Industrial 802.3bt Multi-Gigabit PoE++ Injector

IPOE-171-60W/IPOE-171-95W/IPOE-176

User's Manual

Table of Contents

1. Package Contents

Thank you for purchasing PLANET IPOE-171 and 176 industrial Single-port 802.3bt PoE++ Injector series. In the following section, the term **"IPOE-171 Series"** means the IPOE-171-60W, IPOE-171-95W or IPOE-176.

Model	LAN Port Speed	PoE Standard	PoE Budget
IPOE-171-60W	10M/100M/1G/2.5G/5Gbps	IEEE 802.3at/bt	60 watts
IPOE-171-95W	10M/100M/1G/2.5G/5Gbps	IEEE 802.3at/bt	95 watts
IPOE-176	10M/100M/1G/2.5G/5G/10Gbps	IEEE 802.3at/bt	95 watts

Please unpack the box of the device carefully, and the box should contain the following items:

- 802.3bt PoE injector x 1
- QR code sheet x 1
- Dust cap x 2
- Wall-mount kit x 1

If any item is found missing or damaged, please contact your local reseller for replacement.

2. Product Specifications

Product		IPOE-171-60W	IPOE-171-95W	IPOE-176
Hardware Specifications				
Interface	Input Port	1 x RJ45 STP Data In		
	Output Port	1 x RJ45 STP PoE (Data + Power) Out		
	Data Rate	10M/100M/1G/2.5G/5Gbps		10M/100M/1G/ 2.5G/5G/10Gbps
Connector		Removable 6-pin terminal block Pin 1/2 for Power 1 Pin 3/4 for fault alarm Pin 5/6 for Power 2		
Dimensions (W x D x H)		32 x 87 x 135 mm		
ESD Protection		6KV DC		
Enclosure		IP30 slim type metal case		
Weight		406g	443g	454g
Power Requirements		DC 48~54V, 2A max.	DC 12~54V, 6A max.	DC 48~54V, 2.5A max.
Unit Output Voltage		DC 45~53V	DC 54V (nominal)	DC 45~53V
Power Consumption		75 watts max.	120 watts max.	98 watts max.
Installation		DIN-rail kit or wall-mount ear		
Alarm		Provides one relay output for power failure Alarm Relay current carry ability: 1A @DC 24V		Provides one relay output for power failure or PoE fault Alarm relay contact rating: 1A @24V DC
LED Indicators		System: Power 1 (Green), Power 2 (Green), Alarm (Red) PoE Port: PoE-in-Use x 1 (Amber) PoE Usage: PoE Usage x 3 (Amber)		

<table>
<tr><td rowspan="2">Network Cable*</td><td colspan="3">Twisted-pair cable up to 100 meters (328ft)
10BASE-T: 4-pair UTP Cat. 3/Cat. 4/Cat. 5/Cat. 5e/Cat. 6/Cat. 6A
100BASE-TX: 4-pair UTP Cat.5e/Cat.6/Cat.6A
1G/2.5GBASE-T: 4-pair UTP Cat.5e/Cat.6/Cat.6A/Cat.7
5GBASE-T: 4-pair UTP Cat.6/Cat.6A/Cat.7</td></tr>
<tr><td colspan="2">-</td><td>10GBASE-T: 4-pair UTP Cat.6A/Cat. 7 or above</td></tr>
<tr><td colspan="4">Power over Ethernet</td></tr>
<tr><td>PoE Standard</td><td>IEEE 802.3bt Type 3 PSE</td><td colspan="2">IEEE 802.3bt Type 4 PSE</td></tr>
<tr><td>PoE Power Supply Type</td><td colspan="3">End-span + Mid-span</td></tr>
<tr><td>Power Pin Assignment</td><td colspan="3">Pair 1 End-span: 1/2 (-), 3/6 (+)
Pair 2 Mid-span: 4/5 (+), 7/8 (-)</td></tr>
<tr><td>PoE Mode</td><td colspan="3">Standard mode
Legacy and Force mode</td></tr>
<tr><td rowspan="2">PoE Power Output</td><td>Max. 60W@1m cable

Max. 51W@100m cable</td><td>DC 24V~54V input:
Max. 89.5W@1m cable
Max. 75W@100m cable

DC 12V input:
Max. 60W@1m cable
Max. 52W@100m cable</td><td>DC 54V input:
Max. 95W@1m cable
Max. 71W@100m cable

DC 48V input:
Max. 30W@1m cable
Max. 25W@100m cable</td></tr>
<tr><td colspan="3">Actual available power may vary depending on cable length and DC input voltage.</td></tr>
<tr><td>PoE Power Output Budget</td><td>60-watt PoE via 4-pair@DC 50~54V
30-watt PoE via 2-pair@DC 45~54V</td><td>95-watt PoE via 4-pair

30-watt PoE via 2-pair</td><td>95-watt PoE via 4-pair@DC 50~54V

30-watt PoE via 2-pai@DC 45~54V</td></tr>
<tr><td>No. of devices that can be powered</td><td colspan="3">1</td></tr>
</table>

Standards Conformance	
Standards Compliance	IEEE 802.3 10BASE-T IEEE 802.3u 100BASE-TX IEEE 802.3ab 1000BASE-T IEEE 802.3bz 2.5G/5GBASE-T IEEE 802.3an 10GBASE-T (IPOE-176 only) IEEE 802.3at PoE+ IEEE 802.3bt 4-pair PoE
Regulatory Compliance	FCC Part 15 Class A, CE
Environment	
Operating Temperature	-40 ~ 75 degrees C
Storage Temperature	-40 ~ 85 degrees C
Operating Humidity	5 ~ 90%, relative humidity, non-condensing
Storage Humidity	5 ~ 90%, relative humidity, non-condensing

1. As IEEE 802.3bt device provides high power, please use high-quality network cable and RJ45 connector.
2. The maximum PoE output power depends on the cable length, the quality of cable, and DC input voltage.
3. IPOE-176 provides high-power PoE (up to 95W). Use Cat. 6A or higher grade cable for 10G operation.

3. Product Outlook

3.1 Product Outlook

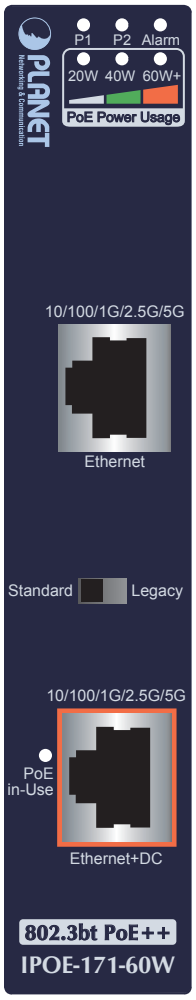


Figure 1: IPOE-171-60W outlook

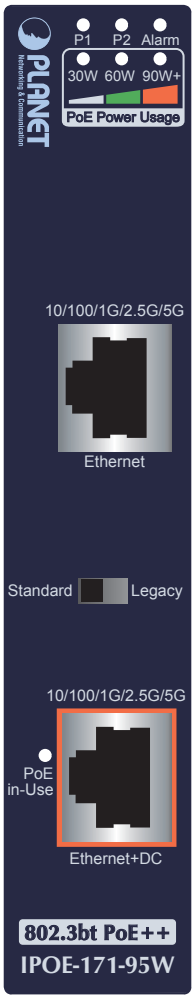


Figure 2: IPOE-171-95W outlook

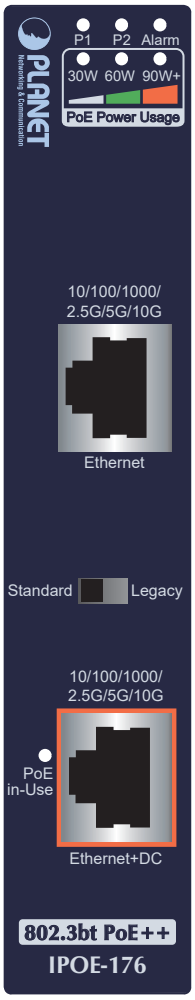


Figure 3: IPOE-176 outlook

IPOE-171-60W LED Indicators:

LED	Color	Function
P1	Green	Lights to indicate power 1 has power.
P2	Green	Lights to indicate power 2 has power.
Alarm	Red	Lights to indicate either power 1 or power 2 has no power.
PoE-in-Use	Amber	Lights to indicate the device is providing PoE power.

PoE Usage	Amber	● **Monitor DC input voltage:** When user powers on IPOE-171-60W, the injector will detect the DC input voltage and then PoE Usage LED will flash three times. **20W:** Flashing three times means the DC input voltage is 48~50.9V. **40W:** Flashing three times means the DC input voltage is 51~52.9V. ● **Monitor power usage:** **20W:** 1. Off to indicate the PoE usage is less than 9W. 2. Blinks to indicate that the PoE usage is around 10W to 19W. 3. Lights to indicate the PoE usage is more than 20W. **40W:** 1. Blinks to indicate that the PoE usage is around 30W to 39W. 2. Lights to indicate the PoE usage is more than 40W. **60W+:** 1. Blinks to indicate that the PoE usage is around 50W to 59W. 2. Lights to indicate the PoE usage is at the maximum.

IPOE-171-95W LED Indicators:

LED	Color	Function
P1	Green	Lights to indicate power 1 has power.
P2	Green	Lights to indicate power 2 has power.
Alarm	Red	Lights to indicate either power 1 or power 2 has no power.
PoE-in-Use	Amber	Lights to indicate the device is providing PoE power.
PoE Usage	Amber	**30W:** 1. Off to indicate the PoE usage is less than 14W. 2. links to indicate that the PoE usage is around 15W to 29W. 3. Lights to indicate the PoE usage is more than 30W. **60W:** 1. Blinks to indicate that the PoE usage is around 45W to 59W. 2. Lights to indicate the PoE usage is more than 60W. **90W+:** 1. Blinks to indicate that the PoE usage is around 75W to 89W. 2. Lights to indicate the PoE usage is at the maximum.

IPOE-176 LED Indicators:

LED	Color	Function
P1	Green	Lights to indicate DC Power 1 is active.
P2	Green	Lights to indicate DC Power 2 is active.
Alarm	Red	The alarm behavior of IPOE-176 is controlled by controller and depends on the selected PoE Mode. **Legacy Mode:** Lights when either power input fails or PoE power delivery fails. **Standard Mode:** Lights only when PoE or PD abnormal condition occurs. No alarm will be triggered when: - PoE power is delivered normally. - No PoE PD is connected (no PoE load). Off when all conditions operate normally.
PoE-in-Use	Amber	Lights when a PD is connected and PoE power is delivered. Off when no PD is connected or no power is delivered.
PoE Usage	Amber	The PoE Power Usage LED indicates the real-time PoE load status according to output power consumption. The LED behavior is defined as follows: **30W:** 1. Off to indicate the PoE usage is less than 14W. 2. links to indicate that the PoE usage is around 15W to 29W. 3. Lights to indicate the PoE usage is more than 30W. **60W:** 1. Blinks to indicate that the PoE usage is around 45W to 59W. 2. Lights to indicate the PoE usage is more than 60W. **90W+:** 1. Blinks to indicate that the PoE usage is around 75W to 89W. 2. Lights to indicate the PoE usage is at the maximum.

PoE Mode of IPOE-171 series and IPOE-176:

PoE Mode	Description
Standard (Default)	The standard mode is chosen to provide power to the PD devices that follow the IEEE 802.3at/bt standard.
Legacy	The legacy mode supports Ultra PoE. It is chosen to provide power to the PD devices that do not fully follow the IEEE 802.3at/bt standard.

Force	If the output power of injector is less than 1 watt when in the Legacy mode, after 20 seconds, the Force mode will be enabled. When the Force mode is enabled, it will provide PD with a maximum of 60 watts. If the output power of injector is less than 1 watt when in the Force mode, after 2 seconds, the Legacy mode will be enabled.

Note	After changing the PoE mode, please power off and then on the PoE injector to make the change effective.

3.2 Industrial PoE++ Injector Upper Panel

The upper panel of the IPOE-17x series has one terminal block connector where there are two DC power inputs.

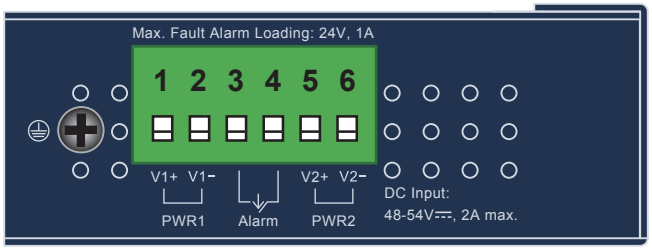


Figure 4: IPOE-171-60W upper panel.

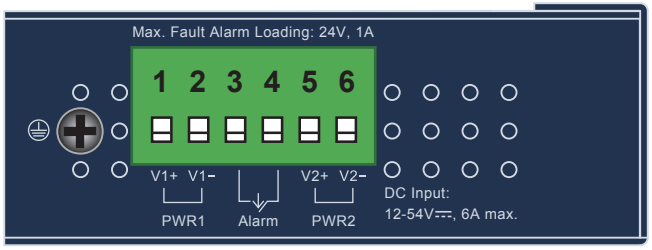


Figure 5: IPOE-171-95W upper panel.

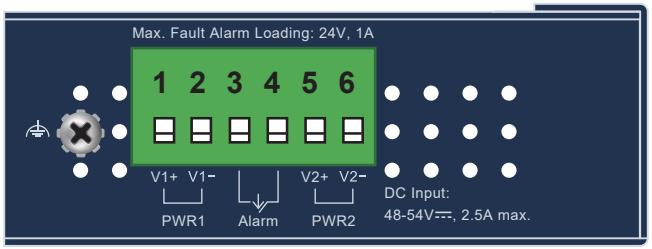


Figure 6: IPOE-176 upper panel.

3.3 Wiring the Power Inputs

The 6-contact terminal block connector on the top panel of the IPOE-17x series is used for two DC redundant power inputs. Please follow the steps below to insert the power wire.

Step 1: Insert Positive/Negative DC power wires into Contacts 1 and 2 for POWER 1, or 5 and 6 for POWER 2.

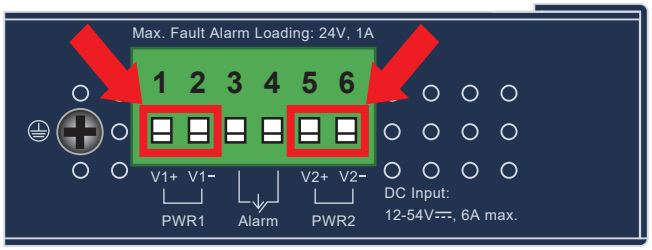


Figure 7: Power input pins.

Step 2: Tighten the wire-clamp screws for preventing the wires from loosening.

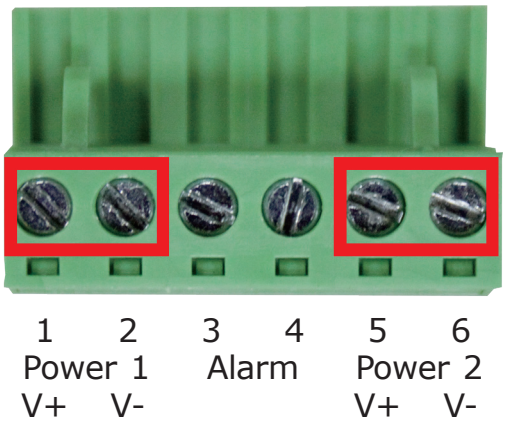


Figure 8: PWR1 & PWR2 Pins of Terminal Block.

Note

The wire gauge for the terminal block should be in the range between 12 ~ 24 AWG.

Note

As the DC input connector of the IPOE-17x series is polarity protected, connecting Positive/Negative DC power wires to the wrong pins will not damage the unit.

3.4 Wiring the Fault Alarm Contact

The fault alarm contacts are in the middle of the terminal block connector as the picture shows below. After inserting the wires, the IPOE-17x series will detect the fault status of the power failure and then form an open circuit. The following illustration shows an application example for wiring the fault alarm contacts.

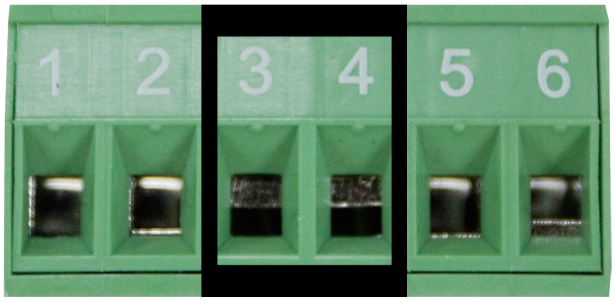


Figure 9: Fault Pin of Terminal Block.

Note

1. The wire gauge for the terminal block should be in the range between 12 ~ 24 AWG.
2. Alarm relay circuit accepts up to 24V, max. 1A currents.

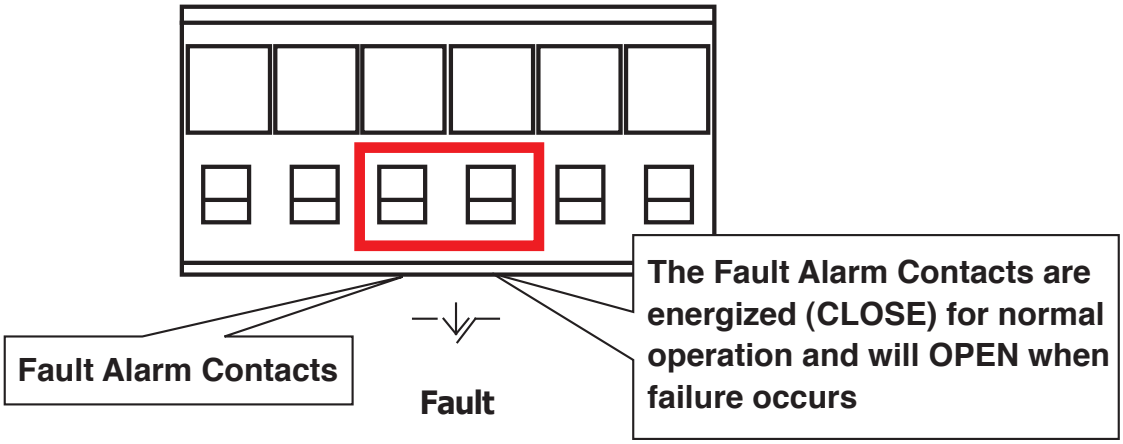


Figure 10: Fault Alarm Contact

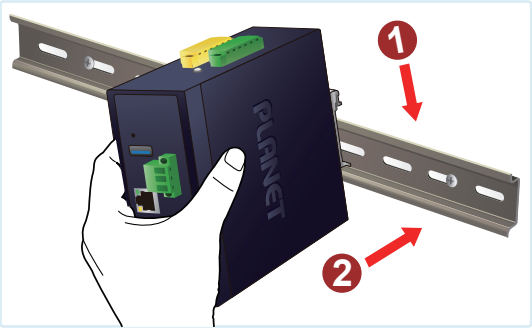
4. Mounting Installation

This section describes how to install the industrial device and make connections to it. Please read the following sections and perform the procedures in the order being presented.

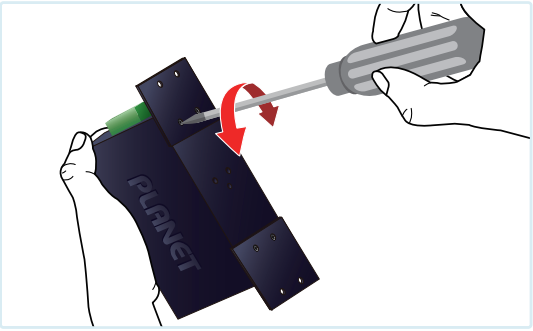
Note

In the installation steps below, this manual uses PLANET Industrial Switch as an example. The steps for PLANET Industrial Slim-type Switch, Industrial Media/Serial Converter and Industrial PoE devices are similar.

4.1 DIN-rail Mounting Installation



4.2 Wall-mount Plate Mounting

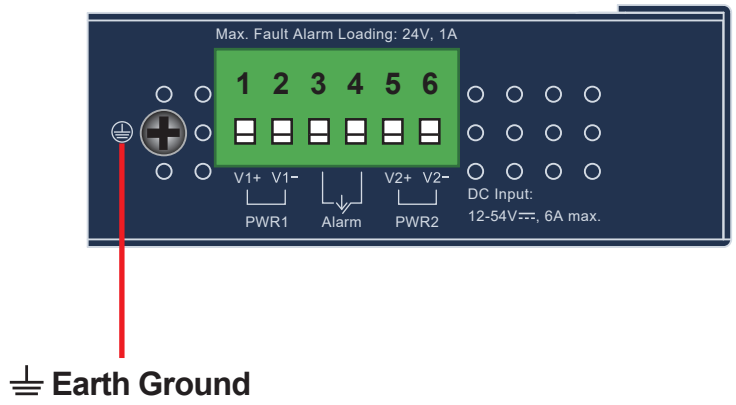


4.3 Side Wall-mount Plate Mounting

* The above pictures are for illustration olny.

4.4 Grounding the Device

Users MUST complete grounding wired with the device; otherwise, a sudden lightning could cause fatal damage to the device.



⏚ Earth Ground

5. Hardware Installation

The following section describes the hardware features of the IPOE-17x series. Before connecting any network device to it, please read this chapter carefully.

5.1 Before Installation

Before your installation, it is recommended to check your network environment. If there is any IEEE 802.3bt device that needs to be powered on and works normally, the IPOE-17x series is the solution that supplies power to this Ethernet device conveniently and easily. If there is difficulty in finding a power socket for the AC-DC connection to your non-IEEE 802.3at/bt networked device, the IPOE-171 series with POE-173S/IPOE-173S and the IPOE-176 with IPOE-176S can supply DC power to this Ethernet device conveniently and easily.


Note

In the installation steps below, this manual uses the IPOE-171 series as an example. Except the input voltage, the steps for the IPOE-171-95W and the IPOE-176 are similar.


Note

Note that the input power range of the IPOE-171-60W and the IPOE-176 are **48 ~ 54V DC** and the input power range of IPOE-171-95W is **12 ~ 54V DC**.

5.2 IPOE-17x series Installation

1. Connect the appropriate DC power supply to the 6-pin terminal block of the IPOE-17x series. The Power LED will light steadily.

- **IPOE-171-60W:** DC 48~54V input
- **IPOE-171-95W:** DC 12~54V input
- **IPOE-176:** DC 48~54V input

2. Connect a standard Ethernet cable from an Ethernet switch or PC workstation to **"Ethernet"** port of the IPOE-17x series.
3. Connect the long cable to the **"Ethernet+DC"** port.

4. The IPOE-17x series can directly connect with any IEEE 802.3at/bt end-nodes, such as PTZ (pan, tilt & zoom) IP cameras, PTZ speed dome cameras, color touch screens, Voice over IP (VoIP) telephones and multi-channel wireless LAN access points which support IEEE 802.3at/bt In-line Power over Ethernet port.

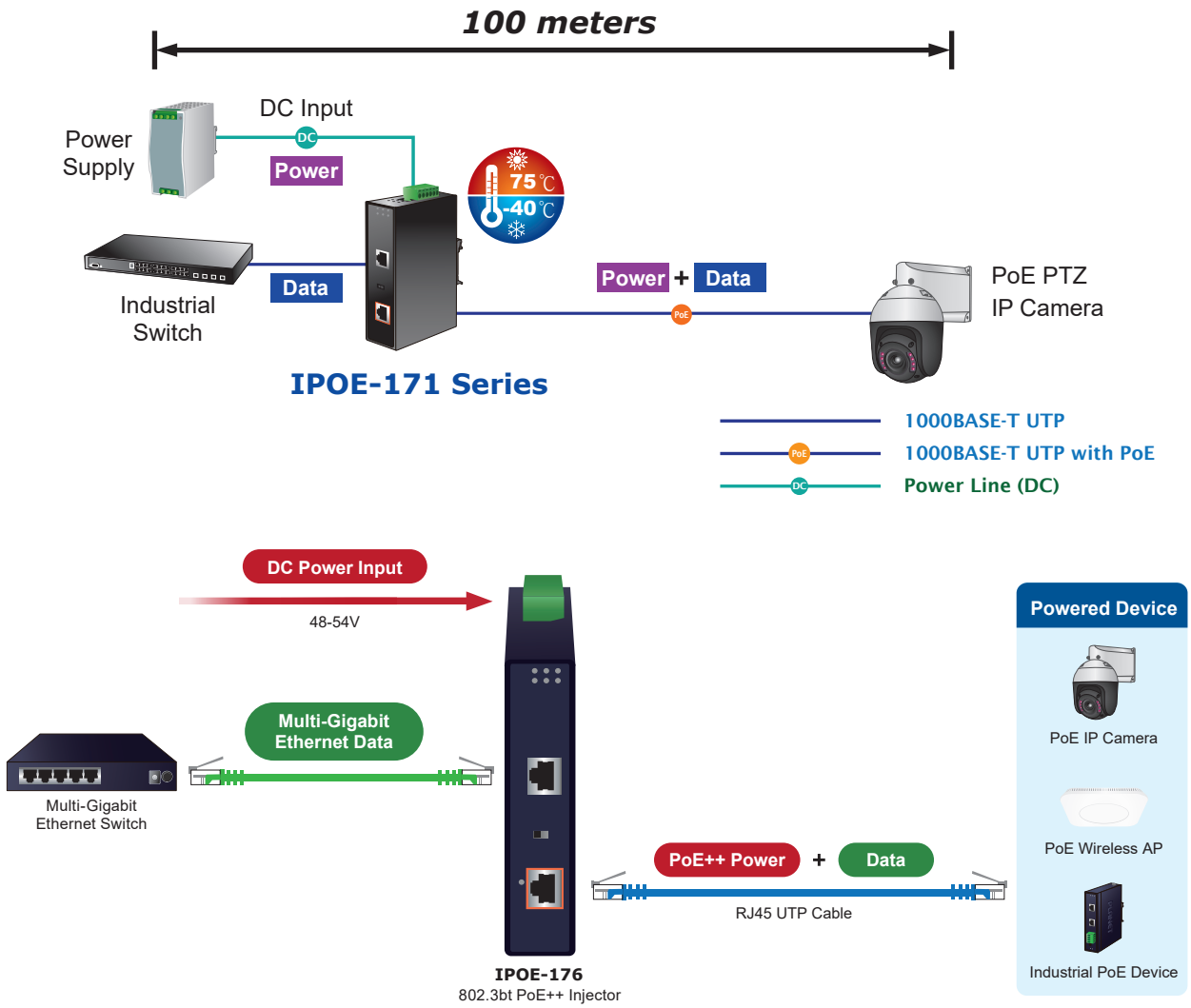


Figure 11: Architecture of connected IEEE 802.3at/bt device

Once the IPOE-17x series detects the existence of an IEEE 802.3at/bt device, the **PoE-in-Use** LED indicator will be steadily on to show it is providing power.

Note	According to IEEE 802.3at/bt Power over Ethernet, the IPOE-17x series will not inject power to the cable if not connected to IEEE 802.3at/bt device. But the Force mode is exceptional.
Note	Depending on the length of cable, the PoE power which PD receives is different.

6. Customer Support

Thank you for purchasing PLANET products. You can browse our online FAQ resource at the PLANET Web site first to check if it could solve your issue. If you need more support information, please contact PLANET support team.

PLANET online FAQs:
https://www.planet.com.tw/en/support/faq

Support team mail address:
support@planet.com.tw

EU Representative
PLANET Technology Europe B.V.
Address: Posthoornstraat 11, 3011 WD Rotterdam, NL
Email: eu_rep@planet.com.tw
URL: www.planet.com.tw

FCC Statement

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

ISEDC Statement

CAN ICES-003(A) / NMB-003(A)

This device complies with Industry Canada license-exempt RSS standard(s).

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le present appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisee aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioelectrique subi, meme si le brouillage est susceptible d'en compromettre le fonctionnement.

CE Mark Warning

This device is compliant with Class A of CISPR 32. In a residential environment this equipment may cause radio interference.

WEEE Warning

To avoid the potential effects on the environment and human health as a result of the presence of hazardous substances in electrical and electronic equipment, end users of electrical and electronic equipment should understand the meaning of the crossed-out wheeled bin symbol. Do not dispose of WEEE as unsorted municipal waste and have to collect such WEEE separately.