

# TP04P

## Instruction Sheet

安 裝 說 明  
安 裝 說 明

Text Panel PLC

文本顯示控制器

文本显示控制器

2013-12-25



5012625001-4P02



Thank you for choosing Delta TP series products. TP04P is composed of a text panel and a PLC. It supports abundant instructions. The capacity of the program memory it supports is 8K steps. TP04P features the same program download port shared by both PLC and TP editing software: WPLSoft/ISPSoft and TPEditor. It also offers various graphical objects for developing the program. The user can also obtain higher efficiency by purchasing additional extension cards, which increase the program portability and save the program download time. Please ensure to use TP series with Delta power supply module, DVPPS01, DVPPS02 or DVPPS05.

EN ✂ TP04P 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 TP04P, or to prevent an accident from damaging TP04P, the control cabinet in which TP04P is installed should be equipped with a safeguard. For example, the control cabinet in which TP04P 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 TP04P is powered up. After TP04P is disconnected, Do NOT touch any terminals in a minute. Make sure that the ground terminal (⊥) on TP04P is correctly grounded in order to prevent electromagnetic interference.

FR ✂ TP04P 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 TP04P pourra être endommagé. Merci de vérifier encore une fois le câblage avant la mise sous tension du TP04P. 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 Outline and Dimensions

### • Front Panel

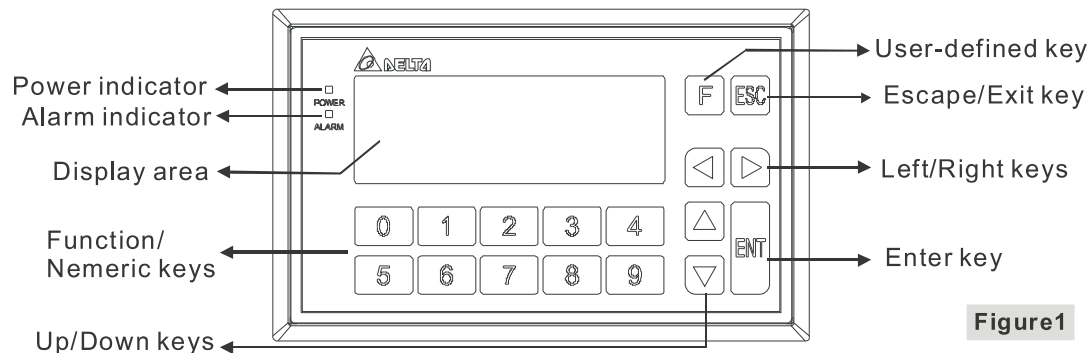


Figure1

### • Back Panel

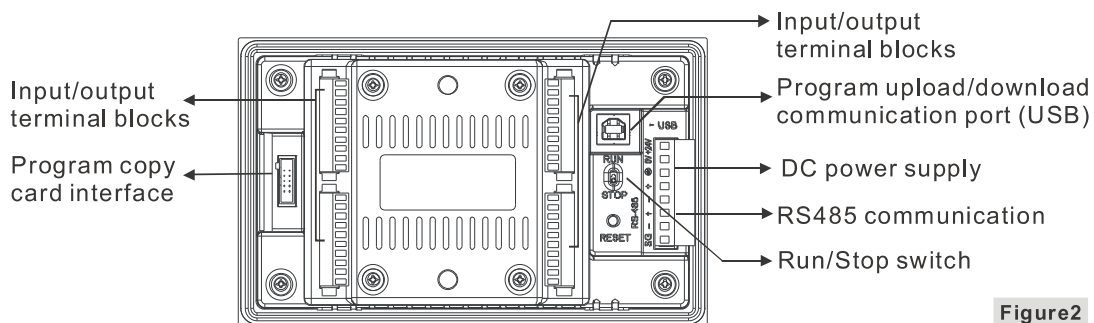
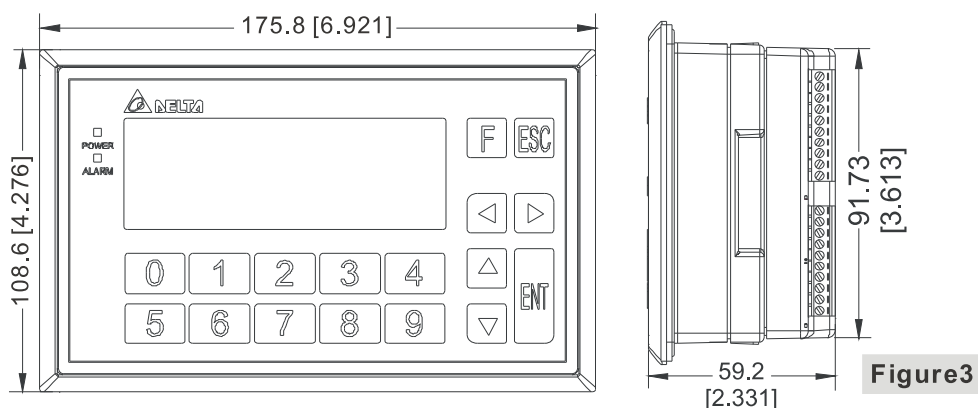
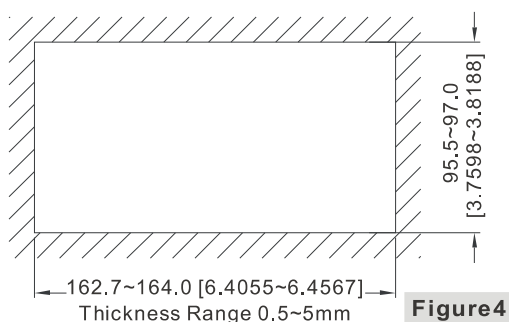


Figure2

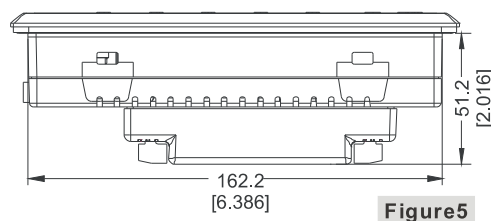
• **Front View and Right Side View (Units: mm, [ ]: inch)**



• **Mounting Dimensions (Units: mm, [ ]: inch)**



• **Top View (Units: mm, [ ]: inch)**



## ■ Function Specifications

Model	TP04P series
Spec.	
PLC program capacity	8k steps
Screen type/Display color	STN-LCD/Monochromatic
Driver	Delta automation products
Function/Numeric keys	0~9, ESC, F, Enter and Up/Down/Left/Right keys
Alarm LED indicator (Red)	Power indication (Blinking for three times)/Communication error alarm/User program indication
Backlight	Automatically turning off the backlight: 1~99 minutes (0: The backlight is not turned off.) (The life span of the backlight is about 50,000 hours at a temperature of 25°C)
Contrast adjustment	Set by software, 10 levels of adjustment
Language/Font	ASCII: (Code page 850) Alphanumeric code (including European characters) Taiwan: Traditional Chinese fonts China: Simplified Chinese fonts
Resolution	192 × 64 dots
Display range	101.8 mm (W) × 35.24 mm (H); 4.1" (diagonal)
Font size	ASCII: 5 × 8, 8 × 8, 8 × 12, 8 × 16
Display text	5×8 dots: 38 characters × 8 rows   8×12 dots: 24 characters × 5 rows 8×8 dots: 24 characters × 8 rows   8×16 dots: 24 characters × 4 rows
Program upload/download communication port USB (COM1)	Transmission method: Virtual communication port Data length: 7 or 8 bits, Stop bits: 1 or 2 bits, Parity: None/Odd/Even Baud rate: 9,600 bps~115,200 bps USB: USB (Type B) terminal
Extension communication port RS485 (COM2) RS485 (COM3)	Asynchronous transmission method: RS-485 Data length: 7 or 8 bits, Stop bits: 1 or 2 bits, Parity: None/Odd/Even Baud rate: 9,600 bps~115,200 bps RS-485: 8 PIN-removable terminal block
Download & Monitoring method	Download program to TP through virtual COM port
Extension interface	Slot for a program copy card

Spec. / Model	TP04P series
Panel component	Explanation
Alarm LED indicator (Red)	Status 1: When power is ON, LED will start to blink slowly Status 2: When the user-defined conditions are met, LED will blink for one second repeatedly along with an alarm sound.
Power LED indicator (Green)	When the power is connected to the product, LED will be ON.
Display area	LCM display area. It is used to display current program status.
Numeric keys	0~9: They function as constants. Users can also define the keys by themselves.
Function keys	Users can define the keys by themselves
Enter key	If the input value is correct, users can press the key. Users can define the key in the user page.
Up/Down/Left/Right keys	Up: increase the value or move up one page. Down: decrease the value or move down one page. Left: Left direction key. Can be used to select the position of the value. Right: Right direction key. Can be used to select the position of the value.

## ■ Electrical Specifications

Spec. / Model	TP04P-16TP1R	TP04P-32TP1R	TP04P-22XA1R	TP04P-21EX1R
CPU	LPC1787FBD208			
Program memory	1 MB-flash memory			
RAM of the system	64K Bytes			
Power supply voltage	24VDC (-15% ~ 20%) (With counter-connection protection on the polarity of DC input power)			
Power consumption	3.2W	5.2W	4.2W	4.2W
Power protection	With counter-connection protection on the polarity of DC input power			
Insulation resistance	> 5 MΩ (all I/O point-to-ground insulation resistance: 500 VDC)			
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 Damped-Oscillatory Wave: Power Line: 1KV, Digital I/O: 1KV RS (IEC 61131-2, IEC 61000-4-3): 26MHz~1GHz, 10V/m			
Ground	The diameter of ground cannot be less than the diameter of the power cable. (If several TP04P are used, they should be grounded directly.)			
Operating temperature for hardware	0°C~50°C: Relative humidity: 20%-90% RH (non-condensing)			
Storage temperature for hardware	-20°C~60°C			
Waterproof class of the front panel	IP66/NEMA4			
Vibration/Shock resistance	International standards IEC61131-2, IEC 68-2-6 (TEST Fc)/ IEC61131-2 & IEC 68-2-27 (TEST Ea)			
Weight	420g	444g	432g	432g
Dimensions	175.8 × 108.6 × 59.2 mm (Width(W) × Height(H) × Deep(D))			
Cooling method	Natural air cooling			

Item / Model	Input terminal	
	24VDC (-15% ~ 20%) single common terminal	
Input number	X0, X1	X2~X7, X10~X17
Input type	DC (Sinking or sourcing)	
Input voltage (±10%)	24VDC, 5mA	
Input impedance	4.7k ohm	
Maximum frequency	10KHz	60Hz
Action level	Off→On	> 16.5 VDC
	On→Off	< 8 VDC
Response time	Off→On	10ms
	On→Off	

Item	Model	Output terminal	
		Relay	
Voltage specifications		250VAC, < 30VDC	
Current specifications	Resistive	1.5A /1 point (5A/COM)	
	Inductive	#1	
	Bulb	20WDC/100WAC	
Response time Off→On		Approximately 10 ms	

#1: Life curves

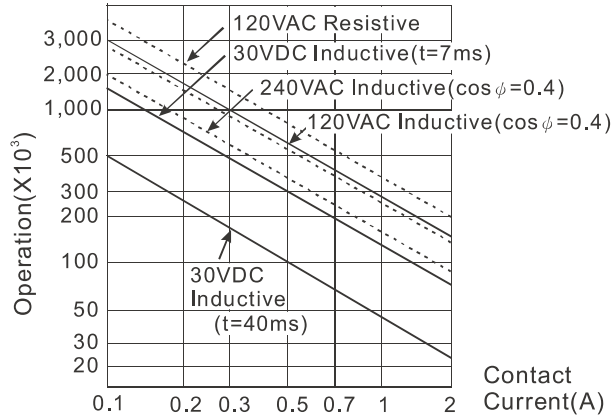


Figure 6

Item	Model	Specifications for the analog input/output of TP04P-22XA1R/TP04P-21EX1R			
		Voltage input*	Current input	Voltage output*	Current output
Analog input range		±10V	22XA1R: ±20mA 21EX1R: 0~20mA	--	--
Analog output range		--	--	±10V	0~20mA
Digital conversion range		±2000	22XA1R: ±1000 21EX1R: 0~4000	±2000	22XA1R: 0~4000 21EX1R: 0~4000
Resolution		12 bits (1LSB=5mV)	22XA1R: 11 bits (1LSB=20uA) 21EX1R: 12 bits (1LSB=5uA)	12 bits (1LSB=5mV)	12 bits (1LSB=5uA)
Input impedance		1MΩ	250Ω	--	--
Output impedance		--	--	100Ω	
Overall accuracy		25°C/77°F: The error is ±0.5% of the input within the range 0~55°C/32~131°F: The error is ±1% of the input within the range			
Response time		3ms/Channel			
Isolation		None		--	
Absolute Input range		±15V	22XA1R: ±32mA 21EX1R: 0~32mA	--	--
Digital data format		Two's complement of a 16-bit number 11 bits are significant bits.			
Maximum current output (Load allowed)		--	--	10mA (1KΩ~2MΩ)	0~500Ω
Protection		--	--	The voltage output is equipped with a short circuit protection and the overcurrent protection. (If the voltage output is short-circuited for a long time, it may be damaged.) The current output can be an open circuit.	

\*: The specifications for voltage output/voltage input is only applicable to TP04P-22XA1R.

Item	Model	TP04P-21EX1R
		Specifications for temperature measurement
Sensor type		2-wire/3-wire PT100
Driving current		1.6mA
Temperature input range		-20°C~160°C

Model	TP04P-21EX1R
Item	Specifications for temperature measurement
Digital conversion range	-200~1600
Resolution	0.1°C
Overall accuracy	0~55°C/32~131°F: The error is ±1% of the input within the range
Response time	300ms×Number of channels
Isolation	None
Digital data format	Two's complement of a 16-bit number

## ■ I/O Configuration (Figure 7)

TP04P-32TP1R (16DI/16DO)	TP04P-16TP1R (8DI/8DO)	TP04P-22XA1R (8DI/8DO/4AI/2AO)	TP04P-21EX1R (8DI/8DO/2AI/1AO/2PT)																																																																																																																																												
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## ■ Installation

Insert TP04P into the opening hole on the panel, and then tighten the screws. If it needs to be mounted firmly, please use the mounting fixed supports and screws in the accessory package which is packed with TP04P. Insert the hooks of the fixed supports into the fixing holes on the back, and then tighten the screws. Please refer to figure 8 and figure 9 below for more information.

(⚠ The torque exerted on a screw should be 4.75 (kg-cm). Please tighten the screws according to the specifications, otherwise the product may be damaged. If the fixed supports are not installed well, Delta will not guarantee the waterproof rating.) The cover of the mounting panel should be waterproof/dust proof or meet the related specifications (IP66/NEMA4).

Do not install TP04P in the following environment.



- A location full of Airborne dust, metallic particles, oily smoke, corrosive or flammable gases and liquids
- High-temperature and humid environment
- A location in which the product may be shocked and vibrated directly

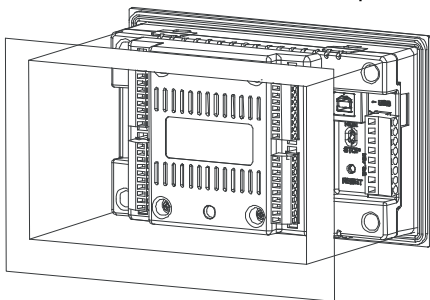


Figure 8

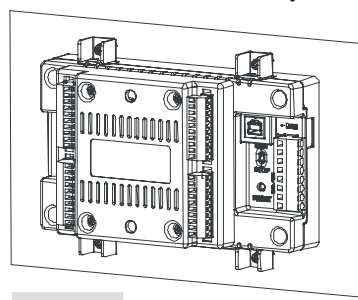
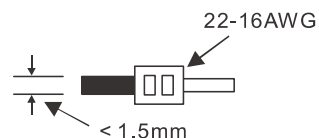


Figure 9

## ■ Wiring

1. Please use single-core cables or twin-core cables. The diameters of the cables used should be within the range between 16 AWG and 22 AWG (1.5mm). The torque applied to the screw terminals should be 1.90 kg-cm (1.65 in-lbs). Please use copper conducting wires. The temperature of the copper conducting wires should be 60/75°C.



2. DO NOT wire the empty terminal. DO NOT put the input signal cables and the output signal cables in the same wiring.
3. DO NOT drop any tiny metallic conductor into TP04P while you are tightening screw and wiring TP04P. After the wiring is complete, you have to ensure that heat can radiate from TP04P.

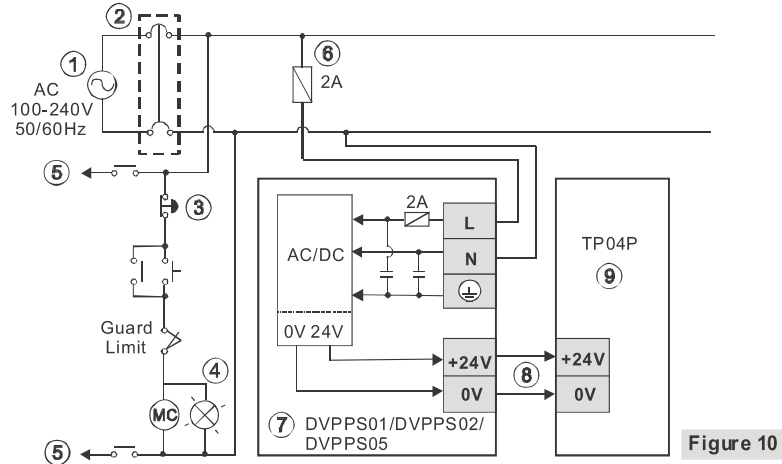
## ◆ Power Supply

The power input of TP04P is DC. When you operate TP04P, 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 20.4VDC, TP04P will stop running, all outputs will be Off, and the ERROR indicator will start to blink.
2. If a power failure lasts for less than 10 ms, the operation of TP04P will not stop. However, if a power failure lasts for long, or the power voltage decreases, TP04P will stop running, and all outputs will be off. After the power returns to the normal status, TP04P will automatically resume the operation. (Users have to note that TP04P is equipped with latched auxiliary relays and registers when they write a program.)

## ◆ Safety Wiring

Since TP04P is only compatible with DC power supply, Delta's power supply modules (DVPPS01/DVPPS02/DVPPS05) are suitable for it. It is suggested that you should install a protection circuit at the power supply terminal to protect DVPPS01, DVPPS02, or DVPPS05. See the figure below.

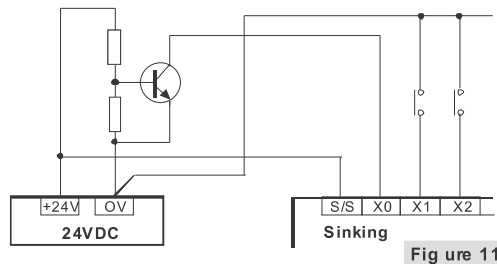


- |  |                           |
|--|---------------------------|
| ① AC power supply: 100 ~ 240VAC, 50/60Hz   | ② Breaker                 |
| ③ Emergency stop: The emergency stop button can be used to cut off the power when an emergency occurs. |                           |
| ④ Power indicator  | ⑤ AC power supply load    |
| ⑥ Power supply circuit protection fuse (2A)  | ⑦ DVPPS01/DVPPS02/DVPPS05 |
| ⑧ DC power supply output: 24VDC, 500mA   | ⑨ TP04P                   |

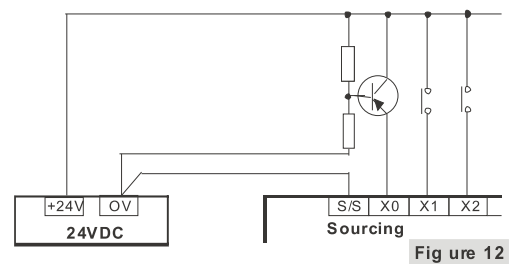
## ◆ Wiring Input Terminals

There are 2 types of DC inputs. They are sinking inputs and sourcing inputs. (See the figures below.)

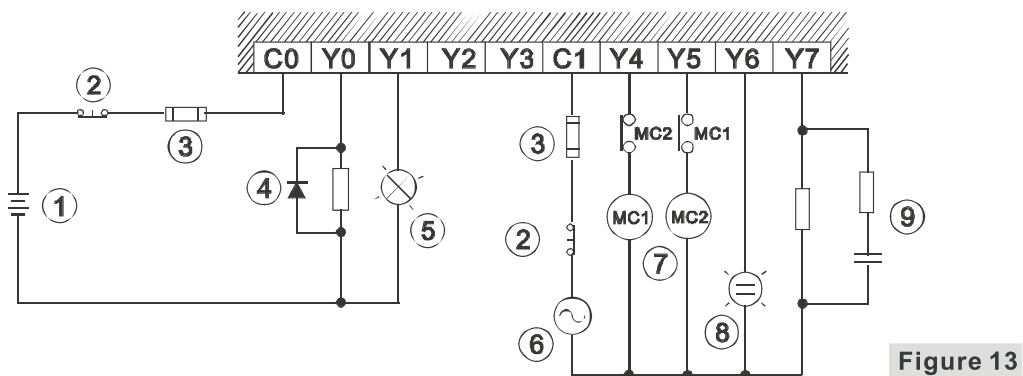
### ● Sinking mode

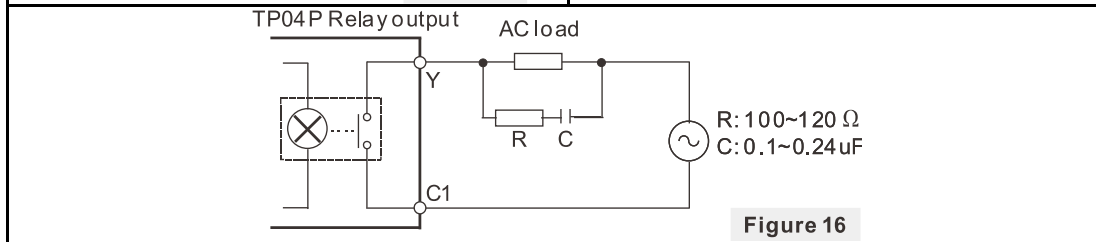
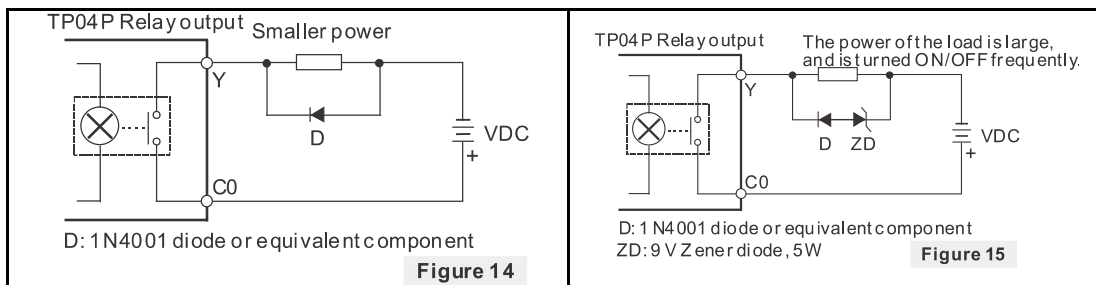


### ● Sourcing mode



## ◆ Wiring Relay Output Terminals





- ① DC power supply
- ② Emergency stop: An external switch is used.
- ③ Fuse: To protect an output circuit, a fuse having a breaking capacity in the range of 5 A to 10 A is connected to a common terminal.
- ④ Transient voltage suppression diode: It can be used to lengthen the lifespan that a contact has.
  1. A Diode is used to suppress the DC passing a load when the power of the load is small. (See figure 14.)
  2. A Diode and a Zener diode are used to suppress the DC passing a load when the power of the load is large, and is turned ON/OFF frequently. (See figure 15.)
- ⑤ Incandescent lamp (resistive load)
- ⑥ AC power supply
- ⑦ Mutually exclusive output: For example, Y4 controls the clockwise rotation of a motor, and Y5 controls the counterclockwise rotation of the motor. The interlock circuit which is formed, and the program in the TP04P series text panel ensure that there are protective measures if an abnormal condition occurs.
- ⑧ Indicator: Neon lamp
- ⑨ Surge absorber: It can be used to reduce the noise produced by an AC load. (See figure 16.)

## ◆ Wiring Analog Input Terminals

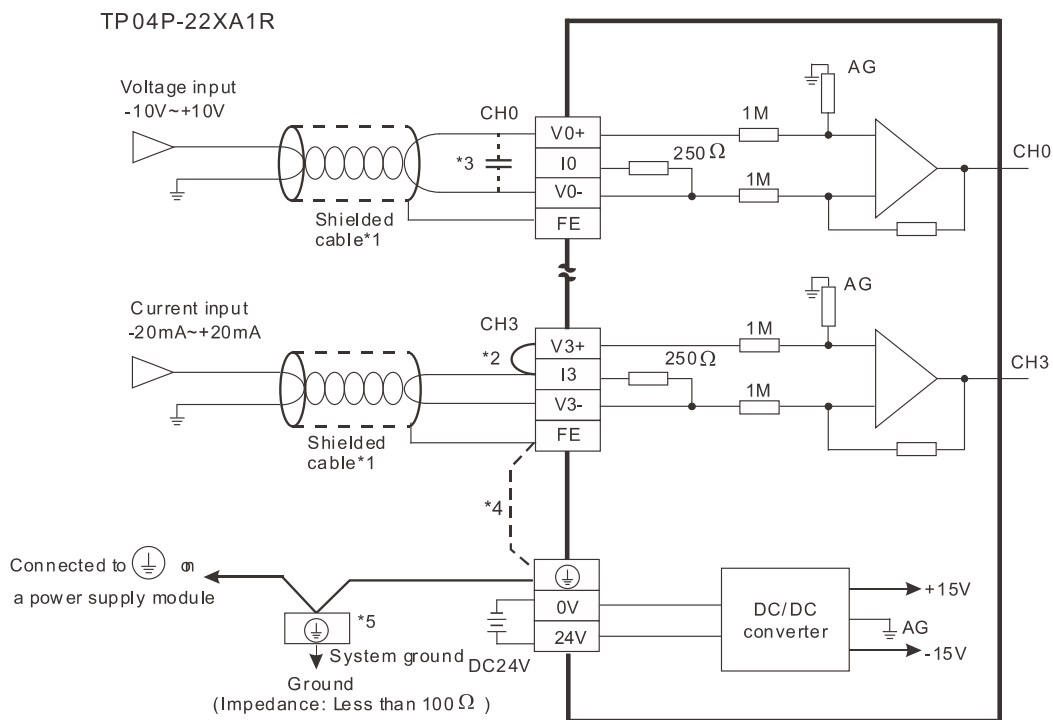


Figure 17



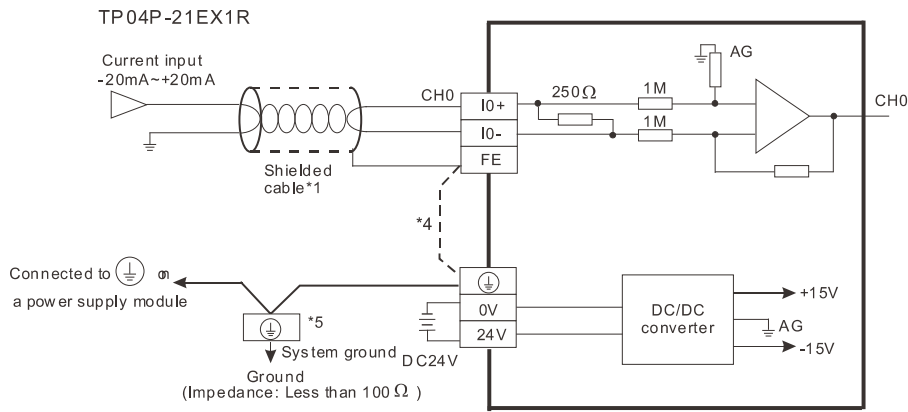


Figure 18

- \*1: Please isolate the analog input signal cables from other power cables.
- \*2: If the text panel is connected to a current signal, the terminals V3+ and I3+ must be short-circuited.
- \*3: If the ripple in the input voltage results in the noise interference with the wiring, please connect the text panel to the capacitor having a capacitance in the range of 0.1  $\mu\text{F}$  to 0.47  $\mu\text{F}$  with a working voltage of 25 V.
- \*4: If there is much noise, please connect the terminal FE to the ground terminal.
- \*5: Please connect the ground terminal on a power supply module and the analog input terminal FE to the system ground, and then ground the system ground or connect the system ground to a distribution box.

### ◆ Wiring of Analog Output Terminals

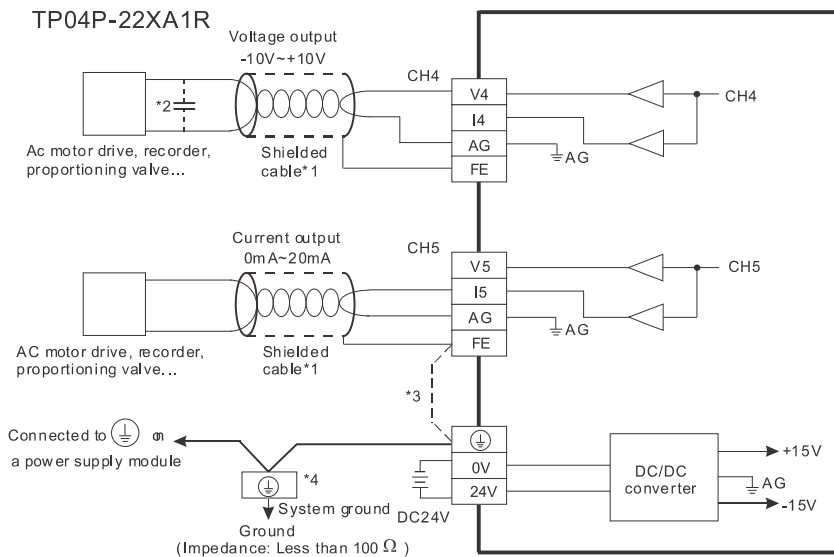


Figure 19

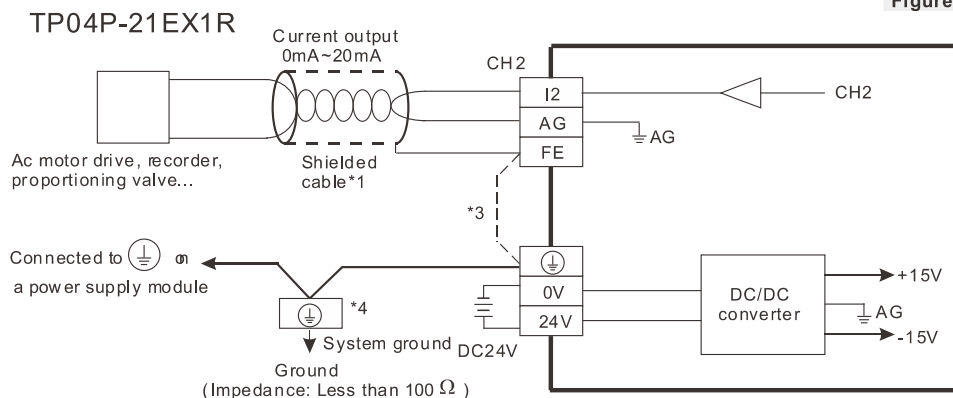


Figure 20

- \*1: Please isolate the analog output signal cables from other power cables.
- \*2: If a ripple is large for the input terminal of the load and results in the noise interference with the wiring, please connect the module to the capacitor having a capacitance in the range of 0.1  $\mu\text{F}$  to 0.47  $\mu\text{F}$  with a working voltage of 25 V.
- \*3: If there is much noise, please connect the terminal FE to the ground terminal.
- \*4: Please connect the ground terminal on a power supply module and the analog output terminal FE to the system ground, and then ground the system ground or connect the system ground to a distribution box.

## ◆ Wiring Temperature Sensors

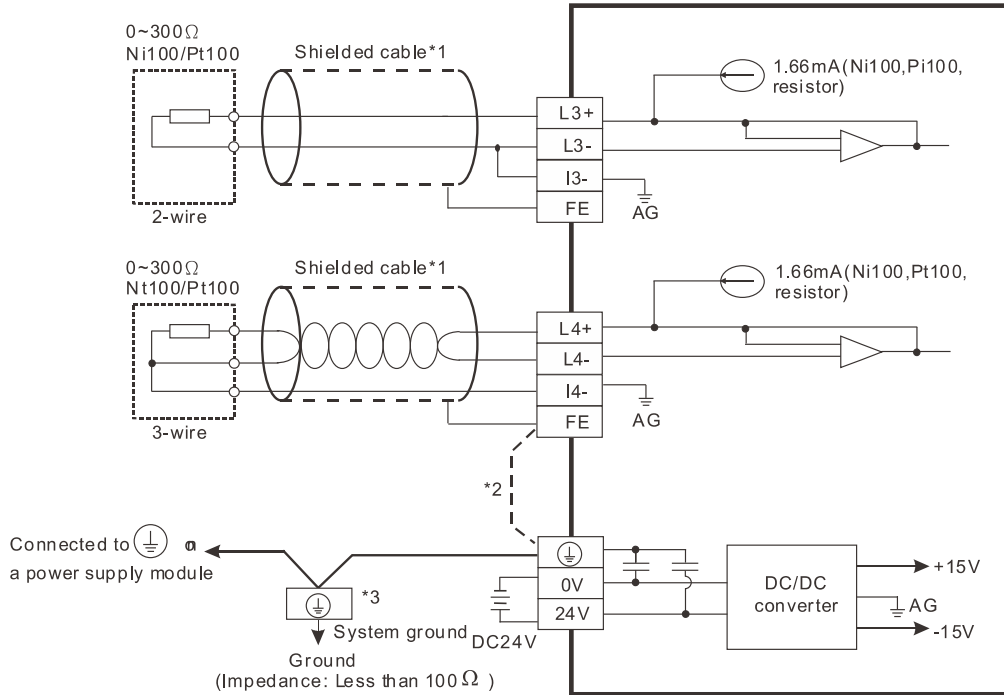


Figure 21

\*1: The cables connected to the input terminals should be the cables or the shielded twisted pair cables which can be connected to the temperature sensors, and should be kept separate from other power cables and cables which generate noise.

\*2: If there is much noise, please connect the terminal FE to the ground terminal.

\*3: Please connect the ground terminal on a power supply module and the analog input terminal FE to the system ground, and then ground the system ground or connect the system ground to a distribution box.

Note: Please do not wire the terminal NC.

## ◆ RS-485 Wiring

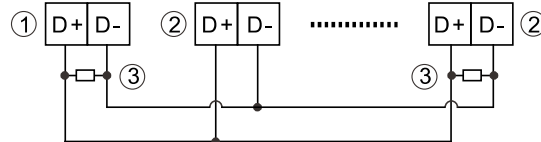


Figure 22

① Master station

② Slave station

③ Terminal resistor

Note: 1. The terminal resistor should be connected to the master station and the last slave station. The resistance of the terminal resistor should be 120Ω.

2. To ensure communication quality, it is suggested that users should use double shielded twisted pair cables (20AWG) for wiring.

## ■ Communication Connection

TP04P may connect to a PC by using USB adaptor cable.  
Please use an AM/BM USB adaptor cable.



Figure 23

## ■ Battery's Life

Temperature (°C)	-20	0	20	60
Life (Year)	2.0	2.5	2.7	2.8

## ■ Precision of the Real Time Clock (Second/Month)

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