OSDR

Outdoor Software-Defined Radio (OSDR) platform

OmniBAS™
WiBAS™
StreetNode™

Installation & Cabling Manual

Edition 3.0

The information contained in this document is subject to change without prior notice.

Document Revision History

Previous Edition:	2.2
Current Edition:	**3.0**

Reasons of Change

M = Modified, **A** = Added, **R** = Removed	Details
New materials (M) (A) New installation procedures (A)	• Sectoral 26/28/32 GHz antenna • Sectoral 10.5 GHz antenna • Parabolic antenna 10.5/26/28/32 GHz • M20 gland • Outdoor AC PoNE • Indoor AC PoNE • XPOL tool kit
Contents restructure (M)	Document optimization
Revised installation instructions (M)	• OSDR to sectoral/parabolic antenna • OSDR to panel antenna • Panel antenna mounting kit • ETH cable installation • Optical cable installation • Power injectors installation • Sectoral antenna pole space requirements

Outdoor Software Defined Radio (OSDR) platform
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Equipment Disposal
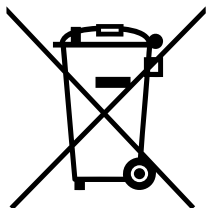
Disposal of old electrical and electronic equipment (applicable through the European Union and other European countries with separate waste collection systems).

This symbol, found on this product and any of its parts or on its operating instructions or on its packaging, indicates that electrical and electronic equipment may not be disposed of as unsorted municipal waste. Instead, this product should be handed over to applicable collection points for the recycling of electrical and electronic equipment.

By ensuring the correct disposal of this product, you will help prevent potential negative consequences to the environment and human health, which could otherwise be caused by inappropriate disposal of this product.

By recycling, reusing and other forms of recovery of old electrical and electronic equipment you are making an important contribution to the conservation of natural resources and to the protection of the environment.

For more information about the recycling of this product, please contact your local municipal authorities, municipal waste disposal service or the store where you purchased this product.
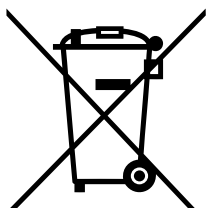
Απόρριψη παλαιών ηλεκτρικών και ηλεκτρονικών συσκευών (ισχύει στην Ευρωπαϊκή Ένωση και άλλες Ευρωπαϊκές χώρες με συστήματα χωριστής συλλογής απορριμμάτων).

Το σύμβολο αυτό, που απεικονίζεται πάνω στο προϊόν και σε τυχόν εξαρτήματα του ή στο εγχειρίδιο οδηγιών του ή στη συσκευασία του, δείχνει ότι οι ηλεκτρικές και ηλεκτρονικές συσκευές, μετά το πέρας της λειτουργίας τους, δεν θα πρέπει να απορρίπτονται μαζί με τα αστικά απόβλητα. Αντίθετα θα πρέπει να παραδίδονται σε κατάλληλα σημεία συλλογής για την ανακύκλωση των ηλεκτρικών και ηλεκτρονικών συσκευών.

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Για περισσότερες πληροφορίες σχετικά την ανακύκλωση αυτού του προϊόντος, παρακαλούμε επικοινωνήστε με τις τοπικές δημοτικές αρχές, την υπηρεσία αποκομιδής αστικών αποβλήτων ή το κατάστημα από το οποίο αγοράσατε το συγκεκριμένο προϊόν.

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Declaration of Conformity

Hereby, Intracom S.A. Telecom Solutions declares that the products **OmniBAS^{TM} & WiBAS^{TM}** are CE marked in compliance with the essential requirements and other relevant provisions of the Radio Equipment Directive 2014/53/EU, Eco Design Directives 2009/125/EC, 2010/30/EU and with the requirements of the RoHS directive 2011/65/EU.

The full text of the EU declaration of conformity is available at the following URL: http://emc.intracom-telecom.com/en/start.htm

Δήλωση Συμμόρφωσης

Με την παρούσα, η Intracom Α.Ε. Τηλεπικοινωνιακών Λύσεων δηλώνει ότι τα προϊόντα **OmniBAS^{TM} & WiBAS^{TM}** φέρουν την σήμανση CE συμμορφούμενο προς τις απαιτήσεις και τις λοιπές διατάξεις των οδηγιών Radio Equipment Directive 2014/53/EU, Eco Design Directives 2009/125/EC, 2010/30/EU καθώς και με τις απαιτήσεις της οδηγίας RoHS 2011/65/EU.

Το πλήρες κείμενο της δήλωσης συμμόρφωσης (EU) είναι διαθέσιμο στην ακόλουθη διεύθυνση URL: http://emc.intracom-telecom.com/en/start.htm

Table of Contents

1. Introduction

About this Document

Scope of Document

The scope of this document is to provide detailed instructions on the installation and cabling of **OSDR** (**O**utdoor **S**oftware-**D**efined **R**adio platform) wireless product.

⚠ Note This document applies for installation of all available operation modes: PtMP Hub[1], PtMP TS[2] and PtP Node[3].

Target audience

This document is addressed to certified technicians with wireless equipment knowledge and skills concerning the following:

- Outdoor Radio Unit Installation (pole installation).
- Antenna installation.
- Preparation & Termination of: Ethernet & Grounding cables.
- Laying and Installation of: Ethernet, Fiber Optic & Grounding cables.
- Testing Ethernet cables using Ethernet cable testers.

Reference manuals

The reference manuals are listed below:

Item	Description
1	Lightning & Surge Protection for Intracom Telecom Radios – Installation Practices.
2	OSDR Product Catalog.
3	OSDR System Description.
4	Lightning & Surge Protector (LSP) Datasheet.
5	WiBAS^{TM}-Connect Installation.
6	OSDR Commissioning.

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[1] WiBAS^{TM} OSDR Hub.
[2] WiBAS^{TM} OSDR Terminal Station (TS). For WiBAS^{TM}-Connect refer to item 5 of the Reference manuals.
[3] OmniBAS^{TM}-OSDR.

About this Document, Continued

Conventions   This document applies to the following conventions:

- **Arial Bold blue** fonts are used for order codes.
- Arial Blue underline fonts are used for document references.
- **Arial Bold black** fonts are used for indicating important information or paragraph header.

This symbol means **DANGER**. The purpose of this symbol is to warn you that any wrong action can cause bodily injury or even death.

This symbol means **CAUTION**. The purpose of this symbol is to prevent you from performing an action that might result in damage of the equipment.

The purpose of this symbol is to protect you from unauthorized entry to the site and damage your equipment.

A note calls your attention to important supplementary information.

A hint denotes helpful piece of advice or practical suggestion.

Safety Precautions

RF EXPOSURE

Locally applicable national and international RF safety requirements must be adhered to when installing the OSDR / antenna system.

Please refer to local regulatory authorities for advice on compliance.

As guidance, for an OSDR 10.5 / 26 / 28 / 32 GHz:

According to EN 50385 and the relative EU Directives (1999/519/EC - general public environment & 2004/40/EC – occupational environment) the OSDR / antenna, should be installed in a location such that it is not possible for workers or members of the public, in the normal course of their work or everyday activities, to gain access closer in front of the antenna than the specified distances in the table below.

The values of the table are given for OSDR at max power and max gain 60 cm terminal antenna.

BAND (GHz)	DISTANCE (meters)			
	WORKER		PUBLIC	
	PtMP Hub	PtMP TS or PtP Node	PtMP Hub	PtMP TS or PtP Node
26 / 28 / 32	0.5	2.55	1	5.1
10.5		1.25		2.5

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Safety Precautions, Continued

General

- Do not install or operate this system in the presence of flammable gases or fumes. Operating any electrical instrument in such an environment is a safety hazard.
- Outdoor units and antennas should be installed ONLY by experienced installation professionals who are familiar with local building and safety codes and, wherever applicable, are licensed by the appropriate government regulatory authorities. Failure to do so may void the product warranty and may expose the end user or the service provider to legal and financial liabilities.
- INTRACOM S.A. TELECOM SOLUTIONS and its resellers or distributors are not liable for injury, damage or violation of regulations associated with the installation of outdoor units or antennas.
- Appropriate labeling should exist at points with high risk of contact with hazardous voltage.
- A list with emergency phone numbers (e.g. medical assistance numbers) should be hung at easy-to-view positions.
- Also, recommended are for safety purposes, a fire detection system and fire extinguishers (installed at easy-to-access points) inside the installation premises.
- This equipment must be permanently earthed for protection and functional purposes.
- Changes or modifications to this equipment not expressly approved by INTRACOM S.A. TELECOM SOLUTIONS or the party responsible for compliance could void the user's authority to operate the equipment.

Working on the Building's Roof

During stormy weather, do not perform any mechanical assembling or antenna installation / alignment works on the building's roof.

The metal structure of towers / masts is prone to lightning.

Equipment Access

Only trained, authorized personnel should have access to the installed equipment.

The equipment premises is intended to be installed in restricted access.

Safety Precautions, Continued

Proper Grounding Installation & Equipotential Bonding

Never power on OSDR equipment unless you have completed the grounding installation.

There is risk of equipment failure and / or electrical shock.

Ensure that:

- The grounding system measures an appropriate path resistance as specified by local regulations.
- An appropriate grounding bar (or terminal) exists at the proximity of each equipment installation position.
- The equipment is intended to be installed in location only where the equipotential bonding has been applied.

Local AC Power Source

Ensure that:

- Safety requirements require a single pole circuit-breaker to be employed between the local power DC source and **outdoor AC PoNE**.
- The circuit breaker must disconnect the mains phase of the AC power.
- For circuit breaker requirements refer to <u>Circuit breakers</u> on page <u>49</u>.

Local DC Power Source

Ensure that:

- Safety requirements require a single pole circuit-breaker to be employed between the local power DC source and **outdoor DC PoNE**.
- The circuit-breaker must control (open / close) the negative (-) V pole of the power supply.
- The positive pole (+) V of the Local DC Power Source, which the wire of DC power cable is terminated on, is grounded.
- For circuit breaker requirements refer to <u>Circuit breakers</u> on page <u>49</u>.

AC & DC Power Supply Cables

Ensure that:

- Power source cables must be tested for short circuits, open circuit or wrong wiring before installed.
- The ground wire of the AC power source cable must be connected to the protective earth (ground) point of the mains electricity installation.

Continued on next page

Safety Precautions, Continued

Proper Connection of Power Injector

Never connect the Gigabit Ethernet (S-FTP) cables coming from the OUT receptacle of power injector to network switches / routers / laptops.

There is risk of network devices failure due to potential power that is carrying inside the cable.

Connect the OUT receptacle of power injectors to electrical GbE port of radio unit as described in current manual.

Proper Radio Unit Power Up

Do not plug / unplug:

The Ethernet cable to / from the radio unit when the power injector operates (powering through power injector).

There is risk of radio unit failure.

Always ensure that the power supply source / power injector is OFF before plugging / unplugging.

Laser Radiation

When using SFP, then the OSDR is a CLASS 1 laser product.

2. Materials

Scope

This chapter describes all the available materials for OSDR installation.

Topics

The chapter includes the following topics:

OSDR

Radio unit

Oder Code	Description
OSDR-OB-U-DSDS-SB	Full outdoor software defined radio, 10.5/26/28/32 GHz, FDD, GbE. Operation Modes: PtMP Hub, PtMP TS, PtP Node.

Antennas

Antenna types

#	Photo	Description
A		Antenna, sectoral 90^0, integrated, 26/28/32 GHz. Includes: • Mounting kit. • Greasing paste. • Installation leaflet.
B		Antenna, sectoral 90^0, integrated, 10.5 GHz. Includes: • Mounting kit. • Greasing paste. • Installation leaflet.
C		Antenna, parabolic, 0.3 m, integrated, 10.5/26/28/32 GHz. Includes: • Mounting kit. • Greasing paste. • Installation leaflet.
D		Antenna[1], panel, 10.5 GHz. For installation requires the following order codes: • **OSDR-ANT-MNT** (mounting kit). • **GRS-PST** (greasing paste).

> **Note** For antennas order codes please refer to item 2 of Reference manuals on page 3.

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[1] Extra bolts and leaflet concerns only WiBAS^{TM}-Connect installation.

Mounting Kits

Mounting kit for panel antenna

Oder Code	Description
OSDR-ANT-MNT	Pole/Wall mounting kit for panel antenna 10.5 GHz (pole diameter 48 mm up to 60 mm).

Pole adaptation bracket for panel antenna

Oder Code	Description
INST-ADAPT	Pole adaptation bracket for panel antenna 10.5 GHz (pole diameter 61 mm up to 120 mm). 📝 **Note** **OSDR-ANT-MNT** is required for mounting panel antenna 10.5 GHz.
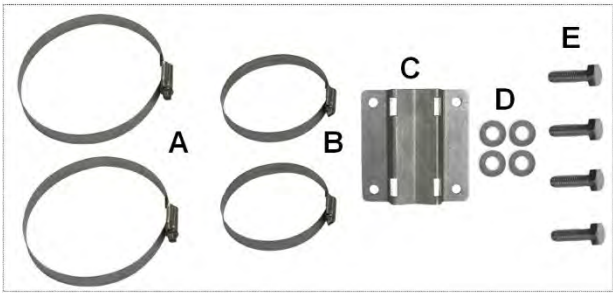
#	Items Description	Qty	Details
A	Hose clamp.	2	For pole diameter 101 mm up to 120 mm.
B	Hose clamp.	2	For pole diameter 61 mm up to 100 mm.
C	Bracket.	1	Pole adaptation bracket.
D	Washers.	4	M8 washers (DIN125A), stainless.
E	Screws.	4	M8x25 hex-headed screw (DIN933), stainless.

Mounting Kits, Continued

Hooks for panel antenna

Oder Code	Description
OSDR-PL-ANT-KIT	Hooks for panel antenna 10.5 GHz.

Pole mounting bracket for outdoor DC PoNE

Oder Code	Description
INST-PONE-PL	Mounting bracket for pole installation of **PONE-OD-DC** power injector (pole diameter 50 to 120 mm / steel hose clamp diameter 64 to 140 mm).

Pole mounting bracket for outdoor AC PoNE

Oder Code	Description
INST-PONE-PL2	Mounting bracket for pole installation of **PONE-OD67-AC** power injector (pole diameter 50 to 120 mm / steel hose clamp diameter 64 to 140 mm). 📝 Note: 2 x screws and lock washers are used. The third set (screw and lock washer) is for spare purpose.

Mounting Kits, Continued

Pole hose clamps

Stainless steel hose clamp for pole installation of **ETH-SRG-OD68** lightning surge protector (one **ETH-SRG-OD68** requires 2 clamps).

The following table shows the available hose clamps:

Item	Order Code	Description
A	**ST-CL64-140**	⌀ 64-140 mm, width = 14.2 mm. For ⌀ 48-100 mm pole diameter.
B	**ST-CL102-178**	⌀ 102-178 mm, width = 14.2 mm. For ⌀ 75-149 mm pole diameter.
C	**ST-CL172-248**	⌀ 172-248 mm, width = 14.2 mm. For ⌀ 150-229 mm pole diameter.
D	**ST-CL242-318**	⌀ 242-318 mm, width = 14.2 mm. For ⌀ 230-300 mm pole diameter.

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Cables

RSSI cable

Order Code / Photo	Description
CAB-RSSI-BNC	RSSI cable, male BNC to 2 x banana plugs, 75 Ω for measuring OSDR receive signal level in volts (voltmeter is required).

Grounding kit

Order Code / Photo	Description
GND-KIT16-OD	Grounding kit for OSDR and outdoor AC PoNE. Includes: • 2 x meter yellow/green grounding cable, 16 mm² stranded • 450 V • Heat shrinkable tube, black, d = 9.5 mm x 4.8 mm. • 1 x M5 terminal lug for 16 mm² grounding cable stranded • 1 x M8 terminal lug for 16 mm² grounding cable stranded

Grounding cable

Order Code / Photo	Description
GND-CAB6-ID	Grounding cable, per meter, yellow/green, 6 mm2, stranded, 450 V for outdoor DC PoNE.

Ethernet S-FTP cable

Order Code / Photo	Description
ETH-CAB-SFTP	Shielded Ethernet cable Cat5E (S-FTP), 4 x 2 x AWG24, black, UV-rated, per meter.

Cables, Continued

	#	Order Code / Photo	Description
Power supply cables for outdoor power injectors	A	**AC-PWR-CAB**	**AC** power bulk cable[1], **3 x 0.75 mm²**, 0.6 / 1 kV, stranded, UV-rated, industrial type, outdoor use, per meter. Used for powering of outdoor AC PoNE (**PONE-OD67-AC**).
	B	**DC-PWR-CAB-2**	**DC** power cable, **2 x 2.5 mm²**, PVC, 1 KV, outdoor use, per meter. Used for powering of outdoor DC PoNE (**PONE-OD-DC**).

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[1] AC connector (**ST-CONN-AC**) is required for cable termination.

Cables, Continued

Fiber optic cables

Prefabricated connectorized fiber optic cables for outdoor use, DX, 2 x LC/PC-LC/PC, available in multi-mode (MM) & single mode (SM) in different lengths.

#	Order Code	Cable Length (m)
A	**FBROPTMM-025**	25
B	**FBROPTMM-050**	50
C	**FBROPTMM-100**	100
D	**FBROPTMM-150**	150
E	**FBROPTMM-200**	200
F	**FBROPTSM-025**	25
G	**FBROPTSM-050**	50
H	**FBROPTSM-100**	100
I	**FBROPTSM-150**	150
J	**FBROPTSM-200**	200

Cable Glands and Holder

M20 and M25 glands and holders

#	Order Code / Photo	Details
A	**M20-GLAND**	OSDR M20 gland for Ethernet cable.
B	**OSDR-HOLD-2**	Cable holder for fastening 2 x **M20-GNAND** (includes 2 x tie wraps: L = 100 mm, D = 18 mm, W = 2.5 mm).
C	**M25-GLAND**	OSDR M25 gland for Fiber optic cable.
D	**OSDR-HOLD-5**	Cable holder for fastening 4 x **M20-GNAND** and 1 x **M25-GLAND** (includes 5 x tie wraps: L = 100 mm, D = 18 mm, W = 2.5 mm).

Power Injectors

Indoor power injectors

#	Order Code / Photo	Description
A	**POE-AC75-ID**	Indoor AC POE – **75 W** (Wall installation materials are not included).
B	**POE-ID-AC72**	Indoor AC POE – **72 W** (Wall installation materials are not included).
C	**POE-AC56-IDH**	Indoor AC POE – **56 W** (Wall installation materials are not included).
D	**IDU-O4P**	Indoor OmniBAS™-4P (provides PoNE-enabled interfaces to up to 4 x OSDR units through 4 x GbE interfaces).

Power Injectors, Continued

Outdoor power injectors

#	Order Code / Photo	Description
A	**PONE-OD-DC** 	Outdoor DC PoNE – **60 W** • For wall installation the package includes: − 4 x screws and wall plugs. − 1 x M4 grounding terminal (for terminating 6 mm^2 grounding cable (**GND-CAB6-ID**)). • For pole installation the **INST-PONE-PL** is required.
B	**PONE-OD67-AC** 	Outdoor AC PONE – **62.7 W** • For wall installation the package includes: − 1 x M5 grounding steel nut (for terminating 16 mm^2 grounding cable (**GND-KIT16-OD**). − 2 x M20 steel cable glands (for Ethernet cable (**ETH-CAB-SFTP**) with RJ-45 (**ST-RJ45**) connector). − 1 x AC power connector (for terminating AC power supply cable **AC-PWR-CAB**). − 2 x washers, screws and wall plugs. • For pole installation the **INST-PONE-PL2** is required.

SFP

Electrical SFP module

Oder Code / Photo	Description
SFP-ELGFE-IN	Electrical SFP for 10/100/1000 Base-T operation.

Optical SFP module

#	Order Code	Description
A	**SFP-MM-500M**	SFP, multi-mode, up to 500 m, 1.25 Gbit/s, 850 nm.
B	**SFP-SM-10KM**	SFP, single mode, up to 10 Km, 1.25 Gbit/s, 1310 nm.
C	**SFP-SM-40KM**	SFP, single mode, up to 40 Km, 1.25 Gbit/s, 1310 nm.
D	**SFP-SM-80KM**	SFP, single mode, up to 80 Km, 1.25 Gbit/s, 1550 nm.

Ancillaries

Others

Item	Order Code / Photo	Description
A	**CAB-TIE-UV**	Cable tie, 500 x 12.5 mm, black, UV-resistant. One tie is recommended per cable meter.
B	**ST-RJ45**	RJ-45 connector, shielded for S-FTP cable termination (**ETH-CAB-SFTP**).
C	**ETH-SRG-OD68**	Outdoor lightning surge protector with IP68 ingress protection for Ethernet lines (one **ETH-SRG-OD68** protects one Ethernet line). **Grounding** An M4 grounding screw is pre-installed on the device for connection with 16 mm² grounding cable. Can be combined with **GND-KIT16-OD** (not included).

Others

Tool kit

Item	Order Code / Photo	Description
A	**SEC-ANT-XPOL-KIT**	Tool kit for adjusting the antenna verticality with respect to the ground.

Tools

Item	Order Code / Photo	Description
A	**CRIMP-TOOL-S**	Hand crimping tool for RJ-45 connector (**ST-RJ45**).
B	**TOOL-M20**	Optional tool for M20 gland. Used for installation of: • OSDR 2 x M20 glands side-by-side • Outdoor AC power injector (**PONE-OD67-AC**) M20 gland.

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3. Before Starting the Installation

Scope   This chapter describes all the prerequisites that must be considered prior to installing the OSDR equipment.

Topics   The chapter includes the following topics:

3.1. Radio Unit View

Receptacles

#	Marking	Description	Use
A	**GbE2**	Gigabit Ethernet, Electrical RJ-45 (100/1000 Base-T).	To connect Ethernet (S-FTP) cable for traffic / inband management and power via power injector.
B	**FE**	Fast Ethernet, RJ-45 (100 Base-T).	To connect Ethernet (S-FTP) cable for outband management / power via power injector.
	PROTECT		To connect Ethernet (S-FTP) cable for protection (OSDR Hub (1+1)).
C	**-**	-	Reserved for future use.
D	**-**	-	Reserved for future use.
E	**GbE1**	Gigabit Ethernet, SFP cage.	To connect SFP module (electrical / optical) for traffic and inband management.

Continued on next page

Radio Unit View, Continued

Label

#	Description
1	Product description.
2	Frequency band.
3	OSDR determination as **L**ow or **H**igh in the link pair.
4	Duplex spacing (MHz).
5	Sub-band (01 up to 18).
6	Transmit frequencies.
7	Receive frequencies.

Radio Unit View, Continued

Other points
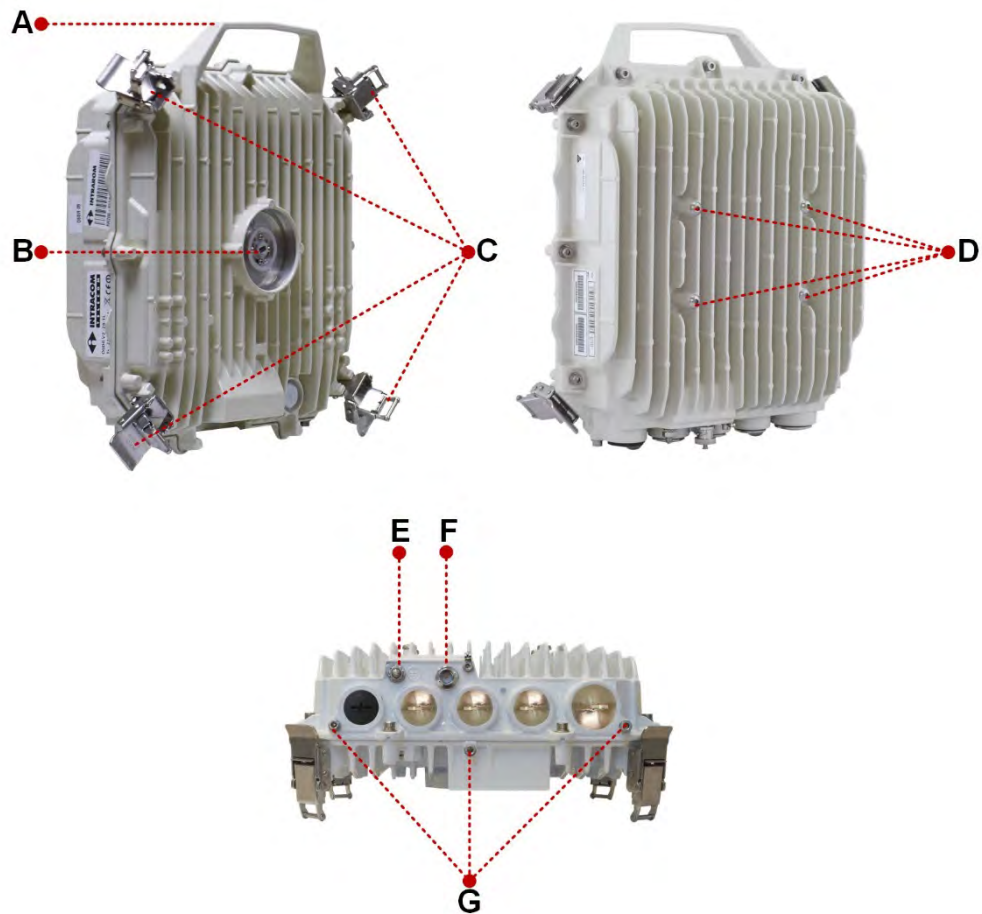
#	Marking	Description	Use
A	**-**	Anchor point	To carry OSDR unit.
B	**-**	Wave guide	To install antenna feeder.
C	**-**	Clamps	To mount antenna.
D	**-**	Female threads for M5 screws.	To install mounting kit for panel antenna.
E	**GND**	Enclosure grounding terminal.	To connect 16 mm^2 grounding cable.
F	**RSSI**	Receive signal level indication.	To connect the RSSI cable for measuring receive signal in volts.
G	**-**	Female threads for screws.	To install cable holder.

3.2. Radio Unit Cabling

Introduction   This topic describes the cabling overview, as follows:

Description	Page
Gigabit ETH cable for service Traffic, Inband Management and Powering	29
Fiber Optic cable for service Traffic and Inband Management / Gigabit Ethernet (S-FTP) cable for service Powering	37

> **Note**   The following instructions refers to cabling overview **without** using any additional device for lightning surge protection.

Gigabit ETH cable for service Traffic, Inband Management and Powering

Cable length restriction

The Gigabit Ethernet (S-FTP) cable for service traffic, inband management and external powering applies to the following restriction:

The **maximum length** of Gigabit Ethernet (S-FTP) cable (Cat5E or Cat6), between **OSDR receptacle (GbE2)** and **customer network receptacle** cannot exceed 100 meters.

Gigabit ETH cable for service Traffic, Inband Management and Powering, Continued

Cabling overview using AC POE

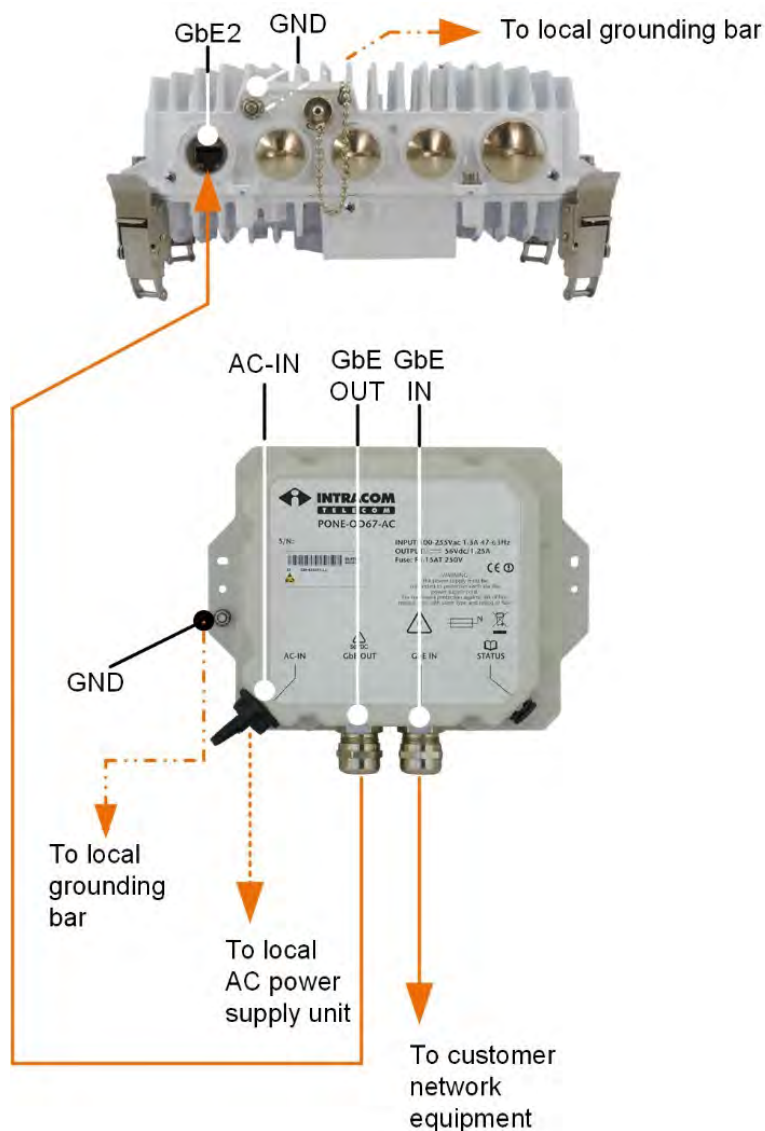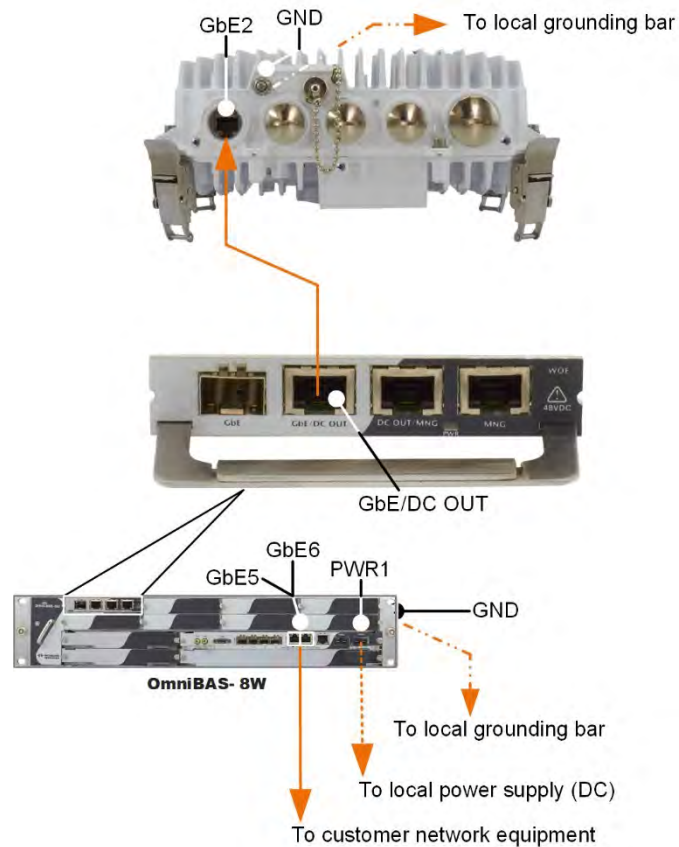The following schematic shows a cabling overview of OSDR radio unit when powering is through an **indoor AC POE (75W)**:

Marking	Cable Type
GbE#2 and OUT	Gigabit Ethernet (S-FTP) cable for traffic, inband management and superimposed DC power.
IN	Gigabit Ethernet (S-FTP) cable for traffic and inband management.
AC INPUT	AC power supply cord.
GND	Grounding cable 16 mm^2 for radio unit.

Gigabit ETH cable for service Traffic, Inband Management and Powering, Continued

Cabling overview using AC POE, continued

The following schematic shows a cabling overview of OSDR radio unit when powering is through an **indoor AC POE (72W)**:

Marking	Cable Type
GbE#2 and POE	Gigabit Ethernet (S-FTP) cable for traffic, inband management and superimposed DC power.
LAN	Gigabit Ethernet (S-FTP) cable for traffic and inband management.
AC INPUT	AC power supply cord.
GND	Grounding cable 16 mm² for radio unit and 6 mm² for POE.

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Gigabit ETH cable for service Traffic, Inband Management and Powering, Continued

Cabling overview using AC POE, continued

The following schematic shows a cabling overview of OSDR radio unit when powering is through an **indoor AC POE (56W)**:

Marking	Cable Type
GbE#2 and OUT	Gigabit Ethernet (S-FTP) cable for traffic, inband management and superimposed DC power.
IN	Gigabit Ethernet (S-FTP) cable for traffic and inband management.
AC INPUT	AC power supply cord.
GND	Grounding cable 16 mm^2 for radio unit.

Gigabit ETH cable for service Traffic, Inband Management and Powering, Continued

Cabling overview using DC PoNE

The following schematic shows a cabling overview of OSDR radio unit when powering is through an **outdoor DC PoNE**:

Marking	Cable Type
GbE#2 and Gbe#OUT	Gigabit Ethernet (S-FTP) cable for traffic, inband management and superimposed DC power.
Gbe#IN	Gigabit Ethernet (S-FTP) cable for traffic and inband management.
INPUT	DC power supply cable.
GND	Grounding cable 16 mm^2 for radio unit and 6 mm^2 for PoNE.

Gigabit ETH cable for service Traffic, Inband Management and Powering, Continued

Cabling overview using DC PoNE, continued

The following schematic shows a cabling overview of OSDR radio unit when powering is through an **outdoor AC PoNE**:

Marking	Cable Type
GbE#2 and GbE#OUT	Gigabit Ethernet (S-FTP) cable for traffic, inband management and superimposed DC power.
GbE#IN,	Gigabit Ethernet (S-FTP) cable for traffic and inband management.
AC-IN	AC power supply cable.
GND	Grounding cable 16 mm^2.

Gigabit ETH cable for service Traffic, Inband Management and Powering, Continued

Cabling overview using DC PoNE, continued

The following schematic shows a cabling overview of OSDR radio unit when powering is through an **indoor OmniBAS™ 4W/8W**:

Marking	Cable Type
GbE#2 and GbE/DC OUT	Gigabit Ethernet (S-FTP) cable for traffic, inband management and superimposed DC power.
GbE#5-6	Gigabit Ethernet (S-FTP) cable for traffic and inband management.
INPUT	DC power supply cable.
GND	Grounding cable 16 mm² for radio unit and 4 mm² for OmniBAS™ – 4W/8W.
PWR1	OmniBAS™ – 4W/8W DC power supply cable.

Continued on next page

Gigabit ETH cable for service Traffic, Inband Management and Powering, Continued

Cabling overview using DC PoNE, continued

The following schematic shows a cabling overview of OSDR radio unit when powering is through an **indoor OmniBAS^{TM} 4P**:
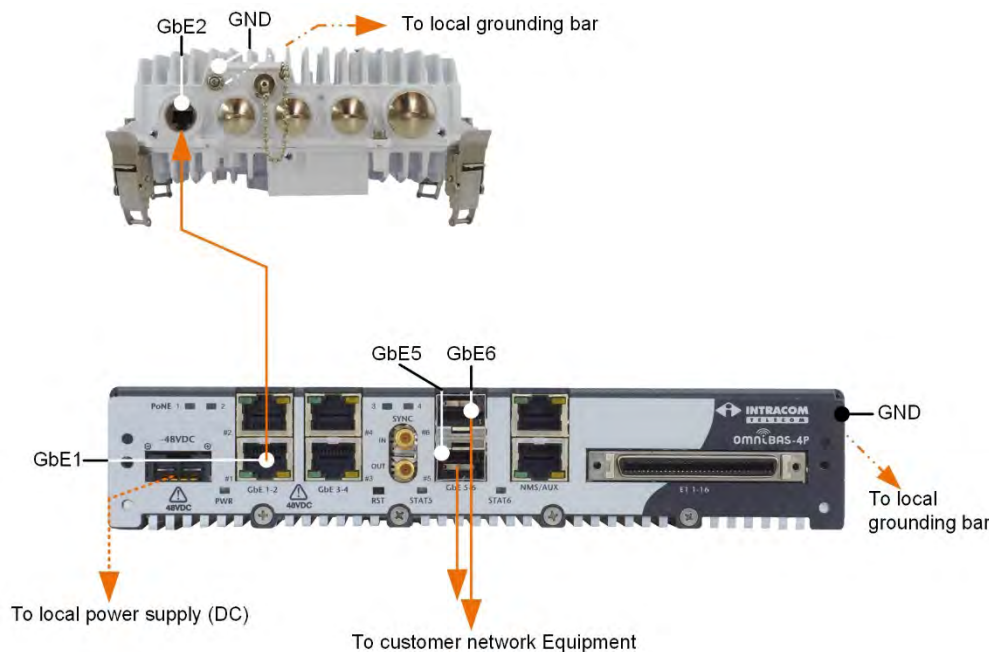
Marking	Cable Type
GbE#1 (OmniBAS^{TM}-4P) and GbE#2	Gigabit Ethernet (S-FTP) cable for traffic, inband management and superimposed DC power.
GbE#5, 6	Gigabit Ethernet (S-FTP) cable with Gigabit Ethernet Electrical SFP module **or** Fiber Optic cable with Optical SFP module for providing traffic and inband management to customer network equipment.
GND	Grounding cable 16 mm^2 for radio unit and 4 mm^2 for OmniBAS^{TM} – 4W/8W.
-48VDC	OmniBAS^{TM} – 4P DC power supply cable.

Fiber Optic cable for service Traffic and Inband Management / Gigabit Ethernet (S-FTP) cable for service Powering

Fiber optic cable length restrictions

The following tables shows the maximum length of optical fiber cables in combination with the SFP type:

Optical Fiber Cable Lengths combined with Gigabit Ethernet SFP:

Optical Fiber Cable Type	SFP Details / Order Code	Max Length (m)
Single mode	1000 Base-LX	5,000
	1000 Base-LX10 **(SFP-SM-10KM)**	10,000
	1000 Base-EX **(SFP-SM-40KM)**	40,000
	1000 Base-ZX **(SFP-SM-80KM)**	80,000
OM1 (62.5/125) Multi-mode	1000 Base-SX **(SFP-MM-500M)**	275
OM2 (50/125) Multi-mode		550

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Fiber Optic cable for service Traffic and Inband Management / Gigabit Ethernet (S-FTP) cable for service Powering, Continued

Gigabit Ethernet (S-FTP) cable length restriction – when AC POE is used

The Gigabit Ethernet (S-FTP) cable for service external powering applies to the following restriction:

The **maximum length** of Gigabit Ethernet (S-FTP) cable (Cat5E or Cat6), between **OSDR receptacle (GbE2** or **FE)** and **power injector receptacle (POE** or **OUT)** cannot exceed 200 meters (1 x 200 meter cable).

> 🖉 **Note** For complete cabling overview refer to <u>Cabling overview using AC POE</u> on page <u>39</u>.

Gigabit Ethernet (S-FTP) cable length restriction – when DC PoNE is used

The Gigabit Ethernet (S-FTP) cable for service external powering applies to the following restriction:

The **maximum length** of Gigabit Ethernet (S-FTP) cable (Cat5E or Cat6), between **OSDR receptacle (GbE2** or **FE)** and **power injector receptacle** (**Gbe OUT/NMS OUT** for **PONE-OD-DC** or **DC OUT/MNG – GbE/DC OUT** for **OmniBAS™-8W** or **GbE1/GbE2** for **OmniBAS™-4P**) cannot exceed 200 meters (requires 2 x 200 meter cables in parallel).

See below an example using **PONE-OD-DC**
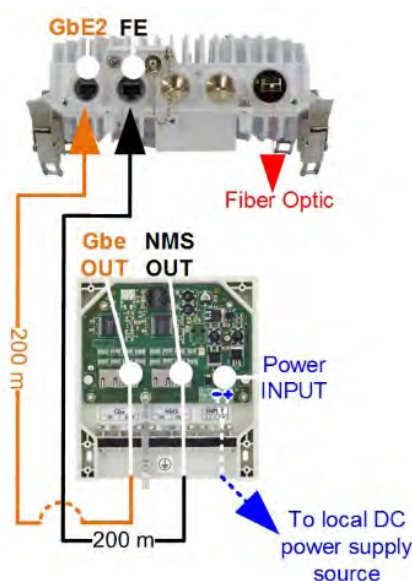
> 🖉 **Note** For complete cabling overview refer to <u>Cabling overview using DC PoNE</u> on page <u>42</u>.

Continued on next page

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Fiber Optic cable for service Traffic and Inband Management / Gigabit Ethernet (S-FTP) cable for service Powering, Continued

Cabling overview using AC POE

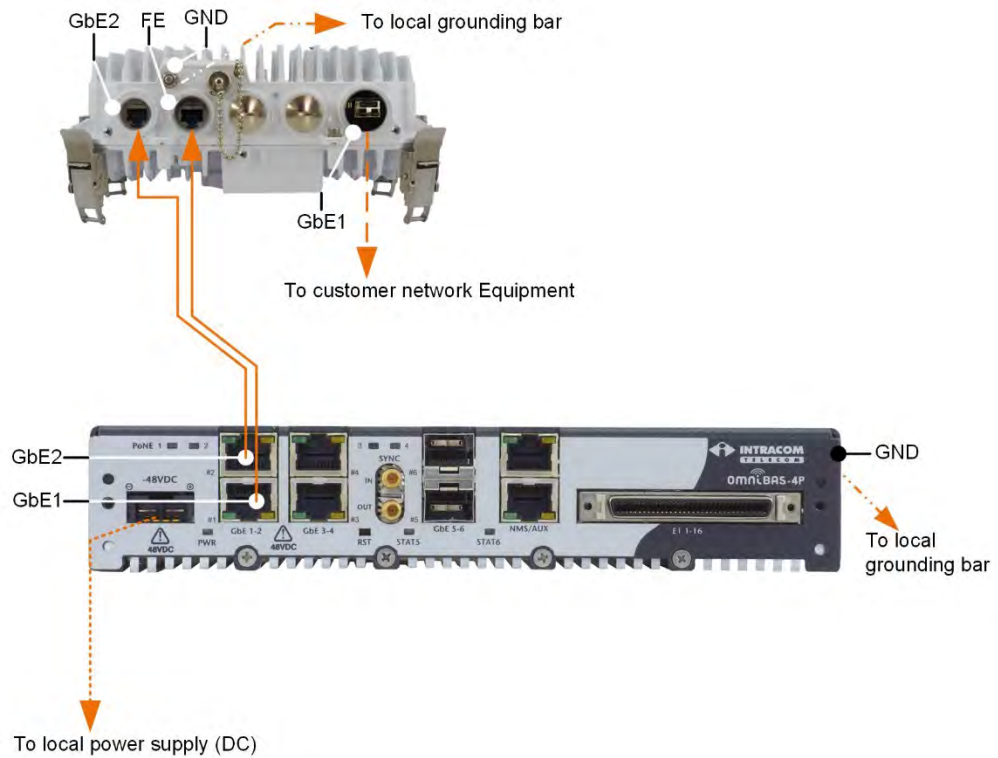The following schematic shows a cabling overview of OSDR radio unit when powering is through an **indoor AC POE (75W)**:

Marking	Cable Type
FE and OUT	Gigabit Ethernet (S-FTP) cable for superimposed DC power.
GbE#1	Fiber Optic cable with Optical SFP module for traffic and inband management.
AC INPUT	AC power supply cord.
GND	Grounding cable 16 mm^2 for radio unit.

Note External powering can be provided either by GbE2 or FE.

Continued on next page

Fiber Optic cable for service Traffic and Inband Management / Gigabit Ethernet (S-FTP) cable for service Powering, Continued

Cabling overview using AC POE, continued

The following schematic shows a cabling overview of OSDR radio unit when powering is through an **indoor AC POE (72W)**:

Marking	Cable Type
FE and POE	Gigabit Ethernet (S-FTP) cable for superimposed DC power.
GbE#1	Fiber Optic cable with Optical SFP module for traffic and inband management.
AC INPUT	AC power supply cord.
GND	Grounding cable 16 mm^2 for radio unit and 6 mm^2 for POE.

📝 Note — External powering can be provided either by GbE2 or FE.

Continued on next page

Fiber Optic cable for service Traffic and Inband Management / Gigabit Ethernet (S-FTP) cable for service Powering, Continued

Cabling overview using AC POE, continued

The following schematic shows a cabling overview of OSDR radio unit when powering is through an **indoor AC POE (56W)**:

Marking	Cable Type
FE and OUT	Gigabit Ethernet (S-FTP) cable for superimposed DC power.
GbE#1	Fiber Optic cable with Optical SFP module for traffic and inband management.
AC INPUT	AC power supply cord.
GND	Grounding cable 16 mm^2.

📝Note   External powering can be provided either by GbE2 or FE.

Continued on next page

Fiber Optic cable for service Traffic and Inband Management / Gigabit Ethernet (S-FTP) cable for service Powering, Continued

Cabling overview using DC PoNE

The following schematic shows a cabling overview of OSDR radio unit when powering is through an **outdoor DC PoNE**:

Marking	Cable Type
GbE#2, FE, NMS#OUT and Gbe OUT	Gigabit Ethernet (S-FTP) cable for superimposed DC power.
GbE#1	Fiber Optic cable with Optical SFP module for traffic and inband management.
INPUT	DC power supply cable.
GND	Grounding cable (16 mm^2 for radio and 6 mm^2 for PoNE).

Continued on next page

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Fiber Optic cable for service Traffic and Inband Management / Gigabit Ethernet (S-FTP) cable for service Powering, Continued

Cabling overview using DC PoNE, continued

The following schematic shows a cabling overview of OSDR radio unit when powering is through an **indoor OmniBAS™ 4W/8W:**
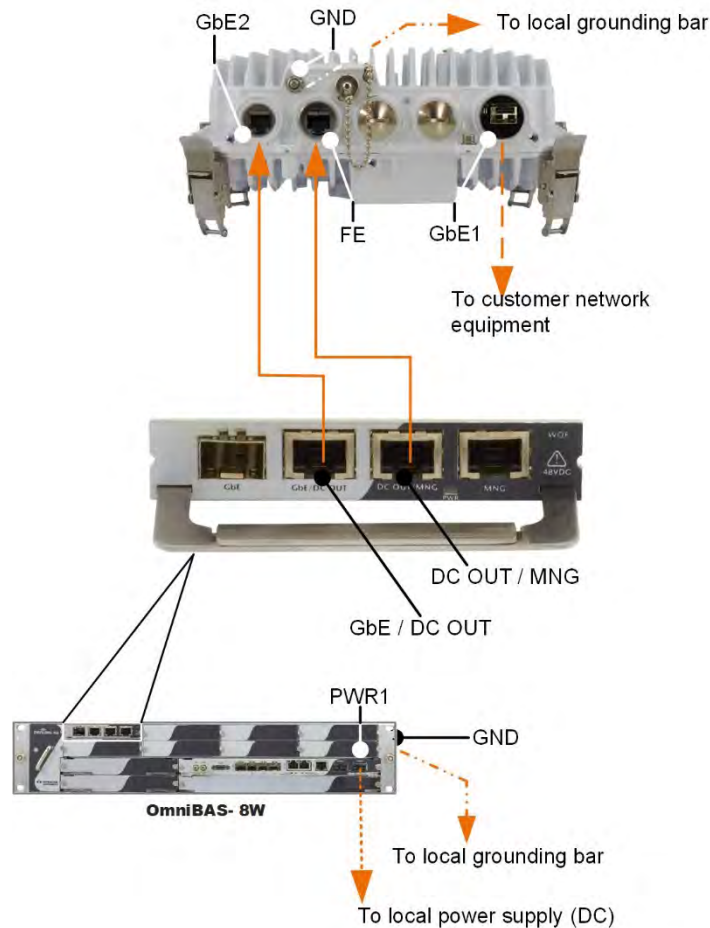
Marking	Cable Type
GbE#2, FE, GbE/DC OUT and DC OUT/MNG	Gigabit Ethernet (S-FTP) cable for superimposed DC power.
GbE#1	Fiber Optic cable with Optical SFP module for traffic and inband management.
INPUT	DC power supply cable.
GND	Grounding cable (16 mm^2 for radio unit and 4 mm^2 for OmniBAS™ – 4W/8W).
PWR1	OmniBAS™ – 4W/8W DC power supply cable.

Continued on next page

Fiber Optic cable for service Traffic and Inband Management / Gigabit Ethernet (S-FTP) cable for service Powering, Continued

Cabling overview using DC PoNE, continued

The following schematic shows a cabling overview of OSDR radio unit when powering is through an **indoor OmniBAS™ 4P**:

Marking	Cable Type
GbE#1 - GbE#2 (OmniBAS™-4P) & GbE#2 - FE (OSDR)	Gigabit Ethernet (S-FTP) cable for superimposed DC power.
GbE#1 (OSDR)	Fiber Optic cable with Optical SFP module for traffic and inband management.
GND	Grounding cable 16 mm² for radio unit and 4 mm² for OmniBAS™ – 4W/8W.
-48VDC	OmniBAS™ – 4P DC power supply cable.

3.3. Installation Tools

Prerequisites   It is installer responsibility to provide the tools for equipment installation.

Equipment installation

Item	Tool / Photo	Description
1		Adjustable torque U-wrench tool (up to 29 mm opening and supporting max tightening torque 40 Nm). Used for tightening screws and nuts.
2	HEXAGON male TORX HEXAGON female CROSS	Adjustable torque wrench tool with bits (supporting max tightening torque 20 Nm). Used for tightening screws and nuts.
3		Set of allen keys. Used for radio polarization change and cable holder installation.
4		Digital inclinometer with magnetic base. Used for sectoral antennas alignment works.
5		13 mm wrench. Used for sectoral antenna verticality works.

Continued on next page

Installation Tools, Continued

Cables Termination

Type of cables to be terminated:

- Ethernet (S-FTP) cable.
- AC & DC power supply cables for outdoor power injectors.
- 6mm^2 and 16 mm^2 outdoor yellow/green grounding cables.

Item	Tool / Photo	Description
1		Blade.
2		Cable cutter.
3		Pliers (long nose).
4		See order code **CRIMP-TOOL-S** on page 23.
5		Ethernet cable tester.
6		Crimping tool for 6 mm^2 and 16 mm^2 grounding cable.
7		Hot air gun.
8		Soldering iron.
9		Solder.

Specific works

Item	Tool / Photo	Description
1		Drill machine with 5 mm bit. Used for wall installation of outdoor power injectors.
2		See order code **TOOL-M20** on page on page 23.

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3.4. Site Prerequisites

Site survey

Site survey should be done before start the installation taking in consideration the following:

Premises information
- Site details (address, contact persons, GPS and/or map co-ordinates, etc.).
- Site access and storage information (means of transport, equipment storage and lifting information, etc.).
- Site location maps.

Network planning
- Site Coordinates.
- LOS verification (Hub – TS).
- Rooftop information (height, status, access, dimensions, layout, etc.).
- Information about pre-existing indoor/ outdoor equipment.
- Available mounting space (on the buildings' roofs) to reserve for the installation of the outdoor equipment.

Site-specific information
- Mechanical specifications of masts/ towers (type, dimensions/ diameter, material, exterior finishing, etc.).
- Location of appropriate grounding points (bar or terminals).
- Location of appropriate power supply distribution points.
- Location of cable conduits available for routing the cables.
- Location of the network port distributors.
- Total length of the cables required.

Site Prerequisites, Continued

Preparation of the installation premises
- Access to the installation premises must be facilitated during the installation period.
- Entrances must be large enough to enable the easy transportation of the new equipment.
- The floor must be level, smooth and able to bear the load of the equipment.
- The roof must be engineered to bear the weight of the service personnel and the outdoor equipment.

Network port distributors
- Suitable electrical network port distributor should be available.
- The exact location of the network port distributor, as well as the network ports to reserve, should be known prior to installing the equipment.
- Also, all the reserved ports on the network port distributors should be qualified and tested before realizing the network connections with the equipment.

Power supply cable routing
Routing of AC or DC power supply power cable should be implemented as prescribed by the local regulations regarding outdoor electrical installations.

Cable conduits
Appropriate cable conduits should exist for the routing of installed cables.

Grounding
Ensure the following:

- To make a protective earth connection, use the grounding point located close to the radio unit.
- A grounding point (designated GND) should be located close to the mounting position of the radio unit **(0 to 2 m).**
- The grounding point must be connected to grounding cable at least **16 mm²** diameter.
- An appropriate, low-resistance grounding system as specified by the local regulations is required.
- The equipment will be connected to this grounding point, via the supplied grounding cable. This can provides **only** partial protection against Lightning-induced power surges. For more information regarding equipment protection against Lightning-induced power surges please refer to Lightning & Surge protection.

Site Prerequisites, Continued

Lightning & Surge protection

A: For Ethernet (S-FTP) Cables:

Lighting surge protection device (LSP) is required to minimize possibility of equipment damage to any equipment connected to the unit from lighting induced surges.

For LSP device installation refer to Reference manuals item 4 on page 3.

B: Power Supply Cables (for power injector):

A power surge protection device (PSP) is required to minimize possibility of equipment damage from lightning induced surges or power supply surges.

For PSP device installation refer to Reference manuals item 1 on page 3.

For LSP and PSP details and instructions refer to Reference manuals item 1 on page 3.

Circuit breakers

The following table provides the circuit breakers characteristics for powering of power injectors:

Powering Type	Required Circuit Breaker
Powering via indoor AC PoE	• single-pole MCB 6 A • 230 V AC (voltage rating) • C-curve (for Industrial Applications)
Powering via outdoor DC PoNE	• single-pole MCB 6 A • min 72 V DC (voltage rating) • C-curve (for Industrial Applications)
Powering via outdoor AC PoNE	• single-pole MCB 6 A • 230 V AC (voltage rating) • C-curve (for Industrial Applications)

> **✎ Note** If the plug of power supply cord is intended to be the power disconnect device of the equipment, arrange in the installation to connect the equipment to a socket-outlet installed close to the power injector and easily accessible.

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Site Prerequisites, Continued

Pole installation

- The pole construction should be rust free and strong enough to handle the weight and restrict movement due to air pressure.

- Should be perfectly perpendicular to allow correct alignment of the antenna.

- The antenna mounting kit should roughly point to the direction of the opposite unit (based on the site survey data).

- Each radio and antenna unit must be installed according to the radio planning data for pole installation (height, degrees e.t.c).

- The outdoor equipment, inclusive of the radio transceiver(s) and antenna(s), should be mounted on a mast or on a tower.

Site Prerequisites, Continued

4. Installation Procedures

Installation procedure overview

This chapter describes the mechanical installation and cabling of the OSDR equipment.

The following tables shows with order all the necessary steps for installation completion:

Action	Description	Page	Photo
1	Radio Unit and Antenna	52	
2	Radio Unit Grounding Cable	76	
3	Radio Unit Ethernet (S-FTP) Cable	77	
4	Power Injector	82	
5	Radio Unit Optical Cable (Optional)	83	
6	Radio Unit Cable Holder	88	

4.1. Radio Unit and Antenna

Sectoral and Parabolic Antenna

Introduction   Apply this procedure for installing the OSDR to sectoral/parabolic antenna.

> 📝 Note For sectoral antennas the procedure includes the alignment steps, also.

> 📝 Note The antenna is capable to be installed in both side of the pole. The following photos are indicative of the installation in the left orientation of the sectoral/parabolic models.

Prerequisites   ⚠️ It is very important to mount the antenna exactly as described to INSTALLATION INSTRUCTION LEAFLET (included in the antenna package).
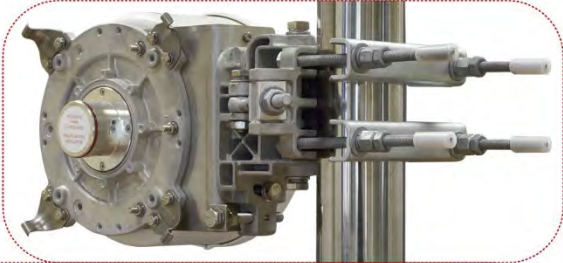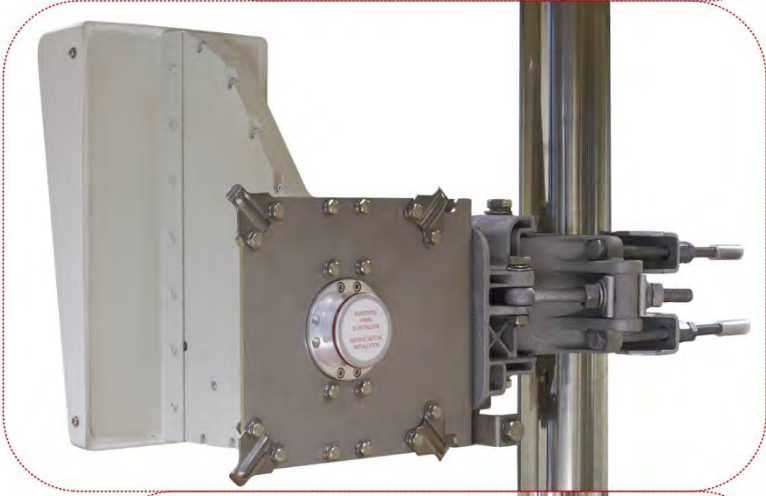
Tools and materials

#	Description
Tools	• Adjustable torque U-wrench. • Allen key.
Materials	OSDR and antenna.

Continued on next page

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Sectoral and Parabolic Antenna, Continued

Procedure   To **install** the OSDR onto the sectoral/parabolic antenna and to **perform antenna alignment**, proceed as follows:

Step	Action
1	The antenna installation should look as follows. **Sectoral 26/28/32 GHz** **Sectoral 10.5 GHz** **Parabolic 10.5/26/28/32 GHz**

Sectoral and Parabolic Antenna, Continued

Procedure,
continued

Step	Action
2	Remove antenna protection label from the feeder, as shown below.

Sectoral and Parabolic Antenna, Continued

Procedure, continued

Step	Action
3	Radio unit and antenna should be adjusted for common polarization, as shown below. If the **LINK** polarization is **VERTICAL** then the feeders should be remained, as shown below:

OSDR 10.5 GHz

Sectoral antenna 10.5 GHz

OSDR 26/28 GHz

Sectoral antenna 26/28 GHz

Parabolic antenna 26/28 GHz

If the **LINK** polarization is **HORIZONTAL**, use the allen key to loosen the four screws at the waveguide port of the OSDR (do not remove the screws) and then **TURN** the polarizer, as shown below:

OSDR

Note How to change antenna polarization refer to antenna installation leaflet.

⚠ Do not over tighten the screws. Apply maximum tightening torque **0.6 Nm**.

Note The misalignment of slots between the movable part and the stationary part of the radio waveguide port is intentional and does not indicate a problem.

Continued on next page

Sectoral and Parabolic Antenna, Continued
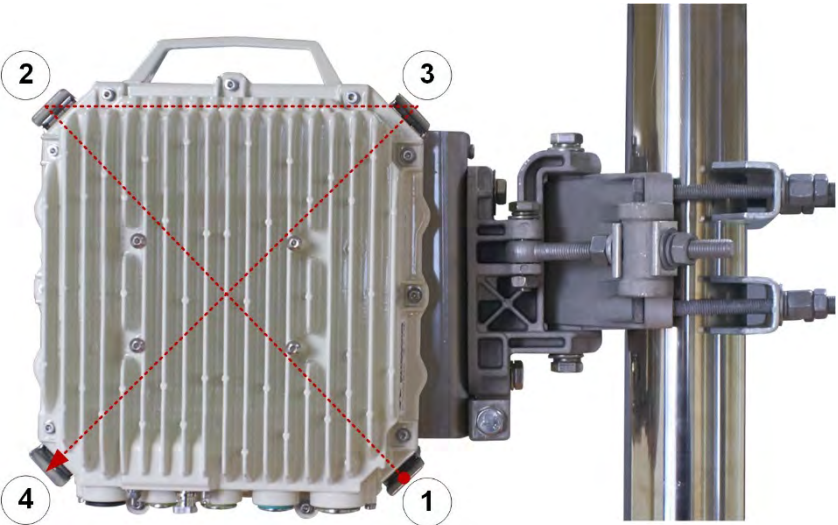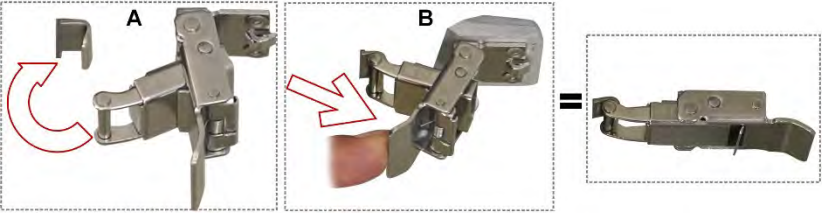
Procedure,
continued

Step	Action
4	Lubricate the O-ring with silicone grease, as shown below. • **For parabolic antenna continue to step 5.** • **For sectoral antenna 26/28/32 GHz go to step 8.** • **For sectoral antenna 10.5 GHz go to step 19.**
5	Unlock the four clamps of the radio unit,, as shown below.
6	Mount the OSDR onto the antenna, as shown below.

Sectoral and Parabolic Antenna, Continued
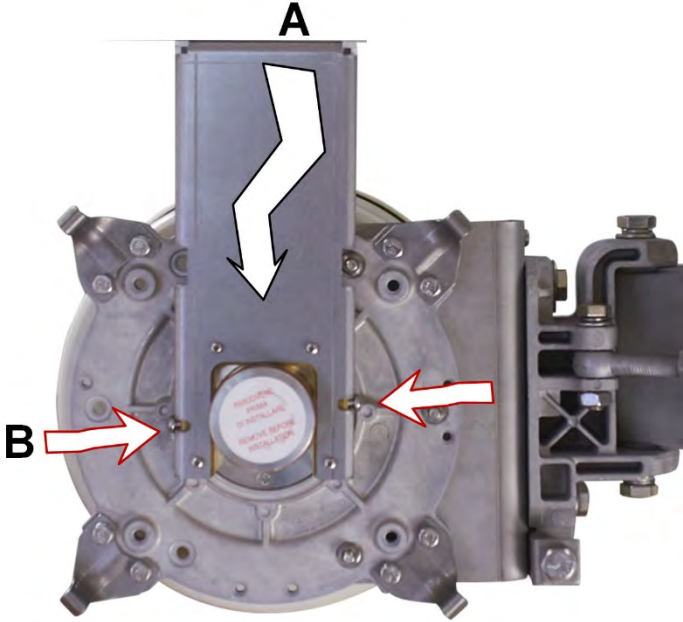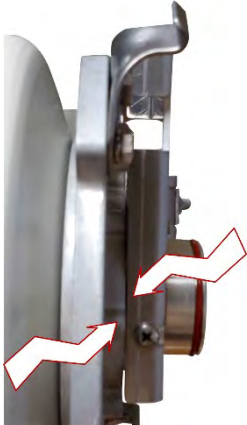
Procedure,
continued

Step	Action
7	Lock and secure all four clamps according to the pattern below.

Details of Clamps closing

End of procedure for parabolic antenna.

[Note] For parabolic antenna alignment refer to item 6 of

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Sectoral and Parabolic Antenna, Continued

Procedure, continued

Step	Action
8	Perform the following actions: A: Mount the tool onto the antenna radio wave feeder, as shown below. B: Use the cross screwdriver to screw the bolts and then fully tighten. ⚠ **Do not over tighten.** ⚠ Make sure no any gap between tool and antenna, as shown below.

Sectoral and Parabolic Antenna, Continued

Procedure, continued

Step	Action
9	Use the U-wrench key (13 mm) to loosen the 3 nuts, as shown below (**do not remove the nuts**).
10	Install the OSDR onto the antenna as described to steps 5, 6 and 7.

Sectoral and Parabolic Antenna, Continued

Procedure, continued

Step	Action
11	To correct the **antenna verticality** with respect to the ground, perform the following actions: A: Place the inclinometer, as shown below: B: Rotate (left-right) the radio unit till the inclinometer digital indicator reaches **0 degrees.**
12	Remove the OSDR.
13	Tighten the three M10 nuts (**see step 9**). DO NOT remove the XPOL tool. ⚠ • **Do not over tighten.** • For maximum tightening torque please follow the antenna installation leaflet (available in package).

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Sectoral and Parabolic Antenna, Continued
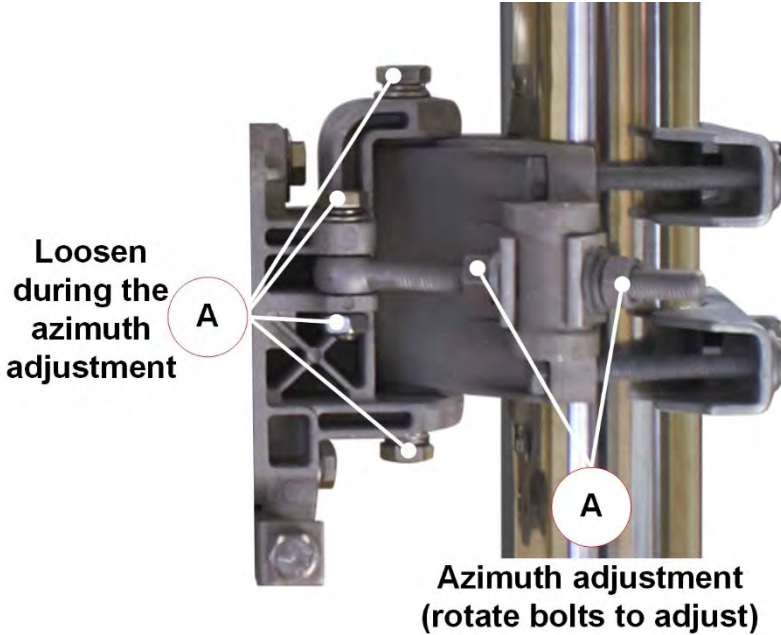
Procedure, continued

Step	Action
14	Install the OSDR onto the antenna as described to steps 5, 6 and 7.
15	To correct the **elevation angle** for matching with the RF planning data, perform the following actions: A: Place the inclinometer, as shown below. B: Use the U-wrench tool to perform **elevation adjustment**, as shown below. Perform adjustment till the inclinometer **reaches the tilt provided by RF planning.** **Loosen during the elevation adjustment** — A **Elevation adjustment (rotate bolt to adjust)** — B C: All elevation nuts and bolts should be tightened. ⚠️ • **Do not over tighten.** • For maximum tightening torque please follow the antenna installation leaflet (available in package).

Sectoral and Parabolic Antenna, Continued

Procedure, continued
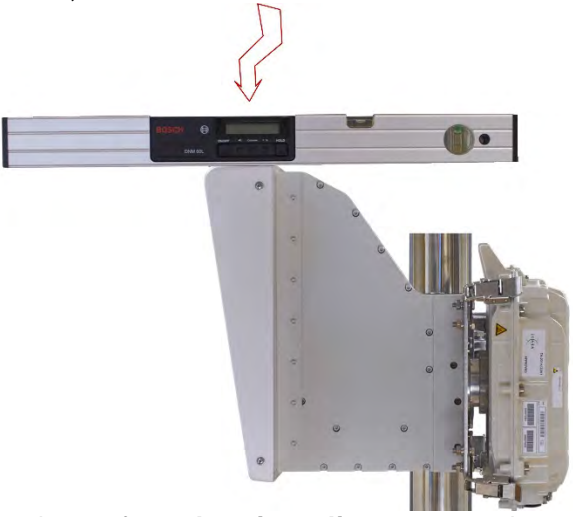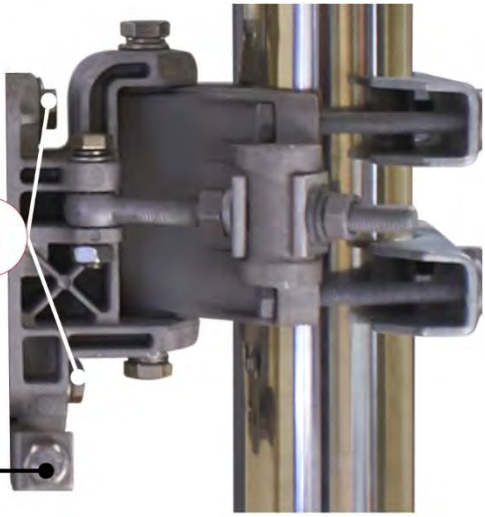
Step	Action
16	Remove the OSDR and the XPOL tool.
17	Install the OSDR onto the antenna as described to steps 5, 6 and 7.
18	Use the U-wrench tool to perform **azimuth adjustment**[1], as shown below.

Loosen during the azimuth adjustment

A

Azimuth adjustment
(rotate bolts to adjust)

A

⚠️ • **Do not over tighten.**
• For maximum tightening torque please follow the antenna installation leaflet (available in package).

End of procedure for sectoral 26/28/32 GHz.

---

[1] The values must be taken from RF planning team.

Sectoral and Parabolic Antenna, Continued
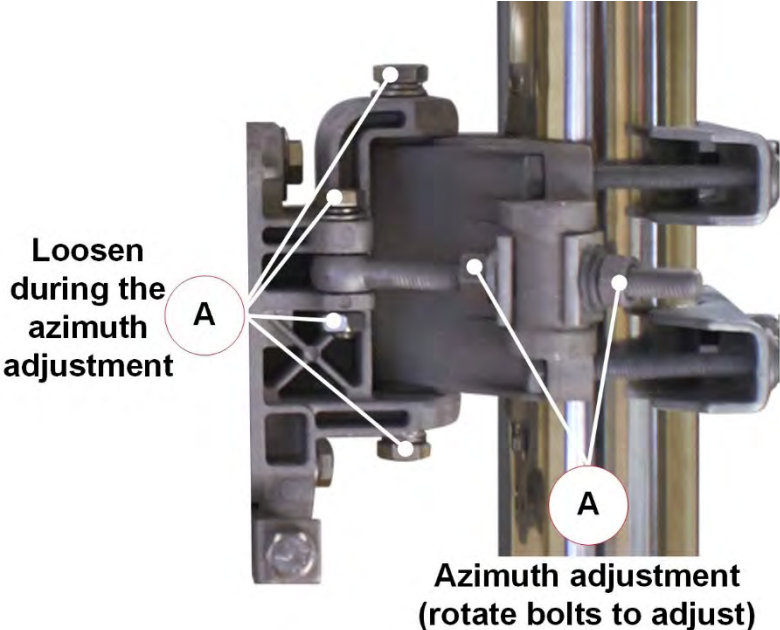
Procedure, continued

Step	Action
19	Install the OSDR onto the antenna as described to steps 5, 6 and 7.
20	To correct the **elevation angle** for matching with the RF planning data, perform the following actions: A: Place the inclinometer, as shown below. B: Use the U-wrench tool to perform **elevation adjustment**, as shown below. **Perform adjustment till the inclinometer reaches the desirable RF planning value.** C: All elevation nuts and bolts should be tightened. • **Do not over tighten.** • For maximum tightening torque please follow the antenna installation leaflet (available in package).

Sectoral and Parabolic Antenna, Continued

Procedure, continued

Step	Action
21	Use the U-wrench tool to perform **azimuth adjustment**[1], as shown below.

Loosen during the azimuth adjustment

Azimuth adjustment (rotate bolts to adjust)

⚠ • **Do not over tighten.**
• For maximum tightening torque please follow the antenna installation leaflet (available in package).

End of procedure for sectoral 10.5 GHz.

End of procedure.

---

[1] The values must be taken from RF planning team.

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Panel Antenna

Introduction   This topic describes the following procedures:

Description	See Page
Mounting kit installation procedure	66
Panel antenna installation procedure	71

Tools and materials

#	Description
Tools	• Adjustable torque U-wrench. • Adjustable torque wrench with bit (hexagon male and cross). • Allen key.
Materials	• **OSDR-ANT-MNT.** • **OSDR-PL-ANT-KIT.** • **GRS-PST.** • OSDR. • Panel antenna.

Mounting kit overview
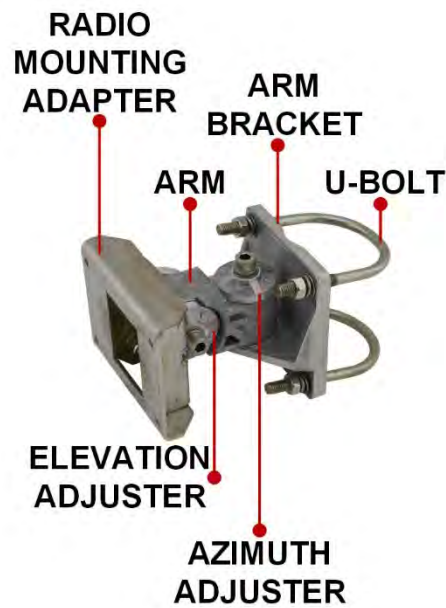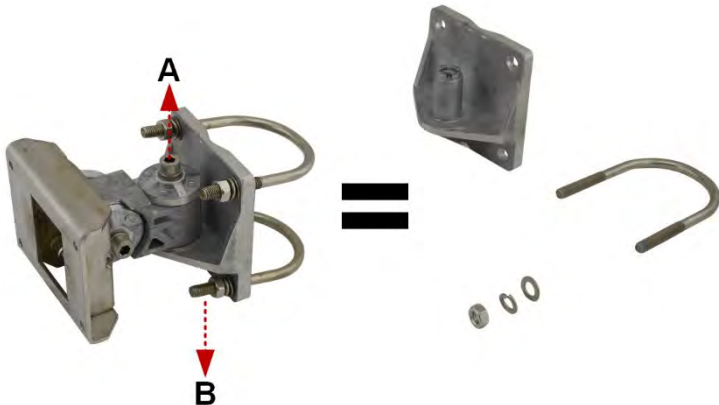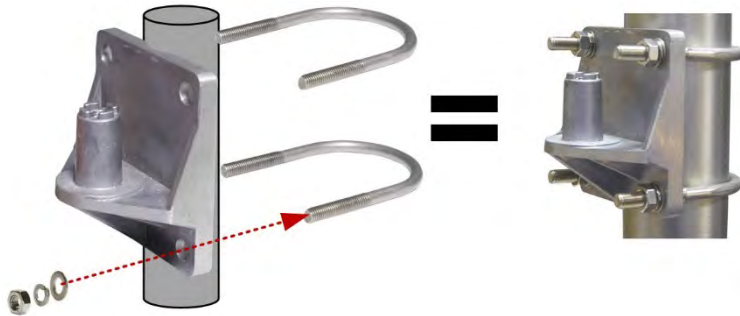
Panel Antenna, Continued

Mounting kit installation procedure
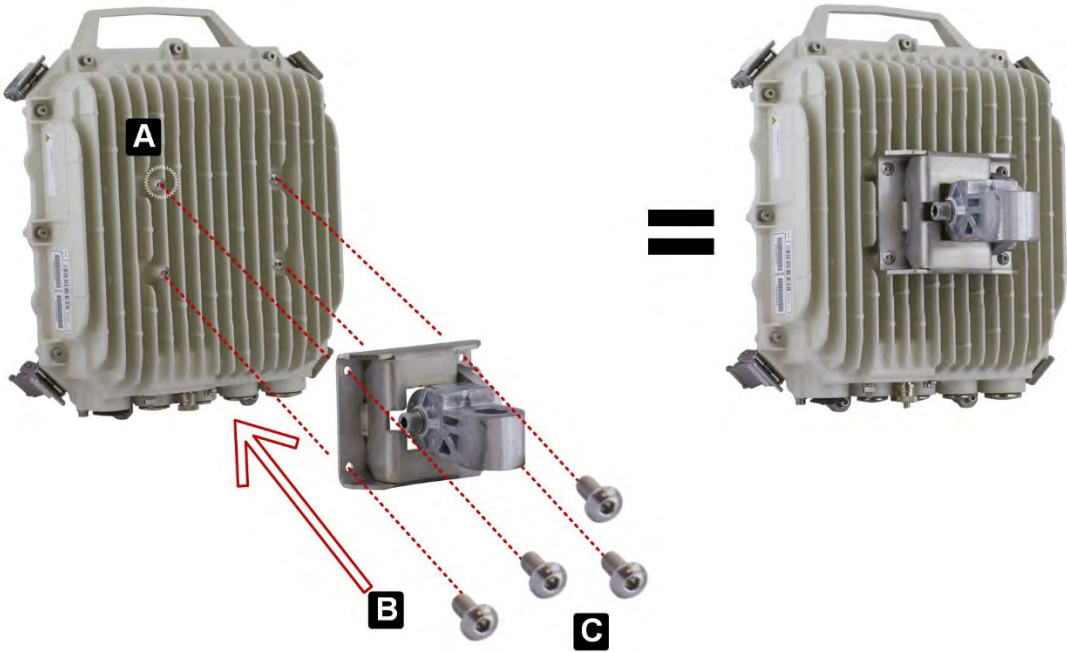
To install the mounting kit, proceed as follows:

Step	Action
1	Perform the following actions: A: Unscrew the azimuth adjuster screw. B: Release the u-bolts.
2	Place the arm bracket to the pole and install the two U-bolts, as shown below. Use the U-wrench to tighten (washer, lock washer and nut). ⚠️ **Do not over tighten.** Adjust the tool for max tightening torque **15 Nm**.

Panel Antenna, Continued
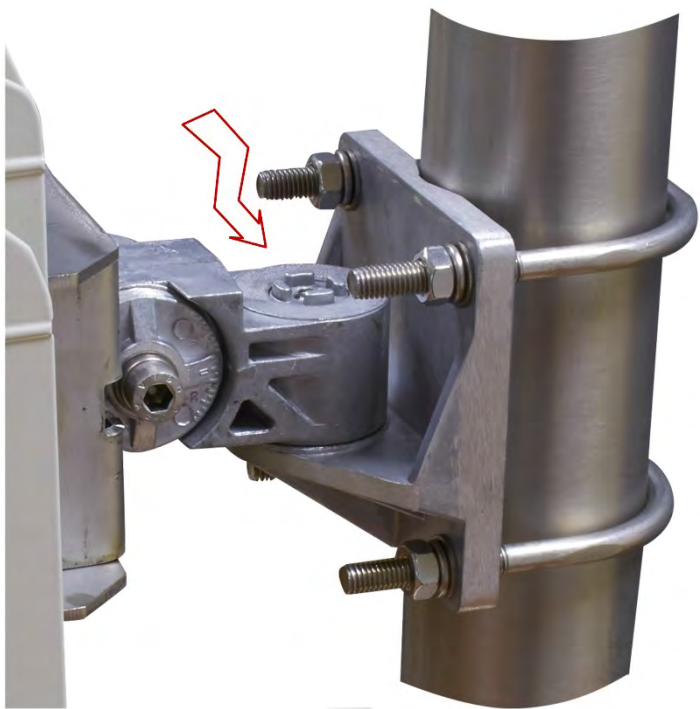
Mounting kit installation procedure, continued

Step	Action
3	Perform the following actions: A: Unscrew the four screws. B: Place the radio mounting adapter onto the OSDR, as shown below. C: Install and screw the four screws. ⚠️ **Do not over tighten.** Adjust the tool for max tightening torque **4.2 Nm**.

Panel Antenna, Continued
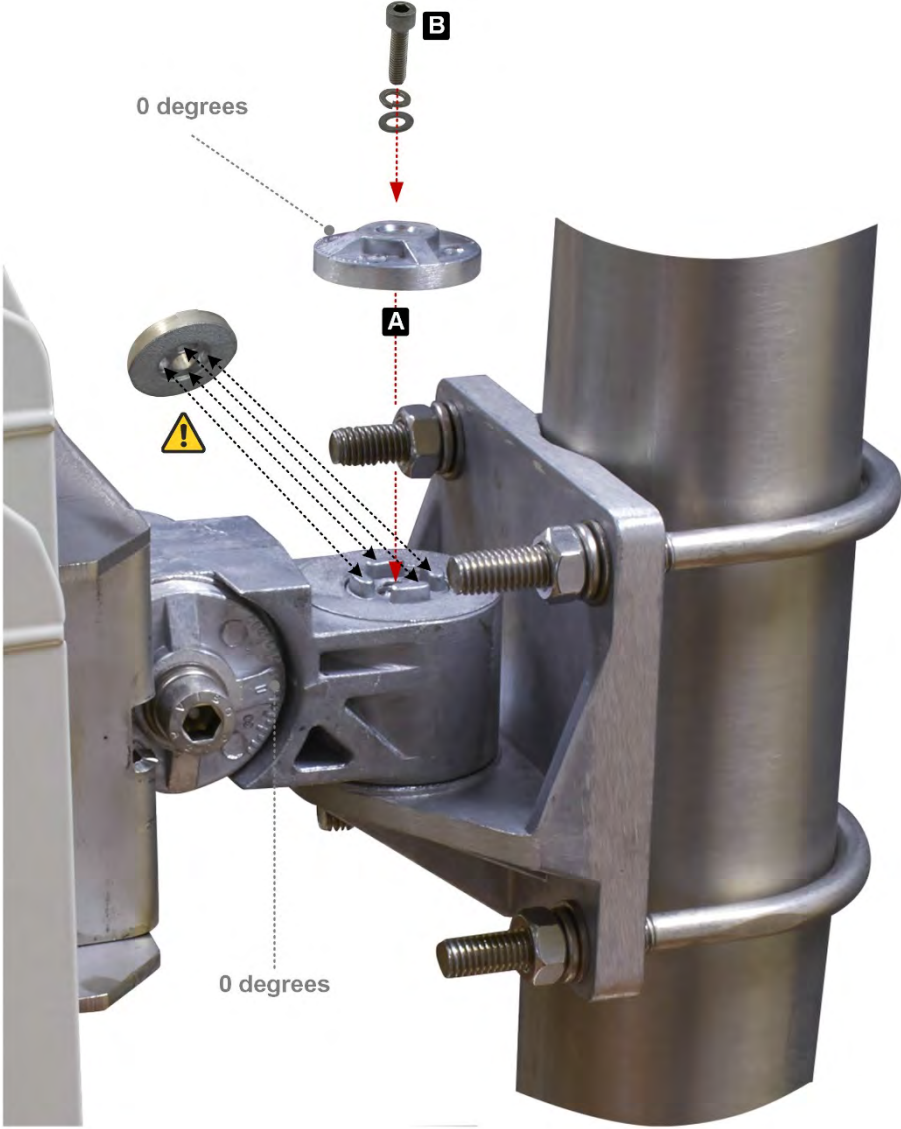
**Mounting kit
installation
procedure,**
continued

Step	Action
4	Insert arm into the arm bracket, as shown below.

Continued on next page

Panel Antenna, Continued

Mounting kit installation procedure, continued

Step	Action
5	Perform the following actions: A: Install the azimuth adjuster (taking into account the caution), as shown below. B: Install the azimuth adjuster bolt, as shown below (washer, lock washer and bolt).

Panel Antenna, Continued

Mounting kit installation procedure, continued

Step	Action
6	Use the adjustable wrench to fully tighten the adjuster bolt. ⚠️ **Do not over tighten.** Adjust the tool for max tightening torque **20 Nm**. The installation should look as follows.
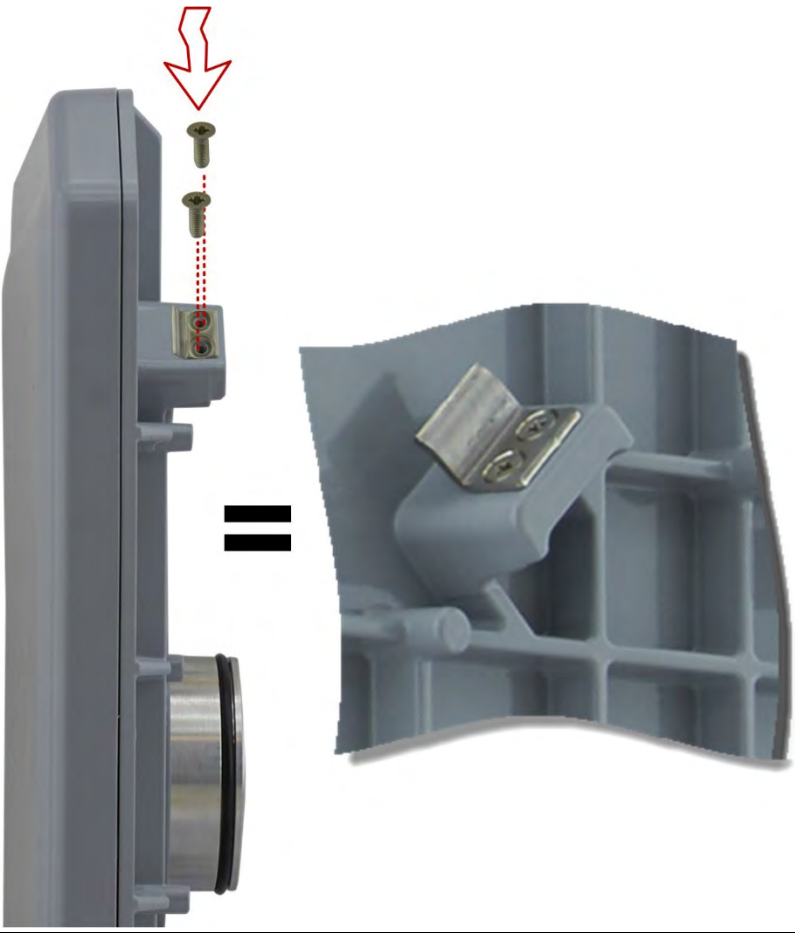
End of procedure.

Panel Antenna, Continued

Panel antenna installation procedure
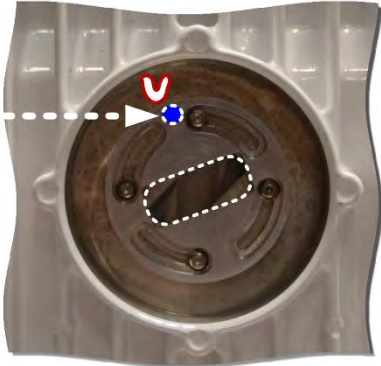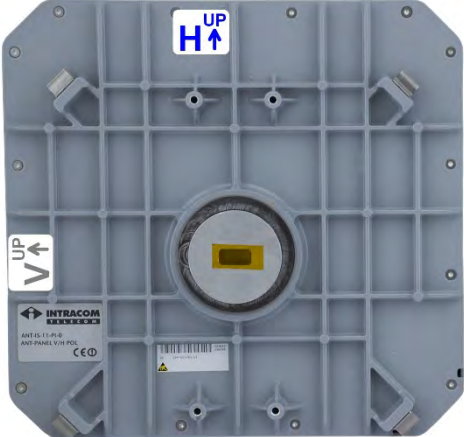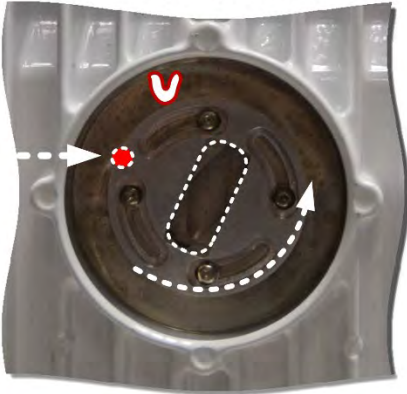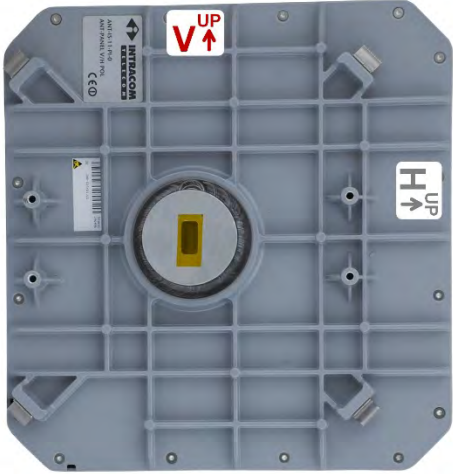
To install the panel antenna to OSDR, proceed as follows:

Step	Action
1	Install the antenna hooks (x 4), as shown below.

Panel Antenna, Continued
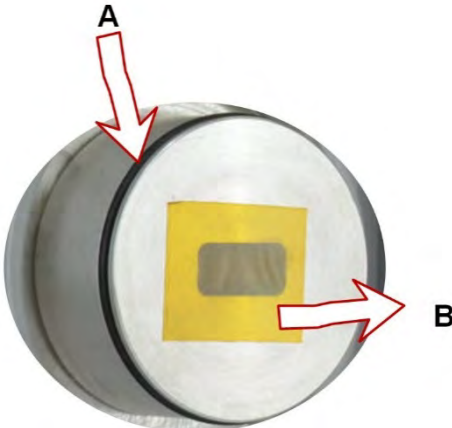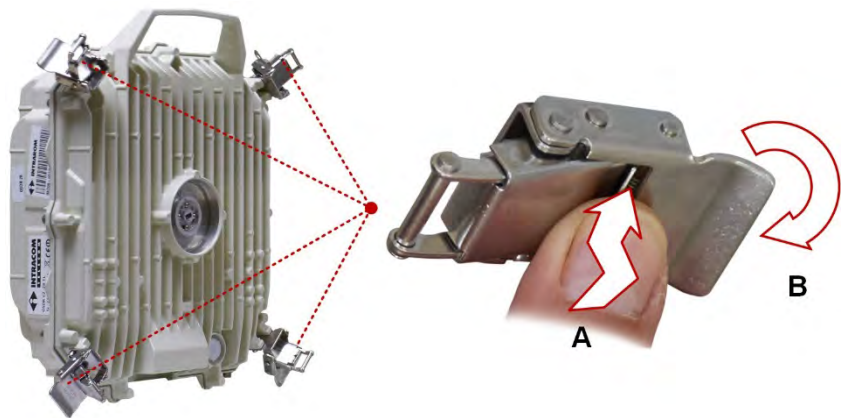
Panel antenna installation procedure, continued

Step	Action
2	Radio unit and antenna should be adjusted for common polarization. If the **LINK** polarization is **HORIZONTAL** then the feeders should be remained, as shown below: If the **LINK** polarization is **VERTICAL**, use the allen key to loosen the four screws at the waveguide port of the radio (do not remove the screws) and then **TURN** the polarizer, as shown below: ⚠ The terminal station polarization at 10.5 GHz (radio-panel antenna) is specific and applicable to this case only. ⚠ Do not over tighten the screws. Apply maximum tightening torque 0.6 Nm. 📝 Note The misalignment of slots between the movable part and the stationary part of the radio waveguide port is intentional and does not indicate a problem.

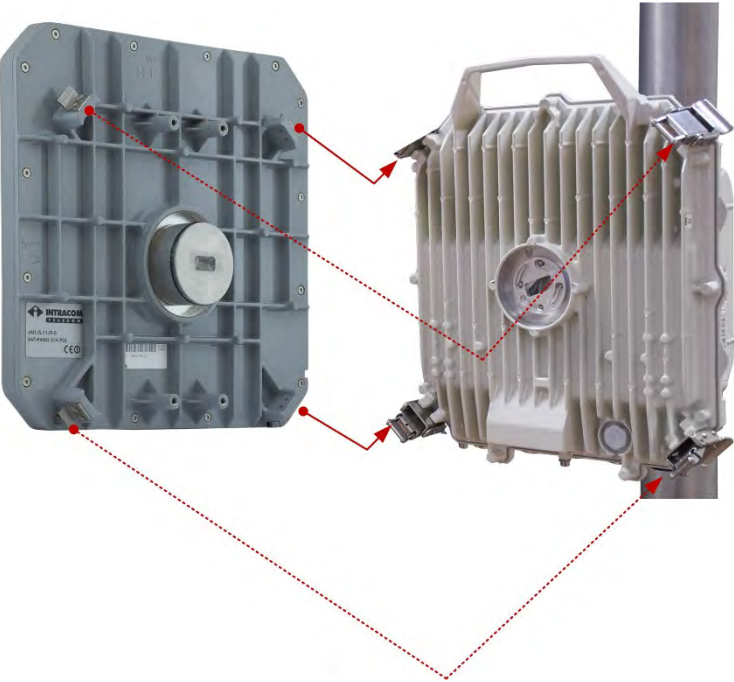*Continued on next page*

Panel Antenna, Continued

Panel antenna installation procedure, continued

Step	Action
3	Perform the following actions: A: Lubricate the O-ring with silicone grease. B: Remove antenna protection plastic sticker from the feeder.
4	Unlock the four radio unit clamps, as shown below.

Panel Antenna, Continued
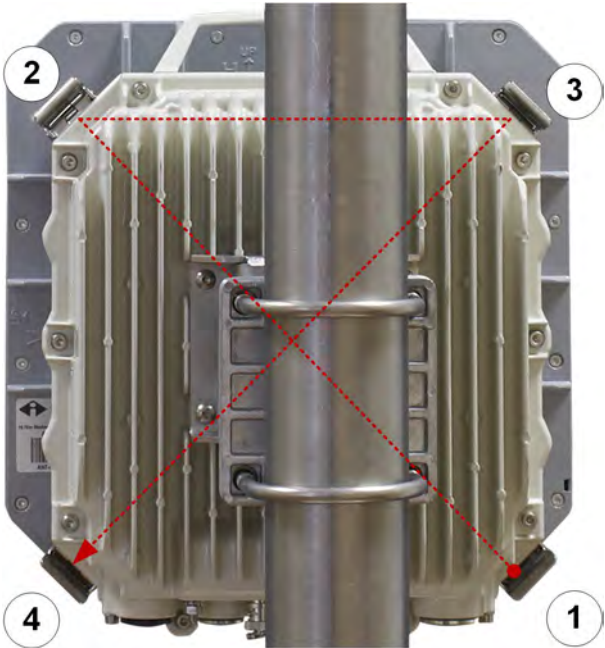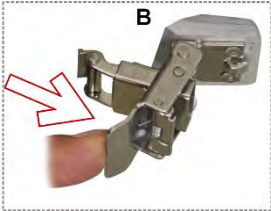
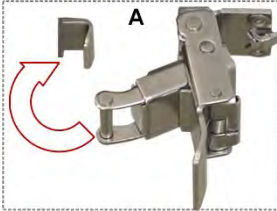**Panel antenna installation procedure**, continued

Step	Action
5	Mount the panel antenna onto the OSDR, as shown below.

Continued on next page

Panel Antenna, Continued

Panel antenna installation procedure, continued

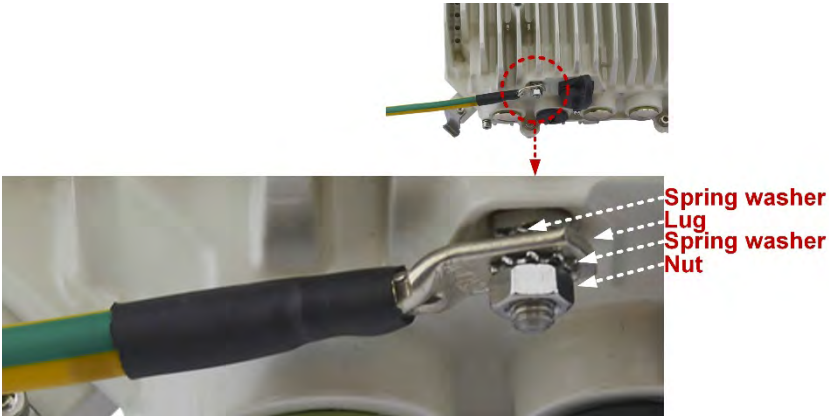| Step	Action
6	Lock and secure all four clamps according to the pattern below.

Details of Clamps closing

End of procedure

4.2. Radio Unit Grounding Cable

Introduction

Apply this procedure for installing the grounding cable to OSDR grounding terminal.

Prerequisites

How to terminate a grounding cable please refer to Appendix D: Cables Termination.

Tools and materials

#	Description
Tools	Adjustable torque U-wrench.
Materials	**GND-KIT16-OD**

Procedure

To install the grounding cable to OSDR, proceed as follows:

Step	Action
1	Use the tool to remove the M5 nut and one spring washer. Then install the cable, as shown below. Use the adjustable U-wrench to tighten the M5 nut. ⚠️ **Do not over tighten.** Adjust the tool for max tightening torque **4.2 Nm**. ⚠️ After completion of OSDR installation **do not forget** to install the other end of the grounding cable to grounding bar.

End of procedure.

INTRACOM TELECOM

4.3. Radio Unit Ethernet (S-FTP) Cable

Introduction   Apply this procedure for installing the Ethernet (S-FTP) cable with M20 gland to OSDR receptacle (GbE2 or FE).

Prerequisites   How to terminate an Ethernet (S-FTP) cable please refer to Appendix D: Cables Termination.
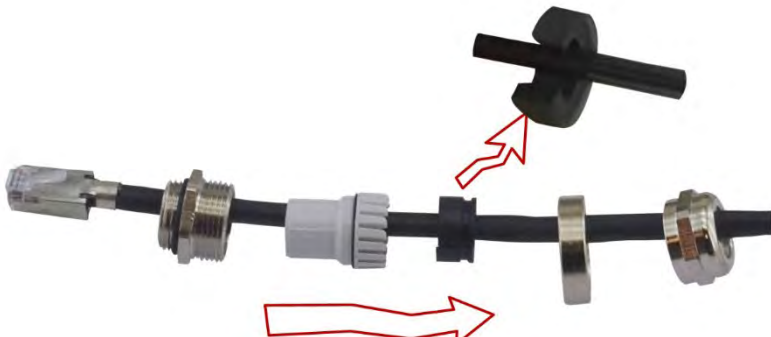
Tools and materials

#	Description
Tools	Adjustable torque U-wrench.
Materials	• **M20-GLAND**. • Terminated Ethernet (S-FTP) cable to RJ-45 jack.

Radio Unit Ethernet (S-FTP) Cable, Continued
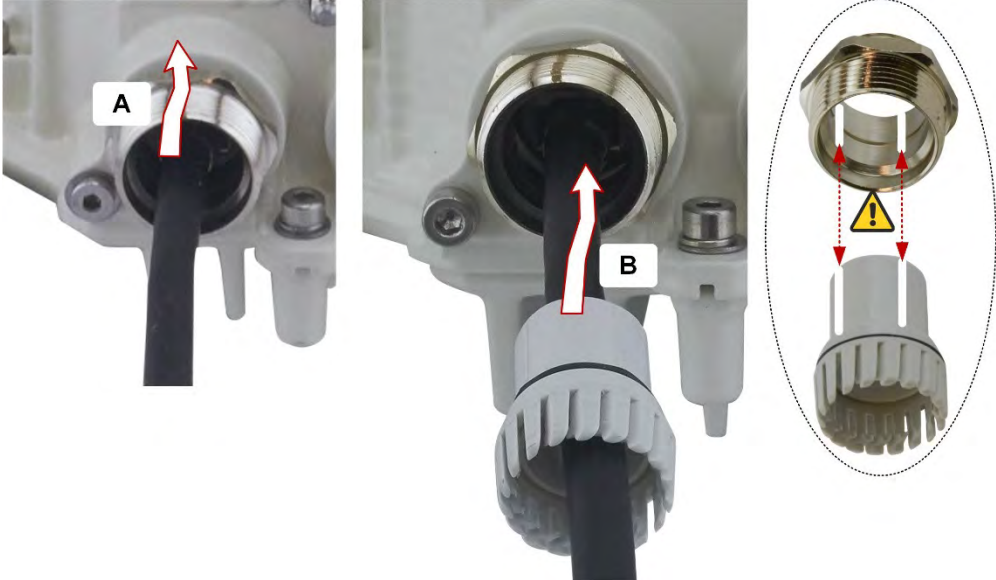
Procedure   To install the Ethernet cable with M20 gland to OSDR receptacle (GbE2 or FE), proceed as follows:

Step	Action
1	Remove the protective cap (plastic for GbE2 or metallic for FE).
2	Disassemble the **M20-GLAND** parts, as shown below.
3	Pass the cable through the parts of gland, as shown below. The **seal** shown below is split-type for easy installation and removal.

Continued on next page

Radio Unit Ethernet (S-FTP) Cable, Continued
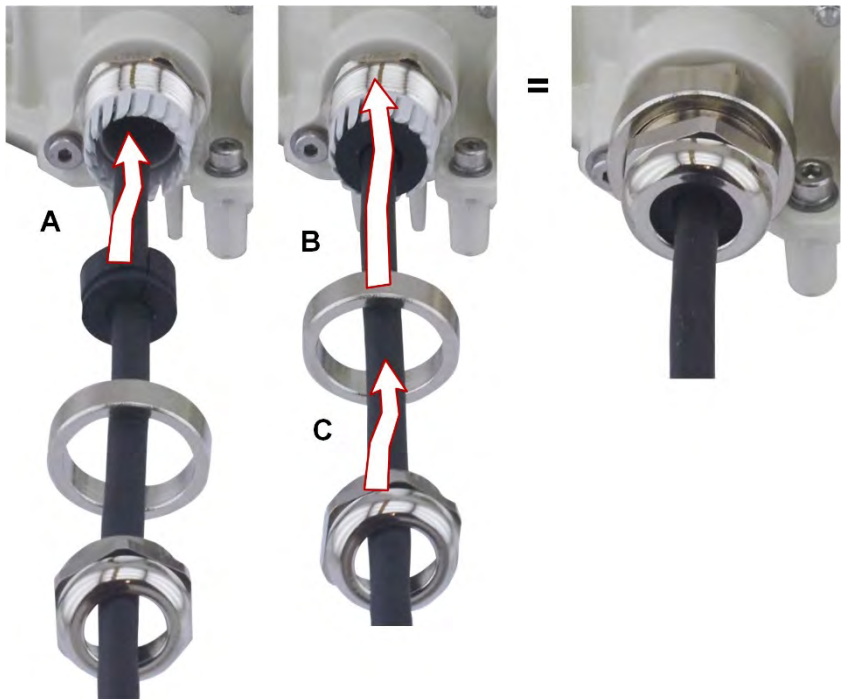
Procedure, continued

Step	Action
4	Plug the RJ-45 jack into the GbE2 port of the OSDR. 💡 **Listen for a "click" when inserting.** This verifies that the jack has been inserted properly.
5	Perform the following actions: A: Screw the body into the OSDR thread. B: Insert claw into the body (taking into account the caution). ⚠ **Do not over tighten.** Adjust the tool for max tightening torque **7 Nm**. ⚠ **Align the designated points.** Misaligning of parts will cause damage.

Continued on next page

Radio Unit Ethernet (S-FTP) Cable, Continued

Procedure,
continued

Step	Action
6	Perform the following actions: A: Insert the seal into "pressure fingers" of claw. B: Insert the O-ring. C: Screw the sealing nut. Use the adjustable torque U-wrench to fully tighten. ⚠️ **The ring protects from overtightening.**

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Radio Unit Ethernet (S-FTP) Cable, Continued

Procedure,
continued

Step	Action
7	Install the cable holder, as described to <u>Radio Unit Cable Holder</u> on page <u>88</u>.

End of procedure.

⚠️ **Take care when you unplug the RJ-45 jack.** The latter is locked into the mating receptacle.

After removing the gland parts of the cable use the flat-headed screwdriver to extract the RJ-45 jack by pressing the clip upwards, as shown below:

4.4. Power Injector

For power injectors installation refer to .

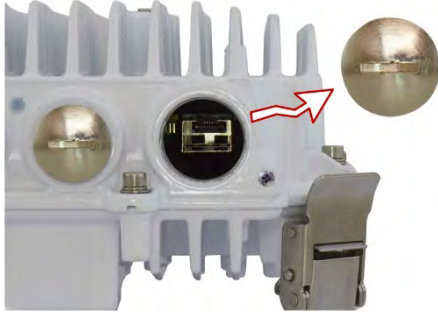# 4.5. Radio Unit Optical Cable (Optional)

Introduction   Apply this procedure for installing the Fiber Optic cable with M25 gland to OSDR receptacle (GbE1).

Tools and materials

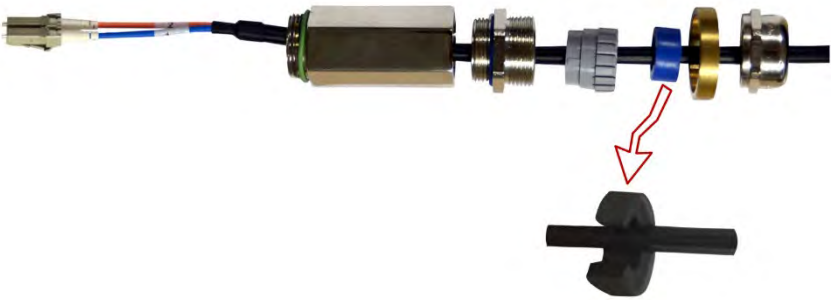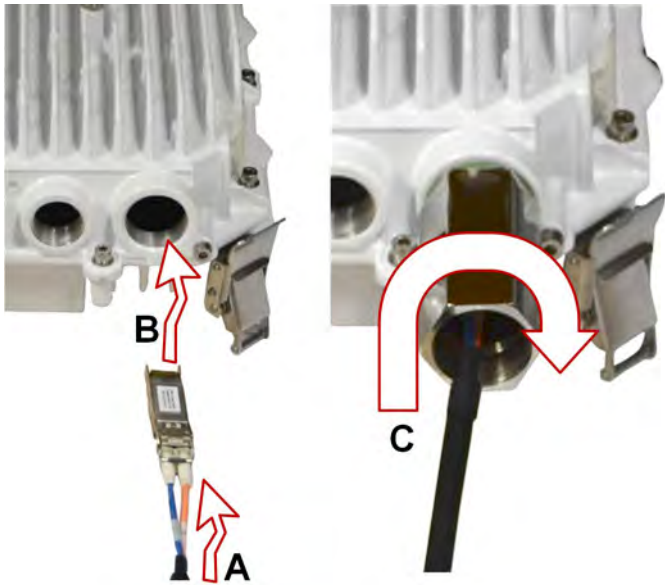| #	Description
Tools	Adjustable torque U-wrench.
Materials	• **M25-GLAND**. • Fiber Optic cable. • SFP module.

Procedure   To install the Fiber Optic cable with M25 gland to OSDR receptacle (GbE1), proceed as follows:

Step	Action
1	Remove the metallic protective cap.
2	Disassemble the **M25-GLAND** parts, as shown below.

Radio Unit Optical Cable (Optional), Continued
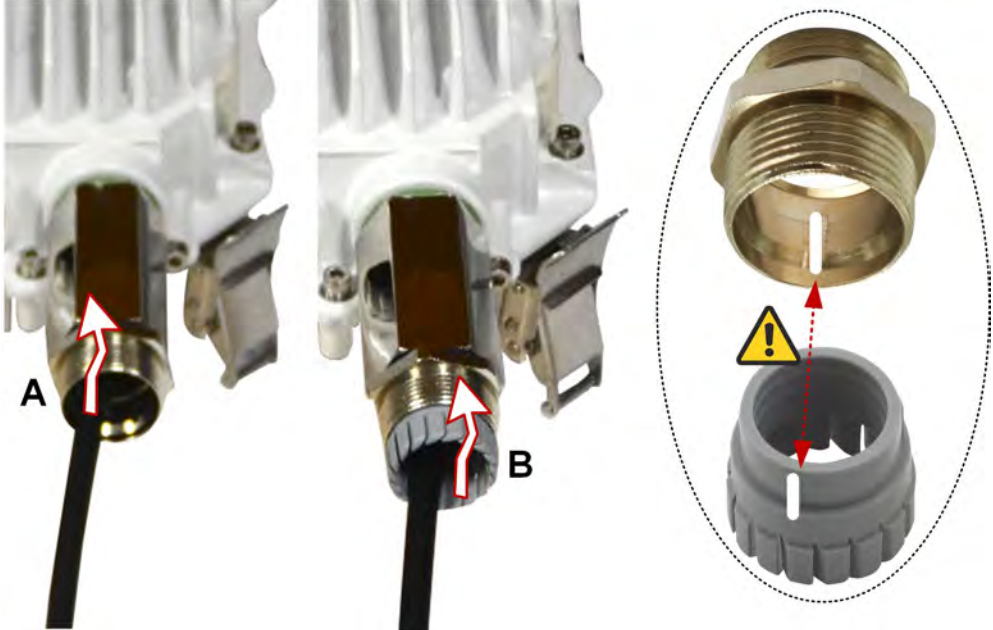
Procedure,
continued

Step	Action
3	Pass the cable through the parts of gland, as shown below. The **seal** shown below is split-type for easy installation and removal.
4	Perform the following actions: A: Install the fiber optic cable into the SFP module. B: Plug the SFP module into the OSDR SFP cage. C: Install the body extension. ⚠ **Do not over tighten.** Adjust the tool for max tightening torque **10 Nm**.

Continued on next page

Radio Unit Optical Cable (Optional), Continued

Procedure, continued

Step	Action
5	Perform the following actions: A: Screw the body into the body extension thread. B: Insert claw into the body (taking into account the caution). ⚠️ **Do not over tighten.** Adjust the tool for max tightening torque **10 Nm.** ⚠️ **Align the designated points.** Misaligning of parts will cause damage.

Continued on next page

Radio Unit Optical Cable (Optional), Continued

Procedure, continued

Step	Action
6	Perform the following actions: A: Insert the seal into "pressure fingers" of claw. B: Insert the O-ring. C: Screw the sealing nut. Use the adjustable torque U-wrench to fully tighten. ⚠️ **The ring protects from overtightening.**

Radio Unit Optical Cable (Optional), Continued

Procedure,
continued

Step	Action
7	Install the cable holder, as described to <u>Radio Unit Cable Holder</u> on page <u>88</u>.

End of procedure.

⚠️ **Take care when you unplug the fiber optic connector.**

The latter is locked into the SFP and must be extracted first (with the tip of a flat-headed screwdriver) after removing the gland parts from the lower part of OSDR.
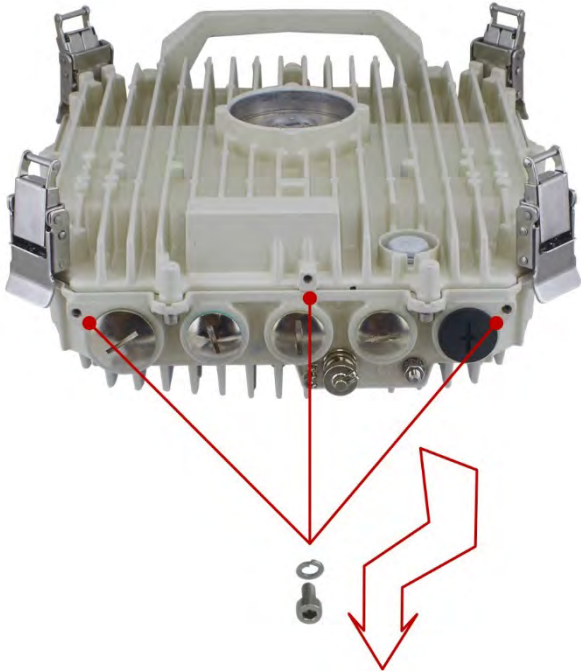
4.6. Radio Unit Cable Holder

Introduction

Apply this procedure for installing the cable holder to OSDR.

Tools and materials

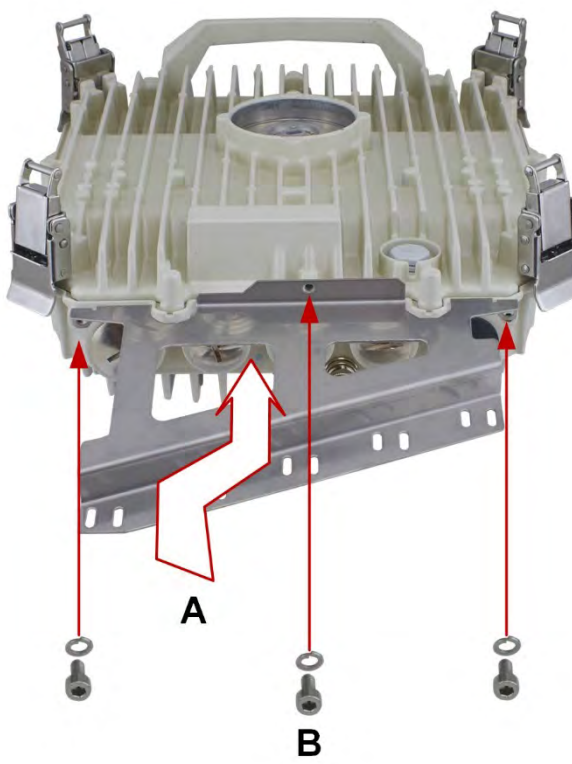| #	Description
Tools	Adjustable torque wrench with hexagon male bit
Materials	**OSDR-HOLD-2** or **OSDR-HOLD-5**

Procedure

To install the cable holder, proceed as follows:

Step	Action
1	Use the tool to remove the three screws with lock washers, as shown below.

Radio Unit Cable Holder, Continued
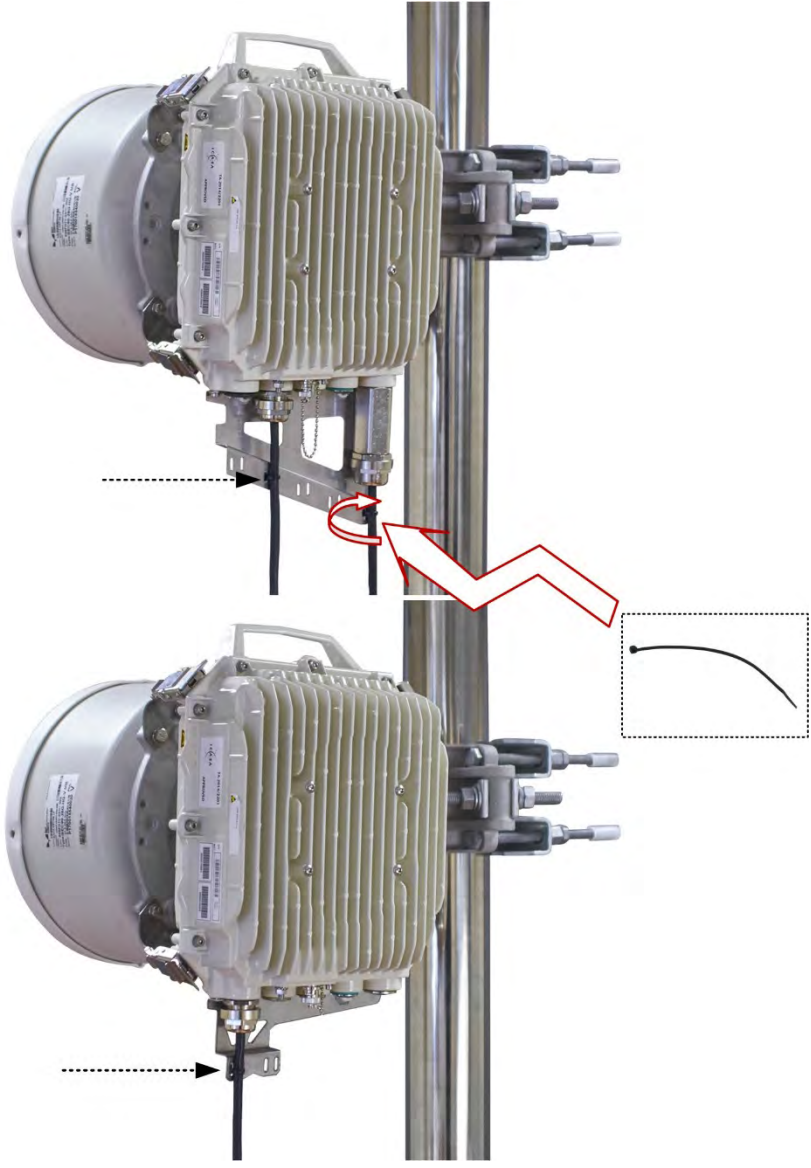
Procedure,
continued

Step	Action
2	Perform the following: A: Attach the holder to radio. B: Use the tool to install the three lock washers and screws, as shown below. ⚠️ **Do not over tighten.** Adjust the tool for max tightening torque **2 Nm**.
3	Install cables and glands. How to install refer to the following: • Radio Unit Ethernet (S-FTP) Cable on page 77. • Radio Unit Optical Cable (Optional) on page 83.

Continued on next page

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Radio Unit Cable Holder, Continued

Procedure,
continued

Step	Action
4	Use the tie wraps to tighten the cable, as shown below.

End of procedure.

⚠️ **Do not forget to install the OSDR grounding cable.**

Appendix A: Adaptation Kit Installation

Pole Installation

Introduction   Apply this procedure for installing the adaptation kit onto the pole.

Tools and materials

#	Description
Tools	• Adjustable torque U-wrench. • Adjustable torque wrench with hexagon female bit.
Materials	**INST-ADAPT**.

Pole Installation, Continued

Procedure   To install adaptation kit onto the pole, proceed as follows:

Step	Action
1	Choose the proper hose clamps based on the pole diameter.
2	Pass through the clamps to bracket, as shown below:
3	Choose the correct position onto the pole to install the adaptation bracket.
4	Use the tool to tighten. ⚠ **Do not over tighten.** Adjust the tool for tightening torque, as follows: • min **5.5 Nm**. • max **7.0 Nm**.

Pole Installation, Continued

Procedure,
continued

Step	Action
5	Install the arm bracket onto the adaptation bracket, as shown below. ⚠️ **Do not over tighten.** Adjust the tool for max tightening torque **15 Nm**.

End of procedure
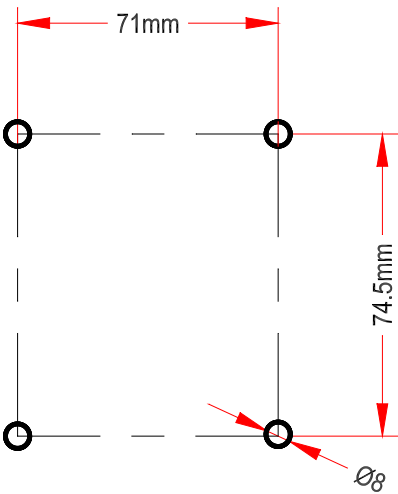
Appendix B: Mounting Kit Wall Installation

Wall Installation

Introduction

Apply this procedure for installing the mounting kit onto the wall.

Tools and materials

#	Description
Tools	Adjustable torque U-wrench.
Materials	**OSDR-ANT-MNT**.

Procedure

To install radio unit to sectoral/parabolic antenna, proceed as follows:

Step	Action
1	Use a drilling machine (fitted with an 8 mm drill bit) and the following drill template to drill the holes in the wall surface, as shown below.

Wall Installation, Continued

Procedure,
continued

Step	Action
2	Insert items (W, A, J, I X) with order, as shown below:

The items **X, W** listed below are not provided:

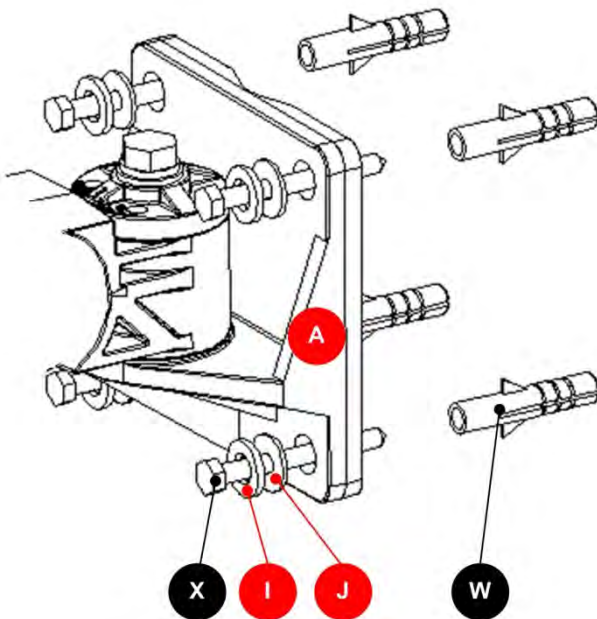| Item	Description	Qty
X	Wood screw 5 x 50 mm, hex-headed, DIN571	4
I	Lock washer M5, stainless	4
J	Washer M5, stainless.	4
A	Arm Bracket	1
W	Wood plug 8 mm, plastic, type B.	4

Step	Action
3	Use the adjustable U-wrench tool item 4 to **fully tighten** the four screws (item X) to secure the arm bracket on the wall surface. ⚠️ **Do not over tighten.**

End of procedure.

Appendix C: Power Injector Installation

Topics

The chapter includes the following topics:

Outdoor DC PoNE

Introduction   Apply this procedure for installing the outdoor DC PoNE onto the pole and wall.

Precautions   Before staring the installation make sure all the following precautions:

- The power at the input of PoNE box must be measured in the range of **-40.5** V DC to **-57.5** V DC.

- Refer to **Safety Precautions** on page 5.

Minimum input voltage versus S-FTP cable length   When the DC voltage at the input of the PoNE is below **41 V** for Cat6 cable and **41.7 V** for Cat5E then the **length** of Gigabit Ethernet (S-FTP) cable (Cat5E or Cat6), between **OSDR receptacles** and **PoNE receptacles**, cannot reach more than 100 meters.

The following table shows the maximum S-FTP cable length versus the voltage at the input of the PoNE for Cat5E and Cat6 cable types:

Input voltage to the PoNE (V DC)	max length of Cat6 S-FTP cable (m)	max length of Cat5E S-FTP cable (m)
40.5	90.00	75.00
40.75	95.00	80.00
41	100.00	85.00
41.25	100.00	90.00
41.5	100.00	95.00
41.75	100.00	100.00
42-57.5	100.00	100.00

Note   The restriction is applied because of the following reasons:
- the **PONE-OD-DC** injector combines power and data passively and
- the voltage drop on the S-FTP cable will result in the voltage at the input of the DC power module of the radio unit to be less than the min allowable value for operation. Higher input voltage need to be applied to ensure proper powering of the radio.

Continued on next page

Outdoor DC PoNE, Continued

Connection diagram
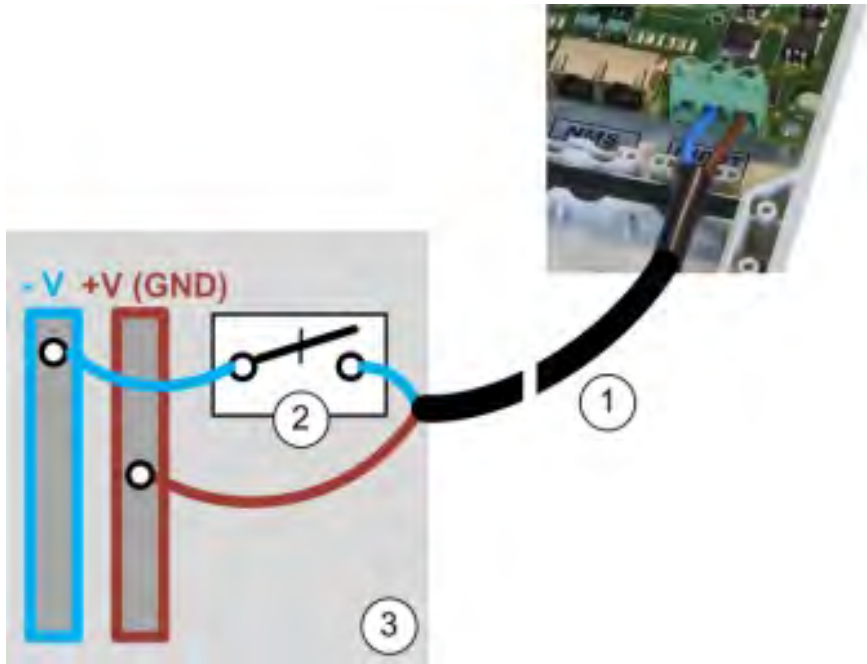
No	Description
1	DC power supply cable.
2	Single pole Circuit.
3	Local DC power distributor.

Outdoor DC PoNE, Continued

**Equipment
overview**

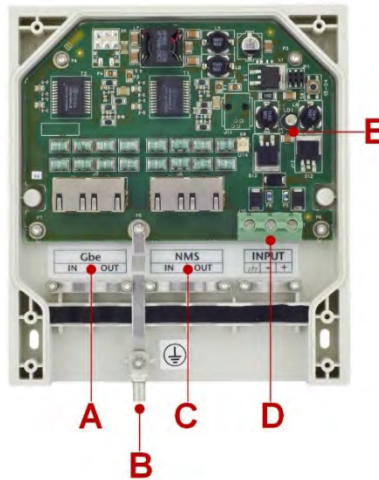| #	Marking	Details	Use
A	**Gbe IN / Gbe OUT**	Gigabit Ethernet 100/1000 Base-T, Electrical (RJ-45).	**Gbe IN**: To connect the Gigabit Ethernet (S-FTP) cable for carrying: • traffic • inband management towards to customer network. **Gbe OUT:** To connect the Gigabit Ethernet (S-FTP) cable for carrying: • traffic • inband management • superimposed DC power towards to radio unit.
B	**GND**	Grounding terminal.	To connect the grounding cable.
C	**NMS IN / NMS OUT**	Ethernet 100 Base-T, Electrical (RJ-45).	**NMS IN:** To connect the Gigabit Ethernet (S-FTP) cable for carrying: • outband management to customer network. **NMS OUT:** To connect the Gigabit Ethernet (S-FTP) cable for carrying: • outband management • superimposed DC power towards to radio unit.
D	**INPUT**	Screw type terminals.	To connect the DC power supply cable (from the local DC power source).
E	**-**	Multi-functioning LED.	To provide radio unit status during operation.

Continued on next page

Outdoor DC PoNE, Continued

Tools and materials
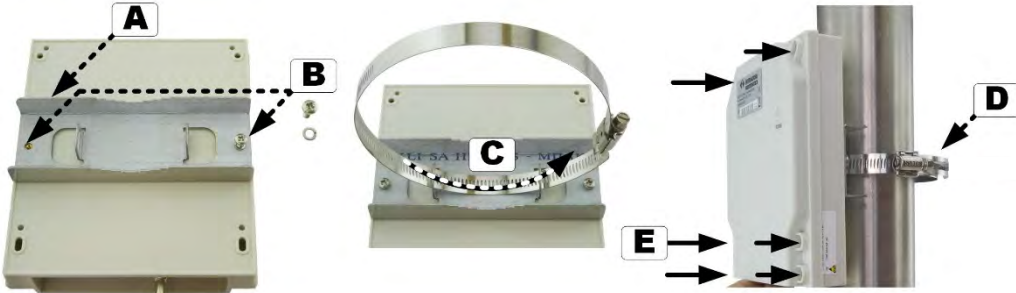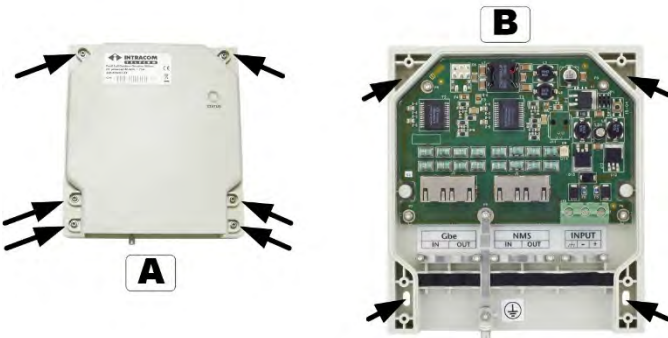
#	Description
Tools	Adjustable torque wrench with all bits.
Materials	**INST-PONE-PL**. **PONE-OD-DC**. - Ethernet (S-FTP) cable terminated to RJ-45 jack. - Grounding cable terminated to 6 mm^2 lug.

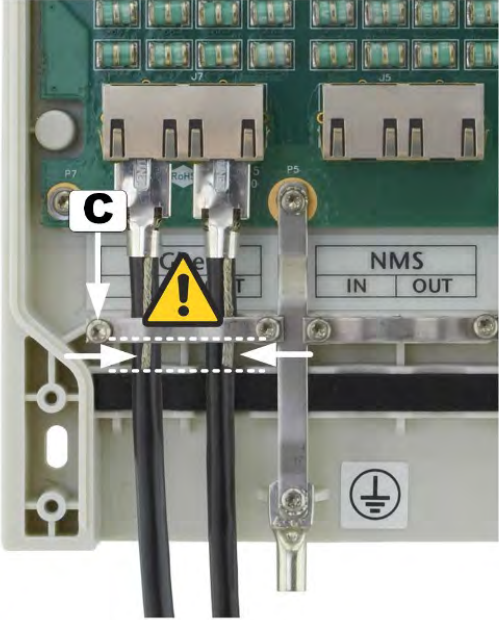# Outdoor DC PoNE, Continued

Pole and wall installation procedure
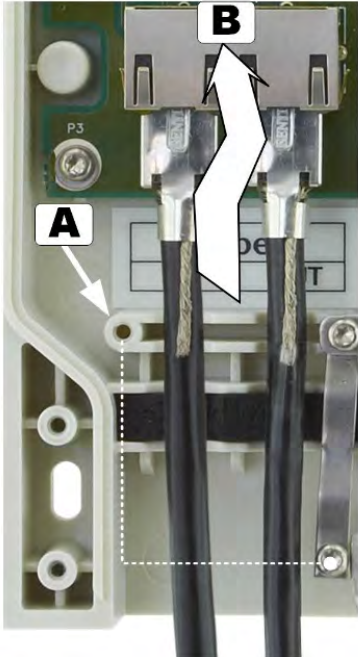
For mechanical installation and cabling of outdoor DC PonE, proceed as follows:

Step	Action
1	**Pole installation:**
	A Attach the plate onto rear side of PonE, as shown below.
	B: Install lock washer and screw. Then use the cross headed screwdriver to fully tighten.
	C: Pass the hose clamp through the plate holes.
	D: Install the PonE onto pole. Use the tool with M5 deep socket to tighten.
	⚠️ **Do not over tighten.** Adjust the tool for max tightening torque 2 Nm.
	E: Use the tool with TORX T10 bit to remove the six screws. Then detach the PonE cover for installing the cables. **Be careful not to drop the screws while removing.**
	Wall Installation:
	A: Perform step E as describes the above procedure.
	B: Perform the following:
	• Position the device on the wall surface and using a pencil mark the drill points. With the drill machine (fitted with 5 mm bit), drill four holes on the wall surface, at a depth of 45 mm.
	• Install the four supplied wall plugs and using the cross headed screwdriver and tighten the four screws.

Outdoor DC PoNE, Continued
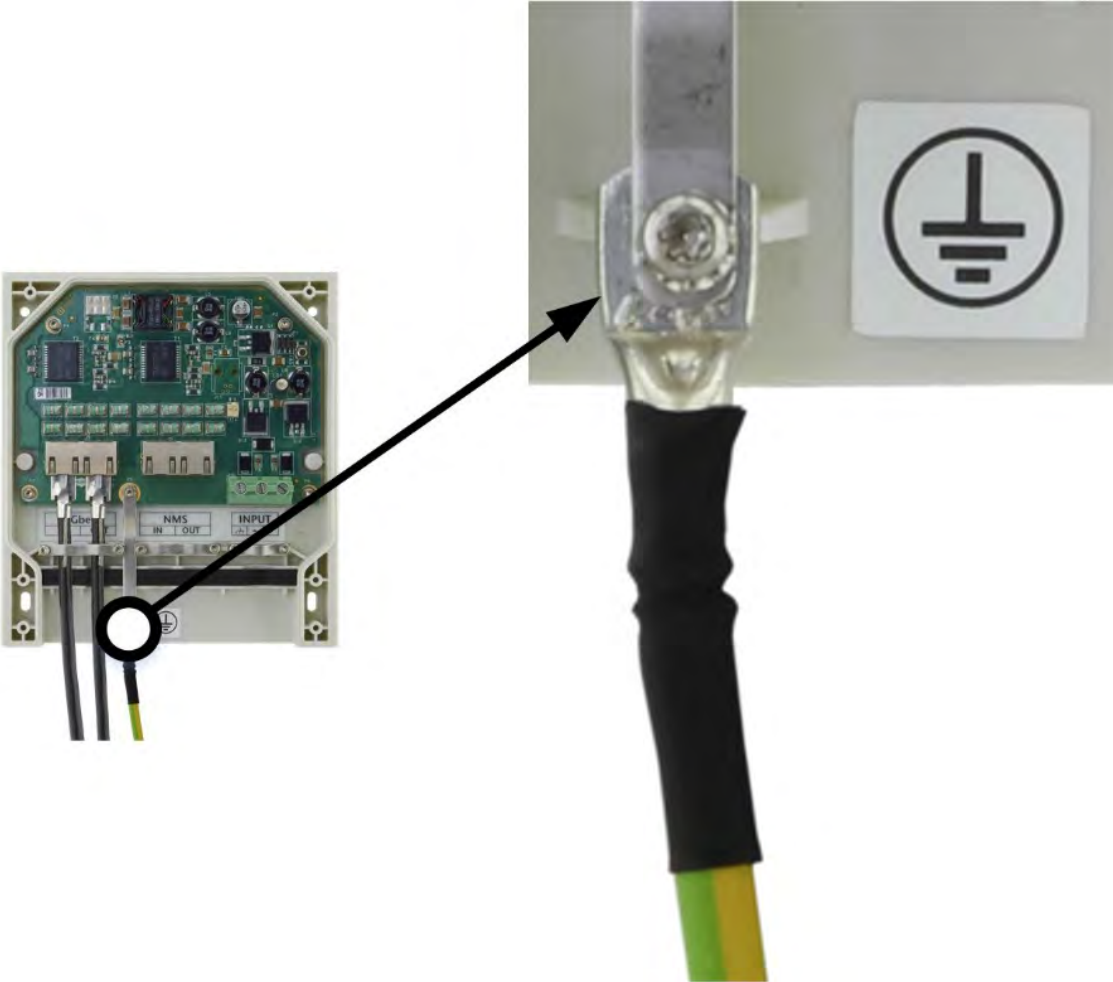
Pole and wall installation procedure, continued

Step	Action
2	Prepare and terminate the Ethernet cables (x 2) as instructed to <u>Appendix D: Cables Termination</u> on page <u>114</u>. Install the Ethernet cables, as follows: A: Use the tool with TORX T10 bit to remove the clamp screw. **Be careful not to drop the screw while removing.** B: Plug the Ethernet cables to the Gbe receptacles (OUT: goes to radio unit and IN: goes to customer network). **Listen for a "click" when inserting.** This verifies that the jack has been inserted properly. ⚠️ The shielded wires should protrude from clamp about 0.5 cm (as shown below). C: Use the tool with TORX T10 bit to install the clamp for securing the cables in place. ⚠️ **Do not over tighten.** Adjust the tool for max tightening torque 0.9 Nm.

Outdoor DC PoNE, Continued

Pole and wall installation procedure, continued

Step	Action
3	Prepare and terminate the grounding cable as instructed to Appendix D: Cables Termination. Use the tool with TORX T10 bit to install the grounding cable, as shown below. ⚠️ **Do not over tighten.** Adjust the tool for max tightening torque 0.9 Nm.

Outdoor DC PoNE, Continued
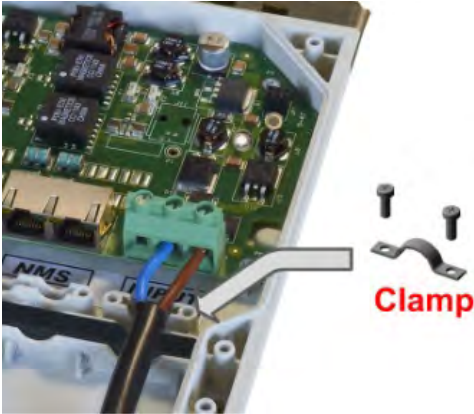
Pole and wall installation procedure, continued

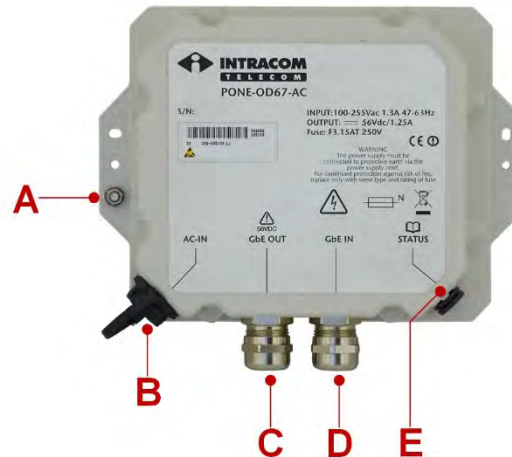| Step	Action
4	⚡ **Switch-off the local DC power source & the circuit breaker** (between PoNE and the local DC power source).
	Install the power supply cable, as follows:
	A: Connect the power cable to the local DC power source (Brown wire: +V, blue wire: -V).
	B: At the other end of the cable, use a blade to strip the wires of the cable, as shown below. Twist strands well to facilitate their insertion into the INPUT receptacle of DC PonE device.
	C: Use the tool with TORX T10 bit to remove the clamp and insert the bare ends of the cable into the corresponding positions of the INPUT receptacle, as shown below: **Blue** wire to **INPUT -**, **Brown** wire to **INPUT +**.
	D: Use the flat-headed screwdriver to tighten the INPUT receptacle screws. **Do not over tighten.** The screws, securing the wire strands into the receptacle, are well isolated each other – no danger for accidental short circuit.
	D: Use the tool with TORX T10 bit to install the clamp in order to secure the DC power supply cable. ⚠ **Do not over tighten.** Adjust the tool for max tightening torque 0.9 Nm.

End of procedure.

Outdoor AC PoNE

Introduction

Apply this procedure for installing the outdoor AC PoNE onto the pole and wall.

Equipment overview

#	Marking	Details	Use
A	**GRD**	Grounding point.	To connect the grounding cable.
B	**AC-IN**	3-pins AC receptacle.	To connect the AC power supply cable (with AC connector).
C	**GbE OUT**	Gigabit Ethernet 10/100/1000 Base-T, Electrical (RJ-45).	To connect the Gigabit Ethernet (S-FTP) cable for carrying: • traffic • inband management • superimposed DC power towards to radio unit.
D	**GbE IN**	Gigabit Ethernet 10/100/1000 Base-T, Electrical (RJ-45).	To connect the Gigabit Ethernet (S-FTP) cable for carrying: • traffic • inband management towards to customer network.
E	**STATUS**	Multi-functioning LED.	To provide radio unit status during operation.

Continued on next page

Outdoor AC PoNE, Continued

**Tools and
materials**

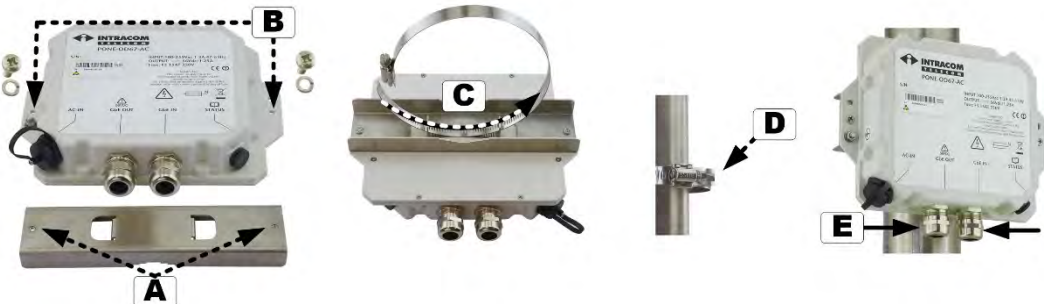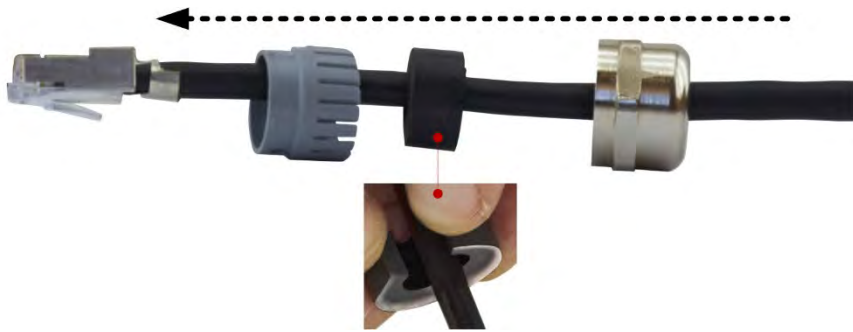| #	Description
Tools	• Adjustable torque U-wrench. • **TOOL-M20**.
Materials	• **INST-PONE-PL2**. • **PONE-OD67-AC**. • Ethernet (S-FTP) cable terminated to RJ-45 jack. • Grounding cable terminated to 16 mm^2 lug.

Outdoor AC PoNE, Continued

Pole and wall installation procedure

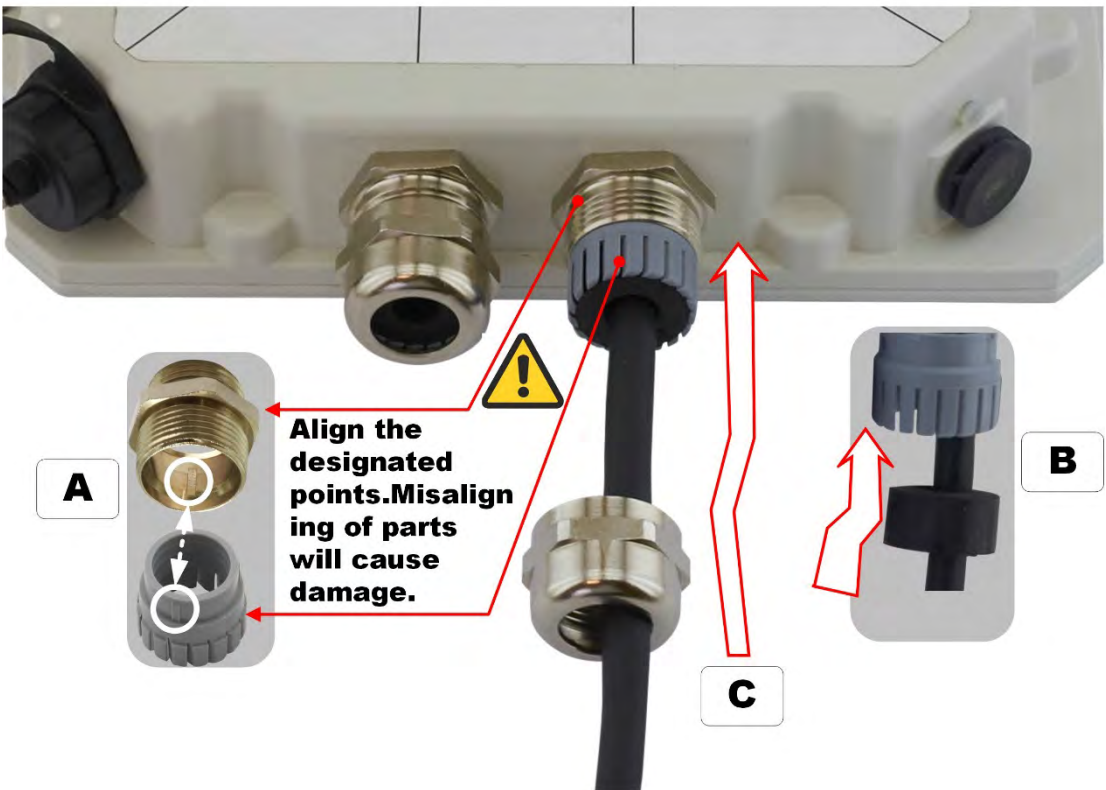For mechanical installation and cabling of outdoor AC PoNE, proceed as follows:

Step	Action
1	Prepare and terminate the Ethernet cables (x 2) as instructed to <u>Appendix D: Cables Termination</u> on page <u>114</u>. For pole installation follow this step. For wall installation go to last step. **Pole installation:** A Attach the plate onto rear side of PonE, as shown below. B: Install lock washer and screw. Then use the cross headed screwdriver to fully tighten. C: Pass the hose clamp through the plate holes. D: Install the PonE onto pole. Use the tool with M5 deep socket to tighten. ⚠️ **Do not over tighten.** Adjust the tool for max tightening torque **2 Nm**. E: Use the U-wrench to remove the two sealing nuts. Then remove the claw and seal (black item).
2	Pass the cable through the parts of gland, as shown below: Plug the Ethernet cables to the GbE receptacles (OUT: goes to radio and IN: goes to customer network). **Listen for a "click" when inserting**. This verifies that the jack has been inserted properly.

Continued on next page

Outdoor AC PoNE, Continued

Pole and wall installation procedure, continued

Step	Action
3	Perform the following: A: Insert the claw to body taking in consideration the caution below. B: Insert the seal to claw. C: Use the adjustable torque U-wrench to screw the sealing nut to body. ⚠️ **Do not over tighten.** Adjust the tool for tightening torque 2 Nm (the final torque will be applied to the next step).

Outdoor AC PoNE, Continued
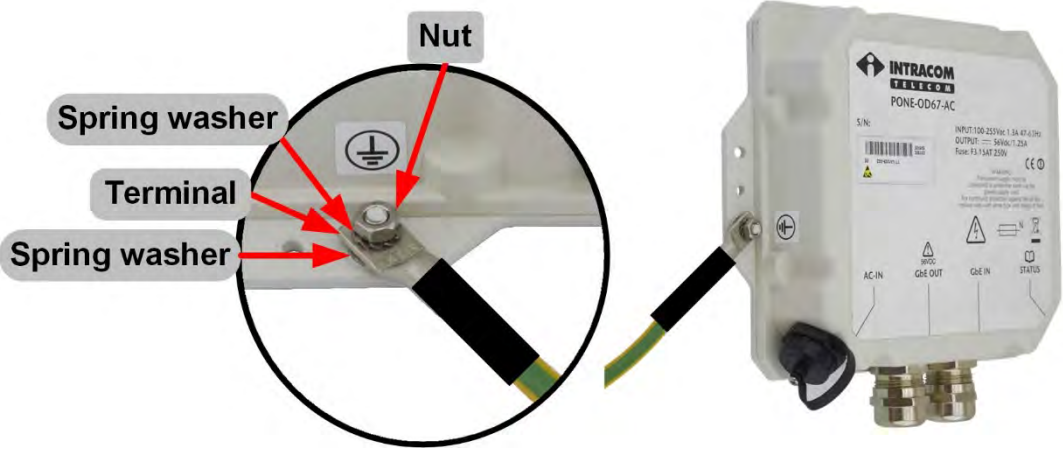
Pole and wall installation procedure, continued

Step	Action
4	Perform the following: A: Set both keys over the sealing nut as shown below. **Use the hexagon 24 mm tool to prevent the body receptacle from rotating and loosening.** B: Use the adjustable torque U-wrench to screw the sealing nut to body. ⚠️ **Do not over tighten.** Adjust the tool for maximum tightening torque **6 Nm**. **Hold the key stabilizer** ⚠️ Take care when you unplug the RJ-45 jack. The latter is locked into the mating receptacle and must be extracted first (with the tip of a flat-headed screwdriver) after removing the gland parts from the lower part of PoNE.

Outdoor AC PoNE, Continued

Pole and wall installation procedure, continued

Step	Action
5	Prepare and terminate the grounding cable as instructed to <u>Appendix D: Cables Termination</u>. Install the grounding cable as shown below. ⚠️ **Do not over tighten.** Adjust the tool with M5 deep socket for maximum tightening torque **3 Nm**.
6	Prepare and terminate the power supply cable as instructed to <u>Appendix D: Cables Termination</u>. Install the power cable as shown below.

Continued on next page

Outdoor AC PoNE, Continued

Pole and wall installation procedure, continued

Step	Action
7	**Wall installation:** Perform the following actions: • Position the device on the wall surface and using a pencil mark the drill points. With the drill machine (fitted with 5 mm bit), drill four holes on the wall surface, at a depth of 45 mm. • Install the 2 supplied wall plugs and using the cross headed screwdriver and tighten the 2 screws.

End of procedure.

Indoor AC POE

Introduction   Apply this procedure for installing the indoor AC POE onto the wall.

Overview

#	Marking	Details	Use
A	**INPUT**	3-pins AC socket (EU).	To connect the AC power supply cord.
B	**LED**	Multi-functioning LED.	To provide radio unit status during operation.
C	**IN/LAN - OUT/POE**	Gigabit Ethernet 10/100/1000 Base-T, Electrical (RJ-45).	**IN/LAN:** To connect the Gigabit Ethernet (S-FTP) cable for carrying: • traffic • inband management towards to customer network. **OUT/POE:** To connect the Gigabit Ethernet (S-FTP) cable for carrying: • traffic • superimposed DC power towards to radio unit.
D	**GND**	Thread for grounding.	To install terminal lug M5 with 6 mm² grounding cable.

Indoor AC POE, Continued

**Wall
installation
procedure**

PoE is an indoor device only and can be installed as desktop or in a wall surface, as shown below:

Materials for wall mount installation **are not included** on the packing list of the product ((requires wood plugs (5 mm X 25 mm) and wood screws cross-headed (4 mm x 30 mm)).

To install the cables (Ethernet, power and grounding), proceed as follows:

Step	Action
1	Prepare and terminate the Ethernet cables (x 2) as instructed to Appendix D: Cables Termination on page 114. **ONLY for 72 W POE:** Prepare and terminate the grounding cable (x 1) as instructed to Appendix D: Cables Termination.
2	Connect the **IN/LAN** receptacle of the device to customer network. ⚠️ **Connect the OUT/POE receptacle of the device to the correspondence receptacle of the radio unit.**
3	Install the IEC plug to the respective input of the PoE and the other plug to the available main socket.

End of procedure.

Appendix D: Cables Termination

Topics

The chapter includes the following topics:

Description	See Page
Ethernet Cable	115
Grounding Cable	120
AC Power Supply Cable	123

Tools and materials

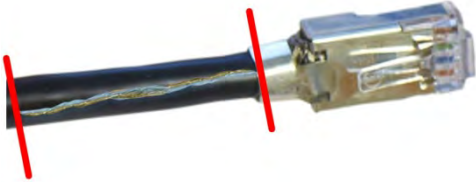| #	Description
Tools	Cables Termination on page 46.
Materials	**ETH-CAB-SFTP** terminated to **ST-RJ45**. **GND-KIT16-OD** terminated to M5 terminal lug for 16 mm^2 cable. **GND-CAB6-ID** terminated to M4 terminal lug for 6 mm2 cable. **AC-PWR-CAB** terminated to AC power connector.

Ethernet Cable

Introduction   Apply this procedure for terminating an Ethernet (S-FTP) cable to RJ-45 connector (**ST-RJ45**).

S-FTP cable overview   The equipment to which you connect the cable requires a different way of cable termination.

Mainly there are two types of cable termination, as shown below:

Termination Type	Details / Photo	Equipment to Connect
A	**No shield wires exposed** 	All, except DC PoNE.
B	**Shield wires (twisted) exposed** 	DC PoNE only.

RJ45 jack overview   The RJ-45 jack (for terminating the S-FTP cable) is composed of two parts:
- the main body and
- the wire guide (with numbering).

(Photo below shows the parts for a pair of RJ-45 jacks).
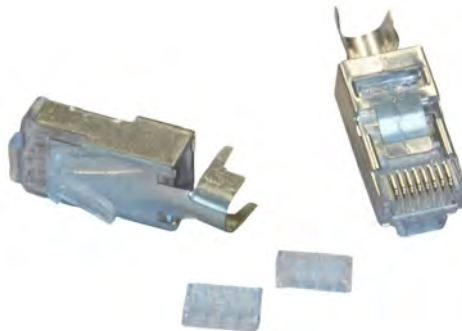
Continued on next page

Ethernet Cable, Continued

Ethernet cable termination procedure
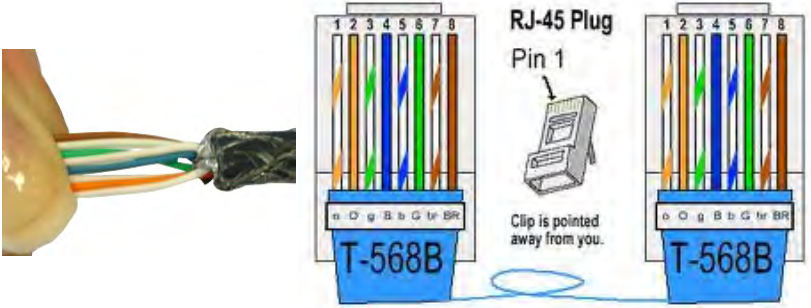
To terminate the cable, proceed as follows:

Step	Action
1	Perform the following:

Perform the following:

A: **For termination type A:**
   Strip 40 mm of outer jacket.

   For termination type B:
   Strip 80 mm of outer jacket.

B: Fold shield back (over the jacket).

C: **For termination type A:**
   Twist shield wires together and allow 10 mm of shield to surround jacket's end.

   For termination type B:
   Twist shield wires together and allow 20 mm of shield to surround jacket's end.

D: Completely remove the exposed foil.

For termination type A:

For termination type B:

Continued on next page

Ethernet Cable, Continued

Ethernet cable termination procedure, continued

2	Untwist wire pairs and arrange according to the T-568 standard straight-through cable, as shown below:
3	Carefully insert the eight wires into the cavity of the wire guide so that its numbering is visible from the top.
4	Measure 16 mm from the jacket's end and cut all wires protruding from the guide.

Continued on next page

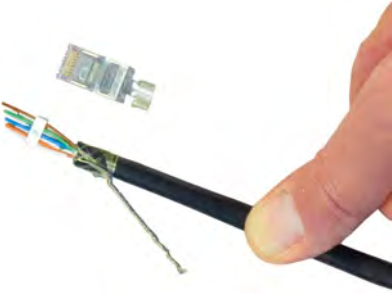# Ethernet Cable, Continued

Ethernet cable termination procedure, continued
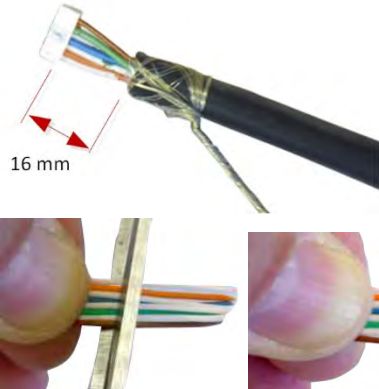
Step	Action
5	Perform the following: A: Fold back the crimping terminal of the connector. B: Fully insert wire guide and cable into the connector's body until the shield (overlapping the jacket's end) reaches the crimping position. **For termination type A:** **For termination type B:**
6	Terminate the wires onto the RJ-45 jack.

Ethernet Cable, Continued

Ethernet cable termination procedure
(continued)

Step	Action
7	With the pliers, bring the terminal of the connector back, over the exposed shield, and press gently around the terminal to form. This will achieve good contact with the shield. **For termination type A:** **For termination type B:**

Grounding Cable

Introduction   Apply the procedures for terminating grounding cable to grounding lug of the following equipment:

GROUNDING CABLE	
6 mm^2	**16 mm^2**
outdoor DC PoNE	OSDR radio unit
indoor AC POE 72 W	outdoor AC PoNE

Grounding Cable, Continued

Grounding cable (16 mm²) termination procedure

To terminate the 16 mm² grounding cable, proceed as follows:

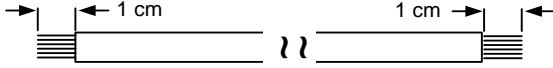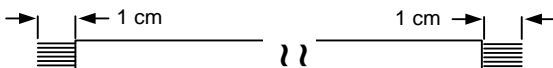| Step	Action
1	Cut the grounding cable **(for 16 mm²)** according to the distance between equipment and grounding bar.
2	Use the blade to strip 1 cm from each end of the cable, as below: 1 cm 1 cm
3	Perform the following: A: Slide the **M5 grounding lug** over the wires at one end of the cable and crimp it with the special crimping tool **(for 16 mm²).** B: Cut the heat shrinkable tube in the middle in two equal pieces in order to use one piece per cable side. C: Slide the one piece of the heat shrinkable tube over the cable. **Heat it over rear grounding ring body and down on to cable jacket using the hot air blower.**
4	Repeat step 3 for the other end of the cable using the appropriate terminal lug. Eventually both ends should be as follows: • M5 grounding lug (OSDR or outdoor AC PoNE side). • Appropriate grounding lug (grounding bar side).

End of procedure.

Grounding Cable, Continued

Grounding cable (6 mm²) termination procedure

To terminate the 6 mm² grounding cable, proceed as follows:

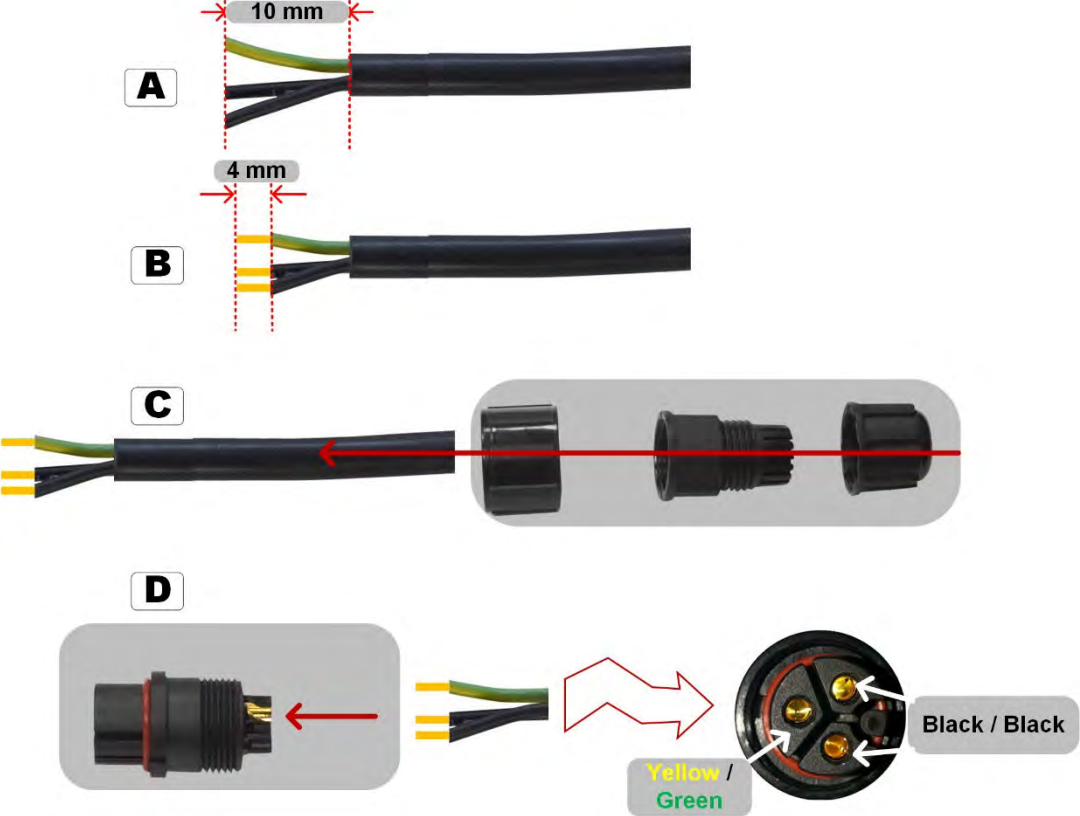| Step	Action
1	Cut the grounding cable **(for 6 mm²)** according to the distance between equipment and grounding bar.
2	Use the blade to strip 1 cm from each end of the cable, as below:
3	Perform the following: A: **For DC PoNE:** Use the tool with TORX T10 bit to unscrew the terminal ring from PonE, as shown below: B: Slide the **M4 grounding terminal** over the wires at one end of the cable and crimp it with the special crimping tool **(for 6 mm²)**. **For AC POE:** Slide the **M5 grounding terminal** over the wires at one end of the cable and crimp it with the special crimping tool **(for 6 mm²)**. C: Cut the heat shrinkable tube in the middle in two equal pieces in order to use one piece per cable side. D: Slide the one piece of the heat shrinkable tube over the cable. **Heat it over rear grounding ring body and down on to cable jacket using the hot air blower.**
4	Repeat step 3 for the other end of the cable using the appropriate terminal lug. Eventually both ends should be as follows: • M4 or M5 grounding terminal • Appropriate grounding lug (grounding terminal side)
5	Use the tool with TORX T10 bit to screw for securing the ring in place. ⚠️ **Do not over tighten.** Adjust the tool for max tightening torque **0.9 Nm**.

End of procedure.

AC Power Supply Cable

Introduction   Apply this procedure for terminating AC power supply cable to AC power
connector for outdoor AC PoNE.

AC Power Supply Cable, Continued
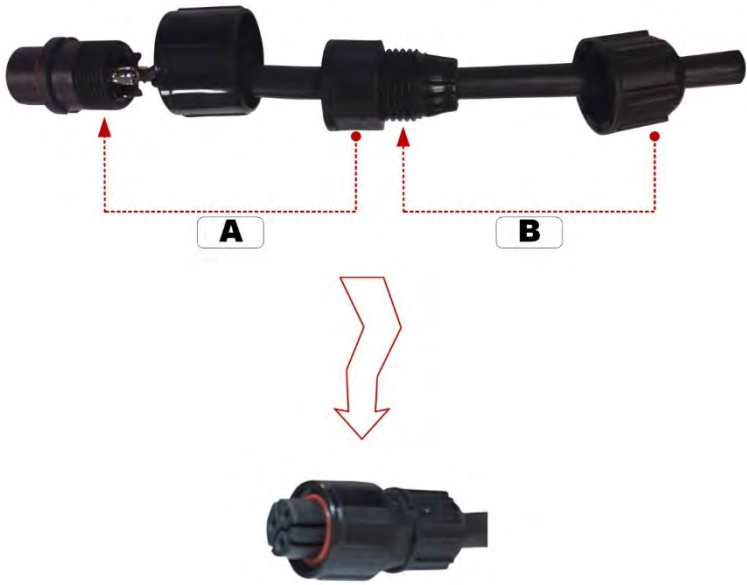
Procedure	To terminate the AC power supply cable to AC power connector of outdoor AC PoNE, proceed as follows:

Step	Action
1	Perform the following actions: A: Strip approx. 10 mm from the cable's outer sheath. B: Strip approx. 4 mm from each wire insulation. C: Pass the cable through the parts of gland. D: Solder the 3 pins to the connector taking in consideration the following: • The Yellow/Green wire must be soldered to the pin shown below (white arrow). • The remaining two black wires are for live **(L)** and neutral **(N).** Both wires must be soldered to the other two pins. **There is no polarity concern regarding these two specific wires.**

Continued on next page

INTRACOM
T E L E C O M

AC Power Supply Cable, Continued

Procedure, continued

Step	Action
2	Assemble the connector by tightening the parts together, as shown below:

End of procedure.

Appendix E: Sectoral Antenna Pole Space Requirements
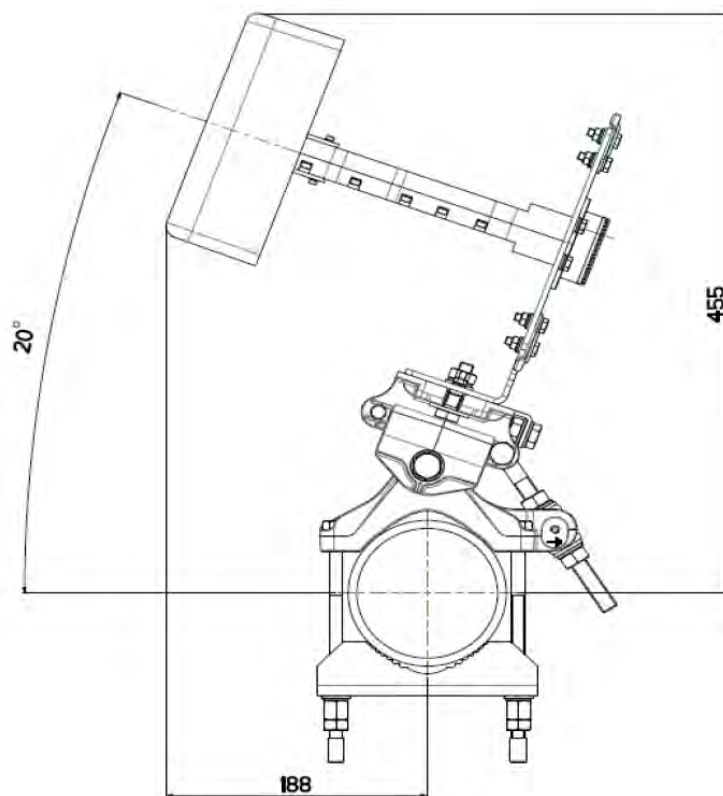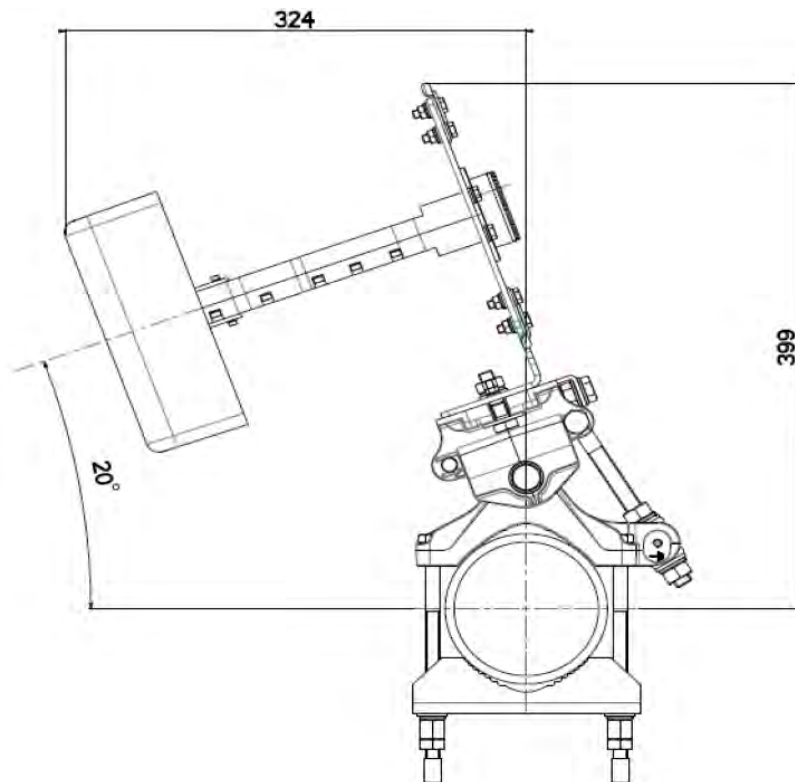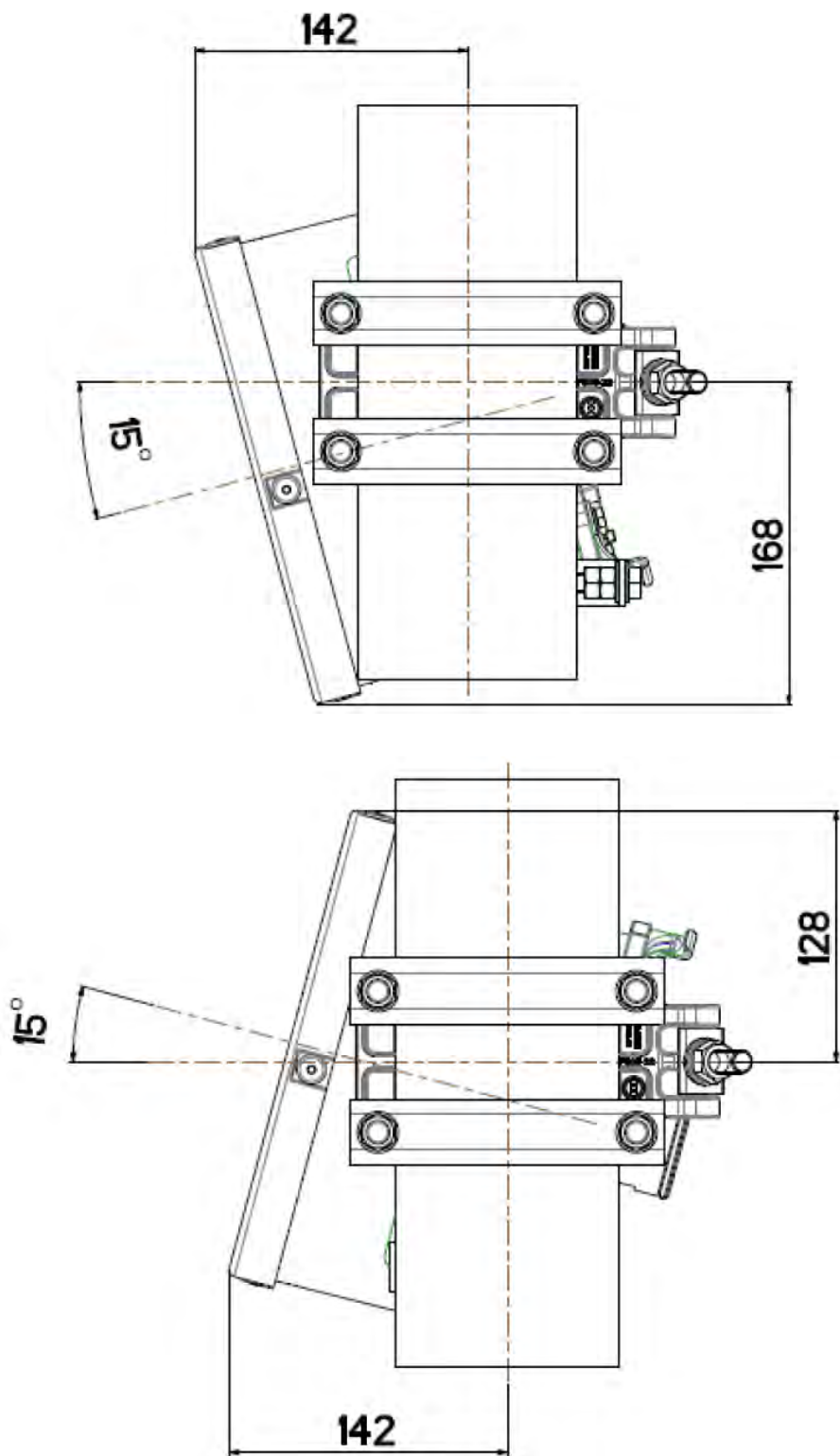
10.5 GHz Antenna

**Elevation axis
(in mm)**
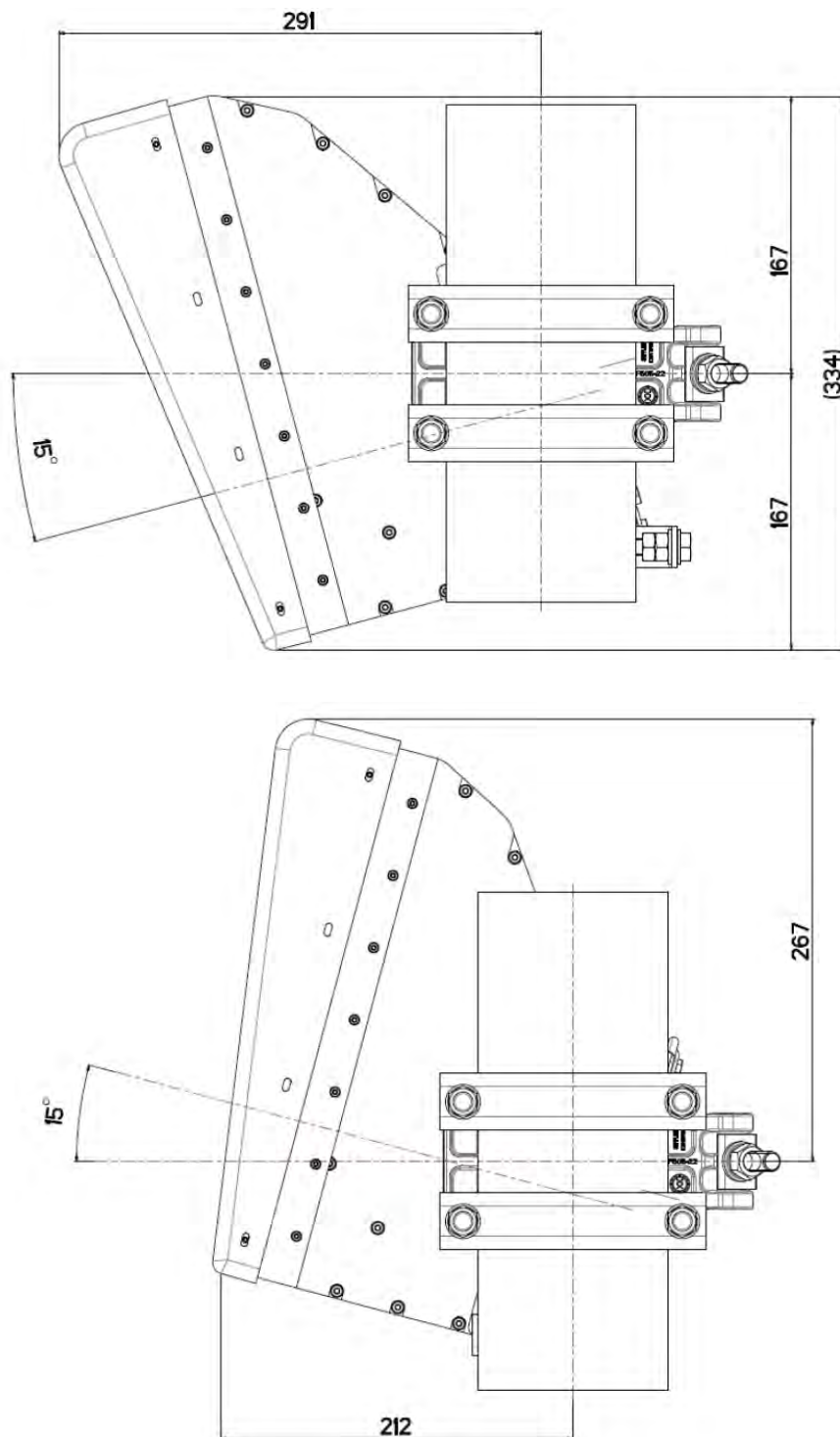
10.5 GHz Antenna, Continued

Azimuth axis (in mm)

26/28/32 GHz Antenna

**Elevation axis
(in mm)**

26/28/32 GHz Antenna

26/28/32 GHz Antenna, Continued
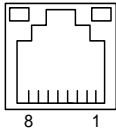
**Azimuth axis
(in mm)**
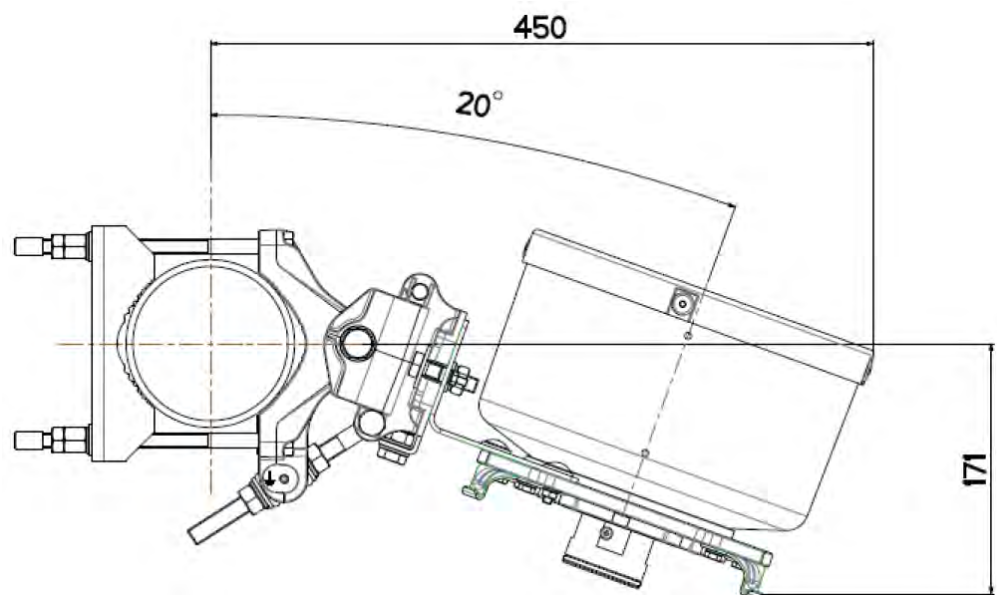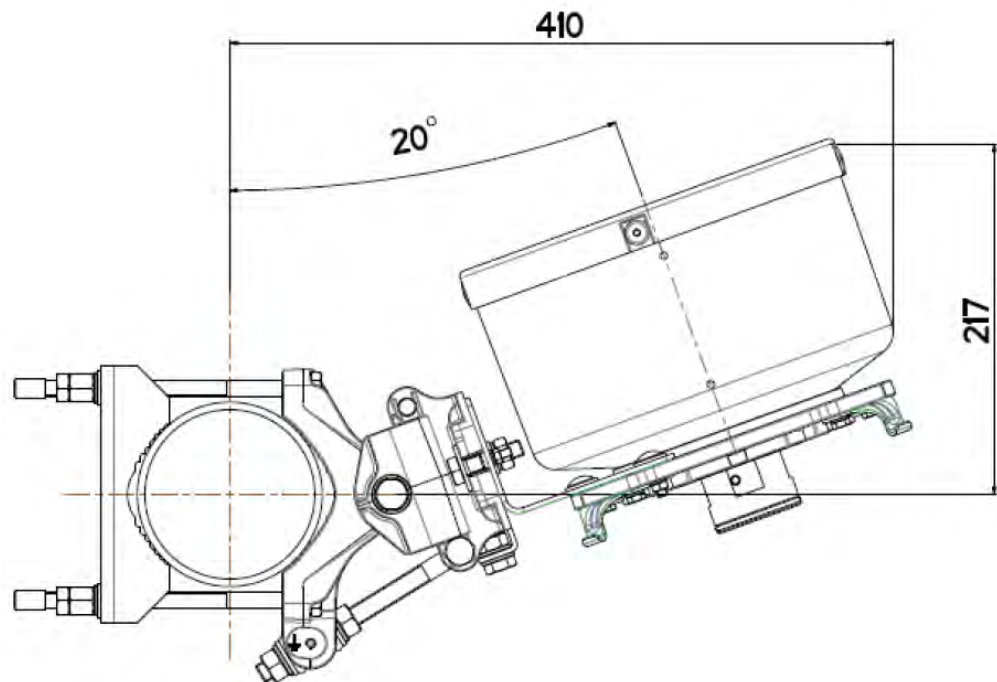
Appendix F: Receptacles Pin Out
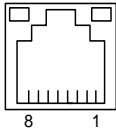
Radio Unit

GbE

Scope	For Traffic / Power.
Type	RJ-45 Female (100/1000 Base-T electrical).
Pin out	

Pin	Signal	Description
1	Transmit and Receive Data A+	Input / Output
2	Transmit and Receive Data A-	Input / Output
3	Transmit and Receive Data B+	Input / Output
4	Transmit and Receive Data C+	Input / Output
5	Transmit and Receive Data C-	Input / Output
6	Transmit and Receive Data B-	Input / Output
7	Transmit and Receive Data D+	Input / Output
8	Transmit and Receive Data D-	Input / Output

FE

Scope	For outband / Power.
Type	RJ-45 Female (10/100/ Base-T electrical).
Pin out	

Pin	Signal	Description
1	Transmit and Receive Data A+	Input / Output
2	Transmit and Receive Data A-	Input / Output
3	Transmit and Receive Data B+	Input / Output
4	Transmit and Receive Data C+	Input / Output
5	Transmit and Receive Data C-	Input / Output
6	Transmit and Receive Data B-	Input / Output
7	Transmit and Receive Data D+	Input / Output
8	Transmit and Receive Data D-	Input / Output

Continued on next page

Radio Unit, Continued

SFP

Scope	For GbE optical data traffic connection.
Type	SFP cage (1000 Base-X fiber).
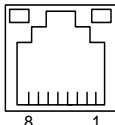
Outdoor DC PoNE

Gbe IN

Scope	For connection of GbE electrical data traffic.
Type	RJ-45 Female (10/100/1000 Base-T electrical).
Pin out	

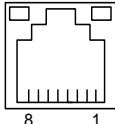| Pin	Signal	Description
1	Transmit and Receive Data A+	Input / Output
2	Transmit and Receive Data A-	Input / Output
3	Transmit and Receive Data B+	Input / Output
4	Transmit and Receive Data C+	Input / Output
5	Transmit and Receive Data C-	Input / Output
6	Transmit and Receive Data B-	Input / Output
7	Transmit and Receive Data D+	Input / Output
8	Transmit and Receive Data D-	Input / Output

Gbe OUT

Scope	For connection of GbE electrical data traffic, and PonE (Power on Ethernet) output.
Type	RJ-45 Female (10/100/1000 Base-T electrical).
Pin out	

Pin	Signal	Description
1	Transmit and Receive Data A+ **+** Power+	Input / Output
2	Transmit and Receive Data A- **+** Power+	Input / Output
3	Transmit and Receive Data B+ **+** Power-	Input / Output
4	Transmit and Receive Data C+ **+** Power+	Input / Output
5	Transmit and Receive Data C- **+** Power+	Input / Output
6	Transmit and Receive Data B- **+** Power-	Input / Output
7	Transmit and Receive Data D+ **+** Power-	Input / Output
8	Transmit and Receive Data D- **+** Power-	Input / Output

Outdoor DC PoNE, Continued

NMS IN

Scope	For connection of outband management input.
Type	RJ-45 Female (10/100 Base-T electrical).
Pin out	

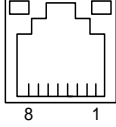| Pin	Signal	Description
1	Transmit and Receive Data A+	Input / Output
2	Transmit and Receive Data A-	Input / Output
3	Transmit and Receive Data B+	Input / Output
4	Transmit and Receive Data C+	Input / Output
5	Transmit and Receive Data C-	Input / Output
6	Transmit and Receive Data B-	Input / Output
7	Transmit and Receive Data D+	Input / Output
8	Transmit and Receive Data D-	Input / Output

NMS OUT

Scope	For connection of outband management and PonE (Power on Ethernet) output.
Type	RJ-45 Female (10/100 Base-T electrical).
Pin out	

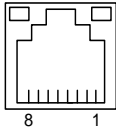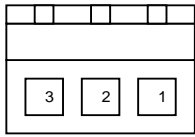| Pin	Signal	Description
1	Transmit and Receive Data A+ ✛ Power+	Input / Output
2	Transmit and Receive Data A- ✛ Power+	Input / Output
3	Transmit and Receive Data B+ ✛ Power-	Input / Output
4	Transmit and Receive Data C+ ✛ Power+	Input / Output
5	Transmit and Receive Data C- ✛ Power+	Input / Output
6	Transmit and Receive Data B- ✛ Power-	Input / Output
7	Transmit and Receive Data D+ ✛ Power-	Input / Output
8	Transmit and Receive Data D- ✛ Power-	Input / Output

Outdoor DC PoNE, Continued

INPUT

Scope	For connection of –48 V dc power supply voltage.
Type	Three poles power receptacle.
Pin out	

Pin	Signal	Description
1	Power Supply Return (GND)	Input
2	-48 V dc, nominal (40 V dc to 60 V dc)	Input
3	Optionally Earth Ground	Input

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