2006-10-24

5011650900-H2E0

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

DVP-EH2

High-Speed, Multi-Functional Programmable Logic Controller

Instruction Sheet

Warning

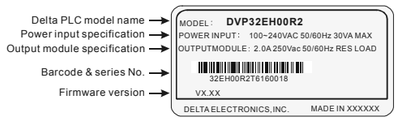
- ✓ *This instruction sheet only provides introductory information on electrical specification, functions, wiring, trouble-shooting and peripherals. For detailed information on programming and instructions, please refer to "DVP-PLC Application Manual: Programming". For how to purchase its peripheral devices, please refers to the manual enclosed with the product.*
- ✓ *DVP-EH2 is an OPEN-TYPE device 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 opening the enclosure) in case danger and damage on the device may occur.*
- ✓ *DO NOT connect 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 and Do NOT tough any terminal when the power is switched on. Make sure the groud terminal ⏚ is correctly grounded in order to prevent electromagnetic interference.*

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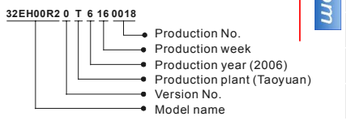
❶ Introduction

1.1 Model Explanation & Peripherals

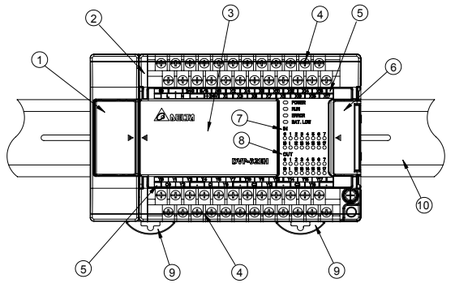
❖ **Nameplate Explanation**



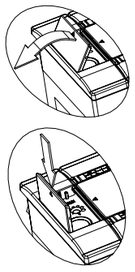
❖ **Model/Serial No. Explanation**



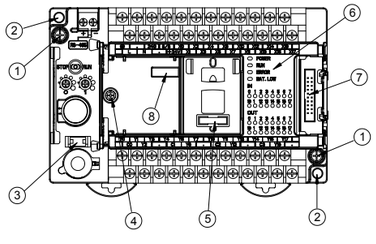
1.2 Product Profile & Outline



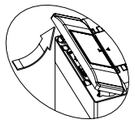
Open COM1 cover



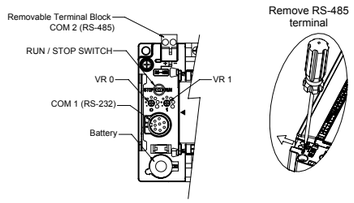
① Communication port cover	⑥ Extension module connection port cover
② I/O terminal cover	⑦ Input indicator
③ Function card/memory card cover	⑧ Output indicator
④ I/O terminals	⑨ DIN rail clip
⑤ I/O terminal No.	⑩ DIN rail (35mm)



Open COM2 cover

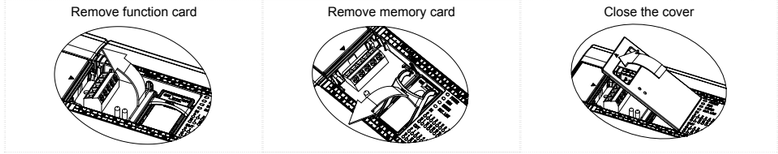


① Mounting screw	⑤ Memory card port
② Direct mounting hole	⑥ POWER/RUN/BAT.LOW/ERROR indicator
③ Battery socket	⑦ Extension module connection port
④ Function card mounting hole	



Part	Description
COM2 (RS-485)	For both master & slave modes
RUN/STOP switch	PLC RUN/STOP control
VR0	Enable M1178/corresponding value of D1178
VR1	Enable M1179/corresponding value of D1179
COM1 (RS-232)	For slave mode
Battery	Shall be changed within 1 min.

1.3 Installation of function card/memory card (optional accessories)



For details, see the instruction sheets of these accessories.

❷ Electrical Specifications

Item \ Model	16EH00□2	20EH00□2	32EH00□2	40EH00□2	48EH00□2	64EH00□2	80EH00□2
Power supply voltage	100 ~240VAC (-15% ~ 10%); 50/60Hz ± 5%						
Fuse capacity	2A/250VAC						
Power consumption	50VA	50VA	60VA	60VA	60VA	80VA	80VA
DC24V current supply	500mA	500mA	500mA	500mA	500mA	500mA	500mA
Power protection	DC24V; output short-circuited						
Withstand voltage	1500VAC (Primary-Secondary); 1500VAC (Primary-PE); 500VAC (Secondary-PE)						
Insulation resistance	＞5 MΩ (all I/O point-to-ground: 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						
Earth	The diameter of grounding wire shall not be less than that of L, N terminal of the power. (When many PLCs are in use at the same time, please make sure every PLC is properly grounded.)						
Operation/storage	Operation: 0ºC ~ 55ºC (temperature); 50 ~ 95% (humidity); pollution degree 2 Storage: -40 ºC ~ 70 ºC (temperature); 5 ~ 95% (humidity)						
Vibration/shock immunity	International standards: IEC1131-2, IEC 68-2-6 (TEST Fc)/IEC1131-2 & IEC 68-2-27 (TEST Ea)						
Weight (g)	500/480	520/500	652/612	710/675	748/688	836/756	948/848

❖ **Input point specifications**

Items \ Spec.		24VDC single common port input		Note
		Low speed	High speed (200KHz)	
Input wiring type		Change wiring from S/S to SINK or SOURCE		Input point X0 ~ X7, X10 ~ X17 can conduct 10 ~ 60ms digital filter adjustment
Input indicator		LED display; light on = ON, light off = OFF		
Input voltage		24VDC ± 10%		
Active Level	Off→On	16VDC ± 10%		
	On→Off	12VDC ± 10%		
Response Time / Noise Immunity		10 ms	0.5us	

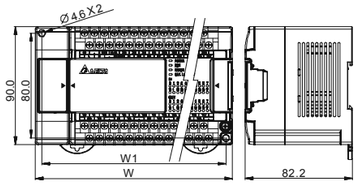
❖ **Output point specifications**

Items \ Spec.		Single common port transistor output		Single common port relay output
		Low speed	High speed*	
Max. frequency		10KHz	200KHz	Load ON/OFF control
Output indicator		LED display; light on = ON, light off = OFF		
Min. load		-		2mA/DC power supply
Working voltage		5 ~ 30VDC		＜250VAC, 30VDC
Insulation		Photocoupler isolation		Magnetic isolation
Current specification		0.3A/1 point @ 40ºC	<1KHz, 0.3A/1 point @ 40°C ≧1KHz, 30mA/1 point @ 40°C	2A/1 point (5A/COM) 75 VA (conductive), 90W (resistive)
Max. output delay time	Off→On	20us	0.2us	10ms
	On→Off	30us		
Over-current protection		N/A		
Mechanical life		N/A		2×10^7 times (without load)
Electrical life		N/A		1.5×10^5 times (5A 30VDC); 5×10^5 times (3A 120VAC); 3×10^4 times (5A 250VAC)

**High-speed output points (Y0, Y2) are only in DVP20EH2 and DVP32EH2; high-speed output points (Y0, Y1, Y2, Y3, Y4, Y6) are only in DVP40EH2.*

❸ Installation & Wiring

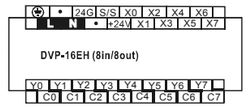
3.1 Dimension



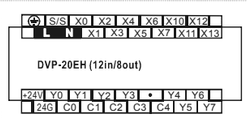
Model	W (mm)	W1 (mm)
DVP16EH00R2/T2	113	103
DVP20EH00R2/T2	113	103
DVP32EH00R2/T2	143.5	133.5
DVP40EH00R2/T2	158.8	153.8
DVP48EH00R2/T2	174	164
DVP64EH00R2/T2	212	202
DVP80EH00R2/T2	276	266

3.2 Wiring terminals

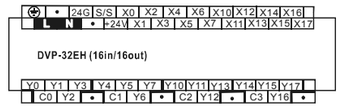
16EH2



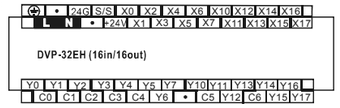
20EH2



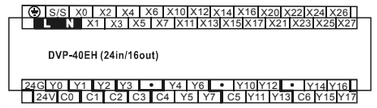
32EH2 *Relay*



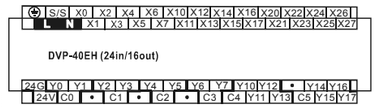
32EH2 *Transistor*



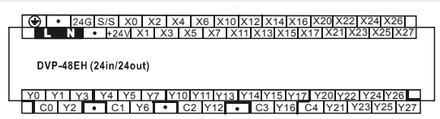
40EH2 *Relay*



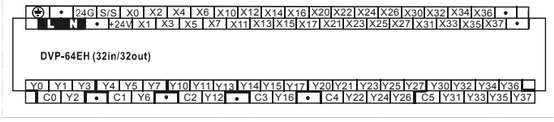
40EH2 *Transistor*



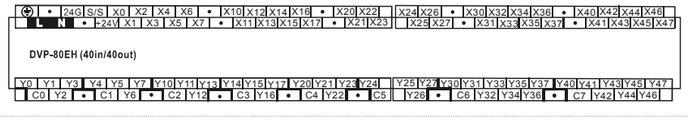
48EH2



64EH2



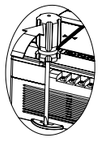
80EH2



3.3 Installation

❖ **How to install DIN rail**

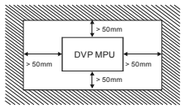
DVP-PLC can be secured to a cabinet by using the DIN rail of 35mm in height and 7.5mm in depth. When mounting PLC to DIN rail, be sure to use the end bracket to stop any side-to-side movement of PLC and reduce the chance of wires being loosen. A small retaining clip is at the bottom of PLC. To secure PLC to DIN rail, place the clip onto the rail and gently push it up. To remove it, pull the retaining clip down and gently remove PLC from DIN rail, as shown in the figure.



❖ **How to screw**

Please use M4 screw according to the dimension of the product.

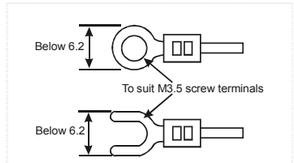
❖ Please install PLC in an enclosure with sufficient space around it to allow heat dissipation as shown in the figure.



3.4 Wiring

Please note that:

1. Use O-type or Y-type terminal. See the figure in the right for its specification. PLC terminal screws should be tightened to 5 ~ 8 kg-cm (4.3 ~ 6.9 in-lbs) and please use only 60/75 ºC copper conductor.
2. DO NOT wire empty terminal ⊡
3. DO NOT drop tiny metallic conductor into the PLC while screwing and wiring. Tear off the sticker on the heat dissipation hole for preventing alien substances from dropping in, to ensure normal heat dissipation of the PLC.

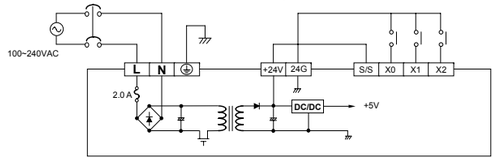


3.5 Power input wiring

The power input of DVP-EH2 series is AC. When operating the PLC, please make sure that:

1. The input voltage should be current and its range should be 100VAC ~ 240VAC. The power should be connected to L and N terminals. Wiring AC110V or AC220V to +24V terminal or input terminal will result in serious damage on the PLC.
2. The AC power input for PLC MPU and I/O extension modules should be ON or OFF at the same time.
3. Use wires of 1.6mm (or longer) for the grounding of PLC MPU.
4. The power shutdown of less than 10 ms will not affect the operation of the PLC. However, power shutdown time that is too long or the drop of power voltage will stop the operation 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.

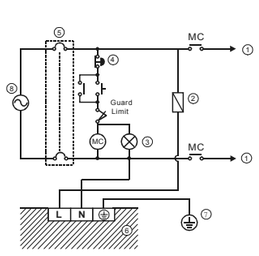
AC Power Input



0.5A is the maximum power supply for +24V power supply output terminal. DO NOT connect other external power supplies to this terminal. Every input terminal requires 6 ~ 7mA to be driven; e.g. the 16-point input will require approximately 100mA. Therefore, +24V cannot give output to external load that is more than 400mA.

3.6 Safety wiring

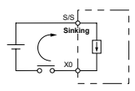
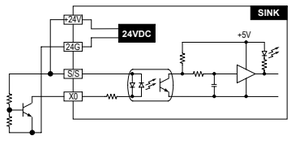
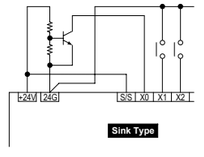
Since a PLC controls many devices, actions of any device may affect actions of other devices and the breakdown of any one device may cause the breakdown of the whole auto-control system and danger. Therefore, we suggest you wire a protection circuit at the power input terminal, as shown in the figure below.

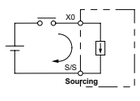
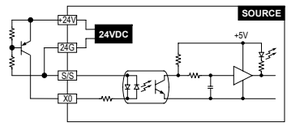
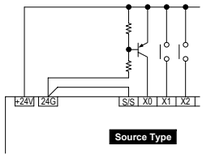


① AC power supply load
② Power circuit protection fuse (3A)
③ Power indicator
④ Emergency stop
This button can cut off the system power supply when accidental emergency takes place.
⑤ System circuit isolation device
The device is made of electromagnetic contactor and relay as the switch to prevent the instability of system when the power is intermittently supplied.
⑥ DVP-PLC (main processing unit)
⑦ Earth
⑧ Power supply
AC: 100 ~ 240VAC, 50/60Hz

3.7 Input point wiring

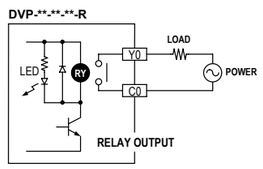
There are two types of DC inputs, SINK and SOURCE.

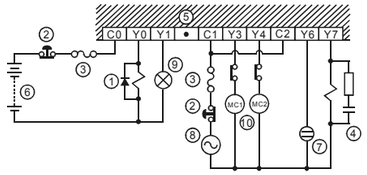
DC Signal IN	Input point loop equivalent circuit	Wiring loop
		
SINK mode (common port for current input S/S)		

DC Signal IN	Input point loop equivalent circuit	Wiring loop
		
SOURCE mode (common port for current output S/S)		

3.8 Output point wiring

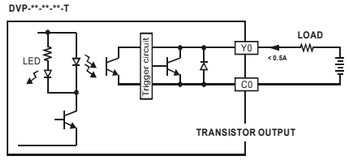
❖ **Relay (R) contact circuit wiring**

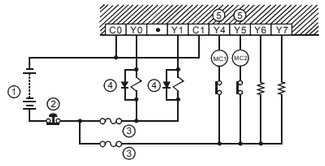




① Flywheel diode: To extend the life span of contact
② Emergency stop: Uses external switch
③ Fuse: Uses 5 ~ 10A fuse at the common port of output contacts to protect the output circuit.
④ Varistor: To reduce the interference on AC load
⑤ Empty terminal: not in use
⑥ DC power supply
⑦ Neon indicator
⑧ AC power supply
⑨ Incandescent light (resistive load)
⑩ Manually exclusive output: Uses external circuit and forms an interlock, together with the PLC internal program, to ensure safety protection in case of any unexpected errors.

❖ **Transistor (T) contact circuit wiring**





① DC power supply
② Emergency stop
③ Circuit protection fuse
④ Flywheel diode + inductive load
⑤ Manually exclusive output: Uses external circuit and forms an interlock, together with the PLC internal program, to ensure safety protection in case of any unexpected errors.

❹ Trial Operation

❖ **Power indication**

The “POWER” LED indicator on the front panel of PLC MPU (or extension module) will be on (in green) when the MPU is powered. That the MPU is powered but the indicator is not on indicates that the 24VDC power supply of the PLC is overloaded. You have to remove the wiring at terminal +24V and 24G and have another DC24V power supply ready. That the “ERROR” LED indicator flashes continuously indicates that the +24V power supply for the PLC is insufficient.

❖ **Low voltage indication**

That the “LOW.V” indicator on the front panel of the PLC extension module is on indicates that the input voltage is insufficient. All outputs of the module are disabled at this time.

❖ **Preparation**

1. Before powering DVP-EH2, be sure that you have checked if the I/O wiring is correct. You may damage the PLC if AC110V or AC220V is directly supplied to input terminals or the output wiring is short-circuited.
2. When the peripheral devices are used to write program into PLC: If the ERROR indicator does not flash, the program you are using is legal and PLC is waiting for RUN instruction from you.
3. You can use HPP to test “force On/Off” of output contacts.

❖ **Operation & test**

1. If the ERROR indicator does not flash, you can use RUN/STOP switch or peripheral device (HPP or WPLSoft) to give RUN instruction and the RUN indicator should be continuously on at this time. That the RUN indicator does not flash indicates PLC has no program in it.
2. When PLC is in operation, use HPP or WPLSoft to monitor the set value or temporarily saved value in the timer, counter, and register and force On/Off of output contacts. That the ERROR indicator is on (not flashes) indicates that part of the program exceeds the preset time-out. In this case, you have to check the program and set On/Off of the power again (PLC automatically returns to STOP status at this time).

❖ **I/O response time**

How to calculate the response time from the input signal to output operation of the PLC:

Response time = input delay time + program scan time (executed by the user) + output delay time

Input delay time	10ms (default); 0 ~ 60ms (adjustable). See the reference on how to use special register D1020 ~ D1021.
Program scan time	See the reference on how to use special register D1010.
Output delay time	Approx. 10ms for relay modules, 20 ~ 30us for transistor modules

❺ How to identify abnormality of PLC

To identify abnormality from the indicators on the panel, please check:

❖ **POWER indicator**

When PLC is powered, the POWER indicator on the front panel will be on (in green). If this indicator is not on when the PLC is powered, remove the wiring of +24V terminal. If this indicator turns on at this time, the +24V DC output is overloaded. In this case, DO NOT use DC power supply at +24V terminal and have another DC24V power supply ready. If this indicator turns off after the overload is eliminated, your PLC is malfunctioned. Send your PLC back to your distributor for repair.

❖ **RUN indicator**

Check your PLC status. When PLC is running, this indicator will be on. You can use HPP, the ladder diagram editing program or the switch on the panel to RUN or STOP PLC.

❖ **ERROR indicator**

1. If you enter illegal program into PLC or use instructions or devices that exceed their range, this indicator will flash (approx. every 1 sec.). When this happens, you have to obtain the error code from D1004 and save the address where the error occurs in register D1137 (if the error is a general circuit error, the address of D1137 will be invalid). Find out the cause of the error, amend the program and resend the program to PLC. If you cannot connect to PLC and this indicator keeps flashing quickly (approx. every 0.2 sec.), there should be insufficient 24VDC power supply. Please check if the 24VCD is overloaded.

   ❶ *For details of error codes (in D1004, hex coding), see “DVP-PLC Application Manual: Programming”*

2. If the ERROR indicator keeps flashing, you have to check the special relay M1008. M1008 is on indicates that the execution time of program loop exceeds the preset time-out (in D1000). In this case, turn the RUN/STOP switch to STOP, check the special register D1008 and obtain the location in the program where the time-out takes place. We suggest you use WDT instruction to correct this problem.

❖ **BAT.LOW indicator**

BAT.LOW indicator will be on when the battery is in low voltage. When this happens, change the battery as soon as possible in case your program and data saved in the latched area will be lost.

❶ *The changing of battery has to be completed within 1 minute when the PLC is not powered in order to save your procedures and data in the PLC.*

After the power is switched off, the data in the latched area are stored in SRAM memory and its power is supplied by the battery. Therefore, when the battery is in low voltage and the power-off has been lasted for more than 1 minute, the data in the latched area will be lost. If you need to permanently save the data in the latched area in the program and device D, refer to “Flash ROM permanently saved and recover mechanism” as stated below.

Permanently saved mechanism

You can use WPLSoft (Options -> PLC<=>Flash) to indicate whether to permanently store the data in the latched area in Flash ROM memory (new indicated data will replace all data previously saved in the memory).

Recover mechanism

If the battery is in low voltage (before the power is switched off when the BAT.LOW indicator is on) and the power is off for more than 1 minute, PLC will automatically restore the data in the latched area in the program and device D of Flash ROM into SRAM memory next time when it is re-powered.

Battery life:

Temperature (ºC)	0	25	50	70
Life (year)	9	8	6	5

❖ **Input indicator**

On/Off of input point is indicated by input indicator or monitored by HPP. When the action criteria of the input point are true, this indicator will be on. If abnormality is identified, check if the indicator and input circuit are normal.

❖ **Output indicator**

On/Off of output point is indicated by output indicator. When the output indicator (On/Off) does not correspond to the action of its load, please be aware of the follows:

1. The output contact may be melted or blocked out of overloading or short-circuited load, which will result in poor contact.
2. If you are suspicious that the output point may execute undesired action, check the output wiring circuit and whether the screw is properly tightened.

❖ **Accuracy (month/second) of RTC**

Temperature (°C/ºF)	0/32	25/77	55/131
Max. inaccuracy (second)	-117	52	-132

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