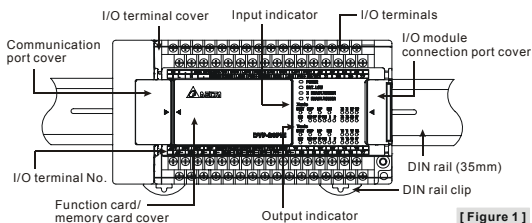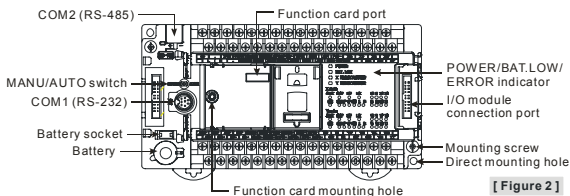# DVP-*20PM*

High-speed Positioning, Multi-function
Programmable Logic Controller

NELTA

- ✗ This instruction sheet only provides information on electrical specification, functions and 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-20PM 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 AC main circuit power supply to any of the I/O terminals, or it may damage the PLC. Check all the wirings before switching on the power. Make sure the ground terminal ⊕ is correctly grounded to prevent electromagnetic interferences. DO NOT touch any terminals when the power is on.
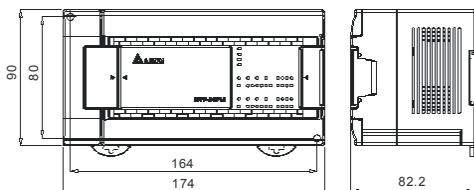
■ Product Profile & Dimension

[Figure 1]

[Figure 2]

[Figure 3]

■ Electrical Specifications

Power supply voltage	100 to 240 VAC (-15 to 10%), 50/60Hz ± 5%
Fuse capacity	2A/250 VAC
Power consumption	60 VA
DC24V current output	500 mA
Power protection	DC24V; output short-circuited
Withstand voltage	1,500 VAC (Primary-secondary); 1,500 VAC (Primary-PE); 500 VAC (Secondary-PE)

Insulation impedance	> 5MΩ (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
Grounding	The diameter of grounding wire shall not be less than that of L, N terminal of the power. (When many PLCs are in use at the same time, please make sure every PLC is properly grounded.)
Operation/storage	Operation: 0 to 55°C (temperature), 50 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)	696

◆ Input Points

Terminal	Description	Response char.	Max. input Cur.	Max. input Vol.	Model 20D/20DT	Model 20M
START0, START1	Enabling input	10 ms	6 mA	24 V	✓	✓
STOP0, STOP1	Disabling input	10 ms	6 mA	24 V	✓	✓
LSP0/LSN0, LSP1/LSN1	Right/left limit input	10 ms	6 mA	24 V	✓	✓
X1/X2 (for Z axis)	Right/left limit input (LSP2/LSN2)	10 ms	6 mA	24 V	-	✓
A0+, A0-, A1+, A1- (shared by Y/Z axis)	MPG A-phase pulse input +, - (differential signal input)	200 kHz	15 mA	5 to 24 V	✓	✓
B0+, B0-, B1+, B1- (shared by Y/Z axis)	MPG B-phase pulse input +, - (differential signal input)	200 kHz	15 mA	5 to 24 V	✓	✓
PG0+, PG0-, PG1+, PG1-	Zero point signal input +, - (differential signal input)	200 kHz	15 mA	5 to 24 V	✓	✓
X3 (for Z axis)	Zero point signal input (PG2)	10 ms	6 mA	24 V	-	✓
DOG0, DOG1	There are 2 variations according to different operation modes: 1. DOG signal when zero return 2. Inserting enabling signal at 1-seg. or 2-seg. speed	1 ms	6 mA	24 V	✓	✓
X0 (for Z axis)	Same as DOG0, DOG1 (DOG2)	10 ms	6 mA	24 V	-	✓

◆ Digital Input Points

Item \ Spec	24 VDC signal common port input Low-speed	24 VDC signal common port input High-speed (200 kHz) #1	Note
Input wiring type	Change wiring from S/S to SINK or SOURCE		#1: Input point A, B, PG is high-speed input; other input point is low-speed input. #2: Input point X0 to X7 can conduct 10 to 60 ms digital filter adjustment.
Input indicator	LED display; light on = ON, light off = OFF		
Input voltage	--		
Action level	Off→On: 20 μs, On→Off: 30 μs		
Response time/ noise immunity #2	10 ms	0.5 μs	

◆ Output Points

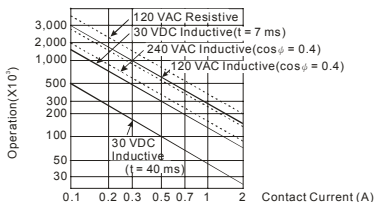| Terminal	Description	Response char.	Max. Cur. (Input)	Model 20D/20DT	Model 20M
CLR0+, LR0-, CLR1+, CLR1-	Clearing signals (by the error counter in Servo drive)	10 ms	20 mA	✓	✓
Y2 (for Z axis)	Same as clearing signals (CLR2)	10 ms	30 mA	-	✓
FP0+, FP0-, FP1+, FP1-	Forward/reverse running mode: Forward pulse output Pulse direction: towards pulse output end	500 kHz	40 mA	✓	✓

Terminal	Description	Response char.	Max. Cur. (Input)	Model 20D/20DT	Model 20M
FP2+, FP2-	A, B phase: A-phase output (FP2+ 、FP2- are for Z axis pulse output)	500 kHz	40 mA	-	✓
RP0+, RP0-, RP1+, RP1-	Forward/reverse running mode: Reverse pulse output	500 kHz	40 mA	✓	✓
RP2+, RP2-	Pulse direction: towards output end A, B phase: B-phase output (RP2+, RP2- are for Z axis pulse output)			-	✓

◆ Digital Output Points

	Spec / Item	Single common port transistor output [1] Low-speed	Single common port relay output [1]
Max. frequency		10 kHz	For load ON/OFF control
Output indicator		LED display; light on = ON, light off = OFF	
Min. load		--	2mA/DC power supply
Working voltage		5 to 30 VDC	< 250 VAC, 30 VDC
Insulation		Photo coupler isolation	Electromagnetic isolation
Maximum load	Resistive	0.5 A/1 point (4A/COM)	2 A/1 point (5 A/COM)
	Inductive	12 W (24 VDC)	[2]
	Lamp	2 W (24 VDC)	20 WDC/100 WAC
Max. output delay time	Off→On	20 μs [2]	10 ms
	On→Off	30 μs [2]	
Over-current protection		N/A	

#1: For DVP20PM00D, Y0 to Y7 are relay output terminals. For DVP20PM00M, Y2 and Y3 are low speed transistor output terminals and Y4 to Y7 are relay output terminals. For DVP20PM00DT, Y0 to Y7 are low speed transistor output terminals.
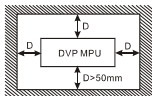
#2: Life curves

[Figure 4]

#3: Load = 0.5A

■ Installation

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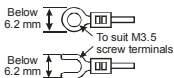

• **Direct Mounting:** Please use M4 screw according to the dimension of the product.
• **DIN Rail Mounting:** When mounting the PLC to 35mm DIN rail, be sure to use the retaining clip to stop any side-to-side movement of the PLC and reduce the chance of wires being loose. The retaining clip is at the 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, as shown in the figure.

■ Wiring

1. Use O-type or Y-type terminal. See the figure in the right hand side for its specification. PLC terminal screws should be tightened to 9.50 kg-cm (8.25 in-lbs) and please use only 60/75ºC copper conductor.

   Below 6.2 mm — To suit M3.5 screw terminals
   Below 6.2 mm

2. DO NOT wire empty terminal. DO NOT place the input signal cable and output power 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 type for DVP-20PM series is AC input. When operating the PLC, please note the following points:

1. The input voltage should be current and its range should be 100 to 240 VAC. The power should be connected to L and N terminals. Wiring AC110V or AC220V to +24V terminal or input terminal will result in serious damage on the PLC.

2. The AC power input for PLC MPU and I/O modules should be ON or OFF at the same time.

3. Use wires of 1.6mm (or longer) for the grounding of PLC MPU.

4. The power shutdown of less than 10 ms will not affect the operation of the PLC. However, 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 operation. (Care should be taken on the latched auxiliary relays and registers inside the PLC when programming).

5. The +24V output is rated at 0.5 A from MPU. 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, +24V terminal cannot give output to the external load that is more than 400 mA.

◆ Safety Wiring

In PLC control system, many devices are controlled at the same time and actions of any device could influence each other, i.e. breakdown of any device may cause the breakdown of the entire auto-control system and danger. Therefore, we suggest you wire a protection circuit at the power supply input terminal. See the figure below.
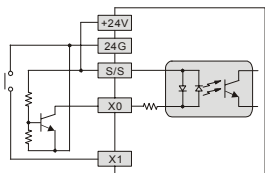

[Figure 5]

① AC power supply: 100 to 240 VAC, 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 DVP-PLC (main processing unit)

⑧ DC power supply output: 24 VDC, 500 mA

◆ 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.)
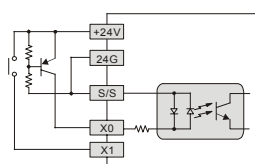
- DC Signal IN – SINK mode
  Input point loop equivalent circuit
- DC Signal IN – SOURCE mode
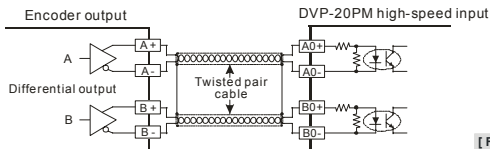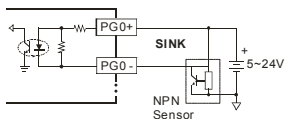 Input point loop equivalent circuit

[Figure 6]

[Figure 7]

◆ Wiring of Differential Inputs

A0 to A1 and B0 to B1 of DVP-20PM series are all 5 to 24 VDC high-speed input circuit and others are 24 VDC inputs. The working frequency of high-speed input circuits can reach up to 200 kHz and is mainly for connecting to differential (double-wire) LINE DRIVER output circuits.

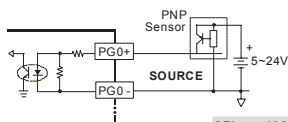- Wiring in a high-speed, high-noise environment

[Figure 8]

In a low-noise and low-frequency (less than 50 kHz) environment, you may also use 5 to 24 VDC SINK/SOURCE input of a single port.
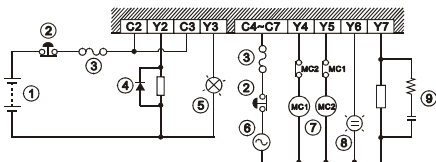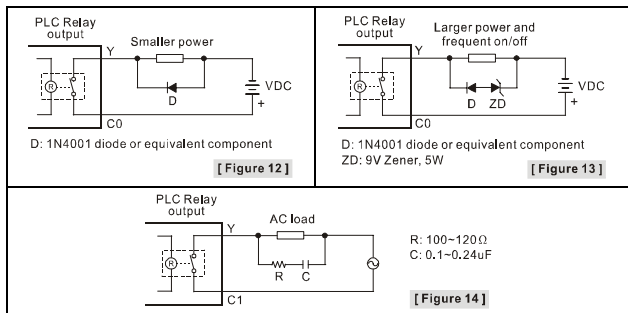

[Figure 9]

[Figure 10]
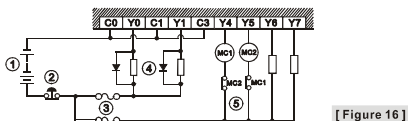
◆ Output Point Wirings

- Relay (R) contact circuit wiring

[Figure 11]

[Figure 12]

D: 1N4001 diode or equivalent component

[Figure 13]

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

[Figure 14]

R: 100~120Ω
C: 0.1~0.24uF
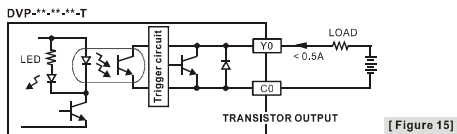
① DC power supply ② Emergency stop: Uses external switch

③ Fuse: Uses 5 to10 A fuse at the shared terminal of output contacts to protect the output circuit

④ Transient voltage suppressor: To extend the life span of contact
  1. Diode suppression of DC load: Used when in smaller power (Figure 12)
  2. Diode + Zener suppression of DC load: Used when in larger power and frequent On/Off (Figure 13)

⑤ Incandescent light (resistive load) ⑥ AC power supply

⑦ 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.

⑧ Neon indicator

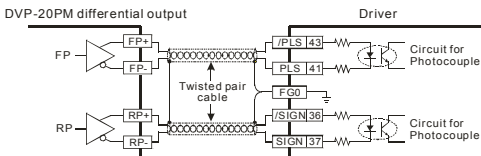⑨ Absorber: To reduce the interference on AC load (Figure 14)

• Transistor (T) contact circuit wiring

[Figure 15]

[Figure 16]

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.

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.
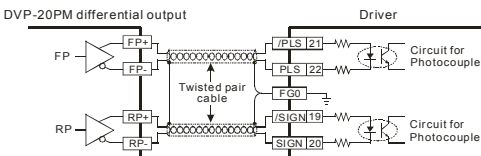
◆ Wiring of Differential Outputs

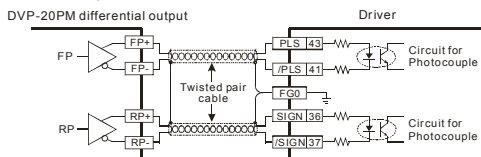• Differential outputs with ASDA-A & A+, ASDA-A2 series driver

[Figure 17]

• Differential outputs with ASDA-B series driver

[Figure 18]

• Differential outputs with ASDA-AB series driver

[Figure 19]

■ 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 are stored in SRAM memory and its power is supplied by the battery. Therefore, when the battery is in low voltage and the power-off has been lasted 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, refer to "Flash ROM permanently saved and recover mechanism" as stated below.

Permanently saved mechanism

You can use PMSoft (Options -> Copy SRAM to Flash) to indicate whether to permanently store the data in the latched area in Flash ROM memory (new 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, 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 (ºC)	-30	0	25	50	70
Life (year)	10	9	8	6	5