DVP-SE

Instruction Sheet

安　裝　說　明

安　装　说　明

Network Type Advanced Slim PLC

網路型進階薄型主機

网络型进阶薄型主机

DVP-0360030-02
20240221

Smarter. Greener. Together.

▪ ENGLISH ▪

Thank you for choosing Delta DVP-SE. DVP-SE features both 12-point (8DI + 4DO) and 26-point (14DI + 12DO) in-built PLC MPUs, offering various instructions and with 16k steps program memory, able to connect to all DVP Slim type series extension modules and high-speed extension modules, including digital I/O (max. 480 I/O points) and analog modules (for A/D, D/A conversion and temperature measurement). 2 points of 100 kHz and 2 points of 10 kHz high-speed pulse output satisfy all kinds of applications. DVP-SE is small in size, and can be installed easily. Users do not have to install any batteries in DVP-SE series PLCs. The PLC programs and the latched data are stored in the high-speed flash memories.

EN ✓ DVP-SE is an OPEN-TYPE device. It should be installed in a control cabinet free of airborne dust, humidity, electric shock and vibration. To prevent non-maintenance staff from operating DVP-SE, or to prevent an accident from damaging DVP-SE, the control cabinet in which DVP-SE is installed should be equipped with a safeguard. For example, the control cabinet in which DVP-SE is installed can be unlocked with a special tool or key.

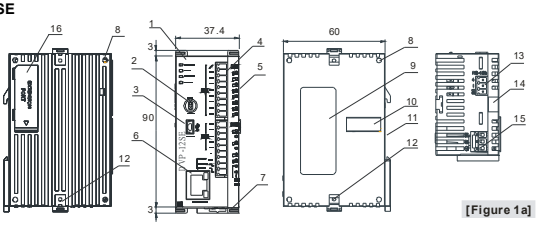
EN ✓ DO NOT connect AC power to any of I/O terminals, otherwise serious damage may occur. Please check all wiring again before DVP-SE is powered up. After DVP-SE is disconnected, Do NOT touch any terminals in a minute. Make sure that the ground terminal ⏚ on DVP-SE is correctly grounded in order to prevent electromagnetic interference.

FR ✓ DVP-SE est un module OUVERT. Il doit être installé que dans une enceinte protectrice (boitier, armoire, etc.) saine, dépourvue de poussière, d'humidité, de vibrations et hors d'atteinte des chocs électriques. La protection doit éviter que les personnes non habilitées à la maintenance puissent accéder à l'appareil (par exemple, une clé ou un outil doivent être nécessaire pour ouvrir a protection).

FR ✓ Ne pas appliquer la tension secteur sur les bornes d'entrées/Sorties, ou l'appareil DVP-SE pourra être endommagé. Merci de vérifier encore une fois le câblage avant la mise sous tension du DVP-SE. Lors de la déconnection de l'appareil, ne pas toucher les connecteurs dans la minute suivante. Vérifier que la terre est bien reliée au connecteur de terre ⏚ afin d'éviter toute interférence électromagnétique.

▪ Product Profiles

• 12SE

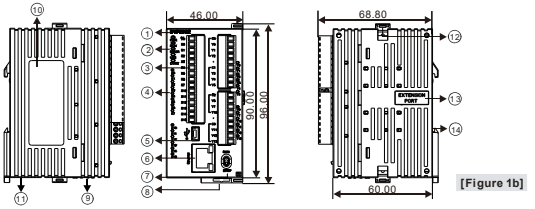


[Figure 1a]

Unit: mm

1. POWER, RUN, ERROR, COM1 indicator	9. Nameplate
2. RUN/STOP switch	10. Right-side extension port
3. COM1 port (Mini USB)	11. DIN rail mounting slot (35mm)
4. I/O terminals and COM3 comm. port (RS-485)	12. Extension unit clip
5. I/O point and COM2, COM3 indicator	13. COM2 communication port (RS-485)
6. Ethernet communication port	14. Mounting rail for extension module
7. DIN rail clip	15. DC power input
8. Mounting hole for extension module	16. Left-side module connection port

- **26SE**



[Figure 1b]

Unit: mm

1. Model name	8. DIN rail clip
2. POWER, RUN, ERROR, USB, COM2 indicator	9. RS-485 communication port
3. I/O terminals	10. Label
4. I/O indicator	11. DC power input
5. I/O port for program communication (Mini USB)	12. Extension unit clip
6. Ethernet communication port	13. Extension port
7. RUN/STOP switch	14. DIN rail mounting slot (35mm)

■ Electrical Specifications

Item \ DVP Model	12SE11R	12SE11T	26SE11R	26SE11T	26SE11S
Power supply voltage	24 VDC (-15 to 20%) (with counter-connection protection on the polarity of DC input power) DVPPS01/PS02: input 100 to 240 VAC, output 24 VDC/1A (PS02: 2A)				
Connector	European standard removable terminal block (Pin pitch: 3.5 mm)				
Operation	Maximum power loss time is 10 ms or less.				
Max inrush current	7.5 A@24 VDC, I^2t = 0.25 A^2S				
Fuse capacity	2.5 A/30 VDC, Polyswitch				
Power consumption	1.8 W	1.5 W	3W	1.8W	1.7W
Power protection	With counter-connection protection on the polarity of DC input power				
Insulation resistance	> 5 MΩ (all I/O point-to-ground: 500 VDC)				
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 RS (IEC 61131-2, IEC 61000-4-3): 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 to 55°C (temp.), 50 to 95% (humidity), Pollution degree 2 Storage: -25 to 70°C (temp.), 5 to 95% (humidity); incondensable.				
Vibration / shock resistance	International standards: IEC61131-2, IEC 68-2-6 (TEST Fc)/IEC61131-2 & IEC 68-2-27 (TEST Ea)				
Weight (g)	145g	135g	175g	135g	135g

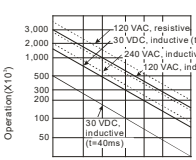
Item \ Model	24 VDC (-15 to 20%) single common port input		
	12SE / 26SE		26SE
Input No.	X0 ~ X2 (12SE) X0 ~ X3 (26SE)	X3 ~ X7 (12SE) X4 ~ X7 (26SE)	X10~X15
Input type	S/S connection (SINK or SOURCE)		

Item \ Model		24 VDC (-15 to 20%) single common port input		
		12SE / 26SE		26SE
Input current (±10%)		24 VDC · 5 mA		
Input impedance		4.7 kΩ		
Max. frequency		100 kHz	10 kHz	50Hz
Action level	Off → On	> 15 VDC		
	On → Off	< 5 VDC		
Response time / Noise reduction	Off → On	< 2.5 μs	< 20 μs	<10ms
	On → Off	< 5 μs	< 50 μs	<10ms
Filter time		X0~X7 : Adjustable within 0 ~ 20 ms by D1020 (Default: 10 ms) X10~X15 : Adjustable within 0 ~ 20 ms by D1021 (Default: 10 ms)		

Item \ Spec.		Output Points			
		Relay	Transistor (NPN & PNP)		
Output No.		Y0 ~ Y13	Y0, Y2	Y1, Y3	Y4~Y13
Max. frequency		1 Hz	100 kHz	10 kHz	1kHz#4
Working voltage		100~250 VAC, 5~30 VDC	5 ~ 30 VDC #1		
Leak current		–	<100uA		
Max. İnrush current		–	Transistor-T (Sink): 10 A Transistor-S (Source): 4 A (When Ta=25℃, VDS=30 VDC and inrush time=1ms)		
Max. load	Resistive	1.5 A /1point (5 A/COM)	0.5 A/1 point (4 A/COM)		
	Inductive	#2	15 W (30 VDC)		
	Lamp	20 WDC/100 WAC	2.5 W (30 VDC)		
Min. load		1mA / 5V	1mA/5V		
Response time	Off → On	Approx.10 ms	2 μs #3	20 μs #3	100μs #3
	On → Off		3 μs #3	30 μs #3	300μs #3

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

#2: Lives of relay contacts would vary according to operation voltage, types of load (cosø: power factor, t: time constant) and current flow at contacts. Refer to the below lifecycle graph for the estimated number of operations.

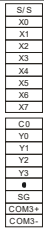
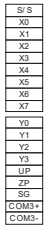
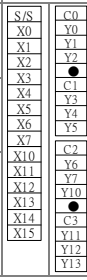
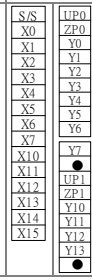


[Figure 2]

#3: Load = 0.5A

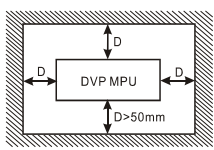
#4: Maximum output speed would be impacted by the actual PLC scan time.

■ I/O Configuration

Model	Input		Output		I/O Configuration	
	Point	Type	Point	Type	Relay	Transistor
DVP12SE11R	8	DC (Sink Or Source)	4	Relay		
DVP12SE11T				Transistor (NPN)		
DVP26SE11R	14		12	Relay		
DVP26SE11T				Transistor (NPN)		
DVP26SE11S				Transistor (PNP)		

■ Dimension & Installation

Please install the PLC in an enclosure with sufficient space around it to allow heat dissipation, See [Figure 3].

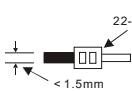


[Figure 3]

- **Direct Mounting:** 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 22-16AWG (1.5mm) single or multiple core wire on I/O wiring terminals. See the figure in the right hand side for its specification. PLC terminal screws should be tightened to 1.90 kg-cm (1.65 in-lbs) and please use only 60/75ºC copper conductor.



2. DO NOT wire empty terminal. DO NOT place the I/O signal cable in the same wiring circuit.
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.

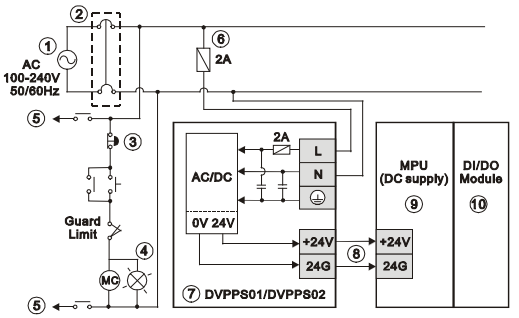
◆ Power Supply

The power input of DVP-SE is DC. When operating DVP-SE please note the following points:

1. The power is connected to two terminals, 24 VDC and 0 V, and the range of power is 20.4 to 28.8 VDC. If the power voltage is less than 17.5 VDC, the PLC will stop running, all outputs will go “Off”, and the ERROR indicator will start to blink continuously.
2. The power shutdown for less than 10ms will not affect the operation of the PLC. However, the 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 returns to normal status, the PLC will automatically resume the operation. (Please take care of the latched auxiliary relays and registers inside the PLC when doing the programming).

◆ Safety Wiring

Since DVP-SE is only compatible with DC power supply, Delta’s power supply modules (DVPPS01/DVPPS02) are the suitable power supplies for DVP-SE. We suggest you install the protection circuit at the power supply terminal to protect DVPPS01 or DVPPS02. See the figure below.



[Figure 4]

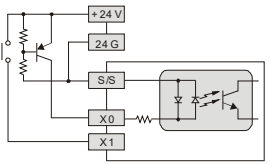
① AC power supply:100 ~ 240VAC, 50/60Hz	② Breaker
③ Emergency stop: This button cuts off the system power supply when accidental emergency takes place.	
④ Power indicator	⑤ AC power supply load
⑥ Power supply circuit protection fuse (2A)	⑦ DVPPS01/DVPPS02
⑧ DC power supply output: 24 VDC, 500 mA	⑨ DVP-PLC (main processing unit)
⑩ Digital I/O module	

◆ Input Point Wiring

There are 2 types of DC inputs, SINK and SOURCE. (See the example below. For detailed point configuration, please refer to the specification of each model.)

• DC Signal IN – SINK mode

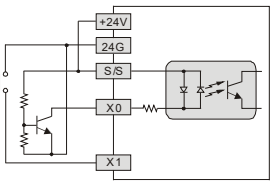
Input point loop equivalent circuit



[Figure 5]

• DC Signal IN – SOURCE mode

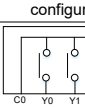
Input point loop equivalent circuit



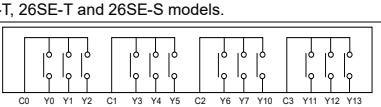
[Figure 6]

◆ Output Point Wiring

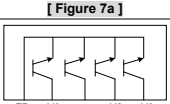
1. DVP-SE has three output modules on it, relay, transistor NPN and PNP. Be aware of the connection of shared terminals when wiring output terminals.
2. Relay output terminals, Y0 to Y3 of relay models use C0 common port. See [Figure 7a]. For the common port configuration of 26SE11R models, see [Figure 7b]. When the output points are enabled, their corresponding indicators on the front panel will be on.
3. Transistor output terminals, Y0 to Y3 of transistor (NPN) models use UP, ZP common port. Refer to [Figure 8a], [Figure 8b] and [Figure 8c] for the configuration of 12SE-T, 26SE-T and 26SE-S models.



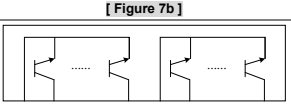
[Figure 7a]



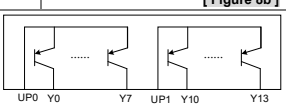
[Figure 7b]



[Figure 8a]



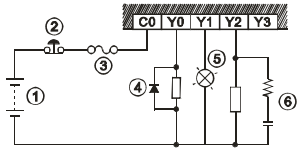
[Figure 8b]



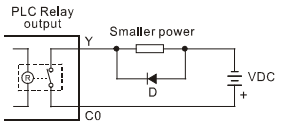
[Figure 8c]

4. Isolation circuit: The optical coupler is used to isolate signals between the circuit inside PLC and output modules.

- **Relay (R) output circuit wiring**

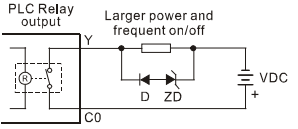


[Figure 9]



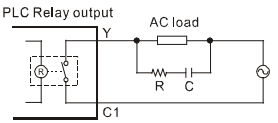
D: 1N4001 diode or equivalent component

[Figure 10a]



D: 1N4001 diode or equivalent component
ZD: 9V Zener, 5W

[Figure 10b]



R: 100~120Ω
C: 0.1~0.24uF

[Figure 11]

① DC power supply ② Emergency stop: Uses external switch

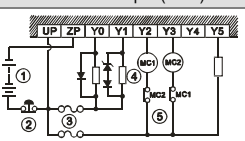
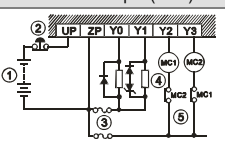
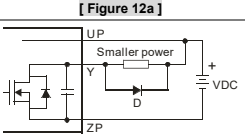
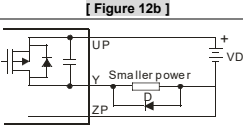
③ Fuse: 5 to10A fuse at the shared terminal of output contacts to protect the output circuit

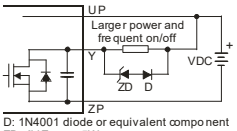
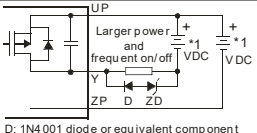
④ Transient voltage suppressor (SB360 3A 60V): Extends the life span of contact.
1. Diode suppression of DC load: Used when in smaller power [Figure 10a]
2. Diode + Zener suppression of DC load: Used when in larger power and frequent On/Off [Figure 10b]

⑤ Incandescent light (resistive load)

⑥ Absorber: Reduces the interference on AC load [Figure 11]

- **Transistor output circuit wiring**

Transistor output (NPN)	Transistor output (PNP)
	
[Figure 12a]	[Figure 12b]
	
D: 1N4001 diode or equivalent component	D: 1N4001 diode or equivalent component
[Figure 13a]	[Figure 13b]

Transistor output (NPN)	Transistor output (PNP)
 D: 1N4001 diode or equivalent component ZD: 9V Zener, 5W **[Figure 13c]**	 D: 1N4001 diode or equivalent component ZD: 9V Zener, 5W *1: We suggest using two isolated power supplies here. **[Figure 13d]**

① DC power supply ② Emergency stop ③ Circuit protection fuse

④ The output of the transistor model is “open collector”. If Y0/Y1 is set to pulse output, the output current has to be bigger than 0.1 A to ensure normal operation of the model.

1. Diode suppression: Used when in smaller power [Figure 13a] and [Figure 13b].
2. Diode + Zener suppression: Used when in larger power and frequent On/Off [Figure 13c] and [Figure 13d]. Please be noticed that it is suggested to use two isolated power supplies(*1) in [Figure 13d].

⑤ Manually exclusive output: For example, Y2 and Y3 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.

◆ RS-485 Wiring

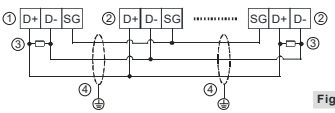


Figure 14

① Master node ② Slave node ③ Terminal resistor ④ Shielded cable

Note:

1. Terminal resistors are suggested to be connected to master and the last slave with resistor value of 120Ω.

2. To ensure communication quality, please apply double shielded twisted pair cable (20AWG) for wiring.

◆ Ethernet (RJ45) Wiring

Please use the twisted pair CAT-5e to connect the Ethernet RJ45 communication port.

① Tx+	⑤ N/C
② Tx-	⑥ Rx-
③ Rx+	⑦ N/C
④ N/C	⑧ N/C

Note: The DVP-SE series PLC is equipped with the Auto MDI/MDIX function. It does not need any jumper wire when it connects to the network device.

◆ Setting the Ethernet

The DVP-SE series PLC contains a built-in Ethernet communication port. Users have to set the network parameter before the PLC connects to other network devices. The default parameter setting values are 192.168.1.5 (the IP address) and 255.255.255.0 (the subnet mask). Users can set the parameter by using DCISoft, or by using the PLC program to write the values into the network control register (CR).

- Software: Start the DCIsoft, and connect the PC to the DVP-SE series PLC through the ehternet cable. Enter “Communication Setting” page in DCISoft, and choose “Ethernet” communication port. Then, click “Search” to search for the picture representing the DVP-SE series PLC. After users click the picture twice, the setting page appears. Finally, enter the related parameters, and click “Apply” to finish the setting.

- PLC program: Users use the instruction “To” to write the IP address (CR#88, 89) and the subnet mask (CR#90, 91). For example, when the IP address is 192.168.1.5, users write 192.168 (H’C0A8) into CR#89, and .1.5 into CR#88 (H’105).

Note: When users use the instruction “From/To” to read the data from the network control register and write the data into it, the module number is K108.

■ Precision of the RTC (Second/Month)

Temperature (°C/°F)	0/32	25/77	55/131
Maximum error (Second)	-117	52	-132

Duration in which the RTC is latched: Two weeks