

PTC1000 PTP Clock Converter Hardware Installation Manual

KYLAND

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**PTC1000 PTP clock converter
Hardware Installation Manual**

Disclaimer: Kyland Technology Co., Ltd. tries to keep the content of this manual as accurate and as updated as possible. This document is not guaranteed to be error-free, and we reserve the right to amend it without notice to users.

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Notice for Safety Operation

This product performs reliably as long as it is used according to the guidance. Artificial damage or destruction of the equipment should be avoided.

- Read this manual carefully and keep it for future reference;
- Do not place the equipment near water sources or damp areas;
- Do not place anything on power cable or put the cable in unreachable places;
- Do not tie or wrap the cable, which may cause a fire risk;
- Power connectors and other equipment connectors should be firmly interconnected and checked frequently;
- Do not repair the equipment by yourself, unless it is clearly specified in the manual;
- Please keep the equipment clean; if necessary, wipe the equipment with soft cotton cloth.

In the following cases, please immediately shut down your power supply and contact your Kyland representative:

- Water gets into the equipment;
- Equipment damage or shell damage;
- Equipment operation or performance has abnormally changed;
- The equipment emits odor, smoke or abnormal noise.

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1 Packing List

PTC1000 PTP Clock Converter	1
CD	1
Screwdriver	1
RJ45-to-DB9 Console port cable (2m)	1
Certificate of Quality (including Certificate of Compliance)	1

Note: After unpacking, please check the accessories and the appearance of the equipment. If anything is missing or damaged, please contact us.

2 Product Overview

PTC1000 clock converter realizes the conversion from PTP to IRIG-B and PPS (Pulses Per Second). This allows the industrial devices that are equipped with IRIG-B clock interfaces and PPS interface to conveniently access PTP network. This achieves the normalization of network clocks and reaches high precision synchronization in the industrial control system.

The PTC1000 supports DIN-Rail. It provides one 100M fiber/copper optional port, one PPS port, two IRIG-B (DC) ports and two IRIG-B (AC) ports in the front panel.

3 Structure and Interface

3.1 Front Panel

- PTC1000-1T

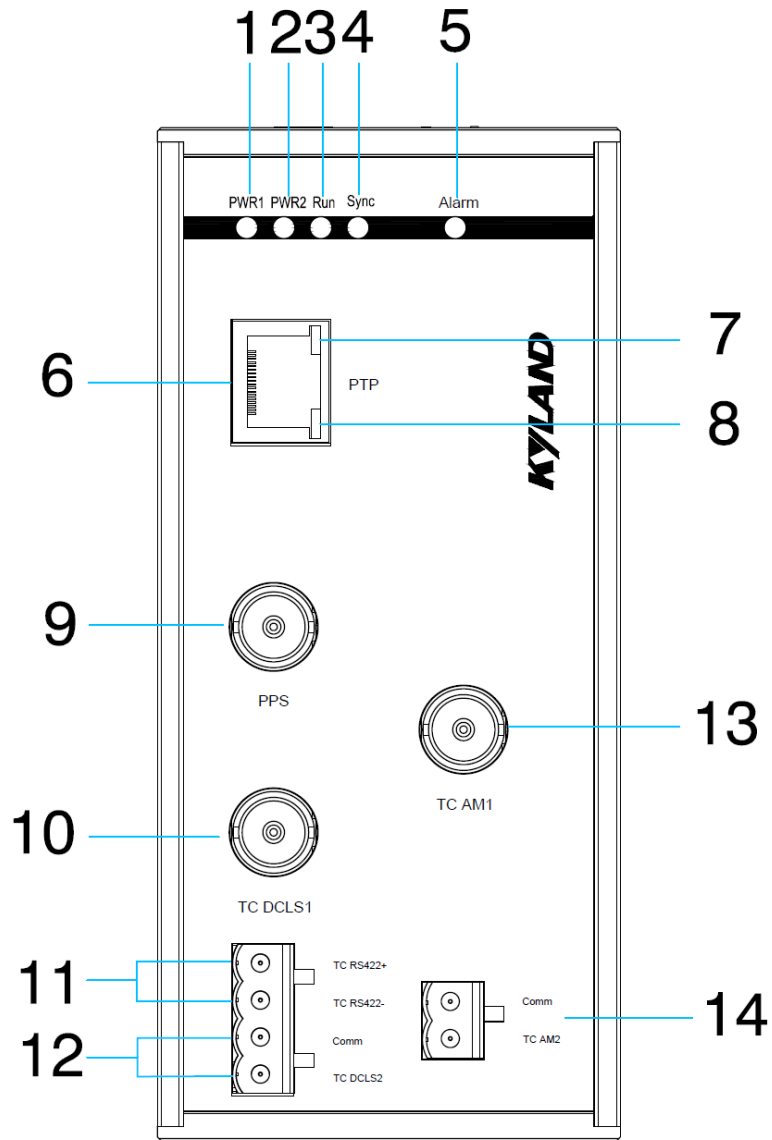


Figure 1 Front Panel 1

Table 1 PTC1000-1T Front Panel

Number	Diagram Label	Description
1	PWR1	Power 1 LED
2	PWR2	Power 2 LED
3	Run	Running LED
4	Sync	PTP Synchronization LED

5	Alarm	Alarm LED
6	PTP	10/100Base-T(X) RJ45 port
7	--	RJ45 port Speed LED
8	--	RJ45 port Link/ACT LED
9	PPS	PPS (Pulses Per Second) port, TTL +5V output, BNC connector
10	TC DCLS1	IRIG-B (DC) port, TTL +5V output, BNC connector
11	TC RS422+ TC RS422-	IRIG-B (DC) port, differential signal output, 4-Pin 5.08mm-spacing plug-in terminal block (using upper two pins)
12	Comm TC DCLS2	IRIG-B (DC) port, TTL+5V output, 4-Pin 5.08mm-spacing plug-in terminal block (using lower two pins)
13	TC AM1	IRIG-B (AC) port, BNC connector
14	Comm TC AM2	IRIG-B (AC) port, 2-Pin 5.08mm-spacing plug-in terminal block

- PTC1000-1S/M

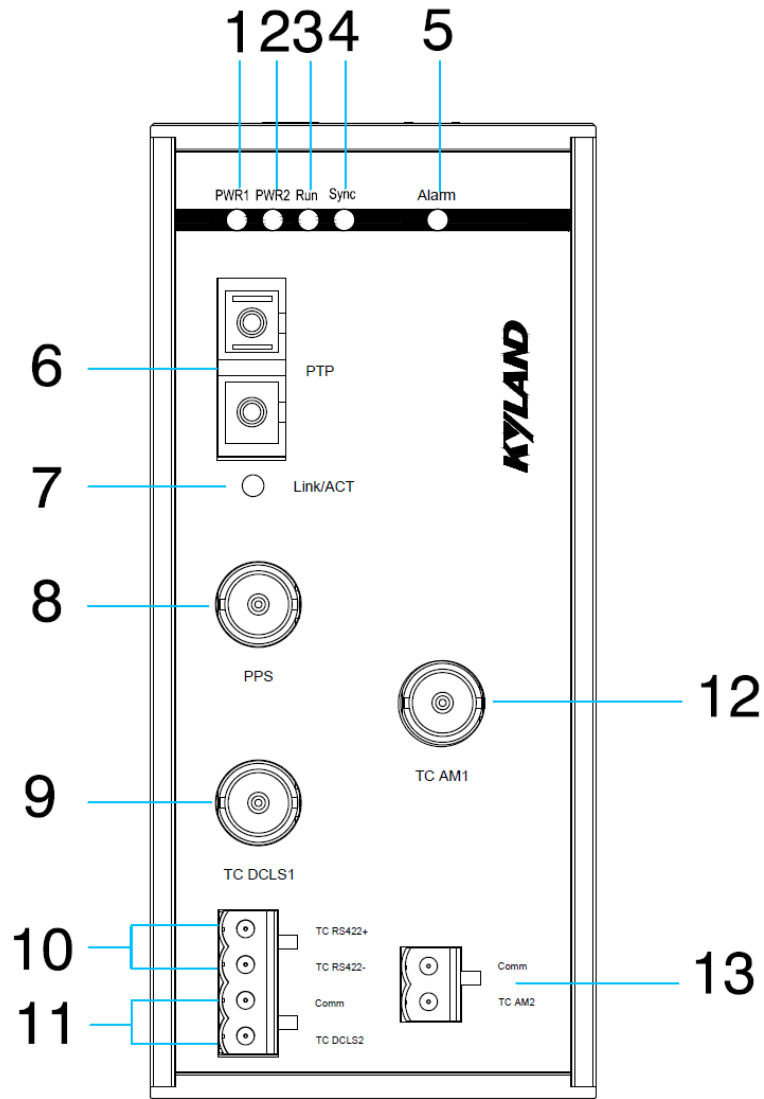


Figure 2 Front Panel 2

Table 2 PTC1000-1S/M Front Panel

Number	Diagram Label	Description
1	PWR1	Power 1 LED
2	PWR2	Power 2 LED
3	Run	Running LED
4	Sync	PTP Synchronization LED

5	Alarm	Alarm LED
6	PTP	100Base-FX port
7	Link/ACT	100Base-FX port LED
8	PPS	PPS (Pulses Per Second) port, TTL +5V output, BNC connector
9	TC DCLS1	IRIG-B (DC) port, TTL +5V output, BNC connector
10	TC RS422+ TC RS422-	IRIG-B (DC) port, differential signal output, 4-Pin 5.08mm-spacing plug-in terminal block (using upper two pins)
11	Comm TC DCLS2	IRIG-B (DC) port, TTL+5V output, 4-Pin 5.08mm-spacing plug-in terminal block (using lower two pins)
12	TC AM1	IRIG-B (AC) port, BNC connector
13	Comm TC AM2	IRIG-B (AC) port, 2-Pin 5.08mm-spacing plug-in terminal block

3.2 Top Panel

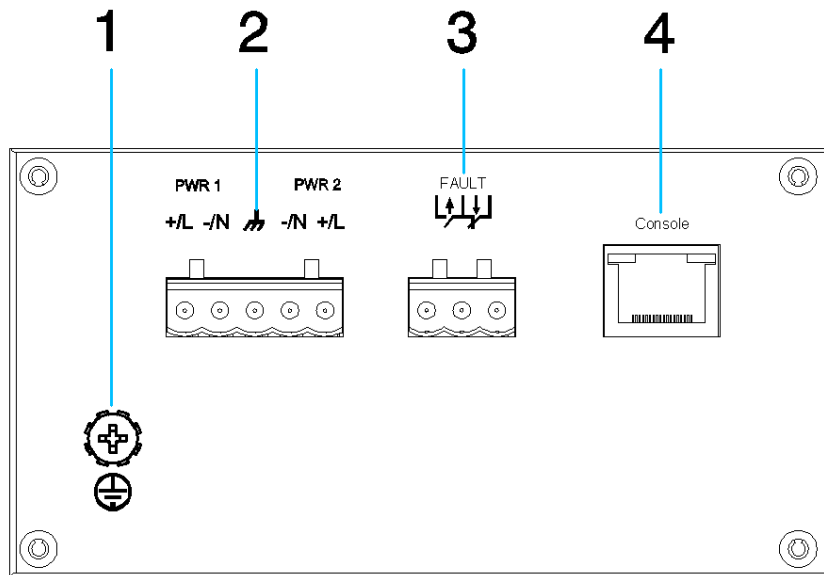





Figure 3 Top Panel

Table 3 PTC1000 Top Panel

Number	Diagram Label	Description
1		Grounding Screw
2	PWR 1 PWR 2 +/L -/N  -/N +/L	Power supply terminal block
3	FAULT 	Relay contact
4	Console	Console interface

4 Mounting

4.1 Dimension Drawing

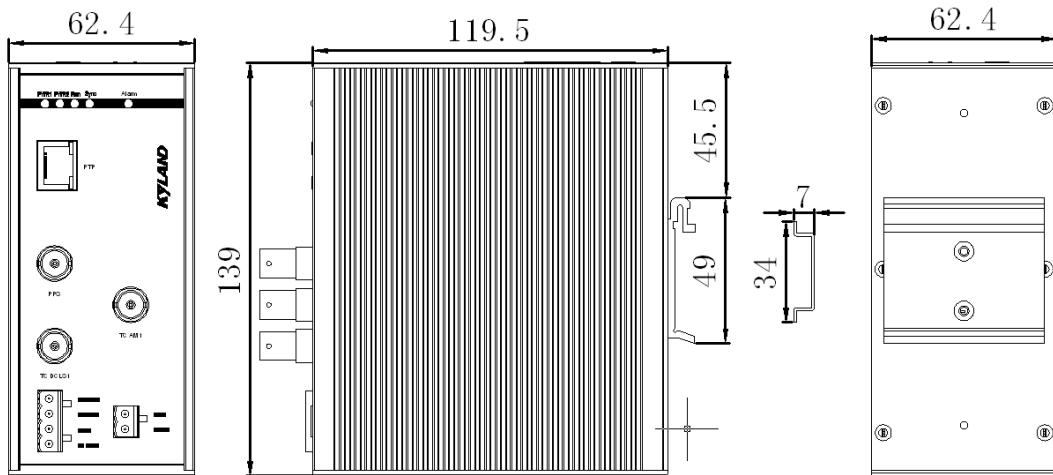


Figure 4 DIN-Rail Mounting Dimension (Unit: mm)

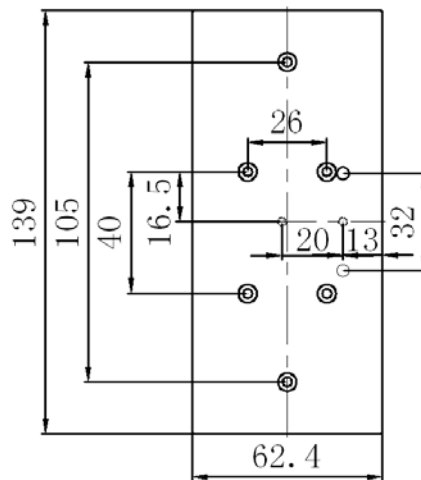


Figure 5 the Transitional Board Mounting Dimension (Unit: mm)

Note: The default mounting of the device is DIN-Rail vertical mounting. If the user wants to install the device horizontally, a transitional board from Table 13 is needed.

4.2 Mounting Steps

PTC1000 support DIN-Rail vertical mounting (default) and horizontal mounting.

- DIN-Rail vertical mounting and dismounting

The specific mounting steps are as follows:

Step 1: Select the mounting position for PTC1000 and ensure that there is adequate space.

Step 2: Insert the slot of the DIN-Rail connecting seat in the rear panel of PTC1000 into the top of the DIN-Rail as shown below; move the device in the direction of arrow 2 to put the whole Din-Rail into the seat; check whether PTC1000 is firmly mounted on the DIN-Rail, as shown below.

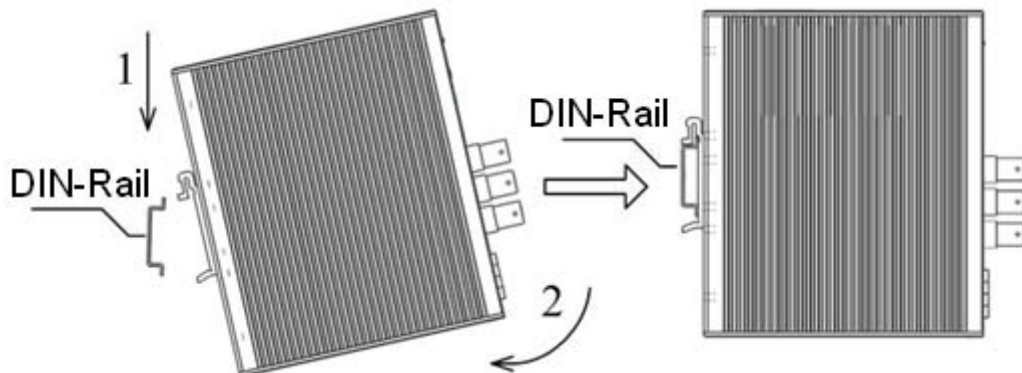


Figure 6 DIN-Rail Mounting

The specific dismounting steps are as follows:

Step 1: Move the device in the direction of arrow 1 as shown in Figure 7.

Step 2: Then move the device in the direction of arrow 2 and the device will be removed from DIN-Rail.

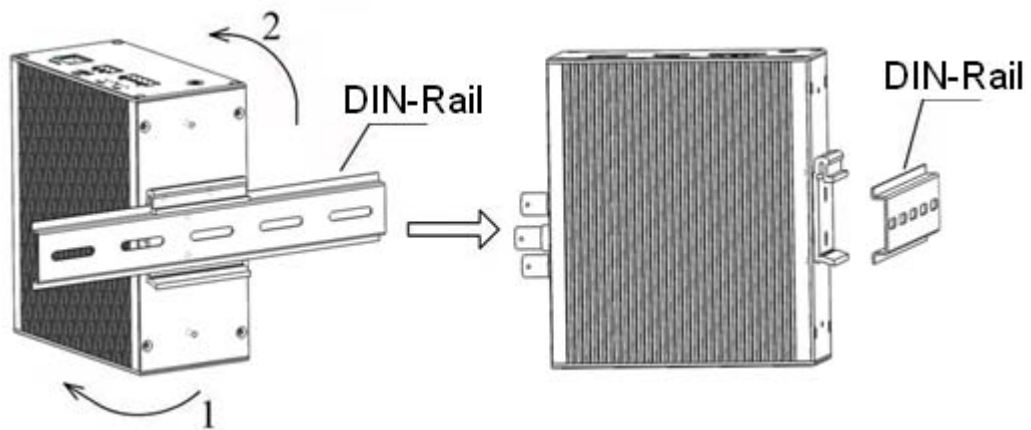


Figure 7 Dismounting

- DIN-Rail horizontal mounting and dismounting

The default mounting of the device is DIN-Rail vertical mounting. If the user wants to install the device horizontally, a transitional board from Table 13 is needed.

The specific mounting steps are as follows:

Step 1: Remove the DIN-Rail connecting seat from the rear panel; Place the device horizontally, and attach the transitional board to the rear panel of the device; then fix the transitional board with six screws (M3×6), as shown in Figure 8.

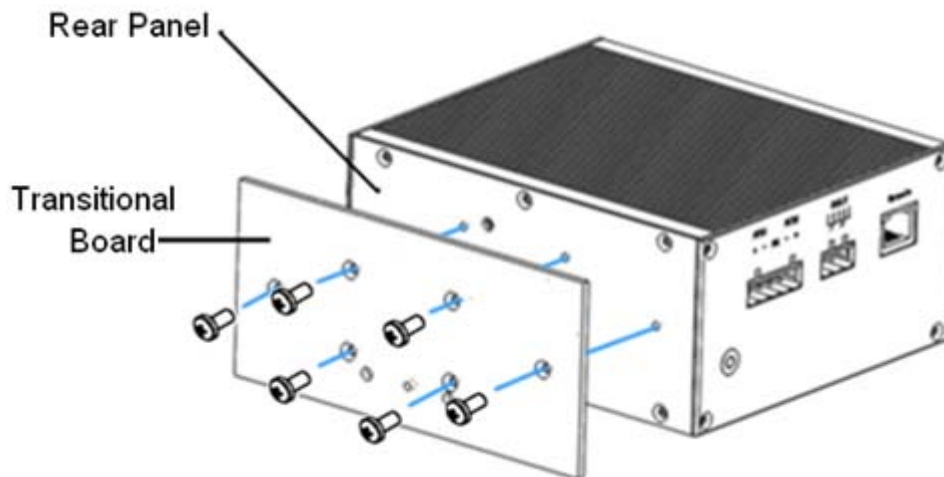


Figure 8 Mounting the Transitional Board

Step 2: Align the two holes of the DIN-Rail connecting seat in the rear panel with corresponding holes of the transitional board, and then use two screws (M3×8) to fix the transitional board, as shown in Figure 9.

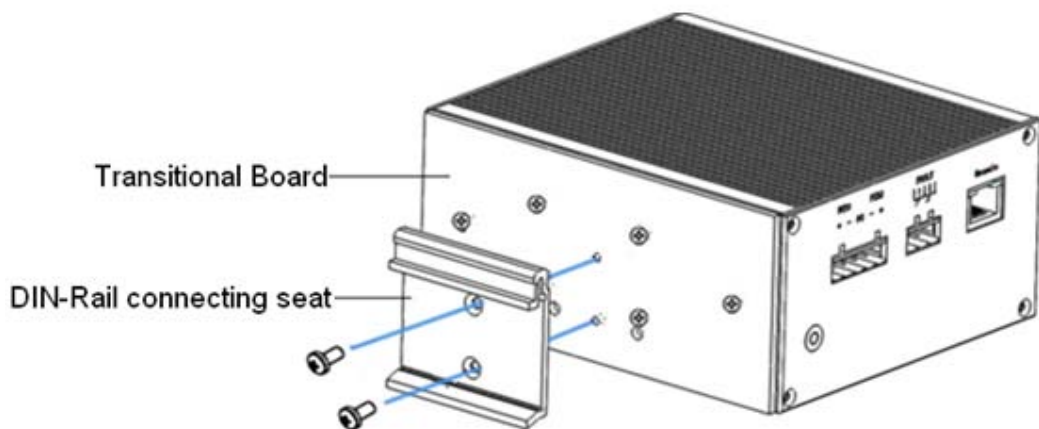


Figure 9 Mounting the DIN-Rail Connecting Seat

Step 3: Insert the slot of the DIN-Rail connecting seat in the rear panel of PTC1000 into the top of the DIN-Rail as shown below; move the device in the direction of arrow 2 to put the whole Din-Rail into the seat; check whether PTC1000 is firmly mounted on the DIN-Rail, as shown below.

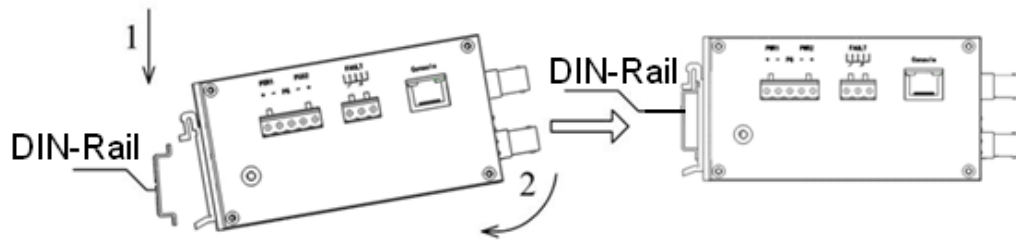


Figure 10 Mounting

The specific dismounting steps are as follows:

Step 1: Move the device in the direction of arrow 1 as shown in Figure 11.

Step 2: Then move the device in the direction of arrow 2 and the device will be removed from DIN-Rail.

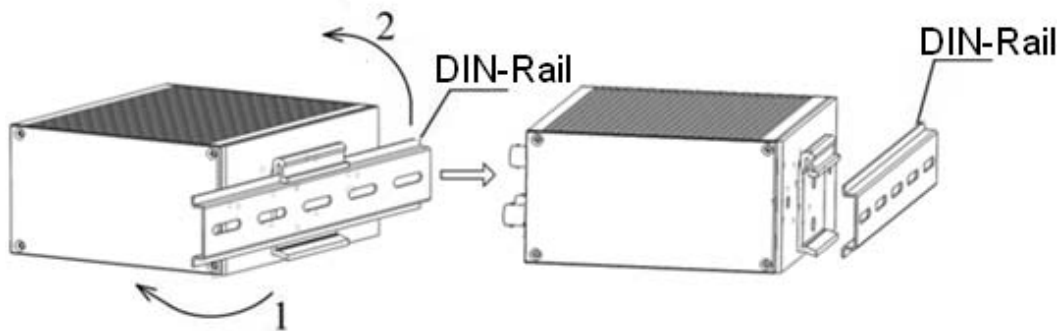


Figure 11 Dismounting

5 Cable Connection

5.1 10/100Base-T(X) Ethernet Port

10/100Base-T(X) Ethernet RJ45 port can be connected to terminal equipment and network devices with straight-through cables or crossover cables. RJ45 connectors must be equipped at both ends of cable.

- Pin definition of 10/100Base-T(X) RJ45 port

Pin number of 10/100Base-T(X) RJ45 port is shown in Figure 12

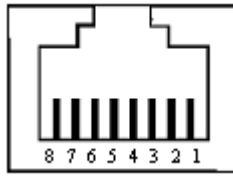


Figure 12 RJ45 Port

Pin definition of 10/100Base-T(X) RJ45 port is shown in Table 4

Table 4 Pin Definition of 10/100Base-T(X) RJ45 Port

Pin	MDI-X Signal Name	MDI Signal Name
1	Receive Data+ (RD+)	Transmit Data+ (TD+)
2	Receive Data- (RD-)	Transmit Data- (TD-)
3	Transmit Data+ (TD+)	Receive Data+ (RD+)
6	Transmit Data- (TD-)	Receive Data- (RD-)
4, 5, 7, 8	Unused	Unused
Note: "+" "-" means level polarity.		

- Wiring Sequence

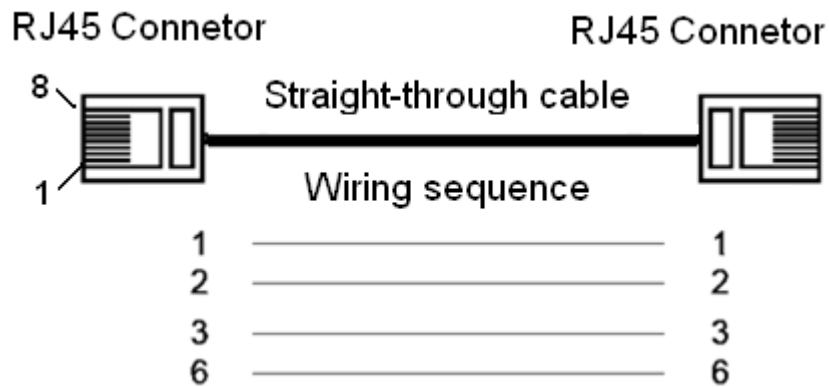


Figure 13 10/100M Straight-through Cable Wiring

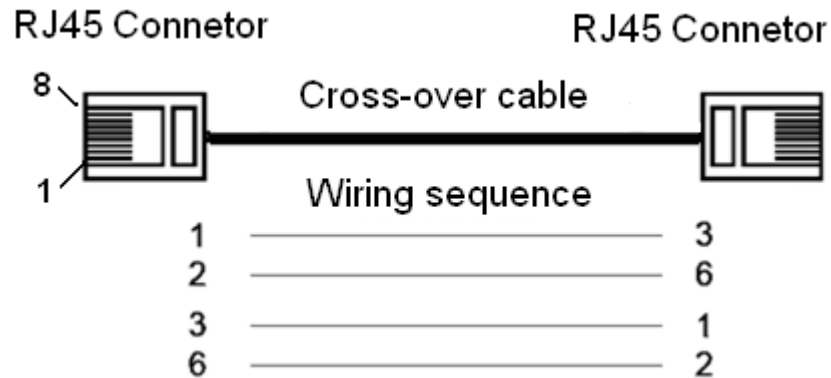


Figure 14 10/100M Cross-over Cable Wiring

Note: The correlation between the pin of RJ45 connector and the color of twisted pair is: 1-orange and white, 2-orange, 3-green and white, 4-blue, 5-blue and white, 6-green, 7-brown and white, 8-white.

5.2 100Base-FX Ethernet Port

100Base-FX Ethernet port is equipped with FC/SC/ST connector, and each port consists of TX (transmit) port and RX (receive) port, as shown in Figure 15.

100Base-FX port wiring is shown in Figure 15 (Take SC port as example; ST/FC wiring method is the same with SC). Connect the TX (transmit) port of device A to the RX (receive) port of device B, and the RX (receive) port of device A to the TX (transmit) port of device B in order to transmit data between device A and device B.

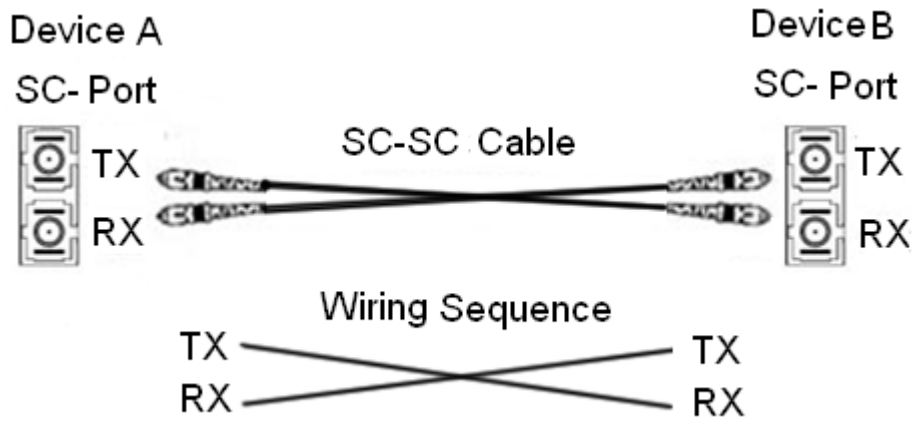
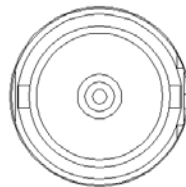


Figure 15 100Base-FX Port Wiring

Note: A laser is used to transmit signals in fiber cables. The laser meets the requirements of level 1 laser products. Routine operation is not harmful to your eyes, but do not look directly at the fiber port when the device is powered on.

5.3 PPS Output

PPS(Pulses Per Second) TTL +5V level output through BNC connector, as shown in Figure 16.



PPS

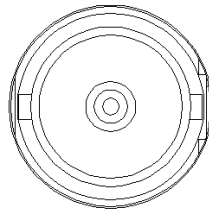
Figure 16 PPS Output BNC Connector

Note: PPS output, TTL +5V level, 50Ω, trigger by rising edge, pulse width 20ms-200ms, software adjustable step is 20ms.

5.4 IRIG-B (DC) Output

Two types of connectors can accomplish IRIG-B (DC) output: one is a BNC connector, and the other one is a 4-pin 5.08mm-spacing terminal block. Users can choose the appropriate interface according to their own requirements.

- BNC connector



TC DCLS1

Figure 17 IRIG-B (DC) Output BNC Connector

Note: IRIG-B output, TTL +5V level, 600Ω, trigger by rising edge, and duty cycle is 50%.

- 4-Pin 5.08mm-spacing plug-in terminal block

The 4-Pin 5.08mm-spacing plug-in terminal block can be used for two signal output; one is IRIG-B(DC) differential signal output, and the other one is IRIG-B(DC) TTL +5V level output

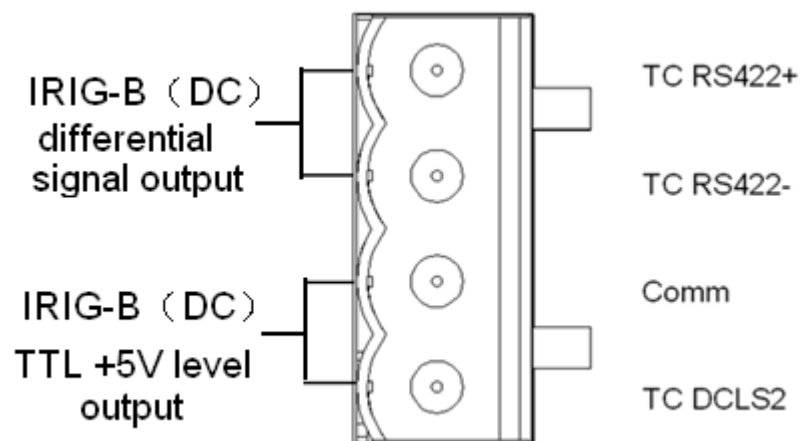


Figure 18 4-Pin 5.08mm-spacing Plug-in Terminal Block

Table 5 IRIG-B (DC) RS422 Output

Diagram Label	Description
TC RS422+	IRIG-B differential positive side output, RS422 port standard
TC RS422-	IRIG-B differential negative side output, RS422 port standard

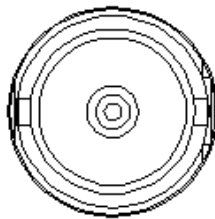
Table 6 IRIG-B (DC) TTL +5V Output

Diagram Label	Description
Comm	Signal Ground
TC DCLS2	IRIG-B(DC)TTL +5V level output

5.5 IRIG-B (AC) Output

Two types of connectors can accomplish IRIG-B (AC) output: one is a BNC connector, and the other one is a 2-pin 5.08mm-spacing terminal block. Users can choose the appropriate interface according to their own requirements.

- BNC connector



TC AM1

Figure 19 IRIG-B (AC) Output BNC Connector

- 2-pin 5.08mm-spacing plug-in terminal block

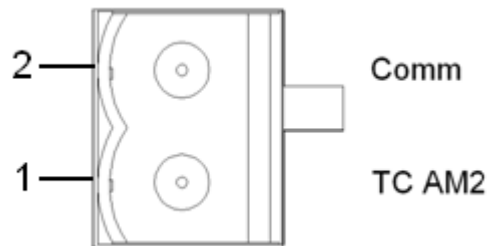


Figure 20 2-pin 5.08mm-spacing Plug-in Terminal Block

Table 7 2-pin 5.08mm-spacing Plug-in Terminal Block Pin Definition

Pin	Diagram Label	Description
1	TC AM2	IRIG-B (AC) output
2	Comm	Signal Ground

Note: IRIG-B (AC) output, Vp-p: 3V~10V software adjustable (default Vp-p: 4.5V), 600Ω, modulation ratio: 3:1, 4:1, 5:1, 6:1 software adjustable (default modulation ratio: 3:1).

5.6 Console Interface

There is a Console interface in the top panel as shown in Figure 21, Connect the 9-pin serial port on the PC to the Console interface on the device with supplied console cable. Run Hyper Terminal software in WINDOWS operating system to connect to console software of the device, which will allow you to configure, maintain and manage the device.

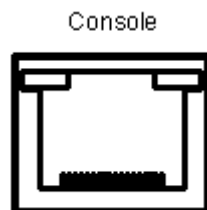


Figure 21 Console Interface

- Console cable

The supplied console cable is shown in Figure 23, and at one end of the cable is a crimped RJ-45 connector for the connection to the Console interface of the device; at the other end of the cable is one DB9 connector for the connection to the 9-pin serial port on the PC.

DB9 connector is shown in Figure 22.

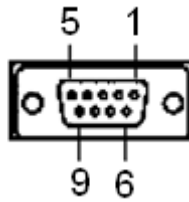


Figure 22 DB Connector

DB9 connector pin definition is shown in Table 8.

Table 8 DB9 Connector Pin Definition

DB9 Connector Pin	Definition
2	RXD(Receive Data)
3	TXD(Transmit Data)
5	GND(Grounding)
1, 4, 6, 7, 8, 9	Unused

The wiring sequence of Console cable is shown in Figure 23.

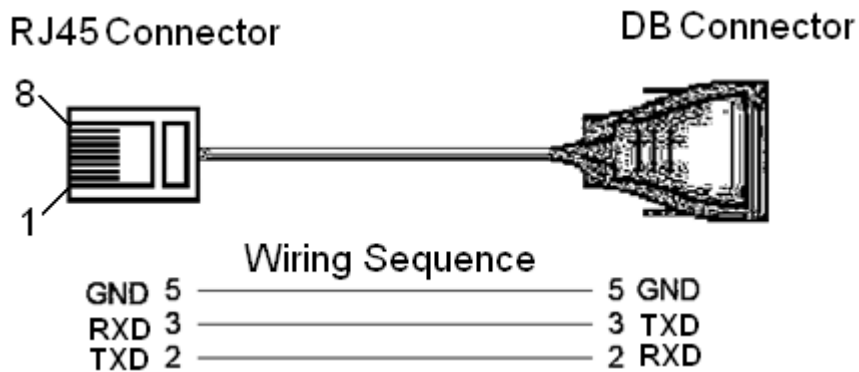


Figure 23 Console Cable Wiring Sequence

5.7 Power

According to the power input requirements, use a 5.08mm-spacing terminal block to connect power cable.

Note: The cross section area of power cable is required to be greater than 0.75mm^2 and less than 2.5mm^2 . The grounding resistance requirement: $<5\Omega$.

- 5 pin 5.08mm power terminal block

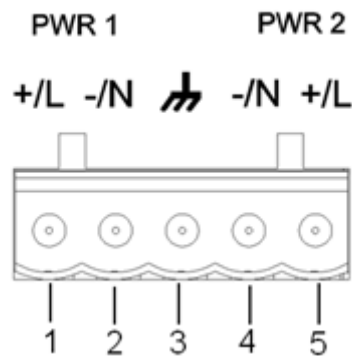


Figure 24 5-pin 5.08mm-spacing Plug-in Terminal Block

Table 9 5 Pin 5.08mm Power Terminal Block Contact Definition

Contact Number	DC Wiring Definition	AC Wiring Definition
1	PWR1: +	PWR1: L
2	PWR1: -	PWR1: N
3	Protection Ground	Protection Ground
4	PWR2: -	PWR2: N
5	PWR2: +	PWR2: L

- Wiring and mounting

Step 1: Take the power terminal block off the device.

Step 2: Insert the power cable into the terminal block according to the

requirements as shown in Table 9, and connect the power cable.

Step 3: Put the terminal block back to the device with the connected cable.

Note: When the power input is 110VAC or 220VAC/DC, PWR1 and PWR2 cannot operate at one time, namely only insert the power cable into the part of PWR1 or PWR2.

5.8 Grounding

There is a grounding screw on the top panel of the PTC1000, which is for chassis ground. One end of the chassis grounding cable is connected with the grounding screw and the other end of the cable is reliably grounded. (The cross section area of chassis grounding cable should be more than 2.5mm^2 . The grounding resistance requirement: $<5\Omega$)

Chassis ground

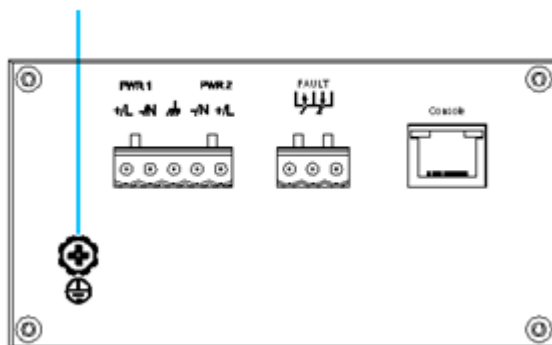


Figure 25 Grounding

5.9 Relay Contact

The relay contact is used for alarm output. When the device works normally, the normally-open contact of the alarm relay is closed and the normally-closed contact is open; when the alarm occurs, the normally-open contact is open and the normally-closed contact is closed. The alarm is

outputted through a 3-pin 5.08mm spacing terminal block as shown in Figure 26.

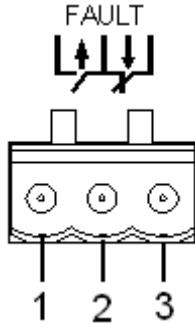


Figure 26 3-Pin 5.08mm-Spacing Plug-In Terminal Block

The electrical parameters of the relay:

Max Device Voltage: 250VAC/220VDC;

Max Device Current: 2A

Max Device Power: 60W

Note: Pin 1 and pin 2 are normally-open contacts; pin 2 and pin 3 are normally-closed contacts. When the device works normally, the pin 1 and 2 are closed, pin 2 and pin 3 are open; when the alarm occurs, the pin 1 and 2 are open; pin 2 and 3 are closed.

6 LED Indicators

Table 10 Front Panel LED

LED	State	Description
Running LED		
Run	ON	CPU is running abnormally or the device is starting.
	Blinking (1HZ)	CPU is running normally
	OFF	CPU is not started up.
Alarm LED		
Alarm	Blinking	System alarm

	(5HZ)	
	OFF	No system alarm.
Power LEDs		
PWR1	ON	Power 1 connects and operates normally.
	OFF	Power 1 disconnects or operates abnormally.
PWR2	ON	Power 2 connects and operates normally.
	OFF	Power 2 disconnects or operates abnormally.
PTP Synchronization LED		
Sync	ON	PTP port has synchronized with upstream clock
	Blinking (1HZ)	PTP port are synchronizing with upstream clock
	OFF	Disable PTP port synchronization
10/100Base-T(X) RJ45 port LED		
Each RJ45 port has two indicators, a yellow LED and a green LED. The yellow LED indicates port rate, while the green LED indicates port connection state.		
Speed (Yellow)	ON	100M working state
	OFF	10M working state or no connection
Link/ACT (Green)	ON	Effective network connection in the port
	Blinking	Network activities in the port
	OFF	No effective network connection in the port
100Base-FX port LED		
Link/ACT	On	Effective network connection in the port
	Blinking	Network activities in the port
	Off	No effective network connection in the port

7 Management Access

Access the device by one of the following three ways.

7.1 Connected through Console Port

1. Use the supplied Console cable to connect the Console interface on the device with the 9-pin serial port on PC.
2. On Windows desktop, click Start → All programs → Accessories → Communications → Hyper Terminal.

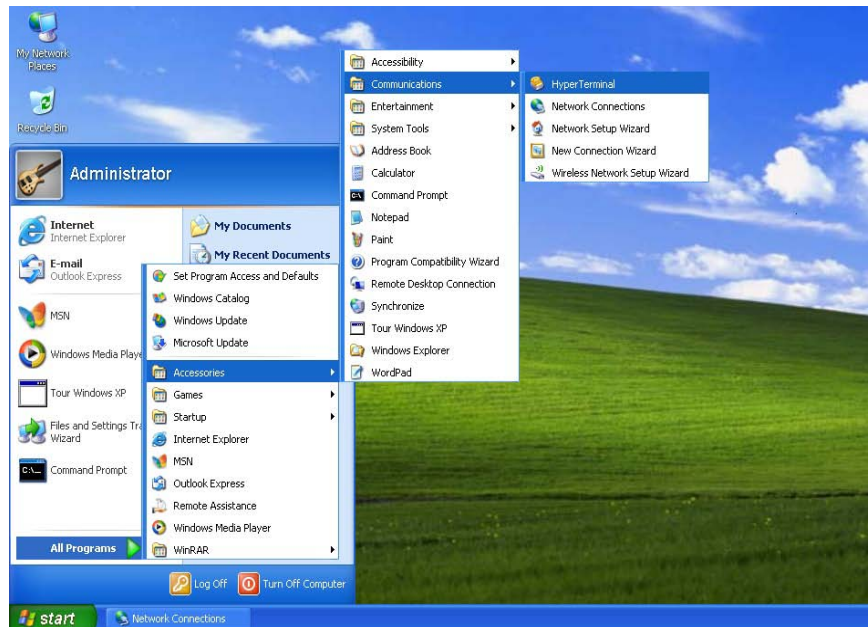


Figure 27 Hyper Terminal

4. Build a new connection named "aa"

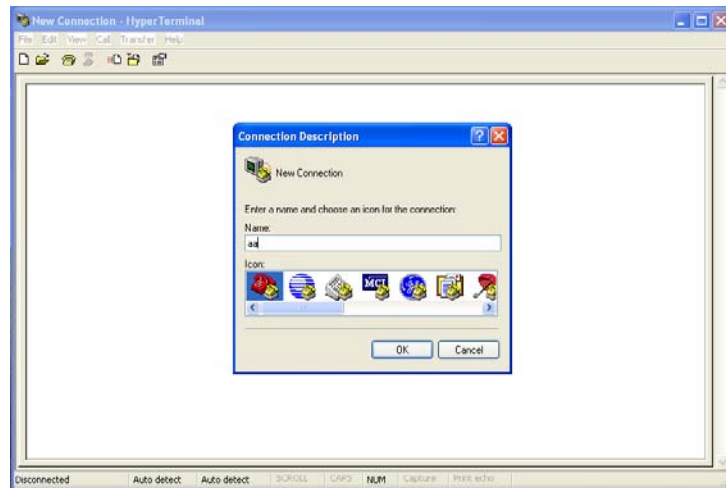


Figure 28 New Connection

5. Select COM port as the connection type.

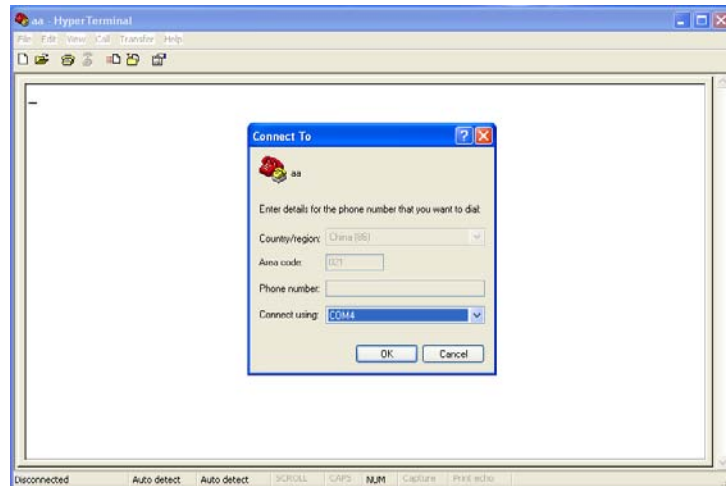


Figure 29 Choose Port

6. Set the parameters of COM port (Bits per second: 9600, Data bits: 8, Parity: None, Stop bits: 1, Flow control: None)

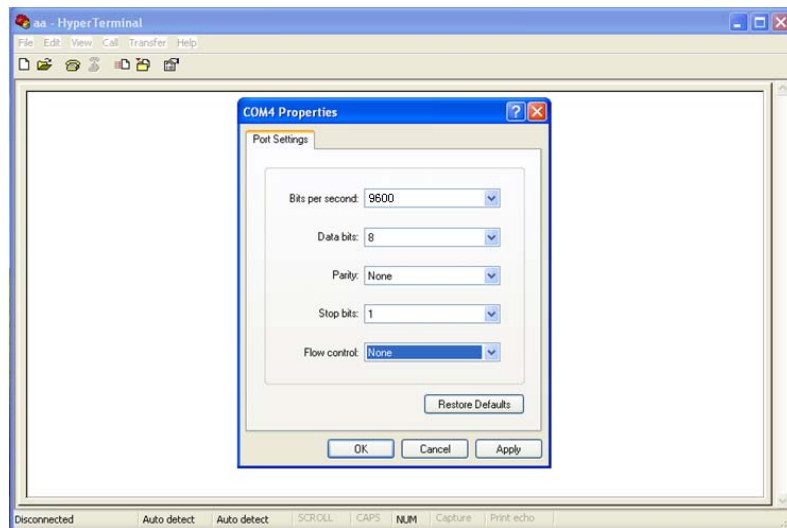


Figure 30 Set COM Parameters

7. Click “OK” to enter the CLI interface, and type in a CLI command from Table 11.

Table 11 CLI Command

View	Command	Description
User View	SWITCH>enable	Enter management view
Management View	SWITCH#show interface	Show the IP address of current device
Management View	SWITCH#show version	Show version of device
Management View	SWITCH#reboot	Reboot
Management View	SWITCH#load default	Restore default configuration (except for IP address)
Management View	SWITCH#config terminal	Enter configuration view

7.2 Connected through Ethernet Cable

1. Connect any RJ45 port of the device with the Ethernet port of a personal computer with a RJ45 cable.
2. Open Run window from the start menu, then input “telnet + ‘IP address’”.

The default IP address is **192.168.0.2**.

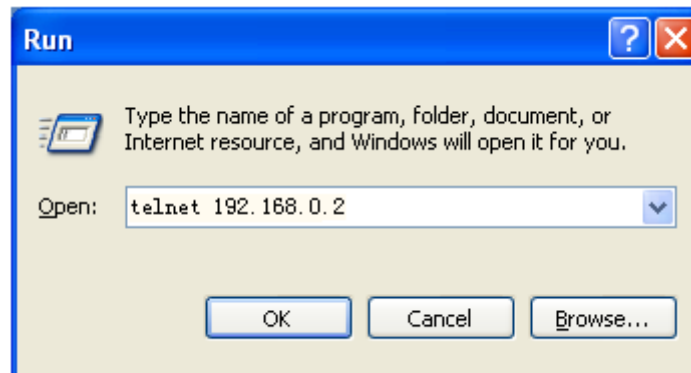


Figure 31 Enter Telnet

3. Click “OK” to enter the Telnet configuration interface. Type in a CLI command from Table 11.

7.3 Web Access

1. Connect the Ethernet port on the PC to any RJ45 port on the device.
2. Input the IP address of the current device in web browser, the default IP is **192.168.0.2**. The Web interface access screen will appear as shown below in Figure 32, login with default user name “**admin**” and password “**123**”.



Figure 32 Web Interface Access Screen

Note: We recommend IE version 8.0 or greater.

8 Product Configuration Information

The specific configuration models of PTC1000 are shown in Table 12.

Table 12 PTC1000 Configuration

Model	Interface Description	Power
PTC1000-1T	1 10/100Base-T(X) RJ45 ports	24VDC(dual redundant power inputs); 110VDC(dual redundant power inputs); 110VAC,220VAC/DC
PTC1000-1S/M	1 100Base-FX,SM/MM ports, FC/SC/ST connector	

Table 13 PTC1000 Optional Accessories

Model	Description
DT-FCZ-RJ45-01	RJ45 dustproof shield

DT-GDCB-01

PTC1000 transitional board

9 Basic Features and Specifications

- Power Requirements

Power module: 24DC (18~36VDC)

or 110DC (90~160VDC)

or 220AC/DC (120~370VDC/85~264VAC)

Power terminal: 5-pin 5.08mm-spacing plug-in terminal block

Power consumption: <4W

- Physical Characteristics

Housing: Aluminum, fanless

Installation: DIN-Rail vertical mounting (default) and horizontal mounting.

Dimensions (W×H×D): 62.4mm×139mm×119.5mm

Weight: 0.75Kg

- Environment Limits

Operating Temperature: -40℃~+85℃

Storage Temperature: -40℃~+85℃

Ambient Relative Humidity: 5%~95% (non-condensing)

- Warranty

5 years

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