DVP-SS2

Instruction Sheet
Bilgi Dökümani
安　裝　說　明
安　装　说　明

Programmable Logic Controller
Programlanabilir Lojik Kontrolör
可程式控制器
可编程控制器

Thank you for choosing Delta DVP-SS2 series PLCs. DVP-SS2 series PLCs include one 12-point PLC, and two 14-point PLCs. A DVP-SS2 series PLC provides various instructions, and the size of the program memory in it is 8k steps. It is able to connect to all DVP-S series extension modules, including digital I/O (max. 480 I/O points) and analog modules (for A/D, D/A conversion and temperature measurement). 4 groups of high-speed (10kHz) pulse output satisfy all kinds of applications. DVP-SS2 is small in size, and can be install easily. Users do not have to install any batteries in DVP-SS2 series PLCs. The PLC programs and the latched data are stored in the flash memories.

EN ✗ DVP-SS2 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-SS2, or to prevent an accident from damaging DVP-SS2, the control cabinet in which DVP-SS2 is installed should be equipped with a safeguard. For example, the control cabinet in which DVP-SS2 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-SS2 is powered up. After DVP-SS2 is disconnected, Do NOT touch any terminals in a minute. Make sure that the ground terminal ⏚ on DVP-SS2 is correctly grounded in order to prevent electromagnetic interference.

FR ✗ DVP-SS2 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-SS2 pourra être endommagé. Merci de vérifier encore une fois le câblage avant la mise sous tension du DVP-SS2. 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

Unit: mm

[Figure 1]
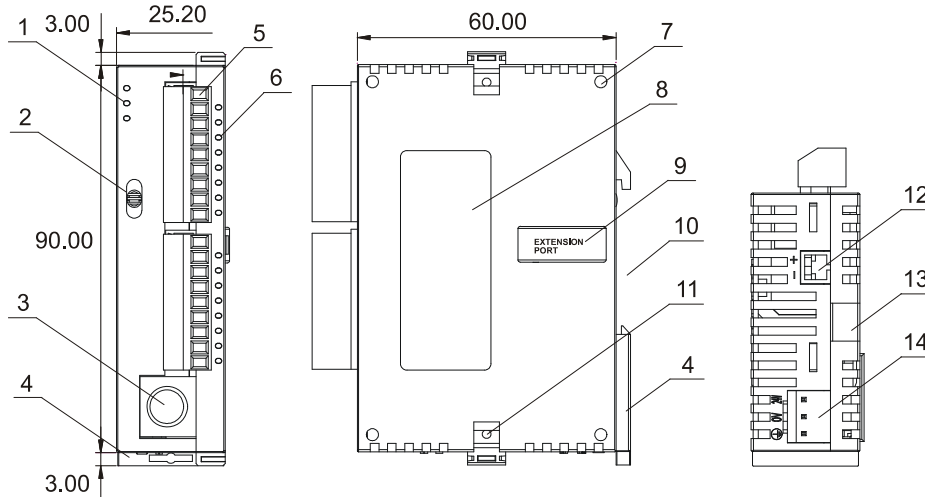
1. POWER, RUN, ERROR indicator	8. Nameplate
2. RUN/STOP switch	9. Extension port
3. I/O port for program communication (RS-232)	10. DIN rail mounting slot (35mm)
4. DIN rail clip	11. Extension unit clip
5. I/O terminals	12. RS-485 communication port
6. I/O point indicator	13. Mounting rail for extension module
7. Mounting hole for extension module	14. DC power input

■ Electrical Specifications

| Item \ Model	DVP14SS211R	DVP14SS211T	DVP12SS211S
Power supply voltage	24VDC (-15% ~ 20%) (with counter-connection protection on the polarity of DC input power) DVPPS01(PS02): input 100-240VAC, output 24VDC/1A(PS02: 2A)		
Inrush current	Max. 7.5A@24VDC		

Model \ Item	DVP14SS211R	DVP14SS211T	DVP12SS211S
Fuse capacity	1.85A/30VDC, Polyswitch		
Power consumption	1.8W		1.5W
Power protection	With counter-connection protection on the polarity of DC input power		
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 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°C ~ 55°C (temp.), 5 ~ 95% (humidity), Pollution degree2 Storage: -25°C ~ 70°C (temp.), 5 ~ 95% (humidity)		
Vibration / shock resistance	International standards: IEC61131-2, IEC 68-2-6 (TEST Fc)/IEC61131-2 & IEC 68-2-27 (TEST Ea)		
Weight (g)	97g	82.5g	90g

Spec. \ Items	Input Point	
	24VDC (-15% ~ 20%) single common port input	
Input No.	X0 ~ X3	X4 ~ X7
Input type	DC (SINK or SOURCE)	
Input Current (± 10%)	24VDC, 5mA	
Input impedance	4.7kΩ	
Max. frequency	20kHz	10kHz
Action level — Off→On	> 15VDC	
Action level — On→Off	< 5VDC	
Response time — Off→On	< 10μs	< 20μs
Response time — On→Off	< 20μs	< 50μs
Filter time	Adjustable within 0 ~ 20ms by D1020 (Default: 10ms)	

Spec. \ Items	Output Point		
	Relay	Transistor	
Output No.	Y0 ~ Y5	Y0 ~ Y3	Y4, Y5
Max. frequency	1Hz	10kHz	1kHz
Working voltage	250VAC, < 30VDC	5 ~ 30VDC [#1]	
Max. load — Resistive	1.5A/1 point (5A/COM)	0.5A/1 point (3A/COM)	
Max. load — Inductive	[#2]	15W (30VDC)	
Max. load — Lamp	20WDC/100WAC	2.5W (30VDC)	
Response time — Off→On	Approx. 10ms	20μs	100μs
Response time — On→Off		30μs	100μs

#1: UP, ZP must work with external auxiliary power supply 24VDC (-15% ~ +20%), rated consumption approx. 10mA/point.

#2: Life curves
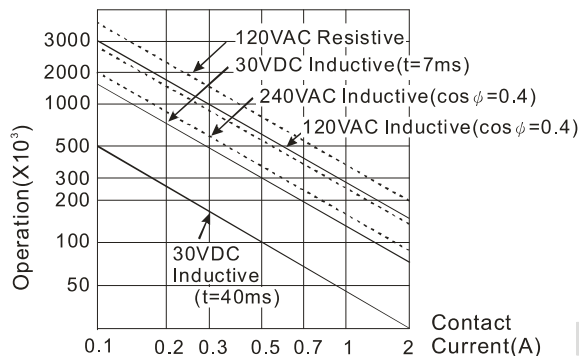
[Figure 2]

■ I/O Configuration

Model	Input		Output		I/O Configuration		
	Point	Type	Point	Type	Relay	Transistor (NPN)	Transistor (PNP)
14SS211R	8	DC (Sink Or Source)	6	Relay	S/S, X0, X1, X2, X3, X4, X5, X6, X7, C0, Y0, Y1, Y2, •, C1, Y3, Y4, Y5	S/S, X0, X1, X2, X3, X4, X5, X6, X7, UP, ZP, •, Y0, Y1, Y2, Y3, Y4, Y5	S/S, X0, X1, X2, X3, X4, X5, X6, X7, UP, ZP, •, DA, PWM, Y0, Y1, Y2, Y3
14SS211T	8	DC (Sink Or Source)	6	Transistor (NPN)			
12SS211S	8	DC (Sink Or Source)	4	Transistor (PNP)			

Note: The layout of output terminals on DVP-SS2 is different from that on DVP-SS.

■ Dimension & Installation

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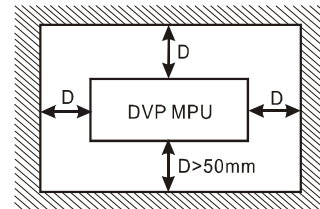
[Figure 3]

■ Wiring

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.

22-16AWG
< 1.5mm
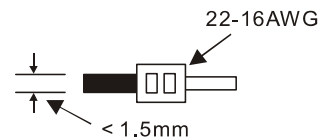
1. DO NOT wire empty terminal. DO NOT place the I/O signal cable in the same wiring circuit.
2. DO NOT drop tiny metallic conductor into the PLC while screwing and wiring. Tear off the sticker on the heat dissipation hole for preventing alien substances from dropping in to ensure normal heat dissipation of the PLC.
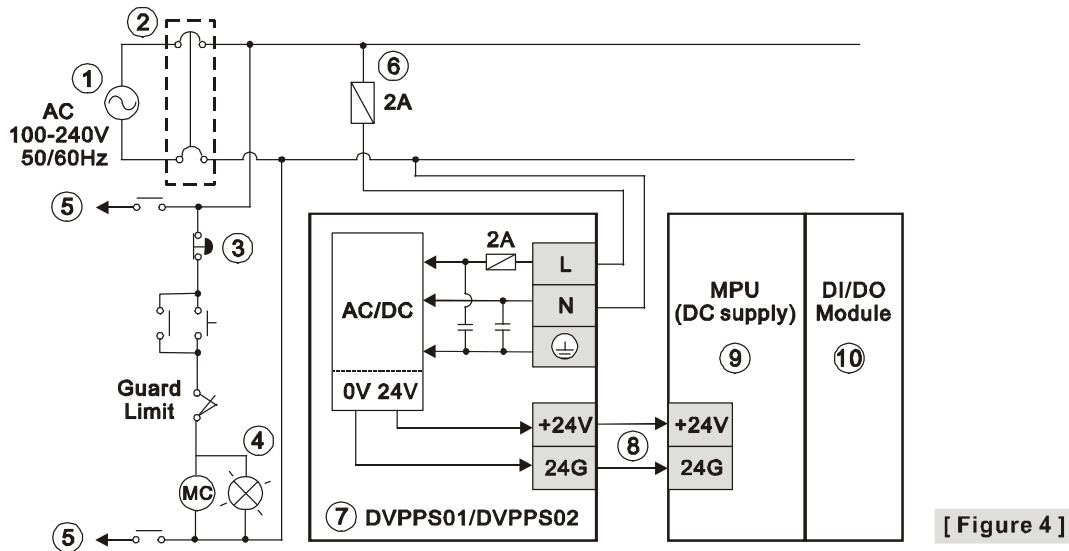
◆ Power Supply

The power input of DVP-SS2 is DC. When operating DVP-SS2, please 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 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-SS2 is only compatible with DC power supply, Delta's power supply modules (DVPPS01/DVPPS02) are the suitable power supplies for DVP-SS2. We suggest you install the protection circuit at the power supply terminal to protect DVPPS01 or DVPPS02. See the figure below.
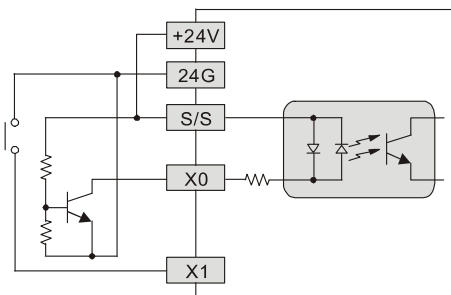
[Figure 4]

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: 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**
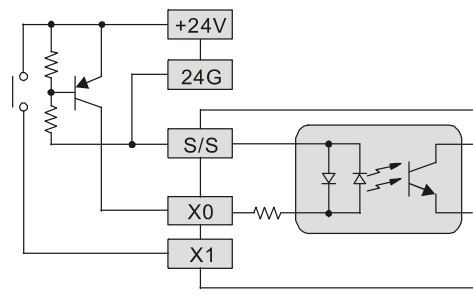Input point loop equivalent circuit

● **DC Signal IN – SOURCE mode**
Input point loop equivalent circuit

[Figure 5]

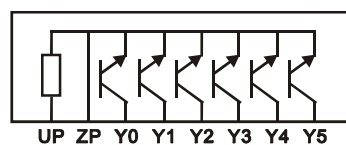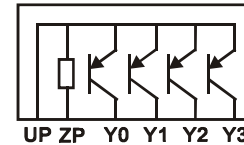

[Figure 6]

◆ Output Point Wiring

1. DVP-SS2 has two output modules on it, relay and transistor. Be aware of the connection of shared terminals when wiring output terminals.
2. Output terminals, Y0, Y1, and Y2, of relay models use C0 common port; Y3, Y4, and Y5 use C1 common port. See [Figure 7]. When the output points are enabled, their corresponding indicators on the front panel will be on.
3. The output terminals Y0~Y5 of the transistor (NPN) model are connected to the common terminals UP and ZP. See [Figure 8a]. The output terminals Y0~Y3 on the transistor (PNP) model are connected to the common terminals UP and ZP. See [Figure 8b].
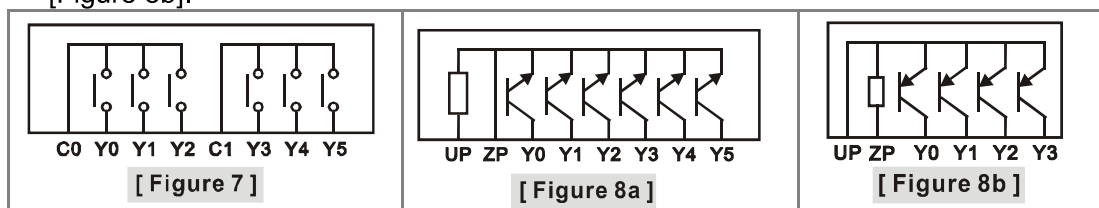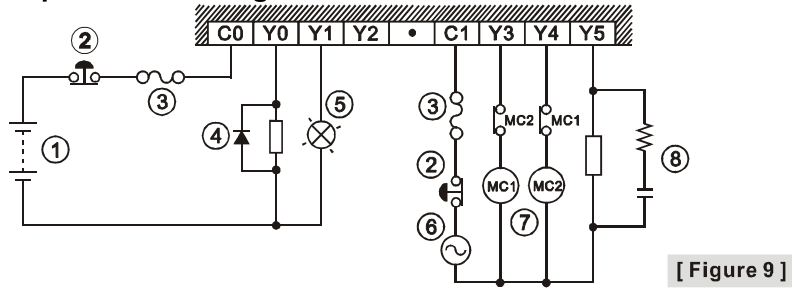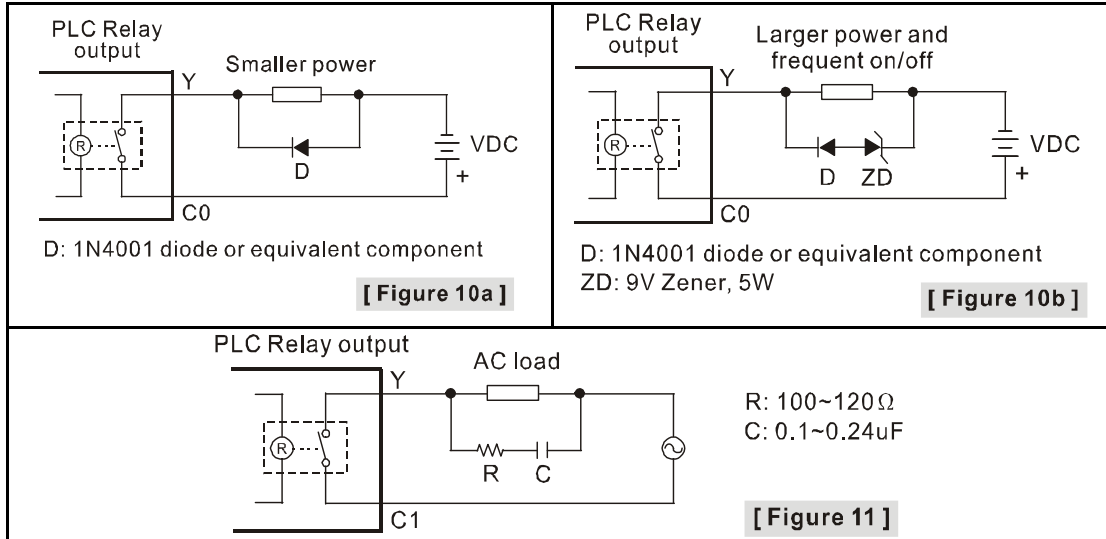

[Figure 7]

[Figure 8a]

[Figure 8b]

4. Isolation circuit: The optical coupler is used to isolate signals between the circuit inside PLC and input modules.
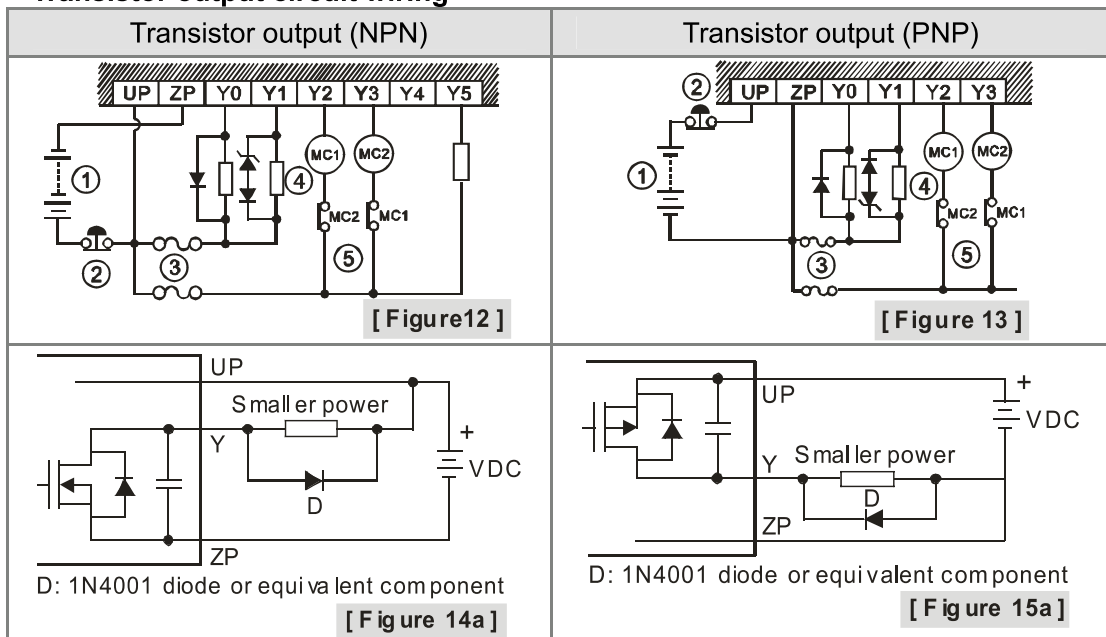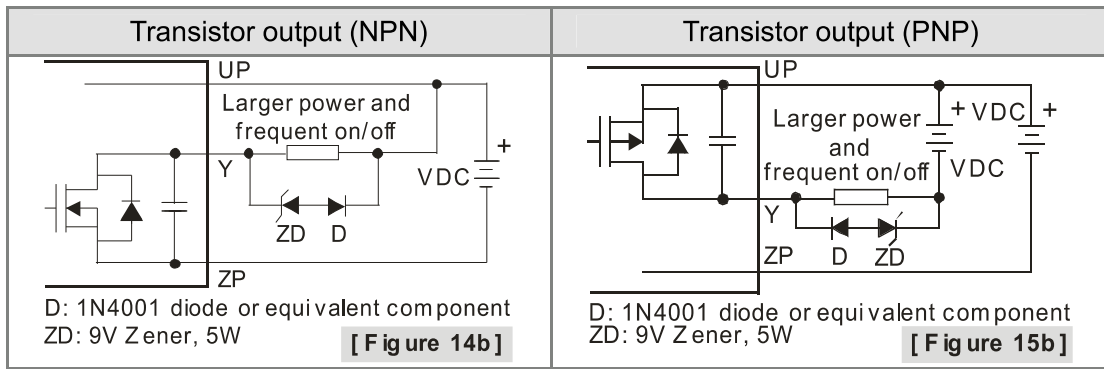
● Relay (R) output circuit wiring

[Figure 9]

PLC Relay output — Smaller power

D: 1N4001 diode or equivalent component

[Figure 10a]

PLC Relay output — Larger power and frequent on/off

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

[Figure 10b]

PLC Relay output — AC load

R: 100~120Ω
C: 0.1~0.24uF

[Figure 11]

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

● Transistor output circuit wiring

Transistor output (NPN)	Transistor output (PNP)
[Figure12]	[Figure 13]
D: 1N4001 diode or equivalent component [Figure 14a]	D: 1N4001 diode or equivalent component [Figure 15a]

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| Transistor output (NPN)	Transistor output (PNP)
D: 1N4001 diode or equivalent component ZD: 9V Zener, 5W　　[Figure 14b]	D: 1N4001 diode or equivalent component ZD: 9V Zener, 5W　　[Figure 15b]

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 14a] and [Figure 15a]
　　Diode + Zener suppression: Used when in larger power and frequent On/Off [Figure 14b] and [Figure 15b]

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.

● **PWM DA output circuit wiring (Only for DVP-12SS211S)**
　Please refer to figure 1 below for more information about wiring.

VR is connected to Rin in parallel.
The impedance is about 1.46 Ω.
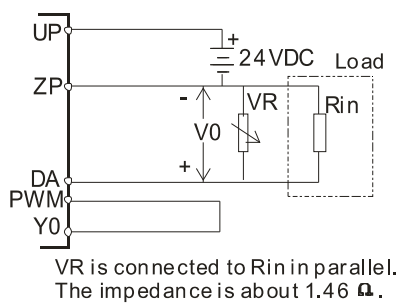
[Figure 1]

Item	Specifications
DA range	0~10VDC
Value range	0~100
Resolution*1	0.1V (1~9V)
Output impedance	2kΩ
Minimum load	1.5kΩ
D/A conversion time	<70ms

*1: 1~9V is a linear area. The resolution is 0.1V. 0~1V and 9~10V are nonlinear areas. The output probably can not reach the voltage set.

Please refer to the correction formula before you use the PWM DA output function.
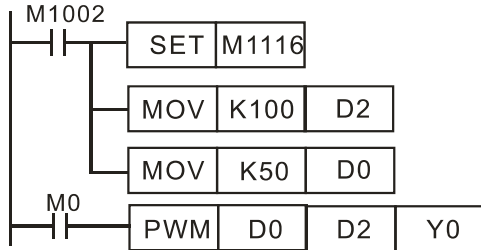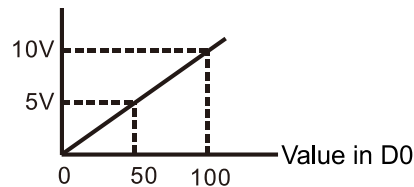

Please refer to the explanation of PWM for more information about setting the time unit for the pulses output by Y0.
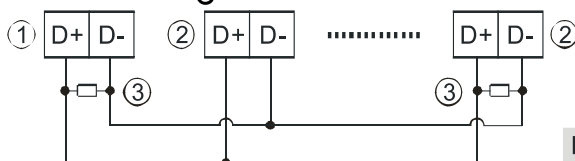
Set the pulse cycle to 100μs.

Set the duty cycle of a pulse to 50%.

Set M0 to ON. Adjust the variable resistor so that V0 is 5V. as shown in the curve below.

◆ **RS-485 Wiring**

Figure 17

①	Master node
②	Slave node
③	Terminal resistor

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.