

2017-02-10



5012625002-4P04

# 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

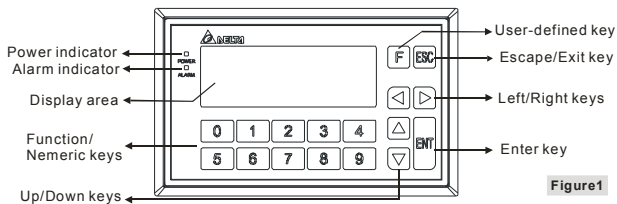


Thank you for choosing Delta TP series products. TP04P is composed of a text panel and a PLC. It supports abundant instructions. The capacity of the program memory it supports is 8K steps. TP04P features the same program download port shared by both PLC and TP editing software: WPLSoft/ISPSoft and TPEditor. 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.

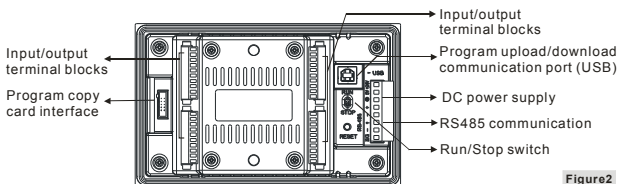
- EN ✘ TP04P is an OPEN-TYPE device. It should be installed in a control cabinet free of airborne dust, humidity, electric shock and vibration. To prevent non-maintenance staff from operating TP04P, or to prevent an accident from damaging TP04P, the control cabinet in which TP04P is installed should 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

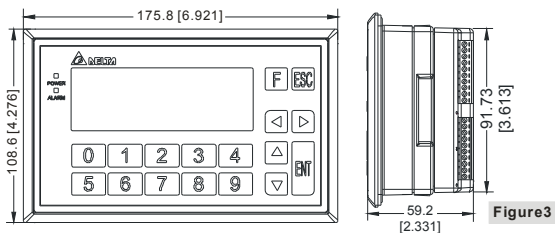
### • Front Panel



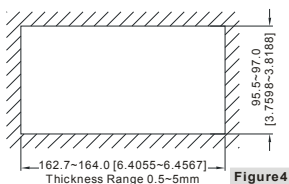
### • Back Panel



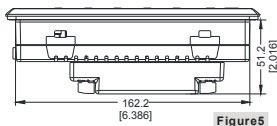
• **Front View and Right Side View (Units: mm, [ ]: inch)**



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



• **Top View (Units: mm, [ ]: inch)**



## ■ Function Specifications

Spec.	Model	TP04P series
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

Spec.	Model	TP04P series
Extension interface		Slot for a program copy card
Panel components		Description
Alarm LED indicator (Red)		Status 1: when turning on the power, this LED will start blinking slowly and when the power is ON, this LED will be off. Status 2: when the user-defined conditions are met, LED will blink every 1 second along with an alarm sound.
Power LED indicator (Green)		When the power is ON, this LED will be ON.
Display area		LCD module; it is used to display current program status.
Numeric keys		Keys 0~9 can be used for inputting constants. Users can also define the keys by themselves.
Function keys		Users can define the keys.
Enter key (ENT)		If the input value is correct, press the key to confirm the setting. Users can define the key in the user page.
Arrow keys		Up: for increasing the setting value or go to the previous page Down: for decreasing the setting value or go to the next page Left/Right: for selecting the position of the setting value Users can redefine functions of the arrow keys in the user page.

## ■ Electrical Specifications

Spec.	Model	TP04P-16TP1R/T	TP04P-32TP1R/T	TP04P-22XA1R/T	TP04P-21EX1R/T
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		3W / 2.5W	5W / 4.5W	4.7W / 4.5W	4.7W / 4.5W
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	<20us	10ms
	On→Off	<50us	

Item		Model	Output terminal	
			Relay	Transistor
Voltage specifications			250VAC, < 30VDC	12-24VDC
Current specifications	Resistive		1.5A /1 point (5A/COM)	1A /1 point (5A/COM)
	Inductive		#1	-
	Bulb		20WDC/100WAC	-
Response time Off→On			Approximately 10 ms	Approximately 10 ms

#1: Life curves

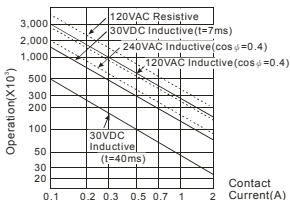


Figure 6

Item		Model	Specifications for the analog input/output of TP04P-22XA1R/T			
			Voltage input	Current input	Voltage output	Current output
Analog range			±10V	±20mA	±10V	0~20mA
Digital conversion range			±2000	±1000	±2000	0~4000
Resolution			12 bits (1LSB=5mV)	11 bits (1LSB=20uA)	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	±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.			

Item		Model	Specifications for the analog input/output of TP04P-21EX1R/T	
			Current input	Current output
Analog I/O range			0~20mA	0~20mA
Digital conversion range			0~4000	0~4000
Resolution			12 bits(1LSB=5uA)	12 bits(1LSB=5uA)
Input impedance			250Ω	--
Output impedance			--	100Ω
Response time			3ms/Channel	
Absolute Input range			0~32mA	--
Maximum current output (Load allowed)			--	0~500Ω
Specifications for temperature measurement				
Sensor type			2-wire/3-wire Pt100	
Driving current			1.6mA	
Temperature input range			-20°C~300°C	
Digital conversion range			-200~3000	
Resolution			0.1°C	
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			300ms×Number of channels	
Isolation			None	

Item	Model	Specifications for the analog input/output of TP04P-21EX1R/T	
		Current input	Current output
Digital data format		Two's complement of a 16-bit number 11 bits are significant bits.	
Protection		The current output can be an open circuit.	

I/O Configuration (Figure 7)																																																																																																																																															
TP04P-32TP1R/T (16DI/16DO)	TP04P-16TP1R/T (8DI/8DO)	TP04P-22XA1R/T (8DI/8DO/4AI/2AO)	TP04P-21EX1R/T (8DI/8DO/2AI/1AO/2PT)																																																																																																																																												
<table border="1"> <tr><td>S/S0</td><td>C0</td></tr><tr><td>X0</td><td>Y0</td></tr><tr><td>X1</td><td>Y1</td></tr><tr><td>X2</td><td>Y2</td></tr><tr><td>X3</td><td>Y3</td></tr><tr><td>X4</td><td>Y4</td></tr><tr><td>X5</td><td>Y5</td></tr><tr><td>X6</td><td>Y6</td></tr><tr><td>X7</td><td>Y7</td></tr><tr><td>•</td><td>•</td></tr><tr><td>S/S1</td><td>C1</td></tr><tr><td>X10</td><td>Y10</td></tr><tr><td>X11</td><td>Y11</td></tr><tr><td>X12</td><td>Y12</td></tr><tr><td>X13</td><td>Y13</td></tr><tr><td>X14</td><td>Y14</td></tr><tr><td>X15</td><td>Y15</td></tr><tr><td>X16</td><td>Y16</td></tr><tr><td>X17</td><td>Y17</td></tr><tr><td>•</td><td>•</td></tr></table>	S/S0	C0	X0	Y0	X1	Y1	X2	Y2	X3	Y3	X4	Y4	X5	Y5	X6	Y6	X7	Y7	•	•	S/S1	C1	X10	Y10	X11	Y11	X12	Y12	X13	Y13	X14	Y14	X15	Y15	X16	Y16	X17	Y17	•	•	<table border="1"> <tr><td>S/S0</td><td>C0</td></tr><tr><td>X0</td><td>Y0</td></tr><tr><td>X1</td><td>Y1</td></tr><tr><td>X2</td><td>Y2</td></tr><tr><td>X3</td><td>Y3</td></tr><tr><td>X4</td><td>Y4</td></tr><tr><td>X5</td><td>Y5</td></tr><tr><td>X6</td><td>Y6</td></tr><tr><td>X7</td><td>Y7</td></tr><tr><td>•</td><td>•</td></tr></table>	S/S0	C0	X0	Y0	X1	Y1	X2	Y2	X3	Y3	X4	Y4	X5	Y5	X6	Y6	X7	Y7	•	•	<table border="1"> <tr><td>S/S0</td><td>C0</td></tr><tr><td>X0</td><td>Y0</td></tr><tr><td>X1</td><td>Y1</td></tr><tr><td>X2</td><td>Y2</td></tr><tr><td>X3</td><td>Y3</td></tr><tr><td>X4</td><td>Y4</td></tr><tr><td>X5</td><td>Y5</td></tr><tr><td>X6</td><td>Y6</td></tr><tr><td>X7</td><td>Y7</td></tr><tr><td>•</td><td>•</td></tr><tr><td>V0+</td><td>V3+</td></tr><tr><td>V0-</td><td>V3-</td></tr><tr><td>I0</td><td>I3</td></tr><tr><td>V1+</td><td>FE</td></tr><tr><td>V1-</td><td>V4</td></tr><tr><td>I1</td><td>I4</td></tr><tr><td>V2+</td><td>AG</td></tr><tr><td>V2-</td><td>V5</td></tr><tr><td>I2</td><td>I5</td></tr><tr><td>FE</td><td>AG</td></tr></table>	S/S0	C0	X0	Y0	X1	Y1	X2	Y2	X3	Y3	X4	Y4	X5	Y5	X6	Y6	X7	Y7	•	•	V0+	V3+	V0-	V3-	I0	I3	V1+	FE	V1-	V4	I1	I4	V2+	AG	V2-	V5	I2	I5	FE	AG	<table border="1"> <tr><td>S/S0</td><td>C0</td></tr><tr><td>X0</td><td>Y0</td></tr><tr><td>X1</td><td>Y1</td></tr><tr><td>X2</td><td>Y2</td></tr><tr><td>X3</td><td>Y3</td></tr><tr><td>X4</td><td>Y4</td></tr><tr><td>X5</td><td>Y5</td></tr><tr><td>X6</td><td>Y6</td></tr><tr><td>X7</td><td>Y7</td></tr><tr><td>•</td><td>•</td></tr><tr><td>I0+</td><td>I3+</td></tr><tr><td>I0-</td><td>I3-</td></tr><tr><td>FE</td><td>I3-</td></tr><tr><td>I1+</td><td>FE</td></tr><tr><td>I1-</td><td>•</td></tr><tr><td>FE</td><td>L4+</td></tr><tr><td>•</td><td>L4-</td></tr><tr><td>I2</td><td>I4-</td></tr><tr><td>AG</td><td>FE</td></tr><tr><td>FE</td><td>•</td></tr></table>	S/S0	C0	X0	Y0	X1	Y1	X2	Y2	X3	Y3	X4	Y4	X5	Y5	X6	Y6	X7	Y7	•	•	I0+	I3+	I0-	I3-	FE	I3-	I1+	FE	I1-	•	FE	L4+	•	L4-	I2	I4-	AG	FE	FE	•
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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

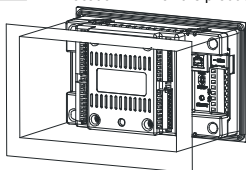


Figure 8

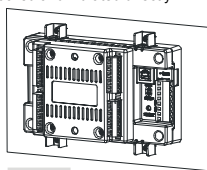
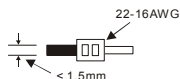


Figure 9

## ■ 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.

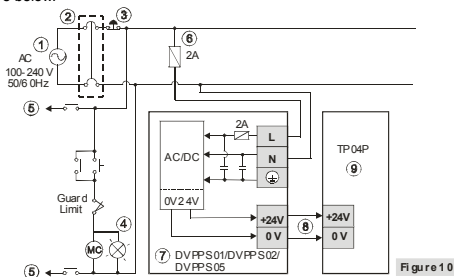
### ◆ Power Supply

The power input of TP04P is DC. When you operates 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

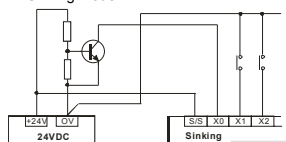


Figure 11

#### ● Sourcing mode

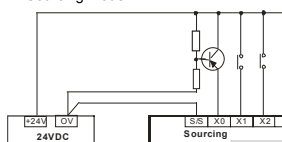
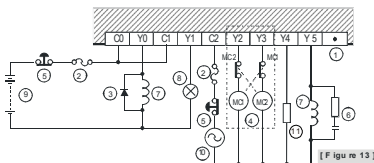


Figure 12

### ◆ Wiring Relay Output Terminals (Sink)



- ① DO NOT wire empty terminal
- ② Fuse
- ③ Reverse current protection diode\*1
- ④ Manual exclusive output\*2
- ⑤ Emergency stop: by external switch
- ⑥ Surge absorber\*3
- ⑦ Inductive load
- ⑧ Indicator: incandescent light
- ⑨ DC power supply
- ⑩ AC power supply
- ⑪ Resistive load

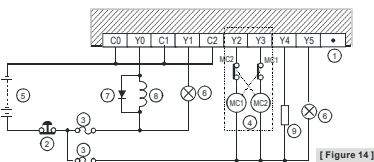
\*1: There is no internal protection circuit in the output relay of the PLC; therefore when activating an inductive load, we suggest you parallel connect a reverse current protection diode to extend the life of the contact.

- The diode has to be able to endure max. 5 ~ 10 times of load voltage.
- The positive current of the diode has to be bigger than load current.

\*2: Manual exclusive output uses external circuit and forms an interlock, together with the PLC internal program, to ensure safety protection in case of any unexpected errors.

\*3: There is no internal protection circuit in the output relay of the PLC; therefore when activating an inductive load, we suggest you parallel connect a surge absorber (0.1uF + "100ohm to 120ohm") to reduce the noise on AC load and extend the life of the contact.

### ◆ Wiring Transistor Output Terminals (Sink)



- ① DO NOT wire empty terminal
- ② Emergency stop
- ③ Fuse
- ④ Manual exclusive output\*1
- ⑤ DC power supply
- ⑥ Indicator: incandescent light
- ⑦ Reverse current protection diode\*2
- ⑧ Inductive load
- ⑨ Resistive load

\*1: Manual exclusive output uses external circuit and forms an interlock, together with the PLC internal program, to ensure safety protection in case of any unexpected errors.

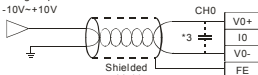
\*2: Use a Zener diode (39V) in the PLC to protect the transistor output. When activating inductive load, we suggest you parallel connect a reverse current protection diode.

### ◆ Wiring Analog I/O and Temperature Sensor

#### ● TP04P-22XA1R

##### Analog Input

Voltage input  
-10V~+10V



Current input  
-20mA~+20mA

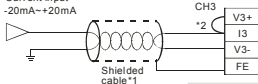
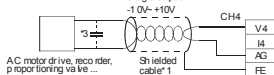


Figure 15

##### Analog Output

Voltage output  
-10V~+10V



Current output  
0mA~20 mA

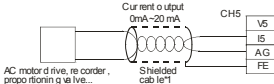


Figure 16



## ● TP04P-21EX1R

### Analog Input

Current input  
-20mA~+20mA

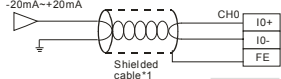


Figure 17

### Analog Output

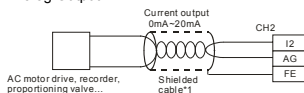


Figure 18

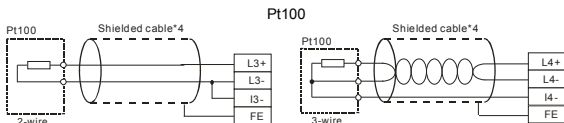


Figure 19

- \*1: The cables connected to the analog input terminals should be kept separate from other power cables and cables which generate noise.
- \*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: 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.

## ◆ RS-485 Wiring

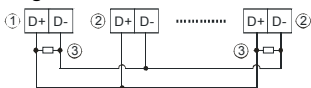


Figure 20

- 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 120 $\Omega$ .

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 21

## ■ Battery's Life

Temperature ( $^{\circ}\text{C}$ )	-20	0	20	60
Life (Year)	2.0	2.5	2.7	2.8

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

Temperature ( $^{\circ}\text{C}/^{\circ}\text{F}$ )	0/32	25/77	55/131
Maximum error (Second)	-117	52	-132