



SV2 Series CPU:

Type	Device	Item	Range	Function		
Relay (bit)	X	External input relay	X0 ~ X377, 256 points, octal	Total 512 points	Corresponds to external input points	
	Y	External output relay	Y0 ~ Y377, 256 points, octal		Corresponds to external output points	
	M	Auxiliary relay	General purpose	M0 ~ M499, 500 points (*2)	Total 4,096 points	The contact can be On/Off in the program.
			Latched	M500 ~ M999, 500 points (*3) M2000 ~ M4095, 2,096 points (*3)		
			Special purpose	M1000 ~ M1999, 1,000 points (some are latched)		
	T	Timer	100ms	T0 ~ T199, 200 points (*2) T192 ~ T199 is for subroutine T250~T255, 6 accumulative points (*4)	Total 256 points	Timer indicated by TMR instruction. If timing reaches its target, the T contact of the same No. will be On.
			10ms	T200 ~ T239, 40 points (*2) T240 ~ T245, 6 accumulative points (*4)		
			1ms	T246 ~ T249, 4 accumulative points (*4)		
	C	Counter	16-bit counting up	C0 ~ C99, 100 points (*2) C100 ~ C199, 100 points (*3)	Total 253 points	Counter indicated by CNT (DCNT) instruction. If counting reaches its target, the C contact of the same No. will be On.
			32-bit counting up/down	C200 ~ C219, 20 points (*2) C220 ~ C234, 15 points (*3)		
32-bit high-speed counter			C235 ~ C244, 1-phase 1 input, 10 points (*3) C246 ~ C249, 1-phase 2 inputs, 4 points(*3) C251 ~ C254, 2-phases 2 inputs, 4 points (*3)			
S	Step	Initial step point	S0 ~ S9, 10 points (*2)	Total 1,024 points	Used for SFC.	
		Zero return	S10 ~ S19, 10 points (used with IST instruction) (*2)			
		General purpose	S20 ~ S499, 480 points (*2)			
		Latched	S500 ~ S899, 400 points (*3)			
		Alarm	S900 ~ S1023, 124 points (*3)			
Register (word data)	T	Present value of timer	T0 ~ T255, 256 points		When the timing reaches the target, the contact of the timer will be On.	
	C	Present value of counter	C0 ~ C199, 16-bit counter, 200 points C200 ~ C254, 32-bit counter, 53 points		When the counting reaches the target, the contact of the counter will be On.	
	D	Data register	General purpose	D0 ~ D199, 200 points, (*2)	Total 12,000 points	Memory area for data storage; E, F can be used for index indication.
			Latched	D200 ~ D999, 800 points (*3) D2000 ~ D9799, 7,800 points (*3) D10000 ~ D11999, 2,000 points (*3)		
			Special purpose	D1000 ~ D1999, 1,000 points		
			Right-side special module	D9900~D9999, 100 points (*3) (*6)		
			Left-side special modules	D9800~D9899, 100 points (*3) (*7)		
Index indication	E0 ~ E7, F0 ~ F7, 16 points (*1)					
N/A	File register	K0 ~ K9,999 (10,000 points) (*4) (*9)		Expanded register for data storage.		

Type	Device	Item	Range	Function	
Pointer	N	For master control loop	N0 ~ N7, 8 points	Control point for main control loop	
	P	For CJ, CALL instructions	P0~P255, 256 points	Position index for CJ and CALL	
	I	Interruption	External interruption (*5)	I00□(X0), I10□(X1), I20□(X2), I30□(X3), I40□(X4), I50□(X5), I60□(X6), I70□(X7), I90□(X10), I91□(X11), I92□(X12), I93□(X13), I94□(X14), I95□(X15), I96□(X16), I97□(X17), 16 points (□=1, rising-edge trigger  , □=0, falling-edge trigger )	Position index for interruption subroutine.
			Timed interruption	I6□□, I7□□, 2 points (□□=02~99ms) time base=1ms I8□□, 1 point (□□=05~99 · time base=0.1ms)	
			Interruption inserted when high-speed counter reaches target	I010, I020, I030, I040, I050, I060, 6 points	
Pulse interruption			I110, I120, I130, I140, 4 points		
		Communication interruption (*8)	I150, I151, I153, I160, I161, I163, I170, 7 points		
Constant	K	Decimal form	K-32,768 ~ K32,767 (16-bit operation) K-2,147,483,648 ~ K2,147,483,647 (32-bit operation)		
	H	Hexadecimal form	H0000 ~ HFFFF (16-bit operation) H00000000 ~ HFFFFFFF (32-bit operation)		

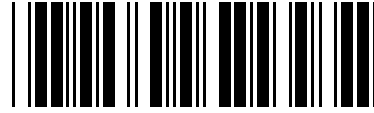
DVP Series	28SV2 (Note1)	28SV2 (Note2)	I/O Extension Unit (Note3)
Input X	X0 ~ X17 (16 points)	X0 ~ X11 (10 points)	X20 ~ X377
Output Y	Y0 ~ Y13 (12 points)	Y0 ~ Y13 (12 points)	Y20 ~ Y377

Note 1: The output type is transistor, among which CH0 (Y0, Y1), CH1 (Y2, Y3), CH2 (Y4) and CH3 (Y6) are high-speed transistor output (200kHz); others are normal transistor output (10kHz).

Note 2: The output type is transistor, among which CH0 (Y0, Y1), CH1 (Y2, Y3), CH2 (Y4) and CH3 (Y6) are high-speed transistor output (200kHz); others are normal transistor output (10kHz). And 2AI (12-bit) are analog input points.

Note 3: The input points on I/O extension units start from X20 and output points start from Y20. The calculation on the No. of I/O points is the same as that in SS series.

2014-04-30



5011669007-SV08

DVP-SV/SV2

Instruction Sheet

安 裝 說 明
安 裝 說 明

Compact, Multi-Functional, Multiple Instructions

微型·多功能·豐富指令集

微型·多功能·丰富指令集



Thank you for choosing Delta DVP-SV^{#1}/DVP-SV2^{#1}. The SV/SV2 is a 28-point (16 inputs + 12 outputs)/24-point (10 inputs + 12 outputs + 2 analog input channels) PLC MPU, offering various instructions and with 16k (SV)/30k (SV2) steps program memory, able to connect to all Slim type series extension models, including digital I/O (max. 512 points), analog modules (for A/D, D/A conversion and temperature measurement) and all kinds of high-speed extension modules. 4 groups of high-speed (200 kHz) pulse outputs (and two axes which generate 10 kHz outputs in 24SV2) and 2 two-axis interpolation instructions satisfy all kinds of applications. DVP-SV/SV2 is small in size and easy to install.

Note #1: DVP28SV11R/T is represented by SV, and DVP24SV11T2 and DVP28SV11R2/T2/S2 are represented by SV2.

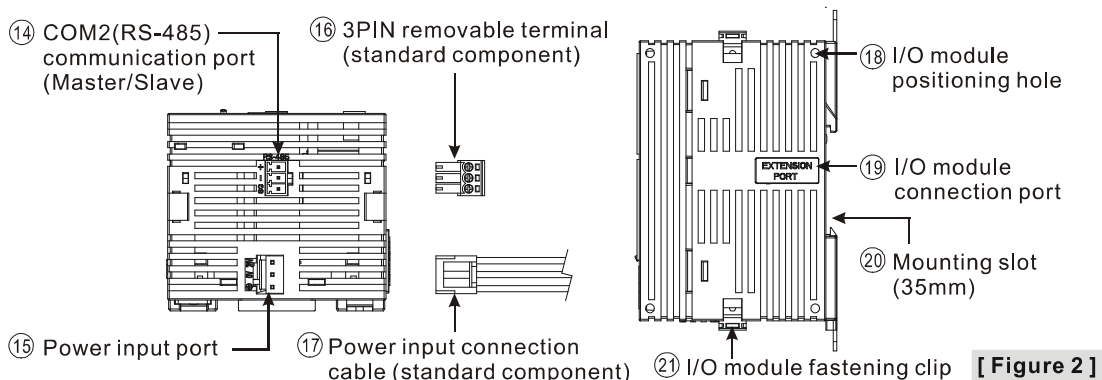
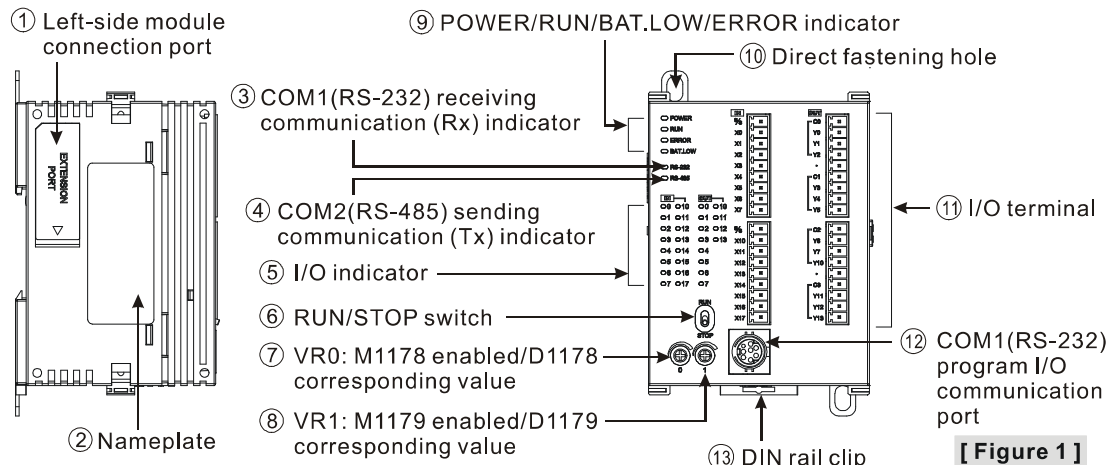
EN ✘ DVP-SV/SV2 is an OPEN-TYPE device. It should be installed in a control cabinet free of airborne dust, humidity, electric shock and vibration. To prevent non-maintenance staff from operating DVP-SV/SV2, or to prevent an accident from damaging DVP-SV/SV2, the control cabinet in which DVP-SV/SV2 is installed should be equipped with a safeguard. For example, the control cabinet in which DVP-SV/SV2 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-SV/SV2 is powered up. After DVP-SV/SV2 is disconnected, Do NOT touch any terminals in a minute. Make sure that the ground terminal ⊕ on DVP-SV/SV2 is correctly grounded in order to prevent electromagnetic interference.

FR ✘ DVP-SV/SV2 est un module OUVERT. Il doit être installé que dans une enceinte protectrice (boîtier, 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-SV/SV2 pourra être endommagé. Merci de vérifier encore une fois le câblage avant la mise sous tension du DVP-SV/SV2. 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 Profile



■ Electrical Specifications

Model	DVP28SV11R	DVP28SV11R2	DVP28SV11T	DVP24SV11T2 DVP28SV11T2	DVP28SV11S2
Item					
Power supply voltage	24VDC (-15% ~ 20%) (with counter-connection protection on the polarity of DC input power)				
Inrush current	Max. 2.2A@24VDC				
Fuse capacity	2.5A/30VDC, Polyswitch				
Power consumption	6W				
Insulation resistance	> 5MΩ (all I/O point-to-ground: 500VDC)				
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				
Grounding	The diameter of grounding wire shall not be less than that of the wiring terminal of the power. (When PLCs are in use at the same time, please make sure every PLC is properly grounded.)				
Operation / storage	Operation: 0°C ~ 55°C (temperature); 5 ~ 95% (humidity); pollution degree 2 Storage: -25°C ~ 70°C (temperature); 5 ~ 95% (humidity)				
Agency approvals	UL508 European community EMC Directive 89/336/EEC and Low Voltage Directive 73/23/EEC				
Vibration / shock immunity	International standards: IEC61131-2, IEC 68-2-6 (TEST Fc)/IEC61131-2 & IEC 68-2-27 (TEST Ea)				
Weight (g)	260	260	240	240	230

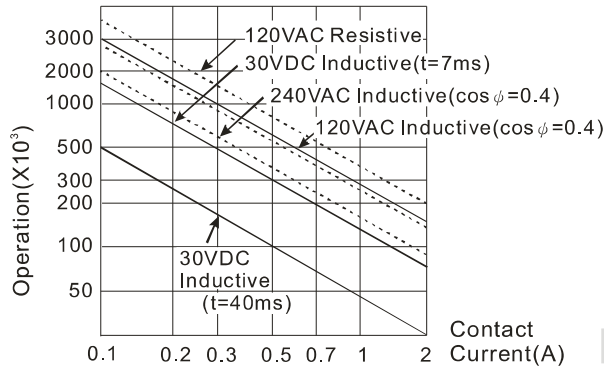
Input Point				
24VDC single common port input				
Items	Spec.	200kHz	20kHz	10kHz
Input No.		X0, X1, X4, X5	X10, X11, X14, X15	X2, X3, X6, X7, X12, X13, X16, X17
Input voltage (±10%)		24VDC, 5mA		
Input impedance		4.7kΩ	3.3kΩ	4.7kΩ
Action level	Off→On	> 4mA (16.5V)	> 6mA (18.5V)	> 4mA (16.5V)
	On→Off	< 1.5mA (8V)	< 2.2mA (8V)	< 1.5mA (8V)
Response time	Off→On	< 150ns	< 3.5μs	< 8μs
	On→Off	< 3μs	< 20μs	< 60μs
Filter time		Adjustable within 10 ~ 60ms by D1020, D1021 (Default: 10ms)		

Note: 24SV2 does not support X12~X17.

Output Point				
Items	Spec.	Relay	Transistor	
			High-speed	Low-speed
Output No.		Y0 ~ Y7, Y10 ~ Y13	Y0 ~ Y4, Y6	Y5, Y7, Y10 ~ Y13
Max. frequency		1Hz	200kHz	10kHz
Working voltage		250VAC, < 30VDC	5 ~ 30VDC #1	
Max. load	Resistive	1.5A/1 point (5A/COM)	0.3A/1 point @ 40°C	
Max. load	Inductive	#2	9W (30VDC)	
	Lamp	20WDC/100WAC	1.5W (30VDC)	
Response time	Off→On	Approx. 10ms	0.2μs	20μs
	On→Off		0.2μs	30μs

#1: For a PNP output model, UP and ZP must be connected to a 24VDC (-15% ~ +20%) power supply. The rated consumption is 10mA/point.

#2: Life curves



[Figure 3]

Specifications for analog inputs (Only applicable to DVP24SV11T2)		
	Voltage input	Current input
Analog input range	0 ~ 10V	0 ~ 20mA
Digital conversion range	0 ~ 4,000	0 ~ 2,000
Resolution	12-bit (2.5mV)	11-bit (10uA)
Input impedance	> 1MΩ	250Ω
Overall accuracy	±1% of full scale within the range of PLC operation temperature	
Response time	2ms (It can be set by means of D1118.) ^{#1}	
Absolute input range	±15V	±32mA
Digital data format	16-bit 2's complement (12 significant bits)	16-bit 2's complement (11 significant bits)
Average function	Provided (It can be set by means of D1062) ^{#2}	
Isolation method	No isolation between digital circuits and analog circuits	

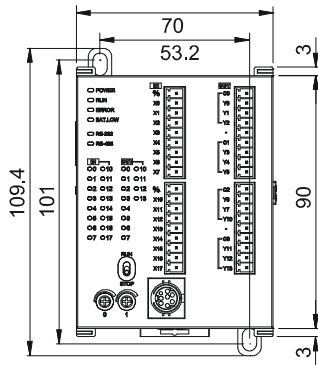
#1: If the scan cycle is longer than 2 milliseconds or greater than the setting value, the scan cycle is given preference.

#2: If the value in D1062 is 1, the present value is read.

I/O Configuration

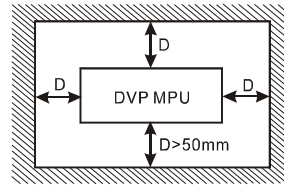
Model	Power	Input		Output		I/O configuration									
		Point	Type	Point	Type	Relay	Transistor (NPN)				Transistor (PNP)				
							28SV		24SV2						
DVP28SV11R	24 VDC	16	DC (Sink Or Source)	12	Relay	S/S X0	C0 Y0	S/S X0	C0 Y0	S/S X0	C0 Y0	S/S X0	UP0 ZP0		
DVP28SV11R2		12		X1 Y1		X1 Y1	X1 Y1	X1 Y1	X1 Y0						
DVP28SV11T		16		12	Transistor (NPN)	X2 Y2	X2 C1	X2 C1	X2 C1	X2 Y1					
		16		X3 Y3		X3 Y2	X3 Y2	X3 Y2	X3 Y2						
				X4 Y4		X4 Y3	X4 Y3	X4 Y3	X4 Y3						
DVP28SV11T2		16		12		X5 Y5	X5 C2	X5 C2	X5 C2	X5 Y4					
DVP24SV11T2		10		12		X6 Y6	X6 Y4	X6 Y4	X6 Y4	X6 Y5					
DVP28SV11S2	16	12	Transistor (PNP)	X7 Y7	X7 Y5	X7 Y5	X7 Y5	X7 Y6							
				S/S X10	C2 Y6	S/S X10	C3 Y6	S/S X10	Y7 ●						
				X11 Y7	X11 Y7	X11 Y7	X11 Y7	X11 ●							
				X12 Y10	X12 ●	X12 ●	X12 ●	X12 UP1							
				X13 ●	X13 C4	X13 C4	X13 C4	X13 ZP1							
				X14 C3	X14 Y10	X14 Y10	X14 Y10	X14 Y10							
				X15 Y11	X15 Y11	X15 Y11	X15 Y11	X15 Y11							
				X16 Y12	X16 Y12	X16 Y12	X16 Y12	X16 Y12							
				X17 Y13	X17 Y13	X17 Y13	X17 Y13	X17 Y13							

■ Installation

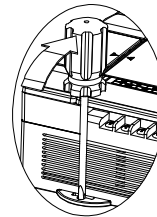


[Figure 4]

Unit: mm



[Figure 5]



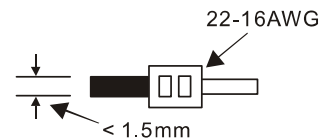
[Figure 6]

Please install the PLC in an enclosure with sufficient space around it to allow heat dissipation. See [Figure 5].

- **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. See [Figure 6].

■ 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 60/75°C 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.



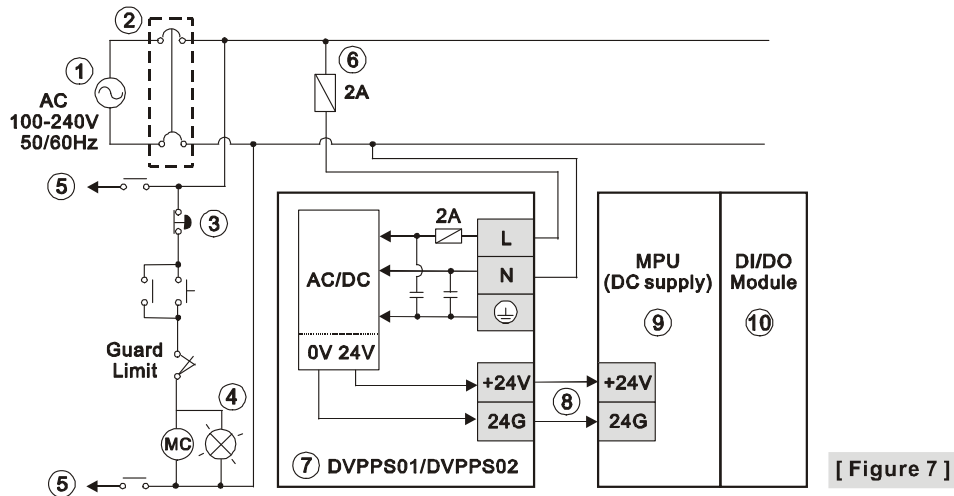
◆ Power Supply

The power input of DVP-SV/SV2 is DC. When operating DVP-SV/SV2, note the following points:

1. The power is connected to two terminals, 24VDC and 0V, and the range of power is 20.4 ~ 28.8VDC. If the power voltage is less than 20.4VDC, the PLC will stop running, all outputs go "Off", and the ERROR LED 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-SV/SV2 is only compatible with DC power supply, Delta's power supply modules (DVPPS01/DVPPS02) are the suitable power supplies for DVP-SV/SV2. We suggest you install the protection circuit at the power supply terminal to protect DVPPS01 or DVPPS02. See the figure below.



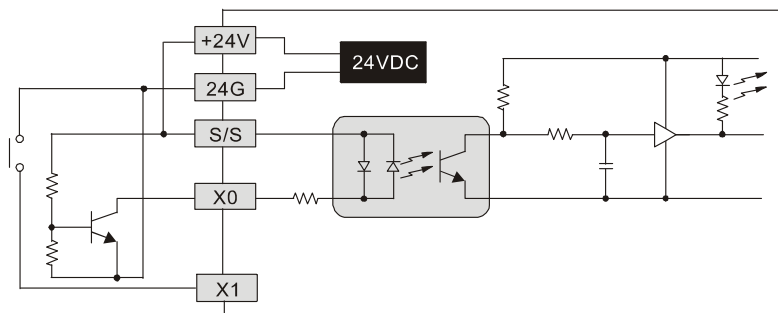
- | | |
|---|----------------------------------|
| ① AC power supply: 100 ~ 240VAC, 50/60Hz | ② Breaker |
| ③ Emergency stop: This button cuts off the system power supply when accidental emergency takes place. | |
| ④ Power indicator | ⑤ AC power supply load |
| ⑥ Power supply circuit protection fuse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

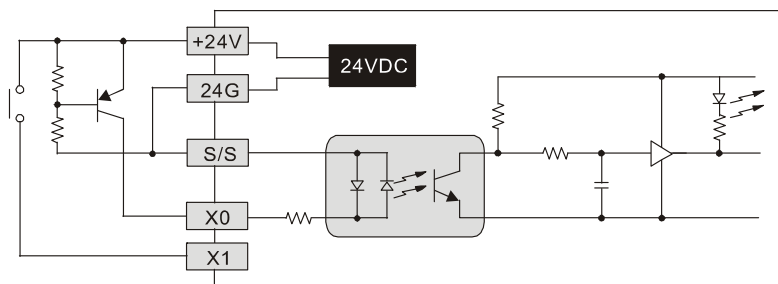
Input point loop equivalent circuit



[Figure 8]

● DC Signal IN – SOURCE mode

Input point loop equivalent circuit

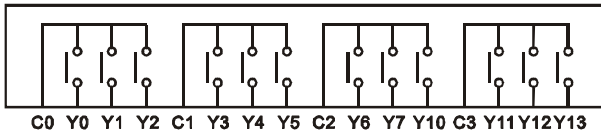


[Figure 9]

◆ Output Point Wiring

- DVP-SV/SV2 has two output modules, relay and transistor. Be aware of the connection of shared terminals when wiring output terminals.
- Output terminals, Y0, Y1, and Y2, of relay models use C0 common port; Y3, Y4, and Y5 use C1 common port; Y6, Y7, and Y10 use C2 common port; Y11, Y12, and Y13

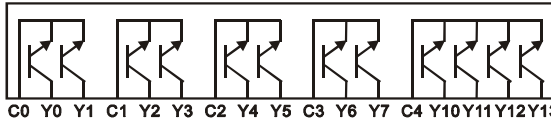
use C3 common port. See [Figure 10].



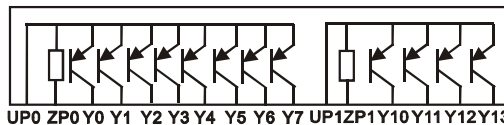
[Figure 10]

When the output points are enabled, their corresponding indicators on the front panel will be on.

- The output terminals Y0 and Y1 of the transistor (NPN) model are connected to the common terminals C0. Y2 and Y3 are connected to the common terminal C1. Y4 and Y5 are connected to the common terminal C2. Y6 and Y7 are connected to the common terminal C3. Y10, Y11, Y12, and Y13 are connected to the common terminal C4. See [Figure 11a]. The output terminals Y0~Y7 on the transistor (PNP) model are connected to the common terminals UP0 and ZP0. Y10~Y13 are connected to the common terminals UP1 and ZP1. See [Figure 11b].



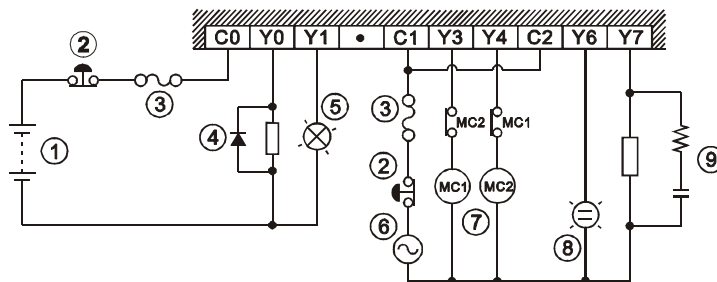
[Figure 11a]



[Figure 11b]

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

• Relay (R) output circuit wiring



[Figure 12]

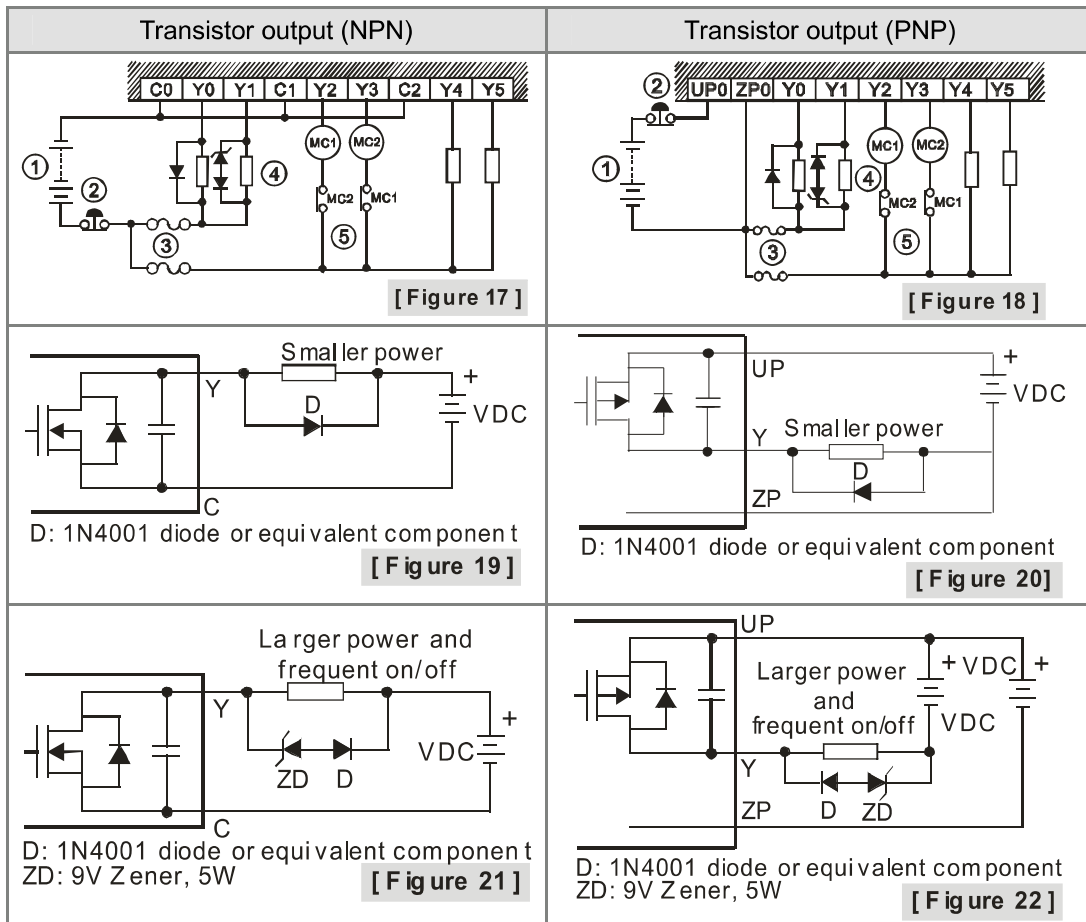
<p>PLC Relay output</p> <p>Smaller power</p> <p>D: 1N4001 diode or equivalent component</p> <p>[Figure 13]</p>	<p>PLC Relay output</p> <p>Larger power and frequent on/off</p> <p>D: 1N4001 diode or equivalent component ZD: 9V Zener, 5W</p> <p>[Figure 14]</p>
<p>PLC Relay output</p> <p>AC load</p> <p>R: 100~120Ω C: 0.1~0.24μF</p> <p>[Figure 15]</p>	

- | | |
|--|--|
| 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 (SB360 3A 60V): Extends the life span of contact. | |
| 1. Diode suppression of DC load: Used when in smaller power [Figure 13] | |
| 2. Diode + Zener suppression of DC load: Used when in larger power and frequent On/Off [Figure 14] | |
| ⑤ Incandescent light (resistive load) | ⑥ AC power supply |

⑦ 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.

⑧ Neon indicator ⑨ Absorber: Reduces the interference on AC load [Figure 15]

• **Transistor output circuit wiring**



① DC power supply ② Emergency stop ③ Circuit protection fuse

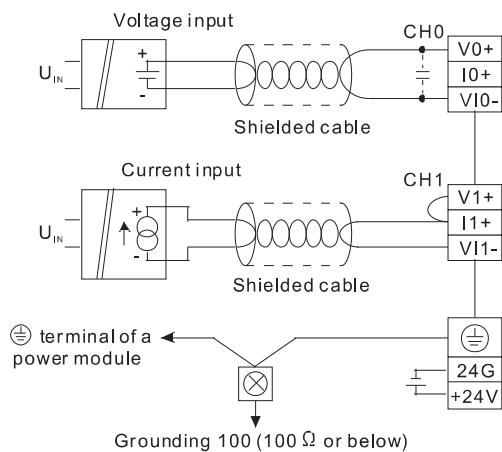
④ The output of the transistor model is “open collector”. If Y0/Y1 is set to pulse output, the output current has to be bigger than 0.1A to ensure normal operation of the model.

1. Diode suppression: Used when in smaller power [Figure 19] and [Figure 20]
2. Diode + Zener suppression: Used when in larger power and frequent On/Off [Figure 21] [Figure 22]

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.

◆ **A/D External Wiring (For DVP24SV11T2 Only)**

• Active



• Passive

