Installation Manual

Pod Version 3.1

PEGO

PEGO

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PEGO Ltd. is certified to ISO9001 and ISO27001, including the requirements of ISO27017 and ISO27018 by QMS International Ltd.

Integrated Management System

ISO 27001: 2013

ISO 9001: 2015

Citation ISO Certification

REGISTERED

Certificate No: 370282021
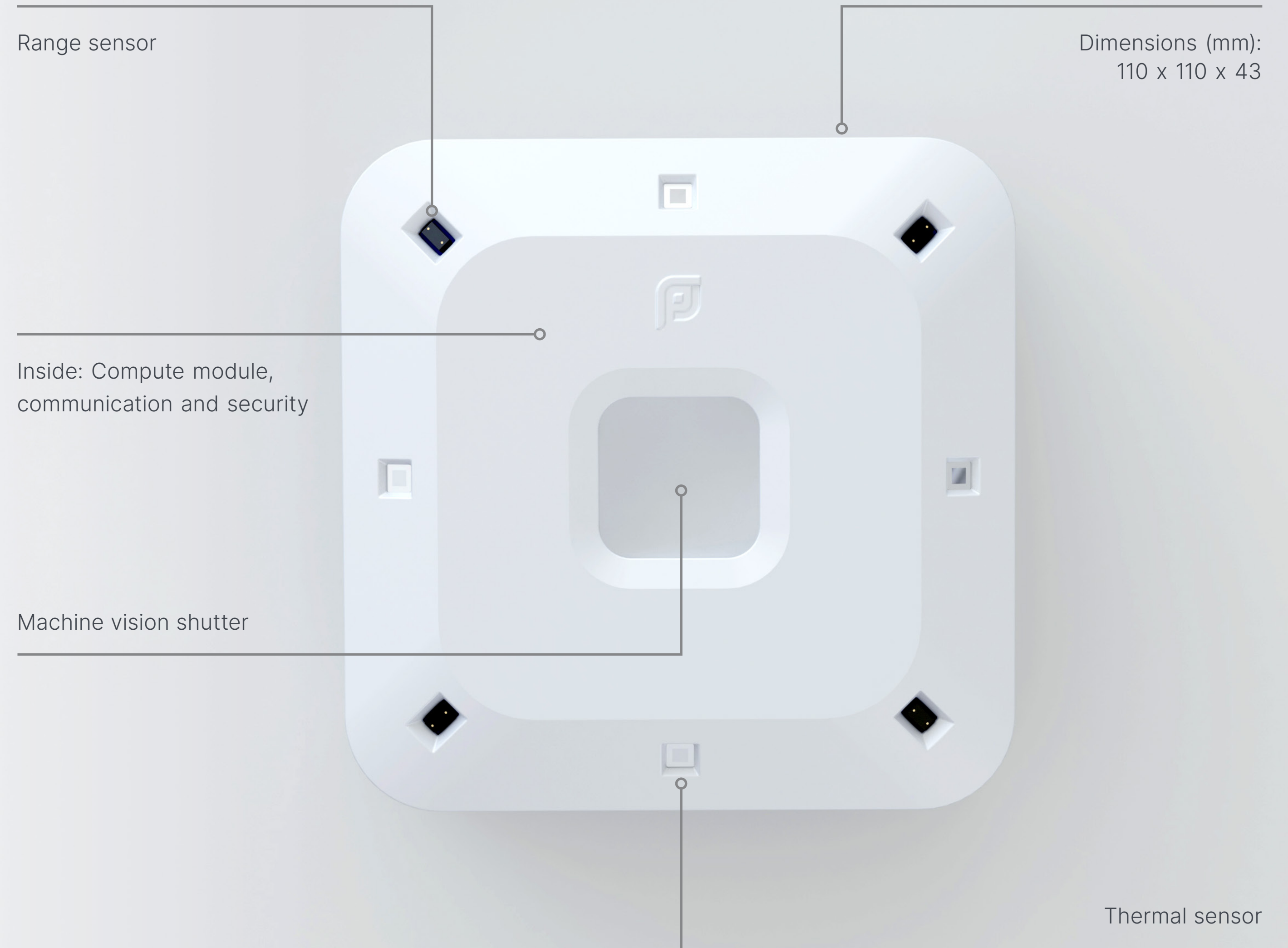
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PEGO Pod

The Pod is a smart Internet of Things device that monitors several aspects of the environment, whilst avoiding collecting Personal Identifiable Information from its users.

Process

1 Install

Pods are fitted in key areas of the space.

2 Analyse

Each Pod analyses the utilisation of the surrounding area, and its cleanliness and tidiness when the space is vacant.

3 Inform

We provide real-time information on the status of facilities to each group of stakeholders.

4 Improve

PEGO provides relevant and actionable information to improve efficiency across multiple aspects of commercial cleaning.

These efficiency gains result in four key benefits:

• Reduce Cleaning Costs
• Lower Environmental Impact
• Improve Workplace Well-being
• Positive Incentives for Improve

Range sensor

Dimensions (mm):
110 x 110 x 43

Inside: Compute module, communication and security

Machine vision shutter

Thermal sensor

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Pod 3.1 Data Sheet & Safety

General

Dimensions (mm)	110 x 110 x 43
Unit Weight (kg)	0.27
Casing	Self-Extinguishing Grade ABS Plastic
Usage	Indoor

Power

Supply	24V DC PoE
Current	Max – 500mA
Rated Power	48W
Average Consumption (over 24h period)	0.25Wh – 5.0Wh (depending on space usage)

Wired Connections

Ethernet Socket	8 Pin 10/100 Ethernet + PoE RJ45
External Devices Socket	8 Pin Peripherals RJ45

Wireless Features

Wi-Fi and Bluetooth	2.4GHz – 2.5GHz Dual Band
Wi-Fi Spec	a/b/g/n/ac
Laser	Infrared Class 1

Operating Temperature & Humidity

Temperature	0° – 50°C
Relative Humidity	20% to 80% non condensing

Safety

Laser	Certified Class 1 Eye Safe Laser EN/IEC 60825–1 2014

Connectivity

Assumptions:

We supply active network equipment to interconnect PEGO Pods, including PoE switches, routers, and other hardware controllers. This equipment requires power and network connectivity and we recommend installing it in a comms room.

On each location we need to connect our router to an available internet uplink which we recommend to be totally isolated from all other networks. We expect some internet protocols to be passed through for HTTPS, VPN, and telemetry connectivity to work seamlessly.

We assume that sites that have more than one installation location provide a comms room and one internet uplink to PEGO on each floor. PEGO can also adapt to using only one internet uplink where inter-floor connectivity is available as long as enough comms bandwidth and power supply is available.

Structured Cabling:

The Pods are always powered by Power over Ethernet (PoE) where the Pods' internal supply will auto negotiate power requirements (approx. 12W). Pods are connected to a PoE switch which provides power supply and external connectivity.

To connect the Pods to the PoE switch, we require a structured cabling network of ISO/IEC 11801 Cat. 6A, or above.

The cabling installation shall comply with the above standard requirements from end to end, encompassing the cables and their terminations, including distribution and patch cables, connectors, plugs, outlets and patch panels.

Both active and passive network equipment need to be clear of all interference sources that can potentially affect comms, including EMI and RFI. To properly isolate from interference we recommend the use of proper cable shielding (S/FTP).

	SWITCHES	
	24-port	48-port
Max Power Consumption (Watt)	465.8	635.7

	POD
Average Link Bandwidth (Mbps)	2.5

How It Works

PEGO Pod's have 1 camera, 4 thermal sensors, 4 TOF sensors and 1 PIR sensor.

Both the thermal and TOF sensors can detect human presence even if the person remains absolutely still. Each thermal sensor detects people within a range of 60°, while each TOF sensor is within a range of 45°. The way the 8 sensors are positioned inside the Pod, makes it possible to have a total range of 107° for the thermal sensor, and 88° total range for the TOF sensor. While the other two type of sensors can detect motionless people, the motion detection is done by the PIR sensor.
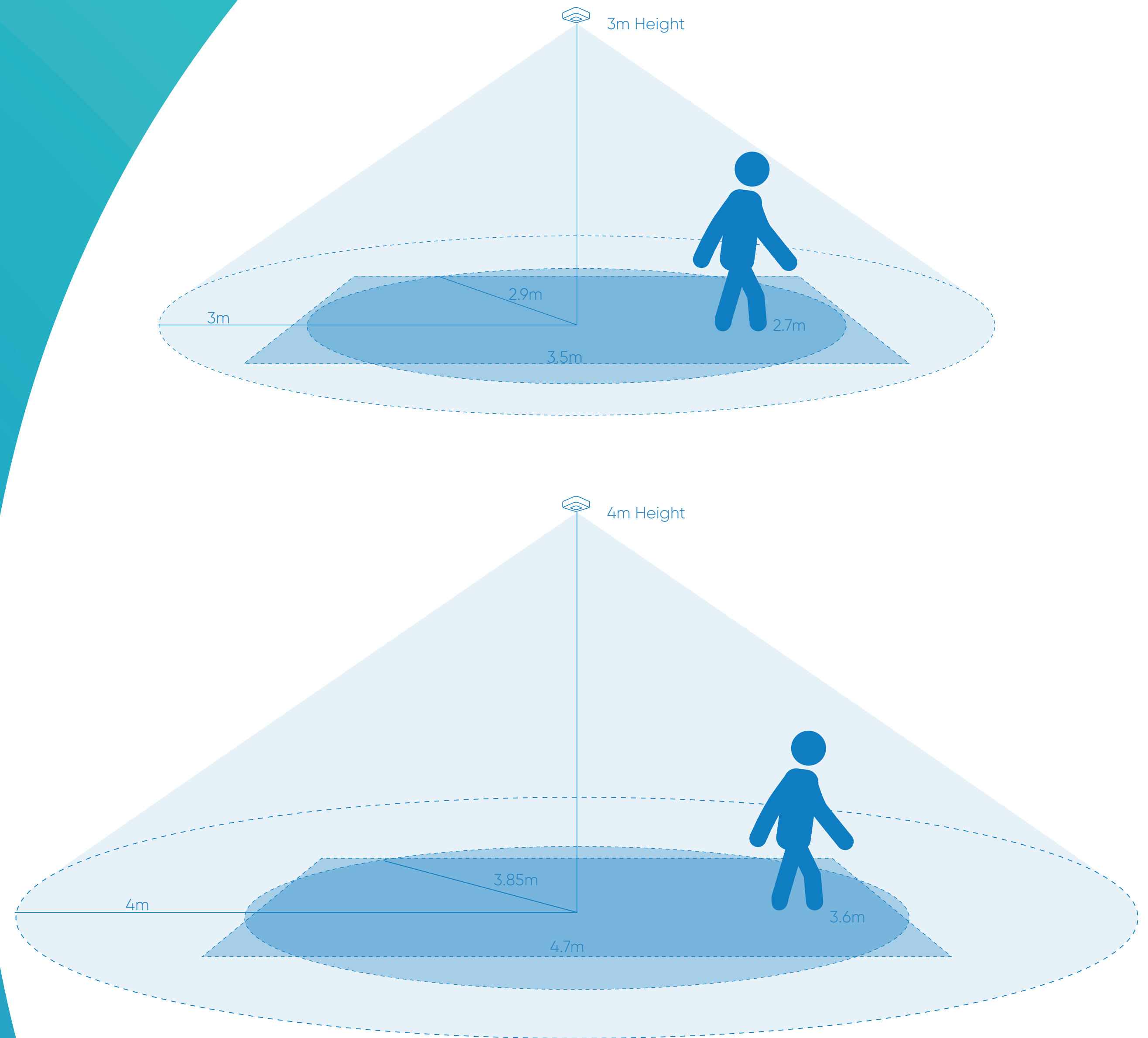
The camera inside the Pod has a shutter and if a person is within range of detection, the shutter remains opaque, making it impossible to capture photographs.

However, if no human presence is detected within range, the machine vision is activated, the shutter becomes temporarily transparent, and a still image is captured and analysed. Imaging range is 58° vertically and 45° horizontally.

Telemetry of human presence, temperatures, cleanliness and tidiness are uploaded to the PEGO cloud service via its internet connection.

Note:
The higher the ceiling, the wider the detection range of the Pod. For ceiling heights above 4.5m, the detection accuracy for the smallest features is partially reduced.

○ **MOTION DETECTION RANGE**

● **STILL PERSON DETECTION RANGE**

■ **IMAGING RANGE**

3m Height

2.9m
3m
3.5m
2.7m

4m Height

3.85m
4m
4.7m
3.6m

Security Features

Hardware Encryption

All Pods include a Trusted Platform Module (TPM 2.0). This hardware component is a secure cryptoprocessor, that verifies the software and hardware integrity each time the Pod boots and enables secure device authentication in the IoT environment.

Physical Shutter

The shutter consists of a proprietary glass screen, which is opaque when at rest. When energised, the shutter becomes momentarily transparent, allowing the imaging device to capture an image of the vacant facilities.

Human Presence Sensors

Thermal Sensors - We utilise high-accuracy 8×8 pixels infrared Thermal Sensors. They can detect variations of the temperature read within each pixel with an accuracy of 0.25° C.

Range Sensors - Consisting of high-performance proximity and ranging sensors, it provides a very accurate real-time distance measurement.

PIR Sensor - Inside the Pod, there is a sensitive motion detection sensor. It has 32 detection zones, with an approximate field of view of 90° and can detect moving humans at up to 7m.

Hack-Proof Architecture

Image Capturing Policy - Any human detection sensor within a Pod can prevent the shutter from opening. If any of the sensors are malfunctioning, the Pod simply shuts down and is flagged in the Pego System as offline.

Closed Circuit Sensors/Shutter - The shutter and all the human detection sensors are controlled by a microprocessor that is independent of the central computing module in the Pod.

Installation

Installing the PEGO Pods requires Ethernet cabling (CAT 6A and above) in order to provide power supply and (optionally) external connectivity. The Pods are always powered by Power over Ethernet (PoE) where the Pods' internal supply will auto-negotiate power requirements (maximum 12 watts per port).

Connectivity Pods are connected to a PoE switch which provides power supply and external connectivity. This PoE switch can connect externally via client's LAN infrastructure.
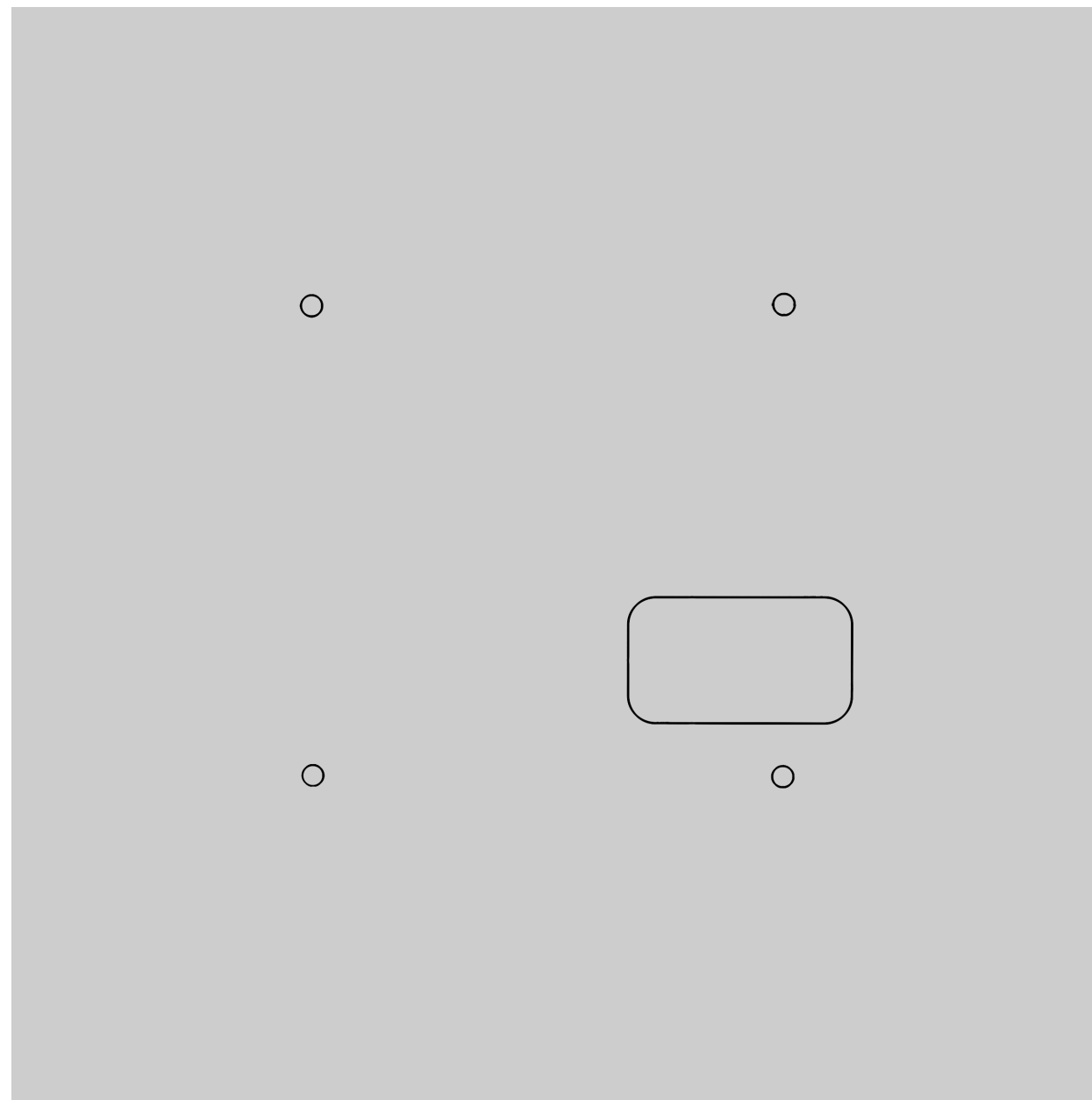

PoE Switch

230 V Mains
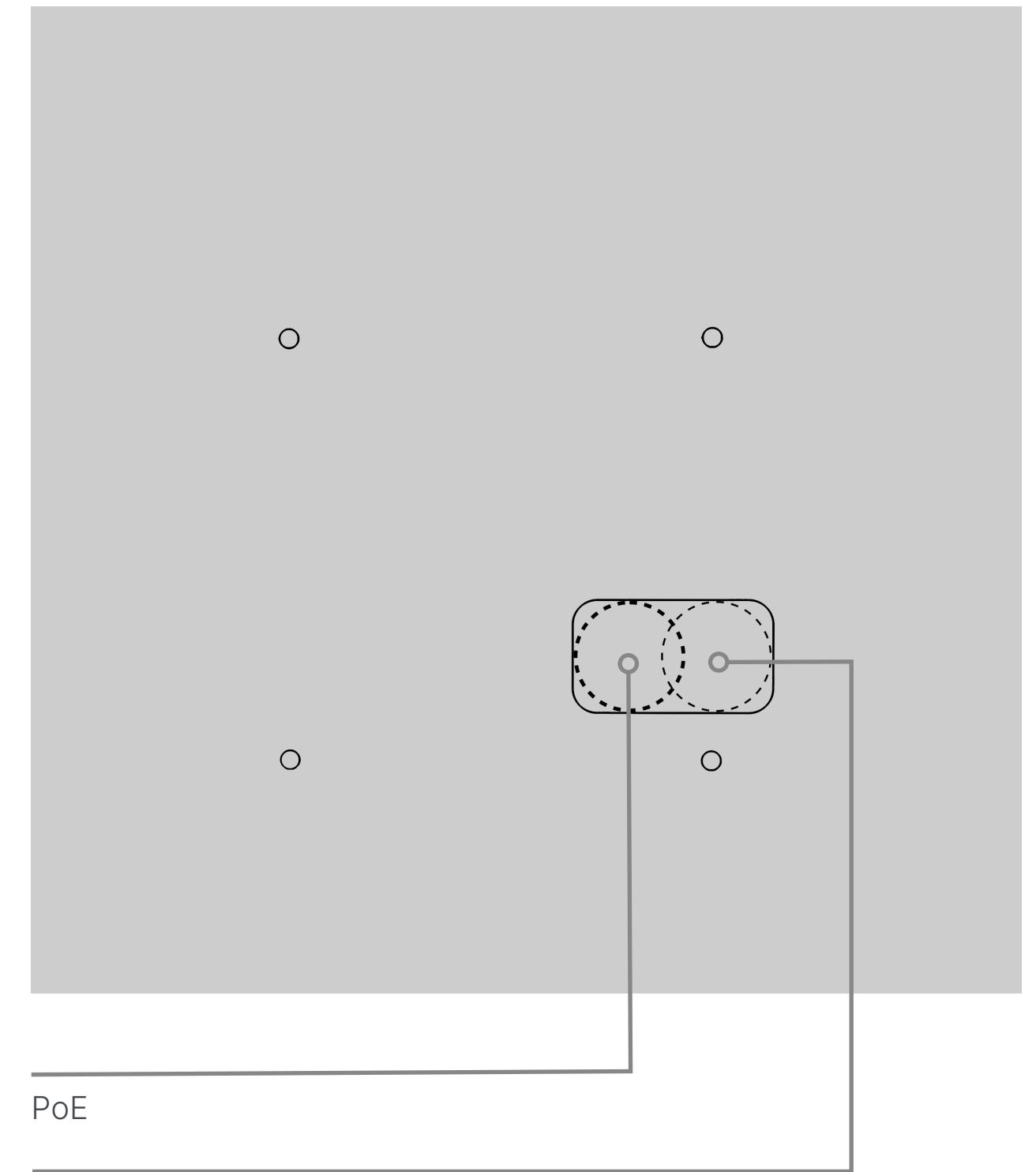
Client Router

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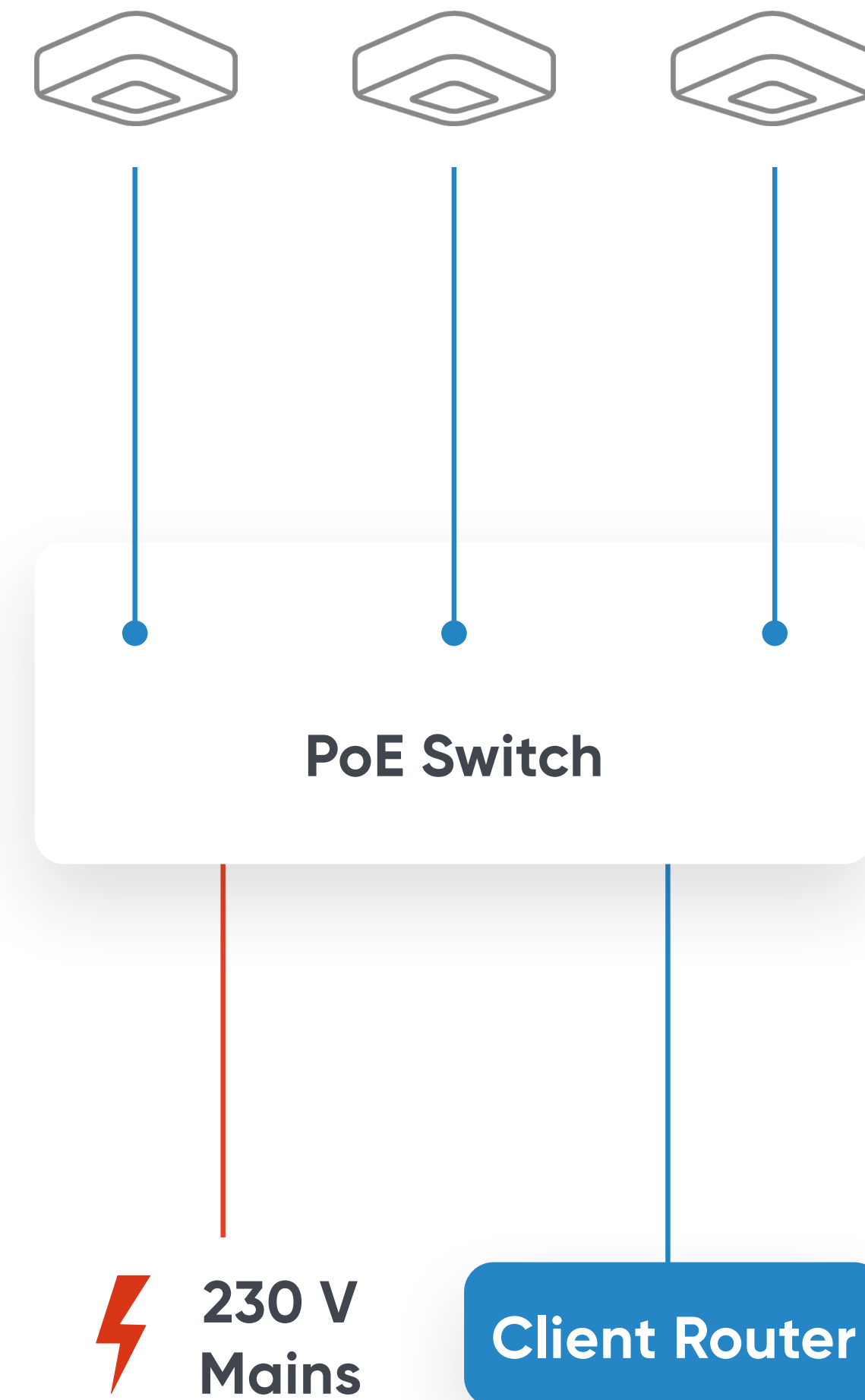
Mounting Instructions

1 Place the bracket in the position specified in the Installation Plan. Ensure the front of the bracket is facing the direction indicated in the Installation Plan. Mark the screw and cabling holes.
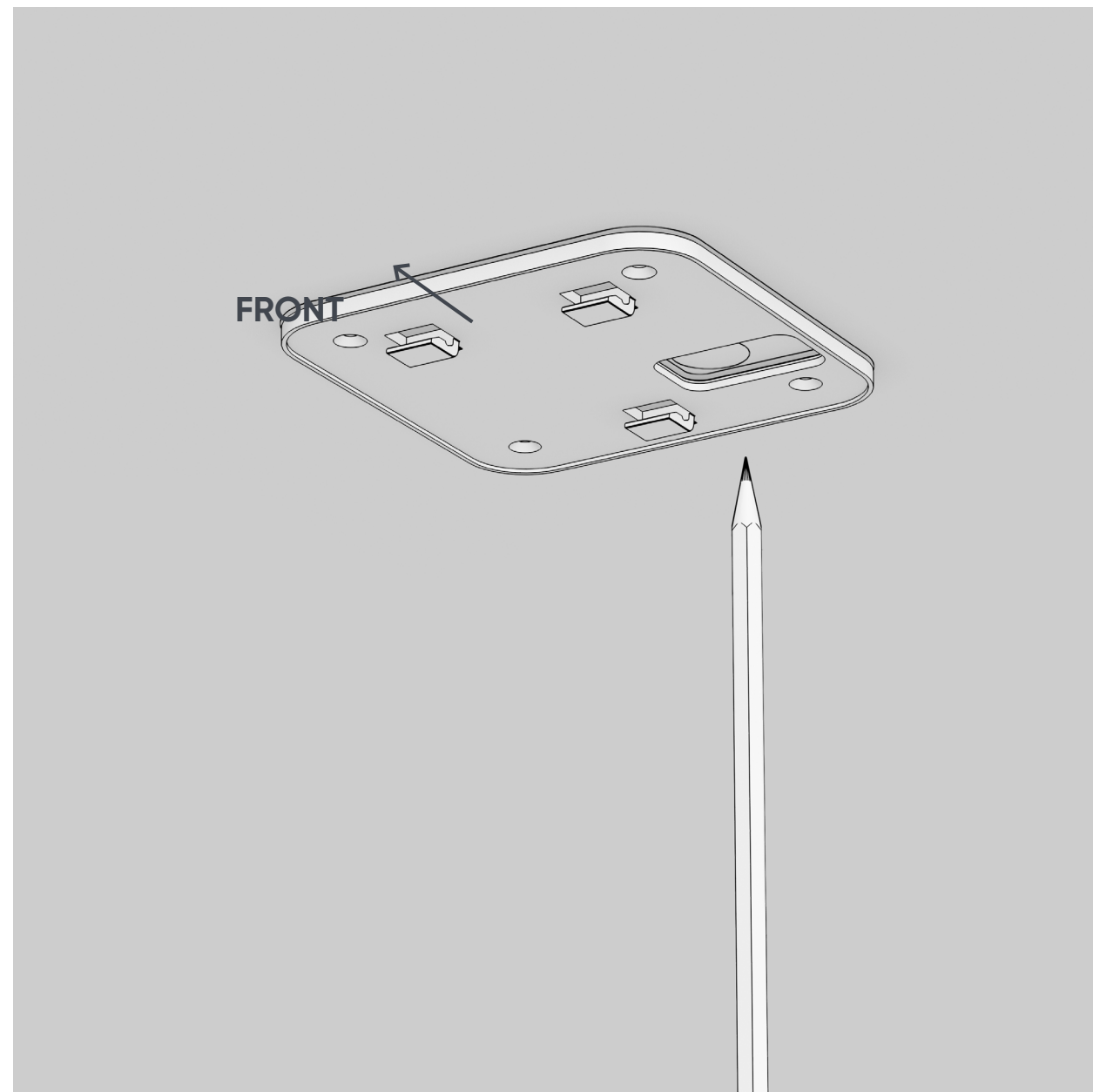
**2** Remove the bracket and make sure the marks are all drawn and visible.

3 You should create one 20mm circular hole within the cable rectangle, to pass the PoE cable. If using the Pod to control external devices, make a second hole within the marked rectangle.
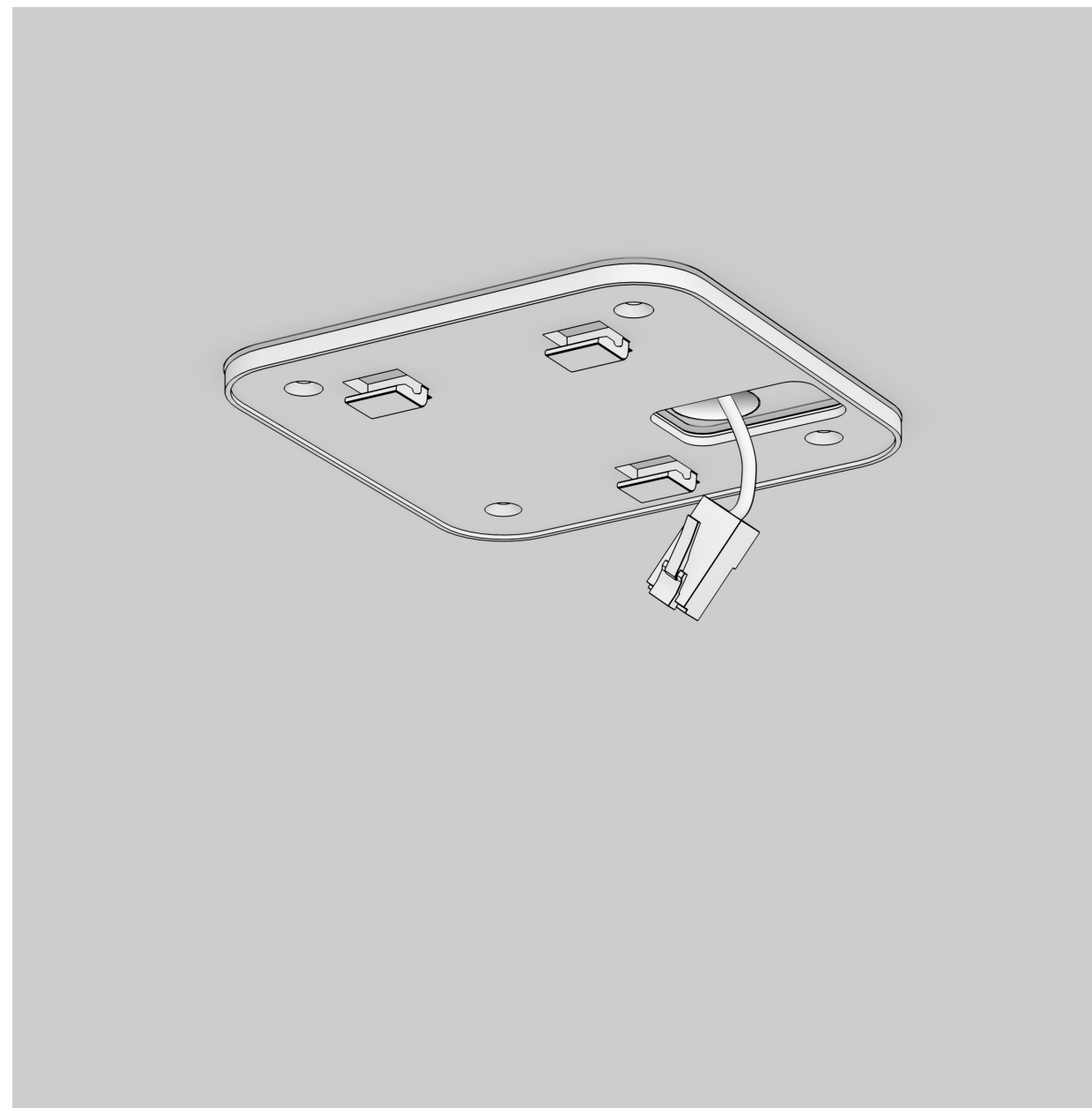

PoE

The optional second hole, for external device control
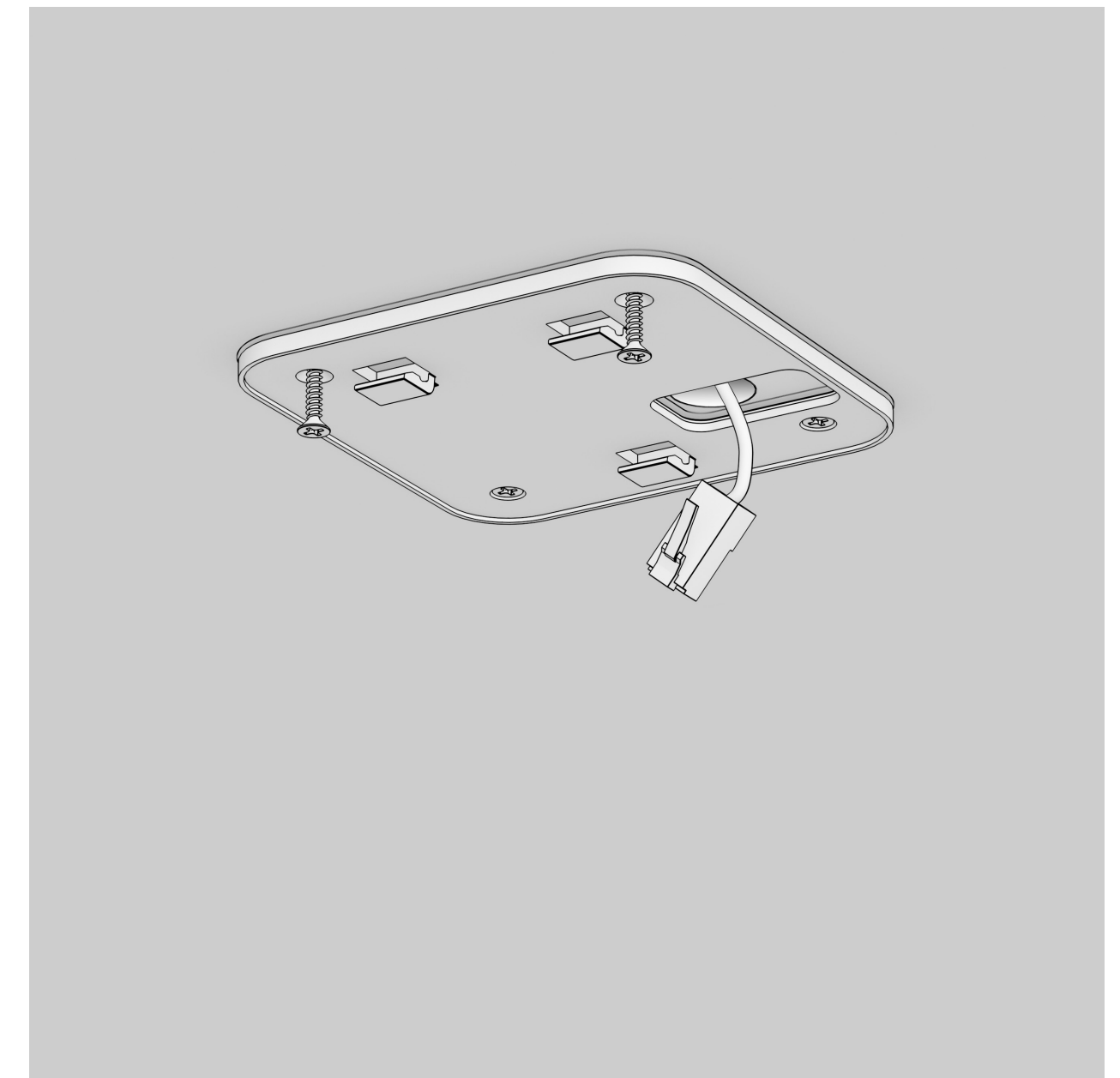
Mounting Instructions

4 Drill the 20mm holes that were marked in Step 3. If using screw anchors, also make the necessary holes where marked.
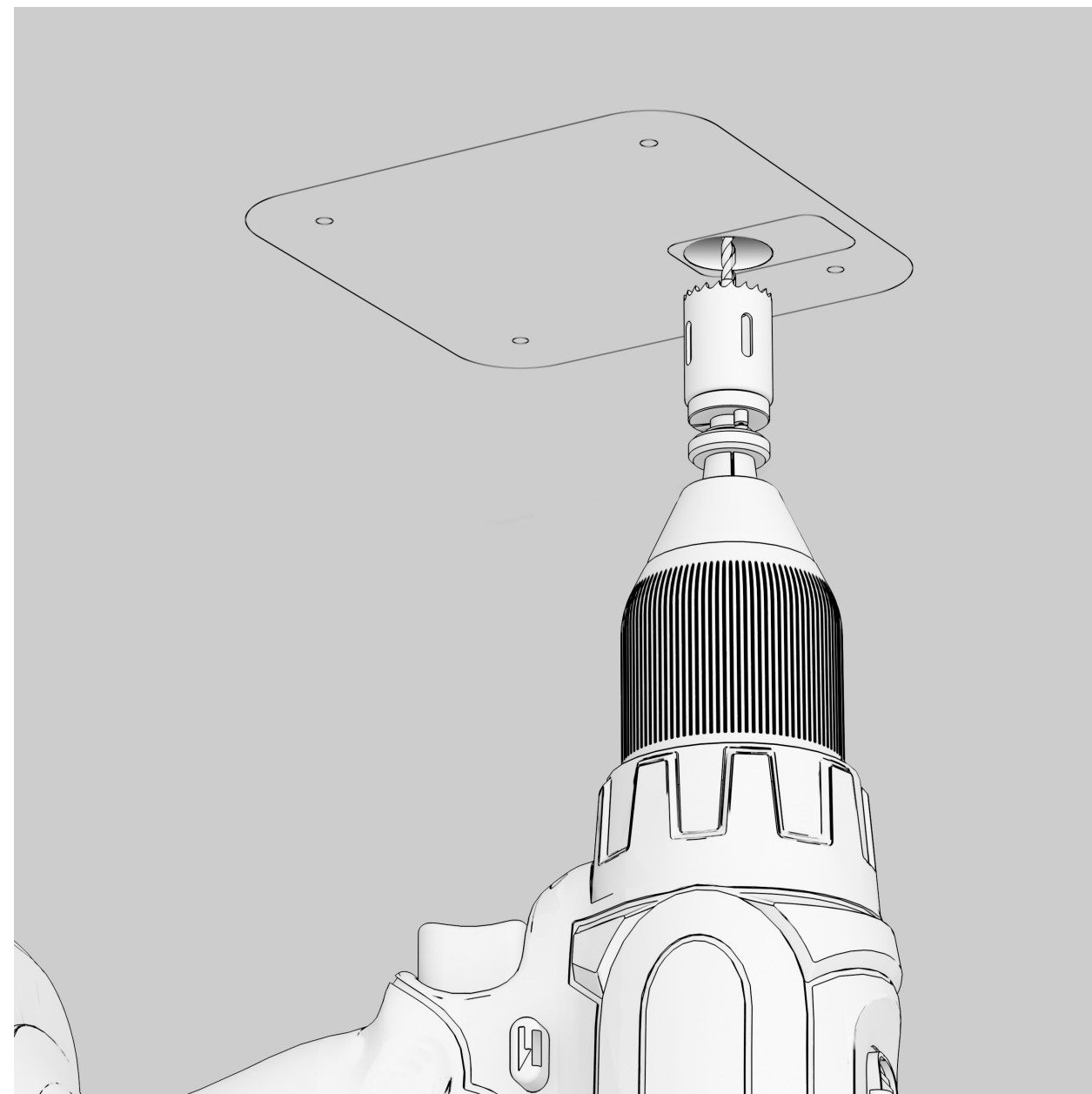
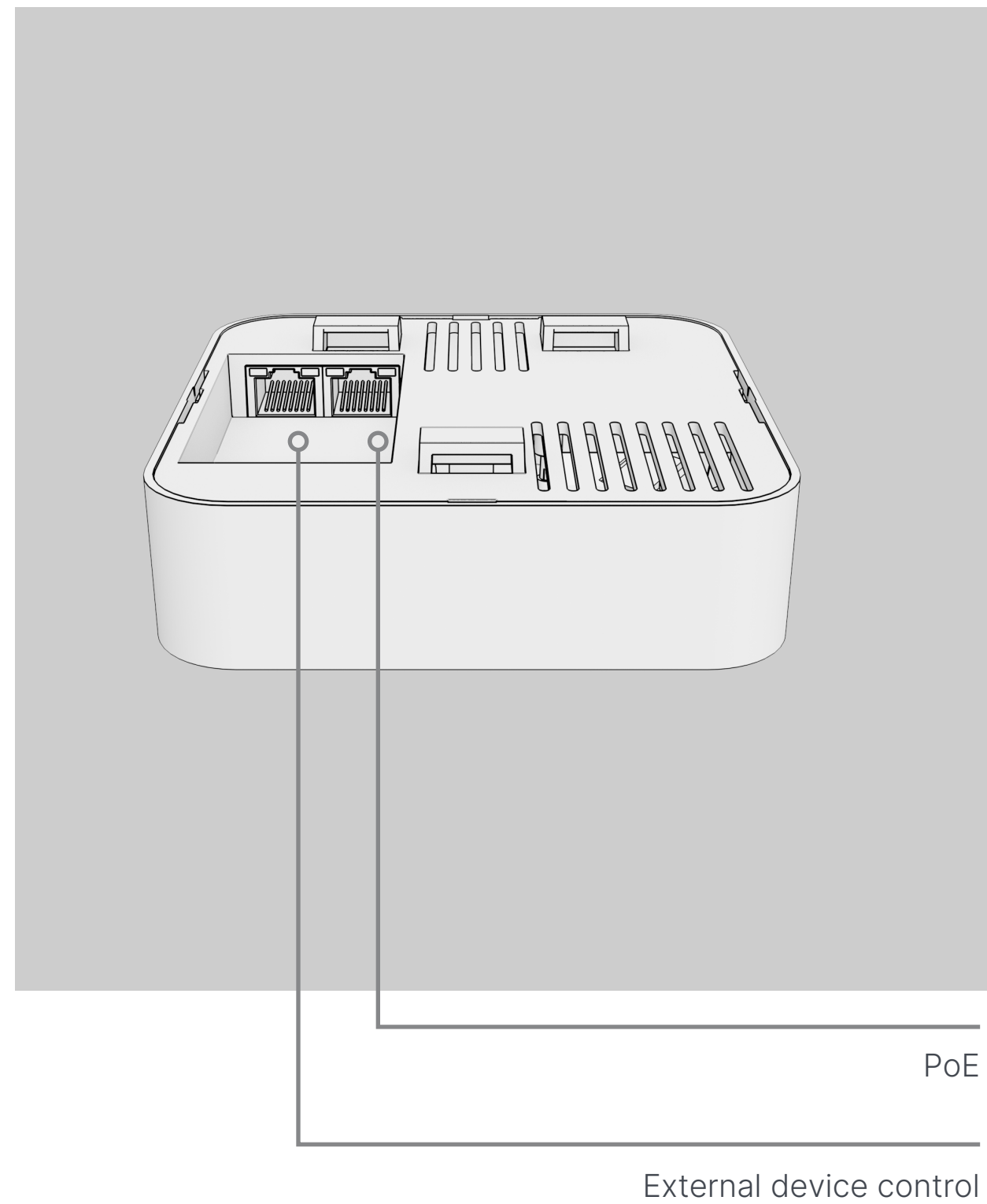**5** Run the RJ45 cable(s) through the larger opening in the bracket.

6 Mount the bracket with the four screws, ensuring the front of the bracket is facing the direction indicated in the Installation Plan.
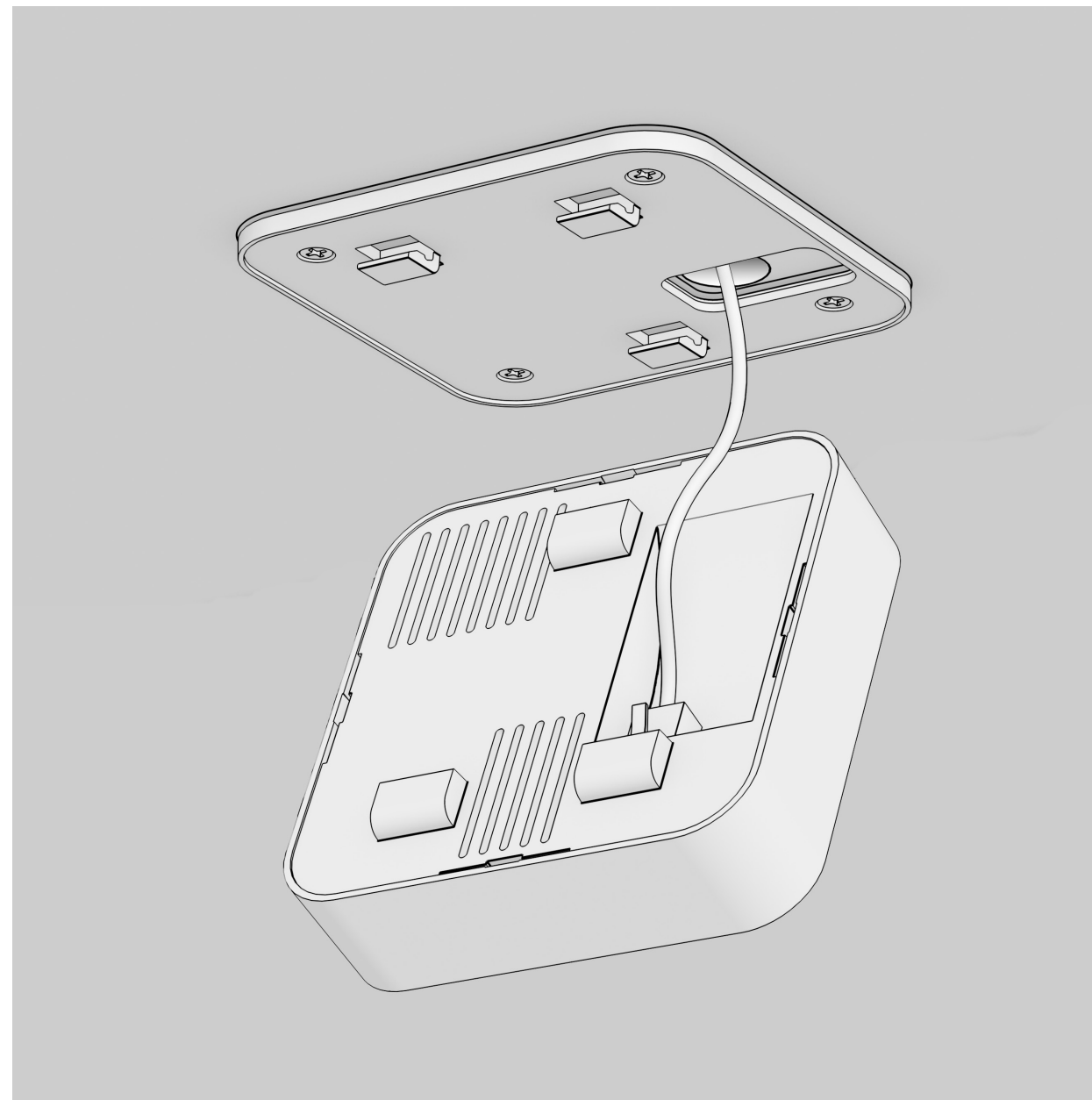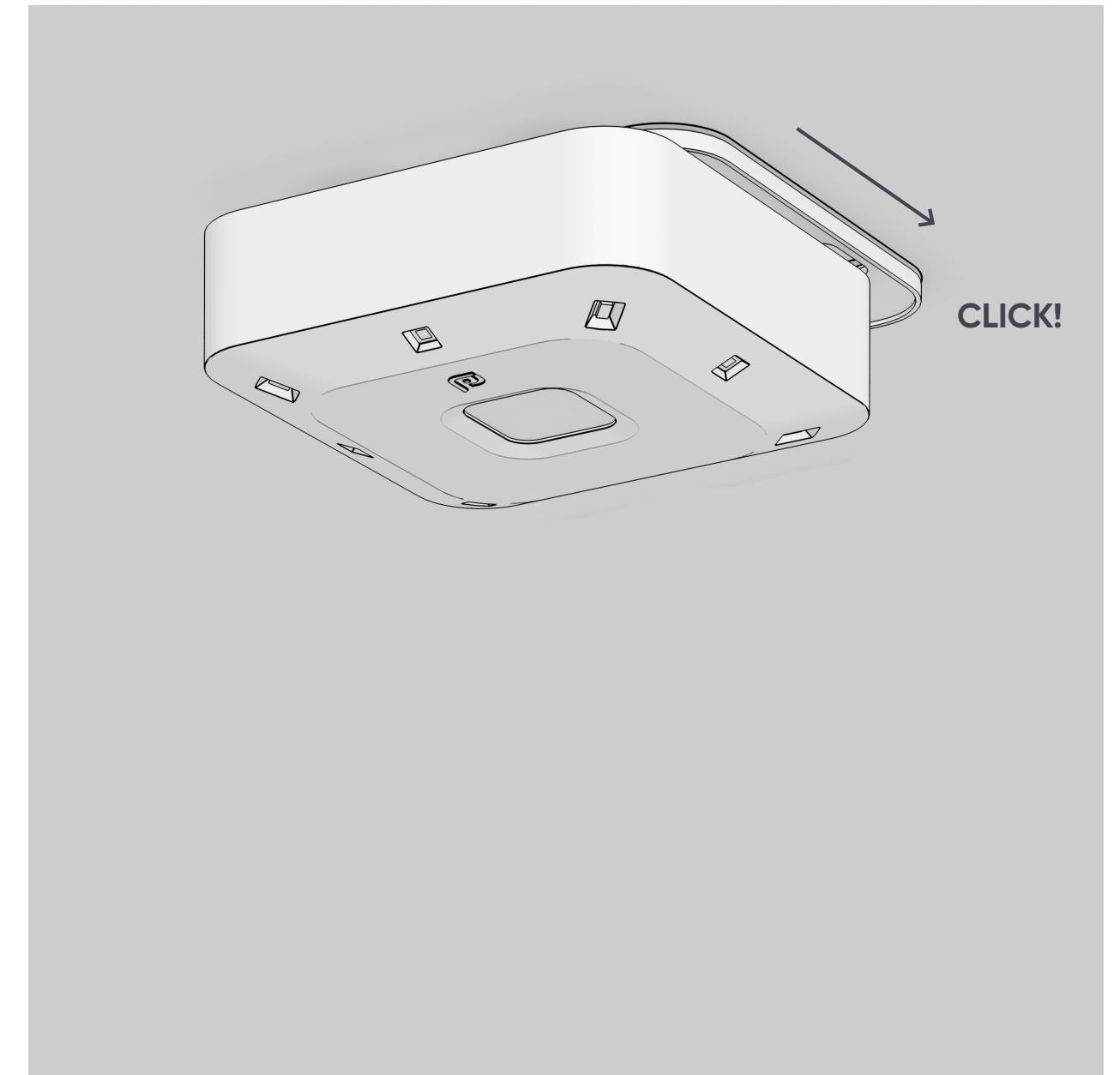
Mounting Instructions

7 In the Pod, identify the sockets for Power over Ethernet and for external devices control.

8 Connect the RJ45 cable(s) to the correct socket(s) in the Pod.

9 Position the Pod against the bracket, pushing the excess cables back into the ceiling, and slide the Pod until you hear a click.

PoE

External device control

CLICK!

Other Hardware

TP-LINK 24-Port PoE Switch (dependant on the number of pods per building)

General Specifications

Dimensions (mm)	440 x 330 x 44 mm (17.3 x 13.0 x 1.7 in.)
Mounting	Rack Mountable
Power Supply	100–240 V AC~50/60 Hz
PoE+ Ports (RJ45)	Standard: 802.3at/af compliant PoE+ Ports: 24 Ports, up to 30W per port Power Budget: 500 W*
Max Power Consumption	49.19 W (110V/60Hz) (no PD device connected) 635.7 W (110V/60Hz) (with 500 W PD device connected)
Max Heat Dissipation	167.85 BTU/hr (110 V/60 Hz) (no PD connected) 2169.2 BTU/hr (110 V/60 Hz) (with 500 W PD connected)
Interface	24 x 10/100/1000 Mbps RJ45 PoE+ Ports 4 x 10G SFP+ Slots 1 x RJ45 Console Port 1 x Micro-USB Console Port
Fan Quantity	3
Power Supply	100–240 V AC~50/60 Hz

TP-LINK 48-Port PoE Switch (dependant on the number of pods per building)

General Specifications

Dimensions (mm)	440 x 330 x 44 mm (17.3 x 13.0 x 1.7 in.)
Mounting	Rack Mountable
Power Supply	100–240 V AC~50/60 Hz
PoE+ Ports (RJ45)	Standard: 802.3at/af compliant PoE+ Ports: 48 Ports, up to 30W per port Power Budget: 500 W*
Max Power Consumption	49.19 W (110V/60Hz) (no PD device connected) 635.7 W (110V/60Hz) (with 500 W PD device connected)
Max Heat Dissipation	167.85 BTU/hr (110 V/60 Hz) (no PD connected) 2169.2 BTU/hr (110 V/60 Hz) (with 500 W PD connected)
Interface	48 x 10/100/1000 Mbps RJ45 PoE+ Ports 4 x 10G SFP+ Slots 1 x RJ45 Console Port 1 x Micro-USB Console Port
Fan Quantity	3
Power Supply	100–240 V AC~50/60 Hz

Other Hardware

Omada Gigabit VPN Router

General Specifications

Interface	Gigabit WAN and LAN Ports
Network Media	1000BASE-T: UTP or STP category 6+ cable (Max 100m)
Fan Quantity	Fan-less
Button	Reset Button
Power Supply	External 12V/1A DC Adapter
Enclosure	Steel
Mounting	Desktop/Wall-mount
Max Power Consumption	7.94 W

TP Link Omada Controller (TP-Link OC200 2-Port Omada Hardware LAN Controller)

Mechanical Specifications

Interface	2 x 10/100Mbps Ethernet Ports 1 x USB 2.0 Port (for configuration backup) 1 x Micro USB Port (for power)
Power Supply	802.3af/at PoE or Micro USB (DC 5V/Minimum 1A)
Dimensions (mm)	100 x 98 x 25 mm (3.9 x 3.9 x 1.0 in.)

FCC Statement

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: 1) this device may not cause harmful interference, and 2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

• Reorient or relocate the receiving antenna.

• Increase the separation between the equipment and receiver.

• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

• Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Radiation Exposure Statement

This device complies with FCC RF radiation exposure limits set forth for an uncontrolled environment.

The FCC certification of this device refers to RF exposure testing performed in typical operating conditions, where a person is no closer than 20 centimetres from the device surface at all times, except for non-repetitive patterns with transient time intervals in the order of a second. Only in the stated conditions, the device is shown to fully comply with the FCC RF Exposure requirements of KDB 447498.

PEGO

Support

For any queries regarding your PEGO system, please contact your Account Manager, or reach us at:

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