

# **KGW3101/KPS3101 Protocol Converter Hardware Installation Manual**

Publication Data: Oct. 2017

Version: V1.0

***KYLAND***

## **KGW3101/KPS3101 Series Protocol 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

The product performs reliably as long as it is used according to the guidance. Artificial damage or destruction of the device should be avoided. Before using the device, read this manual carefully for personal and equipment safety. Please keep the manual for further reference. Kyland is not liable to any personal or equipment damage caused by violation of this notice.

- Do not place the device near water sources or damp areas. Keep the ambient relative humidity within the range from 5% to 95% (non-condensing).
- Do not place the device in an environment with high magnetic field, strong shock, or high temperature. Keep the working and storage temperatures within the allowed range.
- Install and place the device securely and firmly.
- Please keep the device clean; if necessary, wipe it with a soft dry cotton cloth.
- Do not place any irrelevant materials on the device or cables. Ensure adequate heat dissipation and tidy cable layout without knots.
- Wear antistatic gloves or take other protective measures when operating the device.
- Avoid any exposed metal wires because they may be oxidized or electrified.
- Install the device in accordance with related national and local regulations.
- Before power-on, make sure the power supply is within the allowed range of the device. High voltage may damage the device.
- Power connectors and other connectors should be firmly interconnected.
- Do not plug in or out the power supply with wet hands. When the device is powered on, do not touch the device or any parts with wet hands.
- Before operating a device connected to a power cable, remove all jewelry (such as rings, bracelets, watches, and necklaces) or any other metal objects, because they may cause electric shock or burns.
- Do not operate the device or connect or disconnect cables during an electrical storm.
- Use compatible connectors and cables. If you are not sure, contact our sales or technical support personnel for confirmation.

- Do not disassemble the device by yourself. When an anomaly occurs, contact our sales or technical support personnel.
- If any part is lost, contact our sales or technical support personnel to purchase the substitute. Do not purchase parts from other channels.
- Dispose of the device in accordance with relevant national provisions, preventing environmental pollution.
- These devices are open-type and are meant to be installed in an enclosure only accessible with the use of a tool and suitable for the environment.

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.
- The device shall be installed in the appropriate enclosure, if the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

The following information applies when operating this device in hazardous locations:

Suitable for use in Class I, Division 2, Groups A, B, C and D Hazardous Locations, or nonhazardous locations only.

Cet appareillage est utilisable dans les emplacements de Classe I, Division 2, Groupes A, B, C et D, ou dans les emplacements non dangereux seulement.

**WARNING: EXPLOSION HAZARD**

- Do not disconnect equipment while the circuit is live or unless the area is known to be free of ignitable concentrations.
- Substitution of any component may impair suitability for Class I, Division 2.

**AVERTISSEMENT: RISQUE D'EXPLOSION**

- Avant de deconnecter l'equipement, couper le courant ou s'assurer que l'emplacement

est designe non dangereux.

- La substitution de composants peut rendre ce materiel inacceptable pour les emplacements de Classe I, Division 2.

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# 1 Product Overview

KGW3101/KPS3101 is a protocol converter developed by Kyland for factory automation, wind power, distribution network automation, subway PIS, power SCADA, sewage treatment, metallurgy, intelligent transportation, rail transportation and so on. It supports Modbus gateway and serial server model selection. The KGW3101/KPS3101 supports dual power supply, and can enable or disable the RS-485 terminal matching resistor by setting the DIP switch.

The series devices support DIN rail mounting. They provide one 10/100Base-T(X) Ethernet port and one RS-232 / RS-422 / RS-485 serial interface. For details, see the following table.

Table 1 Models

<b>Model</b>	<b>KGW3101-1T1D-L17-L17</b> <b>KPS3101-1T1D-L17-L17</b>
Code definition	Code option
KGW/KPS	KGW: Modbus gateway product model, operating temperature: -40°C ~+75°C KPS: Serial server product model, operating temperature: -40°C ~+75°C
Ports	1T1D
	Note: one 10/100Base-T(X) Ethernet port one RS-232 / RS-422 / RS-485 serial interface
PWR1-PWR2: power input	L+-N-: 24VDC(12-48VDC, redundant input)



**Note:**

For the product information listed in these tables, we reserve the right to amend it without notice.

To obtain the latest information, you can contact our sales or technical support personnel.

Power input is from SELV.

## 2 tructure and Interface



**Caution:**

It is recommended to purchase the port dustproof shield (optional) to keep ports clean and ensure device performance.

### 2.1 Front Panel

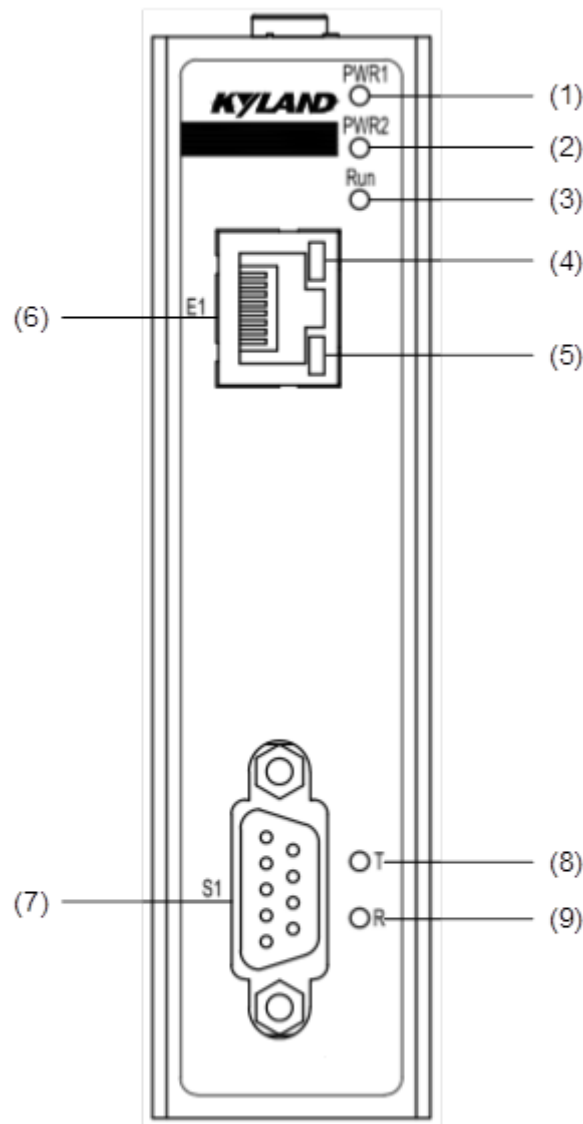


Figure 1 Front Panel

Table 2 Description of the Front Panel

No.	Identifier	Description
(1)	PWR1	Power 1 LED



(2)	PWR2	Power 2 LED
(3)	Run	Run LED
(4)	-	10/100Base-T(X) Ethernet port connection status LED (green)
(5)	-	10/100Base-T(X) Ethernet port speed LED (yellow)
(6)	E1	10/100Base-T(X) Ethernet port
(7)	S1	RS-232/RS-422/RS-485 Serial interface
(8)	S1-T	Serial interface to send data indicator (green)
(9)	S1-R	Serial interface to receive data indicator (green)

## 2.2 Top Panel

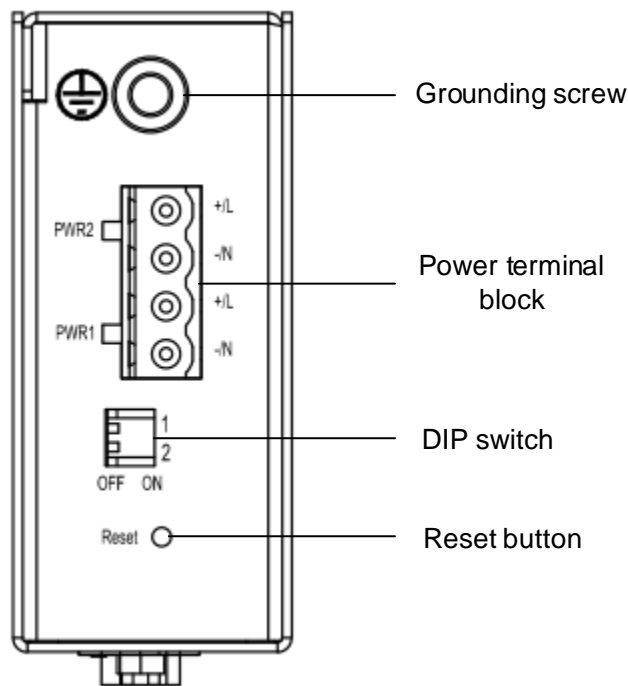


Figure 2 Top Panel

### 3 Mounting

#### 3.1 Dimension Drawing

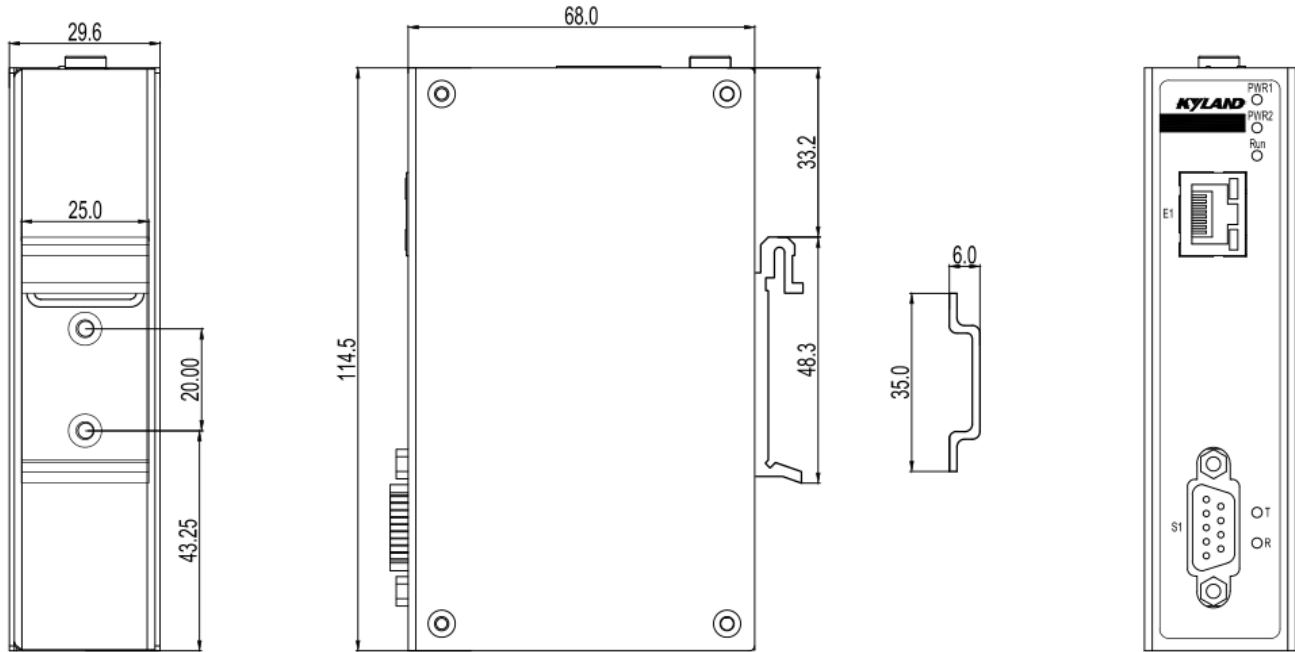


Figure 3 KGW3101/KPS3101 Dimensions (unit: mm)



**Caution:**

- As part of the heat dissipation system, the device housing becomes hot during operation. Please use caution when coming in contact and avoid covering the device housing when the device is running.
- The figures in this manual are only for reference.

#### 3.2 Mounting Modes and Steps

The series devices support DIN-rail mounting. Before installation, make sure that the following requirements are met.

- 1) Environment: temperature (-40°C to +75°C), ambient relative humidity (5% to 95%, non-condensing)
- 2) Power requirement: The power input is within the voltage range of the device.

- 3) Grounding resistance:  $<5\Omega$ .
- 4) No direct sunlight, distant from heat source and areas with strong electromagnetic interference.
- 5) The installation environment meets the ATEX / IECEx Certified IP40 requirements. No direct touch, to avoid personal damage.

**3.2.1 DIN-Rail Mounting (Fixed in inside of Enclosure or Equipment only)**

Step 1: Select the mounting position for the device and guarantee adequate space and heat dissipation (dimensions: 30mm×115mm×68mm).

Step 2: Insert the connecting seat onto the top of the DIN rail, and push the bottom of the device inward and upward to ensure the DIN rail fits in the connecting seat. Make sure the device is firmly installed on the DIN rail, as shown in the following figure.

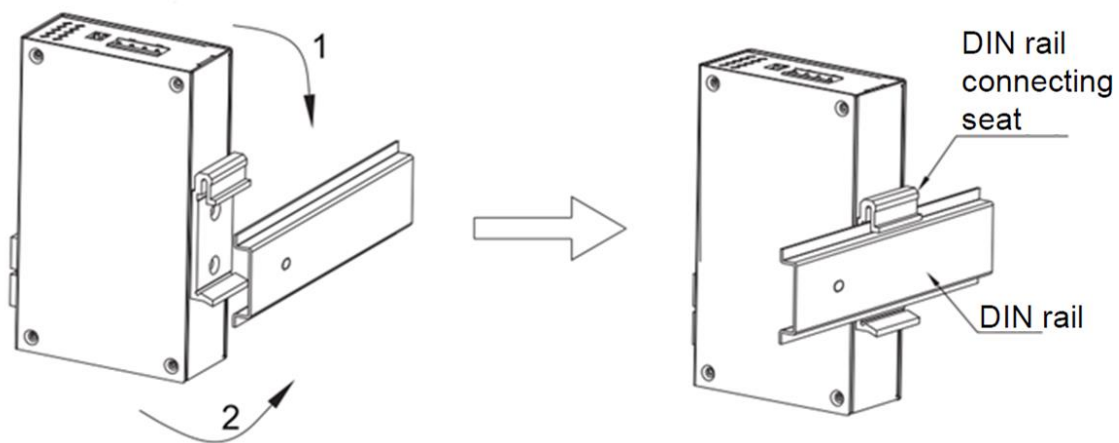


Figure 4 DIN-Rail Mounting

**3.2.2 DIN-Rail Dismounting**

Step 1: As shown in the following figure, press the device downward and move the device in direction 1 until the bottom of the device is detached from the DIN rail.

Step 2: Pull the device upward and move the device in direction 2 until the device is removed from the DIN rail completely.

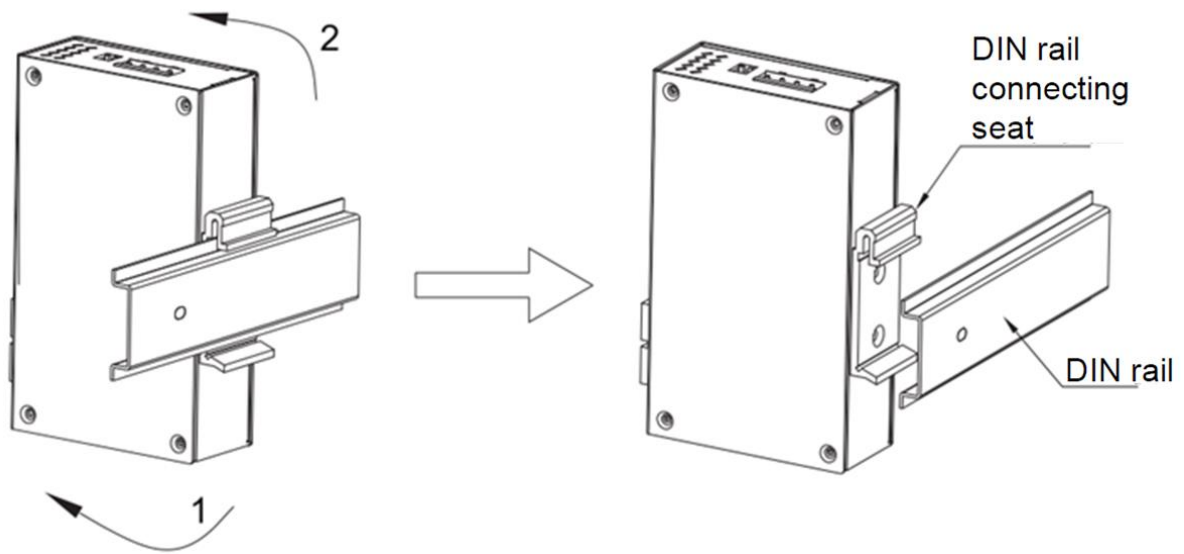


Figure 5 DIN-Rail Dismounting

### 3.2.3 Mounting clearance

It is recommended that there should be enough clearance to install this product:

- Top and bottom side: 30mm
- Sides:20mm
- Front:30mm

## 4 Connection

### 4.1 10/100Base-T(X) Ethernet Port

10/100Base-T(X) Ethernet port is equipped with RJ45 connector. The port is self-adaptive. It can automatically configure itself to work in 10M or 100M state, full or half duplex mode. The port can also adapt to MDI or MDI-X connection automatically. You can connect the port to a terminal or network device with a straight-through or cross-over cable.

- Pin Definition

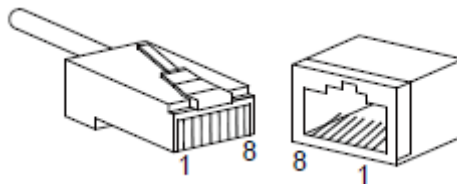



Figure 6 RJ45 Port

Table 3 Pin Definitions of 10/100Base-T(X) Ethernet Port

Pin	MDI-X Signal	MDI Signal
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
 <b>Note:</b> "+" and "-" indicate level polarities.		

- Wiring Sequence

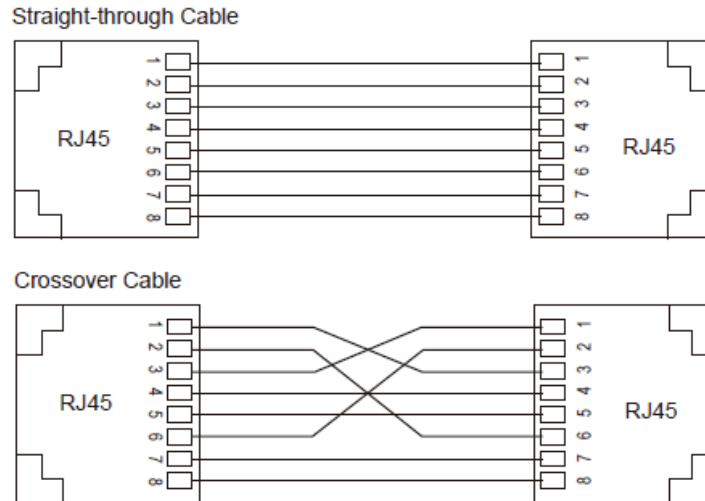


Figure 7 Connection Using Straight-through/Cross-over Cable



**Note:**

The color of the cable for RJ45 connector meets the 568B standard: 1-orange and white, 2-orange, 3-green and white, 4-blue, 5-blue and white, 6-green, 7-brown and white, and 8-brown.

### 4.2 RS-232/RS-422/RS-485 interface

RS-232 / RS-422 / RS-485 interface using standard DB9 male interface, RS-232 interface to support RTS / CTS. The serial interface pins supported by this device are defined in the following table.

Table 4 Serial interface pin definition

Pin	RS-232	RS-422	RS-485
1	CTS	RxD-(B)	-
2	RxD	RxD+(A)	-
3	TxD	TxD-(Z)	Data-(B)
4	RTS	TxD+(Y)	Data+(A)
5	GND	GND	GND
6	-	-	-
7	-	-	-
8	-	-	-
9	-	-	-

### 4.3 Grounding

Grounding protects the device from lightning and interference. Therefore, you must ground the device properly. You need to ground the device before it is powered on and disconnect the grounding cable after the device is powered off.

The device provides a grounding screw(see Figure 2) on the rear panel for chassis grounding. After crimping one end of the grounding cable to a cold pressed terminal, secure the end to the grounding screw and connect the other end to the earth firmly.



**Note:**

Cross-sectional area of the chassis grounding cable  $>2.5\text{mm}^2$ ; grounding resistance  $<5\Omega$ .

### 4.4 Power Terminal Block

There is a power terminal block on the rear panel of the device. You need to connect the power wires to the terminal block to provide power to the device. The device supports single (PWR1) and redundant (PWR1 and PWR2) power supply with a 4-pin 5.08mm-spacing plug-in terminal block. When the redundant power supply is used and one power input is faulty, the device can continue operating properly, thereby improving network reliability.



**Note:**

$0.75\text{mm}^2 < \text{Cross-sectional area of the power wire} < 2.5\text{mm}^2$ ; grounding resistance  $<5\Omega$ .

- 4-Pin 5.08mm-Spacing Plug-in Terminal Block

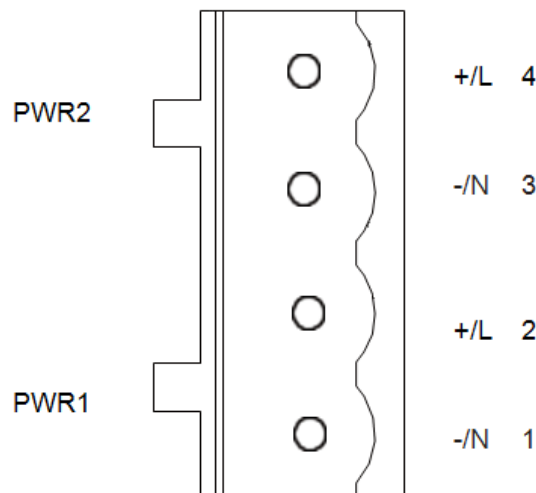


Figure 8 4-Pin 5.08mm-Spacing Plug-in Terminal Block

The following table lists the pin definitions of the 5-pin 5.08mm-spacing plug-in terminal block.

Table 5 Pin Definitions of 4-Pin 5.08mm-Spacing Plug-in Terminal Block

No.	Signal	DC Definition
1	N/-	PWR1: -
2	L/+	PWR1: +
3	N/-	PWR2: -
4	L/+	PWR2: +

- **Wiring and Mounting**

Step 1: Ground the device properly according to section 4.3.

Step 2: Remove the power terminal block from the device.

Step 3: Insert the power wires into the power terminal block according to Table 5 and secure the wires.

Step 4: Insert the terminal block with the connected wires into the terminal block socket on the device.

Step 5: Connect the other end of the power wires to the external power supply system according to the power supply requirements of the device. View the status of the power LEDs on the front panel. If the LEDs are on, the power is connected properly.

Wiring and Mounting should meet following specifications:

Table 6 Wiring and Mounting Specifications

Terminal Type	Required Torque	Wire Range (AWG)
Terminal Block Plug	5.0 lb-in for WEIDMUELLER terminal block	12-24



**Caution:**

- Before connecting the device to power supply, make sure that the power input meets the power requirement. If connected to an incorrect power input, the device may be damaged.



- Warning: temperature of the cable used on this device is 85°C.



**Warning:**

- Do not touch any exposed conducting wire, terminal, or component with a voltage warning sign, because it may cause damage to humans.
- Do not remove any part or plug in or out any connector when the device is powered on.

### 4.5 DIP switch

The top panel of the device has two DIP switches. Each DIP switch has ON and OFF status. The default configuration is OFF. DIP switch can be achieved RS-485 serial terminal matching resistor enable and disable, DIP switch 1 corresponds to the serial port S1.

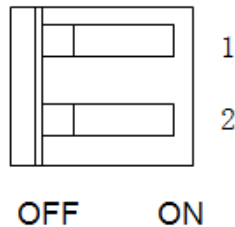


Figure 9 DIP switch

Table 7 Function description of DIP switch

DIP switch	Status	Function description
1	ON	Enable RS-485 terminal matching resistor for serial port S1
	OFF	Disable RS-485 terminal matching resistor for serial port S1

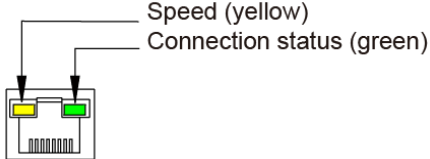
## **5 Reset**

The device provides a Reset button on the top panel. The button can be used to restore factory default settings.

You can restore factory default settings (including the IP address) by pressing and holding the button for five seconds. The default IP address is E1: 192.168.0.249.

## 6 LEDs

Table 8 Front Panel LEDs

LED	State	Description
Power 1 LED-PWR1	On	Power 1 is connected and operates properly.
	Off	Power 1 is not connected or operates abnormally.
Power 2 LED-PWR2	On	Power 2 is connected and operates properly.
	Off	Power 2 is not connected or operates abnormally.
Running LED-Run	On	The CPU is starting up.
	Blinking	The CPU operates properly.
	Off	The CPU does not start up.
		
10/100Base-T(X) Ethernet port speed LED (yellow)	On	100M working state (100Base-TX)
	Off	10M working state (10Base-T) or no connection
10/100Base-T(X) Ethernet port connection status LED (green)	On	Effective port connection
	Blinking	Ongoing network activities
	Off	No effective port connection
S1-T(green)	Blinking	Serial port 1 has a data signal sent
	Off	Serial port 1 No data transfer
S1-R(green)	Blinking	Serial port 1 has data signal reception
	Off	Serial port 1 No data transfer

## 7 Access

You can access the device in any of the following ways:

### 7.1 Access through Telnet

Step 1: Connect the network port of a PC to the Ethernet port of the device with a network cable.

Step 2: On the Windows desktop, click Start and Run. The Run dialog box is displayed. Enter "telnet *IP address*". For example, if the IP address of the serial port module is 192.168.0.249 (default IP address of the device), enter "telnet 192.168.0.249" in the dialog box.

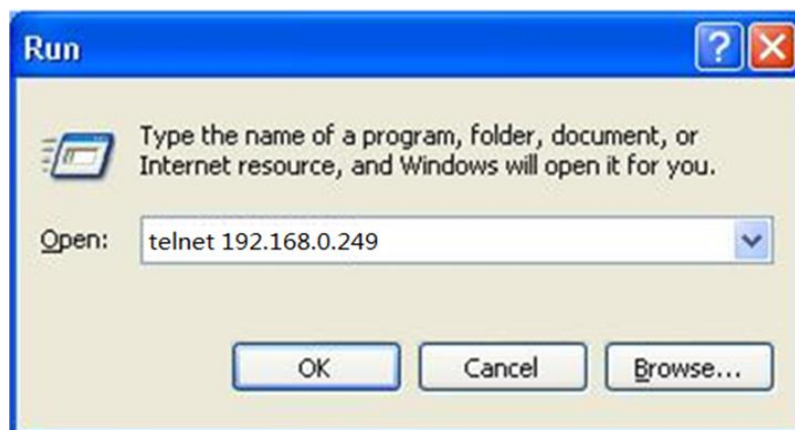


Figure 10 Access through Telnet

Step 3: Click OK. The Telnet CLI is displayed. Then you can run the shell commands to perform operations.

### 7.2 Access through Web

Step 1: Connect the network port of a PC to the Ethernet port of the device with a network cable.

Step 2: Enter the IP address of the device in the address box of the browser. The user login interface is displayed. You can log in to the Web UI by default user name "admin" and password " admin ".

**Note:**

- IE8.0 or a later version is recommended.
  - For details about how to access the device and other operations, refer to the Web operation manual in the delivered CD.
-

## 8 Basic Features and Specifications

### Power Requirements

Power Identifier	Rated Voltage Range	Maximum Voltage Range
L17	24VDC	12-48VDC
Terminal block	4-pin 5.08mm-spacing plug-in terminal block	

### Rated Power Consumption

Rated power consumption	1.8W
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### Physical Characteristics

Housing	Metal, fanless
Protection class	IP40(Exclude Terminal Block)
Installation	DIN-Rail mounting
Dimensions (W×H×D)	30mm×115mm×68mm
Weight	165g

### Environmental Limits

Operating temperature	-40℃~+75℃
Storage temperature	-40℃~+85℃
Ambient relative humidity	5%~95% (non-condensing)
Pollution degree	2
Insulation class	3
Autitude	Up to 2000 m

### MTBF

MTBF	3700009h
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### Warranty

Warranty	5 years
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## 9 Appendix



1. UL control number: 4SH7.
2. The product identity: IND. CONT. EQ. FOR HAZ. LOC. Class I, Division 2, Groups A, B, C and D Hazardous Locations.
3. Max Ambient temperature: xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

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