



DVP-EH

High-speed, Multi-function, Multiple Peripherals PLC Instruction Sheet

1

WARNING



This Installation Sheet only provides descriptions for electrical specifications, function specifications, installation & wiring, troubleshooting and peripherals. Other detail information about programming and instructions, please see PLC Application Manual. For more information about the optional peripherals, please see their individual instructions.



This is an OPEN TYPE PLC. The PLC should be kept in an enclosure away from airborne dust, high humidity, electric shock risk and vibration. Also, it is equipped with protective methods such as some special tools or keys to open the enclosure, in order to prevent the hazard to users and damage the PLC.



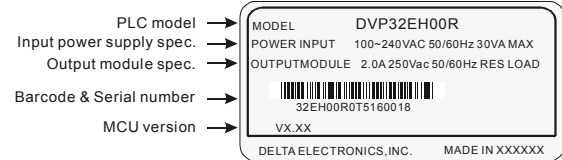
Do NOT connect the AC main circuit power supply to any of the input/output terminals, or it may damage the PLC. Check all the wiring prior to power up. To prevent any electromagnetic noise, make sure the PLC is properly grounded (⚡).

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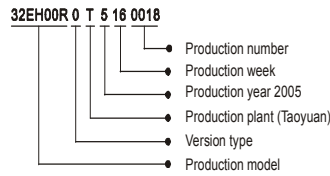
INTRODUCTION

2.1 Model Name Explanation and Peripherals

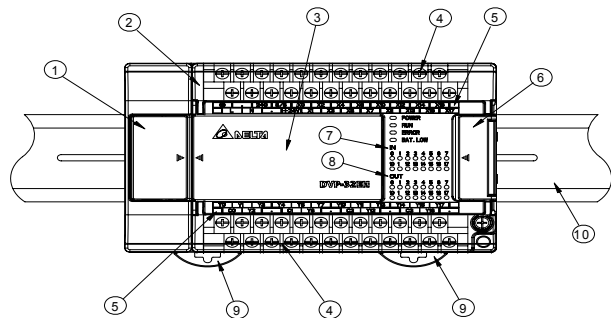
Nameplate Explanation



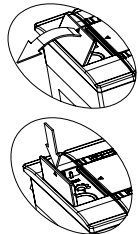
Model/Serial Number Explanation



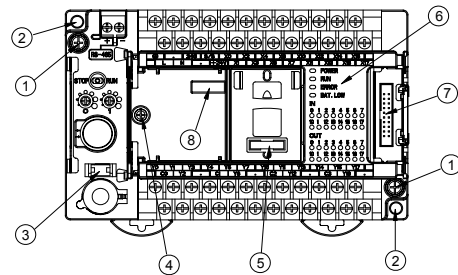
2.2 Product Profile and Outline



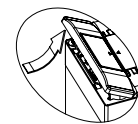
COM1 Cover open



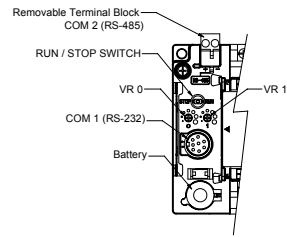
1 Communication Ports Cover	6 Extension Port Cover
2 I/O terminal cover	7 Input indicators
3 Function Card/Memory Card Cover	8 Output indicators
4 I/O terminals	9 DIN rail clip
5 I/O terminal numbers	10 DIN rail (35mm)



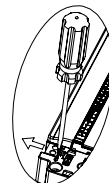
COM2 Cover open



1 Mounting screws	5 Memory Card Port
2 Direct mounting holes	6 Status indicators: POWER, RUN, ERROR and BAT. LOW
3 Battery socket	7 Extension Port
4 Function card mounting hole	



RS-485 Terminal Removal



Location	Explanation
COM2 (RS-485)	Master/Slave dual mode
RUN/STOP Switch	PLC RUN/STOP control
VR0	M1178 START/D1178 corresponding value
VR1	M1179 START/D1179 corresponding value
COM1 (RS-232)	For Slave mode
Battery	Please change the battery within 3 minutes.

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Function Specification

Model	16EH00	20EH00	32EH00	32EH00M	40EH00	48EH00	64EH00	80EH00
Power Supply	100~240VAC (-15%~10%), 50/60Hz ± 5%							
Fuse Capacity	2 A / 250VAC							
Power Consumption	50VA	50 VA	60 VA	60VA	60 VA	60 VA	80 VA	80 VA
DC24V Current Supply	500 mA	500 mA	500 mA	500mA	500 mA	500 mA	500 mA	500 mA
Power Protection	DC24V output short circuit							
Withstand Voltage	1500VAC(Primary-secondary), 1500VAC(Primary-PE), 500VAC(Secondary-PE)							
Insulation Resistance	Over 5 MΩ (between all inputs/outputs and earth at 500VDC)							
Noise Immunity	ESD: 8KV Air Discharge, EFT: Power Line: 2KV, Digital I/O: 1KV, Analog & Communication I/O: 250V Damped-Oscillatory Wave: Power Line: 1KV, Digital I/O: 1KV, RS: 26MHz~1GHz, 10V/m							
Grounding	The diameter of grounding wire cannot be smaller than the wire diameter of terminals L and N (all DVP units should be grounded directly to the ground pole)							
Operation/Storage	Operation: 0℃~55℃ (Temperature), 50~95% (Humidity), Pollution degree: 2; Storage: -40℃~70℃(Temperature), 5~95% (Humidity)							
Vibration/Shock Immunity	International standard: IEC1131-2, IEC 68-2-6(TEST Fc) / IEC1131-2 & IEC 68-2-27 (TEST Ea)							
Weight (g)	500/480	520/500	652/612	644	710/675	748/688	836/756	948/848

Input Specification

Spec. Items		Line Driver Input 5VDC two inputs	24VDC Single Common Input		Remark
			Low Speed	High Speed 200KHz	
Input Wiring Type		Independent	Change wiring from S/S to SINK or SOURCE		1.Line driver input is only for DVP32EH00M, X0, X1, X4, and X5 only. 2.DVP32EH00M is equipped with high-speed inputs, X0, X1, X4, and X5 only.
Input Indicator		LED display, light up for 'ON', light off for 'OFF'			
Input Voltage		5VDC $\pm$ 10%	24VDC $\pm$ 10%		
Active Level	Off→On	>5mA	16VDC $\pm$ 10%		
	On→Off	<2mA	12VDC $\pm$ 10%		
Response Time / Noise Immunity		0.5us	10 ms	0.5us	Inputs X0~X7, X10~X17 10~60 ms digital pulse filter adjustment

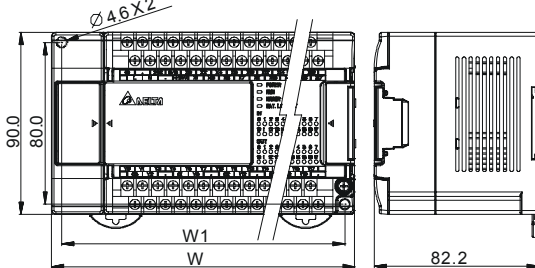
Output Specification

Spec.	Two Line Driver Outputs	Single Common Transistor Output		Single Common Relay Output ON/OFF load control
		Low Speed 10KHz	High Speed 200KHz	
Max. Frequency	200KHz	10KHz	200KHz	
Output Indicator	LED display, light up for 'ON', light off for 'OFF'			
Min. Load	-			2mA/DC
Voltage	5VDC ±10%	5~30VDC		<250VAC, 30VDC
Insulation Method	Line Driver	Photocouple		Magnetic
Current Specification	Under 25mA	0.3A/1 point @ 40℃	30mA	2A/1 point (5A/COM) 75 VA (Conductive), 90 W (Resistive)
Time for Max. delay	Off→On	20us	0.2us	10ms
	On→Off	30us		
Overcurrent Protection	N/A			

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INSTALLATION & WIRING

4.1 Dimensions & Weights



Model	W (mm)	W1 (mm)
DVP16EH00R/T	113	103
DVP20EH00R/T	113	103
DVP32EH00R/T	143.5	133.5
DVP32EH00M	158.8	153.8
DVP40EH00R/T	158.8	153.8
DVP48EH00R/T	174	164
DVP64EH00R/T	212	202
DVP80EH00R/T	276	266

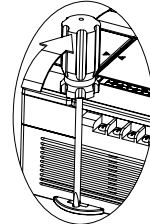
4.2 Wiring Terminal

16EH		32EH Relay	
20EH		32EH Transistor	
32EH Mixed			
40EH			
48EH			
64EH			
80EH			

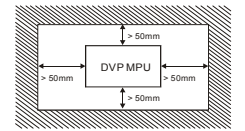
4.3 DIN Rail Installation

The DVP-PLC can be secured to a cabinet by using the DIN rail that is 35mm high with a depth of 7.5mm. When mounting the PLC on the DIN rail, be sure to use the end bracket to stop any side-to-side motion of the PLC, thus to reduce the chance of the wires being pulled loose. On the bottom of the PLC has a small retaining clip. To secure the PLC to the DIN rail, place it onto the rail and gently push up on the clip. To remove it, pull down on the retaining clip and gently pull the PLC away from the DIN rail. Please see the figure on the right:

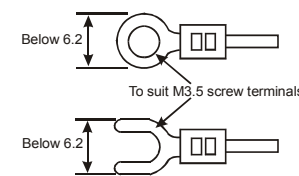
Direct mounting: Use the specified dimensions and install with M4 screws.



For heat dissipation. Make sure to provide a minimum clearance of 50mm between the unit and all sides of the cabinet. (as shown below)



4.4 Wiring



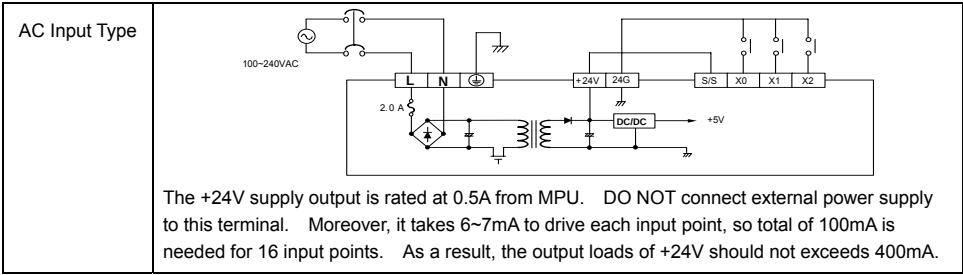
Notes:

- Please use O-type or Y-type terminals for I/O wiring terminals. The specification for the terminals is as shown on the left. PLC terminal screws should be tightened to between 5~8 kg-cm (4.3~6.9 in-lbs). Use copper conductor only, 60/75 ℃.
- DO NOT wire to the No Function terminals.
- I/O signal wires or power supply should not run through the same multi-wire cable or conduit.

4.5 Power Input Wiring

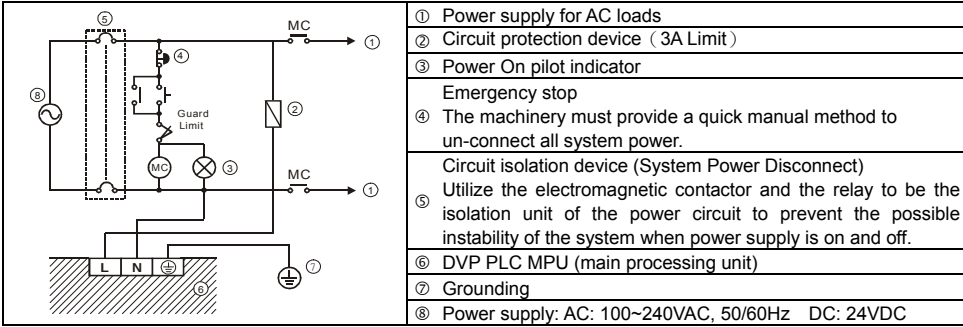
The power for DVP-EH is AC input, please be aware of the following cautions:

- Connect the AC input (100VAC ~ 240VAC) to terminals L and N. Any AC110V or AC220V connected to the +24V terminal or input points will permanently damage the PLC.
- The AC power inputs for the MPU and the I/O Extension Unit should be On or Off at the same time.
- Please use wires of 1.6mm or above for the MPU ground.
- If the power-cut time is less than 10ms, it will not affect PLC operation. If the power-cut time is too long or the power voltage drops, the PLC will stop operation and all the outputs will be Off. Once the power is restored, the PLC will resume operation automatically. (There are latched auxiliary relays and transistors inside of the PLC, please be aware when programming.)



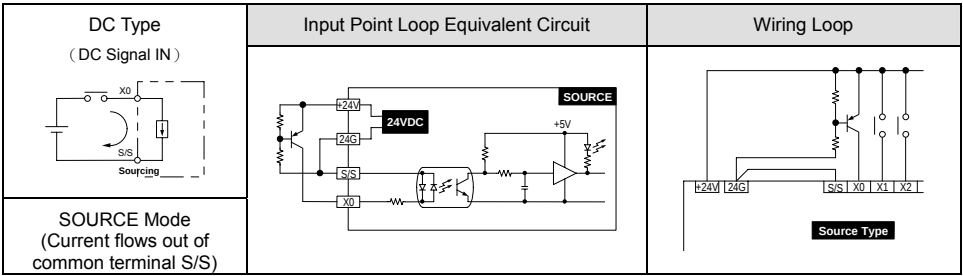
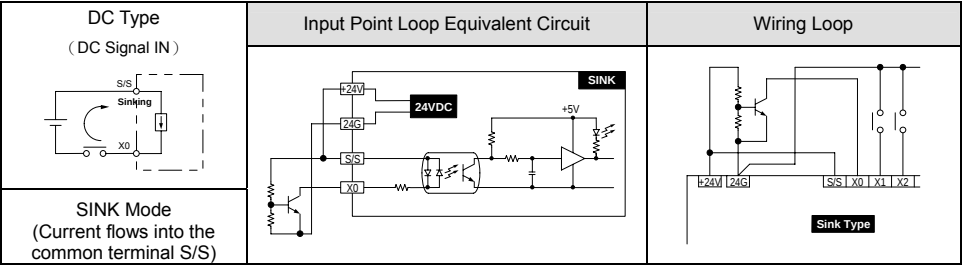
4.6 Safety Wiring

Since the PLC is in control of numerous devices, motion of either one device could affect the motion of other devices, therefore the breakdown of either one device would consequently be detrimental to the whole auto control system, and danger will thus be resulted. Please use the recommended wiring below for the power input:



4.7 Input Point Wiring

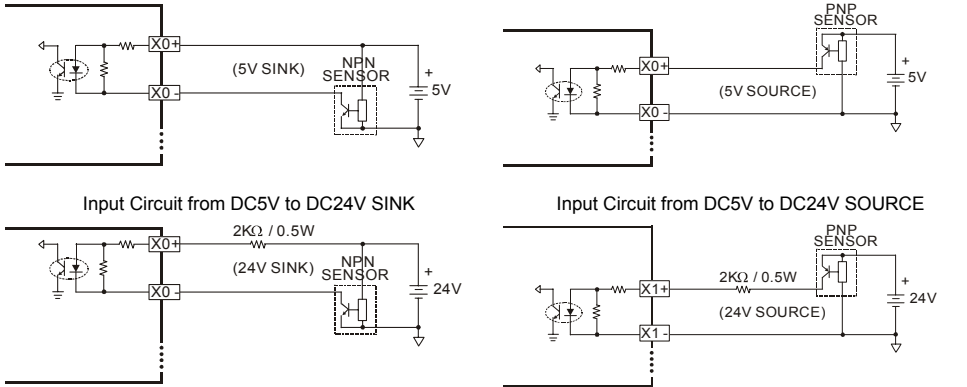
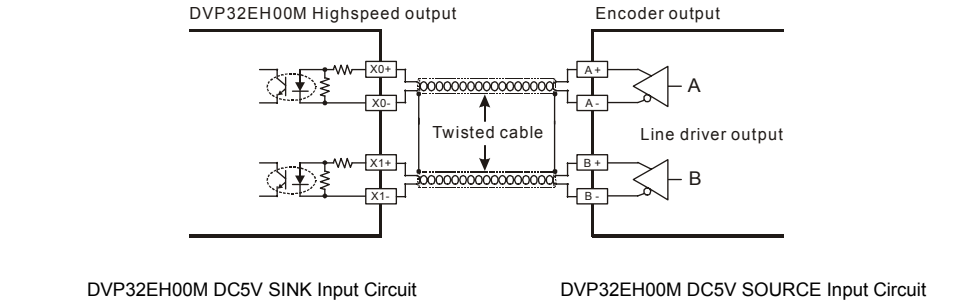
The input signal of the input point is the DC power DC input. Two types of DC source: SINK and SOURCE, defined as follows:



4.8 Line Driver Inputs Wiring

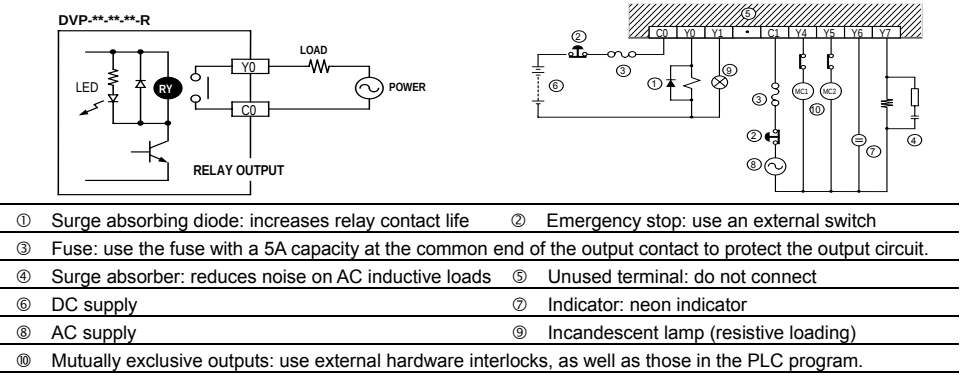
X0~X1 and X4~X5 are DC5V high-speed input circuit (the others are DC24V input) of DVP32EH00M. The high-speed input can be up to 200kHz, which is mainly used for Line Driver output, but in the environment with low interference and frequency (under 50kHz), it is feasible to use single DC5V SINK/SOURCE input or connect a 2KΩ/0.5W resistor in serial to become DC24V SINK/SOURCE input.

4.9 Line Driver Inputs Wiring Diagram (for high-speed and serious interference)



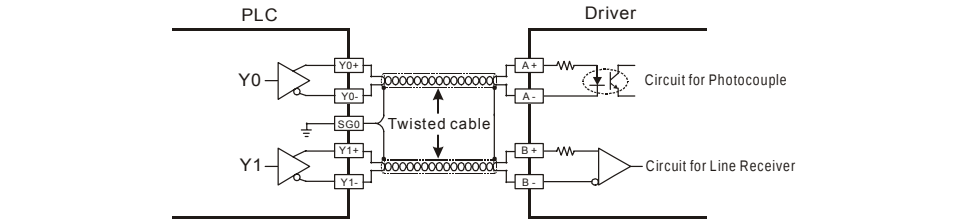
4.10 Output Point Wiring

There are two types of output modules for the DVP Series PLC: Relay (R) or Transistor (T).



- ① Surge absorbing diode: increases relay contact life
- ② Emergency stop: use an external switch
- ③ Fuse: use the fuse with a 5A capacity at the common end of the output contact to protect the output circuit.
- ④ Surge absorber: reduces noise on AC inductive loads
- ⑤ Unused terminal: do not connect
- ⑥ DC supply
- ⑦ Indicator: neon indicator
- ⑧ AC supply
- ⑨ Incandescent lamp (resistive loading)
- ⑩ Mutually exclusive outputs: use external hardware interlocks, as well as those in the PLC program.

4.11 Line Driver Outputs Wiring Diagram



5 TRIAL RUN

- ✧ Power Indication
- The “POWER” LED at the front of the MPU or the Extension Units will be lit if the power is on. If the indicator is not on when the MPU is powered up, it means that the 24V DC power supply of the PLC is overloaded. It is thus necessary to remove the wiring on terminals +24V and 24G, and to use a 24VDC power supply instead. If the ERROR LED is blinking swiftly, it suggests that the +24V power supply of the PLC is insufficient.
- ✧ Low Voltage Indication
- The “LOW V.” LED on the Extension Unit is an indication that the input power voltage is not enough, thus all outputs of the extension unit should be turned off.
- ✧ Low Battery Voltage Indication
- There is also a “BAT.LOW” LED at the front of the MPU. When the LED is on, it indicates that the battery voltage is not enough. Please change the battery as soon as possible (within 3 minutes); otherwise the user programs and the data in the latched area may be lost.
- ✧ Preparation
1. Prior to applying power, please verify that the power lines and the input/output wiring are correct. Please

- DO NOT** supply AC110V or AC220V to the I/O terminals, or it might short-circuit the wiring and would cause direct damage to the PLC.
2. After using the peripheral devices to write the program into the MPU and that the ERROR LED of the MPU is not on, it means that the program in use is legitimate, and it is now waiting for the user to give the RUN command.
 3. Use HPP to execute the forced On/Off test of the output contact.

✧ Operation & Test

If the ERROR LED of the MPU is not blinking, use RUN/STOP switch or the peripheral device (HPP or WPLSoft) to give the RUN command, and the RUN indicator will then be on. If the “RUN” LED is not on, it indicates that there is no program inside the PLC.

HPP could be utilized to monitor the settings and the registered values of the timer (T), the counter (C) and the data register (D) during operation, and moreover, to force the output contacts to conduct the On/Off action. If the ERROR LED is on (but not blinking), it means that the setting of the user’s program has exceeded the preset time-out limit, thus users have to double check the program and perform the On/Off function again. (The PLC is at this moment back to STOP automatically)

✧ PLC Input/Output Reaction Time

The total reaction time from the input signal to the output operation is calculated as follows:

Reaction Time = input delay time + program scan time + output delay time

Input delay time	10ms (default), 0~60 ms adjustable. Please refer to the usage of special registers D1020~1021.
Program scan time	Please refer to the usage of special register D1010.
Output delay time	Relay module: 10ms. Transistor module: 20~30us.

6 TROUBLESHOOTING

- Judge the errors by the indicators on the front panel. When errors occurred on DVP PLC, please check:
- ✧ “POWER” LED
- The “POWER” LED at the front of the MPU will be lit (in green) if the power is on. If the indicator is not on when the MPU is powered up, please remove the wiring on terminals +24V. Once the indicator lights after this, it means that the 24V DC power supply of the PLC is overloaded. Please do not use the DC power supply from the +24V terminals, but use a DC24V power supply instead. If the ERROR LED is blinking swiftly, it suggests that the +24V power supply of the PLC is not enough. If the indicator is not on when the MPU is powered up and with the input power being normal, it is an indication that the PLC is out of order. Please have this machine replaced or directly contact the dealer for repair.
- ✧ PLC “RUN” LED
- Identify the status of the PLC. When the PLC is in operation, this light will be on, and users could thus use HPP or the editing program of the ladder diagram to give commands to make the PLC “STOP” or use RUN/STOP switch to make the PLC “STOP”.

✧ “ERROR” LED

If incorrect programs are loaded to the MPU, or that the commands and the components exceed the allowable range, the indicator will blink. At this moment, the user should check both the error codes saved in the MPU data register D1004 and the Error Code Table below to correct the programs. The address that the error occurs will be stored in data register D1137. After the error is found and the program is revised, send the revised version to the MPU. If not being able to be connected with the PLC, and that the LED is blinking swiftly, it is an indication that the 24VDC power supply is not enough. Please check whether the power supply of 24VDC is normal or not. When the ERROR LED is on (not blinking), users should make a judgment from the special relay M1008 of the MPU. If it is On, it indicates that the execution time of the program loop has exceeded the time-out setting (set by D1000). Please turn the PLC RUN/STOP switch to STOP, and find out the address of the time-out program by special data register D1008. “WDT” command can be used to solve the problem.

✧ “BAT.LOW” LED

When the battery voltage is low, the “BAT.LOW” LED will be on, and the battery should be replaced as soon as possible; otherwise the user program and the data in latched area will lose. (For the unplugged PLC, please change battery within 3 minutes to retain the PLC’s internal user programs and data). Choose lithium battery TDRTL-2150/S. Please refer to the following table for battery life information.

Battery life :

Temperature(°C)	0	25	50	70
Life(Years)	9	8	6	5

Precision of calendar timer :

At 0°C/32°F, less than –117 seconds error per month.

At 25°C/77°F, less than 52 seconds error per month.

At 55°C/131°F, less than –132 seconds error per month.

- ✧ “Input” LED
- The On/Off signals of the input point could be displayed through the “Input” LED, or the status of the input point could be monitored through the device monitoring function of HPP. As long as the motion of the input point is valid, the LED is on. Therefore, if errors are detected, use HPP, the LED and the input signal circuits to check whether the status is normal.
- ✧ “Output” LED
- Output LED indicates if the output signals are On or Off. Please check the following items when the LED On/Off indication does not correspond to the commands: 1. Output contacts may be melted and stuck together due to a short circuit or current overload. 2. Check wiring and verify that the screws are tight.