

DVP32ES2-C

Instruction Sheet

安 裝 說 明
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2014-01-22



5012617102-3202

Second Generation Standard PLC (built-in CANopen)

標準型主機(內建CANopen)

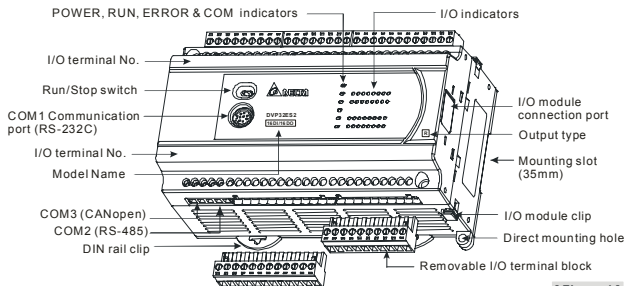
标准型主机(内建CANopen)



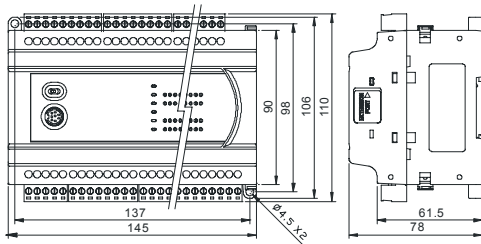
Thank you for choosing Delta's DVP-ES2 series PLC. DVP-ES2 series MPU provides 32 points (16 points digital Input, 16 points digital Output and built-in CANopen). The maximum I/O points including those on the MPU are 256 points. DVP-ES2 series PLCs satisfy various applications in that they can be used with analog input/output modules. Users do not have to install any batteries in DVP-ES2 series PLCs. The PLC programs and the latched data are stored in the high-speed flash memories.

- EN ✗ DVP32ES2-C 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 DVP32ES2-C, or to prevent an accident from damaging DVP32ES2-C, the control cabinet in which DVP32ES2-C is installed should be equipped with a safeguard. For example, the control cabinet in which DVP32ES2-C 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 DVP32ES2-C is powered up. After DVP32ES2-C is disconnected, DO NOT touch any terminals in a minute. Make sure that the ground terminal ⚡ on DVP32ES2-C is correctly grounded in order to prevent electromagnetic interference.
- FR ✗ DVP32ES2-C 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 une protection).
- FR ✗ Ne pas appliquer la tension secteur sur les bornes d'entrées/Sorties, ou l'appareil DVP32ES2-C pourra être endommagé. Merci de vérifier encore une fois le câblage avant la mise sous tension du DVP32ES2-C. 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]



[Figure 2]

■ Electrical Specifications

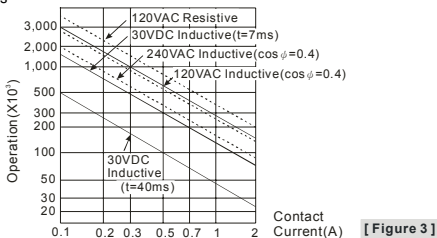
Model	DVP32ES200RC	DVP32ES200TC
Item		
Power supply voltage	100 ~ 240VAC (-15% ~ 10%), 50/60Hz ±5%	
Connector	European standard removable terminal block (Pin pitch: 5mm)	
Operation	DVP-ES2 starts to run when the power rises to 95 ~ 100VAC and stops when the power drops to 70VAC. If the power is suddenly cut off, the MPU will continue running for 10ms.	
Power supply fuse	2A/250VAC	
Power consumption	30VA	
DC24V current output*1	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)	489	432

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

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	< 20μs
	On → Off	< 5μs	< 50μs
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~Y17
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.



[Figure 3]

◆ CANopen Specifications

Communication type	PDO, SDO, SYNC (synchronous transmission), Emergency (emergency transmission), NMT
Serial communication speed	Supports 20K · 50K · 125K · 250K · 500K · 1M bps (bit/second)
Station address	1~127
Electrical isolation	500V DC
Communication cable	Users are suggested to use the Delta standard cable TAP-CB01 or TAP-CB02, and the communication cable should be kept away from the power cable.
Control flag M1349	ON: (Default) Communication is enabled. OFF: Communication is disabled.

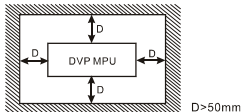
Note 1: The station addresses of slaves connected to DVP32ES2-C as a master only can range between 1 and 16. Besides, the station address of the master and that of the slave can not be the same.

Note 2: The network function of CANopen should be set by means of CANopen Builder. Please refer to the software manual for more information about the setting.

■ 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

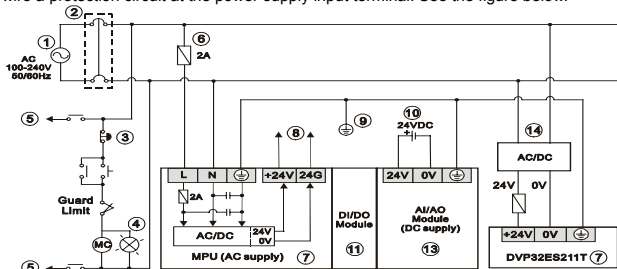
The power input type for DVP-ES2 model is AC input. When operating DVP-ES2, please note the following points:

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.

- Use 1.6mm wire (or longer) for the grounding of the PLC.
- 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.)
- 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]

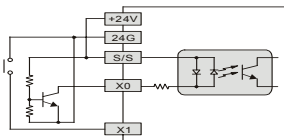
- | | |
|---|----------------------------------|
| ① AC power supply: 100 ~ 240VAC, 50/60Hz | ② Breaker |
| ③ Emergency stop: This button cuts off the system power supply when accidental emergency takes place. | |
| ④ Power indicator | ⑤ AC power supply load |
| ⑥ Power supply circuit protection fuse (2A) | ⑦ DVP-PLC (main processing unit) |
| ⑧ DC power supply output: 24VDC, 500mA | 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 | |

◆ I/O Point Wiring

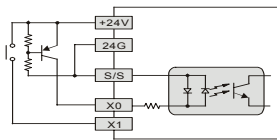
There are 2 types of DC inputs, SINK and SOURCE. (See the example below. For detailed point configuration, please refer to the specification of each model.)

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

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

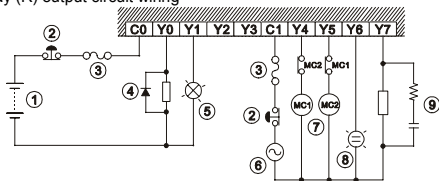


[Figure 5]

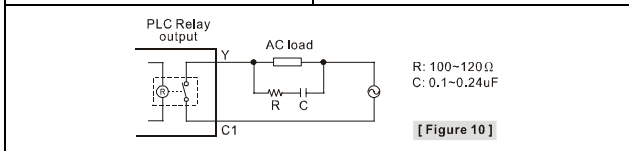
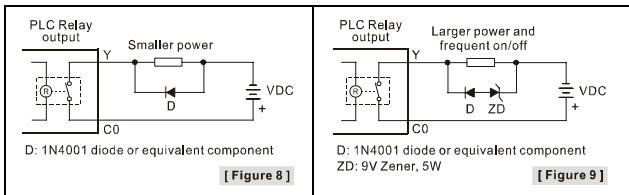


[Figure 6]

• Relay (R) output circuit wiring

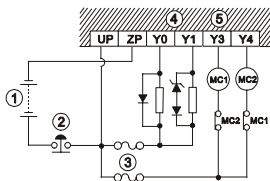


[Figure 7]

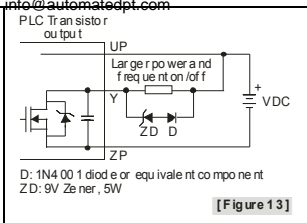
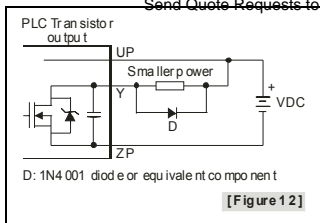


- ① DC power supply
- ② Emergency stop: Uses external switch
- ③ Fuse: Uses 5 ~ 10A fuse at the shared terminal of output contacts to protect the output circuit
- ④ Transient voltage suppressor: To extend the life span of contact.
 1. Diode suppression of DC load: Used when in smaller power (Figure 8)
 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



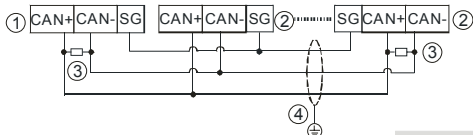
[Figure 11]



- 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.

◆ CANopen(COM3) Wiring

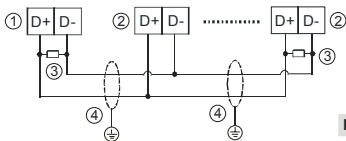
Signal(Color)	CAN+(White)	CAN-(Blue)	SG(Black)
Description	Signal+	Signal-	Signal Ground



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

Note: 1. When users build the CANopen network, they should connect CAN+ and CAN- (the white wire and the blue one respectively) to 120 ohm resistors.
2. The SG (Signal Ground) is the ground signal for the CANopen network's exclusive use.

◆ RS-485(COM2) Wiring



- 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.

■ Description of the CANopen(COM3) Communication Indicators

LED indicator	Description	Resolution
The green light keeps on.	DVP32ES200TC is normal.	No resolution is required.

LED indicator	Description	Resolution
The green light flashes once every one second.	DVP32ES200TC stops.	The program is being downloaded to the superior PLC, and users are waiting to finish downloading the program.
The green light flashes.	As a slave, the PLC is preparing to run.	<ol style="list-style-type: none"> 1. Check whether the CANopen bus cable is a standard one. 2. Check whether the wiring of the bus cable in the CANopen network is correct. 3. Check whether the transmission speed of the master is the same as that of the slave.
	As a master, the PLC is preparing to connect to the slave.	<ol style="list-style-type: none"> 1. Check whether the CANopen bus cable is a standard one. 2. Check whether the wiring of the bus cable in the CANopen network is correct. 3. Check whether the slave is off-line.
The red light flashes twice every one second.	The slave is off-line.	<ol style="list-style-type: none"> 1. Check whether the CANopen bus cable is a standard one. 2. Check whether both ends of the CANopen bus are connected to the terminal resistors.
The red light flashes once every one second.	The bus error exceeds the warning level.	<ol style="list-style-type: none"> 1. Check whether the CANopen bus cable is a standard one. 2. Check whether both ends of the CANopen bus are connected to the terminal resistors. 3. Check whether there is much interference around the CANopen bus cable.
The red light keeps on.	The bus is removed. (Bus-off)	<ol style="list-style-type: none"> 1. Check whether the wiring of the bus cable in the CANopen network is correct. 2. Check whether the transmission speed of DVP32ES200TC is the same as that of the slave.

■ Special D and Special M Used in CANopen

Special D/Special M	Attribute	Description
M1349	R/W	ON: The CANopen function is enabled. (Default: ON)
D9980	R	CANopen state message code
D9981 ~ D9996	R	CANopen state message codes of slave 1~slave 16
D9997	R	CANopen communication firmware version
D9998	R	Error states of slaves (bit0~15: Slave 1~Slave 16; ON: An error occurs.)

Note: Please refer to DVP-ES2/EX2/SS2/SA2/SX2/SE Operation Manual for more information about the CANopen communication.

■ I/O Terminal Layouts

- DVP32ES200RC, DVP32ES200TC

L	N	Ⓢ	NC	+24V	24G	S/S	X0	X1	X2	X3	X4	X5	X6	X7	X10	X11	X12	X13	X14	X15	X16	X17		
<i>DVP32ES2-R (16DI/16DO)</i>																								
EA	CAN-	SG	D+	D-	C0	Y0	Y1	Y2	Y3	C1	Y4	Y5	Y6	Y7	C2	Y10	Y11	Y12	Y13	C3	Y14	Y15	Y16	Y17

L	N	Ⓢ	NC	+24V	24G	S/S	X0	X1	X2	X3	X4	X5	X6	X7	X10	X11	X12	X13	X14	X15	X16	X17		
<i>DVP32ES2-T (16DI/16DO)</i>																								
EA	CAN-	SG	D+	D-	UP0	ZP0	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	UP1	ZP1	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17

■ 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.)