Opal5GS Series Industrial Ethernet Switch

Hardware Installation Manual

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No.:

KYLAND

Opal5GS Series Industrial Ethernet Switch

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.

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 notice 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 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.

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.

Contents

1 Product Overview

Unmanaged Industrial Gigabit Ethernet Switch Opal5GS series applied in the ITS, highway, industrial automation, oil&gas and many other industries. The Opal5GS series are applicable to harsh and hazardous industrial environments due to its high-performance switching engine, solid closed housing, fanless but heat dissipation-capable single-rib shaped chassis, overcurrent, overvoltage, and EMC protection for power input, and sound EMC protection of RJ45 ports. The redundant network and power input support guarantees the reliable operation of the system.

The series switches support DIN rail and panel mounting. For details, see the following table.

Table 1 Opal5GS series

Model	**Opal5GS -Ports - PS1- PS2**
Code definition	Code option
Ports: GX/GE	1GE4GP,1GX4GP
	Note： *1GE4GP：* *one 10/100/1000Base-T(X) ports;* *four 10/100/1000Base-T(X) ports with POE.* *1GX4GP:* *one 1000Base-X，10/100/1000Base-T(X) SFP slots；* four *10/100/1000Base-T(X) ports with POE.*
PS1-PS2: power input	L10(12-58VDC ,54-58V for PoE+, 48-58V for PoE)

Note:

We reserve the right to amend the product information listed in this table without notice. To obtain the latest information, contact our sales or technical support personnel.

2 Structure and Interface

Caution:

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

2.1 Front Panel

- Front Panel of Opal5GS-1GE4GP-L10-L10

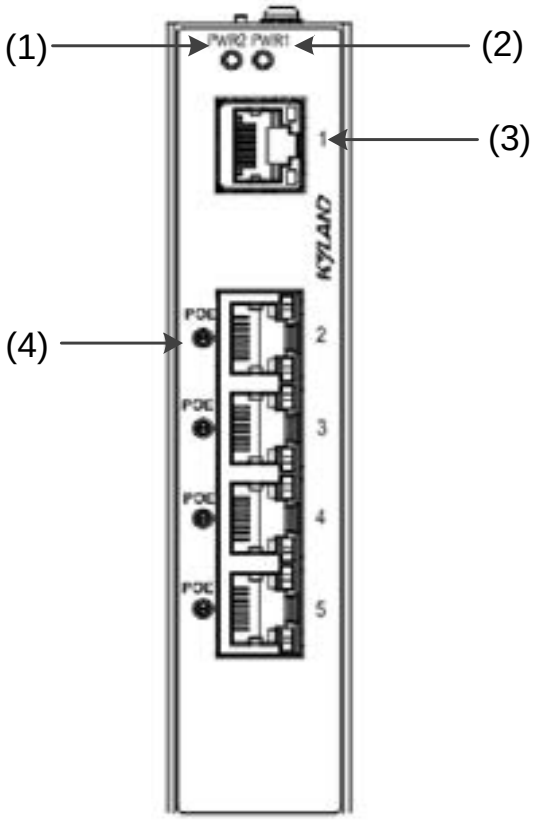


Figure 1 Front Panel

Table 2 Description of the Front Panel

No.	Identifier	Description
(1)	PWR2	Power 2 LED
(2)	PWR1	Power 1 LED
(3)	1	One 10/100/1000Base-T(X) Ethernet Port
(4)	POE(2-5)	Four 10/100/1000Base-T(X) Ethernet Port POE LED

- Front Panel of Opal5GS-1GX4GP-L10-L10

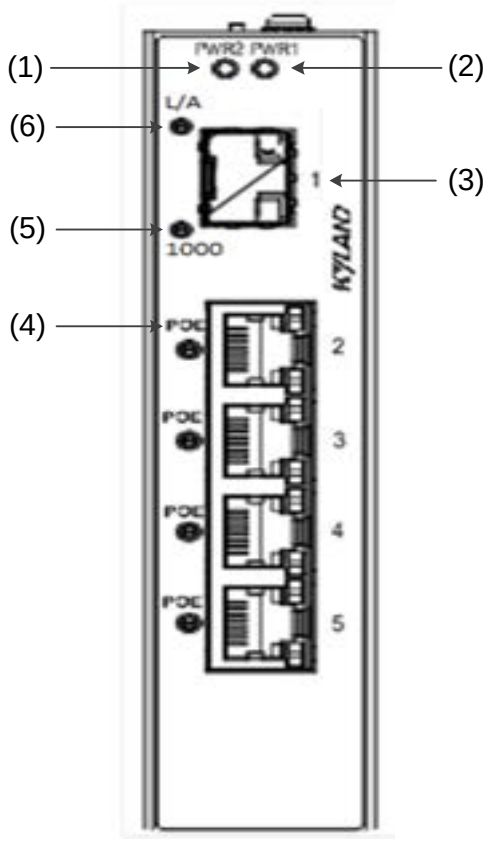


Figure 2 Front Panel

Table 3 Description of the Front Panel

No.	Identifier	Description
(1)	PWR2	Power 2 LED
(2)	PWR1	Power 1 LED
(3)	1	One 1000Base-X, 10/100/1000Base-T(X) SFP slot
(4)	POE(2-5)	Four 10/100/1000Base-T(X) Ethernet Port POE LED
(5)	1000	1000M Working State LED
(6)	L/A	Port connection status LED

2.2 Top Panel

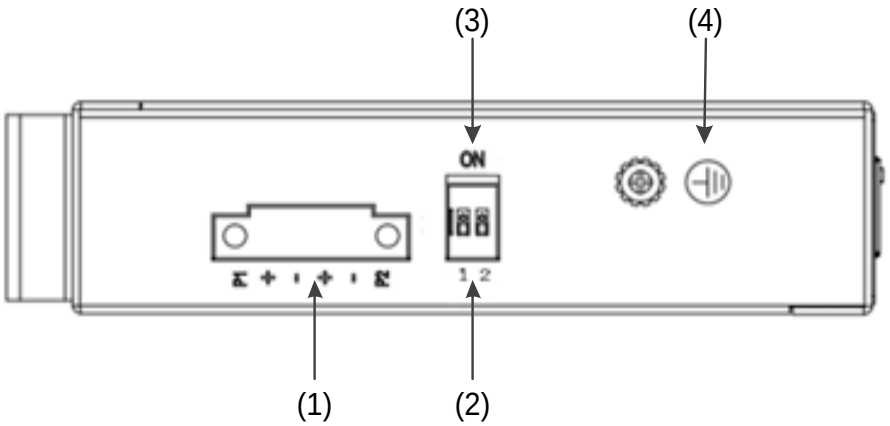


Figure 3 Top Panel

Table 4 Description of the Top Panel

No.	Identifier	Description
(1)	⏚ + ' + ' ⏚	Power terminal block
(2)	1/2	1：Switch of Broadcast storm rate limit 2：Not used
(3)	ON	Dial switch status
(4)	⏚	Grounding screw

3 Mounting

3.1 Dimension Drawing

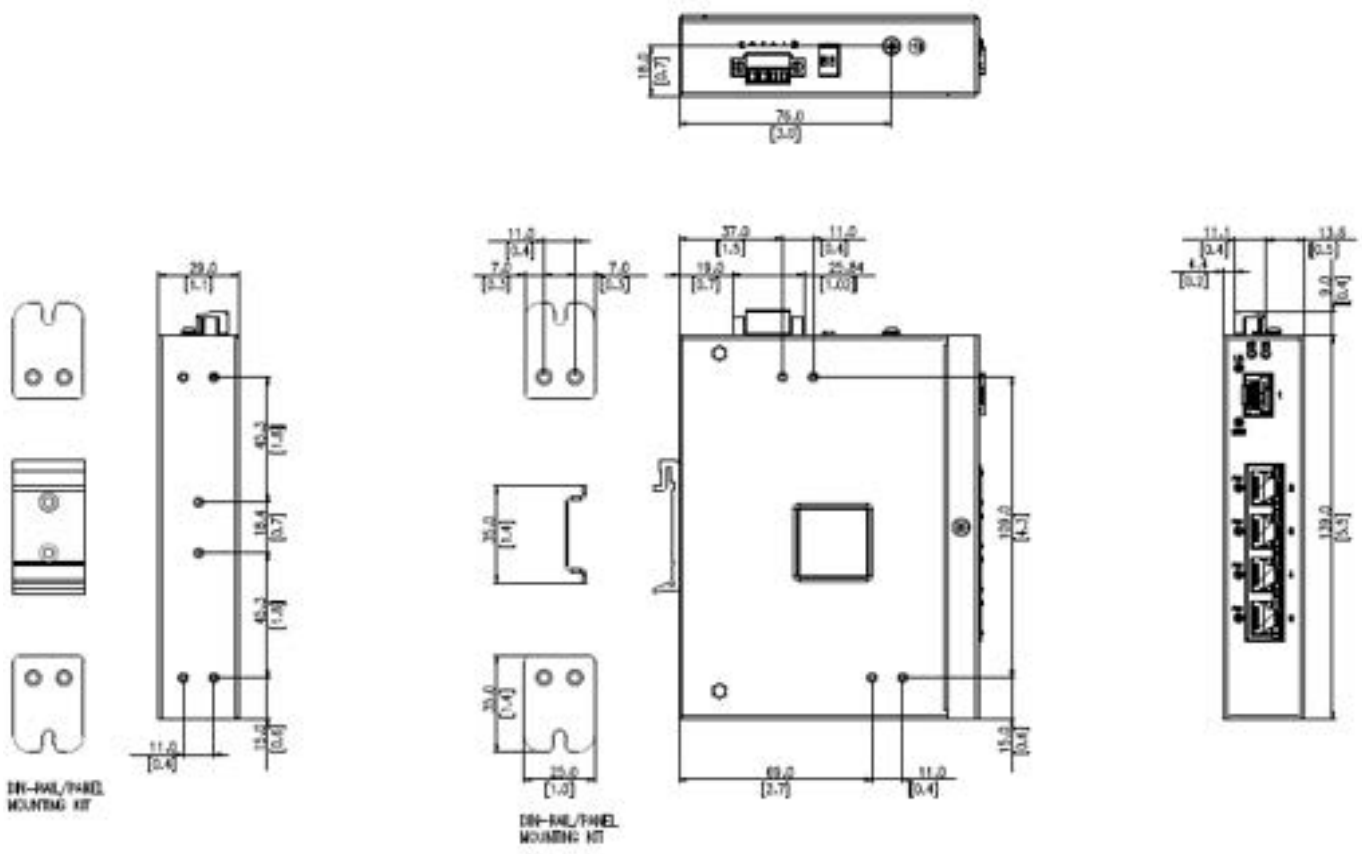


Figure 4 Dimensions for DIN-Rail Mounting (unit: mm)

Caution:

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

3.2 Mounting Modes and Steps

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

1) Environment: temperature (-40℃ to 75℃), ambient relative humidity (5% to 95%, non-condensing)

2) Power requirement: The power input is within the voltage range of the switch.

3) Grounding resistance: <5Ω

4) No direct sunlight, distant from heat source and areas with strong electromagnetic interference.

3.2.1 Mounting

- DIN-Rail Mounting

Step 1: Select the mounting position for the device and guarantee adequate space and heat dissipation .

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.

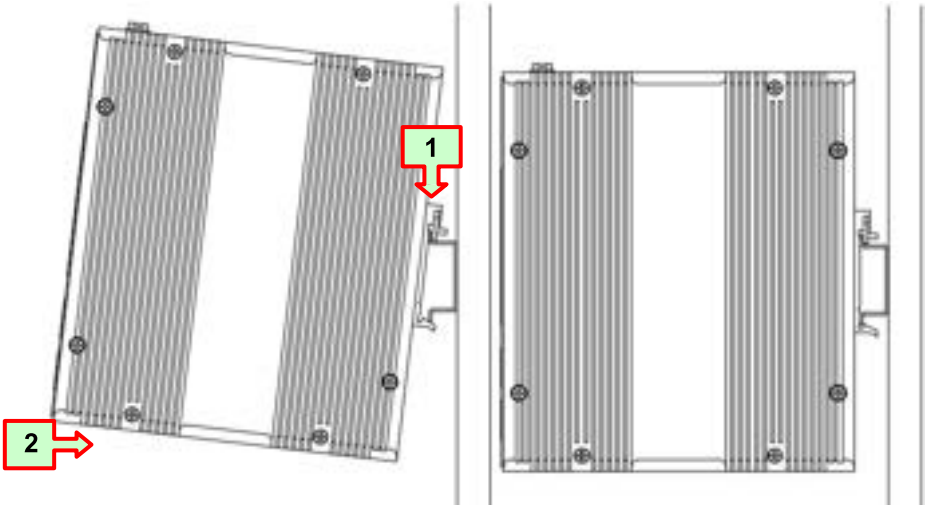


Figure 5 DIN-Rail Mounting

3.2.2 Wall Mounting

Note:

Purchase the plate (optional) for panel mounting.

- Wall Mounting

Screw the wall-mount brackets with screws in the accessory kit.

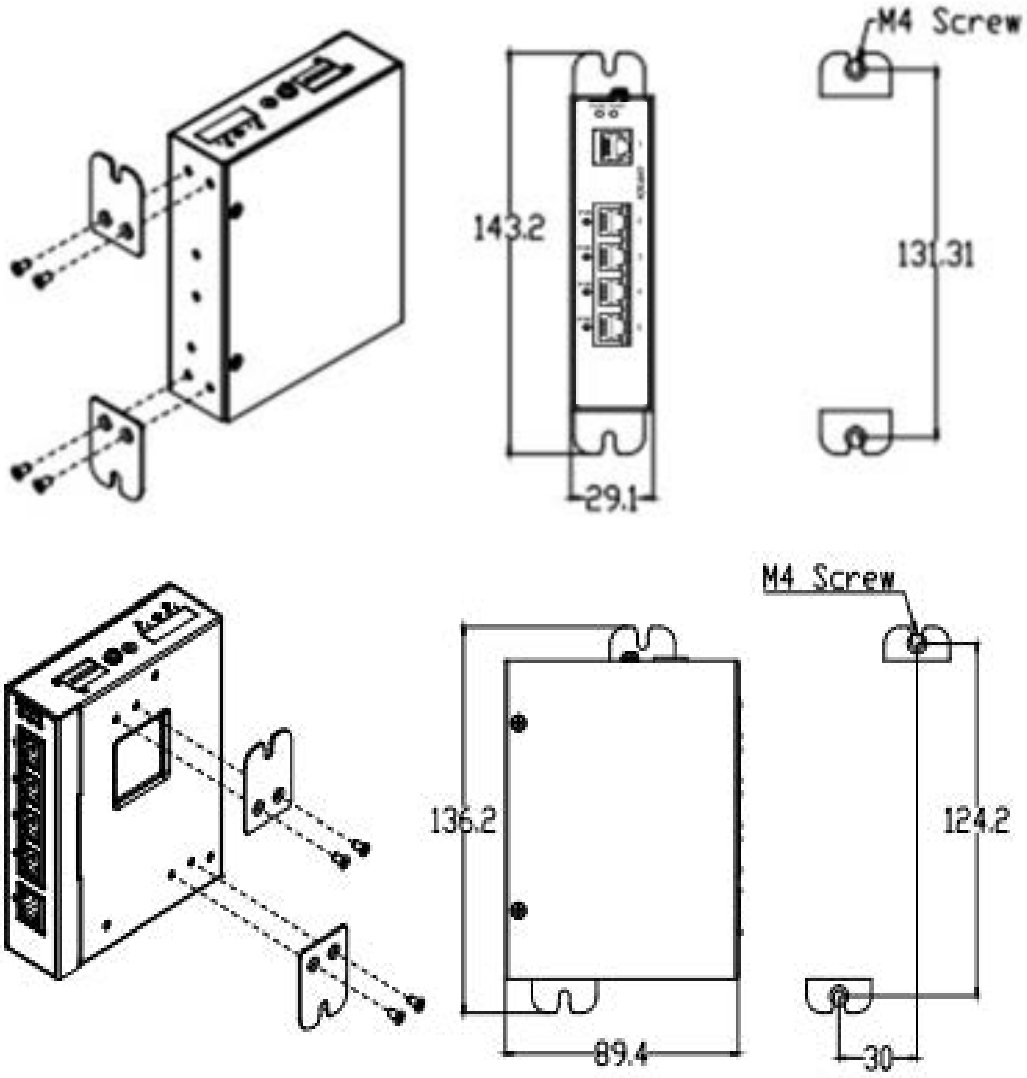


Figure 6 Wall Mounting

4 Connection

4.1 10/100/1000Base-T(X) Ethernet Port

10/100/1000Base-T(X) Ethernet port is equipped with RJ45 connector. The port is self-adaptive. It can automatically configure itself to work in 10M, 100M, or 1000M 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

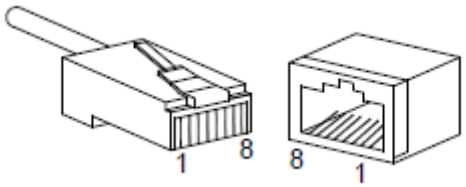


Figure 7 RJ45 Port

Table 5 Pin Definitions of 10/100/1000Base-T(X) RJ45 Port

Pin	MDI-X	MDI
1	Transmit/Receive Data (TRD1+)	Transmit/Receive Data (TRD0+)
2	Transmit/Receive Data (TRD1-)	Transmit/Receive Data (TRD0-)
3	Transmit/Receive Data (TRD0+)	Transmit/Receive Data (TRD1+)
4	Transmit/Receive Data (TRD3+)	Transmit/Receive Data (TRD2+)
5	Transmit/Receive Data (TRD3-)	Transmit/Receive Data (TRD2-)
6	Transmit/Receive Data (TRD0-)	Transmit/Receive Data (TRD1-)
7	Transmit/Receive Data (TRD2+)	Transmit/Receive Data (TRD3+)
8	Transmit/Receive Data (TRD2-)	Transmit/Receive Data (TRD3-)
Note: "+" and "-" indicate level polarities.		

- Wiring Sequence

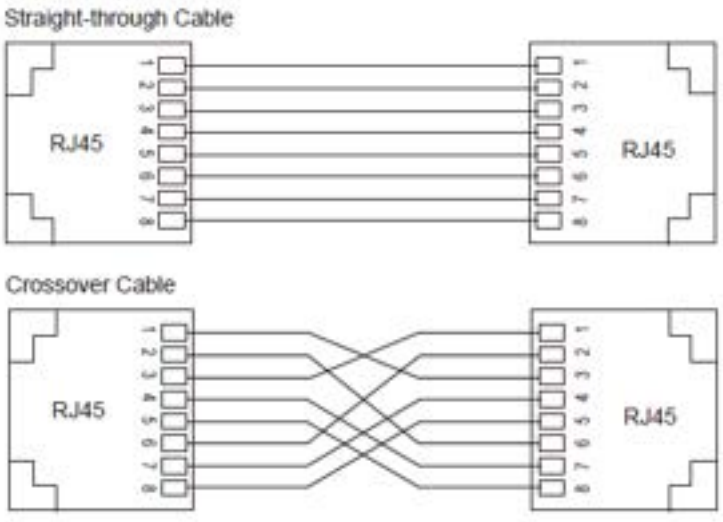


Figure 8 Connection Using Straight-through/Cross-over Cable

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 1000Base-X, 10/100/1000Base-T(X) SFP slot

1000Base-X, 10/100/1000Base-T(X) SFP slot (gigabit SFP slot) requires an SFP optical/electrical module to enable data transmission. The following table lists the gigabit SFP optical/electrical modules (optional) supported by the series switches.

Table 6 Gigabit SFP Optical/Electrical Modules

Model	**Port**	**MM/SM**	**Connector**	**Central Wavelength**	**Transmission Distance**
IGSFP-M-SX-LC-850-0.55	1000Base-X port	MM	LC	850nm	0.55km
IGSFP-S-LX-LC-1310-10	1000Base-X port	SM	LC	1310nm	10km
IGSFP-S-LH-LC-1310-40	1000Base-X port	SM	LC	1310nm	40km
IGSFP-S-ZX-LC-1550-80	1000Base-X port	SM	LC	1550nm	80km
IGSFP-10/100/1000BASE-T-RJ45	10/100/1000Base-T(X) port	--	RJ45	--	--

4.2.1 Gigabit SFP Optical Module

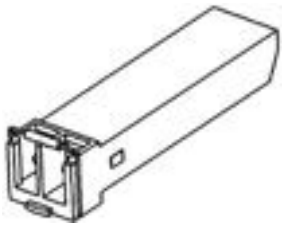


Figure 9 Gigabit SFP Optical Module

An SFP optical module is equipped with LC connector, and each port consists of a TX (transmit) port and an RX (receive) port. To enable communication between Device A and Device B, connect the TX port of Device A to the RX port of Device B, and the RX port of Device A to the TX port of Device B, as shown in the following figure.

Figure 10 Fiber Connection of an SFP Optical Module

- How to Connect the SFP Optical Module

Insert the SFP optical module into the SFP slot in the switch, and then insert the fibers into the TX port and RX port of the SFP module.

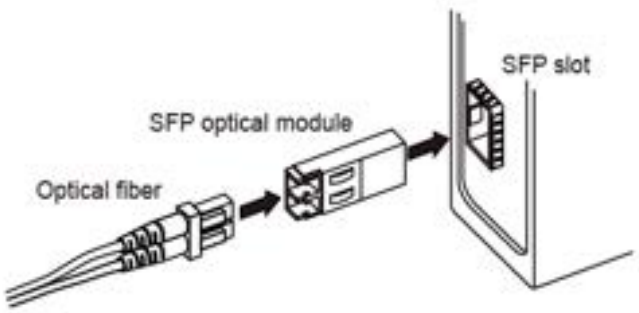


Figure 11 Connecting the SFP Optical Module

Identify the RX port and TX port of an SFP optical module:

1. Insert the two connectors in one end of two fibers into the SFP module, and those in the other end into the peer module.
2. View the corresponding connection status LED:

   If the LED is on, the connection is correct. If the LED is off, the link is not connected. This may be caused by incorrect connection of the TX and RX ports. In this case, swop the two connectors at

one end of the fibers.

Caution:

- The device uses laser to transmit signals in fibers. 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.
- If the defined transmission distance of an SFP module is longer than 60km, do not use a short fiber (<20km) for connection. If such a short fiber is used, the module will be burned.

4.2.2 Gigabit SFP Electrical Module

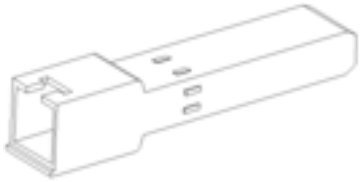


Figure 12 Gigabit SFP Electrical Module

- How to Connect the SFP Electrical Module

Insert the SFP electrical module into the SFP slot in the switch, and then insert the RJ45 connector of the twisted pair into the SFP module.

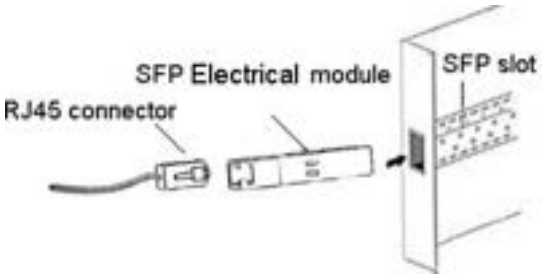


Figure 13 Connecting the SFP Electrical Module

4.3 Grounding

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

The switch provides a grounding screw on the top 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.

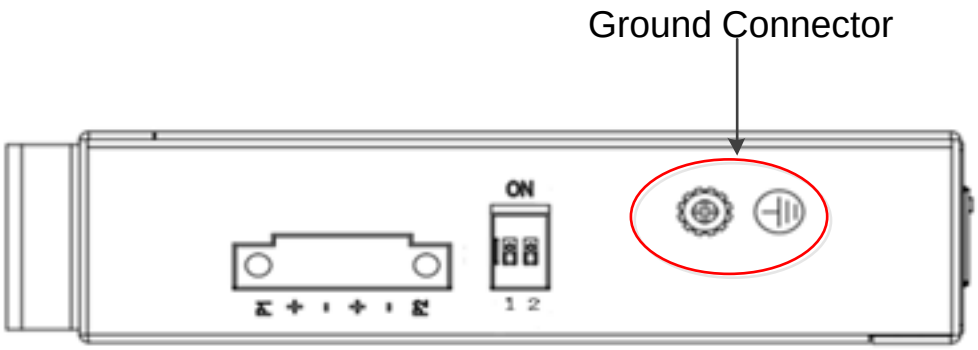


Figure 14 Grounding

Note:

Cross-sectional area of the chassis grounding cable>2.5mm2; grounding resistance<5Ω.

4.4 Power Terminal Block

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. When the redundant power supply is used and one power input is faulty, the device can continue operating properly, thereby improving network reliability.

Note:

0.75mm2<Cross-sectional area of the power wire<2.5mm2; grounding resistance<5Ω.

- 4-Pin 3.81mm-Spacing Plug-in Terminal Block

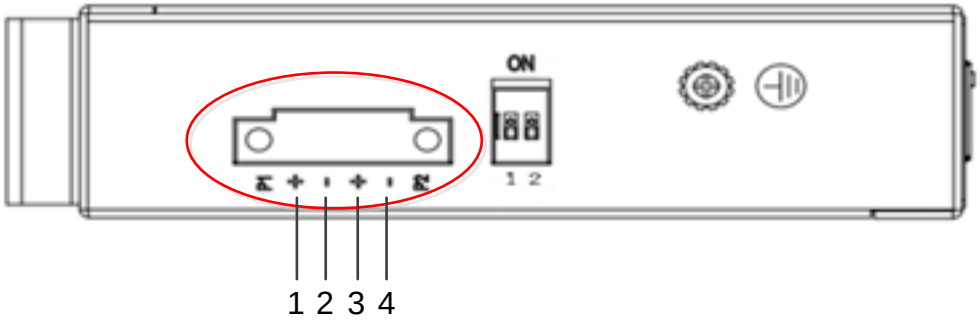


Figure 15 4-Pin 3.81mm-Spacing Plug-in Terminal Block

Table 7 Pin Definitions of 4-Pin 3.81mm-Spacing Plug-in Terminal Block

No.	Signal	DC Definition	AC Definition

1	+/L	PWR1: +	PWR1: L
2	-/N	PWR1: -	PWR1: N
3	+/L	PWR2: +	PWR2: L
4	-/N	PWR2: -	PWR2: N

- 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 7 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 8 Wiring and Mounting Specifications

Terminal Type	**Required Torque**	**Wire Range (AWG)**
Terminal Block Plug	4.5-5.0 lb-in for WEIDMUELLER terminal block	12-58

Caution:

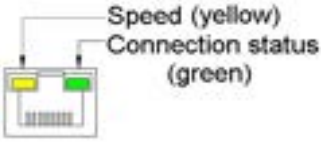
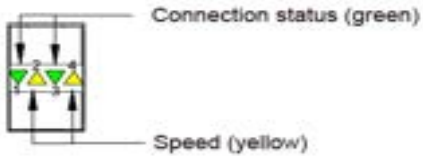
- Before connecting the device to power supply, make sure that the power input meets the power requirement. If connected to an incorrect power input, the device may be damaged.
- To comply with UL restrictions, this equipment must be powered from a source compliant with Class 2.

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.

5 LEDs

Table 9 Front Panel LEDs

<table>
<tr><th>LED Name</th><th colspan="2">Indicator /color</th><th colspan="2">Condition</th></tr>
<tr><td rowspan="2">PWR1/PWR2</td><td colspan="2">On Green</td><td colspan="2">PWR1/PWR2 power line has power</td></tr>
<tr><td colspan="2">Off</td><td colspan="2">PWR1/PWR2power line disconnect or does not have power</td></tr>
<tr><td rowspan="2">Alarm</td><td colspan="2">On Red</td><td colspan="2">Ethernet link fails, alarm or power failure alarm occurs</td></tr>
<tr><td colspan="2">Off</td><td colspan="2">No Ethernet link fails and no power failure alarm</td></tr>
<tr><td rowspan="2">POE LED</td><td colspan="2">On Yellow</td><td colspan="2">POE is detected</td></tr>
<tr><td colspan="2">Off</td><td colspan="2">No link</td></tr>
<tr><td colspan="5"> 
</td></tr>
<tr><td rowspan="4">Port speed LED</td><td rowspan="2">10/100/1000Base-T(X) Ethernet port</td><td>On</td><td colspan="2">1000M working state</td></tr>
<tr><td>Off</td><td colspan="2">10/100M working state or no connection</td></tr>
<tr><td rowspan="2">10/100Base-T(X) Ethernet port</td><td>On</td><td colspan="2">100M working state</td></tr>
<tr><td>Off</td><td colspan="2">10M working state or no connection</td></tr>
<tr><td colspan="2" rowspan="3">Port connection status LED</td><td>On</td><td colspan="2">Effective port connection</td></tr>
<tr><td>Blinking</td><td colspan="2">Ongoing network activities</td></tr>
<tr><td>Off</td><td colspan="2">No effective port connection</td></tr>
<tr><td colspan="5"> 
</td></tr>
<tr><td rowspan="4">1000Base-X, 10/100/1000Base-T(X) SFP slot speed LED</td><td rowspan="2">Gigabit SFP optical module</td><td>On</td><td colspan="2">1000M working state (1000Base-TX)</td></tr>
<tr><td>Off</td><td colspan="2">100M working state (100Base-FX) or no connection</td></tr>
<tr><td rowspan="2">Gigabit SFP electrical module</td><td>On</td><td colspan="2">1000M working state (1000Base-TX)</td></tr>
<tr><td>Off</td><td colspan="2">10/100M working state (10/100Base-T(X)) or no connection</td></tr>
<tr><td colspan="2" rowspan="3">1000Base-X, 10/100/1000Base-T(X) SFP slot connection status LED</td><td colspan="2">On</td><td>Effective port connection</td></tr>
<tr><td colspan="2">Blinking</td><td>Ongoing network activities</td></tr>
<tr><td colspan="2">Off</td><td>No effective port connection</td></tr>
</table>

6 Basic Features and Specifications

Power Requirements		
Power Identifier	Rated Voltage Range	Maximum Voltage Range
L10	12-58 VDC, 54-58V for PoE+, 48-58V for PoE	12-58VDC
Terminal block	4-pin 3.81mm-spacing plug-in terminal block	
Rated Power Consumption		
Rated power consumption	3W (without PD)(MAX)	
Physical Characteristics		
Housing	Aluminum, fanless	
Installation	DIN-rail and panel mounting	
Dimensions (W×H×D)	29mm x 139mm x 107mm	
Weight	<0.5kg	
Environmental Limits		
Operating temperature	-40 to +75°C	
Storage temperature	-40℃~+85℃	
Ambient relative humidity	5%~95% (non-condensing)	
MTBF		
MTBF	25years	
Warranty		
Warranty	5 years	

KYLAND

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For more information about KYLAND products, please visit our website:

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