Lysora L6 Access Point

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. Signs

The signs used in this document are described as follows:

Danger

An alert that calls attention to safety instruction that if not understood or followed can result in personal injury.

Warning

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

Caution

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

Note

An alert that contains additional or supplementary information that if not understood or followed will not lead to serious consequences.

Specification

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

2. Notes

This manual provides installation steps, troubleshooting, technical specifications, and usage guidelines for 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.

Contents

1 Product Overview

1.1 About the L6

The L6 (HVIN: L2542) is a high-performance ceiling-mount dual-band Wi-Fi access point designed to cover a large- and medium-sized indoor area. The access point adopts either IEEE 802.3at PoE power supply or 12 V DC/2 A local power supply. Compliant with the IEEE 802.11a/b/g/n/ac/ax standards, the access point can operate in the 2.4 GHz and 5 GHz frequency bands simultaneously, and supports four spatial streams and MU-MIMO. The access point delivers a combined data rate of 2974 Mbps, with up to 573 Mbps in the 2.4 GHz band and 2401 Mbps in the 5 GHz band. With built-in omnidirectional antennas and a Wi-Fi coverage range of up to 145 m^2 (1560.77 sq. ft.), the access point can be deployed in various scenarios covering offices, businesses, villas, hotels, and government facilities.

1.2 Product Appearance

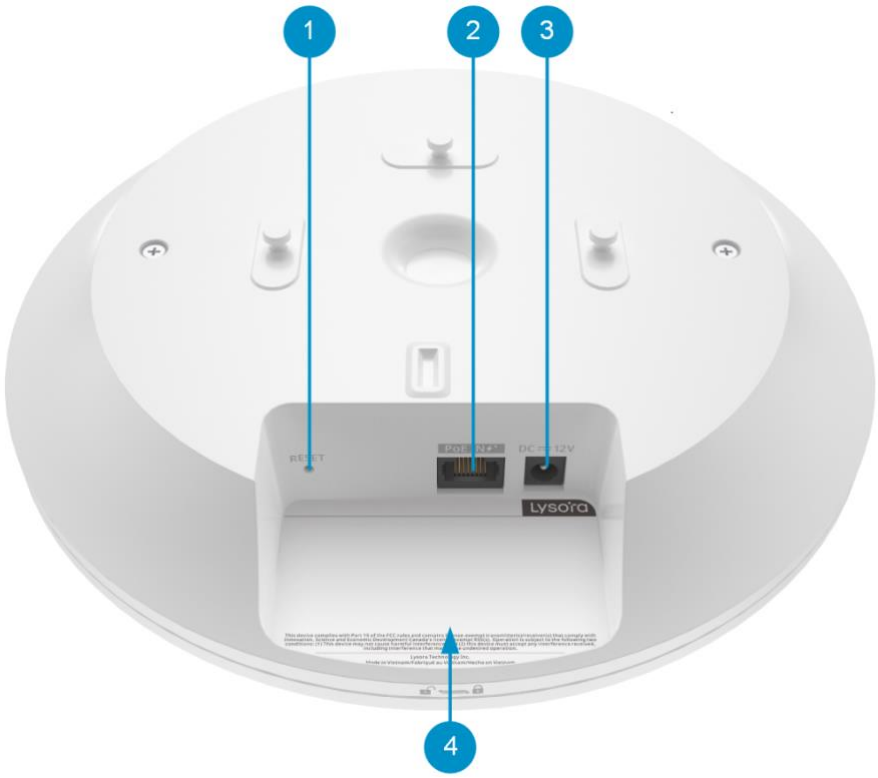
Figure 1-1 L6 Appearance

Note

The CMIIT ID is printed on the product nameplate.

1.2.1 Rear Panel

Figure 1-2 Rear Panel



Note

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

Table 1-1 **Ports and Reset Hole**

No.	Silkscreen	Component	Description
1	RESET	Reset button	Stick the pin into the Reset hole: Restart the access point.
			Press and hold the pin to the Reset hole for more than 5 seconds: Restore the access point to factory settings.

2	PoE IN	Ethernet port	10/100/1000Base-T Ethernet port, supporting PoE input.
3	DC⎓12V	DC Connector	12 V DC/2 A power supply.
4	-	Nameplate	The nameplate is located on the bottom of the device.

1.2.2 LED

Figure 1-3 LED

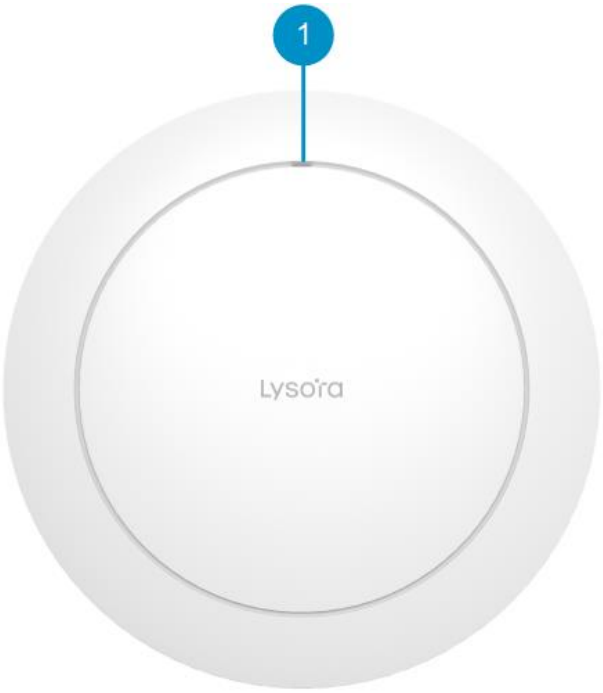


Table 1-2 **LED**

No.	Silkscreen	Component	Status	Description
1	-	System status LED	Solid blue	The access point is operating normally with no alarms.

No.	Silkscreen	Component	Status	Description
			Off	The access point is not receiving power.
			Fast flashing	The access point is starting up.
			Slow flashing (one blink per 2 seconds)	The network is unreachable.
			Flashing twice in succession	Possible cases: • Restoring the access point to factory settings. • Upgrading the firmware. Note: Do not power off the access point in this case.
			One long flash followed by three short flashes	A fault occurs.

1.3 Technical Specifications

Table 1-3 **Technical Specifications**

Parameter Type	Parameter Name	Description
Wi-Fi Radio	Radio design	Dual-radio 4 spatial streams • 2.4 GHz: 2 x 2, MU-MIMO • 5 GHz: 2 x 2, MU-MIMO

Parameter Type	Parameter Name	Description
	5 GHz Wi-Fi	Wi-Fi 4 (IEEE 802.11a/n) Wi-Fi 5 (IEEE 802.11ac) Wi-Fi 6 (IEEE 802.11ax)
	2.4 GHz Wi-Fi	Wi-Fi 4 (IEEE 802.11b/g/n) Wi-Fi 6 (IEEE 802.11ax)
	Operating band	IEEE 802.11b/g/n/ax, 2.400 GHz to 2.4835 GHz IEEE 802.11a/n/ac/ax, 5.150 GHz to 5.350 GHz, 5.470 GHz to 5.725 GHz, 5.725 GHz to 5.850 GHz Note: Available bands vary with countries and regions. To use the preceding frequency bands, ensure that your country or region supports these frequency bands.
	Wireless data rate	2.4 GHz: 573 Mbps 5 GHz: 2401 Mbps Maximum wireless data rate: 2974 Mbps
	Modulation	OFDM: BPSK @ 6/9 Mbps, QPSK @ 12/18 Mbps, 16-QAM @ 24 Mbps, 64-QAM @ 48/54 Mbps DSSS: DBPSK @ 1 Mbps, DQPSK @ 2 Mbps, and CCK @ 5.5/11 Mbps MIMO-OFDM: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM and 1024-QAM OFDMA
	Receive sensitivity	11b: –91 dBm (1 Mbps), –88 dBm (5.5 Mbps), –85 dBm (11 Mbps) 11a/g: –89 dBm (6 Mbps), –80 dBm (24 Mbps), –76 dBm (36 Mbps), –71 dBm (54 Mbps)

Parameter Type	Parameter Name	Description
		11n: –83 dBm (MCS0), –65 dBm (MCS7), –83 dBm (MCS8), –65 dBm (MCS15) 11ac: 20 MHz: –83 dBm (MCS0), –57 dBm (MCS9) 11ac: 40 MHz: –79 dBm (MCS0), –57 dBm (MCS9) 11ac: 80 MHz: –76 dBm (MCS0), –51 dBm (MCS9) 11ac: 160 MHz: –76 dBm (MCS0), –50 dBm (MCS9) 11ax: 20 MHz: –85 dBm (MCS0), –58 dBm (MCS11) 11ax: 40 MHz: –82 dBm (MCS0), –54 dBm (MCS11) 11ax: 80 MHz: –79 dBm (MCS0), –52 dBm (MCS11) 11ax: 160 MHz: –76 dBm (MCS0), –49 dBm (MCS11)

	Maximum transmit power	Frequency bands and maximum Effective Isotropic Radiated Power (EIRP):
		Note: Country specific restrictions apply.
		• European Union & United Kingdom:
		  ○ 2400–2483.5 MHz, EIRP ≤ 20 dBm
		  ○ 5150–5350 MHz, EIRP ≤ 23 dBm
		  ○ 5470–5725 MHz, EIRP ≤ 30 dBm
		• United States:
		  ○ 2400–2483.5 MHz, max output power ≤ 30 dBm & EIRP ≤ 36 dBm
		  ○ 5150–5250 MHz, max output power ≤ 30 dBm & EIRP ≤ 36 dBm
		  ○ 5250–5350 MHz, max output power < 24 dBm & EIRP ≤ 30 dBm

Parameter Type	Parameter Name	Description
		○ 5470–5725 MHz, max output power < 24 dBm & EIRP ≤ 30 dBm ○ 5725–5850 MHz, max output power ≤ 30 dBm & EIRP ≤ 36 dBm • Myanmar: ○ 2400–2483.5 MHz, EIRP ≤ 23 dBm ○ 5725–5825 MHz, EIRP ≤ 30 dBm • Thailand: ○ 2400–2483.5 MHz, EIRP ≤ 20 dBm ○ 5150–5350 MHz, EIRP ≤ 23 dBm ○ 5470–5725 MHz, EIRP ≤ 30 dBm ○ 5725–5825 MHz, EIRP ≤ 30 dBm • Indonesia: ○ 2400–2483.5 MHz, EIRP ≤ 27 dBm ○ 5150–5350 MHz, EIRP ≤ 23 dBm ○ 5725–5825 MHz, EIRP ≤ 23 dBm • Egypt: ○ 2400–2483.5 MHz, EIRP ≤ 20 dBm ○ 5150–5350 MHz, EIRP ≤ 23 dBm
	Power Step	1 dBm
Antenna	Antenna	2.4 GHz: 2 built-in omnidirectional antennas 5 GHz: 3 built-in omnidirectional antennas

Parameter Type	Parameter Name	Description
	Antenna gain (5 GHz)	5.15 dBi
	Antenna gain (2.4 GHz)	3.53 dBi
Dimensions and Weight	Product dimensions (diameter x height)	Ø220 mm x 52.6 mm (Ø8.66 in. x 2.07 in.) (excluding the mounting bracket)
	Weight	≤ 0.5 kg (1.10 lbs.) (without packaging materials)
	Shipping weight	≤ 0.7 kg (1.54 lbs.)
	Color	White
Port Specifications	Number of 10/100/1000BASE-T ports	1
	Reset button	1
	LEDs	1 x system status LED
Power Supply and Consumption	Power supply	• DC power adapter • PoE/PoE+ Note: If both the DC power adapter and PoE/PoE+ are available for power supply, the DC power adapter is preferred.
	Local power supply	Yes, one DC power connector (12 V, 2 A)

Parameter Type	Parameter Name	Description
	Dimensions of the DC connector	Outer diameter: 5.5 mm (0.22 in.) Inner diameter: 2.1 mm (0.08 in.) Depth: 10 mm (0.39 in.)
	PoE In standard	• IEEE 802.3af (PoE) Note: Radio transmission and reception is limited to 2T2R at 2.4 GHz and 2T3R at 5 GHz, and the wireless rate at 5 GHz is 60% of the original rate. • IEEE 802.3at (PoE+)
	Maximum power consumption	18 W
Environment and Reliability	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	5% RH to 95% RH (non-condensing)
	Storage humidity	5% RH to 95% RH (non-condensing)
	Mounting options	Ceiling/Wall
	Surge protection	Ethernet port: ±2 kV for common mode
	MTBF	400,000 hours
	RoHS	Yes

Parameter Type	Parameter Name	Description
Certification and Regulatory Compliance	Certification	FCC, IC, cTUVus

Warning

This device does not support the 6G frequency band (5925MHz-7125MHz).

1.4 Power Supply Requirements

- DC power adapter: 12 V DC/2 A. The technical specifications of the DC connector are as follows:
  - Inner diameter: 2.1 mm (0.08 in.).
  - Outer diameter: 5.5 mm (0.22 in.).
  - Depth: 10 mm (0.39 in.).
  - Conductor resistance: 5 Ω.
  - Voltage resistance: 100 MΩ.
  - Voltage for insulator and conductor test: 1000 V.
  - Polarity symbol:

    Center (tip) of the output plug: Positive (+).

    Barrel (ring) of the output plug: Negative (-).

    Reverse polarity symbol is not allowed.
- PoE injector: IEEE 802.3at-comliant.

Caution

- The DC input power should be greater than the power actually consumed by the access point.

- You are advised to use a DC power adapter with specifications recommended by Lysora.
- You are advised to use a Lysora-certified PoE injector.

1.5 Cooling

The AP adopts the fanless design. Therefore, when installing the AP, ensure that there is sufficient clearance around the AP for heat dissipation.

2 Preparing for Installation

2.1 Package Contents

Table 2-1 **Package Contents**

No.	Item	Quantity
1	L6 access point	1
2	Mounting bracket	1
3	Cross pan head screws (ST4.2 x 20 mm)	2
4	Plastic expansion anchors (φ9 x 25.4 mm)	2
5	User Manual	1
6	Warranty Card	1

Note

The package contents generally contain the above items. The actual delivery is subject to the order contract. And please check your goods carefully against the order contract. If you have any questions, please contact the distributor.

2.2 Safety Guidelines

Note

- To avoid personal injury or equipment damage, review the safety guidelines in this chapter before you begin the installation.
- The following safety guidelines may not include all the potentially hazardous situations.

2.2.1 General Precautions

- Do not expose the equipment to high temperatures, dust, or harmful gases. Do not

install the equipment in flammable or explosive environments. Keep the equipment away from sources of electromagnetic interference (EMI), such as large radar stations, radio stations, and substations. Do not subject the equipment to unstable voltage, vibration, or excessive noise.

- The installation site should be dry. Do not install the equipment in a place near the sea. Keep the equipment at least 500 m (1640.42 ft.) away from the ocean and do not face it towards the sea breeze.
- The installation site should be free from water flooding, seepage, dripping, or condensation. The installation site should be selected according to network planning and communications equipment features, and considerations such as climate, hydrology, geology, earthquake, electrical power, and transportation.
- Ensure that the equipment and power distribution system are properly grounded.
- The product and power supply equipment can only be installed and used in the same building.

⚠ Caution

Follow the procedures in the user manual to install and remove the equipment.

2.2.2 Chassis-Lifting Guidelines

- Avoid moving the equipment frequently.
- Cut off all power supplies and disconnect all cables before lifting or moving the equipment.

2.2.3 Electricity 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.

- Check whether there are potential risks in the working area. For example, check whether the grounding is reliable, and whether the ground is wet.
- Locate the emergency power-off switch in the room before installation. In the case of an accident, cut off the power supply immediately.
- Check the equipment carefully before shutting down the power supply.
- Keep the equipment far away from the grounding facility and lightning protection facility of the power equipment.
- Keep the equipment away from radio stations, radar stations, high-frequency and high-current equipment, microwave ovens, and other high-power wireless equipment.

2.3 Site Requirements

Install the equipment indoors to ensure its normal operation and prolonged service life. The installation site must meet the following requirements.

2.3.1 Floor Loading

Evaluate the weight of the equipment and its accessories, and ensure that the installation site (such as a wall) can bear the weight.

2.3.2 Airflow

The equipment adopts natural cooling. Reserve a sufficient clearance around the equipment to ensure proper ventilation.

2.3.3 Temperature and Humidity

To ensure the normal operation and prolonged service life of the equipment, maintain appropriate temperature and humidity in the equipment room. Working in an environment with too high or too low temperature and humidity for a long period may damage the equipment.

- When exposed to high relative humidity, insulating materials may exhibit poor insulation capabilities, increasing the risk of electrical leakage. Sometimes, high humidity may cause changes in the mechanical properties and cause rusting of metal parts.
- When exposed to low relative humidity, the insulating strip may dry out and shrink, increasing the risk of static electricity generation.
- Too high temperatures can accelerate the aging of insulation materials, greatly

reducing the reliability of the equipment and severely affecting its service life.

Table 2-2 **Temperature and Humidity Requirements**

Operating Temperature	Operating Humidity
0°C to 40°C (32°F to +104°F)	5% RH to 95% RH (non-condensing)

2.3.4 Cleanliness

Dust poses a major threat to the equipment. The indoor dust can cause electrostatic adhesion when falling on the equipment, causing poor contact of the metallic joint. Such electrostatic adhesion occurs more easily when the indoor relative humidity is low, not only affecting the service life of the equipment, but also causing communication failure easily. The following table lists the requirements for the dust content and diameter in the equipment room.

Table 2-3 **Dust and Particles**

Particle Diameter	Unit	Concentration
≥ 0.5 μm	Particles/m^3	≤ 1.4×10^7
≥ 1 μm	Particles/m^3	≤ 7×10^5
≥ 3 μm	Particles/m^3	≤ 2.4×10^5
≥ 5 μm	Particles/m^3	≤ 1.3×10^5

Apart from dust, the salt, acid, and sulfide in the air of the equipment room must meet strict requirements. These harmful substances will accelerate metal corrosion and component aging. The equipment room should be protected from harmful gases (such as sulfur dioxide, hydrogen sulfide, nitrogen dioxide, ammonia, and chlorine). The following table lists the limits of harmful gases in the equipment room.

Table 2-4 **Hazardous Gases**

Gas	Average (mg/m3)	Maximum (mg/m3)
Sulfur dioxide (SO_2)	0.2	1.5
Hydrogen sulfide (H_2S)	0.006	0.03
Nitrogen dioxide (NO_2)	0.04	0.15
Ammonia gas (NH_3)	0.05	0.15
Chlorine gas (CI_2)	0.01	0.3

Note

The average value is measured over one week. The maximum value is the upper limit of the harmful gas measured in one week for up to 30 minutes every day.

2.3.5 Grounding

A proper grounding system is the basis for stable and reliable running and 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.

2.3.6 Preventing Electromagnetic Interference

- Keep the AP away from grounding or lightning protection devices for power equipment.
- Keep the AP away from radio stations, radar stations, high-frequency high-current equipment, microwave ovens, and other high-power wireless equipment.

2.4 Tools

Table 2-5 **Tools**

Common Tools	Phillips screwdriver, cables, Ethernet cables, diagonal pliers, and cable ties

Special Tools	ESD-preventive gloves, wire stripper, crimping pliers, RJ45 crimping pliers, wire cutter, and waterproof tape
Meters	Multimeterand bit error rate tester (BERT)

Note

The equipment is delivered without a toolkit. Prepare the preceding tools by yourself.

3 Installing the AP

The AP must be installed and used indoors.

⚠ Caution

Before installing the equipment, ensure that guidelines and requirements in Chapter 2 have been met.

3.1 Before You Begin

Carefully plan and arrange the installation position, networking mode, power supply, and cabling before installation. Confirm the following requirements before installation:

- The installation site should provide sufficient space for heat dissipation.
- The installation site meets the temperature and humidity requirements of the equipment.
- The power supply is available at the installation site, and its current meets the requirements.
- The power supply meets the requirements.
- The installation site meets the cabling requirements of the equipment.
- The installation site meets the site requirements of the equipment.
- The customized equipment meets the client-specific requirements.

3.2 Precautions

To avoid damage to the access point, observe the following safety precautions:

- Do not power on the equipment during installation.
- Place the equipment in a well-ventilated environment.
- Do not subject the equipment to high temperatures.
- Keep the equipment away from high-voltage power cables.
- Do not expose the equipment to a thunderstorm or strong electric field.
- Keep the access point clean and dust-free.
- Cut off the power supply before cleaning the equipment.

- Do not wipe the device with a damp cloth.
- Do not wash the device with liquid.
- Do not open the enclosure when the equipment is working.
- Secure the equipment properly.

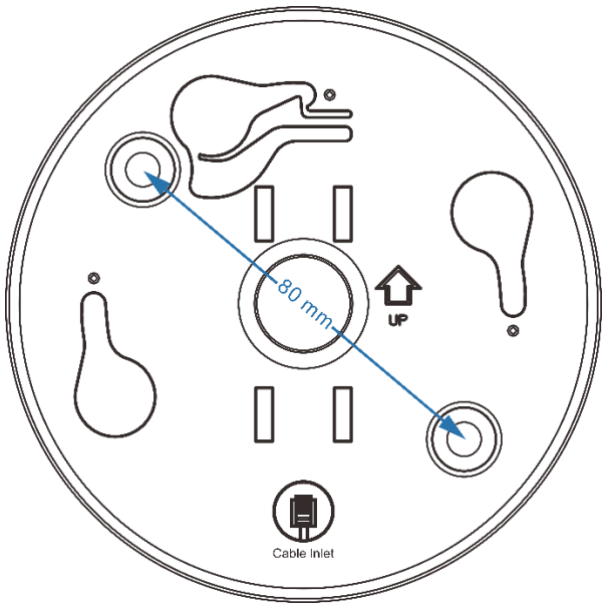
3.3 Installing the Equipment

Note

- For indoor environments, ceiling mounting is preferred because it offers a broader coverage area than wall mounting.
- This installation guide is for reference only. The actual installation procedure may differ depending on the specific product.

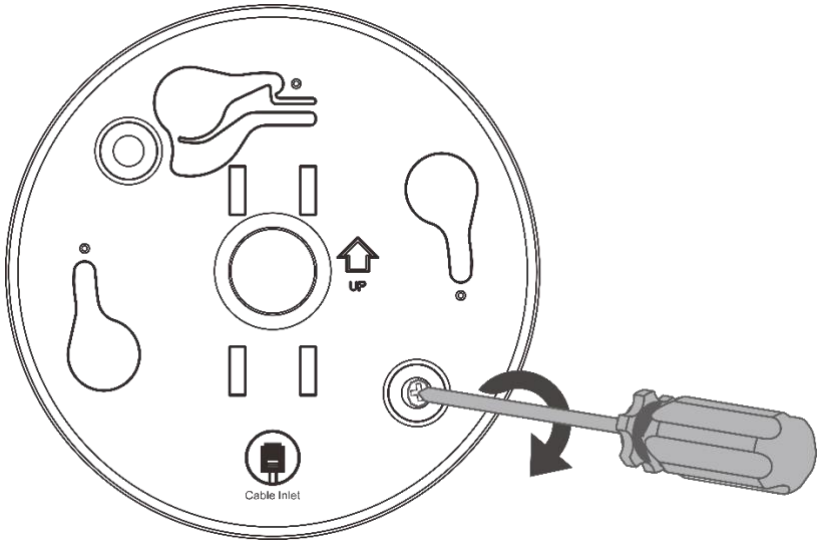
(1) Take out the mounting bracket from the packaging material and use the mounting bracket as a template to mark the mounting holes' positions. Drill two holes at 80 mm (3.15 in) spacing on the wall or ceiling.

Figure 3-1 Drilling Two Holes on the Wall or Ceiling



(2) Secure the mounting bracket to the ceiling or wall by using cross pan head screws (ST4.2 x 20 mm) and plastic expansion anchors (φ9 x 25.4 mm).

Figure 3-2 Securing the Mounting Bracket to the Wall or Ceiling

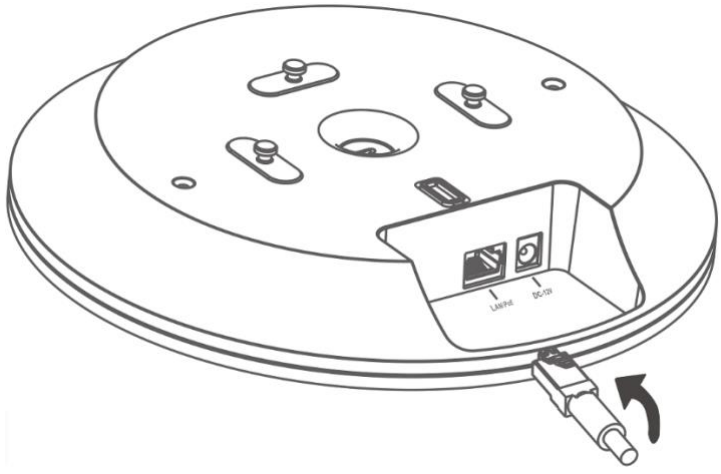


(3) Connect the Ethernet cable to the PoE IN port on the rear of the access point. See 7.1 Connectors and Media for the supported wiring for twisted pairs.

Caution

- Avoid a small bend radius at the connector of the cable.
- You are advised not to use an Ethernet cable with an RJ45 boot.

Figure 3-3 Connecting the Ethernet Cable to the PoE IN Port

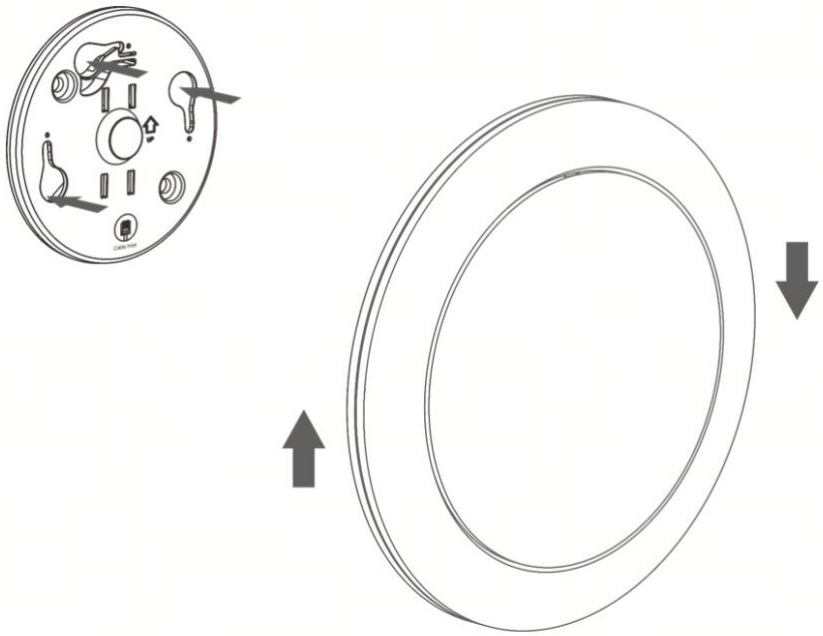


(4) Align the round feet at the bottom of the access point over the mounting holes on the bracket. Slide the AP into the mounting bracket.

Caution

- Install the Ethernet cable properly before securing the access point to the mounting bracket.
- The access point can be installed in any of four directions on the mounting bracket depending on how you route the Ethernet cable.
- The round feet should fit easily into the mounting holes. Do not force the round feet into the mounting holes.
- After installation, verify that the access point is secured properly.

Figure 3-4 Securing the Access Point to the Mounting Bracket



3.4 Removing the Equipment

Hold the access point in your hands and push it upward and away from the mounting bracket.

3.5 Bundling up Cables

Precautions

- Bundle the cable in a visually pleasing way.
- Bend twisted pairs naturally or to a large radius close to the connector.

- Do not over-tighten the twisted pair bundle as it may reduce the cable life and performance.

Bundling Steps

(1) Bundle the hanging part of the twisted pairs using cable ties and lead them to the PoE IN port of the AP by convenience.

(2) Fasten the twisted pair cables to the cable trough of the mounting bracket.

(3) Extend the twisted pair cables under the AP and route them in a straight line.

3.6 Checklist After Installation

- Checking the AP
  - Verify that the external power supply meets the requirement of the AP.
  - Verify that the AP is securely fastened.
- Checking the Cable Connection
  - Verify that the cable type matches the port type.
  - Verify that the cables are properly bundled.
- Checking the Power Supply
  - Verify that the power cord is properly connected and meets safety requirements.
  - Verify that the AP works properly when powered by the power supply.

4 Commissioning

4.1 Setting Up the Configuration Environment

If the access point is powered by PoE or DC power adapter, verify that the power cord is properly connected and compliant with safety requirements.

4.2 Power-on

4.2.1 Checklist Before Power-on

- Verify that the power cord is properly connected.
- Verify that the input voltage meets with the requirement of the access point.

4.2.2 Checklist After Power-on

- Verify the LED status.
- After the AP is powered on, check whether the SSID (@Lysora-mXXXX for multiple devices or @ Lysora-sXXXX for a single device) can be searched by a mobile phone or other wireless devices.

4.3 Login to Web

Wired Connection

(1) Connect a PC to an Ethernet port on the equipment through an Ethernet cable.

(2) Power on the PC and configure the local connection attribute on the PC. Set the IP address of the PC to 10.100.111.XXX (1 to 252).

(3) Open a browser on the PC and enter 10.100.111.254 to log in to the web interface. The default password is admin for the first login. For security purposes, change the default password after login.

5 Monitoring and Maintenance

5.1 Monitoring

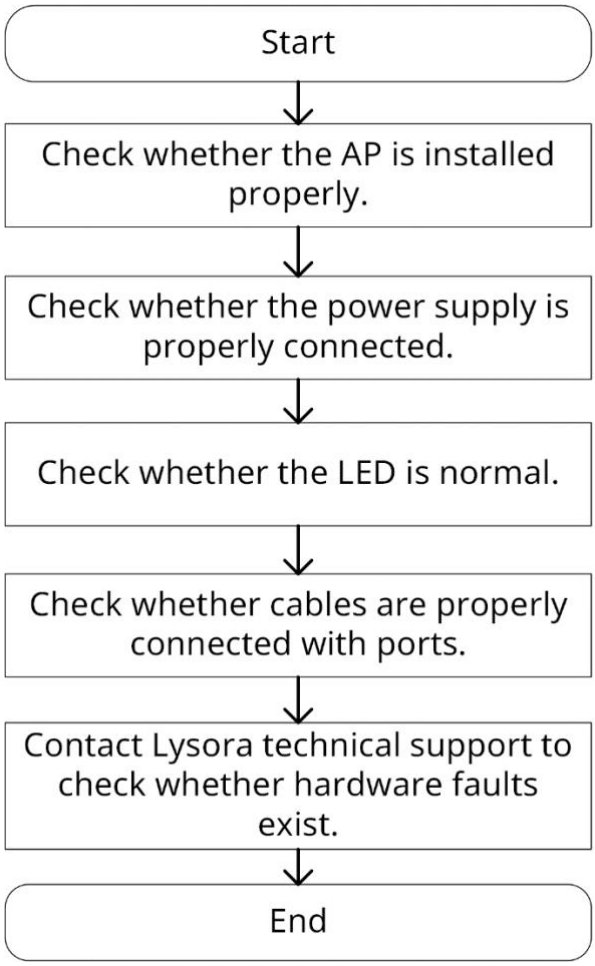
When L6 is operating, you can monitor its status by observing the LEDs.

5.2 Maintenance

If the hardware is faulty, please contact the local distributor.

6 Common Troubleshooting

6.1 General Troubleshooting Flowchart



6.2 Common Faults

- Why is the LED off after the equipment is powered on?
  - If the access point is powered by PoE, verify that the power sourcing equipment (PSE) should be at least 802.3at-capable and the Ethernet cable is connected properly.
  - If the access point is powered by a DC adapter, verify that the adapter has mains input and works properly.
- Why does the Ethernet port fail to work after the Ethernet cable is connected to it?

Verify that the peer equipment is working properly. Then, verify that the Ethernet cable is capable of providing the required data rate and is properly connected.

- Why can’t clients discover the AP?
  - Verify that the equipment is properly powered.
  - Verify that the Ethernet port is correctly connected.
  - Check whether the AP is correctly configured.
  - Move the client to adjust the distance between it and the AP.

7 Appendix

7.1 Connectors and Media

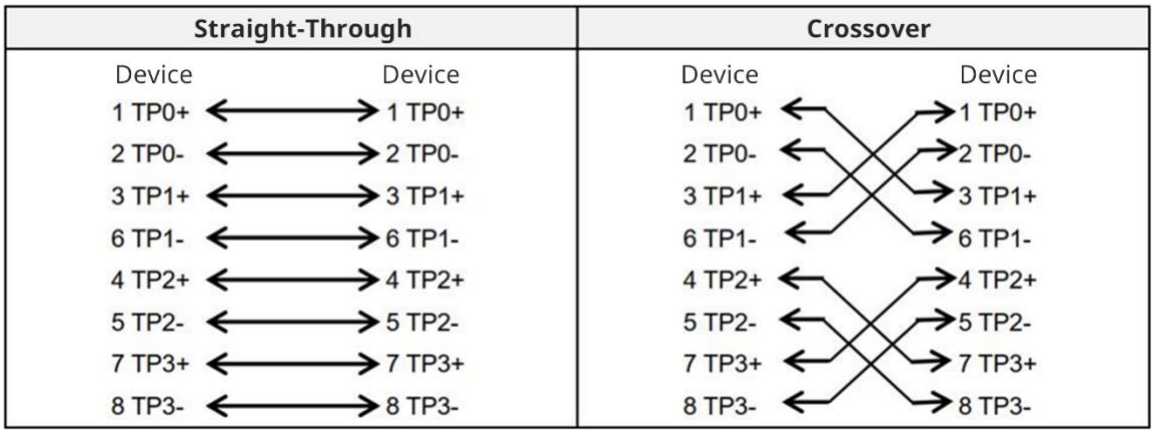
7.1.1 10/100/1000BASE-T Port

The 10/100/1000BASE-T port supports auto-negotiation for 10 Mbps, 100 Mbps, and 1000 Mbps connections and also supports auto MDI/MDIX Crossover.

Compliant with IEEE 802.3ab, a 1000BASE-T port connects to a 100-ohm Category 5 Enhanced (CAT5e) Unshielded Twisted Pair (UTP) or recommended Shielded Twisted Pair (STP) cable with a maximum distance of 100 meters (328.08 feet).

The 1000BASE-T port requires that all four pairs of wires be connected for data transmission. The following figure shows the four pairs of wires for the 1000BASE-T port.

Figure 7-1 Twisted Pair Connections for 1000BASE-T Ports



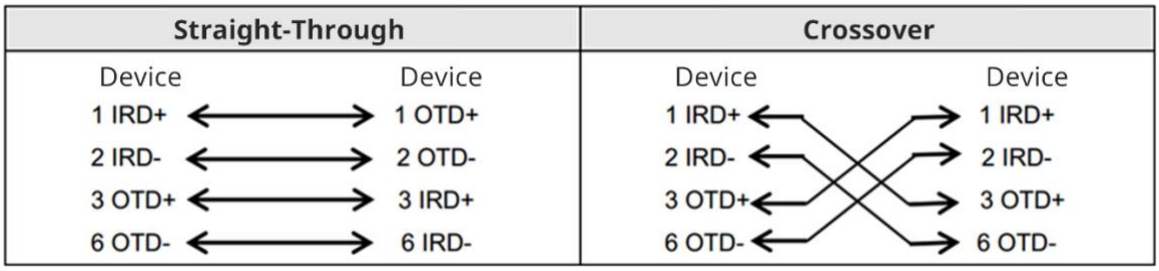
The 100BASE-TX or 10BASE-T port can also be connected by cables of the preceding specifications. Besides, the 10BASE-T port can be connected by 100-ohm Category 3, Category 4, and Category 5 cables with a maximum distance of 100 meters (328.08 ft.). The 100BASE-TX port can be connected by 100-ohm Category 5 cables with a maximum distance of 100 meters (328.08 ft.). The following table shows pin assignments for 100BASE-TX or 10BASE-T ports.

Table 7-1 **Pin Assignments for 100BASE-TX or 10BASE-T Ports**

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

The following table shows wiring of straight-through and crossover cables for the 100BASE-TX or 10BASE-T ports.

Figure 7-2 Twisted Pair Connections for 100BASE-TX or 10BASE-T Ports



7.2 Cabling Recommendations

During installation, route cable bundles upward or downward along the sides of the cable management bracket depending on the actual situation in the equipment room. All adapted connectors should be placed at the bottom of the rack in an orderly manner instead of outside the rack that is easy to touch. Power cords are routed beside the rack. Top cabling or bottom cabling is adopted according to the actual situation in the equipment room, such as the positions of the DC power distribution box, AC socket, or lightning protection box.

7.2.1 Requirement for the Minimum Bend Radius of Cables

- The bend radius of a fixed power cord, Ethernet cable, and flat cable should be over five times greater than their respective external diameters. The bend radius of these

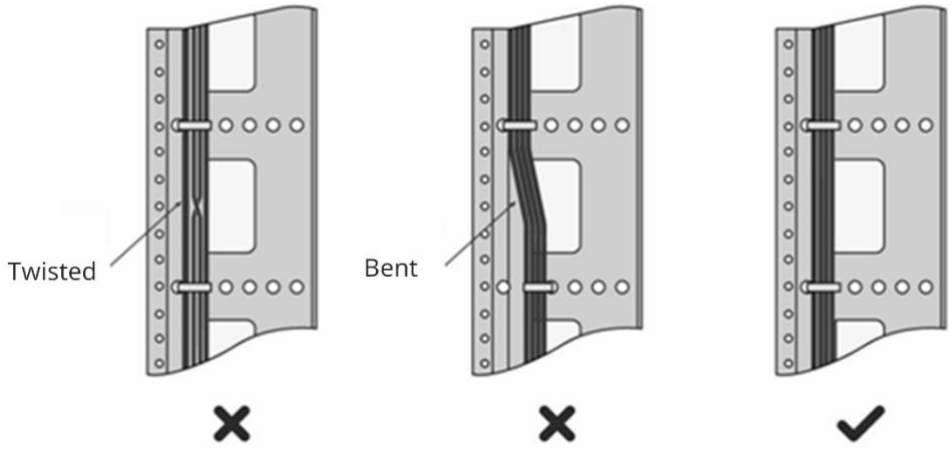
cables that are often bent or plugged should be over seven times greater than their respective external diameters.

- The bend radius of a fixed common coaxial cable should be over seven times greater than its external diameter. The bend radius of these cables that are often bent or plugged should be over 10 times greater than their respective external diameters.
- The minimum bend radius of a high-speed cable, such as an SFP+ cable, should be over five times greater than its external diameter. The bend radius of these cables that are often bent or plugged should be over 10 times greater than their respective external diameters.

7.2.2 Precautions for Cable Bundling

- 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 7-3.

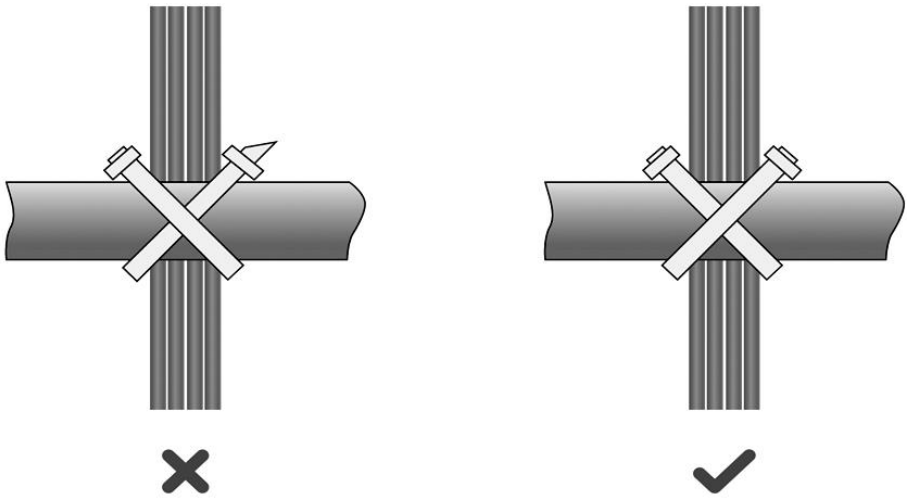
Figure 7-3 Bundling Cables (1)



- Cables of different types (such as power cords, signal cables, and grounding wires) should be separated in cabling and bundling. Mixed bundling is not allowed. 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.

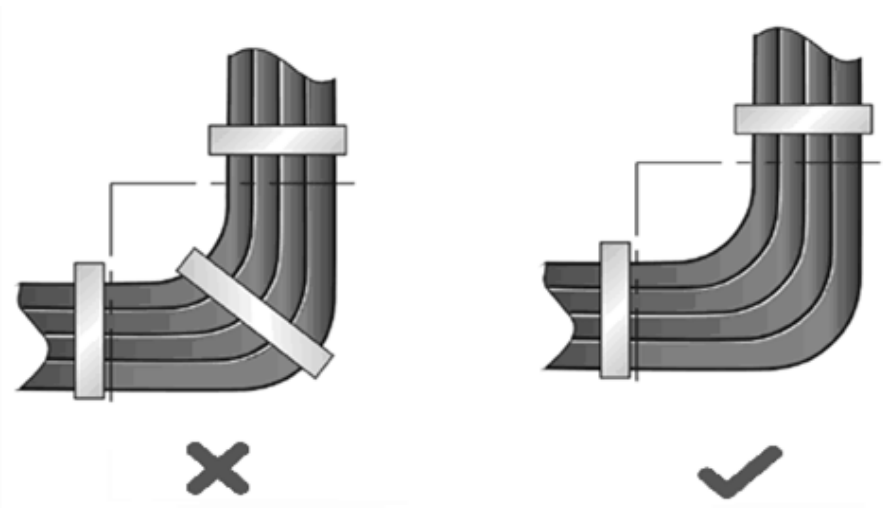
- The metal holes traversed by cables should have a smooth and fully rounded surface or an insulated lining.
- Use cable ties to bundle cables properly. Please do not connect two or more cable ties to bundle cables.
- After bundling up cables with cable ties, cut off the remaining part. The cut should be smooth and trim without sharp corners, as shown in Figure 7-4.

Figure 7-4 Bundling Cables (2)



- When cables need to be bent, bundle them first but do not tie cables within the bend. Otherwise, stress may be generated on the cables and cause the wires inside to break, as shown in Figure 7-5.

Figure 7-5 Bindling Cables (3)



- Cables not to be assembled or the remaining parts of cables should be folded and placed in a proper position of the rack or cable management trough. The proper position refers to a position that does not affect the equipment running or damage the equipment or cables.
- Power cords must not be bundled on the guide rails of moving parts.
- The power cords connecting moving parts such as door grounding wires should be reserved with some excess after being assembled to avoid suffering tension or stress. When a moving part reaches the installation position, the remaining cable part should not touch heat sources, sharp corners, or sharp edges. If heat sources must be touched, high-temperature cables should be used.
- When using screw threads to secure a cable lug, ensure that the bolt or screw is properly tightened and take measures to prevent it from loosening, as shown in Figure 7-6.

Figure 7-6 Fastening Cables

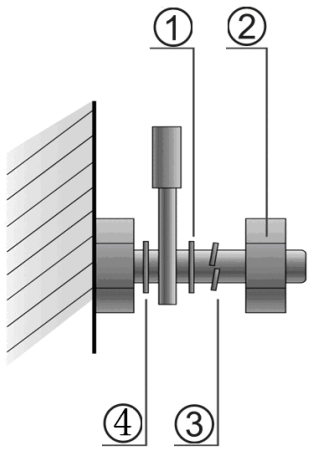


Table 7-2 **Fastening Cables**

No.	Component
1	Flat washer
2	Nut
3	Spring washer
4	Flat washer

- Hard power cords should be secured near the cable termination area to prevent stress on the cable termination area and cables.
- Do not use tapping screws to secure cable lugs.
- 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 cables by using cable ties according to the following table.

Cable Bunch Diameter	Bundling Spacing
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 blocks (such as circuit breakers) with cord end terminals, the metal part of the cord end terminal should not be exposed outside the terminal block when assembled.