

Lysora LCS-16GS-P Switch

Installation Guide

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Preface

Intended Audience

This document is intended for:

- Network engineers
- Technical support and servicing engineers
- Network administrators

Technical Support

- Official website: <https://help.lysoratech.com/>
- Technical support email: support@lysoratech.com

Conventions

1. Symbols

The symbols that may be found in this document are described as follows:

Danger

An alert that calls attention to critical guidelines which, if not understood or followed, can result in personal injury.

Warning

An alert that calls attention to important information which, if not understood or followed, can result in data loss or equipment damage.

Caution

An alert that calls attention to essential information which, if not understood or followed, can result in functional failure or performance degradation.

Note

An alert that indicates additional or supplementary information.

Specification

An alert that indicates a description of product or version support.

2. Notes

This document provides installation steps, troubleshooting, technical specifications, and usage guidelines about cables and connectors. It is intended for users who want to understand the above and have extensive experience in network deployment and management, and assume that users are familiar with related terms and concepts.

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1 Overview

The LCS-16GS-P cloud managed switch features 18 x 10/100/1000BASE-T ports (ports 1 to 16 support PoE/PoE+), 2 x 1000BASE-X SFP ports, one LED mode switch and one reset button on the front panel. The device also has an AC power connector and one grounding stud on the rear panel.

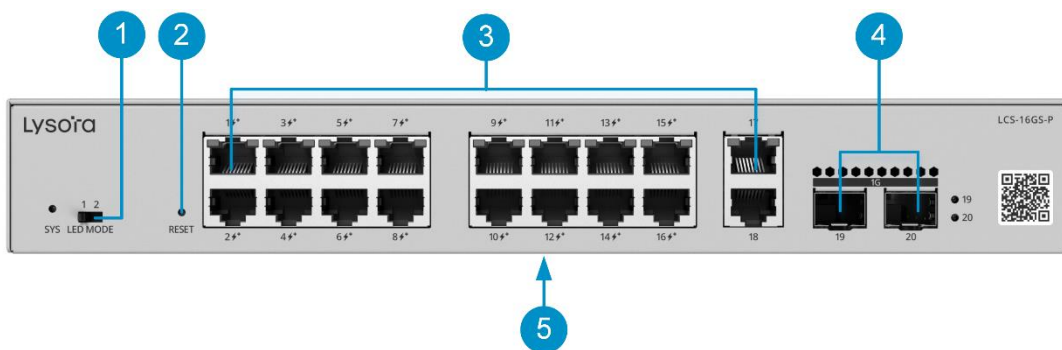
1.1 Product Appearance

Figure 1-1 Appearance of LCS-16GS-P



1.1.1 Front Panel

Figure 1-2 Front Panel of LCS-16GS-P



Note

⚡ indicates PoE+ port, which is compliant with IEEE 802.3af and IEEE 802.3at.

Table 1-1 Components on the Front Panel

No.	Silkscreen	Component	Description
1	LED MODE	LED Mode toggle switch	<ul style="list-style-type: none"> Switching mode (Mode 1): When the switch is toggled to the left, the LEDs of ports 1–18 display the data transmission status of the Ethernet ports. PoE mode (Mode 2): When the switch is toggled to the right, the LEDs of ports 1–16 display the PoE status of the Ethernet ports.
2	RESET	Reset button	<ul style="list-style-type: none"> Press and hold the button for less than 2s: Restart the switch. Press and hold the button for more than 5s: Press and hold the button for more than 5s until the system status LED starts blinking to restore factory settings and restart the switch. Press and hold for 2s to 5s: No action is triggered.
3	1-18	10/100/1000BASE-T ports (ports 1-18)	10/100/1000BASE-T ports, with ports 1–16 supporting PoE/PoE+.
4	19, 20	1000BASE-X SFP ports (ports 19 and 20)	The 1000BASE-X SFP port is not downward compatible with 100BASE-FX.
5	-	Nameplate	The nameplate is located at the bottom of the switch.

1.1.2 Rear Panel

Figure 1-3 Rear Panel of LCS-16GS-P



Table 1-2 Components on the Rear Panel

No.	Silkscreen	Component	Description
1	-	Grounding stud	For connecting to a grounding wire.
2	-	Power connector	For connecting to an AC power supply.
3	-	Power cord retention clip hole	For securing the power cord retention clip.

1.1.3 LEDs

Figure 1-4 LEDs of LCS-16GS-P

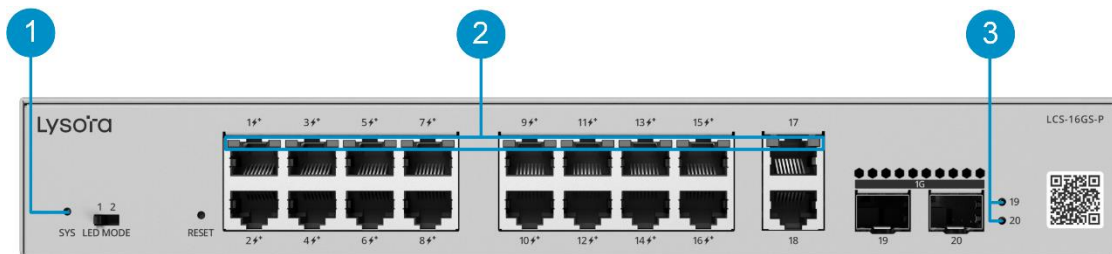


Table 1-3 LEDs

No.	Silkscreen	Component	Description
1	SYS	System status LED	<ul style="list-style-type: none"> Off: The switch is not powered on. Blinking green: If the PoE output power exceeds 250 W, the newly connected PD cannot be powered up because of insufficient power, but the switching function will operate properly. Solid green: The system is operating normally.
2	-	10/100/1000BASE-T port status LED	<p>The LEDs of ports 1–16 can operate in either switching mode or PoE mode, while the LEDs of ports 17 and 18 can only operate in switching mode.</p> <ul style="list-style-type: none"> Switching mode (LED MODE 1): <ul style="list-style-type: none"> Off: The port is not connected. Solid green: The port is operating at

No.	Silkscreen	Component	Description
			<p>10/100/1000 Mbps, but is not receiving or sending data.</p> <ul style="list-style-type: none"> ○ Blinking green: The port is operating at 10/100/1000 Mbps, and is receiving or sending data. ● PoE mode (LED MODE 2): <ul style="list-style-type: none"> ○ Off: PoE is disabled. ○ Solid green: PoE is enabled. ○ Blinking green: PoE overload occurs.
3	19, 20	SFP port status LED	<ul style="list-style-type: none"> ● Off: The port is not connected. ● Solid green: The port is operating at 1000 Mbps, but is not receiving or sending data. ● Blinking green: The port is operating at 1000 Mbps, and is receiving or sending data.

1.2 Technical Specifications

Table 1-4 Technical Specifications

Parameter Type	Parameter Name	LCS-16GS-P
System Specifications	Flash memory	8 MB
	Forwarding rate	29.76 Mpps
	Switching capacity	40 Gbps(bit/s)
Port Specifications	Total number of RJ45 ports	18
	Total number of optical ports	2
	Number of 1GE SFP ports	2
	Number of 10/100/1000BASE-T ports	18

Parameter Type	Parameter Name	LCS-16GS-P
	Optical Transceiver Type	See Appendix 6.2. SFP transceivers are not supported. The transceiver types may update without prior notification. Please contact Lysora for details.
	Reset button	1
	DIP switch	LED mode switch toggled to left (Mode 1): The port LED status indicates the status of traffic transmission. Solid green means that the port is link up, while blinking green means that the port is transmitting and receiving data. LED mode switch toggled to right (Mode 2): The port LED status indicates the PoE status. Solid green means that the port is supplying power, while blinking green means that the port is in power overload state.
Power Supply and Consumption	PoE Out standard	PoE/PoE+ (IEEE 802.3af/at)
	Number of PoE/PoE+ Out ports	16
	PoE budget per port	30 W
	PoE budget	250 W
	PoE power pins	1-2 (+), 3-6 (-)
	Power input	220 V AC power supply: <ul style="list-style-type: none"> Rated input voltage: 100 V AC to 240 V AC, 50 Hz to 60 Hz Maximum input voltage: 90 V AC to 264 V AC, 47 Hz to 63 Hz Rated input current: 4.5 A
Maximum power consumption	<ul style="list-style-type: none"> 15 W (with no PoE load) 265 W (with PoE full load) 	
Dimensions and	Enclosure Material	Metal

Parameter Type	Parameter Name	LCS-16GS-P
Weight	Product dimensions (W x D x H)	300 mm x 223 mm x 43.6 mm (11.81 in. x 8.78 in. x 1.72 in.)
	Weight	<ul style="list-style-type: none"> • 2.12 kg (4.67 lbs) (without packaging materials) • 2.80 kg (6.17 lbs) (with packaging materials)
Environment and Reliability	Fan	1 x fixed fan
	Cooling	Air cooling, left-to-right airflow
	Acoustic noise	< 40 dB: 25°C (77° F)
	Mounting options	Rack/Desk
	Hot swapping of cables	Hot swapping supported by the service port and power connector
	MTBF	200,000 hours
	Operating temperature	0°C to 40°C (32°F to 104°F)
	Storage temperature	-40°C to +70°C (-40°F to +158°F)
	Operating humidity	10% RH to 90% RH (non-condensing)
	Storage humidity	5% RH to 95% RH (non-condensing)
	Altitude	-500 m to +5,000 m (-1,640.42 ft. to +16,404.20 ft.)
	ESD protection	<ul style="list-style-type: none"> • Air discharge: 8 kV • Contact discharge: 6 kV
	Surge protection	Service port: ±4 kV for common mode Power connector: ±6 kV for common mode and ±6 kV for differential mode
Certification and Regulatory Compliance	EMC	FCC 47 CFR Part 15 Subpart B ICES-003 Issue 7
	Safety compliance	UL 62368-1:2019
	Certification	FCC, IC, cTUVus

Parameter Type	Parameter Name	LCS-16GS-P
Interface	EEE	Yes

! Warning

Operation of this equipment in a residential environment could cause radio interference.

⚠ CAUTION: DOUBLE POLE/NEUTRAL FUSING

Electric shock hazard! The fuse may be in the neutral, and that the mains shall be disconnected to de-energize the phase conductors.

1.3 Cooling

The LCS-16GS-P switch adopts fan cooling. To ensure that the switch works properly in the specified environment, a minimum clearance of 100 mm (3.94 in.) must be maintained around the device to ensure proper ventilation. Dust the device every three months to avoid blocking the ventilation openings on the housing.

2 Preparing for Installation

2.1 Package Contents

Table 2-1 LCS-16GS-P Package Contents

No.	Item	Quantity
1	Switch	1
2	Rubber pad	4
3	User Manual	1
4	M3 x 6 mm cross recessed countersunk head screws	6
5	Power cord	1
6	Power cord retainer clip	1
7	Rack-mount bracket	2
8	Warranty card	1

Note

The package contents above are intended to provide a general overview, and are subject to the terms of the order contract. Please check your goods carefully against the package contents or order contract. If you have any questions, please contact the distributor.

2.2 Safety Guidelines

Caution

- To avoid personal injury and device damage, carefully read the safety precautions before you install the device.
 - The following safety precautions may not cover all possible dangers.
-

2.2.1 General Precautions

- Keep the chassis clean, free from any dust.
- Do not place the device in walking areas.

- During the installation and maintenance, do not wear loose clothes, ornaments, or any other things that may be hooked by the device.
- Cut off all the power supplies and unplug all power cords before placing the device in a rack or removing the device from a rack.

2.2.2 Chassis-Lifting Guidelines

- Avoid handling the device frequently.
- Keep balance and prevent personal injuries when handling the device.
- Turn off all power supplies and disconnect all cables before lifting or moving the equipment.

2.2.3 Electric Safety

Warning

- Any deviation from standard or improper electrical operations can result in accidents such as fires or electric shocks, potentially causing severe or even fatal harm to both individuals and equipment.
 - Direct or indirect touch through a wet object on high-voltage and mains supply can bring a fatal danger.
-

- Always observe the local regulations and standards. Only qualified personnel should be allowed to operate the equipment.
- Carefully check the work area for potential hazards, including ungrounded power system, absent safety grounds, and damp floors.
- Locate the emergency power-off switch in the room before installation. In the case of an accident, cut off the power supply immediately.
- Never assume that power is disconnected from a circuit. Always check.
- Select the right leakage protector (also called “leakage current switch” or “leakage current breaker”) for the power supply system. This equipment automatically disconnects the power supply in the event of leakage and the risk of electric shock. A leakage protector should meet the following requirements:

- The rated leakage action current of each leakage protector is greater than twice the theoretical maximum leakage current of all the power supplies in the system.

For example, if a system is equipped with 16 identical power supplies, and the leakage current of each power supply is equal to or less than 3.5 mA, then the leakage current of the system totals 56 mA. A leakage protector with a rated leakage action current of 30 mA supports no more than four power supplies (that is, action current of the leakage protector/2/Maximum leakage current of each power supply = $30/2/3.5 \approx 4.28$). In this case, 16 power supplies in the system require at least four

leakage protectors with a rated action current of 30 mA, with each leakage protector supporting four power supplies.

Although the number of power supplies in a system differs in models, the rated leakage action current of each leakage protector divided by two must be greater than the sum of the maximum leakage current of all the power supplies.

- The rated leakage non-action current of a leakage protector should be 50% of the leakage action current. If the non-action current value is too small, the high sensitivity level can cause the circuit to break, leading to power cutoff and service interruption, even if the leakage current value is normal.

For example, if a leakage protector has a rated leakage action current of 30 mA, the rated leakage non-action current should be 15 mA. The leakage protector will not activate unless the leakage current exceeds 15 mA.

⚠ Caution

To ensure personal safety, each leakage protector in the system must have a rated leakage action current equal to or below 30 mA, which is the recognized safety threshold for human body current. If the total leakage current of the system exceeds twice the 30 mA limit, the system must be equipped with two or more leakage protectors to maintain safety.

2.2.4 Preventing ESD Damage

To prevent damage caused by static electricity, you must pay attention to the following:

- Ensure that the grounding screw on the rear panel of the device is tightened.
- Ensure that the AC power socket is a single-phase three-core power socket with protective earthing conductors (PE).
- Keep the site as dust free as possible.
- Maintain appropriate humidity conditions.
- Before installing any pluggable modules, wear an anti-ESD wrist strap and make sure that it is properly grounded.
- Avoid contact between the printed circuit boards and clothing. The anti-ESD wrist strap only protects the printed circuit boards from ESD voltages on the body. ESD voltages on clothing can still cause damage.

2.2.5 Laser Safety

The equipment supports various types of optical transceivers, which are Class I laser products.

- When an optical transceiver is working, ensure that its port is connected to an optical cable or covered by a dust cap to keep out dust and prevent it from burning your eyes.

- Do not stare into an optical port.

Figure 2-1 Laser Product ID



⚠ Caution

Do not approach or stare into an optical port under any circumstances. This may cause permanent damage to your eyes.

2.3 Site Requirements

The equipment must be installed indoors for normal operation and prolonged service life.

The installation site must meet the following requirements.

2.3.1 Ventilation and Cooling Requirements

Maintain a minimum clearance of 100 mm (3.94 in.) around the switch for air circulation and ventilation. After various cables are connected, bundle the cables or place them in the patch panel to avoid blocking air inlets. Dust the device every three months to avoid blocking the ventilation openings on the housing.

2.3.2 Temperature and Humidity

To ensure the normal operation and a prolonged service life of the equipment, maintain an appropriate temperature and humidity in the installation environment.

Prolonged exposure to inappropriate temperature and humidity conditions can cause damage to the equipment.

- In an environment with high relative humidity, insulating materials are prone to poor insulation or even electricity leakage.
- In an environment with low relative humidity, insulating gaskets may shrink, resulting in screw loosening.
- In a dry environment, static electricity is more likely to occur, posing a risk to the internal circuits of equipment.
- A high temperature can accelerate the aging process of insulation materials, greatly reducing the availability of the equipment and severely affecting its service life.

Note

The operating temperature and humidity are measured at 1.5 m (4.92 ft.) above the floor and 0.4 m (1.31 ft.) before the rack when there is no protective plate in front or on the rear of the rack.

2.3.3 Cleanliness

Dust poses a significant hazard to the equipment. Dust on the enclosure causes electrostatic adhesion, leading to poor contact of the metallic joints. Electrostatic adhesion is more likely to occur in an indoor environment with relatively low humidity, not only affecting the service life of the equipment, but also causing communication faults. The following table lists the requirements for dust concentration and particle size in the equipment room.

Table 2-2 Requirements for Dust

Particle Diameter	Unit	Concentration
≥0.5 μm	Particles/m ³	≤ 3.5 × 10 ⁶
≥5 μm	Particles/m ³	≤ 3.5 × 10 ⁴

Apart from dust, there are also requirements on the salt, acid, and sulfide in the air of the equipment room. These harmful substances will accelerate metal corrosion and component aging. Therefore, the equipment room should be properly protected against harmful gases, such as sulfur dioxide, hydrogen sulfide, nitrogen dioxide, chlorine gas, and so on. The following table lists the limits on harmful gases.

Table 2-3 Requirements for Gases

Gas	Average (mg/m ³)	Maximum (mg/m ³)
Sulfur dioxide (SO ₂)	0.3	1.0
Hydrogen sulfide (H ₂ S)	0.1	0.5
Nitrogen dioxide (NO ₂)	0.5	1.0
Chlorine gas (Cl ₂)	0.1	0.3

Note

Average refers to the average value of harmful gases measured in a week. **Maximum** refers to the upper limit of harmful gases measured in a week for up to 30 minutes every day.

2.3.4 Anti-interference

The switch is susceptible to external interference by capacitive coupling, inductive coupling, electromagnetic waves, common impedance (ground) coupling, or conduction over power lines, signal lines and output lines. Note that:

- In a TN earthing system, use a 3-wire single-phase outlet that has a protective earth (PE) contact to allow the filter circuit in the device to eliminate interference from the power grid.
- The switch should be located far away from the large power radio launch pads, radar launch pads, and high-frequency large-current devices.
- Use EMI shielding such as shielded interface cables to minimize interference when necessary.
- Route interface cables only indoors to prevent signal ports from getting damaged by overvoltage or overcurrent caused by lightning strikes.

2.3.5 Grounding

A proper grounding system is the basis for stable and reliable running. It is indispensable for preventing lightning strikes and interference. Carefully check the grounding conditions at the installation site according to the grounding specifications, and complete grounding properly based on the actual situation.

Note

- Effective grounding of the switches is an important guarantee for lightning protection and interference prevention. Therefore, the switch must be properly grounded.
 - The grounding wire is customer supplied.
-

- **Secure Grounding**

Ensure that the rack and power distribution device are securely grounded when the switch uses the AC power supply. Otherwise, electric shock may occur when the insulation resistance between the power supply inside the switch and the chassis becomes small.

Note

- The building should provide a protective ground connection to ensure that the device is connected to a protective earth.
 - The O&M personnel should check whether the AC socket is reliably connected to the protective ground of the building. If not, the O&M personnel should use a protective earth conductor from the AC outlet protective earth terminal to the building protective earth.
 - The power socket should be installed near the device and easily accessible.
 - During the device installation, the ground connection must always be made first and disconnected last.
 - The cross-sectional area of the protective ground cable should be at least 0.75 mm² (18 AWG).
 - Install the switch by using 3-core power cords, with a minimum cross-sectional area of 0.75 mm² or 18AWG per pin.
-

- **Lightning Grounding**

The lightning protection system of facilities is standalone, and is composed of a lightning rod, a down conductor, and a connector connected to the grounding system. The grounding system is usually used for power reference grounding and safe grounding of the rack. Lightning discharge grounding is required only for facilities and is not required for the device.

- **EMC Grounding**

Grounding required for electromagnetic compatibility includes shielded grounding, filter grounding, noise and interference suppression, and level reference, which contribute to the overall grounding requirements. The resistance of the grounding cable should be smaller than 1 ohm.

2.3.6 EMI Requirements

All electromagnetic interference (EMI) sources, either from outside or inside of the device or application system, affect the device by capacitive coupling, inductive coupling, or electromagnetic waves.

EMI occurs due to radiation or conduction, depending on the transmission path.

When the energy, often radio energy, from a component arrives at a sensitive component through space, the energy is known as radiated interference. The interference source can be both a part of the interfered system and a completely electrically isolated unit. Conducted interference occurs when interference is transferred from one unit to another through cables which are usually electromagnetic wires or signal cables connecting the source and the sensor. Conducted interference often affects the power supply of the switch, but this can

be controlled by a filter. Radiated interference may affect any signal path in the equipment, and is difficult to shield.

- Interference prevention measures should be taken for the power supply system.
- Keep the grounding device of the switch far away from the grounding device and lightning grounding device of the power equipment.
- Keep the switch far away from the high-power radio transmitter, radar launch pad, and high-frequency large-current devices.
- Take electromagnetic shielding measures when necessary.

2.3.7 Lightning Protection Requirements

When an AC power cord is introduced from outdoors and directly connected to the power port of the switch, the AC power port must be connected to an external lightning resistance socket to protect the switch against lightning strokes. The lightning resistance socket is used as follows: Connect the mains AC power cable to the lightning resistance socket and then connect the switch to the lightning resistance socket. This prevents the current of high-voltage lightning from directly passing through the switch along the mains cable.

Note

- Surge arrestors are customer supplied.
 - For details of surge arrestors, see the related user guide.
-

2.4 Tools

Table 2-4 Tools

Common Tools	Phillips screwdriver, slotted screwdriver, related copper and fiber-optic cables, bolts, diagonal pliers, cable ties
Special Tools	ESD tools
Meters	Multimeter

Note

The LCS-16GS-P switch is delivered without a tool kit. Customers need to get ready the tools.

3 Product Installation

Note

- Before reading chapter 3 "Product Installation", ensure that you have read chapter 2 carefully.
 - Verify that requirements described in chapter 2 have been met.
-

3.1 Before You Begin

Confirm the following requirements before installation:

- The installation environment meets heat dissipation requirements.
- The installation environment meets the temperature and humidity requirements.
- The power supply and required current are available in the installation site.
- Ethernet cables have been deployed at the installation site.

3.2 Precautions

To ensure normal operation and prolong the service life of the equipment, observe the following safety precautions:

- Do not power on the equipment during installation.
- Place the equipment in a well-ventilated environment.
- Do not expose the equipment to high temperatures.
- Keep the equipment away from high-voltage power cables.
- Install the equipment indoors.
- Do not expose the equipment to a thunderstorm or strong electric field.
- Keep the equipment clean and dust-free.
- Cut off the power supply before cleaning the equipment.
- Do not wipe the equipment with a damp cloth.
- Do not wash the equipment with liquid.
- Do not open the enclosure when the equipment is working.
- Secure the equipment properly.
- Connect the power cords of different colors to the corresponding grounding studs.
- Ensure that the power cords are securely connected.
- Do not place heavy objects on the equipment.

- Maintain a minimum clearance of 100 mm (3.94 in.) around the equipment to ensure proper airflow. Do not stack switches.
- Keep the equipment away from high-power radio launch pads, radar launch pads, and high-frequency large-current devices. Take electromagnetic shielding measures to minimize interference when necessary, for example, use shielded cables.
- Route port cables only indoors to prevent ports from getting damaged by overvoltage or overcurrent caused by lightning strikes.

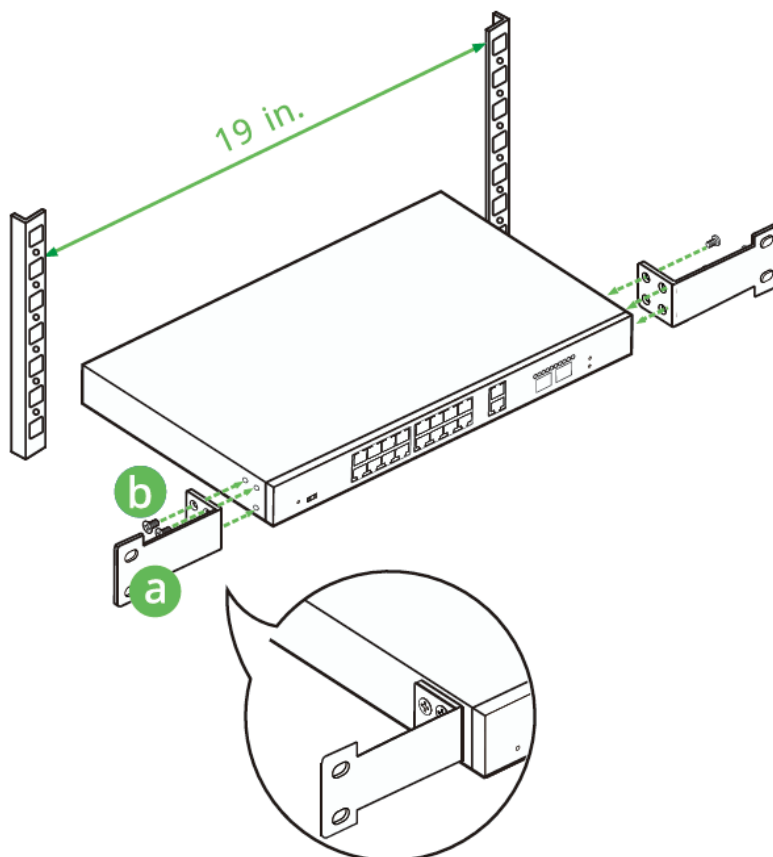
3.3 Installing the Switch

3.3.1 Mounting the Switch onto a Rack

The LCS-16GS-P meets the standard defined by the Electronic Industries Alliance (EIA), and can be installed onto a 19-inch rack. The installation steps are as follows:

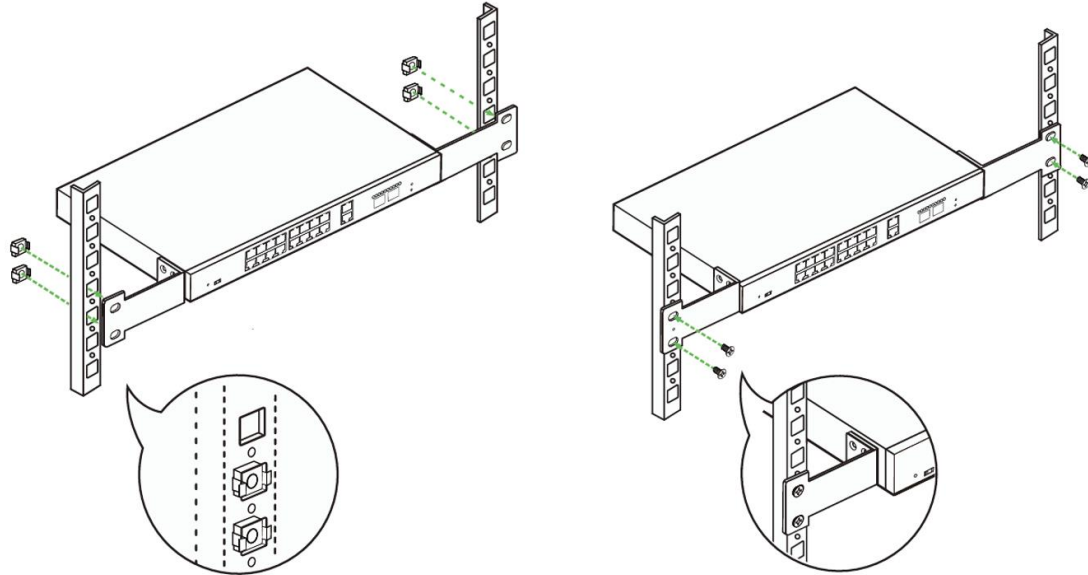
- (1) Take out the mounting brackets delivered with the switch and the M3 x 6 mm screws, and secure one end of the mounting brackets to the switch.

Figure 3-1 Securing the Mounting Brackets



- (2) Place the switch horizontally to an appropriate position in the rack. Use four M6 screws and matching cage nuts (both screws and nuts are to be provided by the user) to secure the other end of the mounting brackets to the square hole rack posts.

Figure 3-2 Mounting the Switch onto a Rack

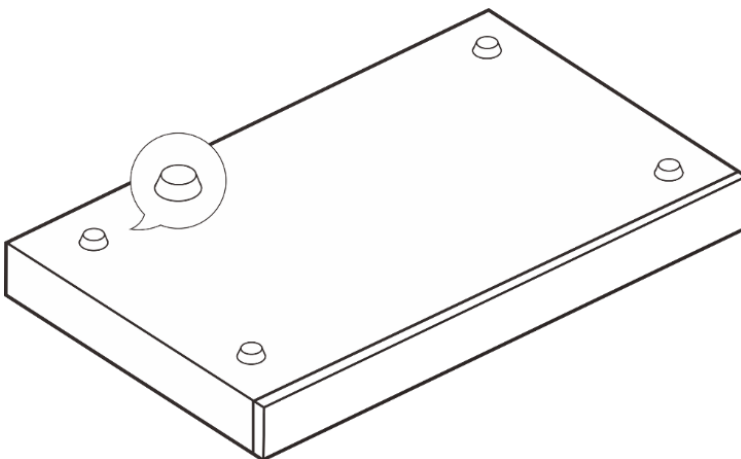


3.3.2 Mounting the Switch on a Workbench

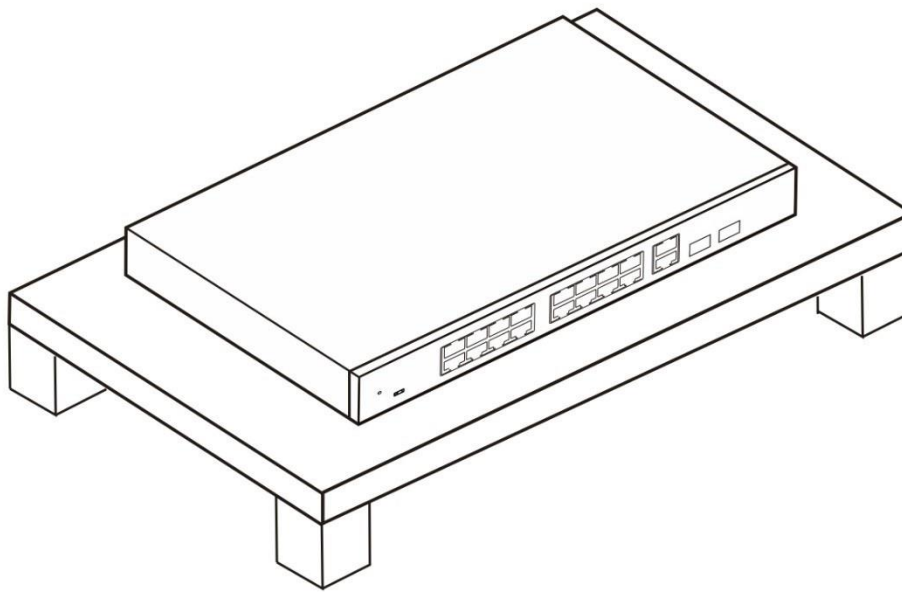
If a standard rack is not available, install the switch on a clean workbench. The installation steps are as follows:

- (1) Attach four rubber pads to the four corners at the bottom of the switch.

Figure 3-3 Attaching the Rubber Pads



- (2) Place the switch on a workbench and ensure that the switch is properly ventilated.

Figure 3-4 Mounting the Switch on a Workbench

⚠ Caution

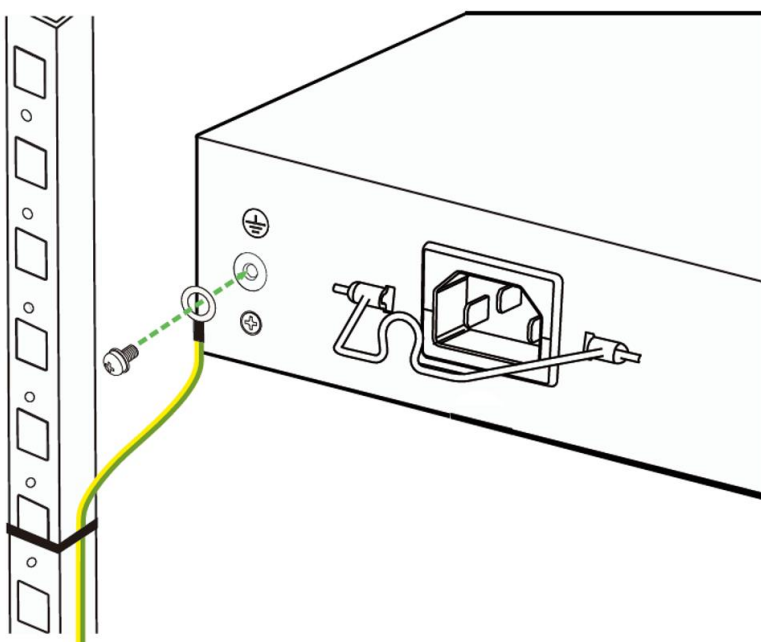
The switch must be installed in a location where movement is restricted.

3.4 Grounding the Equipment

Connect the grounding wire to the grounding stud on the rear panel of the switch.

i Note

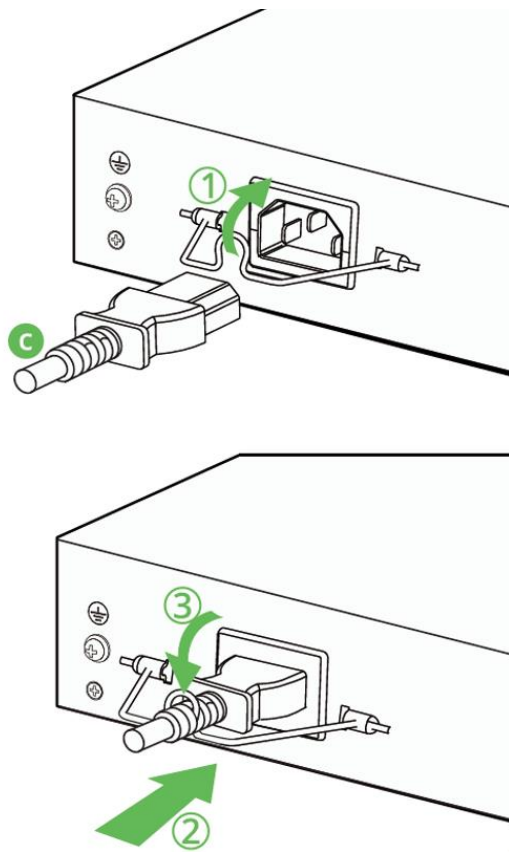
The grounding wire is not delivered with the switch. Please purchase it based on actual requirements.

Figure 3-5 Connecting the Cables

3.5 Connecting the Cables

Take the following steps to connect the power cord and cables.

- (1) Connect the power cord
 - a. Insert the power cord retainer clip delivered with the switch into the power cord retainer clip holes on the rear panel of the switch.
 - b. Pull the power cord retainer clip upwards, insert the power plug, and then release it to secure the plug in place.

Figure 3-6 Connecting the Power Cord

- c. Connect the other end of the power cord to the power socket of the external power system.
- (2) Connect the Ethernet cable: Connect an Ethernet cable with an RJ45 connector to a port.
- (3) Connect the optical cable (ensure that an optical transceiver is inserted into the port):
 - a. Use the appropriate optical cable based on the type of device connected to the other end of the optical port (e.g., single-fiber optical transceiver).
 - b. Connect the cable to the devices at both ends, making sure to match the correct transmit and receive wavelengths for the optical transceiver or media converter.

3.6 Checklist After Installation

Caution

Please turn off the power to avoid personal injury and damage to components caused by incorrect connection.

- Verify that the grounding wire is connected.
- Verify that the Ethernet cables and power cord are properly connected.

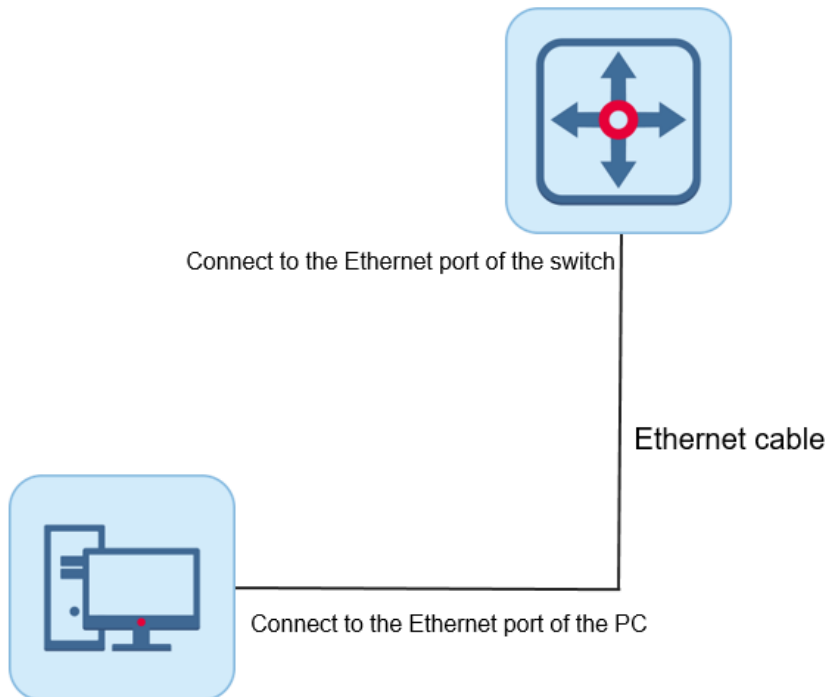
- Check whether the Ethernet cables with a distance of 100 m (328.08 ft.) are routed indoors. If not, check whether the power strip with surge protection, Ethernet surge protector, and others are installed for the AC power supply.
- Verify that there is a minimum clearance of 10 cm (3.94 in.) around the switch.

4 Networking Configuration

4.1 Setting Up the Configuration Environment

Connect a PC to the switch's Ethernet port using an Ethernet cable.

Figure 4-1 Configuring Environment



4.2 Power-on

(1) Check the items before power-on.

- The equipment is properly grounded.
- The power cord is reliably connected.
- The input voltage meets the requirement.
- The Ethernet cable is properly connected, and the client such as a PC used for configuration is already turned on.

(2) Power on the equipment.

(3) Check the items after power-on.

After the equipment is powered on, check the following items:

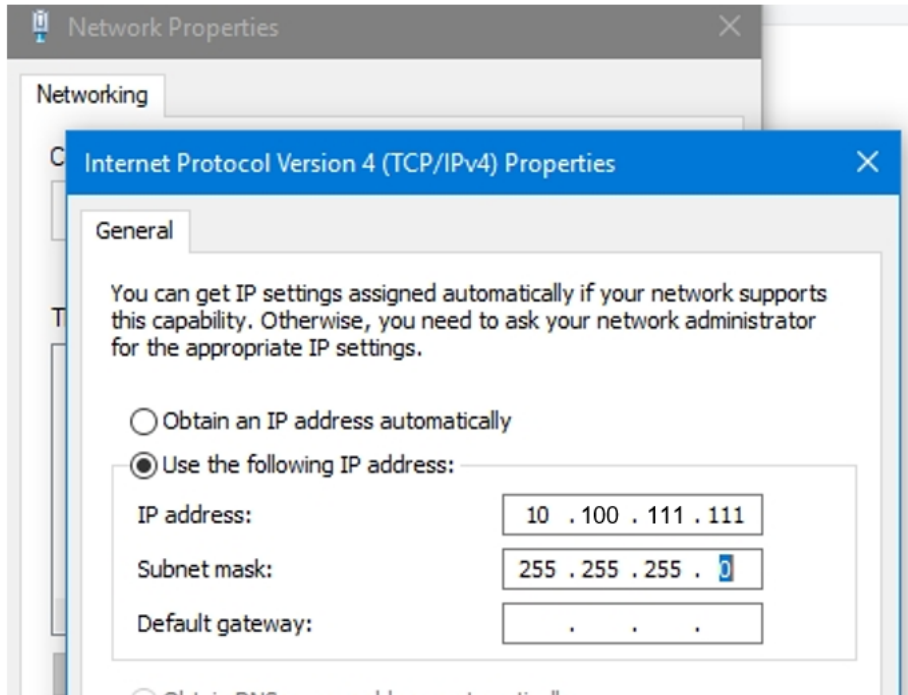
- The system status LED works properly.

- Service ports can forward data properly.

4.3 Configuring the Switch through Web Login

- (1) Set the IP address of the PC to 10.100.111.XXX (Range: 1–254, excluding 200).

Figure 4-2 Changing the PC's IP Address



- (2) Open your browser, enter 10.100.111.200 in the address bar, and log in to the management system after setting a password.
- (3) Perform device commissioning and configuration based on service requirements.

Note

For security purposes, you are advised to change the password regularly.

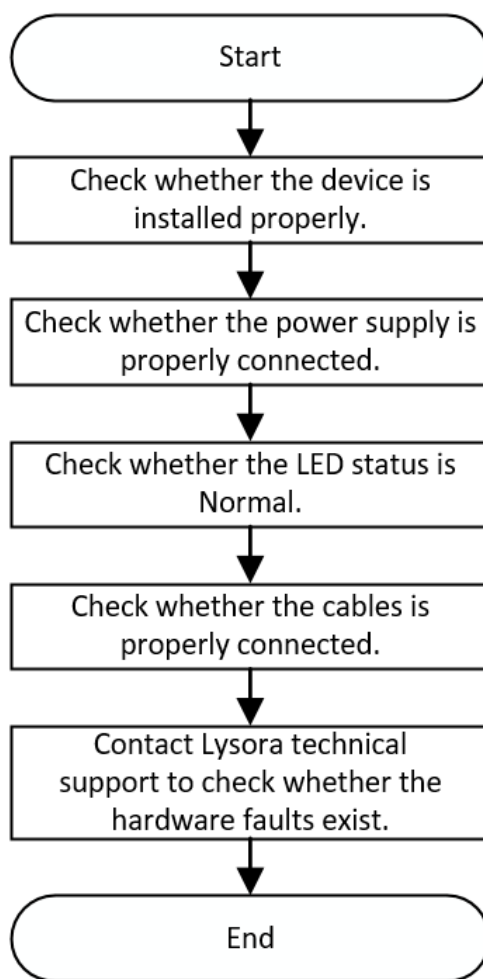
5 Troubleshooting

5.1 Troubleshooting Flowchart

Note

You can determine whether each checking item in the process is normal based on the information provided in the previous "Overview" and "Product Installation" sections.

Figure 5-1 General Troubleshooting Flowchart



5.2 Common Troubleshooting

Fault Symptom	Possible Cause	Suggested Action
The system status	No power is supplied to the	Check whether the power socket

Fault Symptom	Possible Cause	Suggested Action
LED is off after the switch is powered on.	switch or the power cord is loose.	in the equipment room is normal and whether the power cord connected to the switch is loose.
The Ethernet port is disconnected or an error occurs in the transmission and receiving of frames.	The twisted pair cable is not connected properly.	Replace the twisted pair cable.
	The cable length exceeds 100 m (328.08 ft.).	Use an optical cable for data transmission or connect to an intermediate switch for relay.
	The port is specially configured and does not use the same work mode as the interconnected switch.	Check whether the port is configured to work in the same mode as that of the interconnected switch.
An optical port is not reachable.	The transmit and received ends are connected incorrectly.	Exchange the transmit and received ends of the optical cable.
	The types of the interconnected optical transceivers do not match.	Replace the optical transceiver with another one of the same type.
	The optical cable type does not meet the requirements.	Replace the optical cable with a qualified one.
	The optical cable length is beyond the allowed length marked on the optical transceiver.	Use an optical cable with the required length.
	The optical cable or connector is contaminated.	Clean the connector with a lint-free cloth or a cleaning pen.
The Ethernet ports are transmitting and receiving frames normally, but their LEDs are off.	<p>The LED mode toggle is incorrectly set.</p> <p>The LED mode toggle is set to LED mode 2. As a result, the Ethernet port LEDs display the PoE status, but PoE is disabled on the ports.</p>	Set the LED mode toggle to LED mode 1 so that the Ethernet port LEDs display the data receiving and sending status.

6 Appendix

Note

The appendix contains general information. Some items may not apply to this product and can be ignored.

6.1 Connectors and Media

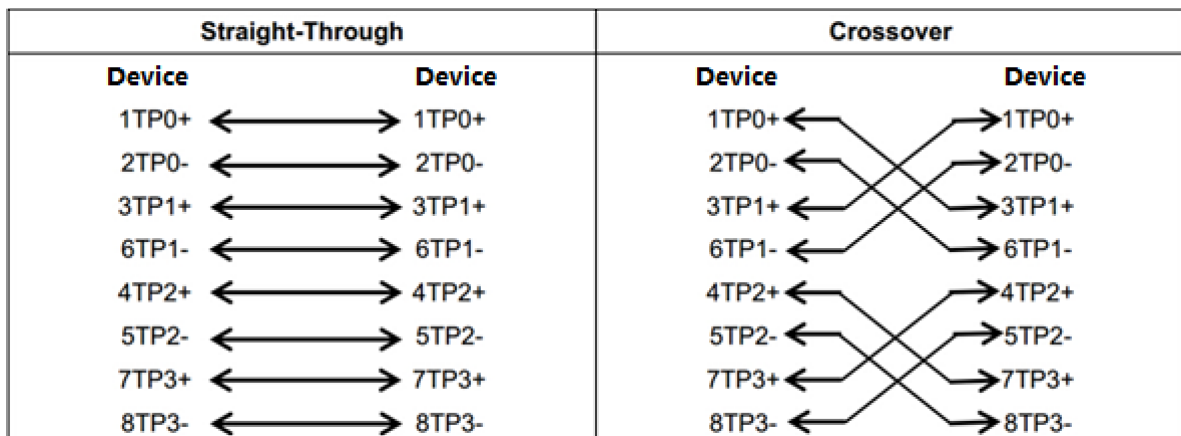
6.1.1 10/100/1000BASE-T Ports

1000BASE-T/100BASE-TX/10BASE-T ports are Ethernet ports with auto-negotiation of three speeds: 10 Mbps, 100 Mbps, and 1000 Mbps. They supports auto MDI/MDIX Crossover, and use RJ 45 connectors.

Compliant with the IEEE 802.3ab standard, a 1000BASE-T port requires 100-ohm Category 5 or 5e unshielded twisted pair (UTP) or shielded twisted pair (STP) (recommended) cables, and supports a maximum distance of 100 meters (328 feet).

A 1000BASE-T port requires all four pairs of wires to be connected for data transmission. [Figure 6-1](#) shows the four pairs of wires for the 1000BASE-T port.

Figure 6-1 1000BASE-T Twisted Pair Connections



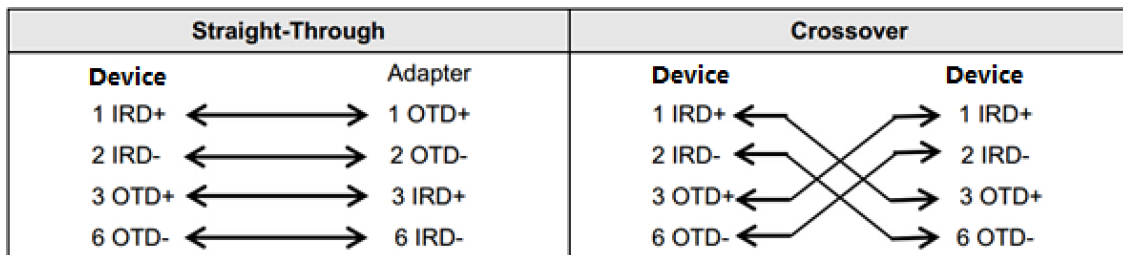
100BASE-TX/10BASE-T ports can be interconnected using cables of the preceding specifications. In addition, a 10BASE-T port can be connected using 100-ohm Category 3, Category 4, and Category 5 cables, while a 100BASE-TX port can be connected using 100-ohm Category 5 cables, and supports a maximum distance of 100 meters (328 feet). [Table 6-1](#) shows 100BASE-TX/10BASE-T pin assignments.

Table 6-1 100BASE-TX/10BASE-T Pin Assignments

Pin	Socket	Plug
1	Input Receive Data+	Output Transmit Data+
2	Input Receive Data-	Output Transmit Data-
3	Output Transmit Data+	Input Receive Data+
6	Output Transmit Data-	Input Receive Data-
4, 5, 7, 8	Not Used	Not Used

[Figure 6-2](#) shows the connection of straight-through and crossover cables for 100BASE-TX/10BASE-T ports.

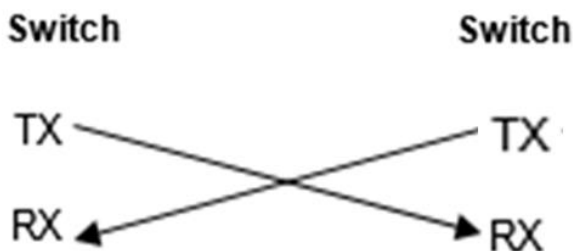
Figure 6-2 100BASE-TX/10BASE-T Twisted Pair Connections



6.1.2 Optical Cable Connection

You can choose SMF or MMF optical cables based on the type of optical transceiver connected to the optical port. [Figure 6-3](#) shows the connection.

Figure 6-3 Connecting the Optical Cables



6.2 SFP Transceivers

We provide appropriate SFP transceivers based on port types. You can choose the one that best suits your needs. In addition to the following SFP optical transceivers, the MINI-GBIC-GT for photoelectric conversion is also supported. The following models and technical specifications of some SFP transceivers are listed for your reference.

Table 6-2 Technical Specifications of SFP Optical Transceivers

Model	Wavelength (nm)	Fiber Type	DDM Supported (Yes/No)	Transmit Power (dBm)		Receive Power (dBm)	
				Min.	Max.	Min.	Max.
MINI-GBIC-SX-MM850	850	MMF	No	-9.5	-3	-17	0
MINI-GBIC-LX-SM1310	1310	SMF	No	-9.5	-3	-20	-3
GE-eSFP-SX-MM850	850	MMF	Yes	-9.5	-3	-17	0
GE-eSFP-LX-SM1310	1310	SMF	Yes	-9.5	-3	-20	-3
GE-SFP-LX-SM1310	1310	SMF	No	-9.5	-3	-20	-3
MINI-GBIC-LH40-SM1310	1310	SMF	Yes	-2	3	-22	-3
GE-SFP-SX-SM1310-BIDI	1310	MMF	No	-10	-5	-17	-3
GE-SFP-SX-SM1550-BIDI	1550	MMF	No	-10	-5	-17	-3
GE-SFP-LX20-SM1310-BIDI	1310TX/1550RX	SMF	Yes	-9	-3	-20	-3
GE-SFP-LX20-SM1550-BIDI	1550TX/1310RX	SMF	Yes	-9	-3	-20	-3
GE-SFP-LH40-SM1310-BIDI	1310TX/1550RX	SMF	Yes	-5	0	-24	-1
GE-SFP-LH40-SM1550-BIDI	1550TX/1310RX	SMF	Yes	-5	0	-24	-1
MINI-GBIC-ZX50-SM1550	1550	SMF	Yes	-5	0	-22	-3
MINI-GBIC-ZX80-SM1550	1550	SMF	Yes	0	4.7	-22	-3

Model	Wavelength (nm)	Fiber Type	DDM Supported (Yes/No)	Transmit Power (dBm)		Receive Power (dBm)	
				Min.	Max.	Min.	Max.
MINI-GBIC-ZX100-SM1550	1550	SMF	Yes	0	5	-30	-9
GE-SFP-SX	850	MMF	No	-9.5	-3	-17	0
GE-SFP-LX	1310	SMF	No	-9.5	-3	-20	-3
SFP-MM850	850	MMF	No	-9.5	-3	-17	0
SFP-SM1310	1310	SMF	No	-9.5	-3	-20	-3

Table 6-3 1000BASE-T SFP Media Converter

Standard	Model	DDM Supported (Yes/No)
1000BASE-T	Mini-GBIC-GT	No

Table 6-4 Cabling Specifications of SFP Optical Transceivers

Model	Port Type	Fiber Type	Core Size (µm)	Max. Cabling Distance
MINI-GBIC-SX-MM850	L/C	MMF	62.5/125	275 m
			50/125	550 m
MINI-GBIC-LX-SM1310	L/C	SMF	9/125	10 km
GE-eSFP-SX-MM850	L/C	MMF	62.5/125	275 m
			50/125	550 m
GE-eSFP-LX-SM1310	L/C	SMF	9/125	10 km
GE-SFP-LX-SM1310	L/C	SMF	9/125	10 km
MINI-GBIC-LH40-SM1310	L/C	SMF	9/125	40 km
GE-SFP-SX-SM1310-BIDI	L/C	MMF	50/125	500 m
GE-SFP-SX-SM1550-BIDI	L/C	MMF	50/125	500 m

Model	Port Type	Fiber Type	Core Size (μm)	Max. Cabling Distance
GE-SFP-LX20-SM1310-BIDI	L/C	SMF	9/125	20 km
GE-SFP-LX20-SM1550-BIDI	L/C	SMF	9/125	20 km
GE-SFP-LH40-SM1310-BIDI	L/C	SMF	9/125	40 km
GE-SFP-LH40-SM1550-BIDI	L/C	SMF	9/125	40 km
MINI-GBIC-ZX50-SM1550	L/C	SMF	9/125	50 km
MINI-GBIC-ZX80-SM1550	L/C	SMF	9/125	80 km
MINI-GBIC-ZX100-SM1550	L/C	SMF	9/125	100 km
GE-SFP-SX	L/C	MMF	62.5/125	275 m
			50/125	550 m
GE-SFP-LX	L/C	SMF	9/125	10 km
Mini-GBIC-GT	RJ45 Ethernet cable	Cat 5 (or higher) twisted-pair cable		100 m

Caution

- For SFP transceivers with a cabling distance of 40 km (24.85 mi.) or longer, install an inline optical attenuator to avoid overload when using short SMF cables.
- An optical transceiver is a laser transmitter. Do not look into the optical source to prevent it from burning your eyes.
- To keep an optical transceiver clean, ensure that unused ports remain capped.

Table 6-5 Pairing of BiDi Optical Transceivers

Rate/Distance	Pairing Model
1000 Mbps/3 km (1.86 mi.)	<ul style="list-style-type: none"> • GE-SFP-SX-SM1310-BIDI • GE-SFP-SX-SM1550-BIDI
1000 Mbps/20 km (12.43 mi.)	<ul style="list-style-type: none"> • GE-SFP-LX20-SM1310-BIDI

Rate/Distance	Pairing Model
	<ul style="list-style-type: none"> • GE-SFP-LX20-SM1550-BIDI
1000 Mbps/40 km (24.85 mi.)	<ul style="list-style-type: none"> • GE-SFP-LH40-SM1310-BIDI • GE-SFP-LH40-SM1550-BIDI

i Note

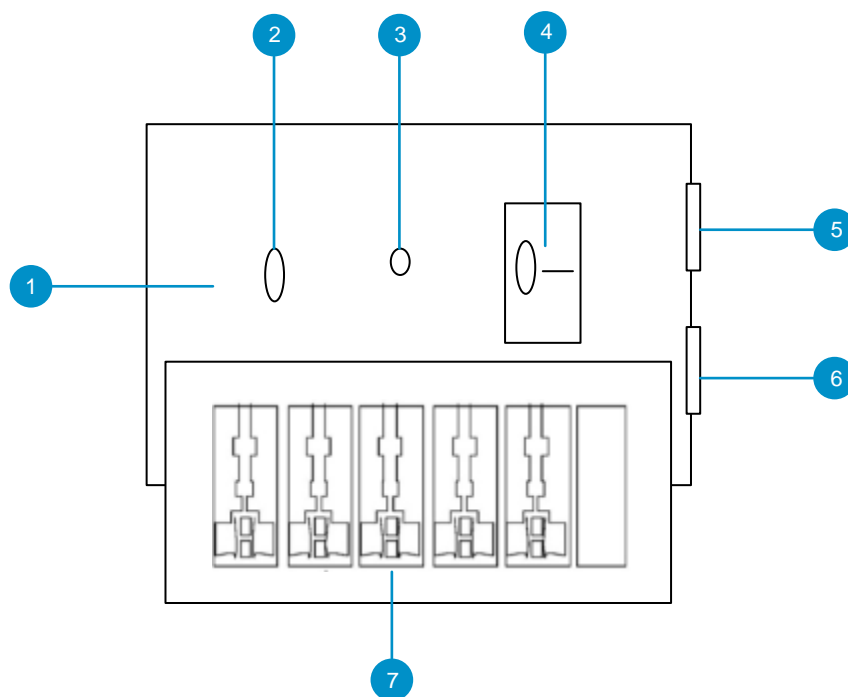
BiDi optical transceivers must be used in pairs. For example, if GE-SFP-LX20-SM1310-BIDI is used at one end, then GE-SFP-LX20-SM1550-BIDI must be used at the other end.

6.3 Surge Protection

6.3.1 Installing an AC Power Lightning Arrester

When an AC power cord from outdoors is directly plugged into the power port of the equipment, the AC power connector must be connected to an external surge protector power strip to protect the equipment against lightning strikes. The surge protector power strip can be fixed on the rack, workbench, or wall in the equipment room by using cable ties and screws. AC power enters the equipment through the surge protector power strip.

Figure 6-4 Installing an AC Power Lightning Arrester



No.	Description
1	Installed electronic circuit board
2	Normally running indicator: When the indicator is green, the circuit is working properly. Otherwise, the protective circuit is damaged.
3	Grounding and polarity detection indicator: If the indicator is red, cable connection is incorrect (the ground cable is not connected, or the N and L lines are reversely connected). Check your power supply line.
4	Power switch
5	IEC standard socket, which is connected to the power supply in the equipment room through the power cable
6	Overload auto-protector, which can be reset manually
7	Multi-purpose sockets (connected to the power supply of the switch)

 Note

The lightning arrester is not delivered with the equipment. Please purchase it based on actual requirements.

Precautions:

- Make sure that the PE terminal of the power arrester is well grounded.
- After the AC power plug of the equipment is connected to the socket of the power arrester (lightning resistance socket), the surge protection function is implemented only if the RUN indicator is green and the ALARM indicator is OFF.
- If the indicator on the power arrester is red, check whether it is caused by poor grounding connection or by the reversed connection of the Null and Live lines. The detection method is as follows: Use a multimeter to measure the polarity of the power socket for the arrester when the indicator is red. If the N line is on the left and the L line is on the right (facing the socket), the arrester's PE terminal is not grounded. If not, the polarity of the arrester power cord should be reversed. In this case, you should open the power arrester and rectify the polarity of the connection. If the indicator is still red, the arrester's PE terminal is not grounded.

6.3.2 Installing an Ethernet Port Lightning Arrester

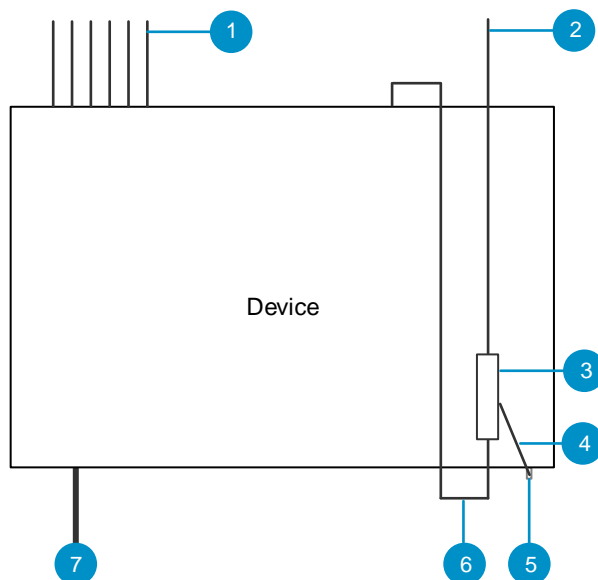
Connect an Ethernet port arrester to the equipment to prevent the damage by lightning before connecting an outdoor network cable to the device.

Tools: Phillips screwdrivers or flat-head screwdriver, multimeter, and diagonal pliers

Procedure:

- (1) Tear one side of the protective paper for the double-sided adhesive tape and paste the tape to the enclosure of the Ethernet port arrester.
- (2) Tear the other side of the protective paper for the double-sided adhesive tape and paste the Ethernet port arrester to the enclosure. The paste position for the Ethernet port arrester should be as close to the grounding terminal of the equipment as possible.
- (3) According to the distance between the equipment grounding terminal and the Ethernet port arrester, cut the grounding cable for the Ethernet port arrester and firmly crimp the grounding cable to the grounding terminal of the equipment.
- (4) Use a multimeter to check whether the grounding cable for the arrester is in good contact with the grounding terminal and the enclosure of the equipment.
- (5) Connect the arrester by using an adapter cable (note that the external network cable is connected to the IN end, while the adapter cable connected to the equipment is connected to the OUT end) and check whether the service module LED is normal.
- (6) Use a nylon cable tie to bind the power cords.

Figure 6-5 Installing an Ethernet Port Lightning Arrester



No.	Description
1	Ethernet cable for indoor connection
2	Ethernet cable connected to the outdoor
3	RJ45 port arrester (pasted on the enclosure)
4	Ground cable of the arrester
5	Grounding lug of the equipment
6	RJ45 port adapter cable
7	Power input

Note

- The Ethernet port arrester is only for Ethernet ports with an RJ45 connector.
 - The Ethernet port arrester is not delivered with the equipment. Please purchase it based on actual requirements. The Ethernet port arrester user manual contains technical parameters and maintenance and installation instructions for the Ethernet port arrester. Carefully read this manual before installation.
-
- Pay attention to the following situations during the installation to avoid influencing the performance of the Ethernet port arrester:
 - Reversed installation direction of the arrester. Connect the external network cable to the “IN” end and connect the Ethernet port of the equipment to the “OUT” end.
 - Poor grounding of the arrester. The grounding cable of the arrester should be as short as possible to ensure that it is in good contact with the grounding terminal of the equipment. Use a multimeter to confirm the contact condition after grounding.
 - Incomplete arrester installation. If there is more than one port connected to external power cords, arresters need to be installed on all connection ports for the purpose of surge protection.

6.4 Recommended Cabling

6.4.1 Requirements for the Minimum Bend Radius of an Ethernet Cable

- The bend radius of a fixed power cord, Ethernet cable, or flat cable should be over five times greater than their respective diameters. The bend radius of these cables that are often bent

or plugged should be over seven times greater than their respective diameters.

- The bend radius of a fixed common coaxial cable should be over seven times greater than its diameter. The bend radius of the common coaxial cable that is often bent or plugged should be over 10 times greater than its diameter.
- The bend radius of a fixed high-speed cable (such as SFP+ cable) should be over five times greater than its diameter. The bend radius of the fixed high-speed cable that is often bent or plugged should be over 10 times greater than its diameter.

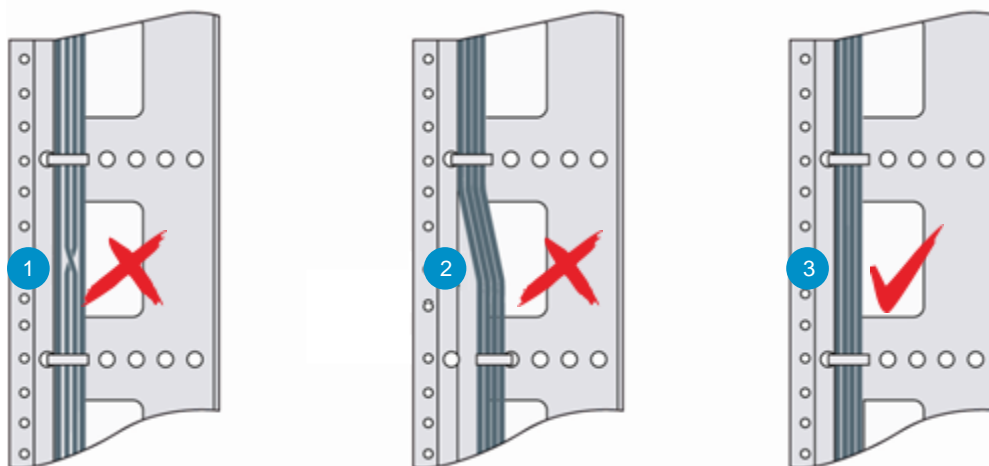
6.4.2 Requirement for the Minimum Bend Radius of an Optical Cable

- When an optical cable is coiled, the diameter of a fiber tray should be over 25 times greater than the diameter of the optical cable.
- When an optical cable is moved, the bend radius of the optical cable should be over 20 times greater than the diameter of the optical cable.
- When an optical cable is laid, the bend radius of the optical cable should be over 10 times greater than the diameter of the optical cable.

6.4.3 Precautions for Bundling up Cables

- Before cables are bundled, mark labels and stick the labels to cables wherever appropriate.
- Cables should be neatly and properly bundled in the rack without twisting or bending, as shown in [Figure 6-6](#).

Figure 6-6 Binding Cables (I)

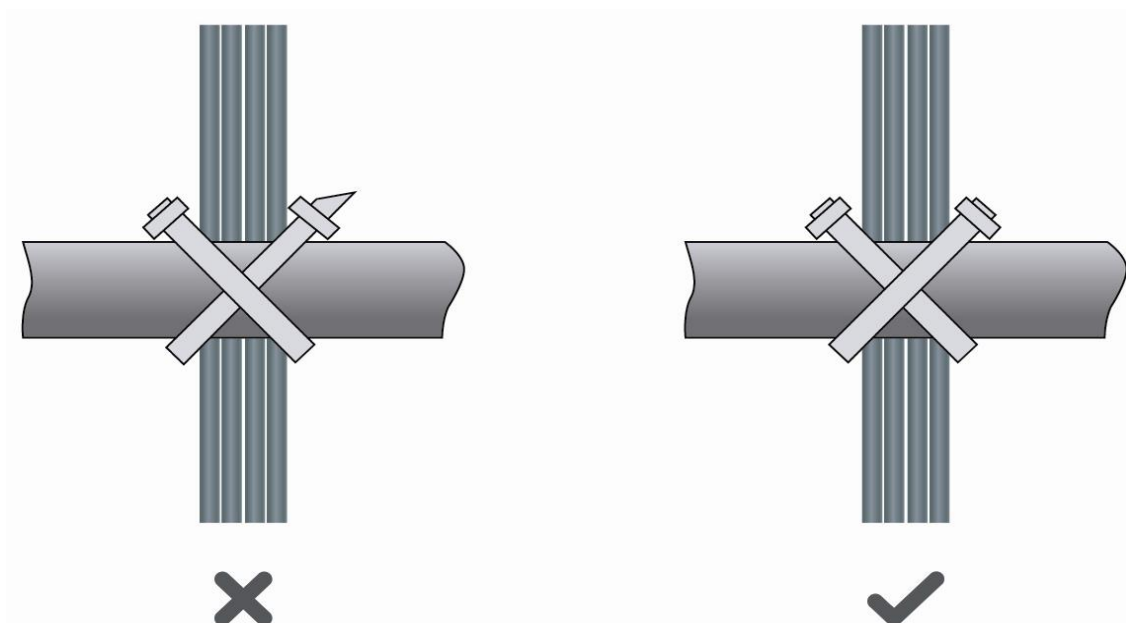


No.	Description
1	In the rack, cables should not be wound up after being bundled.

No.	Description
2	In the rack, cables should not bend after being bundled.
3	In the rack, cables should be neatly and straightly bundled.

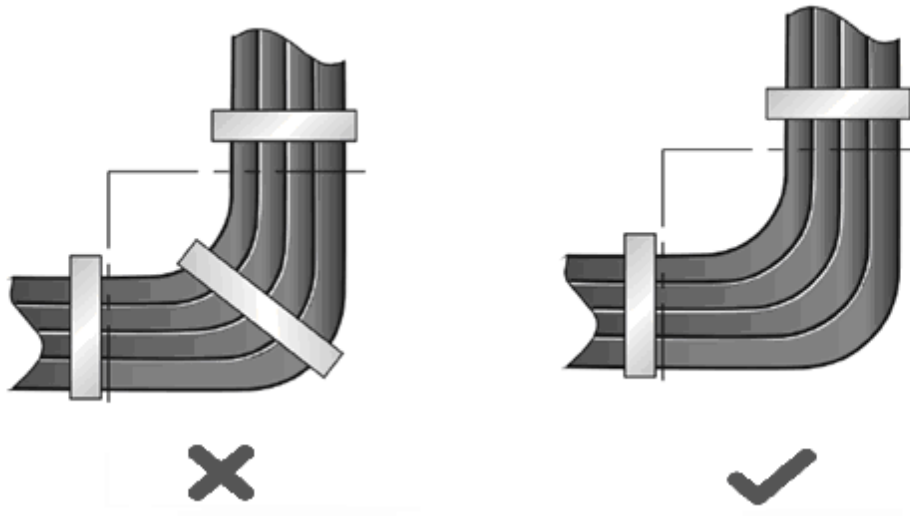
- Cables of different types (such as power cords, signal cables, and ground cables) should be separated in cabling and bundling. Mixed bundling is disallowed. When they are close to each other, you are advised to adopt crossover cabling. In the case of parallel cabling, maintain a minimum distance of 30 mm (1.18 in.) between power cords and signal cables.
- The cable management brackets and cabling troughs inside and outside the rack should be smooth without sharp corners.
- The metal hole traversed by cables should have a smooth and fully rounding surface or an insulated lining.
- Use cable ties to bundle up cables properly. Please do not connect two or more cable ties to bundle up cables.
- After bundling up cables with cable ties, cut off the remaining part. The cut should be smooth and trim, without sharp corners, as shown in [Figure 6-7](#).

Figure 6-7 Binding Cables (II)



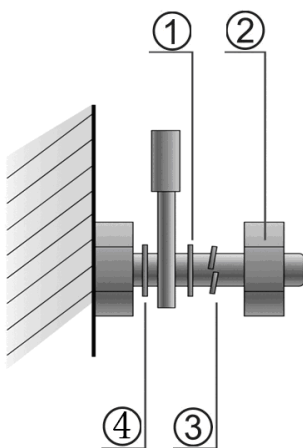
- When cables need to be bent, please bundle them up but do not tie them where the cables will be bent, as shown in [Figure 6-8](#).

Figure 6-8 Binding Cables (III)



- Cables not to be assembled or remaining parts of cables should be folded and placed in a proper position of the rack or cable trough. The proper position refers to a position that does not affect device running or damage the device or cable.
- Do not bind power cords to the guide rails of moving parts.
- The power cords connecting moving parts such as door grounding cables should be reserved with a margin after being assembled to avoid suffering tension or stress. When the moving part is installed, the remaining cable part should not touch heat sources, sharp corners, or sharp edges. If heat sources cannot be avoided, high-temperature cables should be used.
- When screw threads are used to fasten cable terminals, the anchor or screw must be tightly fastened, as shown in [Figure 6-9](#) .

Figure 6-9 Cable Fastening



- ① Flat washer ③ Spring washer
- ② Screw nut ④ Flat washer

- Hard power cords should be fastened in the terminal connection area to prevent stress on terminal connection and cable.
- Do not use self-tapping screws to fasten terminals.
- Power cords of the same type and in the same cabling direction should be bundled up into cable bunches, with cables in cable bunches clean and straight.
- Bundle up cables by using cable ties.

Cable Bunch Diameter	Distance Between Every Binding Point
10 mm (0.39 in.)	80 mm to 150 mm (3.15 in. to 5.91 in.)
10 mm to 30 mm (0.39 in. to 1.18 in.)	150 mm to 200 mm (5.91 in. to 7.87 in.)
30 mm (1.18 in.)	200 mm to 300 mm (7.87 in. to 11.81 in.)

- Do not tie cables or bundles in a knot.
- For wiring terminal sockets (such as circuit breakers) with cord end terminals, the metal part of the cord end terminal should not be exposed outside the terminal socket when assembled.

6.5 Site Selection

- The equipment room should be at least 5 km (3.11 miles) away from heavy pollution sources, such as the smelter works, coal mine, and thermal power plant. The equipment room should be at least 3.7 km (2.30 miles) away from medium pollution sources, such as the chemical factory, rubber factory, and electroplating factory. The equipment room should be at least 2 km (1.24 miles) away from light pollution sources, such as the food factory and leather plant. If the pollution source is unavoidable, the equipment room should be located on the windward side of the pollution source perennially with advanced protection.
- The equipment room should be at least 3.7 km (2.30 miles) away from the sea or salt lake. Otherwise, the equipment room must be sealed, with air conditioner installed for temperature control. Saline soil cannot be used for construction. Otherwise, you should select devices with advanced protection against severe environment.
- Do not build the equipment room in the proximity of livestock farms. Otherwise, the equipment room should be located on the windward side of the pollution source perennially. The previous livestock house or fertilizer warehouse cannot be used as the equipment room.

- This is a Class A product. The equipment room should be located away from residential areas. Equipment rooms near residential areas should meet construction specifications to avoid noise and radio interference.
- The equipment room should be away from the residential area. Otherwise, the equipment room should meet the construction standard in terms of noise.
- Make sure the air vent of the equipment room is away from the sewage pipe, septic tank, and sewage treatment tank. Keep the equipment room under positive pressure to prevent corrosive gas from entering the equipment room to corrode components and circuit boards.
- Keep the equipment room away from industrial boiler and heating boiler.
- The equipment room should be on the second floor. Otherwise, the equipment room floor should be 600 mm (23.62 in.) higher than the highest flood level ever recorded.
- Make sure there are no cracks or holes in the wall and floor. If there are cable entries in the wall or window, take proper sealing measures. Ensure that the wall is flat, wear-resistant, and dust-free, which should be up to the standard for flame retarding, soundproofing, heat absorption, dust reduction, and electromagnetic shielding.
- Keep the door and the window closed to make the equipment room sealed.
- The steel door is recommended for soundproofing.
- Sulfur-containing materials are forbidden.
- Keep the air conditioner from blowing wind straight toward the device or blowing water drops from the window or air vent toward the device.