NEC

iPASOLINK EX
Advanced

INSTALLATION

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iPASOLINK EX Advanced

INSTALLATION

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1. OVERVIEW

The standard installation is summarized in this section. Followings show the typical installation work flow and guides:

Figure 1-1 Installation Flow

```
┌─────────────────────────────────────┐
│        Unpack iPASOLINK EX/A         │
│ (Section: 3. UNPACK iPASOLINK EX/A)  │
└─────────────────────────────────────┘
                   │
                   ▼
┌─────────────────────────────────────┐
│        Mount iPASOLINK EX/A          │
│ (Section: 4. MOUNT iPASOLINK EX/A)   │
└─────────────────────────────────────┘
                   │
                   ▼
┌─────────────────────────────────────┐
│            Connect Cables            │
│   (Section: 5. CONNECT CABLES)       │
└─────────────────────────────────────┘
                   │
                   ▼
┌─────────────────────────────────────┐
│            Ground (Earth)            │
│ (Section: 6. GROUND iPASOLINK EX/A)  │
└─────────────────────────────────────┘
                   │
                   ▼
┌─────────────────────────────────────┐
│        Start Up iPASOLINK EX/A       │
│ (Section: 7. START UP AND SHUT DOWN) │
└─────────────────────────────────────┘
                   │
```

WebLCT should be operational here.
Refer to the **Set Network & System Provisioning** *manual.*

```
                   ▼
┌─────────────────────────────────────┐
│        Adjust Equipment Angle        │
│ (Section: 8. ADJUST ANTENNA ANGLE)   │
└─────────────────────────────────────┘
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2. COMPOSITIONS

2.1 Overview

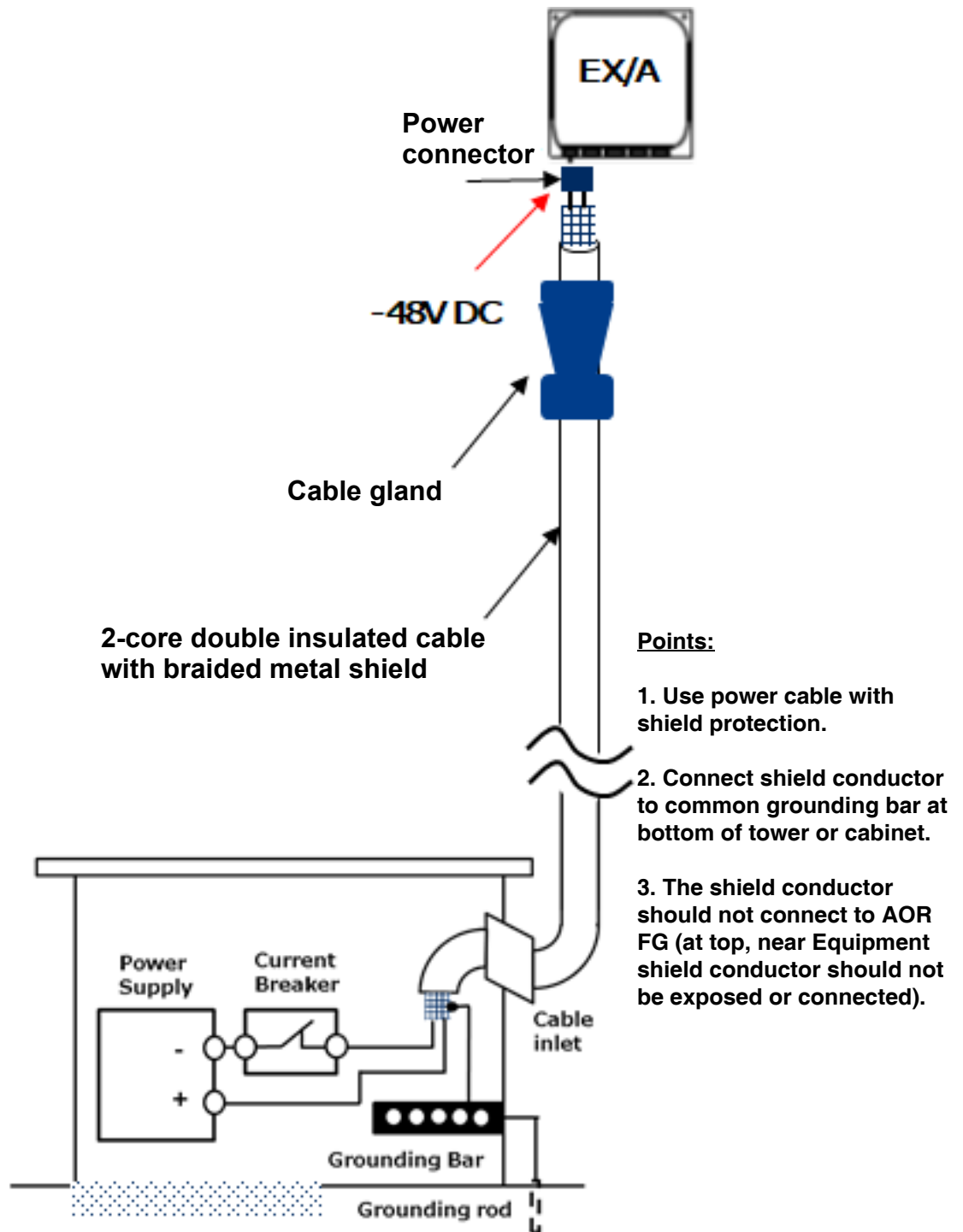Followings show the list of contents; iPASOLINK EX/A and its parts required to set up iPASOLINK EX/A. Confirm them before starting the installation.

2.2 Power Supply and Circuit Breaker

Since iPASOLINK EX/A itself does not have a power on/off switch, it requires a circuit breaker or shut-off function externally. See the following for reference.

2.2.1 Typical Connection (to DC –48 V Port)

Figure 2-1 Power Supply and Circuit Breaker (Typical)

Points:

1. Use power cable with shield protection.

2. Connect shield conductor to common grounding bar at bottom of tower or cabinet.

3. The shield conductor should not connect to AOR FG (at top, near Equipment shield conductor should not be exposed or connected).

2.2.2 Using PoE Port

When using the PoE Port to supply the power, the –48 V DC Power Port should be disabled. Select either –48 V DC Power Port or PoE Port but not both for the power supply.

This equipment conforms to the international standards: IEC61000-4-5. To obtain the higher surge immunity, place an external surge protection device to the system.

◆ **Recommended External Surge Protection Device**
- Standard to Conform: IEC61643-21
- Specifications: ±10 kV, 5 kA, 8/20 μsec

NOTE: EX/A Dual does not support PoE.

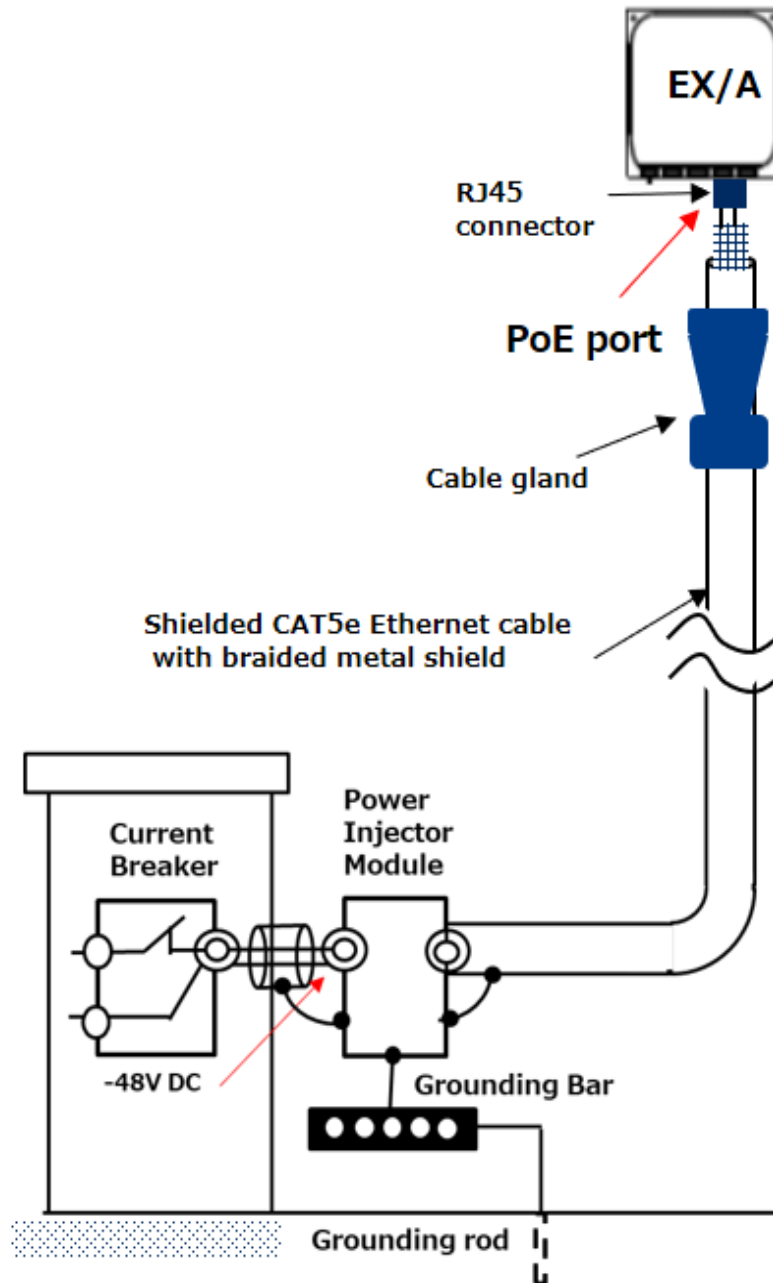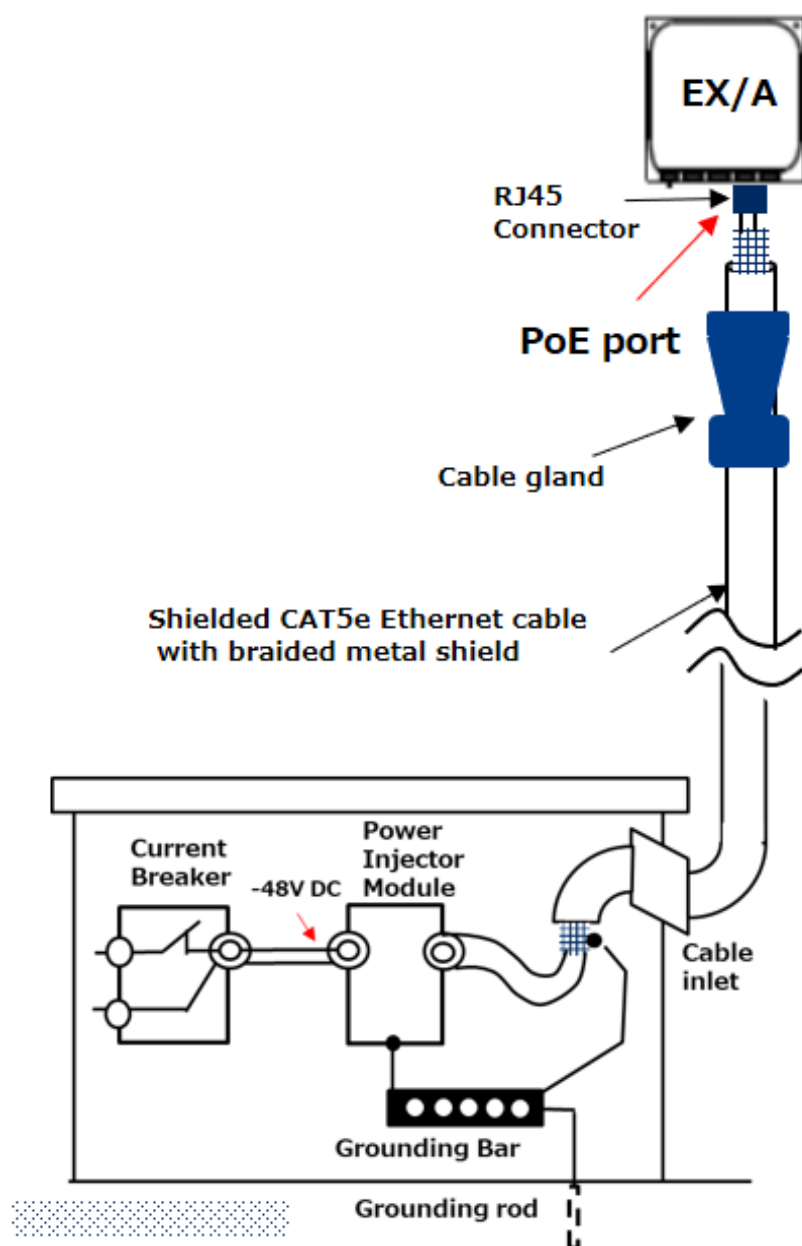**Figure 2-2 Outdoor Power Injector Module (DC PSE Unit)**

Figure 2-3 Indoor Power Injector Module (DC PSE Unit)

2.3 Available Systems and Components

2.3.1 1+0 System

Table 2-1 iPASOLINK EX/A Components — 1+0 System

CONTENTS	QTY	DESCRIPTION
iPASOLINK EX/A	1	TRP-80G10GB-1A: NWA-A01926-*** [*2.4.1*, *Figure 2-4*]
AC-DC CONV Unit	0 or 1	SELV *NOTE*; NWA-091121 [*2.4.2*, *Figure 2-6*]; AC-DC Converter; with Waterproofing Cap
Power Injector		SELV *NOTE* LTPoE++: DC PSE Unit: NWA-A00087 [*2.4.3.1*, *Figure 2-7*]
Power Cable	0 or 1	SELV *NOTE*; Double-Insulated with braided metal shield; with Waterproofing Cap [*2.4.4*, *Figure 2-8*] EX/A supports the PoE Port. When using the PoE Port to Power supply , the Power Cable is not required.
LAN Cables (Electric)	1	For P1 Port; RJ-45; Double-Shielded; with Waterproofing Cap. [*2.4.5*, *Figure 2-9*]
LAN Cables (Optic)	1 or 2	For P2 and P3 Ports; LC; with Waterproofing Cap [*2.4.6*, *Figure 2-10*]]
Grounding Cable	1	EX/A should be grounded. [*2.4.7*, *Figure 2-11*]
Antenna and its Mounting Bracket	1	[*2.4.8*, *Figure 2-12*]

Table 2-2 iPASOLINK EX/A Dual Components — 1+0 System

CONTENTS	QTY	DESCRIPTION
iPASOLINK EX/A Dual	1	TRP-80G20GB-1A; NWA-A11629-*** [*2.4.1*, *Figure 2-5*]
Power Cable	1	SELV *NOTE*; Double-Insulated with braided metal shield; with Waterproofing Cap [*2.4.4*, *Figure 2-8*]
LAN Cables (Electric)	1	For P1 Port; RJ-45; Double-Shielded; with Waterproofing Cap. [*2.4.5*, *Figure 2-9*]
LAN Cables (Optic)	1 to 3	For P2,P3 and P4 Ports; LC; with Waterproofing Cap [*2.4.6*, *Figure 2-10*]]
Grounding Cable	1	EX/A Dual should be grounded. [*2.4.7*, *Figure 2-11*]
Antenna and its Mounting Bracket	1	[*2.4.8*, *Figure 2-12*]

NOTE: *SELV (Safety Extra Low Voltage).*

NOTE: *AC-DC CONV Unit (NWA-091121) cannot be used for EX/A Dual.*

2.3.2 2+0,1+0 XPIC System

Table 2-3 iPASOLINK EX/A Components — 2+0,1+0 XPIC System

CONTENTS	QTY	DESCRIPTION
iPASOLINK EX/A Dual	1	TRP-80G20GB-1A; NWA-A11629-*** [*2.4.1*, *Figure 2-5*]
Power Cable	1	SELV *NOTE*; Double-Insulated with braided metal shield; with Waterproofing Cap [*2.4.4*, *Figure 2-8*]
LAN Cables (Electric)	1	For P1 Port; RJ-45; Double-Shielded; with Waterproofing Cap. [*2.4.5*, *Figure 2-9*]
LAN Cables (Optic)	1 to 3	For P2,P3 and P4 Ports; LC; with Waterproofing Cap [*2.4.6*, *Figure 2-10*]]
Grounding Cable	1	EX/A should be grounded. [*2.4.7*, *Figure 2-11*]
Antenna and its Mounting Bracket	1	[*2.4.8*, *Figure 2-12*]

NOTE: *SELV (Safety Extra Low Voltage).*

NOTE: *AC-DC CONV Unit (NWA-091121) cannot be used for EX/A Dual.*

2.4 Components Appearances

2.4.1 iPASOLINK EX/A Main Part
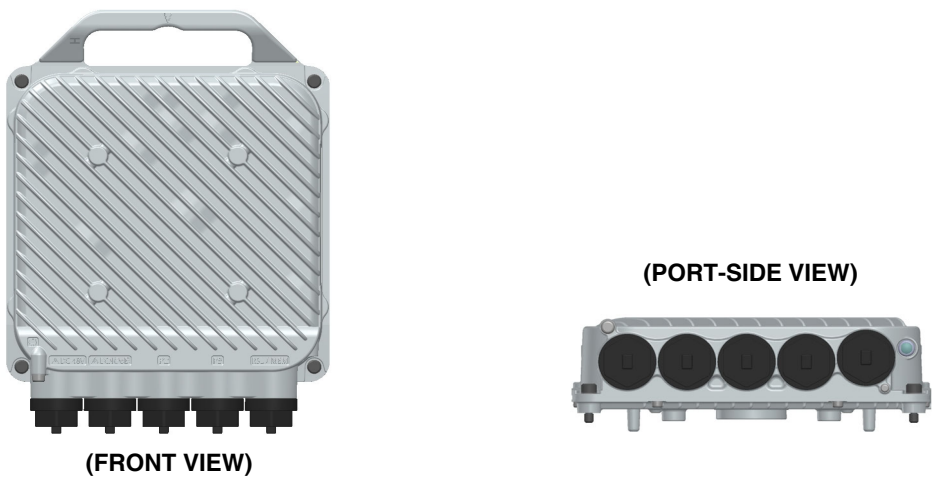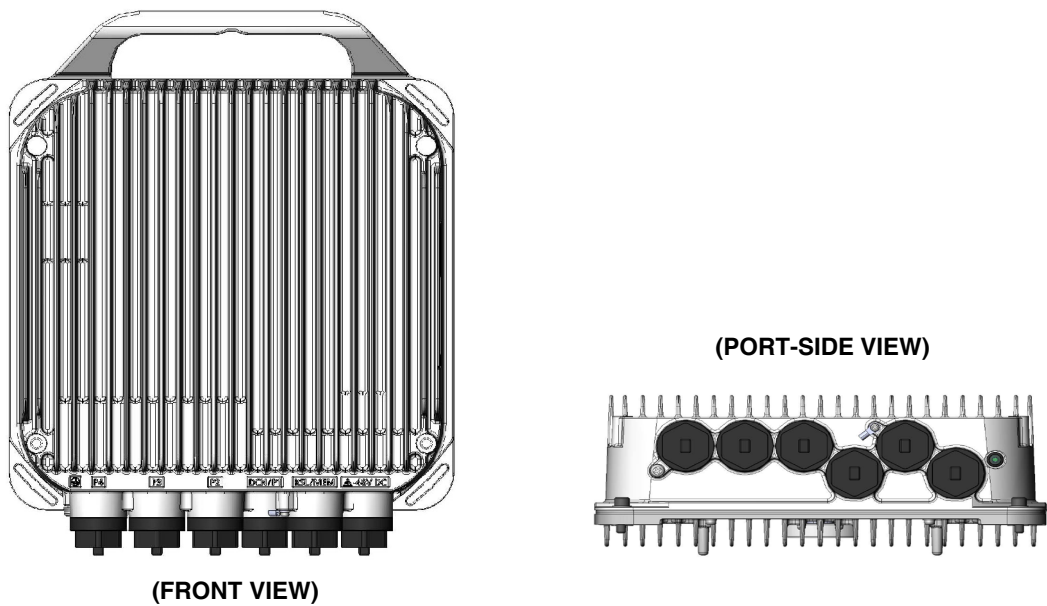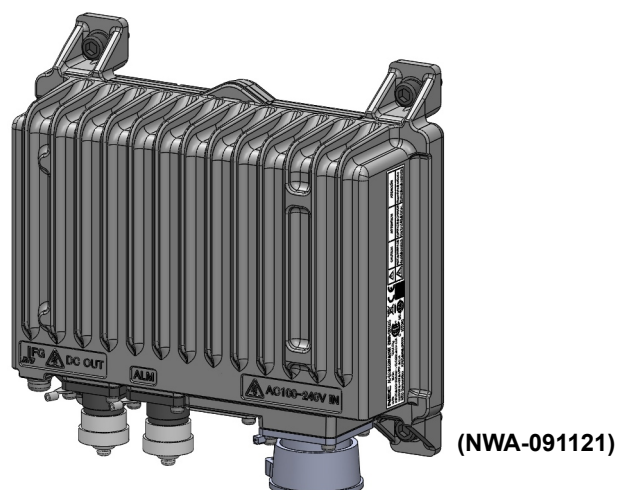
Figure 2-4 iPASOLINK EX/A

(FRONT VIEW)

(PORT-SIDE VIEW)

Figure 2-5 iPASOLINK EX/A Dual

(FRONT VIEW)

(PORT-SIDE VIEW)

2.4.2 AC-DC CONV Unit

Figure 2-6 AC-DC CONV Unit

(NWA-091121)
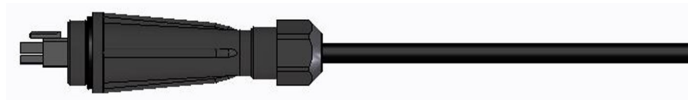
2.4.3 Power Injector

2.4.3.1 DC PSE Unit

> **NOTE:** *DC PSE Unit does not convert the voltage. That is, the power voltage of the power source will be applied as it is to iPASOLINK EX/A. When connecting the DC PSE Unit, ensure to sue the power source that can supply the stable power.*

Figure 2-7 DC PSE Unit

(NWA-A00087)

2.4.4 Power Cable (SELV)

Figure 2-8 Power Cable (SELV; Double-Insulated)

2.4.5 LAN Cable (Electric)

Figure 2-9 LAN Cable (Electric; Double-Shielded, with Waterproofing Cap)

2.4.6 LAN Cable (Optic)

Figure 2-10 LAN Cable (Optic) with Waterproofing Cap
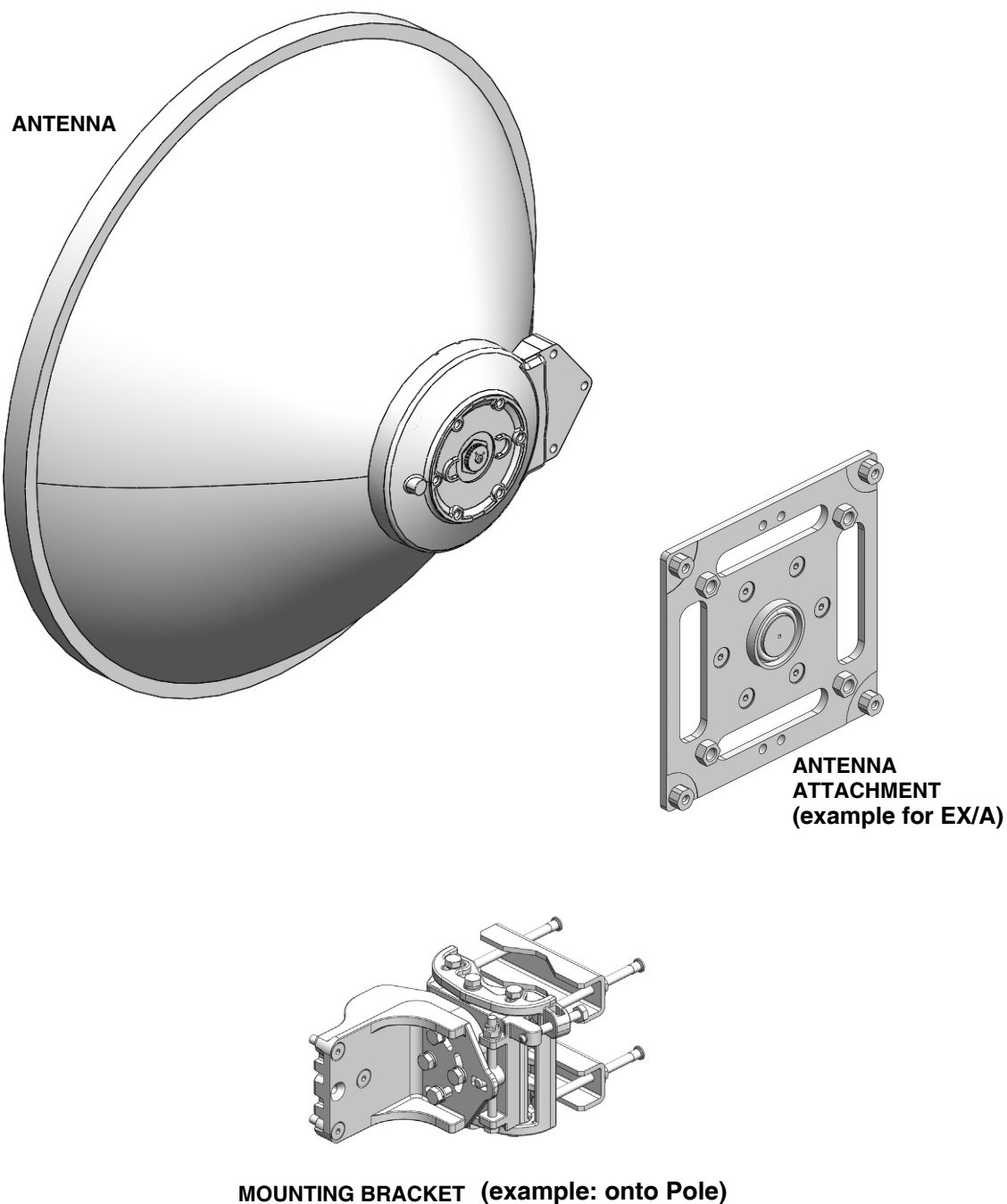
2.4.7 Grounding Cable

Figure 2-11 Grounding Cable

2.4.8 Antenna and its Mounting Brackets

NOTE: *EX/A Dual has OMT inside the equipment. External OMT cannot be applied to this equipment.*

Figure 2-12 Antenna with its Mounting Brackets

ANTENNA

ANTENNA ATTACHMENT (example for EX/A)

MOUNTING BRACKET (example: onto Pole)

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3. UNPACK iPASOLINK EX/A

Followings show the procedures of unpacking iPASOLINK EX/A.

> **NOTE:** *Please keep the packing materials. In case that the equipment needs to be transported, use the original packing materials to prevent the equipment from damages.*
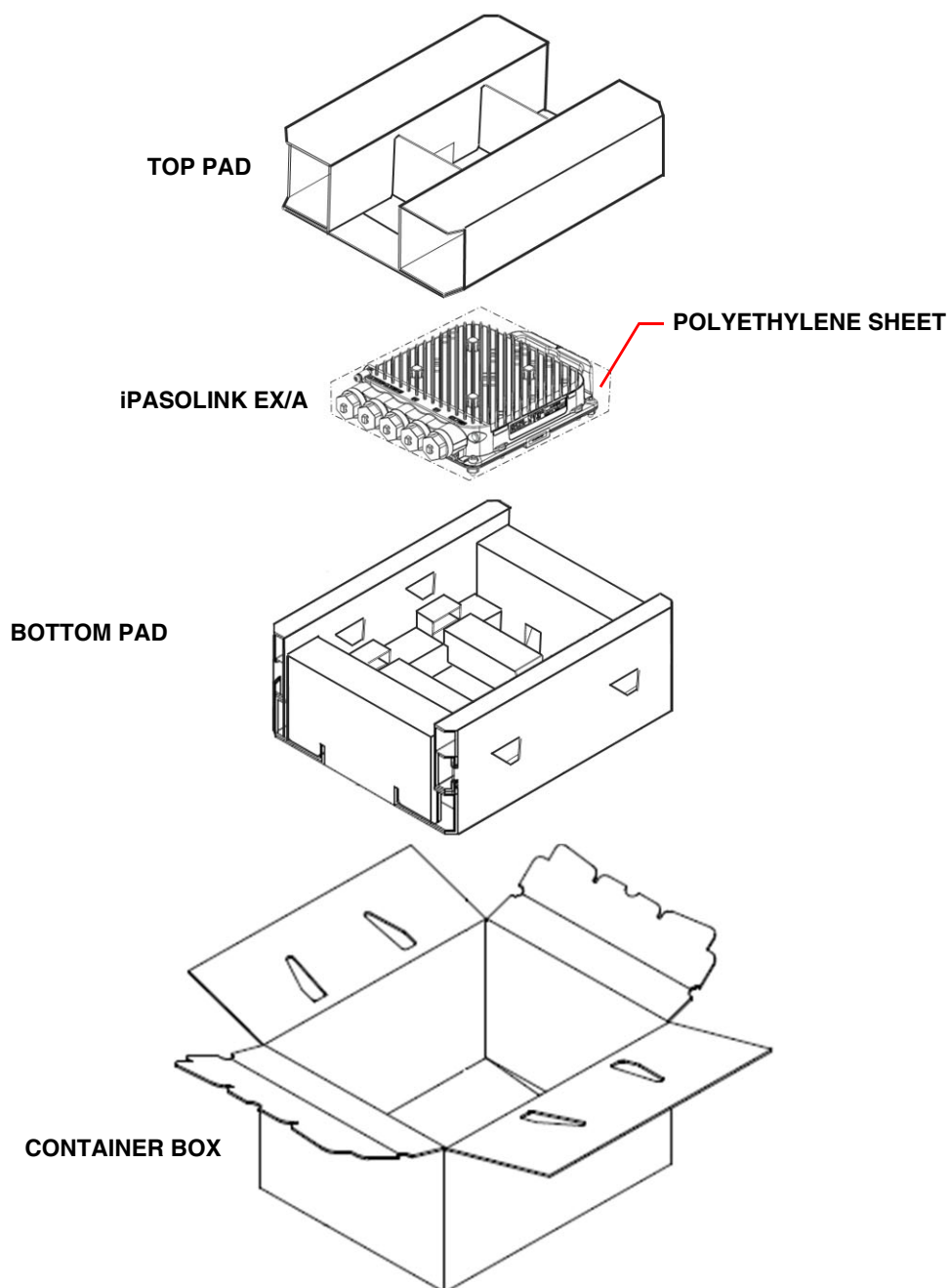
1. Unpack the container box by opening its top cover:

Figure 3-1 iPASOLINK EX/A Container Box

CAUTION MARK
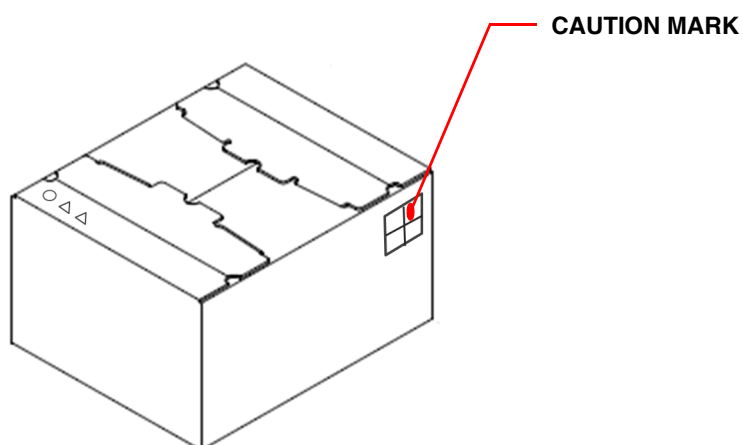
2. Unbox the contents. The contents are boxed as shown below:

Figure 3-2 Packing Structure

TOP PAD

POLYETHYLENE SHEET

iPASOLINK EX/A

BOTTOM PAD

CONTAINER BOX

3. Remove the polyethylene sheet from iPASOLINK EX/A.

4. Confirm whether there are not damages in the appearance at iPASOLINK EX/A.

4. MOUNT iPASOLINK EX/A

This section provides the installation procedures to mount iPASOLINK EX/A and its Antenna onto a Pole. For the detailed descriptions for the Antenna Installation, see the instruction manual attached to the Antenna.

Tools required for the installation are listed below.

Table 4-1 Tools

TOOLS
Wrench or Monkey Wrench
Screwdriver
Torque Wrench

4.1 For Placing Equipment

■ **NOTICE**

1. iPASOLINK EX/A (equipment) generates non-ionizing radiation. Installing the equipment indoors may affect, which needs to take the adequate measures, if occurs.

2. The equipment should be installed in the appropriate site. Do not install it on a slant or unstable spot. Improper installation raise the temperature inside the equipment, which may damage the equipment.

3. iPASOLINK EX/A should be installed as follows.

   ◆ *Accessing to the equipment is only by the SERVICE PERSONNEL or by users who are WELL TRAINED WITH ENOUGH SKILLS AND KNOWLEDGES regarding these restrictions, precautions and installation sites.*

   ◆ *Accessing should be protected using a tool, locks, keys, and/or other means of security, which should be managed by the authority who is responsible for the installed site.*

   ◆ *The other end of the Grounding terminal should be connected to the station earth point. For details, refer to **6. GROUND iPASOLINK EX/A** section.*

Following show the procedures of direct-mounting antenna. Depending on configuring system, the mounting procedures differ.

4.2 Mount iPASOLINK EX/A for 1+0 System

## 4.2.1 Set Antenna Brackets to Pole

Antenna Bracket's position to the pole differ depending on the use of the equipment.

NOTE: iPASOLINK EX/A should be mounted as pointing its one of two Polarization. The opposite-site iPASOLINK to which this iPASOLINK is to be facing should point the same Polarization Label.

4.2.1.1   Polarization: Vertical

V mark is found on the grip. Place this **V** mark on top. For the Vertical Polarization, either side to the pole is available to be mounted (no restrictions):

Figure 4-1 V-Polarization and Position to Install

(mounted on the left to the pole)   *(mounted on the right to the pole)*
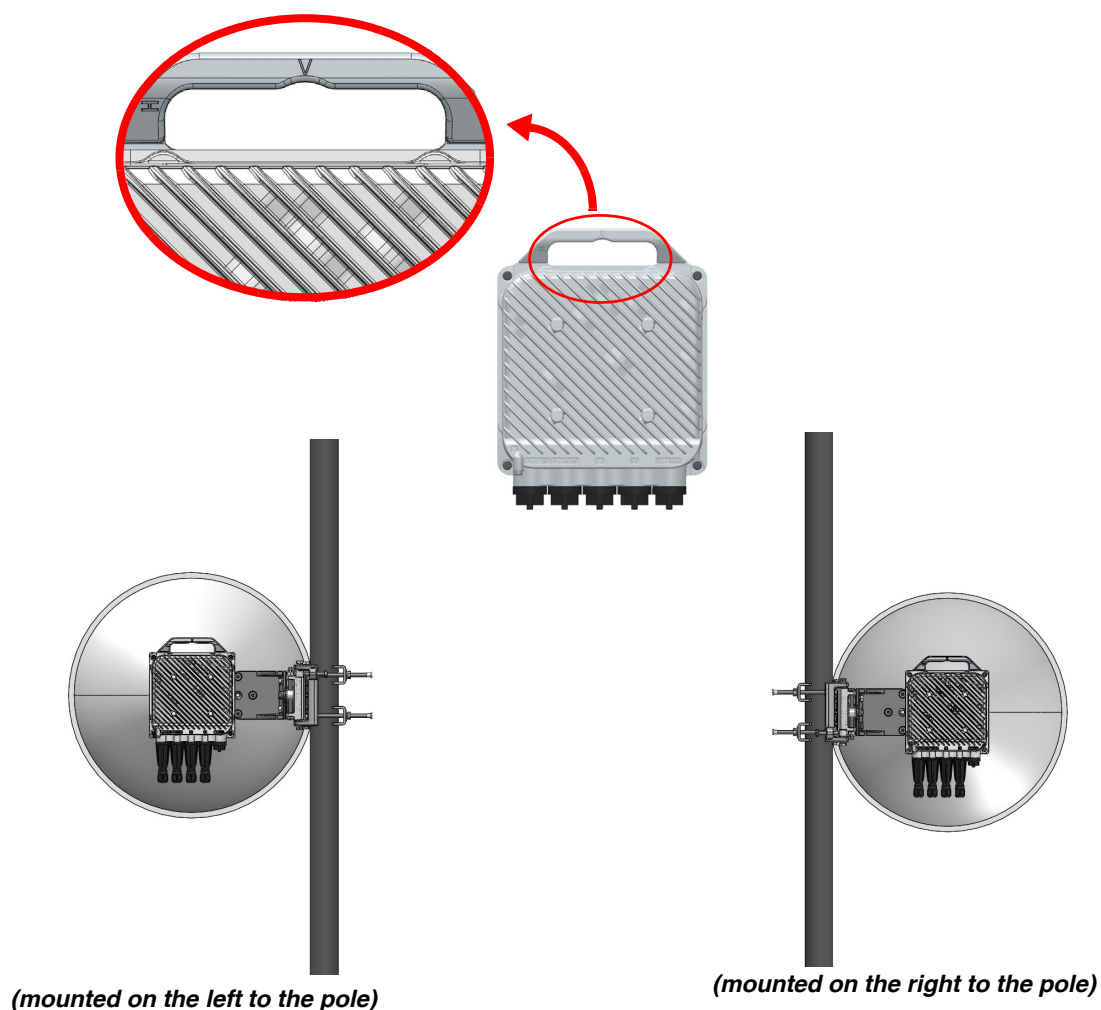
4.2.1.2   Polarization: Horizontal

H mark is found on the bottom left of the grip. To mount the equipment on left to the pole, place the equipment showing its **H** mark on top. To mount the equipment on right to the pole, place the equipment showing its **H** mark on bottom:

**Figure 4-2 H-Polarization and Position to Install**

(to mount the equipment on left to the pole)

(to mount the equipment on right to the pole)
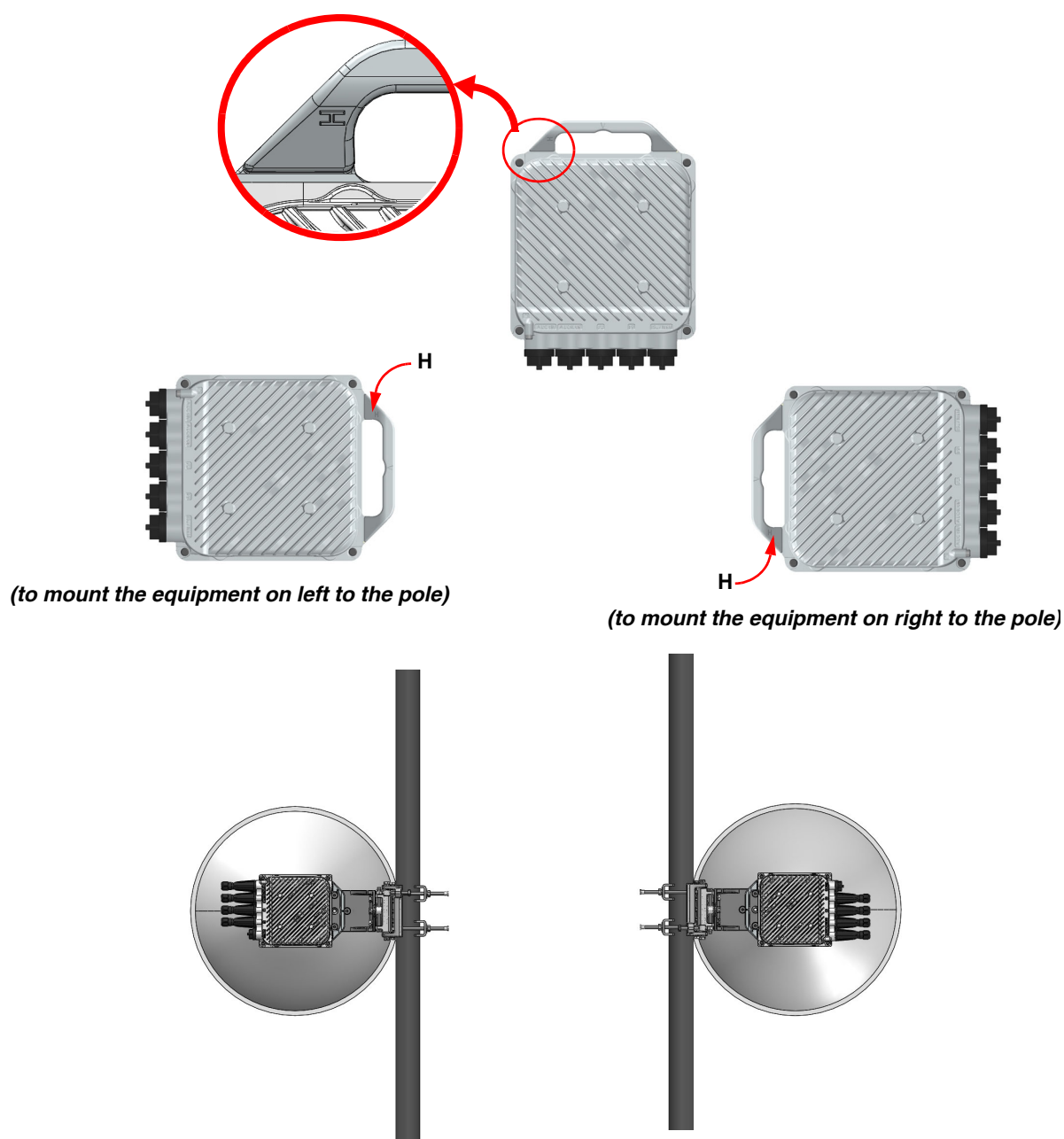
4.2.2 Secure iPASOLINK EX/A to Antenna Attachment

1. Using four M6 Screws, secure the iPASOLINK EX/A to the Antenna Attachment:

> **NOTE:** *Tightening torque is 4.0 N•m ±10%*

Figure 4-3 Mount iPASOLINK EX/A (example: H Mark is on Top)

POLE
(Φ50 ～ 115 mm; Φ 2.0 ～ 4.5 inches)
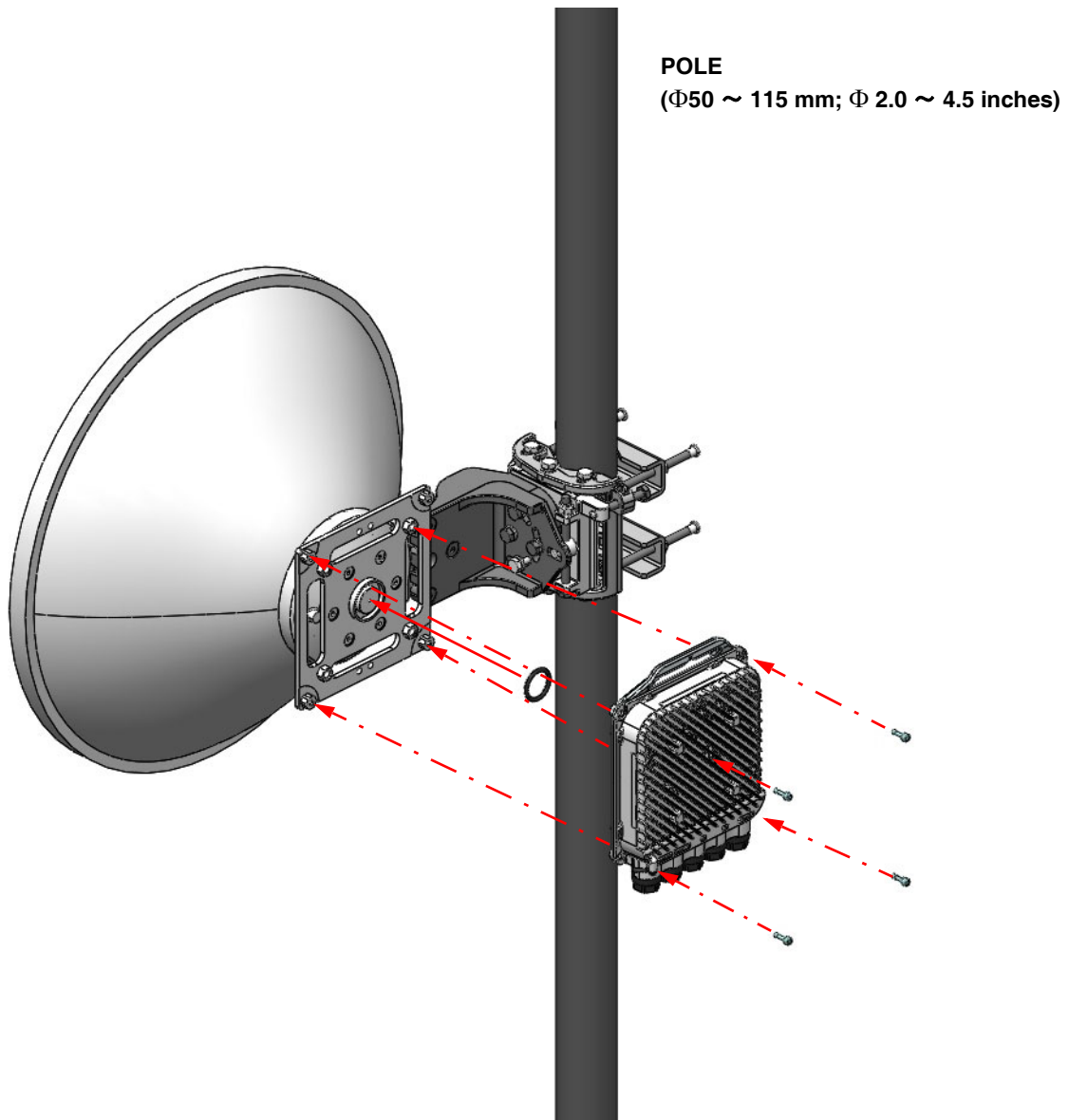
This step ends the procedure.

# 4.3 Mount iPASOLINK EX/A Dual for 1+0 / 2+0 / 1+0 XPIC System

4.3.1 Set Antenna Brackets to Pole

Antenna Bracket's position to the pole differ depending on the use of the equipment.

Install the EX/A Dual equipment vertical like Figure 4-4. This equipment cannot be used in such an orientation that the FIN is horizontal. When using V-polarization, set to use MODEM Slot 1 in the equipment configuration of LCT menu. When using H-polarization, set to use MODEM Slot 2 in the equipment configuration of LCT menu.

Refer to **Set Network and System Provisioning** manual for equipment configuration detail.

Figure 4-4 Position to install

(mounted on the left to the pole)   *(mounted on the right to the pole)*
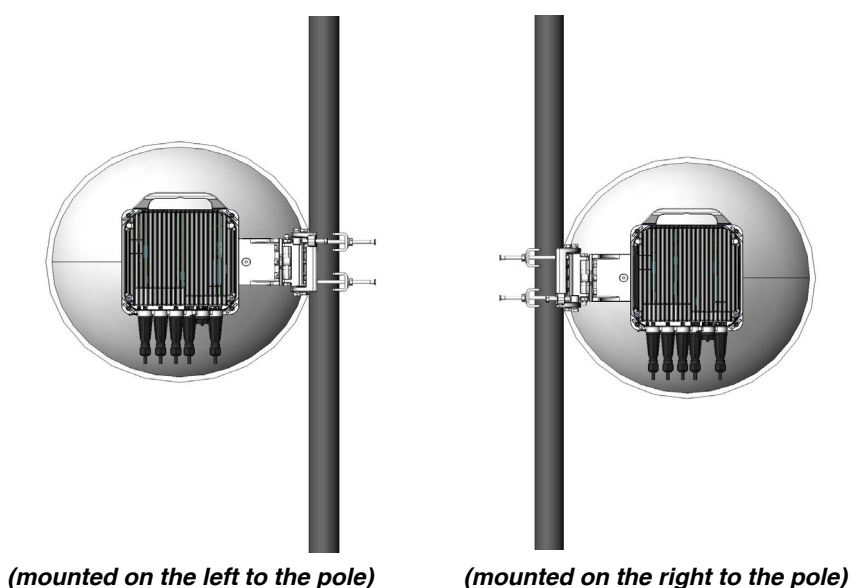
4.3.2 Secure iPASOLINK EX/A Dual to Antenna Attachment

1. Using four M6 Screws, secure the iPASOLINK EX/A to the Antenna Attachment:

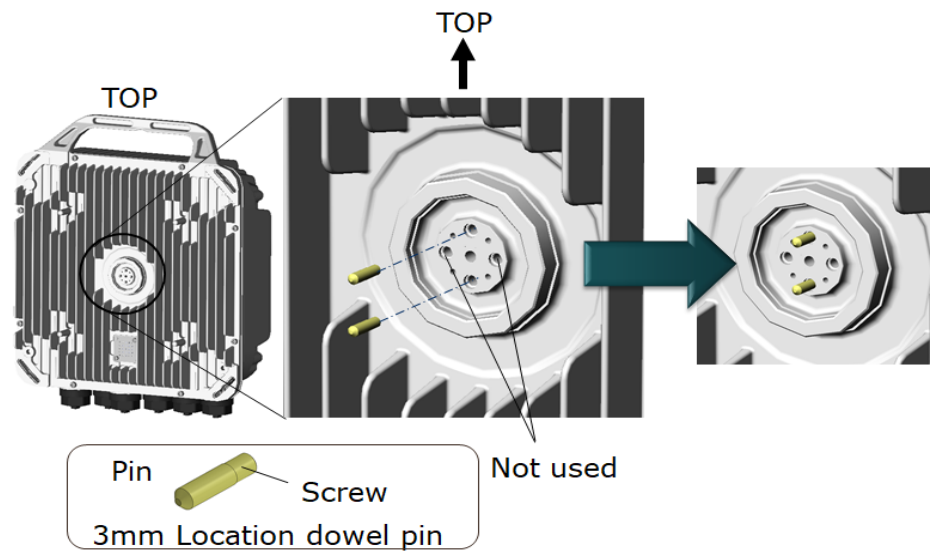NOTE: *Tightening torque is 4.0 N•m ±10%*

Figure 4-5 Mount iPASOLINK EX/A Dual

POLE
(Φ50 ∼ 115 mm; Φ 2.0 ∼ 4.5 inches)
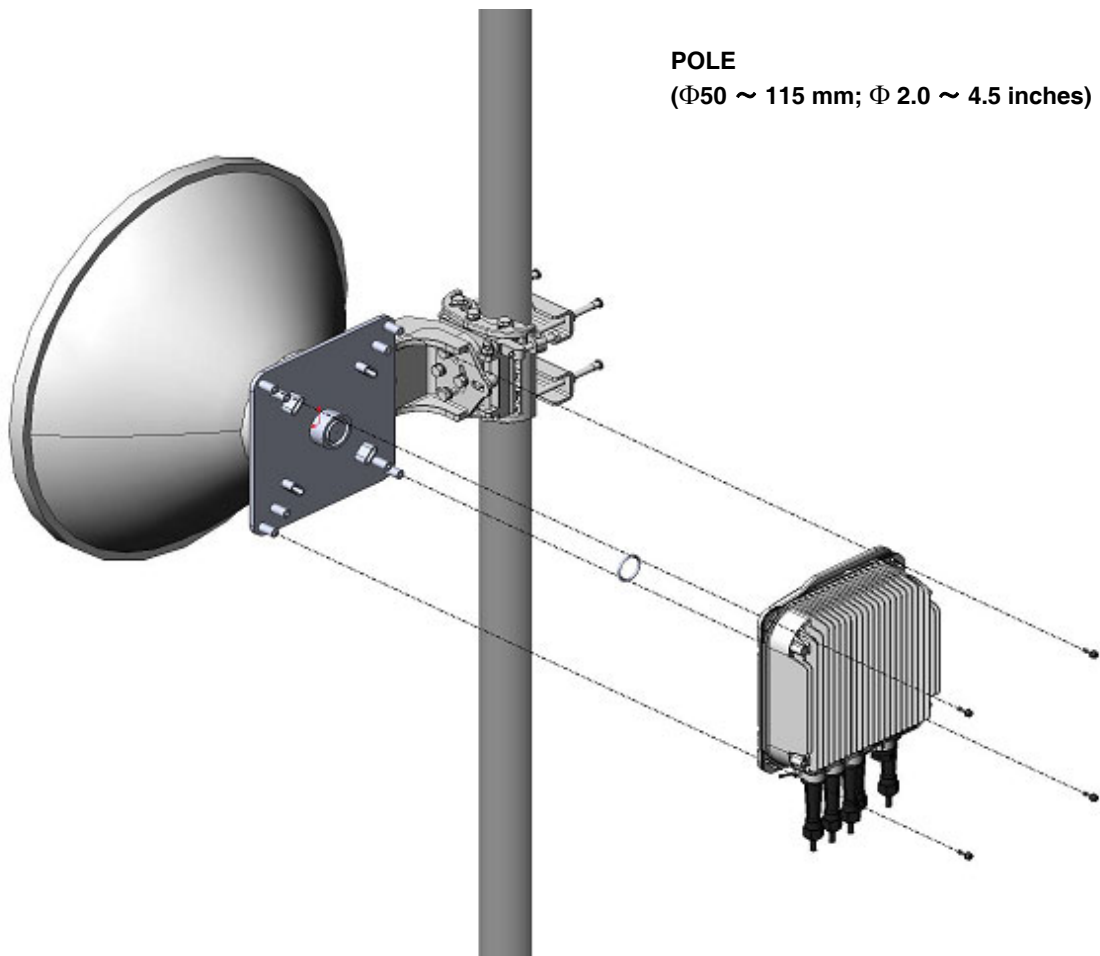
NOTE: *If location pins are required for the antenna attachment, install them as follows*

Figure 4-6 iPASOLINK EX/A Dual Location Pins

This step ends the procedure.

4.4 Mount SFP Module

ATTENTION!!

It is recommended to use the designated SFPs supplied by NEC for use in iPASOLINK EX/A. NEC does not guarantee the performances of iPASOLINK EX/A if other vendors' SFP modules are installed.
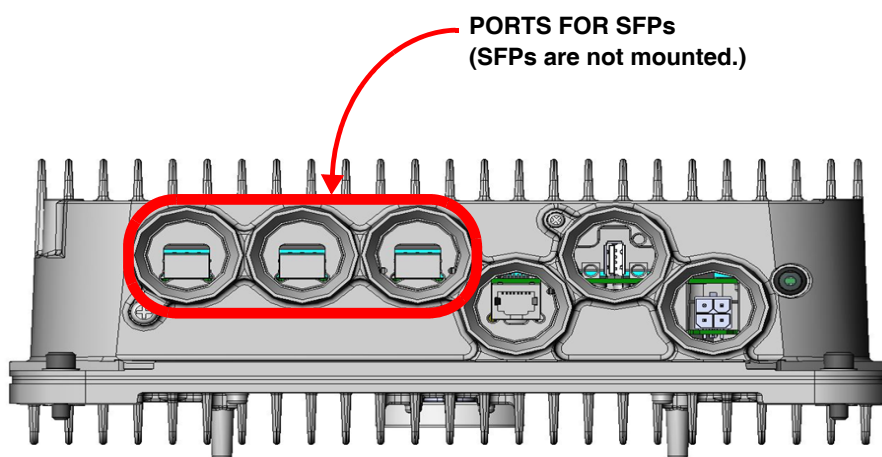
Figure 4-7 SFP Module Ports iPASOLINK EX/A

**PORTS FOR SFPs
(SFPs are mounted.)**
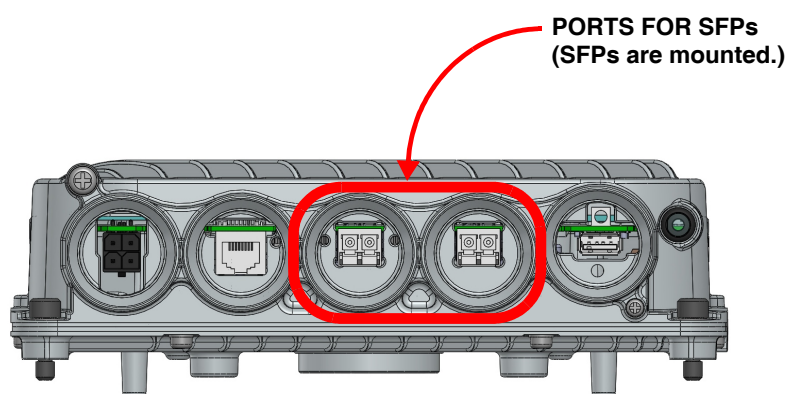
Figure 4-8 SFP Module Ports iPASOLINK EX/A Dual

**PORTS FOR SFPs
(SFPs are not mounted.)**

The Small Form-Pluggable (SFP) is a compact and hot-pluggable transceiver designated to support 10 Gigabit Ethernet (10GbE) and/or 1 Gigabit Ethernet (GbE) in the iPASOLINK EX/A. The SFP on iPASOLINK EX/A offers the followings:

1) Single Module Fiber (SMF): This SFP complies with 10GBASE-LR Ethernet, 25GBASE-LR Ethernet and 1000BASE-LX Ethernet. The SFP operates with the 1310 nm laser transmitter and has a duplex LC connector.

2) Multi Mode Fiber (MMF): This SFP complies with 10GBASE-SR, 25GBASE-SR and 1000BASE-SX Ethernet interfaces. The SFP operates with the 850 nm laser transmitter and has a duplex LC connector.

The SFP Modules also accept LC Fiber Connectors with polished connector (LC-PC) or ultra polished connector (LC-UPC).

iPASOLINK EX/A Dual supports 25 Gigabit Ethernet (25GbE) additionally.

4.5 Mount PSE Unit

See the instruction manual attached to the PSE Unit for steps to mount the PSE Unit.

Followings show an example of PSE and cables:

Figure 4-9 Mount PSE Unit on Pole
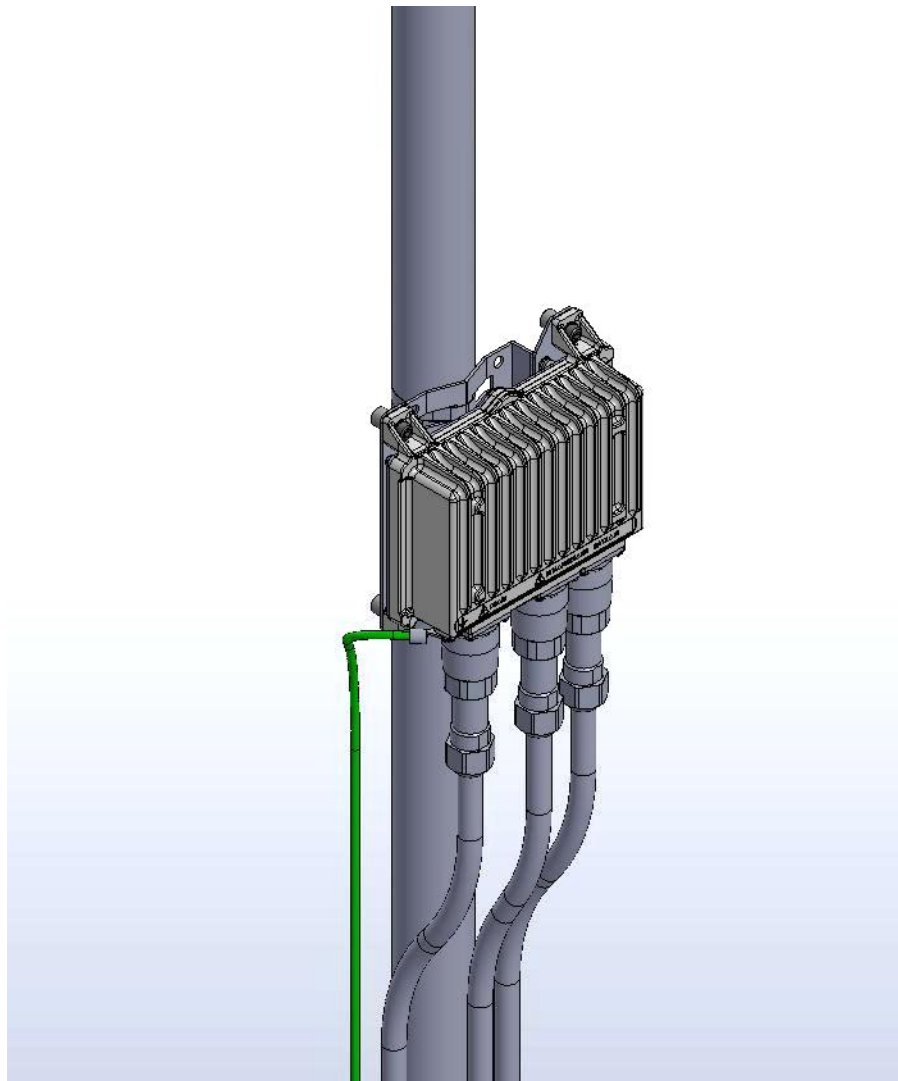
5. CONNECT CABLES

5.1 Overview

This section provides the descriptions for connecting Traffic Cables and Power Cable. This section also provides the assembly procedures of the Grounding Cable and Power cable for the purpose of preparing them on site, if needed.

Followings show the summary of the cable installation:

1. Connect the Grounding Cable to Grounding Terminal on iPASOLINK EX/A. (See *6. GROUND iPASOLINK EX/A* for detailed descriptions and steps.)

    > *NOTE:* *Tightening torque is 2.7 ±0.3 N•m*

2. Connect the Power Cable.

    > *NOTE:* *This step is not required when using a PoE. Refer to* *Step 3.*

3. Connect a LAN Cable to **DCN (PoE)** Port.

    > *NOTE:* *To use this port as the PoE, confirm that the power injector to be connected is powered off. If it is powered on, connecting the LAN cable to* ***DCN (PoE)*** *port immediately turns on the iPASOLINK EX/A.*

    (1) Connect a LAN Cable to **DCN (PoE)** Port on iPASOLINK EX/A.

    (2) Connect the other end of LAN Cable:

     ◆ To use this port as PoE, connect it to the power injector.

     ◆ To operate **WebLCT**, connect it to your PC (web browser should be installed).

4. Connect LAN Cables to **P2**,**P3** and **P4** Ports, as necessary.

5.2 Connecting Terminals

iPASOLINK EX/A has following terminals. Depending on its placing angle, these terminals may be shown on bottom left.

5.2.1 iPASOLINK EX/A (1+0 System)
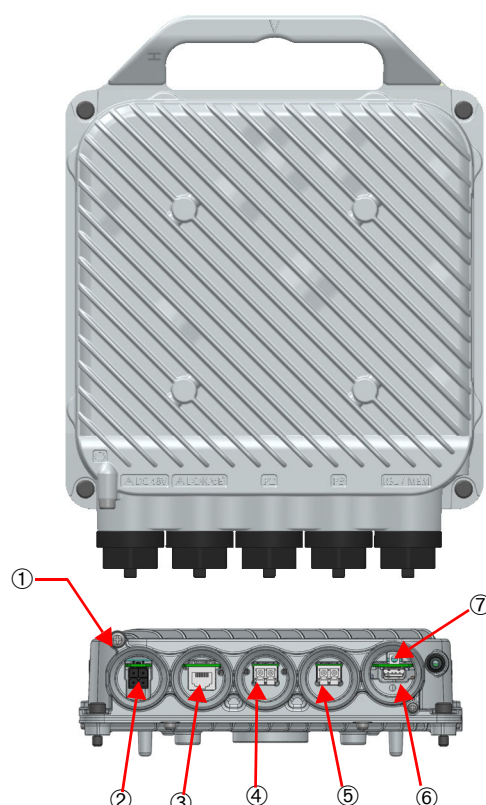
Figure 5-1 Terminals on iPASOLINK EX/A

Table 5-1 Terminals on iPASOLINK EX/A

No.	INDICATION	PURPOSE
①	⏚	Grounding Terminal (dia. 5 mm)
②	**DC –48V**	Power Supply (SELV)
③	**DCN (PoE)**	GbE; Power Supply by PoE (RJ-45); WebLCT / NMS Connecting Port or User Port
④	**P2**	SFP (GbE) / SFP+ (10GbE) Port
⑤	**P3**	SFP (GbE) / SFP+ (10GbE) Port
⑥	**MEM**	USB Memory Interface
⑦	**RSL**	Monitoring Port for RSL (Received Signal Level)

5.2.2 iPASOLINK EX/A Dual (1+0 / 2+0 / 1+0 XPIC System)

Figure 5-2 Terminals on iPASOLINK EX/A Dual
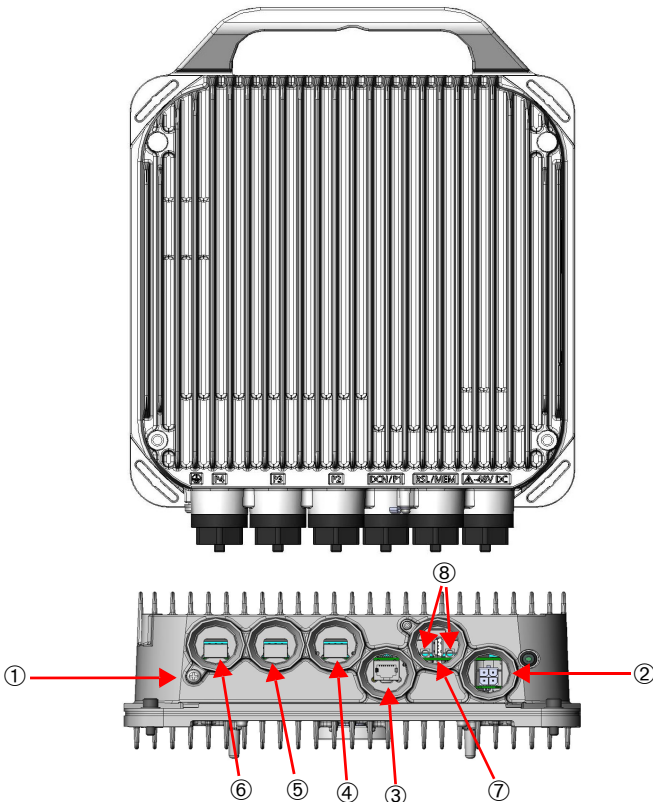
Table 5-2 Terminals on iPASOLINK EX/A Dual

No.	INDICATION	PURPOSE
①	⏚	Grounding Terminal (dia. 5 mm)
②	DC –48V	Power Supply (SELV)
③	DCN/P1	GbE; WebLCT or NMS Connecting Port
④	P2	SFP (GbE) / SFP+ (10GbE) Port
⑤	P3	SFP (GbE) / SFP+ (10GbE) Port
⑥	P4	SFP (GbE) / SFP+ (10GbE) / SFP28 (25GbE) Port
⑦	MEM	USB Memory Interface
⑧	RSL	Monitoring Port for RSL (Received Signal Level)

5.3 Grounding Cable

Followings show the location of Grounding terminal.

Figure 5-3 Connect Grounding Cable

example: mounted for V Polarization

GROUNDING TERMINAL (M5)

example: mounted for V Polarization
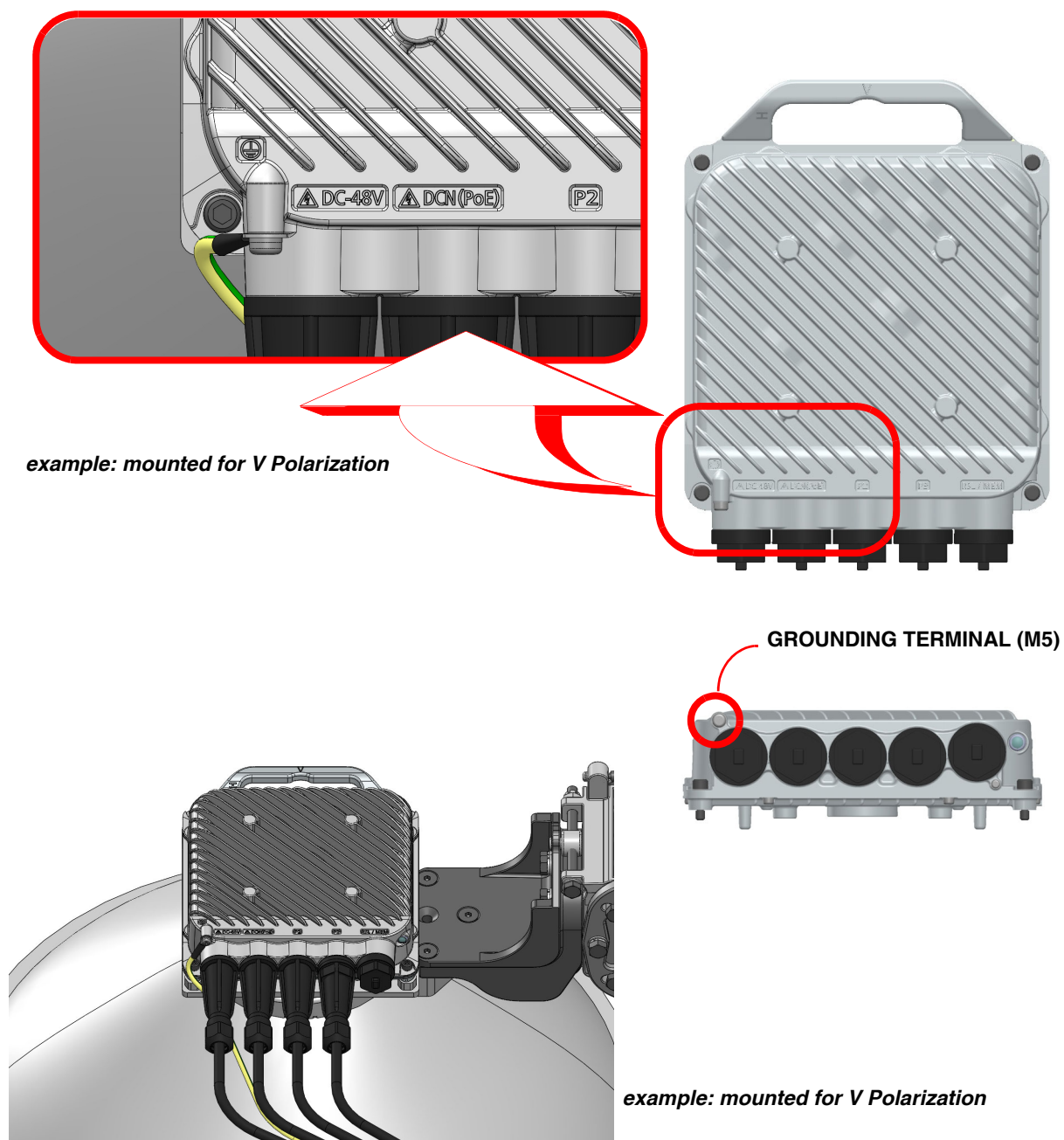
Detailed descriptions and routing procedures are provided in the Section *5.6 Routing Cables*.

5.4 Power Cable

Power Cable to connect with iPASOLINK EX/A requires the waterproof process on its connection point. The braided metal shield including power cable is connected to grounding point at bottom of tower or cabinet. Followings show the connecting procedure of Power Cable and waterproof cover:

■ **Reference**

Figure 5-4 Power Cable with Waterproofing Cover
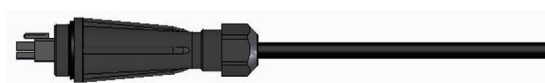
1. Open the Power Port (SELV):

   (1) Turn the waterproofing cap counter-clockwise, and open it.

Figure 5-5 Remove Waterproofing Cap on Power Port
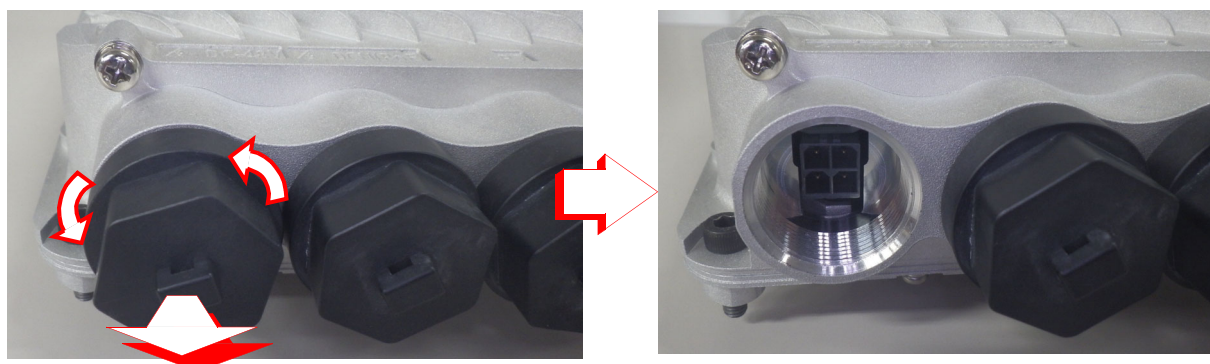
   (2) The removed cap should be stored properly.

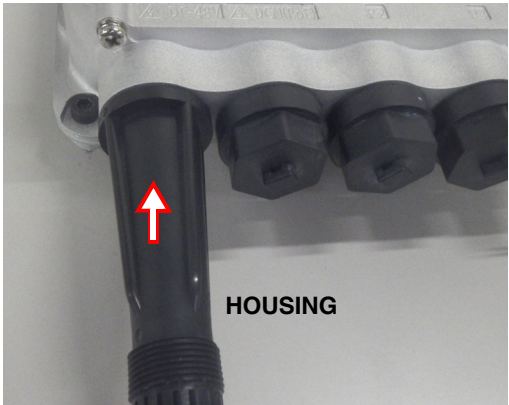2. Connect the Power Cable (SELV):

   (1) Insert the Power Cable's plug into the opened power port.
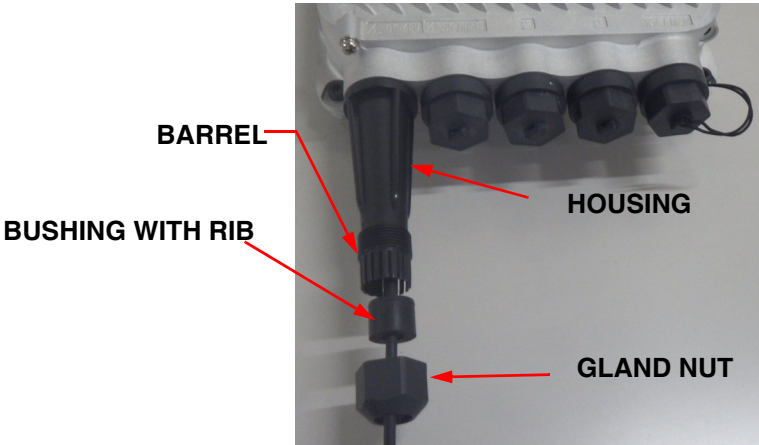
Figure 5-6 Connecting a Plug
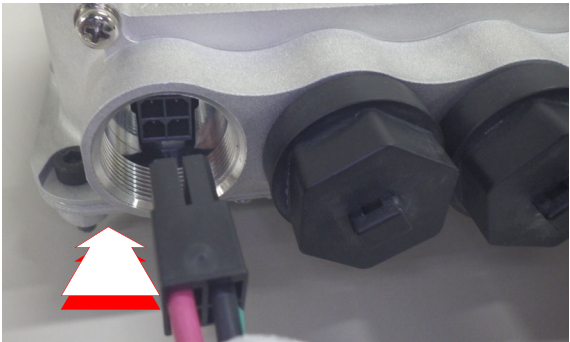
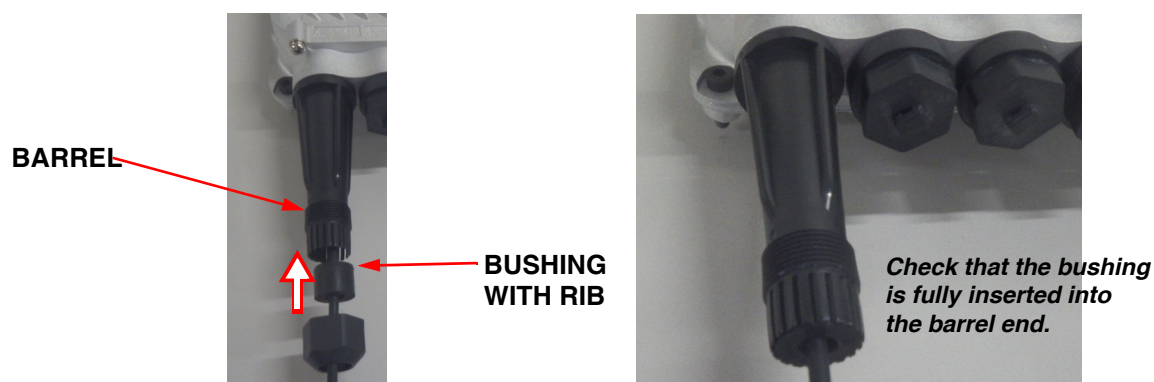(2) Place and set the housing:

Figure 5-7 Place Housing

HOUSING

no gap

gasket is seen
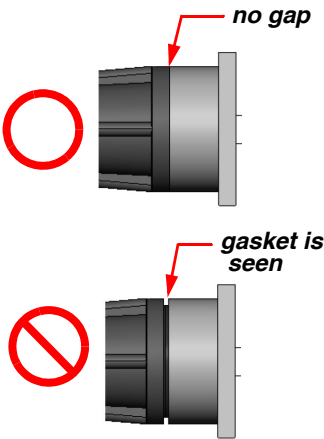
(3) Push the housing till the plug is fit at the end of the shell.

Figure 5-8 Place Plug Housing

BARREL

BUSHING WITH RIB

HOUSING

GLAND NUT

(4) Push the Bushing into the barrel.

Figure 5-9 Set Bushing into Barrel

BARREL

BUSHING
WITH RIB

*Check that the bushing
is fully inserted into
the barrel end.*

3. Secure the Gland Nut:

Figure 5-10 Secure Bland Nut
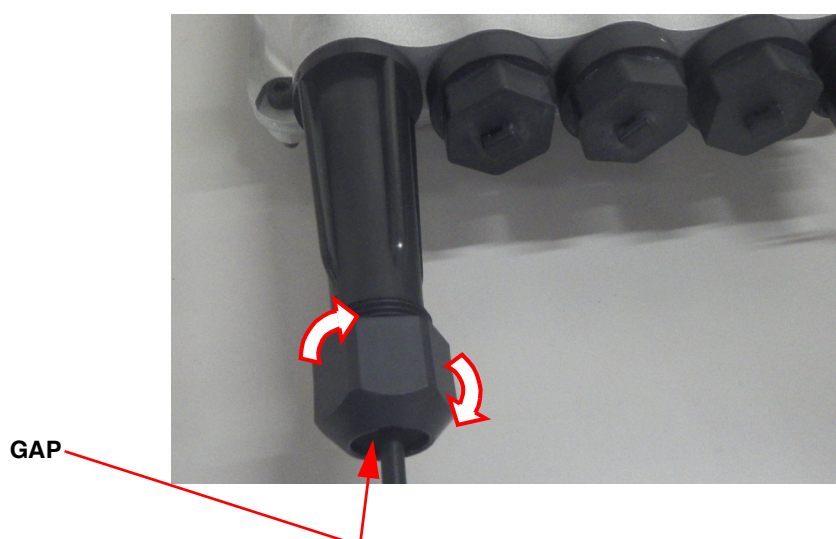
GAP

CAUTION: *In case using the thin cable, the Gland Nut may not stop if tightened by force.
Stop rotating the Gland Nut at the appropriate position so that the barrel end does
not stick out of the gap at the Gland Nut end.*

5.5 LAN Cables

5.5.1 DCN (PoE) Port (RJ-45)

A LAN Cable to connect with iPASOLINK EX/A requires the waterproof process on its connection point. Followings show the connecting procedure of the LAN Cable (Electric) and the waterproofing cover:

This equipment conforms to the international standards: IEC61000-4-5. To obtain the higher surge immunity, place an external surge protection device to the system at the position that is closer to EX/A.

◆ Recommended External Surge Protection Device

- Standard to Conform: IEC61643-21
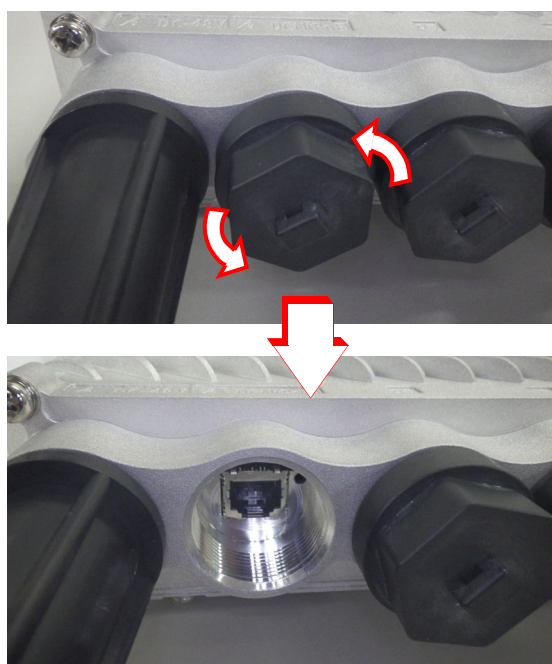- Specifications: ±10 kV, 5 kA, 8/20 µsec

■ Reference

Figure 5-11 LAN (Electric) Cable with Waterproofing Cover

1. Turn the waterproofing cap counter-clockwise, and open the port.
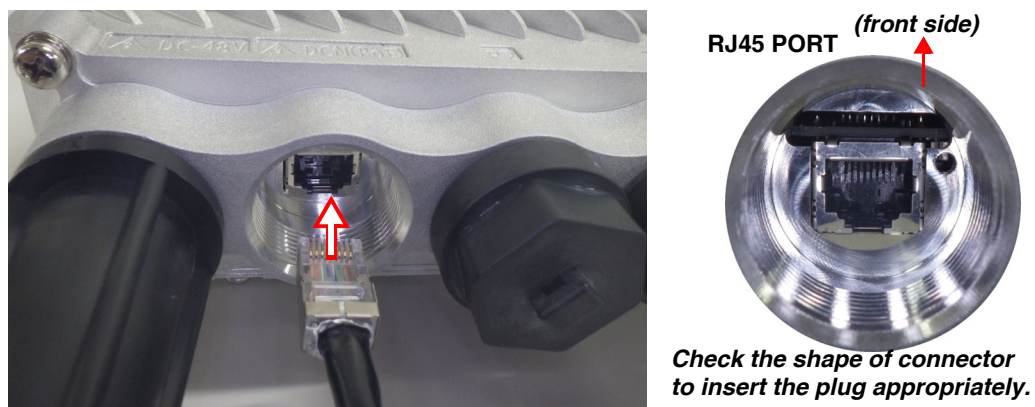
#### Figure 5-12 Remove Waterproofing Cap from DCN (PoE) Port

(bottom view)

2. Confirm the connector shape of the RJ45 Port, then insert the plug of LAN Cable with waterproofing cap.
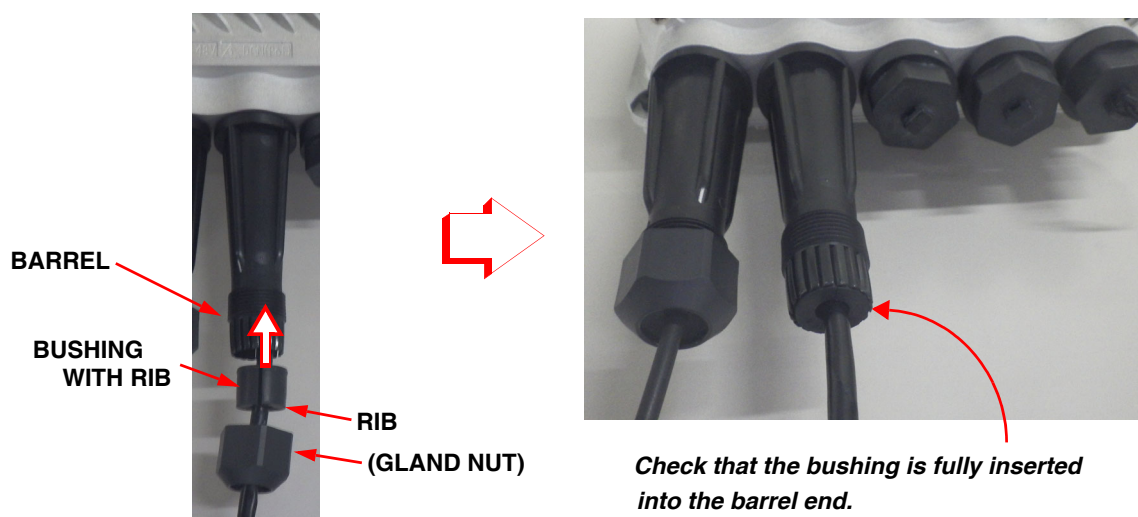
Figure 5-13 Connect LAN Cable

RJ45 PORT   *(front side)*

Check the shape of connector to insert the plug appropriately.

3. Place the housing over the RJ45 Connector, and turn it clockwise.

Figure 5-14 Turning the Housing

no gap

gasket is seen
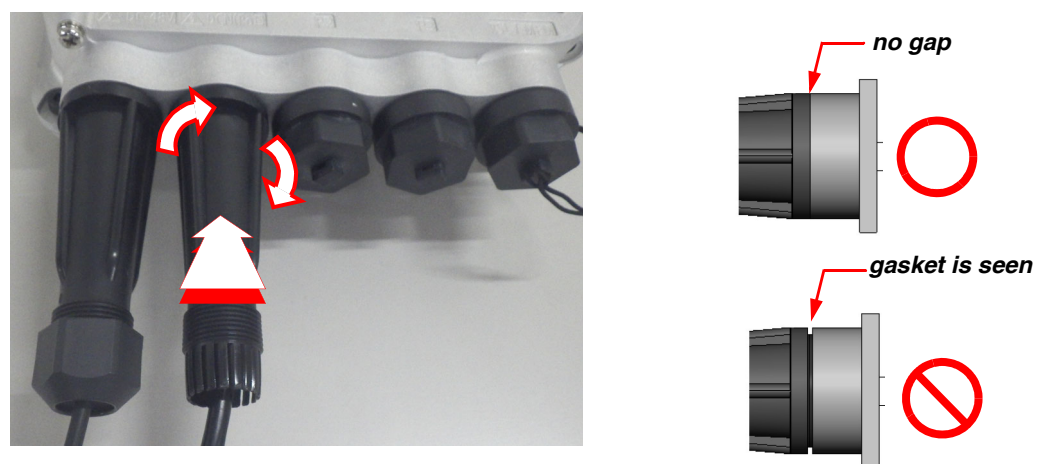
4. Push the Bushing fully into the barrel:

Figure 5-15 Set Bushing into Barrel

BARREL

BUSHING
WITH RIB

RIB

(GLAND NUT)

Check that the bushing is fully inserted into the barrel end.

5. Tighten the Gland Nut at the barrel end level, and secure them using the torque wrench.

Figure 5-16 Secure Gland Nut
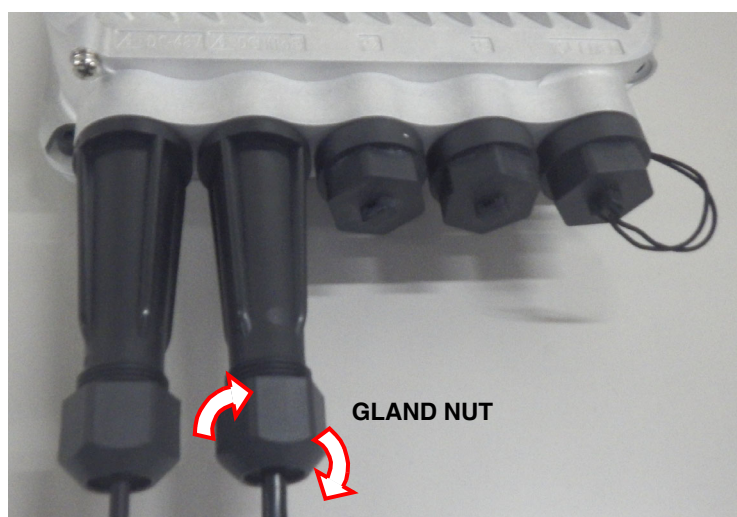
GLAND NUT

CAUTION: *In case using the thin cable, the Gland Nut may not stop if tightened by force. Stop rotating the Gland Nut at the appropriate position so that the barrel end does not stick out of the gap at the Gland Nut end.*

5.5.2 P2/P3/P4 Port (SFP/SFP+)

Each LAN cable to connect with iPASOLINK EX/A should wear a waterproofing cap. Followings show the connecting procedure of LAN Cable with SFP+ and waterproofing cap:
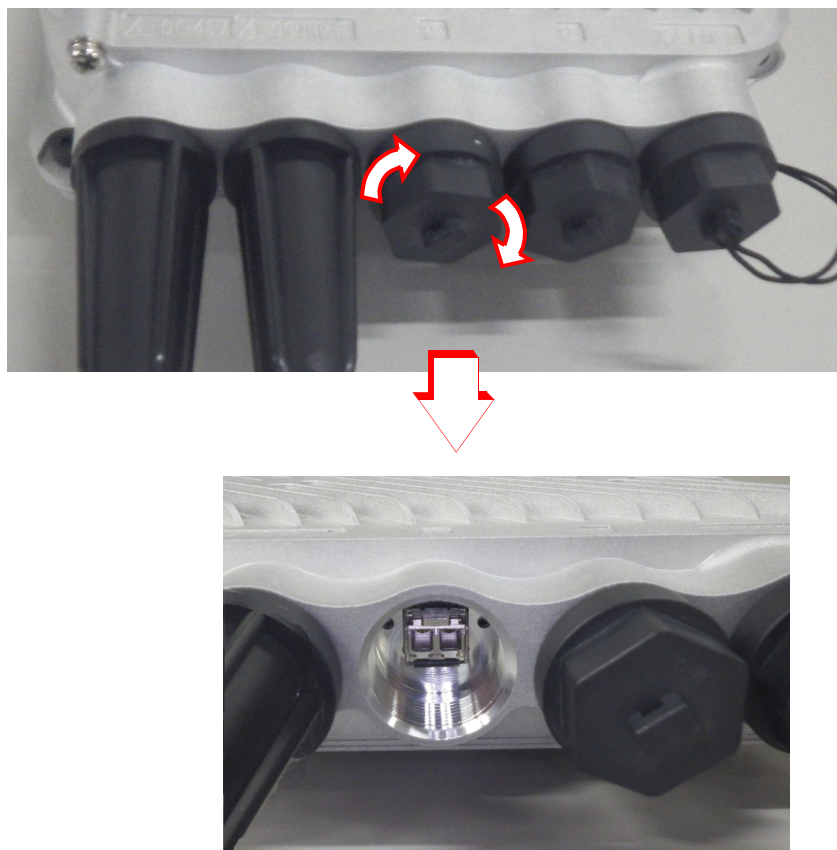
■ **Reference**

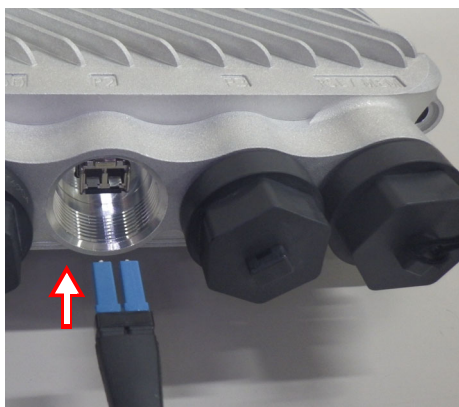**Figure 5-17 LAN (Optic) Cable with Waterproofing Cover**

1. Turn the waterproofing cap counter-clockwise, and open the port.
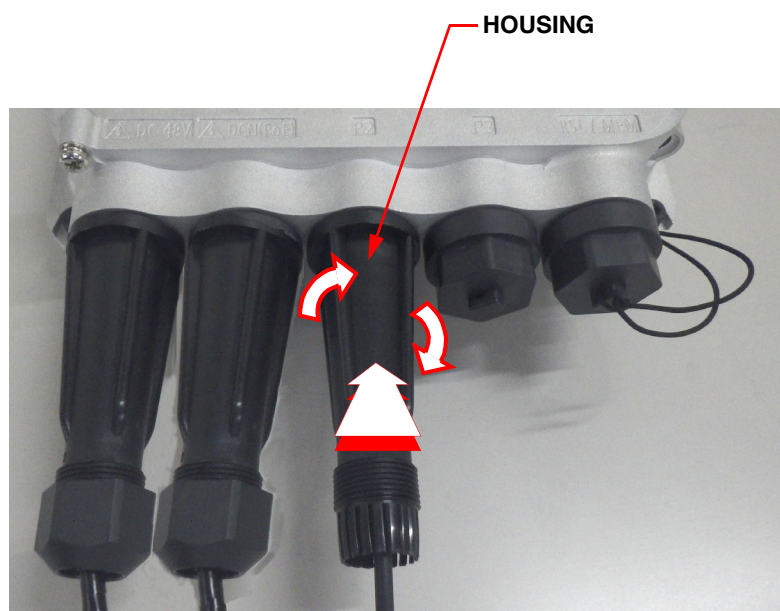
Figure 5-18 Remove Waterproofing Cap

2. Insert the LC Connectors into the SFP+ Port:
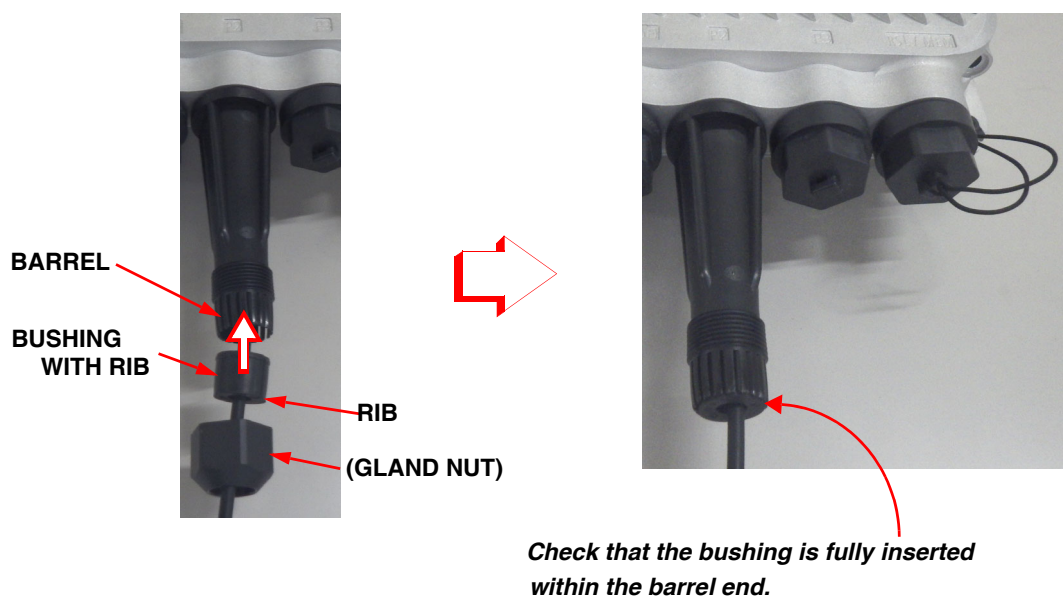
Figure 5-19 Connect LAN Cable

3. Place the housing over the LC Connectors, and turn it clockwise, then slide the waterproofing cap toward the port fully.

Figure 5-20 Turning the Housing

4. Turn the waterproofing cap clockwise to lock the cap.

Figure 5-21 Set Bushing into Barrel

BARREL

BUSHING
WITH RIB

RIB

(GLAND NUT)

Check that the bushing is fully inserted within the barrel end.

5. Tighten the Gland Nut at the barrel end level, and secure them using the torque wrench.

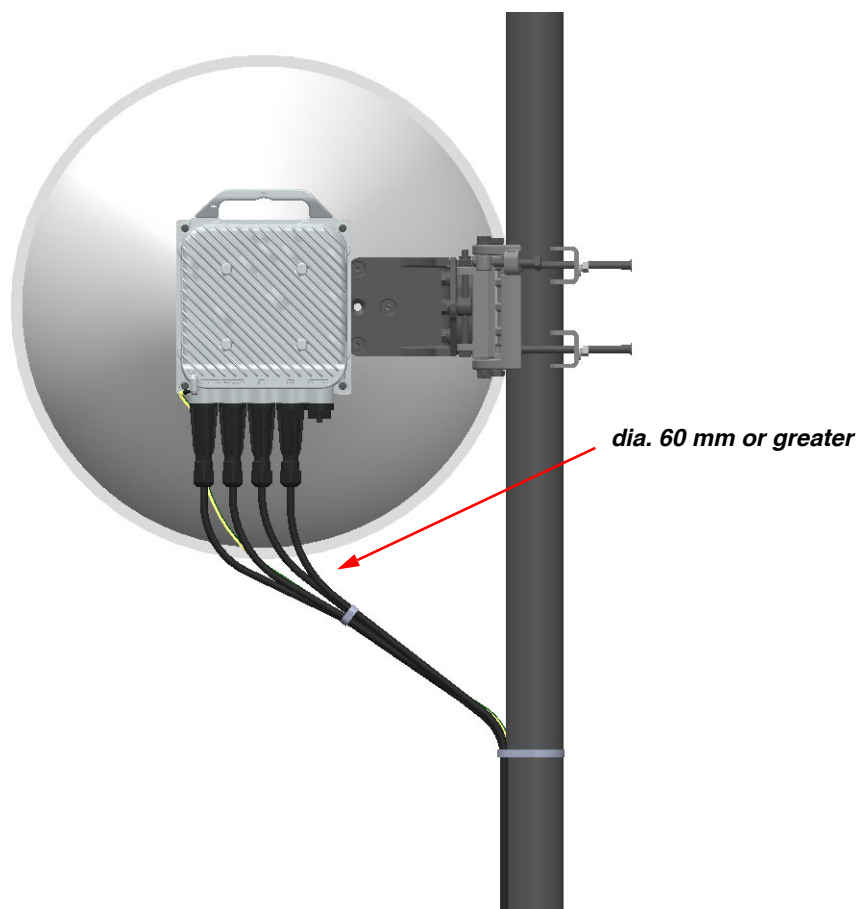**Figure 5-22 Secure Gland Nut**

This step ends the procedure.

■ **Refer to** *5.6 Routing Cables* **to end the Cable Connecting procedure.**

5.6 Routing Cables

5.6.1 Allowable Bending Radius of Cables

Allowable bending radius of cables is 60 mm in diameter or greater.

Figure 5-23 Allowable Bending Radius of Cables

dia. 60 mm or greater

5.6.2 Secure Cables (for 1+0 System)

Secure the cables as shown below:

1. Tie cables.

2. Then secure tied cables onto the pole.
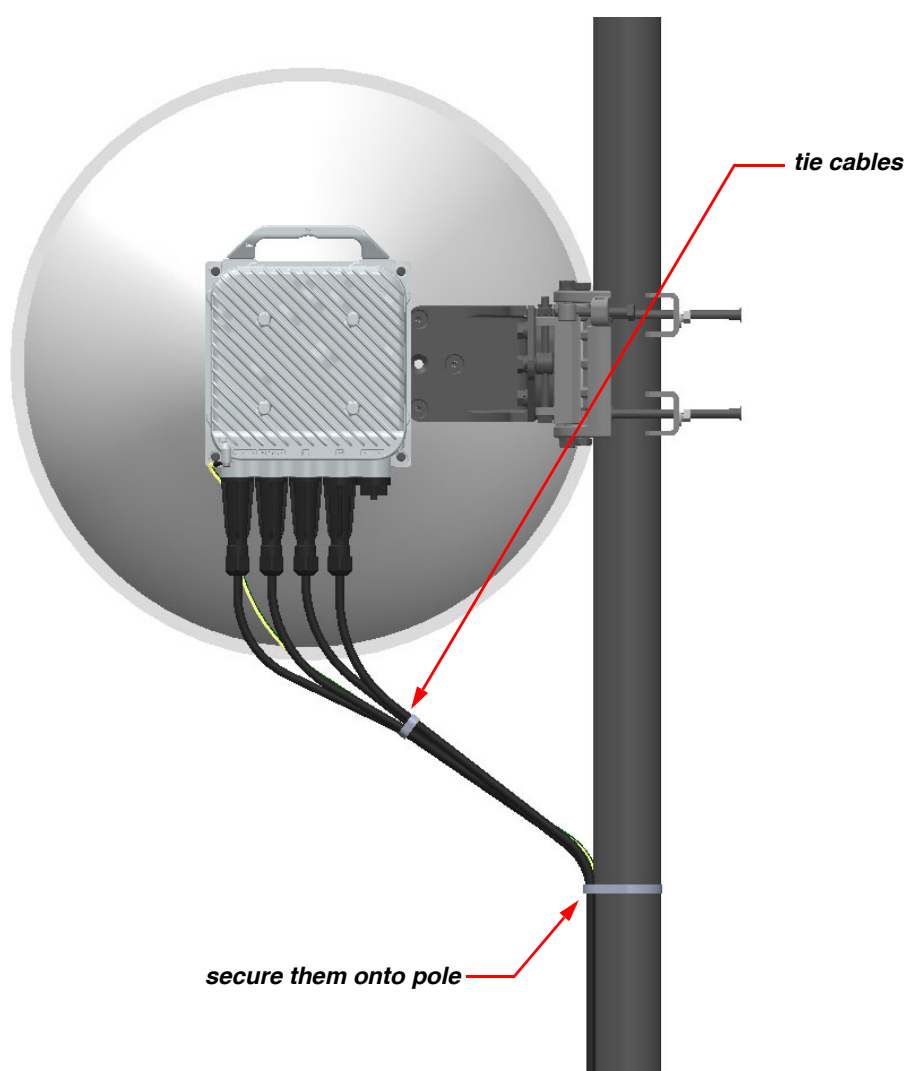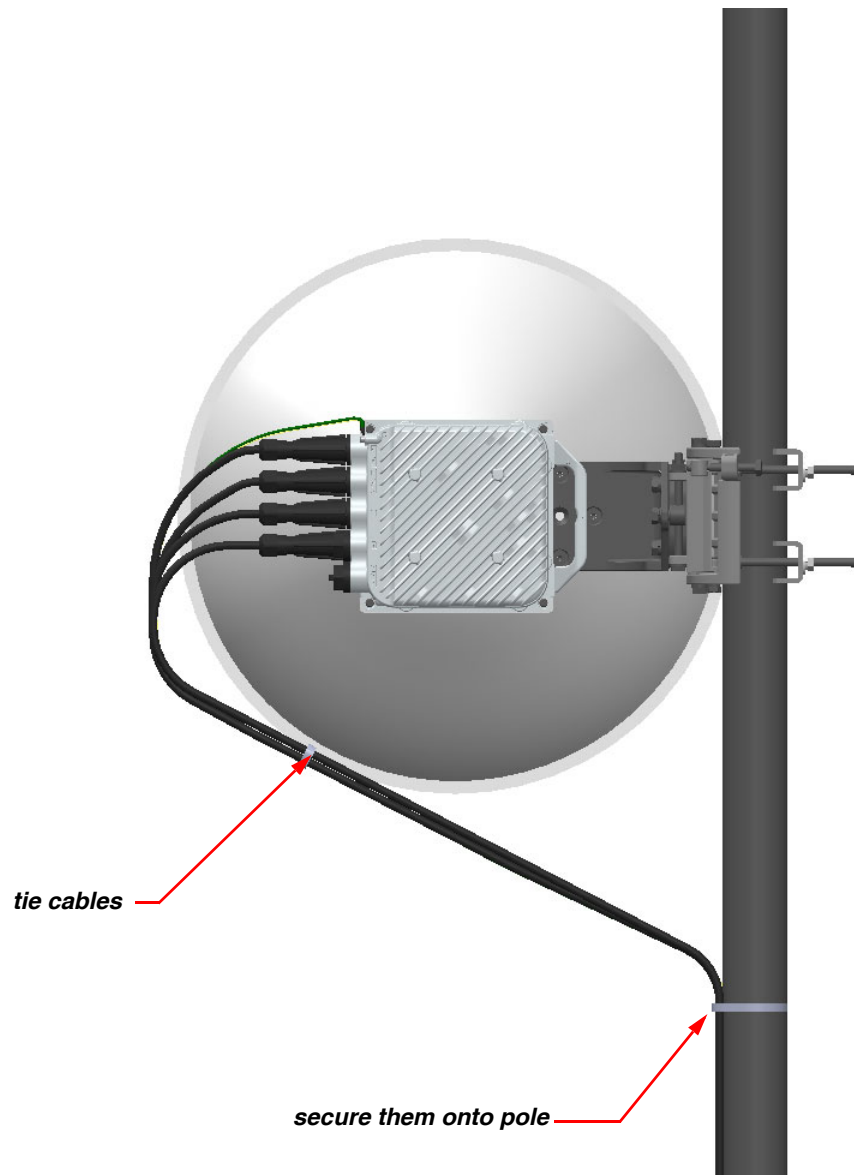
Figure 5-24 Secure Cables (1+0 System) — V-Polarization

Figure 5-25 Secure Cables (1+0 System) — H-Polarization

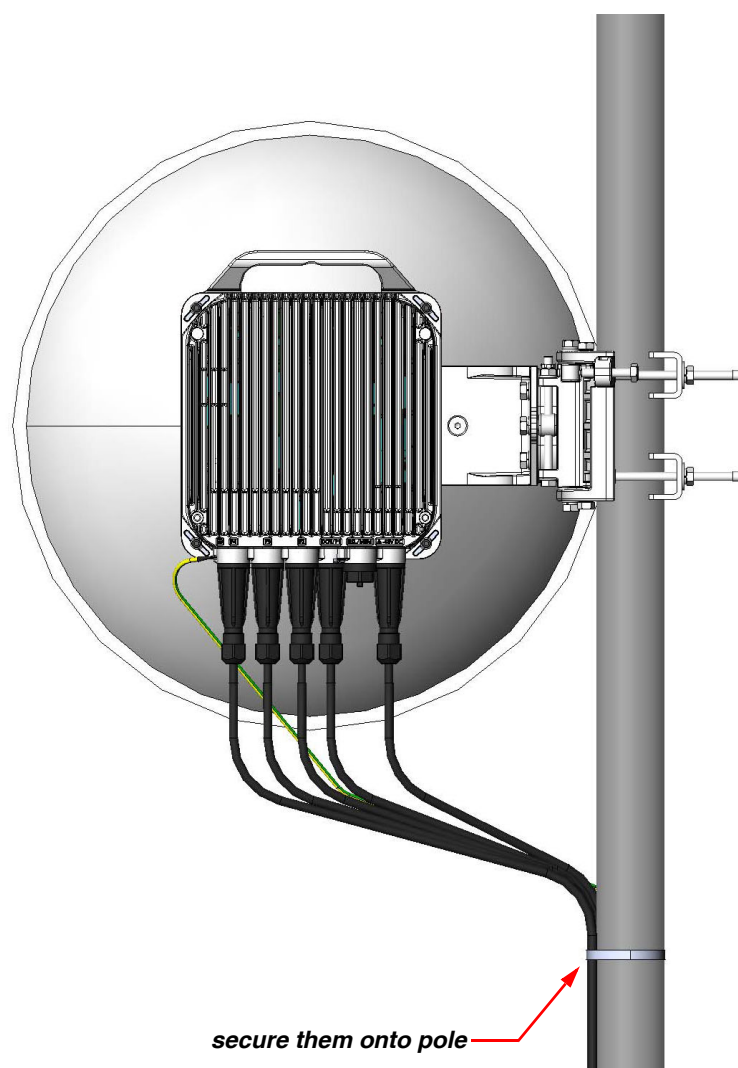*tie cables*

secure them onto pole

This step ends the procedure.

5.6.3 Secure Cables (EX/A Dual for 1+0 / 2+0 / 1+0 XPIC System)

Secure the cables as shown below:

Figure 5-26 Secure Cables (for 1+0 / 2+0 / 1+0 XPIC System)

secure them onto pole

5.7 Pin Assignment of Connectors

Followings show the pin assignment of connectors of iPASOLINK EX/A.

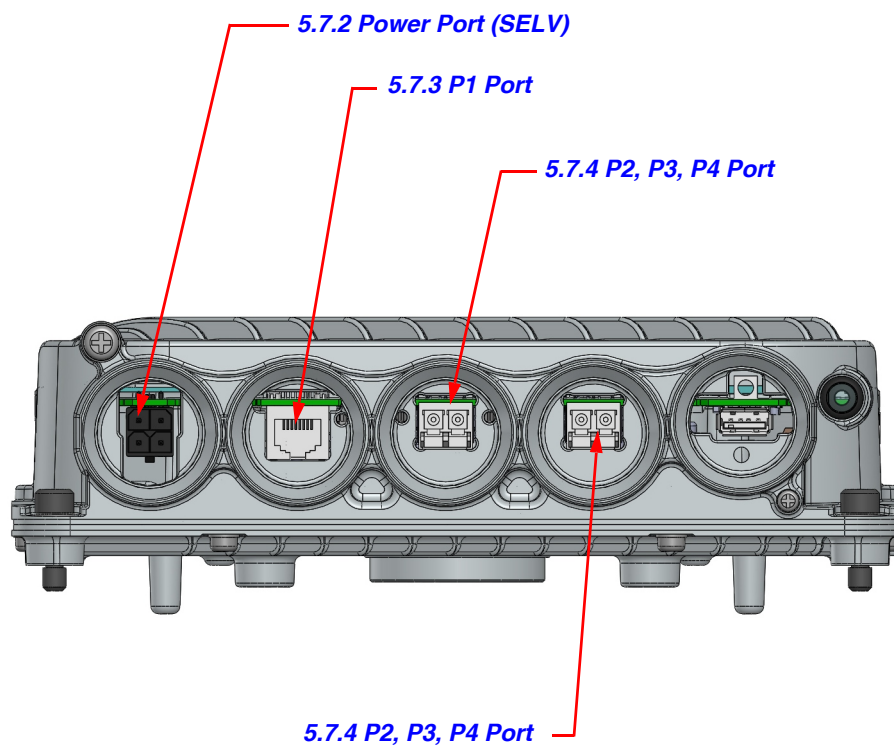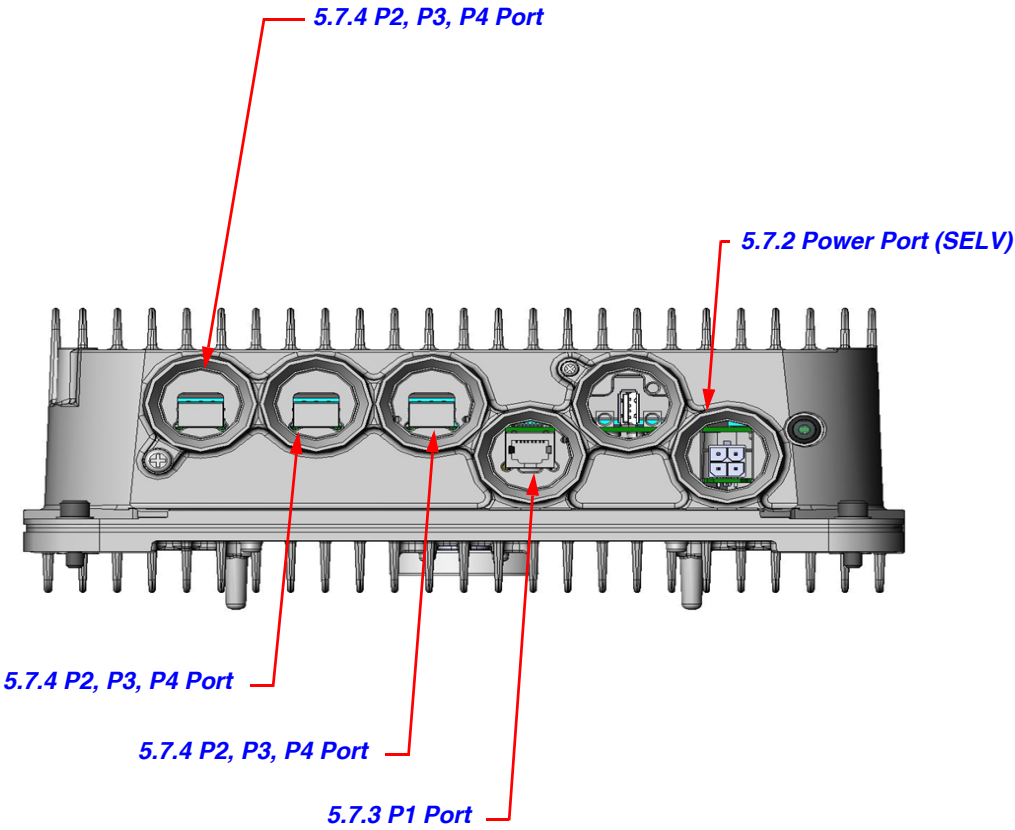## 5.7.1 Summary

Figure 5-27 Ports on iPASOLINK EX/A Index

5.7.2 Power Port (SELV)

5.7.3 P1 Port

5.7.4 P2, P3, P4 Port

5.7.4 P2, P3, P4 Port

Figure 5-28 Ports on iPASOLINK EX/A Dual Index

5.7.4 P2, P3, P4 Port

5.7.2 Power Port (SELV)

5.7.4 P2, P3, P4 Port
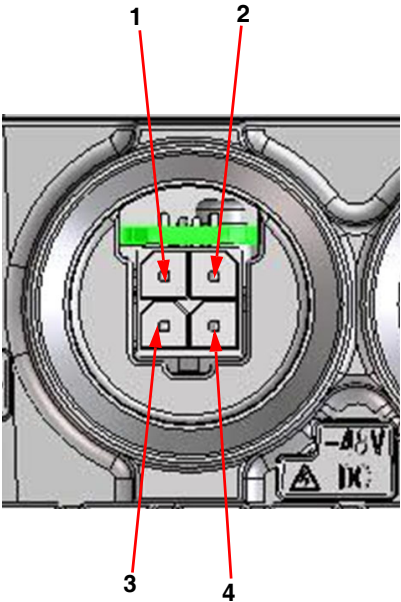
5.7.4 P2, P3, P4 Port

5.7.3 P1 Port

5.7.2 Power Port (SELV)

■ **Indication:**   **DC –48V**

■ **Connector Type:**   **molex® MEGA-FIT4P**
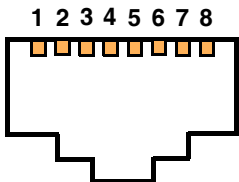
Table 5-3 Pin Assignment of DC –48V Port (SELV)

DC –48 V [4-Pin]

PIN No.	ASSIGNMENT
1	Positive
2	Positive
3	Negative
4	Negative

5.7.3 P1 Port

■ **Indication:** **DCN(PoE) [EX/A]**
DCN/P1 [EX/A Dual]

■ **Connector Type: RJ-45**

Table 5-4 Pin Assignment of DCN (PoE) Port

RJ-45

1 2 3 4 5 6 7 8

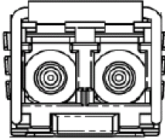| PIN No.	ASSIGNMENT
1	DA+ / Positive V_{PD}, Negative V_{PD}
2	DA− / Positive V_{PD}, Negative V_{PD}
3	DB+ / Positive V_{PD}, Negative V_{PD}
4	DC+ / Positive V_{PD}, Negative V_{PD}
5	DC− / Positive V_{PD}, Negative V_{PD}
6	DB− / Positive V_{PD}, Negative V_{PD}
7	DD+ / Positive V_{PD}, Negative V_{PD}
8	DD− / Positive V_{PD}, Negative V_{PD}

NOTE:

1. Use 4-pair shielded cable of CAT5e or higher. The cable should be shielded to keep operating in conformity with EMC standards.

2. Make sure not to connect LCT cable for a long time as surge countermeasure.

3. EX/A Dual does not support PoE.

5.7.4 P2, P3, P4 Port

■ **Indication:**   **P2, P3, P4**

■ **Port Type:**   **SFP, SFP+ (LC Connector type modules)**

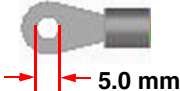**Table 5-5 Pin Assignment of P2/P3/P4 Port**

SFP/SFP++

PIN No.	ASSIGNMENT
1	TX
2	RX

5.8 Assemble Cables

5.8.1 Grounding Cable

5.8.1.1 Outlines of Parts

Table 5-6 List of Applicable Cable

| Parts		Description
Grounding Cable	AWG10 (IEC60204-1)	♦ Outer Color: Green and Yellow
Grounding Terminal	Ring Terminal (for M5 Screw Type)	5.0 mm
	Insulation Sleeve	
Hand Tools	Screwdriver	Flat-blade, Phillips-head
	Crimping Tool	——
	Wire Stripper, Wire Cutter, etc.	——

5.8.1.2 Procedure

1. Cut the AWG10 cable to the appropriate length.

2. Strip approximately 7 mm of cable sheath from one end of each cable.
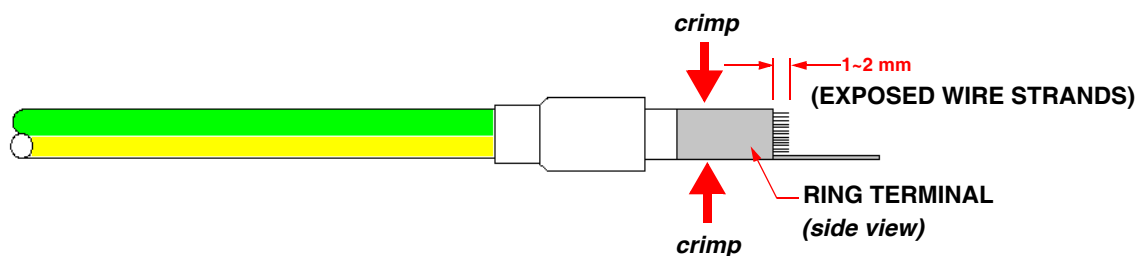
Figure 5-29 Strip the Wire

CABLE SHEATH

1~2 mm

(RING TERMINAL)
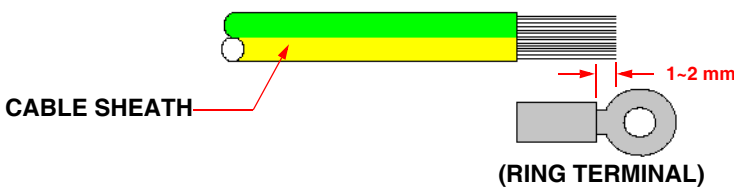
3. Slide the insulation sleeve onto the cable.

Figure 5-30 Place Insulation Sleeve on Cable

INSULATION SLEEVE
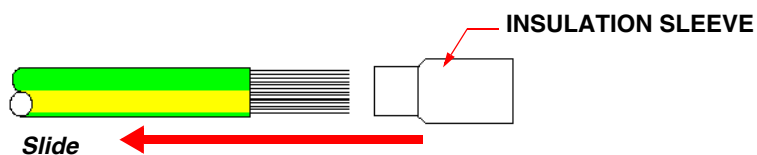
Slide

4. Apply the Crimp Ring to the cable end, and fasten it using a crimping tool.

Figure 5-31 Place and Secure Crimp Ring

crimp

1~2 mm
(EXPOSED WIRE STRANDS)

RING TERMINAL
(side view)

crimp

5. Slide insulation sleeve back to cover the root of crimp contact.

Figure 5-32 Secure Crimp Contact

INSULATION SLEEVE

Slide back
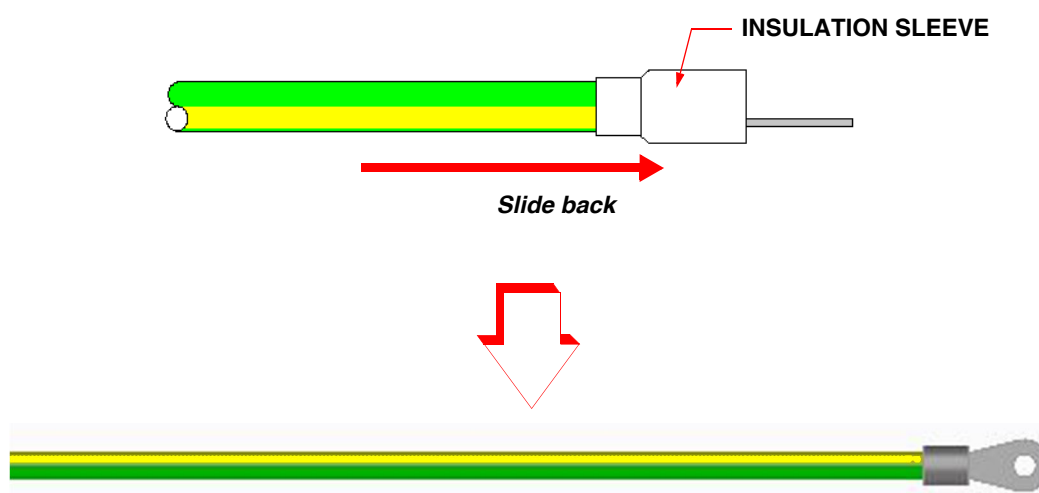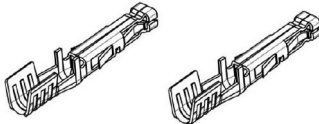
This step ends the procedure.

5.8.2 Power Cable (2-Core Cable)

Two-core cable is used for the Power Port. Followings are the procedure to prepare the power cable:

5.8.2.1 Outlines of Parts

Table 5-7 Parts List

Parts		Description
Connector Housing	171692-0104 (molex)	
Contact(s)	172063-0311 (molex)	
Cable	AWG14 to AWG16	2-core double insulated cable with braided metal shield, 5.86 to 10.00 mm in diameter: ◆Pin #1: Positive ◆Pin #3: Negative
Hand Crimping Tool	63825-7100 (molex) 200218-7200 (molex)	
Waterproofing Plug Cover	——	

5.8.2.2   Considering to Wear Waterproofing Plug Cover

If the connector of the other end (at the power unit side) is larger than 14.5 mm in diameter, and is already assembled, put the cable through the Waterproofing Plug Cover and Watertight Hose through **prior to starting the procedure below**. See *5.4 Power Cable* also.

■ Plug Cover Mechanism:

Figure 5-33 Plug Cover

1. Disassemble the Waterproofing Plug Cover.

2. Put the cable into and through the parts.

Figure 5-34 Set Waterproofing Cover Parts
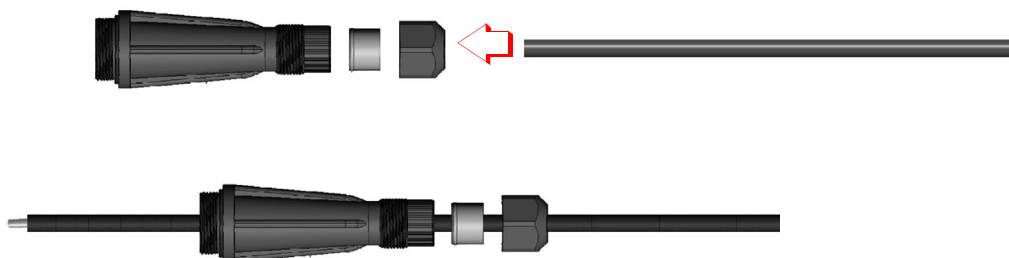
5.8.2.3 Procedure

1. Strip the cable jacket.

2. Remove the insulation to expose each conductor:

Figure 5-35 Expose Conductor

5.75 ±0.25 mm
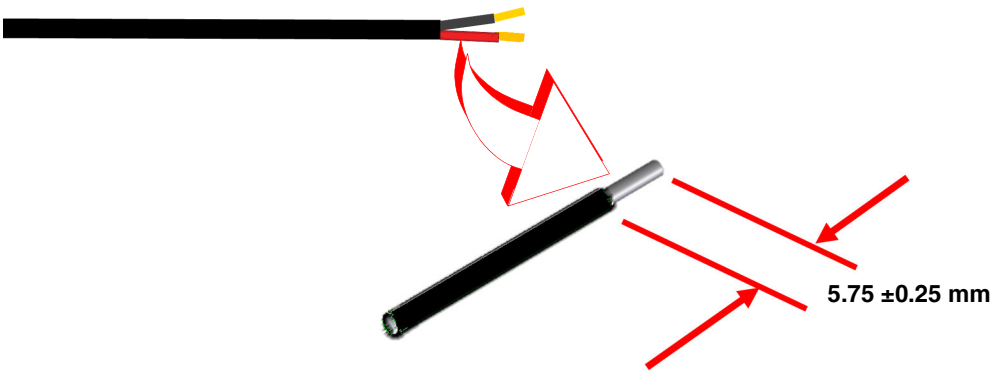
NOTE: Ensure not to damage the braided wire.

Tools	• knife • cutter • measuring tool, etc.

3. Set contact to each conductor.

Figure 5-36 Set Contacts
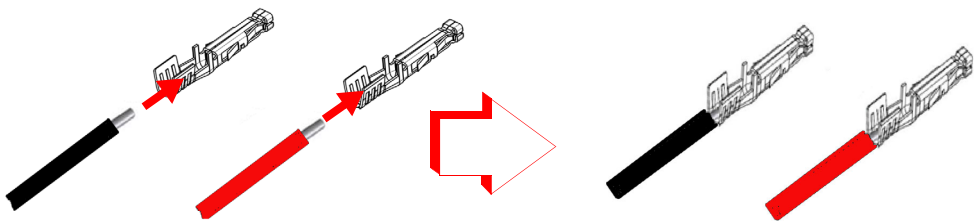
4. Seal the crimp.

Figure 5-37 Seal Crimps
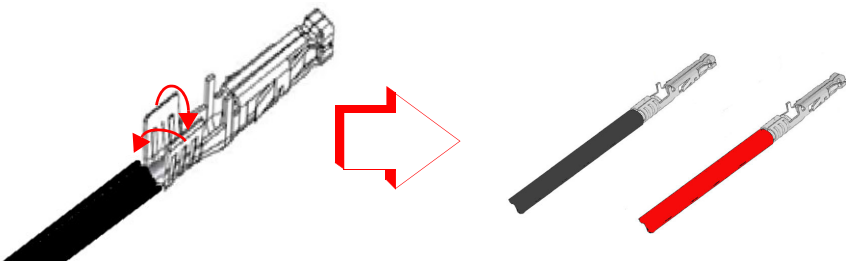
5. Insert the both contacts into the connector housing.

   NOTES:

   1. *The drawings below put the connector housing upside down for some reasons. Be sure to* confirm *the orientation of completed connector when connecting it to the equipment.*

   2. *The 2-core cable is connected to the 4-pin Power Port.*

POWER CONNECTOR HOUSING (REAR SIDE)
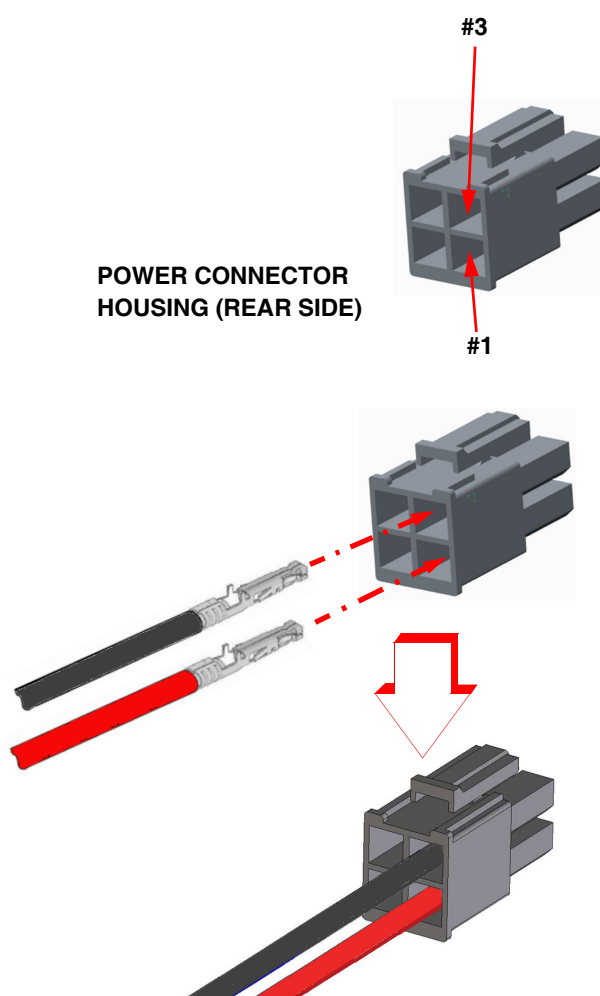
◆ **Wear Waterproofing Plug Cover if Prepared:**

Figure 5-38 Reference for Power Cable with Waterproofing Cover

This step ends the procedure.

6. GROUND iPASOLINK EX/A

Grounding is required for the operation of iPASOLINK EX/A. Followings show the procedure of grounding equipment.

Figure 6-1 Grounding Procedure (Example – 1/2)
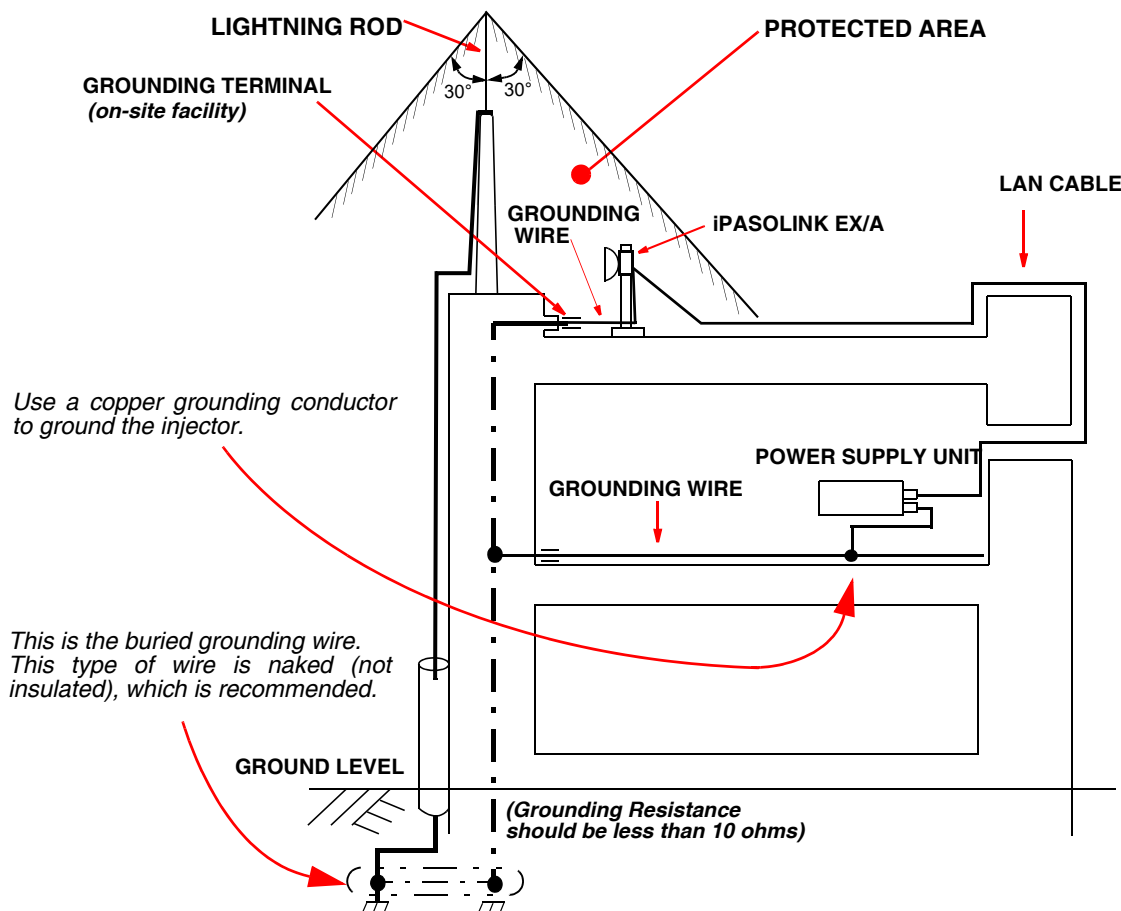
Cautions

1. **Ensure to install iPASOLINK EX/A within the area protected by lightning rod.**

2. **To avoid surge currents caused by lightning circulating in the equipment earth system, connect the equipment earth system to the ground of the lightning rod at the ground level.**

   NOTES:

   1. For grounding iPASOLINK EX/A, 5 mm square cable, which means more than 2.5 mm diameter cable, of AWG #10 with an appropriate crimping terminal should be used.

   2. Screwing torque should be within 2.7 ± 0.3N•m.

Figure 6-2 Grounding Procedure (Example – 2/2)

LIGHTNING ROD

Tower

It lets through the center of the steel tower as much as possible.

iPASOLINK EX/A

GROUNDING WIRE

POWER CABLE

GROUNDING TERMINAL

Grounding wire for iPASOLINK EX/A should be connected to the nearest EP of the tower.

GROUNDING WIRE
(away from tower)

(Grounding Resistance should be less than 10 Ohms Refer *2 in Notes.)

EP

GROUNDING WIRE*1
(Grounding Resistance should be less than 10 ohms)

Let the cables run through inside of steel tower.

(Grounding Resistance of Tower should be less than 10 ohms.)

POWER CABLE

This is the buried grounding wire. This type of wire is naked (not insulated), which is recommended.

GROUND LEVEL

NOTES:

> **1   NEC recommends that the equipment should be connected to earth line as NEC's standard installation.*

> **2   If grounding resistance of tower is low enough (less than 10 ohms), grounding wire of lightning rod is unnecessary.*

EP: Earth Ground Point of tower

7. START UP AND SHUT DOWN

7.1 Start Up iPASOLINK EX/A

7.1.1 Basic Operation

CAUTIONS:

Equipment surface may be hot after starting up. Ensure not to touch the equipment.

1. Confirm that the power cable is properly connected:

    ◆ In case of Power Port: the power cable (SELV) should be connected at **DC –48V** Port.

    ◆ In case of PoE: the LAN cable should be connected at **DCN (PoE)** Port.

2. **SYSTEM** LED (Green) starts blinking by turning on the equipment.

3. When the starting-up process is completed, the **SYSTEM** LED stays on.

4. The only first start up of the equipment disable the radio output, It will be able to output radio power from the second time start up.

WARNING:

Do not turn off the power until the start-up process is complete. Repeated turning the power on and off within a short interval may cause the equipment failure.

7.1.2 Start Up Equipment Using USB Memory Device

iPASOLINK EX/A provides a function to start up the equipment using the configuration information data stored in the USB memory device.

7.1.2.1 Preparation

Followings should be considered for the data to be used for this function:

 ◆ NE Names should be identical. This means that if an NE Name is registered to the equipment, the stored data should have the same NE Name, and also that if the equipment has no NE Name, then the stored data should not have the NE Name either.

 ◆ The Configuration file with no NE Name can be applied for either system with or without an NE Name.

 ◆ If Configuration data of multiple NEs are stored in the USB memory device, the data with the identical NE Name (including no name) to that of the connected equipment will be uploaded.

 ◆ Followings show their file paths when the storage is USB memory device:

Table 7-1 Designated File Path

File Type	NE Name	File Path	File Name
NET/Equipment Configuration Data	Registered	`/config/`	*<NE Name>*-`ex10-netequip.cfg`
	No Name	`/config/`	`ex10-netequip.cfg`
User Configuration Data	Registered	`/config/`	*<NE Name>*-`ex10-user.cfg`
			`ex10-user.cfg`
	No Name	`/config/`	`ex10-user.cfg`

7.1.2.2 Start-Up Process Using USB Memory Device

1. Referring to *7.1.2.1 Preparation*, confirm the data stored in the USB memory device.

2. Confirm that the power is not supplied to the equipment.

3. Plug in the USB memory device to the USB Port on the equipment.

4. Supply the power to the equipment.

   NOTE: *If the valid data are not found in the plugged USB memory device, the equipment starts up using its configuration data stored in its own.*

7.2 Check Reception Level

Refer to *8. ADJUST ANTENNA ANGLE* for checking the reception levels.

7.3 Shut Down iPASOLINK EX/A

1. Powering off the power unit or power injector shuts down iPASOLINK EX/A.

WARNING:

Disconnecting LAN Cable from DCN (PoE) Port while the equipment is powered on may cause the equipment failure.

8. ADJUST ANTENNA ANGLE

Adjust the antenna angle by following steps after the completion of installation.

8.1 Precautions

1. Required Tools

- ◆ Digital Multimeter

- ◆ Test Leads

- ◆ WebLCT (PC)

2. Check the followings:

Check the followings before starting the procedures here.

- ■ Cables are properly connected.

- ■ Power is supplied to iPASOLINK EX/A (operational).

- ■ PC with a web browser installed is connected.

8.2 Adjust Equipment Angle

1. Set **TX Power Control**:

    (1) Launch **WebLCT**, and log in to the equipment.

    (2) Expand **Equipment Setup** to select **Radio Configuration** in **MENU** pane.

    (3) Click **Setup** tool button to display **Step 1 Detailed Radio Configuration** window.
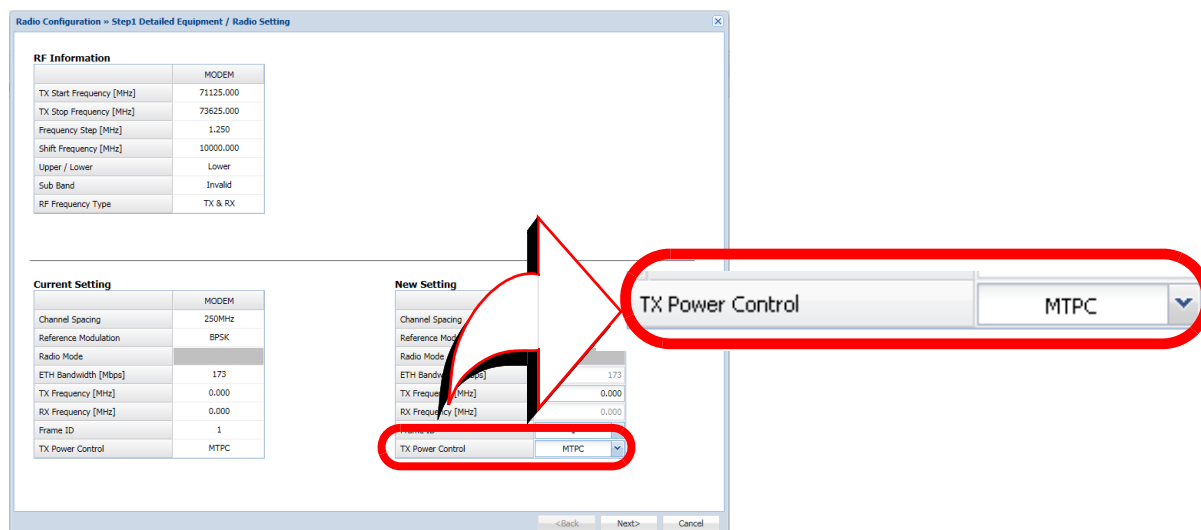
Figure 8-1 Radio Configuration

(4) Select **MTPC** if a different value is selected at **TX Power Control** parameter.

Figure 8-2 Step 1 Detailed Equipment / Radio Setting Window

.

2. Repeat steps above at the opposite site.

3. Prepare to measure RX Level:

CAUTION:

> ***Surface of iPASOLINK EX/A may be hot during the operation. Ensure not to touch the equipment by mistake.***

(1) Remove a protective cap from **RSL** terminal on iPASOLINK EX/A, and connect a digital multimeter to it. Refer to Figure 8-3.

(2) Monitor the reception levels at both the local and opposite site, and adjust the reception levels to be maximum by turning antenna up and down and/ or left to right. Refer to Section 8.3 Adjust Antenna Angle.

NOTES:

1. *RSL monitor conforms to IEC61169-24.*

2. *Put the waterproofing cap back to the RSL terminal to protect it after checking.*

Figure 8-3 Example to Measure Reception Level for Antenna Angles Adjustment iPASOLINK EX/A

RSL TERMINAL
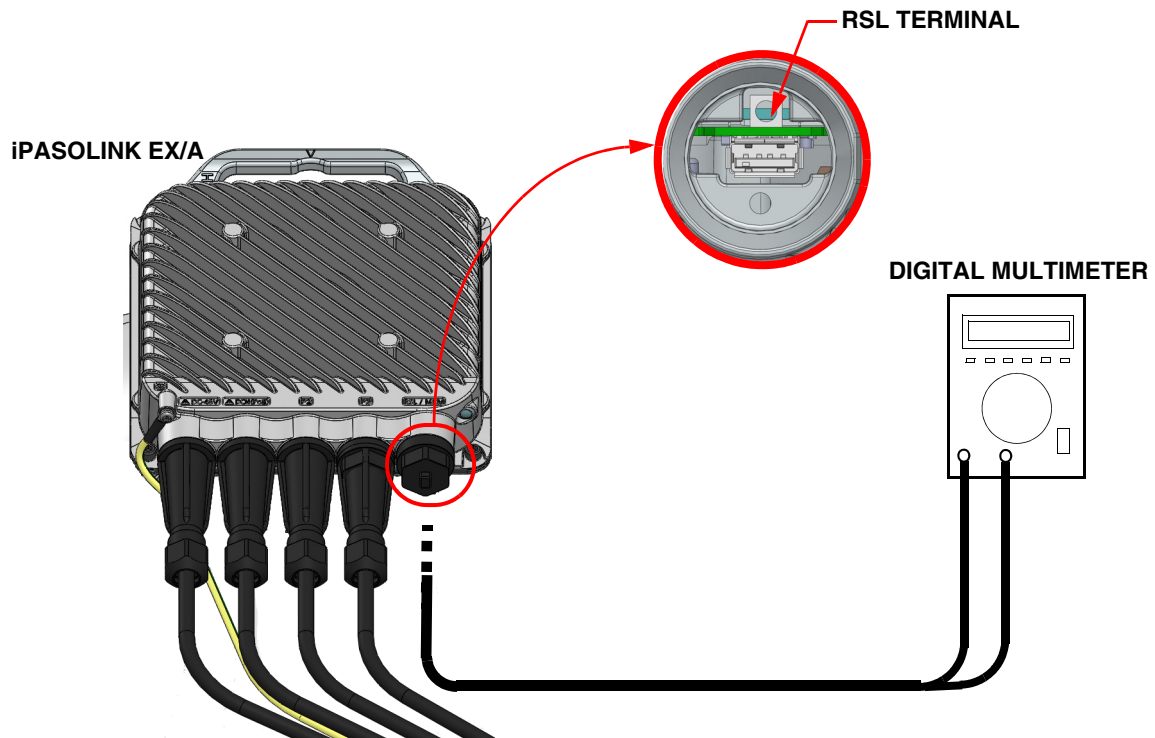
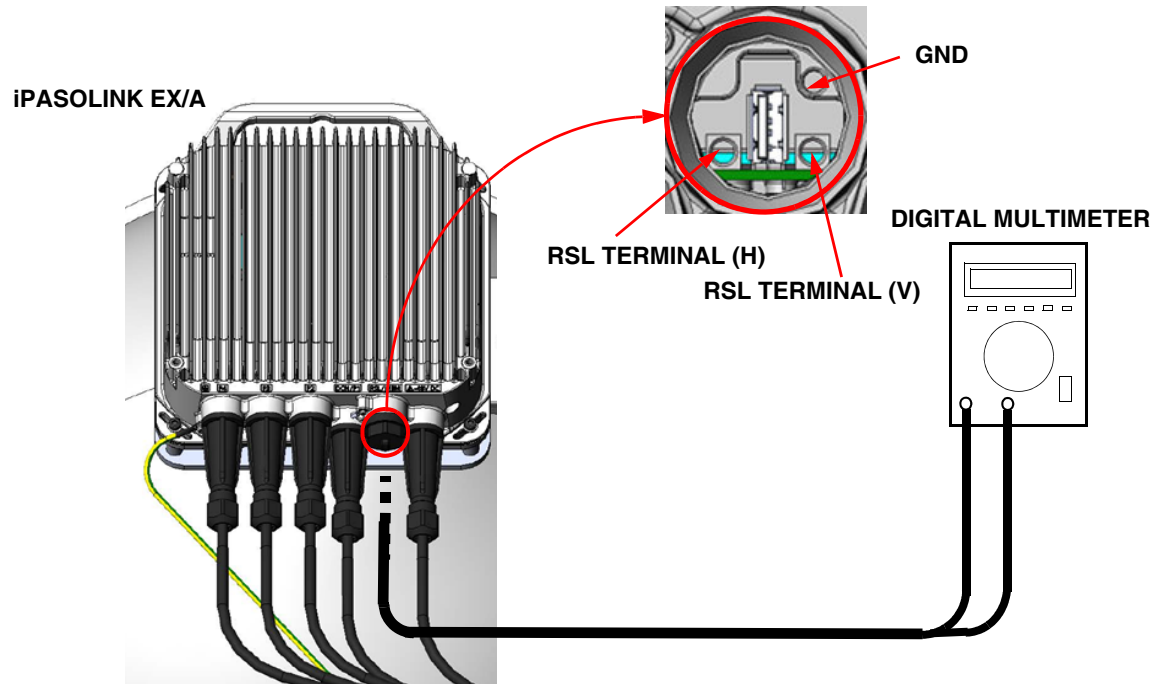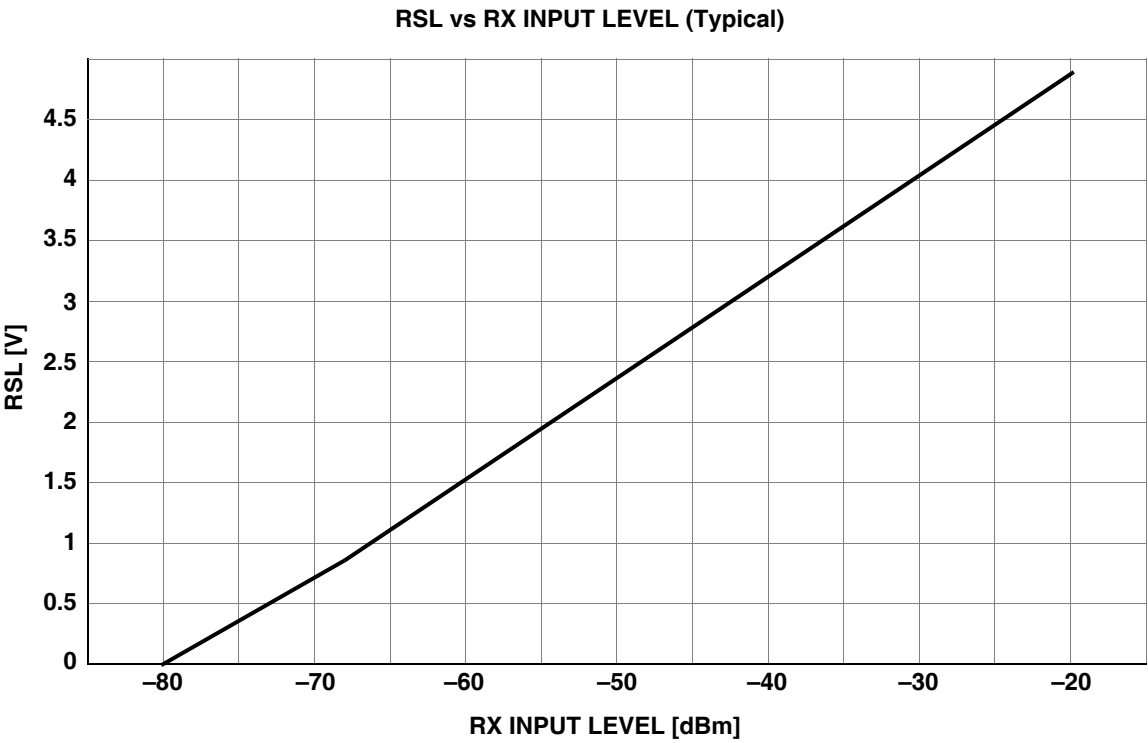iPASOLINK EX/A

DIGITAL MULTIMETER

Figure 8-4 Example to Measure Reception Level for Antenna Angles Adjustment iPASOLINK EX/A Dual

Followings show the relationship between **RX INPUT LEVEL (dbm)** and **RSL (V)**.

Figure 8-5 RSL and RX Input Level

RSL vs RX INPUT LEVEL (Typical)

8.3 Adjust Antenna Angle

Figure 8-6 Shape Model of Beams

SECOND SIDE-LOBE
(if detected)

NULL

FIRST SIDE-LOBE

NULL

MAIN BEAM
(Target Voltage)

5°

Up/Down Adjustment

RX POWER LEVEL

Left/Right Adjustment
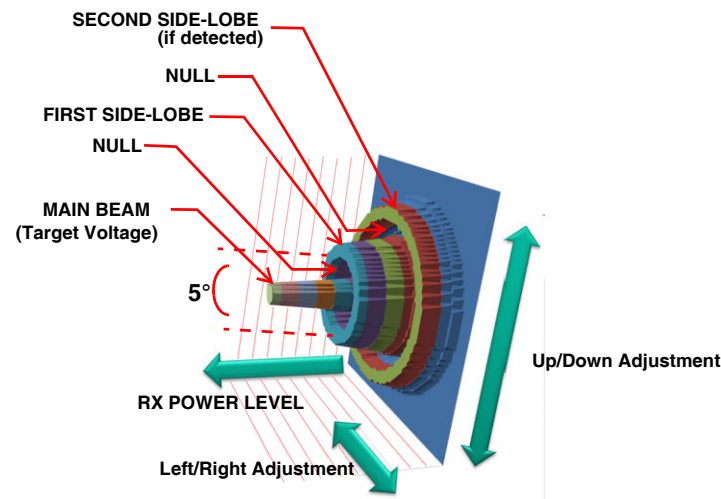
Figure 8-7 Fine Adjustment

Left/Right Adjustment

MAIN BEAM
(Target Voltage)

RX Level

Left/Right Adjustment
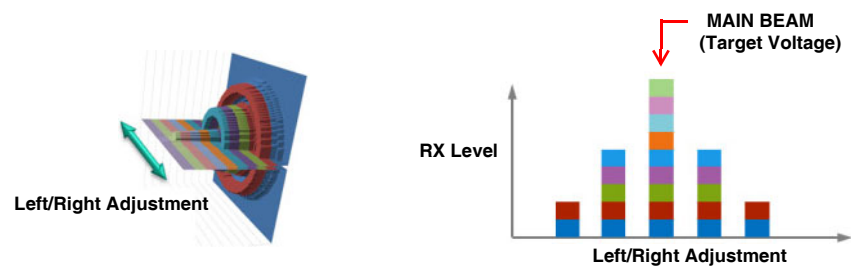
Figure 8-8 Possible Attempts before Fine Adjustment

Below Target Voltage

CENTER
(NO MAIN BEAM)

Below
Target Voltage

CENTER
(NO MAIN BEAM)

CENTER
(NO MAIN BEAM)

CENTER
(NO MAIN BEAM)
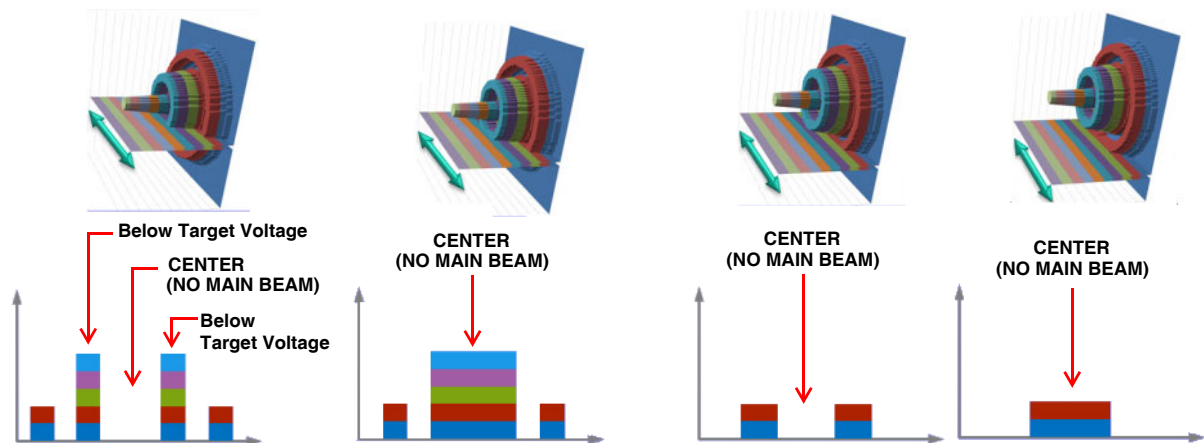
1. Adjust the antenna angle — Left or Right:

**Figure 8-9 Turn Antenna to Left or Right**
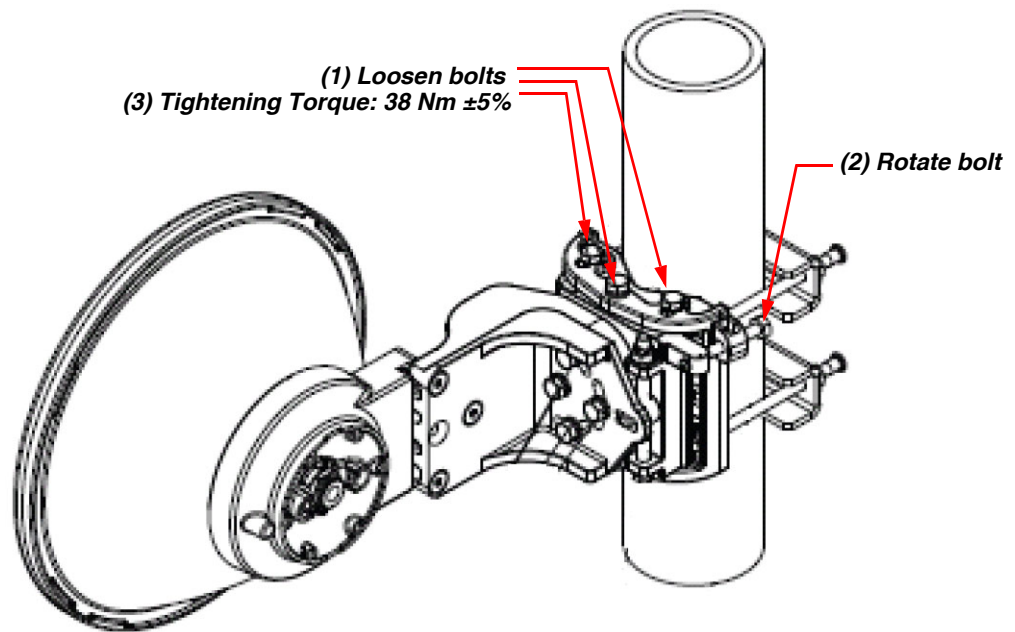
(1) Loosen six bolts on top and bottom of the bracket.

(2) Rotate the bolt to turn the antenna to the left or right.

(3) Adjust and specify parameters for control items using **WebLCT** at both opposite sites.

(4) When the left/right angle is adjusted, secure the six bolts back in place.

2. Adjust the antenna angle — Turn it up or down:

Figure 8-10 Turn Antenna Up or Down

(1) Loosen bolts
(3) Tightening Torque: 38 Nm ±5%
(2) Rotate bolt
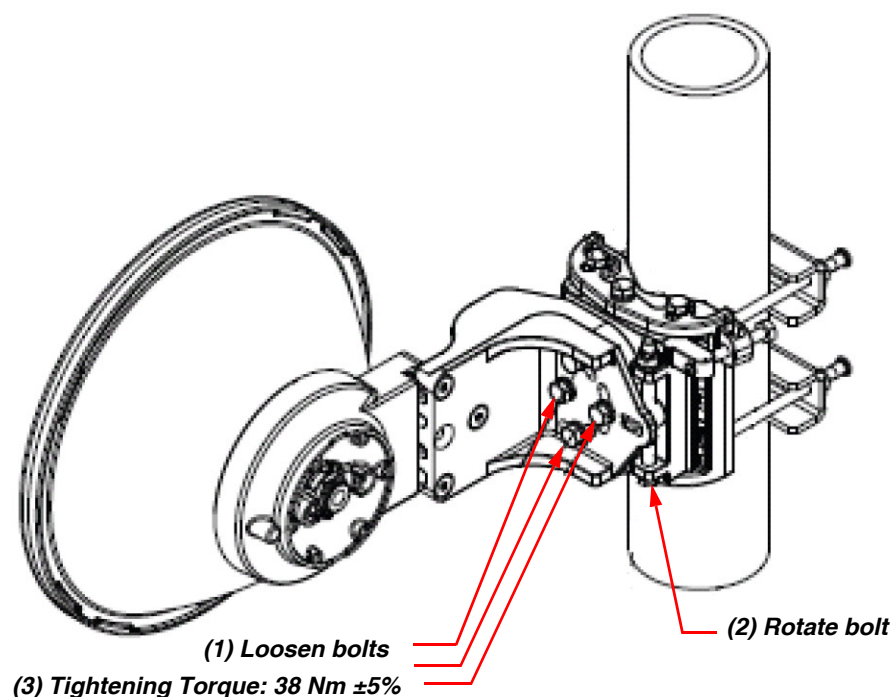
(1) Loosen three bolts.

(2) Rotate the bolt to turn the antenna up and down.

(3) Adjust and specify parameters for control items using **WebLCT** at both opposite sites.

(4) Secure the four bolts back after up/down angles are adjusted.

3. Release the system from **Maintenance** mode using WebLCT.

4. Disconnect the Multimeter from **RSL** terminal.

5. Put the protective cap back on **RSL** terminal of each station for waterproof.

6. At each station, secure the Antenna by re-tightening bolts that have been loosen in Step 2.

8.4 Adjust XPD

NOTE: Since the cross-polarization signal changes sharply in the axial direction, its XPD should be adjusted more carefully comparing to adjusting the co-polarization signal.

Procedure 8-1

1. Pan the Antenna so that the RSL Monitor indicates the maximum value at the RSL(V).

2. At opposite site, power off the RF No2(H).

3. In this conditions, adjust antenna axial rotation so that the XPD indicated the maximum value.

   XPD: RSL(V) - RSL(H)

4. Confirm that the XPD value is more than 18 dB, if not, repeat Azimuth Angle, Elevation Angle and XPD Adjustment.

5. At opposite site, power on the RF No2(H).

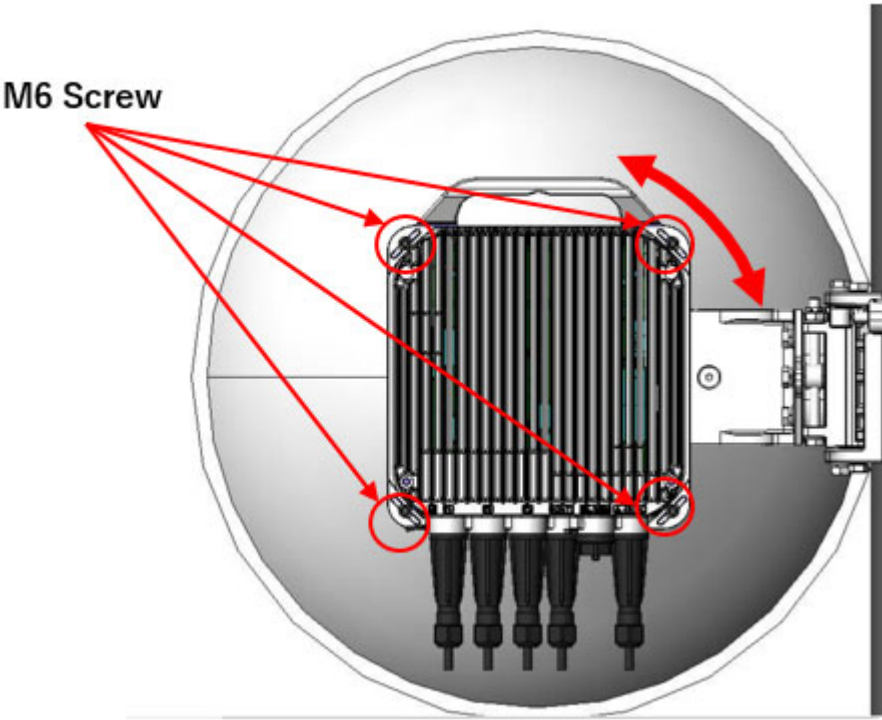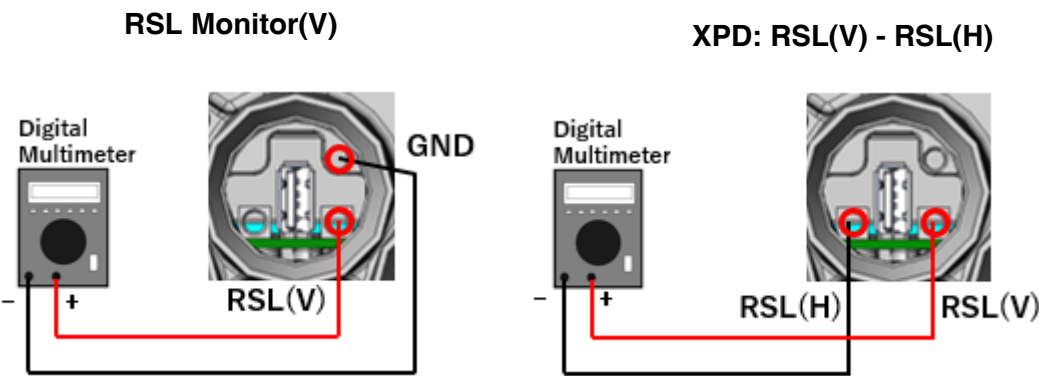**Figure 8-11 Location of Adjusting Nuts and Bolts iPASOLINK EX/A Dual**

Figure 8-12 Example to Measure XPD Levels for Fixing Angles iPASOLINK EX/A Dual

NOTE: If the multi-meter indicates minus value, change V and H connection.

8.5 Safety Guideline for Microwave Radiation Hazard

The radiation levels of Microwave and Millimeter-Wave iPASOLINK series are very low, and no health hazard has been reported for them so far. However, advanced countries that care much about health hazard have started regulating the radiation levels. For EU countries, it is specified by EN 62311 Annex A A.2. In order to follow the regulation, operators should not work near the antenna if its transmitter is activating. Especially, the radiation level of a specific area (X and Y in the illustration below) in front of antenna is high.

See the following illustration and **Calculation Examples 1 and 2**:

Power density in front of the antenna turns high along the antenna beam. Ensure not to allow yourself radiated by beams anytime.

Figure 8-13 Radiation Hazard Area
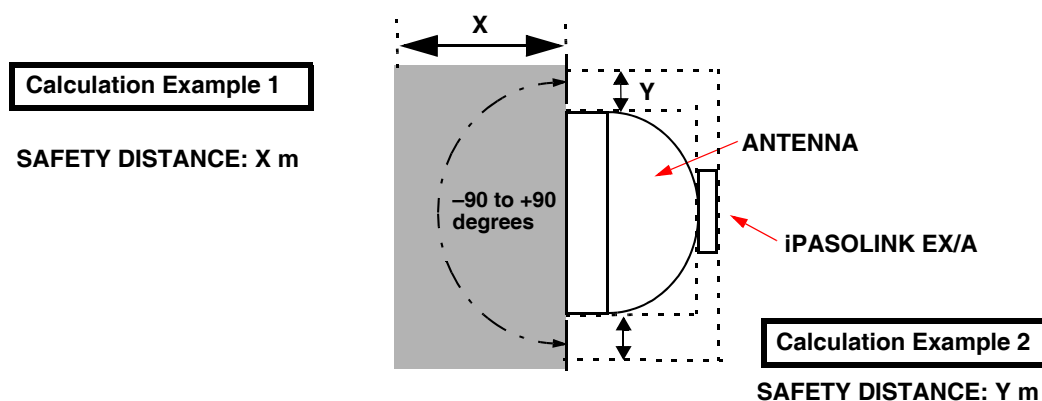
The power density and field strength level can be obtained by the following calculation formula:

$$\text{Power Density}: S = \frac{P}{4\pi R^2} \ (W/m^2) = \frac{10^{\left(\frac{P' + G - 30}{10}\right)}}{40\pi R^2} \ (mW/cm^2)$$

Where
        P = Output Power (**W**),
        P' = Output Power (**dBm**),
        G = Antenna Gain (**dBi**),
            (in condition of angle and range from antenna)
        R = Distance between human being and antenna (**m**)

Safety distance should be calculated according to the conditions of installation site. Followings show the calculation examples:

■ Calculation Example 1 (Front Side of Antenna)

- ◆ Output Power = +18 dBm

- ◆ Antenna Diameter = 0.6 m

- ◆ Antenna Gain = 52 dBi

- ◆ Distance = 9.0 m

- ◆ Output Power Density : S = 0.982 mW/cm^2 $\leqq$ 1 mW/cm^2

Limit: Output Power Density S = 10 (W/m^2) * = 1 (mW/cm^2)

*: **COUNCIL RECOMMENDATION** *(1999/519/EC) of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz)*

■ Calculation Example 2 (Rear Side of Antenna)

- ◆ Output Power = +18 dBm

- ◆ Antenna Diameter = 0.6 m

- ◆ Antenna Gain = –16 dBi

- ◆ Distance = 0.004 m = 4.0 mm

- ◆ Output Power Density : S = 0.788 mW/cm^2 $\leqq$ 1 mW/cm^2

Limit: Output Power Density S = 10 (W/m^2) * = 1 (mW/cm^2)

*: **COUNCIL RECOMMENDATION** *(1999/519/EC) of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz)*

The safety distance that is obtained by the conditions above and is below the value defined by **COUNCIL RECOMMENDATION** (1999/519/EC) of 1 mW/cm² is:

- ◆ Front Side of Antenna (X) $\geqq$ 9.0 m

- ◆ Rear Side of Antenna (Y) $\geqq$ 0.004 m = 4.0 mm

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