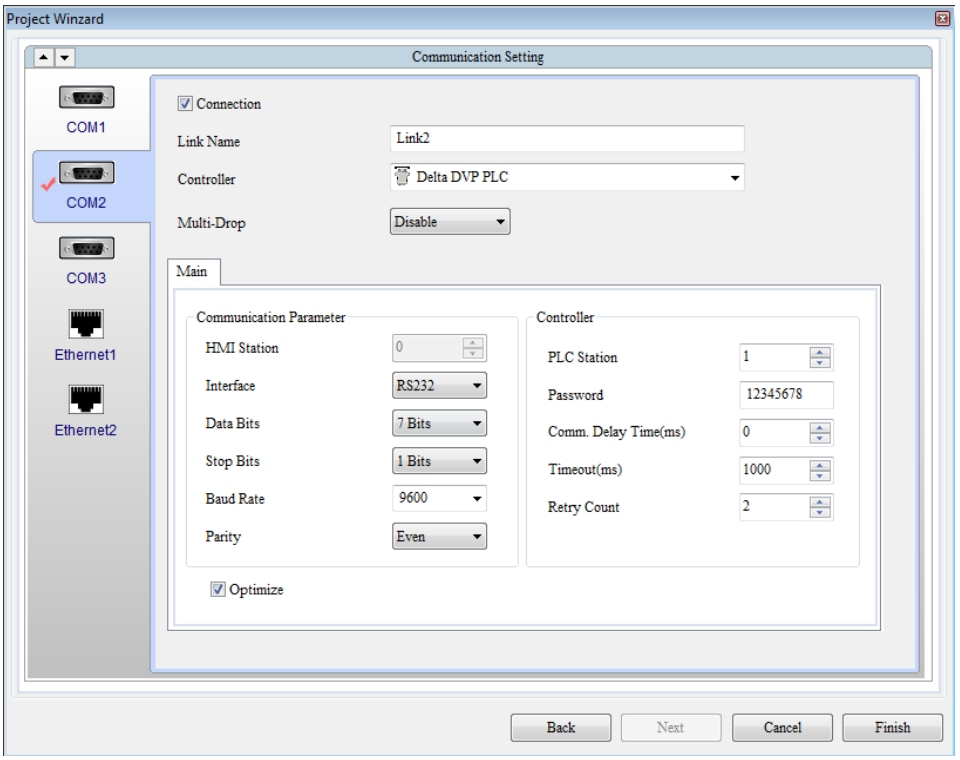


Figure 29-5-4 HMI screen setting I

Click Next to complete the network setting.



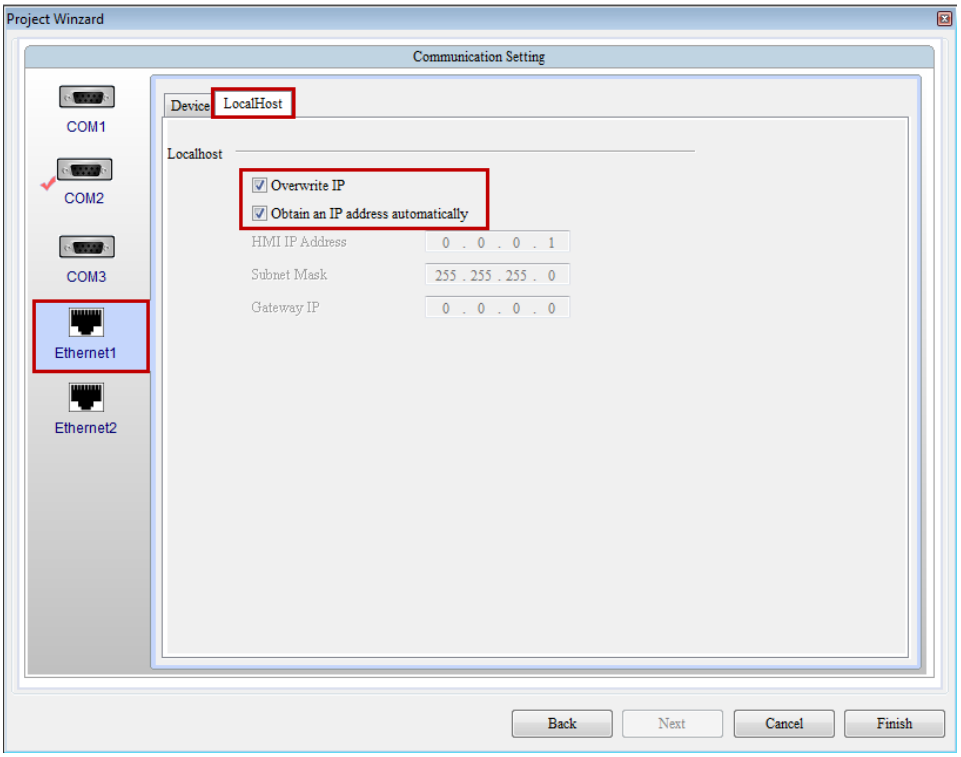


Figure 29-5-5 HMI screen setting II

☞ Print

Go to [Options] → [Configuration] → [Print] and select [Ethernet]. Then, fill in IP address and port number.

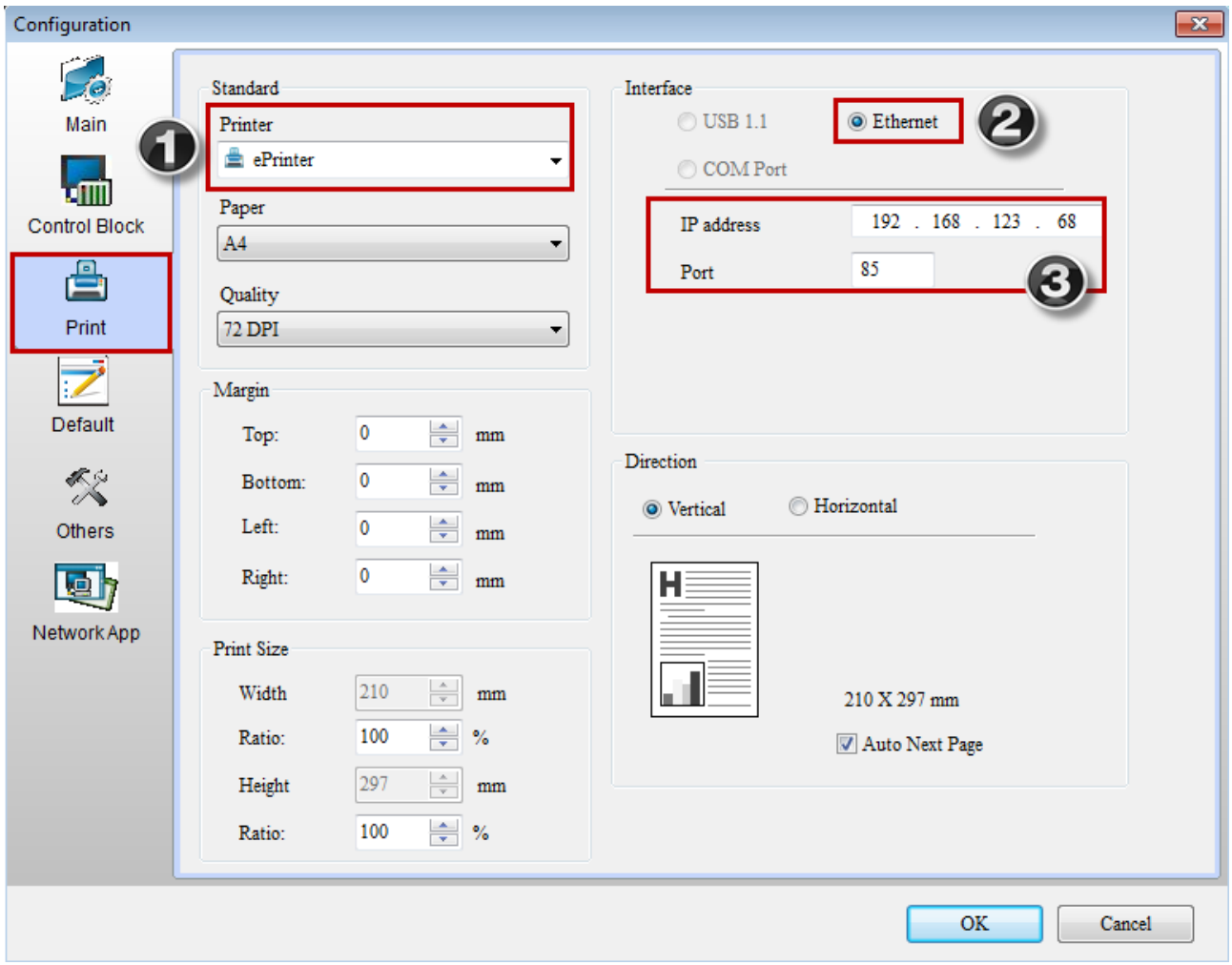


Figure 29-5-6 HMI screen setting III

✐ **<u>IP Address:</u>** This address is the one for enabling PrnServer.Users can use ipconfig in Command Prompt and check PC's IP address, which is 192.168.123.68 in this example.

NOTE:

✓ This IP address should share the identical network segment with HMI's.

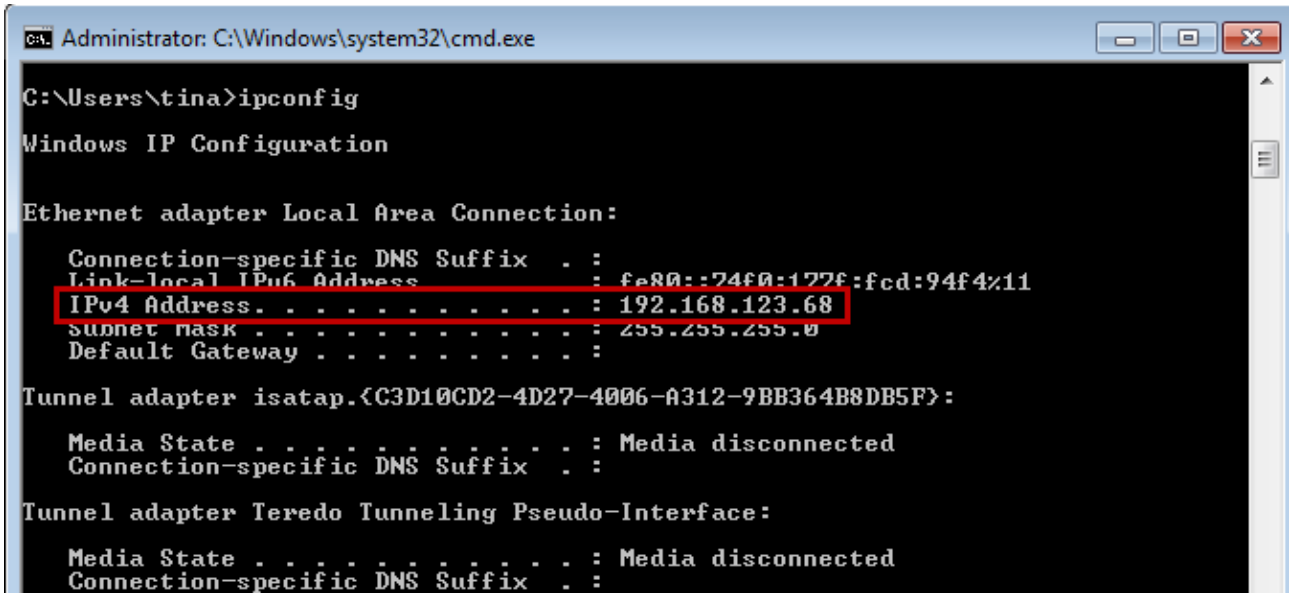


Figure 29-5-7 Check PC's IP address

✐ **Port**: 85 is the default connecting port of the printer.It is also the connecting port in PrnServer.

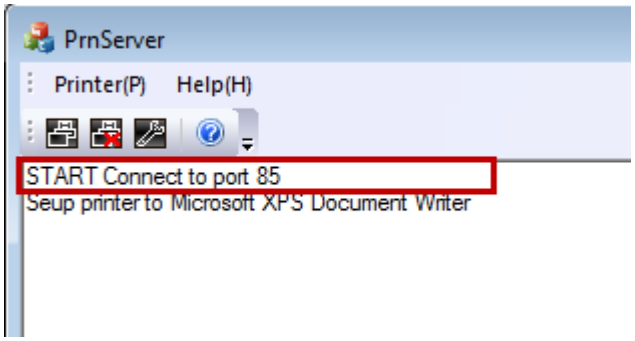


Figure 29-5-8 e-Printer connecting port

☞ Create the report list.

Create the rectangle, circle and report list elements in DOPSoft editing screen. Then, set the report device toPrinter.

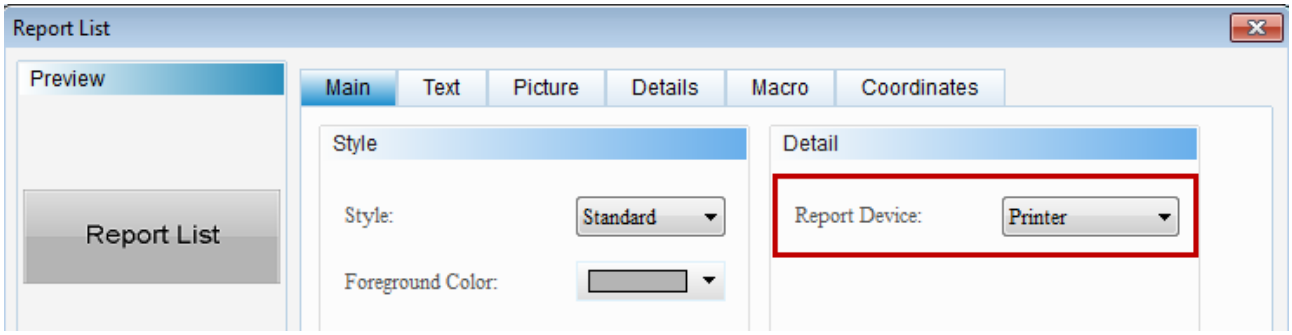


Figure 29-5-9 Create the report list element

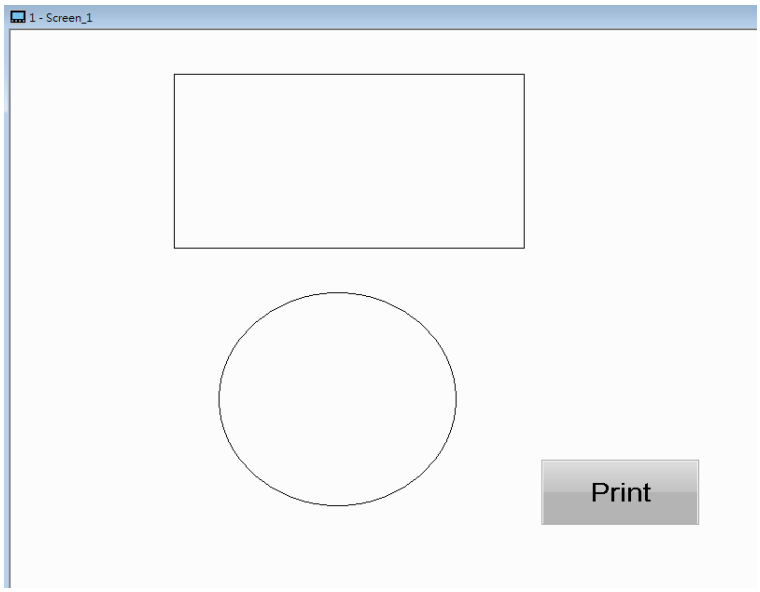


Figure 29-5-10 Create the rectangle and circle element

- ☞ Please compile and download the screen to the HMI.
- ☞ Before pressing the report list element, please enable PrnServer for connection.

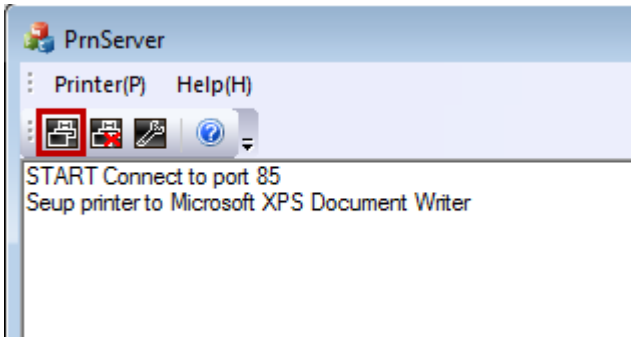


Figure 29-5-11 Enable PrnServer

- ☞ Click on the Print button on HMI to print your file.

29-6 Multi-Language Setting

This function provides 16 languages. Users can define the displaying text languages. Go to [Options] → [Multi-Lang Setting] to enable the function. With the [Multi-Lang Input] from [Input Element], users will be able to use the function of multi-language.
If you do not check other supported languages, then you can only use the default one – English.

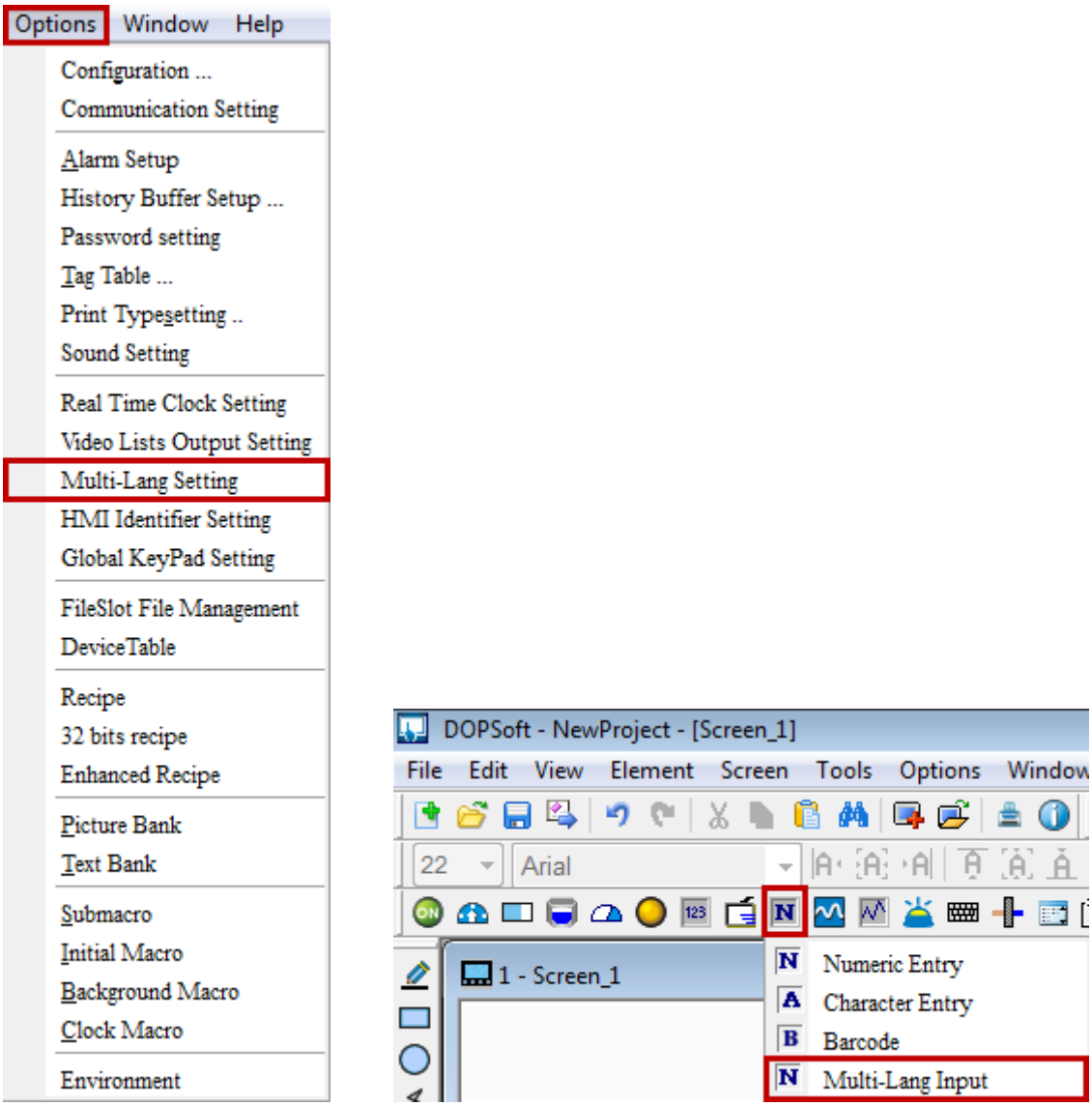


Figure 29-6-1 Multi-Lang Input

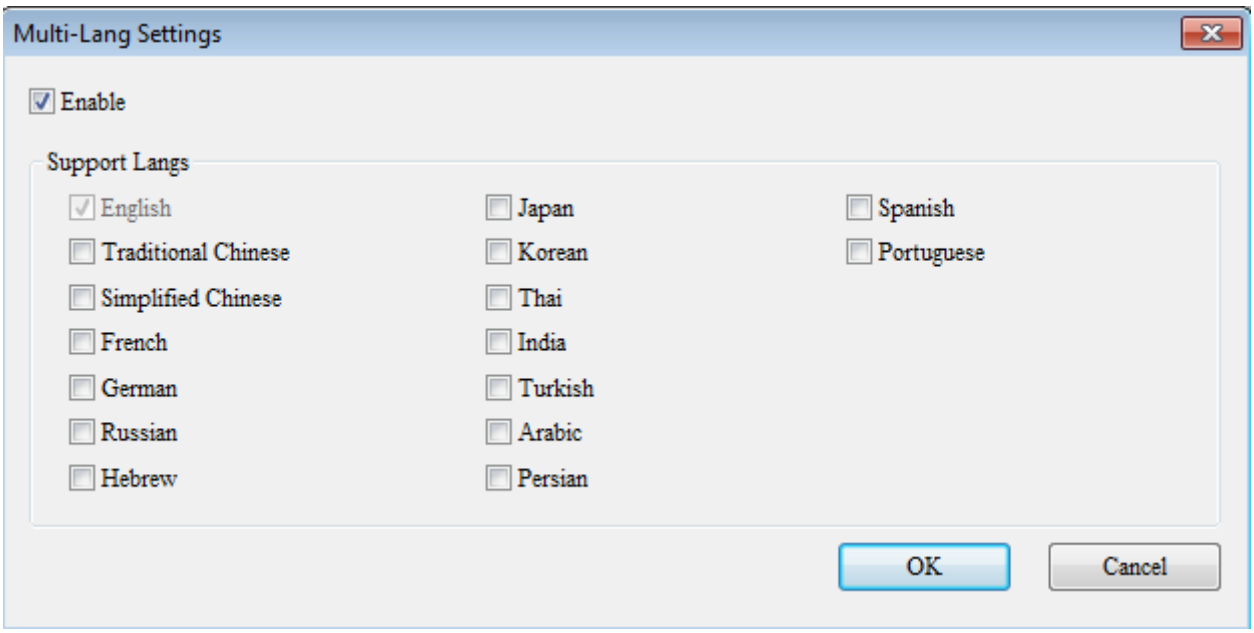
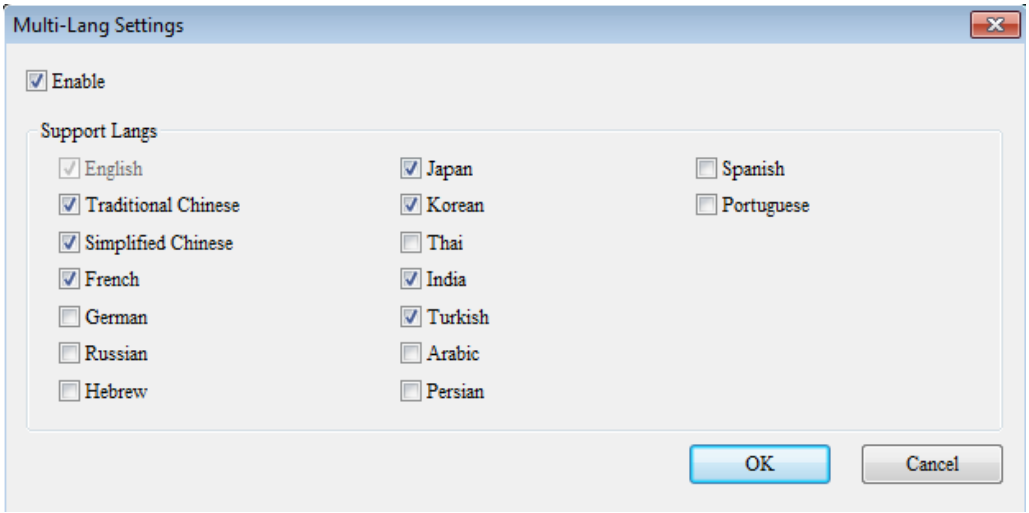


Figure 29-6-2 Enable Multi-Lang input

NOTE:

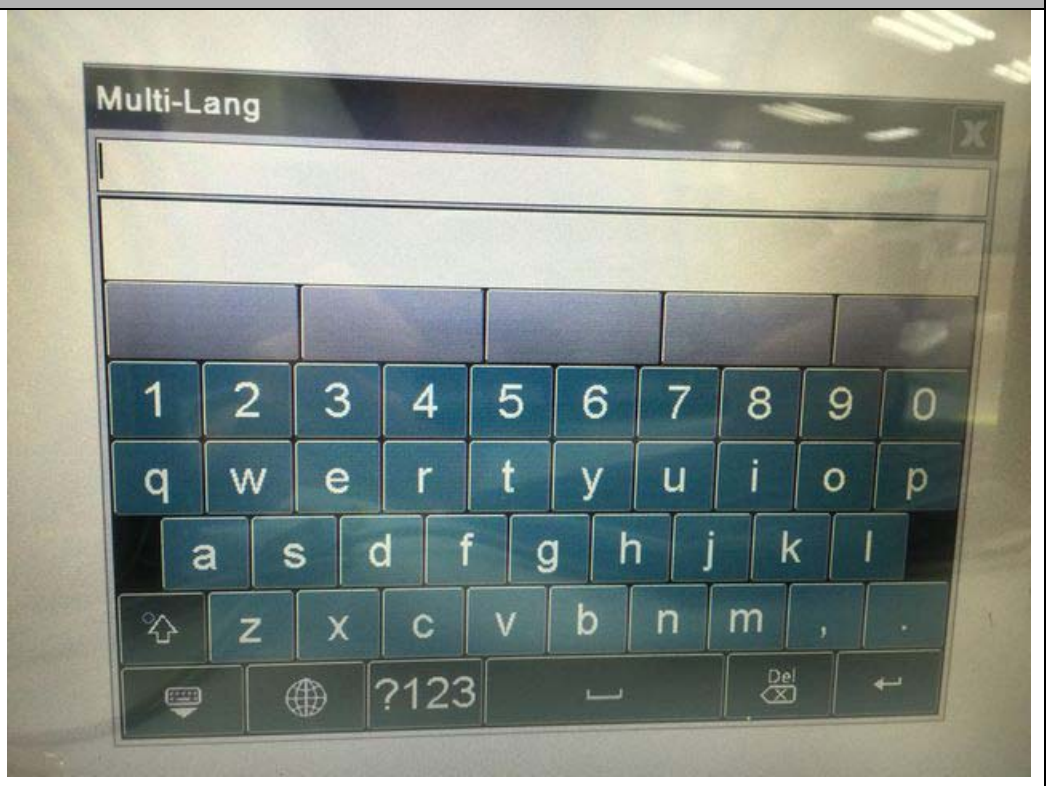
✓ Multi-language input does not support the function of online/offline simulation.

Please refer to Table 29-6-1 for the example of multi-language input.

<table>
<tr><th colspan="3">Multi-Language Input
Table 29-6-1 Example of multi-language input</th></tr>
<tr><td>Read memory address</td><td></td><td>
<table>
<tr><th colspan="2">Multi-lang Input Element</th></tr>
<tr><td>Write memory address</td><td>$555</td></tr>
<tr><td colspan="2">**********</td></tr>
</table></td></tr>
<tr><td>Multi-Lang Settings</td><td colspan="2">➢ The string length for multi-lang input element is 10.
➢ Go to [Options] → [Multi-Lang Setting] to enable the function. Then, select the supported languages that you wish to use. See as below.
 
</td></tr>
<tr><td>Result</td><td colspan="2">➢ When creating the element, please compile and download the screen to the HMI.
➢ Click on Multi-Lang element and the following window will pop up.</td></tr>
</table>

Multi-Language Input

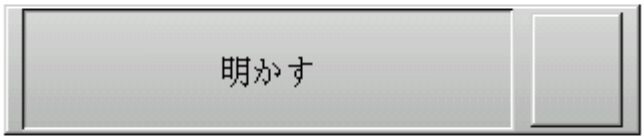
Table 29-6-1 Example of multi-language input



➢ Press to switch the input language.

➢ Long press to view all input languages that are available or

Multi-Language Input Table 29-6-1 Example of multi-language input	
	select the language you wish to use in this screen. ➢ We select Japanese Kana as the example here.

Multi-Language Input Table 29-6-1 Example of multi-language input	
	

Double-click Multi-Lang Input to display the Multi-Lang Input Properties screen as shown below.

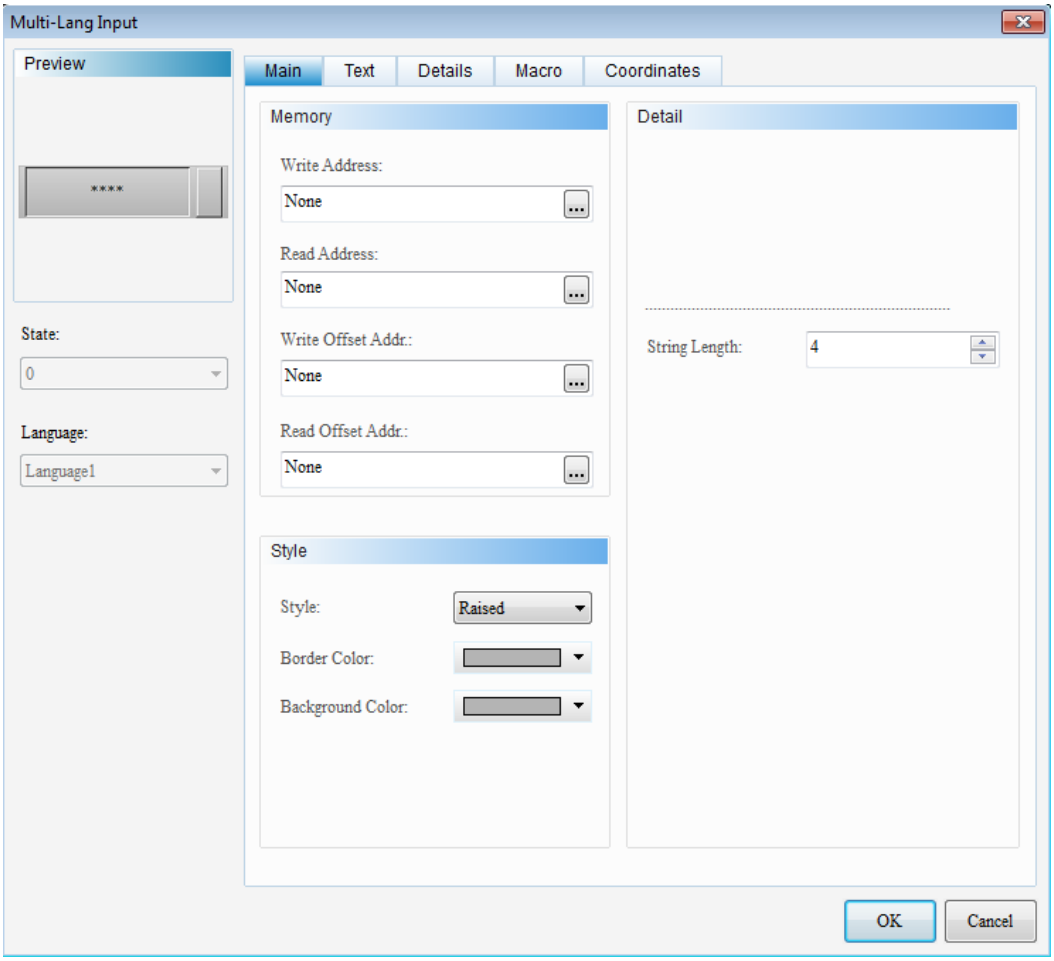


Figure 29-6-3 Multi-Lang Input Properties

Multi-Language Input	
Function Page	**Content Description**
Preview	The selections of state and language areunavailable.
Main	It sets theread address, write address, read offset address, write offset address, element's style, border color, background color and string length.
Text	It sets the text font / size / color / alignment.
Details	It sets input mode, interlock state, interlock address, trigger type, trigger, invisible address, user security level, set low security and display asterisk (*).
Coordinates	It sets the X-Y coordinate, width, and height of elements.

Table 29-6-2 Multi-Lang Input Function Page

◆ Main

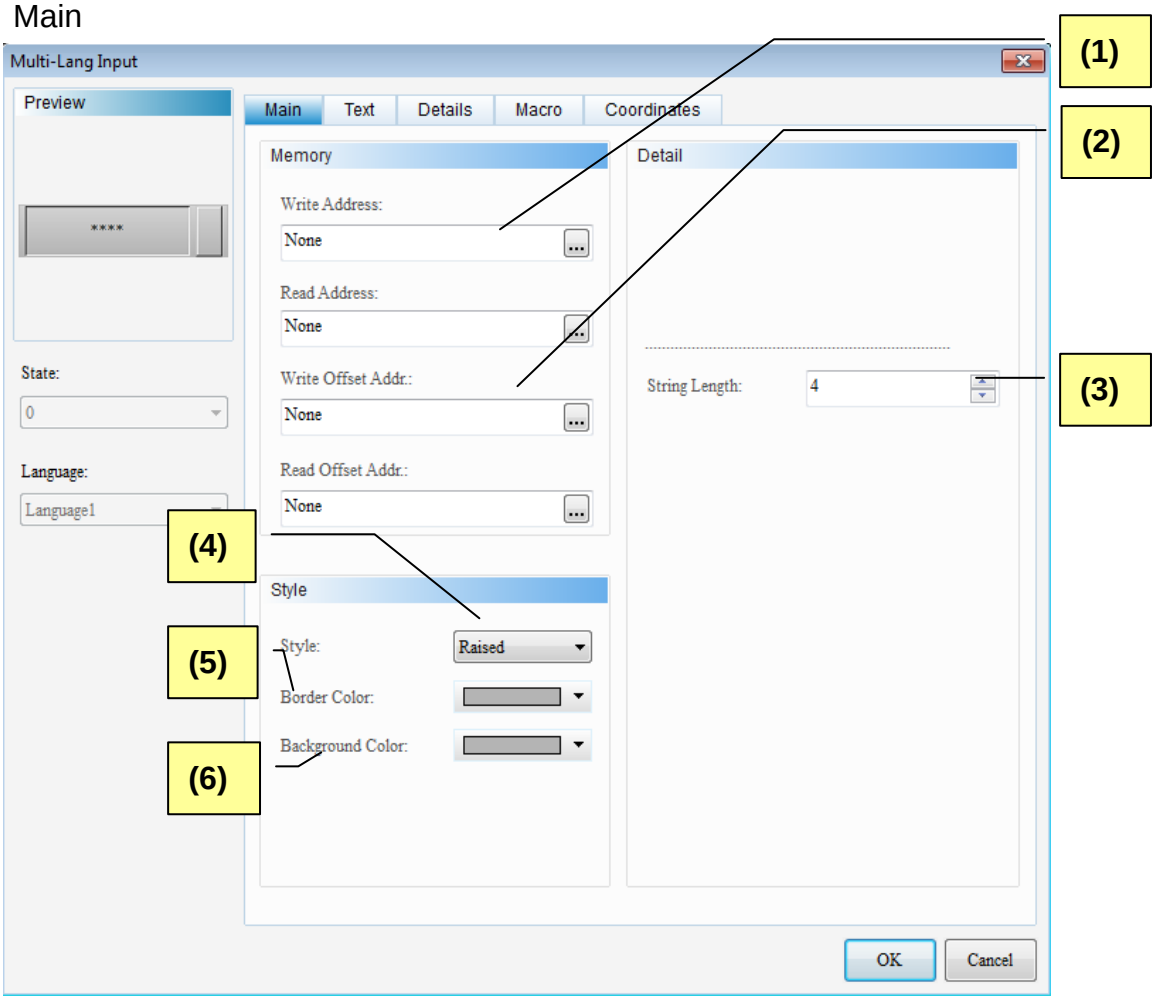
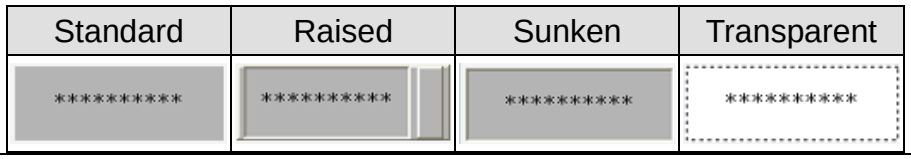
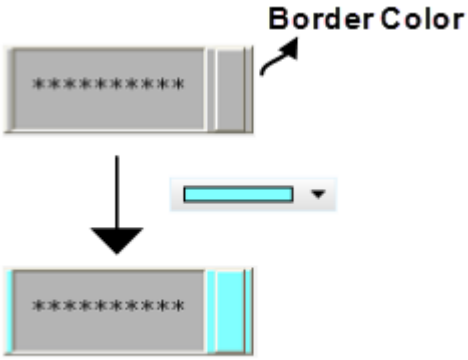
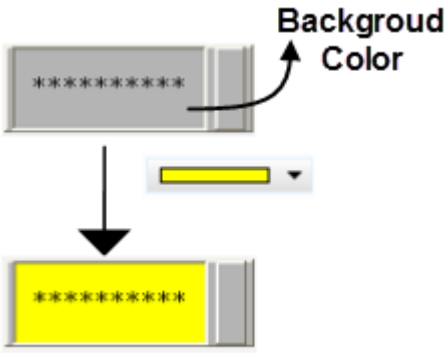


Figure 29-6-4 Multi-lang Input Element Main Properties Page

No.	Property	Function
(1)	Write Address	➢ It can be internal memory or controller register address. ➢ Users can choose the link name or style. Please refer to CH05 5-1 Button Element.
	Read Address	➢ It can be internal memory or controller register address. ➢ Users can choose the link name or style. Please refer to CH05 5-1 Button Element.
(2)	Write Offset Address	➢ Please refer to Appendix D Write and Read Offset Address.
	Read Offset Address	
(3)	String Length	➢ The range of string length is from 1 to 256.

No.	Property	Function
(4)	Style	➢ The element style can be Standard, Raised, Sunken and Transparent. This setting enables users to change the appearance of the element. 
(5)	Border Color	➢ It can set the border color. ➢ If you choose Transparent or Sunken as the element style, then this function will be invalid. 
(6)	Backgrou nd Color	➢ It can set the background color. ➢ If you choose Transparent as the element style, then this function will be invalid. 

◆ Text

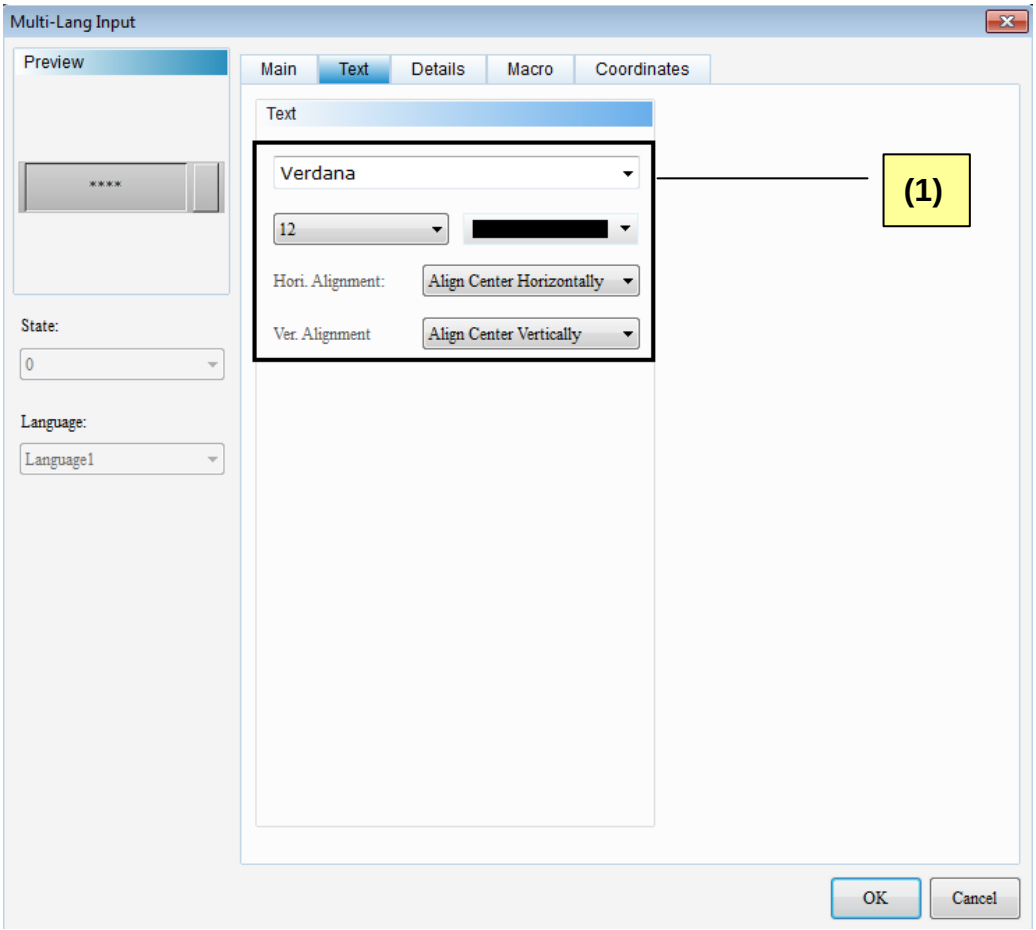


Figure 29-6-5 Multi-Lang Input Element Text Properties Page

No.	Property	Function
(1)	Text Properties	➢ It can set text properties, including font type, font size, font color, and text alignment.

◆ Details

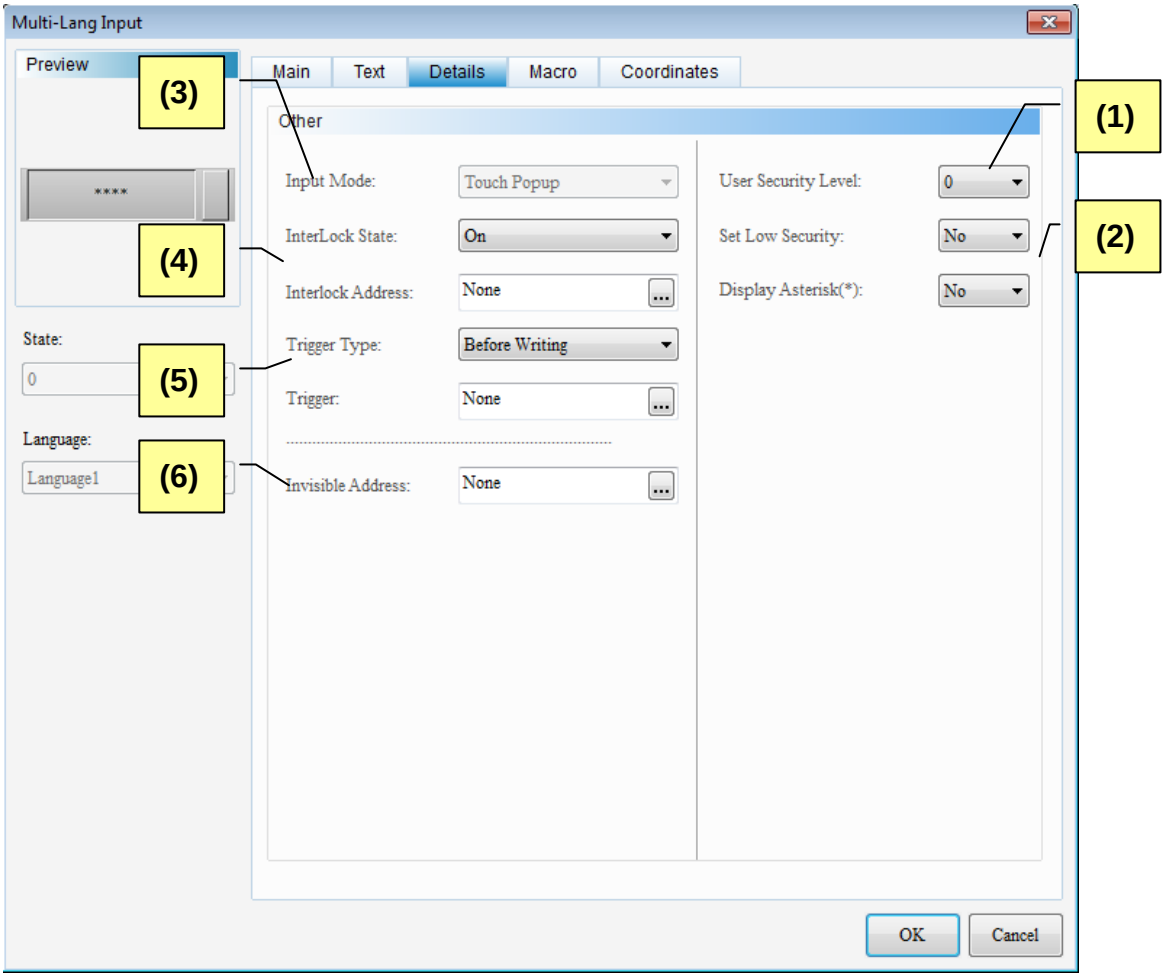
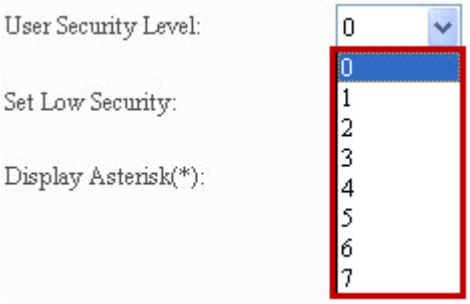
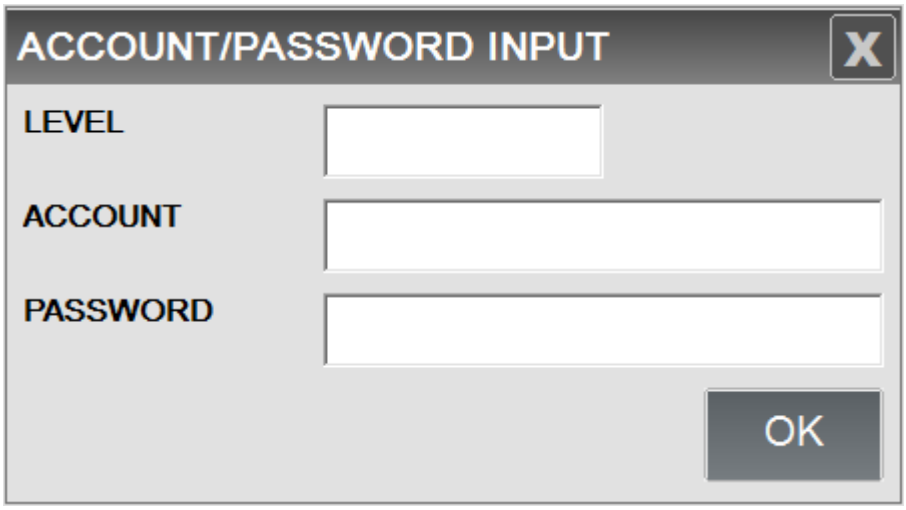
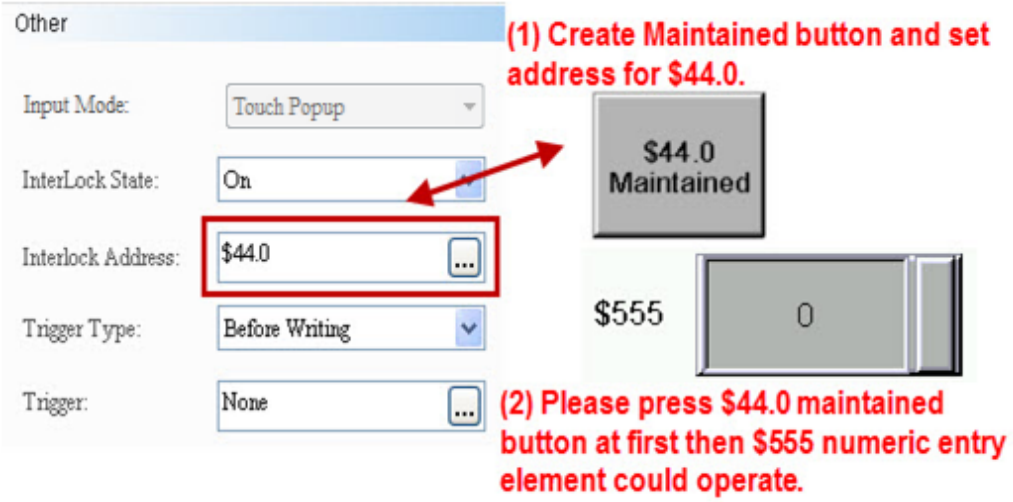
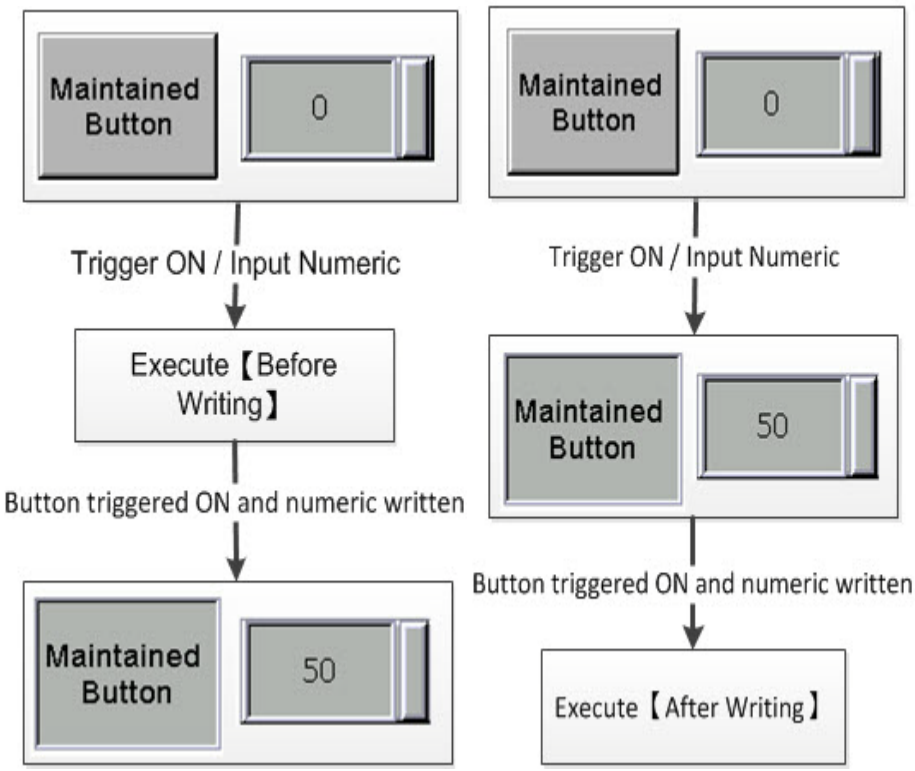


Figure 29-6-6 Character Entry Element Details Properties Page

No.	Property	Function
(1)	User Security Level	
	Set Low Security	➢ This function sets the security of pressing the element. To use this function, users have to have the set level or higher user security. ➢ Once you set the users security level, when pressing the element, a pop-up window for entering the password will appear and confirm if the password is correct. (Password can be changed via password table. Please refer to 29-1 for Password Setting).

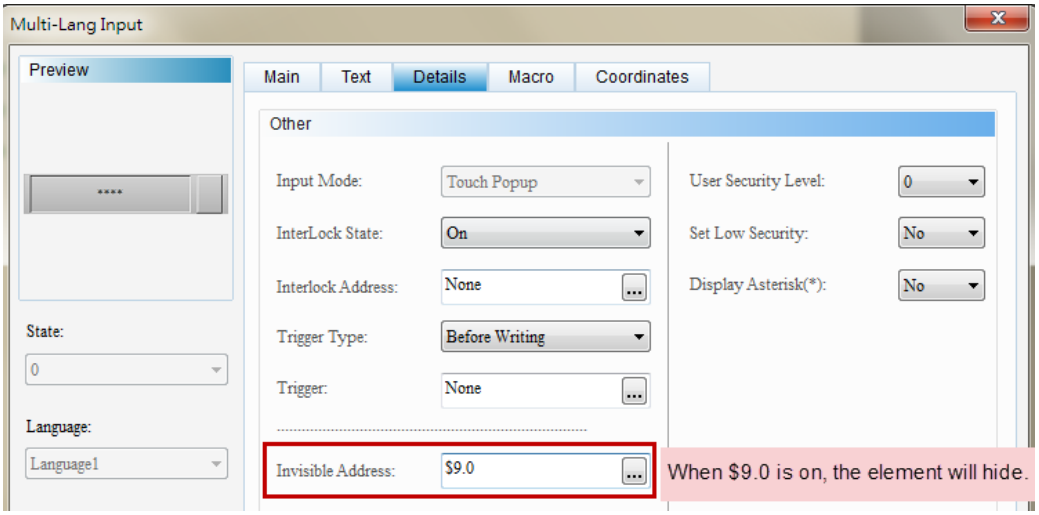
No.	Property	Function
		 If “YES” is selected for Set Low Security, the HMI automatically sets the security to the lowest level every time when users input the password. When users activate the element again, they will be requested to input the password that corresponded to the element again.
(2)	Display Asterisks (*)	➢ Select [Yes] for displaying asterisks. When entering the text in multi-language input window and click on Enter, the displayed value will be *. See the figure below.
(3)	Input Mode	➢ Multi-language input element does not support this function.
(4)	InterLock State	➢ Interlock Address allows users to operate an element from this particular address. It must be used along with Interlock State. If Interlock State is “OFF”, this means the interlock address is operable when the interlock state is “OFF”. In contrast, when Interlock State is “ON”, this means the interlock address is operable when the interlock state is “ON”. ➢ The operations are as follows: 1. Please create one maintained button and set its write-in

No.	Property	Function
	InterLock Address	memory address as$44.0. Then, set the write-in memory address of multi-language input element as $555 and interlock address as $44.0. 2. Click on the maintained button $44.0 to activate the multi-language input element $555. 

<table>
<tr><td rowspan="2">(5)</td><td>Trigger Type</td><td>
➢ There are two trigger types, trigger before writing and trigger after writing.
<table>
<tr><th></th><th>Trigger before writing</th><th>Trigger after writing</th></tr>
<tr><td>Behavior when triggering</td><td>The trigger bit will be on before the value is changed.</td><td>The value is changed before the trigger bit is on.</td></tr>
</table>
➢ The triggering function can only set the triggering address to On. Users have to set it off.
➢ See below for the flow chart of Trigger before writing: See below for the flow chart of Trigger after writing:
</td></tr>
<tr><td>Trigger</td><td>


</td></tr>
<tr><td>(6)</td><td>Invisible Address</td><td>
➢ When the invisible address is set to On, the button element will be hidden and its setting function will be inactivated.

</td></tr>
</table>

		 Multi-Lang Input Preview Main Text Details Macro Coordinates Other Input Mode: Touch Popup InterLock State: On Interlock Address: None Trigger Type: Before Writing Trigger: None Invisible Address: $9.0 User Security Level: 0 Set Low Security: No Display Asterisk(*): No State: 0 Language: Language1 When $9.0 is on, the element will hide.

◆ Coordinates

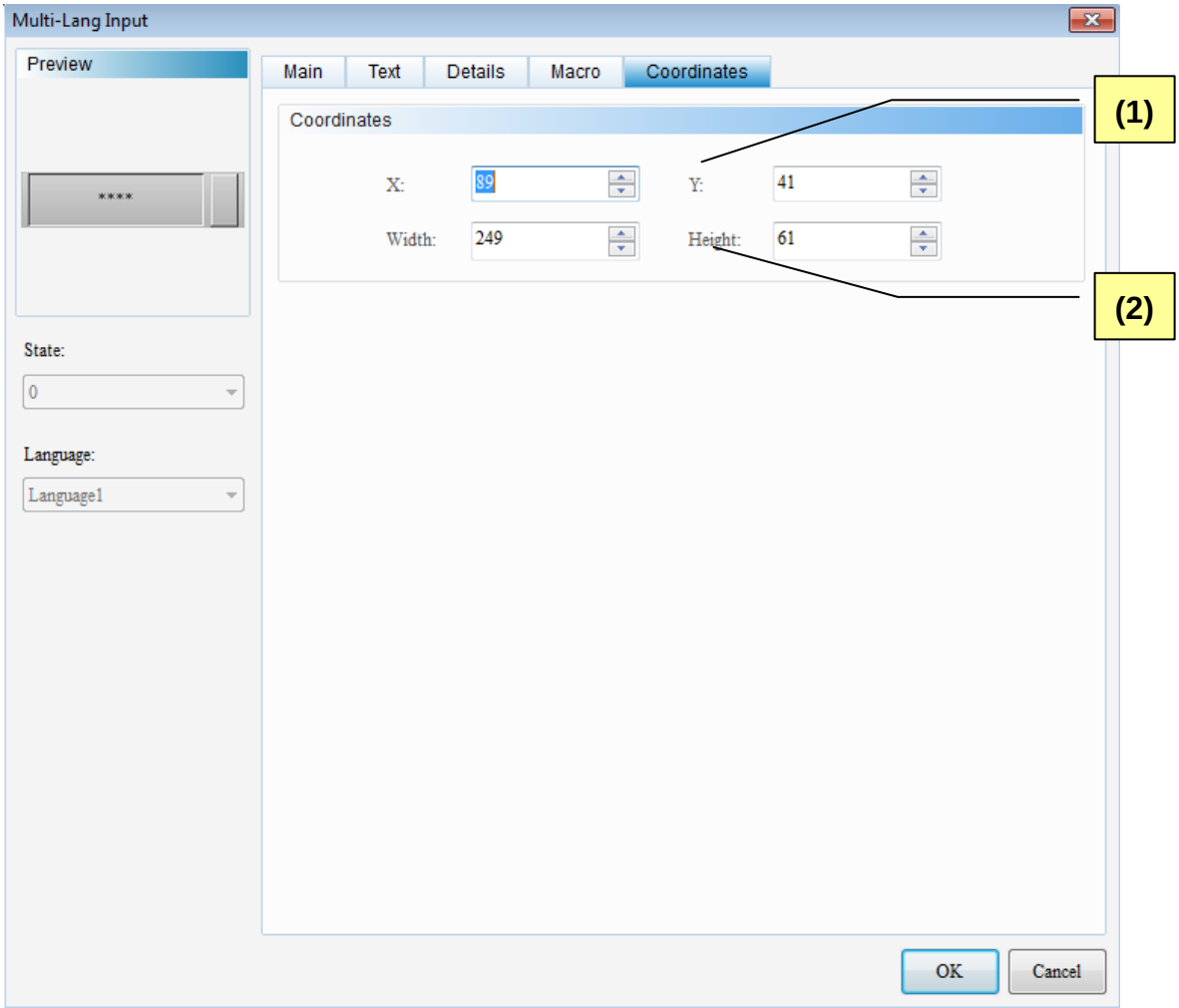


Figure 29-6-7 Multi-Lang Input Element Coordinates Properties Page

No.	Property	Function
(1)	X-value and Y-value	➢ Sets the upper left X-coordinate and Y-coordinate of elements.
(2)	Width and Height	➢ Sets element width and height.

◆ Macro

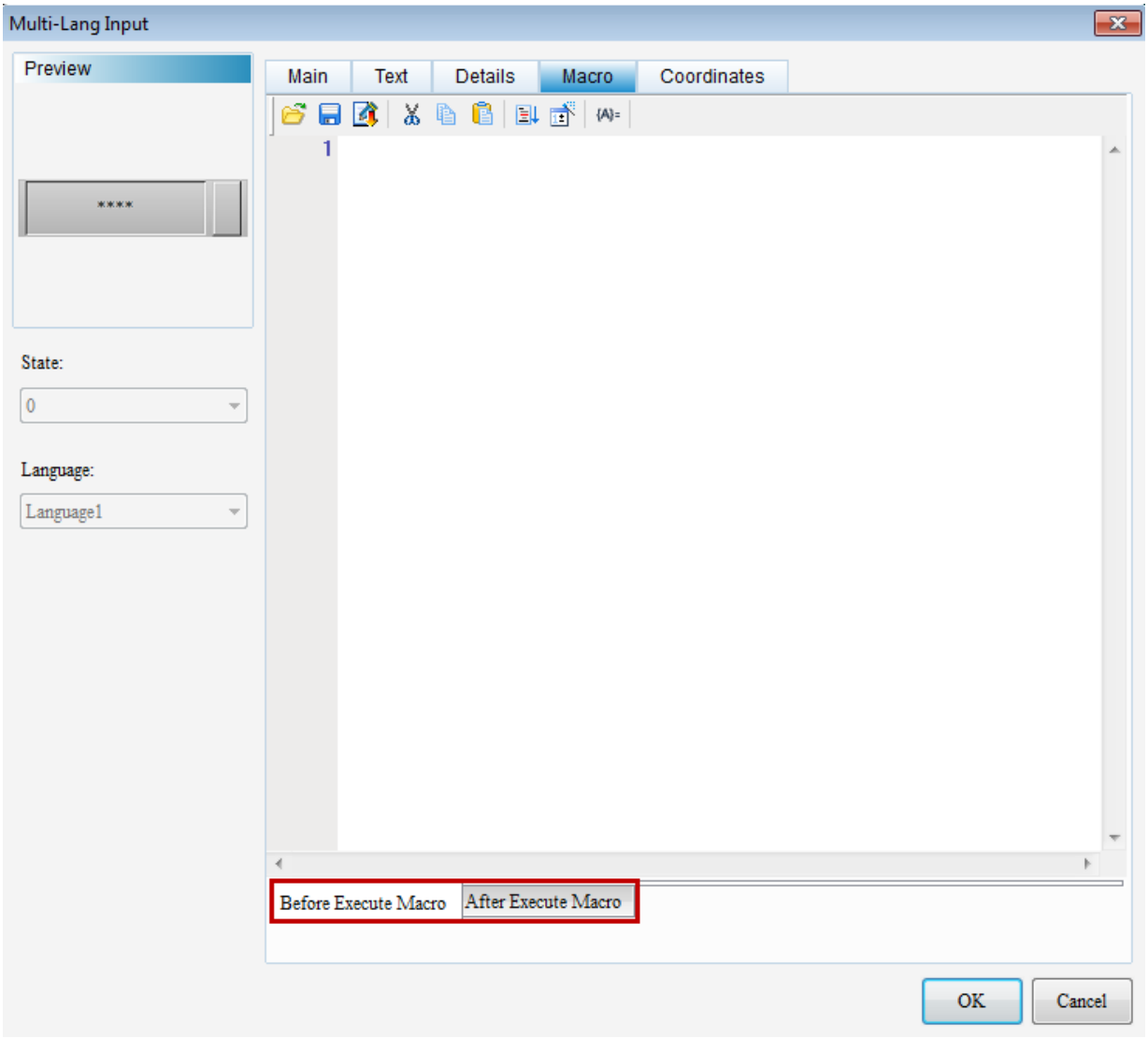
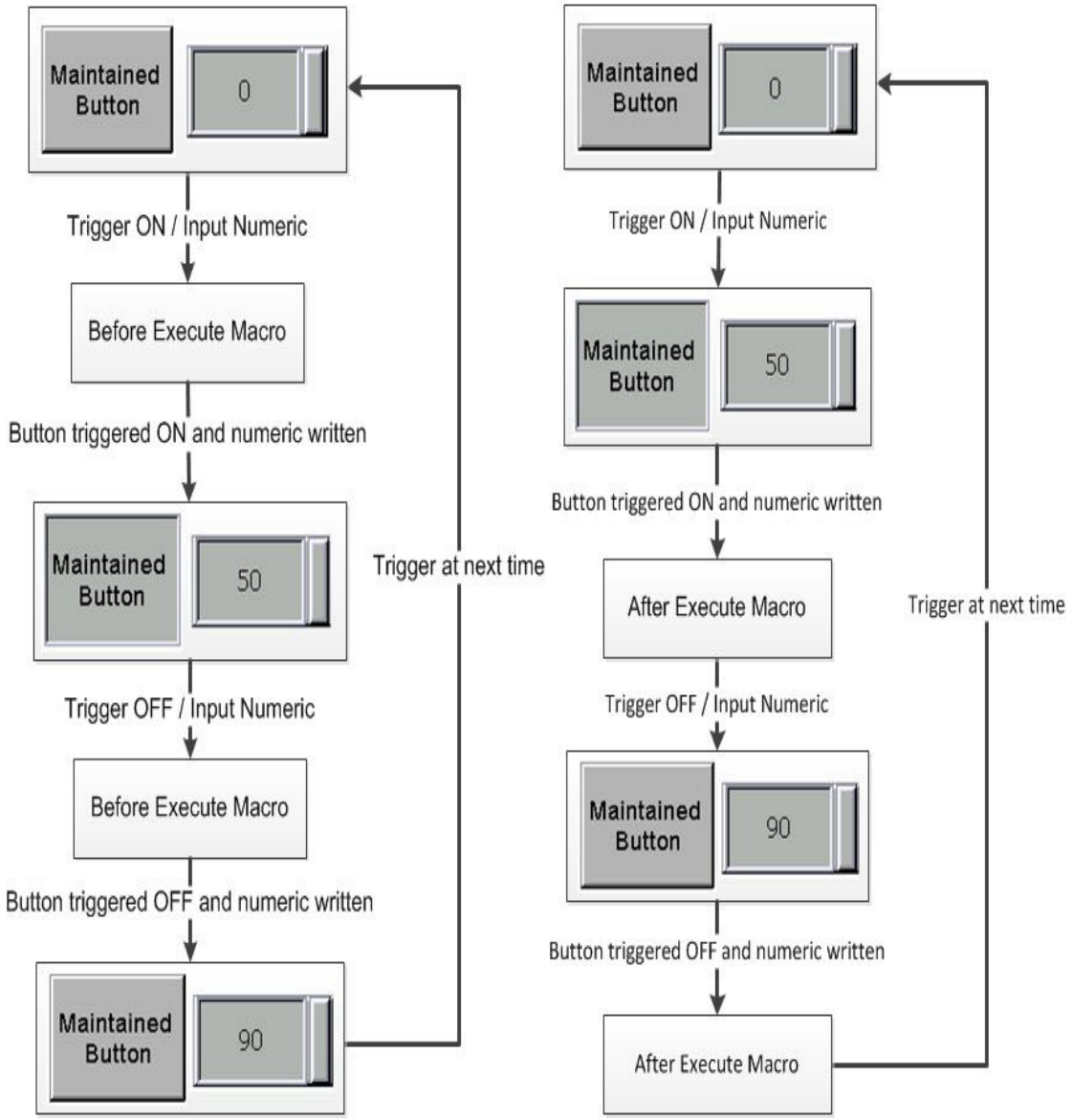


Figure 29-6-8 Multi-Lang Input Element Macro Properties Page

No.	Property	Function
(1)		➢ The running process of the Before Execute Macro and the After ExecuteMacro are shown as below: 
	Before Execute Macro	➢ When users touch the button element, the HMI will firstly run the commands in the macro and then execute the button action. If the button state is not changed by means of touching button (using external controller commands or other macros), HMI will not run the corresponding macro commands.
	After Execute Macro	➢ After users touch the button element, theHMI will firstyexecute the button action and then run the commands in the macro. If the button state is not changed by means of touching button (using external controller commands or other macros), HMI will not run the corresponding macro commands.

29-7 Auto Log Out

This function allows the HMI to automatically log out when no operation is conducted for a period of time.

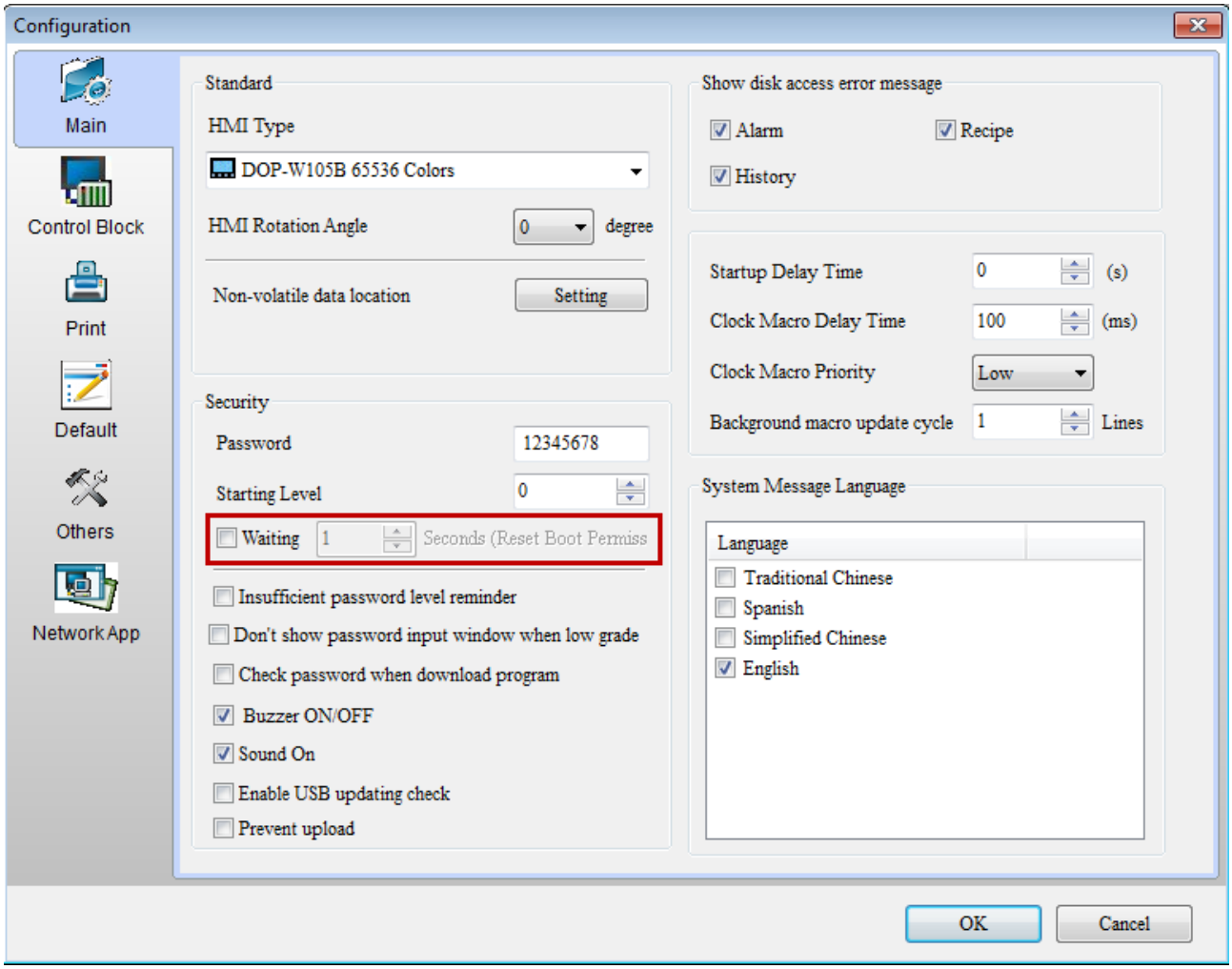
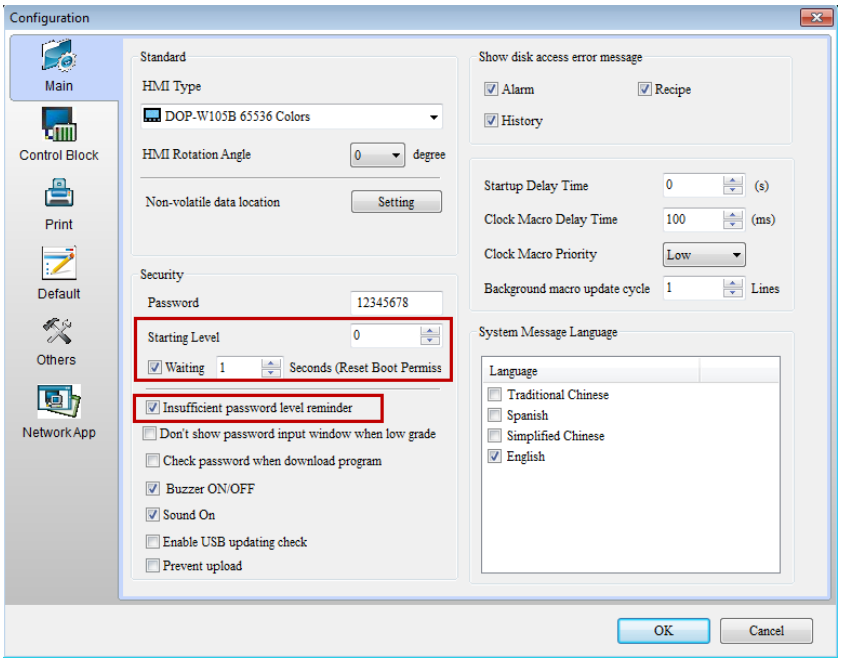
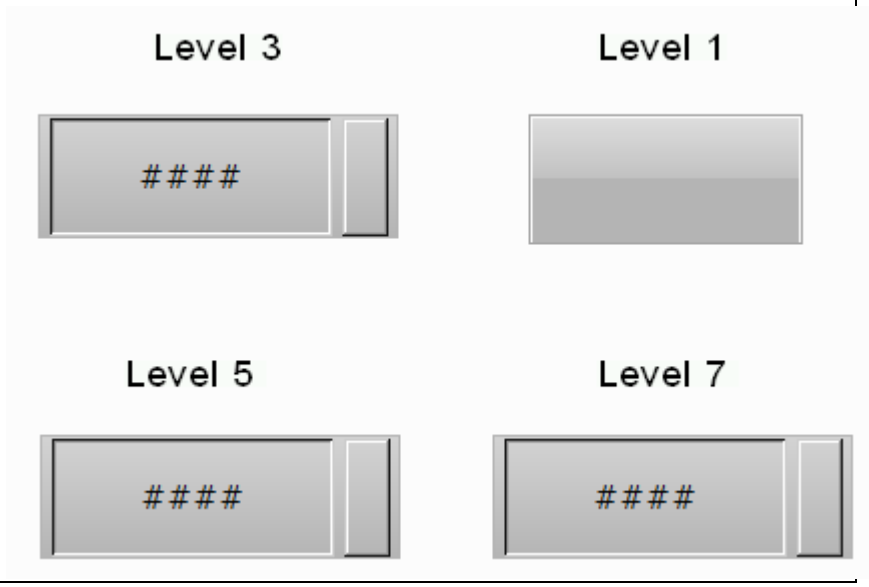
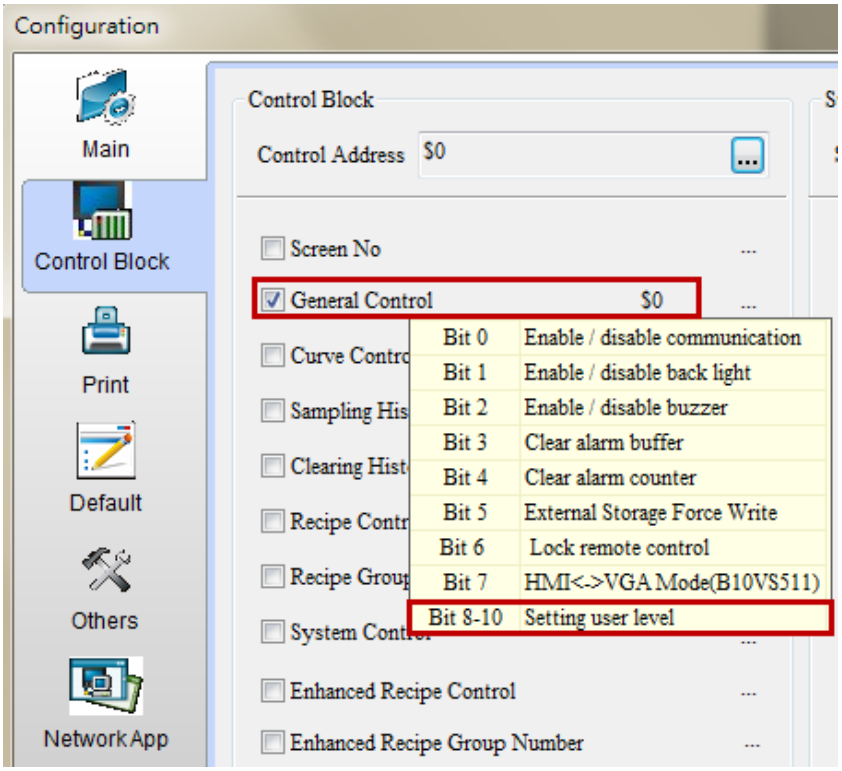
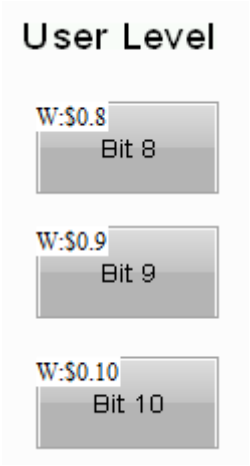
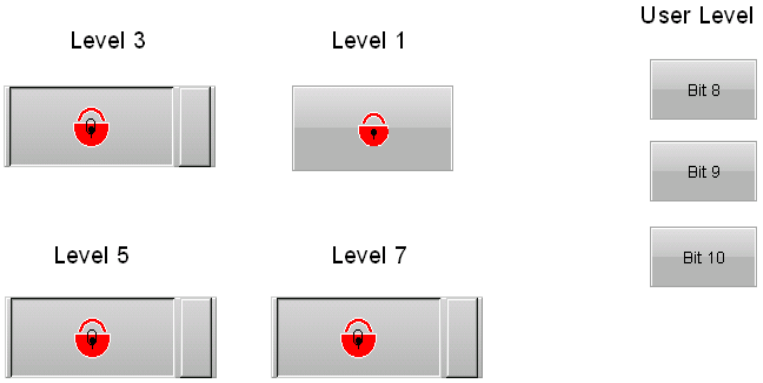
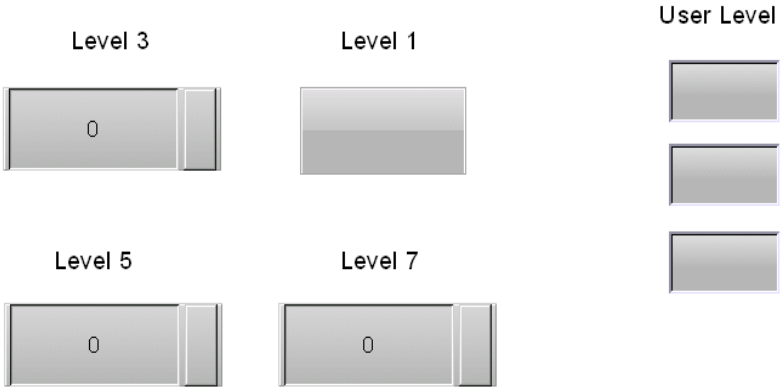
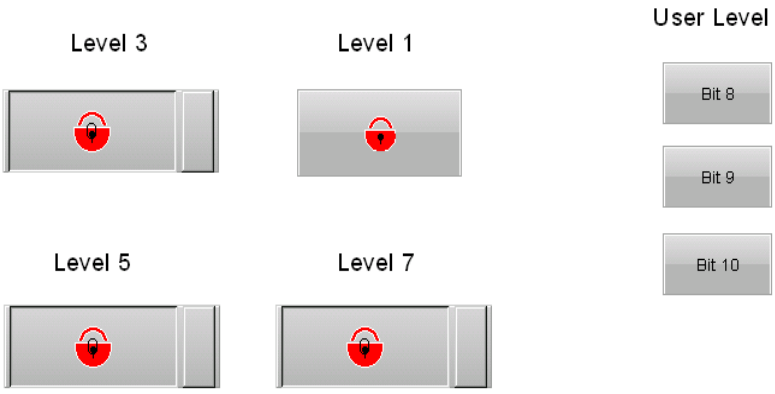


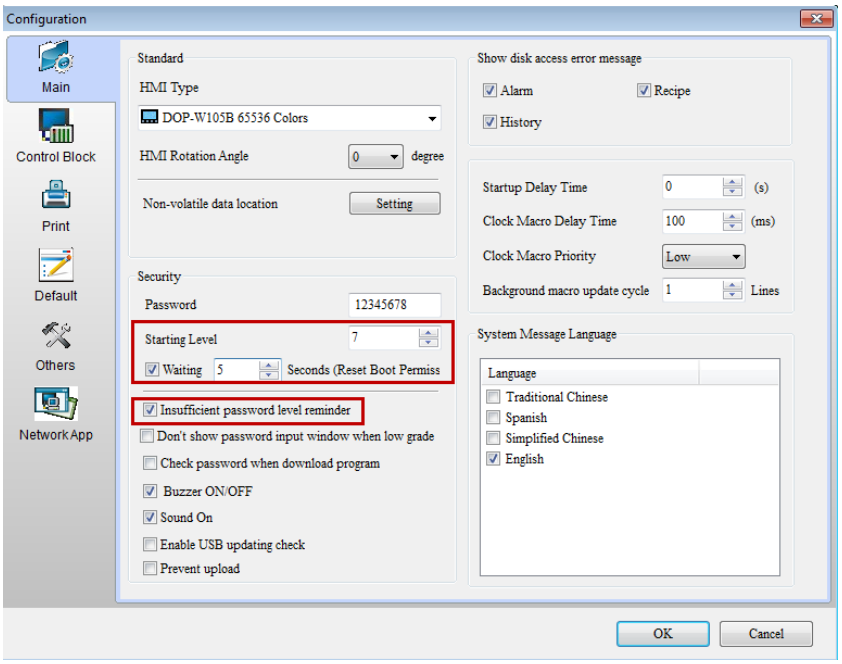
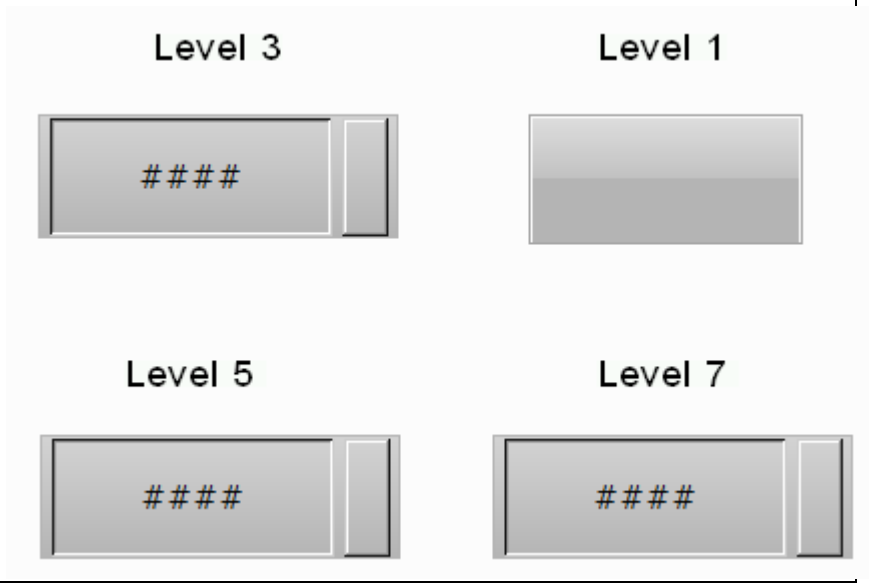
Figure 29-7-1 Auto Log Out

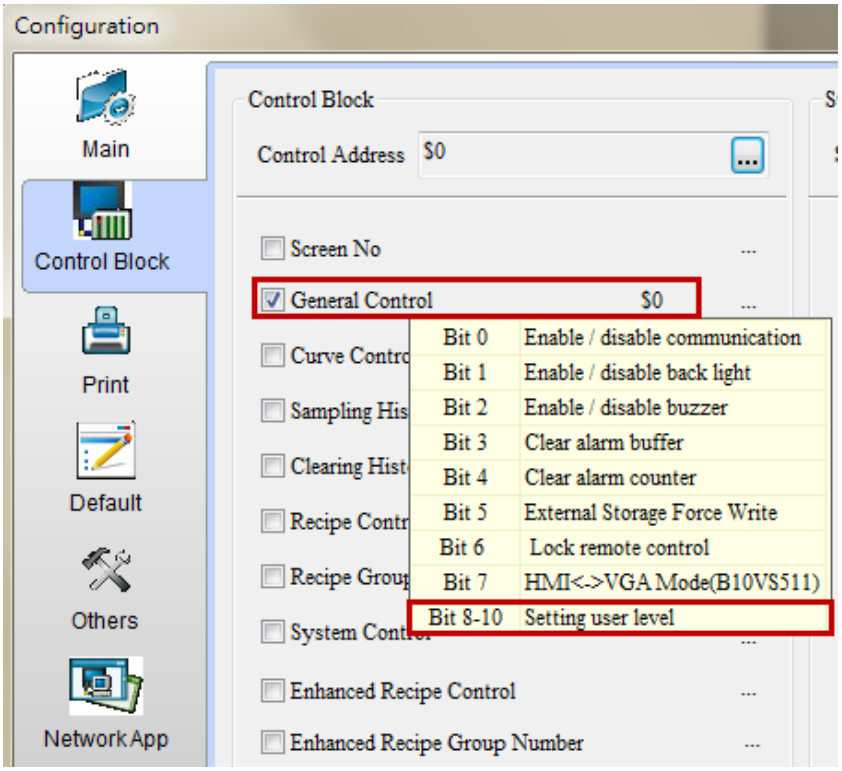
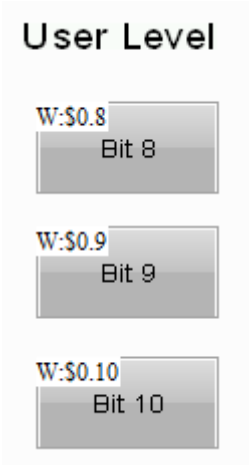
Please refer to Table 29-7-1 for the descriptions of auto log out

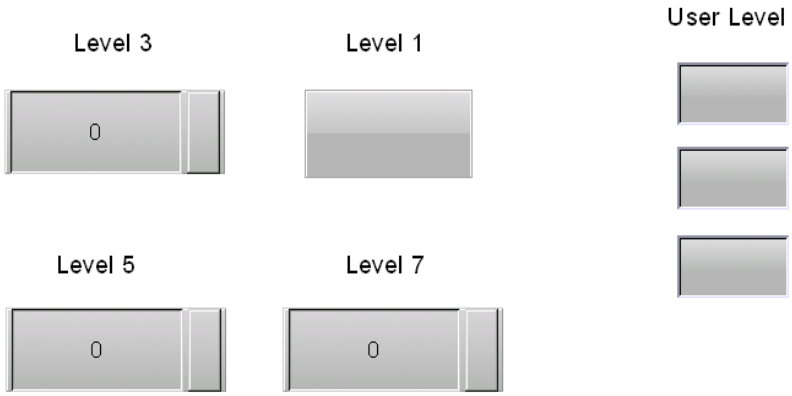
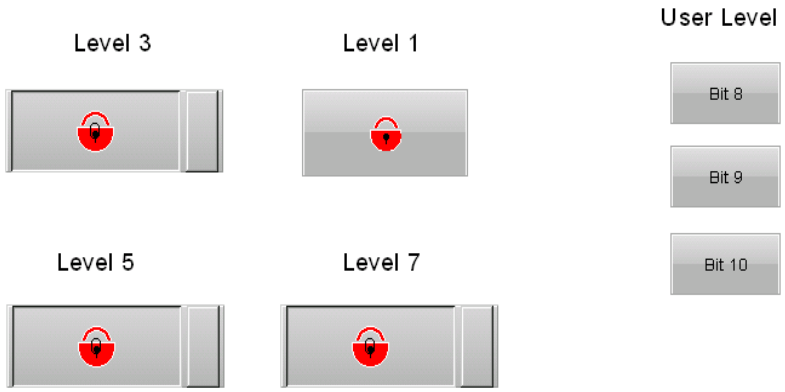
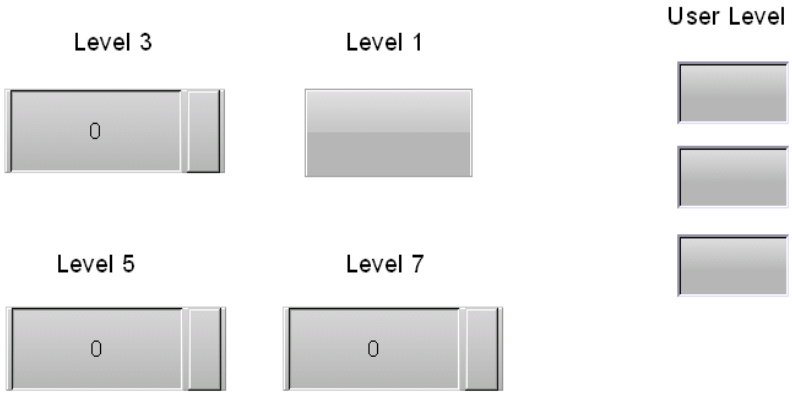
【User Level】is higher than【Starting Level】 Table 29-7-1 Descriptions of Auto Log Out		
Step1	Set the Security Level	➢ Go to [Options] → [Configuration] and set the starting level to 0. ➢ Check Waiting and set it to 1 (second) for reseting boot permission. ➢ Check [Insufficient password level reminder]. 
Step2	Set the Security Level as 1, 3, 5 and 7	➢ Create the numeric entry element and maintained button and set the secrutiy level as 1, 3, 5, and 7. 

Step3	Set the Control Block and Create the Maintained Button	➢ Go to [Options] → [Configuration] to set the start address of Control Block as $0. Then, check [General Control].  ➢ Create three maintained buttons and set the address as $0.8, $0.9 and $0.10 respectively. 

Step3	Result	➢ When the above setting is complete, please compile and download the screen to the HMI. ➢ Set the starting level to 0. All elements will show a lock icon meaning insufficient authority.  ➢ Please press Bit 8, Bit 9 and Bit 10 button. Then wait for one minute.  ➢ All elements will return to the starting level, 0. 

【User Level】is lower than【Starting Level】 Table 29-7-1 Description of Auto Log Out		
Step1	Set the Security Level	➢ Go to [Options] → [Configuration] and set the starting level to 5. ➢ Change [Waiting] and set it to 5 (seconds) for setting the time of returning to starting level. ➢ Check [Insufficient password level reminder]. 
Step2	Set the Security Level as 1, 3, 5 and 7	➢ Create the numeric entry element and maintained button and set the security level as 1, 3, 5, and 7. 

Step3	Set the Control Block and Create the Maintained Button	➢ Go to [Options] → [Configuration] to set the start address of Control Block as $0. Then, check [General Control].  ➢ Create three maintained buttons and set the address as $0.8, $0.9 and $0.10 respectively. 

Step3	Result	➢ When the above setting is complete, please compile and download the screen to the HMI. ➢ Set the starting level to 7. No lock icon will show meaning you have the authority to use all functions.  ➢ Please press Bit 8, Bit 9 and Bit 10 button. Then wait for five minutes.  ➢ All elements will return to the default user level, 7. 

29-8 Custom Keypad

Only DOP-W series of HMIs support the function of custom keypad. If you wish to create custom keypad element on DOP-B series HMIs, the following message will pop up.

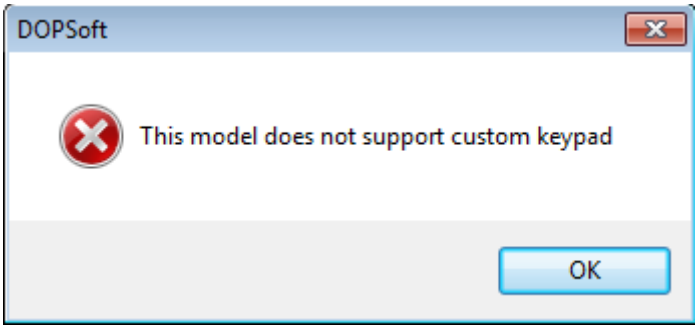


Figure 29-8-1 DOP-B does not support the custom keypad

The custom keypad has to be built by dragging the element from Element Tool. Please right click the mouse on the place highlighted in the following figure to make sure the element tool is checked.

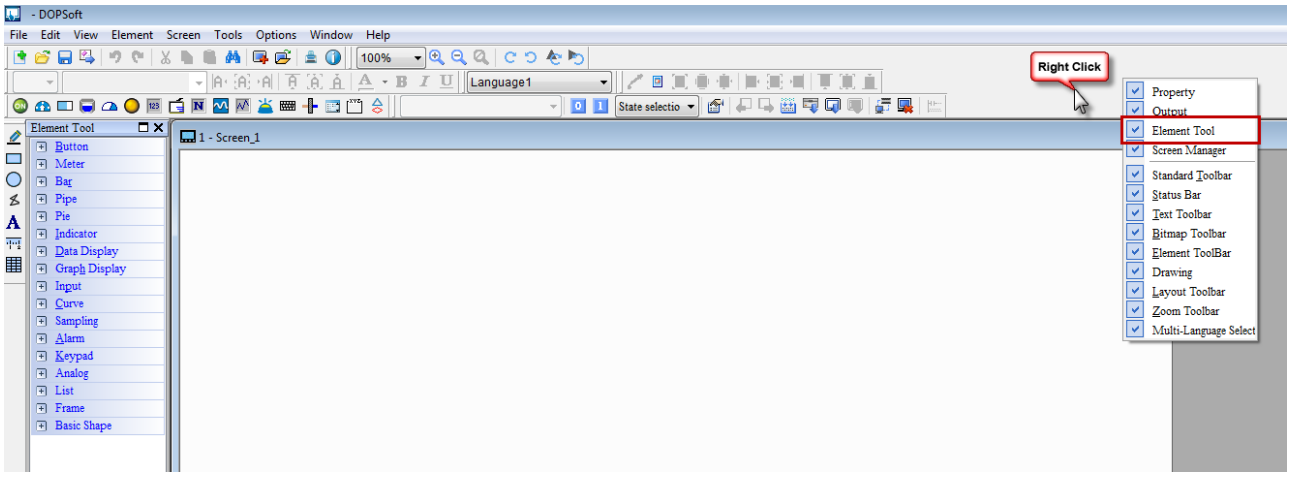


Figure 29-8-2 How to enter the window of element tool

Please click [Element tool] → [Keypad-Templet] and you will see 16 types of keypad provided by the software.

- ☞ KP (1): Decimal keypad (Two kinds in total and two different sizes for each kind <Big/Small>)
- ☞ KP (2): Hexadecimal keypad (Two kinds in total and two different sizes for each kind <Big/Small>)
- ☞ KP (3): ASCII keypad (Two kinds in total and two different sizes for each kind <Big/Small>)
- ☞ EASCII: Extended ASCII (One kind and two different sizes<Big/Small>)
- ☞ KP_Swedish: Swedish keypad (One kind and two different sizes<Big/Small>)

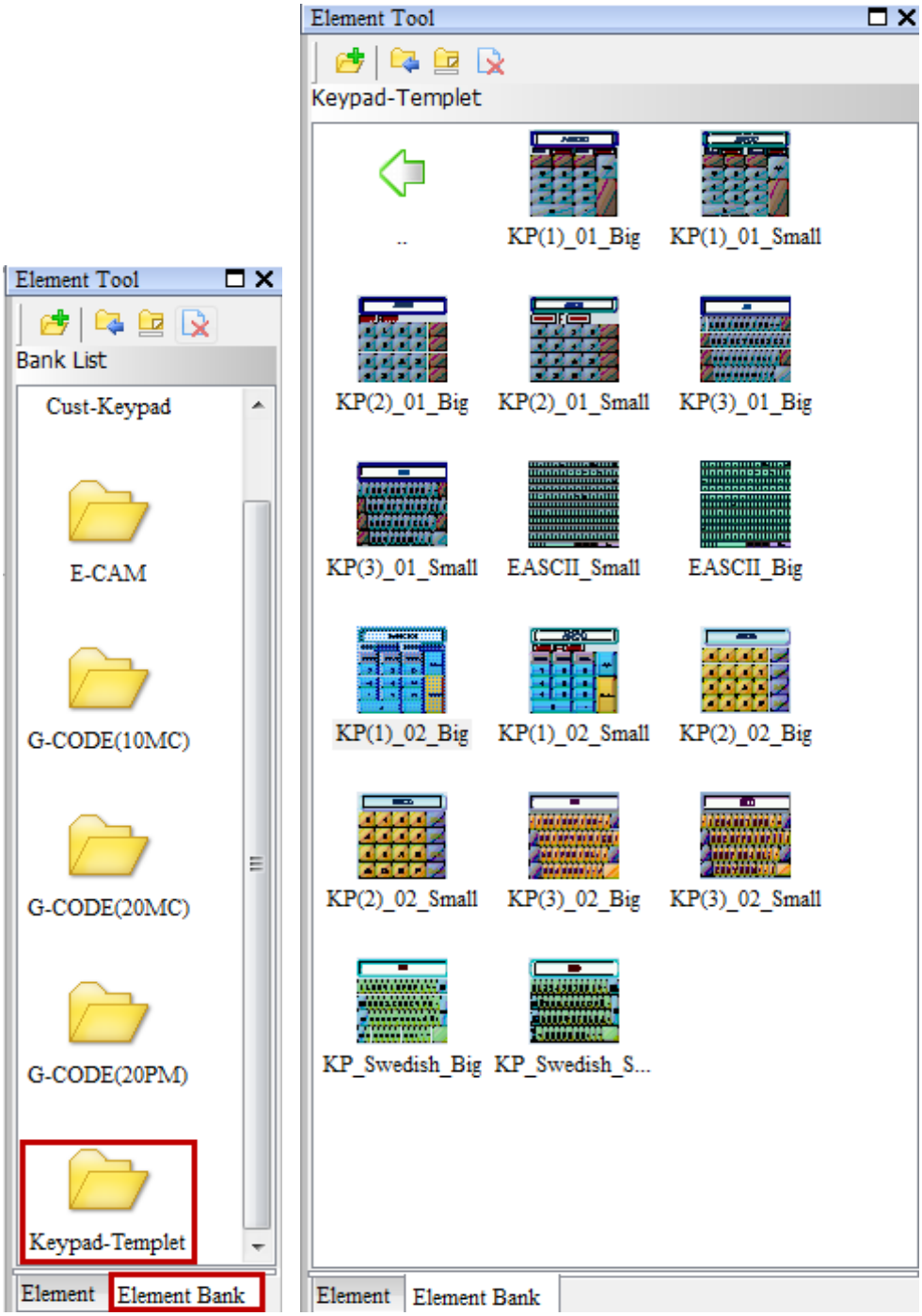


Figure 29-8-3 Element Bank

When enabling this function, if you drag any of the keypads when the keypad element has not been completely downloaded, the following message will pop up.

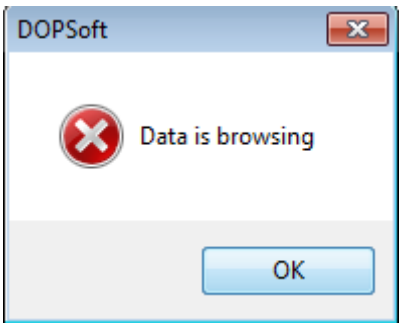


Figure 29-8-4 Download the keypad element

The software provides a complete keypad style. Users also can select the customized keypad which is in [Cust-Keypad].

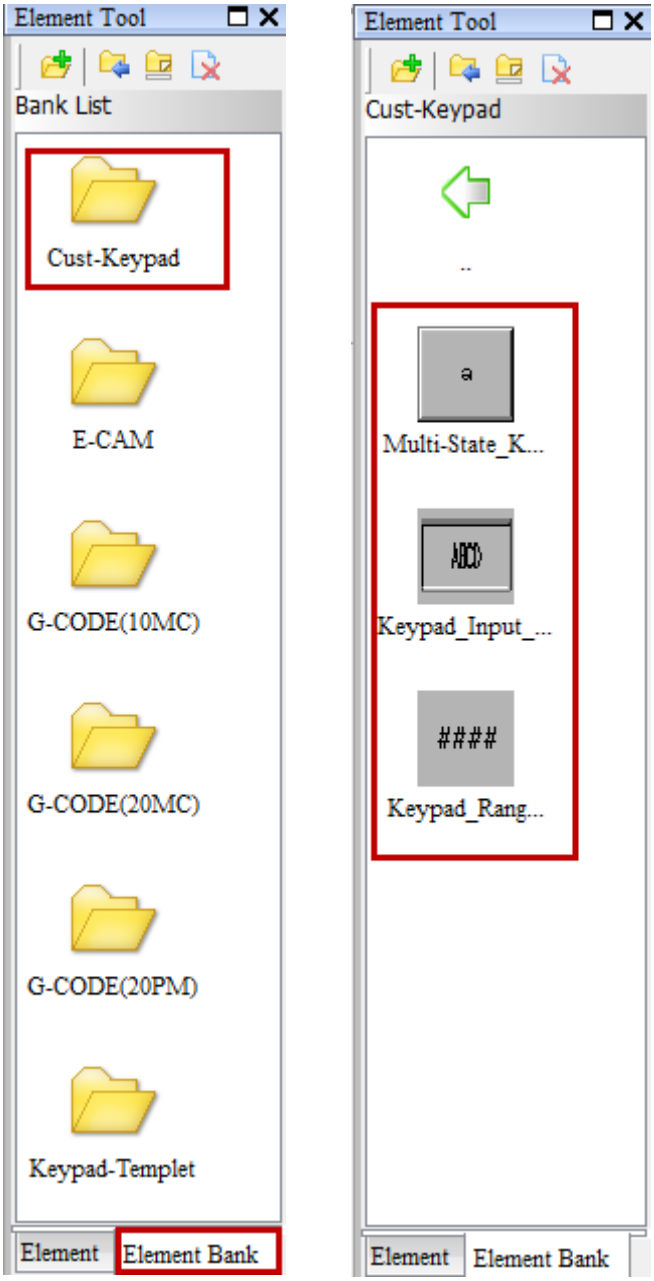


Figure 29-8-5 Cust-Keypad element

With the cust-keypad element, users can replace one provided by the software. Ungroup the keypad element and drag the element from cust-keypad to the keypad. See the figure below.

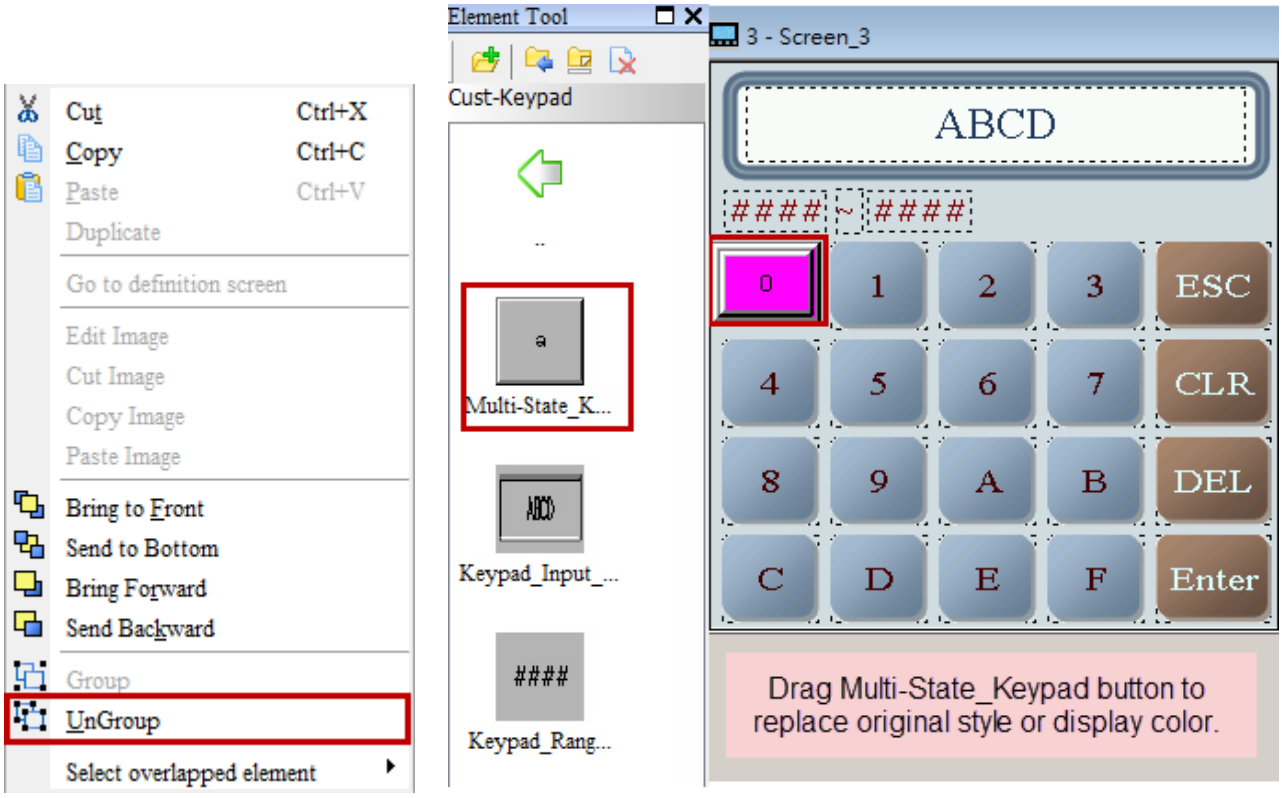


Figure 29-8-6 Replace by the cust-keypad element

29-8-1 Create Keypad Screen

When creating the cust-keypad in element bank, the screen has to be [Keypad Screen] so that users can apply the cust-keypad function. Otherwise, users will be unable to create the customized keypad element in main or sub screen when the cust-keypad function is applied by global keypad setting, numeric entry element, character entry element, Barcode entry element or any setting button.
To create the keypad screen:

→ If you wish to add a new screen, please select [Keypad Screen] for the Screen Type.

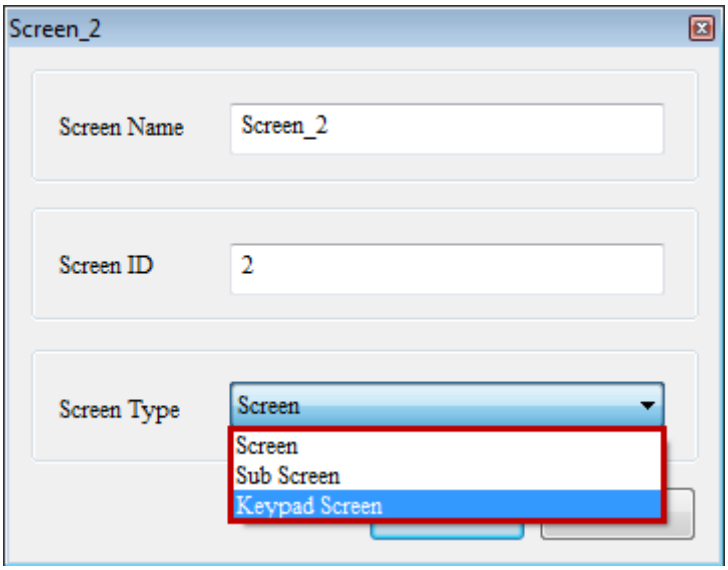


Figure 29-8-7 Create the keypad screen

→ Double click the screen to enter Screen Properties and change the screen to [Keypad Screen].

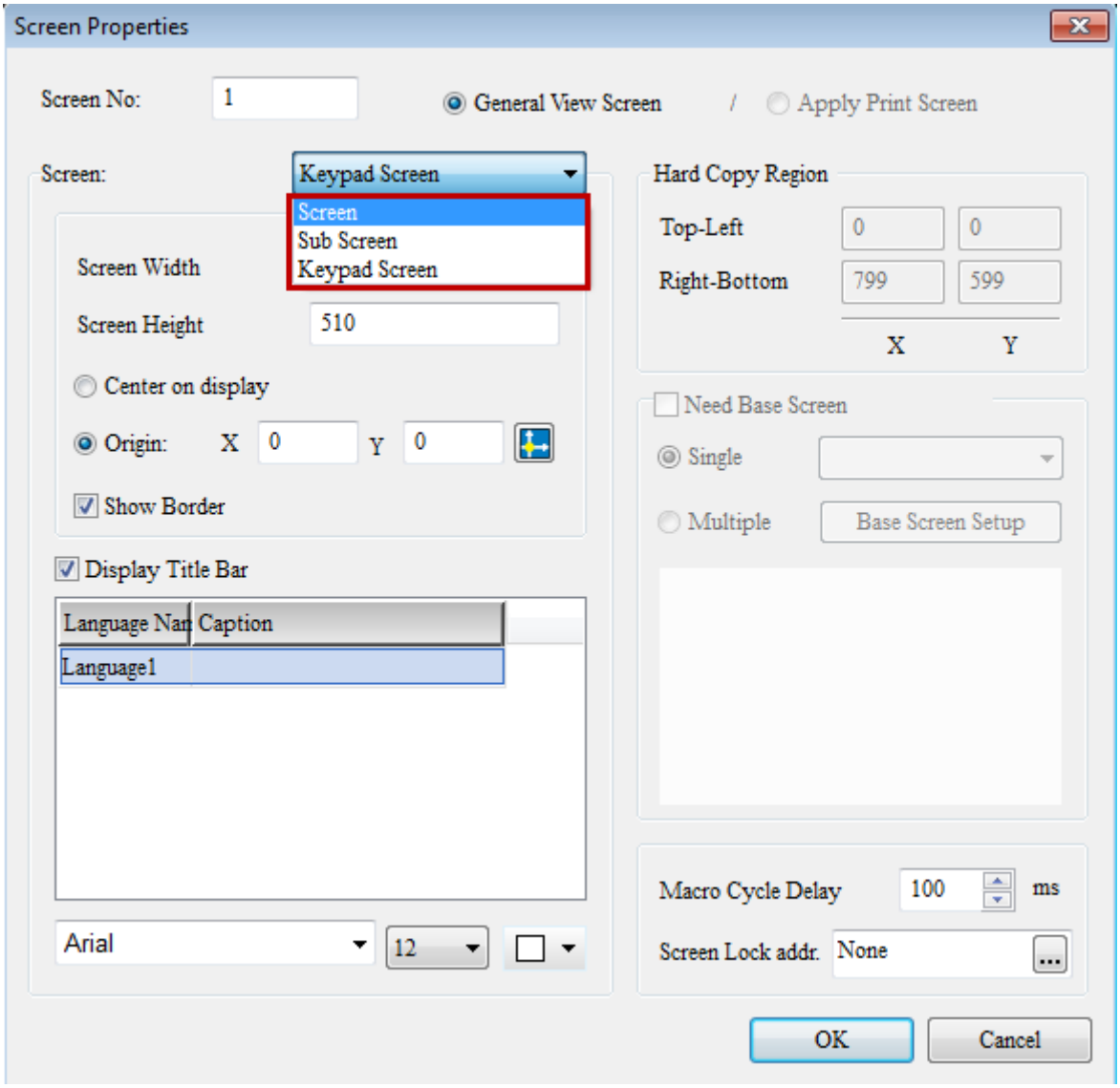


Figure 29-8-8 Screen Properties

The custom keypad can work with global keypad setting. Firstly, users need to set the screen as Keypad Screen. Then, create the keypad style and apply the keypad style to all keypad elements. Please refer to CH02 2-2-8-9 Global keypad setting for further information.

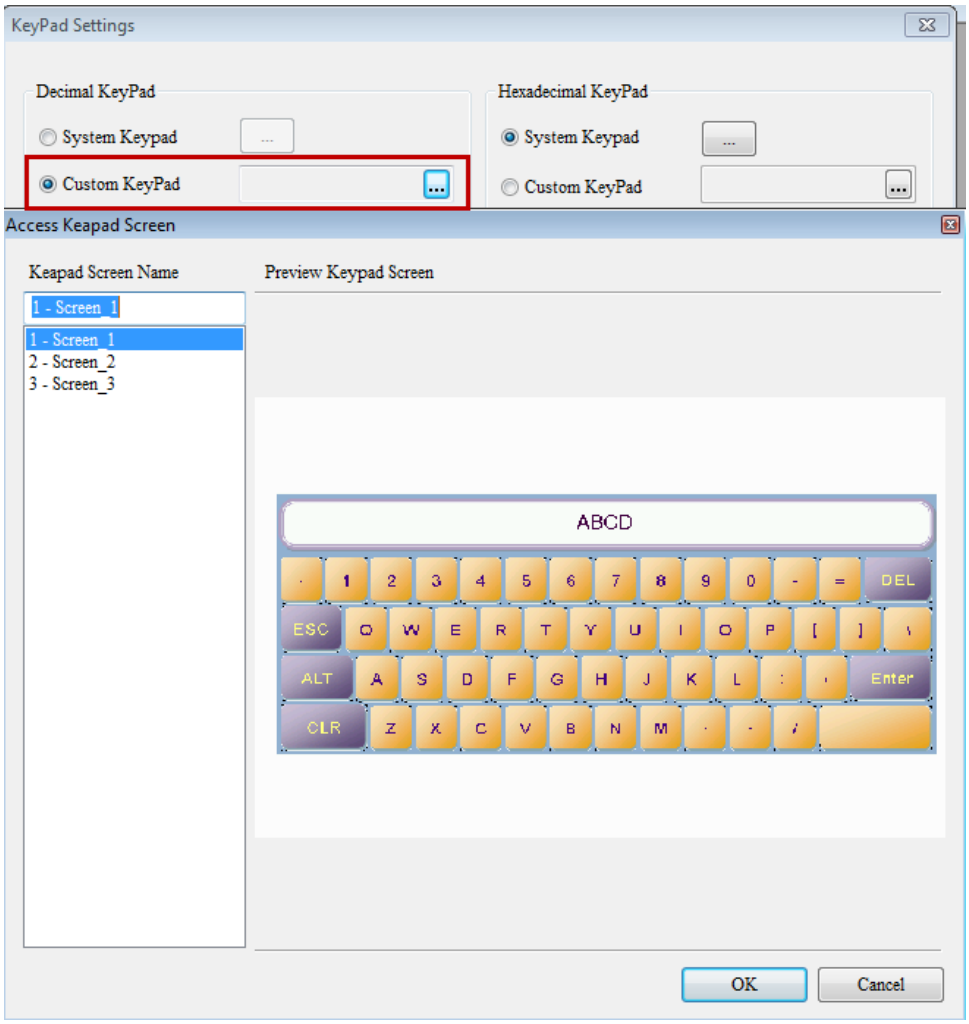
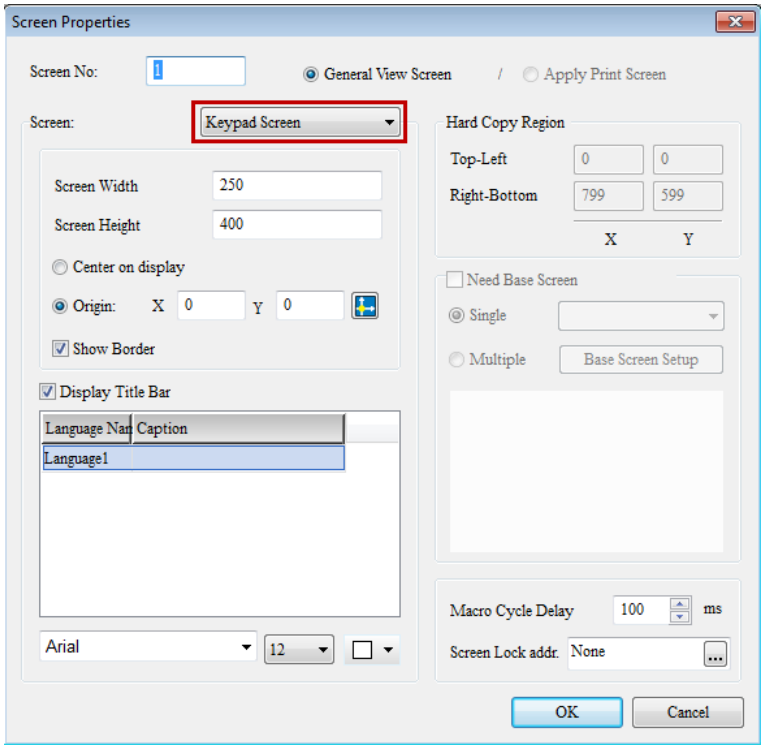


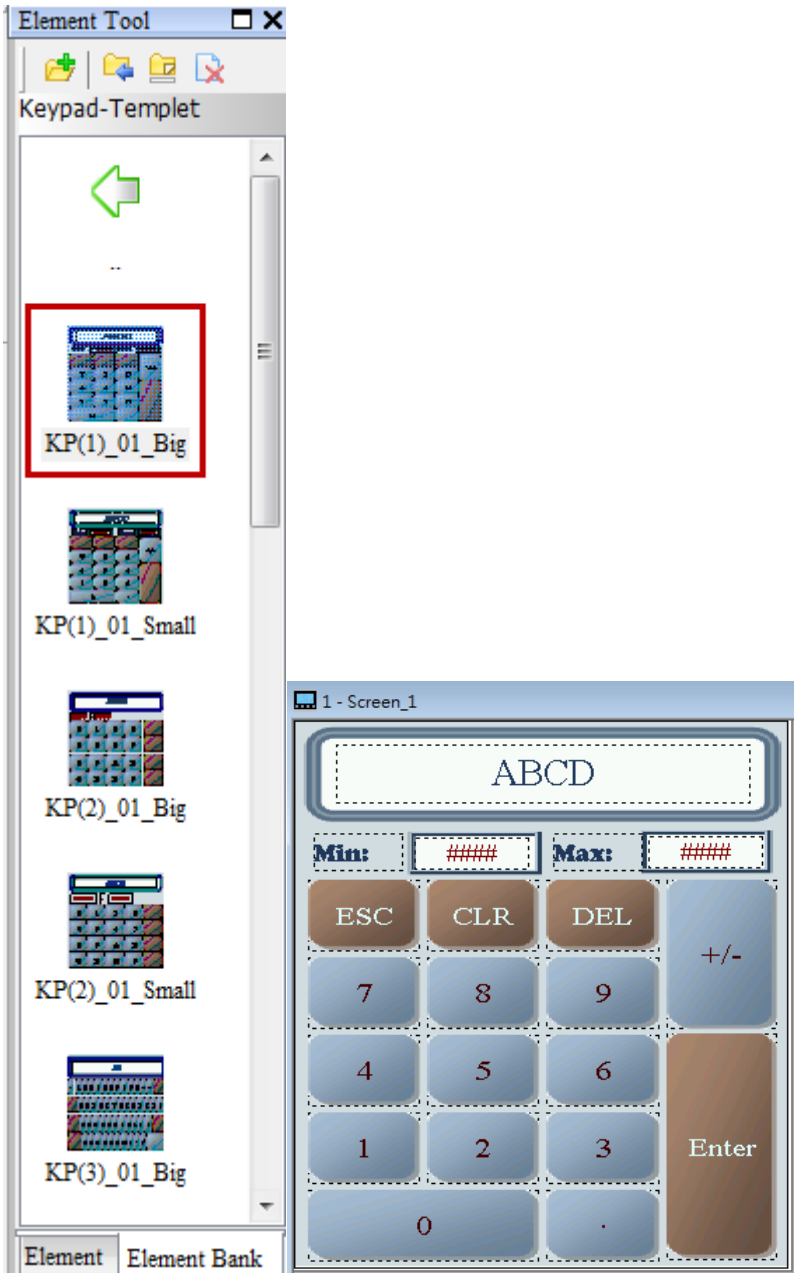
Figure 29-8-9 Custom Keypad

NOTE:

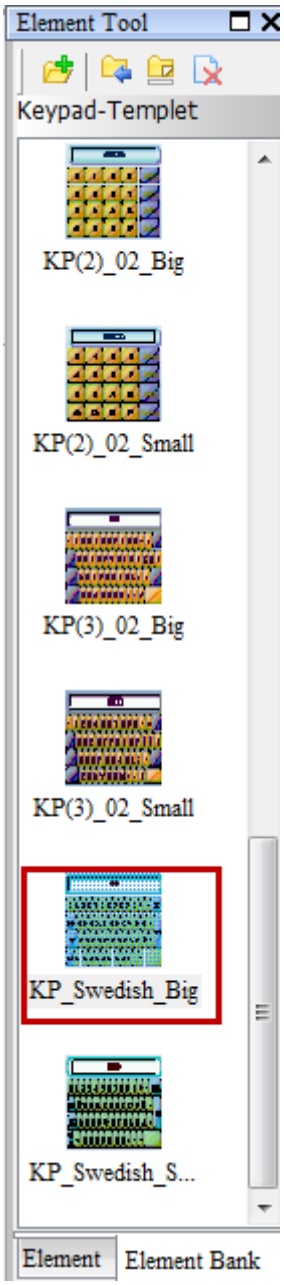
- ✓ Only DOP-W series HMIs support the function of Keypad Screen.
- ✓ The keypad screen cannot be set as the default boot screen.
- ✓ Users can create more than one keypad elements in keypad screen.
- ✓ Once the keypad screen is deleted, it cannot be recovered.
- ✓ This function supports offline and online simulation.

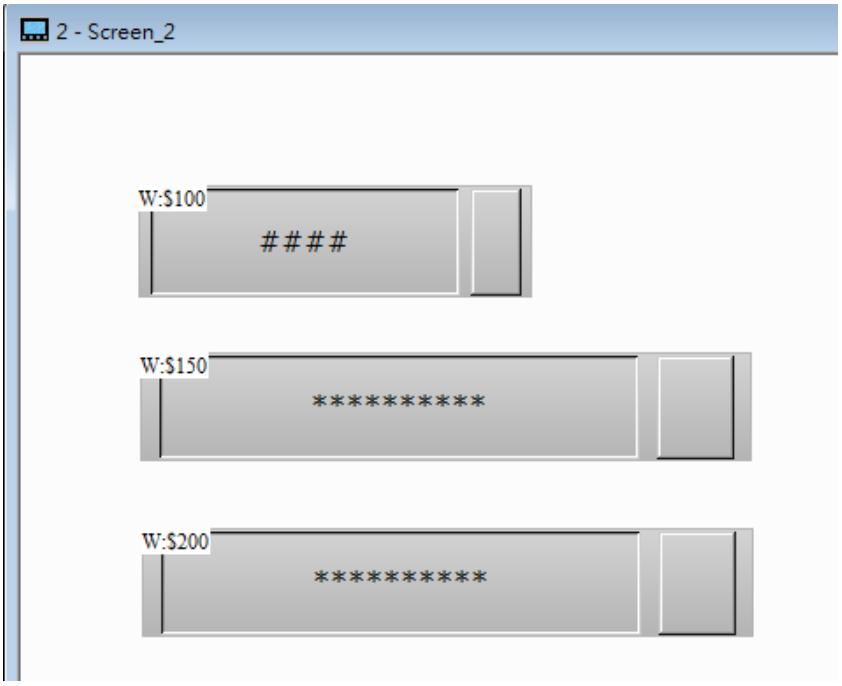
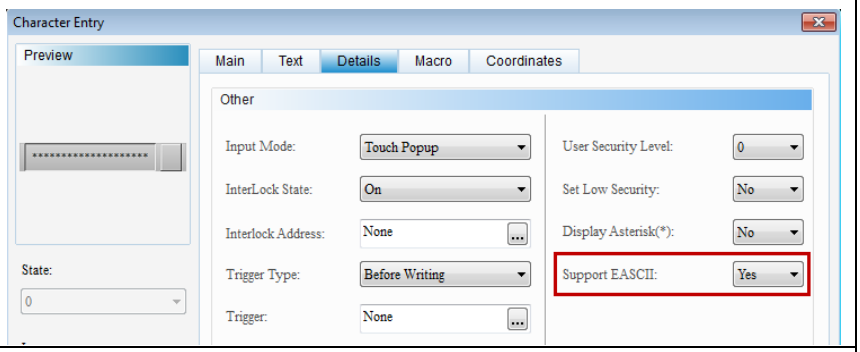
Following is the example of custom keypad.

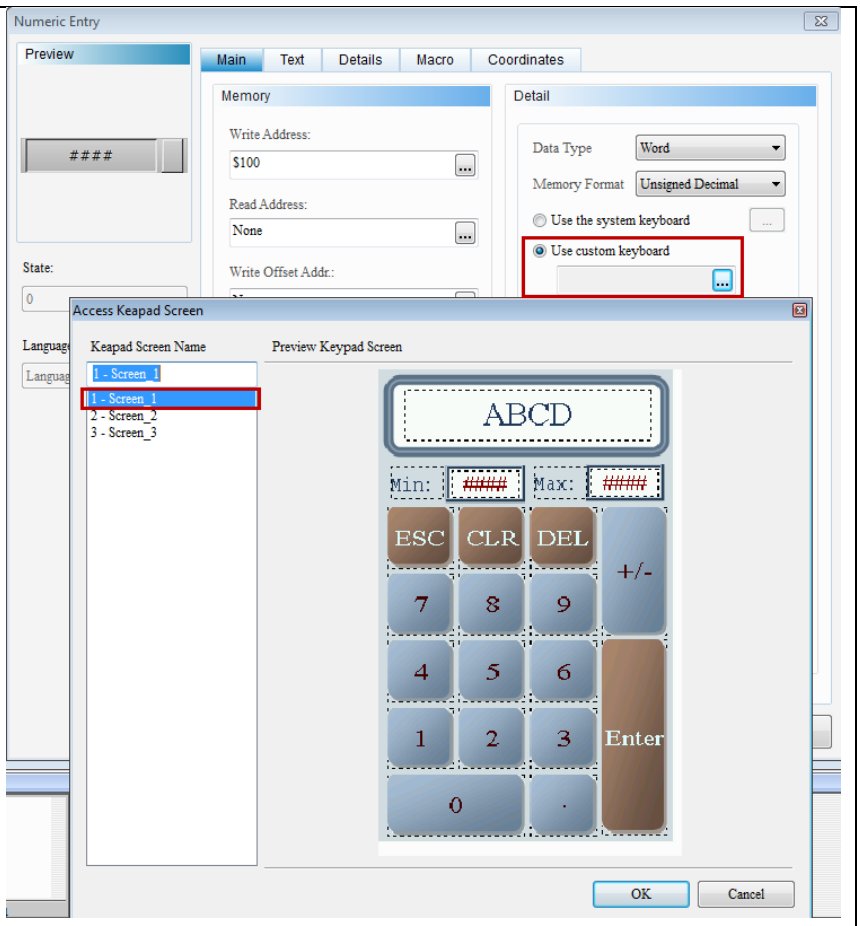
Custom Keypad 《Table 29-8-1 Custom Keypad》		
Step1	Set the Keypad Screen and Create the Keypad Element	➢ Create three screens, one is main screen and the other two are keypad screens.  ➢ Go to [Keypad-Templet] of Element Tool. Select KP (1)_01.Big as the keypad style and create it on the first keypad screen.



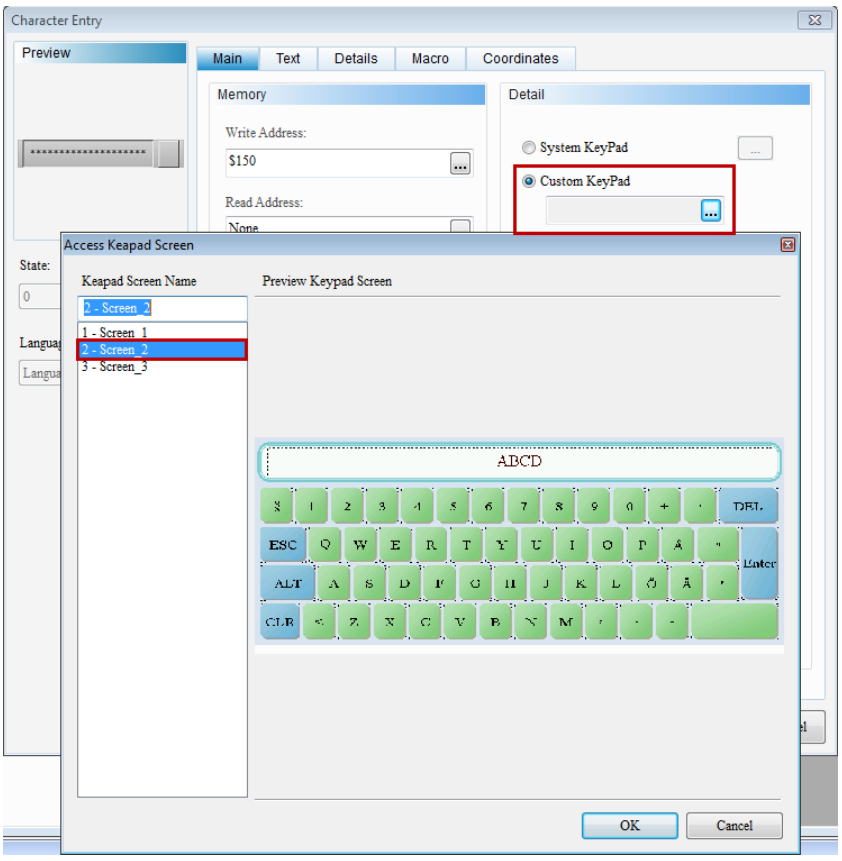
➢ Go to [Keypad-Templet] of Element Tool. Select KP_Swedish.Big as the keypad style and create it on the second keypad screen.

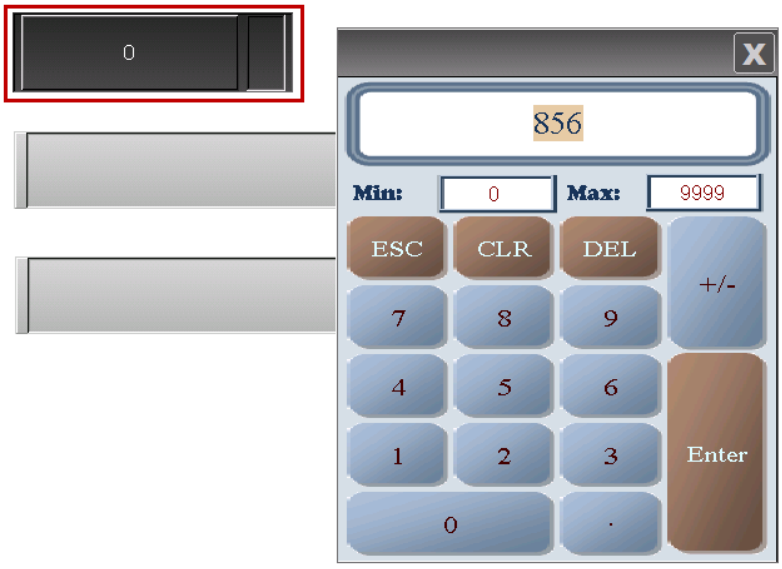
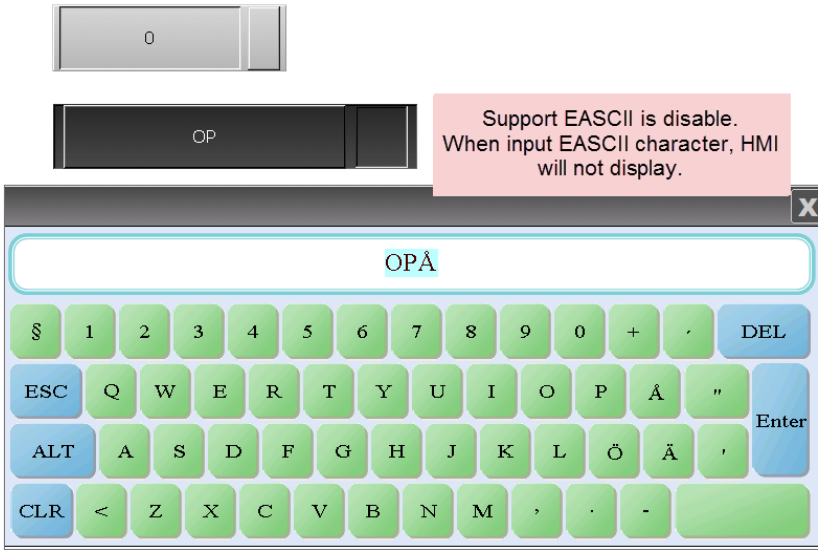
		
Step2	Set the main screen and create the numeric and character entry	➢ Create one numeric entry element and two character entry elements on the main screen. Then, set the address of numeric entry element as $100 and two character entry elements as $150 and $200 respectively and the string length is 10.

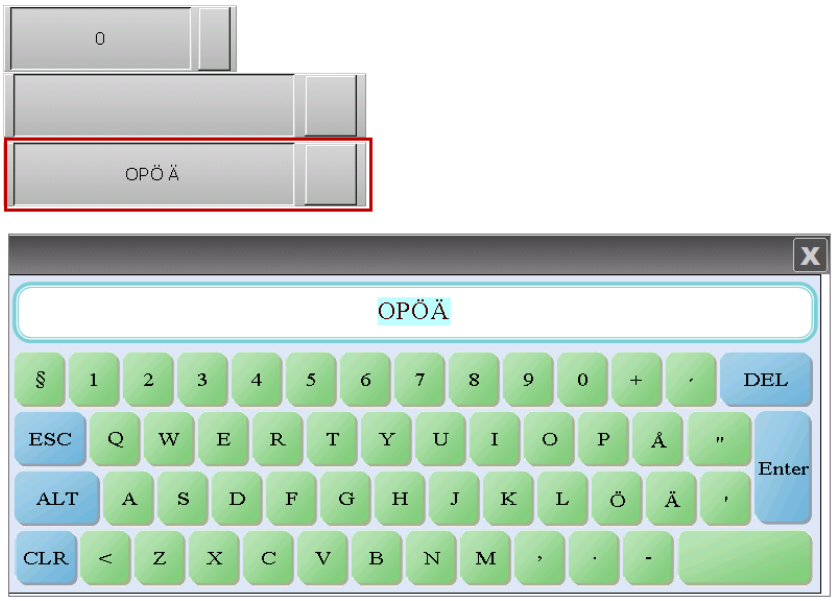
	element.	 ➢ Set the Support EASCII of $200 character entry element to YES. 
Step3	Use custom keypad	➢ The character entry element with address of $100 uses the custom keypad. And select Screen 1 as the keypad screen.



➢ The character entry elements with address of $150 and $200 use the custom keypad. And select Screen 3 as the keypad screen.



Step4	Result	➢ When the above setting is complete, please compile and download the screen to the HMI. ➢ When users press the numeric entry element with address of $100, the pop-up keypad will be the customized one.  ➢ Since the Support EASCII setting of this element is NO, when users press the character entry element with the address of $150, users will be unable to enter any EASII characters.  ➢ Since the Support EASCII setting of this element is YES, when users press the character entry element with the address of $200, it will appear EASII characters meaning the setting is supported.

		 0 OPÖ Ä OPÖÄ § 1 2 3 4 5 6 7 8 9 0 + ´ DEL ESC Q W E R T Y U I O P Å ¨ Enter ALT A S D F G H J K L Ö Ä ' CLR < Z X C V B N M , . -

29-8-2 Delete Keypad Screen

To delete the keypad screen, you have to consider if the keypad screen is referable by the element.

The software provides three ways enable users to delete the keypad screen.

☞ Go to [Screen] on the toolbar → [Delete Screen].

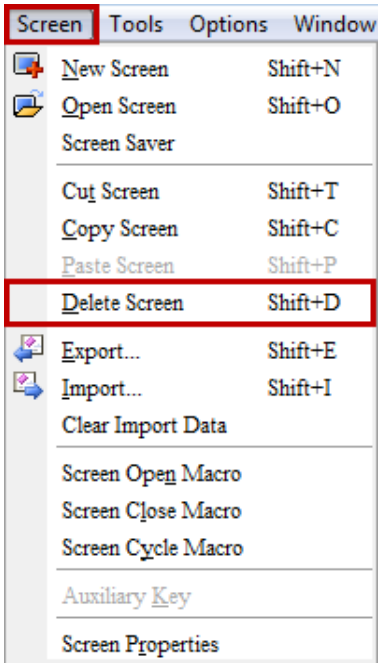


Figure 29-8-10 Delete Screen

☞ Select the screen that you wish to delete from [Screen Manager] and right click the mouse to delete.

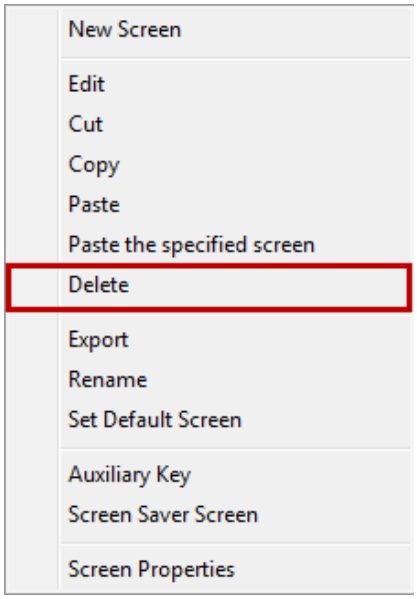


Figure 29-8-11 Delete Screen

☞ Change the screen to Screen or Sub Screen todelete the keypad screen.

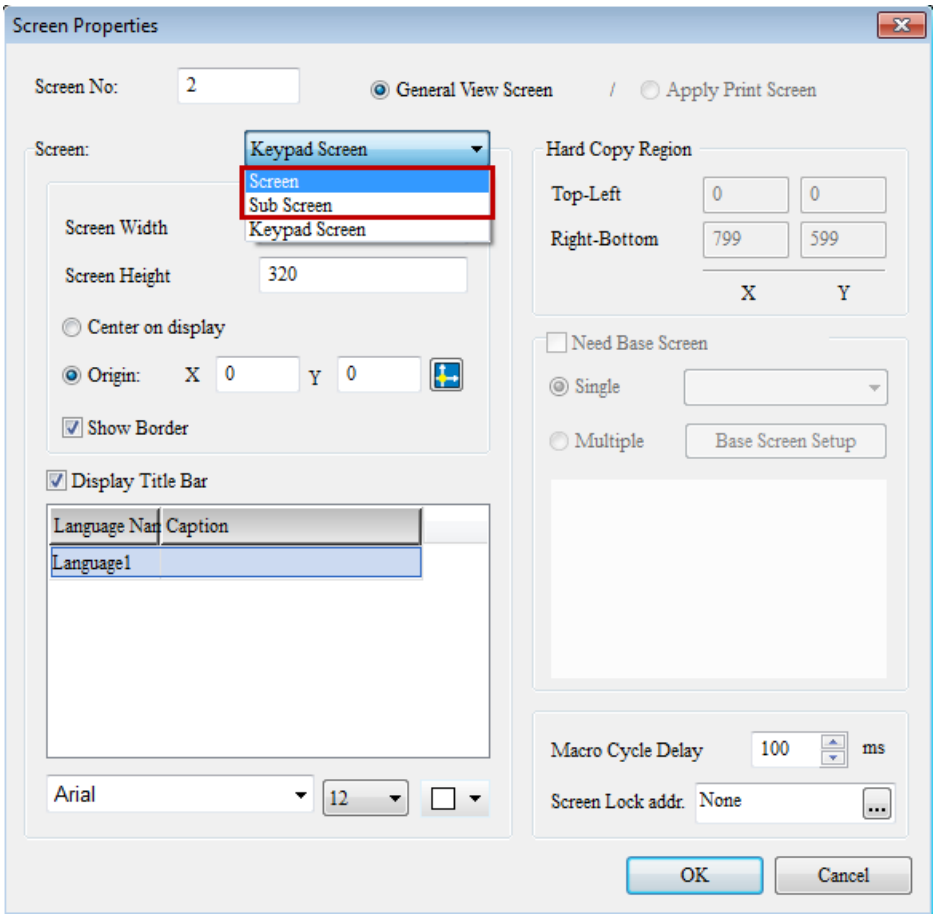


Figure 29-8-12 Delete Screen

29-8-2-1 Keypad Screen reference by element

When the created keypad screen is usedby global keypad setting, numeric entry, character entry element, Barcode entry element or the custom keypad, regardless the way you used to delete the keypad screen, the following message will pop as a reminder.

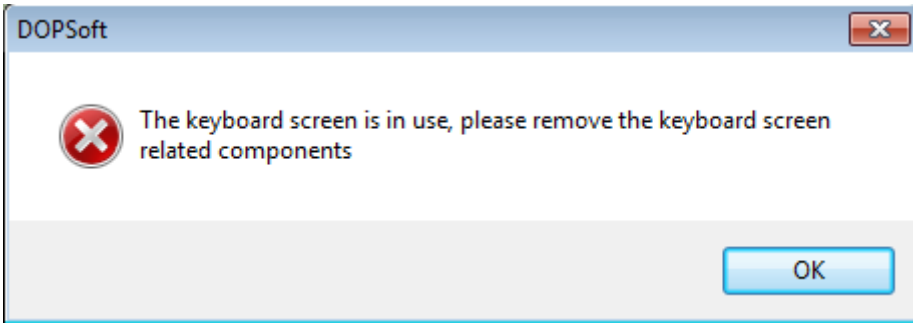


Figure 29-8-13 The keypad screen is in use

Click on OK, the screen will show the keypad lists for users to change.

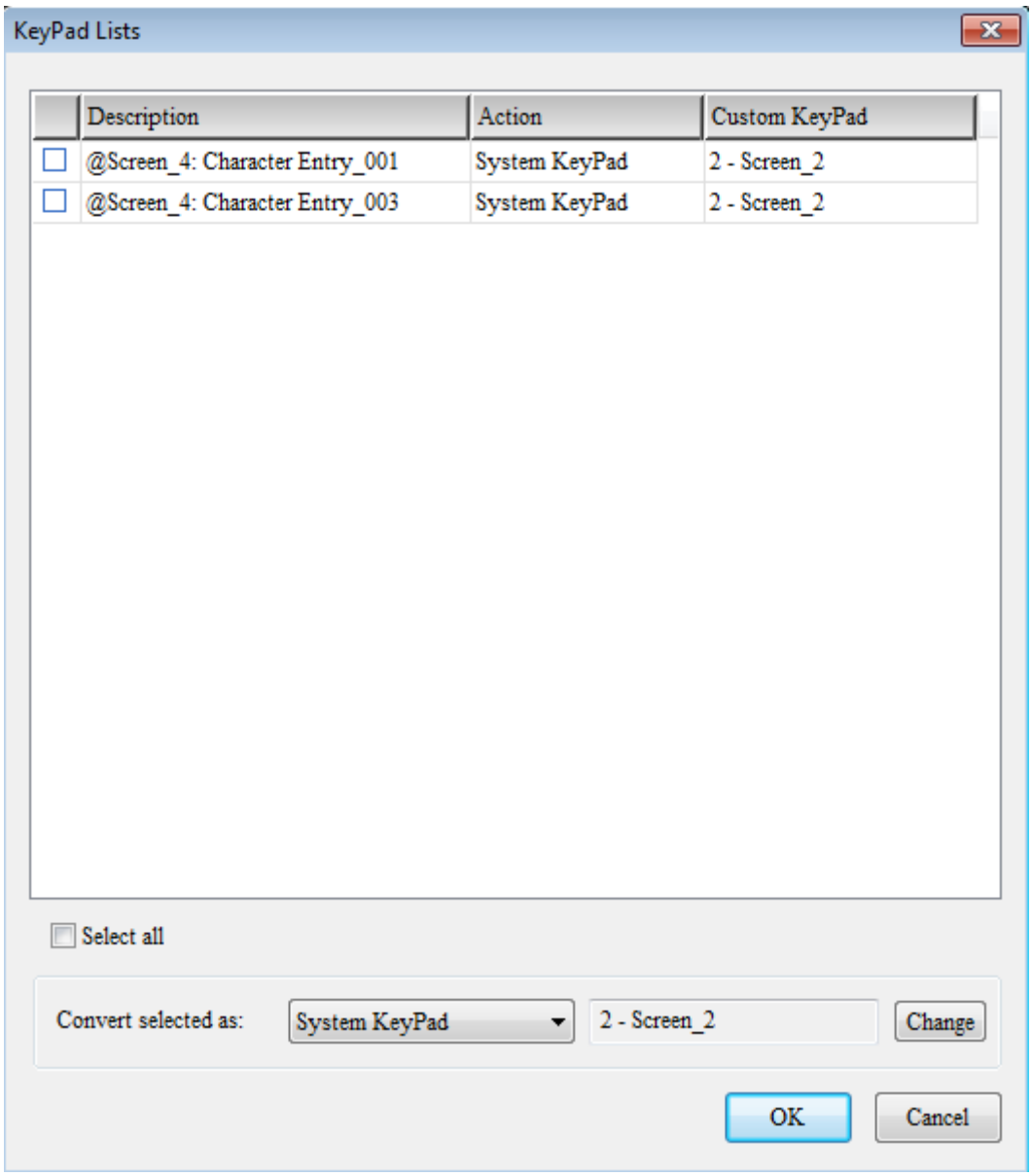
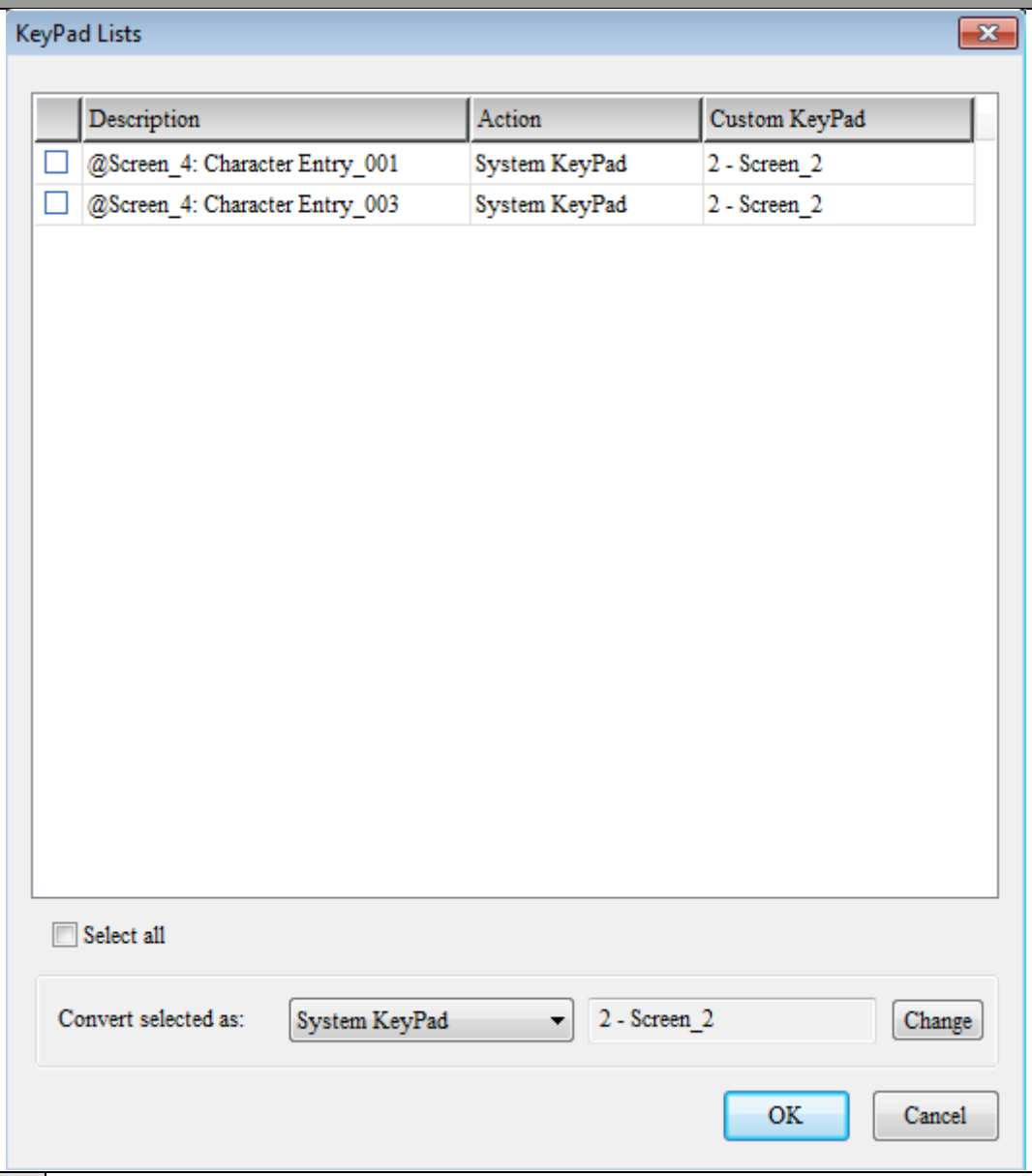


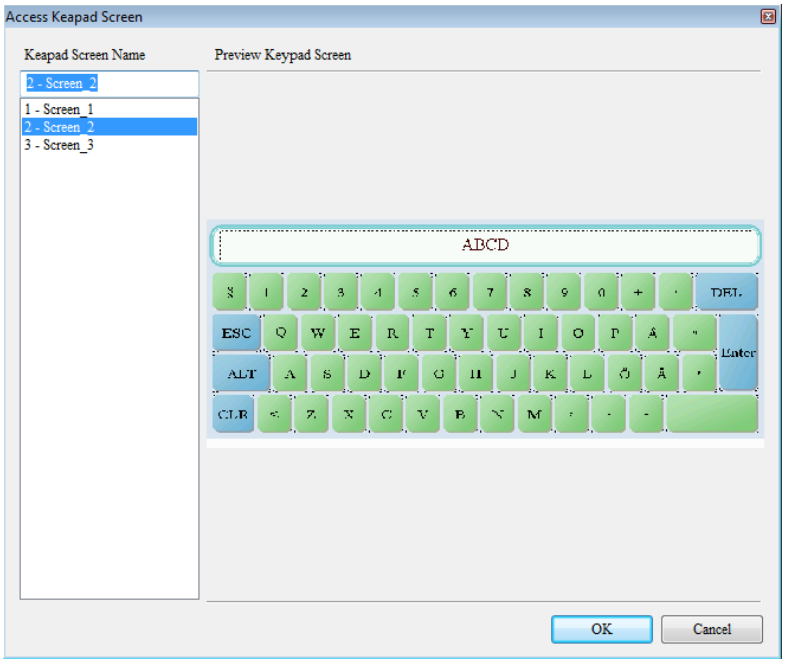
Figure 29-8-14 Keypad Lists

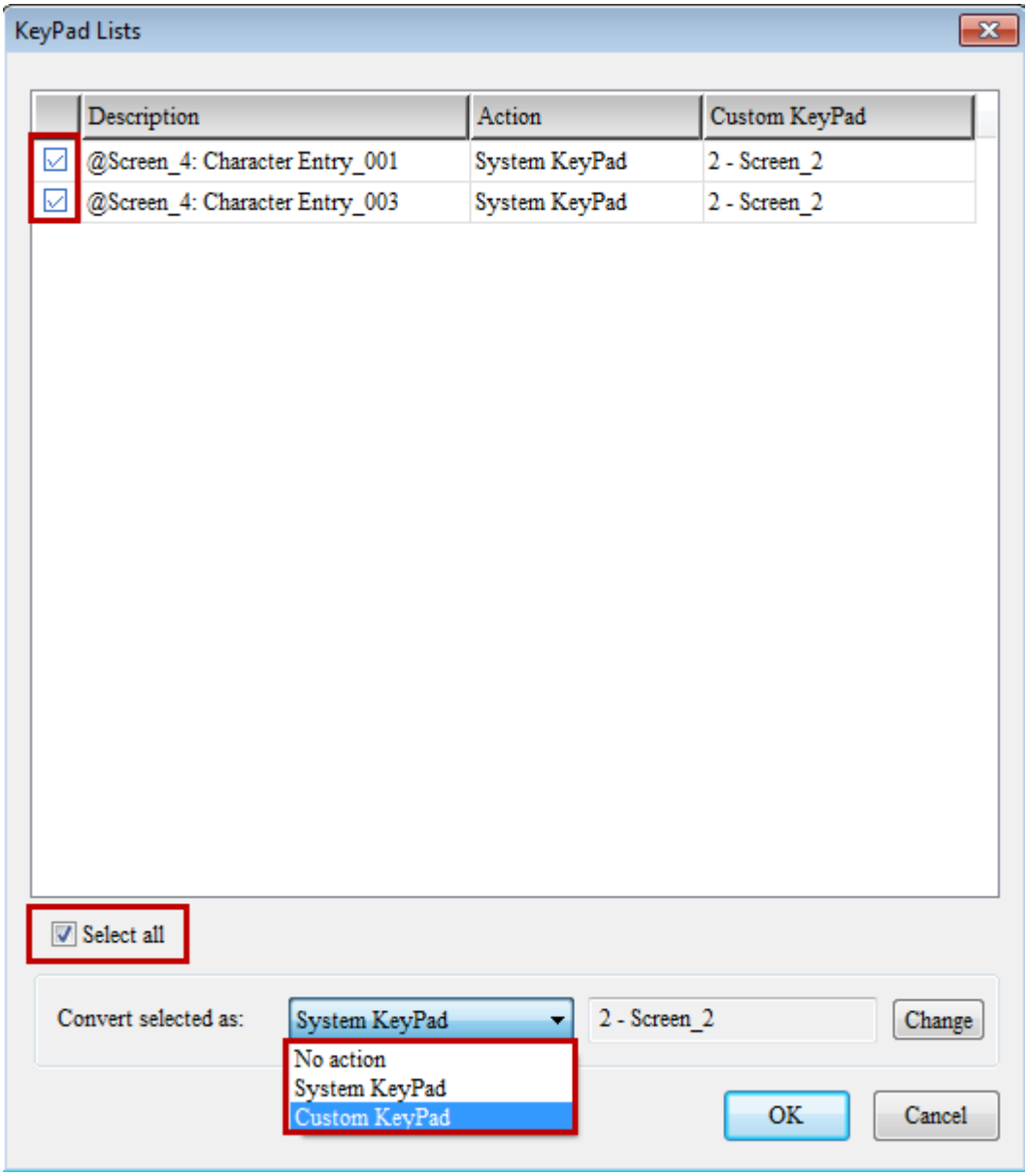
Keypad Lists

Table 29-8-2 Keypad Lists

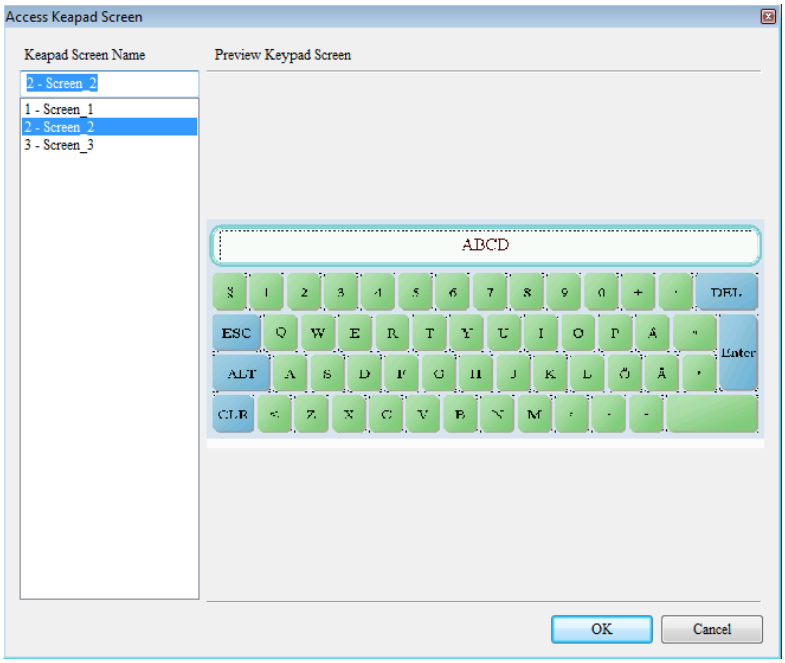


☐	➢ Users can select the system keypad executed in one specific element, the custom keypad or not to change the current setting.	
Description	➢ It shows the description for element or global keypad. Clicking on the descripted element, it will switch to the corresponding screen and show the corresponding element.	
Action	No action	➢ It means not to change the current setting.
	Use system keypad	➢ It means to change to system keypad.
	Use custom keypad	➢ It means to change to custom keypad. A window for selecting the keypad will pop up.

		
Custom Keypad	➢ It displays the custom keypad screen ID and name that currently applied. The setting will be valid only when you select [Custom Keypad] in the [Action] field.	
Select All	➢ Users can [Select all] to convert the selected screen as No action, System Keypad or Custom keypad.	



Convert selected as	No action	➢ It means not to change the current setting.
	System Keypad	➢ It means to change to system keypad.
	Custom Keypad	➢ It means to change to custom keypad. A window for selecting the keypad will pop up.

		
Change	➢ This function will convert the selected element and action with the original one. ➢ When enabling this function, please click on OK. Otherwise, this function might be invalid.	
OK	➢ Clicking OK, it will apply the setting to the corresponding element and global keypad. ➢ Click [X] or [Cancel] to close the window and the setting will not be changed.	

After converting, the HMI will ask if users are sure to delete the screen. Select [Yes] to delete the screen; select [No] the screen will be remained and cancel or transfer the referable link of the original element.

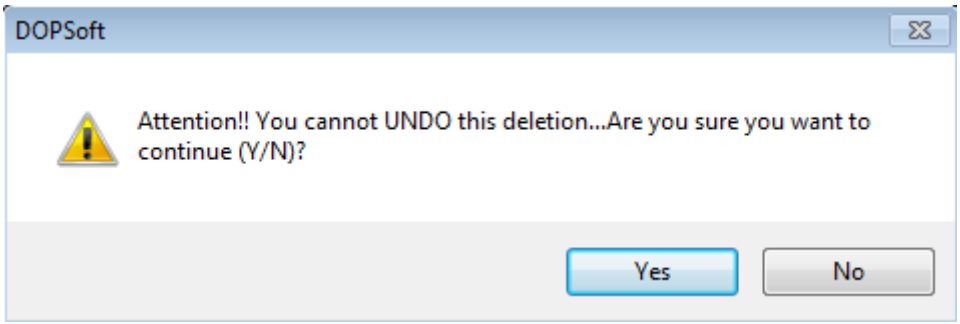


Figure 29-8-15 Whether to delete the screen or not

29-8-2-2 Keypad Screen not reference by element

When the created keypad screen is not used by global keypad setting, numeric entry, character entry element, Barcode entry element or the custom keypad, if you right click on the mouse to delete the screen from toolbar → delete screen, the following message will pop up as the reminder.

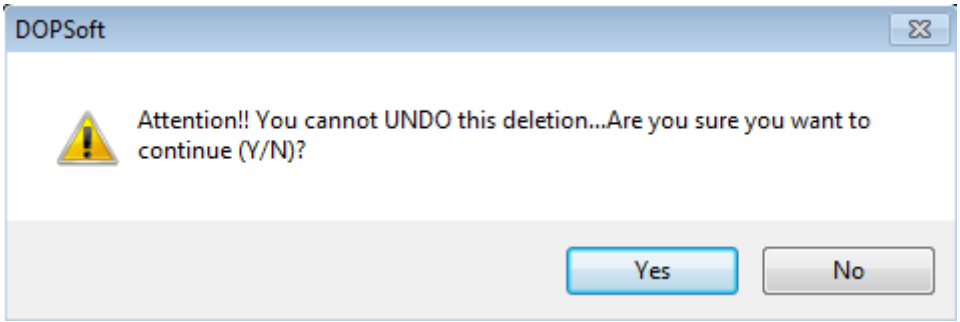


Figure 29-8-16 Determine whether you are going to delete the screen or not

Select [Yes] to delete the screen; select [No] the screen will be remained.
If you change this screen to main or sub screen, no warning message will show. It will directly change to the one that users set.

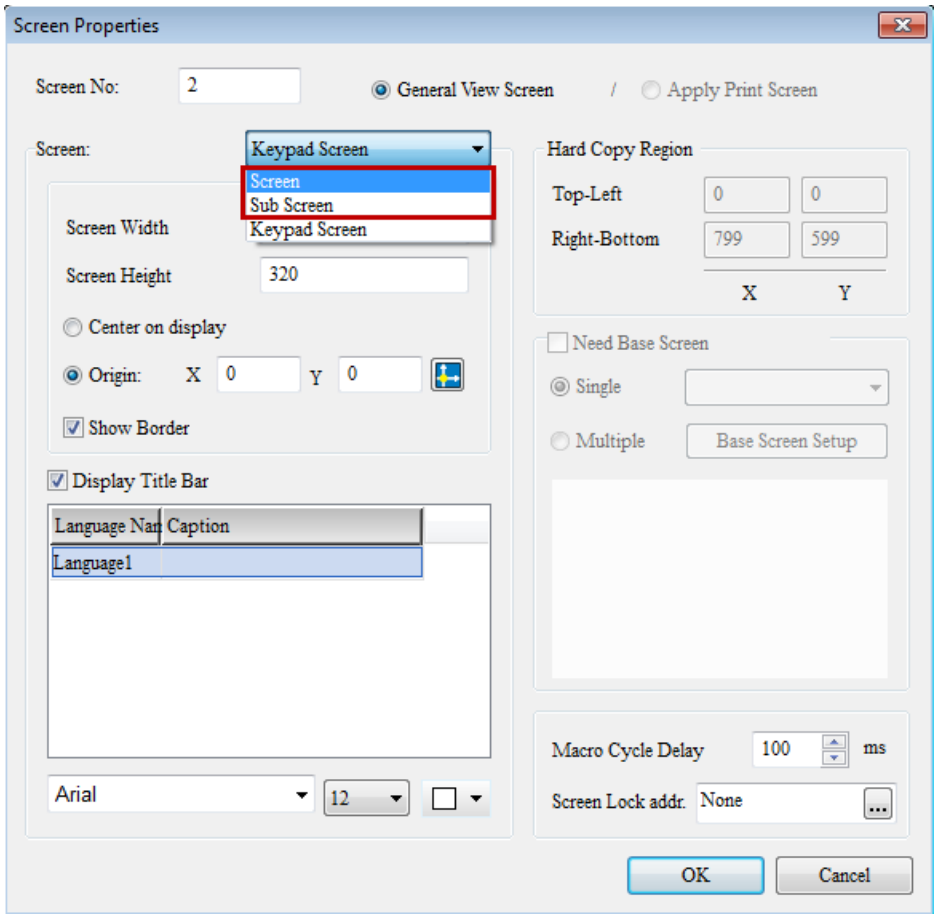


Figure 29-8-17 Change the screen type

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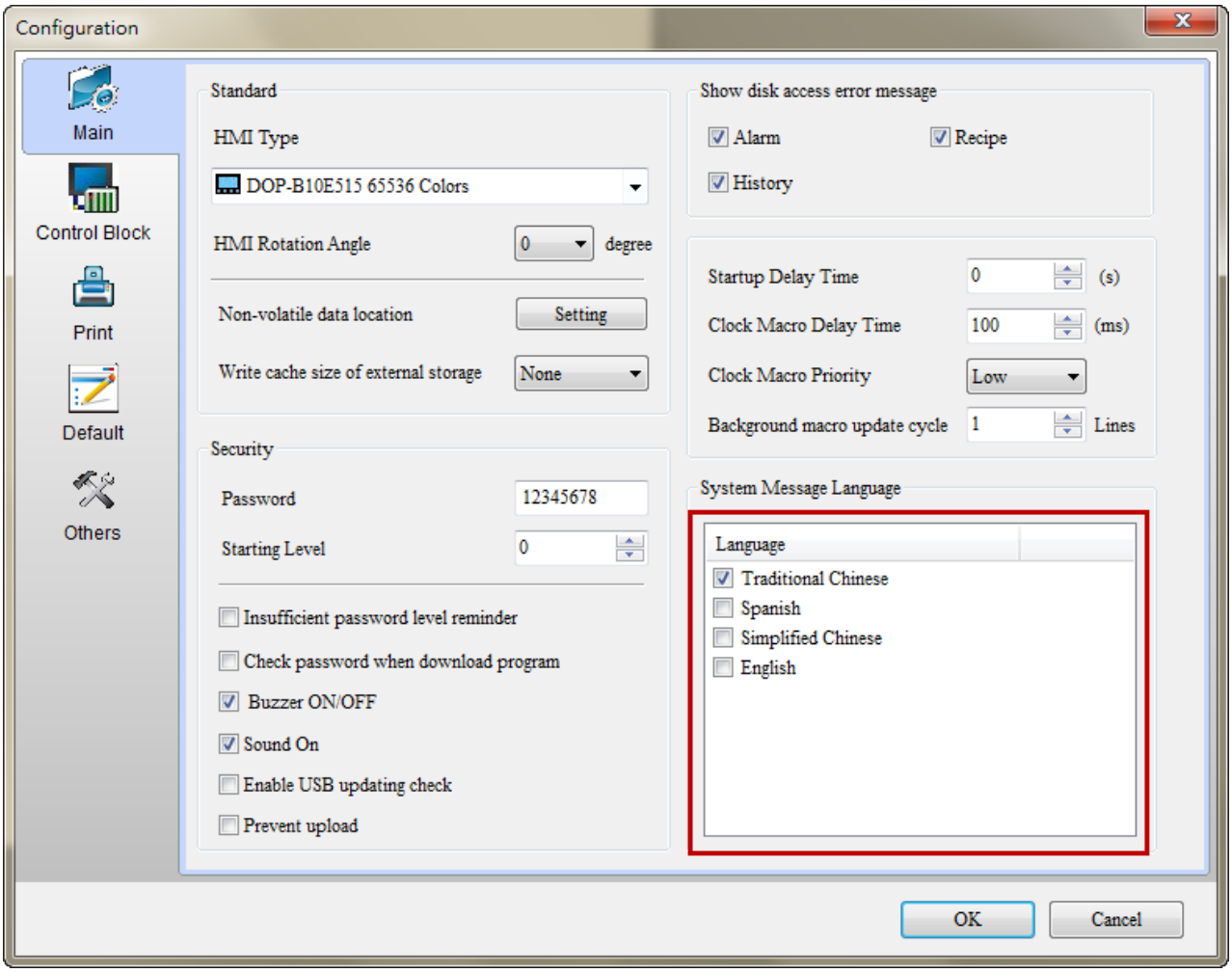
A-3 Upload/Download 41
A-4 System Info 54
A-5 HMI Doctor 56

Appendix A System Screen

This chapter describes the functions that the HMI system screen provides, including [System Setup], [Upload/Download], [System Data] and [HMI Doctor].

A

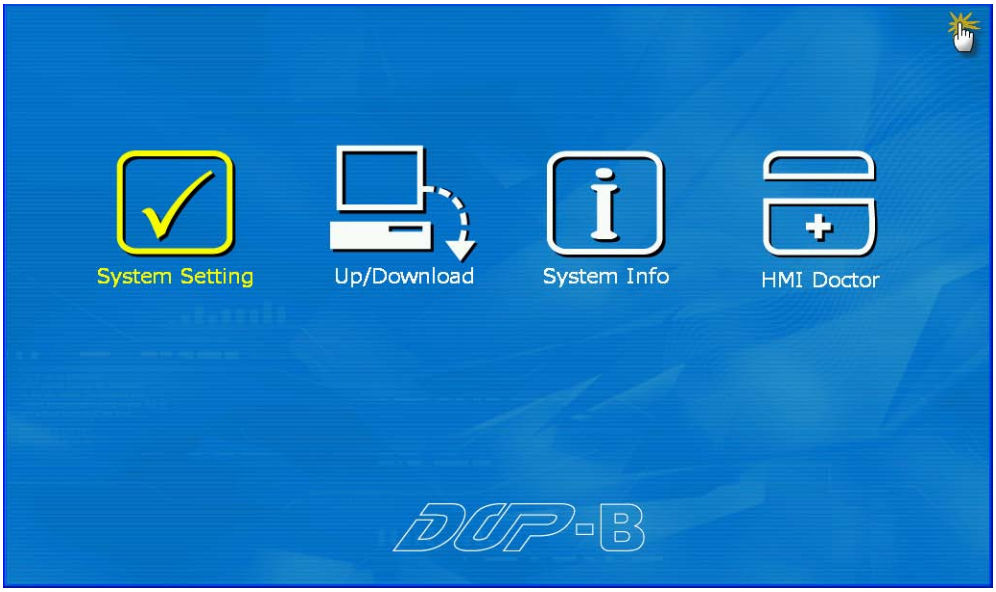
The DOPSoft software allows the user to set the language to be displayed on the system screen, including Traditional Chinese, Simplified Chinese, English and Spanish. Traditional Chinese will be used as an example for the description below.



FigureA-1 System Language Setup

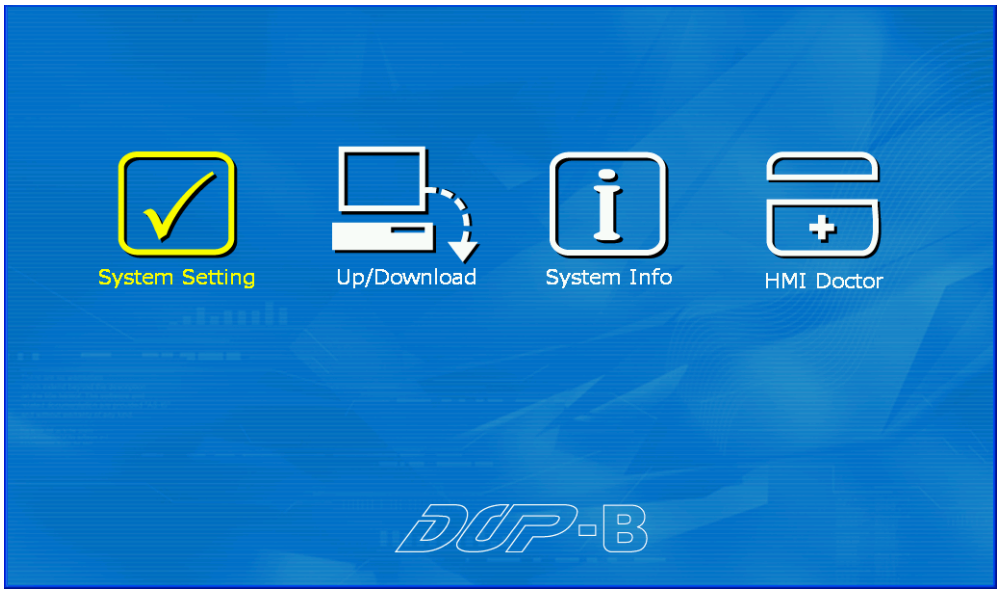
A-1 System Screen Overview

- How to enter the system screen
  - Method 1: The user can press the System Key on the back of HMI to enter the HMI system screen.
  - Method 2: Open the DOPSoft software to create the System Menu button. Then download the screen to HMI and click the System Menu button to enter the HMI system screen.
  - Method 3: This way is focus on without System key models like DOP-B07S410, DOP-B10S411, DOP-B10S511 and DOP-B10E515.
    - Step1: User could press at blank space for a while, and then will hear Buzzer sound.
    - Step2: After hearing the Buzzer sounded, please press left top corner for 1 second to enter system menu.
- How to leave the system screen
  - Method 1: The user can press the System key on the back of the HMI to leave the HMI system screen.
  - Method 2: Press the icon at the upper right corner to leave the HMI system screen.



FigureA-1-1 Press the Top Right Corner to Leave the System Screen

- How to operate the system screen



FigureA-1-2 System Screen

- The user can click the icon on the screen to access corresponding function options.
- The model with auxiliary keys, such as DOP-B07S201 and DOP-B07S211, allows the user to press physical keys to operate the system screen.
  - ✓ Move the selected icon left and right on the screen. Enter the selected option.
  - ✓ The white color means that the area is not selected; the yellow color means that the area is selected.

■ System screen function list

System Screen Function List Table A-1-1 System Screen Function List			
System Setup	Display Panel	Contrast	Contrast Adjustment
		Bright	Brightness Adjustment
		Gamma	LCD Gamma Adjustment
	Date/Time	Date	System Date Setup

System Screen Function List

Table A-1-1 System Screen Function List

		Time	System Time Setup
		Alarm Clock	Alarm Clock Setup (Currently Not Enabled)
	Touch Panel	Delay	Touch Panel Delay Setup
		Force	Touch Panel Force Setup
		Calibrate	Touch Panel Calibration
	Network	HMI Name	HMI Name Display
		DHCP	DHCP Enable Setup
		IP	IP Address Setup
		Mask	Network Mask Setup
		Gateway	Gateway Setup
		MAC	HMI MAC Address Display
	COM Port	COM 1	COM Mode, Baud Rate, Stop Bits, Data Bits, Parity bit, Communication Delay, Communication Timeout, Communication Retry Times, HMI Station, PLC Station, Multi-Drop and
		COM 2	
		COM 3	

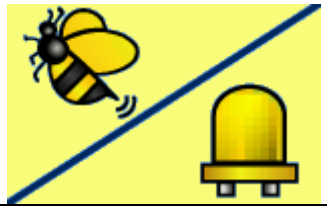
System Screen Function List

Table A-1-1 System Screen Function List

			Baud Rate Tuning Setup for COM 1 ~ COM 3
	Volume	Speaker	Volume Adjustment
		Buzzer	HMI Key Tone and Buzzer Volume Adjustment
	Password	Level 0 ~ Level 7 Password Table Setup A Password Is Needed for Password Table Setup	
	MISC.	Touch Cursor	Touch Cursor Display Setup
		Screen Save Enable Time	Setup of the Time after Which the Screen Saver is Enabled.
		Energy Saving Enable Time	Setup of the Time after Which the Energy Saving is Enabled.
		Energy Saving %	Energy Saving % Setup
		Startup Delay Time	Startup Delay Time Setup
		Default Language	Multi-Language ID Selection
		BD LED Function Mode	LED Function Mode Setup, Including Comm.(Communication), Disk IO, Network and Disable
		Startup Screen	Startup Screen Setup
		USBCommMode	Set USB upload and download mode
	File Management	Formatting	Formatting for HMI, USB, CF and SD

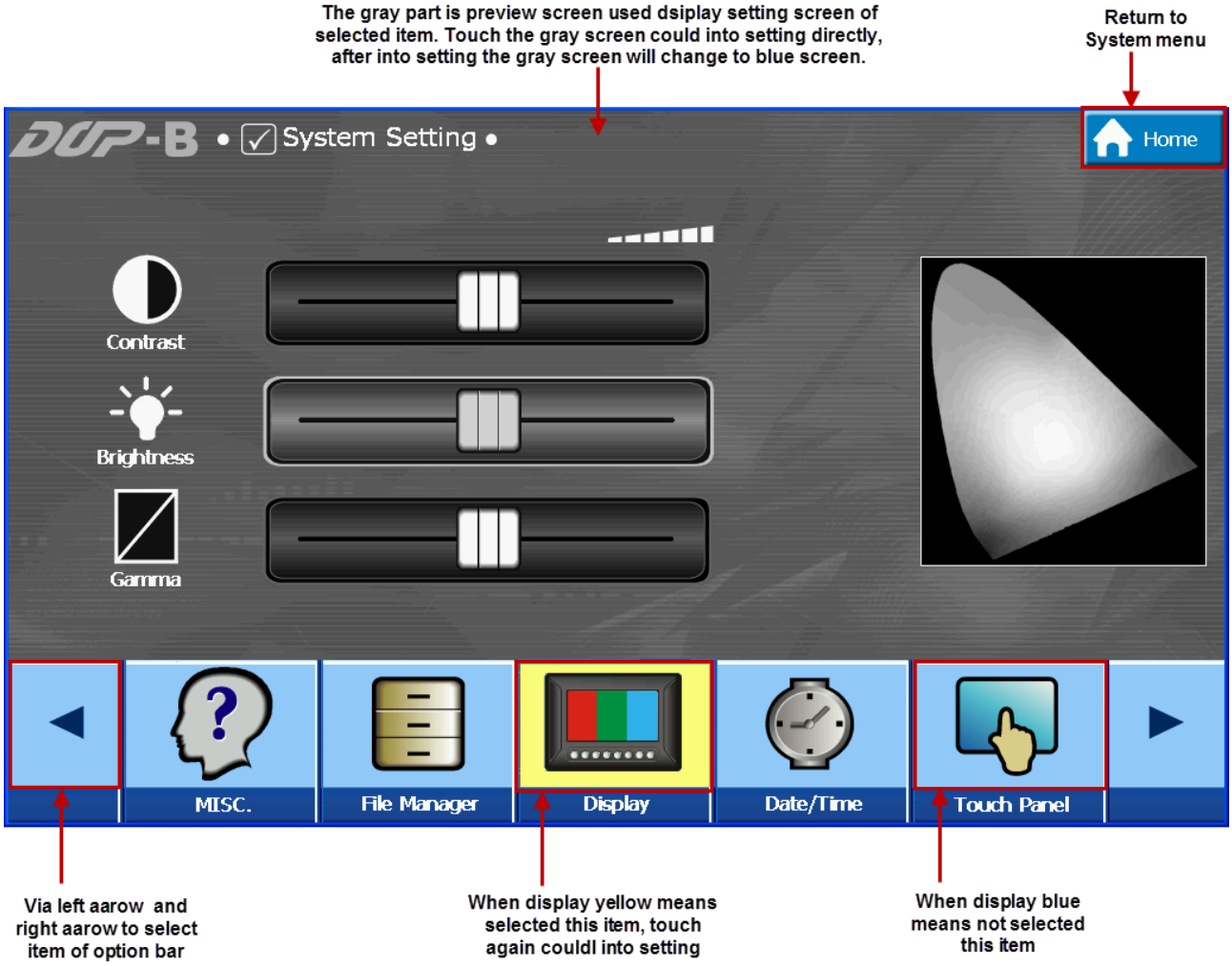
System Screen Function List Table A-1-1 System Screen Function List			
			The File System Is Cleared after Formatting
		Copy File	Copy of the Screen to External Storage (USB Disk or SD Card)
		Multi-Window File	Multiple Startup Screens Setup
		Firmware Update	Update of HMI Firmware from USB Disk or SD Card
		Encrypt	Encryption of Screen Data and Setup of Copy Times
Upload/Download	Normal	COM 1	COM 1 or COM 2 in the Normal Mode Must Be Selected for Upload/Download Screen Data.
		COM 2	
	Bypass	Mode 1 COM 1 → COM 2	The HMI Is Used as a Bridge in the Bypass Mode to Transmit Data between PC and PLC.
		Mode 2 COM 1 → COM 3	
		Mode 3 COM 2 → COM 1	
	Transmission	Upload	Upload/Download of DVP Files Used in PLC.
		Download	
System Data	Display of HMI Data, Including Firmware Version, Model, Battery Capacity, Memory Space, CPU Rate, Test Data, Current Time, PLC Driver in Use and Connection to External Storage.		
HMI Doctor	Blue	Blue Screen Test	

System Screen Function List Table A-1-1 System Screen Function List		
	Green 	Green Screen Test
	Red 	Red Screen Test
	Black 	Black Screen Test
	White 	White Screen Test
	Network 	Network Test (Currently Not Enabled)
	Color 	Color Saturation Test
	USB 	USB Test
	ADC	ADC Test

System Screen Function List Table A-1-1 System Screen Function List		
	Buzzer / LED 	Buzzer / LED Test
	Draw a Line 	Touch Panel Line Drawing Test

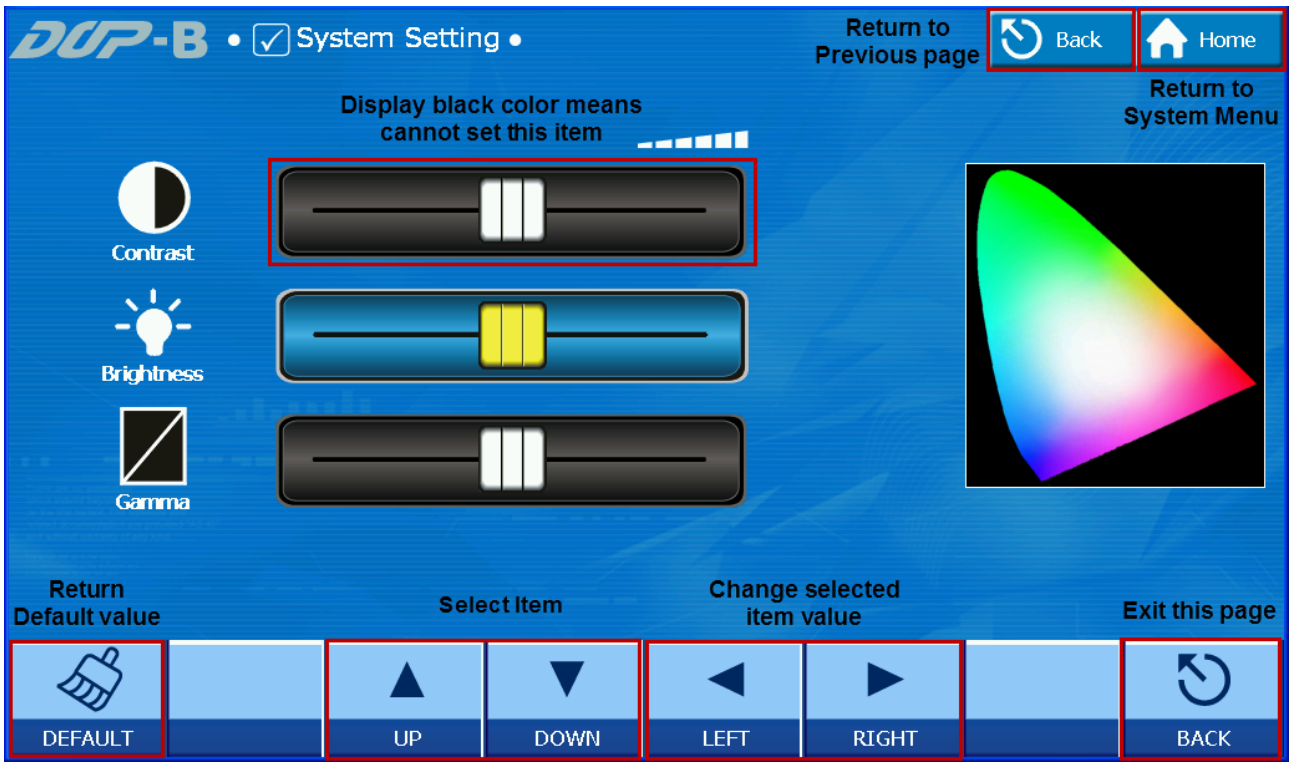
A-2 System Setup

The system setup operation is described below.



FigureA-2-1System Setup Operation

■ Display Panel



FigureA-2-2Display Panel

➢ Set LCD display.

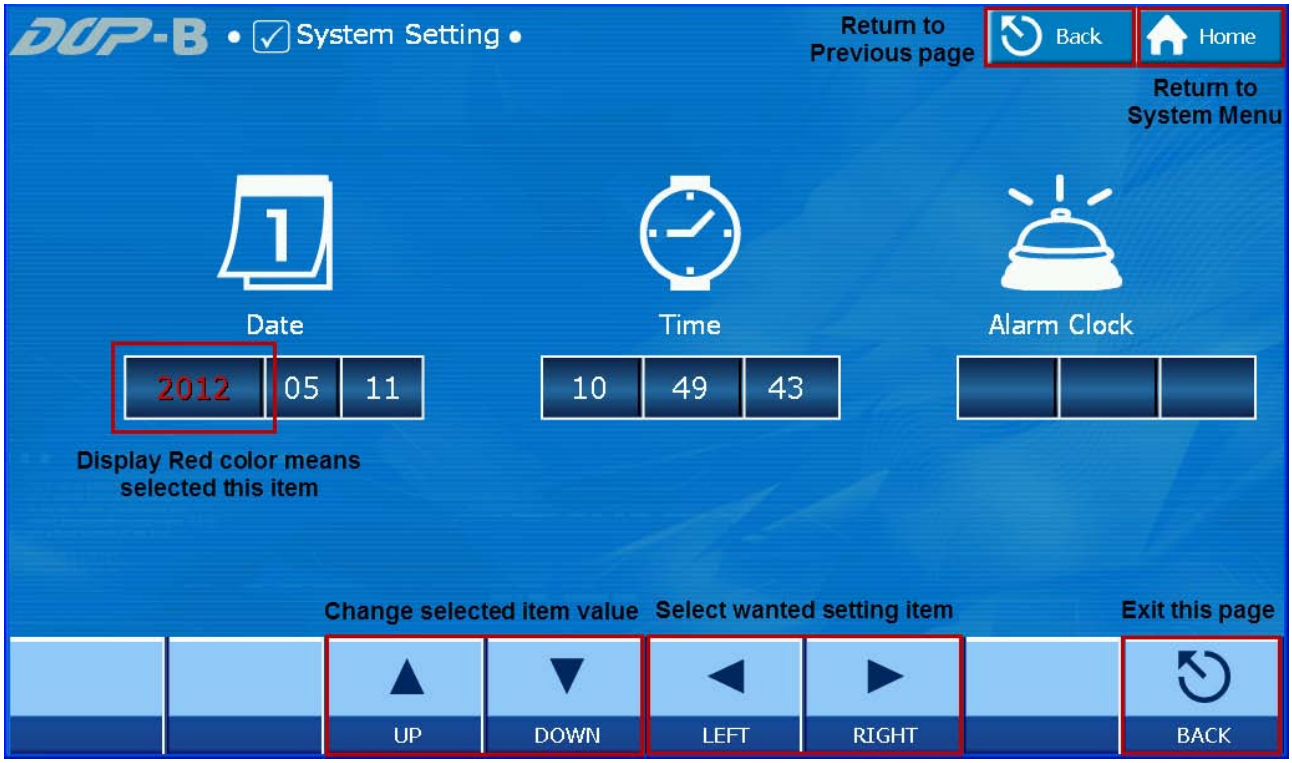
Display Panel	Contrast	The user can adjust the contrast. (Currently not Enabled)
	Bright	The user can adjust HMI brightness.
		B05S100 / B05S101 / B07S201 / B07S211 can support brightness adjustment. New models such as B07S(E)415 / B07S(E)515 / B08S(E)515 / B10S(E)615 only support brightness adjustment.
	Gamma	The user can adjust the LCD Gamma value.
		B05S100 / B05S101 / B07S201 / B07S211 can support the Gamma value.

➢

➢ Auxiliary key and function bar mapping list

Default	Up	Down	Left	Right	Exit
F1	F3	F4	◀	▶	SYS

■ Date/Time



FigureA-2-3Date/Time

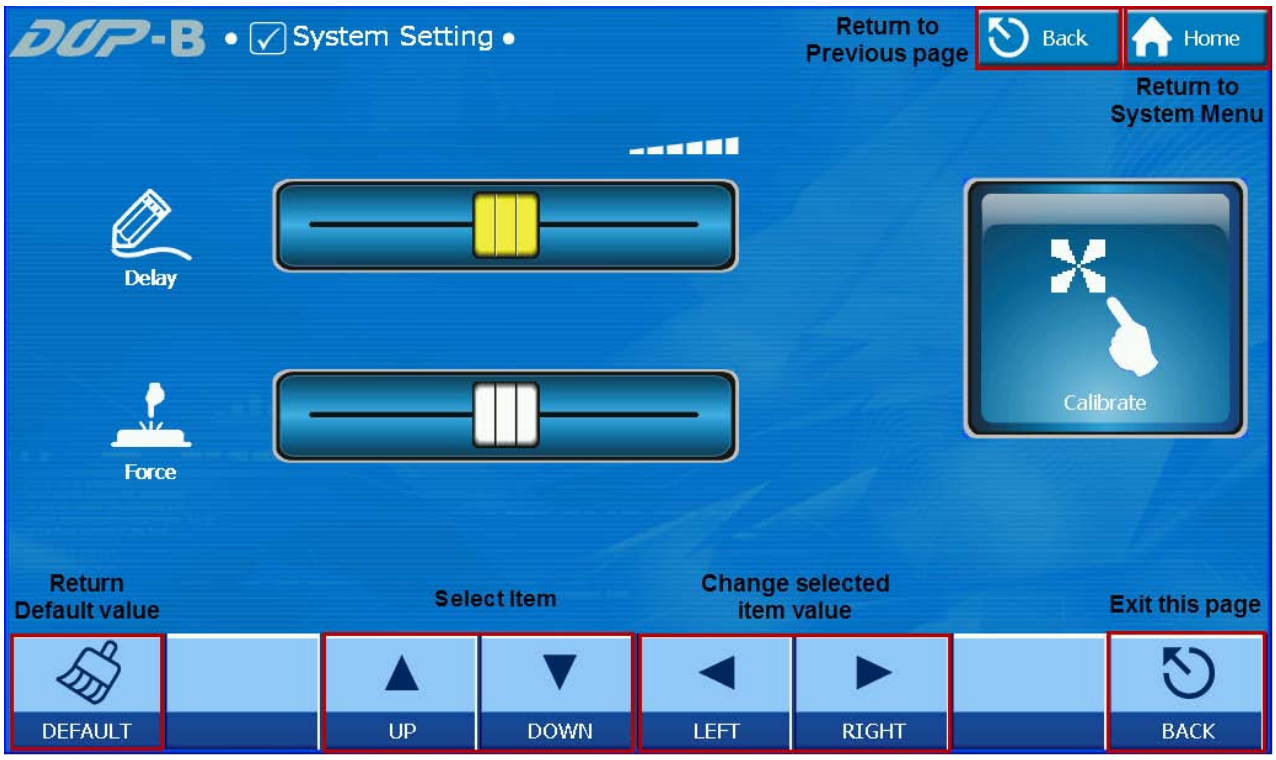
➢ Set the date and time (year, month, day, hour, minute, second) for the HMI system.

Date/Time	Date	Set HMI system date.
		The date is set in YYMMDD format.
	Time	Set HMI system time.
		The time is set in HHMMSS format.
	Alarm Clock	Set the alarm clock time (Currently Not Enabled)

➢ Auxiliary key and function bar mapping list

Up	**Down**	**Left**	**Right**	**Exit**
F3	F4	◄	►	SYS

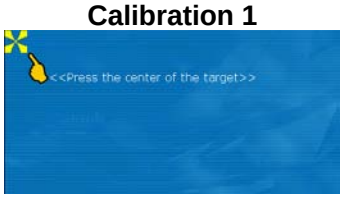
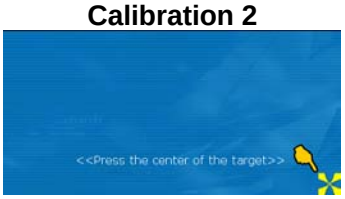
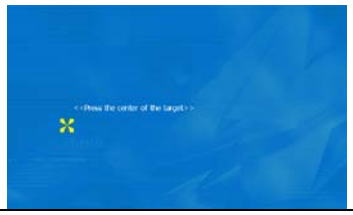
■ Touch Panel



FigureA-2-4Touch Panel

➢ Set the touch panel, including the delay time, press force and calibration

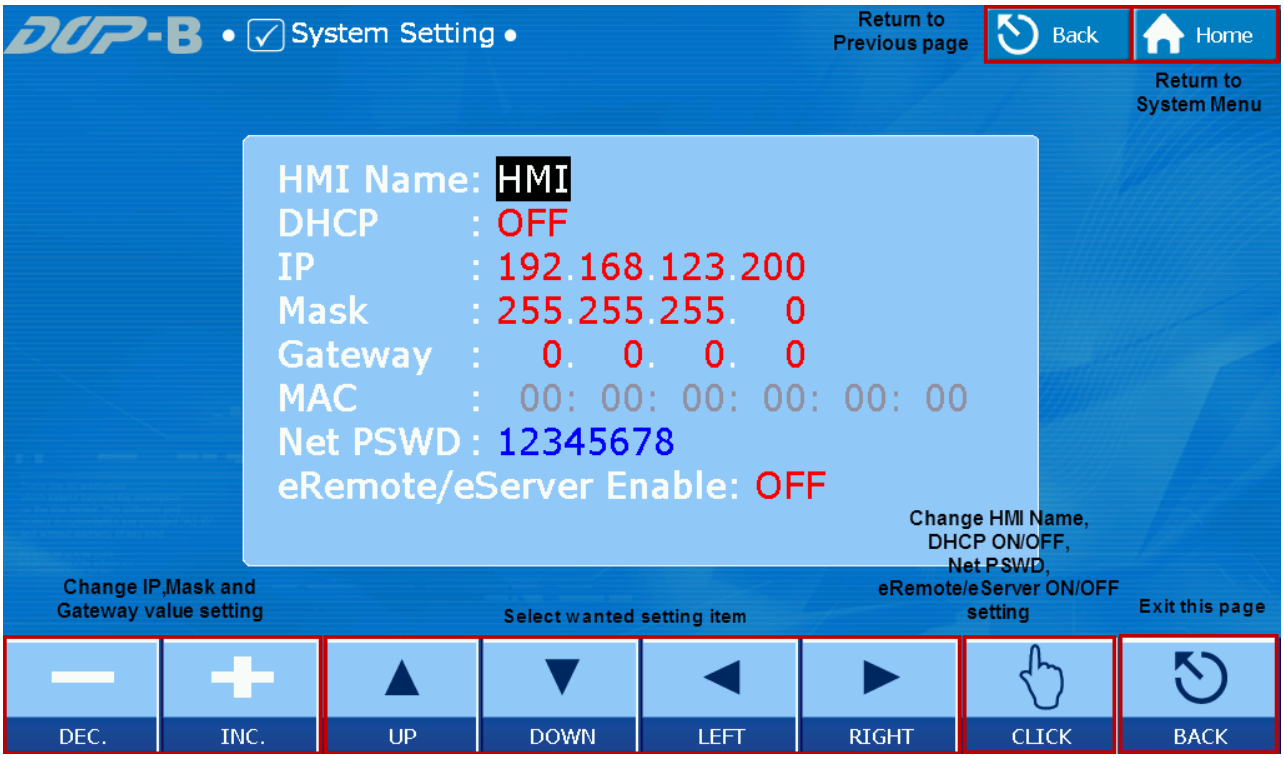
Touch Panel	Delay	Set the touch panel delay time.
		Set the HMI processing delay time for touch and movement of messages. Move the slider right to reduce the delay time for quicker movement. Move the slider left to increase the delay time for slower movement.
	Force	Set the touch force for the panel.
		Move the slider left to reduce the force. HMI will recognize lower force and the touch operation becomes easier. Move the slider right to increase the force. HMI will recognize the higher force and the touch operation becomes more difficult.
	Calibrate	Calibrate the touch panel.
		Follow the instructions and touch the center of to conduct five-point calibration of the HMI touch panel. A significant deviation may be brought about to the touch panel if the user touches a point far away from the

		center point in the calibration area. It is suggested to use a dedicated stylus for the calibration.
		Calibration 1  **Calibration 2**  **Calibration 3** **Calibration 4** **Calibration 5** 

➢ Auxiliary key and function bar mapping list

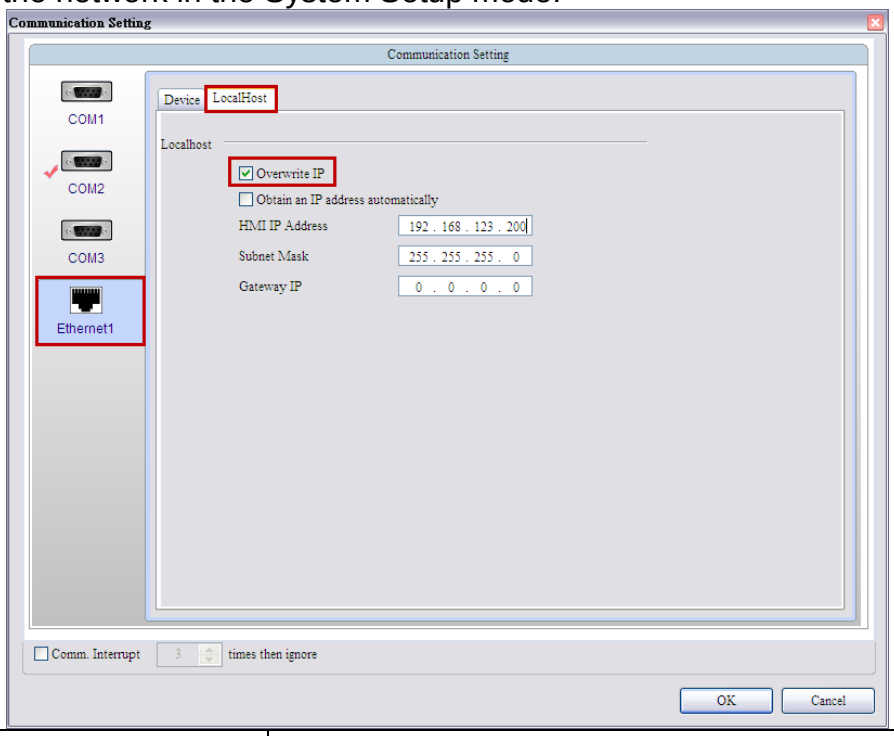
Default	**Up**	**Down**	**Left**	**Right**	**Exit**
F1	F3	F4	◀	▶	SYS

■ Network



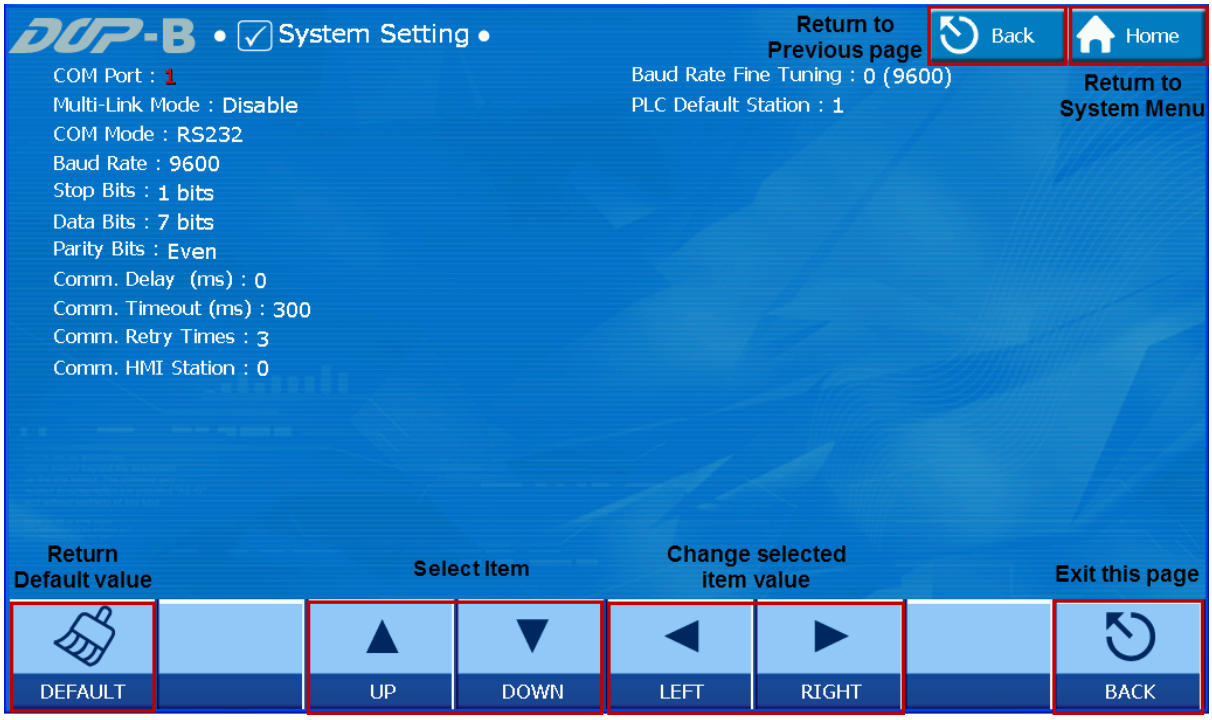
FigureA-2-5Network

➢ The Network option is only available when the Ethernet function is provided. The user can use this option to set DHCP, IP, Mask and Gateway.

Network	The user can enter [Options] → [Communication Setting] → [Ethernet] → [Local Host] to change the following settings for the network in the System Setup mode. 	
	HMI Name	Show HMI Name

		This name is set up by HMI. To change the name, enter [Options] → [Communication Setting] → [Ethernet] → [Local Host] to perform the change.
	DHCP	Set to enable DHCP
		The user can enable DHCP or enter IP address manually.
	IP	Set IP address
		When DHCP is OFF, set the IP address manually
	Mask	Set network mask
		When DHCP is OFF, set the mask manually
	Gateway	Set gateway
		When DHCP is OFF, set the gateway manually
	MAC	Display HMI MAC address
		Display the MAC address of HMI. This setting cannot be changed
	Net PSWD	Set connection password with HMI and eRemote or eServer
		User could set the connection password by manual
	eRemote/eServer Enable	Enable the connection with HMI and eRemote or eServer or not
		User could enable or disable by manual

■ Port



FigureA-2-6Port

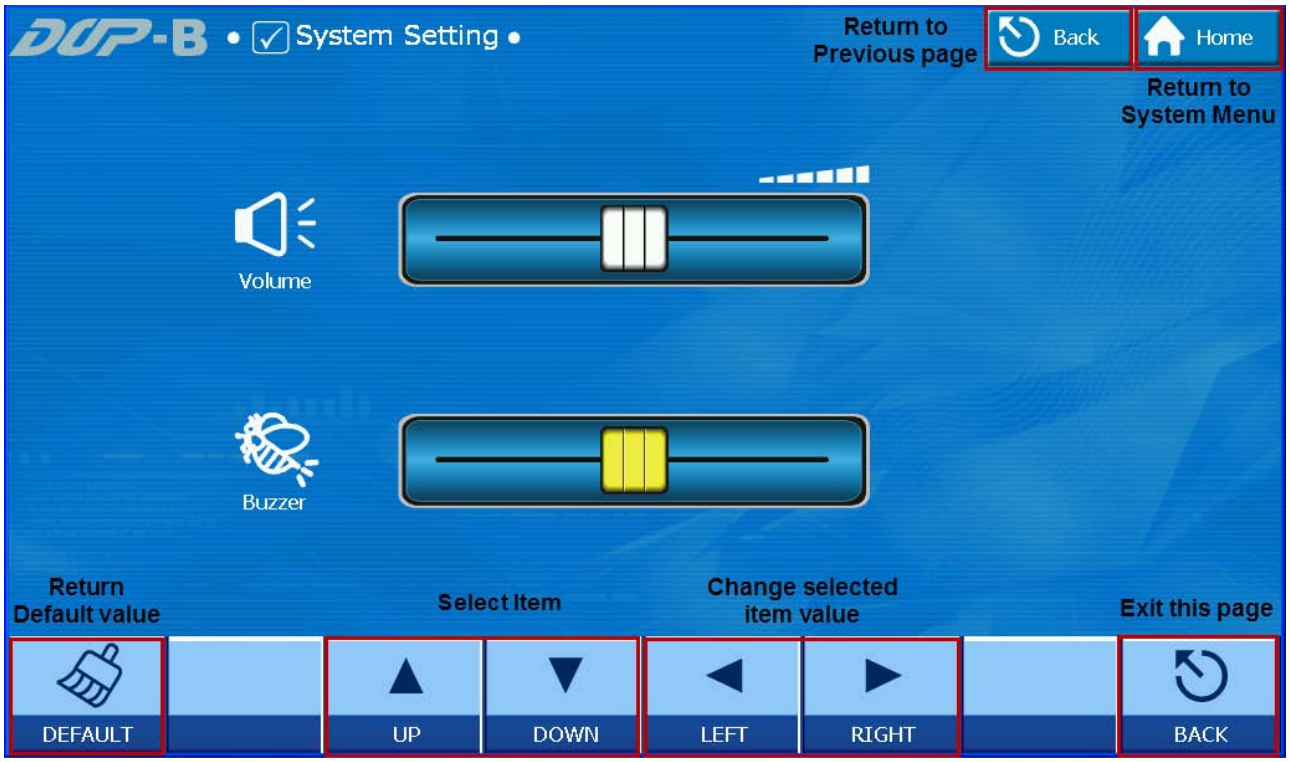
➢ Set COM 1, COM 2 and COM 3 parameters.

Port	COM 1	Set COM Mode, Baud Rate, Stop Bits, Data Bits, Parity bit, Communication Delay, Communication Timeout, Communication Retry Times, HMI Station, PLC Station, Multi-Drop and Baud Rate Tuning for COM 1 ~ COM 3.
	COM 2	
	COM 3	

➢ Auxiliary key and function bar mapping list

Default	**Up**	**Down**	**Left**	**Right**	**Exit**
F1	F3	F4	◀	▶	SYS

■ Sound



FigureA-2-7Sound

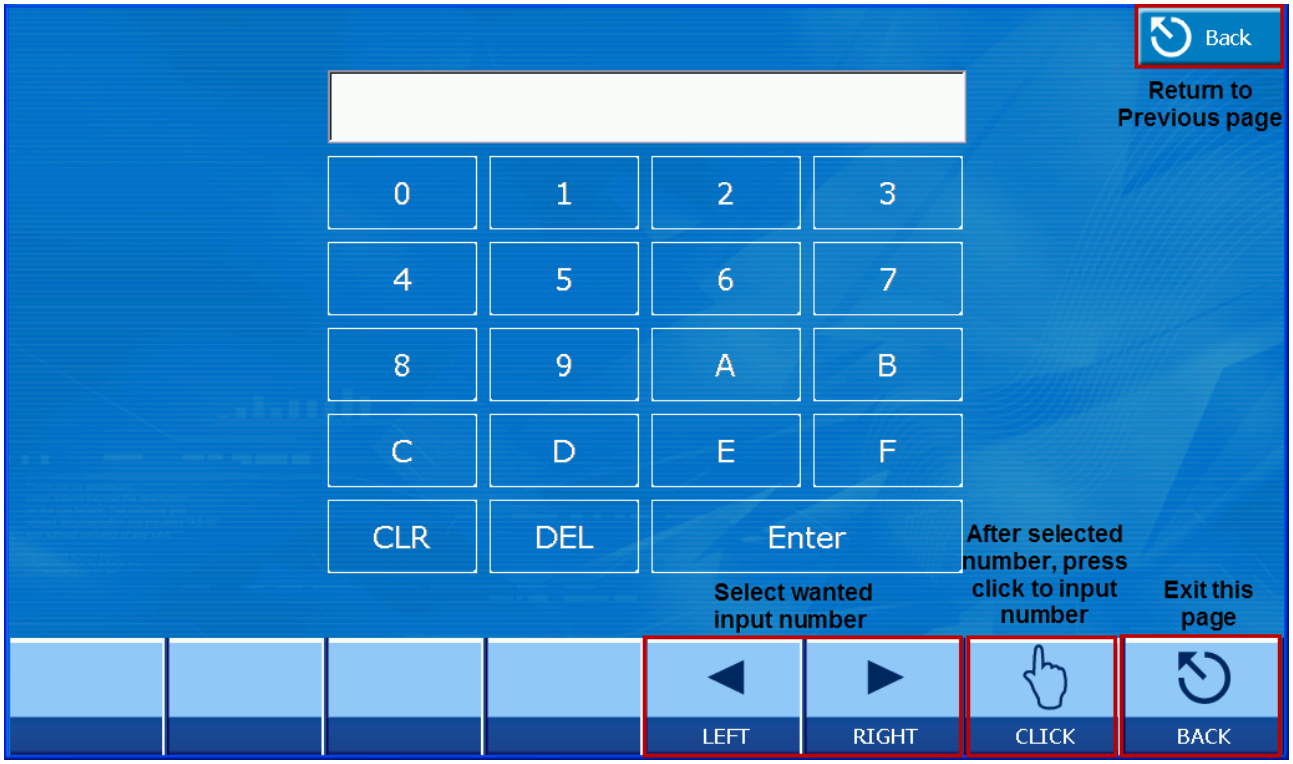
➢ Set the volume for the speaker and buzzer.

Volume	Speaker	Adjust the volume of HMI speakers
		The volume setup is only available to the model with Audio output function. Move the slider left to reduce the volume; move the slider right to increase the volume.
	Buzzer	Adjust HMI key tone and buzzer volume
		This function is used to adjust HMI key tone and buzzer volume. Move the slider left to reduce the volume; move the slider right to increase the volume.

➢ Auxiliary key and function bar mapping list

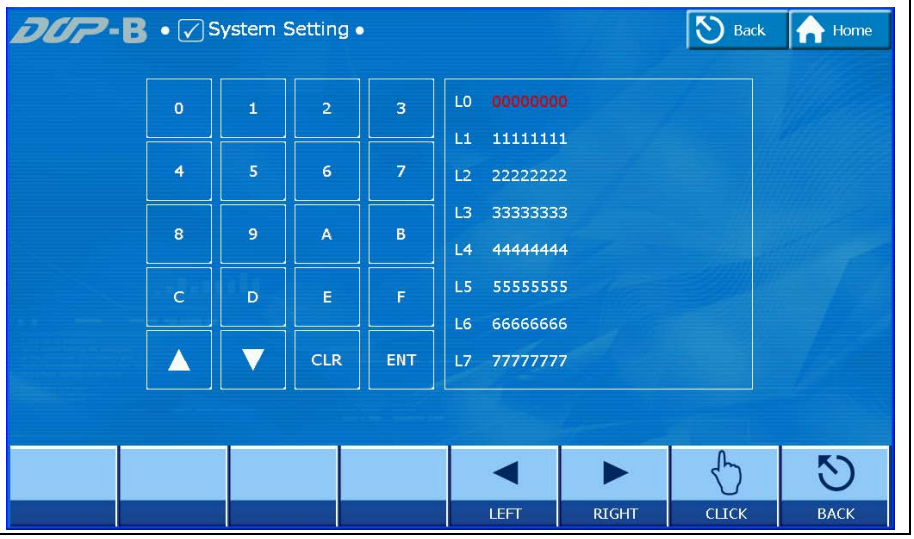
Default	Up	Down	Left	Right	Exit
F1	F3	F4	◀	▶	SYS

■ Password



FigureA-2-8Password

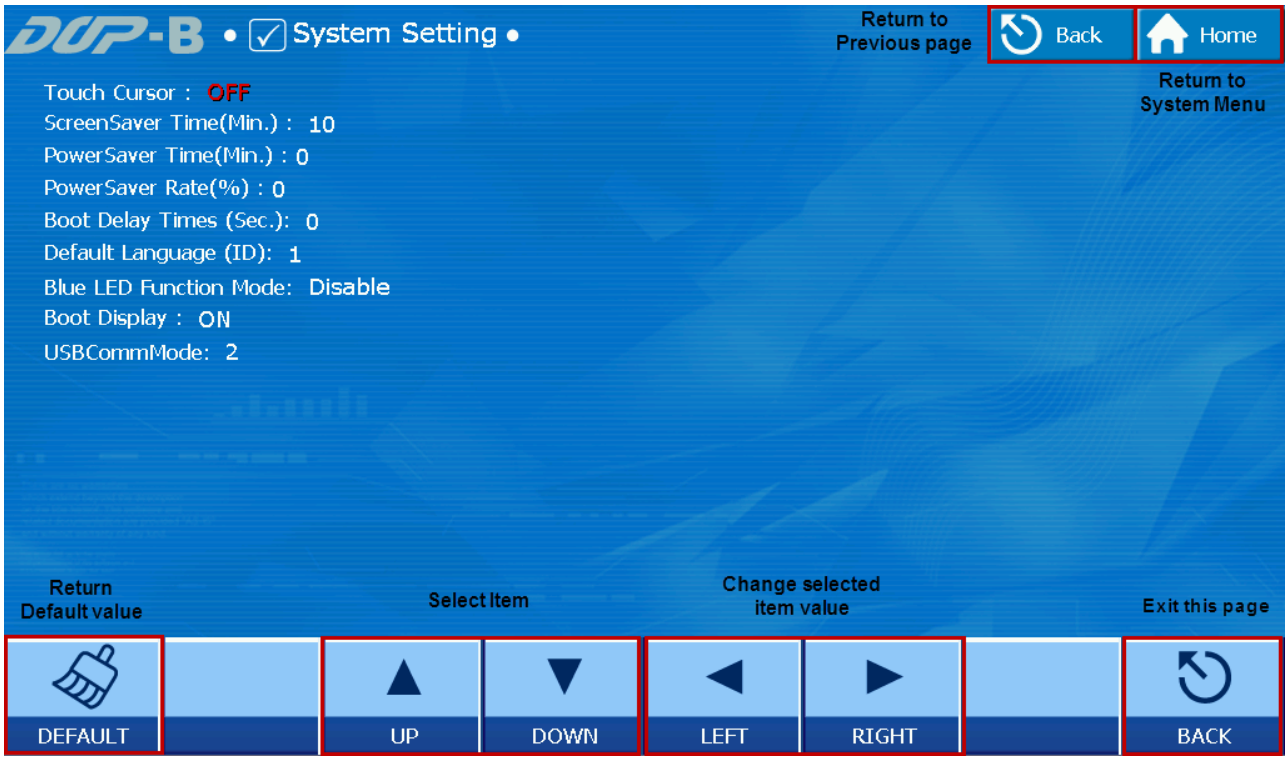
➢ Set Level 0 ~ Level 7 password table.

	Level 0 ~ Level 7 password table setup
Password	A password is needed to set the password table. Setting of the password table can be performed after the password is entered and recognized successfully. 

➢ Auxiliary key and function bar mapping list

Left	**Right**	**OK**	**Exit**

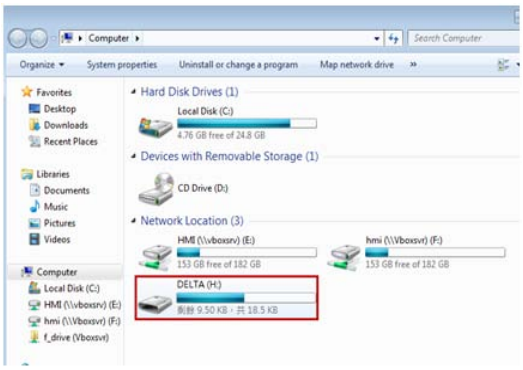
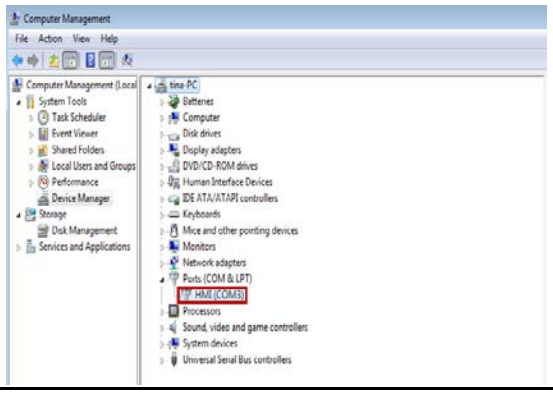
■ MISC.



FigureA-2-9MISC.

➢ Set other HMI parameters.

MISC.	Touch Cursor	Set the display of the touch cursor	
	Screen Save Enable Time	Set the time after which the screen saver is enabled	
	Energy Saving Enable Time	Set the time after which the energy saving is enabled	
	Energy Saving %	Set energy saving %	
	Startup Delay Time	Set startup delay time	
	Default Language	Select a multi-language ID HMI System Setting | Language No | Language Name | Detail Setup | Enable | Default Font Style ☑ 1 | Language1 | 0 | ☑ | Arial ☐ 2 | Language2 | 1 | ☑ | Arial	
	BD LED Function Mode	LED function mode is not enabled	Disable
		LED flashes only for communication	Comm.(Communication)
		LED flashes only for processing of Disk IO	Disk IO
		LED flashes	Network

		only for network connection	
	Startup Screen	Set display of the startup screen	
	USBCOMMMODE	0	USBCommMode 0 is the traditional mode for USB uploading/downloading files. Uses have to manually install theUSB driver before uploading and downloading files with HMI.
		1	USBCommMode 1 is USB Disk mode. Set USBCommMode to 1. Then, users can check if there is a removable storage device named [DELTA] in Computer after completing the setting and returning to theHMI screen. 
		2	USBCommMode 2 is USB CDC mode. When USBCommMode is set to 2, please go to Computer> Right click the mouse and select [Content] > Go to [Computer Management] and see if the device named [HMI] is displayed under [Ports]. 

➢ Auxiliary key and function bar mapping list

Default	Up	Down	Left	Right	Exit
F1	F3	F4	◀	▶	SYS

■ File Management

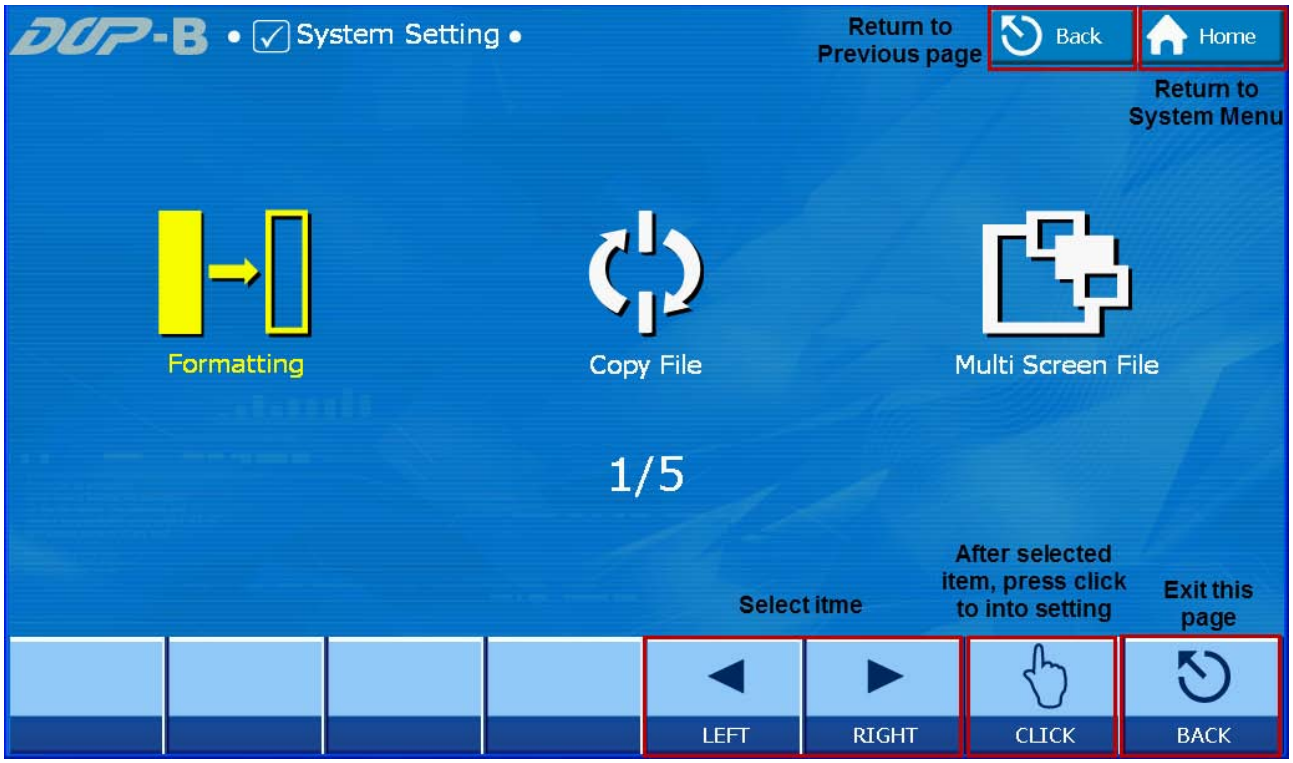


Figure A-2-10File Management

➢ File format, copy, select multiple startup screens, firmware update, encrypt.

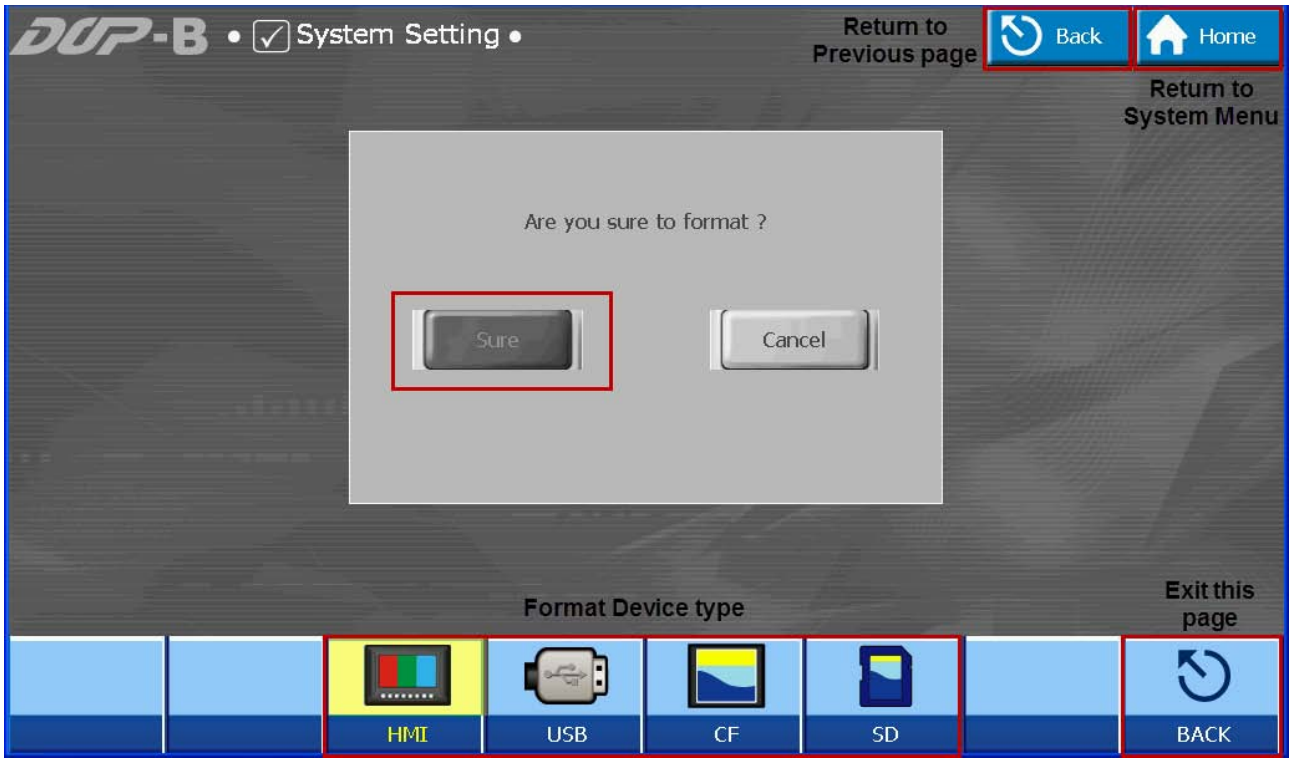
File Management	Formatting	Formatting for HMI, USB, CF and SD The file system is cleared after formatting.
	Copy File	The screen can be copied to an external storage (USB Disk or SD Card)
	Multi-Window File	Set multiple startup screens.
	Firmware Update	Update HMI firmware from USB Disk or SD Card
	Encrypt	Encrypt screen data and set up allowable copy times

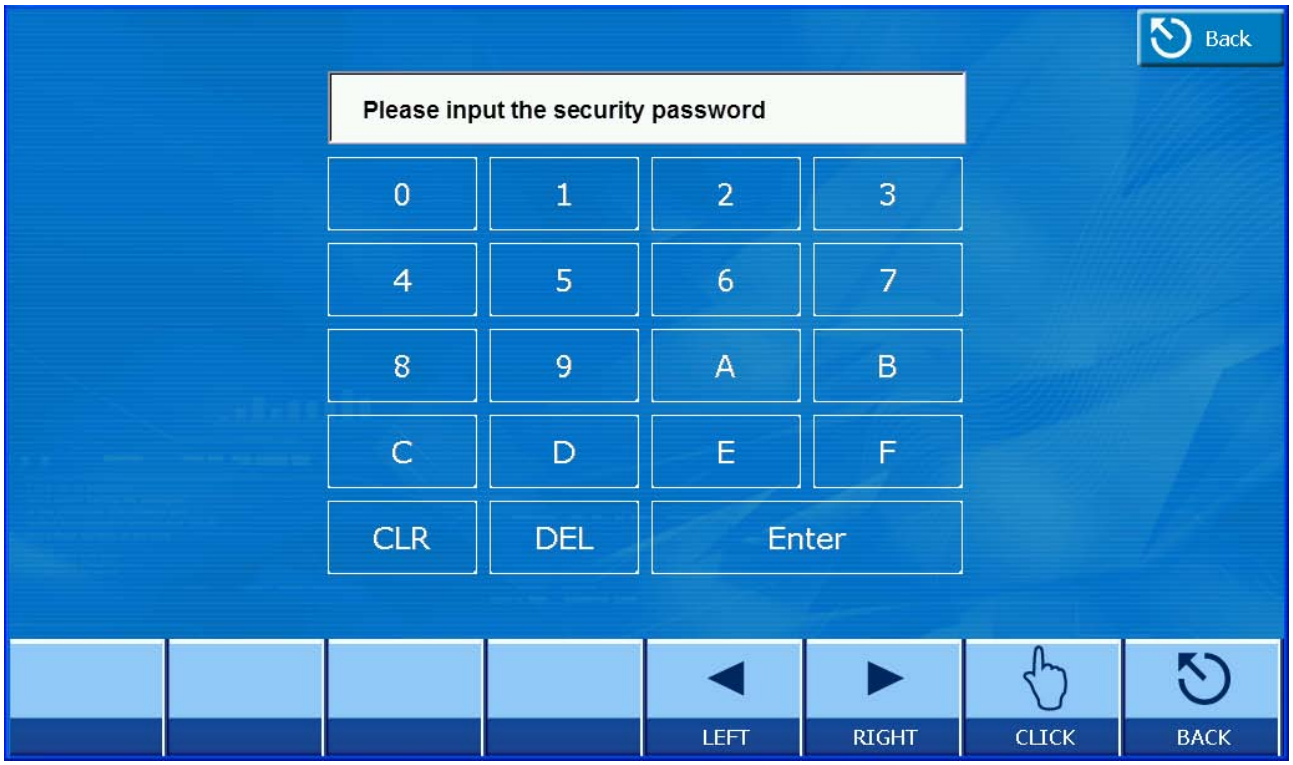
➢ Auxiliary key and function bar mapping list

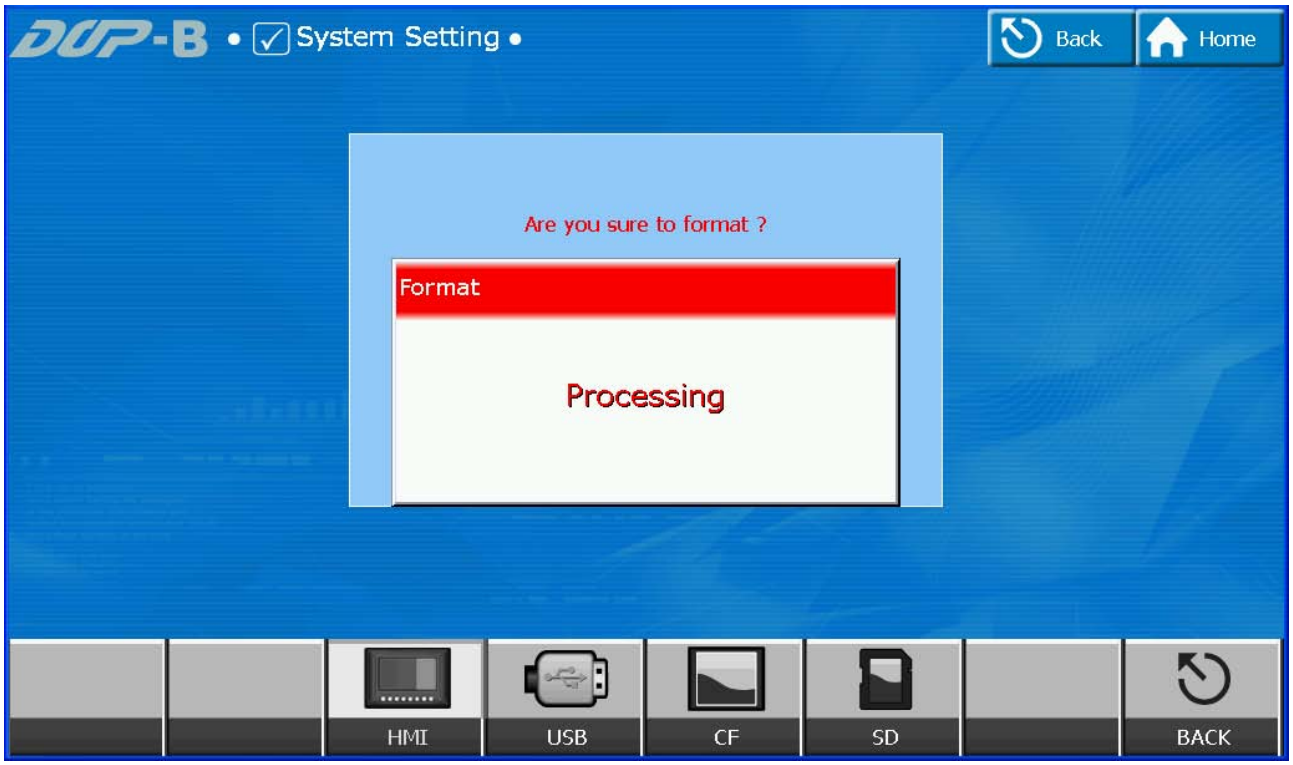
Left	Right	OK	Exit
			SYS

✓ Formatting

The formatting function is used to format internal and external devices, including HMI, USB, CF and SD. This option is not enabled before inserting the USB, CF or SD in HMI. After selection of the device to be formatted, the user needs to enter the password and the device will be formatted after the password is verified.


DUP-B • System Setting •
Return to Previous page
Back
Home
Return to System Menu
Are you sure to format ?
Sure
Cancel
Format Device type
Exit this page
HMI
USB
CF
SD
BACK

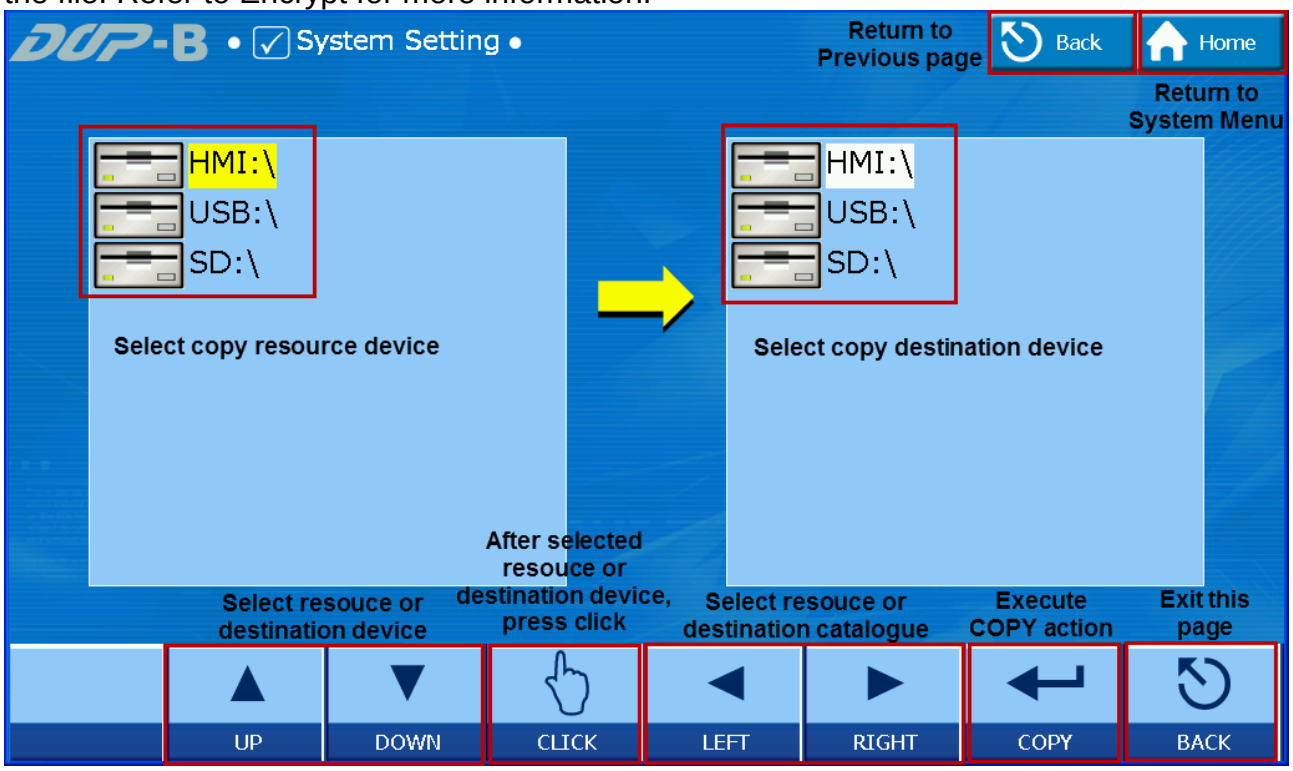

Back
Please input the security password
0
1
2
3
4
5
6
7
8
9
A
B
C
D
E
F
CLR
DEL
Enter
LEFT
RIGHT
CLICK
BACK



✓ Copy File

A file can be selected and copied from the device in the source directory to the device in the destination directory.

The Copy File function can be used in conjunction with the Encrypt function. This function enables the user to set the copy times for a file. When an encrypted file is copied more than the setting value of the copy times, the system will inform the user to ensure the security of the file. Refer to Encrypt for more information.



➢ Auxiliary key and function bar mapping list.

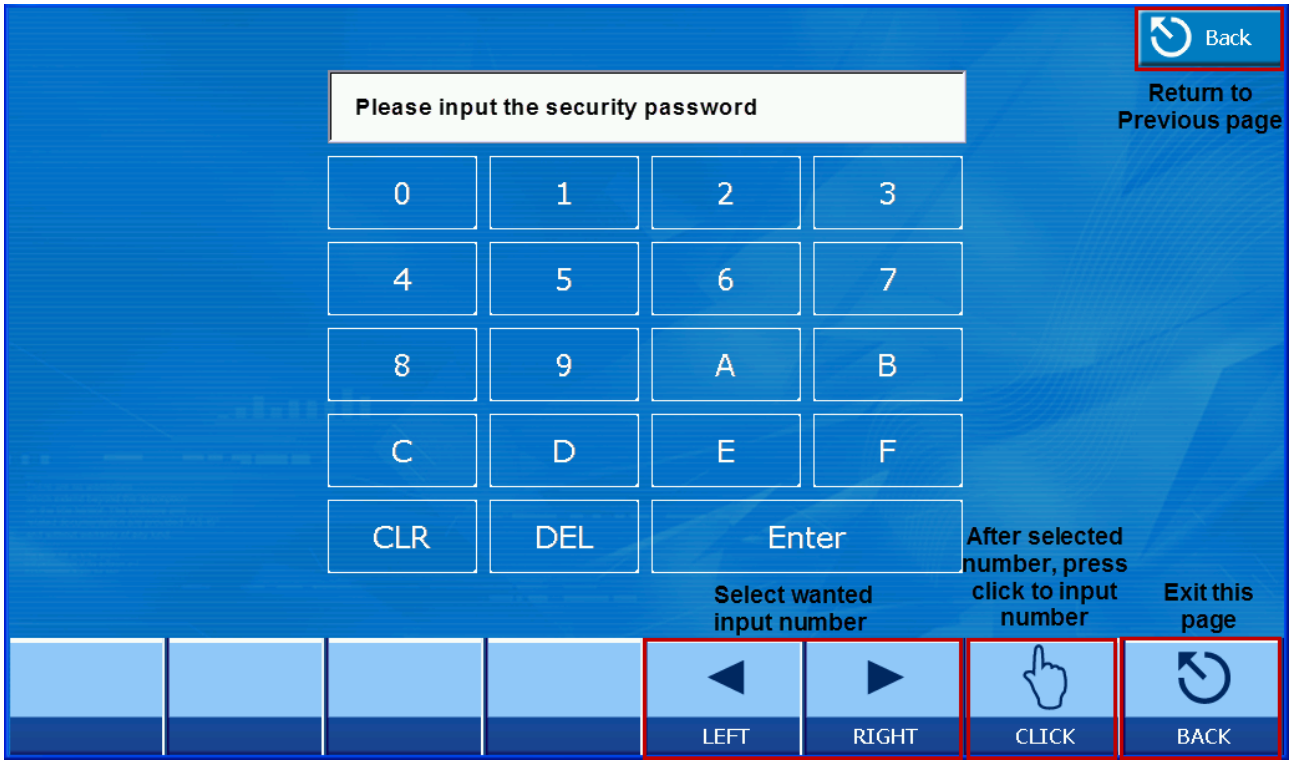
Up	Down	OK	Left	Right	Copy	Exit
F2	F3	F4	◀	▶	↵	SYS

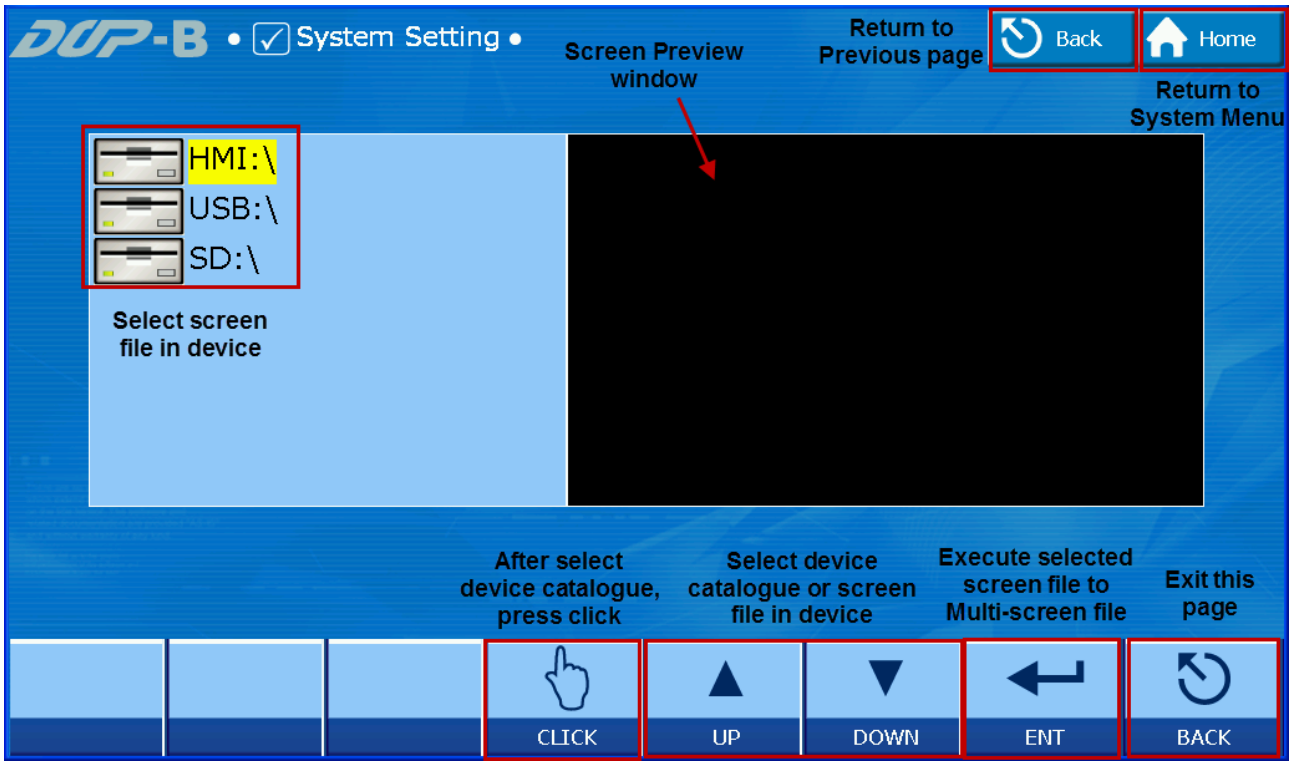
➢ **NOTE**

- HMI does not support direct copying between disks.
- HMI only supports the directories HMI-000 ~ HMI255.
- If HMI is selected as the destination directory, the original file will be removed before being copied from the source directory to the destination.
- If New… is selected as the destination directory, HMI will look for a directory not used in HMI-000~HMI-255 and create it as the destination.
- If the screen file in the source directory is password protected, HMI will ask for a password. The user must enter the password for the screen file of the source directory to perform the copy function.

✓ Multi-Window File

This function enables the user to select the preferred startup screen file. The user only needs to enter the password to access the startup screen setup function.





➢ Auxiliary key and function bar mapping list

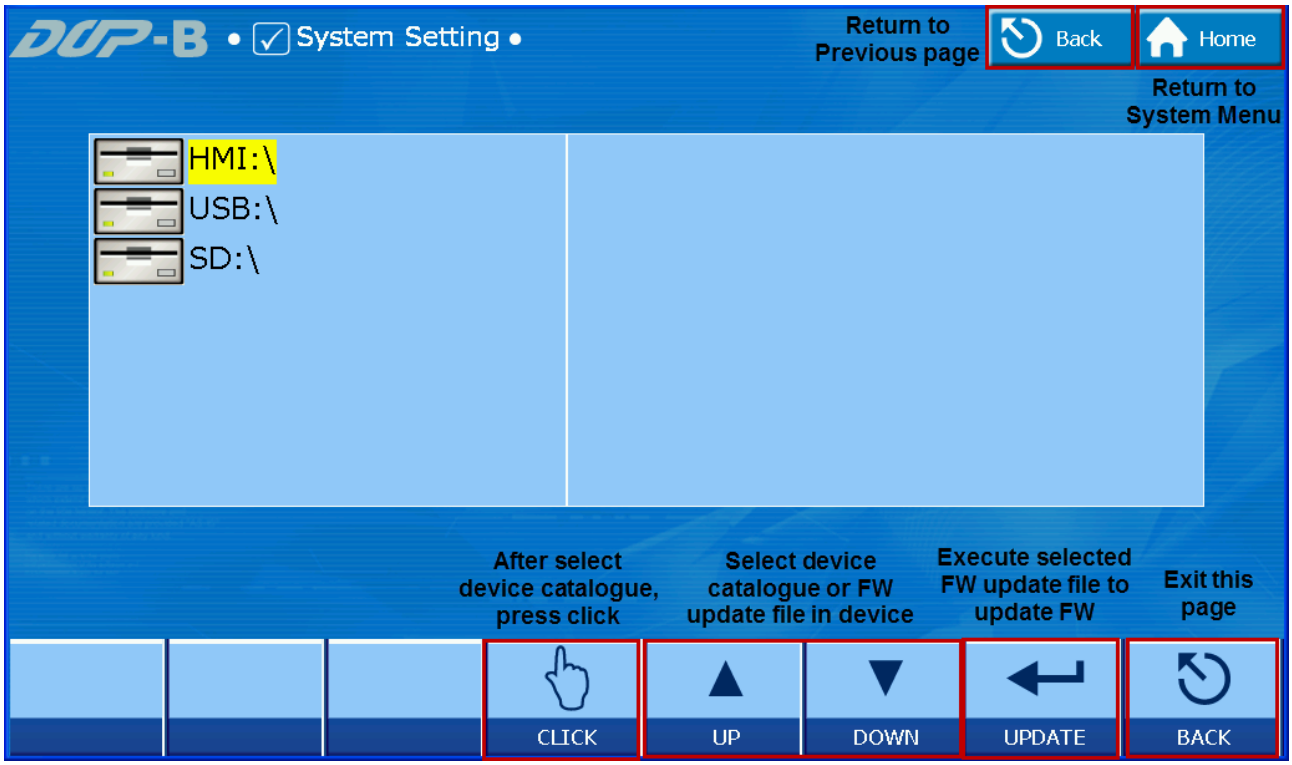
OK	Up	Down	ENTER	Exit
F4	◄	►	↵	SYS

➢ **NOTE**

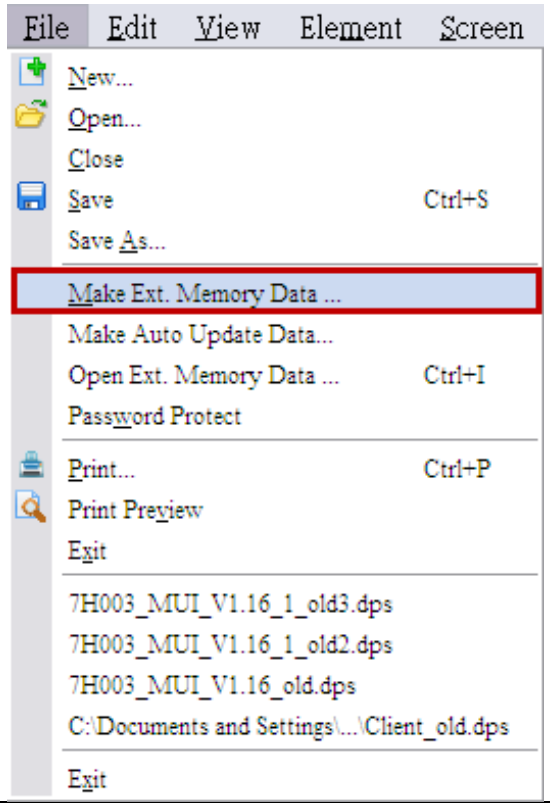
- HMI only supports the directories HMI-000 ~ HMI255.
- If the user turns on the machine and cannot find the existing startup directory, HMI will open the internal screen file instead of changing the path to the startup directory. When the user turns on the machine the next time and finds the startup directory again, he can use it for startup of the machine.
- If the startup directory is an external sector, the non-volatile data of this screen will be stored in this startup directory automatically, no matter whether the data are set to an internal or external sector.

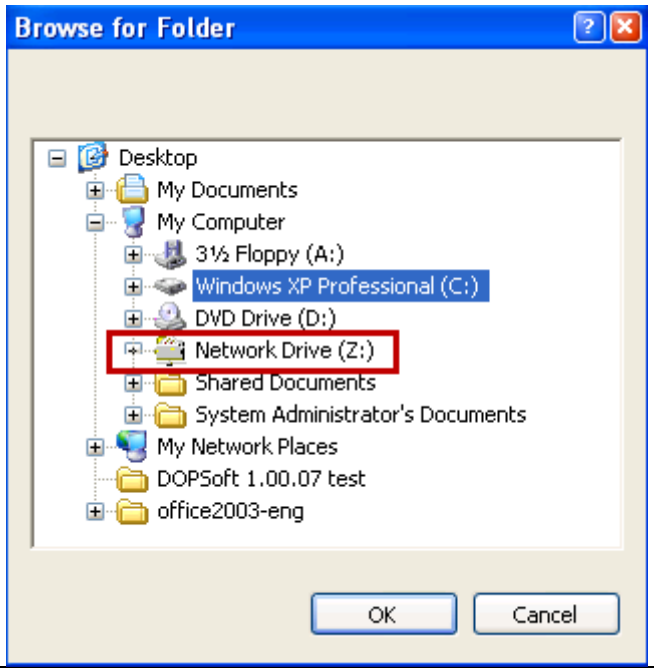
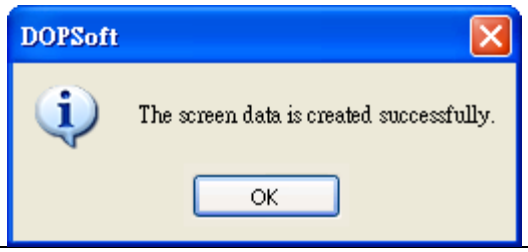
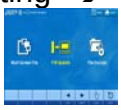
✓ Firmware Update

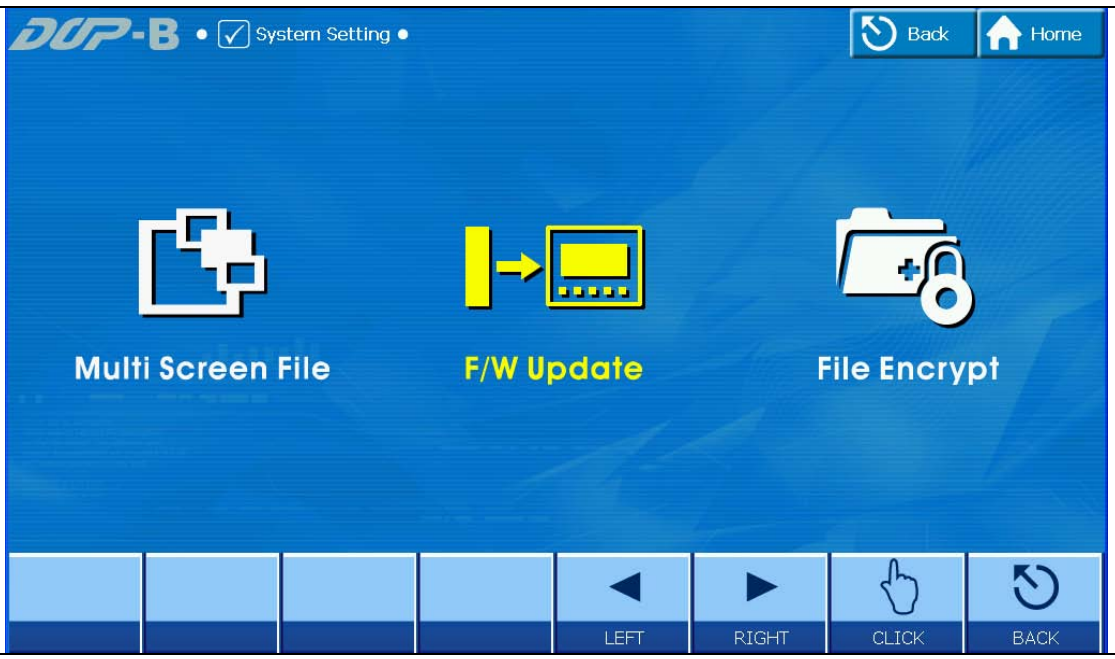
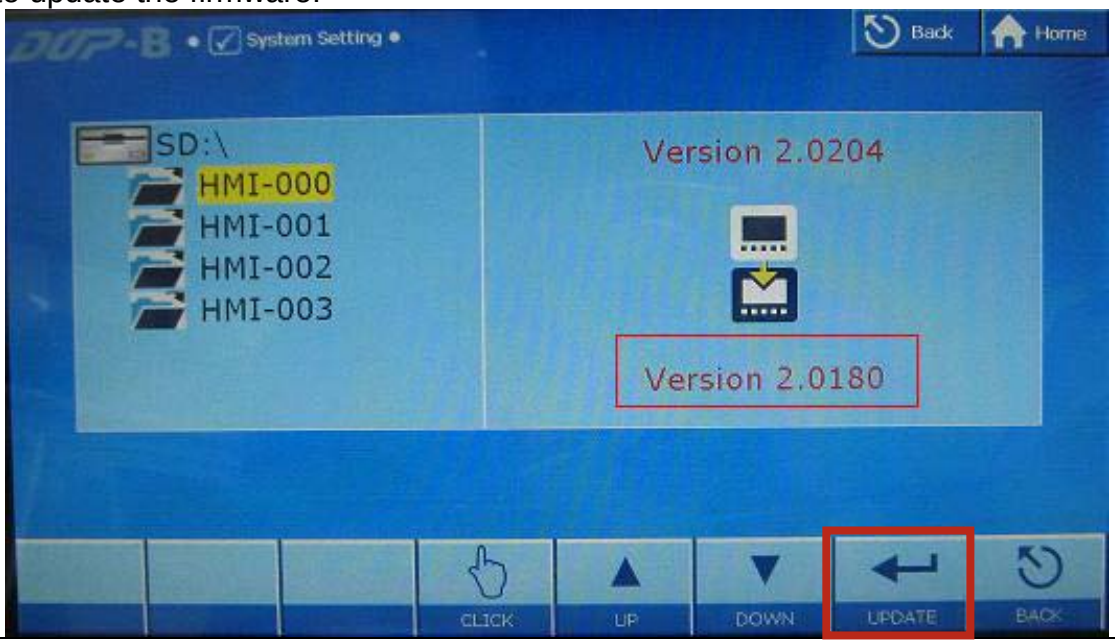
This function enables the user to perform firmware update using an external disk (USB Disk or SD Card).

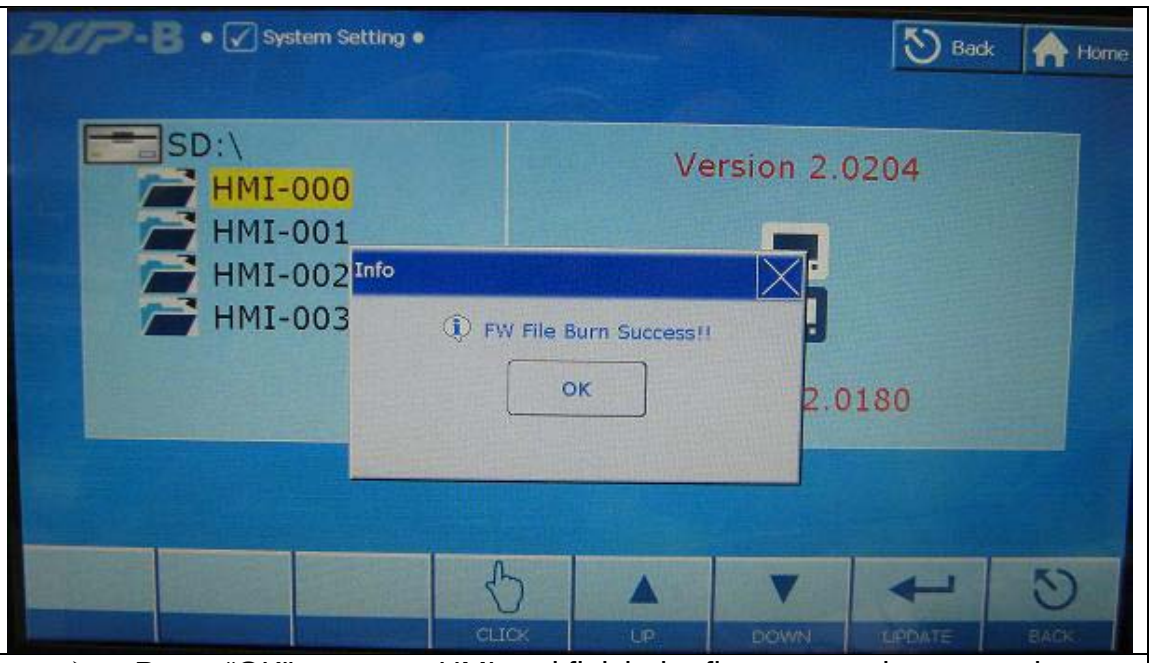


The following is an example of the firmware update.

Step 1	➢ Enter "File" → "Make Ext. Memory Data" and select Make Ext. Memory Data. 
Step2	➢ Select an external disk (USB Disk or SD Card) for making the memory

	data and click OK. 
Step3	➢ When the memory data are made successfully,a message appears for confirmation. 
Step4	➢ Insert the external sector in HMI.
Step5	➢ Enter the HMI system screen and select “System Setting" ➔ “File Manager” ➔ "F/W Update". If the “F/W Update” icon  is not shown in the “File Manager”, press to flip the page.

	
Step6	Select the source of the firmware to be updated. The firmware version after the update will be displayed on the screen. Confirm the version and click "UPDATE" to update the firmware. 
Step7	➢ The “FW File Burn Success!!” appears to confirm the successful update of the firmware.

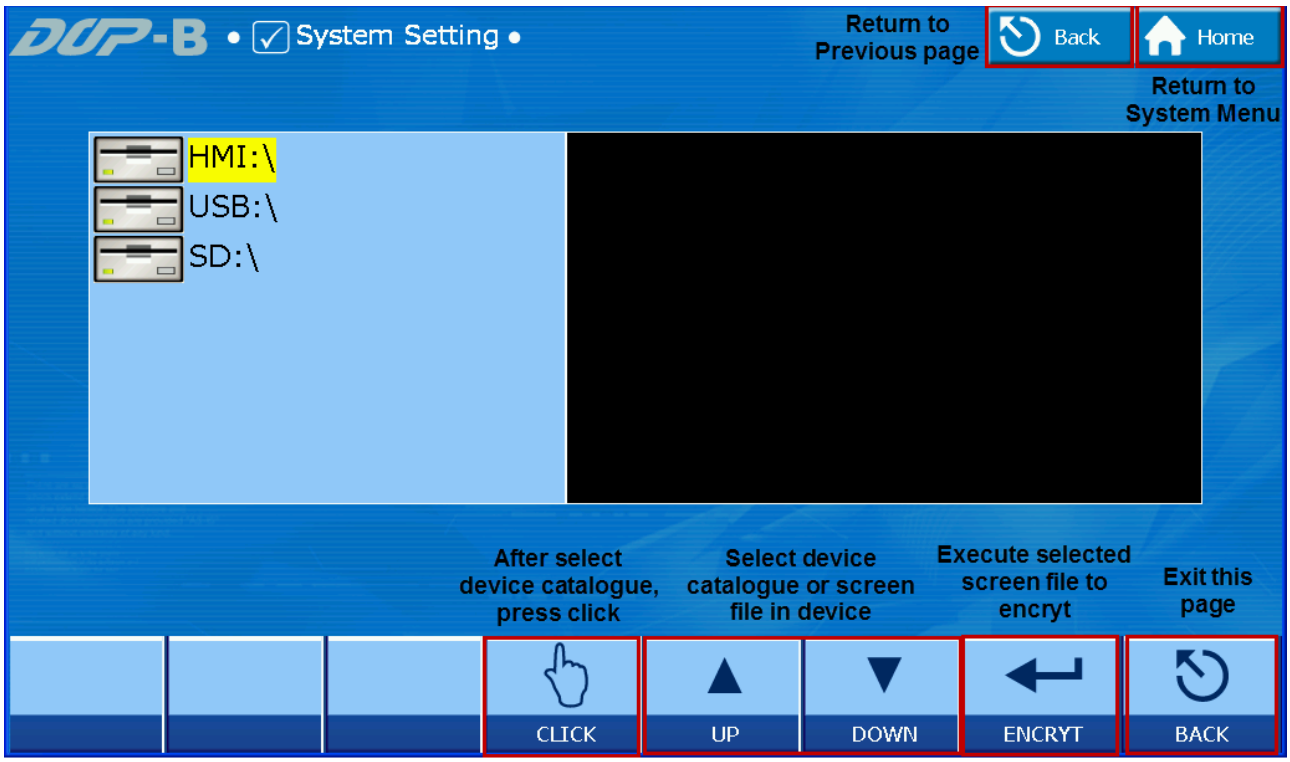
	
Step8	➢ Press “OK" to restart HMI and finish the firmware update operation.

➢ Auxiliary key and function bar mapping list

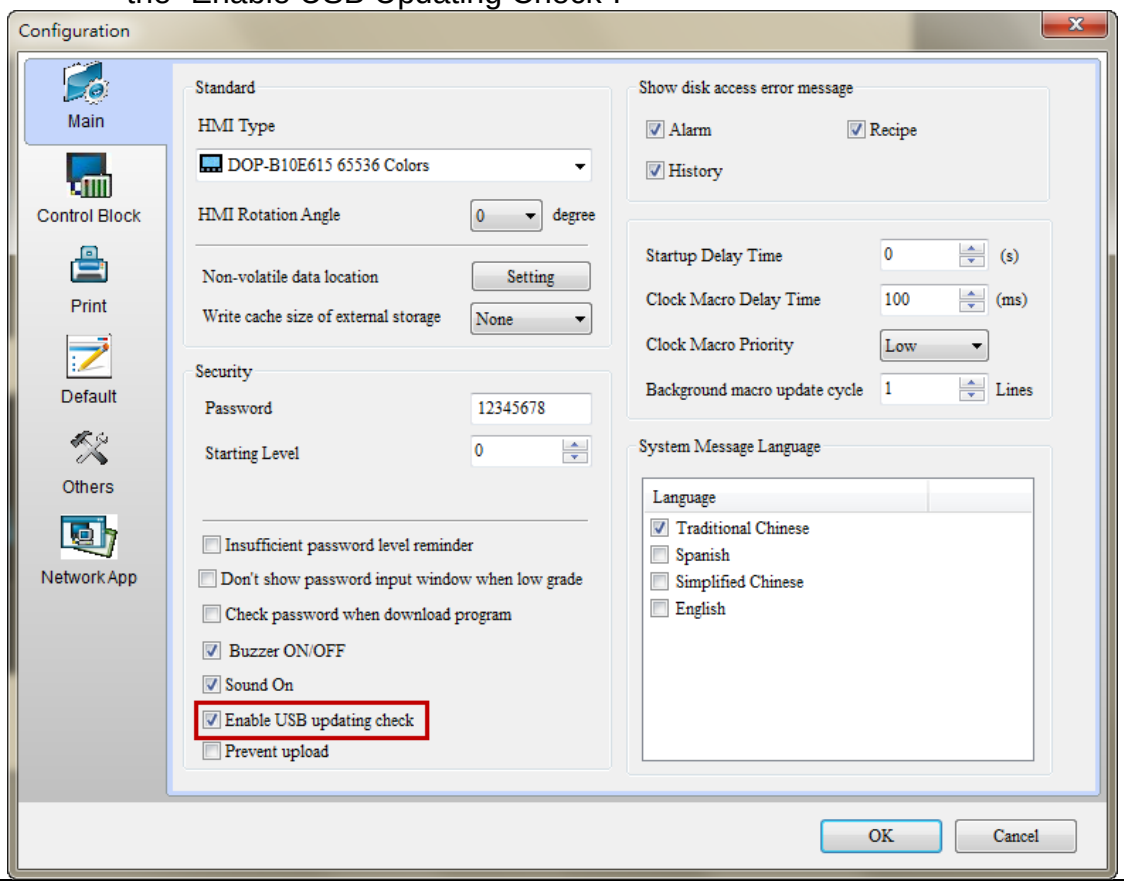
OK	**Up**	**Down**	**Update**	**Exit**
F4	◀	▶	↵	SYS

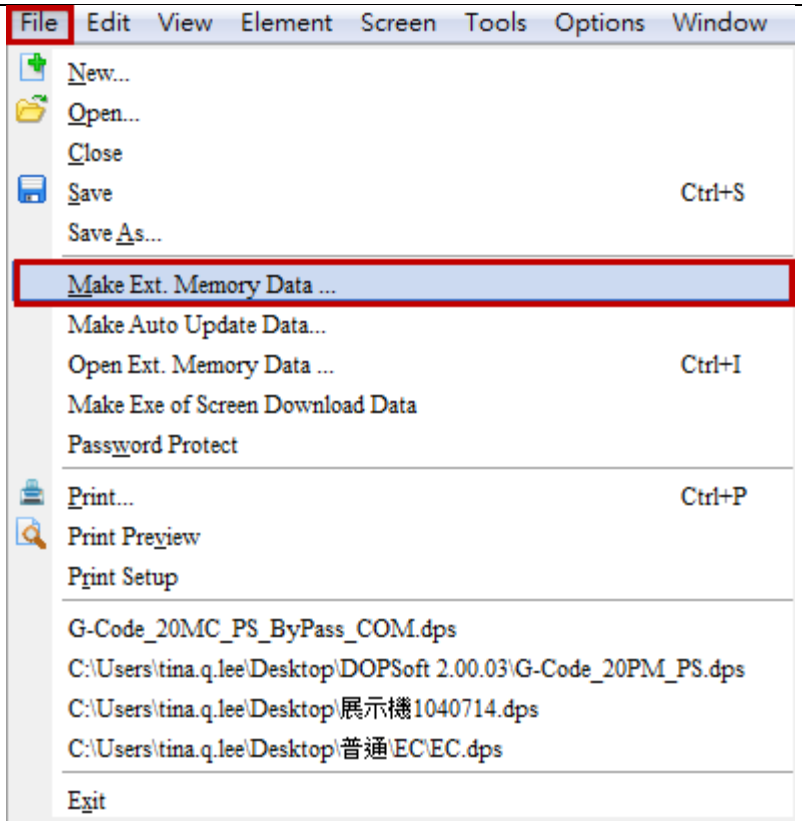
✓ Encrypt

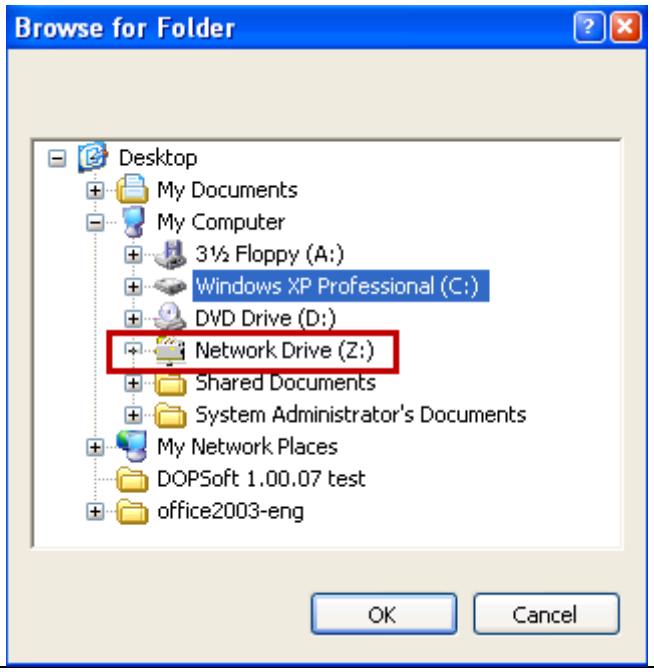
This function enables the user to encrypt the screen data file and set the maximum copy times. It provides the user with a secure and flexible file protection mechanism.



The following is an example of encryption.

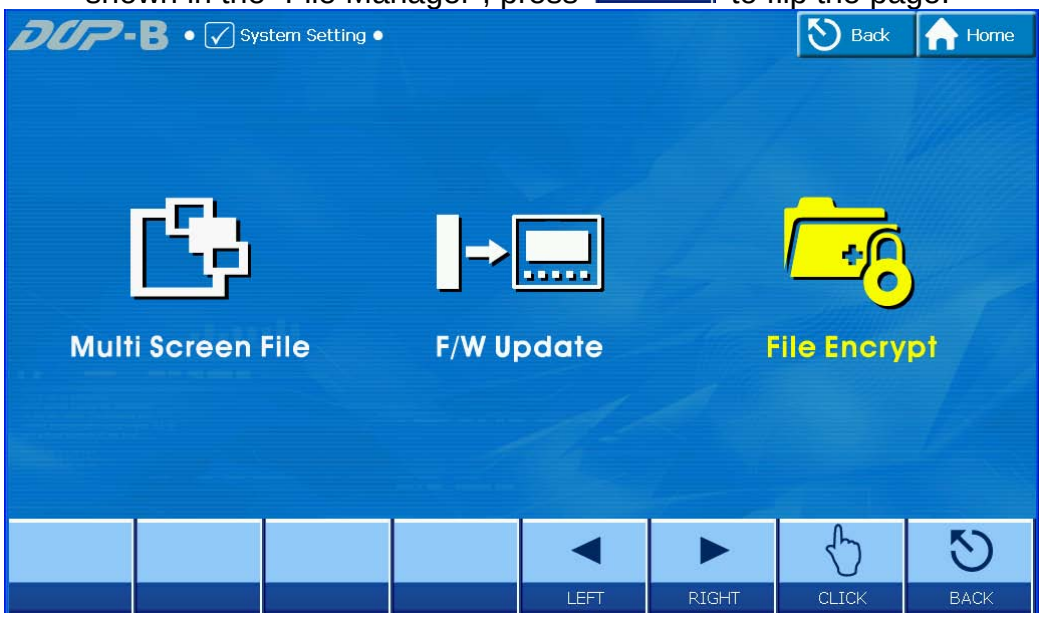
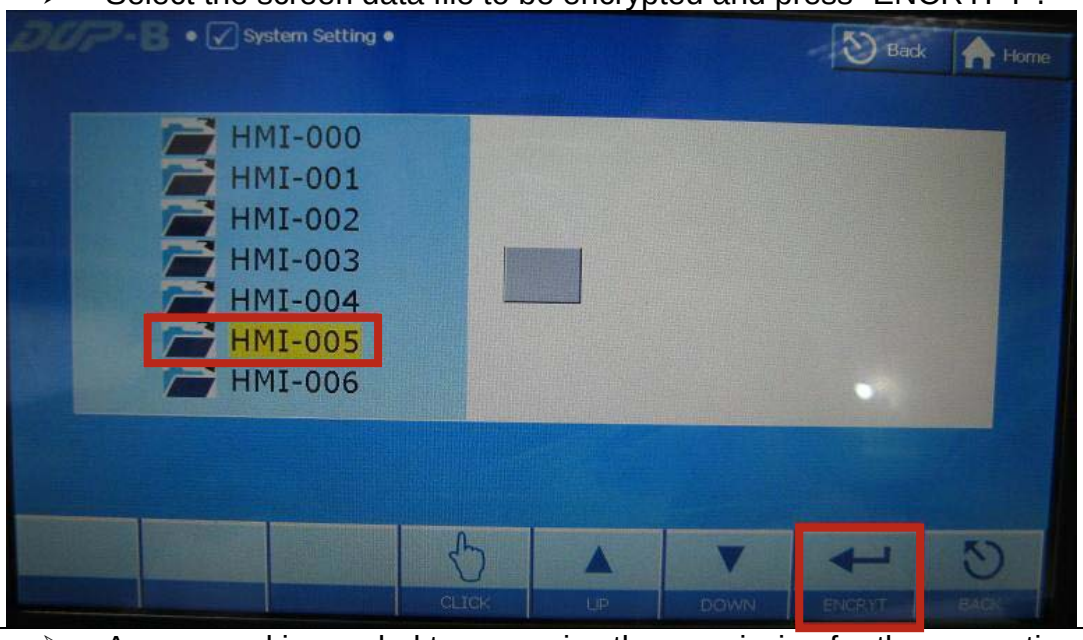
Step 1	➢ Enter [Options]➔[Configuration….] from the editing screen and check the "Enable USB Updating Check". 
Step2	➢ Use the edited screen to make memory data. Click [File]➔[Make Ext. Memory Data]and select an external disk (USB Disk or SD Card).

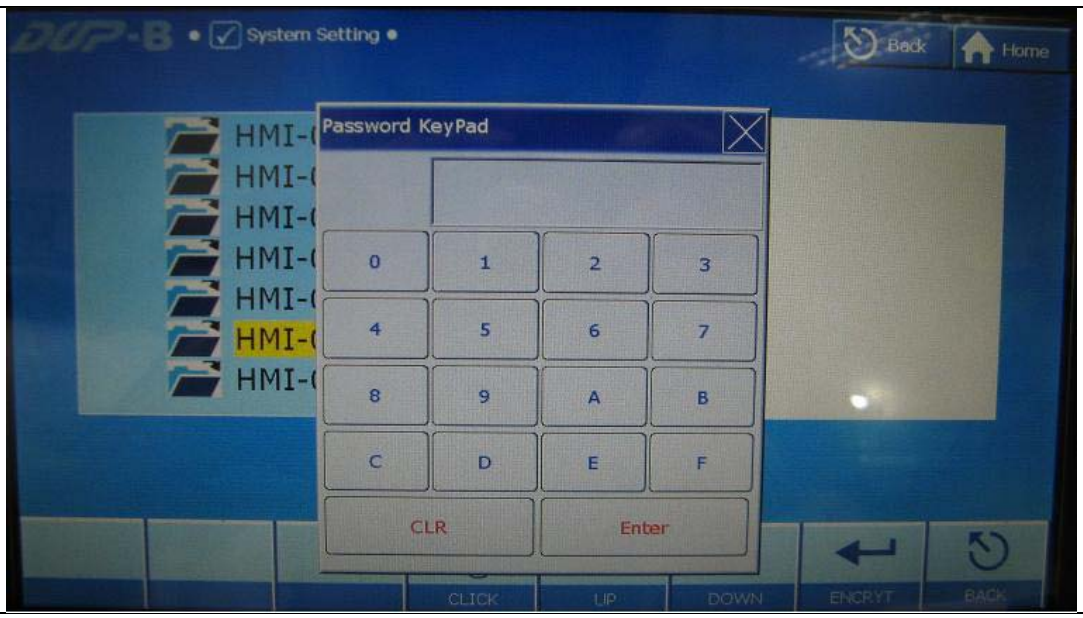
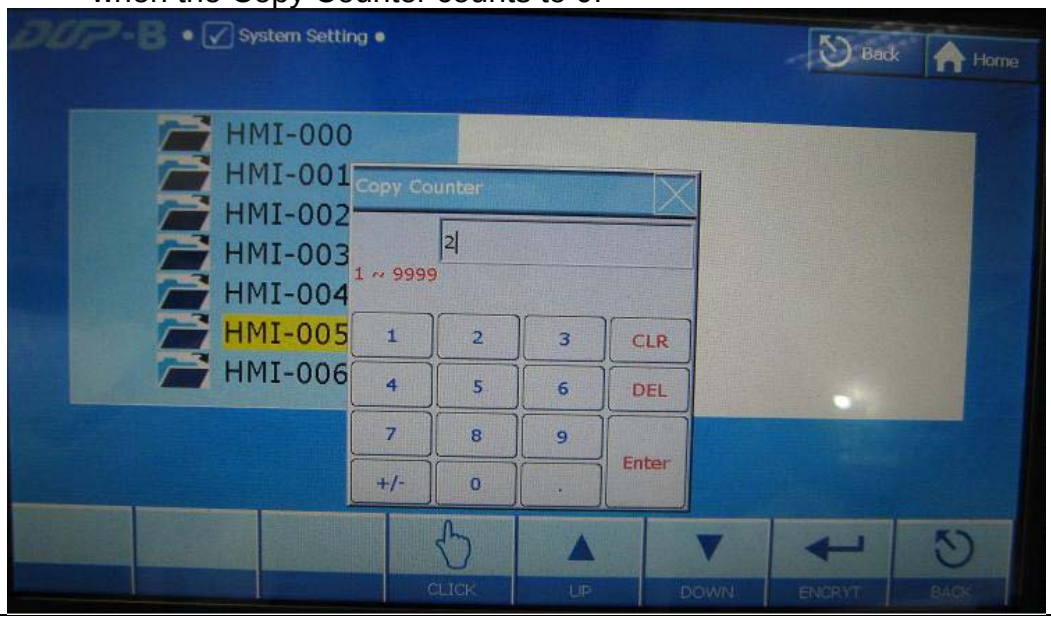
<table>
<tr>
<td></td>
<td>


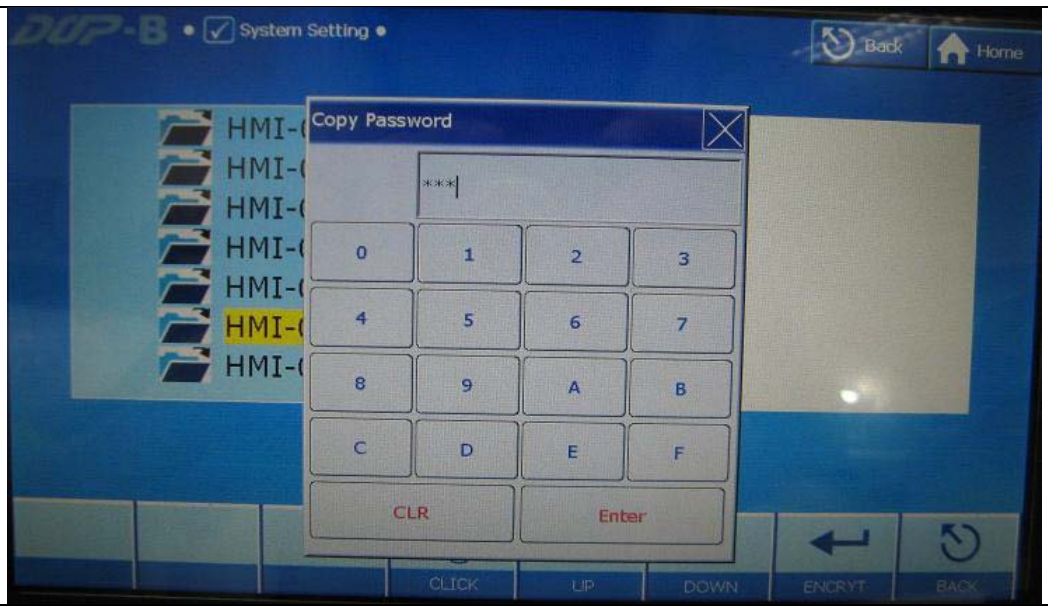
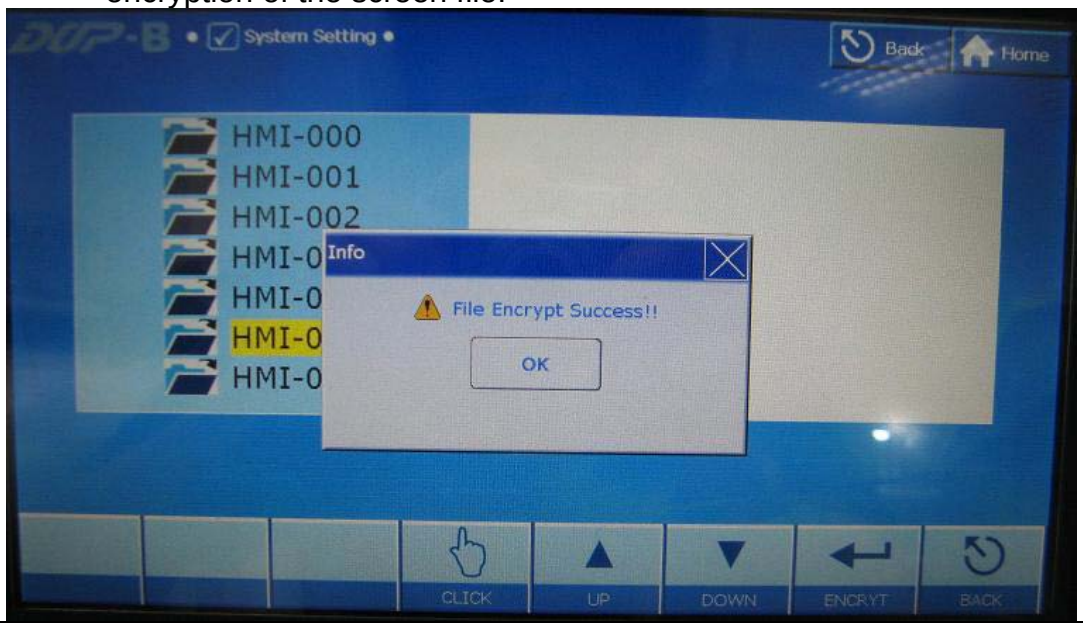
➢ Select an external disk (USB Disk or SD Card) for making the memory data and click OK.


</td>
</tr>
<tr>
<td>Step3</td>
<td>
➢ When the memory data are made successfully, a message appears for confirmation.

</td>
</tr>
<tr>
<td>Step4</td>
<td>➢ Insert the external disk in HMI.</td>
</tr>
</table>

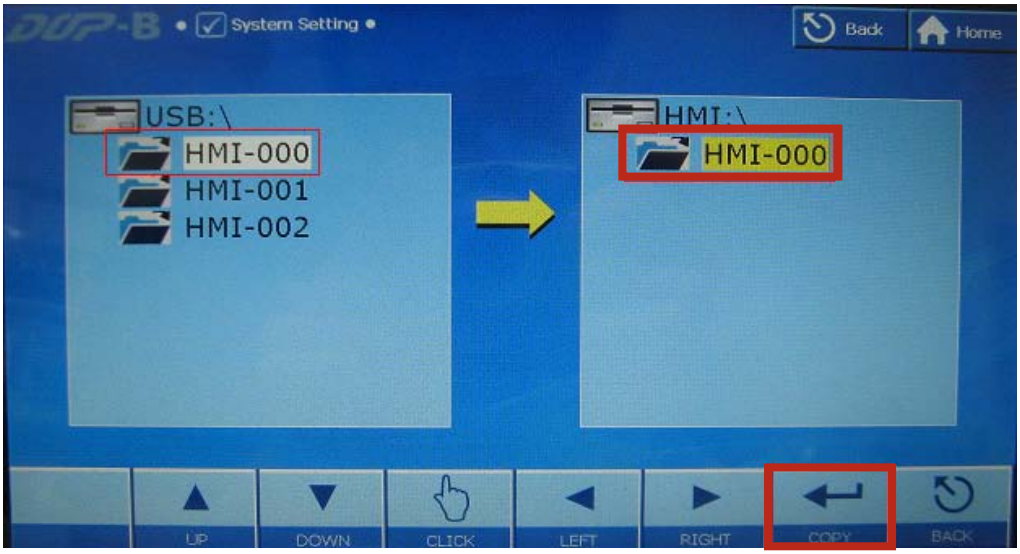
Step5	➢ Enter the HMI system screen and select “System Setting" ➔ “File Manager” ➔ "File Encrypt". If the “File Encrypt” icon is not shown in the “File Manager”, press to flip the page. 
Step6	➢ Select the screen data file to be encrypted and press “ENCRYPT”. 
Step7	➢ A password is needed to recognize the permission for the encryption.

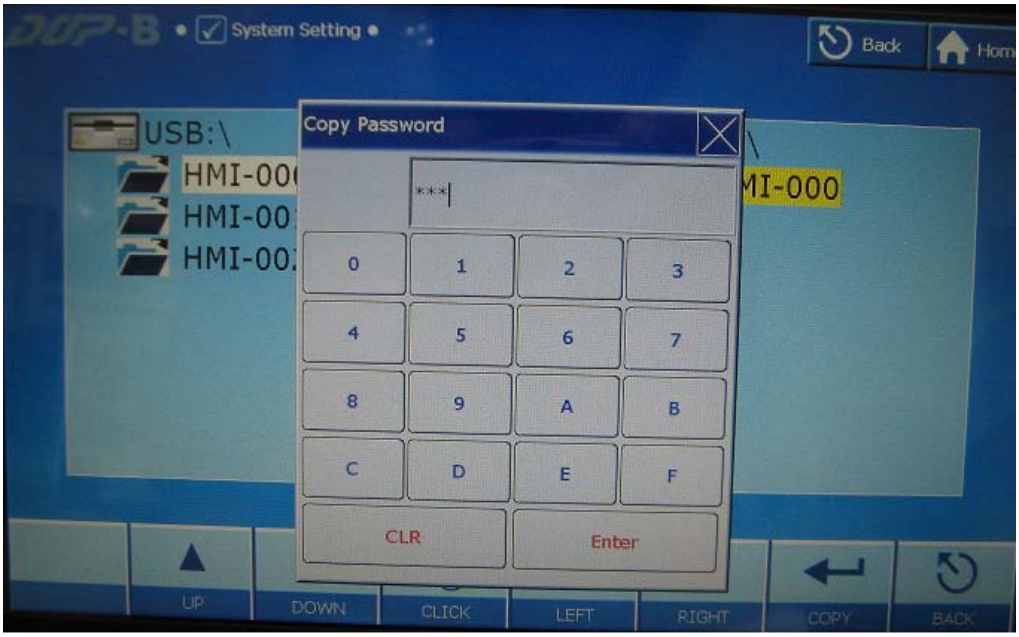
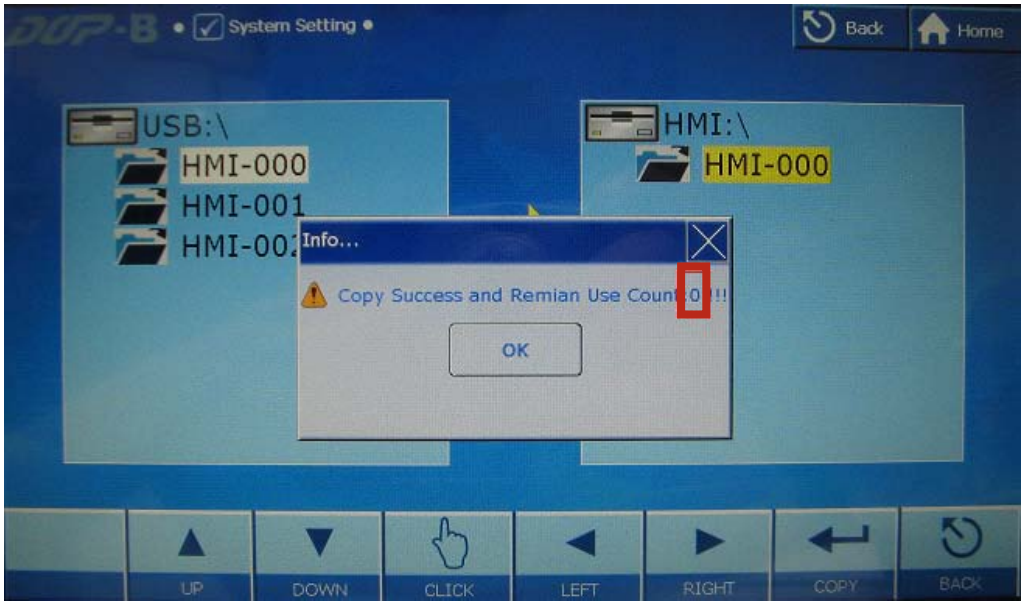
	
Step8	➢ After setting the copy times for a file, it cannot be copied any more when the Copy Counter counts to 0. 
Step9	➢ Set a password for the copy, and this copy password will be requested every time when the user copies a file.

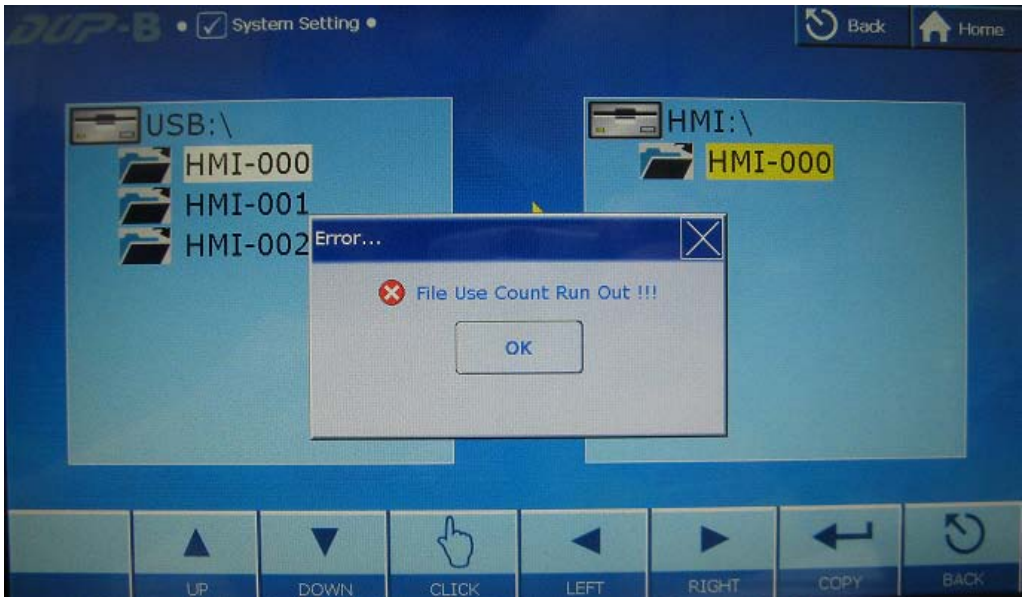
	
Step10	➢ The “File Encrypt Success!!” appears to confirm the successful encryption of the screen file. 
Step11	➢ The successfully encrypted screen file can be copied to an external disk or used internally in HMI.

➢ After the encryption, the user can use the Copy File function to verify the effectiveness of the copy times setting.

Step1	➢ Enter the HMI system screen and select “System Setting” ➔ “File Manager” ➔ “Copy File".

Step2	➢ Select an encrypted screen file for copying. 
Step3	➢ A window appears to ask for the password. Enter the copy password to copy the file.

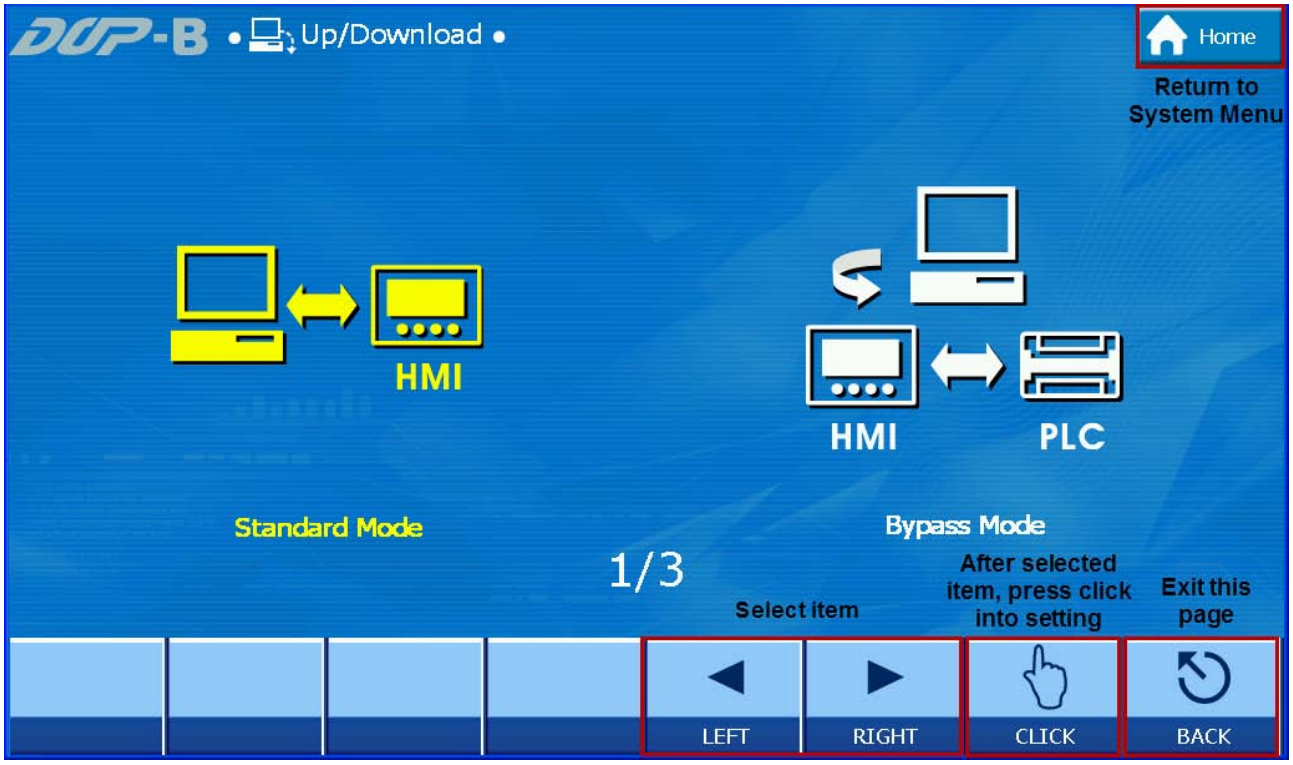
	
Step4	➢ The rest of the copy times will be displayed after the copy is performed. 
Step5	➢ The encrypted file cannot be copied any more when the copy times count to 0.



➢ Auxiliary key and function bar mapping list

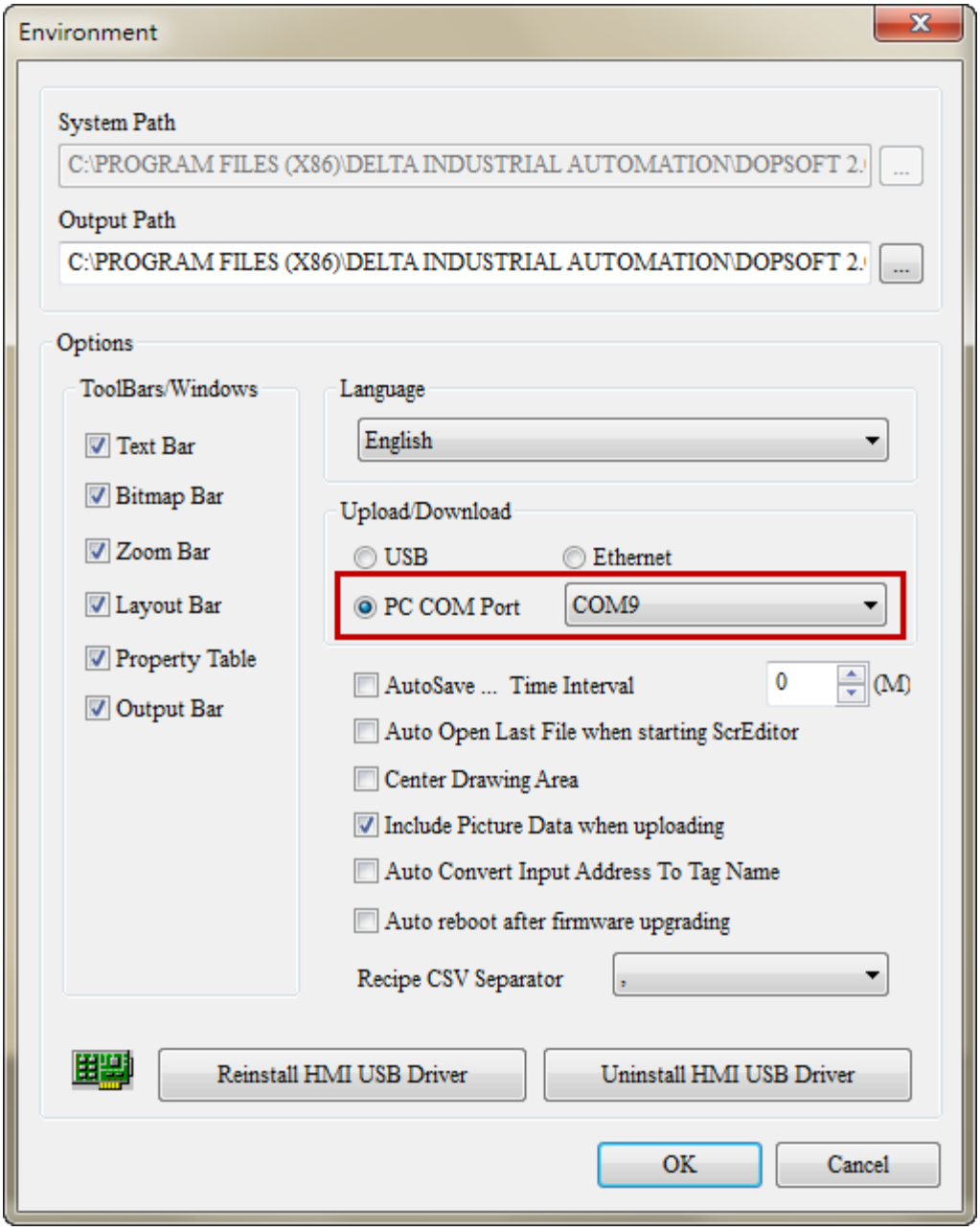
OK	**Up**	**Down**	**Encrypt**	**Exit**
F4	◀	▶	↵	SYS

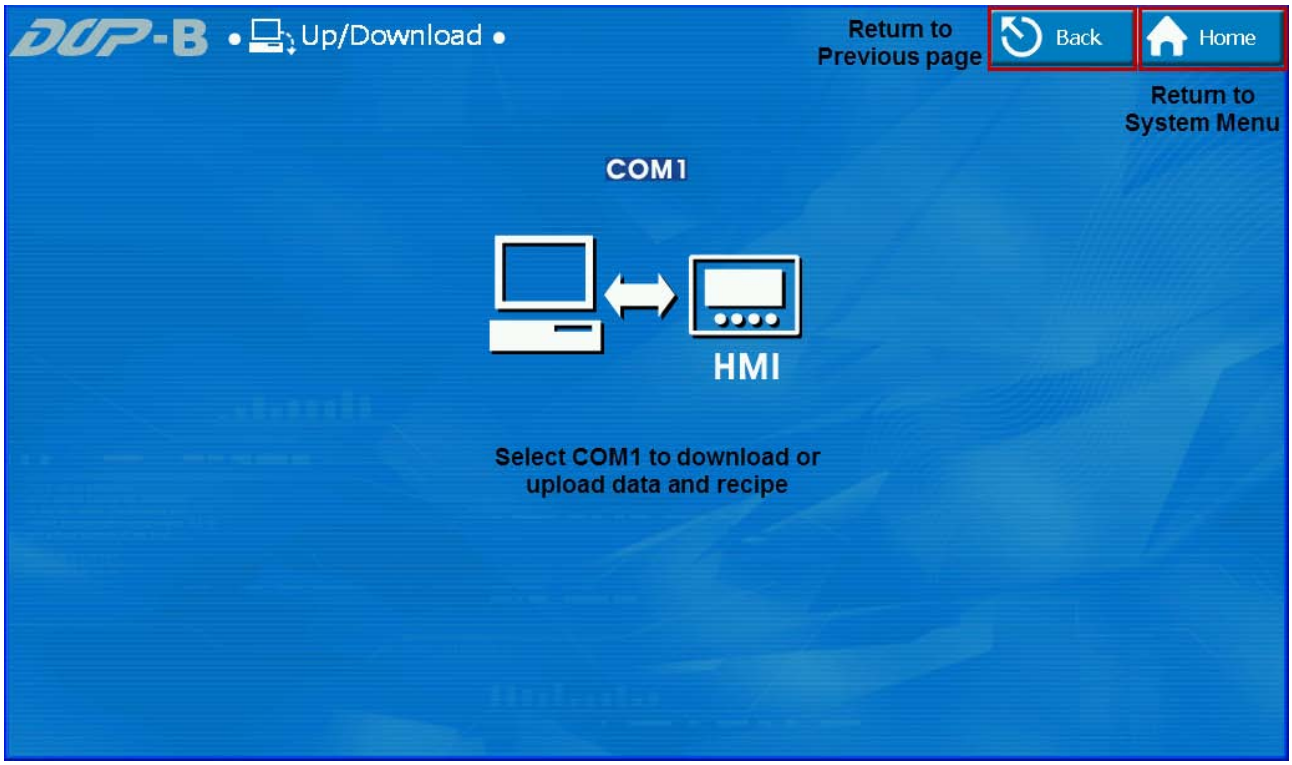
A-3 Upload/Download



■ Standard Mode

Set the COM Port to the DOPSoft protocol setting and wait for the DOPSoft to send the command and packet for upload/download. If the PC COM Port of the software is used for download ([Options] → [Environment]) in the Standard mode, the user needs to enter the system screen to select [Upload/Download] → [Standard Mode]. The user also needs to select COM 1 or COM 2 and wait for upload/download of the screen and recipe data. Refer to Chapter 2, Section 2-2-8-8 Environment for more information.


Environment
System Path
C:\PROGRAM FILES (X86)\DELTA INDUSTRIAL AUTOMATION\DOPSOFT 2.
Output Path
C:\PROGRAM FILES (X86)\DELTA INDUSTRIAL AUTOMATION\DOPSOFT 2.
Options
ToolBars/Windows
Text Bar
Bitmap Bar
Zoom Bar
Layout Bar
Property Table
Output Bar
Language
English
Upload/Download
USB
Ethernet
PC COM Port
COM9
AutoSave ... Time Interval
0
(M)
Auto Open Last File when starting ScrEditor
Center Drawing Area
Include Picture Data when uploading
Auto Convert Input Address To Tag Name
Auto reboot after firmware upgrading
Recipe CSV Separator
,
Reinstall HMI USB Driver
Uninstall HMI USB Driver
OK
Cancel



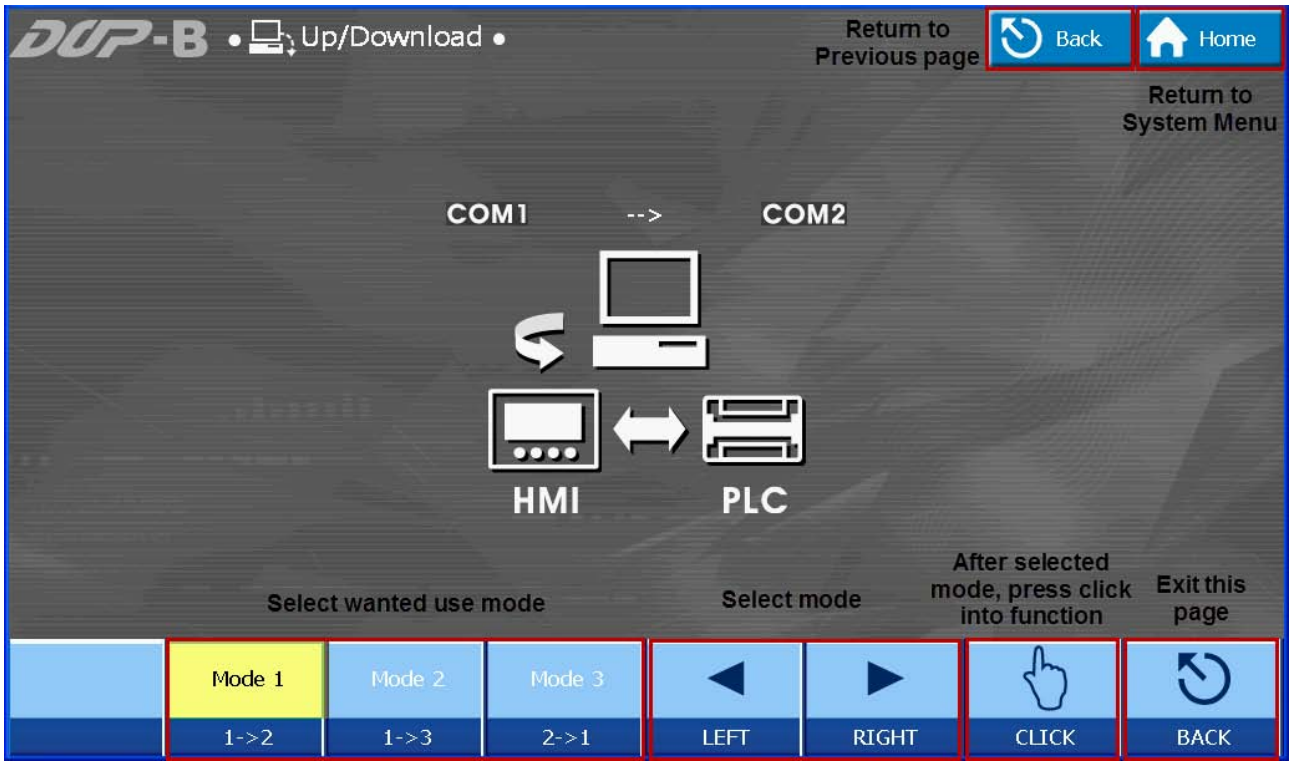
Standard Mode	COM 1	COM 1 upload/download
		Set COM 1 to transmit and receive DOPSoft upload/download command and packet data.
	COM 2	COM 2 upload/download
		Set COM 2 to transmit and receive DOPSoft upload/download command and packet data.

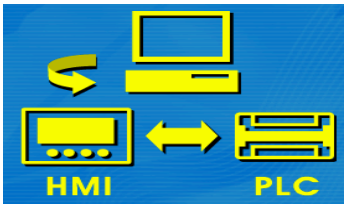
➢ Auxiliary key and function bar mapping list

Left	**Right**	**OK**	**Exit**
			SYS

■ Bypass Mode

With HMI as an intermediary, it will transmit the data from the source port to the destination port.



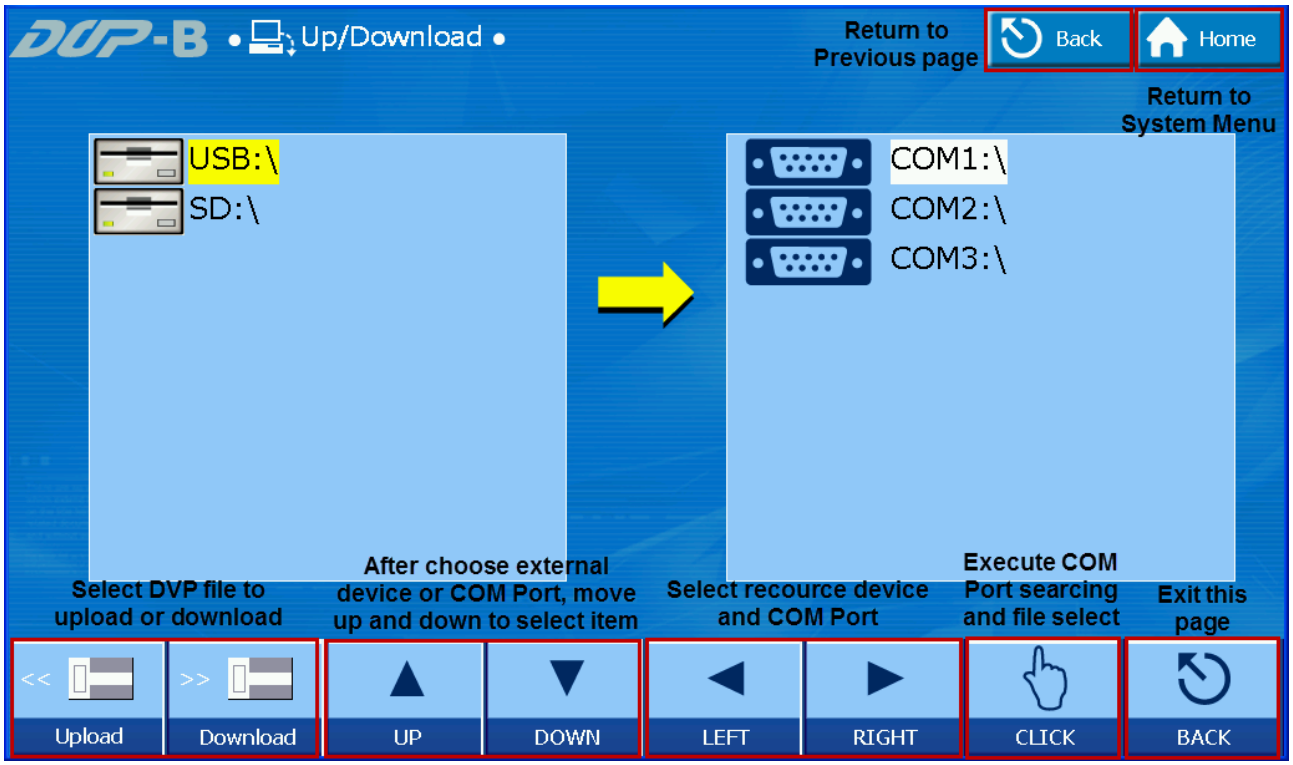
Bypass Mode 	Mode 1 COM 1 → COM 2	With COM 1 as the source and COM 2 as the destination, transmit the data that COM 1 received using the COM 2 protocol.
	Mode 2 COM 1 → COM 3	With COM 1 as the source and COM 3 as the destination, transmit the data that COM 1 received suing the COM 3 protocol.
	Mode 3 COM 2 → COM 1	With COM 2 as the source and COM 1 as the destination, transmit the data that COM 2 received suing the COM 1 protocol.

➢ Auxiliary key and function bar mapping list

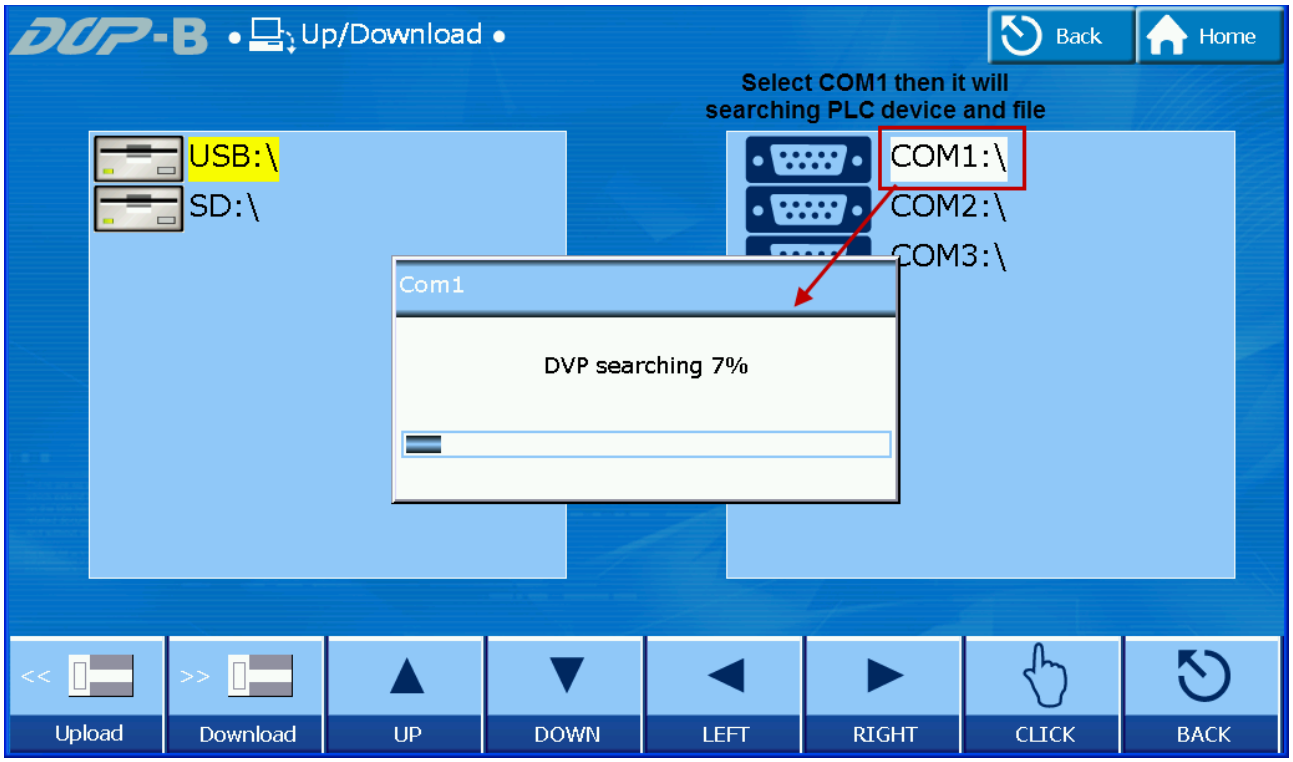
Mode 1 1 → 2	Mode 2 1 → 3	Mode 3 2 → 1	Left	Right	OK	Exit
F2	F3	F4	◀	▶	↵	SYS

■ Transfer Mode

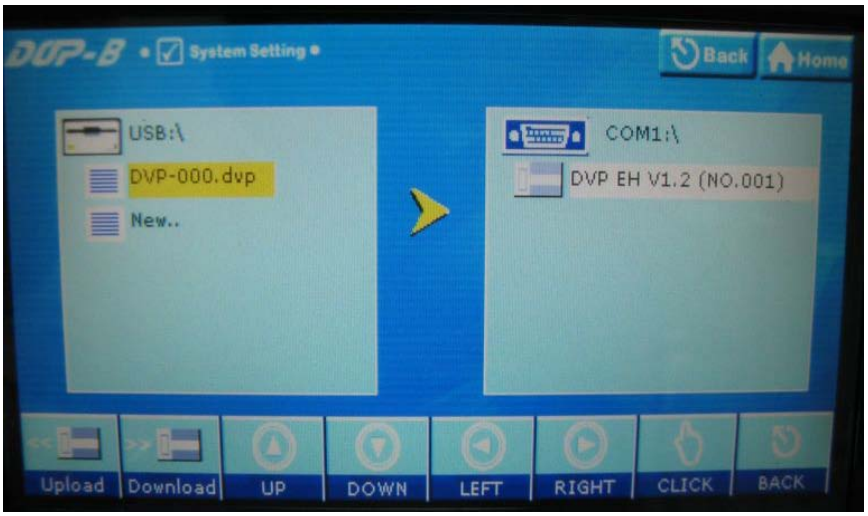
The Transfer mode is used to upload/download PLC DVP files that HMI uses.



Select COM 1 and HMI will search PLC automatically.



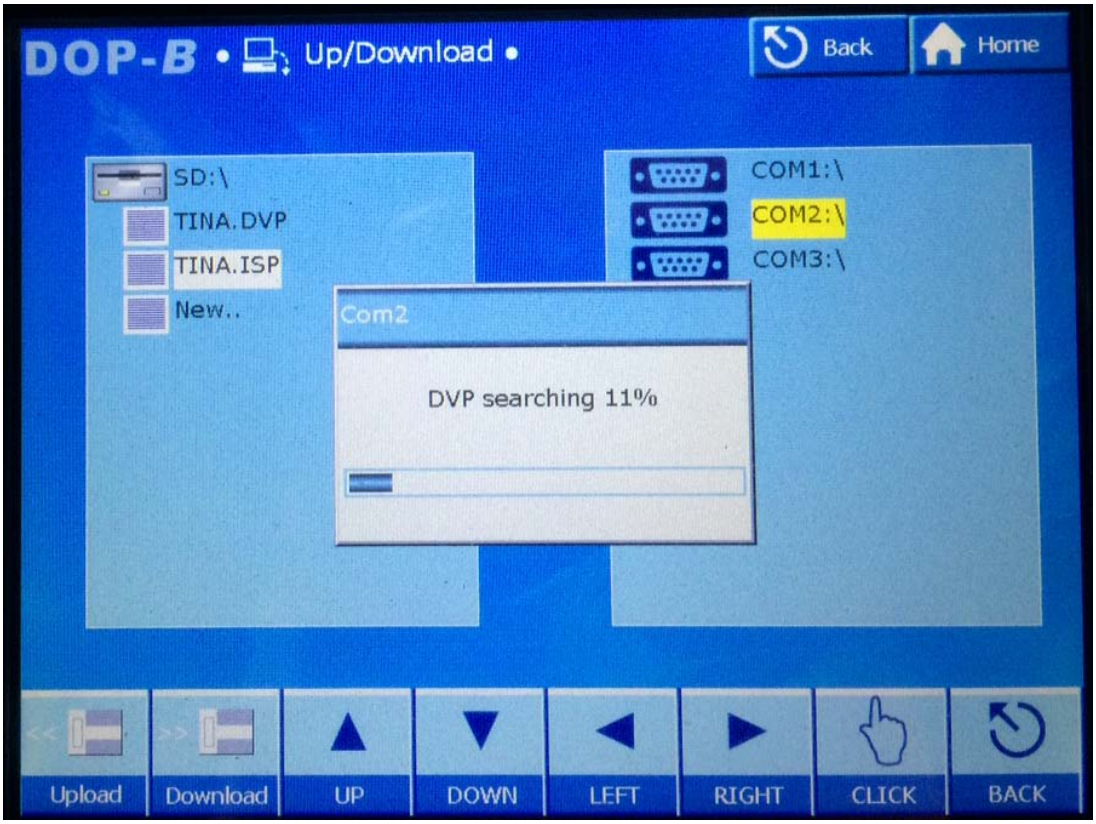
After the DVP file needed is found, the user can upload it from PLC or download a file from an external storage to PLC.



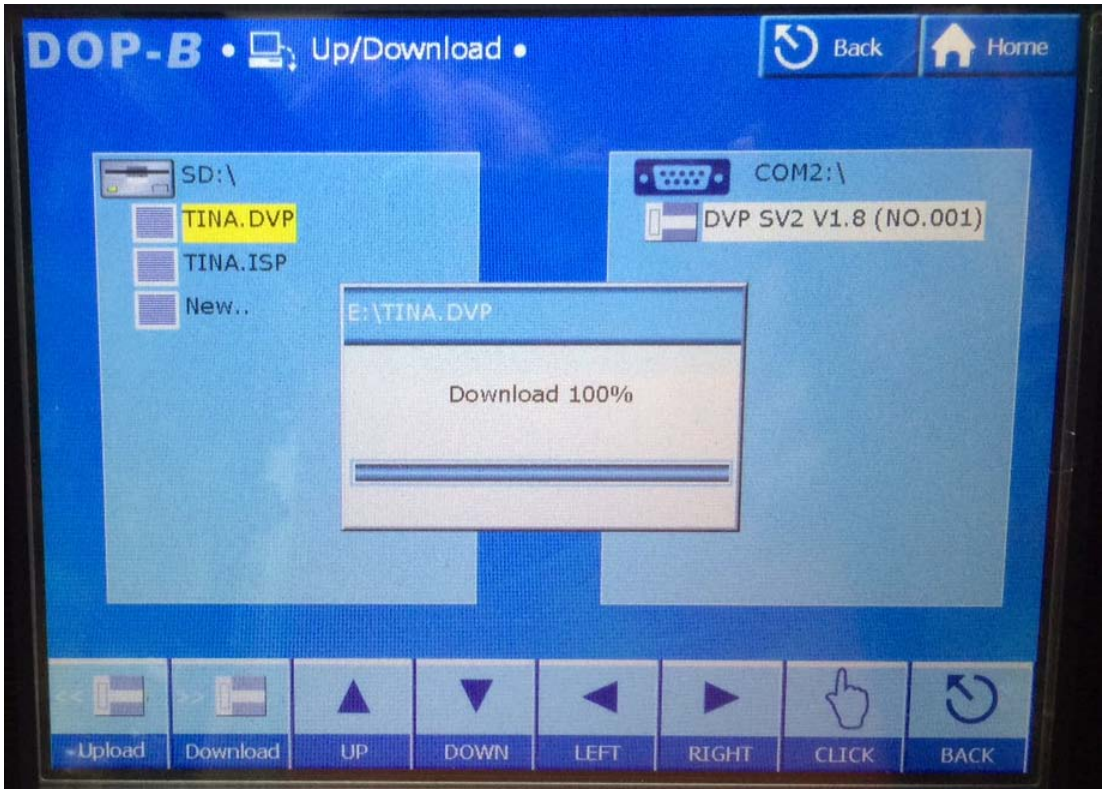
Transfer Mode	Upload	The DVP file in the PLC is uploaded or downloaded using this function. When the user presses COM 1 ~ COM 3, the software will search the PLC devices in use automatically. The DVP file found during the search can be uploaded to the storage device. If a DVP file is to be copied from the storage device to PLC, select download.
	Download	

✓ **Download DVP file to PLC**

Select the communication port that connects to the PLC. Then, the HMI will search the file in the PLC.

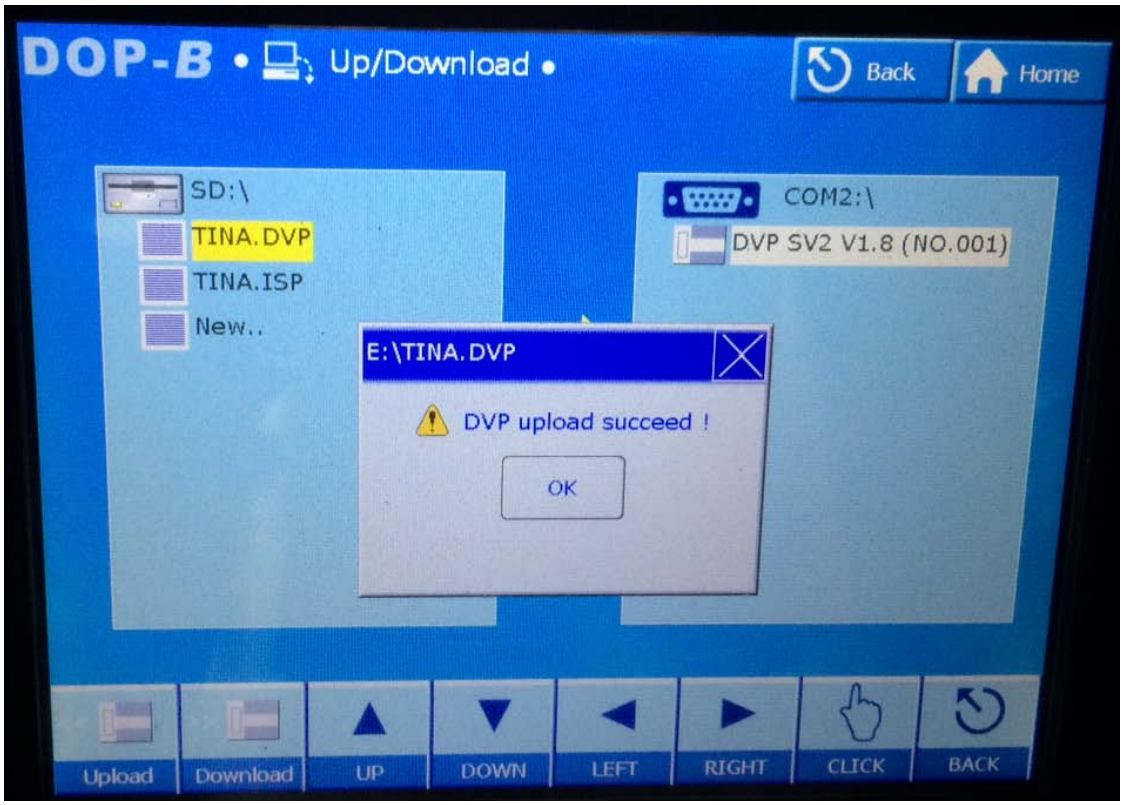


Select the external storage device, TINA.DVP and click to download it. Then, the file will be downloaded to thePLC.



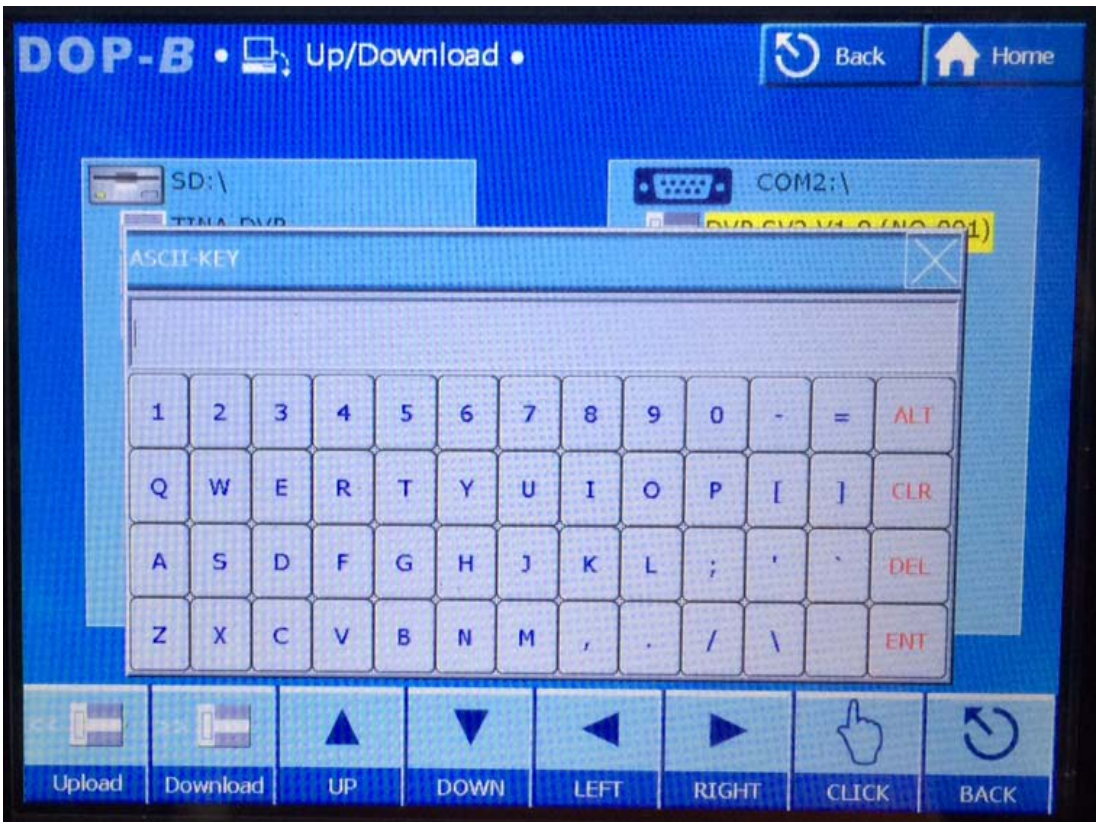
✓ **Upload DVP file from PLC to SD card (the external storage device)**

Select theDVP file from PLC communication port and click on “Upload”. The file will be uploaded to SD card.

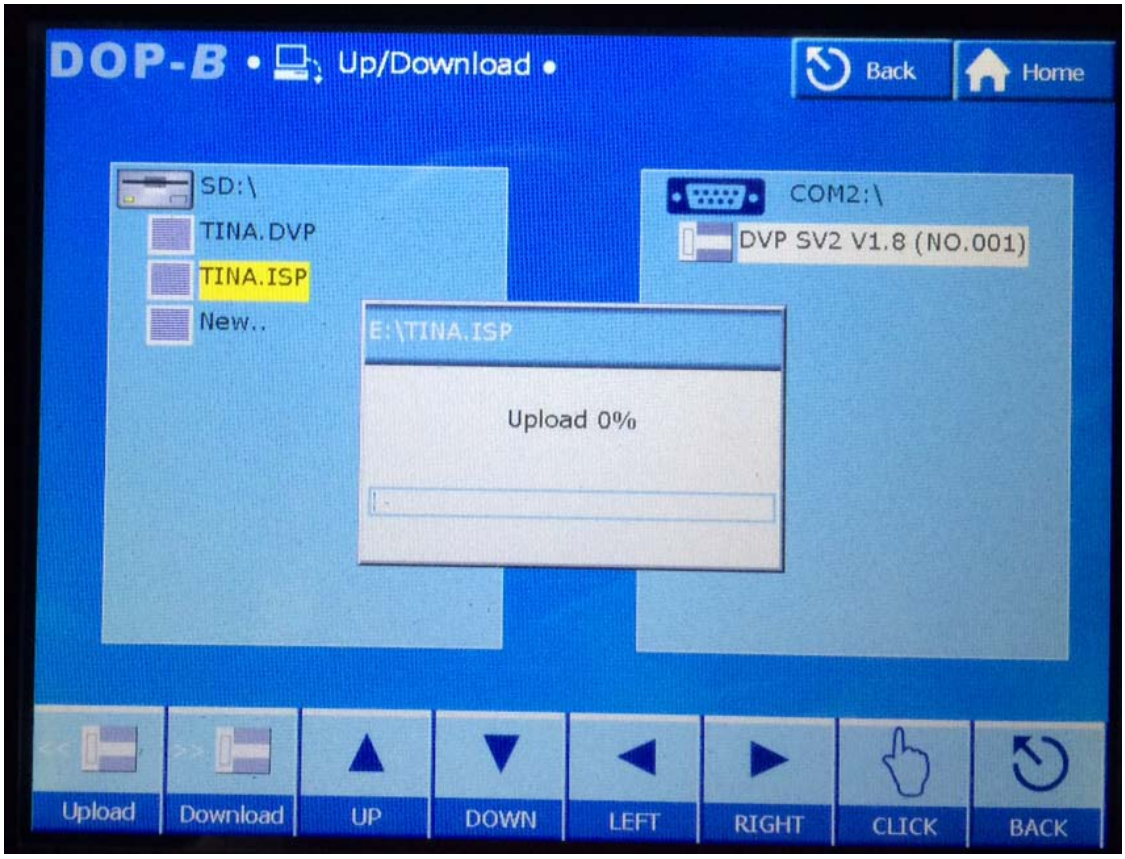


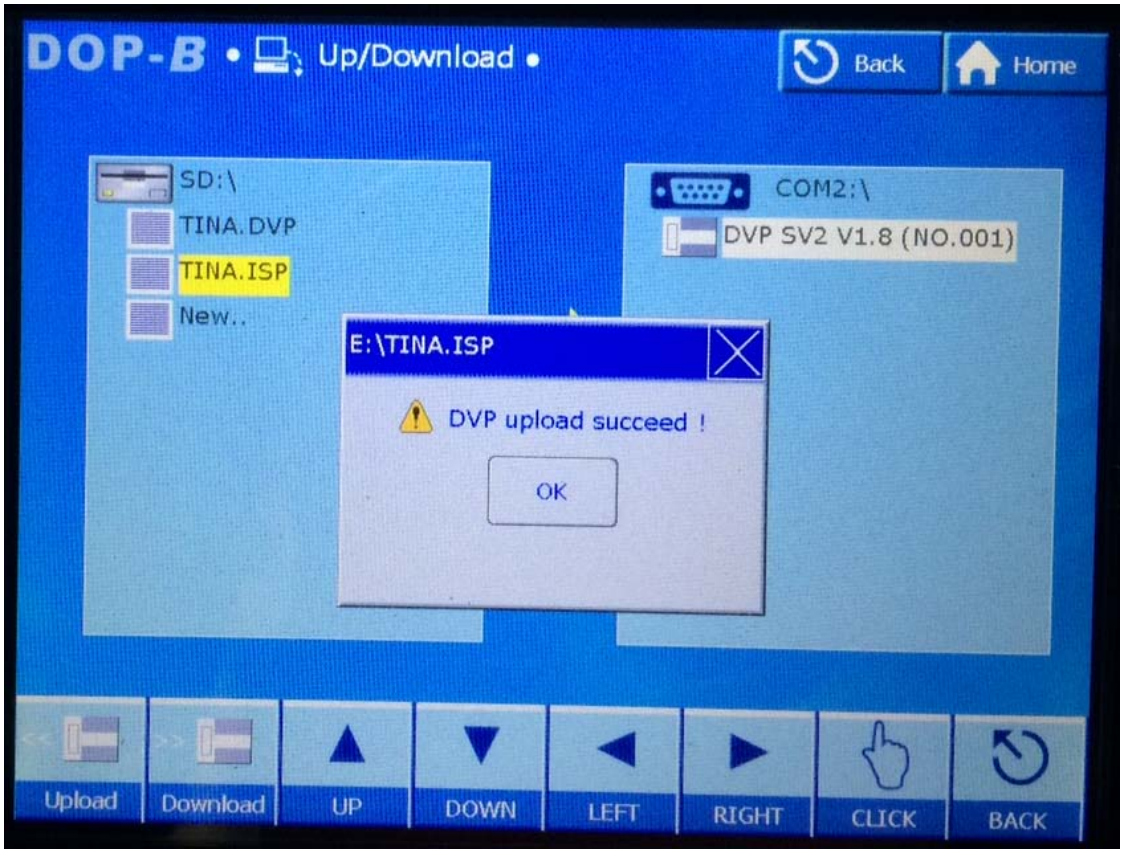
✓ **Upload the encrypting file, ISP from PLC to SD card (the external storage device)**

Click “Upload”. A prompt message will pop up and ask users to enter the password.



If entering the correct password, the file will be successfully uploaded to SD card.




DOP-B • Up/Download •
Back
Home
SD:\
TINA.DVP
TINA.ISP
New..
COM2:\
DVP SV2 V1.8 (NO.001)
E:\TINA.ISP
DVP upload succeed !
OK
Upload
Download
UP
DOWN
LEFT
RIGHT
CLICK
BACK

NOTE：

- ✓ The file name in the PLC to be uploaded or downloaded using this function must be DVP-xxx.dvp. (xxx is a number between 000 and 999.)
- ✓ When downloading PLC file, project password, sub-program password, POU password, PLCpassword (note)is required by HMI.
- ✓ When downloadingPLC file, program IDand PLC ID are both required. Also, their ID has to be identical so can the users download the file. Or, both have no ID to download the file. (When only one of them has ID, the file is not allowed to be downloaded.)
- ✓ When uploading the file, HMI will ask PLC ID andPLC password. Others such as project password, sub-program password and POU password will be deleted by HMI. When PLC has PLC password, the password will be regarded as the project password during the uploading process.
  - ● For example, assuming that PLC password is set to 1234 and project password is set to 5678 andHMI needs PLC password when uploading the file, PLC password will be regarded as project password when opening the file. That is to say, both PLC password and project password will be 1234.
- ✓ When applying the project edited by ISPSoft, please compile it before downloading it to PLC. Otherwise, error message of "IL code size is mismatch" will pop up.
- ✓ If a PLC DVP file is to be uploaded as a new file, select “New.." from the window on the right side and press Upload.
- ✓ The Transmission mode only support *.dvp upload/download. It does not support the upload or download of subroutine/Ladder graphic code/SFC graph/device name comment/row comment/non-volatile data/Label structure/Symbol structure…
  - ☞ Note: PLC password is the password set in 【System Security Setting】→【Password function】 of WPL and ISP software.

- See the table below for the supported function of each version:

PLC Series	PLC password	Limit login attempts	Password for subroutine	PLC ID and Program ID	Password for project (should be set in Editing Software)
ES/EC/EC3	V	V8.20 (above)	V8.20(above)	V8.20(above)	It is supported by WPLSoft V2.20 and ISPSoft V1.60 (above)
SS	V	X	X	X	
EX	V	V8.20(above)	V8.20(above)	V8.20(above)	
SA	V	X	X	X	
SX	V	V3.00(above)	V3.00(above)	V3.00(above)	
SC	V	X	X	X	
EH	V	X	X	X	
EH2	V	V1.40(above)	V1.40(above)	V1.40(above)	
SV	V	V1.40(above)	V1.40(above)	V1.40(above)	
ES2/EX2	V	V	V	V	
SS2	V	V	V	V	
SA2	V	V	V	V	
SX2	V	V	V	V	
SE	V	V	V	V	
MC	V	V	V	V	
EH3	V	V	V	V	
SV2	V	V	V	V	

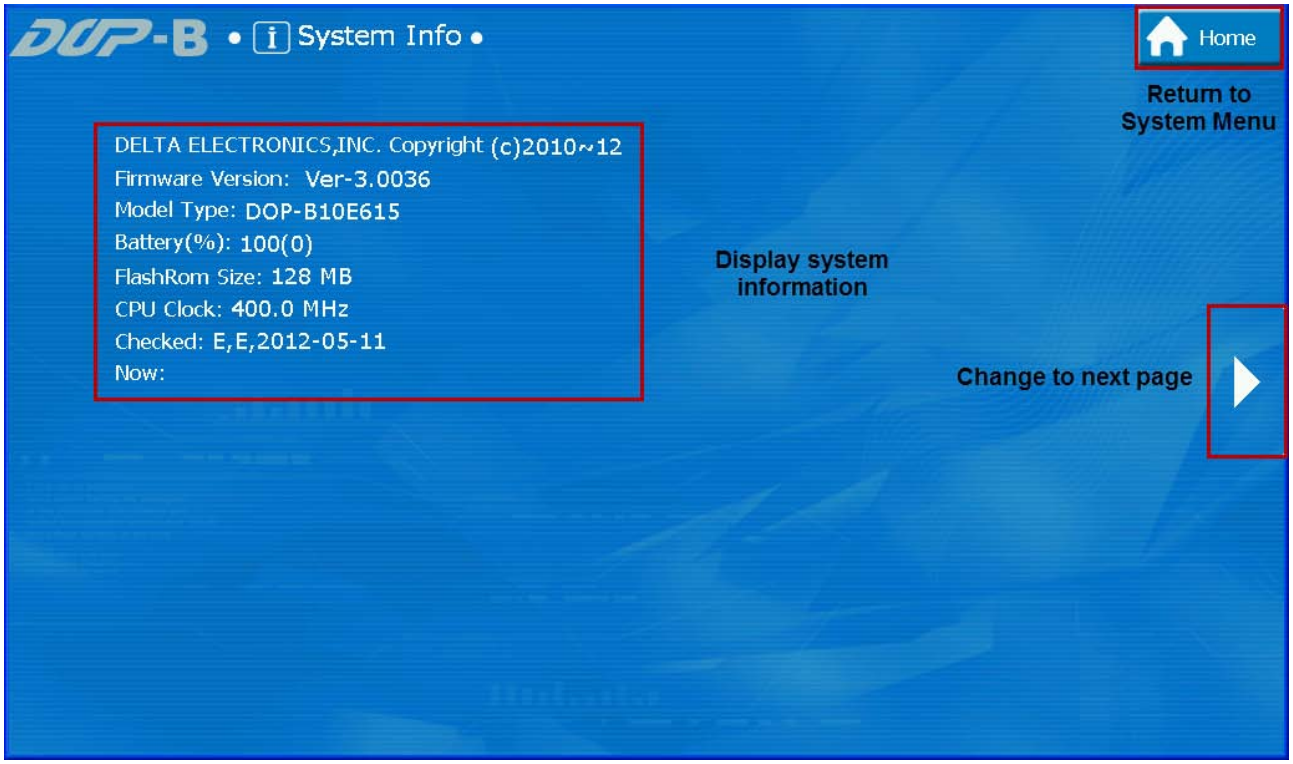
AH Series	PLC password	Limit login attempts	Password for subroutine	PLC ID and Program ID	Password for project (should be set in Editing Software)
AHCPU510-EN	V	V	V	V	It is supported by ISPSoft
AHCPU510-RS2	V	V	V	V	
AHCPU520-EN	V	V	V	V	
AHCPU520-RS2	V	V	V	V	
AHCPU530-EN	V	V	V	V	
AHCPU530-RS2	V	V	V	V	

Auxiliary key and function bar mapping list

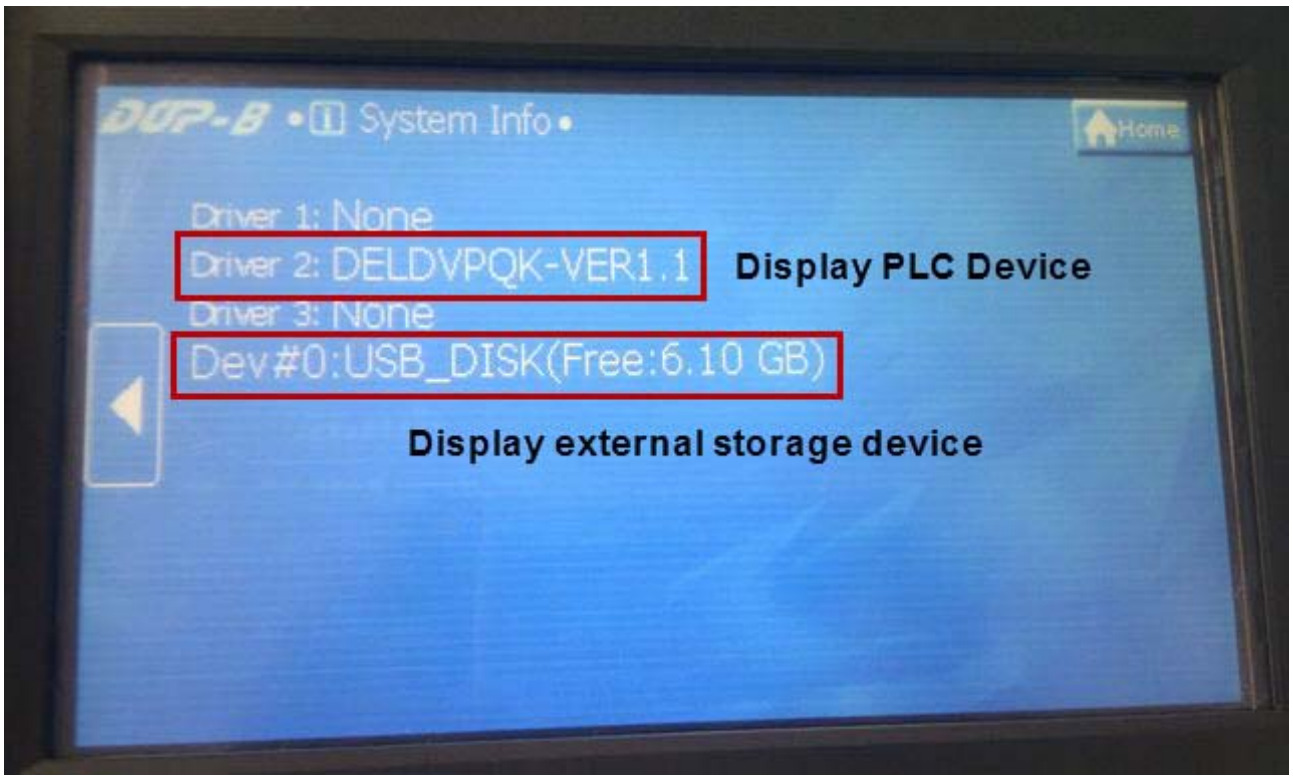
Upload	Download	Up	Down	Left	Right	OK	Exit
F2	F2	F3	F4	◀	▶	↵	SYS

A-4 System Info

This function enables the user to view HMI data including the firmware version, model, current battery capacity, the size of internal Flash ROM, CPU clock, current system time and date, PLC device and external storage device.



After switching the page, the user can see the HMI PLC Driver and external storage information.

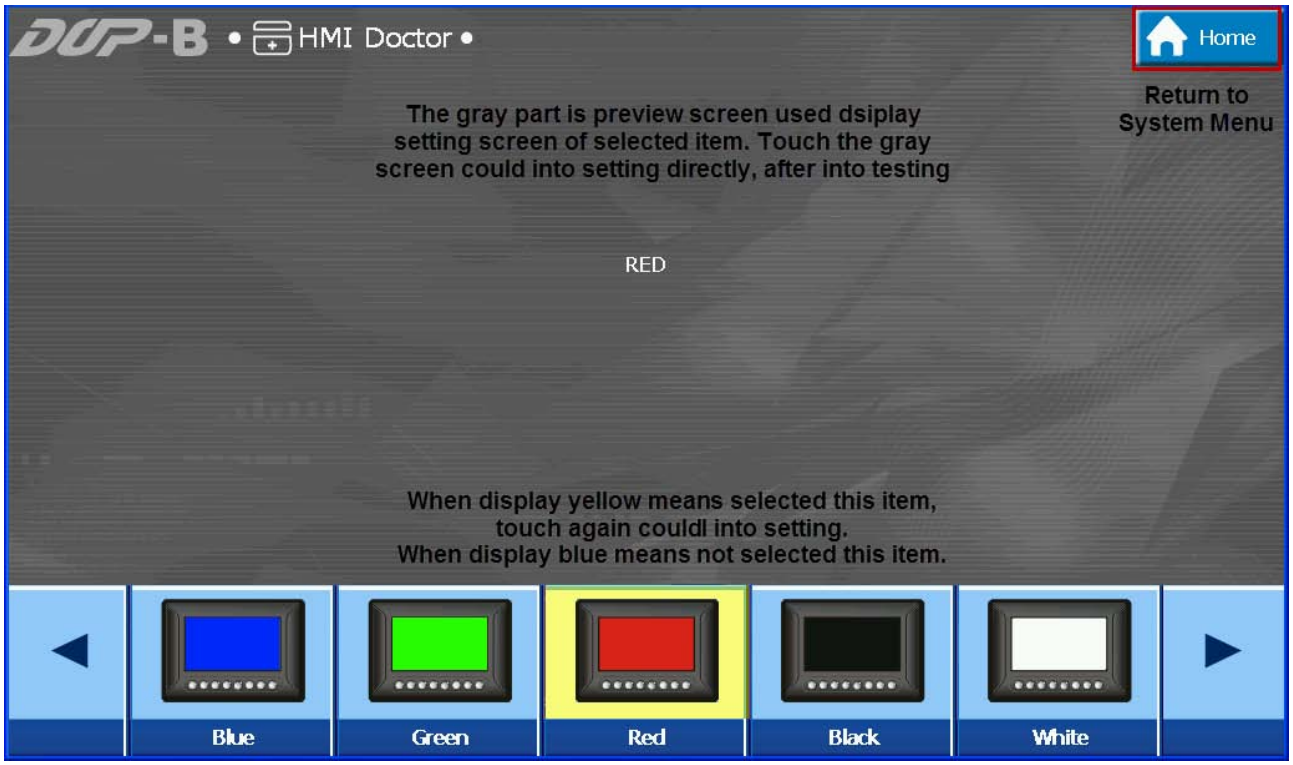


➢ Auxiliary key and function bar mapping list

Prev. page	Next page	Exit
◀	▶	SYS

A-5 HMI Doctor

HIMI Doctor is a simple application that provides the user with a testing interface. This function offers LCDs (Blue, Green, Red, Black, White), Network (for Ethernet model only), Draw a Line, Buzzer/LED, USB, ADC and Keys (for B07S201 and B07S211 models only) for selection.

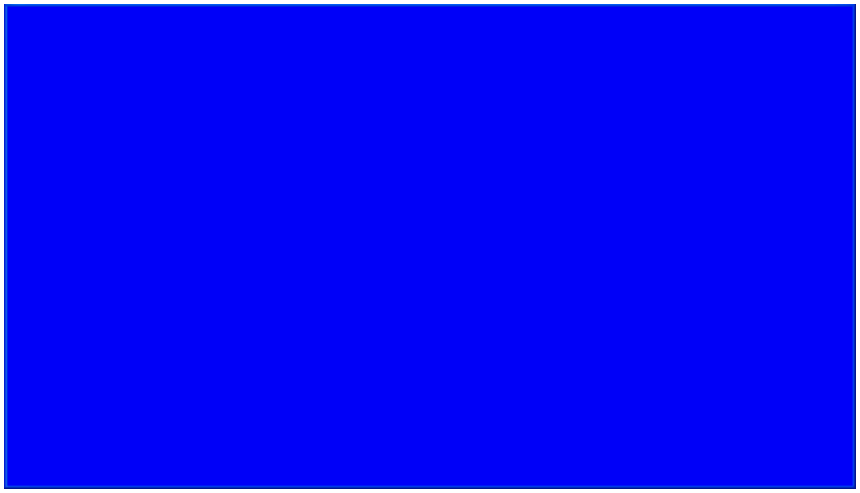


➢ Auxiliary key and function bar mapping list

Left	Right	OK	Exit
◀	▶	↵	SYS

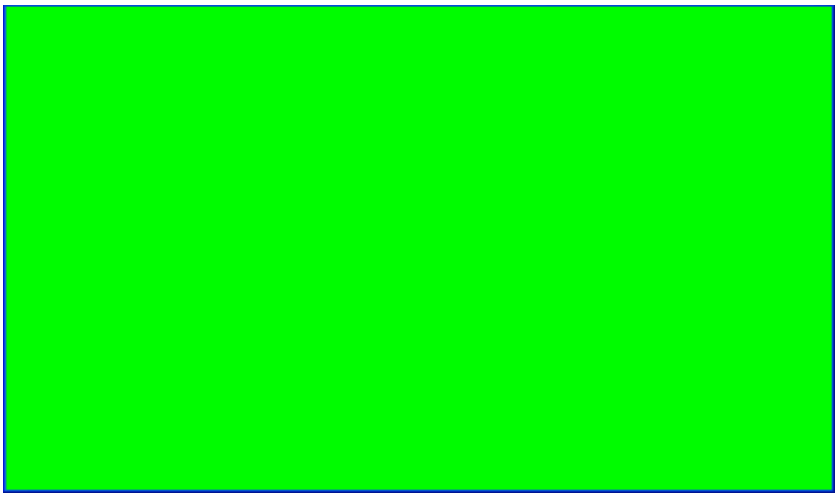
■ Blue Screen Test

Check if there are any blue dark points or other similar stains on the LCD surface.



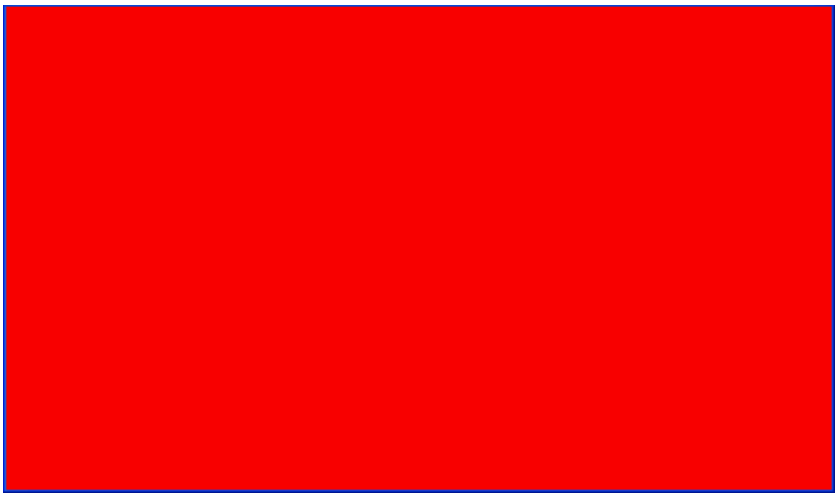
■ Green Screen Test

Check if there are any green dark points or other similar stains on the LCD surface.



■ Red Screen Test

Check if there are any red dark points or other similar stains on the LCD surface



■ Black Screen Test

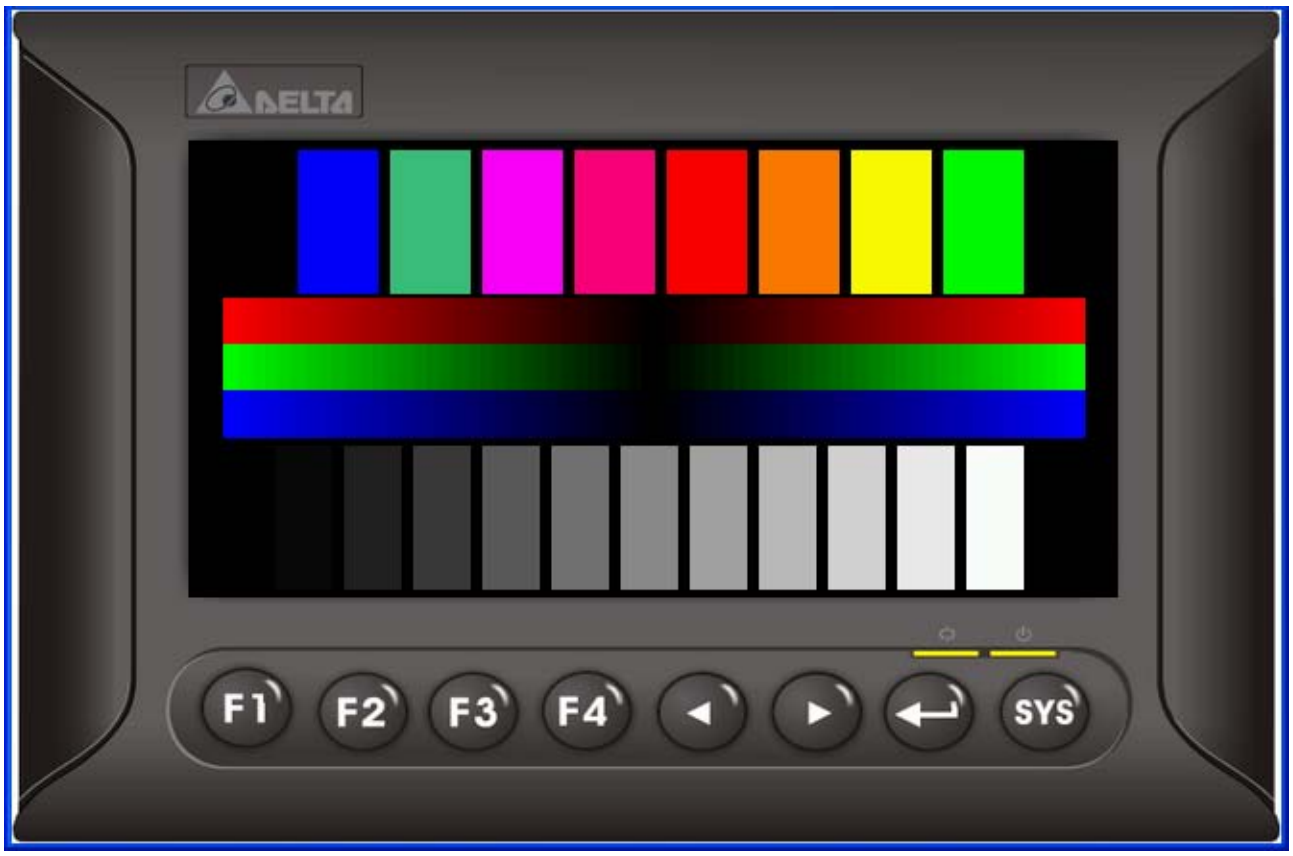
Check if there are any black dark points or other similar stains on the LCD surface.

■ White Screen Test

Check if there are any white dark points or other similar stains on the LCD surface.

■ Color Saturation Test

Check the normal display of LCD color.

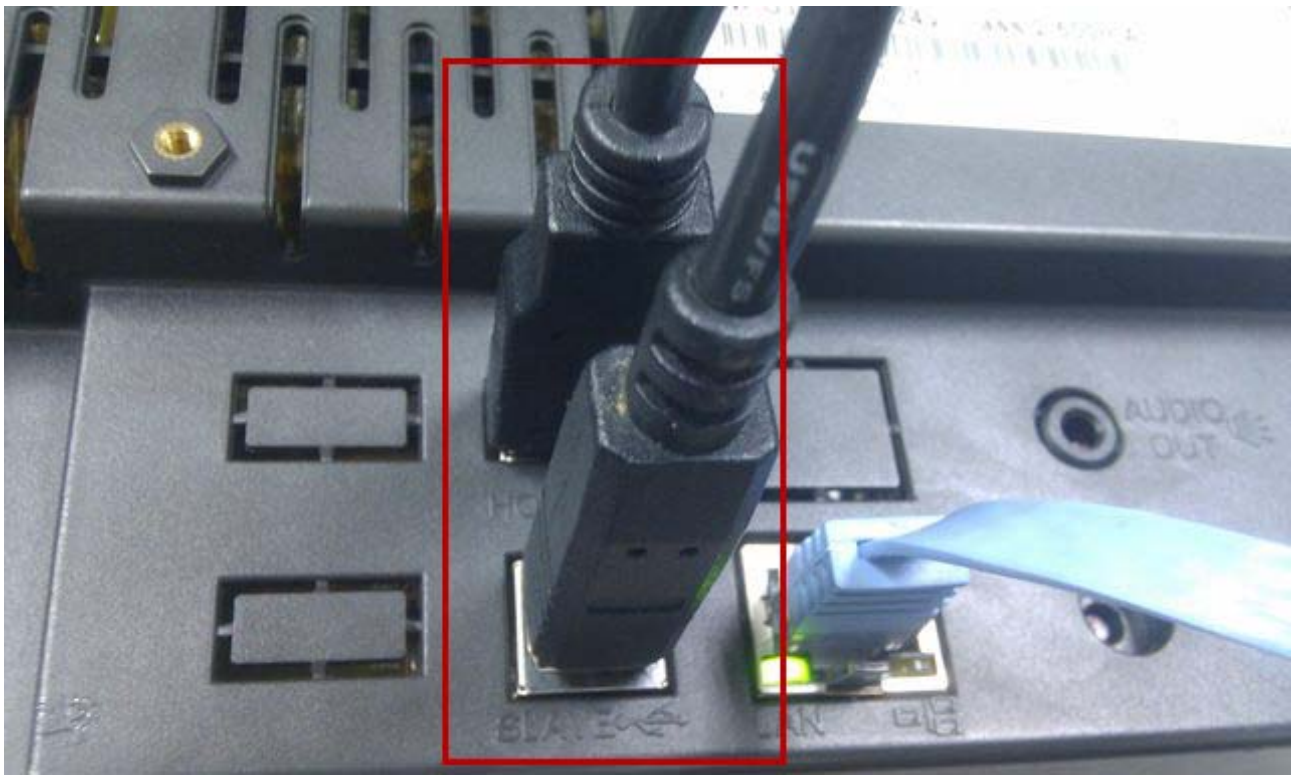


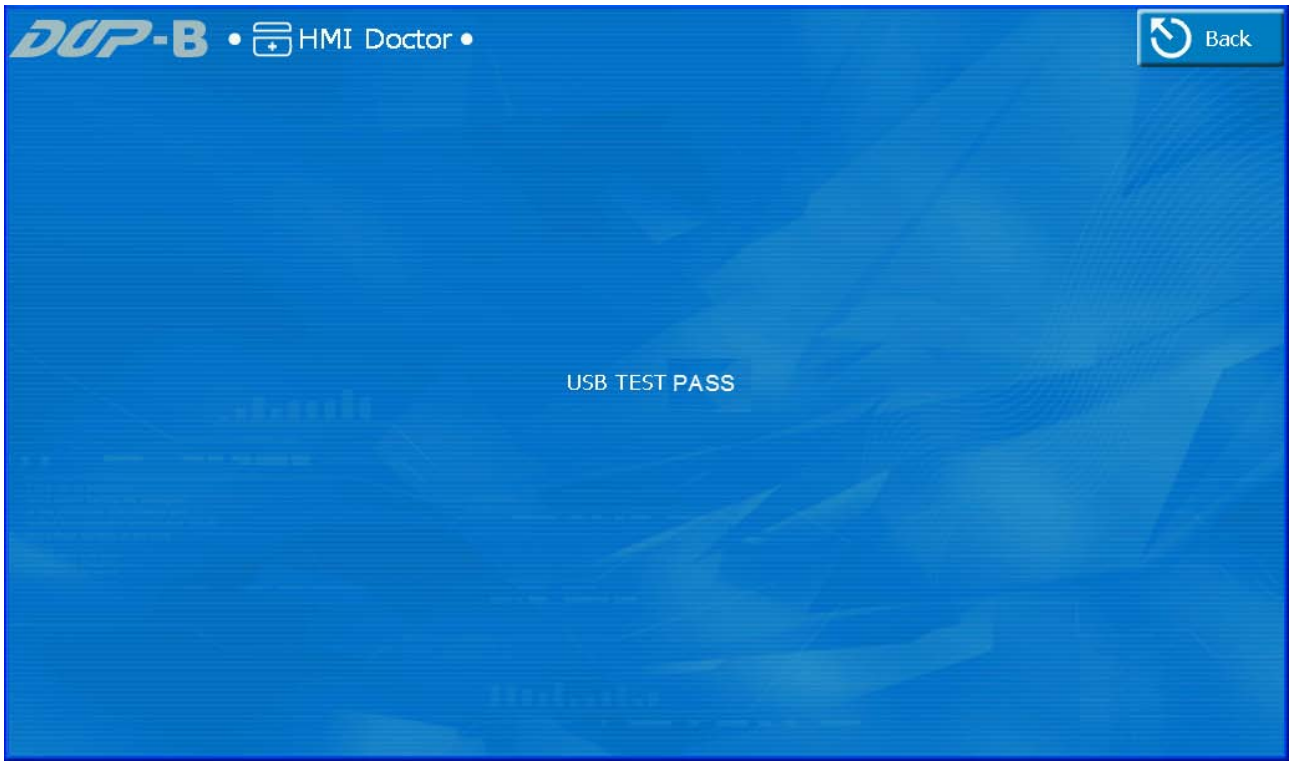
■ Network Test

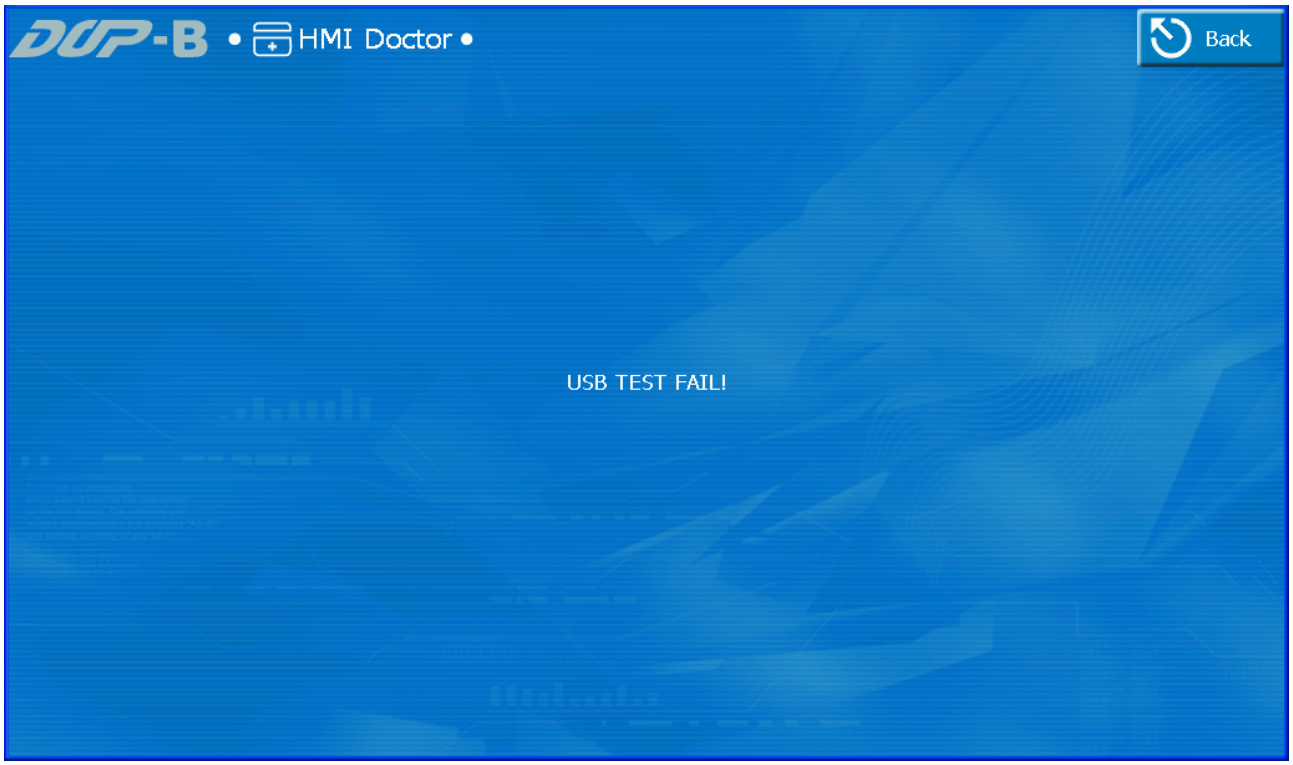
The network test function is currently not enabled.

■ USB Test

The user only needs to connect the USB Host and Slave ends to HMI to perform the test function. The “USB Test Successful!” message appears to confirm the completion of the test, or the “USB Test Fails!” message appears to confirm the failure of the test.

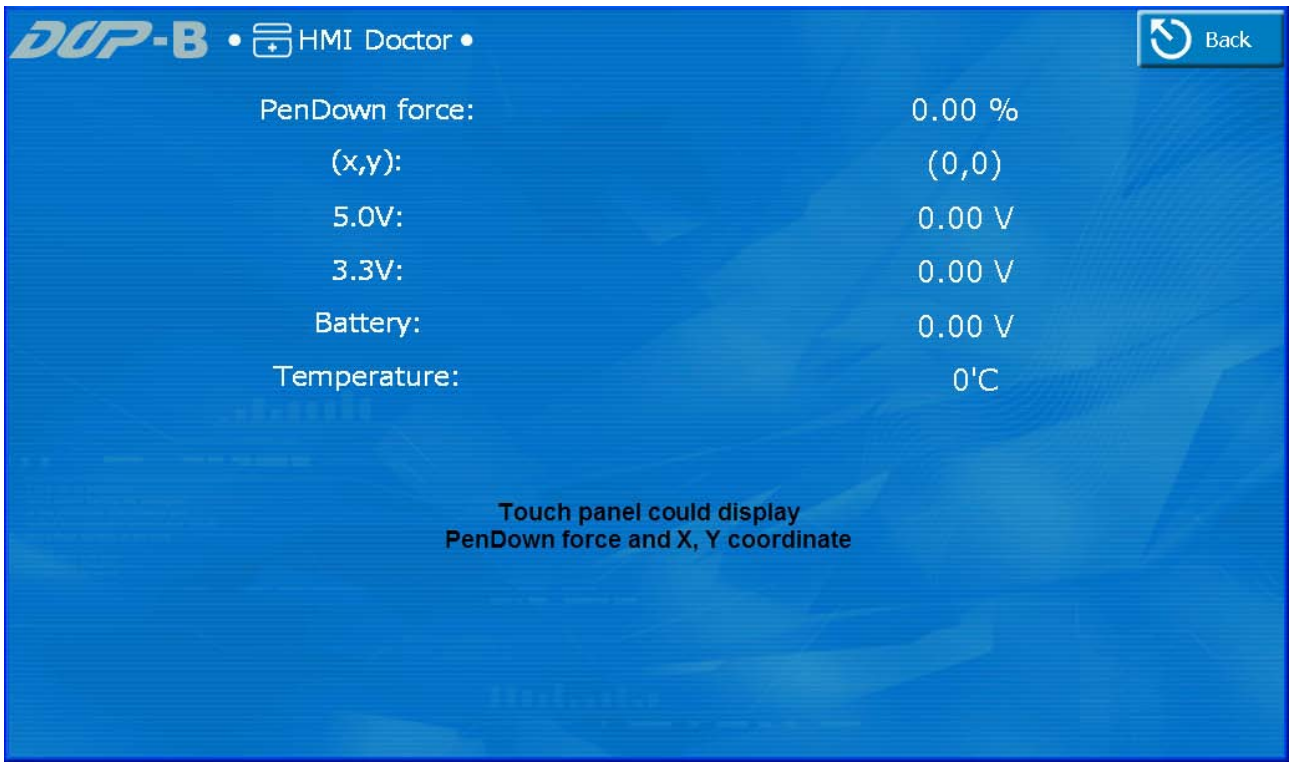

AUDIO OUT


DVP-B
HMI Doctor
Back
USB TEST PASS



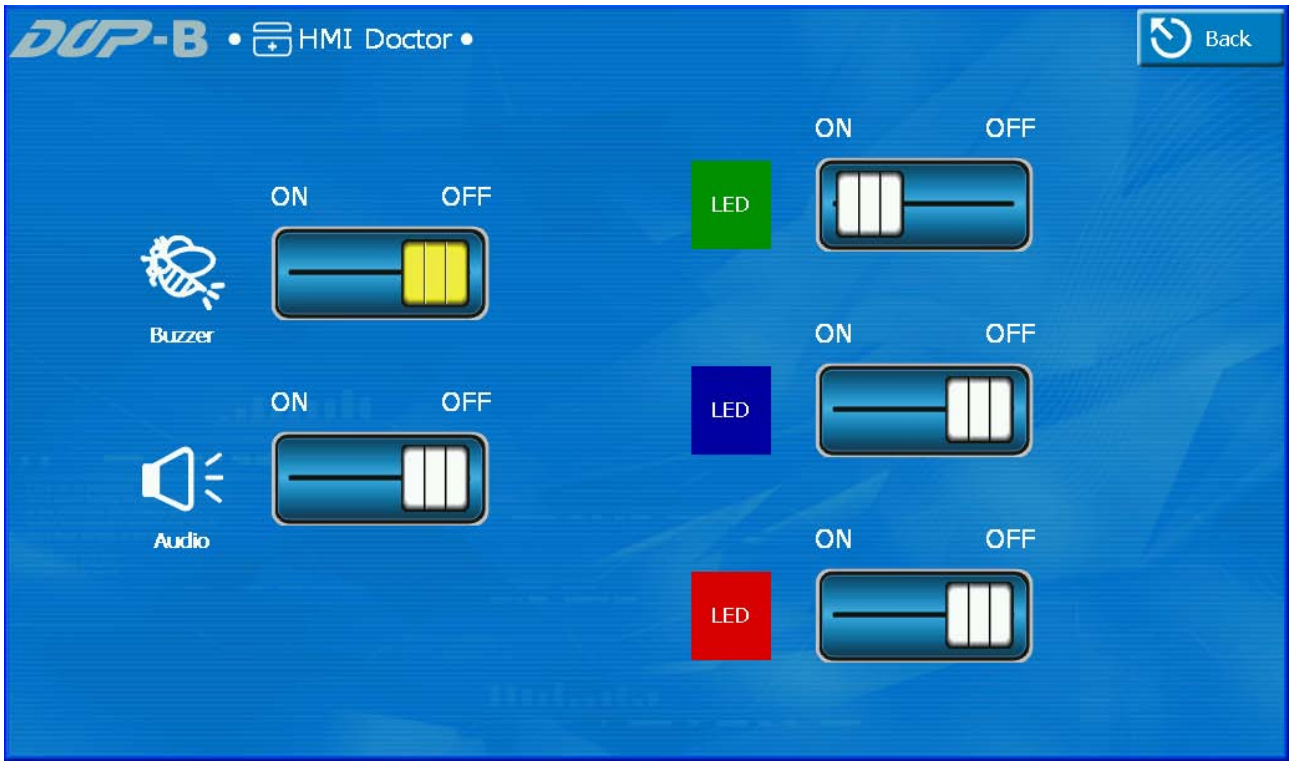
■ ADC Test

The ADC test function is mainly used to test the touch force, touch XY and the voltage, battery and temperature of the system.



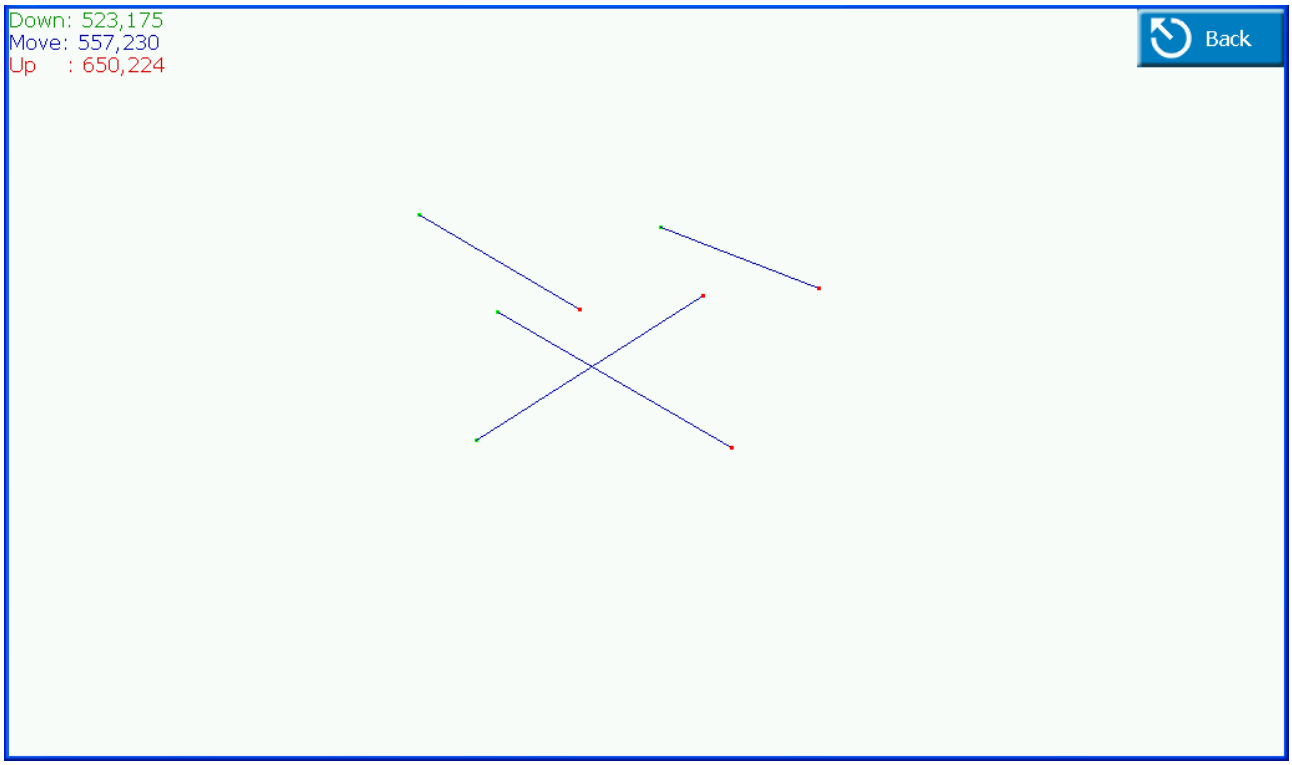
■ Buzzer/LED Test

The Buzzer/LED test function is used to test the normal operation of the buzzer and speaker as well as the function of the red/blue/green LED indicators.



■ Draw a Line

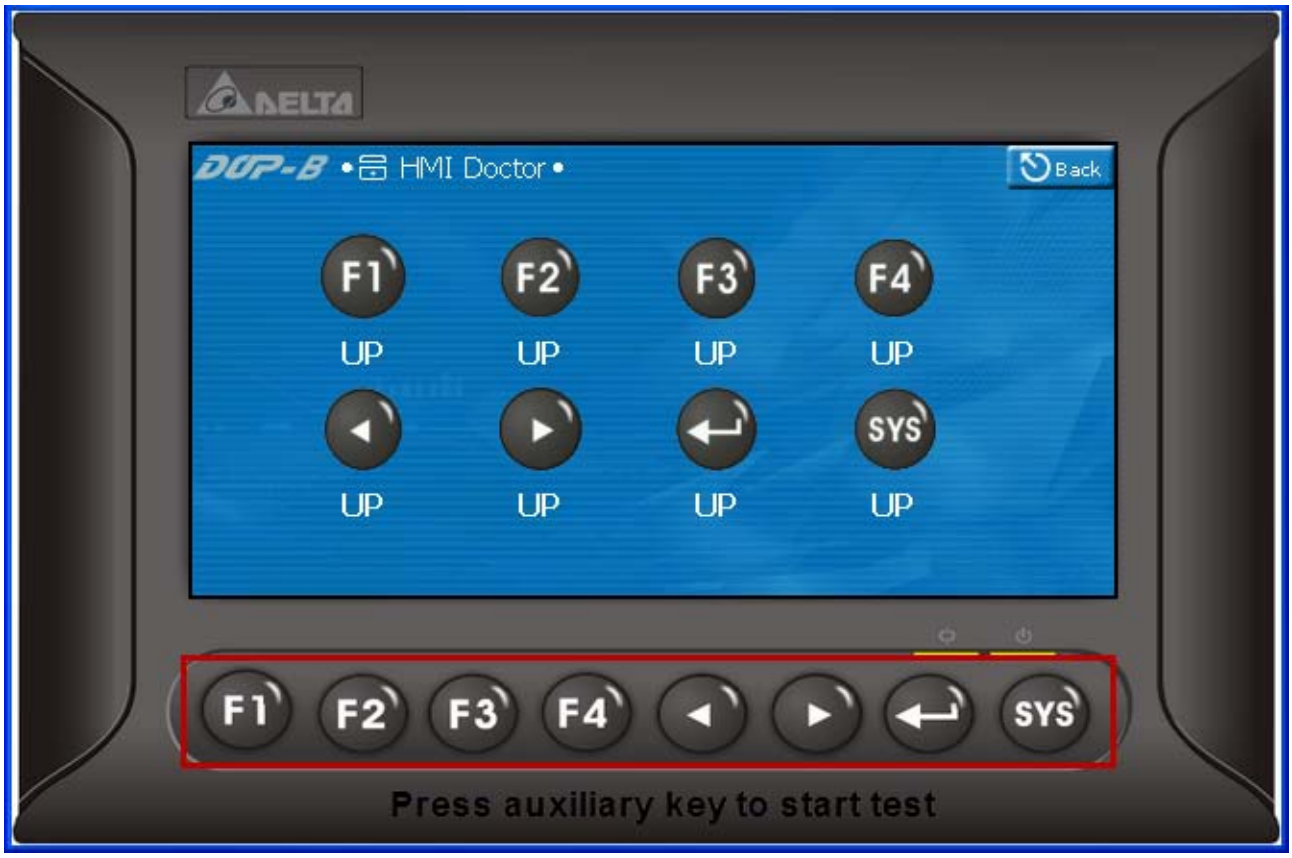
This function is used to make sure there is no deviation between the start point to draw the line and the actual display position on the screen. If the deviation is significant, the touch panel must be re-calibrated.



■ Keys

The Keys test function is used to check the normal operation of the auxiliary keys for the B07S201 and B07S211 models. After entering the test screen, press the auxiliary keys F1~

SYS and the corresponding keys on the screen will show UP → DOWN. If there is no response in spite of pressing the key, this hard key might be in a damaged state.



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Appendix B Multi-Drop

This chapter describes the multi-drop structure and limits as well as the multi-drop setup steps.

The multi-drop concept refers to the connection of multiple HMIs to one or more PLCs. When the Host HMI connects to a device, all Client HMIs can create a virtual connection on the network. Hence, the user can operate a physical device using a single HMI in the multi-drop mode. Up to 12 links are available in the multi-drop structure, and every added port indicates a link. For example, if only one COM Port (using one PLC) is used, up to 12 HMIs can be connected. Assuming that each COM Port connects to one PLC (using three PLCs), up to four HMIs can be connected. Refer to the figure below.

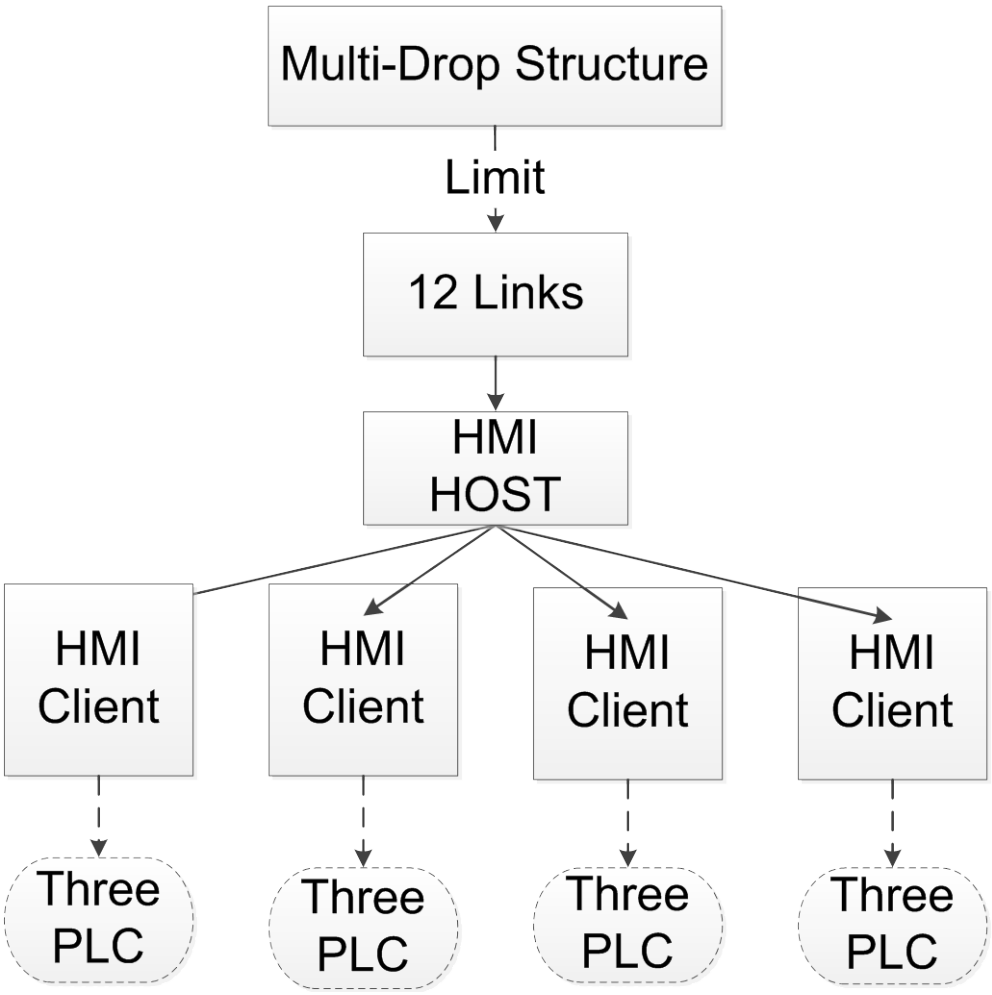


Figure B-1-1 Multi-Drop Structure I

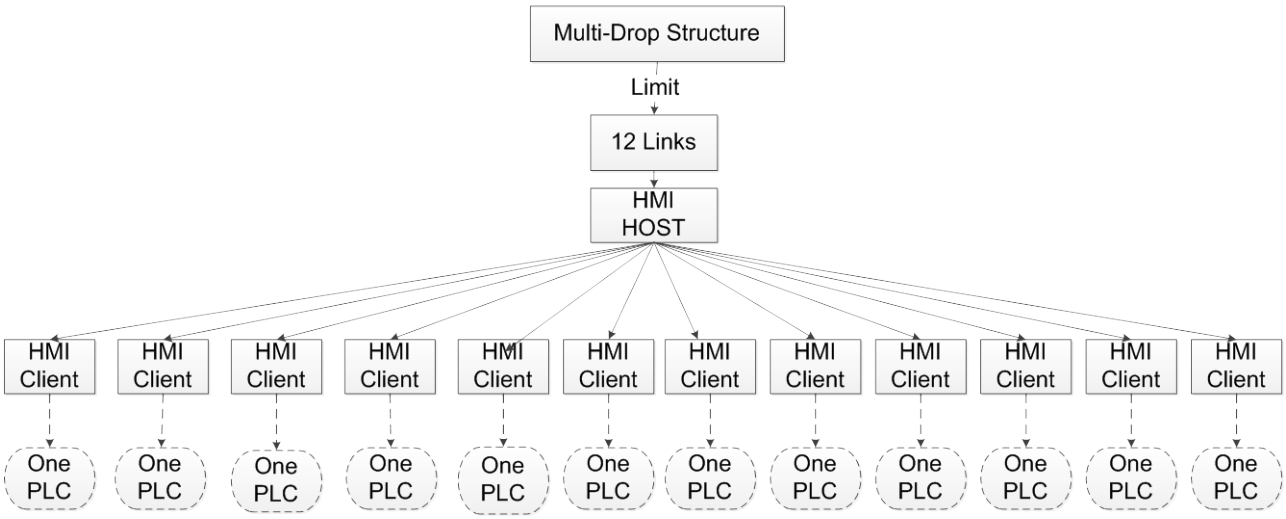


Figure B-1-2 Multi-Drop Structure II

The concept and limit of the multi-drop structure are described above. The setup and operation in the multi-drop structure will be described below.

The multi-drop mode is not supported if Delta DVP Q-Link is selected for the controller.

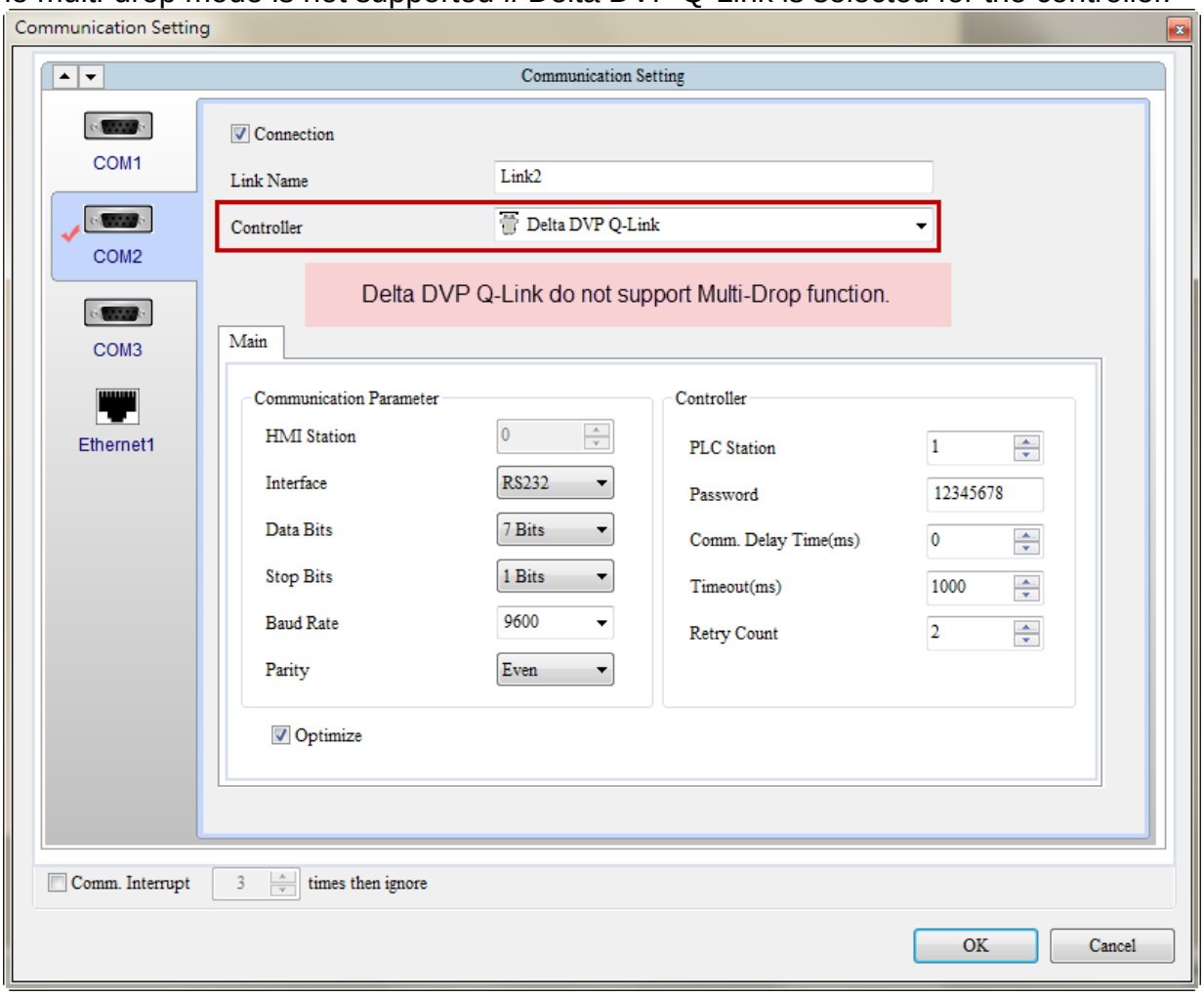


Figure B-1-3 Multi-Drop Mode

B-1 Multi-Drop Example

The following example is taken in an environment using 3 HMIs to test the multi-drop mode. HMI-HOST is the host end while HMI-Client1 and HMI-Client2 are the client ends. The HMI-HOST is physically connected to a Delta DVP PLC. Refer to the figure below.

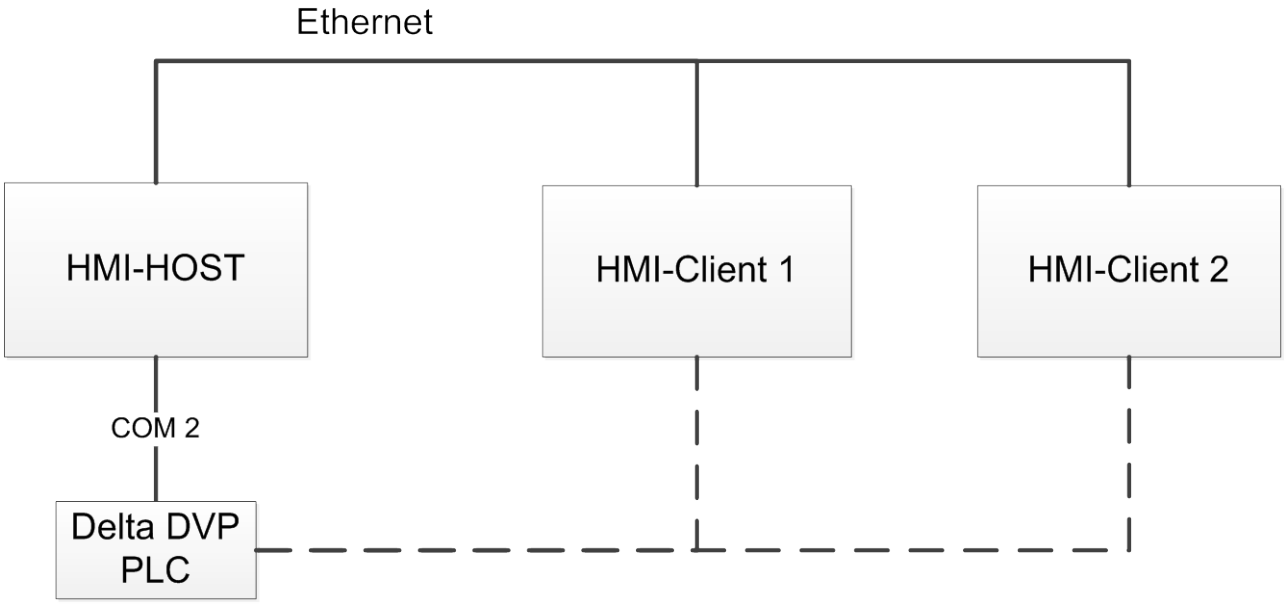


Figure B-1-4 Multi-Drop Environment

■ HMI-HOST Setup

Create a project. Set the Controller to **"Delta DVP PLC"** and select **"HOST"** for the multi-drop mode.

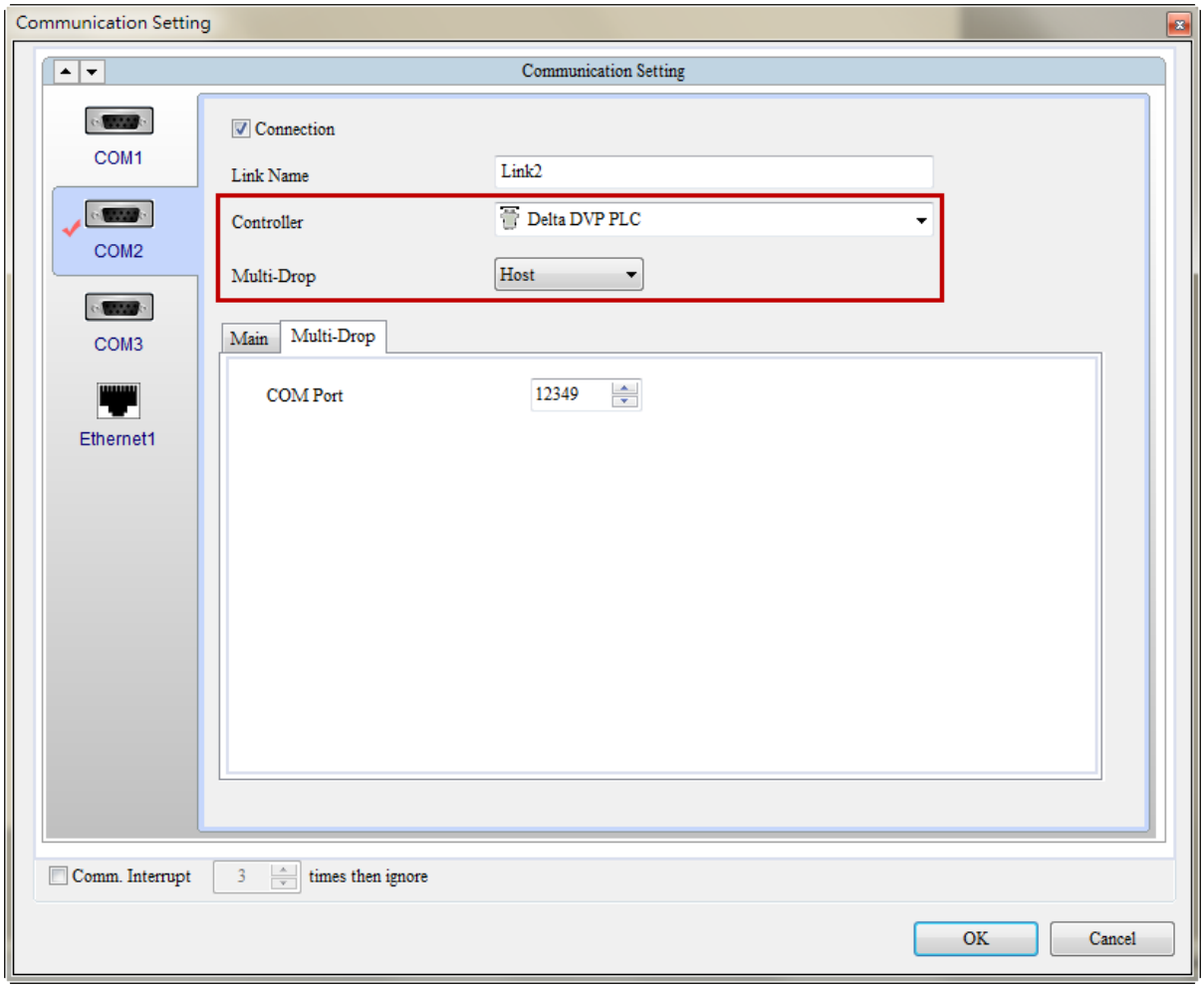


Figure B-1-4 HOST for the Multi-Drop Mode

Into [**Option**] → [**Network App**] → [**LocalHost**] to set HMI name as **HMI-HOST**.
Into [**Ethernet1**] → [**LocalHost**] to set HMI IP address as **172.16.190.100.**

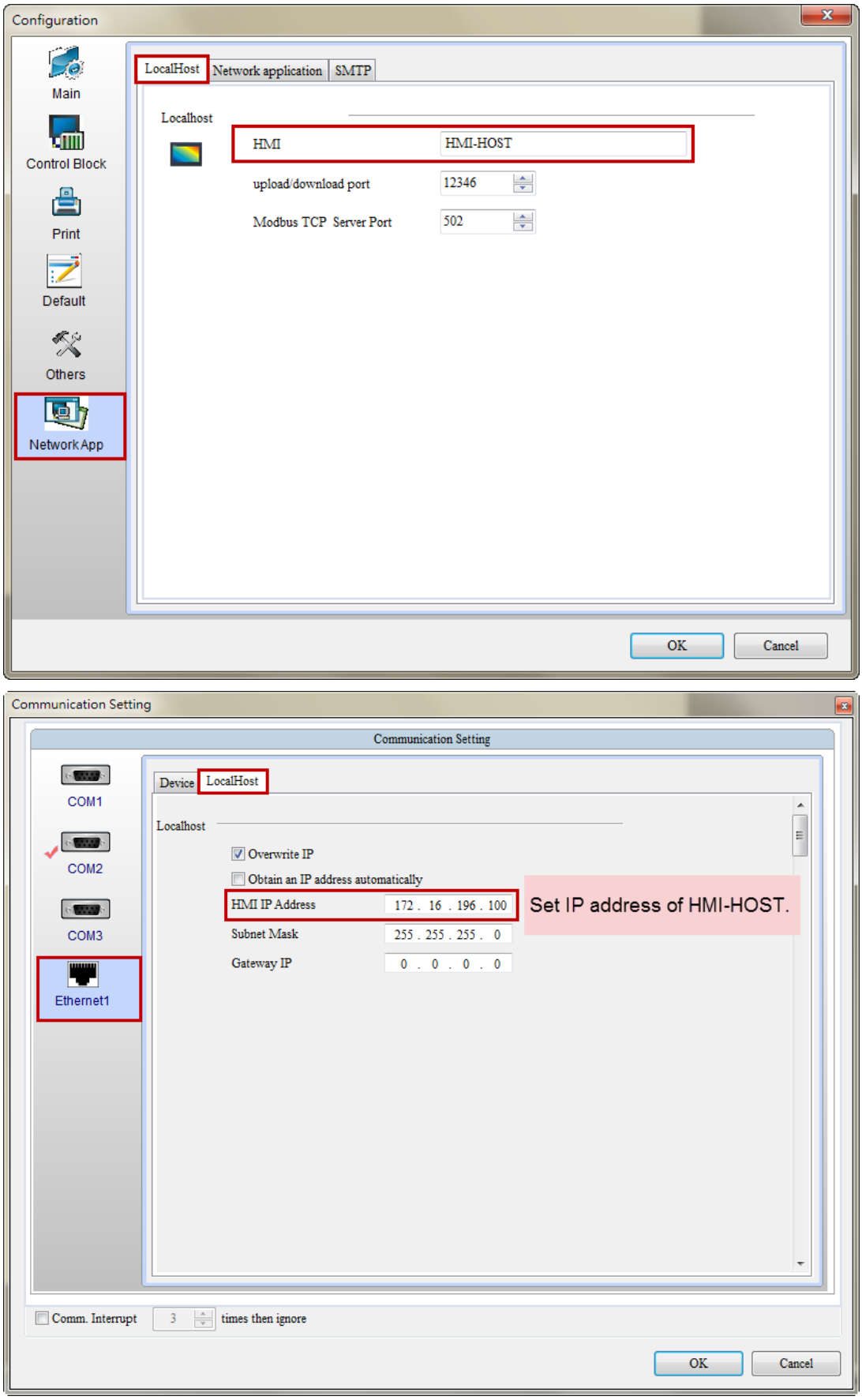


Figure B-1-5 HMI-HOST IP Address Setup

Create a numeric element on the editing screen and set the Write Address to **"D100"**.

Create a numeric display element and set the Read Address to **"D200"**.

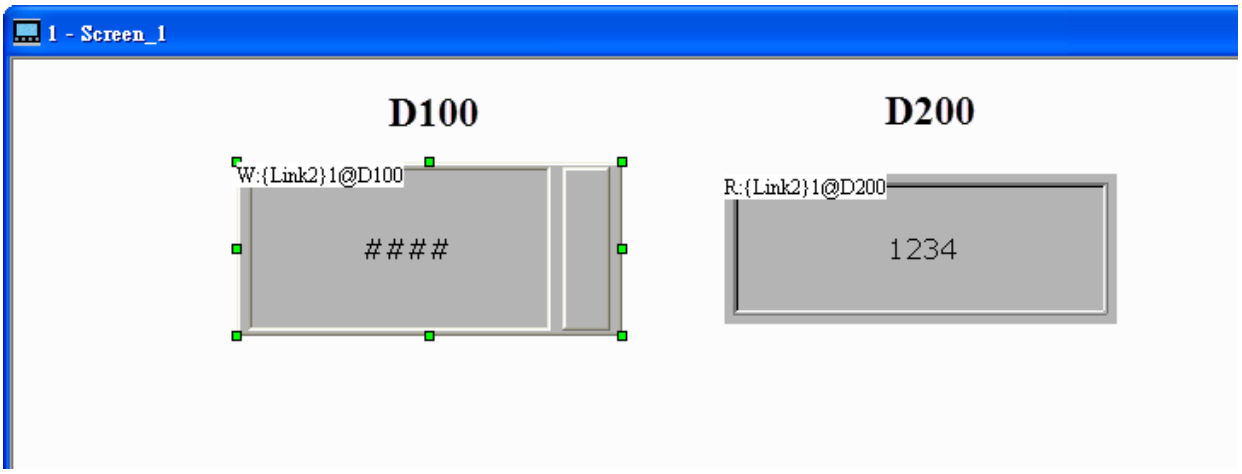


Figure B-1-6 Create Elements

After the editing is completed, execute compile and download the screen the HMI.

■ HMI-Client 1 Setup

Create a project. Set the Controller to **"Delta DVP PLC"** and select **"Client"** for the multi-drop mode. Enter **"172.16.190.100"** in the IP Address field. This is the HMI-HOST IP address.

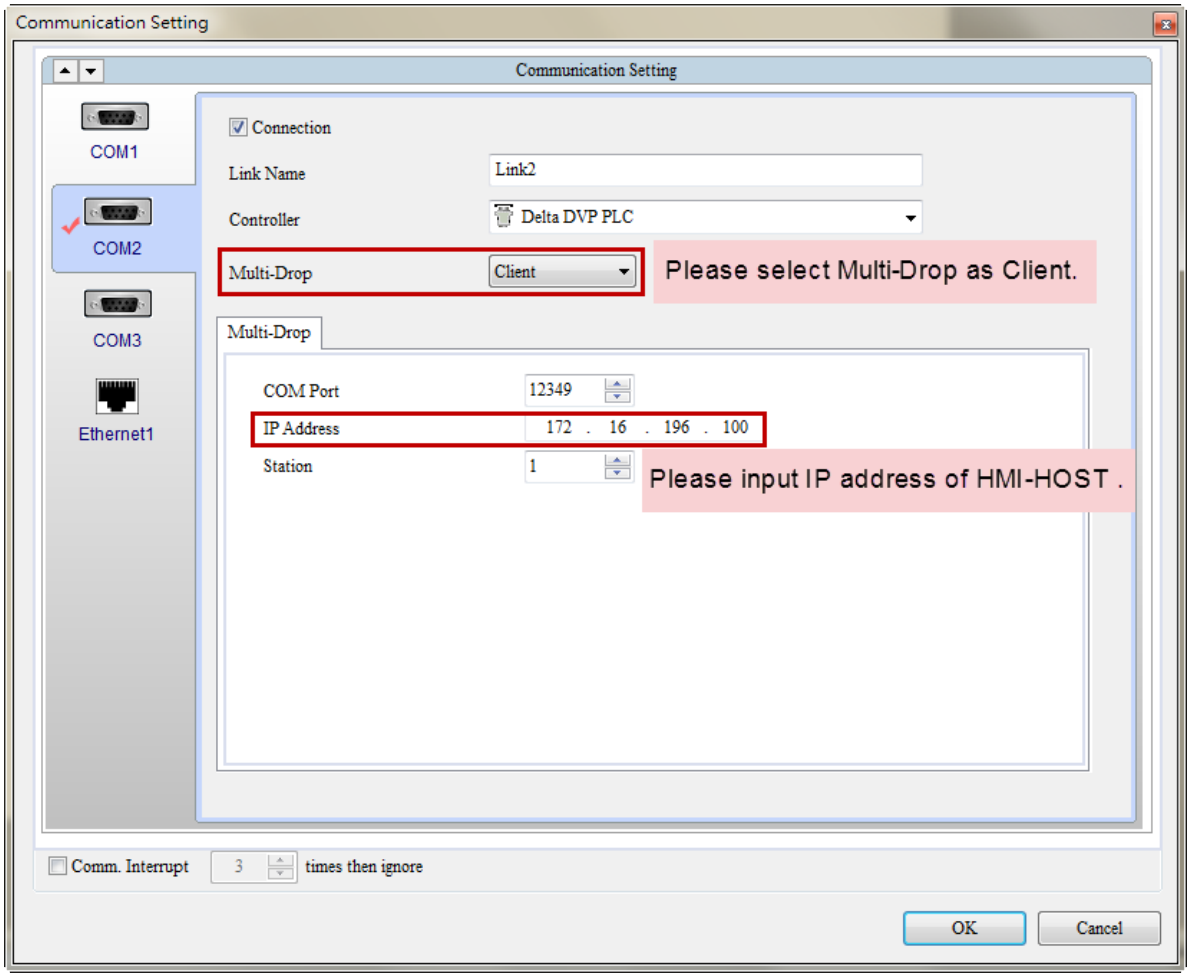
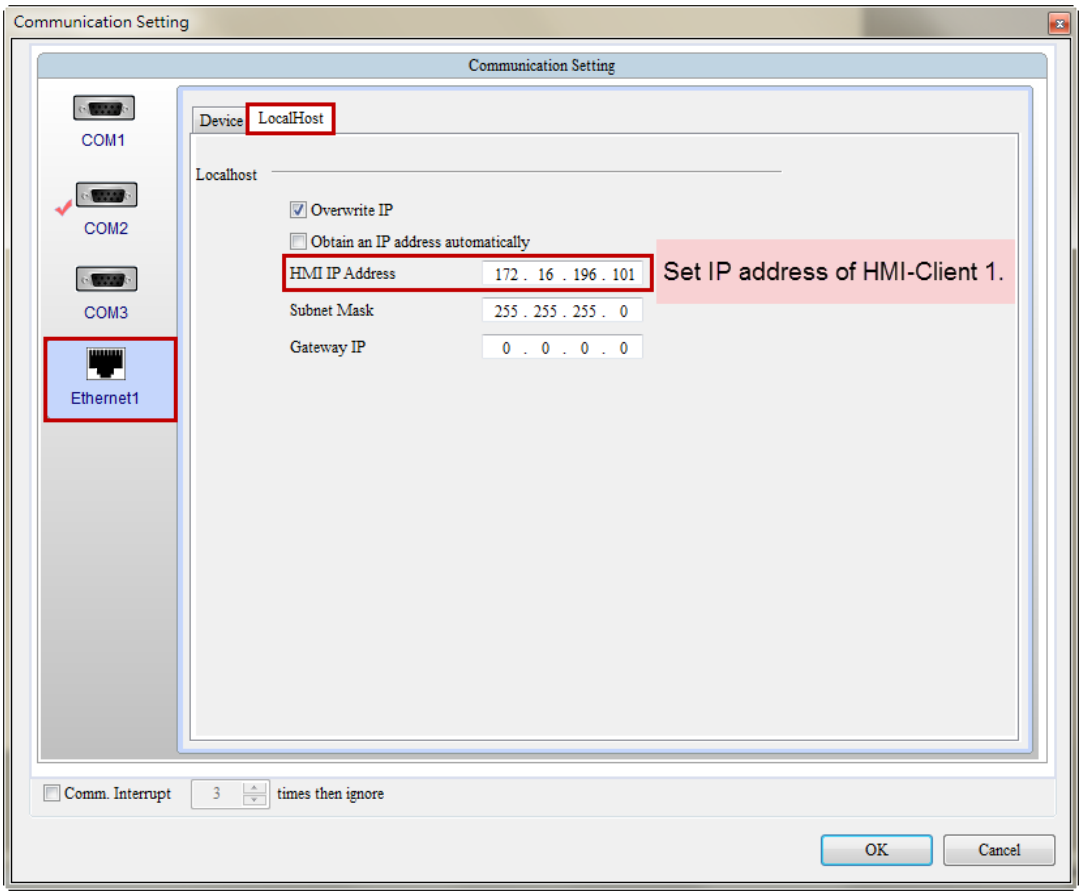


Figure B-1-7 select "Client" for the multi-drop mode

Into [**Ethernet1**] → [**LocalHost**] to set HMI IP address as **172.16.190.101.**

Into [**Option**] → [**Network App**] → [**LocalHost**] to set HMI name as **HMI-Client1**.



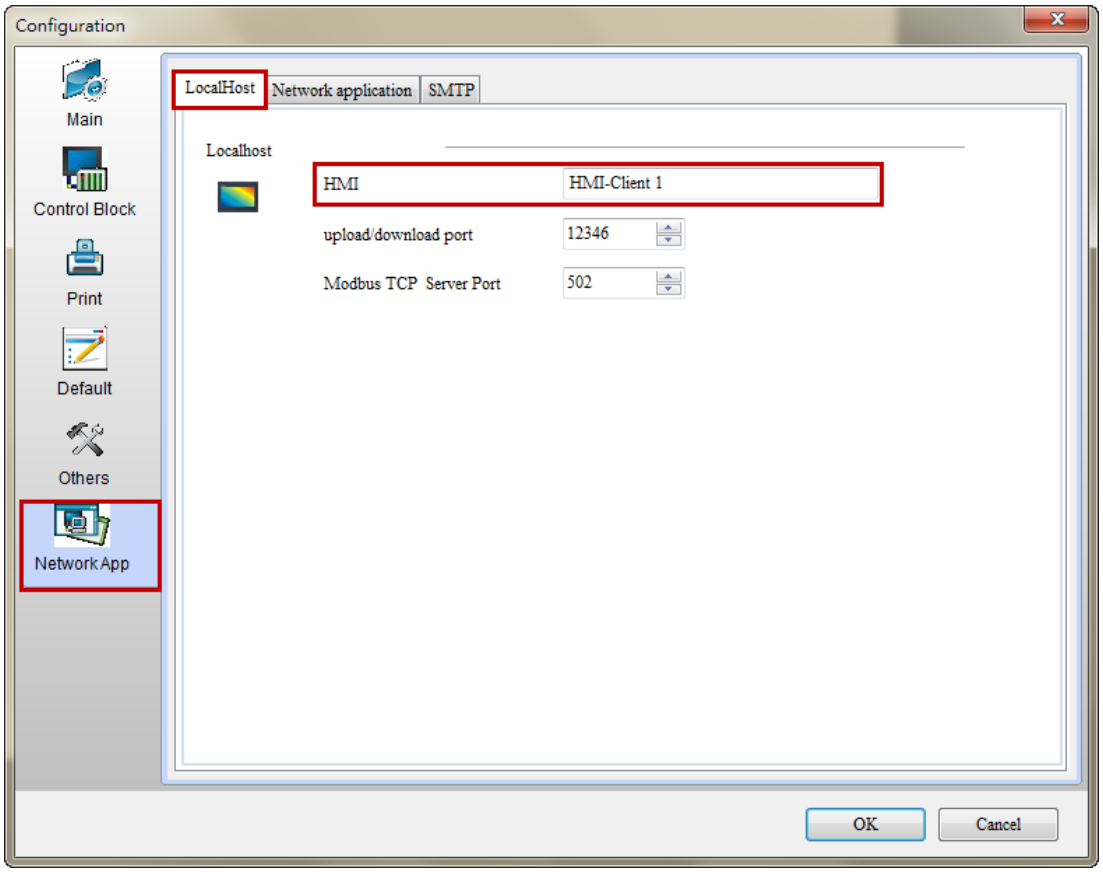


Figure B-1-8 HMI-Client1 IP Address Setup

Create a numeric element on the editing screen and set the Write Address to **"D200"**.
Create a numeric display element and set the Read Address to **"D100"**.

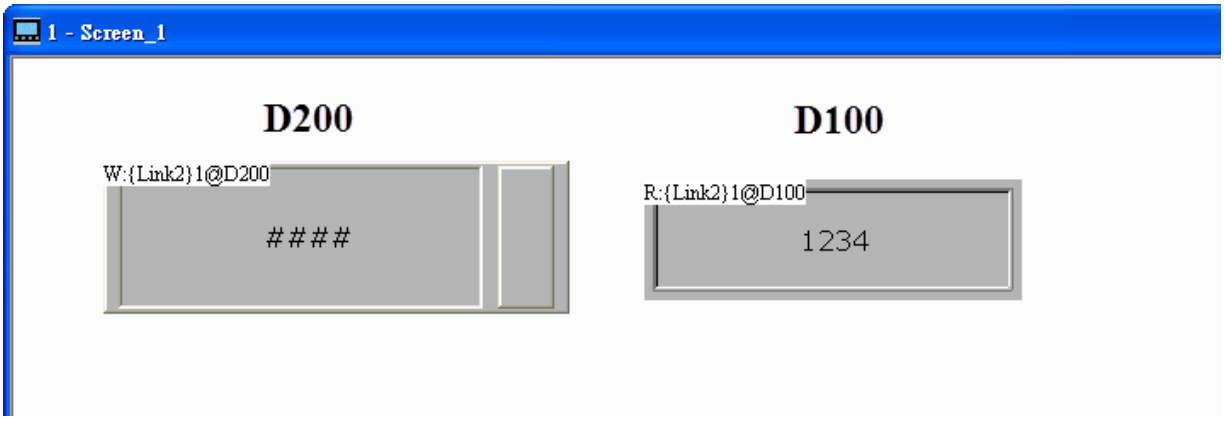


Figure B-1-9 Create element

After the editing is completed, execute compile and download the screen to the HMI.

■ HMI-Client 2 Setup

Create a project. Set the Controller to **"Delta DVP PLC"** and select **"Client"** for the multi-drop mode. Enter **"172.16.190.100"** in the IP Address field. This is the HMI-HOST IP address.

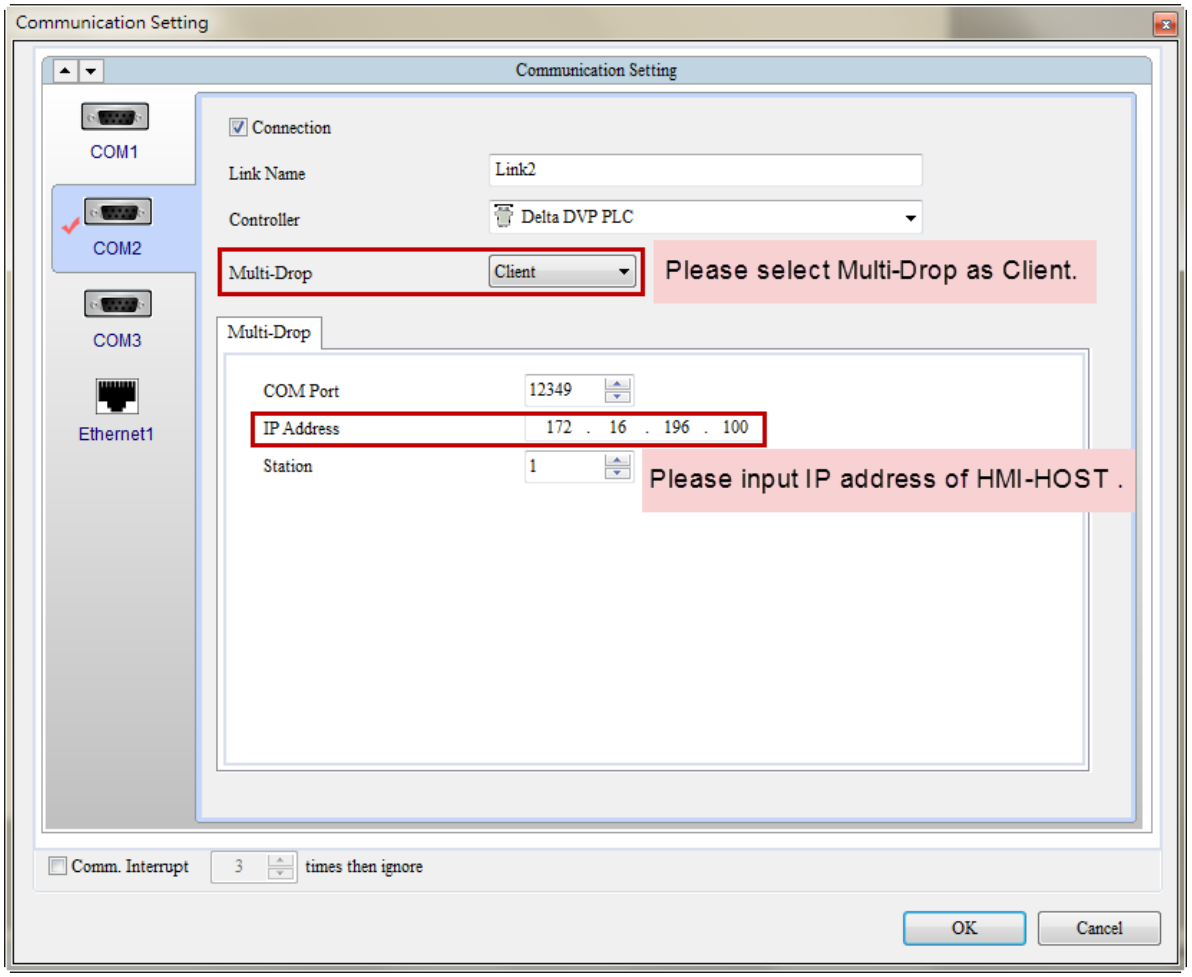
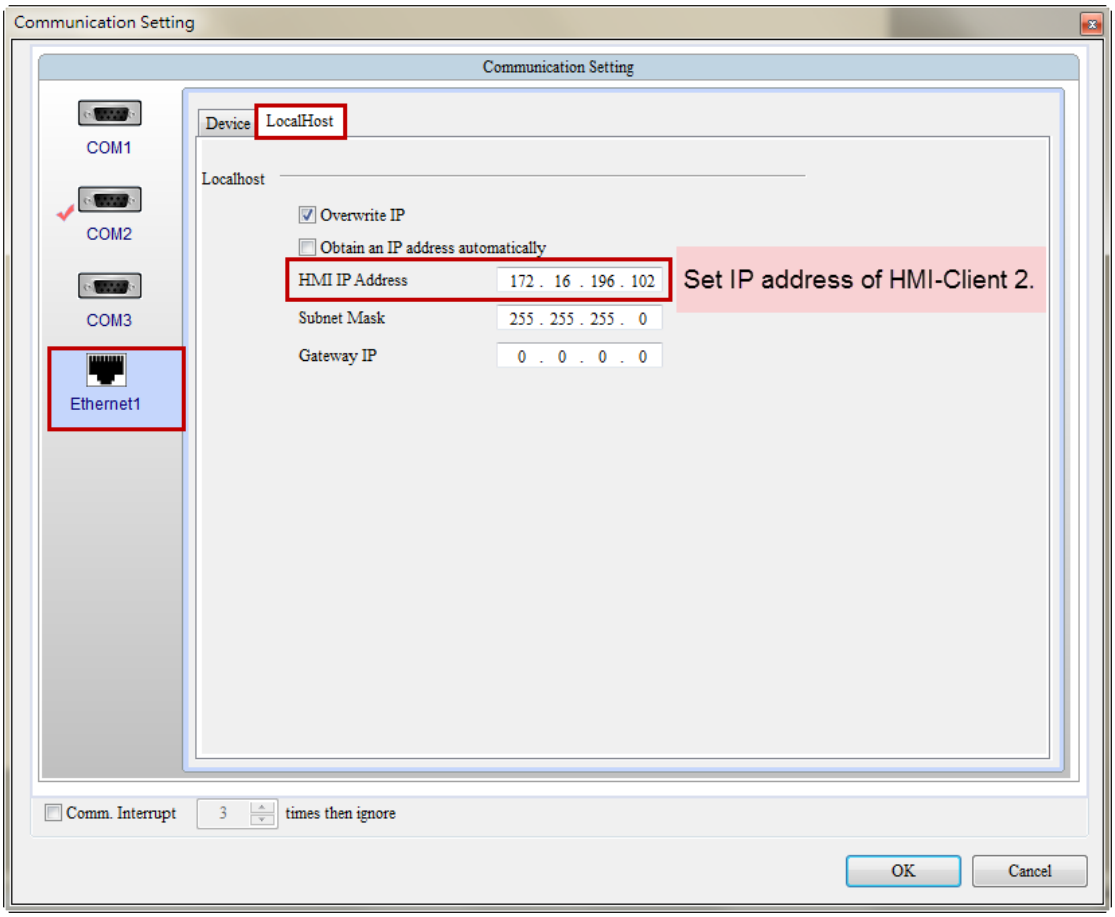


Figure B-1-10 select "Client" for the multi-drop mode

Into [**Ethernet1**] → [**LocalHost**] to set HMI IP address as **172.16.190.102**.
Into [**Option**] → [**Network App**] → [**LocalHost**] to set HMI name as **HMI-Client2**.



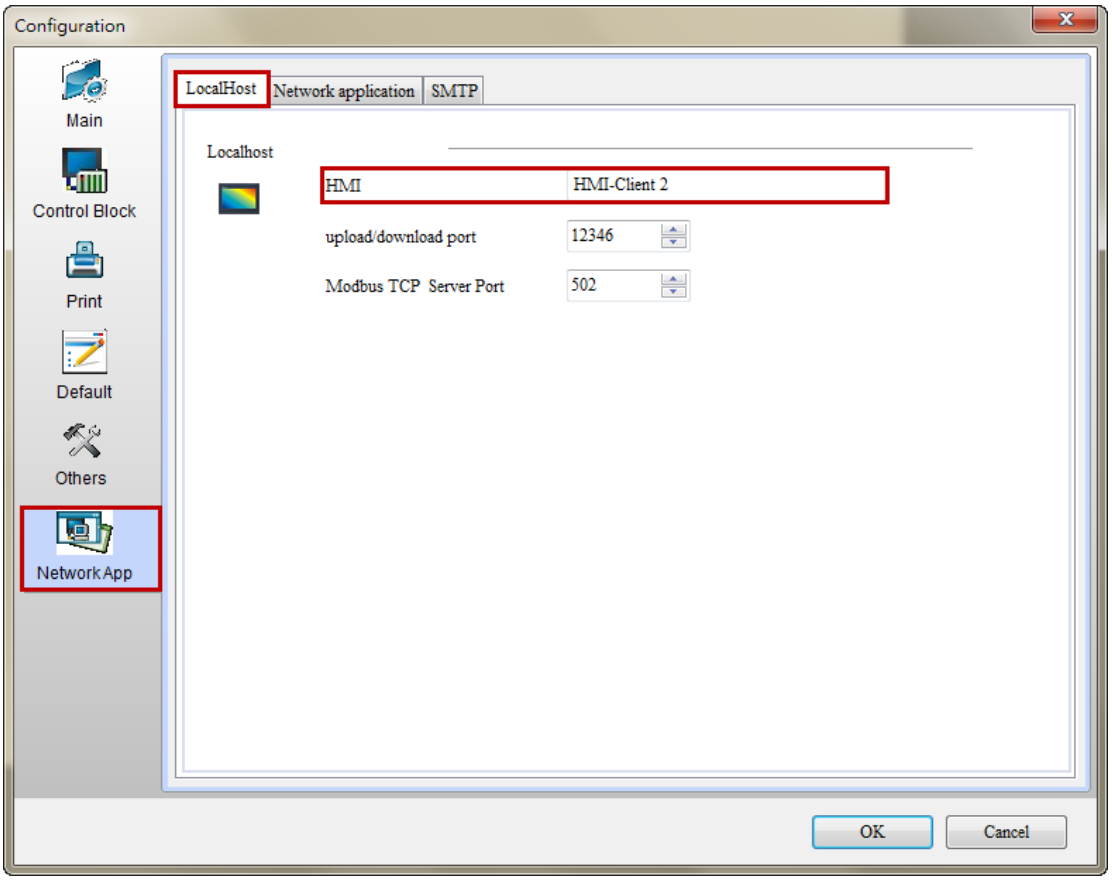


Figure B-1-11 HMI-Client2 IP Address Setup

Create a numeric element on the editing screen and set the Write Address to **"D200"**. Create a numeric display element and set the Read Address to **"D100".**

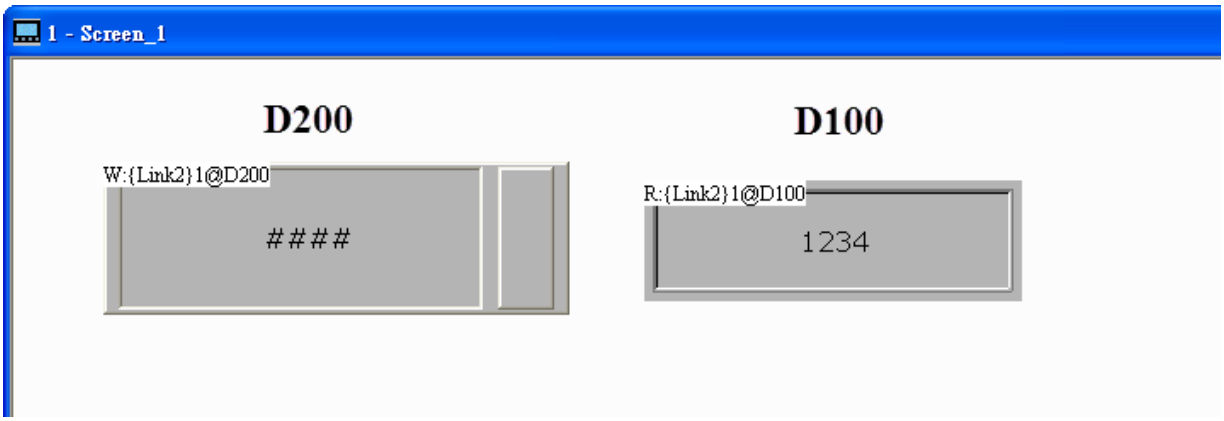


Figure B-1-12 Create element

After the editing is completed, execute compile and download the screen to the HMI.

After HMI-HOST, HMI-Client1 and HMI-Client2 are set up and downloaded to HMI, the user can use any HMI to operate PLC. If D200 is used to input 36 in HMI-Client1, Both the D200 addresses of the HMI-HOST and HMI-Client2 will show 36. If D100 is used to input 99 in HMI-HOST, both the D100 address of the HMI-Client1 and HMI-Client2 will show 99.

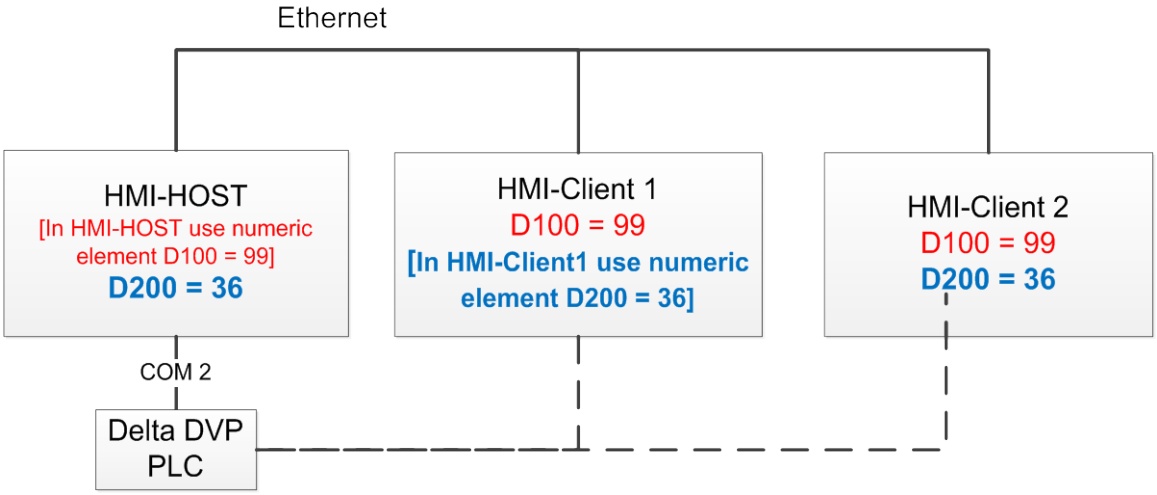


Figure B-1-13 Execution Results

Appendix C Communication Error Messages

If a communication error is detected, a corresponding error message will be shown on HMI screen (Figure C-1-1). This chapter describes the meanings of communication error messages displayed on HMI screen.

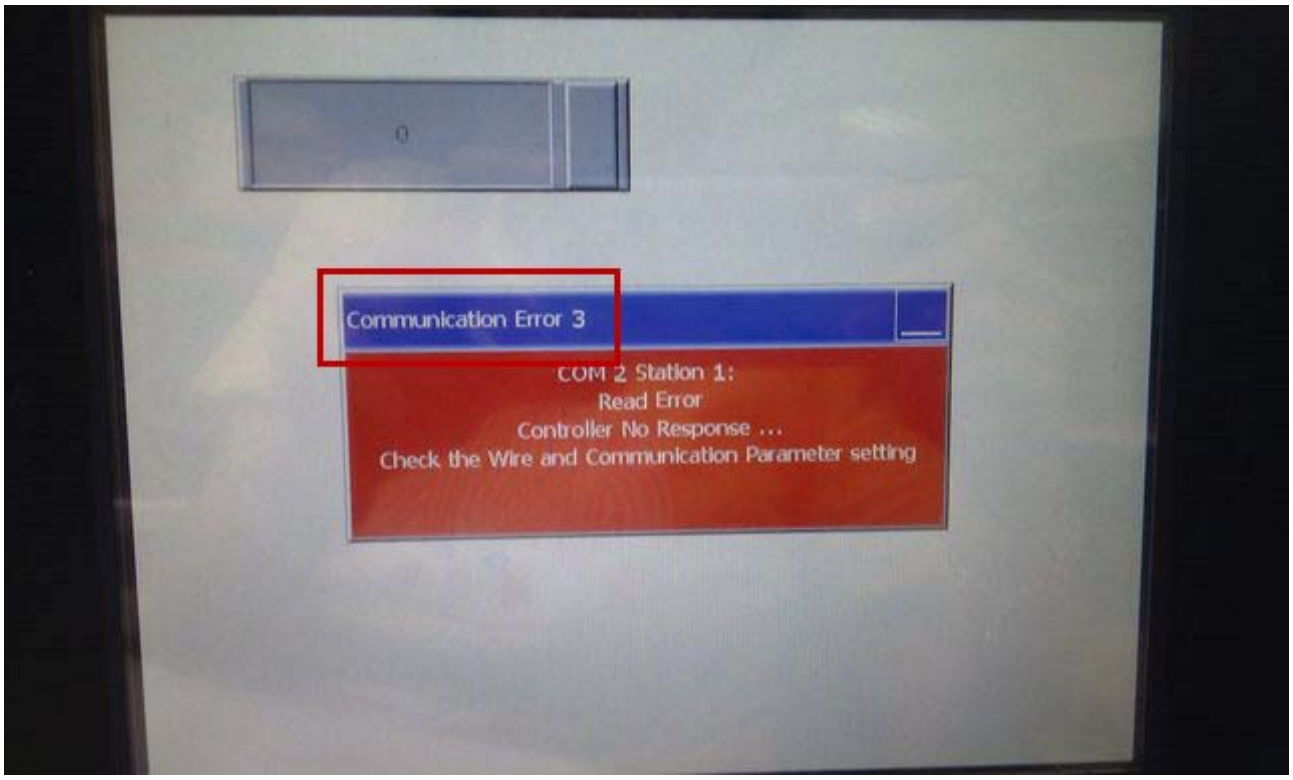


Figure C-1-1 Example of HMI Communication Error Message

When HMI cannot communicate with the controller, to help debug, please refer to the following table for the meanings of communication error codes and its corresponding error messages.

Error Code	Communication Error Messages	Reason	Trouble Shooting
0x02	Unknown	Noise Interference	Stronger anti-noise interference equipment, screened from transfer cable.
0x03	NoResponse	Incorrect wiring, PLC station number, communication parameter include (Baudrate, Parity, Data bits and Stop bit)	Please refer to left description to check setting correct or not.
0x05	ControllerCheckSumError	When HMI check PLC CheckSum then find out error	Please checks PLC CheckSum enable or not, it has to use PLC software to confirm this function.
0x06	CommandError	Read PLC command error	Please check HMI read address could over PLC useful address or not, or the address cannot be written.
0x07	AddressError	Read PLC address error	Please check HMI read address could over PLC useful address or not, or the address cannot be written.
0x08	ValueError	Data written to PLC error	Please check PLC acceptable data range.
0x09	Controller busy	PLC is busy and uable to process the command.	PLC is busy, please try it later.

Error Code	Communication Error Messages	Reason	Trouble Shooting
0x0A	NoCTS	HMI CTS pin did not receive PLC RTS signal.	Please check CTS pin at HMI side and RTS pin at PLC side connect or not, or PLC send RTS signal or not.
0x0E	HMIStationNumberError	HMI station number error	Please check HMI station number over legal station number range or not, or duplicated with other statation number.
0x0F	PLCStationNumberError	PLC station number error	Please check PLC station number over legal station number range or not, or duplicated with other statation number.
0x10	UARTCommunicateFail	HMI bottom layer occur communication error. COM Port did not open or HMI work too busy to cause COM Port abnormal situation.	Please be sure COM Port could use normally or not, or simplified HMI loading. For example, delete ALARM or MACRO command.
0x1A	RTCSYNCError	PLC does not support this command.	Please use the PLC which supports this command.
0x1B	Receive Error	Data format sent by PLC is wrong.	Please make sure the data format is correct.

Table C-1-1 Communication Error Codes and Messages

MPI communication error codes are for Siemens's controllers such as S7-300 (Direct MPI) series, S7-300 (Without PC Adaptor) series and S7-200 series. If the communication is failed when connecting to Siemens's controllers, please refer to the following Table C-1-2 to identify the error messages.

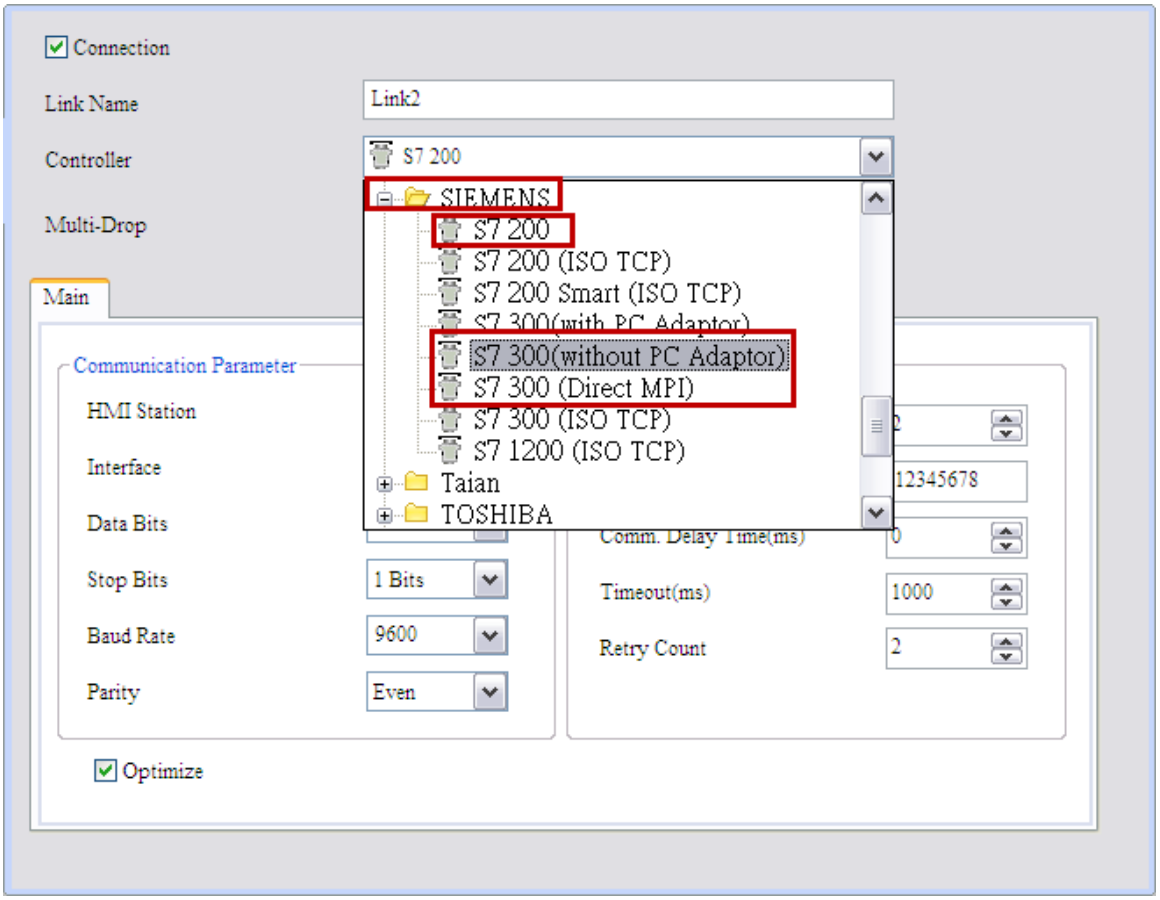


Figure C-1-2 Siemens's Controllers

Error Code	Communication Error Messages	Reason	Trouble Shooting
0x11	MPI_IDLE (It is suitable for S7 300 - without PC adaptor, S7 300 - Direct MPI or S7-200)	The error message is special for Siemens PLC. When the Internet idel, HMI cannot acquire the packet.	See if it is because the number of connected module is excessive and causes insufficient bandwidth
0x12	MPI_SN_COLLID (It is suitable for S7 300 - without PC adaptor, S7 300 - Direct MPI or S7-200)	The error message is special for Siemens PLC. Duplicate station number.	Please make sure if the station number is duplicate.
0x14	MPI_NO_SC (It is suitable for S7 300 - without PC adaptor, S7 300 - Direct MPI or S7-200)	The error message is special for Siemens PLC. The connected station number exceeds the limit.	See if the connected module exceeds the limit.
0x18	MPINoResponse (It is suitable for S7 300	The error message is special for Siemens	See if it is because the cable is disconnected

	- without PC adaptor or S7 300 - Direct MPI)	PLC. The connection request has no response.	or defective contact.
0x0B	NoResource (Applicable for S7 300 - without PC adaptor, S7 300 - Direct MPI and S7-200)	Siemens PLC error message. It is PLC loading too heavy.	Simplified PLC program, reduce loading.
0x0C	NoService (Applicable for S7 300 - without PC adaptor, S7 300 - Direct MPI and S7-200)	Siemens PLC error message. It is PLC loading too heavy.	Simplified PLC program, reduce loading.
0x3F	Read Error (It is suitable for S7 300 - without PC adaptor, S7 300 - Direct MPI or S7-200)	The error message is special for Siemens PLC. PLC address exceeds the accessing range.	Please set up PLC address which can be normally accessed.

Table C-1-2 MPI Communication Error Codes and Messages

When the connecting controller is OMRON’s C/CPM/CQM Series, if a communication erroro ccurs, please refer to the following Table C-1-3 for the meanings of communication eorror code.

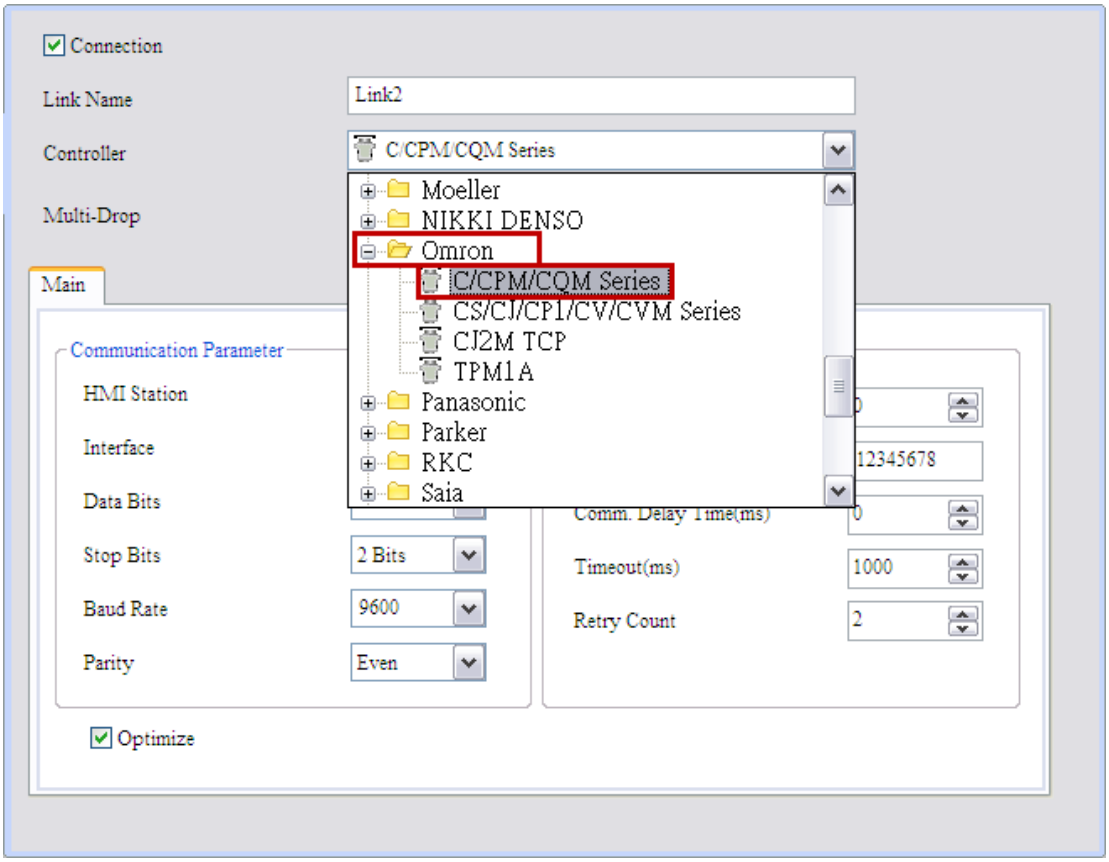


Figure C-1-3 Omron's Controllers

Error Code	Communication Error Messages	Reason	Trouble Shooting
0x1F	NOTExecutableInRunMode	It means HMI already connected with PLC, but PLC is in Run mode, so that it cannot accept data write command.	PLC must be in Monitor Mode then it could accept data write command. This error message only have one time, due to when HMI find out Mode error, it will change PLC mode to Monitor mode automatically.

Table C-1-3 Communication Error Code and Message for Omron's Controller

Appendix D
Write and Read Offset Address

This chapter describes the method of writing and reading offset address. The offset address enables users to flexibly read and write the memory address without downloading the screen again.

After setting the offset address:

Actual write-in address: write memory address + value that you write into the offset address × element [Data type].

Actual read-out address: read memory address + value that you read from the offset address × element [Data type].

If you have set up the write offset address but not the read offset address, the read offset address will be regarded as the same as the write offset address.

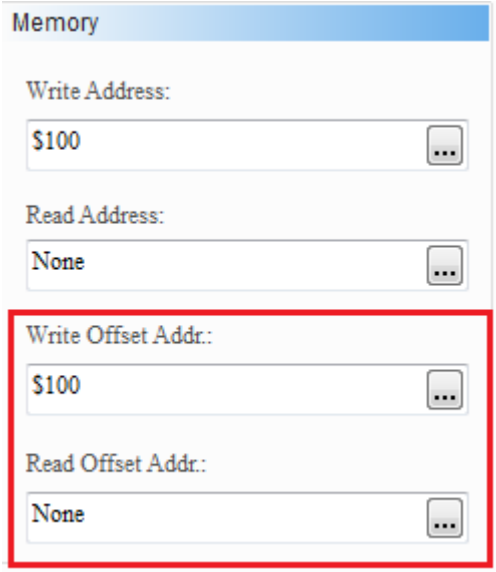


Figure D-1-1 Setup Offset Address

NOTE:

- ✓ Value in offset address has to be unsigned, which ranges from 0 to 65535.
- ✓ If the button element does not have [Data Type] selection, its data type is Bit. Data type for [Character display] and [Character entry] element is Word, not [String length].
- ✓ Elements that can set writing memory address can set writing offset address. The read offset address applies the same rule. Please refer to the following table for writing/reading offset address which can be set by all elements.

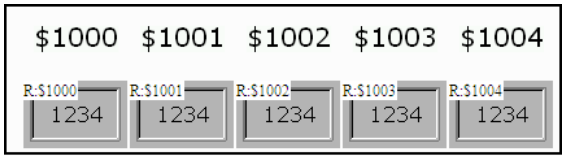
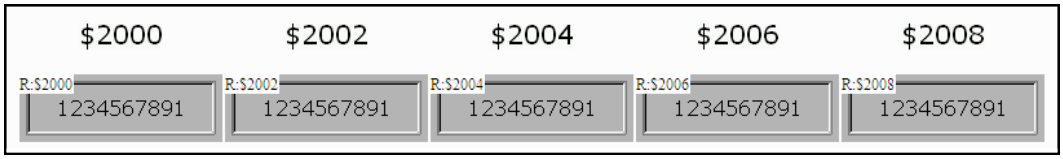
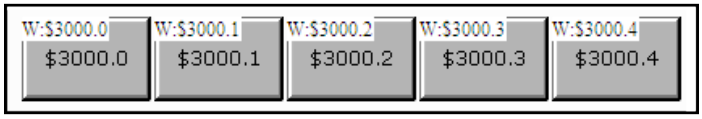
Element		Offset Address	
		Write	Read
Button	Set	◎	◎
	Reset	◎	◎
	Momentary	◎	◎
	Maintained	◎	◎
	Multistate	◎	◎
	Set Value	◎	
	Set Constant	◎	
	Increment	◎	◎
	Decrement	◎	◎
Meter (1)(2)(3)			◎
Bar	Normal		◎
	Differential		◎
Pipe (1)(2)(6)(7)			◎
Pie (1)(2)(3)(4)			◎
Indicator	Multistate indicator		◎
	Value range indicator		◎
	Simple indicator		◎
Display	Numeric display		◎
	Character display		◎
	Prestored message display		◎
	Moving sign		◎
Graph Display	State graphic		◎
	Animated		◎
	Dynamic line		◎
	Dynamic rectangle		◎
	Dynamic ellipse		◎
Input	Numeric entry	◎	◎
	Character entry	◎	◎
	Barcode entry	◎	◎
Analog	Slider	◎	◎
List	ComboBox	◎	◎
	ListBox	◎	◎

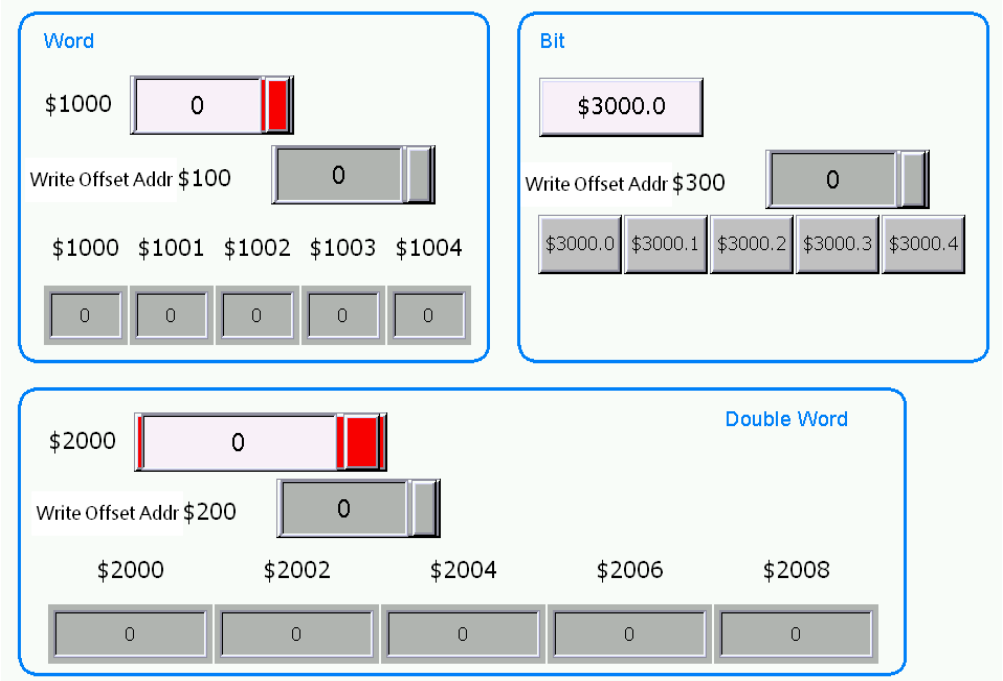
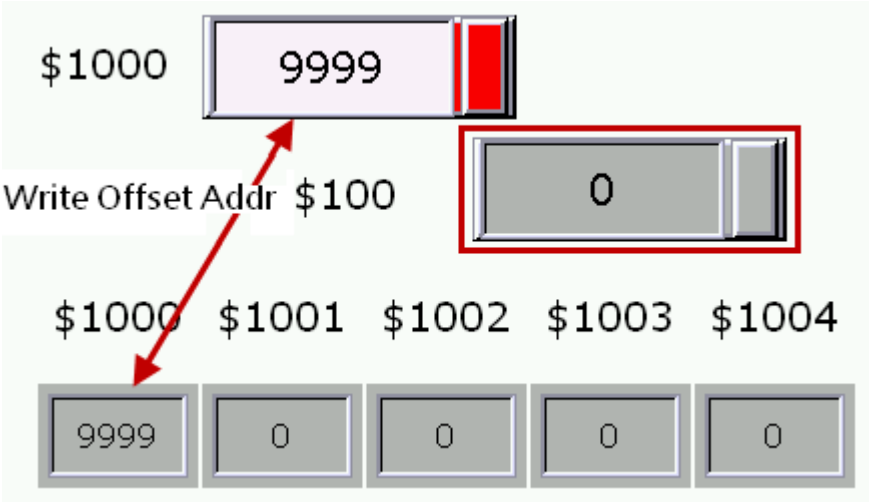
✓ Users can select the internal memory or controller register as the Write / Read memory address for elements. Curretnly, only data size of Word is supported. For example,

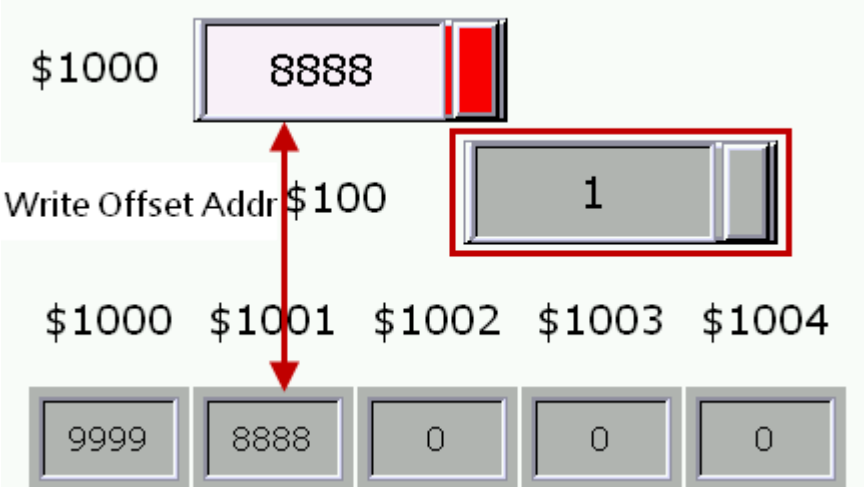
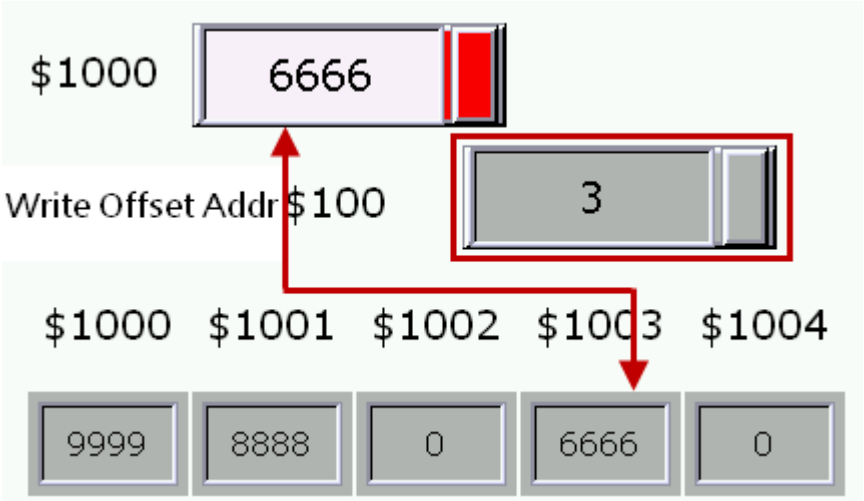
C200 – C255 in Delta's DVP PLC is not supported because its data size is Double Word.

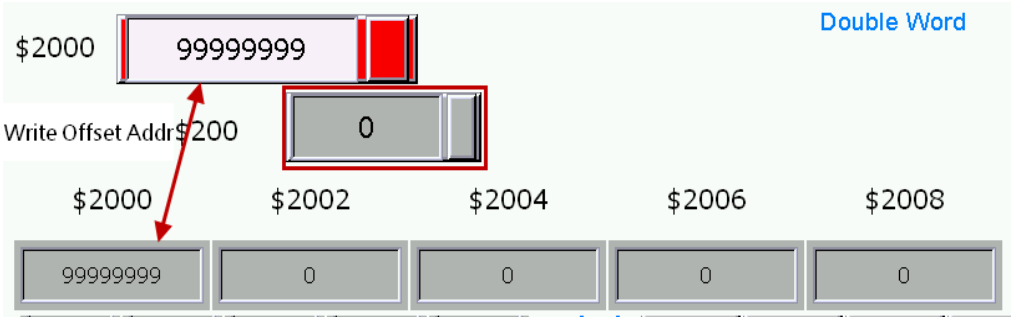
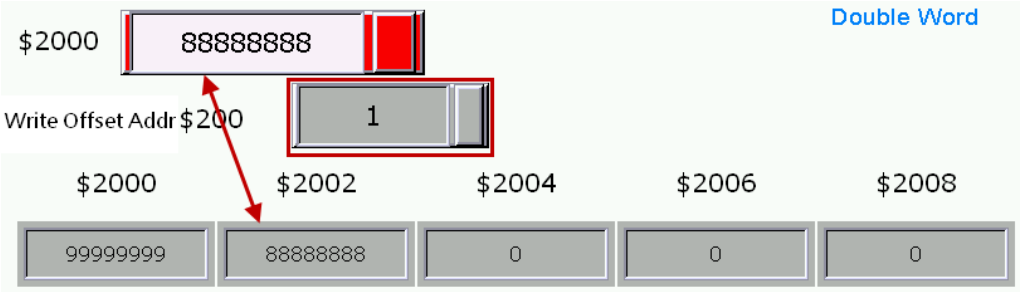
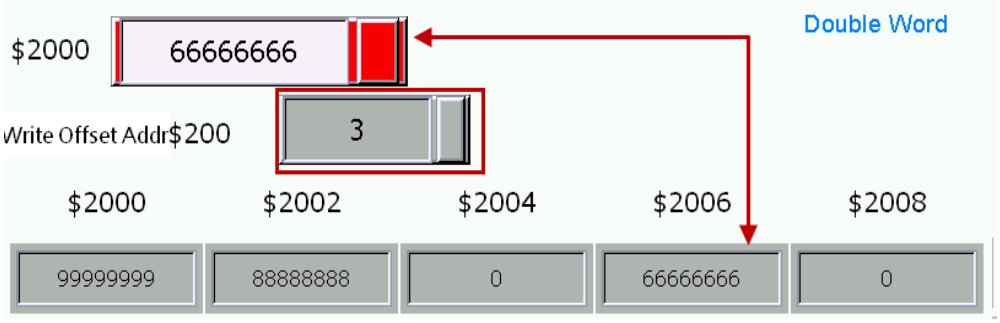
Variable	Memory Usage		
	Internal Memory	PLC Register	Constant
Write Offset Address	◎	◎	
Read Offset Address	◎	◎	

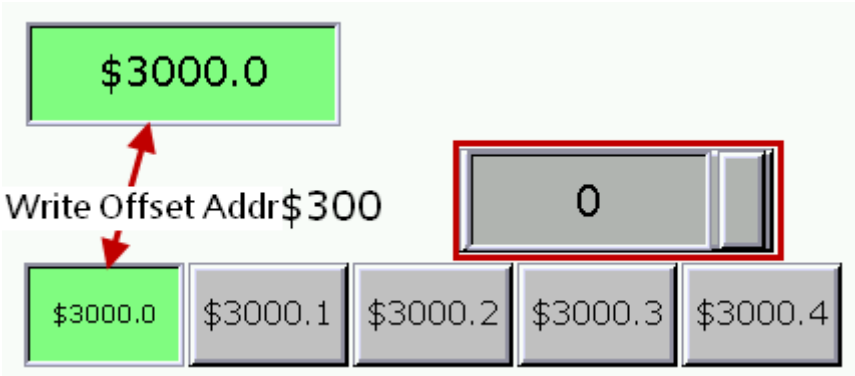
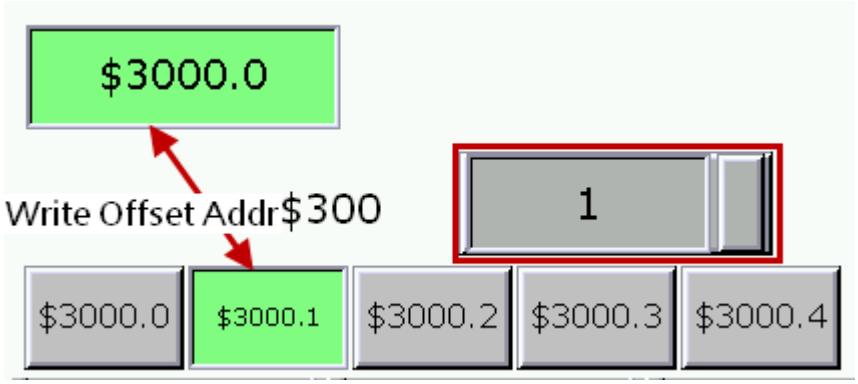
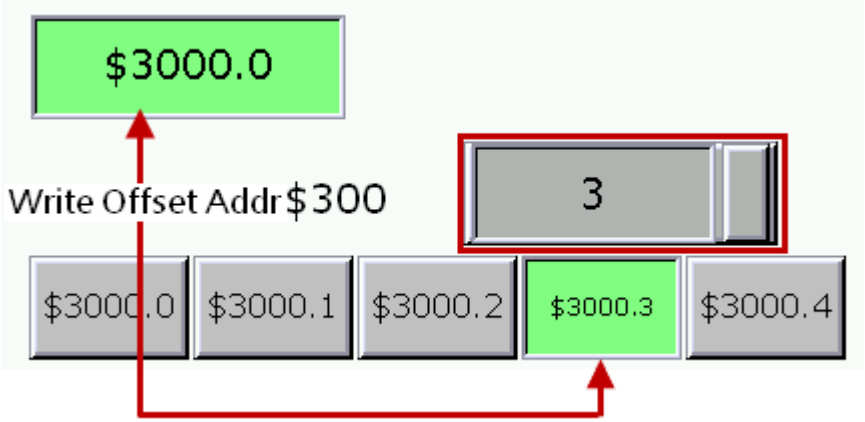
See the following examples of [Offset Address].

Example of applying offset address Table D-1-1 Example of applying offset address	
Create the Numeric Entry Element	➢ Step 1: Create three numeric entry elements and set the writing address to $100, $200 and $300 respectively.
Create the Data Display Element	➢ Step 1: Create five data display elements with the data type as Word and set the address ranging from $1000 to $1004 in sequence.  ➢ Step 2: Create five data display elements with the data type as Double Word and set the address ranging from $2000 to $2004 in sequence. 
Create the Maintained Button	➢ Step 1: Create five maintained button elements and set the address ranging from $3000.0 to $3000.4 in sequence. 
Setup Offset Address	➢ Step 1: Create one numeric entry element with the data type as Word and set the address to $1000 and write offset to $100. ➢ Step 2: Create one numeric entry element with the data type as Double Word and set the Write address to $2000 and Write offset to $200. ➢ Step 3: Create one maintained button element and set the Write address to $3000.0 and Write offset to $300.

Example of applying offset address Table D-1-1 Example of applying offset address	
Download the Screen to HMI	➢ When all elements creation is complete, please compile and download the screen to the HMI. 
Result when the Data Type is Word	➢ When the Write offset address $100 is 0, the actual writing address of numeric entry element is $1000.  ➢ If the Write offset address $100 is 1, the actual writing address of numeric entry element will be $1001.

Example of applying offset address Table D-1-1 Example of applying offset address	
	 ➢ If the Write offset address $100 is 3, the actual writing address of numeric entry element will be $1003. 

Example of applying offset address Table D-1-1 Example of applying offset address	
Result when the Data Type is Double Word	➢ When the Write offset address $200, the actual writing address of numeric entry element is $2000.  ➢ If the Write offset address $200 is 1, the actual writing address of numeric entry element will be $2002.  ➢ If the Write offset address $200 is 3, the actual writing address of numeric entry element will be $2006. 

Example of applying offset address Table D-1-1 Example of applying offset address	
Result when the Data Type is Bit	➢ When the Write offset address $300 is 0, the actual writing address of maintained button element is $3000.0.  ➢ If the Write offset address $300 is 1, the actual writing address of maintained button element will be $3000.1.  ➢ If the Write offset address $300 is 3, the actual writing address of maintained button element will be $3000.3. 

Contents

E-1 WPLSoft DirectLink USB 2
E-1-1 USB Disk Mode 2
E-1-2 CDC Mode 6
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E-3-1 USB Disk Mode 14
E-3-2 CDC Mode 18
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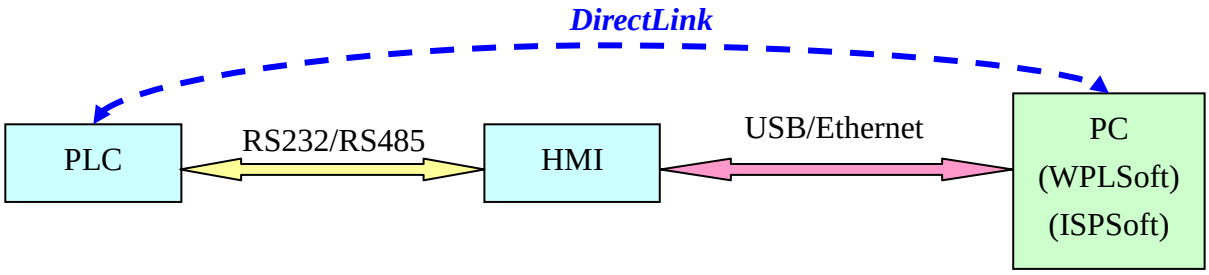
Appendix E DirectLink

Users can use Delta WPLSoft or Delta ISPSoft software to download / upload or monitor the executing program of Delta PLC via the HMI.

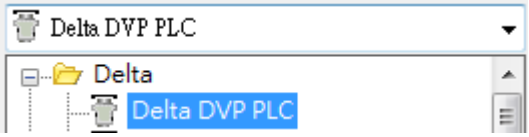


There are two types of DirectLink:

1. **USB DirectLink**: Use USB Cable to read and write PLC via the HMI
   a. USB Disk Mode
   b. CDC Mode
2. **Ethernet DirectLink**: Use Ethernet to read and write PLC via the HMI.

Limit of applying DirectLink:

When DOP-B / DOP-W model applies DirectLink function, the HMI can work properly.
When DOP-A model applies DirectLink function, it will switch to the screen of Bypass Mode automatically. Users will be unable to operate the HMI.
The communication proptocol supported by HMI: Delta DVP PLC only.



NOTE:
- ✓ DirectLink does not support the download function of PLC ES/EC2/EC3, but it supports the upload function and online monitoring.
- ✓ If you wish to apply DirectLink CDC Mode, the HMI firmware version has to be 3.0090, V2.41 for WPLSoft and V2.05 for ISPSoft.

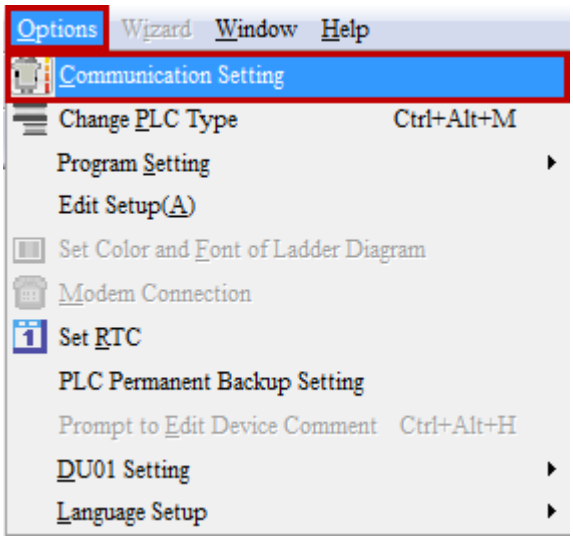
E-1 WPLSoft DirectLink USB

E-1-1 USB Disk Mode

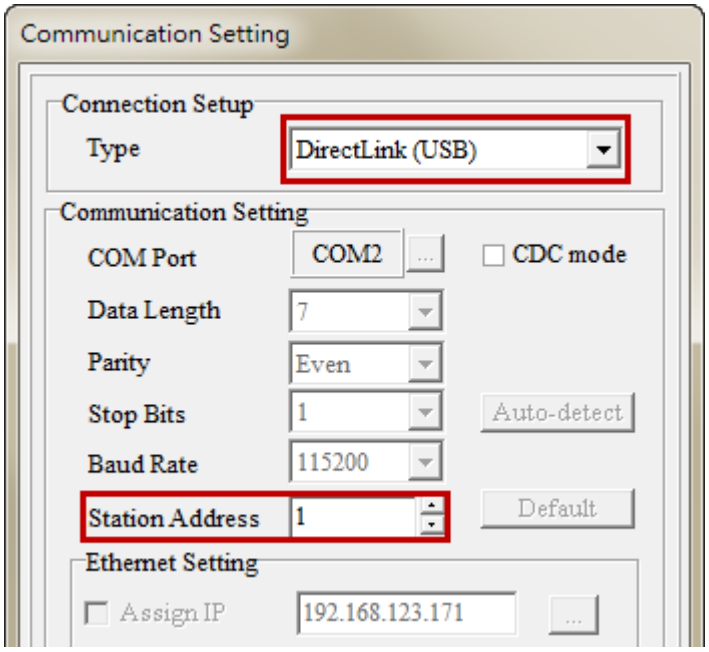
- ➢ Before the communication of DirectLink is established, please make sure the

communication between the HMI and Delta PLC works properly via RS232/RS485. Your personal computer shall connect to the HMI via USB Cable.

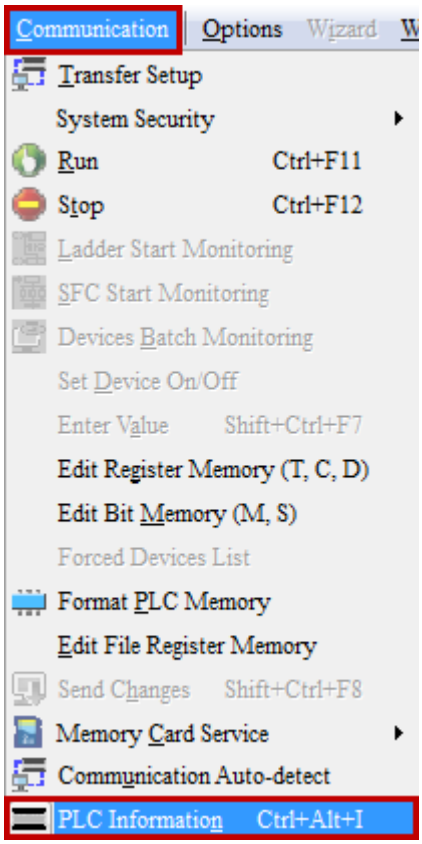
- Go to system directory > [System setting] > [MISC.] and set USBCommMode to 1.
- Open Delta WPLSoft software, go to [Options] > [Communication Setting] dialog box.



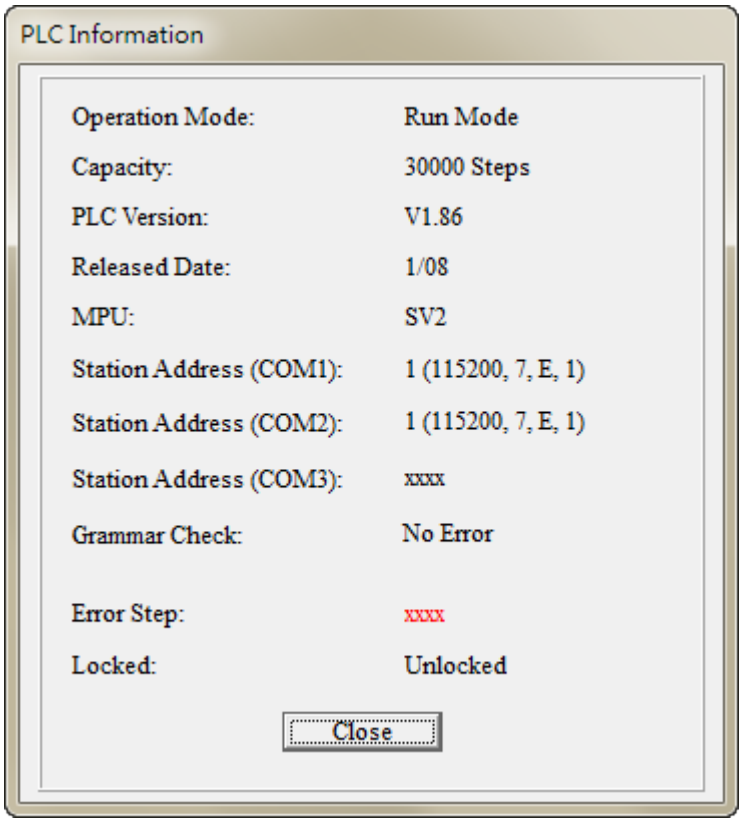
- Select [DirectLink(USB)] as the connection type and set Station Address the same as the PLC's. The station address is set to 1 in this example.



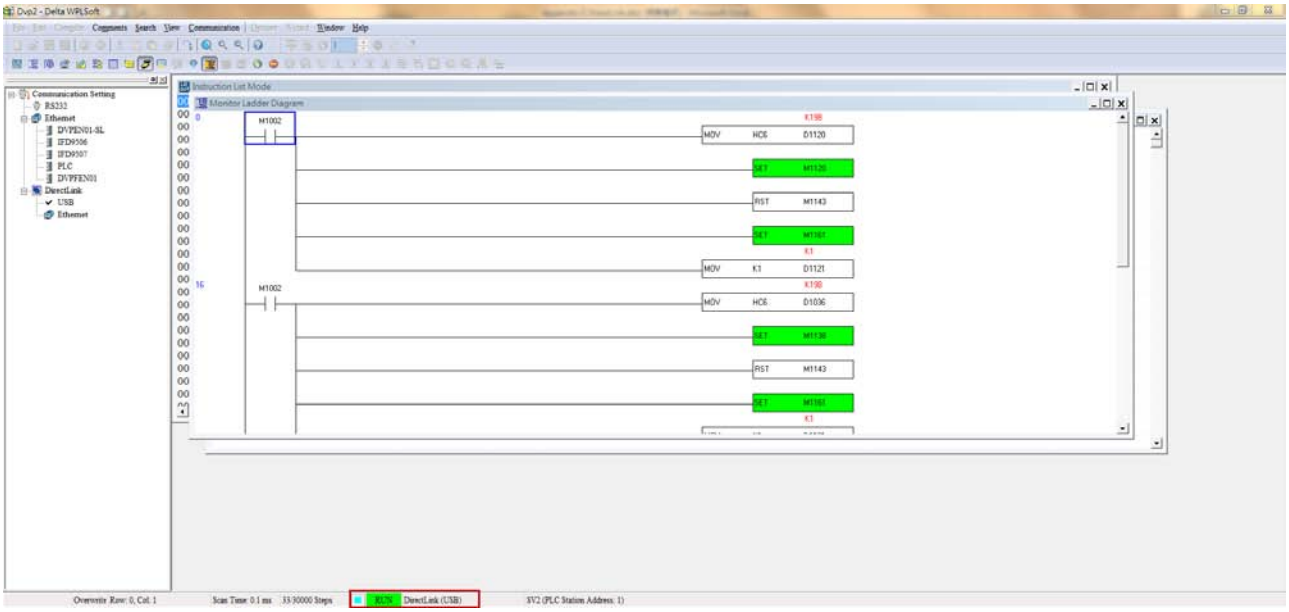
- When the setting is complete, please go to [Communication] > [PLC Information] to check if the communication is successful.



➢ Then, the screen will be shown as below.

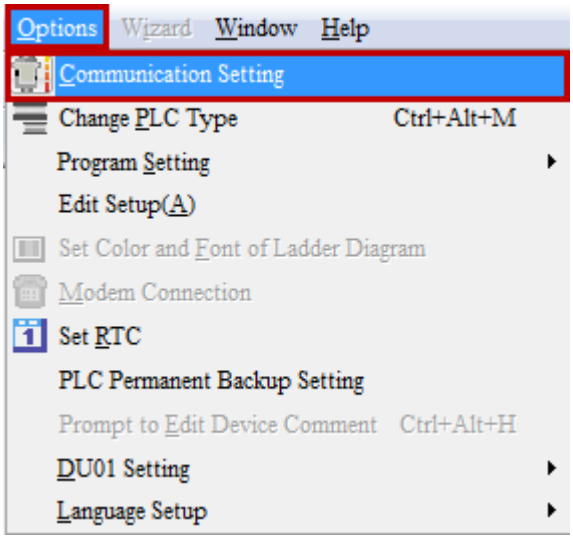


➢ When the communication is ok, users can online monitor the PLC or upload / download files.

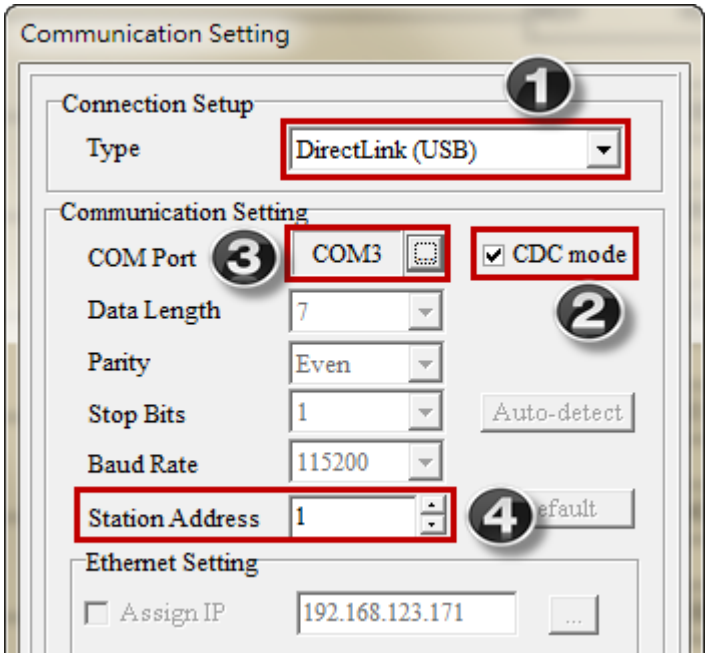

Dvp2 - Delta WPLSoft
Communication Setting
RS232
Ethernet
DVPEN01-SL
IFD9506
IFD9507
PLC
DVPFEN01
DirectLink
USB
Ethernet
Instruction List Mode
Monitor Ladder Diagram
M1002
MOV
HC6
D1120
SET
M1120
RST
M1143
SET
M1161
K1
MOV
K1
D1121
K198
MOV
HC6
D1036
SET
M1138
RST
M1143
SET
M1161
K1
Overwrite Row: 0, Col: 1
Scan Time: 0.1 ms
33/30000 Steps
RUN
DirectLink (USB)
3V2 (PLC Station Address: 1)

E-1-2 CDC Mode

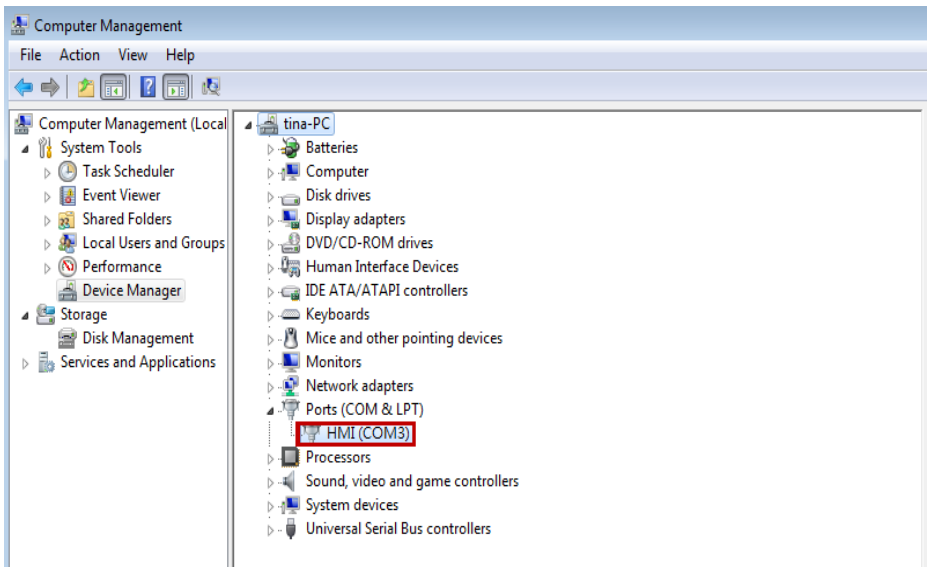
- Before applying DirectLink, please make sure the communication between the HMI and Delta PLC works properly via RS232/RS485. Your personal computer shall connect to the HMI via USB Cable.
- Go to the system directory > [System setting] > [MISC.] and set USBCommMode to 2.
- Open Delta WPLSoft software, go to [Options] > [Communication Setting] dialog box.



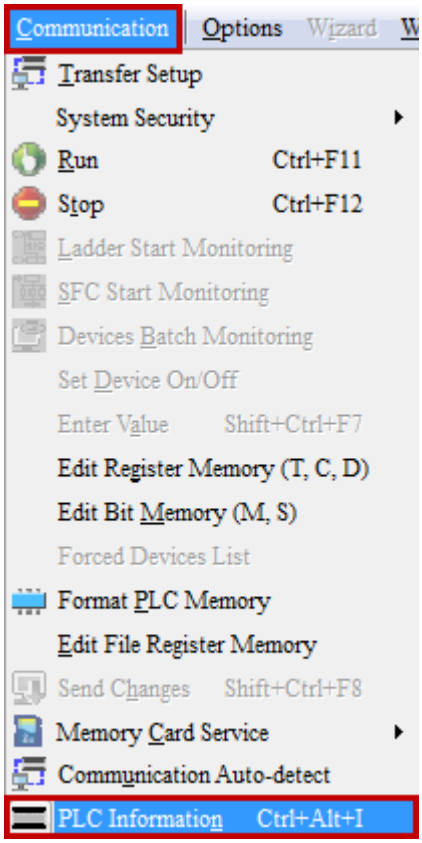
- Please refer to the following table for further descriptions.



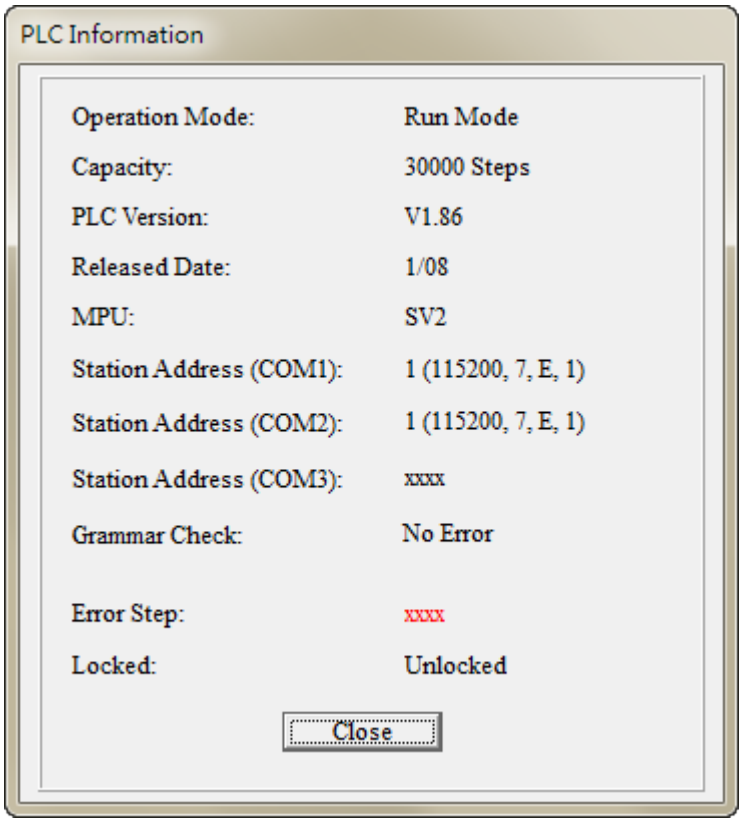
1	Select [DirectLink(USB)] as the connection type.
2	Please check [CDC mode].
3	Set COM port. Here we select COM3, which can be found in computer management.

	
4	Please set the station address the same as the PLC's. It is set to 1 in this example.

- When the setting is complete, please go to [Communication] > [PLC Information] to check if the communication is successful.

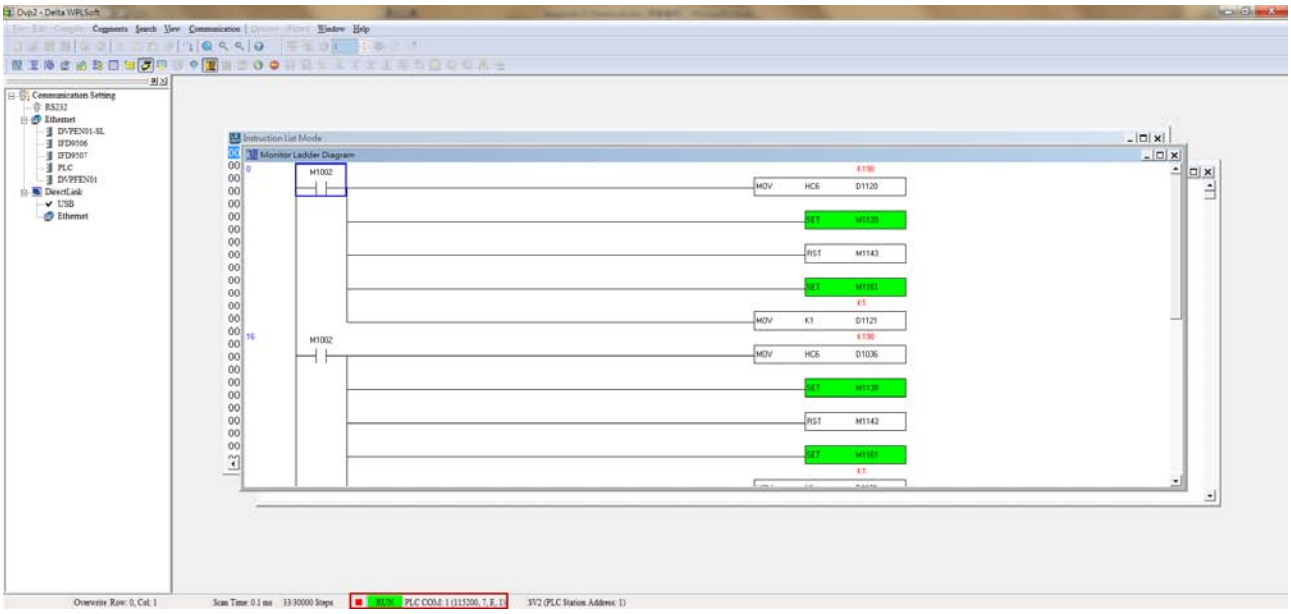


- Then, the screen will be shown as below.



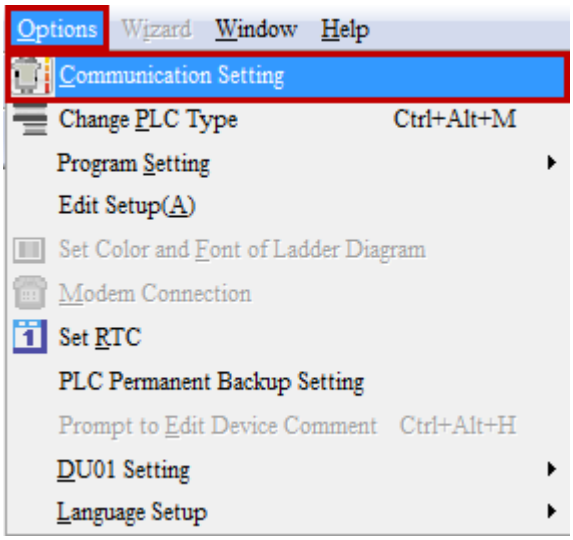
- When the communication is ok, users can online monitor the PLC or upload /

download files.

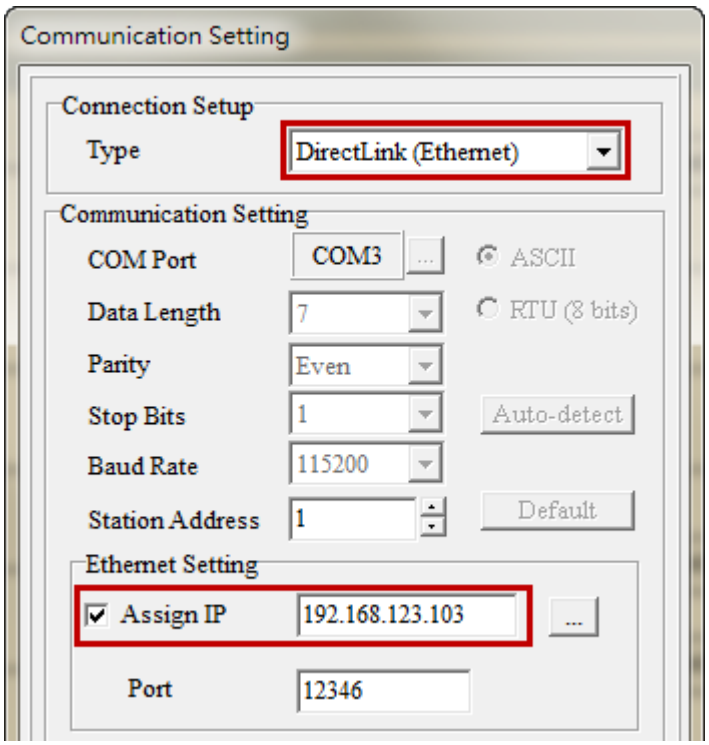


E-2 WPLSoft DirectLink Ethernet

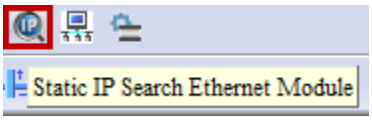
- Before applying DirectLink, please make sure the communication between the HMI and Delta PLC works properly via RS232/RS485. Your personal computer and the HMI shall share the same Ethernet address.
- Open Delta WPLSoft software and go to [Options] > [Communication Setting] dialog box.



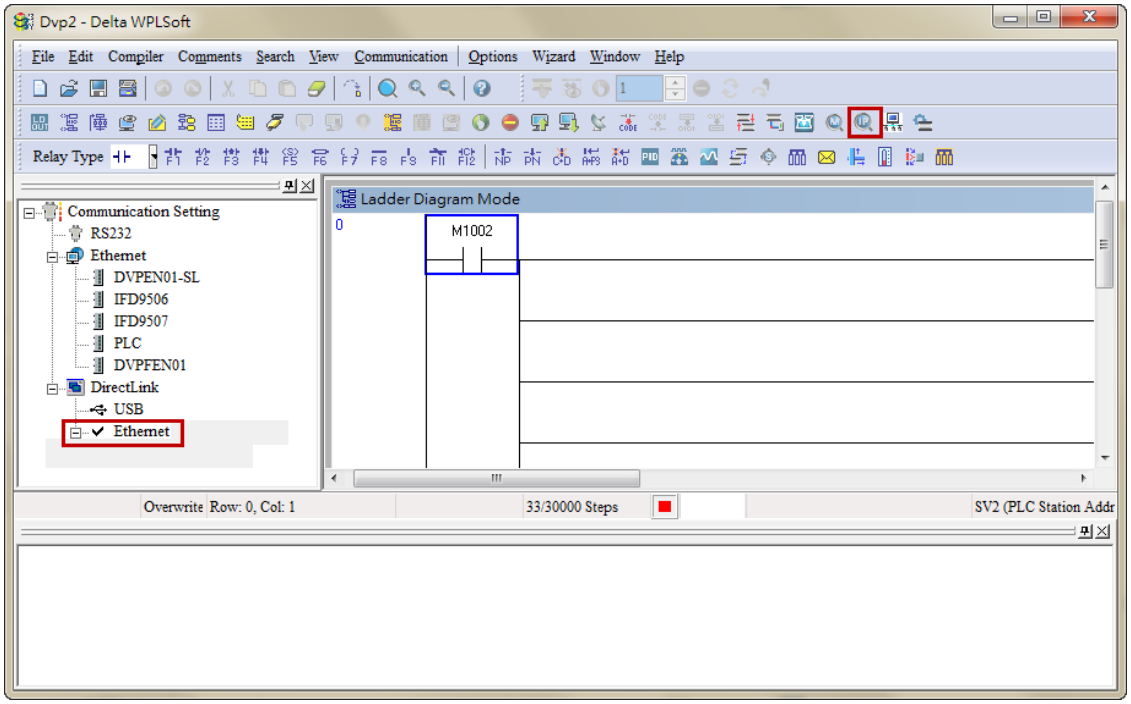
- Please select [DirectLink (Ethernet)] as the connection type and specify the HMI's IP address. 192.168.123.103 is the IP address in this example.



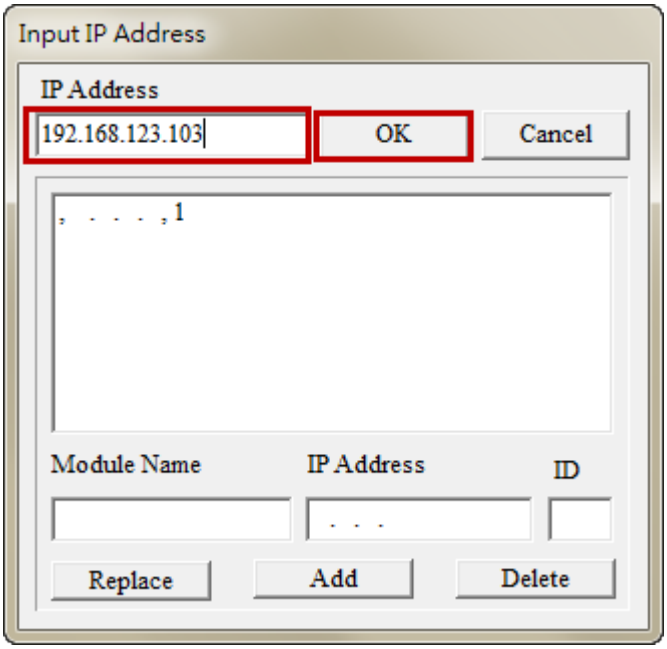
- When the setting is complete, click on ✔ Ethernet first. Then, click on



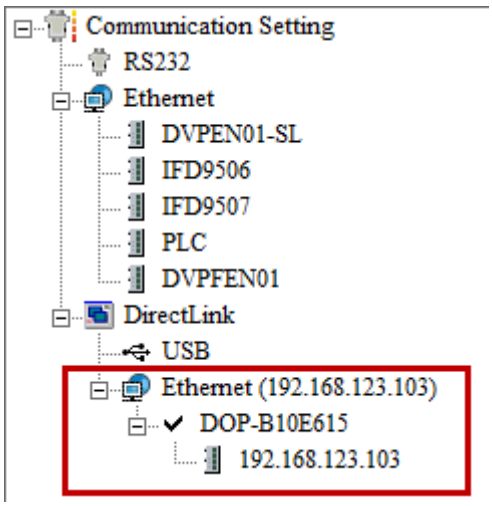
to find the HMI.



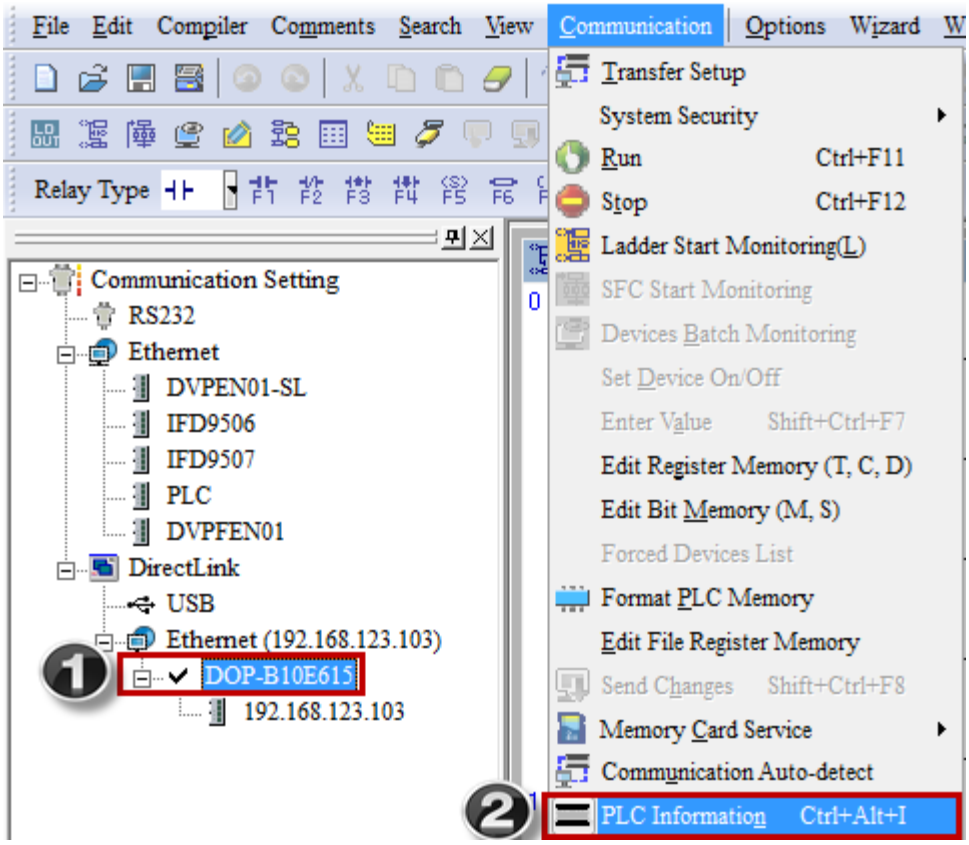
- Search the module by entering the specified IP address. Users shall firstly enter the HMI's IP address, 192.168.123.103 for example. Then, click OK.

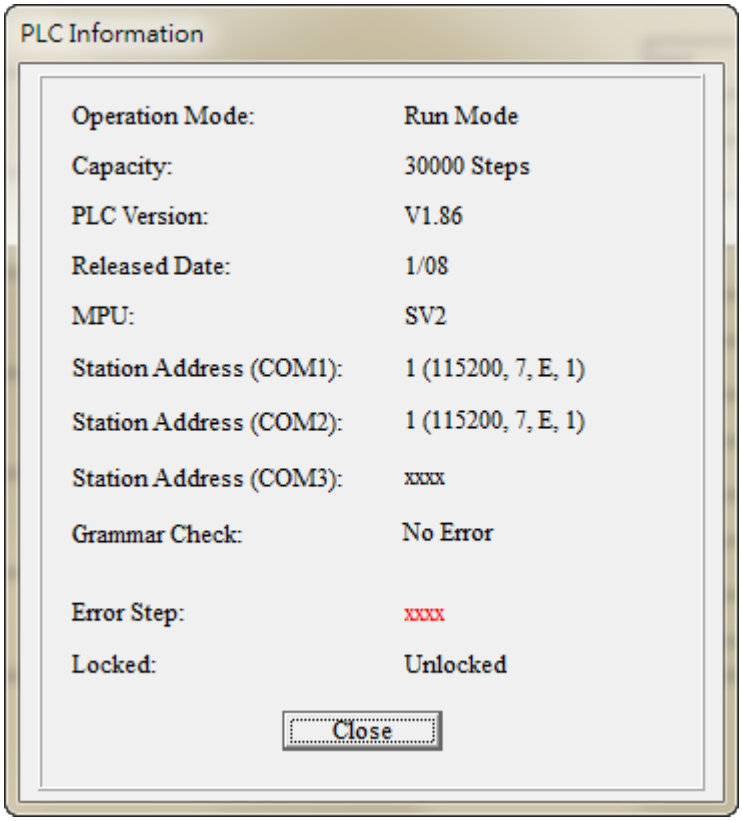


- If the HMI is found, the screen will be shown as below.

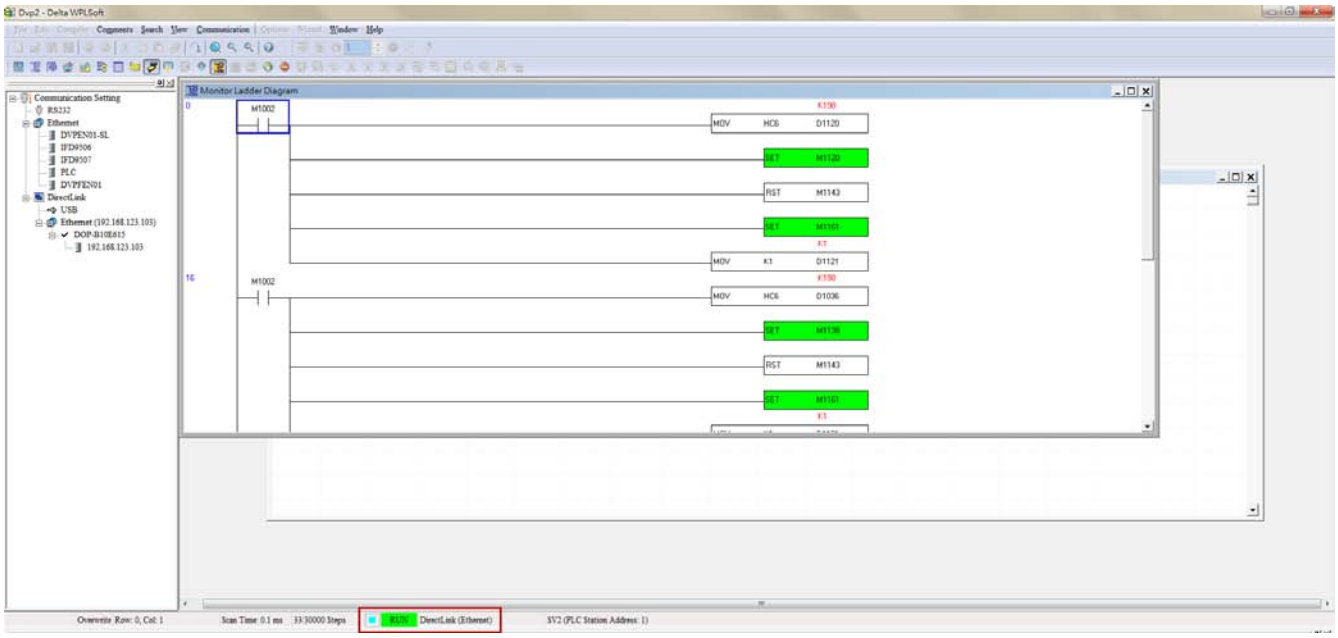


➢ Then, click on the searched HMI. Go to [Communication] > [PLC Information] to make sure the communication is successful.





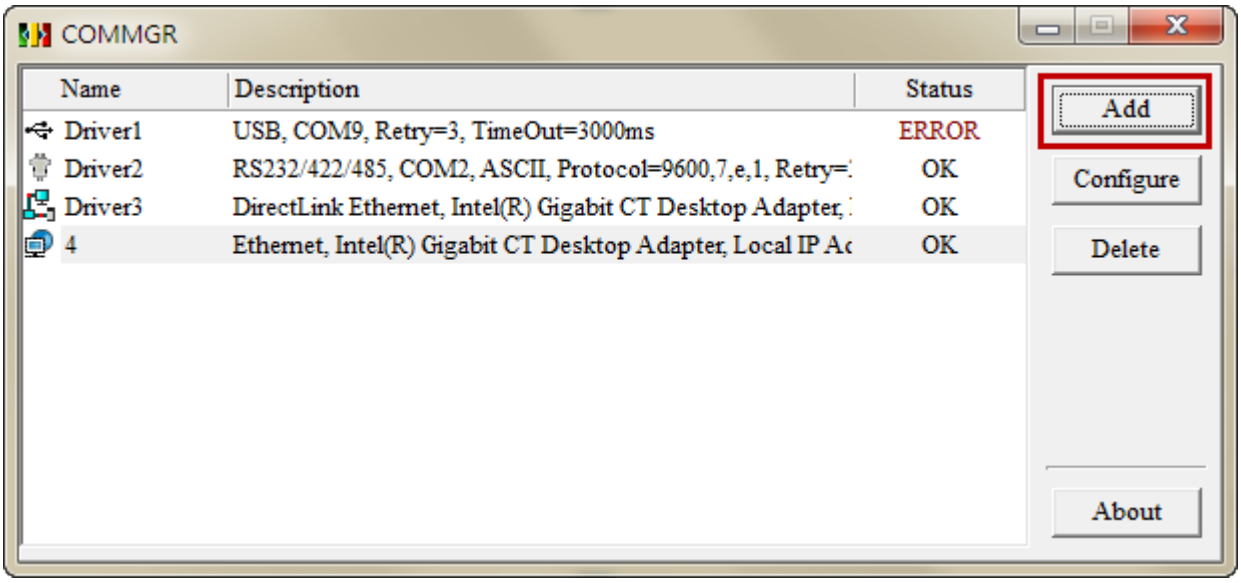
- When the communication is ok, click on the searched HMI before proceeding to online monitor the PLC or upload / download files.



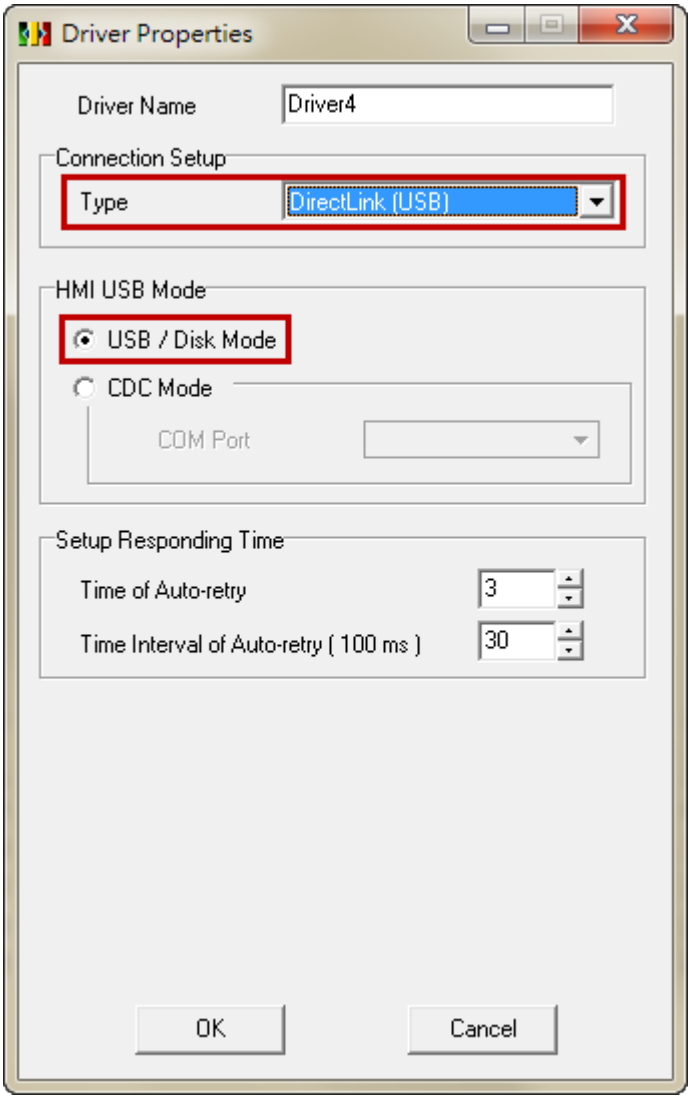
E-3 ISPSoft DirectLink USB

E-3-1 USB Disk Mode

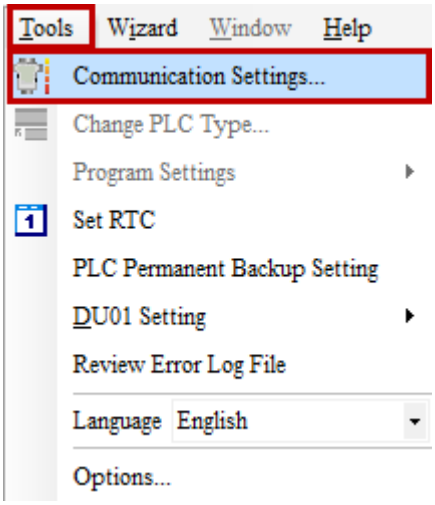
- Before applying DirectLink, please make sure the communication between the HMI and Delta PLC works properly via RS232/RS485. Your personal computer shall connect to the HMI via USB Cable.
- Go to the system directory > [System setting] > [MISC.] and set USBCommMode to 1.
- Enable COMMGR and click on [Add] before enabling Delta ISPSoft software.



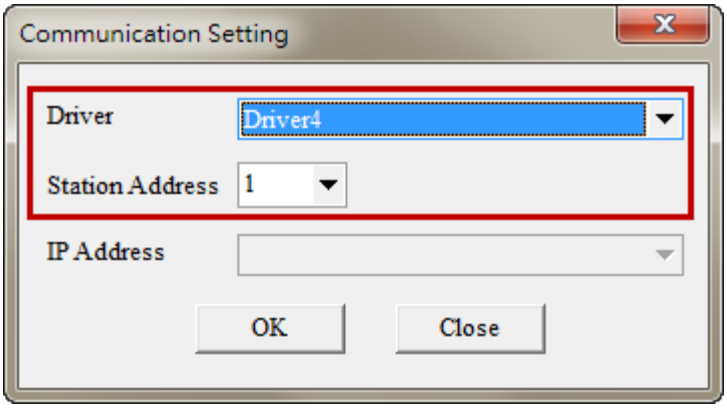
- Select [DirectLink (USB)] as the connection type and check [USB/Disk Mode] as the HMI USB Mode.



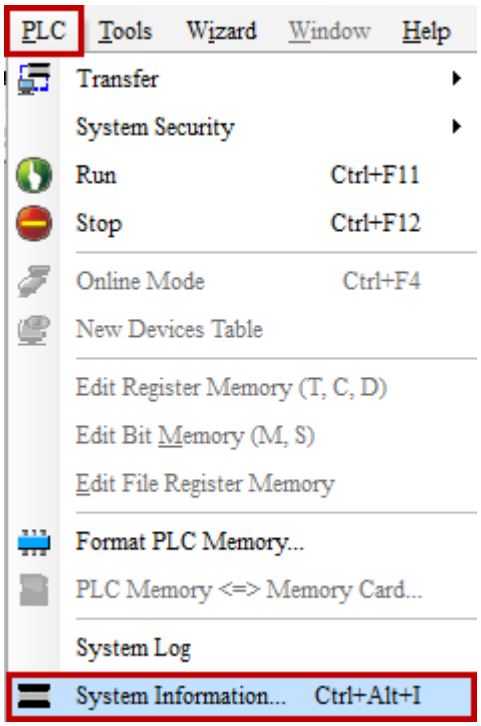
➢ Open Delta ISPSoft software and go to [Tools] > [Communication Settings] dialog box.



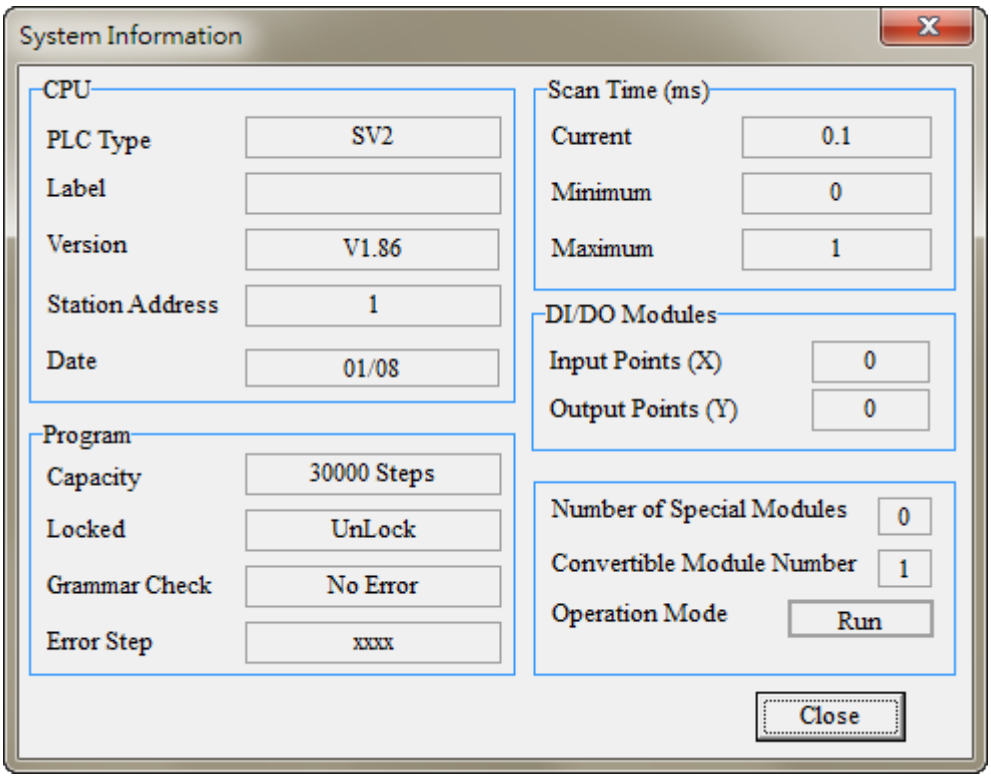
➢ Select [Driver 4] and set 1 as the station address.



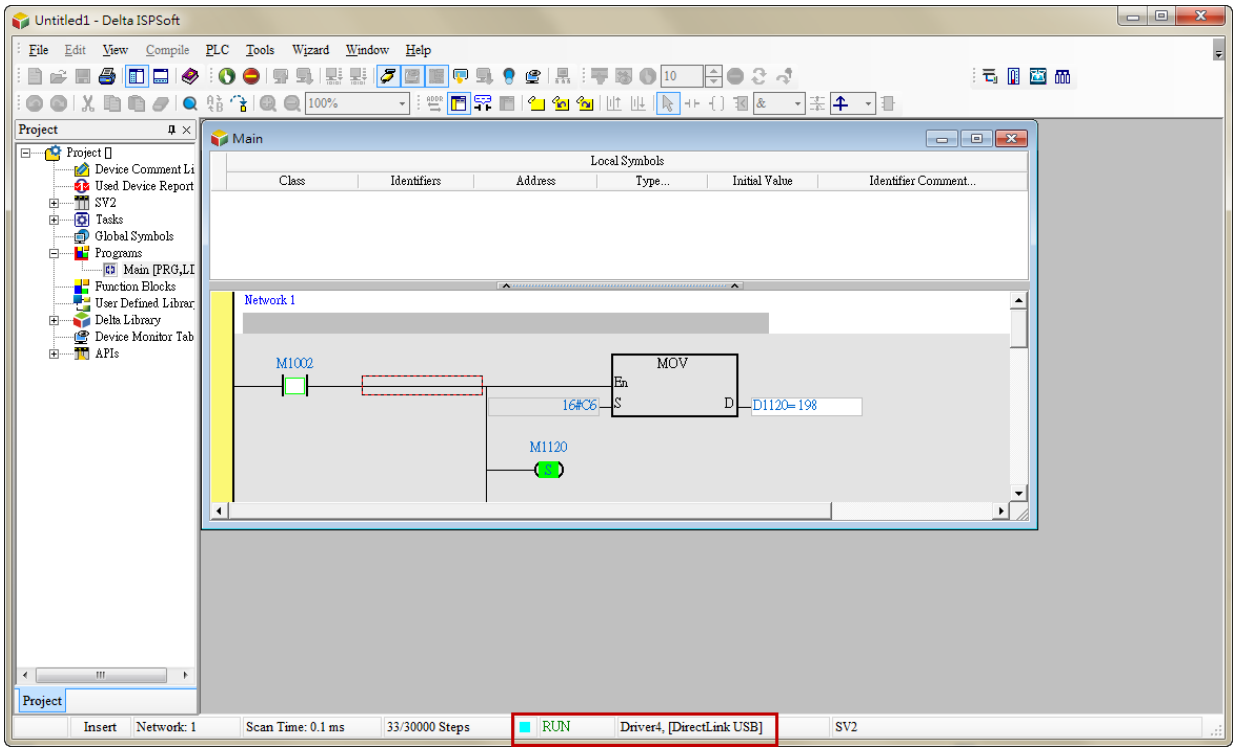
➢ When the setting is complete, please go to [PLC] > [System Information] to check if communication is established successfully.



➢ Then, the screen will be shown as below.



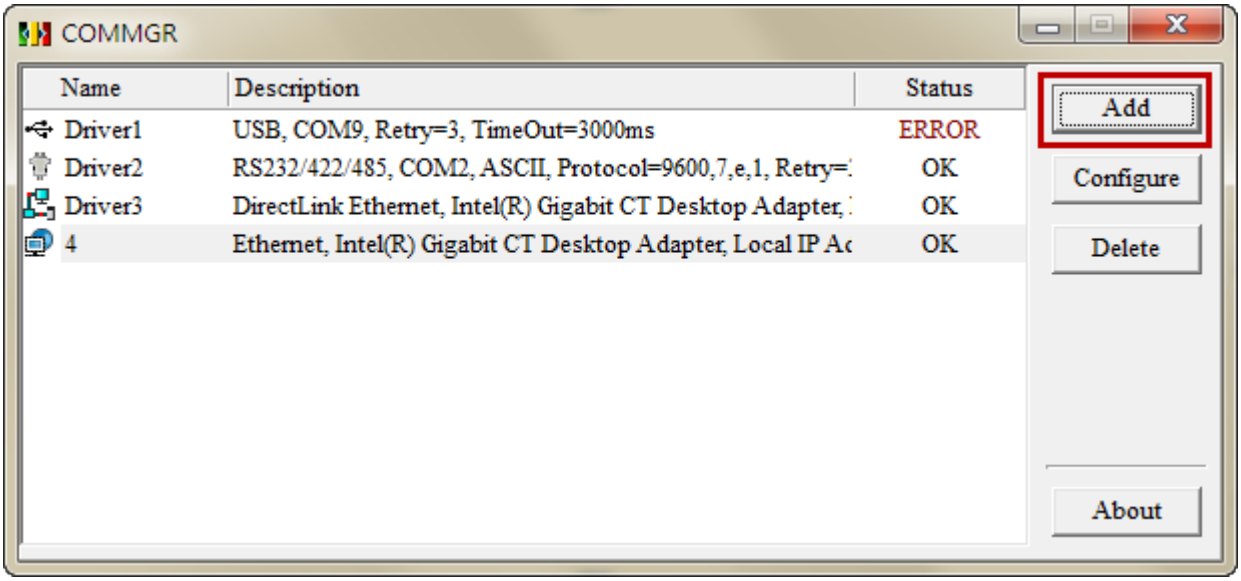
➢ When the communication is ok, users can online monitor the PLC or upload / download files.



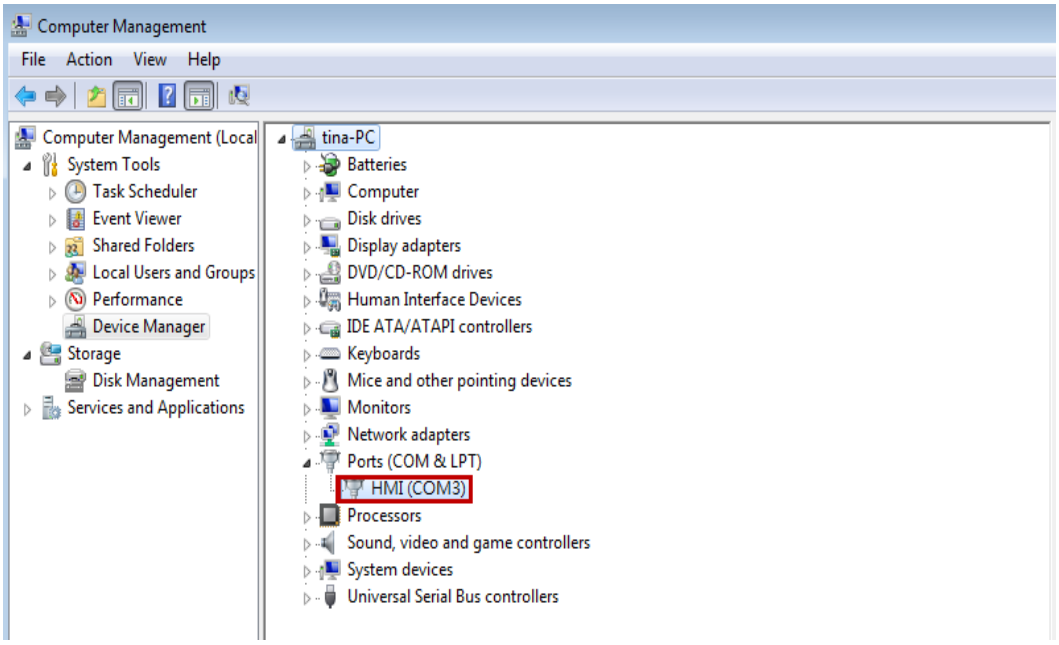
E-3-2 CDC Mode

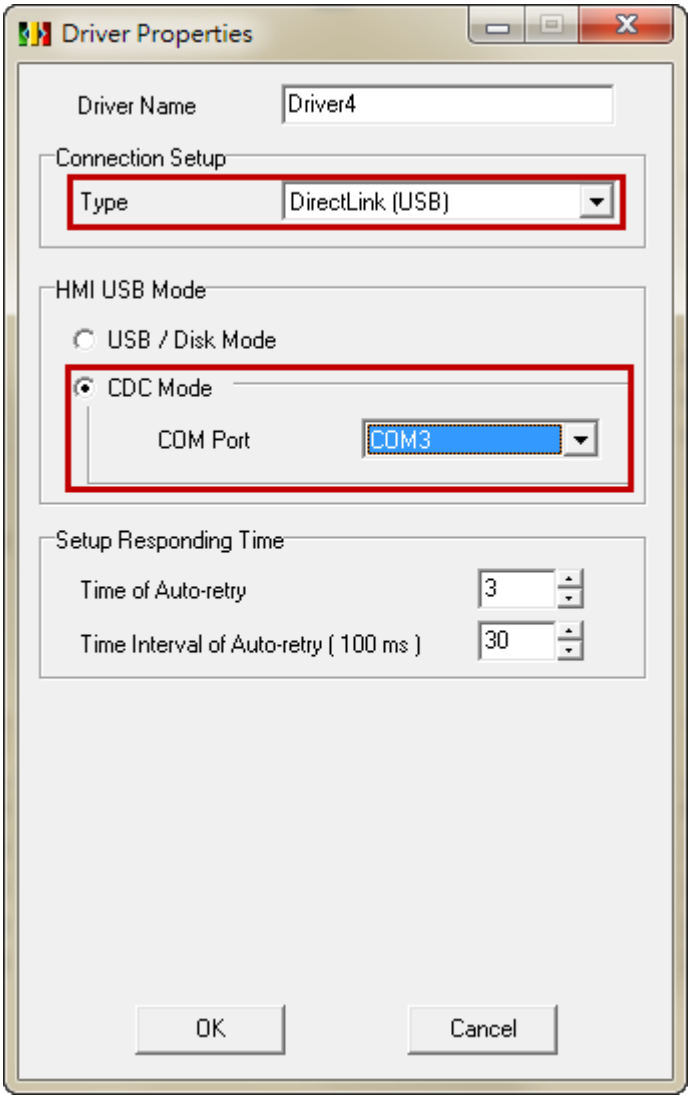
- Before applying DirectLink, please make sure the communication between the HMI and Delta PLC works properly via RS232/RS485. Your personal computer shall connect to the HMI via USB Cable.
- Go to the system directory > [System setting] > [MISC.] and set USBCommMode to 2.

- Enabling COMMGR and click on [Add] before enabling Delta ISPSoft software.

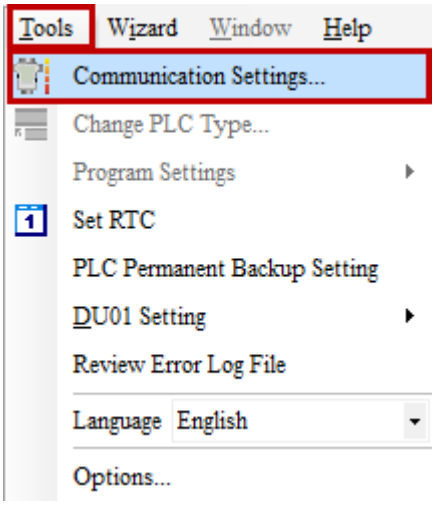


- Select [DirectLink (USB)] as the connection type, set [CDC Mode] as the HMI USB mode and set COM Port to COM3, which can be found in Computer Management.

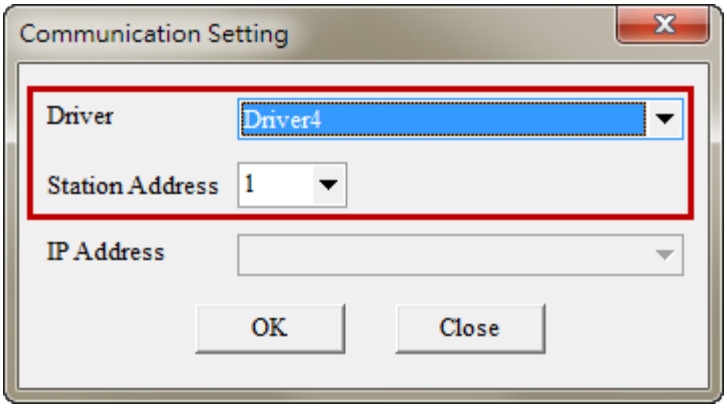




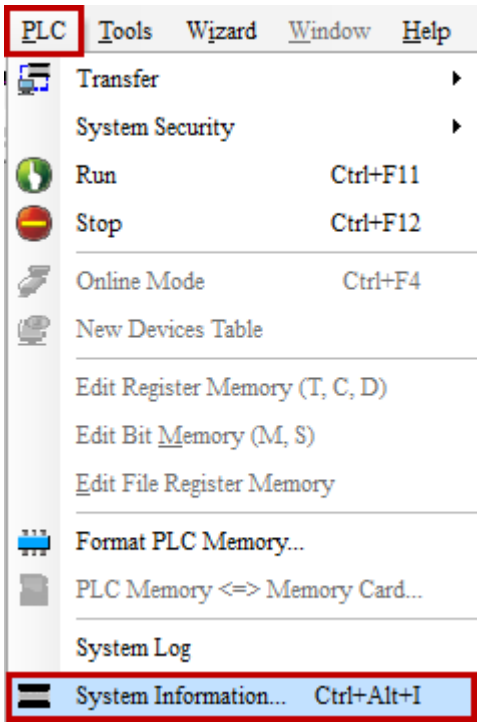
➢ Open Delta ISPSoft software and go to [Tools] > [Communication Settings] dialog box.



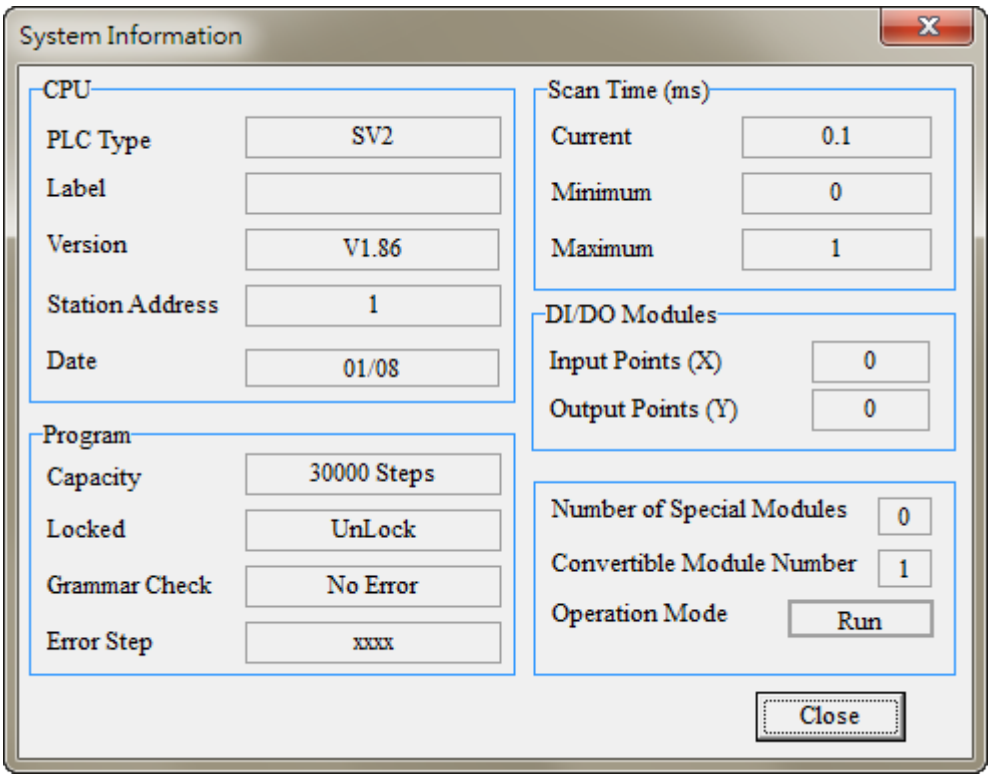
➢ Select [Driver 4] and set 1 as the station address.



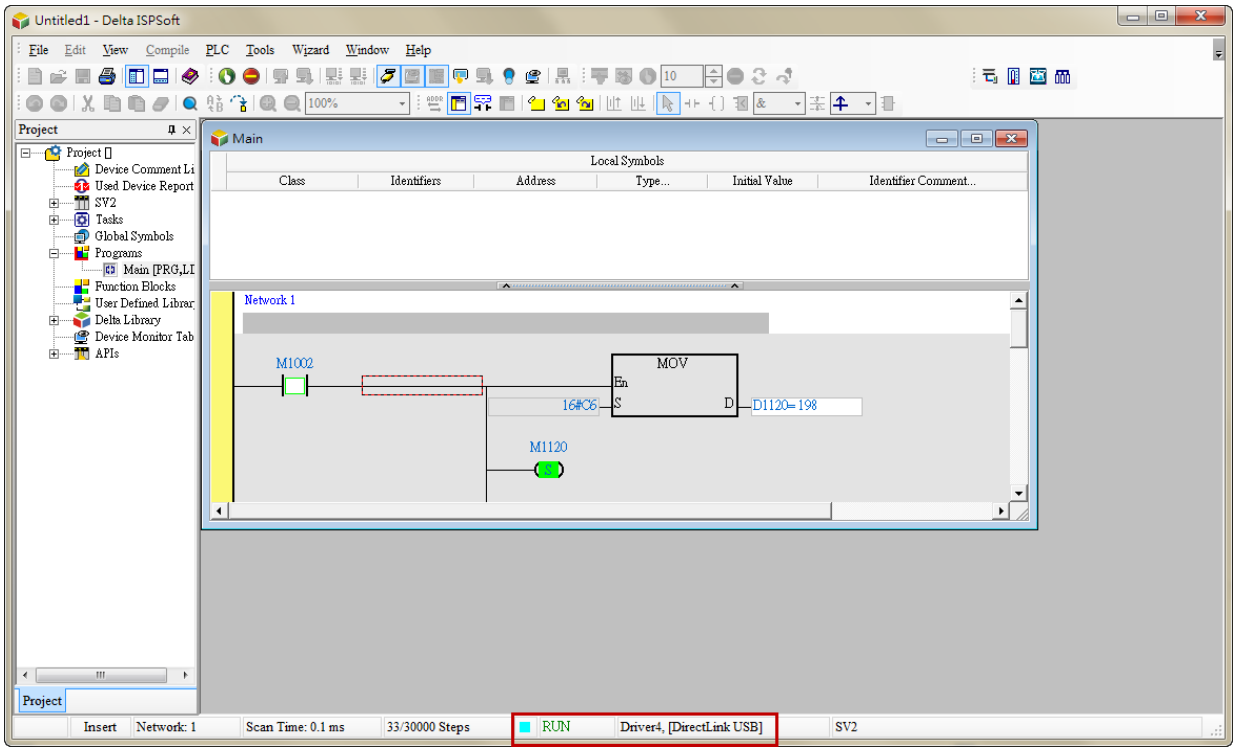
➢ When the setting is complete, please go to [PLC] > [System Information] to check if communication is successful.



➢ Then, the screen will be shown as below.

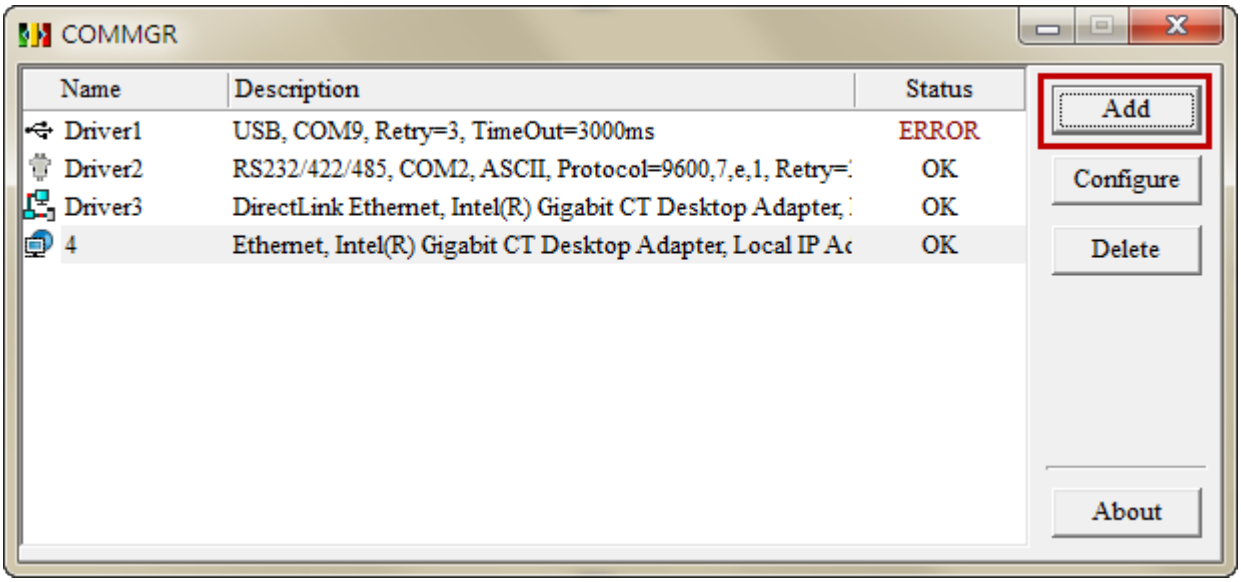


➢ When the communication is ok, users can online monitor the PLC or upload / download files.

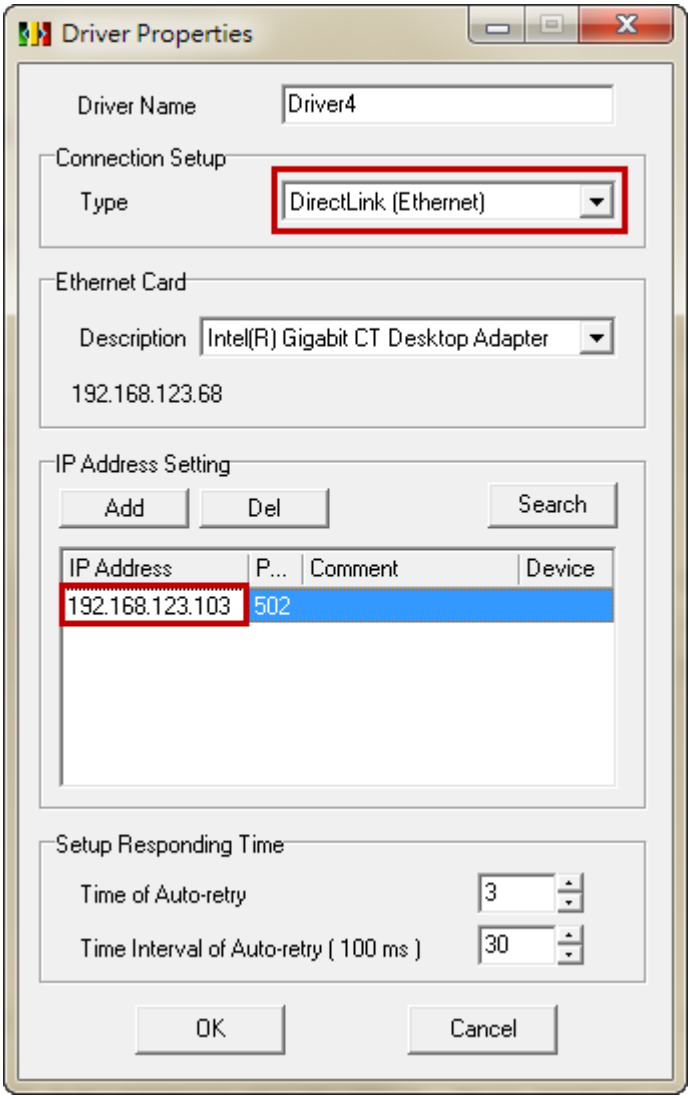


E-4 ISPSoft DirectLink Ethernet

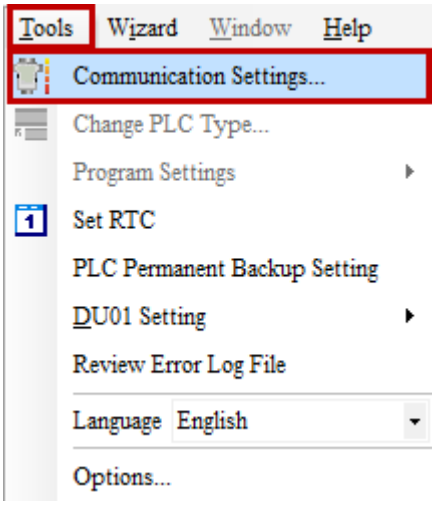
- Before applying DirectLink, please make sure the communication between the HMI and Delta PLC works properly via RS232/RS485. Your personal computer and the HMI shall share the same Ethernet address.
- Enable CMMGR and click [Add] before opening Delta ISPSoft software.



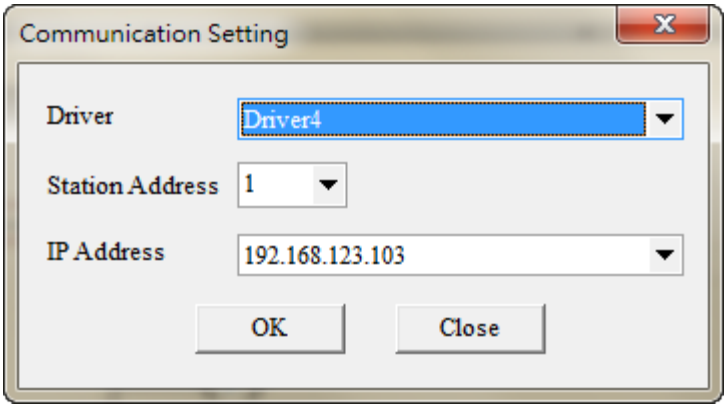
- Select [DirectLink (Ethernet)] as the connection type. Then, select Search or Add the HMI's IP address that you wish to connect. Here we enter 192.168.123.26 as the example.



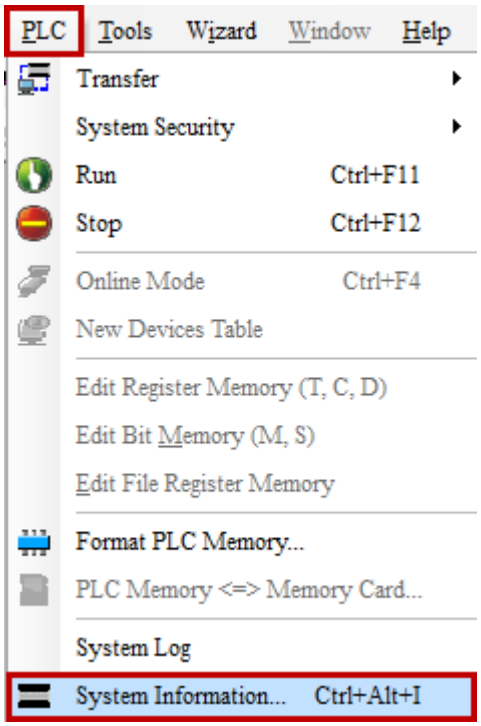
➢ Open Delta ISPSoft software and enter [Tools] > [Communication Settings] dialog box.



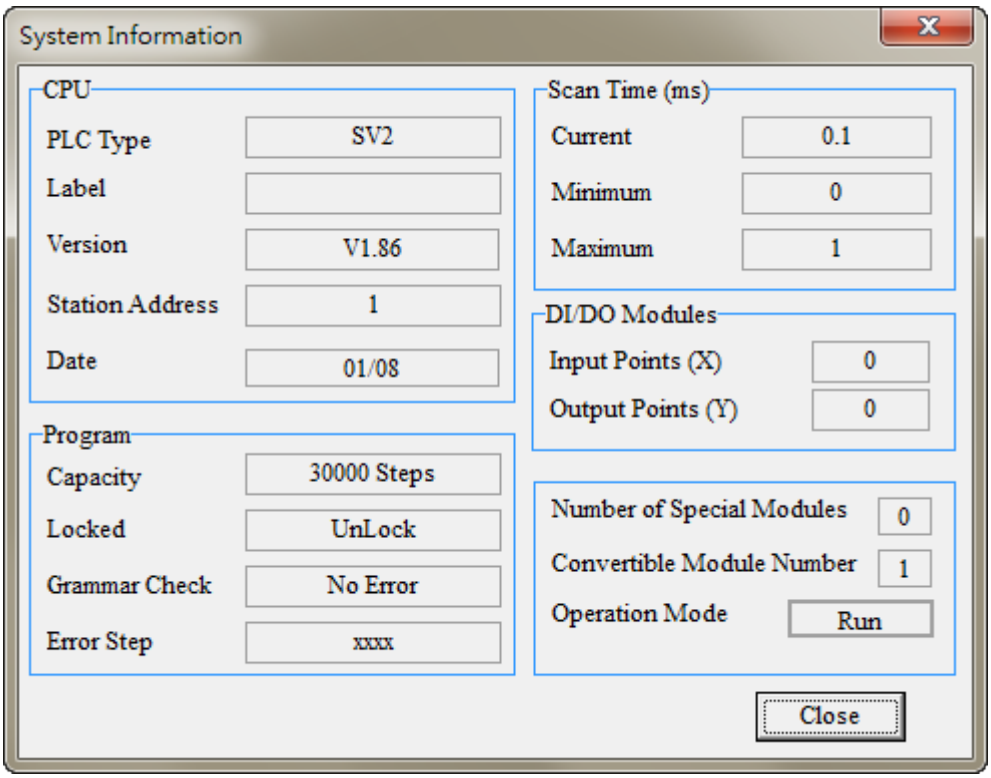
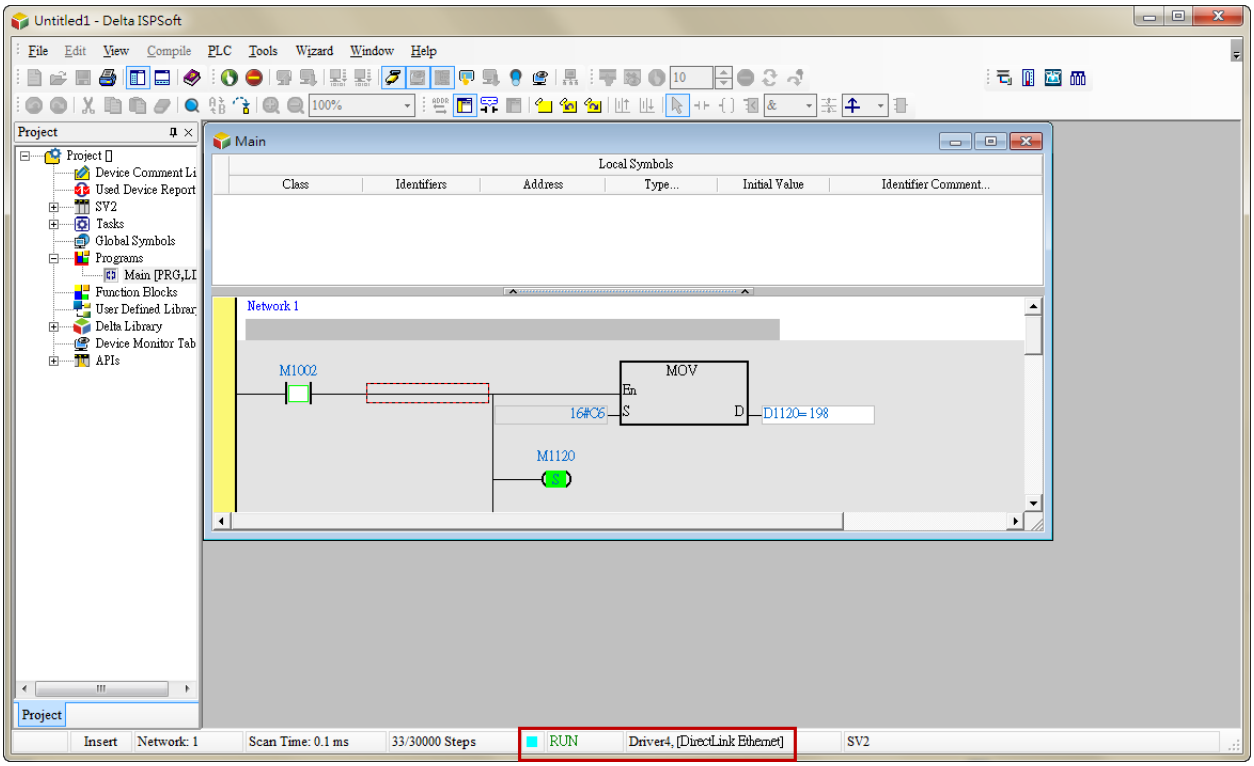
➢ Select [Driver 4] and set 192.168.123.103 as the IP address.



➢ When the setting is complete, go to [PLC] > [System Information] to check if the communication is successful.



➢ Then, the screen will be shown as below.



➢ When the communication is ok, users can online monitor the PLC or upload / download files.