DIAView

RealTimeChart/HistoryChart

Ruby

2020/05/01

Outline

- The concepts of chart
- RealtimeChart
  - Overview
  - Create a RealtimeChart
  - Properties
  - Toolbar Buttons
  - Scripts
- HistoryChart
  - Overview
  - Create a HistoryChart
  - Properties
  - Toolbar Buttons
  - Scripts

Purpose

In this chapter, you will learn …..

… more about Realtime Chart

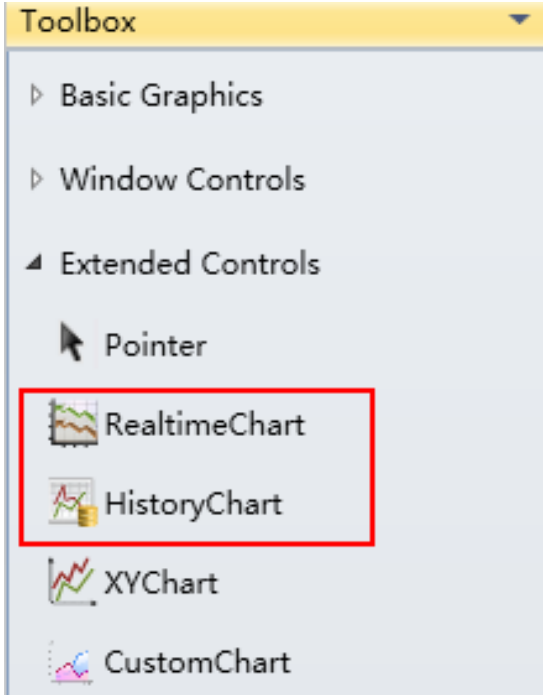
… more about Histoty Chart

Outline

- The concepts of chart
- RealtimeChart
  - Overview
  - Create a RealtimeChart
  - Properties
  - Toolbar Buttons
  - Scripts
- HistoryChart
  - Overview
  - Create a HistoryChart
  - Properties
  - Toolbar Buttons
  - Scripts

The Concepts of Chart

The curve that reflects the trend of data change with time, and is widely used in industry. For example, it displays the trend of environmental temperature, water temperature, production output and other changes with time, which is convenient for users to efficiently and quickly collect, analyze, and process various industrial data , Thereby improving production efficiency. The DIAView software contains various chart controls. Here we introduce real-time chart and history chart.



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- RealtimeChart
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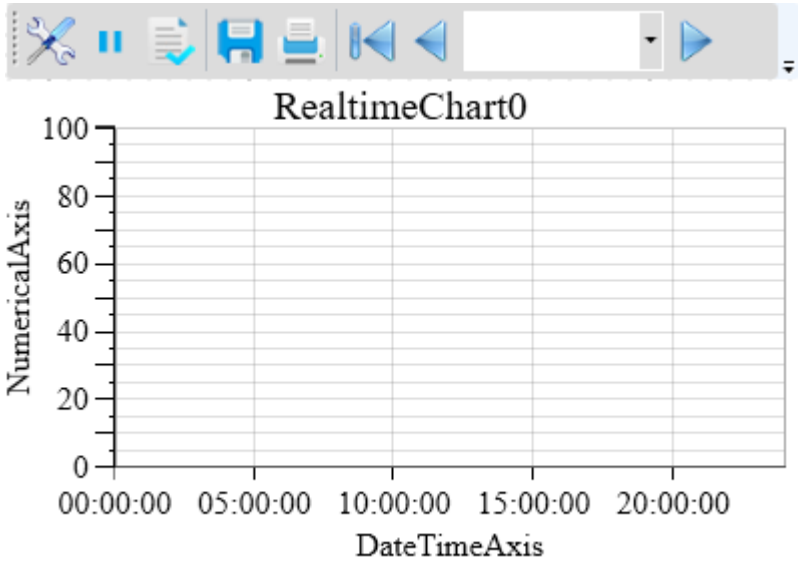
Realtime Chart

➢ Overview

The RealtimeChart is a graph of the value of the variables or expressions in a period of time, which changes with time. It is usually used in energy, medical and other industries. In order to facilitate user query, real-time trend can not only draw the curve of real-time data, but also provide special configuration types such as trend mode, trend time, curve, time axis, value axis, etc. Drawing and charting methods meet a variety of different needs.



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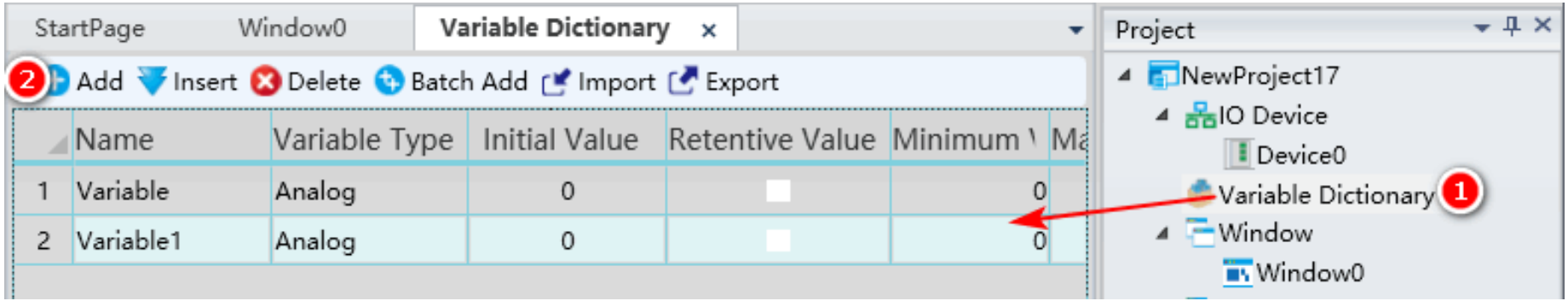
Realtime Chart

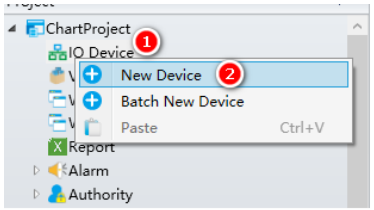
- Create a RealtimeChart that refreshes the real-time data

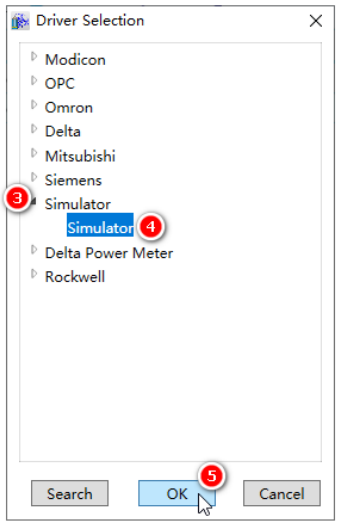
(1)Create 2 variables :Variable, Variable1

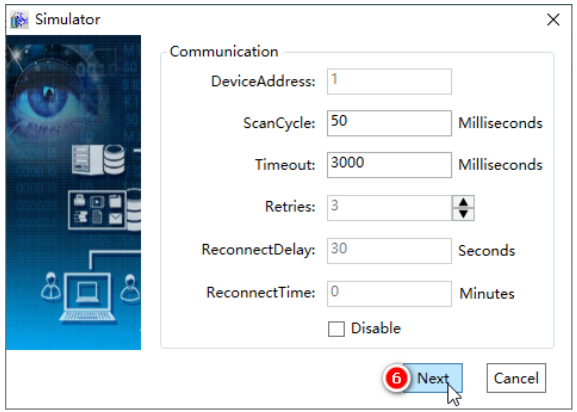


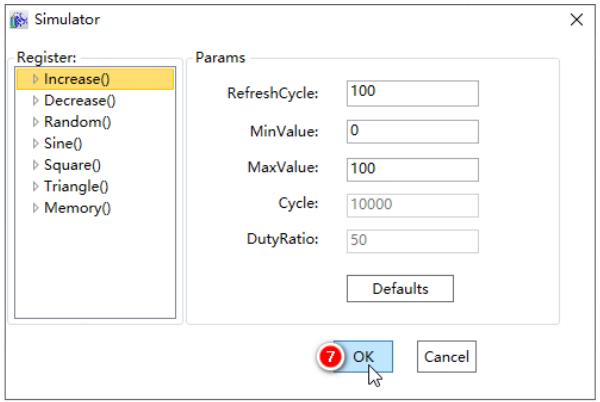
※Refer to the section “6.3 Variables” in user manual.

(2) Create a simulated device：Device0





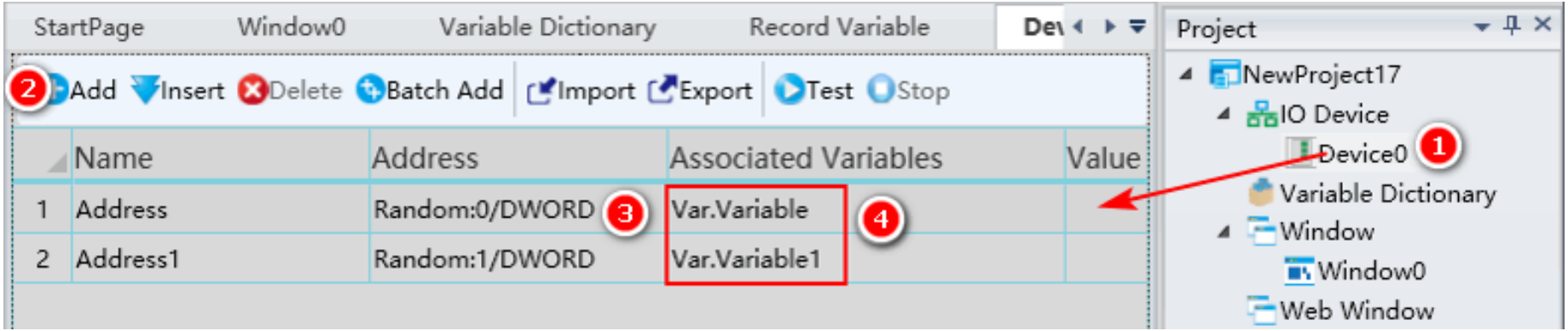




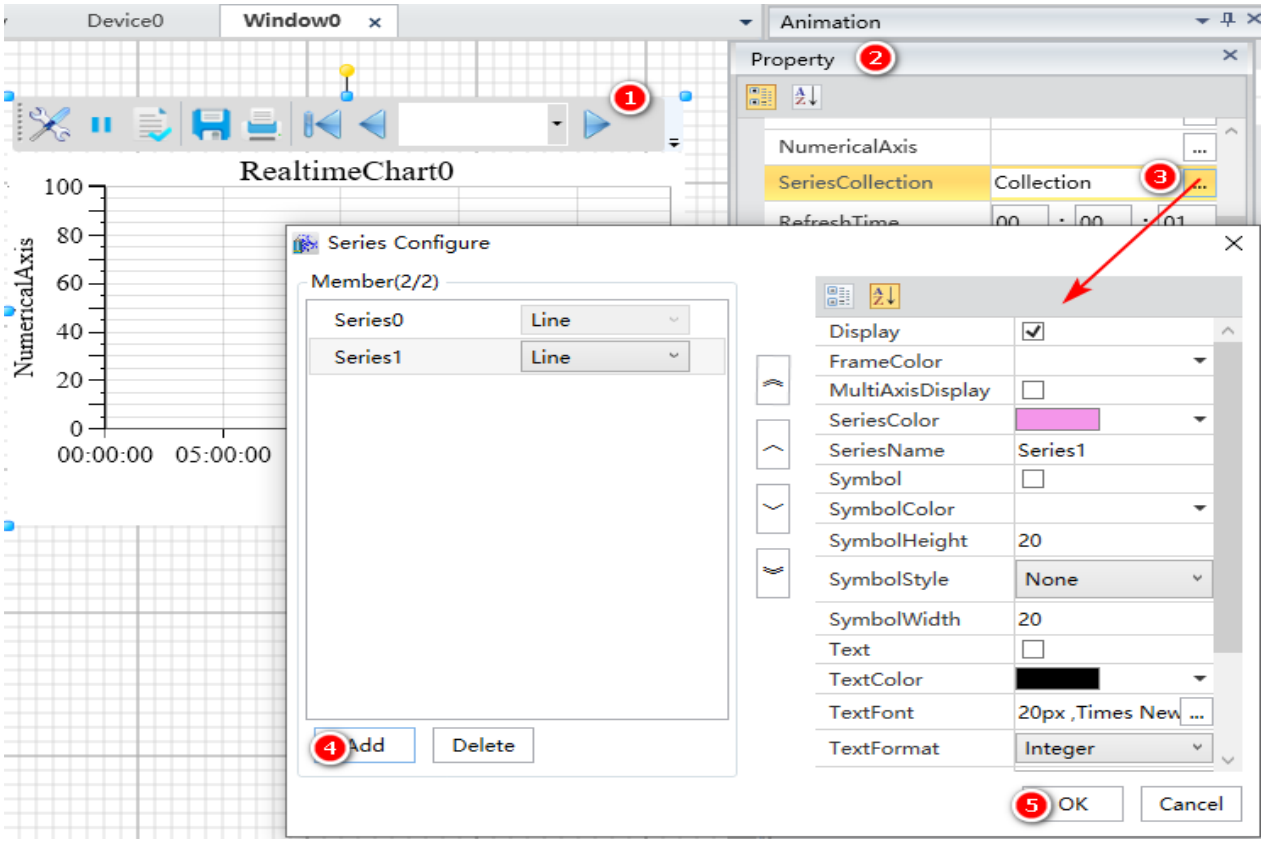
①Right click “IO Device” node
②Click “New Device”
③④Double click “Simulator”

※Refer to the section “5.10.1 Simulator” in user manual.

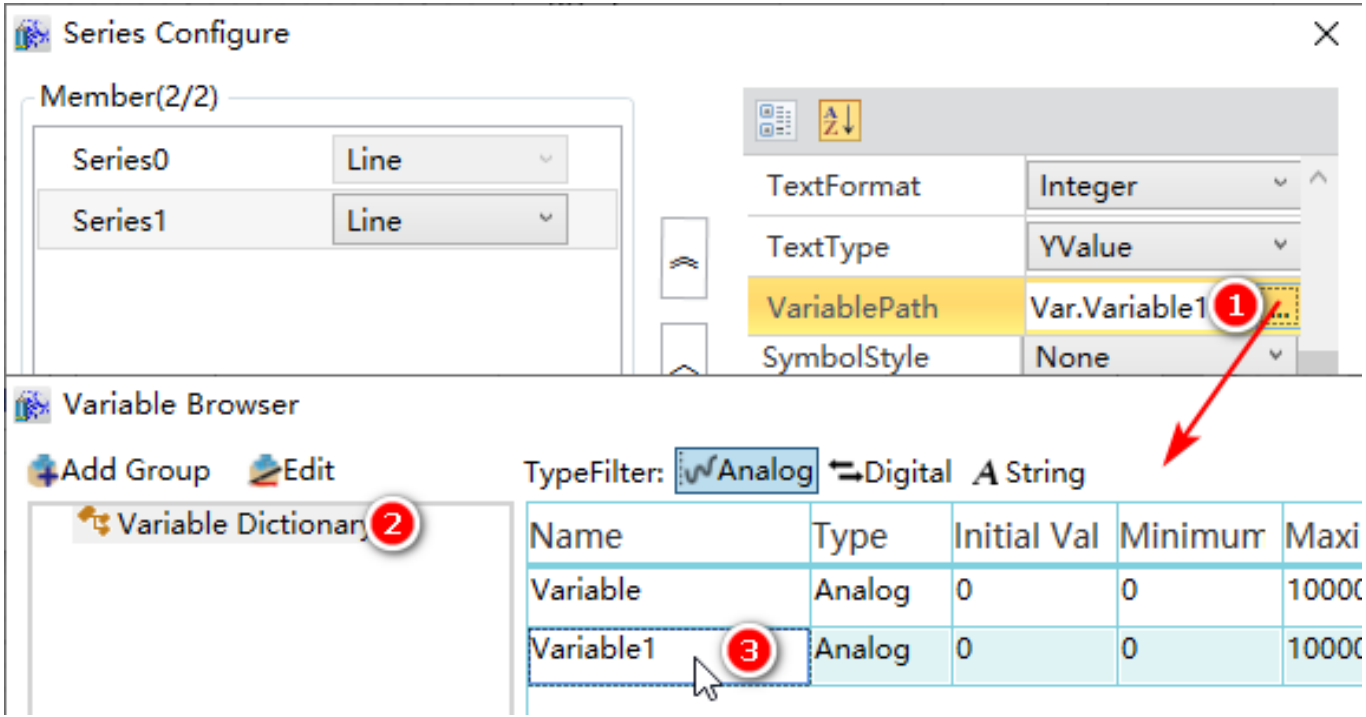
(3) Create two simulation address in the Device0 that associated with Variable, Variable1 respectively



(4) Create a RealtimeChart0 in the Window0, and add 2 curves in the RealtimeChart0

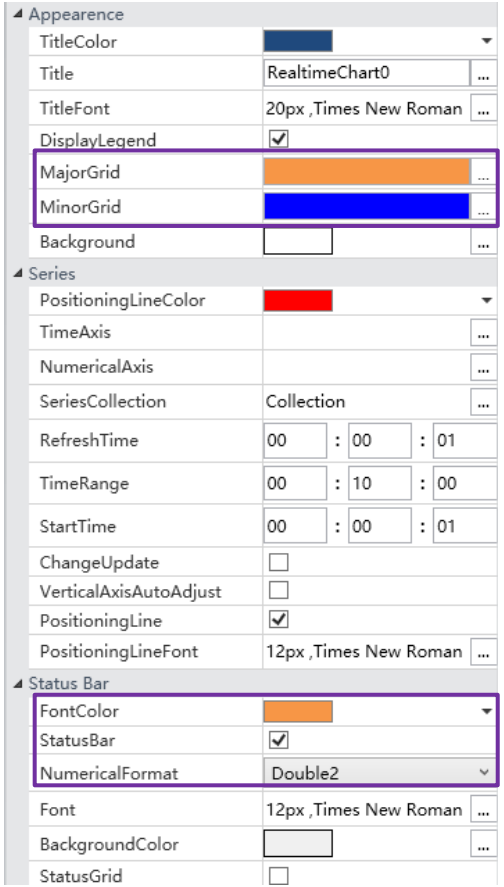


(5) Curves associated variables: Series0 associated Variable, Series1 associated Variable1



Realtime Chart

(6)Set some properties



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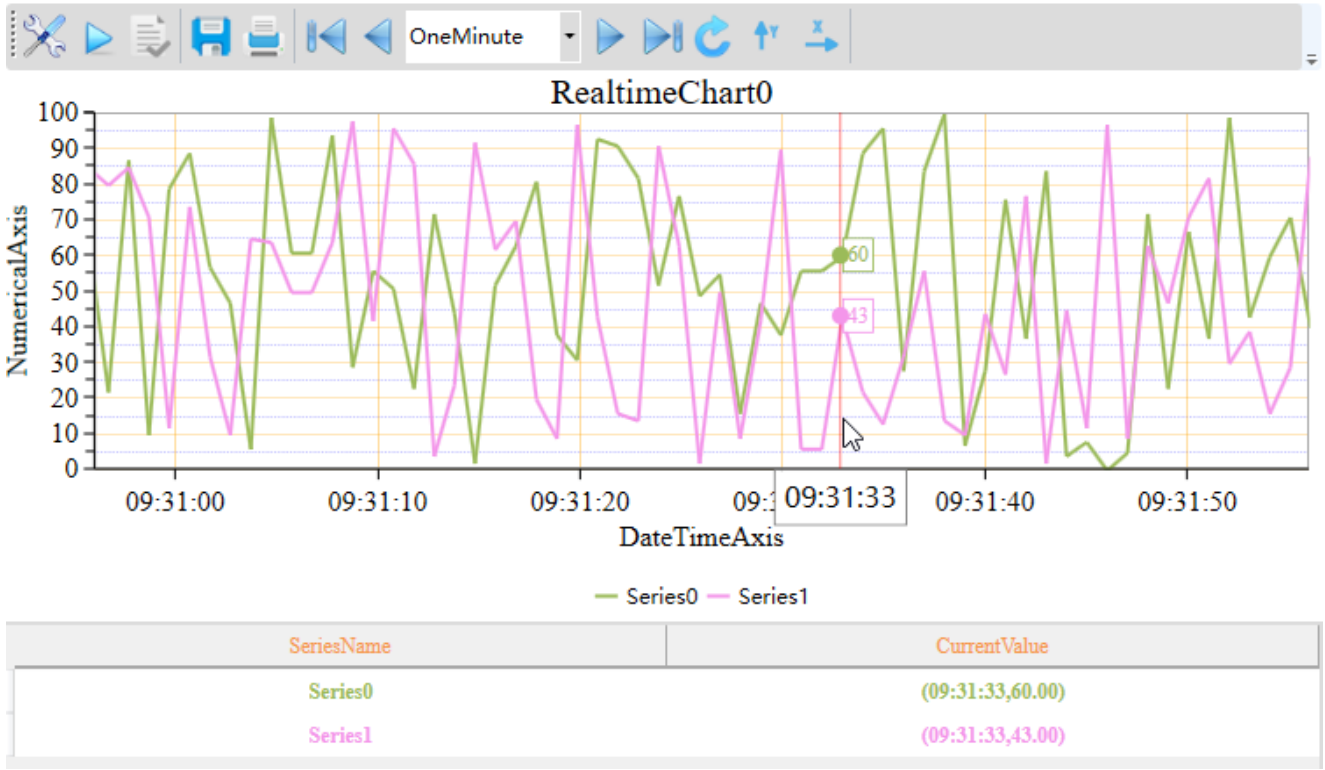
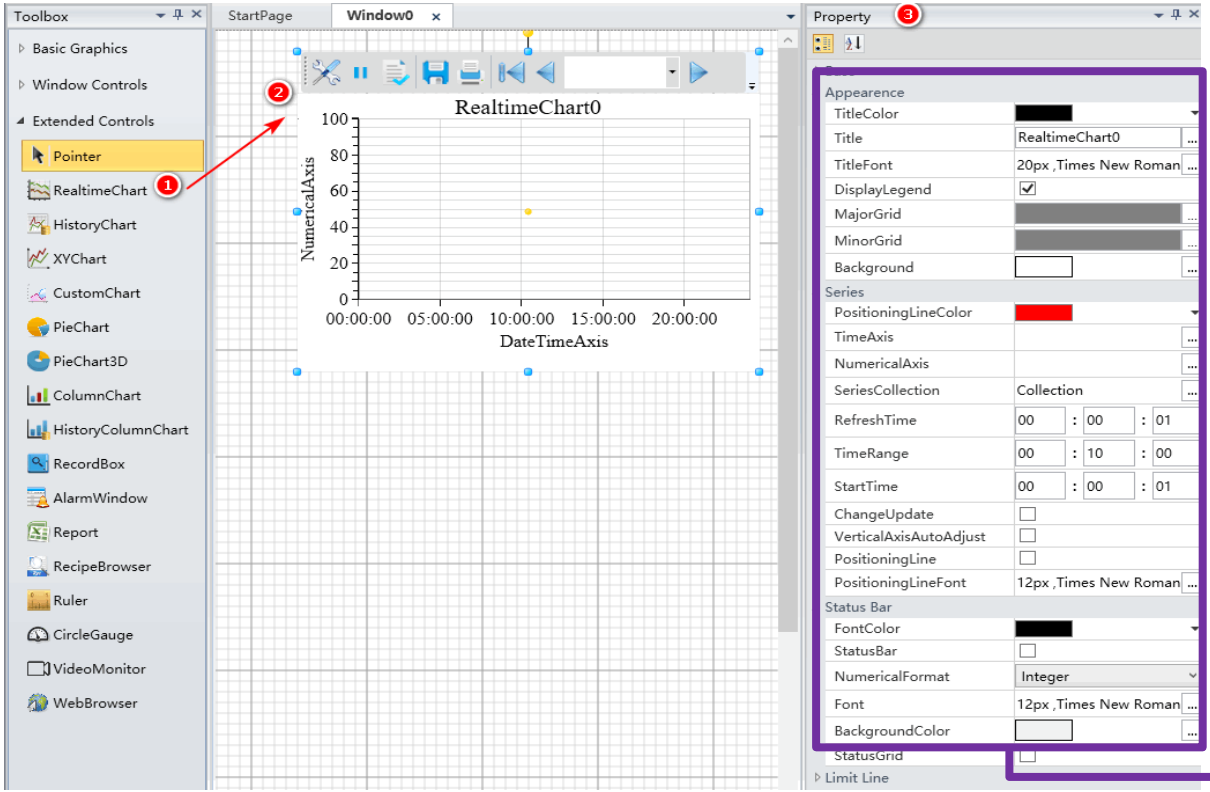
Realtime Chart

(7)Run the Window0, The RealtimeChart0 refreshes data as follows



Realtime Chart

➢ Property window

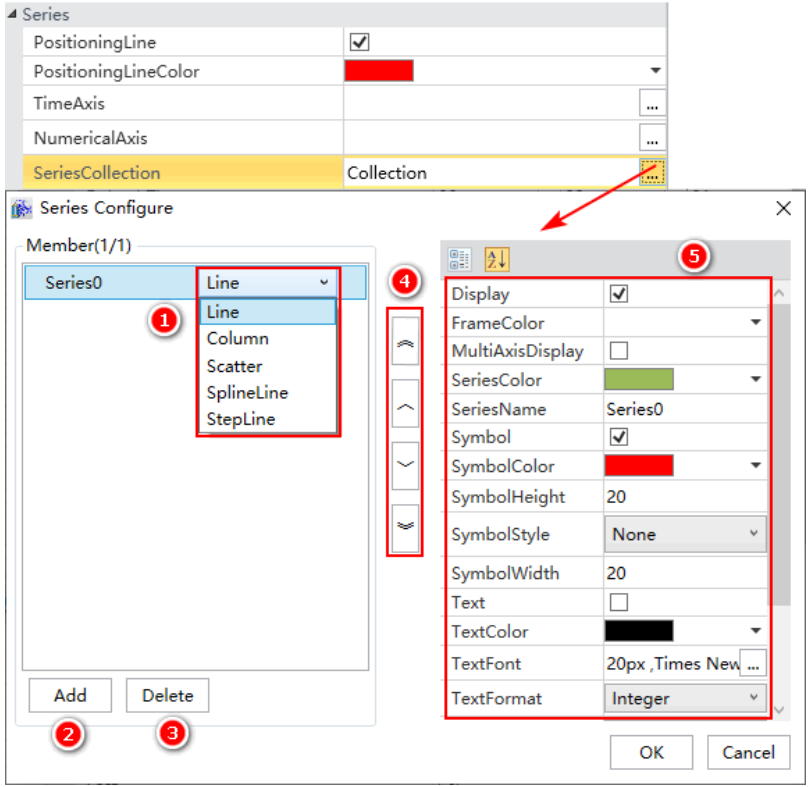


- **TimesAxis**: Set properties of TimeAxis
- **NumericalAxis**: Set properties of NumericalAxis
- **SeriesCollection**: Add or delete series, set properties of series
- **ChangeUpdate**: Set whether to update data only when the value changes
- **VerticalAxisAutoChange**: Set whether to automatically adjust the maximum value of the vertical axis.
- **PositionLine**: Whether to display position line
- **PositionLineColor**: Set the color of position line
- **PositionLineFont**: Set the font format of the data on the position line
- **DisplayLegend:** Whether display legend of a chart.
- **MajorGrid:** Set major grid style
- **MinorGrid:** Set minor grid style

※ Refer to the section "7.7.1 RealTimeChart" in the user manual

Realtime Chart

➢ SeriesCollection property

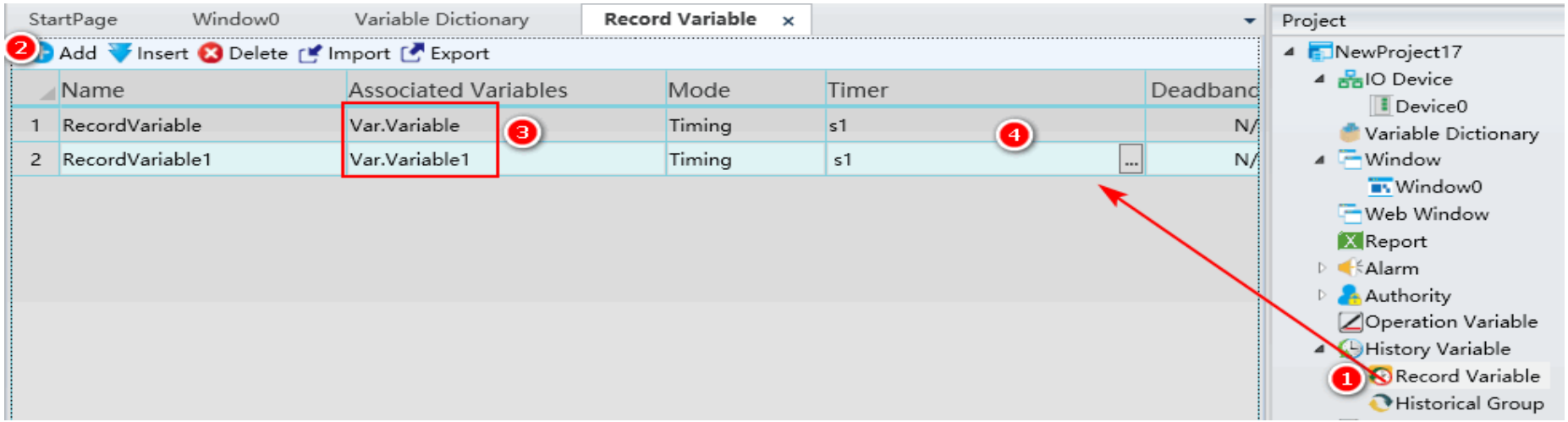


①SeriesType：Set the type of the series
②Add series in the RealtimeChart
③Remove series from the RealtimeChart
④Change the display order of series
⑤Set properties of currently selected series

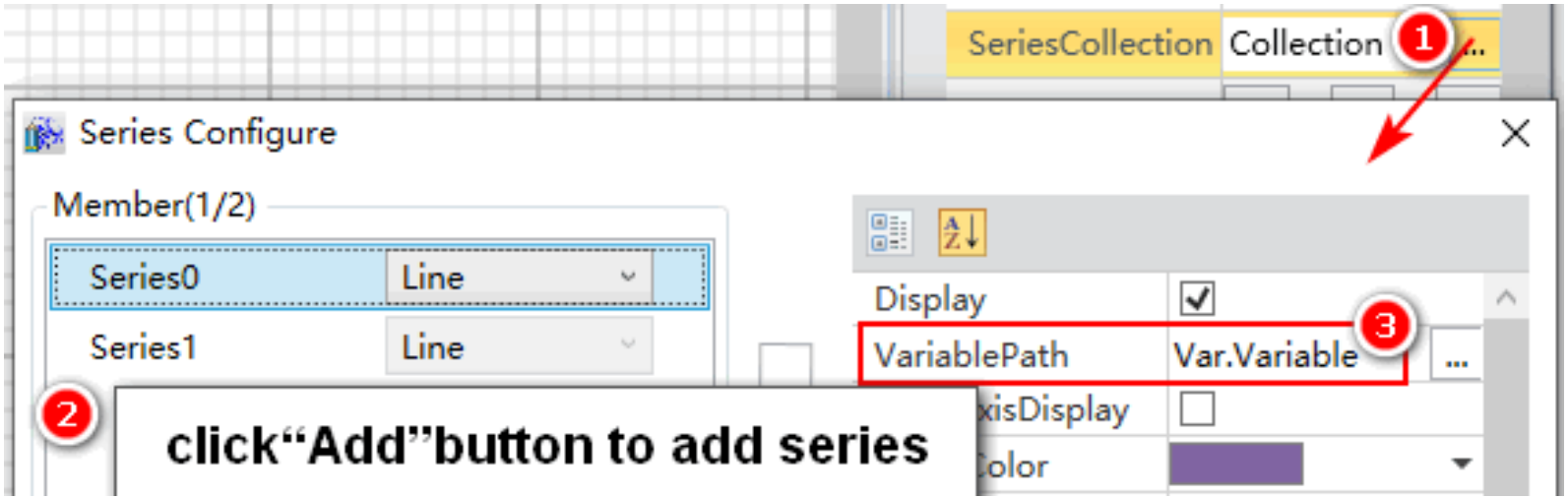
Realtime Chart

- TimeRange property example

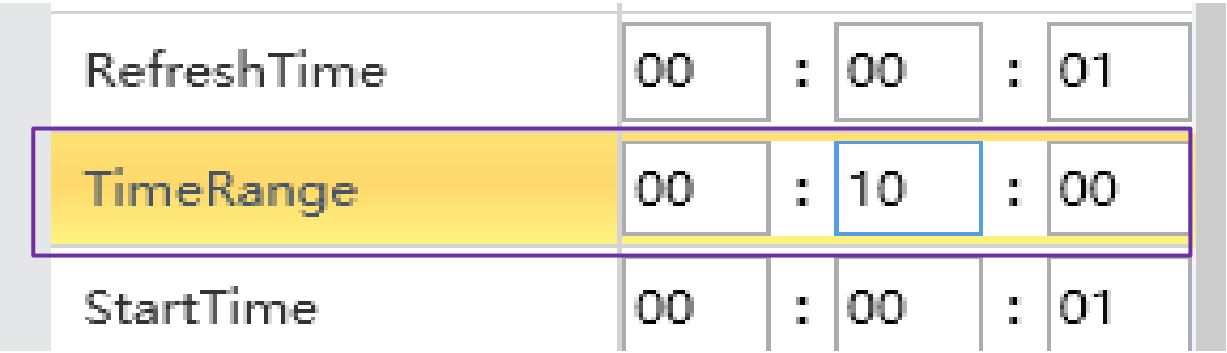
(1)The variables associated with the curves in the series collection of RealtimeChart are also associated with the simulation device and historical variables



(2)Series0 associated Variable, Series1 associated Variable1



(3)Set TimeRange property to 10min



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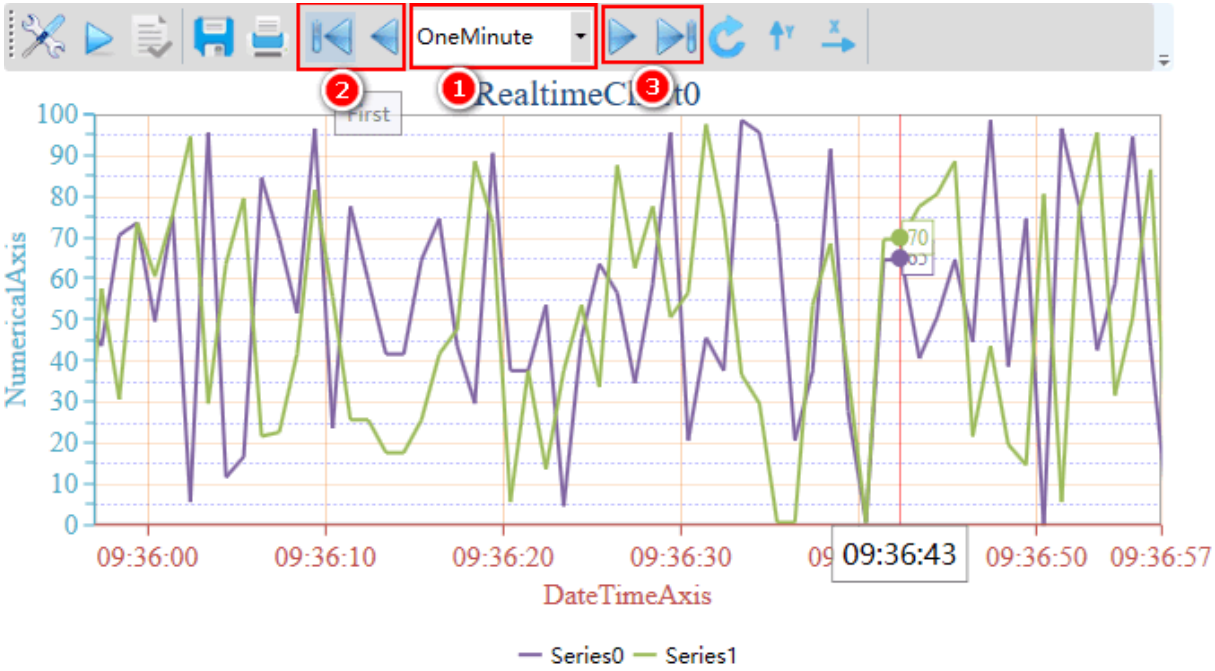
Realtime Chart

(4)Run the project



①Set Page Range to 1min
②③Use the “First”, “Forward”, “Backward”, “Last” button to view the historical data (within 10min). In this configuration, up to 10 pages of data can be viewed

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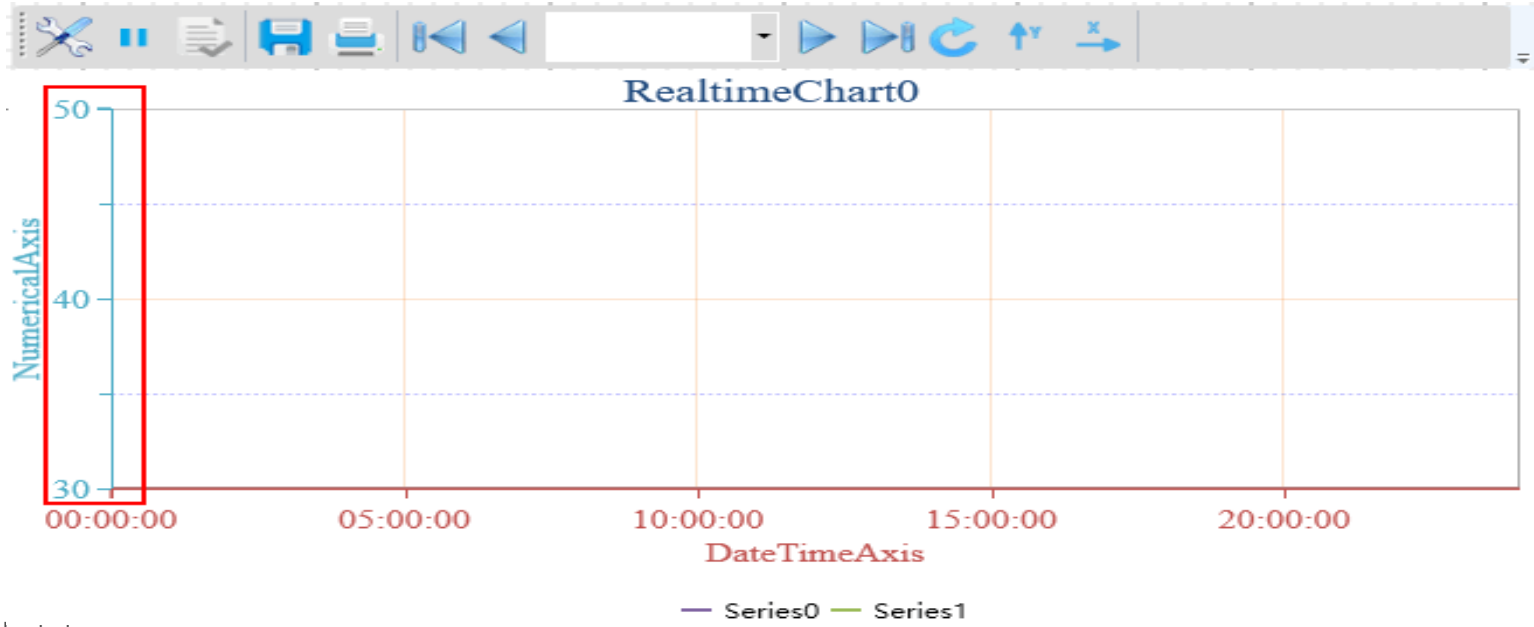
Realtime Chart

- VerticalAxisAutoAdjust property example

(1) Create a RealtimeChart0 and set the numerical axis range from 30 to 50, Series0,Series1 associated with the Variable0,Variable1 respectively(associated with Simulation Device) range from 0 to 100



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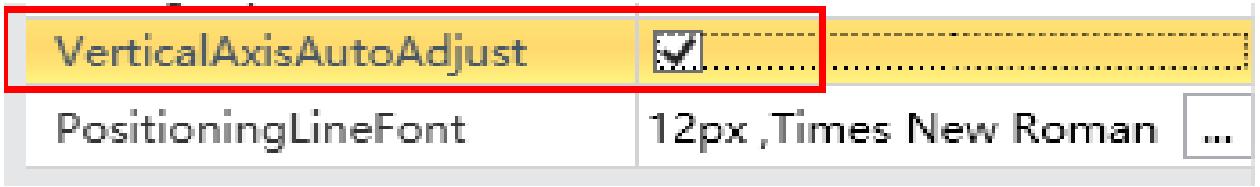
(2) Check the VerticalAxisAutoAdjust property of RealtimeChart0



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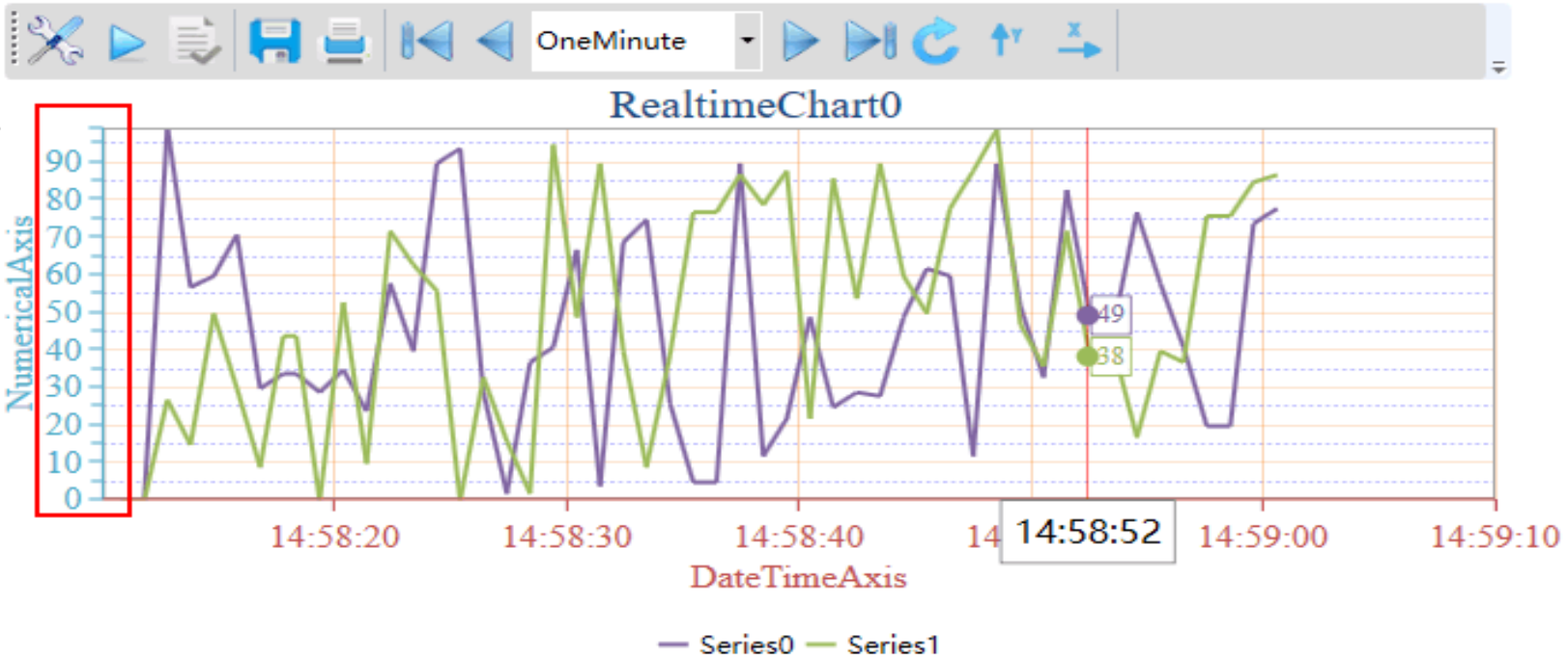
(3) Run the project, the range of the numerical axis is adjusted with the value of the data points



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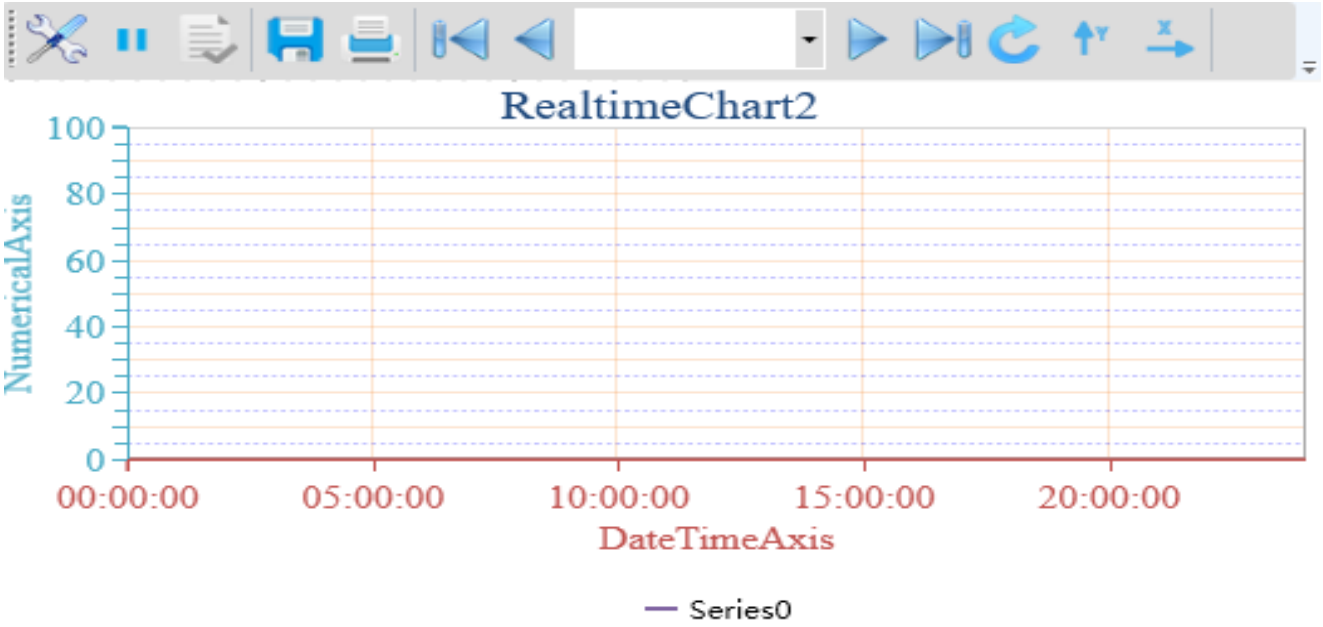
Realtime Chart

- ChangeUpdate property example

(1)Create a RealtimeChart1 , RealtimeChart2 in the Window0 and all add a Series0 who is associated with Variable4(not associated with any device) in the variable dictionary



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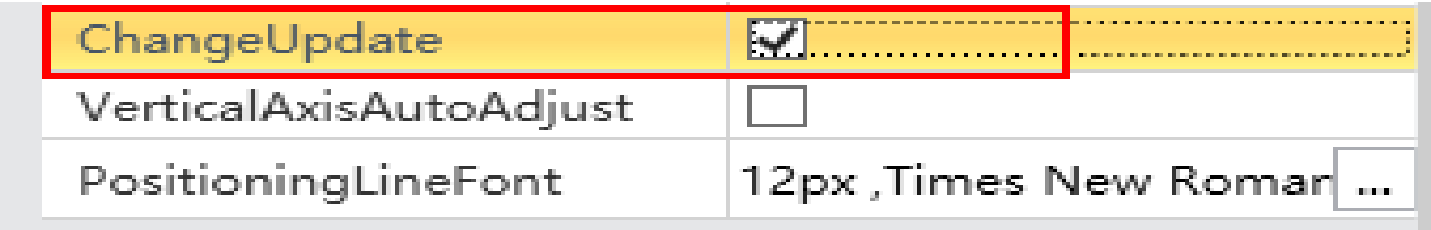
(2)Uncheck ChangeUpdate property of RealtimeChart1, Check the ChangeUpdate property of RealtimeChart2



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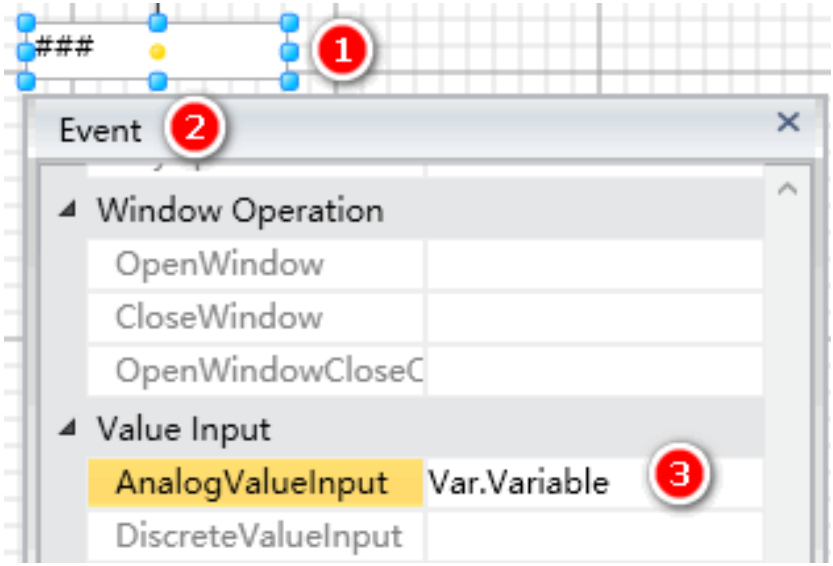
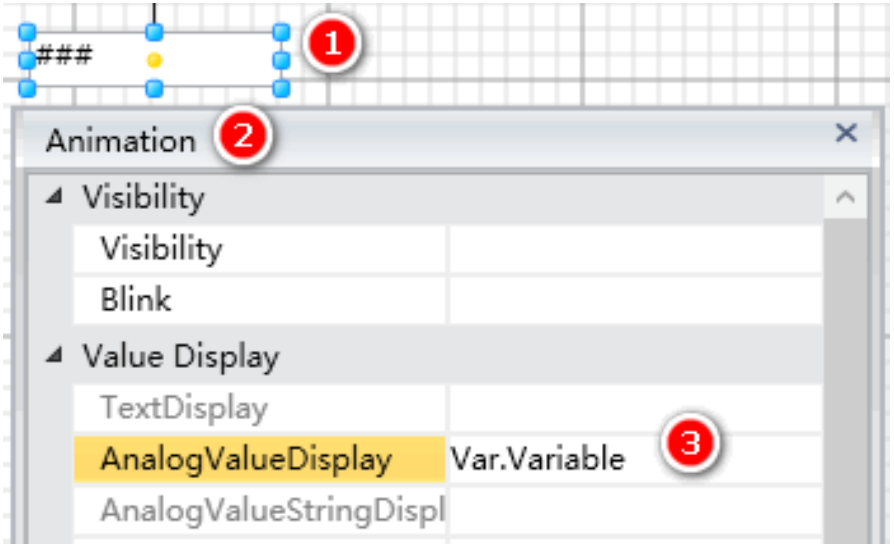
(3)Create a TextBox0 in the Window0.Configure event and animation of the TextBox0



Analog Value Input Event



Analog Value Display Animation

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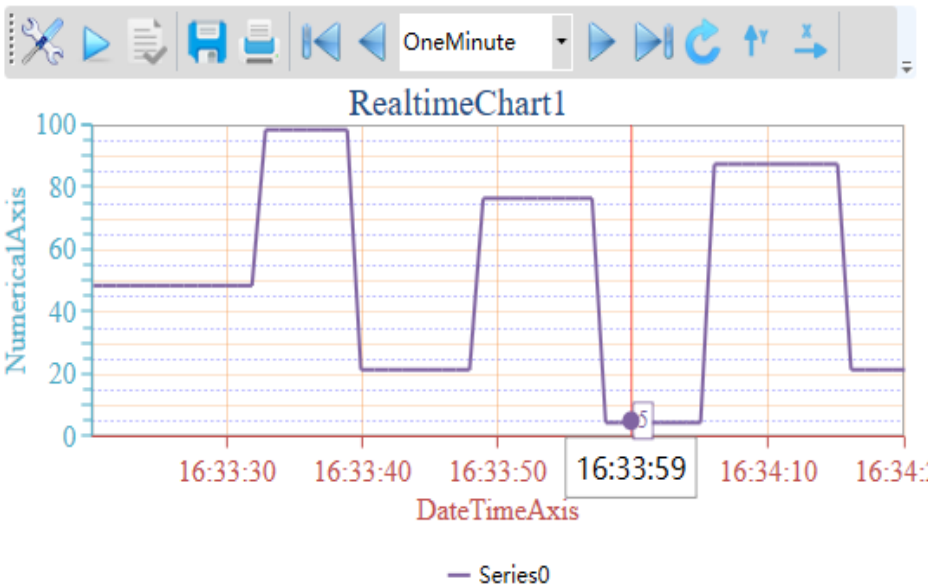
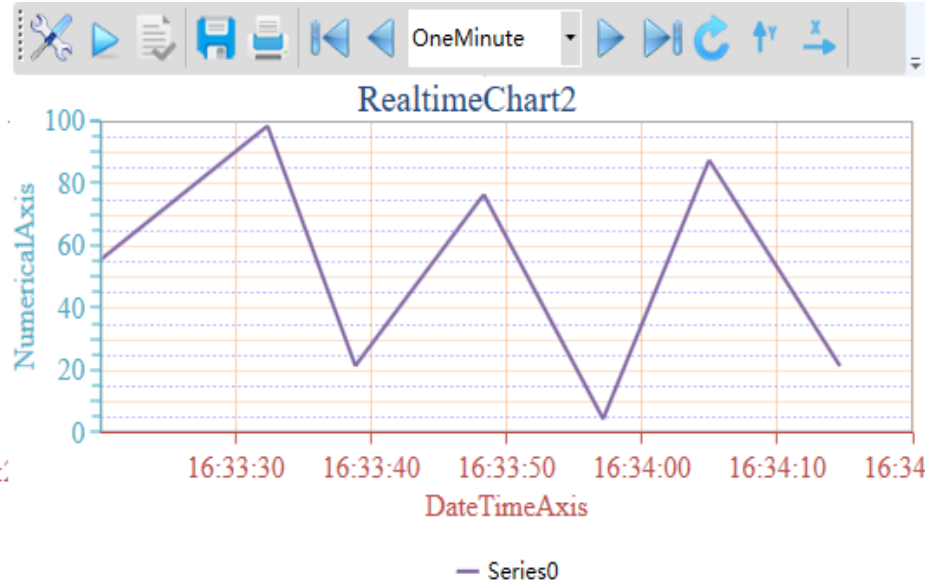
Realtime Chart

(4)At run time, enter a data in TextBox0 every few seconds, the RealtimeChart1 and RealtimeChart2 refresh effect are as shown below



ChangeUpdate property is Unchecked



ChangeUpdate property is checked

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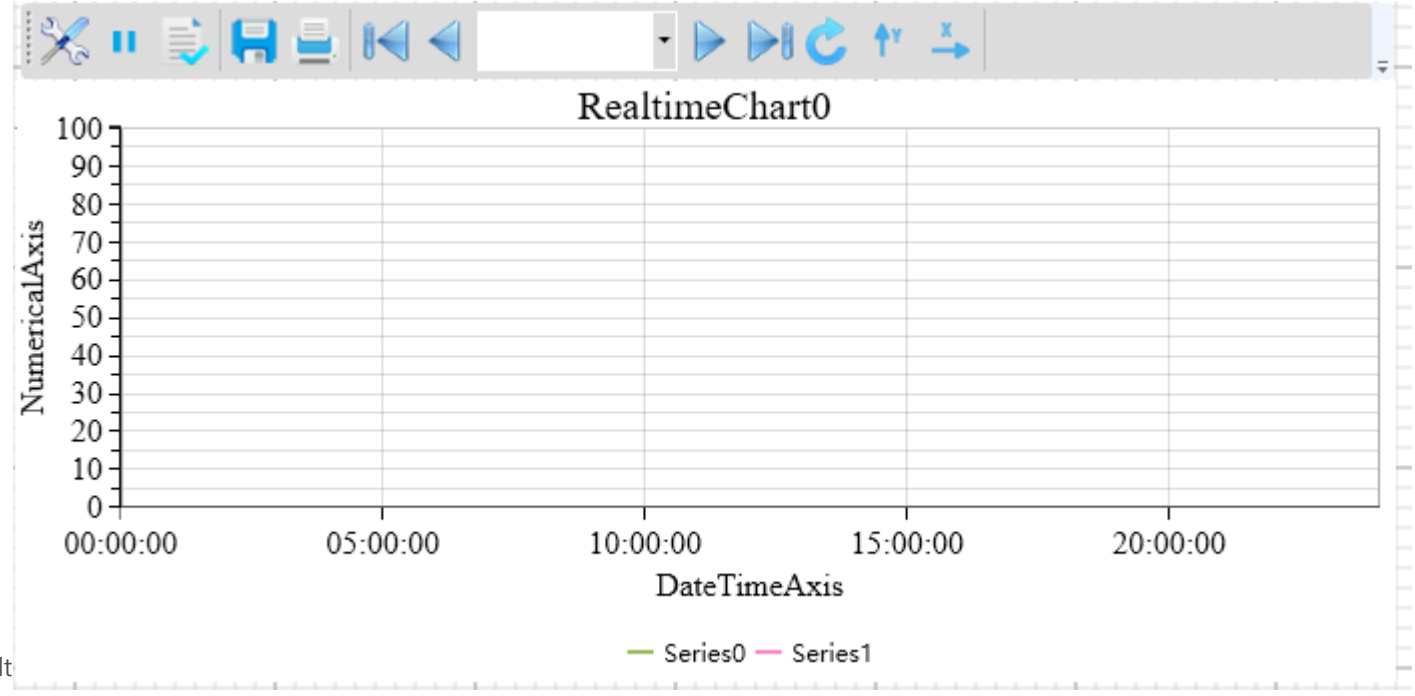
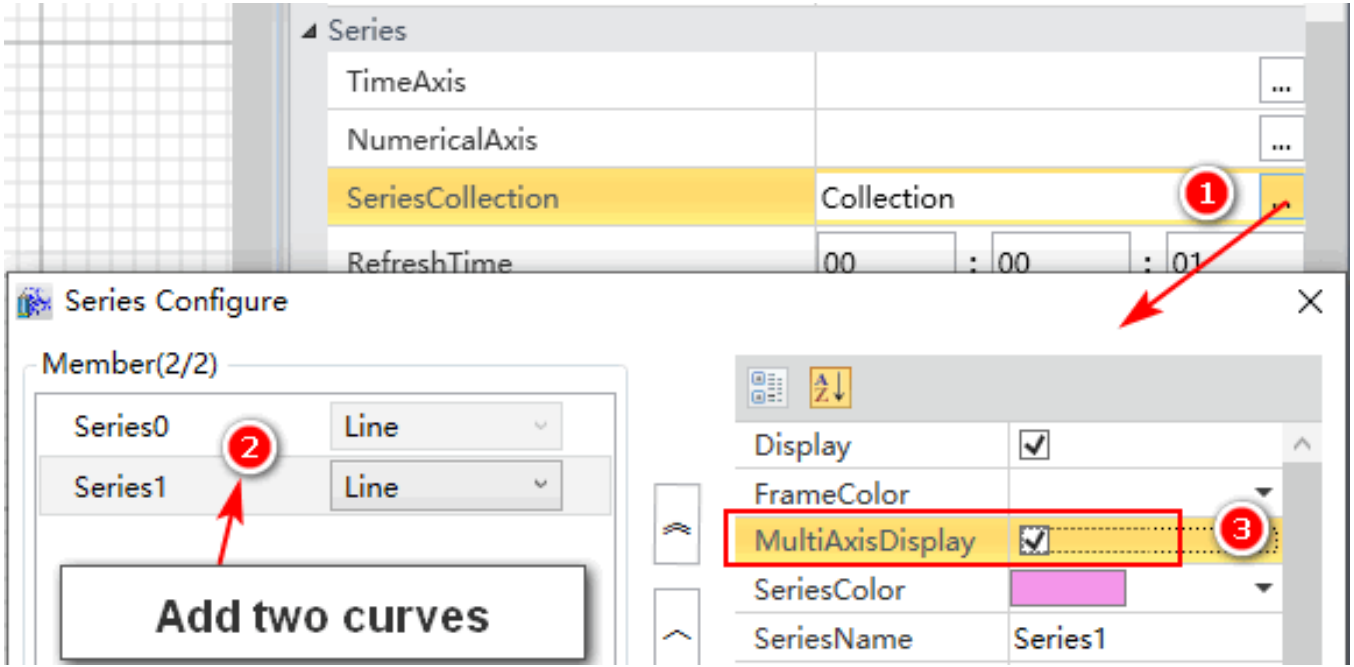
Realtime Chart

- MultiAxisDisplay property example

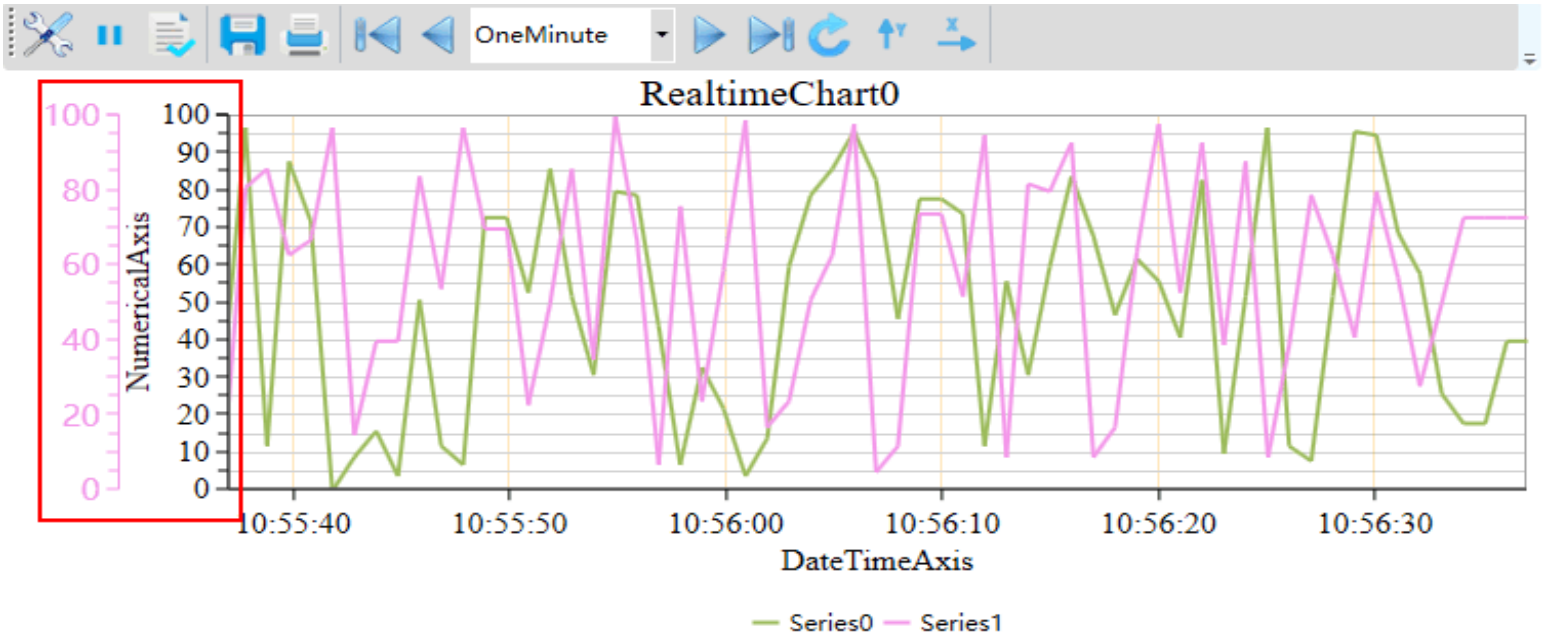
(1) Create a RealtimeChart0 and add two curves,Series0,Series1 associated with the Variable0,Variable1 respectively(associated with Simulation Device).



(2) Check the MultiAxisDisplay property of Series1 in the RealTimeChart0



(3) Run the project, two numerical axis will be displayed on the RealtimeChart0



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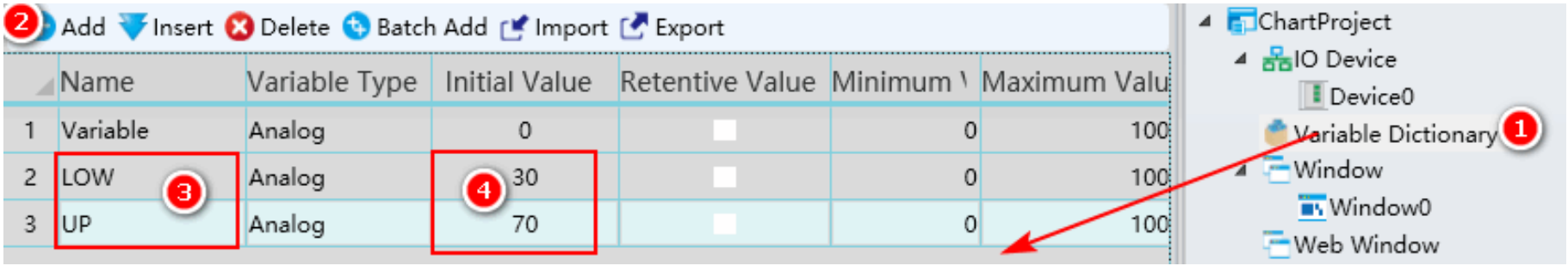
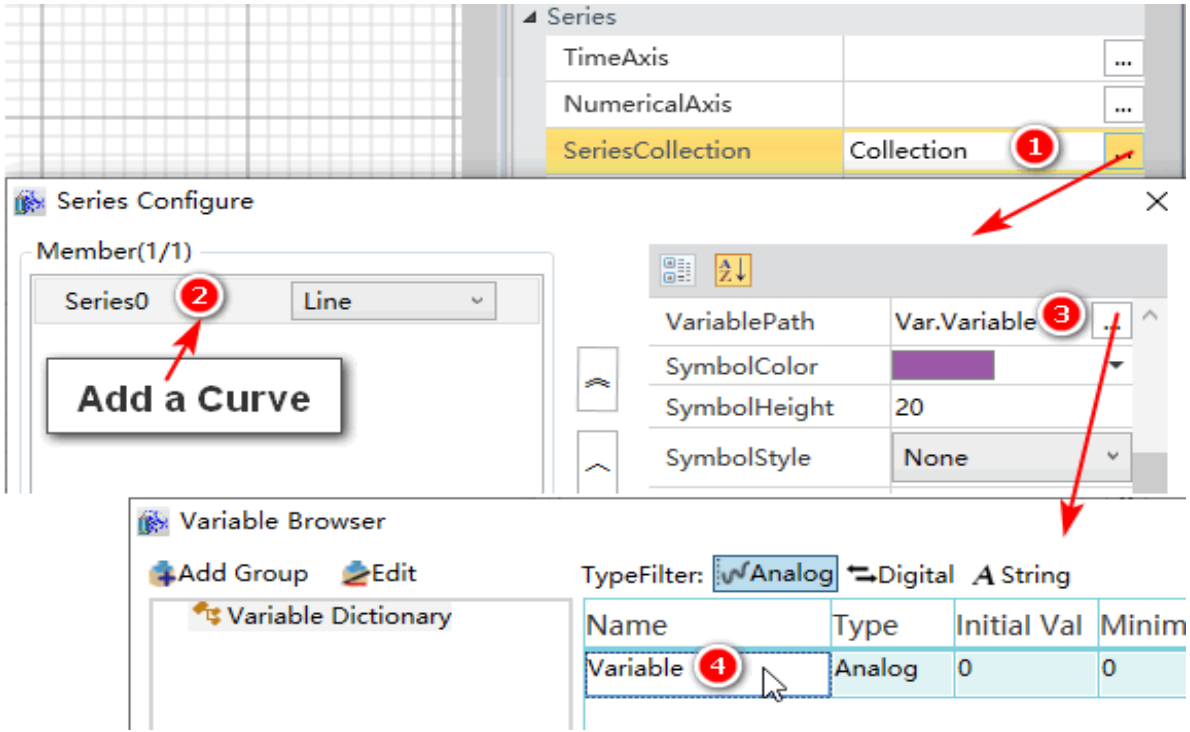
- Limit Line property example

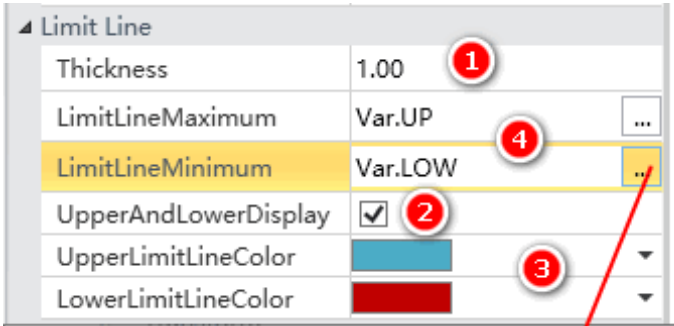
(1) Create three variables : Variable,UP,LOW(Variable associated with Simulation Device).



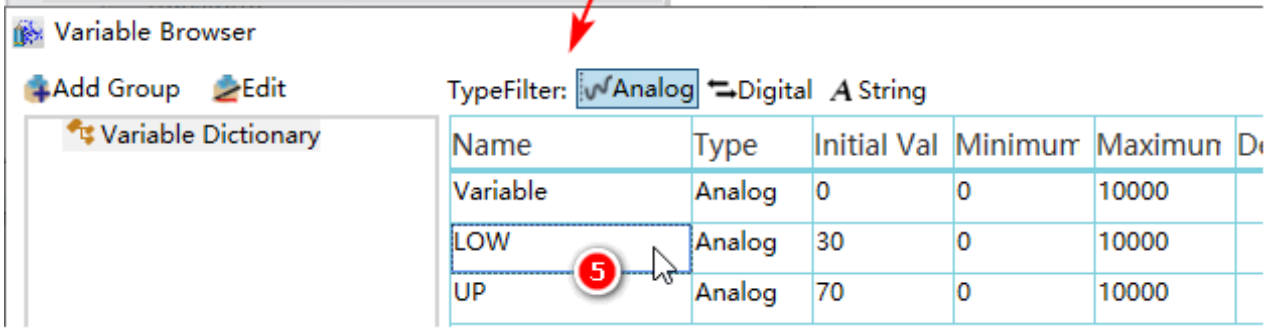
(2) Create a RealtimeChart0 and add a Series0(SeriesType is Line),Series0 associated with the Variable



(3)Set limit line property of the RealtimeChart0



①Set the thickness of the limit line
②Checked the UpperAndLowerDisplay property
③Set the color of the limit line
④⑤Set the associated variable of the limit line



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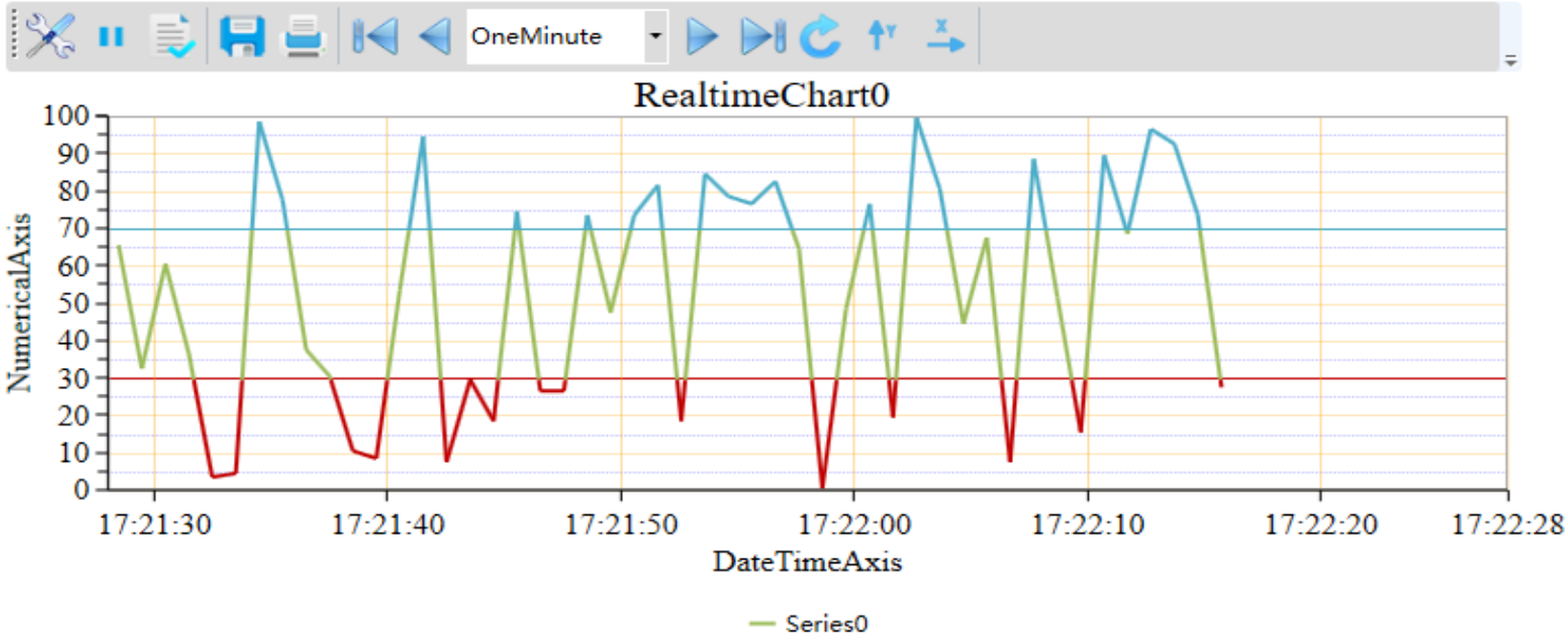
Realtime Chart

(4) Run the Window0, limit line display



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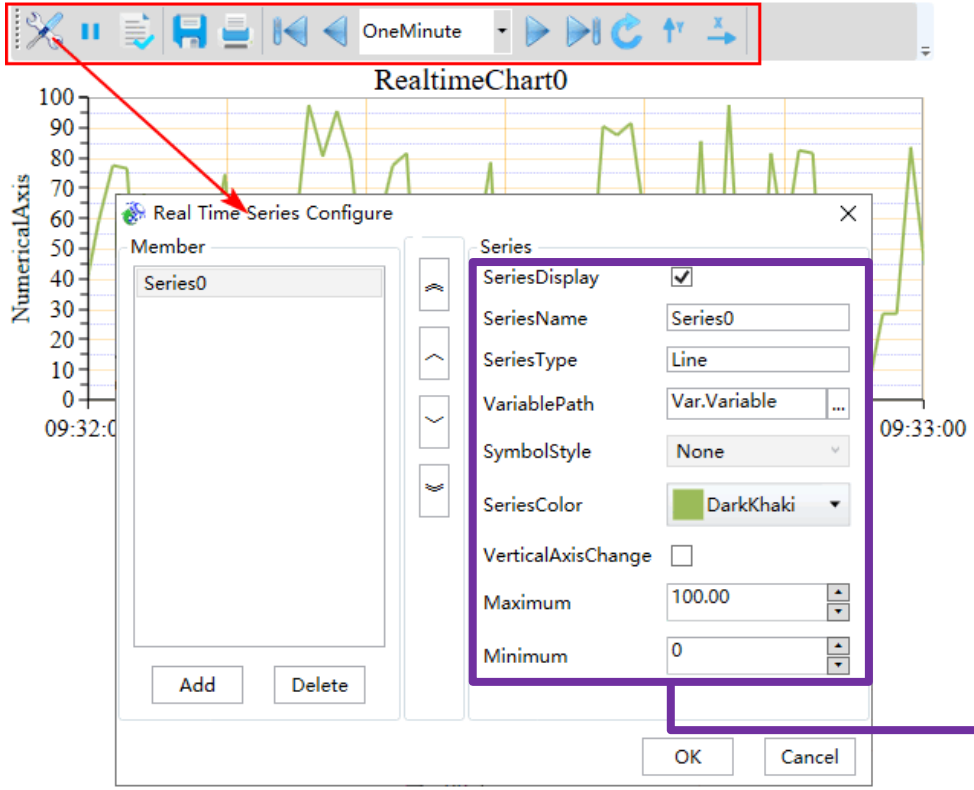
Realtime Chart

- The usage of the toolbar of RealtimeChart



Real Time Series Configure (Modify properties of series at run time) :

- **SeriesDisplay** : Whether to display the series
- **SeriesName** : Change the name of the series
- **SeriesType** : Display the type of series
- **VariablePath** : Set the variable path of the series
- **SymbolStyle**: Set symbol style of the series
- **SeriesColor**: Set the color of the series
- **VerticalAxisChange**: Set whether to adjust the range of the vertical axis according to the value of the data point.(Check the " VerticalAxisAutoChange" property during development, this property is valid)
- **Maximum**: Set the maximum of the vertical axis
- **Minimum**: Set the minimum of the vertical axis

Realtime Chart

➢ The scripts of RealtimeChart

For the usage of scripts of RealtimeChart, please refer to the section "20.3 Script grammar and function" → "Programming model" → "Picture" → "Extended controls" → "HMIRealTimeChart object" in the user manual

Methods list

	Name	Description
	AddNewLimitLine	Add a new limit line
	ArrayToString	Image array translate into string
	DeletevalueAll	Delete all data points
	Export	Export data
	ExportRealData	Export excel
	FindAnimation	Look for animation to modify the associated variables of the animation
	HiddenSeries	Hidden curve
	OpenShowFileDialog	Get saved path selected by dialog box
	Print	Print
	RemoveAllLimitLine	Remove all the limit line
	Save	Save
	Save	Save as pictures
	SetSeriesVariablePath	Curve correlation variable substitution
	SetTimeRangeWithRefresh	Set the time interval and refresh interval
	StartTimer	Start timer
	StopTimer	Stop timer
	VisiableSeries	Display curves

Property list

	Name	Description
	Height	Height
	IsShow	Whether display specified object
	IsShowBtnCrossLine	Whether display the positioning line button
	IsShowBtnLeftMost	Whether display the most left button
	IsShowBtnLeftShift	Whether display the left shift button
	IsShowBtnReSet	Whether display the reset button
	IsShowBtnRightMost	Whether display the most right button
	IsShowBtnRigthShift	Whether display the right shift button
	IsShowRealBtnConfig	Whether display the curve configuration button
	IsShowRealBtnPrint	Whether display the print button
	IsShowRealBtnSave	Whether display the save button
	IsShowRealBtnStop	Whether display the began or pause button
	IsShowStopTime	Whether display the pause time button
	Left	The left coordinate
	Name	Name
	NumberInterval	Get or set the maximum scale of numerical axis
	NumberSmallInterval	Get or set the minimum scale of numerical axis
	NumericalAxisMaximum	Get or set the maximum scale of numerical axis
	NumericalAxisMinimum	Get or set the minimum scale of numerical axis
	ToolTip	Tooltip text
	Top	The top coordinate
	Width	Width
	ZIndex	Layer index

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- The concepts of chart
- RealtimeChart
  - Overview
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  - Properties
  - Toolbar Buttons
  - Scripts
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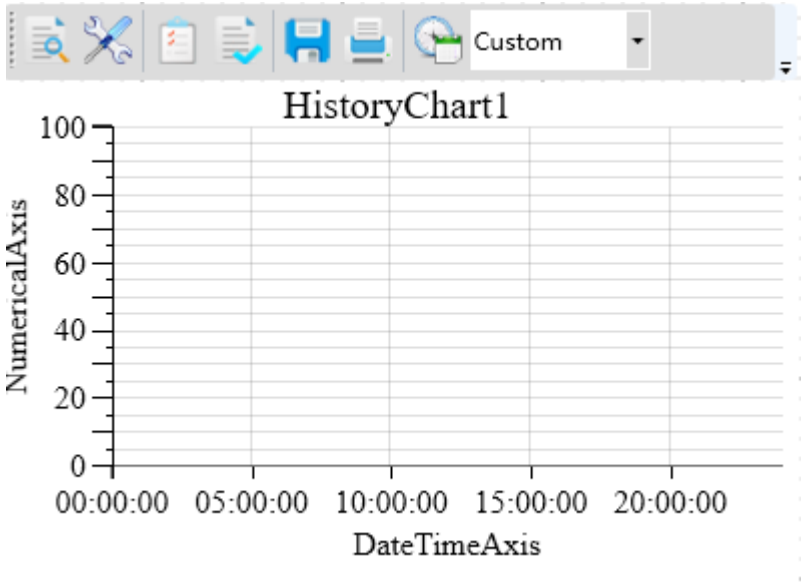
  - Scripts

History Chart

➢ Overview

The HistoryChart is a graph reflecting the historical change process of the historical variable value. The historical chart is mainly used for accident analysis and operation performance analysis to provide corresponding basis for optimizing the system. The history curve contains the main attributes such as curve set, coordinate axis, toolbar, status bar and so on. The historical curve is related to the variable of the configuration history record, and the data change of the variable in different time periods can be read.



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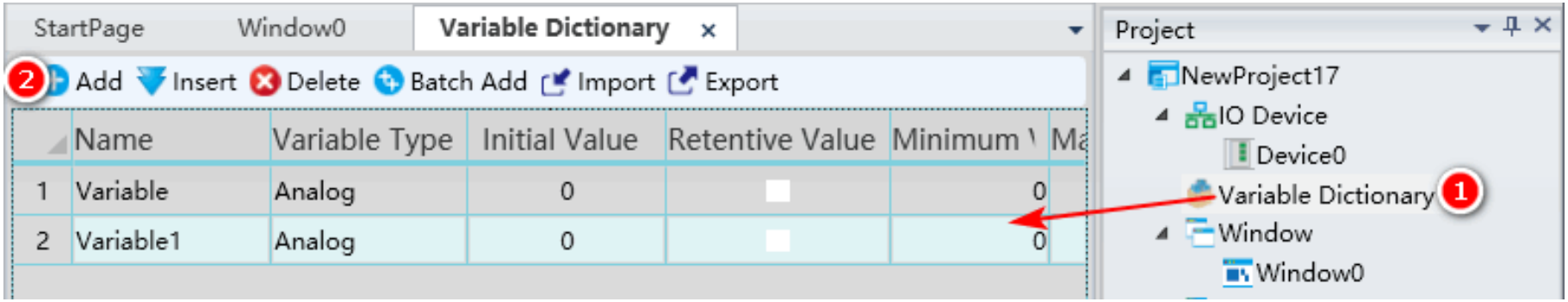
History Chart

- Create a HistoryChart that query historical data

(1)Create 2 variables：Variable、Variable1



※Refer to the section “6.3 Variables” in user manual.

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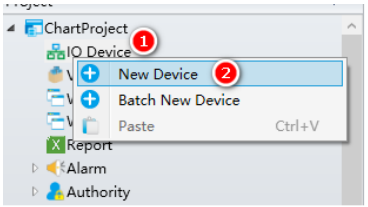
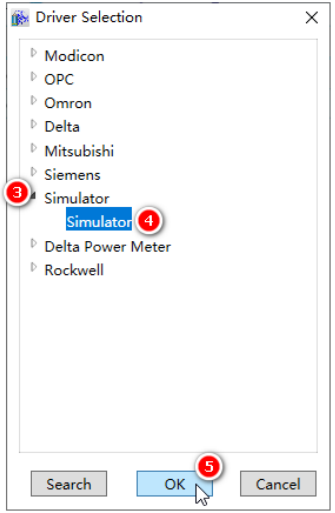
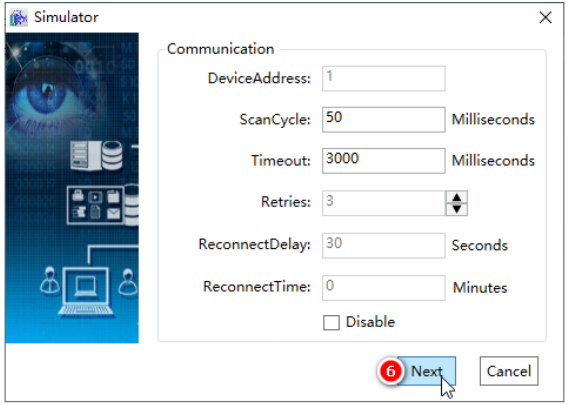
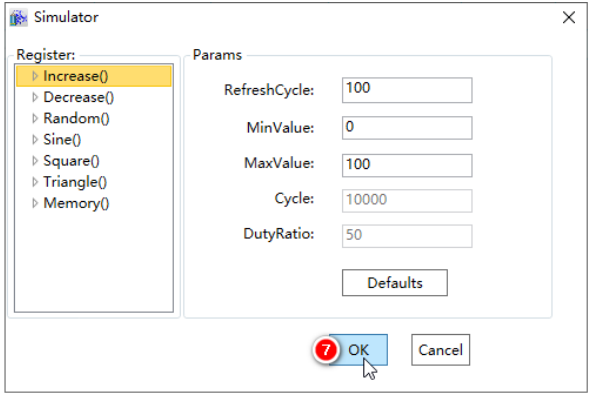
(2) Create a simulated device：Device0







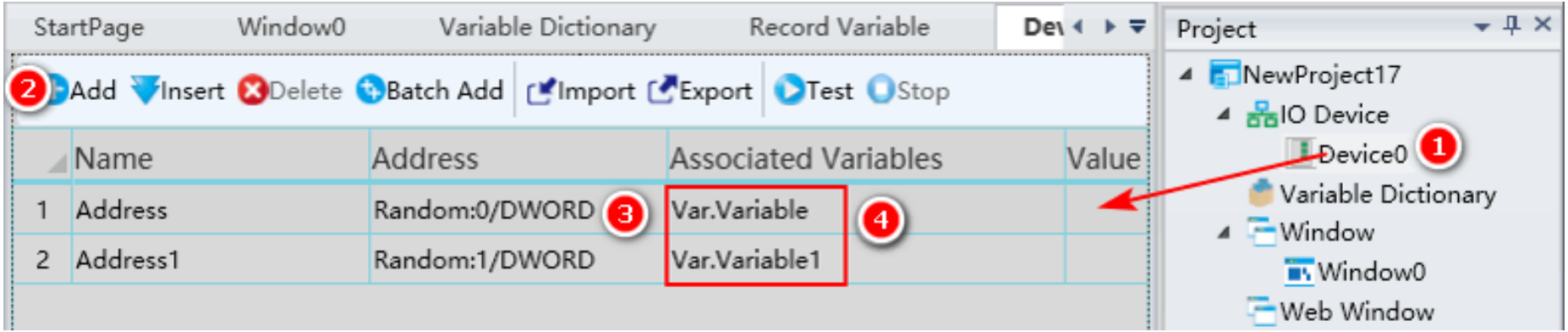


①Right click “IO Device” node
②Click “New Device”
③④Double click “Simulator”

※Refer to the section “5.10.1 Simulator” in user manual.

History Chart

(3) Create two simulation address in the Device0 that associated with Variable, Variable1 respectively



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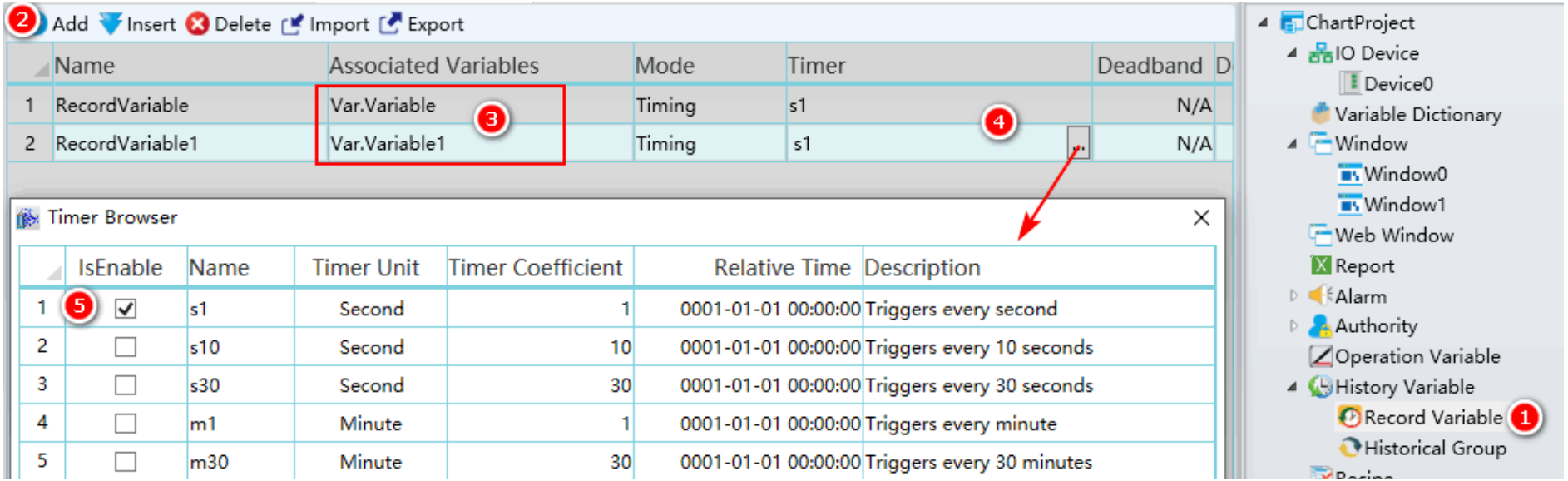
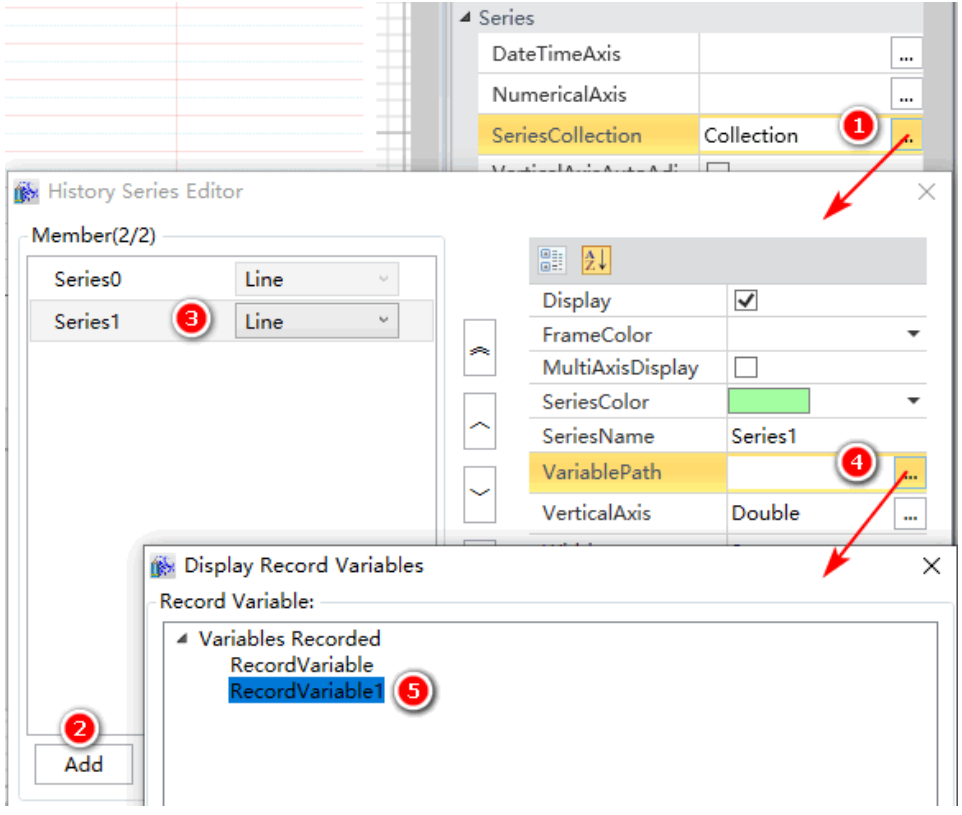
History Chart

(4) Create two historical variables in the Record Variable that associated with Variable, Variable1 respectively



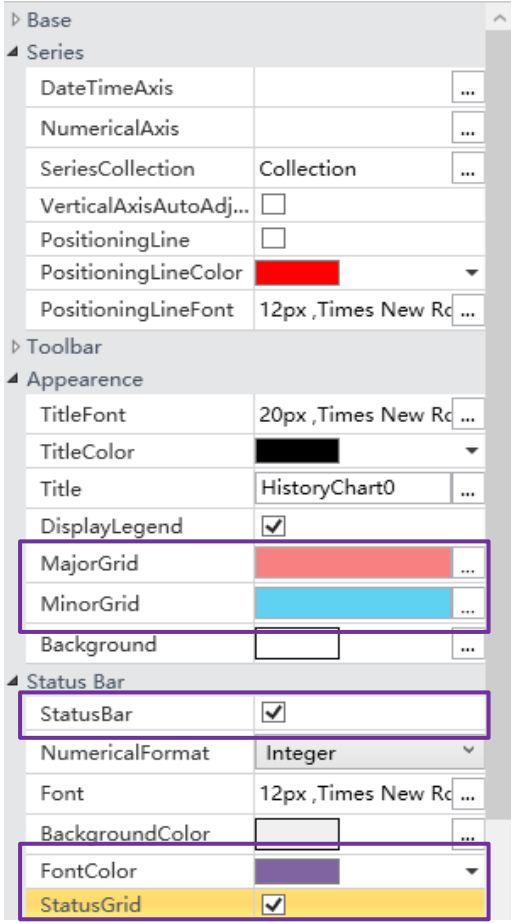
※Refer to the section "14.2 Setting history record variable" in user manual.

(5) Create a HistoryChart0 in the Window0, and add 2 curves in the HistoryChart0, Series0 associated RecordVariable, Series1 associated RecordVariable1



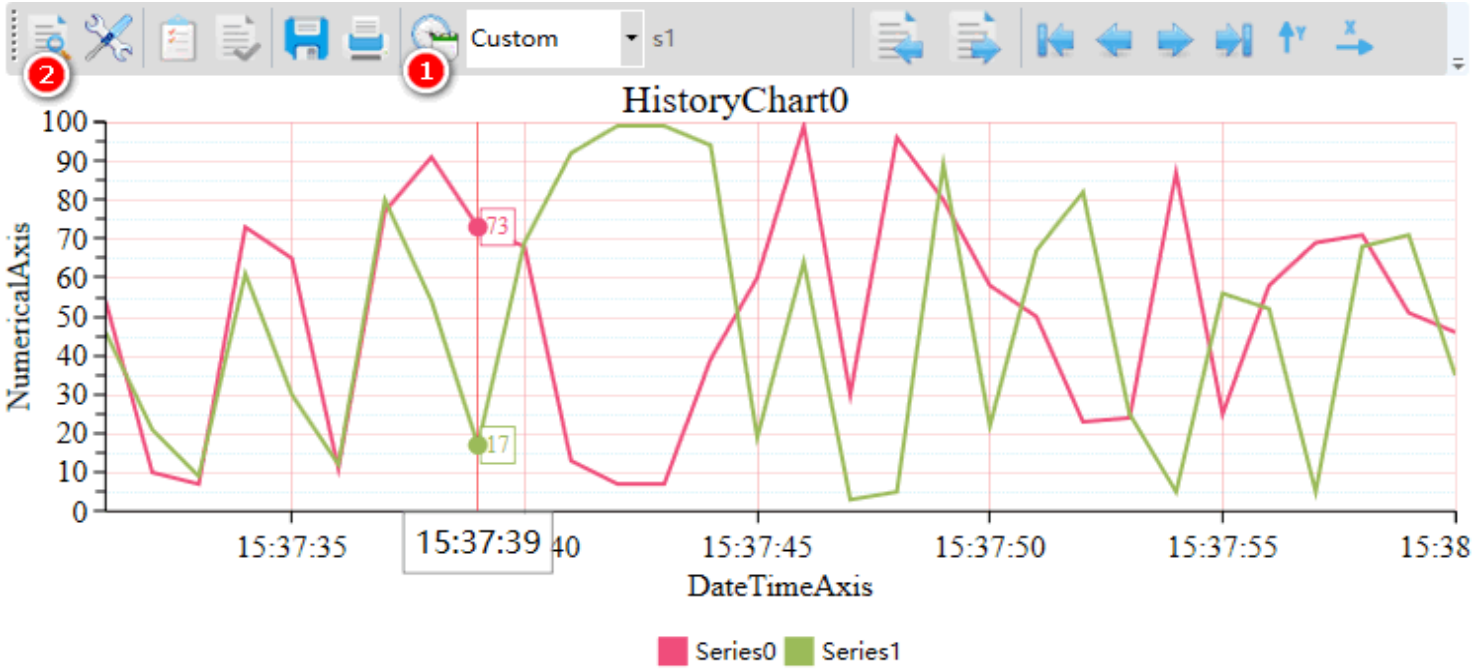
History Chart

(6) Set some properties of the HistoryChart0



History Chart

(7)Run the Window0,query historical data

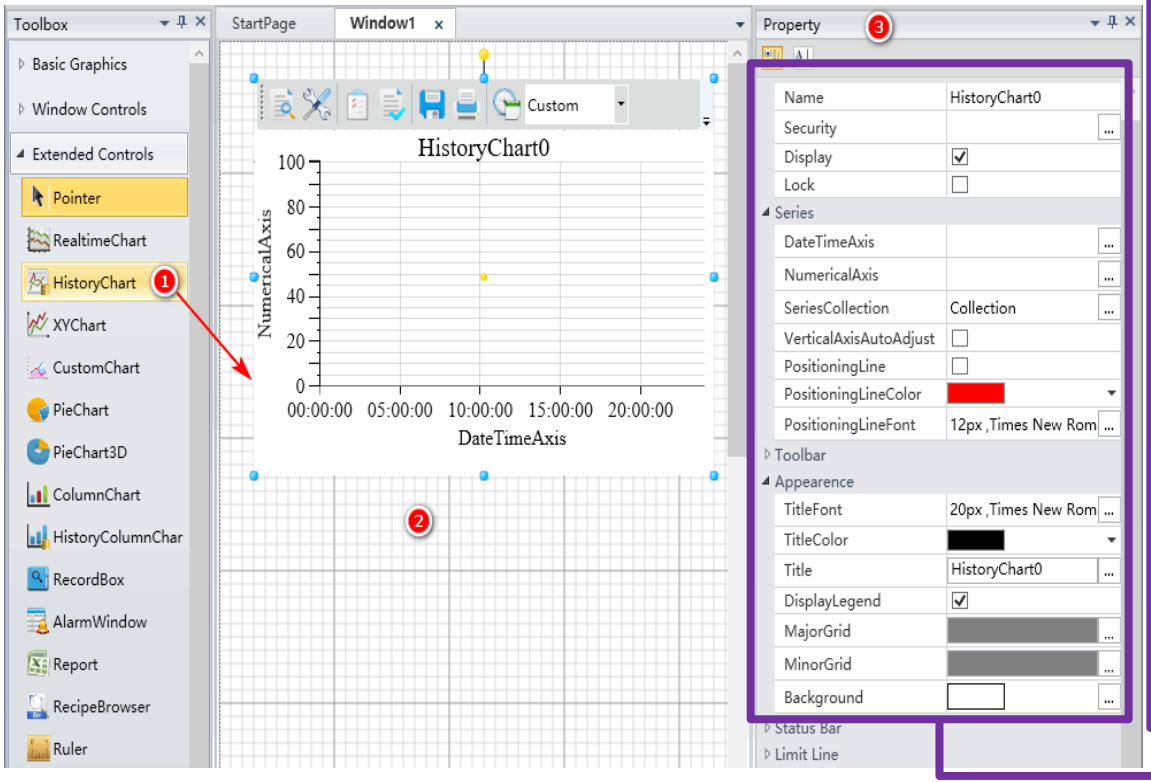


SeriesName	Minimum	Maximum	Average	Sum	Count	CurrentValue
Series0	7	99	51	1522	30	(15:37:39,73)
Series1	3	99	48	1451	30	(15:37:39,17)

①Set query start time and end time
②Query

History Chart

➢ Property window

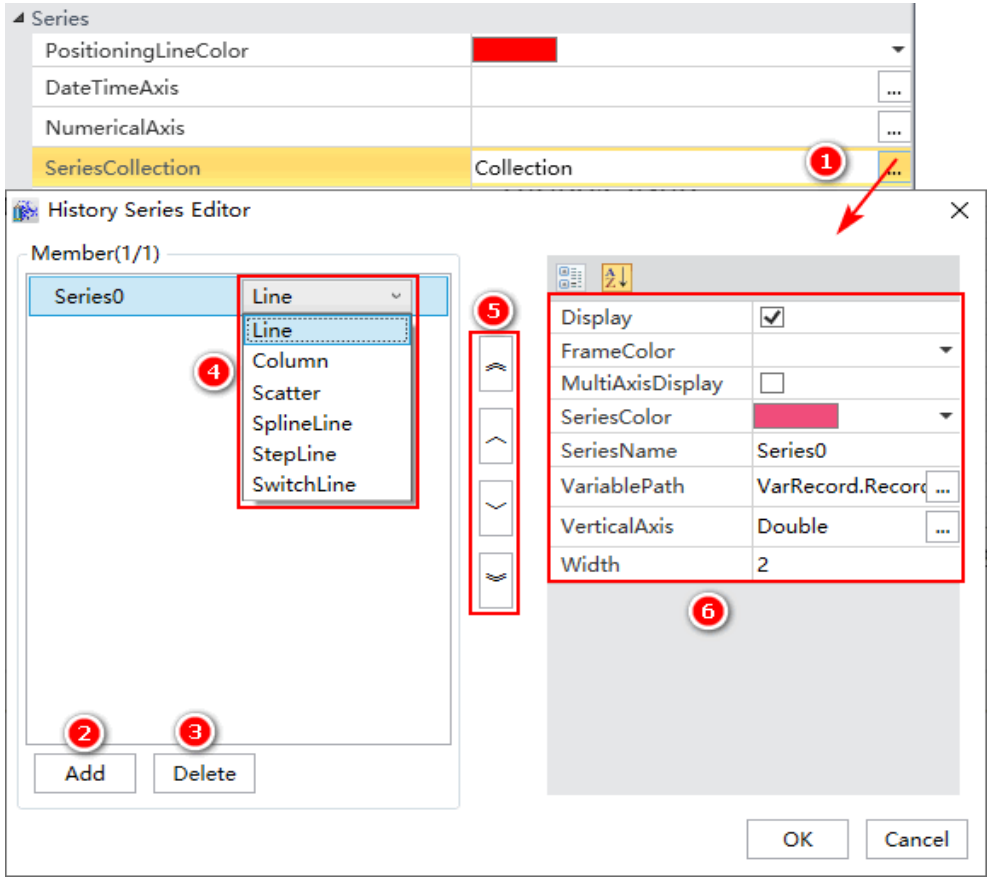


- **DateTimesAxis**: Set properties of DateTimeAxis
- **NumericalAxis**: Set properties of NumericalAxis
- **SeriesCollection**: Add or delete series, set properties of series
- **VerticalAxisAutoChange**: Set whether to adjust the range of the vertical axis according to the value of the data point
- **PositionLine**: Whether to display position line
- **PositionLineColor**: Set the color of position line
- **PositionLineFont**: Set the font style of the test on the position line
- **TitleFont**: Set font style of the title
- **TitleColor**: Set color of the title
- **Title**: Set content of the title
- **DisplayLegend**: Set whether to display legend
- **MajorGrid**: Set the property of major grid
- **MinorGrid**: Set the property of minor grid

※ Refer to the section "7.7.2 HistoryChart" in the user manual

History Chart

- SeriesCollection property

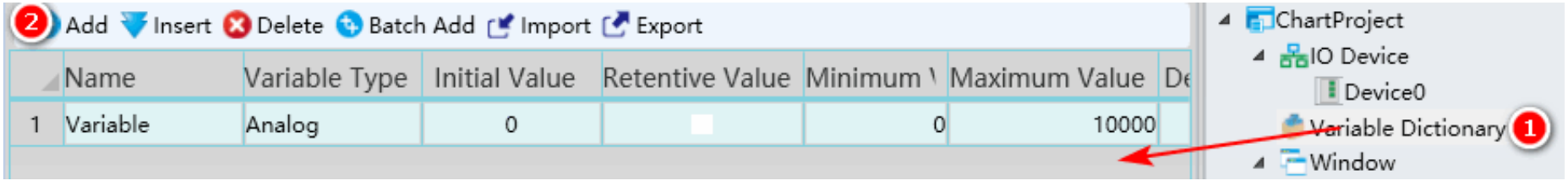


②Add series in the RealtimeChart
③Remove series from the RealtimeChart
④SeriesType：Set the type of the series
⑤Change the display order of series
⑥Set properties of currently selected series

History Chart

- VerticalAxisAutoAdjust property example

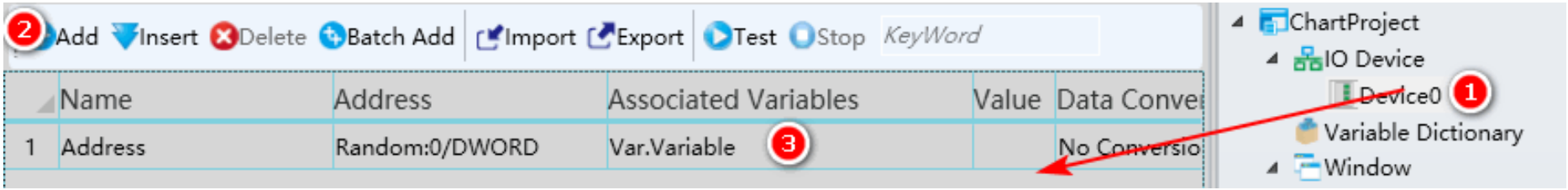
(1)Create 1 variable：Variable



※Refer to the section “6.3 Variables” in user manual.

History Chart

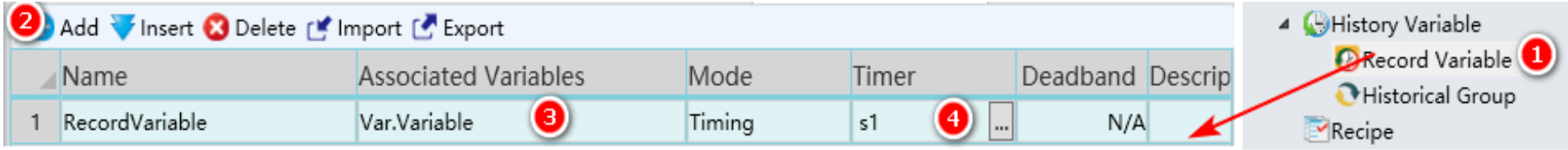
(2) Create a address(the range is 0 to 100) in the simulation device(Device0) that associated with Variable



※Refer to the section “5.10.1 Simulator” in user manual.

History Chart

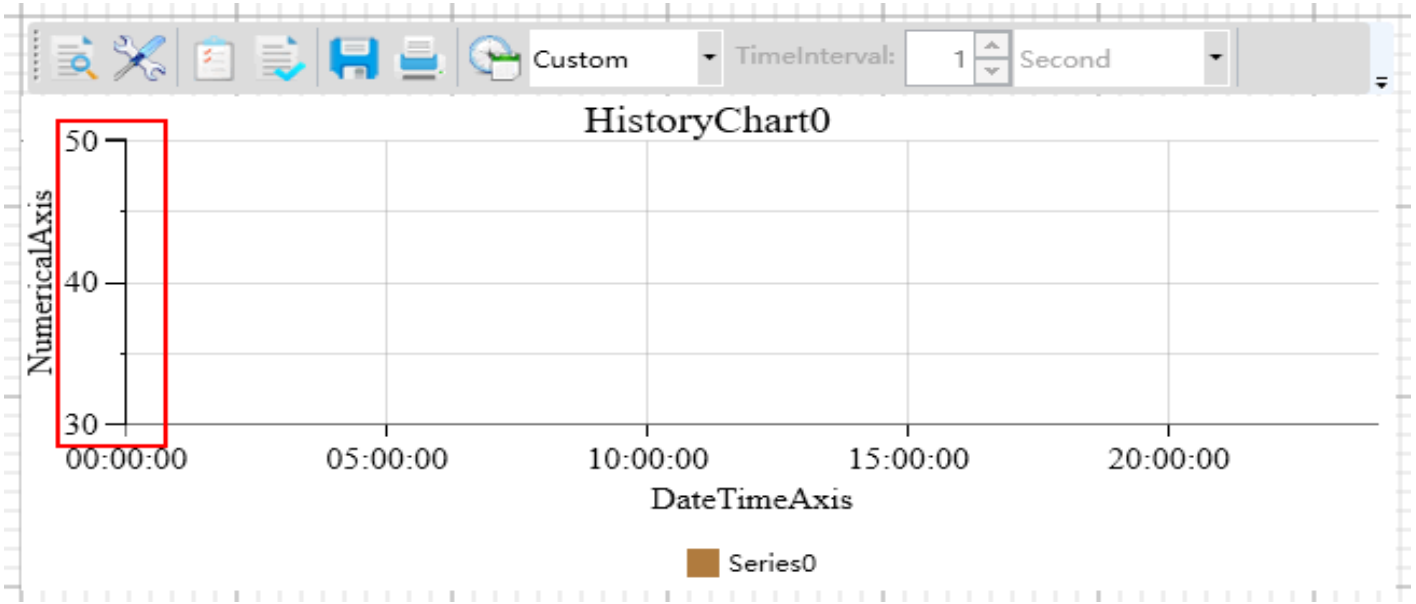
(3) Create a historical variable in the Record Variable that associated with Variable



※Refer to the section “14.2 Setting history record variable” in user manual.

History Chart

(4) Create a HistoryChart0 and set the numerical axis range from 30 to 50, add a Series0 in the HistoryChart0 that associated with the historical variable(RecordVariable) in the Record Variable



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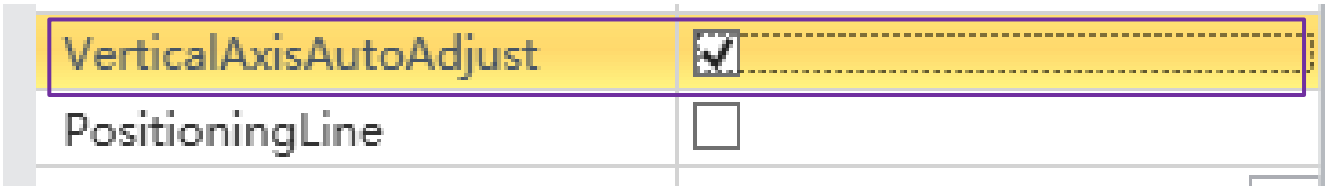
(5) Check the VerticalAxisAutoAdjust property of HistoryChart0



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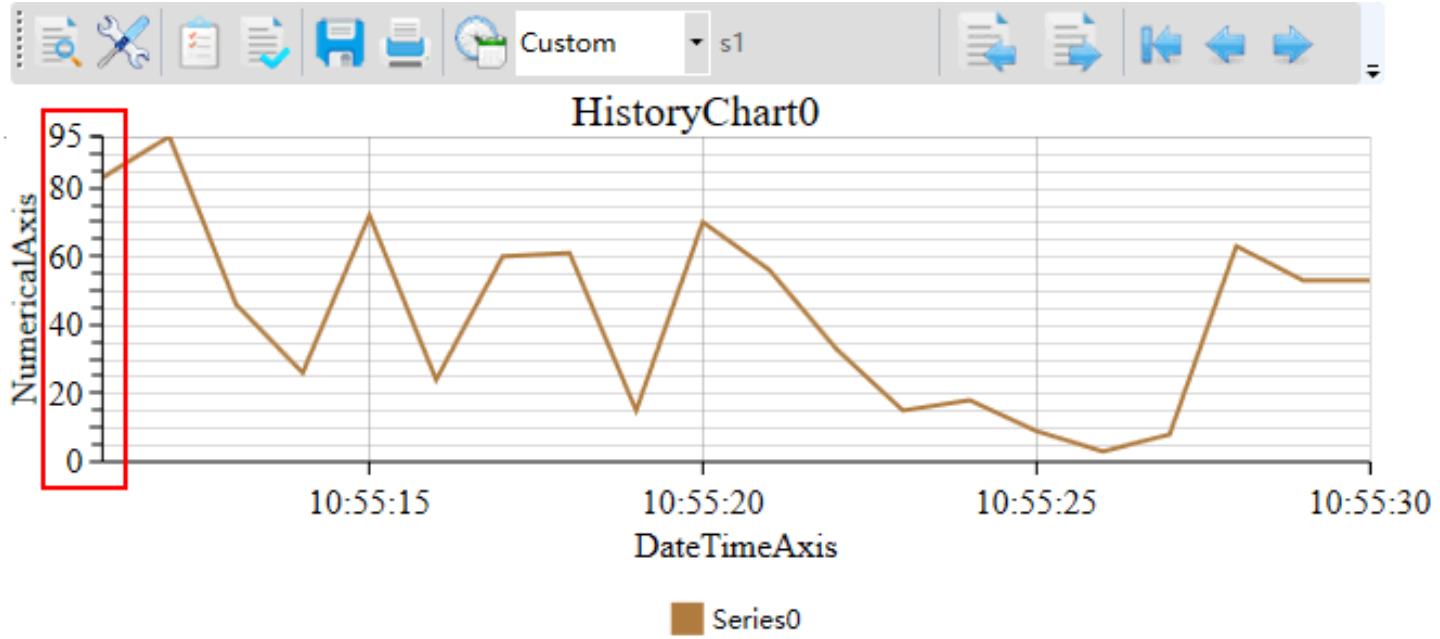
History Chart

(6) At run time, the range of the numerical axis is adjusted with the value of the history data value.



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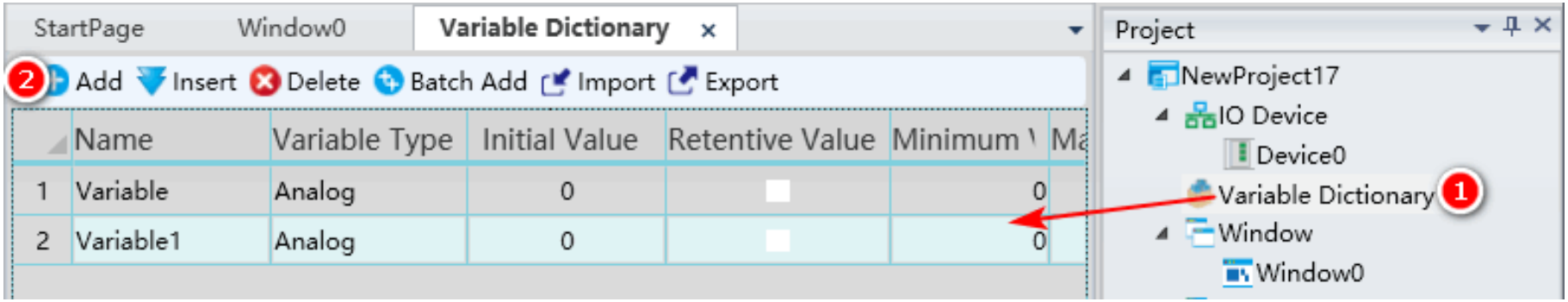
History Chart

- MultiAxisDisplay property example

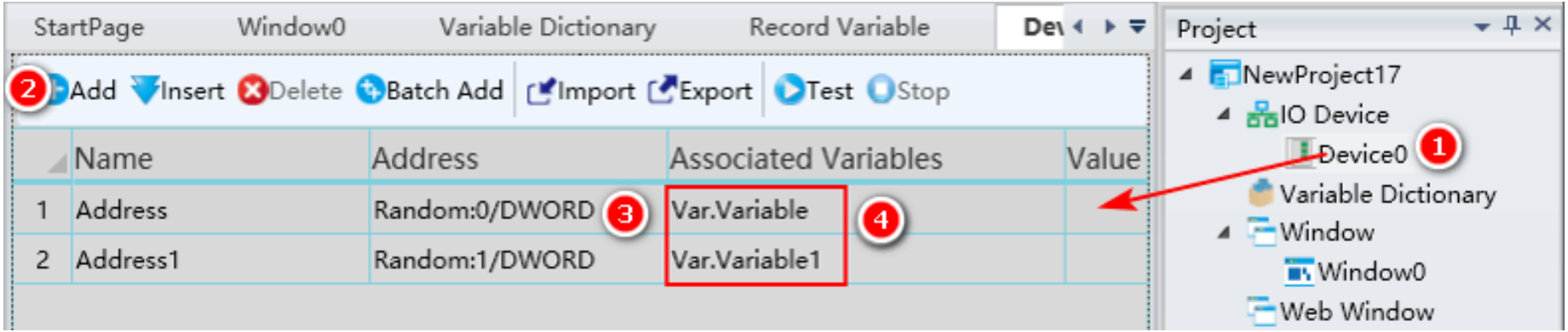
(1)Create 2 variables：Variable、Variable1



※Refer to the section “6.3 Variables” in user manual.

History Chart

(2) Create two simulation address in the Device0 that associated with Variable, Variable1 respectively



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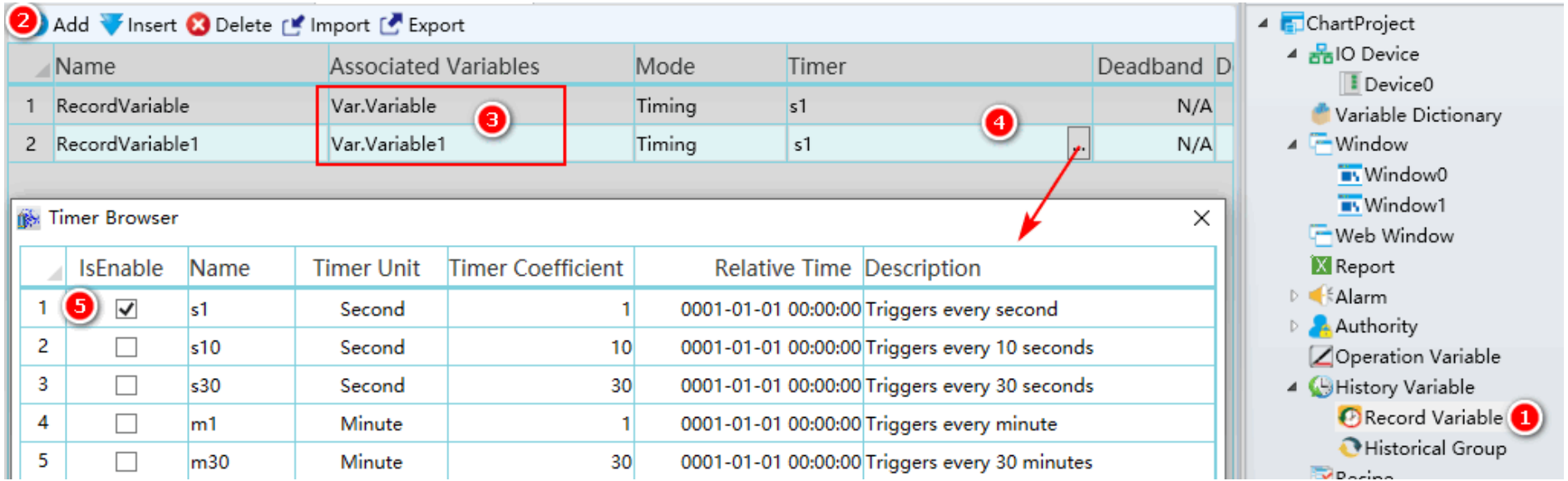
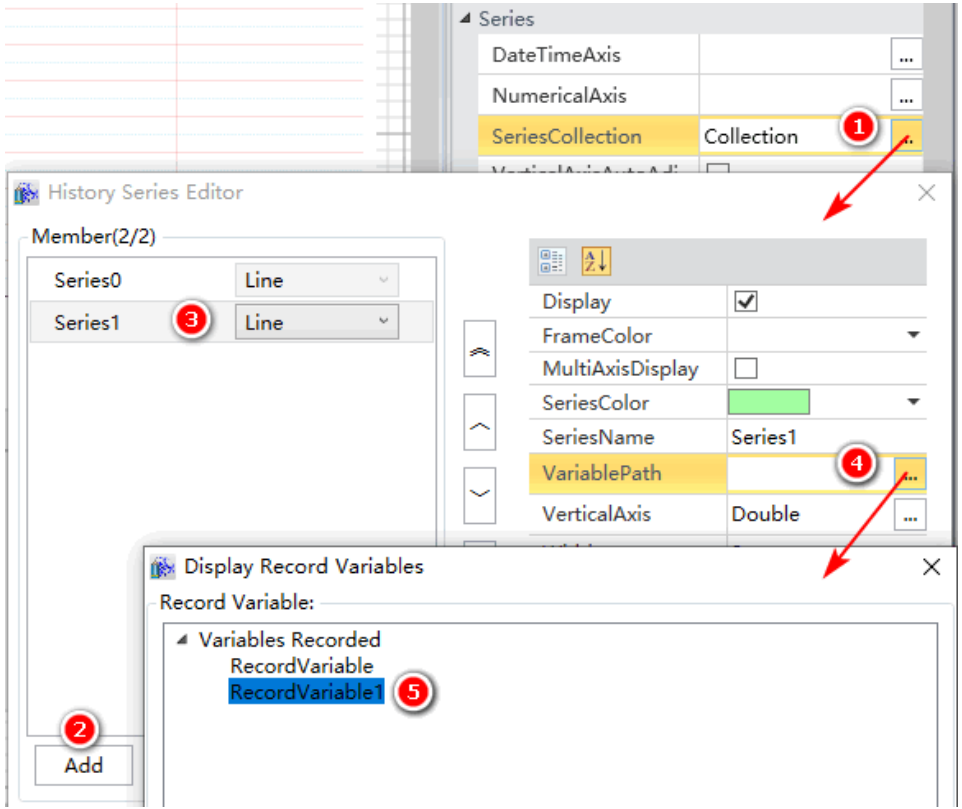
History Chart

(3) Create two historical variables(RecordVariable0,RecordVariable1) in the Record Variable that associated with Variable, Variable1 respectively

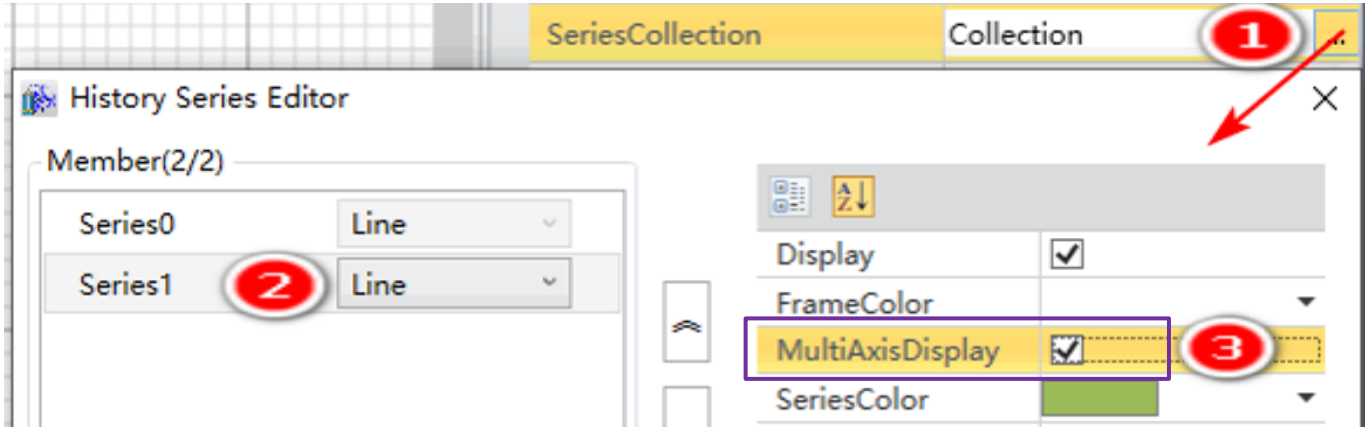


※Refer to the section “14.2 Setting history record variable” in user manual.

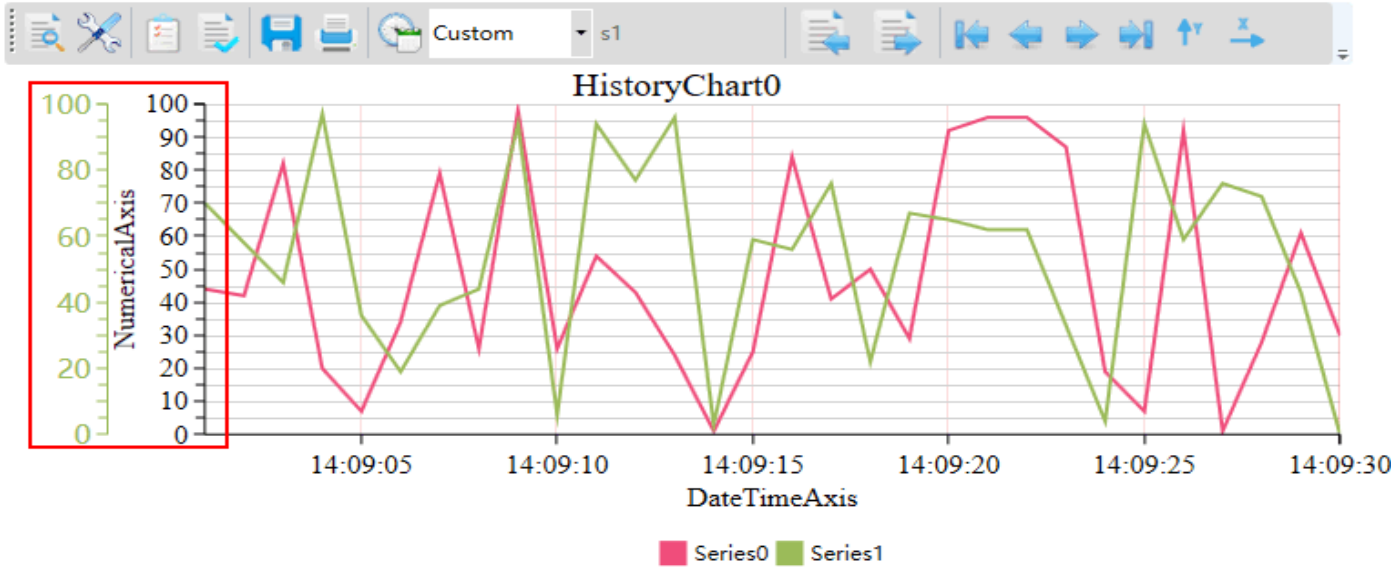
(4) Create a HistoryChart0 in the Window0, and add 2 curves in the HistoryChart0, Series0 associated RecordVariable, Series1 associated RecordVariable1



(5) Check the MultiAxisDisplay property of Series1 in the HistoryChart0



(6) Run the project, two numerical axis will be displayed on the HistoryChart0



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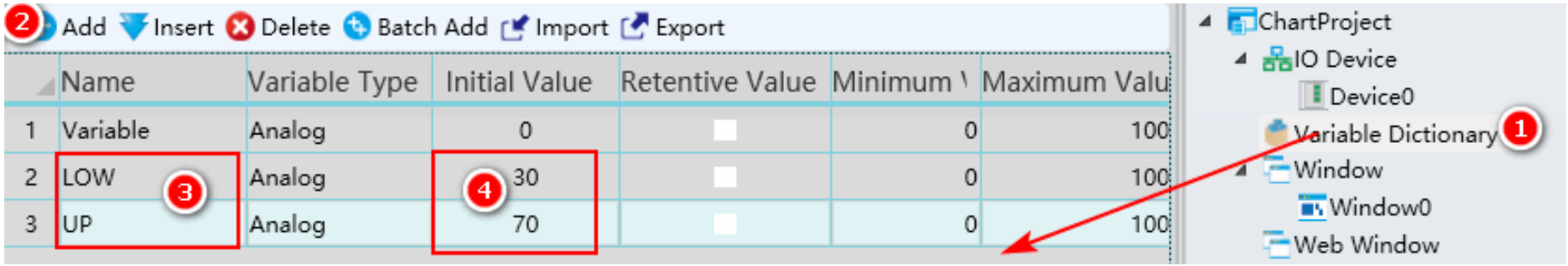
History Chart

- Limit Line property example

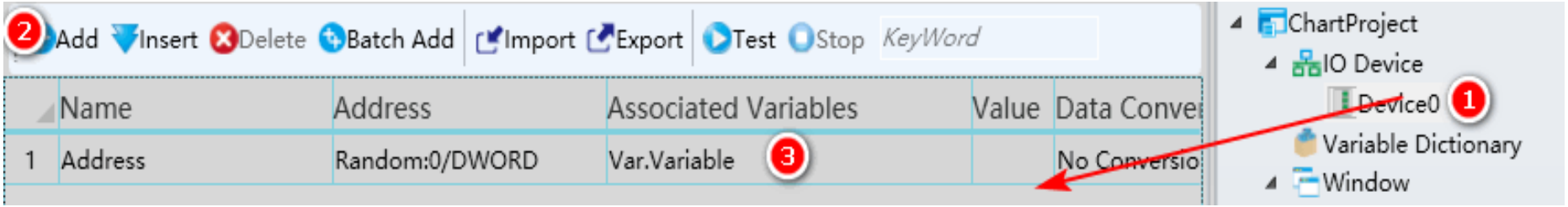
(1)Create three variables: Variable, LOW, UP



※Refer to the section "6.3 Variables" in user manual.

History Chart

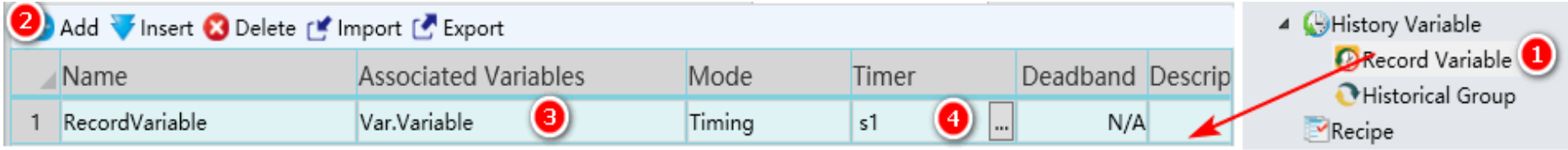
(2) Create a address(the range is 0 to 100) in the simulation device(Device0) that associated with Variable



※Refer to the section “5.10.1 Simulator” in user manual.

History Chart

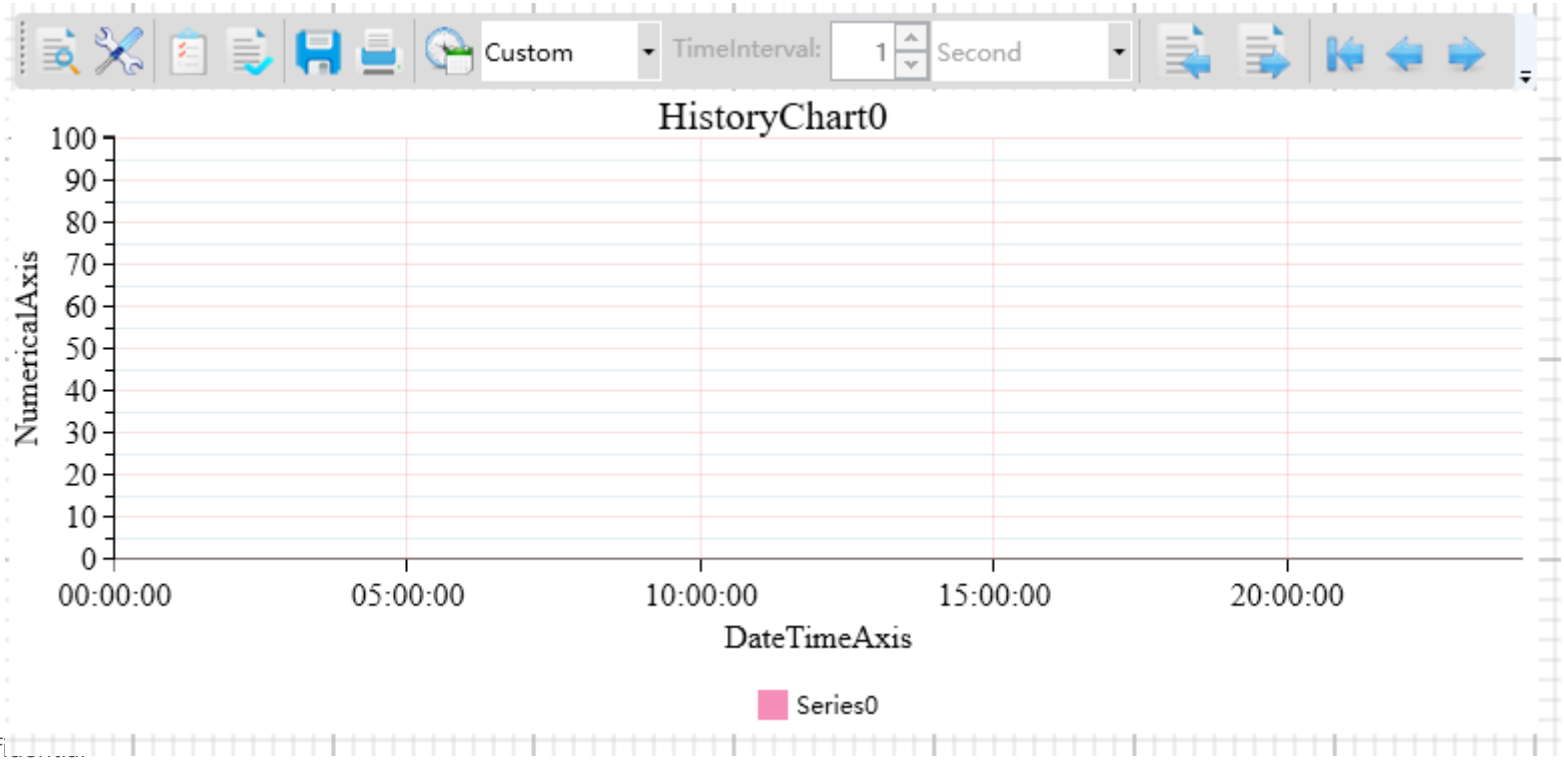
(3) Create a historical variable in the Record Variable that associated with Variable



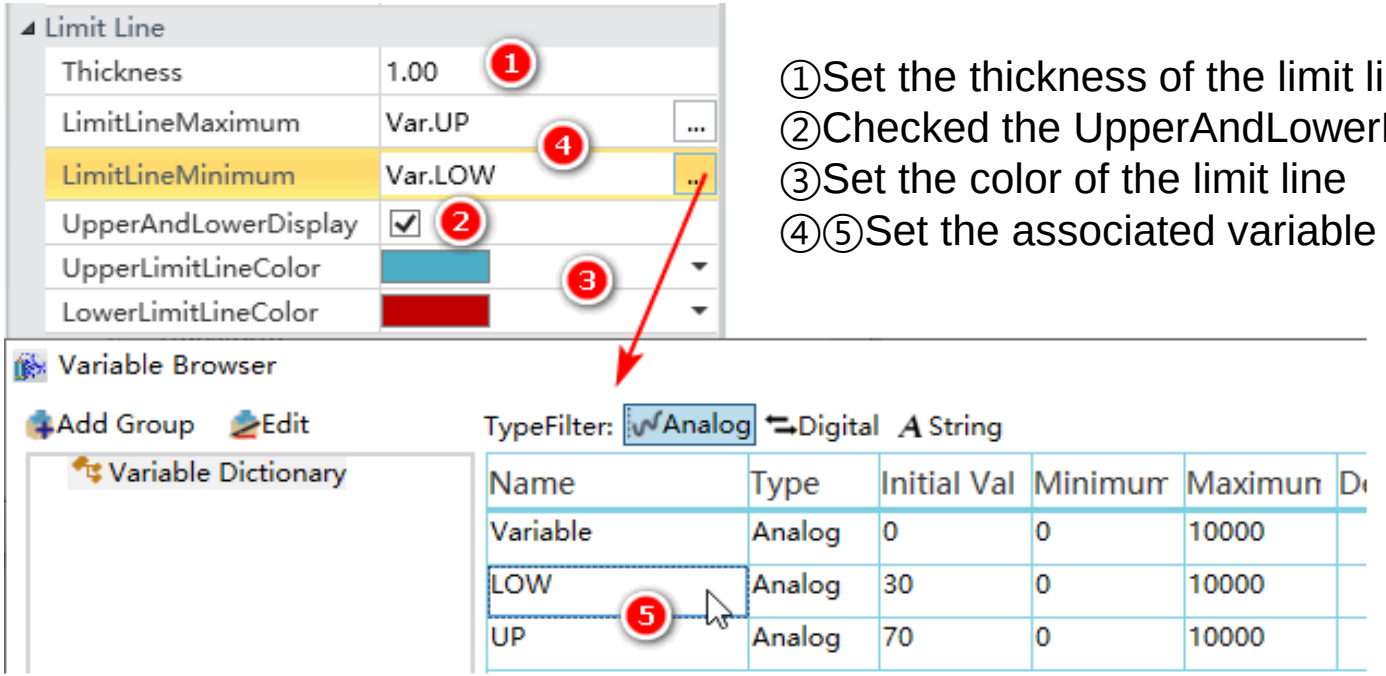
※Refer to the section “14.2 Setting history record variable” in user manual.

History Chart

(4) Create a HistoryChart0 and add a Series0(SeriesType is Line),Series0 associated with the hisrotrical variable(RecordVariable)



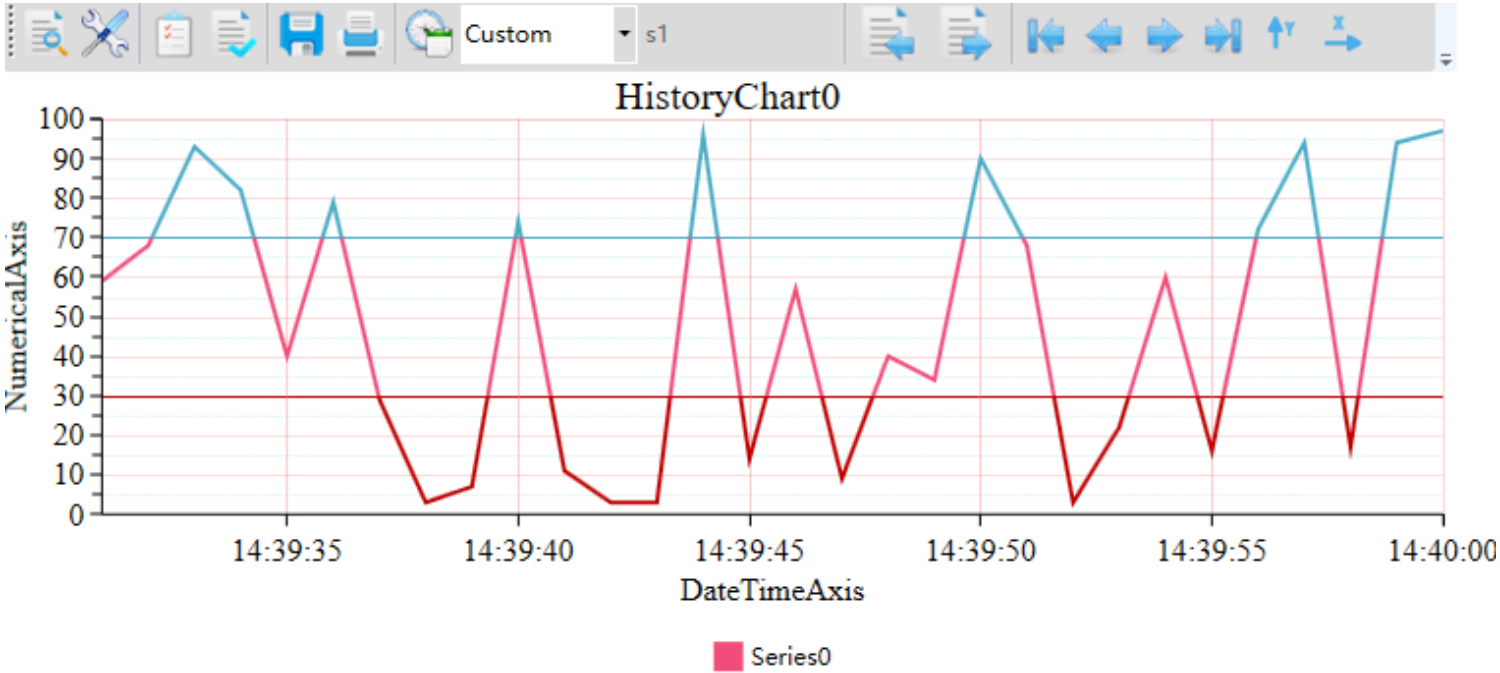
(5)Set limit line property of the HistoryChart0



①Set the thickness of the limit line
②Checked the UpperAndLowerDisplay property
③Set the color of the limit line
④⑤Set the associated variable of the limit line

History Chart

(6) Run the Window0, limit line display



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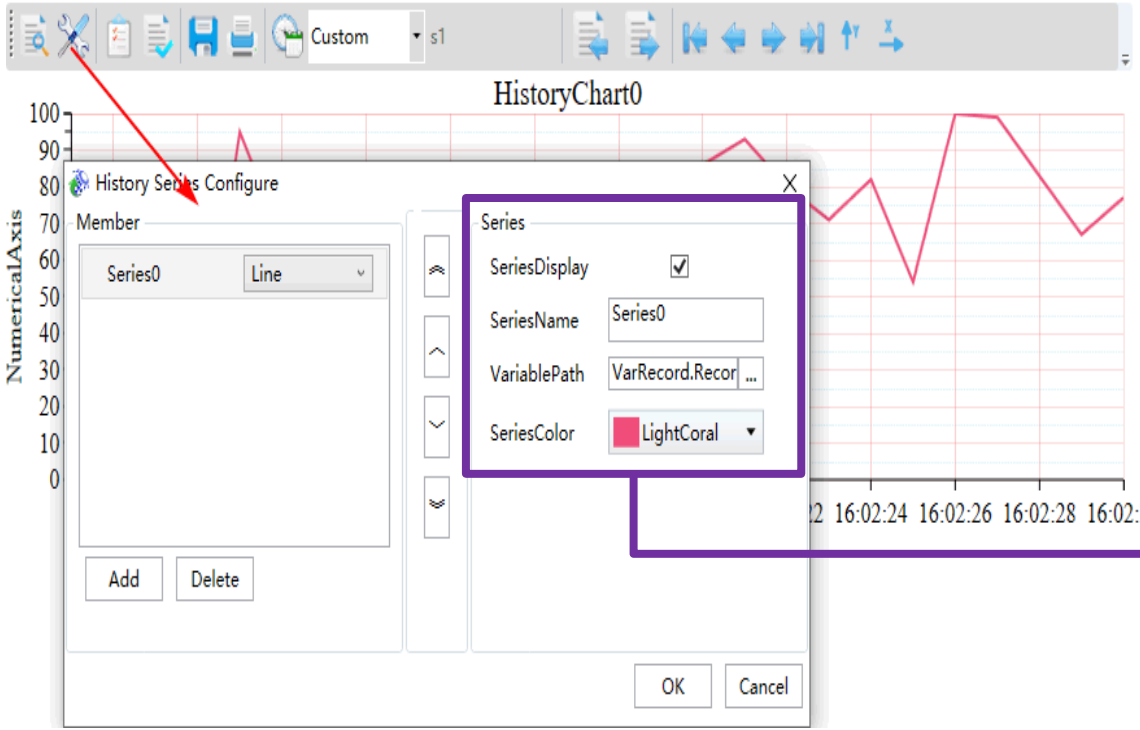
History Chart

- The usage of the toolbar buttons



- **History Series Configure(Modify the properties of series at run time)**: **SeriesDisplay:** Whether to display the series
- **SeriesName:** Change the name of the series
- **VariablePath:** Set the variable path of the series
- **SeriesColor**: Set the color of the series

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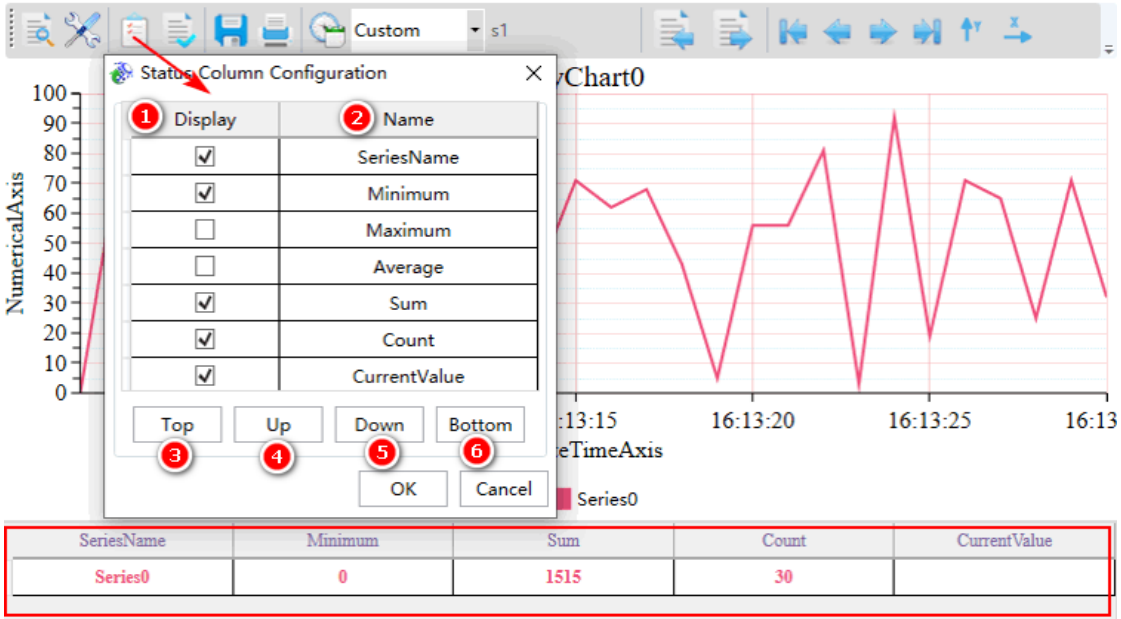
History Chart

- The usage of the toolbar buttons



Status Column Configuration window:

①**Display**: Check means display,Uncheck means hide this column

②**Name**: The name of column in the status

③**Top**: Move to top

④**Up**: Move forward

⑤**Down**: Move backward

⑥**Bottom**: Move to bottom

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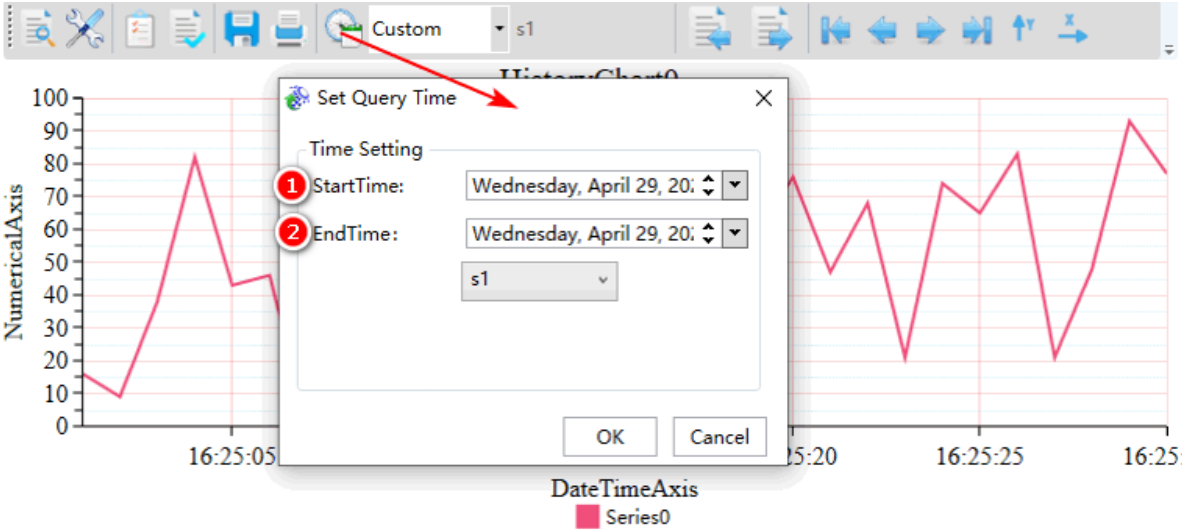
History Chart

- The usage of the toolbar buttons



Set Query Time window:
①**StartTime**: Set query start time
②**EndTime**: Set query end time
Rule: Set query rule

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History Chart

- The scripts of HistoryChart

For the usage of scripts of HistoryChart, please refer to the section "20.3 Script grammar and function" → "Programming model" → "Picture" → "Extended controls" → "HMIHistoryChart object" in the user manual

Methods list

Name	Description
AddNewLimitLine	Add new limit line
ArrayToString	Image array translate into string
Export	Export data
Export	Export excel
FindAnimation	Look for animation to modify the associated variables of the animation
FirstAction	The most left
GetDataTable	Store data to data table
HiddenSeries	Hidden curve
Import	Import excel
LastAction	The most right
NextAction	Right shift
OpenShowFileDialog	Get the path of save dialog select
PreAction	Left shift
Print	Print
QueryEndTime	Set the end time of the query data
QueryHistoryDate	Query of the historical data
QueryHistoryDate	Query of the historical data(with parameters)
QueryInveral	Set the query interval
QueryStartTime	Set the start time of the query data
QueryUnit	Set the query unit
RemoveAllLimitLine	Remove all the limit line
Save	Save
Save	Save as pictures
SetSeriesVariablePath	Curve correlation variable substitution
SetVarRecordRulerName	Set the name of query rule
VisiableSeries	Display curve

Property list

Name	Description
Height	Height
IsShow	Whether display the specified object
IsShowBtnConfig	Whether display the curve configuration button
IsShowBtnCrossLine	Whether display the positioning line
IsShowBtnMenu	Whether display the import and export button
IsShowBtnPrint	Whether display the print button
IsShowBtnSave	Whether display the save button
IsShowBtnUpdate	Whether display the query button
IsShowCbTime	Whether display the quick time setting button
IsShowSetTime	Whether display the time setting button
IsShowStatusBar	Whether display the status column
IsShowToolBar	Whether display the tools column
Left	The left coordinate
Name	Name
NumberAxisMaximum	Get or set the maximum value of numerical axis
NumberAxisMinimum	Get or set the minimum value of numerical axis
NumberInterval	Get or set the maximum scale of numerical axis
NumberSmallInterval	Get or set the minimum scale of numerical axis
ToolTip	Tooltip text
Top	The top coordinate
Width	Width
ZIndex	Layer index

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