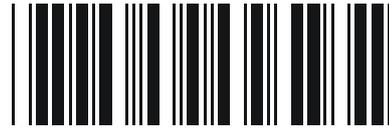
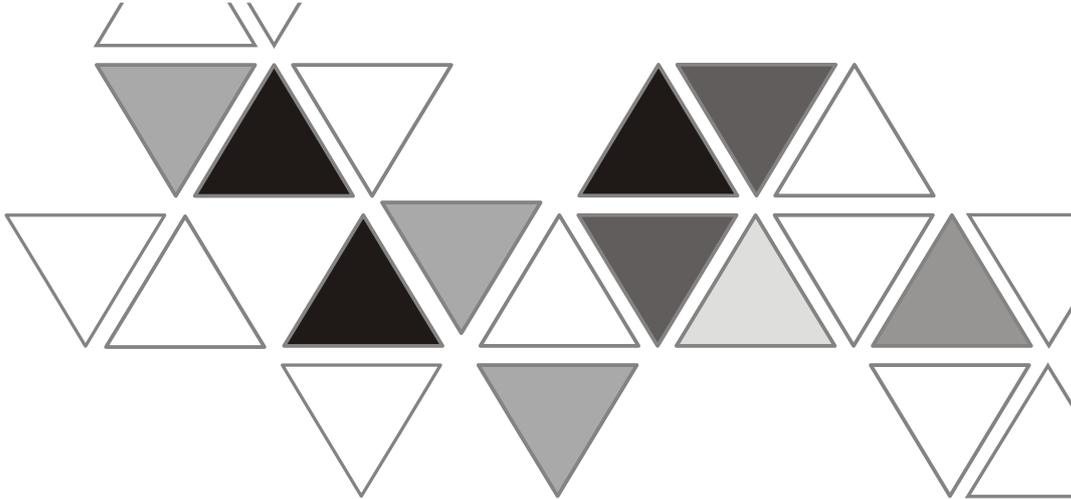


2009-04-27



5011687200-E2D0



# DVP-ES2 DIDO

## INSTRUCTION SHEET

### 安裝說明 安装说明

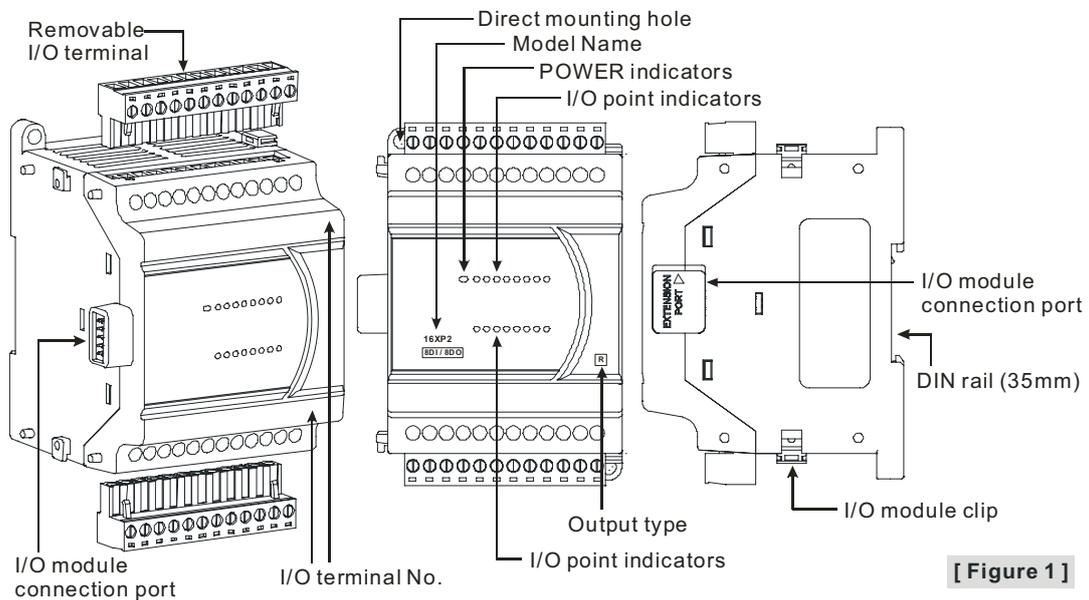
- ▲ *Digital Input/Output Module*
- ▲ 數位輸入 / 輸出模組
- ▲ 数字量输入 / 输出模块



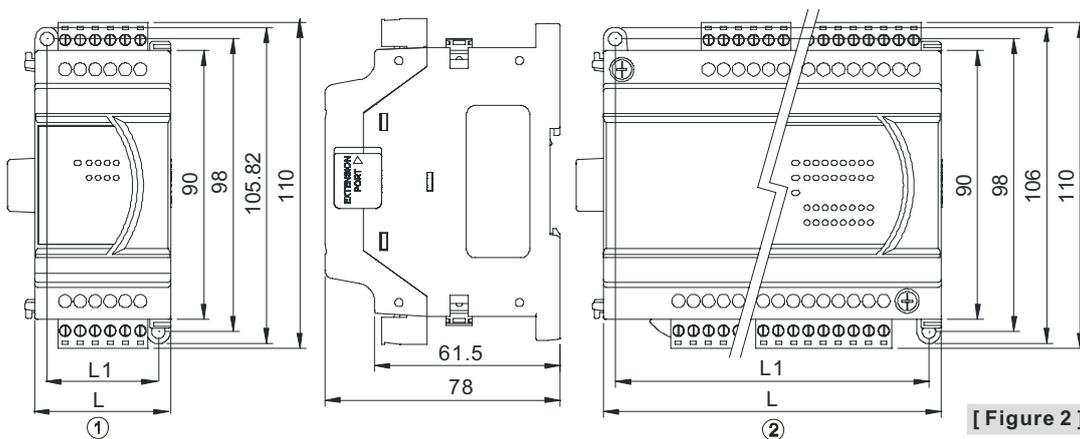
<http://www.delta.com.tw/industrialautomation>

- ✚ This instruction sheet provides only information on the electrical specification, general functions, installation and wiring. For detailed program design and applicable instructions for DVP-ES2, please refer to “DVP-ES2 Operation Manual: Programming”. For details of the optional peripheral, please refer to the instruction sheet enclosed in the package.
- ✚ This is an OPEN TYPE digital input/output module and therefore should be installed in an enclosure free of airborne dust, humidity, electric shock and vibration. The enclosure should prevent non-maintenance staff from operating the device (e.g. key or specific tools are required for operating the enclosure) in case danger and damage on the device may occur.
- ✚ DO NOT connect the input AC power supply to any of the I/O terminals; otherwise serious damage may occur. Check all the wiring again before switching on the power. Make sure the ground terminal  $\oplus$  is correctly grounded in order to prevent electromagnetic interference.

## ■ Product Profile & Dimension



[ Figure 1 ]



[ Figure 2 ]

Unit: mm

Model	08XM2 11N	08XP2 11R/T	08XN2 11R/T	16XM2 11N	16XP2 11R/T	16XN2 11R/T	24XP2 00R/T	24XN2 00R/T	32XP2 00R/T
L	45			70			145		
L1	37			62			137		
Type	①			②			②		

## ■ Digital Input/Output Modules

Model	Power input	Input spec.		Output spec.	
		Points	Type	Points	Type
DVP08XM211N	Supplied by bus power from MPU	8	24VDC Sink or Source	-	-
DVP08XP211R		4		4	Relay
DVP08XP211T		4		4	Transistor
DVP08XN211R		-		8	Relay
DVP08XN211T		-		8	Transistor
DVP16XM211N		16		-	-
DVP16XP211R	24VDC	8		8	Relay
DVP16XP211T		8		8	Transistor
DVP16XN211R		-		16	Relay
DVP16XN211T		-		16	Transistor
DVP24XP200R	100 ~ 240 VAC	16		8	Relay
DVP24XN200T		16		8	Transistor
DVP24XN200R		-		24	Relay
DVP24XN200T		-		24	Transistor
DVP32XP200R		16		16	Relay
DVP32XP200T		16		16	Transistor

## ■ Electrical Specifications

Model Item	08XM2 11N	08XP2 11□	08XN2 11□	16XM2 11N	16XP2 11□	16XN2 11□	24XP2 00□	24XN2 00□	32XP2 00□
Power supply voltage	Supplied by bus power from MPU				24VDC (-15% ~ 10%)		100 ~ 240VAC (-15% ~ 10%) 50/60Hz ± 5%		
Power consumption	1.2W	R:1.2W T:1W	R:1.2W T:0.5W	2.4W	R:2.4W T:1.6W	R:2.4W T:1W	20VA	20VA	R:25VA T:20VA
DC24V current output	-						100mA		
Power supply protection	-				Power reverse protection		Output short circuit protection		
Voltage withstand	1,350VAC (Primary-secondary) 1,350VAC (Primary-PE) 500VDC (Secondary-PE)								
Insulation resistance	> 5MΩ at 500VDC (between all I/O points and ground)								
Noise immunity	ESD: 8KV Air Discharge EFT: Power Line: 2KV, Digital I/O: 1KV RS: 26MHz ~ 1GHz, 10V/m								
Environment	Operation: 0°C~55°C (temperature), 50~95% (humidity), pollution degree2 Storage: -25°C~70°C (temperature), 5~95% (humidity)								
Vib. / shock resistance	International standards: IEC61131-2, IEC 68-2-6 (TEST Fc)/ IEC61131-2 & IEC 68-2-27 (TEST Ea)								
Weight (g)	105	R: 120 T: 107	R: 135 T: 109	148	R: 179 T: 149	R: 209 T: 143	R: 300 T: 260	R: 390 T: 310	R: 340 T: 280

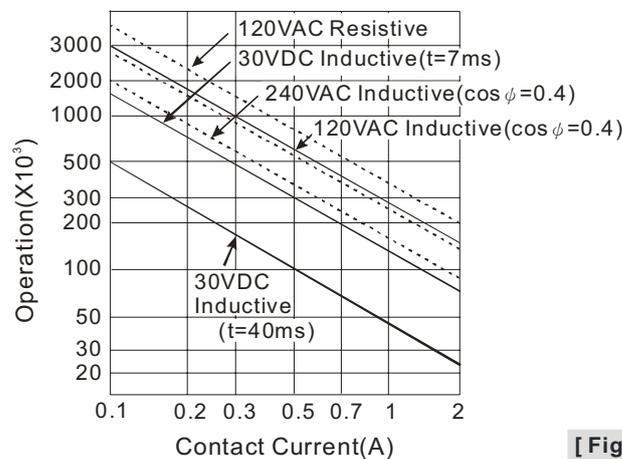
## ■ I/O Terminal Specifications

Input point electrical specifications			
Input point type		Digital input	
Input type		DC (SINK or SOURCE)	
Input current		24VDC, 5mA	
Active level	Off → On	>15VDC	
	On → Off	< 5VDC	
Response time	Off → On	10ms ± 10%	
	On → Off	15ms ± 10%	
Input impedance		4.7KΩ	
Output point electrical specifications			
Output point type		Relay-R	Transistor-T
Voltage specification		Below 250VAC, 30VDC	5~30VDC #2
Maximum load	Resistive	2A/1 point (5A/COM)	0.5A/1 point (4A/COM)
	Inductive	#3	12W (24VDC)
	Lamp	20WDC/100WAC	2W (24VDC)
Switching frequency #1		≤ 1Hz	≤ 1kHz
Response time	Off → On	Approx .10ms	50μs
	On → Off		200μs

#1: The actual frequency will be affected by the scan period.

#2: UP, ZP must work with external auxiliary power supply 24VDC (-15% ~ +20%), rated consumption approx. 1mA/point.

#3: Life curves

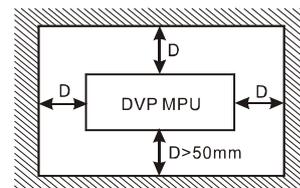


[ Figure 3 ]

## ■ Installation

Please install the PLC in an enclosure with sufficient space around it to allow heat dissipation, as shown in the figure.

- **Direct Mounting:** Please use M4 screw according to the dimension of the product.
- **DIN Rail Mounting:** When mounting the PLC to 35mm DIN rail, be sure to use the retaining clip to stop any side-to-side movement of the PLC and reduce the chance of wires being loose. The retaining clip is at the bottom of the PLC. To secure the PLC to DIN rail, pull down the clip, place it onto the rail and gently push it up. To remove the PLC, pull the retaining clip down with a flat screwdriver and gently remove the PLC from DIN rail.



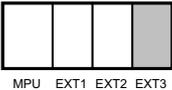
## ■ Wiring

1. Use the 12-24 AWG single-core bare wire or the multi-core wire for the I/O wiring. The PLC terminal screws should be tightened to 3.80 kg-cm (3.30 in-lbs) and please use 60/75°C copper conductor only.
2. DO NOT wire empty terminal. DO NOT place the input signal wire and output power wire in the same wiring circuit.
3. DO NOT drop tiny metallic conductor into the PLC while screwing and wiring.
  - Please attach the dustproof sticker to the PLC before the installation to prevent conductive objects from dropping in.
  - Tear off the sticker before running the PLC to ensure normal heat dissipation.

## ◆ I/O Point Serial Sequence

40-point and 60-point DVP-ES2 series MPU start their input extension from X30 and X50 and output extension from Y20 and Y30. Other models start their input extension from X20 and output from Y20. The extension I/O points can be increased by 8's multiple. Point number less than 8 will be regarded as 8. See the example below.

1. When using MPU with points less than 32 to connect digital I/O module, the input number of the 1<sup>st</sup> digital I/O module will be started from X20 in sequence and the output number will be started from Y20 in sequence. Please refer to the following example for detail:

System application	PLC	Model	Input points	Output points	Input number	Output number	Power consumption
example 1:	MPU	32ES200R	16	16	X0 ~ X17	Y0 ~ Y17	30VA
	EXT1	08XP211R	4	4	X20 ~ X23	Y20 ~ Y23	1.2W
	EXT2	16XP211R	8	8	X30 ~ X37	Y30 ~ Y37	2.4W
	EXT3	16XN211R	0	16	-	Y40 ~ Y57	2.4W

- The I/O points on the 1<sup>st</sup> digital I/O module DVP08XP211R are both 4 but are regarded as 8. The higher 4 input points and 4 output points therefore have no actual corresponding I/O points. For the 2<sup>nd</sup> digital I/O module DVP16XP211R, the input points start from X30, and output points star from Y30, which results in continuous points in the serial connection of two digital I/O modules.
  - Output current supplied from 24VDC on MPU is 500mA(12W). Remaining applicable power:  $12 - (1.2+2.4+2.4) = 6W$
2. When using MPU with points 60 to connect digital I/O module, the input number of the 1<sup>st</sup> digital I/O module will be started from X50 in sequence and the output number will be started from Y30 in sequence. Please refer to the following example for detail:

System application	PLC	Model	Input points	Output points	Input number	Output number	Power consumption
example 2:	MPU	60ES200R	36	24	X0 ~ X47	Y0 ~ Y27	30VA
	EXT1	08XM211N	8	0	X50 ~ X57	-	1.2W
	EXT2	16XP211R	8	8	X60 ~ X67	Y30 ~ Y37	2.4W
	EXT3	08XP211R	4	4	X70 ~ X73	Y40 ~ Y43	1.2W

- The input points of the 1<sup>st</sup> MPU are 36, its input will be defined as 40 and there will be no corresponding input points for the 4 higher numbers.
- The 3<sup>rd</sup> digital I/O module DVP08XP211R will be defined as 8 input/output points and there will be no corresponding input/output points for the 4 higher numbers. In order to continue the input/output number, place the digital I/O module at last if the digital I/O module is with empty input/output numbers.
- Output current supplied from 24VDC on MPU is 500mA(12W). Remaining applicable power:  $12 - (1.2 + 2.4 + 1.2) = 7.2W$

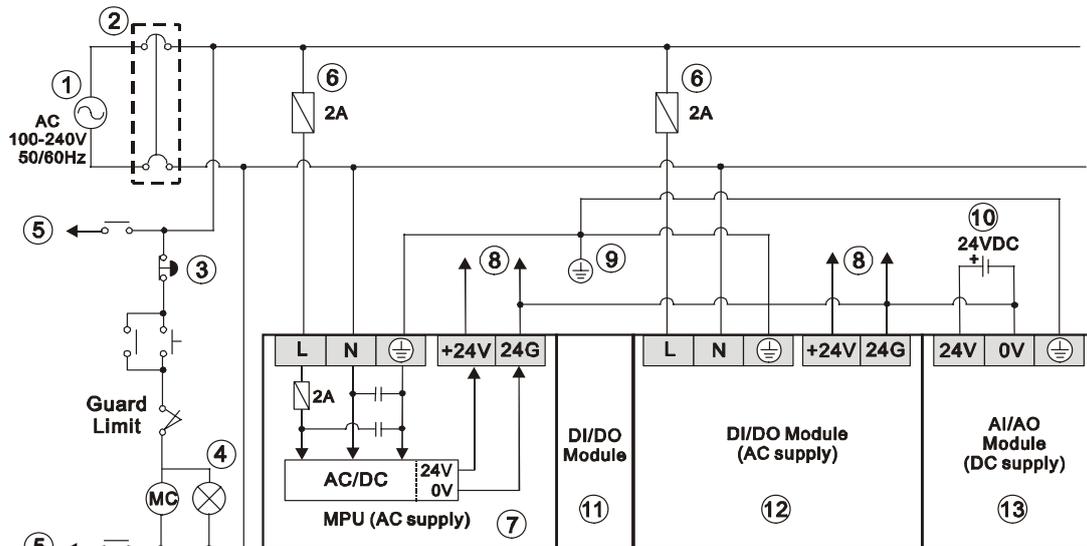
## ◆ Power Supply

DVP-ES2 DIDO has to work with DVP-ES2 series MPU. Please note the following item when using it:

1. The AC power supply voltage range for DVP-ES2 series MPU is 100 ~ 240VAC. Please connect the AC power supply to L and N terminals and note that connecting AC110V or AC220V to +24V output terminal or digital input terminal will damage the PLC.
2. The power supply for digital I/O points is 24VDC. Please make sure the  $\pm$  power supply is correctly connected.
3. It is highly suggested that the DC power supplies for the MPU and DVP-ES2 DIDO go ON or OFF at the same time.
4. Use 1.6mm wire (or longer) for the grounding of the PLC.
5. The power shutdown of less than 10ms will not affect the operation of the PLC. However, power shutdown time that is too long or the drop of power supply voltage will stop the running of the PLC, and all outputs will go "OFF". When the power supply turns normal again, the PLC will automatically return to its operation. (Please be aware of the latched auxiliary relays and registers inside the PLC when programming.)

## ◆ Safety Wiring

In PLC control system, many devices are controlled at the same time and actions of any device could influence each other, i.e. breakdown of the entire auto-control system and danger. Therefore, we suggest you wire a protection circuit at the power supply input terminal. See the figure below.



[ Figure 4 ]

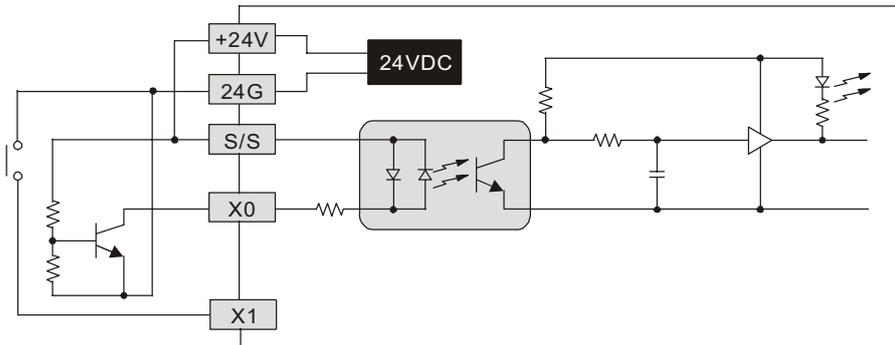
- |  |                                  |
|--|----------------------------------|
| ① AC Power supply: 100 ~ 240VAC, 50/60Hz   | ② Breaker                        |
| ③ Emergency stop: This button can cut off the system power supply when accidental emergency takes place. |                                  |
| ④ Power indicator  | ⑤ AC power supply load           |
| ⑥ Power supply circuit protection fuse (2A)  | ⑦ DVP-PLC (main processing unit) |
| ⑧ DC Power supply Output: 24VDC, 500mA   | ⑨ Grounding resistance: < 100Ω   |
| ⑩ DC Power supply: 24VDC   | ⑪ Digital I/O module (DC supply) |
| ⑫ Digital I/O module (AC supply)   | ⑬ Analog I/O module (DC supply)  |

## ◆ I/O Point Wiring

There are 2 types of DC inputs, SINK and SOURCE. (Below is an example. For detailed point configuration, please refer to specifications of each model.)

### • DC Signal IN – SINK mode

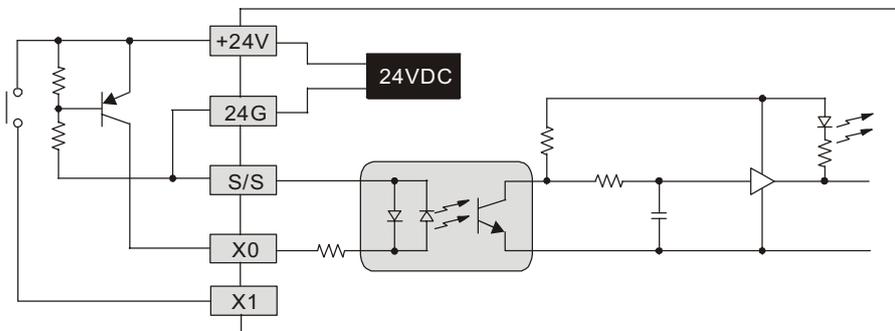
Input point loop equivalent circuit



[ Figure 5 ]

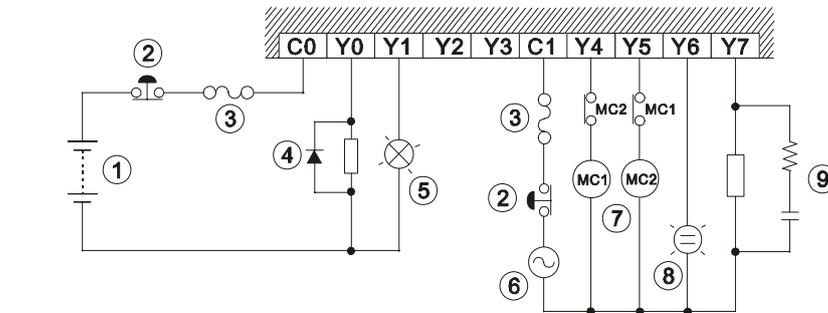
### • DC Signal IN – SOURCE mode

Input point loop equivalent circuit

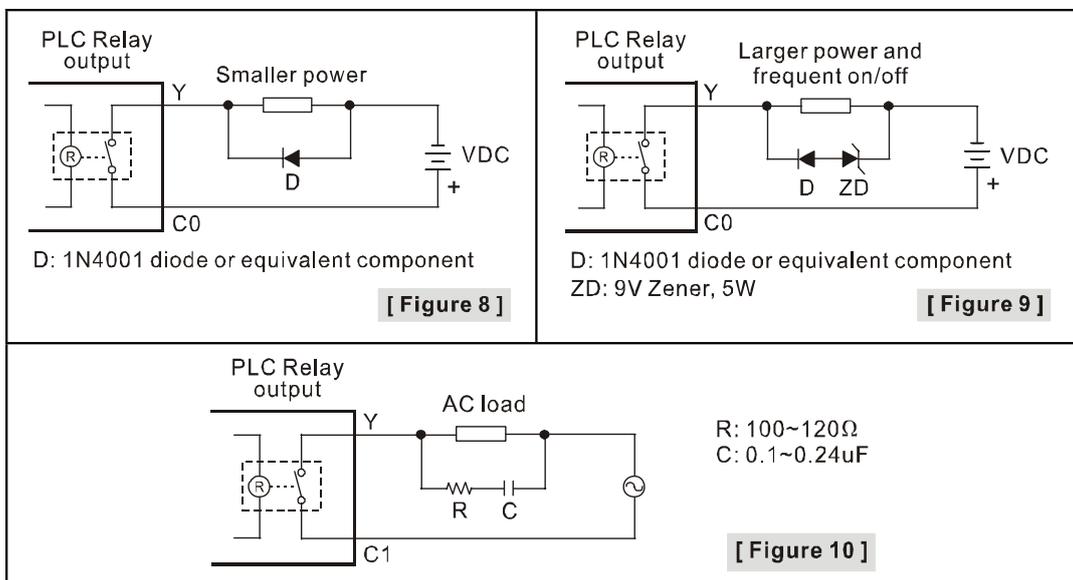


[ Figure 6 ]

### • Relay (R) output circuit wiring

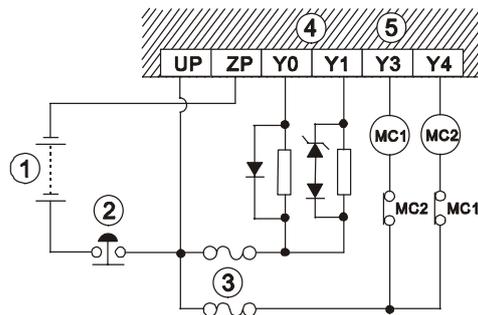


[ Figure 7 ]

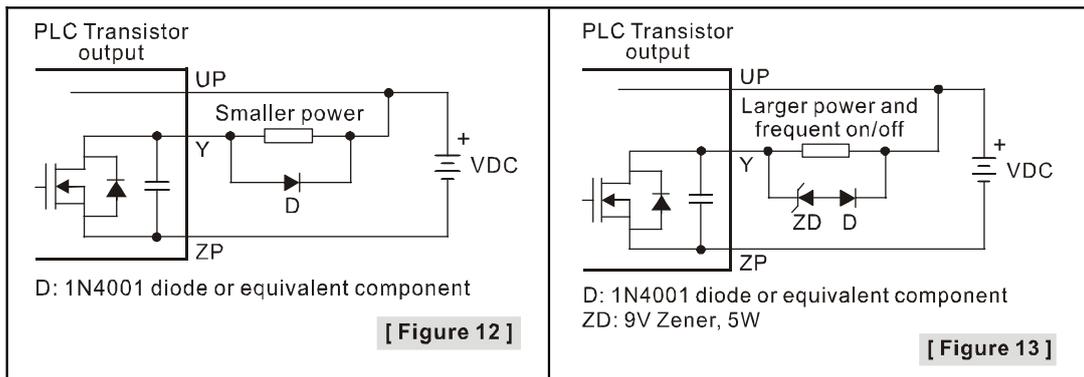


- ① DC power supply
- ② Emergency stop: Uses external switch
- ③ Fuse: Uses 5 ~ 10A fuse at the shared terminal of output contacts to protect the output circuit
- ④ Transient voltage suppressor: To extend the life span of contact.
  - 1. Diode suppression of DC load: Used when in smaller power (Figure 8)
  - 2. Diode + Zener suppression of DC load: Used when in larger power and frequent On/Off (Figure 9)
- ⑤ Incandescent light (resistive load)
- ⑥ AC power supply
- ⑦ Manually exclusive output: For example, Y4 and Y5 control the forward running and reverse running of the motor, forming an interlock for the external circuit, together with the PLC internal program, to ensure safe protection in case of any unexpected errors.
- ⑧ Neon indicator
- ⑨ Absorber: To reduce the interference on AC load (Figure 10)

• Transistor (T) output circuit wiring



[ Figure 11 ]



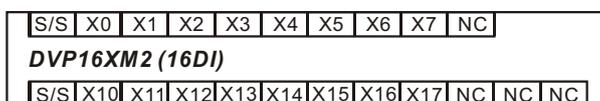
- ① DC power supply
- ② Emergency stop
- ③ Circuit protection fuse
- ④ The output of the transistor model is “open collector”.
  - 1. Diode suppression: Used when in smaller power (Figure 12)
  - 2. Diode + Zener suppression: Used when in larger power and frequent On/Off (Figure 13)
- ⑤ Manually exclusive output: For example, Y3 and Y4 control the forward running and reverse running of the motor, forming an interlock for the external circuit, together with the PLC internal program, to ensure safe protection in case of any unexpected errors.

■ I/O Terminal Layouts

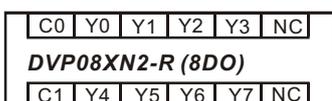
• DVP08XM211N



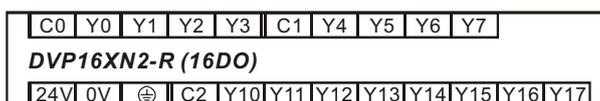
• DVP16XM211N



• DVP08XN211R/T



• DVP16XN211R/T



NC	NC	Y0	Y1	Y2	Y3
<b>DVP08XN2-T (8DO)</b>					
UP	ZP	Y4	Y5	Y6	Y7

UP0	ZP0	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7		
<b>DVP16XN2-T (16DO)</b>											
UP1	ZP1	⊕	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17	NC

• DVP08XP211R/T

S/S	X0	X1	X2	X3	NC
<b>DVP08XP2-R (4DI/4DO)</b>					
C0	Y0	Y1	Y2	Y3	NC

S/S	X0	X1	X2	X3	NC
<b>DVP08XP2-T (4DI/4DO)</b>					
UP	ZP	Y0	Y1	Y2	Y3

• DVP16XP211R/T

S/S	X0	X1	X2	X3	X4	X5	X6	X7	NC		
<b>DVP16XP2-R (8DI/8DO)</b>											
24V	0V	⊕	C0	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7

S/S	X0	X1	X2	X3	X4	X5	X6	X7	NC		
<b>DVP16XP2-T (8DI/8DO)</b>											
UP	ZP	⊕	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	NC

• DVP24XP200R/T

L	N	⊕	NC	S/S	X0	X1	X2	X3	X4	X5	X6	X7	X10	X11	X12	X13	X14	X15	X16	X17	
<b>DVP24XP2-R (16DI/8DO)</b>																					
+24V	24G	C0	Y0	Y1	Y2	Y3	C1	Y4	Y5	Y6	Y7										

L	N	⊕	NC	S/S	X0	X1	X2	X3	X4	X5	X6	X7	X10	X11	X12	X13	X14	X15	X16	X17	
<b>DVP24XP2-T (16DI/8DO)</b>																					
+24V	24G	UP	ZP	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7										

• DVP24XN200R/T

L	N	⊕	NC	C0	Y0	Y1	Y2	Y3	C1	Y4	Y5	Y6	Y7	C4	Y20	Y21	Y22	Y23	NC	NC	
<b>DVP24XN2-R (24DO)</b>																					
+24V	24G	NC	NC	C2	Y10	Y11	Y12	Y13	C3	Y14	Y15	Y16	Y17	C5	Y24	Y25	Y26	Y27	NC	NC	

L	N	⊕	NC	UP0	ZP0	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	UP2	ZP2	Y20	Y21	Y22	Y23	NC	
<b>DVP24XN2-T (24DO)</b>																					
+24V	24G	NC	NC	UP1	ZP1	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17	UP3	ZP3	Y24	Y25	Y26	Y27	NC	

• DVP32XP200R/T

L	N	⊕	NC	S/S	X0	X1	X2	X3	X4	X5	X6	X7	X10	X11	X12	X13	X14	X15	X16	X17	
<b>DVP32XP2-R (16DI/16DO)</b>																					
+24V	24G	C0	Y0	Y1	Y2	Y3	C1	Y4	Y5	Y6	Y7	C2	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17	

L	N	⊕	NC	S/S	X0	X1	X2	X3	X4	X5	X6	X7	X10	X11	X12	X13	X14	X15	X16	X17	
<b>DVP32XP2-T (16DI/16DO)</b>																					
+24V	24G	UP	ZP0	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	ZP1	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17	