

DVP30EX2

2014-01-22



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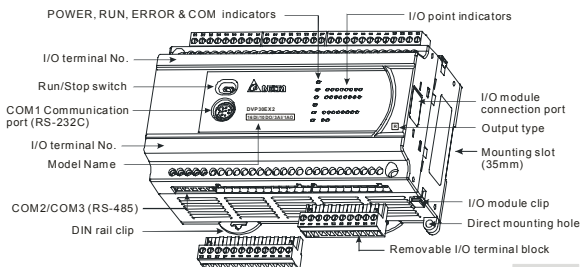
Second Generation Temperature/Analog I/O PLC



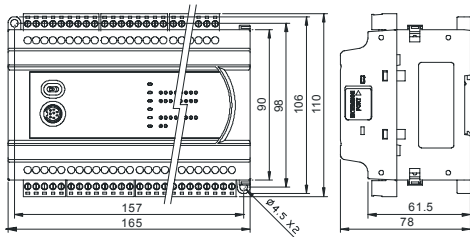
Thank you for choosing Delta's DVP-EX2 series PLC. DVP-EX2 series provides 30 points MPU (16 points digital Input, 10 points digital Output, 3 channel Analog input and 1 channel Analog output). The maximum I/O points including those on the MPU are 256 points. DVP-EX2 series PLCs satisfy various applications in that they can be used with analog input/output modules. Users do not have to install any batteries in DVP-EX2 series PLCs. The PLC programs and the latched data are stored in the high-speed flash memories.

- EN ✘ DVP30EX2 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 DVP30EX2, or to prevent an accident from damaging DVP30EX2, the control cabinet in which DVP30EX2 is installed should be equipped with a safeguard. For example, the control cabinet in which DVP30EX2 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 DVP30EX2 is powered up. After DVP30EX2 is disconnected, Do NOT touch any terminals in a minute. Make sure that the ground terminal ⚡ on DVP30EX2 is correctly grounded in order to prevent electromagnetic interference.
- FR ✘ DVP30EX2 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 DVP30EX2 pourra être endommagé. Merci de vérifier encore une fois le câblage avant la mise sous tension du DVP30EX2. 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 & Dimension



[Figure 1]



Unit: mm

[Figure 2]

■ Electrical Specifications

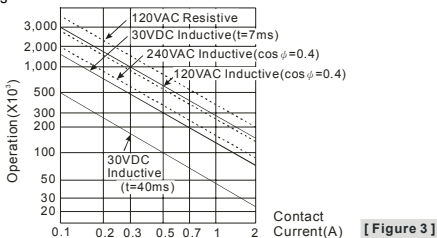
Model	DVP30EX200R	DVP30EX200T
Item		
Power supply voltage	100 ~ 240VAC (-15% ~ 10%), 50/60Hz ±5%	
Connector	European standard removable terminal block (Pin pitch: 5mm)	
Operation	DVP-EX2 starts to run when the power rises to 95 ~ 100VAC and stops when the power drops to 70VAC. If the power is suddenly cut off, the MPU will continue running for 10ms.	
Power supply fuse	2A/250VAC	
Power consumption	30VA	
DC24V current output	500mA	
Power supply protection	DC24V output short circuit protection	
Voltage withstand	1,500VAC (Primary-secondary), 1,500VAC (Primary-PE), 500VAC (Secondary-PE)	
Insulation resistance	> 5MΩ at 500VDC (between all I/O points and ground)	
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 shall not be less than that of L, N terminal of the power supply. (When many PLCs are in use at the same time, please make sure every PLC is properly grounded.)	
Environment	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)	505	530

Input Point				
Input No.	X0 ~ X3	X4 ~ X7	X10 ~ X17	
Type	Digital input			
Input type	DC (SINK or SOURCE)			
Input current	24VDC, 5mA			
Input impedance	3.9KΩ	4.7KΩ		
Max. frequency	100kHz	10kHz	60Hz	
Action level	Off → On	>15VDC		
	On → Off	< 5VDC		
Response time	Off → On	< 2.5μs	< 20us	< 10ms
	On → Off	< 5μs	< 50us	< 15ms
Filter time	X0 ~ X7	Adjustable within 0 ~ 20ms in D1020 (Default: 10ms)		

Output Point					
Output point type	Relay-R		Transistor-T		
Output point number	All		Y0, Y2	Y1, Y3	Y4~Y11
Voltage specification	< 250VAC, 30VDC		5 ~ 30VDC #1		
Max. frequency	1Hz		100kHz	10kHz	1kHz
Maximum load	Resistive	2A/1 point (5A/COM)	0.5A/1 point (4A/ZP)		
	Inductive	#2	15W (30VDC)		
	Lamp	20WDC/100WAC	2.5W(30VDC)		
Response time	Off → On	Approx .10ms	< 2μs	< 20μs	< 100μs
	On → Off		< 3μs	< 30μs	< 100μs

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

#2: Life curves



◆ Specifications of A/D, D/A and Temperature Sensors

Items	Analog Input (A/D) ^{#1}				Analog Output (D/A) ^{#1}		
	Voltage		Current		Voltage	Current	
Analog I/O range	±10V	±5V	1~5V	±20mA	4~20mA	±10V	0~20mA 4~20mA
Digital conversion range	±32,000		0~32,000	±32,000	0~32,000	±32,000	0~32,000
Resolution #2	16-bit				12-bit		
Input impedance	> 1MΩ		250Ω		-		
Output impedance	-				0.5Ω or lower		
Tolerance carried impedance	-				> 5KΩ	< 500Ω	
Response time	25ms ^{#3}				2ms ^{#4}		
Absolute input range	±15V		±32mA		-		
Average function	Provided (set up in D1062) ^{#5}				-		
Temperature Sensor	PT100 / PT1000 Input ^{#1}				NI100 / NI1000 Input ^{#1}		
Temperature Range	-180°C ~ 800°C				-80°C ~ 170°C		
Digital conversion range	-1800 ~ 8000				-800 ~ 1700		
Resolution	20-bit						
Response time	3-Wire: 210ms/2-Wire: 105ms						
Average function	Provided (set up in D1062) ^{#5}						
Overall accuracy	Non-linear accuracy: ±1% of full scale within the range of PLC operation temperature Maximum deviation: ±1% of full scale at 20mA and +10V						
Digital data format	2's complement of 16-bit, 12 significant bits						
Isolation method	No Isolation between digital circuit and analog circuit						
Protection	Voltage output has short circuit protection, but a long period of short circuit may cause internal wire damage and open circuit of current output.						

#1: Detailed explanation of D1115: (Default is HFFFF, disable all channels)

Bit15~12(D/A)	Bit11~8(A/D-Ch2)	Bit7~4(A/D-Ch1)	Bit3~0(A/D-Ch0)
D/A output mode	A/D input mode	A/D input mode	A/D input mode

A/D input mode:

Value	0	1	2	3	4	5
Mode	PT100(2wire)	NI100(2wire)	PT1000(2wire)	NI1000(2wire)	PT100(3wire)	NI100(3wire)
Value	6	7	8	9	A	B
Mode	PT1000(3wire)	NI1000(3wire)	-10V ~ +10V	-5V ~ +5V	+1V ~ +5V	-20mA~+20mA
Value	C	D	E	F		
Mode	4mA ~ 20mA	Reserved		Disabled		

D/A output mode:

Value	0	1	2	3~E	F
Mode	-10V ~ +10V	0mA ~ 20mA	4mA ~ 20mA	Reserved	Disabled

For example: Assume A/D-Ch0 is PT100(3wire), A/D-Ch1 is PT100(2wire), A/D-Ch2 is 4mA~20mA and D/A is 4~20mA, then the D1115 will be set to H2C04.

#2: Resolution formula

Analog Input (A/D)		Analog Output (D/A)	
Voltage	Current	Voltage	Current
$(312.5\mu V = \frac{20V}{64000})$	$(0.625\mu A = \frac{40mA}{64000})$	$(5mV = \frac{20V}{4000})$	$(5\mu A = \frac{20mA}{4000})$

#3: When the scan period is longer than 25ms, the setting will follow the scan period.

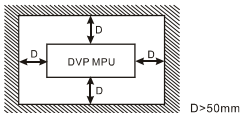
#4: When the scan period is longer than 2ms, the setting will follow the scan period.

- #5: When the sampling range is "1", the present value will be read. The setting range is 1~15.
 #6: PT sensors support PT100 and PT1000. The unit of the value is 0.1°C. That is, 1 indicates 0.1°C, 2 indicates 0.2°C, and etc.
 #7: NI sensors support NI100 and NI1000. The unit of the value is 0.1°C. That is, 1 indicates 0.1°C, 2 indicates 0.2°C, and etc.

■ 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.



■ Wiring

1. Use the 12-24 AWG single-core bare wire or the multi-core wire for the I/O wiring. The PLC terminal screws should be tightened to 3.80 kg-cm (3.30 in-lbs) and please use 60/75°C copper conductor only.
2. DO NOT wire empty terminal. DO NOT place the input signal wire and output power wire in the same wiring circuit.
3. DO NOT drop tiny metallic conductor into the PLC while screwing and wiring.
 - Please attach the dustproof sticker to the PLC before the installation to prevent conductive objects from dropping in.
 - Tear off the sticker before running the PLC to ensure normal heat dissipation.

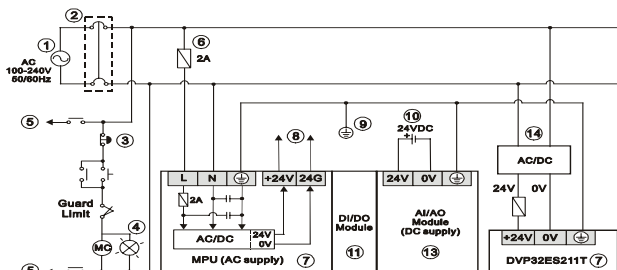
◆ Power Supply

The power input type for DVP-EX2 model is AC input. When operating DVP-EX2, please note the following points:

1. The range of the input voltage should be 100 ~ 240VAC. The power supply should be connected to L and N terminals. Please note that wiring AC110V or AC220V to +24V output terminal or digital input points will result in serious damage on the PLC.
2. The AC power inputs for the MPU and the digital I/O module should be ON or OFF at the same time.
3. Use 1.6mm wire (or longer) for the grounding of the PLC.
4. The power shutdown of less than 10ms will not affect the operation of the PLC. However, power shutdown time that is too long or the drop of power supply voltage will stop the running 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 0.5A from MPU. DO NOT connect other external power supplies to this terminal. Every input terminal requires 5 ~ 7mA to be driven; e.g. the 16-point input will require approximately 100mA. Therefore, +24V terminal cannot give output to the external load that is more than 400mA.

◆ 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 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 DVP-PLC (main processing unit) |
| ⑧ DC power supply output: 24VDC, 500mA*1 | ⑨ Grounding resistance: < 100Ω |
| ⑩ DC power supply: 24VDC | ⑪ Digital I/O module (DC supply) |
| ⑫ Digital I/O module (AC supply) | ⑬ Analog I/O module (DC supply) |
| ⑭ DC power supply: 20.4VDC~28.8VDC | |

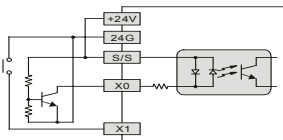
*1: It is suggested that the power output should not be supplied to HMIs.

◆ I/O 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

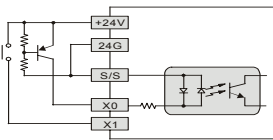
Input point loop equivalent circuit



[Figure 5]

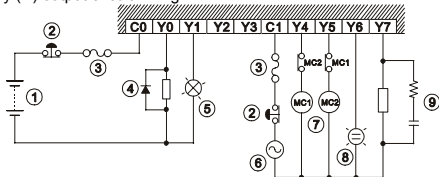
- DC Signal IN – SOURCE mode

Input point loop equivalent circuit

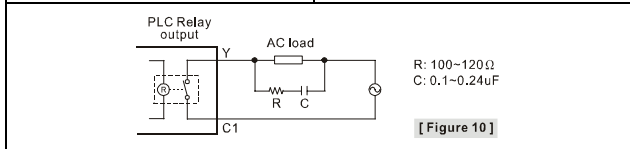
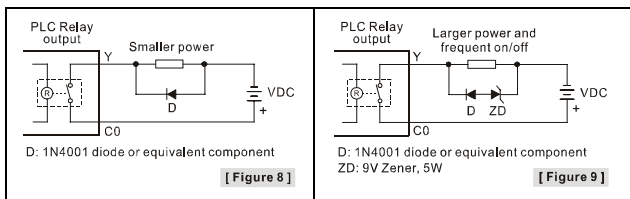


[Figure 6]

- Relay (R) output circuit wiring

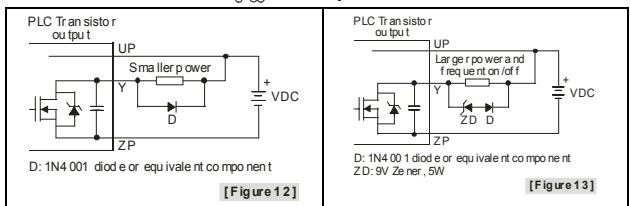
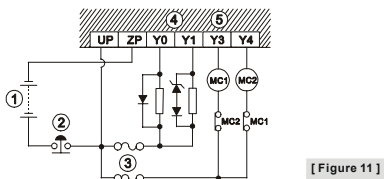


[Figure 7]



- 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: To extend the life span of contact.
 - 1. Diode suppression of DC load: Used when in smaller power (Figure 8)
 - 2. Diode + Zener suppression of DC load: Used when in larger power and frequent On/Off (Figure 9)
- 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 10)

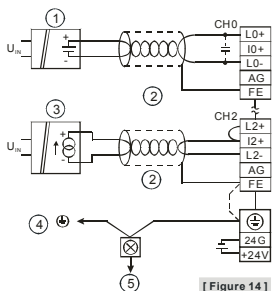
• Transistor (T) output circuit wiring



- 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 12)
 - 2. Diode + Zener suppression: Used when in larger power and frequent On/Off (Figure 13)
- ⑤ 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.

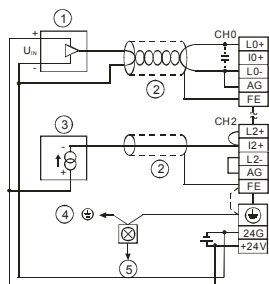
◆ Wiring of A/D, D/A, and Temperature Sensors

• A/D: Active



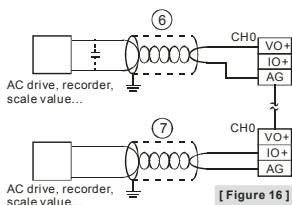
[Figure 14]

• A/D: Passive



[Figure 15]

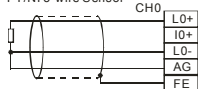
• D/A



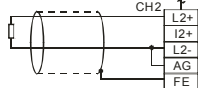
[Figure 16]

• PT/NI

PT/NI 3-wire Sensor



PT/NI 2-wire Sensor



[Figure 17]

- ① Voltage input ② Shielded cable ③ Current input
 ④ Terminal of power module ⑤ Grounding(100Ω or less) ⑥ Voltage output
 ⑦ Current output

Note: When the A/D module is connected to current signals, make sure to short-circuit "V+" and "I+" terminals.

◆ RS-485 Wiring

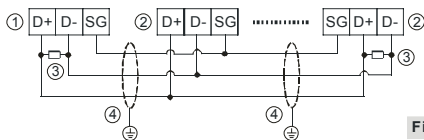


Figure 18

- ① Master node ② Slave node
 ③ Terminal resistor ④ Shielded cable

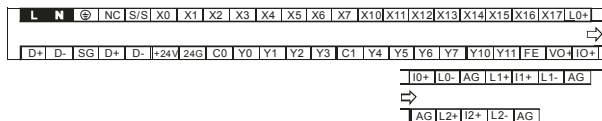
Note: 1. Terminal resistors are suggested to be connected to master and the last slave with resistor value of 120Ω.

2. To ensure communication quality, please apply double shielded twisted pair cable (20AWG) for wiring.

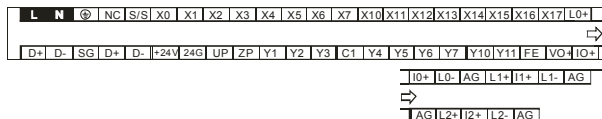
3. When voltage drop occurs between the internal ground references of two systems, connect the systems with Signal Ground point (SG) for achieving equal potential between systems so that a stable communication can be obtained.

■ I/O Terminal Layouts

• DVP30EX200R



• DVP30EX200T



■ Precision of the RTC (Second/Month)

Temperature (°C/°F)	0/32	25/77	55/131
Maximum error (Second)	-117	52	-132

Duration in which the RTC is latched: One week (Only version 2.00 and above are supported.)