2011-01-27

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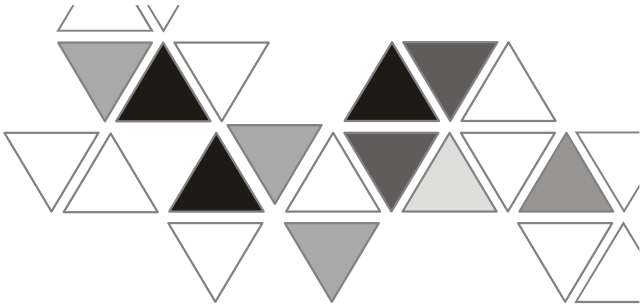
DELTA ELECTRONICS, INC.



# DVP-SA2

## INSTRUCTION SHEET
## 安裝說明
## 安装说明
## BİLGİ DÖKÜMANI

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

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

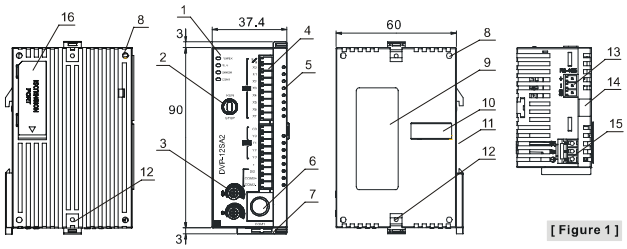
DVP-1180070-01

■ ENGLISH ■

Thank you for choosing Delta DVP-SA2. DVP-SA2 is a 12-point (8DI + 4DO) PLC MPU, offering various instructions and with 16k steps program memory, able to connect to all DVP-S 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-SA2 is small in size and easy to install.

- This instruction sheet only provides introductory information on electrical specifications, general specifications, installation and wiring. For detailed information on programming and instructions, please refer to *"DVP-SA2 Operation Manual: Programming"*. For information about optional peripherals, please see individual product instruction sheet enclosed with DVP-SA2.
- This 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 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. Make sure the ground terminal ⏚ is correctly grounded in order to prevent electromagnetic interference. DO NOT touch any terminals when the power is switched on.

## ■ Product Profiles




[ Figure 1 ]

Unit: mm

| | |
|---|---|
| 1. POWER, RUN, ERROR, COM1 indicator | 9. Nameplate |
| 2. RUN/STOP switch | 10. Right-side extension port |
| 3. VR0/VR1 | 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. COM1 communication port (RS-232) | 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 |

## ■ Electrical Specifications

| Item \ Model | DVP12SA211R | DVP12SA211T |
|---|---|---|
| Power supply voltage | 24 VDC (-15 to 20%)<br>(with counter-connection protection on the polarity of DC input power)<br>DVPPS01/PS02: input 100 to 240 VAC, output 24 VDC/1A (PS02: 2A) | |
| Connector | European standard removable terminal block (Pin pitch: 3.5mm) | |
| Operation | Maximum power loss time is 10ms or less. | |

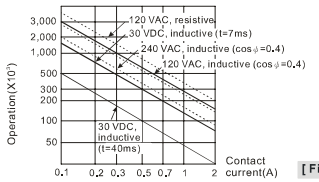
| Item \ Model | DVP12SA211R | DVP12SA211T |
|---|---|---|
| Inrush current | Max. 7.5 A@24 VDC, $I^2t$ = 0.25 $A^2S$ | |
| Fuse capacity | 2.5 A/30 VDC, Polyswitch | |
| Power consumption | 1.8 W | 1.5 W |
| Power protection | With counter-connection protection on the polarity of DC input power | |
| Insulation resistance | > 5 MΩ (all I/O point-to-ground: 500 VDC) | |
| Noise immunity | ESD: 8 kV Air Discharge<br>EFT: Power Line: 2 kV, Digital I/O: 1 kV, Analog & Comm. I/O: 1 kV<br>RS: 26 MHz to 1 GHz, 10 V/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<br>Storage: -25 to 70°C (temp.), 5 to 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) | 140g | 131g |

| Items \ Spec. | | Input Points | |
|---|---|---|---|
| | | 24 VDC (-15 to 20%) single common port input | |
| Input No. | | X0 to X2 | X3 to X7 |
| Input type | | DC (SINK or SOURCE) | |
| Input current (±10%) | | 24 VDC, 5 mA | |
| Input impedance | | 4.7 kΩ | |
| Max. frequency | | 100 kHz | 10 kHz |
| Action level | Off → On | > 15 VDC | |
| | On → Off | < 5 VDC | |
| Response time | Off → On | < 2.5 μs | < 20 μs |
| | On → Off | < 5 μs | < 50 μs |
| Filter time | | Adjustable within 0 ~ 20ms by D1020 (Default: 10ms) | |

| Items \ Spec. | | Output Points | | |
|---|---|---|---|---|
| | | Relay | Transistor | |
| Output No. | | Y0 to Y3 | Y0, Y2 | Y1, Y3 |
| Max. frequency | | 1 Hz | 100 kHz | 10 kHz |
| Working voltage | | 250 VAC, < 30 VDC | 5 to 30 VDC #1 | |
| Max. load | Resistive | 1.5 A/1 point (5 A/COM) | 0.5 A/1 point (2 A/COM) | |
| | Inductive | #2 | 15 W (30 VDC) | |
| | Lamp | 20 WDC/100 WAC | 2.5 W (30 VDC) | |
| Response time | Off → On | Approx. 10 ms | 2 μs #3 | 20 μs #3 |
| | On → Off | | 3 μs #3 | 30 μs #3 |

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

#2: Life curves




[ Figure 2 ]

#3: Load = 0.5A

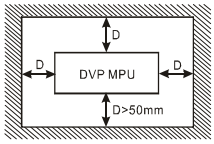
## ■ I/O Configuration

| Model | Input | | Output | | I/O Configuration | |
|---|---|---|---|---|---|---|
| | Point | Type | Point | Type | Relay | Transistor |
| DVP 12SA211R | 8 | DC (Sink Or Source) | 4 | Relay | S/ S<br>X0<br>X1<br>X2<br>X3<br>X4<br>X5<br>X6<br>X7<br>C0<br>Y0<br>Y1<br>Y2<br>Y3<br>●<br>SG<br>COM3+<br>COM3- | S/ S<br>X0<br>X1<br>X2<br>X3<br>X4<br>X5<br>X6<br>X7<br>Y0<br>Y1<br>Y2<br>Y3<br>UP<br>ZP<br>SG<br>COM3+<br>COM3- |
| DVP 12SA211T | | | | Transistor | | |

*Note: The layout of output terminals on DVP-SA2 is different from that on DVP-SA.*

## ■ Dimension & Installation

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

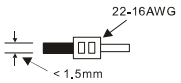



[ Figure 3 ]

- **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

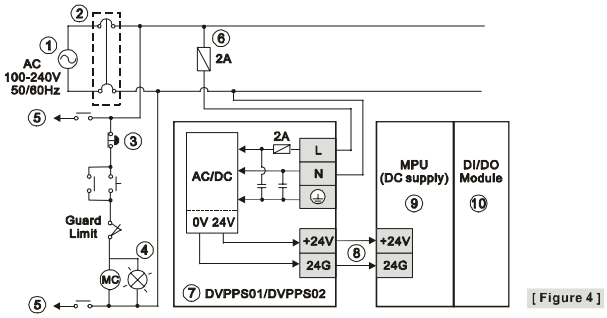
The power input of DVP-SA2 is DC. When operating DVP-SA2, please note the following points:

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-SA2 is only compatible with DC power supply, Delta's power supply modules (DVPPS01/DVPPS02) are the suitable power supplies for DVP-SA2. We suggest you install the protection circuit at the power supply terminal to protect DVPPS01 or DVPPS02. See the figure below.



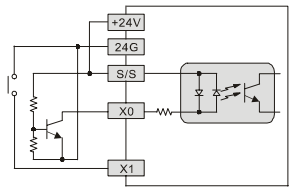

[ Figure 4 ]

| | |
|---|---|
| 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

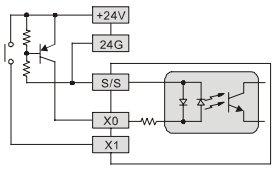
There are 2 types of DC inputs, SINK and SOURCE. (See the example below. For detailed point configuration, please refer to the specification of each model.)

**• DC Signal IN – SINK mode**
Input point loop equivalent circuit




[ Figure 5 ]

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



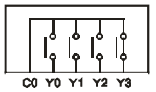

[ Figure 6 ]

### ◆ Output Point Wiring

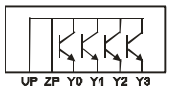
1. DVP-SA2 has two output modules on it, relay and transistor. Be aware of the

connection of shared terminals when wiring output terminals.

2. Relay output terminals, Y0 to Y3 of relay models use C0 common port. See [Figure 7]. 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 models use UP, ZP common port. See [Figure 8].



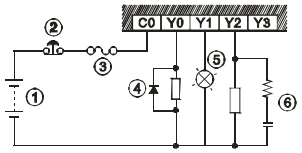

[ Figure 7 ]



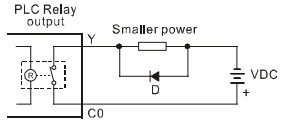

[ Figure 8 ]

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

**• Relay (R) output circuit wiring**

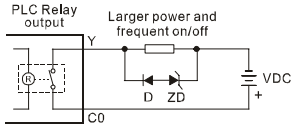



[ Figure 9 ]



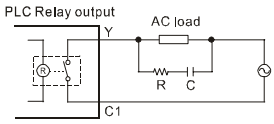

D: 1N4001 diode or equivalent component

[ Figure 10a ]




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

[ Figure 10b ]

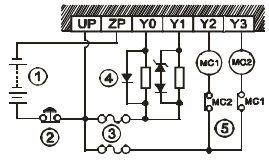



R: 100~120Ω
C: 0.1~0.24uF

[ 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.<br>1. Diode suppression of DC load: Used when in smaller power [Figure 10a]<br>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 (T) output circuit wiring**




[ Figure 12 ]