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

DVP-Slim **Digital I/O Extension Unit (Pin Headed)**

Instruction Sheet

Warning

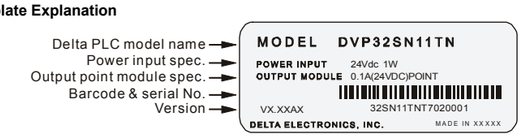
- ✓ *Please read this instruction sheet carefully before use.*
- ✓ *DVP-Slim is an OPEN-TYPE device and therefore should be installed in an enclosure free of airborne dust, humidity, electri shock and vibration. The enclosure should prevent non-maintenance staff from operating the device (e.g. key or specific tools are required to open 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. DO NOT touch any terminal when the power is switched on.*

❶ Introduction

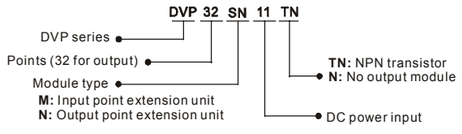
1.1 Model Explanation & Peripherals

Thank you for choosing Delta DVP-Slim series programmable logic controller. DVP-Slim series pin-headed digital I/O extension unit offers 32 points. For DVP-SS/SA/SX/SC series MPU, the maximum digital I/O extension points (including the MPU) can reach 128 points. For SV series MPU, the maximum digial I/O extension points (including the MPU) can reach 256 points. In addition, maximum 8 additional special modules (AD/DA/PT/TC/XA/PU) can be extended to DVP-Slim series extension unit.

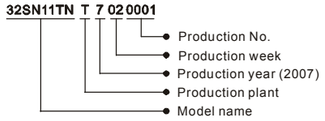
Nameplate Explanation



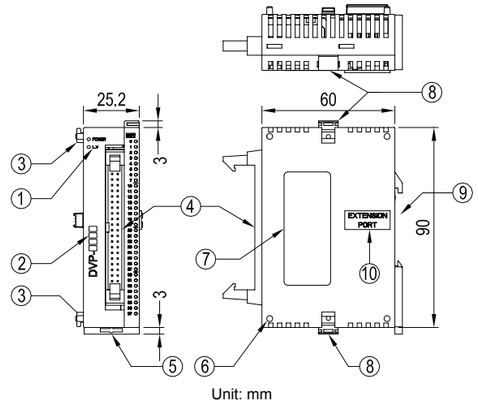
Model Name



Serial No.



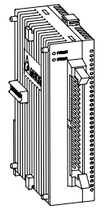
1.2 Product Profile



Unit: mm

①	POWER, L.V (low voltage) indicator	⑥	Extension unit positioning hole
②	Model name	⑦	Nameplate
③	Extension unit fixing clip	⑧	Extension unit fixing clip
④	I/O terminals	⑨	DIN rail (35mm)
⑤	DIN rail clip	⑩	Connection port for extension unit

1.3 Model Information

Model name	Power supply	Input Points	Input Type	Output Points	Output Type	Dimension (mm)			Outline
DVP32SM11N	24V DC	32	DC Type Sink/Source	0	N/A	25.2	90	60	
DVP32SN11TN		0	N/A	32	(NPN) Transistor				

❷ Specifications

2.1 Electrical Specifications

Item \ Model	DVP32SM11N	DVP32SN11TN
Power supply voltage	24V DC (-15% ~ 20%) (with DC input polarity reverse protection)	
Motion specification	Within 5ms of the momentary power loss, the device will keep on operating.	
Power consumption	1W	1.5W
Insulation resistance	＞5 MΩ (all I/O point-to-ground: 500V DC)	
Noise immunity	ESD (IEC 61131-2, IEC 61000-4-2): 8KV Air Discharge EFT (IEC 61131-2, IEC 61000-4-4): Power Line: 2KV, Digital I/O: 1KV, Analog & Communication I/O: 1KV Damped-Oscillatory Wave: Power Line: 1KV, Digital I/O: 1KV RS (IEC 61131-2, IEC 61000-4-3): 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 environment	Operation: 0ºC ~ 55ºC (temperature); 50 ~ 95% (humidity); pollution degree 2 Storage: -40ºC ~ 70ºC (temperature); 5 ~ 95% (humidity)	
Shock/vibration immunity	International standards: IEC1131-2, IEC 68-2-6 (TEST Fc)/IEC1131-2 & IEC 68-2-27 (TEST Ea)	
Weight (g)	70g	70g

2.2 I/O Point Specifications

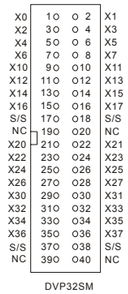
Input Point	
Input type	DC (SINK or SOURCE)
Input current	24VDC, 5mA
Active level	Off → On more than 16V DC On → Off less than 14.4V DC
Response time	Approx. 10ms, 0 ~ 15ms adjustable from D1020, D1021
Circuit isolation / operation instruction	By photocoupler / LED On

Output Point	
Output type	Transistor – T (NPN)
Current specification	0.1A/point
Voltage specification	5 ~ 24 VDC
Maximum load	55ºC/1A (COM), 25ºC/2.4A (COM)
Response time	Off → On less than 0.1ms On → Off less than 0.3ms

❸ Installation & Wiring

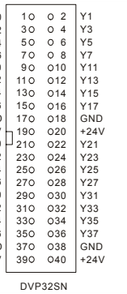
3.1 Terminals of Digital I/O Extension Unit

DVP32SM11N



DVP32SM

DVP32SN11TN

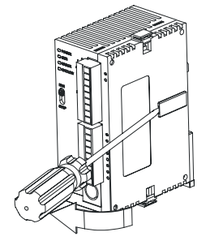


DVP32SN

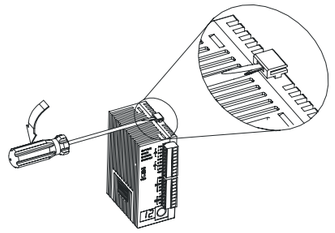
- DVP32SN currently only offers TN (NPN) transistor output.
- Please be aware of the following PIN wiring methods for DVP32SN to prevent burn-down of the extension unit.
  1. PIN19, PIN20, PIN39 and PIN40 can only connected to +24V DC. The 4 points have already been designed as short-circuit within the extension unit; therefore only 1 of the points needs to be wired.
  2. PIN17, PIN18, PIN37 and PIN38 can only connected to GND. The 4 points have already been designed as short-circuit within the extension unit; therefore only 1 of the points needs to be wired.

3.2 Connection

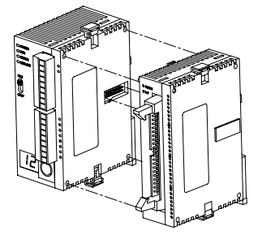
Step 1: Screw open the side cover of the extension unit and you will see the connection port.



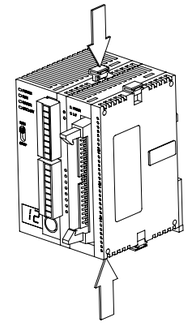
Step 2: Lift the fixing clip by the screwdriver.



Step 3: Adjust the positioning hole of the MPU and the extension unit and meet the connection port on the MPU with the extension unit to tightly connect the two.

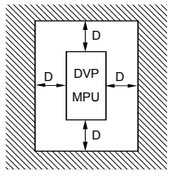


Step 4: Fasten the fixing clip on the extension unit to complete the connection.



3.3 Installation & Wiring

Install the PLC in an enclosure with sufficient space around it to allow heat dissipation as shown in the figure below.

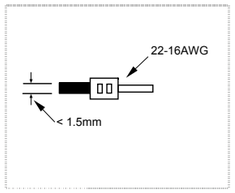


D > 50mm

■ **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.

■ **Wiring**



1. Use 22-16AWG (1.5mm) single or multiple core wire on I/O wiring terminals. The specification of the terminal is shown in the figure on the left. The PLC terminal screws shall be tightened to 1.95 kg-cm (1.7 in-lbs).
2. DO NOT place the I/O signal wires and power supply wire in the same wiring duct.
3. Use 60/75ºC copper wires only.

DO NOT install PLC in an environment with:

- *Dust, smoke, metallic debris, corrosive or flammable gas*
- *High temperature, humidity*
- *Direct shock and vibration*

3.4 Notes

■ **During the Engineering**

1. DO NOT drop tiny metallic conductor into the PLC when screwing and wiring.
2. There should be a margin of more than 50mm between the PLC and other control device and the PLC should be placed away from high voltage wire and power equipments.

■ **Arrangement of I/O Points**

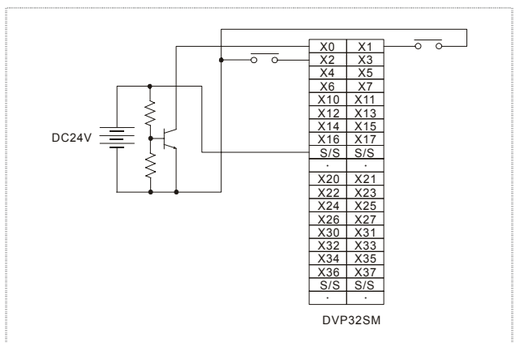
No matter the MPU with how many points you are using, the input point No. of the first connected extension unit has to start from X20 and output point No. from Y20. The connection of MPU and extension units is demonstrated in the figure below.

PLC	Model	Input points	Output points	Input point No.	Output point No.
MPU	SS/SA/SX/SC	8	4/6	X0 ~ X7	Y0 ~ Y5
EXT1	32SM11N	32	0	X20 ~ X57	-
EXT2	32SN11TN	0	32	-	Y20 ~ Y57
EXT3	32SN11TN	0	32	-	Y60 ~ Y77 Y100 ~ Y117
EXT4	32SM11N	32	0	X60 ~ X77 X100 ~ X117	-

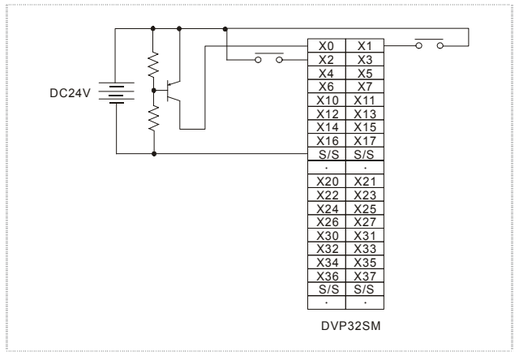
■ **Input Point Wiring and Specification**

The input signal is DC. There are 2 types of DC inputs, SINK and SOURCE. The wirings are as follows.

SINK

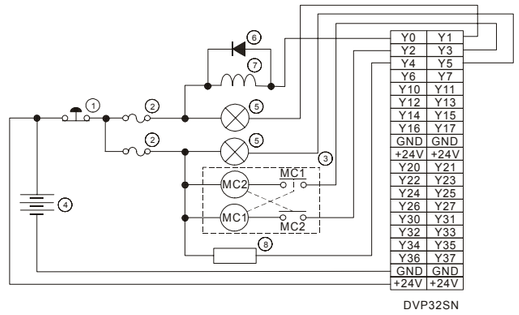


SOURCE



■ **Transistor Output Circuit Wiring**

NPN transistor output



①	Emergency stop	⑤	Incandescent light (resistive load)
②	Fuse	⑥	Reverse current protection diode (*2)
③	Manual exclusive output (*1)	⑦	Inductive load
④	DC power supply	⑧	Resistive load

**1: Manual 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.*

**2: Zener diode (39V) inside PLC protects the transistor output. When activating an inductive load, we suggest you parallely connect a reverse current protection diode.*

❹ Trail Operation

■ **POWER Indicator**

The "POWER" LED indicator on the front panel of PLC MPU or extension unit will be on (in green) when the MPU is powered. That the MPU is powered but the indicator is not on indicates that the DC power supply of the PLC is abnormal. Please check if the terminal wirings of +24V and 0V are correct. That the "ERROR" LED indicator flashes continuously indicates that the +24V power supply for the PLC is insufficient. That the "L.V" indicator on the extension unit is on indicates that the input voltage for the power of the extension unit is insufficient and all outputs from the extension unit will be disabled.

■ **Preparation**

Before powering, make 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. When the peripheral devices are used to write program into PLC and if the ERROR indicator does not flash, the program you are using is legal and PLC is waiting for RUN instruction from you. You can use HPP to test "force On/Off" of output contacts.

■ **Operation & Test**

If the ERROR indicator does not flash, you can give RUN instruction to the peripheral device and the RUN indicator should be continuously on at this time. When PLC is in operation, use HPP to monitor the set value or temporarily saved value in the timer (T), counter (C), and register (D) 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).

❺ How to identify abnormality of PLC

5.1 PLC Abnormality

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

■ **"POWER" Indicator**

When PLC is powered, the POWER LED indicator on the front panel will be on (in green). If the indicator is not on, check if the power supply is normal. If the problem still exists, your PLC is malfunctioned. Please change a new one or send your PLC back to your distributor for repair.

■ **"L.V" Indicator**

That the "L.V" indicator on the extension unit is on indicates that the input voltage for the power of the extension unit is insufficient and all outputs from the extension unit will be disabled.

■ **Input Indicator**

On/Off of input point is indicated by input indicator or by the monitoring function of the device. 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 by HPP/WPLSoft. Use of electronic switch with too much electricity leakage often results in unexpected actions of the input point.

■ **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.

5.2 Regular Check

DVP series PLC does not utilize any disposable components; therefore, you do not need to replace most of the components with new ones. However, if the output relay is used for activating big current load, the life of output contact will be shortened. In this case, you will need to check whether the contact is in permanently "open circuit" or "short circuit" and note that::

1. DO NOT place the PLC under direct sunlight and avoid placing it close to an over-heated object in case the high temperature will affect the functions of the PLC.
2. Clean the airborne dust or metallic particles in the panel on a regular basis.
3. Check regularly that if the wiring and terminals are tightened properly.

5.3 Suggestions for Operation

DVP series pin-headed digital extension unit is relatively more sensitive to the temperature in the operation environment; therefore, when using the unit, please note that:

1. The lift of I/O points will be shortened if the voltage and the temperature are too high in the external environment.
2. When the external voltage is larger than 24VDC, it is suggested that the output load current be reduced to below 0.1A.
3. To sum up, operate the unit in 55ºC/1A (COM), 25ºC/2.4A (COM); otherwise, the life of I/O points will be shortened.