

2013-08-15



5012605501-P1M1

DVP-10PM

Instruction Sheet

>>>Programmable Logic Controller




ATO

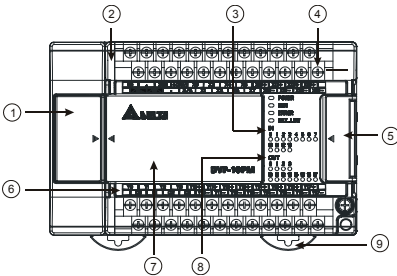
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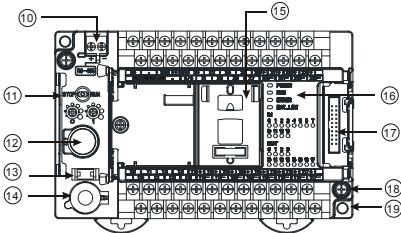
Website: www.ato.com

- ✓ This instruction sheet only provides information on electrical specifications, functions, wiring. For detailed information on programming and instructions, please refer to “DVP-PM Application Manual: Programming”. For more information about the optional peripherals, please see individual product instruction sheet or “DVP-PLC Application Manual: Special Modules”.
- ✓ DVP-10PM 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 for operating the enclosure) in case danger and damage on the device may occur.
- ✓ DO NOT connect the input AC power supply to any of the I/O terminals; otherwise serious damages may occur. Check all the wirings before switching on the power. Make sure the ground terminal  is correctly grounded in order to prevent electromagnetic interferences.

■ Product Profile & Dimensions

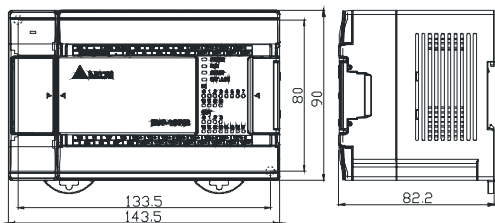


[Figure 1]



[Figure 2]

1	Communication port cover	2	I/O terminal cover
3	Input indicators	4	I/O terminals
5	I/O module connection port cover	6	Numbers of I/O terminals
7	Function card/memory card cover	8	Output indicators
9	DIN rail clip	10	COM2 (RS-485)
11	STOP/RUN switch	12	COM1 (RS-232)
13	Battery socket	14	Battery
15	Function card port	16	POWER/RUN/ERROR/BAT.LOW indicators
17	I/O module connection port	18	Mounting screw
19	Mounting hole		



[Figure 3]

Unit: mm

■ Electrical Specifications

Power supply voltage	100 ~ 240 VAC (-15 to 10%), 50/60 Hz \pm 5%
Fuse capacity	2 A/250 VAC
Power consumption	60 VA
DC24V current output	500 mA
Power protection	24 VDC, output short-circuited
Withstand voltage	1,500 VAC (Primary-secondary); 1,500 VAC (Primary-PE); 500 VAC (Secondary-PE)
Insulation impedance	> 5 M Ω (all I/O point-to-ground 500 VDC)
Noise immunity	ESD: 8 kV Air Discharge, EFT: Power Line: 2 kV, Digital I/O: 1 kV, Analog & Communication I/O: 250 V
Earth	The diameter of grounding wire shall not be less than that of the L, N terminal of the power. (When many PLCs are used at the same time, make sure every PLC is properly grounded.)
Operation/storage	Operation: 0 to 55°C (temperature), 5 to 95% (humidity), pollution degree 2 Storage: -25 to 70°C (temperature), 5 to 95% (humidity)
Vibration/shock immunity	International standards: IEC61131-2, IEC 68-2-6 (TEST Fc) / IEC61131-2 & IEC 68-2-27 (TEST Ea)
Weight (g)	612

◆ Input Points

Items	Spec.	Two differential inputs	24 VDC single common port input
		200 kHz	
Input wiring type		Independent wiring	Change wiring from S/S to SINK or SOURCE
Input indicator		LED display; light on = ON, light off = OFF	
Input voltage (\pm 10%)		5 to 24 VDC	24 VDC
Max. input current		15 mA	15 mA
Input point configuration		X10+, X10-, X11+, X11- ^{#2} , X12+, X12-, X13+, X13- ^{#3}	X0 to X7 ^{#1}
Active level	Off→On	20 μ s	
	On→Off	30 μ s	
Response time/noise immunity		0.5 μ s	

- #1 : X0, X2, X4 and X6 can separately be the DOG signal for X, Y, Z and A axes. X1, X3, X5 and X7 can be the PG0 signal for the four axes
- #2 : X10、X11 are MPG pulse inputs.
- #3 : X12、X12 and X13 can only receive differential pulse signals for counting.

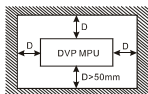
◆ Output Points

Items \ Spec.	Two differential outputs	Single common port transistor
		High speed
Max. frequency	1 MHz	200 kHz
Output indicator	LED display; light on = ON, light off = OFF	
Output point configuration	Y10 to Y17 ^{#1}	Y0 to Y3 ^{#2}
Working voltage	5 VDC	5 to 30 VDC
Max. output current	40 mA	40 mA
Insulation	Line driver	Photocoupler isolation
Maximum load	Resistive	< 25 mA
	Inductive	--
	Lamp	--
Max. output response time	Off→On	0.2 μs
	On→Off	
Over-current protection	N/A	
<p>#1 : Y10+,Y10-,Y12+,Y12-,Y14+,Y14-,Y16+,Y16-:Forward-running pulse output; Pulse/direction: Pulse output; A/B phase output: A phase Y11+,Y11-,Y13+,Y13-,Y15+,Y15-,Y17+,Y17-: Reverse-running pulse output; Pulse direction: Direction output; A/B phase: output: B phase</p> <p>#2 : Y0 to Y3 are 4 groups of PWM outputs; and can be the independent outputs.</p>		

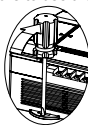
■ Installation

Please install the PLC in an enclosure with sufficient space around it to allow heat dissipation.

- **Direct Mounting:** Please use M4 screw according to the dimensions of the product.

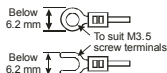


- **DIN Rail Mounting:** When mounting the PLC to a 35mm DIN rail, be sure to use the retaining clip to stop any side-to-side movement of the PLC and reduce the chance of wires being loosened. The retaining clip is at the bottom of the PLC. To secure the PLC to the DIN rail, pull down the clip, place 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 the rail



■ Wiring

1. Use the O-type or Y-type terminal. See the figure in the right hand side for the specifications. The PLC terminal screws should be tightened to 9.50 kg-cm (8.25 in-lbs) and use only 60/75°C copper conductors.
2. DO NOT wire empty terminals, or place the input signal cable and output power cable in the same wiring circuit.
3. DO NOT drop tiny metallic conductors into the PLC while screwing and wiring. Tear off the sticker on the heat dissipation hole to prevent alien substances from dropping in to ensure normal heat dissipation of the PLC.



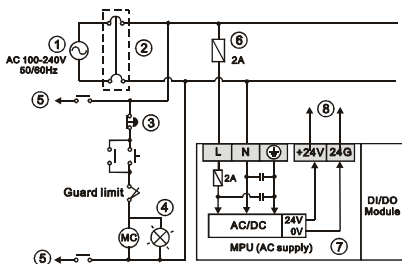
◆ Power Supply

DVP-10PM accepts AC power input. When operating the PLC, please note the following points:

1. The input voltage should be current, and the range is 100 to 240 VAC. Connect the power supply to the L and N terminals. Wiring AC110V or AC220V to the +24V input terminal will result in serious damages on the PLC.
2. The AC power input for DVP-10PM and I/O modules should be ON or OFF at the same time.
3. Use wires of 1.6mm (or longer) for the grounding.
4. The power shutdown of less than 10 ms will not affect the operation of the PLC. However, the power 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 its operation. (Care should be taken on the latched auxiliary relays and registers inside the PLC during the programming).
5. The maximum supply from the +24 V output terminal is 0.5 A. DO NOT connect other external power supplies to this terminal. Every input terminal requires 6 to 7 mA to be driven, e.g. the 16-point input will require approximately 100 mA. Therefore, the +24V terminal cannot output to the external load that is bigger than 400 mA.

◆ Safety Wiring

In a PLC control system, many devices are controlled at the same time and actions of any device could affect each other, e.g. breakdown of one device may cause the breakdown of the entire auto-control system. Therefore, wiring a protection circuit at the power supply input terminal is highly suggested. See the figure below.



[Figure 5]

① AC power supply: 100 to 240 VAC, 50/60 Hz ② Breaker

③ Emergency stop: This button cuts off the system power supply when an accidental emergency takes place.

④ Power indicator

⑤ AC power supply load

⑥ Power supply circuit protection fuse (2 A) ⑦ DVP-PLC (main processing unit)

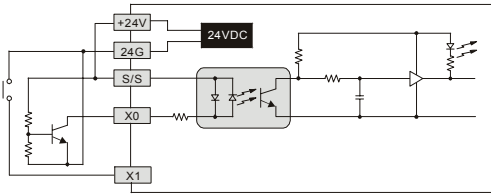
⑧ DC power supply output: 24 VDC, 500 mA

◆ Input Points Wiring

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

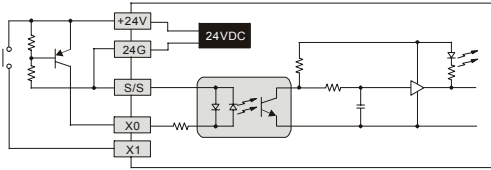
• DC Signal IN – SINK mode

Input point loop equivalent circuit



[Figure 6]

- DC Signal IN – SOURCE mode
Input point loop equivalent circuit

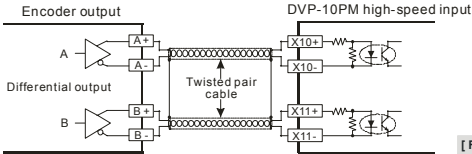


[Figure 7]

◆ Wiring of Differential Inputs

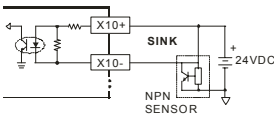
X10 to X13 on DVP-10PM are 5 to 24 VDC high-speed input circuits; other inputs are 24 VDC). The frequency of high-speed input circuits can be up to 200 kHz and is for connecting to differential (double-wire) LINE DRIVER output circuits.

- Wiring in high-speed, high-noise environment

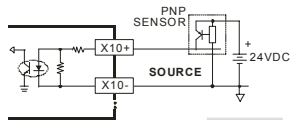


[Figure 8]

- Wirlings of sensors for differential points (24 VDC):



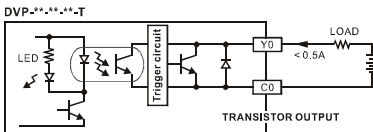
[Figure 9]



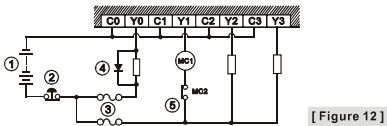
[Figure 10]

◆ Output Points Wiring

- Transistor (T) contact circuit wiring

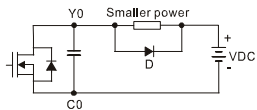


[Figure 11]



[Figure 12]

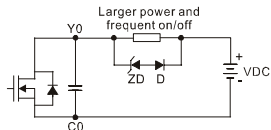
PLC Transistor output



D: 1N4001 diode or equivalent component

[Figure 13]

PLC Transistor output



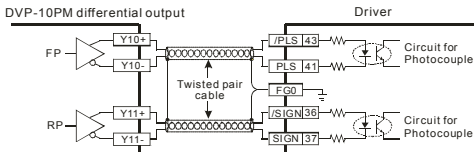
D: 1N4001 diode or equivalent component

[Figure 14]

- 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 13)
 2. Diode + Zener suppression: Used when in larger power and frequent On/Off (Figure 14)
- ⑤ Manually exclusive output: For example, Y4 and Y5 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.

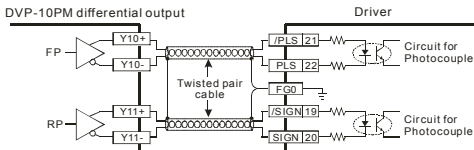
◆ Wiring of Differential Outputs

• Differential output with ASDA-A & A+, ASDA-A2 series servo drives



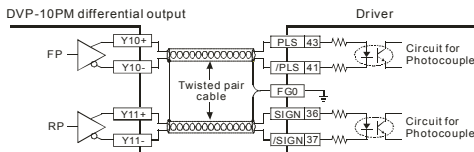
[Figure 15]

• Differential output with ASDA-B series servo drive



[Figure 16]

• Differential output with ASDA-AB series servo drive



[Figure 17]

■ BAT.LOW Indicator

BAT.LOW indicator will be on when the battery is in low voltage. When this happens, change the battery as soon as possible in case your program and data saved in the latched area will be lost.

After the power is switched off, the data in the latched area will be stored in the SRAM memory, and its power will be supplied by the battery. Therefore, when the battery is in low voltage and the power-off status has been lasting for more than 1 minute, the data in the latched area will be lost. If you need to permanently save the data in the latched area in the program and device D, see the “permanently saved mechanism” and “recover mechanism” sections below.

Permanently saved mechanism

Use PMSOft (Options -> PLC<=>Flash) to permanently save the data in the latched area in Flash ROM memory. The newly indicated data will replace all data previously saved in the memory.

Recover mechanism

If the battery is in low voltage before the power is switched off when the BAT.LOW indicator is on, and the power is off for more than 1 minute, the PLC will automatically restore the data in the latched area in the program and device D of Flash ROM into SRAM memory next time when it is re-powered.

◆ Battery Life

Temperature (°C)	-30	0	25	50	70
Life (year)	10	9	8	6	5