

TP04P

Instruction Sheet

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Text Panel PLC
文本顯示控制器
文本显示控制器

2013-01-07



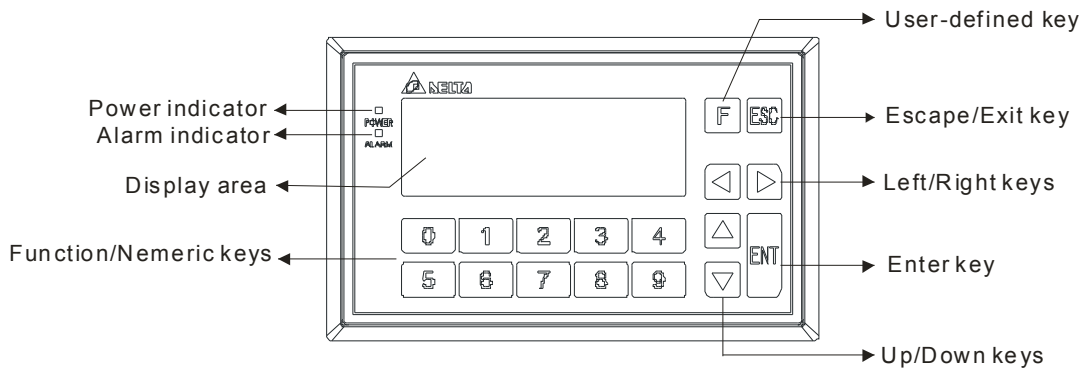
5012625000-4P00

Thank you for choosing Delta TP series products. TP04P is a text panel PLC supporting 16~32 inputs and outputs, various instructions, and 8k steps SRAM for programming. TP04P features the same program download port shared by both PLC and TP editing software: WPLSoft 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 and DVPPS02.

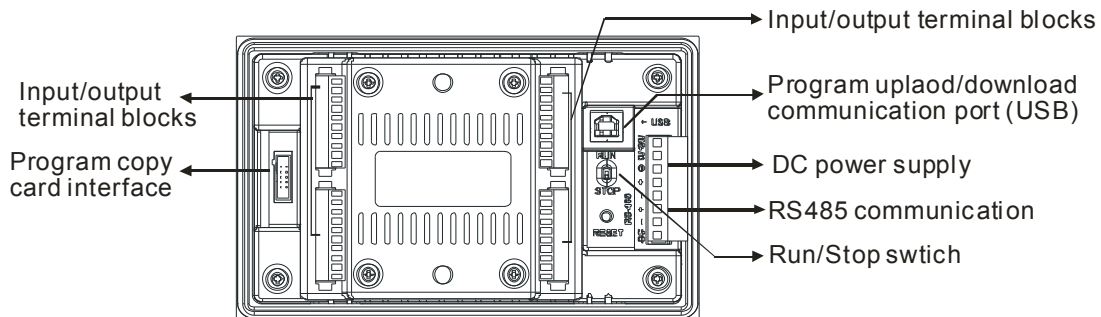
- ✎ Please read this instruction carefully before use. This instruction sheet only provides introductory information on electrical specifications, general specifications, installation and wiring. For detailed information on programming and instructions, please refer to “DVP-ES2/EX2/SS2/SA2/SX2/SE Operation Manual—Programming”. For information about optional peripherals, please see individual product instruction sheet enclosed with TP04P.
- ✎ Switch off the power before wiring. DO NOT touch any terminal when the power is switched on. DO NOT touch any internal circuit in 1 minute after the power is switched off.
- ✎ DO NOT connect AC input power to any of the input/output terminals, otherwise serious damage may occur. Check all the wiring again before switching on the power.
- ✎ Make sure the ground terminal (⊕) is correctly grounded in order to prevent electromagnetic interference.
- ✎ The display panels of TP04P series products are waterproof. However, please prevent grease, corrosive liquids and sharp objects from contacting TP04P series products.
- ✎ Please use the fixed supports which are packed in the product package. Tighten the cables or screws according to the specified torque, otherwise serious damage may occur.

■ Product Outline and Dimensions

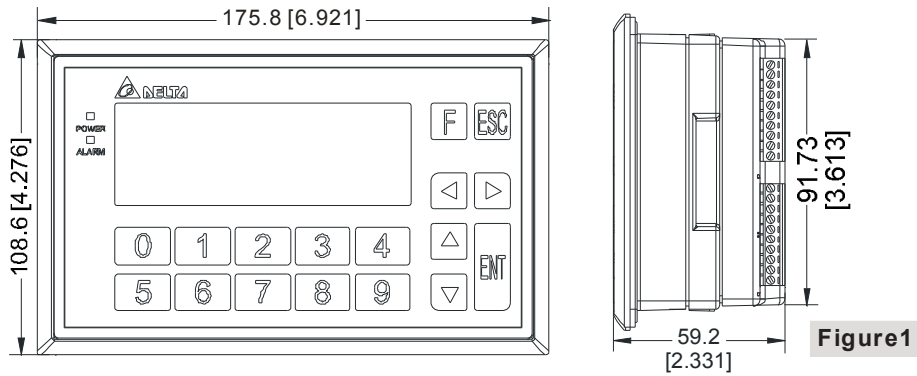
• Front Panel



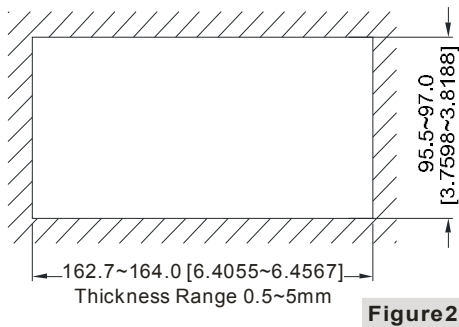
• Back Panel



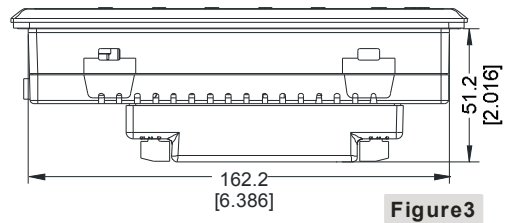
• **Front View and Right Side View (Units: mm, []: inch)**



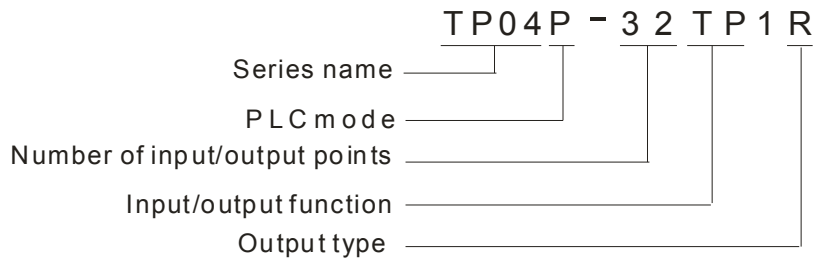
• **Mounting Dimensions (Units: mm, []: inch)**



• **Top View (Units: mm, []: inch)**



■ **Model Name and Serial Number**



■ **Function Specifications**

Spec.	Model	TP04P series
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

Spec. / Model	TP04P series	
Display text	5×8 dots: 38 characters × 8 rows 8×8 dots: 24 characters × 8 rows	8×12 dots: 24 characters × 5 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	
Battery cover	DC 3V battery	
Monitoring method	Download program to TP through virtual COM port	
Extension interface	Slot for a program copy card	

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
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
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 PLCs are used, they should be grounded directly.)	
Operating temperature for hardware	0°C~50°C: Relative humidity: 20%-90% RH (non-condensing)	

Model	TP04P-16TP1R	TP04P-32TP1R
Spec.		
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
Dimensions	175.8 × 108.6 × 59.2 mm (Width(W) × Height(H) × Deep(D))	
Cooling method	Natural air cooling	

Model		Input terminal	
Item		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	
Model		Output terminal	
Item		Relay	
Current specifications		2A/1 point (5A/COM)	
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

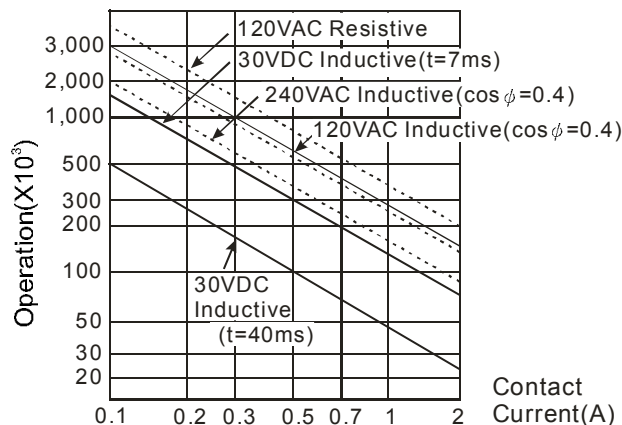


Figure 4

■ I/O Configuration

Model	Input		Output		I/O Configuration	
	Point	Type	Point	Type	32TP1R	16TP1R
TP04P-32TP1R	16	DC (Sink or Source)	16	Relay	S/S0 X0 X1 X2 X3 X4 X5 X6 X7 ●	C0 Y0 Y1 Y2 Y3 Y4 Y5 Y6 Y7 ●
TP04P-16TP1R	8		8		S/S1 X10 X11 X12 X13 X14 X15 X16 X17 ●	C1 Y10 Y11 Y12 Y13 Y14 Y15 Y16 Y17 ●

■ 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 5 and figure 6 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

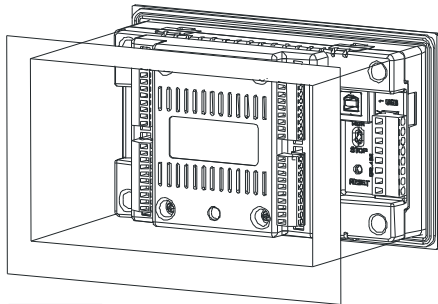


Figure5

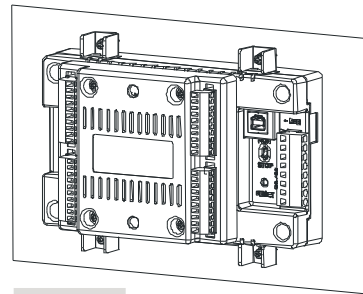
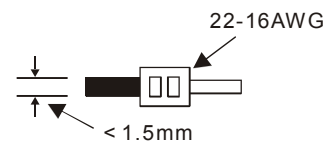


Figure6

■ 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 the PLC while you are tightening screw and wiring the PLC. After the wiring is complete, you have to ensure that heat can radiate from the PLC.

◆ Power Supply

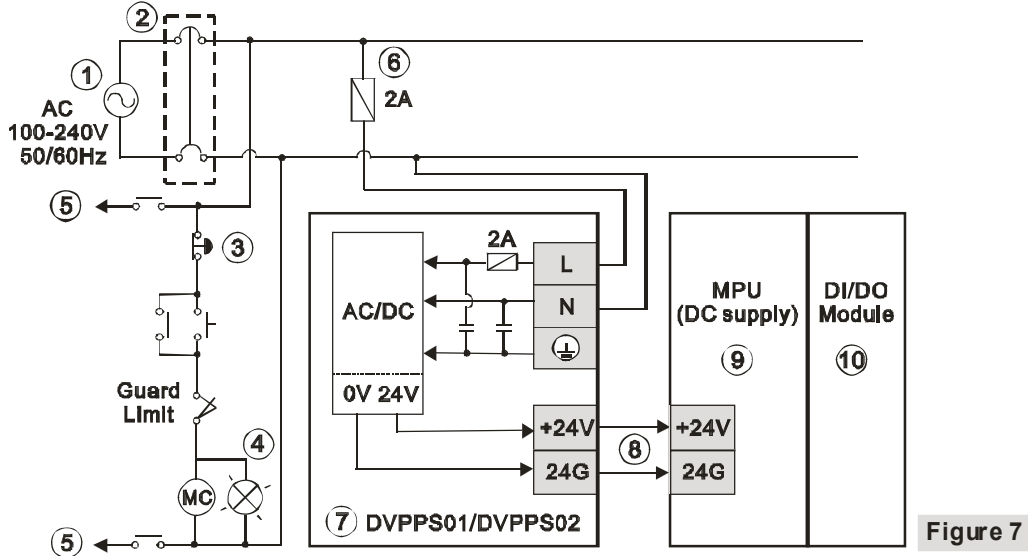
The power input of TP04P is DC. When you operates TP04P, please note the following points:

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) are suitable for it. It is suggested that you should install a protection circuit at the power supply terminal to protect DVPPS01 or DVPPS02. 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 |
| ⑧ DC power supply output: 24VDC, 500mA | ⑨ DVP series PLC (main processing unit) |
| ⑩ Digital I/O module | |

◆ Input Point Wiring

There are 2 types of DC inputs, SINK and SOURCE. (See the figures below)

● SINK Mode

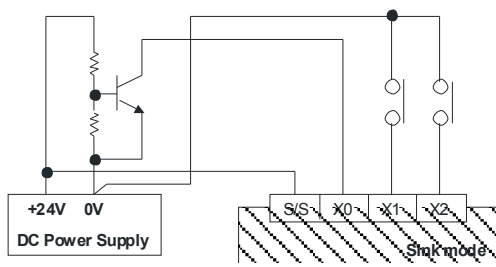


Figure 8

● SOURCE Mode

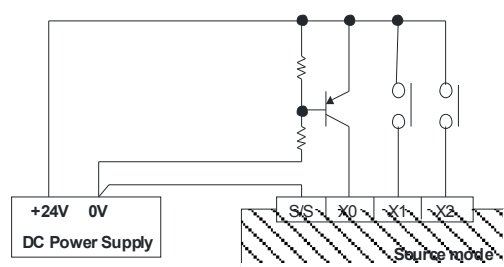


Figure 9

◆ Relay (R) output circuit wiring (Sink)

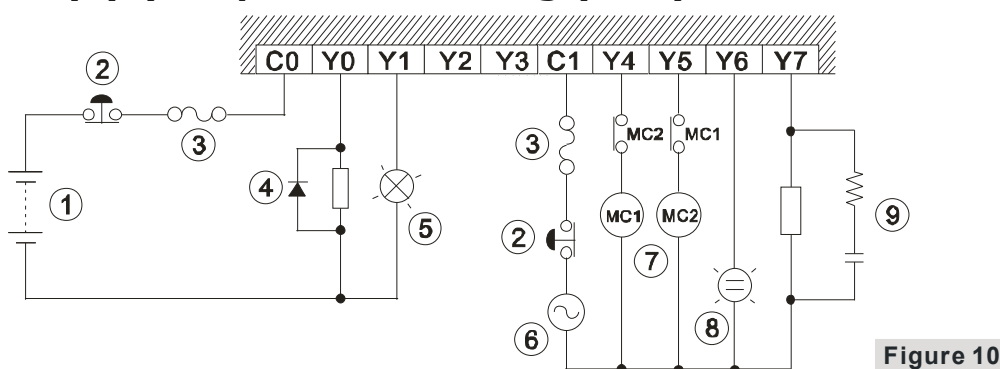
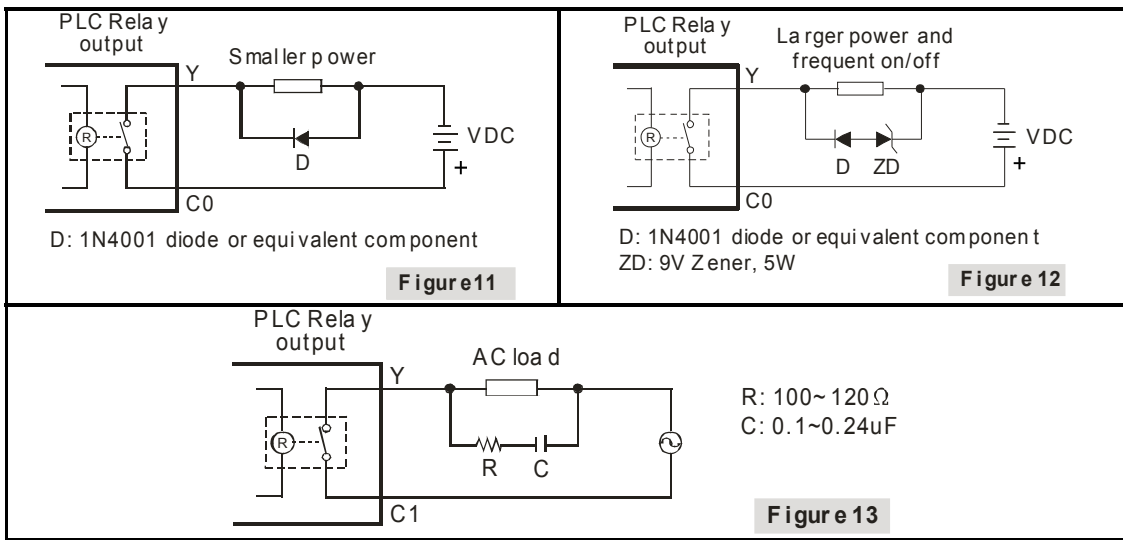


Figure 10



- ① DC power supply
- ② Emergency stop: An external switch is used.
- ③ Fuse: To protect the output circuit, a fuse having a breaking capacity within the range between 5 A and 10 A is connected to the common terminal.
- ④ Transient voltage suppressor: It increases the life span of the terminal.
 - 1. Diode suppression of the DC load: It will be used if the power is small. (See figure 11.)
 - 2. Diode + Zener suppression of the DC load: It is used when the power is large, and TP04P is turned on and off frequently. (See figure 12.)
- ⑤ Incandescent light (resistive load)
- ⑥ AC power supply
- ⑦ Mutually exclusive output: Y4 controls the clockwise rotation of the motor, and Y5 controls the counterclockwise rotation of the motor. The interlock circuit which is formed, and the program in the PLC ensure that there are protective measures if an abnormal condition occurs.
- ⑧ Incandescent bulb: Neon light
- ⑨ Absorber: It reduces the interference from the AC load. (See figure 13)

◆ RS-485 Wiring

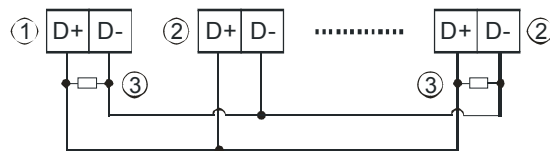


Figure 14

- 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 15

■ 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