



NetStream Primo

Installation Guide

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Information to User

Any changes or modifications of equipment not expressly approved by the manufacturer could void the user's authority to operate the equipment and the warranty for such equipment.

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Regulatory Compliance

General Note

This system has achieved Type Approval in various countries around the world. This means that the system has been tested against various local technical regulations and found to comply. The frequency bands in which the system operates may be “unlicensed” and in these bands, the system can be used provided it does not cause interference.

FCC - Compliance

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generate, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

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

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



Warning

It is the responsibility of the installer to ensure that when using the outdoor antenna kits in the United States (or where **FCC** rules apply), only those antennas certified with the product are used. The use of any antenna other than those certified with the product is expressly forbidden by **FCC** rules 47 CFR part 15.204.



Warning

It is the responsibility of the installer to ensure that when configuring the radio in the United States (or where **FCC** rules apply), the Tx power is set according to the values for which the product is certified. The use of Tx power values other than those, for which the product is certified, is expressly forbidden by **FCC** rules 47 CFR part 15.204.



Caution

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. Resellers or distributors of this equipment are not liable for injury, damage or violation of regulations associated with the installation of outdoor units or antennas. The installer should configure the output power level of antennas according to country regulations and antenna type.



Warning

Where Outdoor units are configurable by software to Tx power values other than those for which the product is certified, it is the responsibility of the Professional Installer to restrict the Tx power to the certified limits.

This product was tested with special accessories - indoor unit (IDU or PoE), FTP CAT 5e shielded cable with sealing gasket, 12 AWG grounding cable - which must be used with the unit to insure compliance.

Indoor Units comply with part 15 of the FCC rules. Operation is subject to the following two conditions:

- These devices may not cause harmful interference.
- These devices must accept any interference received, including interference that may cause undesired operation.

Canadian Emission Requirements for Indoor Units

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

China MII

Operation of the equipment is only allowed under China MII 5.8 GHz band regulation configuration with EIRP limited to 33 dBm (2 Watt).

India WPC

Operation of the equipment is only allowed under India WPC GSR-38 for 5.8GHz band regulation configuration.

Unregulated

In countries where the radio is not regulated the equipment can be operated in any regulation configuration, best results will be obtained using Universal regulation configuration.

Safety Practices

Applicable requirements of National Electrical Code (NEC), NFPA 70; and the National Electrical Safety Code, ANSI/IEEE C2, must be considered during installation.



A Primary Protector is not required to protect the exposed wiring as long as the exposed wiring length is limited to less than or equal to 140 feet, and instructions are provided to avoid exposure of wiring to accidental contact with lightning and power conductors in accordance with NEC Sections 725-54 (c) and 800-30.

In all other cases, an appropriate Listed Primary Protector must be provided. Refer to Articles 800 and 810 of the NEC for details.

For protection of ODU against direct lightning strikes, appropriate requirements of NFPA 780 should be considered in addition to NEC.

For Canada, appropriate requirements of the CEC 22.1 including Section 60 and additional requirements of CAN/CSA-B72 must be considered as applicable.

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1. Before You Start

1.1. Important Notes

- For the warranty to be honored, install the unit in accordance with the instructions in this manual.
- Any changes or modifications of equipment not expressly approved by the manufacturer could void the user's authority to operate the equipment and the warranty for such equipment.
- NetStream Primo is intended for installation in a restricted access location.
- NetStream Primo must be installed and permanently connected to protective earth by qualified service personnel in accordance with applicable national electrical codes.

1.2. Safety Precautions & Declared Material

1.2.1. General Equipment Precautions



Warning

To avoid malfunctioning or personnel injuries, equipment or accessories/kits/plug-in unit installation, requires qualified and trained personnel. Changes or modifications not expressly approved by Netronics Networks could void the user's authority to operate the equipment.

Where special cables, shields, adapters and grounding kits are supplied or described in this manual, these items must be used, to comply with the FCC regulations.

Use of controls, adjustments, or performing procedures other than those specified herein, may result in hazardous radiation exposure.

When working with a NetStream Primo, note the following risk of electric shock and energy hazard:

Disconnecting one power supply disconnects only one power supply module. To isolate the unit completely, disconnect all power supplies.

Machine noise information order - 3. GPSGV, the highest sound pressure level amounts to 70 dB (A) or less, in accordance with ISO EN 7779.



Caution

Static electricity may cause body harm, as well as harm to electronic components inside the device. Anyone responsible for the installation or maintenance of the NetStream Primo must use an ESD Wrist Strap. ESD protection measures must be observed when touching the unit. To prevent damage, before touching components inside the device, all electrostatic must be discharged from both personnel and tools.



In Norway and Sweden:

Equipment connected to the protective earthing of the building installation through the mains connection or through other equipment with a connection to protective earthing – and to a cable distribution system using coaxial cable, may in some circumstances create a fire hazard. Connection to a cable distribution system has therefore to be provided through a device providing electrical isolation below a certain frequency range (galvanic isolator, see EN 60728-11).

Utstyr som er koplet til beskyttelsesjord via nettplugg og/eller via annet jordtilkoplest utstyr – og er tilkoplest et kabel-TV nett, kan forårsake brannfare. For å unngå dette skal det ved tilkopling av utstyret til kabel-TV nettet installeres en galvanisk isolator mellom utstyret og kabel-TV nettet.

Utrustning som är kopplad till skyddsjord via jordat vägguttag och/eller via annan utrustning och samtidigt är kopplad till kabel-TV nät kan i vissa fall medföra risk för brand. För att undvika detta skall vid anslutning av utrustningen till kabel-TV nät galvanisk isolator finnas mellan utrustningen och kabel-TV nätet.

1.2.2. Précautions générales relatives à l'équipement



Warning

L'utilisation de commandes ou de réglages ou l'exécution de procédures autres que celles spécifiées dans les présentes peut engendrer une exposition dangereuse aux rayonnements.

L'usage de NetStream Primo s'accompagne du risque suivant d'électrocution et de danger électrique : le débranchement d'une alimentation électrique ne déconnecte qu'un module d'alimentation électrique. Pour isoler complètement l'unité, il faut débrancher toutes les alimentations électriques.

Bruit de machine d'ordre - 3. GPSGV, le plus haut niveau de pression sonore s'élève à 70 dB (A) au maximum, dans le respect de la norme ISO EN 7779.

1.2.3. Allgemeine Vorsichtsmaßnahmen für die Anlage



Warning

Wenn andere Steuerelemente verwendet, Einstellungen vorgenommen oder Verfahren durchgeführt werden als die hier angegebenen, kann dies gefährliche Strahlung verursachen.

Beachten Sie beim Arbeiten mit NetStream Primo das folgende Stromschlag- und Gefahrenrisiko: Durch Abtrennen einer Stromquelle wird nur ein Stromversorgungsmodul abgetrennt. Um die Einheit vollständig zu isolieren, trennen Sie alle Stromversorgungen ab.

Maschinenlärminformations-Verordnung - 3. GPSGV, der höchste Schalldruckpegel beträgt 70 dB(A) oder weniger gemäß EN ISO 7779.

1.3. Pre-Installation Instructions

1.3.1. Packing

The equipment should be packed and sealed in moisture absorbing bags.

1.3.2. Transportation and Storage

The equipment cases are prepared for shipment by air, truck, railway and sea, suitable for handling by forklift trucks and slings. The cargo must be kept dry during transportation, in accordance with ETS 300 019-1-2, Class 2.3. For sea-transport, deck-side shipment is not permitted. Carrier-owned cargo containers should be used.

It is recommended that the equipment be transported to the installation site in its original packing case.

If intermediate storage is required, the packed equipment must be stored in a dry and cool environment, and out of direct sunlight, in accordance with ETS 300 019-1-1, Class 1.2.

1.3.3. Unpacking

The equipment is packed in sealed plastic bags and moisture absorbing bags are inserted. Any separate sensitive product, i.e. printed boards, are packed in anti-static handling bags. The equipment is further packed in special designed cases.

Marking is done according to standard practice unless otherwise specified by customers. The following details should be marked:

- Customers address
- Contract No
- Site name (if known)
- Case No

1.3.4. Inspection

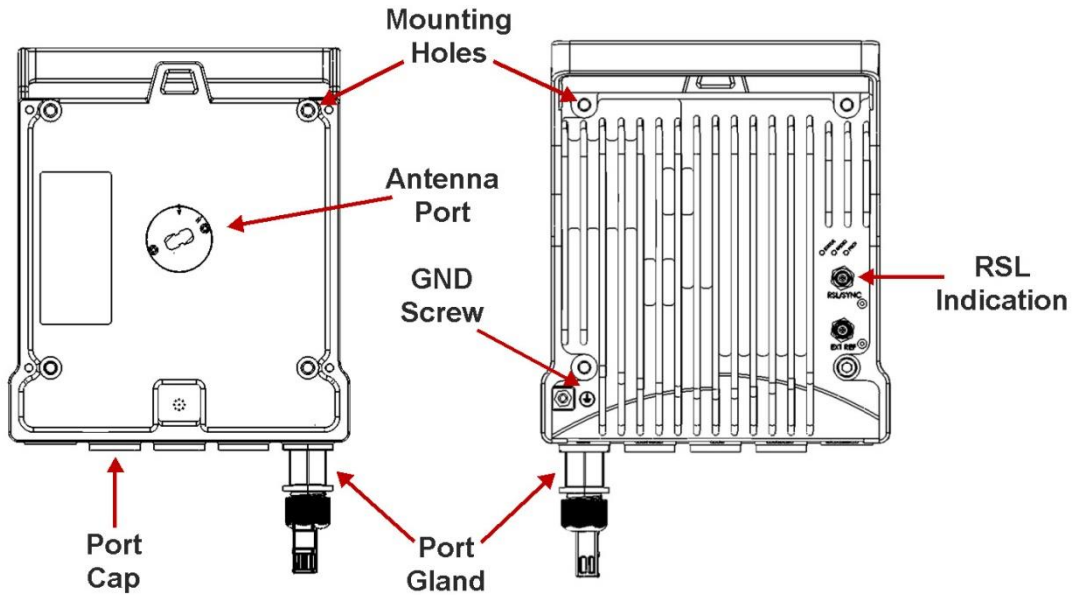
Check the packing lists and ensure that correct parts numbers quantities of goods have arrived. Inspect for any damage on the cases and equipment. Report any damage or discrepancy to a Netronics representative, by e-mail or fax.

2. Product Hardware Description

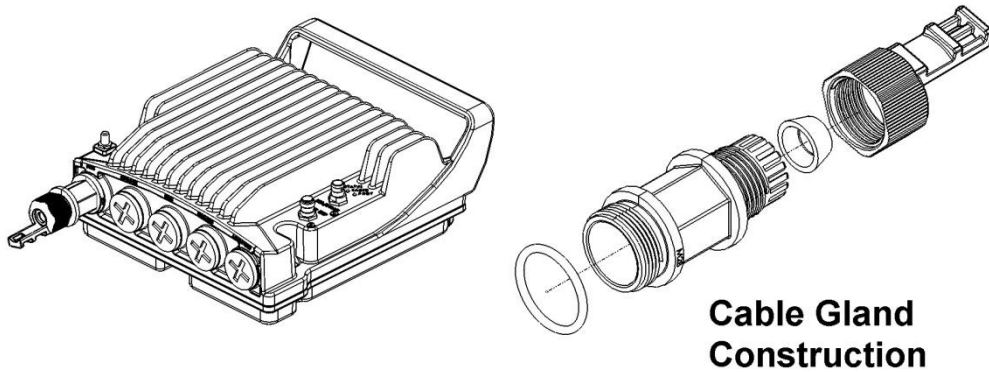
2.1. NetStream Primo Hardware Overview

NetStream Primo features an all-outdoor architecture consisting of a single unit directly mounted on the antenna.

NetStream Primo Rear View (Left) and Front View (Right)

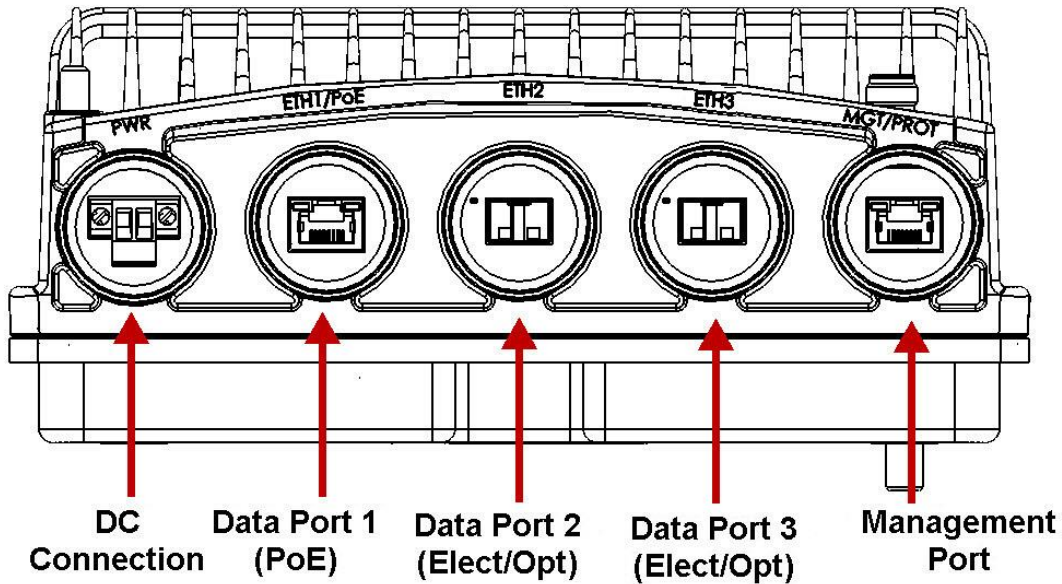


Cable Gland Construction



2.1.1. NetStream Primo Interfaces

NetStream Primo Interfaces



- Data Port 1 for GbE traffic:
 - Electric: 10/100/1000Base-T. Supports PoE.
 - Optical: 1000Base-X (optional)
- Data Port 2 for GbE traffic:
 - Electric 10/100/1000Base-T
 - Optical: 1000Base-X (optional)
- Data Port 3 for GbE traffic
 - Electric: 10/100/1000Base-T
 - Optical: 1000Base-X (optional)
- Power interface (-48VDC)
- Management Port: 10/100Base-T
- 1 RF Interface – Standard interface per frequency band
- RSL interface: BNC connector
- Grounding screw

2.2. PoE Injector

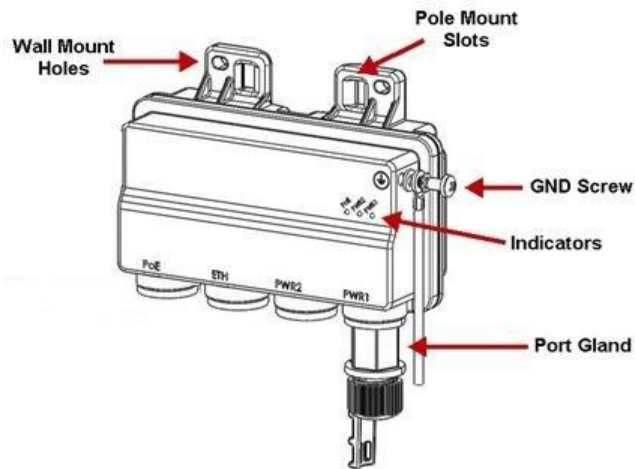
The PoE injector is an outdoor unit which can be mounted on a wall, pole, or indoor rack.

Each PoE Injector kit includes the following items:

- PoE injector
- 2 DC power connectors

Product Hardware Description

PoE Injector



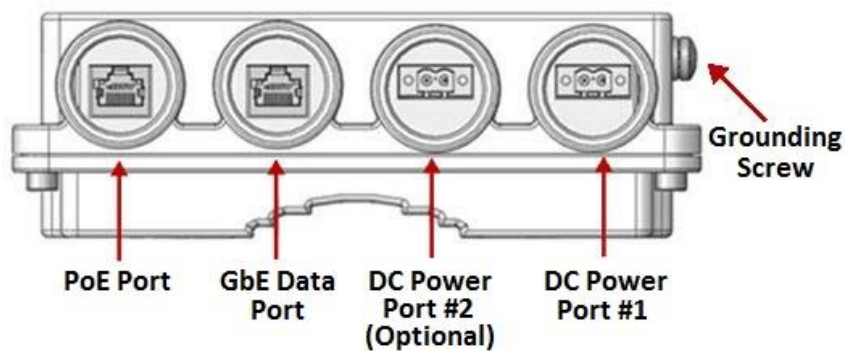
Two models of the PoE Injector are available:

- **PoE_Inj_AO_2DC_24V_48V** – Includes two DC power ports with power input ranges of $\pm(18-60)V$ each.
- **PoE_Inj_AO** – Includes one DC power port (DC Power Port #1), with a power input range of $\pm(40-60)V$.

2.2.1. PoE Injector Interfaces

- Power-Over-Ethernet (PoE) Port
- GbE Data Port supporting 10/100/1000Base-T
- DC Power Port 1 $\pm(18-60)V$ or $\pm(40-60)V$
- DC Power Port 2 $\pm(18-60)V$ (Optional)
- Grounding screw

PoE Injector Ports



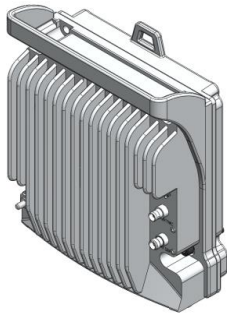
2.3. System Components

The following figures show the main components used in the NetStream Primo installation procedures.

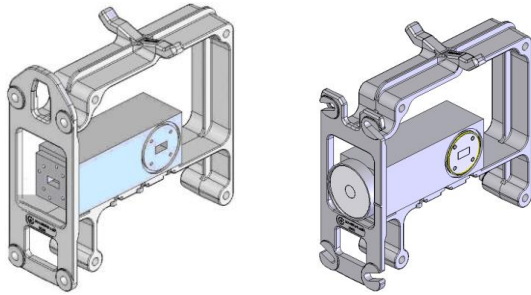


In general, the NetStream Primo utilizes the exact same mediation devices as the ODU unless stated otherwise.

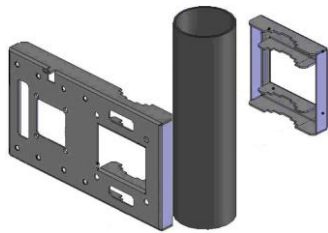
NetStream Primo
OMT



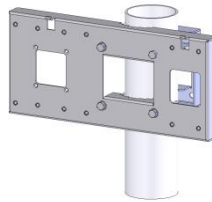
Coupler



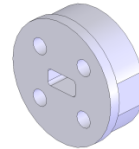
Remote Pole Mount



Remote Dual Pole Remote Mount



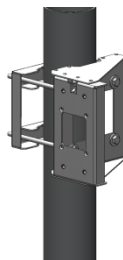
4+0/4+4 Extender



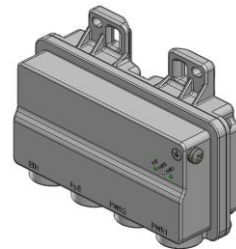
Twist



Remote Mount for 4+0



Poe Injector



Product Hardware Description

2.4. Adaptors and Installation Kits

scription	6GHz	7-8GHz	10-11GHz	13GHz	15GHz	18GHz	23GHz	26GHz	28-31GHz	32GHz	38GHz	42GHz
OCU COUPLER KIT	ODU6-CPLR-Kit	ODU7_8-CPLR-Kit	ODU10_11-CPLR-Kit	ODU13-CPLR-Kit	ODU15-CPLR-Kit*0	ODU18-CPLR-Kit*0	ODU23-CPLR-Kit	ODU26-CPLR-Kit	ODU28-CPLR-Kit	ODU32-CPLR-Kit	ODU38-CPLR-Kit	ODU42-CPLR-Kit
ODU SYMMETRICAL COUPLERS KIT	ODU6-Sym-cplr-kit	ODU7_8-Sym-cplr-kit	ODU10_11-Sym-cplr-kit	ODU13-Sym-cplr-kit	ODU15-Sym-cplr-kit	ODU18-Sym-cplr-kit	ODU23-Sym-cplr-kit	ODU26-Sym-cplr-kit	ODU28-Sym-cplr-kit	NA	ODU38-Sym-cplr-kit	NA
ODU TWIST KIT	ODU6-TWST-Kit	ODU7_8-TWST-Kit	ODU10_11-TWST-Kit	ODU13-TWST-Kit	ODU15-TWST-Kit	ODU18-TWST-Kit	ODU23_26-TWST-Kit		ODU28_32-TWST-Kit		ODU38-TWST-Kit	ODU42-TWST-Kit
OCU COUPLER KIT	ODU6-OMT-DM-Kit	ODU7_8-OMT-DM-Kit	ODU10_11-OMT-DM-Kit	ODU13-OMT-DM-Kit	ODU15-OMT-DM-Kit	ODU18-OMT-DM-Kit	ODU23-OMT-DM-Kit	ODU26-OMT-DM-Kit	ODU28-OMT-DM-Kit	ODU32-OMT-DM-Kit	ODU38-OMT-DM-Kit	ODU42-OMT-DM-Kit
ODU ADAPTORS OMT KIT	ODU6-OMT-ADAPT	ODU7_8-OMT-ADAPT	ODU10_11-OMT-ADAPT	NA								
ODU SHORT OMT KIT	ODU-OMT-SHORT-PLATE											

Product Hardware Description

Remote Mount	6GHz	7-8GHz	10-11GHz	13GHz	15GHz	18GHz	23GHz	26GHz	28-31GHz	32GHz	38GHz	42GHz
ODU REMOTE MOUNT KIT	ODU-PoleMount											
NetStream Primo DC REMOTE MOUNT KIT	NetStream Primo-Pole-Mount											
ODU ADAPTOR REMOTE MOUNT KIT	ODU6-RM_ADAPT	ODU7_8-RM_ADAPT	ODU10_11-RM_ADAPT	ODU13-RM_ADAPT								
ODU WG Kit	Flx-WG-4FT-6	Flx-WG-4FT-7_8	Flx-WG-4FT-10_11	Flx-WG-3FT-13	Flx-WG-3FT-15	Flx-WG-3FT-18-26			Flx-WG-3FT-28-38		Flx-WG-3FT-42	
ODU ADAPTOR TO FLEX WG (IMPERIAL) KIT	ADPT_ODU6-RM_mill	ADPT_ODU7_8-RM_mill	ADPT_ODU10_11-RM_mill	ADPT_ODU13-RM_mill	ADPT_ODU15-RM_mill	ADPT_ODU18_26-RM_mill			ADPT_ODU28_38-RM_mill			

1500P Adaptors	6GHz	7-8GHz	10-11GHz	13GHz	15GHz	18GHz	23GHz	26GHz	28-31GHz	32GHz	38GHz	42GHz
ODU-PHOSPHORUS DM ADAPTOR KIT			ADPT_ODU10_11-DM_1500P	ADPT_ODU13-DM_1500P	ADPT_ODU15-DM_1500P	ADPT_ODU18-DM_1500P	ADPT_ODU23-DM_1500P	ADPT_ODU26-DM_1500P	ADPT_ODU28-DM_1500P	ADPT_ODU32-DM_1500P	ADPT_ODU38-DM_1500P	NA

Imperial to mm Transitions	6GHz	7-8GHz	10-11GHz	13GHz	15GHz	18GHz	23GHz	26GHz	28-31GHz	32GHz	38GHz	42GHz
ODU ADAPTOR KIT TO IMPERIAL ANT.	ADPT_ODU6-RM_imp	ADPT_ODU7_8-RM_imp	ADPT_ODU10_11-RM_imp	ADPT_ODU13-RM_imp	ADPT_ODU15-RM_imp	ADPT_ODU18_26-RM_imp			ADPT_ODU28_38-RM_imp		NA	
ODU ADAPTOR KIT TO IMP WG	ADPT_ODU6-RM_mill	ADPT_ODU7_8-RM_mill	ADPT_ODU10_11-RM_mill	ADPT_ODU13-RM_mill	ADPT_ODU15-RM_mill	ADPT_ODU18_26-RM_mill			ADPT_ODU28_38-RM_mill		NA	

Product Hardware Description

Antenna Circ. Adapters for OMT ¹	6GHz	7-8GHz	10-11GHz	13GHz	15GHz	18GHz	23GHz	26GHz	28GHz	32GHz	38GHz	42GHz
Andrew	ODU6-OMT-INT-A	ODU7_8-OMT-INT-A	ODU10_11-OMT-INT-A	ODU13-OMT-INT-A	ODU15-OMT-INT-A	ODU18-OMT-INT-A	ODU23-OMT-INT-A	ODU26-OMT-INT-A	ODU28-OMT-INT-A	ODU32-OMT-INT-A	ODU38-OMT-INT-A	ODU42-OMT-INT-A
RFS 1-6FT	ODU6-OMT-INT-1_6FT-R	ODU7_8-OMT-INT-1_6FT-R	ODU10_11-OMT-INT-1_6FT-R	ODU13-OMT-INT-1_6FT-R	ODU15-OMT-INT-1_6FT-R	ODU18-OMT-INT-1_6FT-R	ODU23-OMT-INT-1_6FT-R	ODU26-OMT-INT-1_6FT-R		ODU32-OMT-INT-1_6FT-R	ODU38-OMT-INT-1_6FT-R	NA
Radio Waves	ODU6L-OMT-INT-RW / ODU6H-OMT-INT-RW	ODU7_8-OMT-INT-RW	ODU10_11-OMT-INT-RW	ODU13-OMT-INT-RW	ODU15-OMT-INT-RW	ODU18-OMT-INT-RW	ODU23-OMT-INT-RW	ODU26-OMT-INT-RW	ODU28-OMT-INT-RW	NA	ODU38-OMT-INT-RW	NA
Shenglu		ODU7_8-OMT-INT-SH	ODU10_11-OMT-INT-SH	ODU13-OMT-INT-SH	ODU15-OMT-INT-SH	ODU18-OMT-INT-SH	ODU23-OMT-INT-SH	ODU26-OMT-INT-SH				
LEAX	ODU6-OMT-INT-CR1	ODU7_8-OMT-INT-CR1	ODU10_11-OMT-INT-CR1	ODU13-OMT-INT-CR1	ODU15-OMT-INT-CR1	ODU18-OMT-INT-CR1	ODU23-OMT-INT-CR1	ODU26-OMT-INT-CR1	ODU28-OMT-INT-CR1	ODU32-OMT-INT-CR1	ODU38-OMT-INT-CR1	ODU42-OMT-INT-CR1
Xian Putian	ODU6-OMT-INT-CR	ODU7_8-OMT-INT-CR	ODU10_11-OMT-INT-CR	ODU13-OMT-INT-CR	ODU15-OMT-INT-CR	ODU18-OMT-INT-CR	ODU23-OMT-INT-CR	ODU26-OMT-INT-CR	ODU28-OMT-INT-CR	ODU32-OMT-INT-CR	ODU38-OMT-INT-CR	NA
Xian Putian (OEM branding)	ODU6-OMT-INT-X	ODU7_8-OMT-INT-X	ODU10_11-OMT-INT-X	ODU13-OMT-INT-X	ODU15-OMT-INT-X	ODU18-OMT-INT-X	ODU23-OMT-INT-X	ODU26-OMT-INT-X	ODU28-OMT-INT-X	ODU32-OMT-INT-X	ODU38-OMT-INT-X	NA

¹ This adapter is not required if the antenna is equipped with a circular feeder. Such antenna will have the following marketing model structure: Am-size(ft)-freq-CIRC-mnf.

Product Hardware Description

PoE Injector

Marketing Model	Description
PoE_Inj_AO	PoE Injector all outdoor, -48VDC (Default offering)
PoE_Inj_AO_2DC_24V_48V	POE Injector all outdoor, redundant DC input, +24VDC support and -48VDC support
PoE_Inj_19inch_Rack_Mnt_kit	PoE Injector 19" Rack Mount Kit
PoE_Inj_ETSI_Rack_Mnt_kit	PoE Injector ETSI Rack Mount Kit

2.5. Antenna Connection

Netstream Primo can be mounted directly for all frequencies (6-42 GHz) using the following antenna types (for integrated antennas, specific antennas part numbers are required):

- Andrew: VHLP series
- RFS: SB/SU series
- Shenglu: SLC series
- Xian Putian: WTC/WTG series
- General Dynamics: HPS series

For remote mount installations, the following Flexible Waveguide flanges should be used (millimetric). The same antenna type (integrated) as indicated above can be used (recommended).

Other antenna types using the flanges listed in the table below may also be used.

Frequency		Circ. WG Diameter	Rect. WG Flange Des.	Radio Side (Remote) Flange Des.	Flex WG Side A Flange Des.	Flex WG Side B Flange Des.	Antenna (Remote) Flange Des.
Band	Range (GHz)						
6(L/U) GHz	5.8-7.1	31.8 mm	WR137	UDR70	PDR70	PDR70	UDR70
7/8 GHz	7.1-8.5	26 mm	WR112	UBR84	PBR84	PBR84	UBR84
10/11 GHz	10.0-11.7	18 mm	WR90	UBR100	PBR100	PBR100	UBR100
13 GHz	12.7-13.3	15 mm	WR75	UBR120	PBR120	PBR120	UBR120
15 GHz	14.5-15.4	13.5 mm	WR62	UBR140	PBR140	PBR140	UBR140
18 GHz	17.7-19.7	10.5 mm	WR42	UBR220	PBR220	PBR220	UBR220
23 GHz	21.2-23.6	9 mm					
26 GHz	24.5-26.6	8 mm					
28-31 GHz	27.3-29.5	7 mm	WR28	UBR320	PBR320	PBR320	UBR320
32 GHz	31.8-33.4	6.5 mm					
38 GHz	37.0-40.0	5.5 mm					
42 GHz	40.5-43.5	4.775 mm	WR22	UG383/U	UG383/U	UG383/U	UG383/U

If a different antenna type (CPR flange) is used, a flange adaptor is required. Please contact your Netronics representative for details.



Appropriate lubricant or grease can be applied to the screws that connect the NETSTREAM PRIMO to the antenna interface.

2.6. Power Specifications

2.6.1. Electrical Requirements

- -48V DC Nominal
- Maximum current rating 1.5 A
- Maximum Cable length 300 meter
- Maximum cable size for PoE cable is 24 AWG, with maximum current up to 2A from the power source.

2.6.2. Important Notes!

- The unit must only be installed by service personnel.
- The unit must have a permanent connection to protective grounding.
- Data port 2, Data port 3, the Management port, and the TNC connector do not provide protection from over-voltages on telecommunication networks for host equipment users.
- The RSL interface connector is intended for technician use only.
- Disconnect device (circuit breaker) in the building installation:
 - Shall be readily accessible and incorporated external to the equipment.
 - The maximum rating of the overcurrent protection shall be up to 6 Amp.

2.7. Environmental Specifications

Operating: ETSI EN 300 019-1-4 Class 4.1

Temperature range for continuous operating temperature with high reliability:

-33°C (-27°F) to +55°C (131°F)

Temperature range for exceptional temperatures; tested successfully, with limited margins:

-45°C (-49°F) to +60°C (140°F)

Humidity: 5%RH to 100%RH

IEC529 IP66

Storage: ETSI EN 300 019-1-1 Class 1.2

Transportation: ETSI EN 300 019-1-2 Class 2.3

3. Cable Installation and Grounding

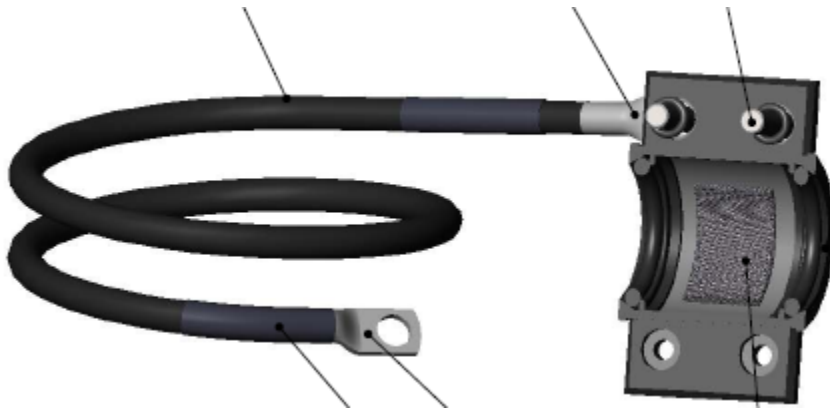
3.1. Minimum and Maximum Cable Diameter

To fit the gland, the outer cable diameter should be between 6-10 mm. This applies to all glands on both the NetStream Primo unit and the PoE Injector.

3.2. Cable Grounding

Cables must be grounded as follows:

- For optical (SFP) cable (see *Connecting an Optical Fiber Cable and SFP* on page 36), no grounding is required.
- For Ethernet cables (see *Connecting the Ethernet Cable* on page 42), the cable should be grounded to the antenna tower every 50m using the kit CAT5E_gnd_kit.



3.2.1. Grounding Procedure

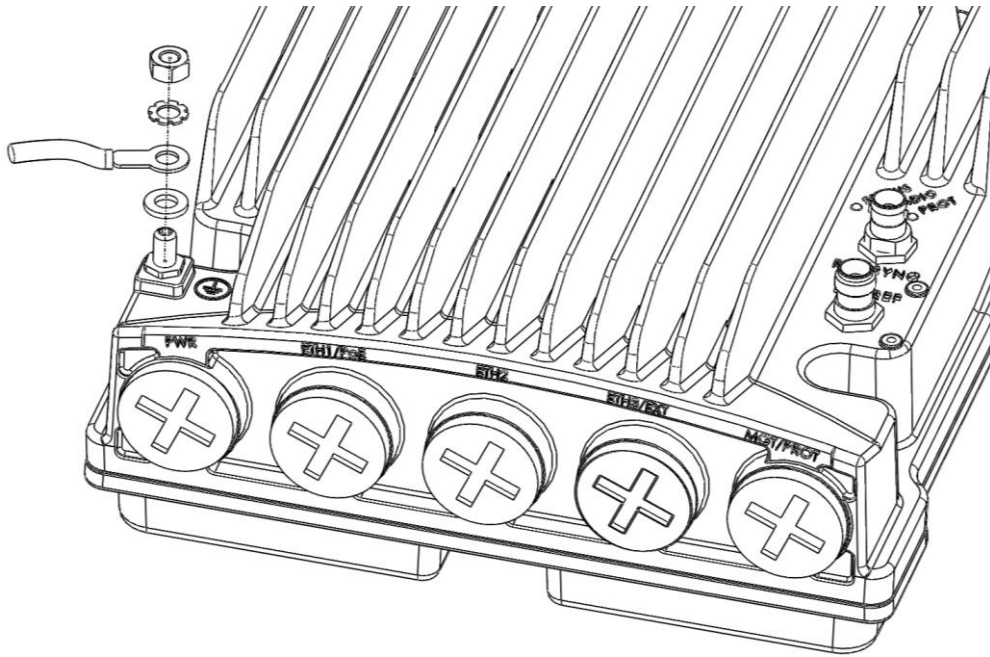
Required Tools

- Metric offset wrench key wrench #3
- Metric wrench 10mm

Procedure

- 1 On the front of each NetStream Primo unit, loosen the nut, plain washer, and serrated washer from the GND stud, using the metric offset hexagon key and the wrench.

Cable Installation and Grounding



- 2 Place the cable lug (supplied with the NetStream Primo grounding kit) in place on the screw.
- 3 Secure the cable lug.
- 4 The second side of the GND cable should be connected to the main ground bar or terminal ground bar of the site.
- 5 Perform a resistance test between the 2 lugs of the GND cable. Verify that the result is 0-2 ohms.



Note

The unit's earthing screw terminal shall be permanently connected to protective earth in a building installation in accordance with applicable national code and regulations by a service person.

A 2-pole circuit breaker, a branch circuit protector, suitably certified in accordance with applicable national code and regulations, rated maximum 20A, shall be installed for full power disconnection in a building installation.

Any outdoor antenna cable shield shall be permanently connected to protective earth in a building installation.

3.3. Power Source

When selecting a power source, the following must be considered:

DC power can be from -40 VDC to -60 VDC.

Recommended: Availability of a UPS (Uninterrupted Power Source), battery backup, and emergency power generator.

Whether or not the power source provides constant power (i.e., power is secured on weekends or is shut off frequently and consistently).

The power supply must have grounding points on the AC and DC sides.



Caution

The user power supply GND must be connected to the positive pole in the NetStream Primo power supply.
Any other connection may cause damage to the system!



Note

For the warranty to be honored, you must install the NetStream Primo in accordance with the instructions above.

3.4. Surge Protection

NetStream Primo includes built-in surge protection for its Ethernet and power interfaces. NetStream Primo's surge protection implementation complies with surge immunity standard IEC 61000-4-5, level 4, provided the Ethernet cables were prepared according to the instructions in *Preparing the Ethernet Cable and Plug-in Field* on page 43.

In areas in which severe lighting conditions are likely to occur, it is strongly recommended to add additional protection by placing lightning protectors on all electrical Ethernet cables, near the connection points with the NetStream Primo unit.

3.5. Available Cable Options

3.5.1. Fiber Optic Cables - Single Mode

Marketing P/N	Description
NS PRIMO/DIPLO_FO_SM_LC2LC_ARM_7m	CABLE,FO,DUAL LC/LC,7M,SM,55mm OPEN END,M28 GLAND,ARMORED,OU
NS PRIMO/DIPLO_FO_SM_LC2LC_ARM_15m	CABLE,FO,DUAL LC/LC,15M,SM,55mm OPEN END,M28 GLAND,ARMORED,O
NS PRIMO/DIPLO_FO_SM_LC2LC_ARM_30m	CABLE,FO,DUAL LC/LC,30M,SM,55mm OPEN END,M28 GLAND,ARMORED,O
NS PRIMO/DIPLO_FO_SM_LC2LC_ARM_50m	CABLE,FO,DUAL LC/LC,50M,SM,55mm OPEN END,M28 GLAND,ARMORED,O
NS PRIMO/DIPLO_FO_SM_LC2LC_ARM_70m	CABLE,FO,DUAL LC/LC,70M,SM,55mm OPEN END,M28 GLAND,ARMORED,O
NS PRIMO/DIPLO_FO_SM_LC2LC_ARM_80m	CABLE,FO,DUAL LC/LC,80M,SM,55mm OPEN END,M28 GLAND,ARMORED,O
NS PRIMO/DIPLO_FO_SM_LC2LC_ARM_100m	CABLE,FO,DUAL LC/LC,100M,SM,55mm OPEN END,M28 GLAND,ARMORED
NS PRIMO/DIPLO_FO_SM_LC2LC_ARM_150m	CABLE,FO,DUAL LC/LC,150M,SM,55mm OPEN END,M28 GLAND,ARMORED

3.5.2. Fiber Optic Cables - Multi Mode

Marketing P/N	Description
NS PRIMO/DIPLO_FO_MM_LC2LC_ARM_7m	CABLE,FO,DUAL LC/LC,7M,MM,55mm OPEN END,M28 GLAND,ARMORED,OU
NS PRIMO/DIPLO_FO_MM_LC2LC_ARM_15m	CABLE,FO,DUAL LC/LC,15M,MM,55mm OPEN END,M28 GLAND,ARMORED,O
NS PRIMO/DIPLO_FO_MM_LC2LC_ARM_20m	CABLE,FO,DUAL LC/LC,20M,MM,55mm OPEN END,M28 GLAND,ARMORED
NS PRIMO/DIPLO_FO_MM_LC2LC_ARM_30m	CABLE,FO,DUAL LC/LC,30M,MM,55mm OPEN END,M28 GLAND,ARMORED,O
NS PRIMO/DIPLO_FO_MM_LC2LC_ARM_50m	CABLE,FO,DUAL LC/LC,50M,MM,55mm OPEN END,M28 GLAND,ARMORED,O
NS PRIMO/DIPLO_FO_MM_LC2LC_ARM_80m	CABLE,FO,DUAL LC/LC,80M,MM,55mm OPEN END,M28 GLAND,ARMORED,O
NS PRIMO/DIPLO_FO_MM_LC2LC_ARM_100m	CABLE,FO,DUAL LC/LC,100M,MM,55mm OPEN END,M28 GLAND,ARMORED
NS PRIMO/DIPLO_FO_MM_LC2LC_ARM_150m	CABLE,FO,DUAL LC/LC,150M,MM,55mm OPEN END,M28 GLAND,ARMORED
NS PRIMO/DIPLO_FO_MM_LC2LC_ARM_200m	CABLE,FO,DUAL LC/LC,200M,MM,55mm OPEN END,M28 GLAND,ARMORED

3.5.3. DC Cable and Connector

Cable Installation and Grounding

Marketing P/N	Description
Outdoor_DC_cbl_2x18AWG_drum	CABLE,305M,OUTDOOR_DC_CBL_2X18AWG_DRUM
NS PRIMO/DILOC_DC_Conn	NS PRIMO/DILOC_DC_Conn

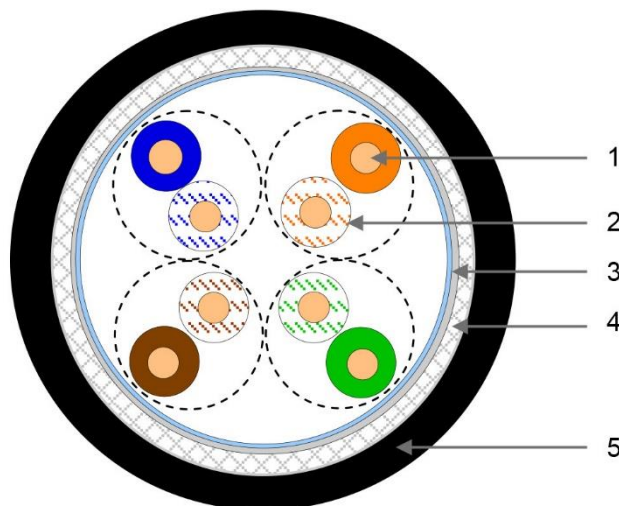
3.5.4. Ethernet Cable and Specifications

Marketing P/N	Description
CAT5E_SFUTP_Outdoor_50m	CABLE,RJ45 TO RJ45 STR 50M,CAT-5E,ETHER,UV RES
CAT5E_SFUTP_Outdoor_75m	CABLE,RJ45 TO RJ45 STR 75M,CAT-5E,ETHER,UV RES
CAT5E_SFUTP_Outdoor_305m_drum	CABLE,MATERIAL,CAT-5E,SFUTP,4X2X24AWG,UV RESISTANCE,305M
CAT5E_Arm_50m	CABLE,RJ45 TO RJ45 STR,50M,CAT-5E,M28 GLAN,ARM,UV RESISTANCE
CAT5E_Arm_70m	CAT5E_Arm_75mCABLE,RJ45 TO RJ45 STR,70M,CAT-5E,M28 GLAN,ARM,UV RESISTANCE
CAT5E_Arm_305m_drum	CABLE,MATERIAL,CAT-5E,FTP,4X2X24AWG,ARMORED,UV RESIST,305M

This cable has the following specifications:

- Suitable for:
 - Fast Ethernet
 - Gigabit Ethernet
 - PoE

Cable Design – The numbers in the figure below refer to the items listed beneath the figure.



- [1]Conductor
- [2]Insulation
- [3]Screen: Alu/Pet foil. Alu outside
- [4]Tinned copper braid

Cable Installation and Grounding

- [5]Jacket

Color Code

Pair	Wire A	Wire B
1	WHITE-blue	BLUE
2	WHITE-orange	ORANGE
3	WHITE-green	GREEN
4	WHITE-brown	BROWN

Cable Installation and Grounding

3.5.5. Outdoor Ethernet Cable Specifications

Electrical Requirements	
Cable type	CAT-5e SFUTP, 4 pairs, according to ANSI/TIA/EIA-568-B-2
Wire gage	24 AWG
Stranding	Solid
Voltage rating	70V
Shielding	Braid + Foil
Pinout	<p>The diagram shows the pinout for an RJ45 connector. It consists of two rows of four pins each, labeled RJ45,P1 on the left and RJ45,P2 on the right. The pins are numbered 1 through 8. The color coding for each pin is as follows:</p> <ul style="list-style-type: none"> Pin 1: WHITE/GREEN Pin 2: GREEN Pin 3: WHITE/ORANGE Pin 6: ORANGE Pin 4: BLUE Pin 5: WHITE/BLUE Pin 7: WHITE/BROWN Pin 8: BROWN Pin 9: DRAIN WIRE + SHIELD (SHELL)
Mechanical/ Environmental Requirements	
Jacket	PVC, double, UV resistant
Outer diameter	7-10 mm
Operating and Storage temperature range	-40°C - 85°C
Flammability rating	According to UL-1581 VW1, IEC 60332-1
RoHS	According to Directive/2002/95/EC

Cable Installation and Grounding

3.5.6. Outdoor DC Cable Specifications

Electrical Requirements	
Cable type	2 tinned copper wires
Wire gage	18 AWG (for <100m installations) 12 AWG (for >100m installations)
Stranding	stranded
Voltage rating	600V
Spark test	4KV
Dielectric strength	2KV AC min
Mechanical/ Environmental Requirements	
Jacket	PVC, double, UV resistant
Outer diameter	7-10 mm
Operating & Storage temperature range	-40°C - 85°C
Flammability rating	According to UL-1581 VW1, IEC 60332-1
RoHS	According to Directive/2002/95/EC

3.6. Securing the Cables

All cables should be secured at every meter on-site using either a T-Rups kit, P/N Outdoor Ties (AA-0604-0) or cable clamps. When using the T-Rups kit, take special care to apply the proper amount of force in order to avoid damage to the cable. This is especially important for optical (SFP) cables.

The following cable clamps are available:

Cable Clamps

Part Number	Marketing Model	Item Description
SI-1114-0	Fiber_clamp_6cbl_6.5-7.5mm	DUAL FEADER CLAMP FOR 6.5-7.5mm CABLE 6 WAY.
SI-1113-0	Fiber_clamp_4cbl_6.5-7.5mm	DUAL FEADER CLAMP FOR 6.5-7.5mm CABLE 4 WAY.
SI-0954-0	Fiber_clamp_2cbl_6.5-7.5mm	DUAL FEADER CLAMP FOR 6.5-7.5mm CABLE 2 WAY.

3.7. Special Instructions for use of Glands



Note

Each NetStream Primo unit is supplied with two glands. If additional glands are required, they must be ordered separately, in kits of five glands each.

Glands Kit

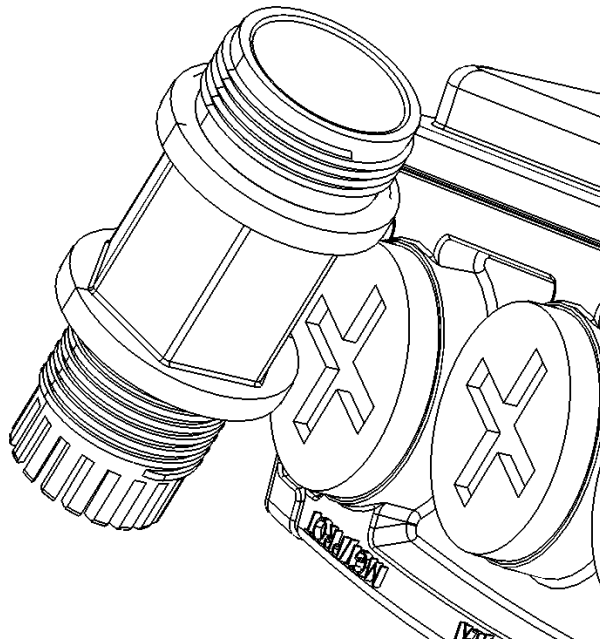
Marketing Model	Marketing Description
NS PRIMO/DIPLO_Glands_kit	NS PRIMO/DIPLO_Glands_x5_kit

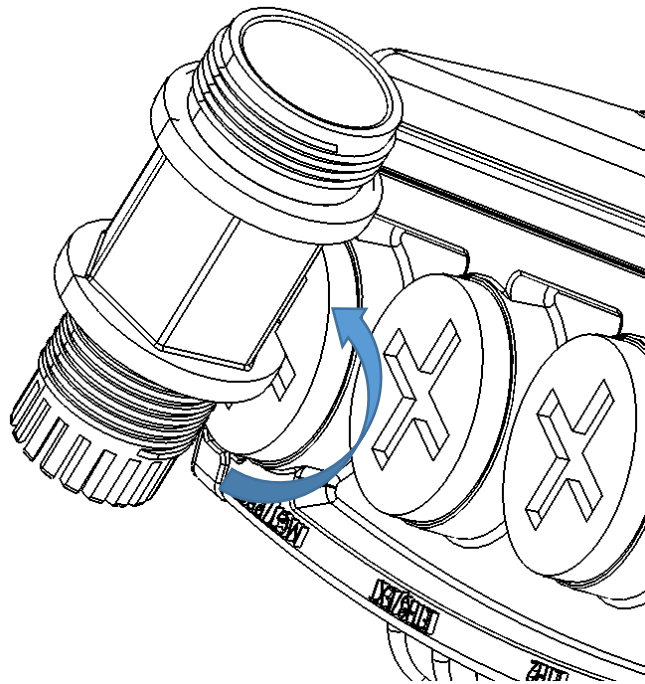
In addition, gland caps can be ordered to protect the cable and connector from damage when elevating the cable and gland to the radio unit. See Step 5 in Section 3.7.1, *General Installation Procedure*. Gland caps are ordered separately, in kits of 10 caps each.

Gland Cap

Marketing Model	Marketing Description
Cable_Prot_10Caps_kit	Cable protective caps kit 10 pcs, NS PRIMO/DIPLOC/S/E

In order to remove the plastic plugs for the unit, you can use the flange of supplied glands to disconnect them. See below pictures

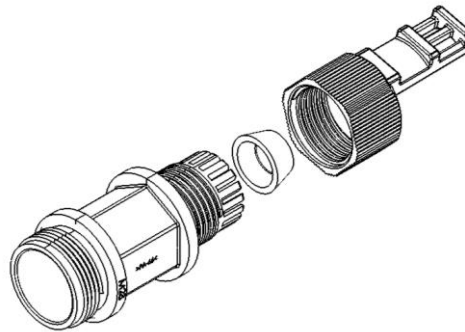




3.7.1. General Installation Procedure

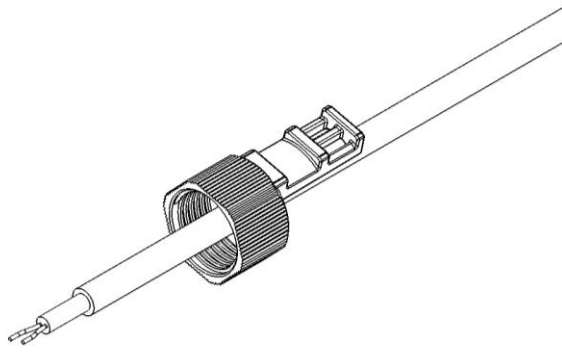
This procedure applies to all cable types, and explains how to install the cables using long glands. The gland is supplied assembled.

- 1 Before inserting a cable, you must disassemble the gland cap and gland rubber from the gland body.

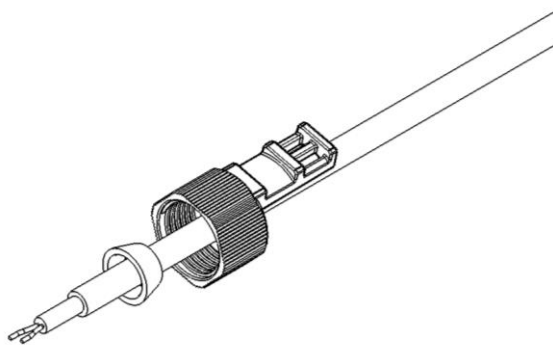


- 2 Slide the gland cap into the cable.

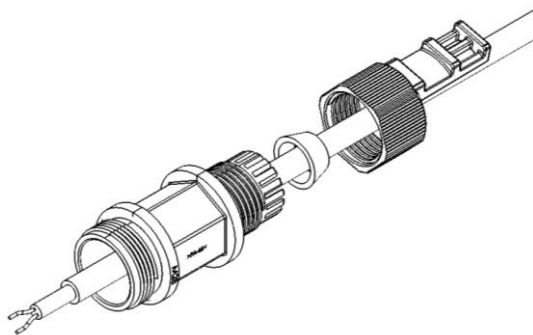
Cable Installation and Grounding



- 3 Slide the gland rubber into the cable.

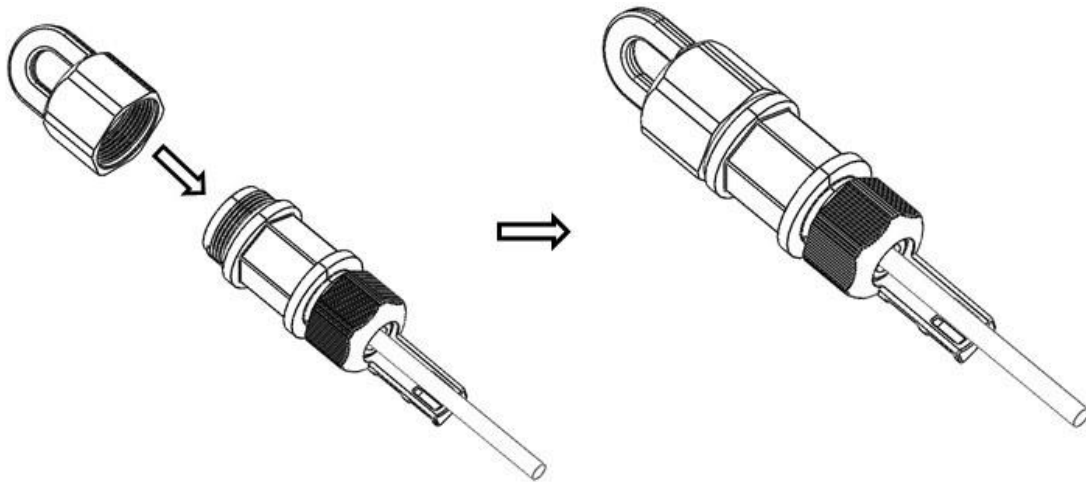


- 4 Slide the cable into the body of the gland. If you are using a gland cap (see Step 5), make sure to leave enough space for the gland cap to fit into the gland without disturbing the cable.

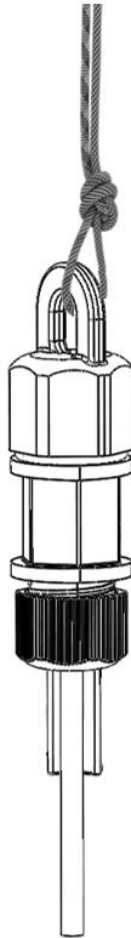


- 5 Optionally, after securing the cable into the body of the gland, you can close the other side of the gland with an M28 gland cap. The gland cap protects the cable and connector from damage when elevating the cable and gland to the radio unit.

Cable Installation and Grounding

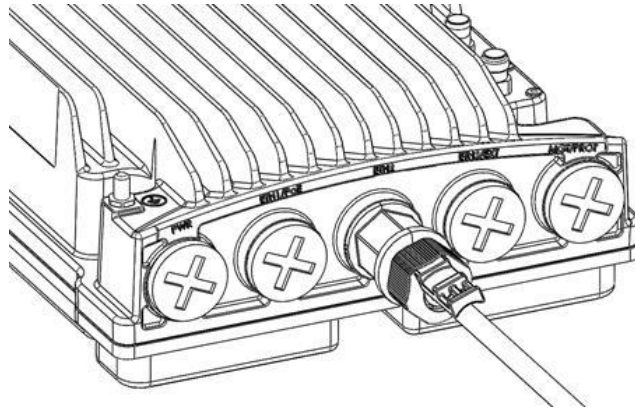


- 6 The M28 gland cap has hook on top. After attaching the gland cap to the gland, you can connect a rope to the hook and use this to life the gland and cable up to the radio unit. Before screwing the gland into the radio unit, you must remove the gland cap.



Cable Installation and Grounding

- 7 If you used an M28 gland cap to close the gland when raising the gland and cable to the radio unit, remove the gland cap from the gland at this point by unscrewing the cap.
- 8 Connect the cable to the port.
- 9 Screw the gland into the radio unit until there is full contact between the gland and the radio unit.



Note

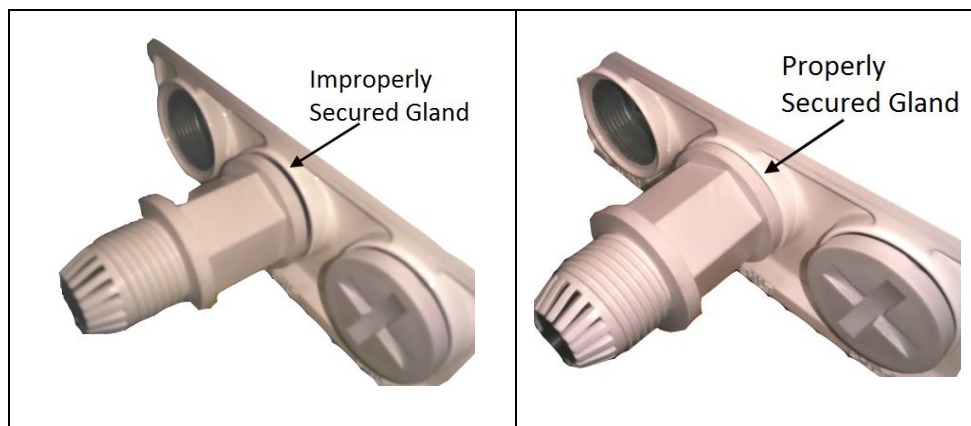
Before tightening the gland, make sure the gland is aligned with the tapped hole in the unit. Tightening the gland at an angle can ruin the thread on the gland and prevent proper sealing of the interface.

- 10 Insert the main part of the gland into the thread in the radio body and tighten until there is full contact and the gasket is fully contained between the gland and the radio and cannot be seen. Tighten the gland gently and make sure there is no resistance. If there is resistance, stop immediately, and thread out the gland. Verify that the gland thread is not damaged and tighten the gland again.



Note

Pay attention that the gland rubber is properly located and not damaged during the tightening of the gland cap.
If the gland thread is damaged do not use it!



Cable Installation and Grounding

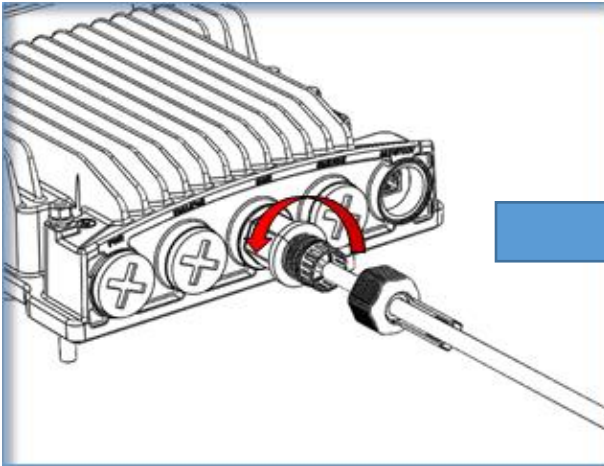
- 11 Tighten the rear portion of the gland onto the main part of the gland and make sure that the main part of the gland does not have an additional swivel after the rear portion is secured.



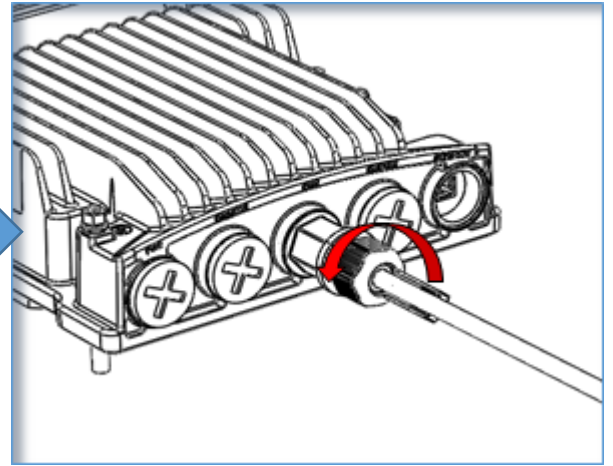
Note

If the main portion of the gland is rotated while the rear portion is seizing the cable, this may ruin the cable connector.

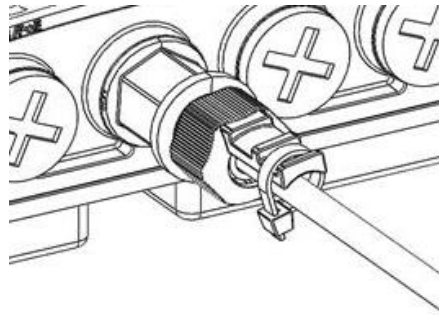
Tightening the Front Portion of the Gland



Tightening the Rear Portion of the Gland



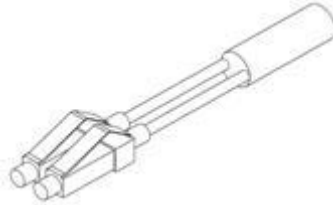
- 12 Secure the cable to the lip of the gland using a tie wrap.



3.8. Connecting an Optical Fiber Cable and SFP

To connect an optical fiber cable and the SFP transceiver:

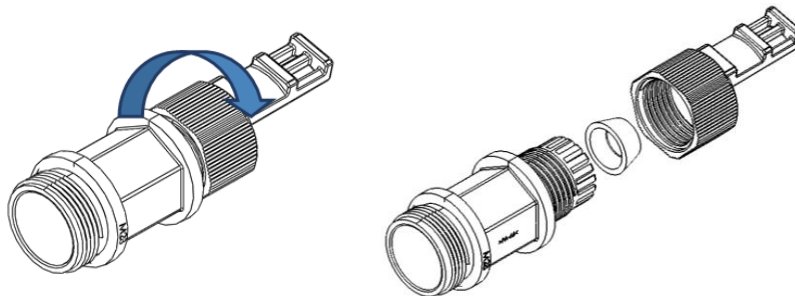
- 1 Use a pre-assembled cable.



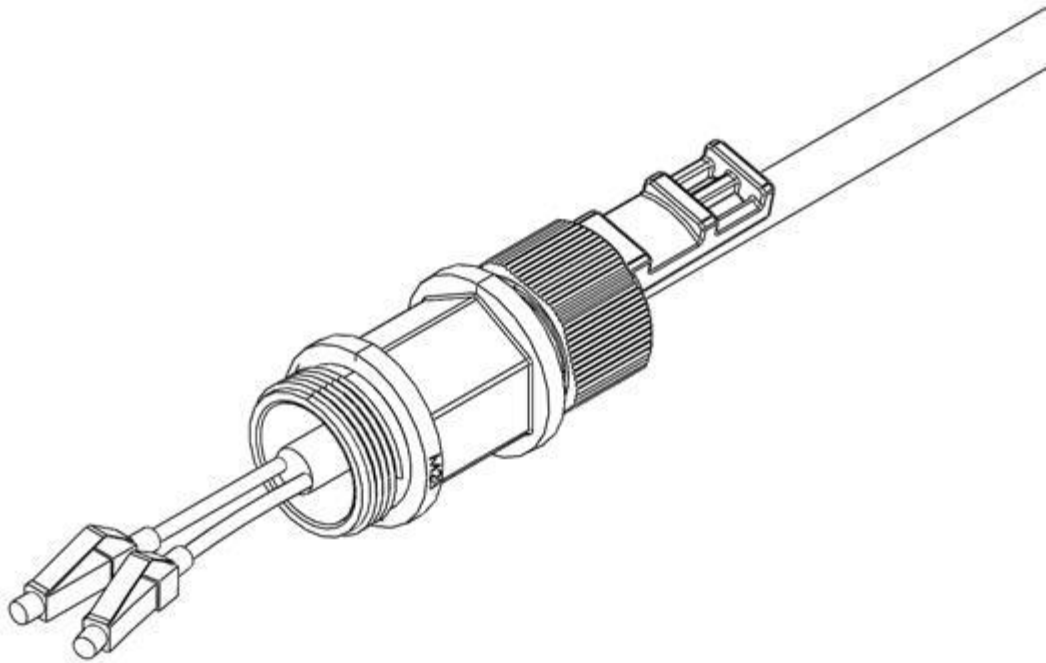
- 2 Split the connector into two separate blue units (one for each wire).



- 3 Remove the gland cap and rubber from the gland body.



- 4 Slide the gland cap into the cable.
- 5 Slide the rubber into the cable.
- 6 Insert wires with connector one by one into the cable gland.

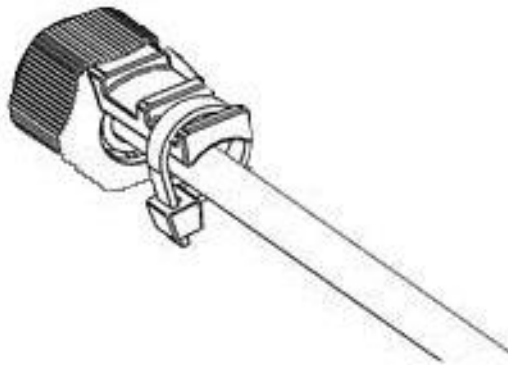


- 7 Secure the cable to the lip of the gland using a tie wrap.

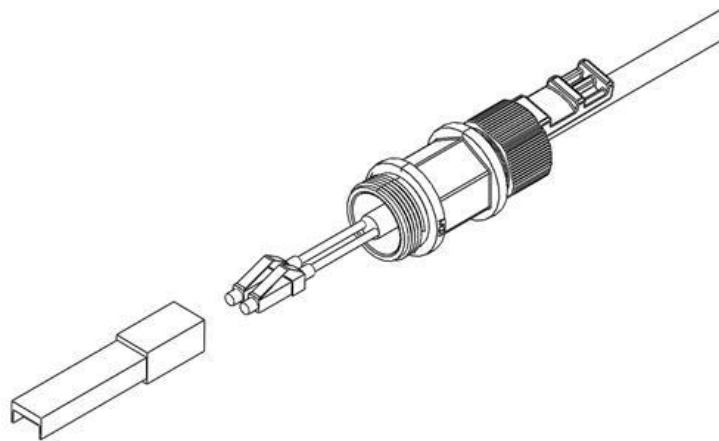


Note

If you are raising the cable to a radio unit on a tower, this step is crucial to prevent the cable from slipping from the gland, which could damage the connector.



- 8 Connect the wires to the SFP transceiver. Listen for the “click” to ensure that it is fully inserted.



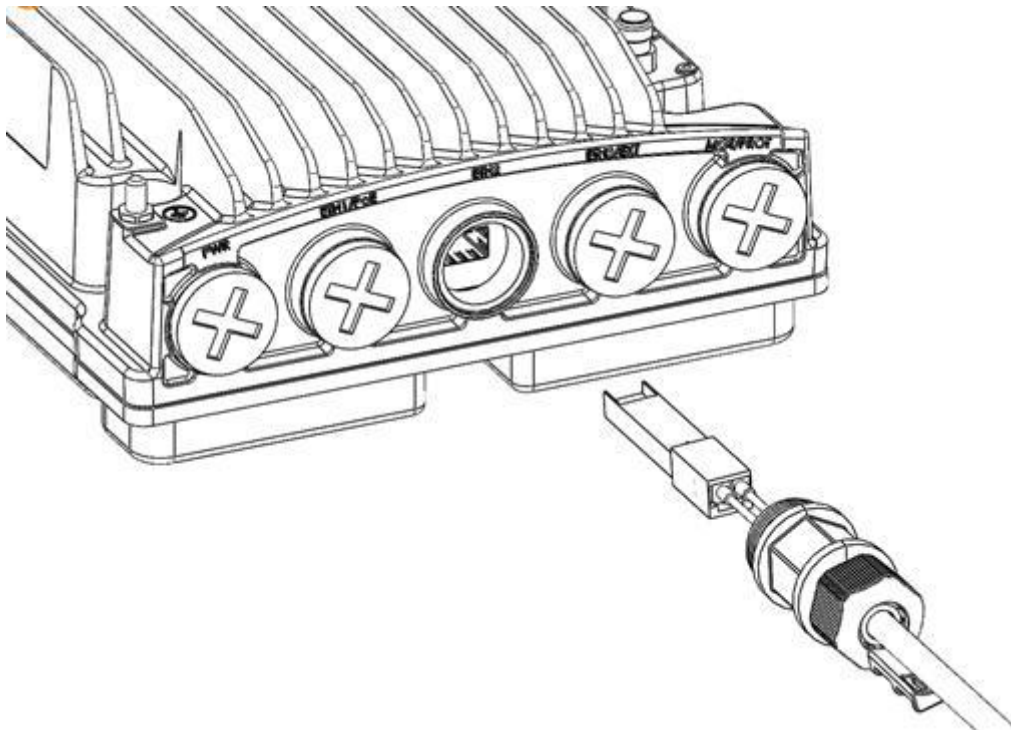
- 9 Remove the tie wrap securing the cable to the gland.



Note

A new tie wrap must be used to secure the cable to the gland at the end of the procedure, as described in Step 13.

- 10 Connect the connector into the NetStream Primo plug connector.



- 11 Tighten the gland to the radio unit until there is full contact between the gland and the radio unit.

Cable Installation and Grounding

- 12 Tighten the gland cap.

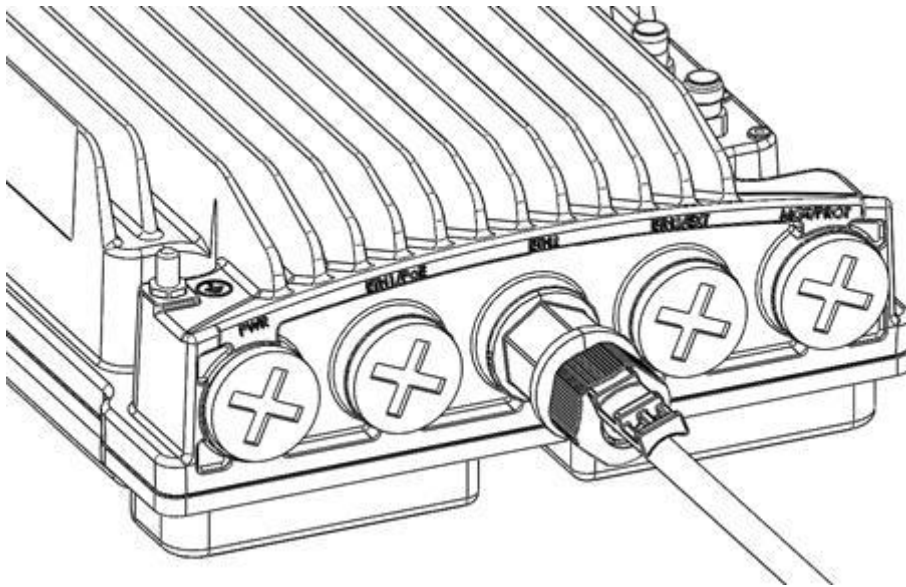


Note

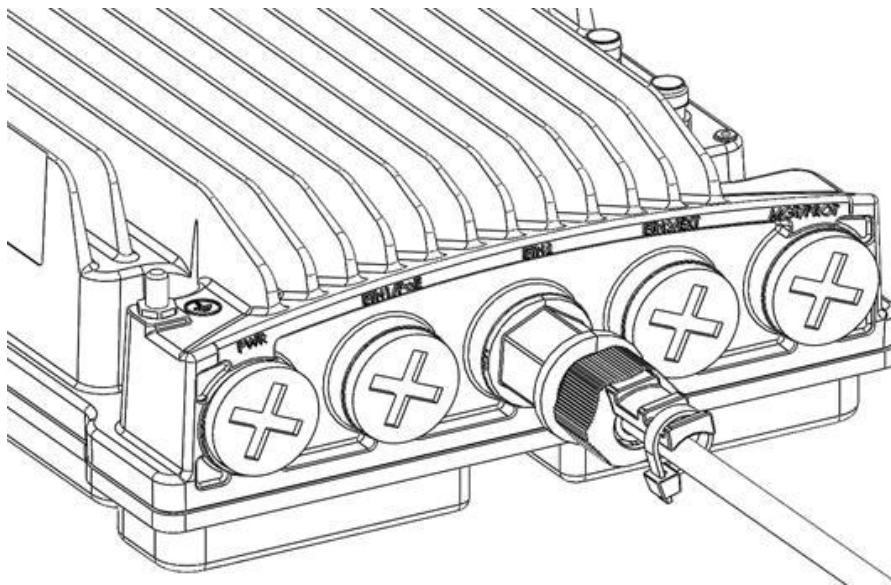
Before tightening the gland, make sure the gland is aligned with the tapped hole in the unit.

Tightening the gland at an angle can ruin the thread on the gland and prevent proper sealing of the interface. Tighten the gland gently and make sure there is no resistance. If there is resistance, stop immediately, thread out the gland, and verify that the gland threads are not damaged. Then, tighten the gland again.

If the gland thread is damaged do not use it!



- 13 Secure the cable to the gland using a tie wrap.



3.9. Connecting a DC Power Cable

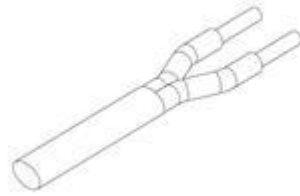


Note

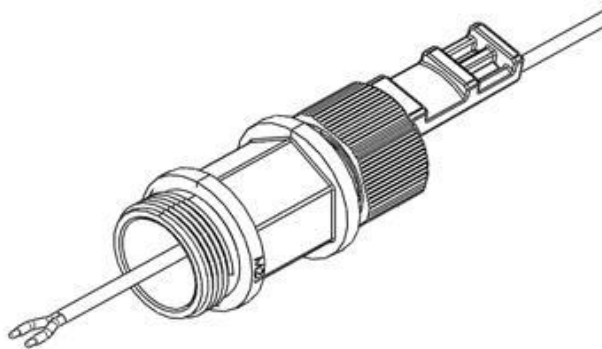
The DC power cable and connector must be ordered separately. See *DC Cable and Connector* on page 24.

To connect a DC power cable:

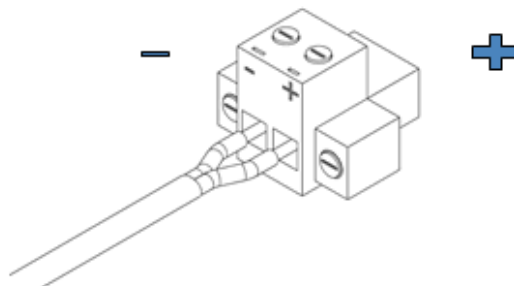
- 1 Strip off 45 mm from the cable jacket.
- 2 Expose 10 mm at the edge of each of the two wires.



- 3 Insert the power cable into the gland.

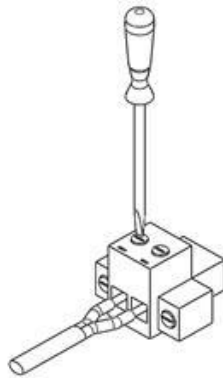


- 4 Insert the power cable wires into the power connector.
- 5 Match “+” and “-” to the red and black cord colors according to the power supply connection cord colors.

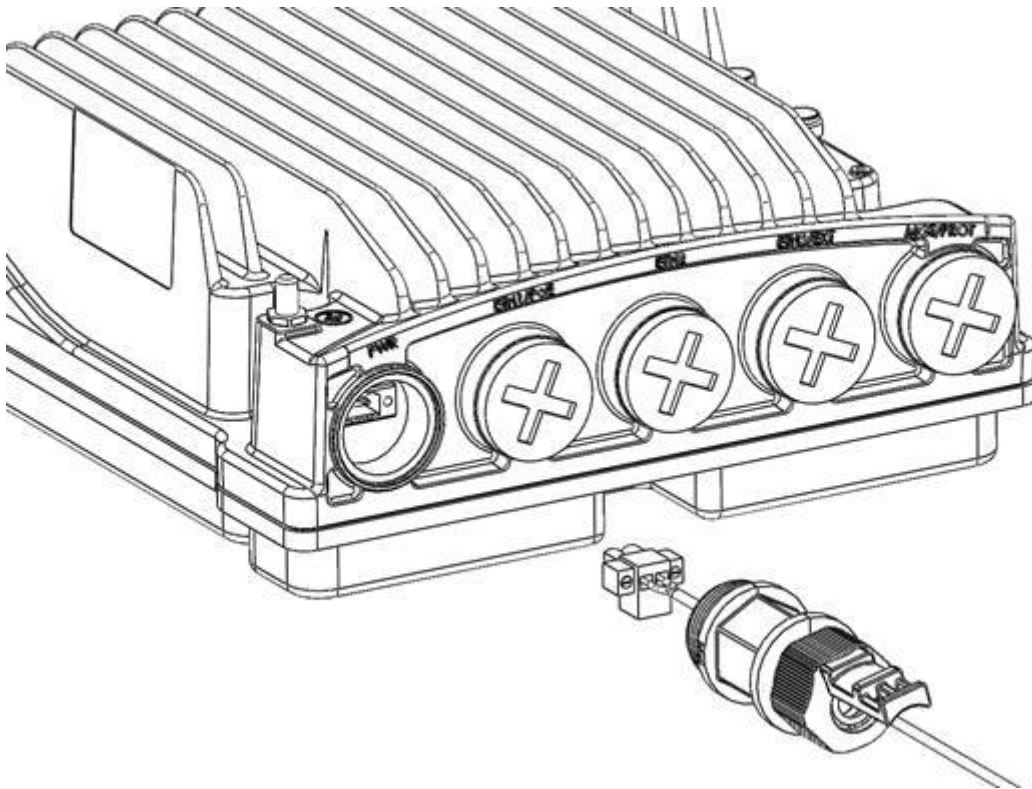


- 6 Tighten the two top screws.

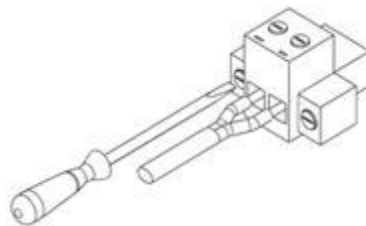
Cable Installation and Grounding



- 7 Plug the power cable with connector into the NetStream Primo power connector.



- 8 Tighten the two front screws.

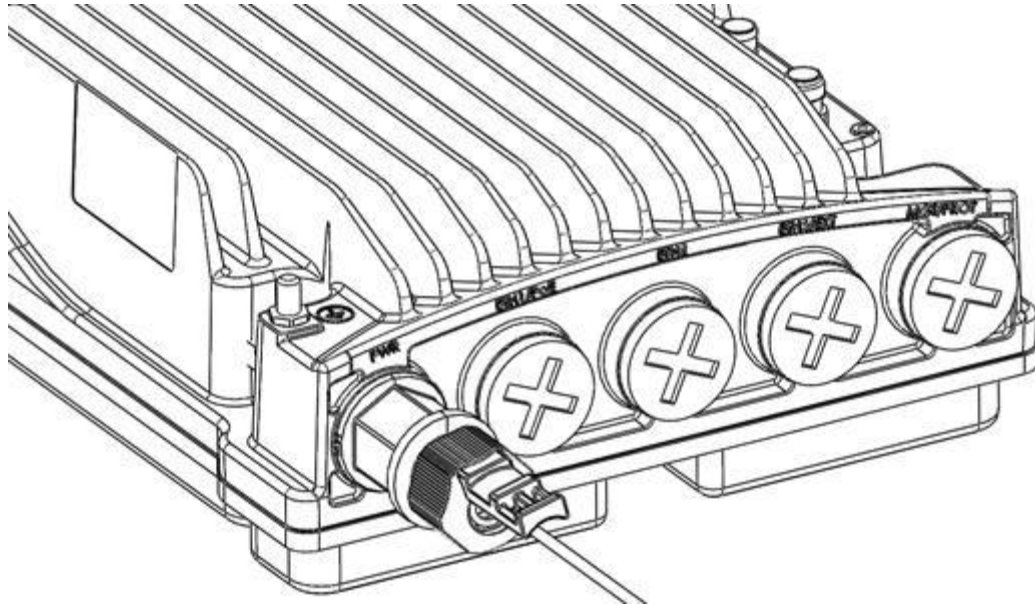


- 9 Screw the gland into the radio unit



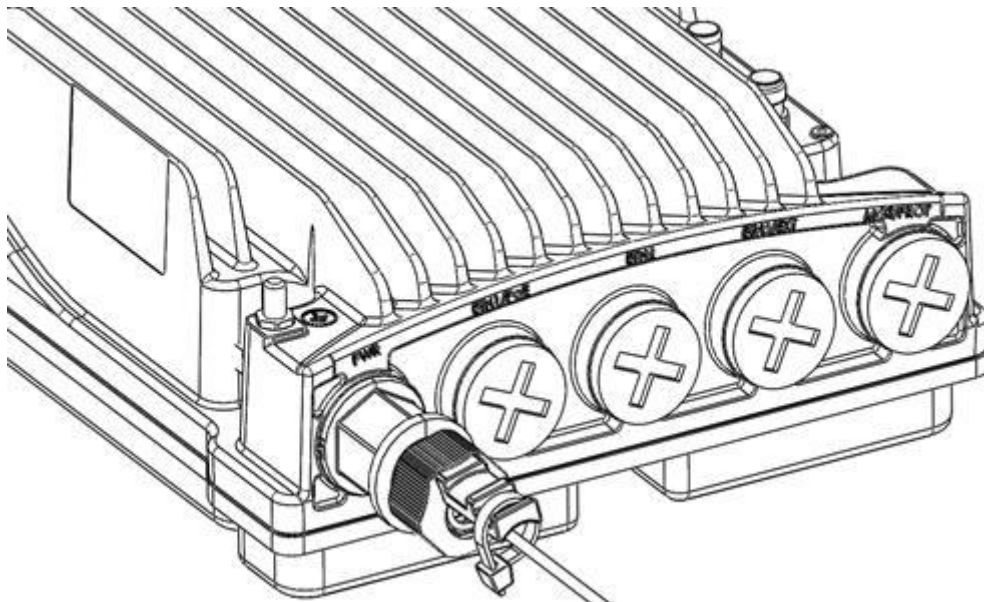
Note

Before tightening the gland, make sure the gland is even with the cover. Tighten the gland gently and make sure there is no resistance. If there is resistance, stop immediately and verify that the gland is not being inserted at an angle. Tightening the gland at an angle can ruin the thread on the gland and prevent proper sealing of the interface.



10 Tighten the gland cap.

11 Secure the cable to the gland with a tie wrap.



3.10. Connecting the Ethernet Cable

Cable Installation and Grounding

If you need to assemble the Ethernet cable, follow the instructions in section 3.10.1, *Preparing the Ethernet Cable and Plug-in Field*, then proceed to section 3.10.3, *Connection of Ethernet Cable to NetStream Primo*.

If you are using a pre-assembled Ethernet cable, follow the instructions in section 3.10.2, *Preparing the Ethernet Cable Already Assembled*, then proceed to section 3.10.3, *Connection of Ethernet Cable to NetStream Primo*.



To ensure proper grounding and connectivity, it is recommended to use pre-assembled Ethernet cables.

3.10.1. Preparing the Ethernet Cable and Plug-in Field



To ensure proper grounding, the RJ-45 plug must be shielded, with a crimping tail.



To prepare the Ethernet cable and plug-in field:

- 1 Prepare the gland and insert the cable, as described in *General Installation Procedure* on page 31.
- 2 Strip off approximately 45 mm of the outer insulation jacket from the CAT5E cable.
- 3 Do not strip off the end of the cable shield, but rather, twist the shield to form a braid.



Cable Installation and Grounding

- 4 Roll back the foil shield insulation and wrap the drain wire around the foil. Do not remove any insulation from the conductors.
- 5 Align the colored wires.



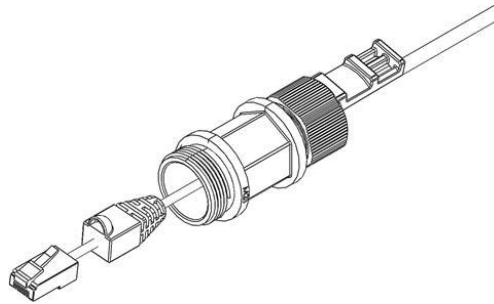
Note

Cord colors should be matched to the same pins on both ends of the cable.

- 6 Trim all wires to the same length. About 12 mm on the left should be exposed from the inner sheath.
- 7 Separate the wires and place the twisted braid between the separated wires.



- 8 Insert the wires into the RJ45 plug. Verify that each wire is fully inserted into the front of the RJ45 plug and in the correct order, according to the pinouts shown in Section 3.5.5, *Outdoor Ethernet Cable Specifications*. The sheath of the Ethernet cable should extend into the plug by about 13 mm and held in place by the crimp.
- 9 Extend the cable jacket with the shield into the connector about 5 mm for strain relief and shielding connection.



- 10 Wrap the twisted braid firmly around the cable jacket and let the crimping tail of the RJ45 plug envelop it.



Note

To ensure proper grounding, it is essential that the twisted braid be firmly connected to the RJ45 plug.



Twisted Braid Enveloped by Crimping Tail

- 11 Crimp the RJ45 plug with the crimp tool. Make sure the twisted braid is crimped firmly to the RJ45 plug.



- 12 Verify that the wires ended up the correct order and that the wires extend to the front of the RJ45 plug and make good contact with the metal contacts in the RJ45 plug.
- 13 Push back the CAT5E plug cover on the connector plug.



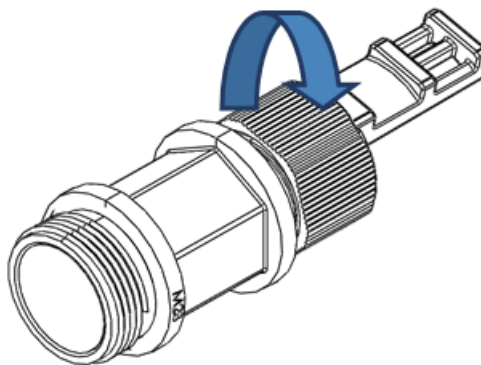
Note

It is recommended that the newly prepared cable be tested with a cable Analyzer such as the FLUKE DTX-1800 (or the equivalent), to make sure the cable complies with ANSI/TIA/EIA-568-B-2. Make sure to verify both connectivity and grounding continuity at both ends of the cable.

3.10.2. Preparing the Ethernet Cable Already Assembled

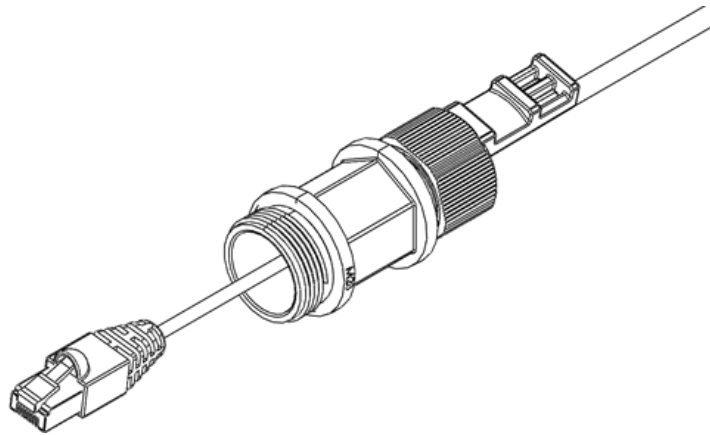
To prepare the Ethernet cable already assembled:

- 1 Release the gland cap and the gland rubber slightly.



Cable Installation and Grounding

- 2 Insert the CAT5E cable into the gland cap and into the rubber gland.

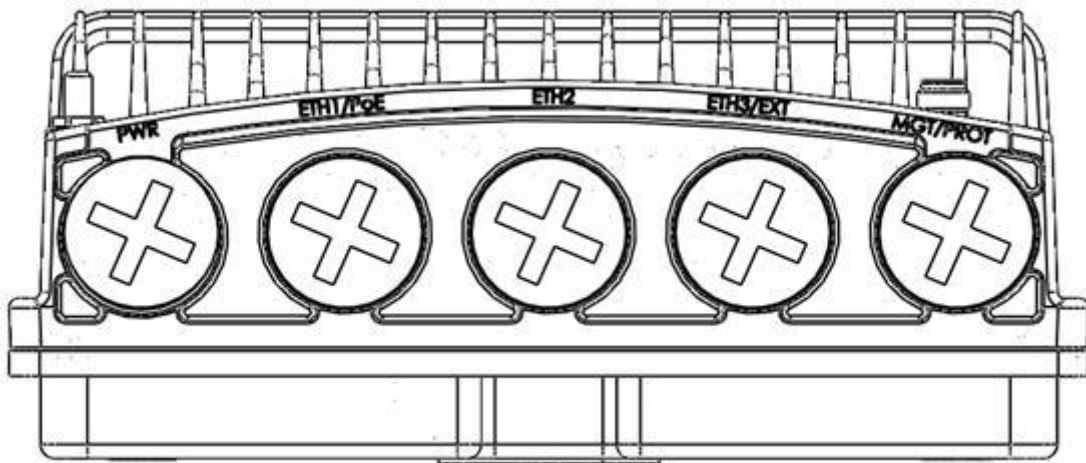


- 3 Insert the CAT5E cable into the gland body.

3.10.3. Connection of Ethernet Cable to NetStream Primo

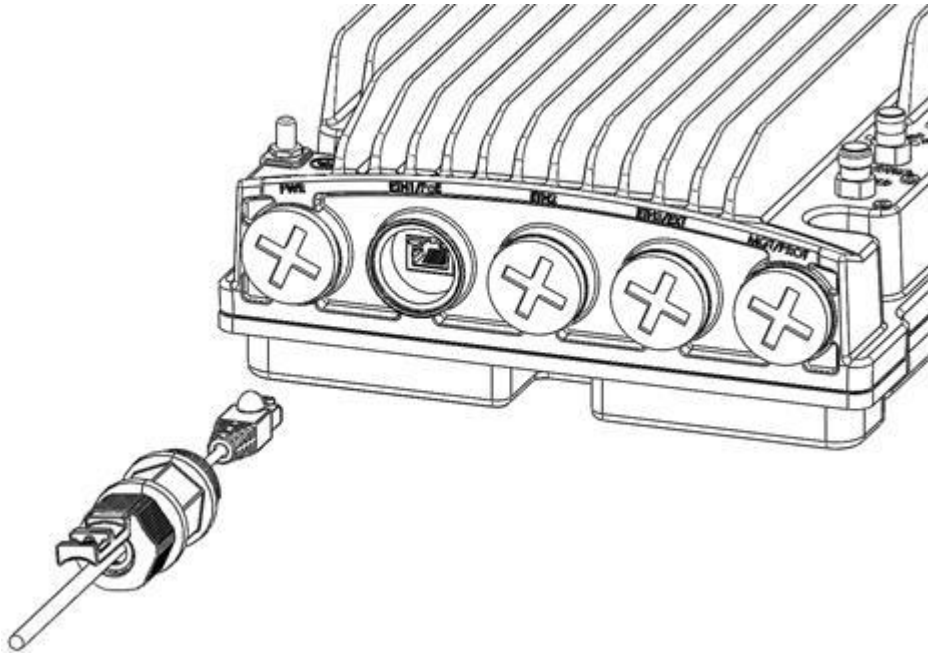
To connect the Ethernet cable to the NetStream Primo:

- 1 Remove the relevant cap from the NetStream Primo radio. You can use the side of the gland to unscrew the cap.



- 2 Connect the CAT5E cable to the NetStream Primo.

Cable Installation and Grounding

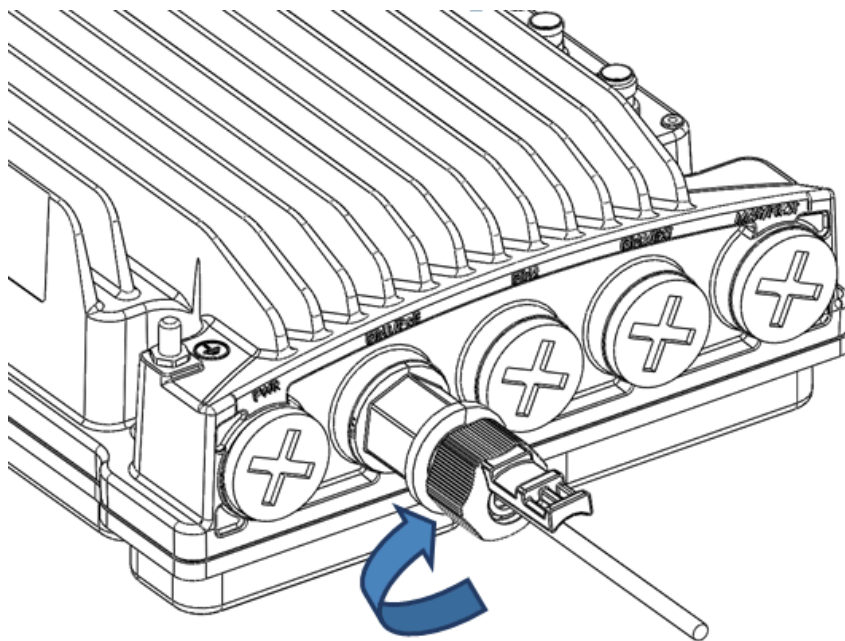


- 3 Screw the gland into the radio unit.



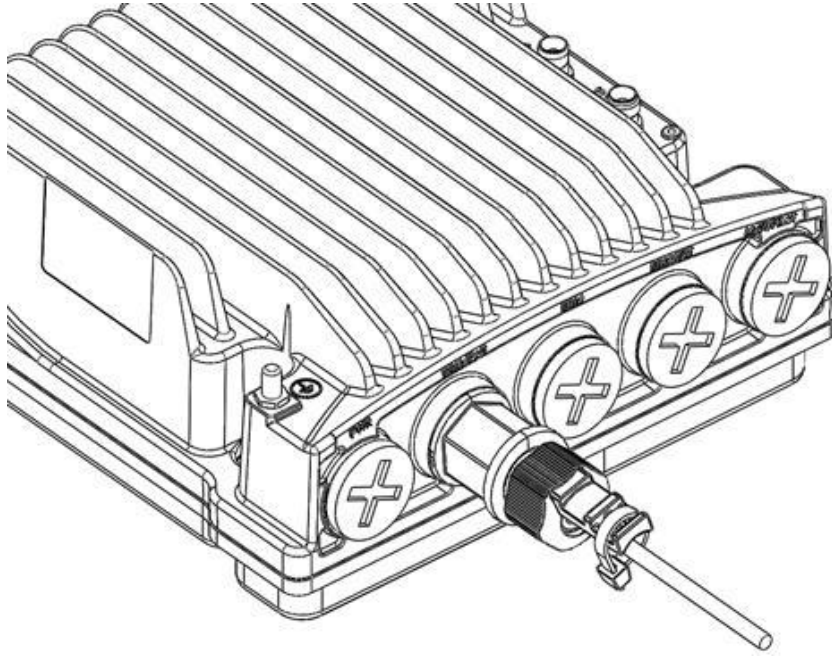
Note

Before tightening the gland, make sure the gland is even with the cover. Tighten the gland gently and make sure there is no resistance. If there is resistance, stop immediately and verify that the gland is not being inserted at an angle. Tightening the gland at an angle can ruin the thread on the gland and prevent proper sealing of the interface.



Cable Installation and Grounding

- 4 Tighten the gland cap.
- 5 Secure the cable to the gland using a tie wrap.



3.11. Management Connection for 1+1 HSB Configurations

In HSB protection configurations, two Y-splitter cables and a special signaling cable must be used to connect the management ports (MGT/PROT) of the two NetStream Primo units and provide management access to each unit.

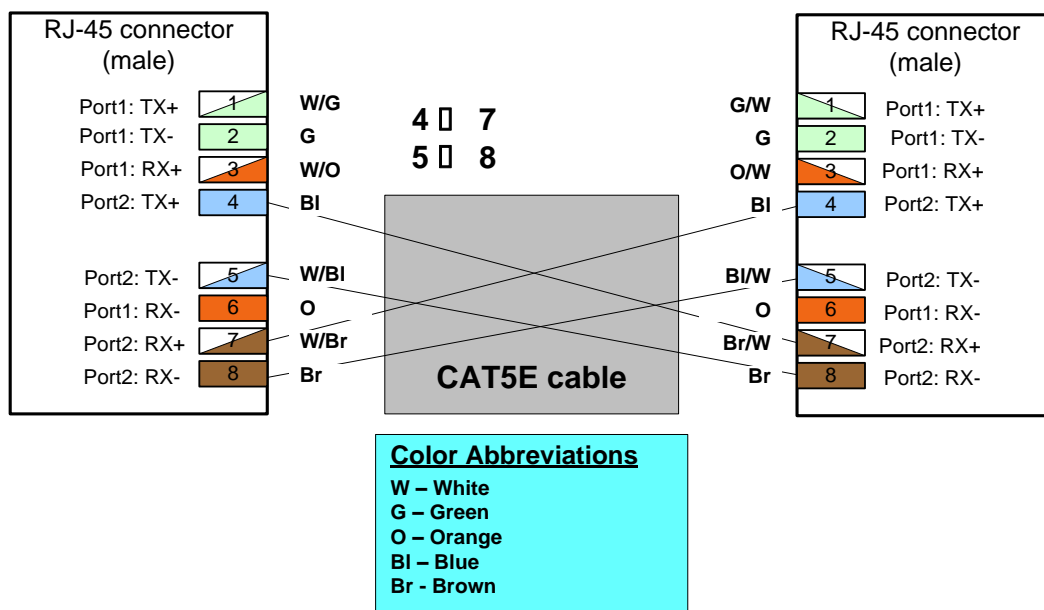
The Protection signaling cables are available pre-assembled from Netronics in various lengths, but users can also prepare them in the field.

The following sections explain how to prepare and connect these cables.

3.11.1. Preparing a Protection Signaling Cable

The Protection signaling cables require the following pinouts.

Protection Signaling Cable Pinouts



Other than the pinout connection described above, the cable should be prepared according to the cable preparation procedure described in *Connecting the Ethernet Cable* on page 42.

3.11.2. Connecting the Protection Splitters and Protection Signaling Cable

Each splitter has three ports:

- System plug (“Sys”) – The system plug should be connected to the NetStream Primo’s management port.
- Management port (“Mng”) – A standard CAT5E cable should be connected to the splitter’s management port in order to utilize out-of-band (external) management.



Note

Even for systems that use in-band management, initial configuration of an HSB protection configuration must be performed manually using out-of-band management.

- Protection signaling port (“Prot”) – A Protection signaling cross cable, as described above, should be connected between this port and the other “Prot” port of the second splitter on the mate NetStream Primo unit.

4. PoE Injector Installation and Connection

4.1. PoE Injector Cable Connection

The PoE Injector cables are connected similar to the NetStream Primo.

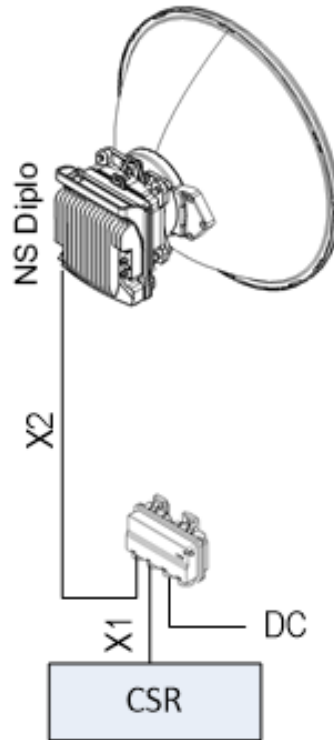
- To connect the Ethernet (CAT5E) cable to the PoE or Data port, refer to *Connection of Ethernet Cable to NetStream Primo* on page 46.
- To connect the DC power cable to the power port or dual feed port, refer to *Connecting a DC Power Cable* on page 40. This cable is not supplied with the PoE Injector.
- The total length of the cable between the NetStream Primo port and the Switch/Router the device is connected to should not exceed 100m/328ft. This length includes the connection between the NetStream Primo and the PoE Injector ($X1 + X2 \leq 100\text{m}/328\text{ft}$ in the figure below).

PoE Injector Installation and Connection



Note

The length of the cable connecting the customer equipment to the PoE injector should not be longer than 10m (according to ANSI/TIA-568 standard).



Note

For the warranty to be honored, the connection must be through the glands only. Do not open the PoE injector box cover.

4.2. PoE Injector Grounding

To ground the PoE Injector:

- 1 On the right side of each PoE Injector, loosen the screw, plain washer, and serrated washer.
- 2 Place the cable lug (supplied with the PoE injector kit) between the plain and serrated washer.
- 3 Tighten the screw.

4.3. PoE Injector Wall Mount Installation

List of Items

PoE Injector Installation and Connection

Item	Description	Quantity	Remarks
1	PoE Injector	1	
1	Glands Kit	1	For outdoor installations.



Note

Glands are required for outdoor installations. The glands kit (three or five glands) is not supplied with the PoE Injector, and must be ordered separately.

Glands Kit

Marketing Model	Marketing Description
NS PRIMO/DIPLO_3xGlands_kit	NS PRIMO/DIPLO_3xGlands_kit
NS PRIMO/DIPLO_Glands_kit	NS PRIMO/DIPLO_Glands_x5_kit

Required Tools

- Metric offset wrench key wrench set
- Hammer
- Drilling Machine

PoE Injector Installation and Connection

Procedure

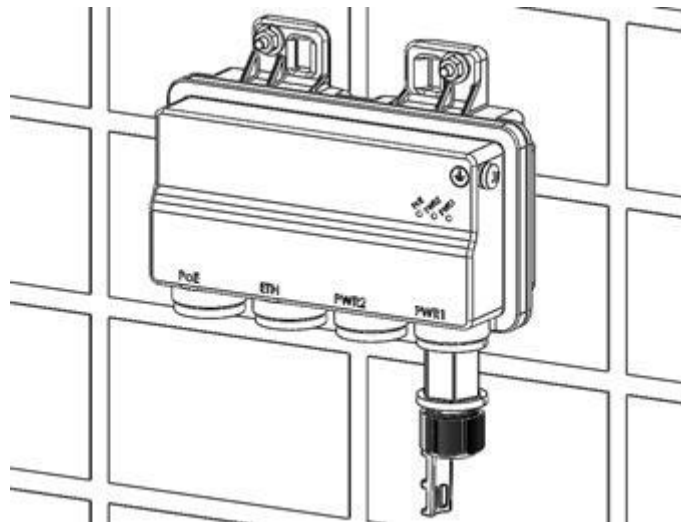
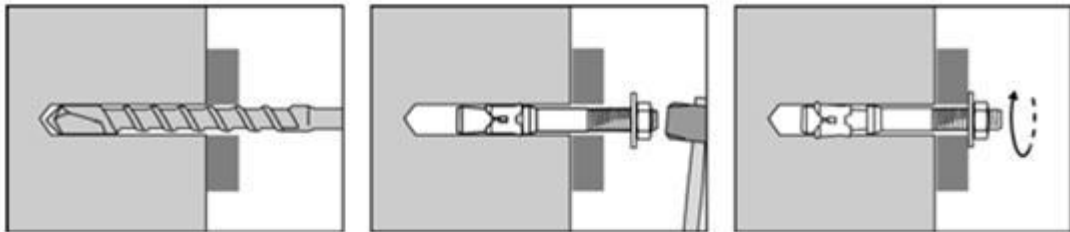
- 1 Mount and tighten the PoE Injector to a wall using two M6 bolts and anchors. The M6 bolts and anchors must be purchased separately.



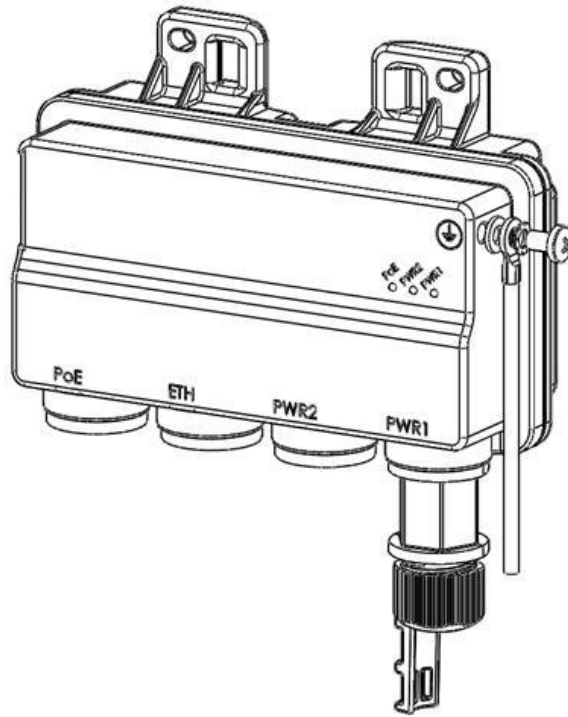
Note

Use Anchor Stainless Steel with flanged Hexagonal nut M6X70.

- 2 Drill two 6mm diameter holes with 100mm distance between the center of the holes.
- 3 Insert the anchors with the bolts.
- 4 Place the washers on the bolt.
- 5 Tighten the nuts.



PoE Injector Installation and Connection



4.4. PoE Injector Pole Mount Installation

List of Items

Item	Description	Quantity	Remarks
1	PoE Injector	1	

Required Tools

- Slot Screwdriver

PoE Injector Installation and Connection

Procedure

To mount the PoE Injector on a pole:

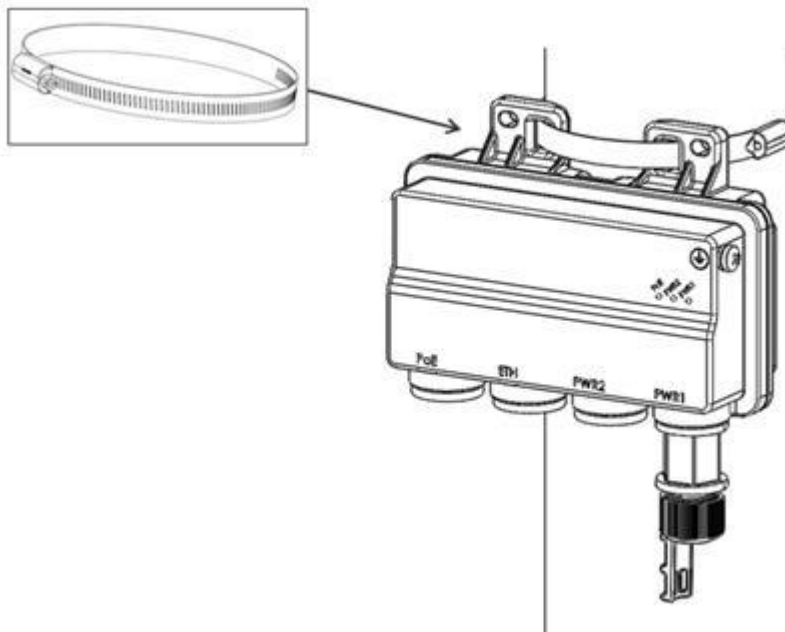
- 1 Mount and tighten the PoE Injector to a pole with a diameter of 114 mm using a stainless steel hose clamp.
- 2 Pass the hose clamp through the pole mount slots.



Note

The Hose Clamp is not supplied with PoE injector kit.

- 3 Attach the PoE injector to the pole.
- 4 Connect the ends of the hose clamp.
- 5 Tighten the hose clamp using the captive screw.



4.5. PoE Injector 19" Rack Installation

List of Items

Item	Description	Quantity	Remarks
1	PoE Injector	1	
2	PoE Injector 19" Rack Mount Kit	1	

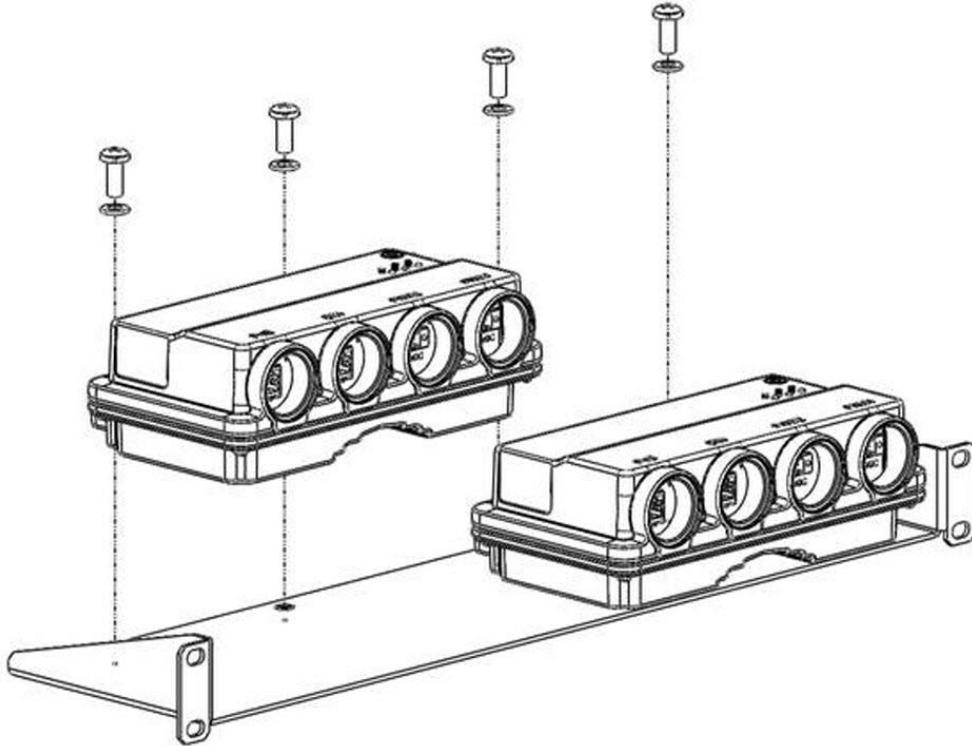
Required Tools

- Philips Screwdriver

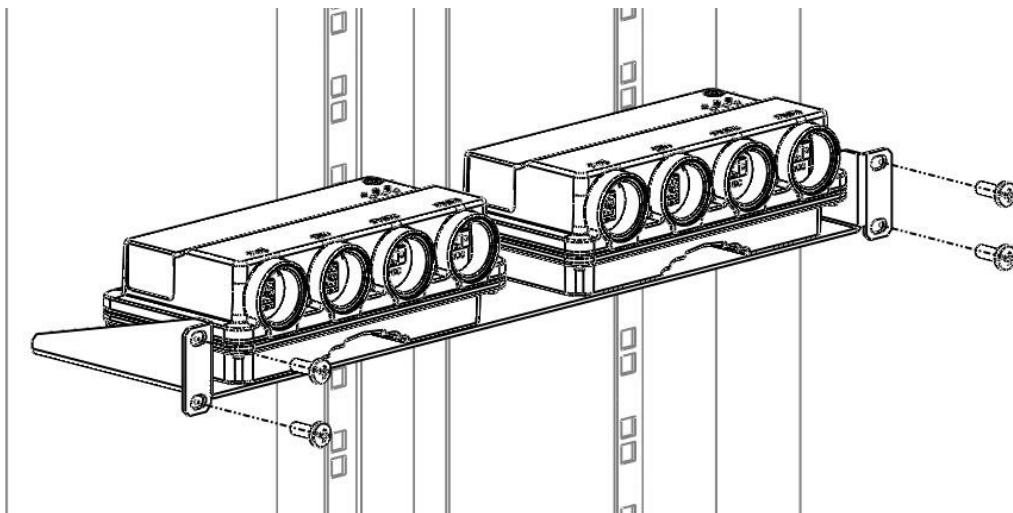
PoE Injector Installation and Connection

To mount the PoE Injector on a rack:

- 1 Mount the PoE Injector to a 19" rack using a 19" rack adaptor.
- 2 Mount the PoE Injector on the 19" adaptor through the wall mounting holes, using M6 screws and washers.



- 3 Mount the 19" rack adaptor to a 19" rack using four M6 screws and cage nuts.



4.6. PoE Injector ETSI Rack Installation

List of Items

Item	Description	Quantity	Remarks
1	PoE Injector	1	
2	PoE Injector ETSI Rack Mount Kit	1	

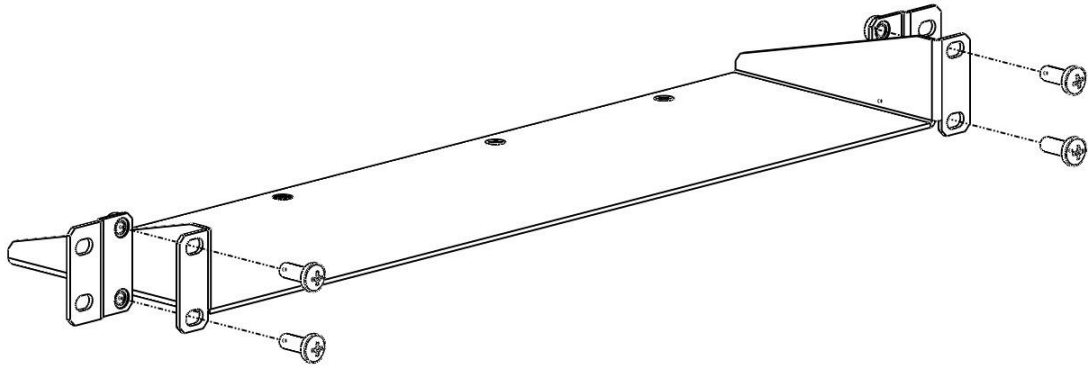
Required Tools

- Philips Screwdriver

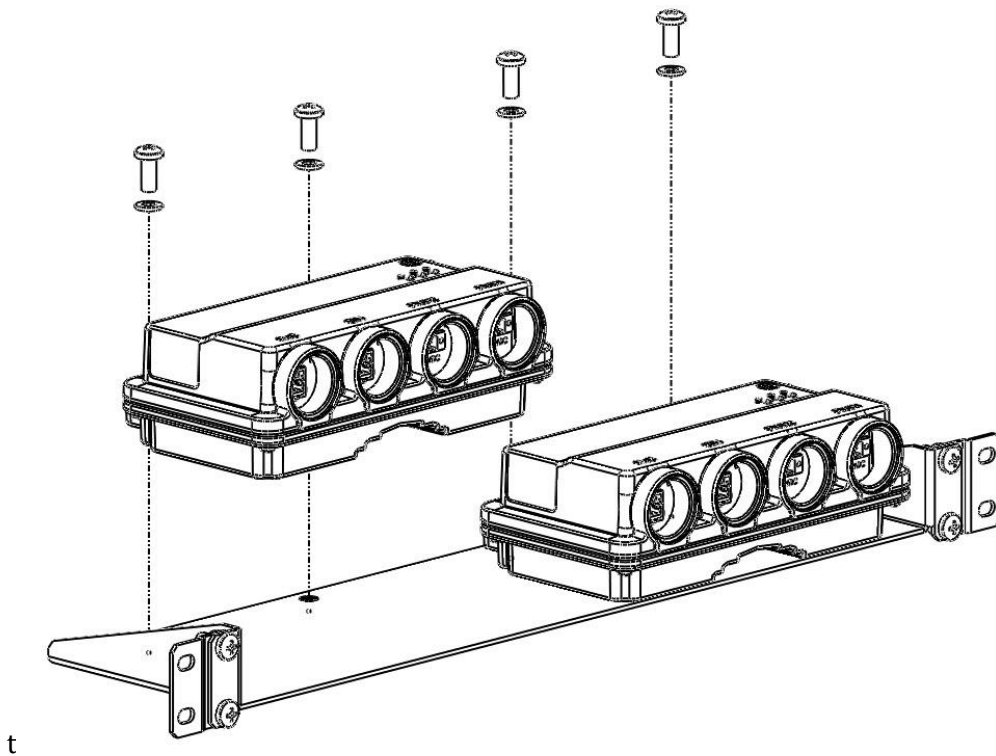
PoE Injector Installation and Connection

To mount the PoE Injector to an ETSI rack:

- 1 Mount the PoE Injector to an ETSI rack using a 19" rack adaptor and ETSI adapting ears.
- 2 Connect the ETSI adapting ears to a 19" rack adaptor using four M6 screws.

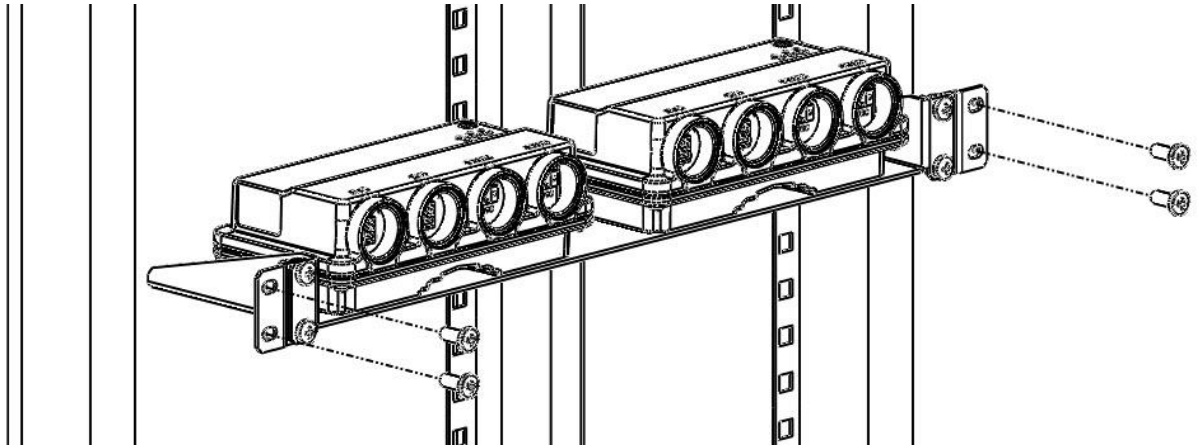


- 3 Mount the PoE Injector on the adaptor through the wall mounting holes using M6 screws and washers.



- 4 Mount the 19" rack adaptor with the ETSI ears on the ETSI rack using four M6 screws and cage nuts.

PoE Injector Installation and Connection



Note

For this type of installation, a 2RU space is required.

5. Generic Installation Procedures and Notes

5.1. Torque Requirements

When tightening the captive screws, use 20 Nm torque for radio-antenna, radio-mediation device, and mediation device-antenna connections. In order to avoid tilt, screws should be tightened progressively.

When fastening a waveguide to the radio or mediation device, use the following torque, according to frequency and screw type:

- 6 GHz: M5/#10-32: 3.5 Nm
- 7/8-15 GHz: M4/#8-32: 2.5 Nm
- 18-42 GHz: M3/#4-40: 1Nm

5.2. Pole Mount Installation

The pole diameter range for pole mount installations is 8.89 cm – 11.43 cm (3.5 inches – 4.5 inches).

5.2.1. NetStream Primo DC Pole Mount Procedure

List of Items

Item	Description	Quantity	Remarks
1	NetStream Primo DC POLE MOUNT KIT	1	

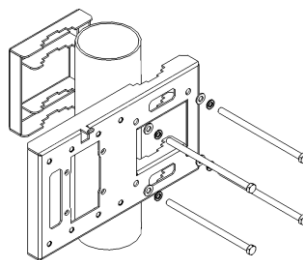
Required Tools

- Metric offset wrench key wrench set

Procedure

- 1 Mount and tighten the NetStream Primo DC pole mount to a pole with a diameter of 114 mm using the four washers and screws supplied with the NetStream Primo DC pole mount kit.

Mount NetStream Primo DC Pole Mount to Pole



5.3. Remote Mount Installation for Single Polarization with an Imperial Waveguide

List of Items

Item	Description	Quantity	Remarks
1	NetStream Primo RADIO	1	
2	ODU ADAPTATION KIT TO FLEXIBLE WG IMPERIAL	1	
3	ODU POLE MOUNT KIT	1	
4	FLEXIBLE WAVEGUIDE IMPERIAL KIT	1	

Required Tools

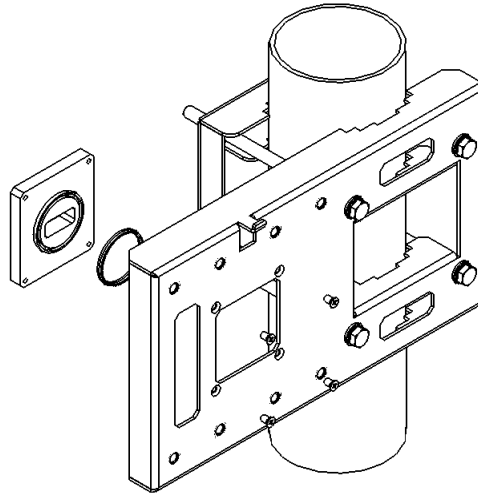
- Metric offset hexagon key wrench set
- Imperial offset hexagon key wrench set
- Phillips #1, #2 screwdriver

Generic Installation Procedures and Notes

5.3.1. 6-15GHz

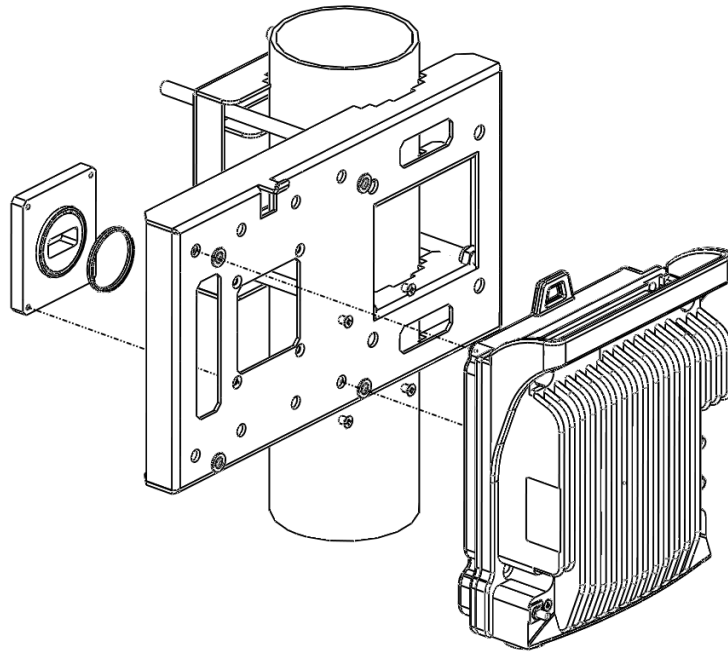
- 1 Mount and tighten the ODU Adaptor plate (supplied in ODU Adaptation kit to Flexible WG Imperial) to the ODU Remote Pole Mount using the four flat screws supplied with the ODU Adaptation kit to Flexible WG Imperial.

Mount NetStream Primo to Remote Pole Mount



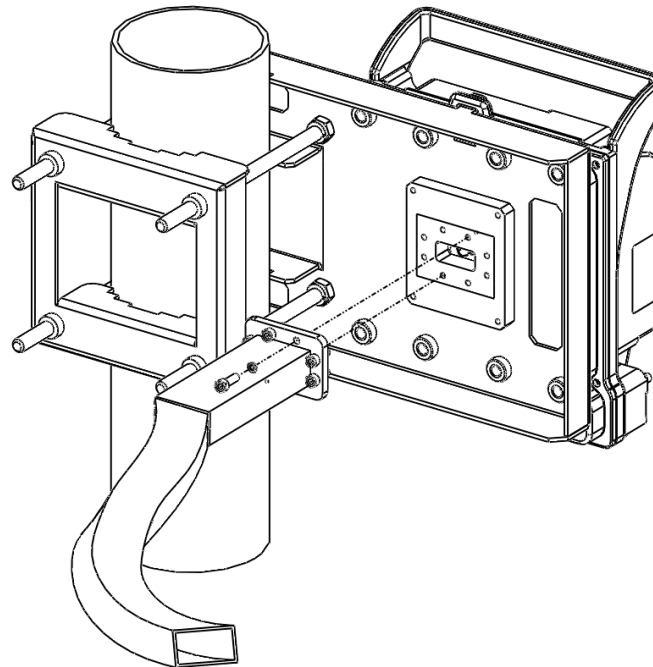
- 2 Mount and tighten the NetStream Primo radio to the ODU Adaptor plate using the four captive screws and washers that are assembled to the NetStream Primo radio. Pay attention that the O-rings are mounted on the ODU Adaptor plate.

Generic Installation Procedures and Notes



- 3 Connect the Flexible Waveguide and Sealing Gasket supplied with the Flexible Waveguide Imperial Kit to the ODU Adaptor plate. Tighten the four screws supplied with the Flexible Waveguide Imperial Kit.

Connect Flexible Waveguide and Sealing Gasket to ODU Adaptor Plate

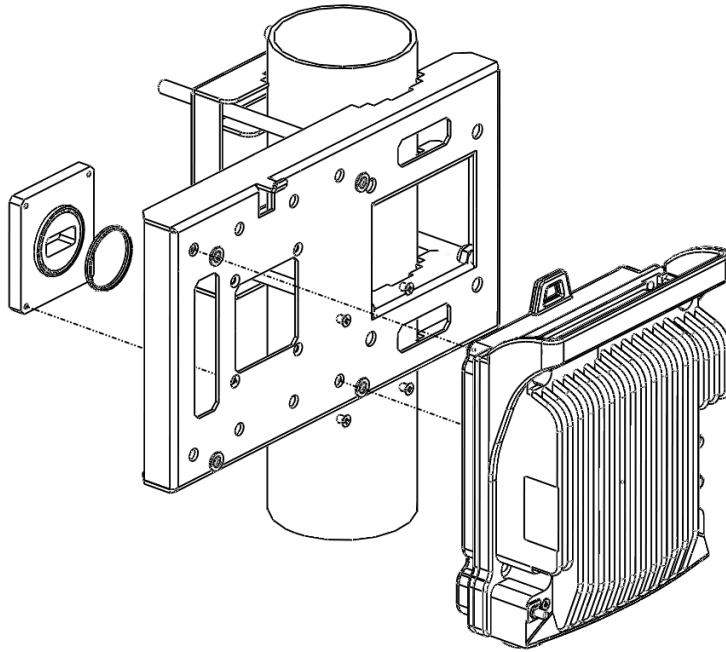


5.3.2. Remote Mount Installation with an Imperial Waveguide – 13-15 GHz

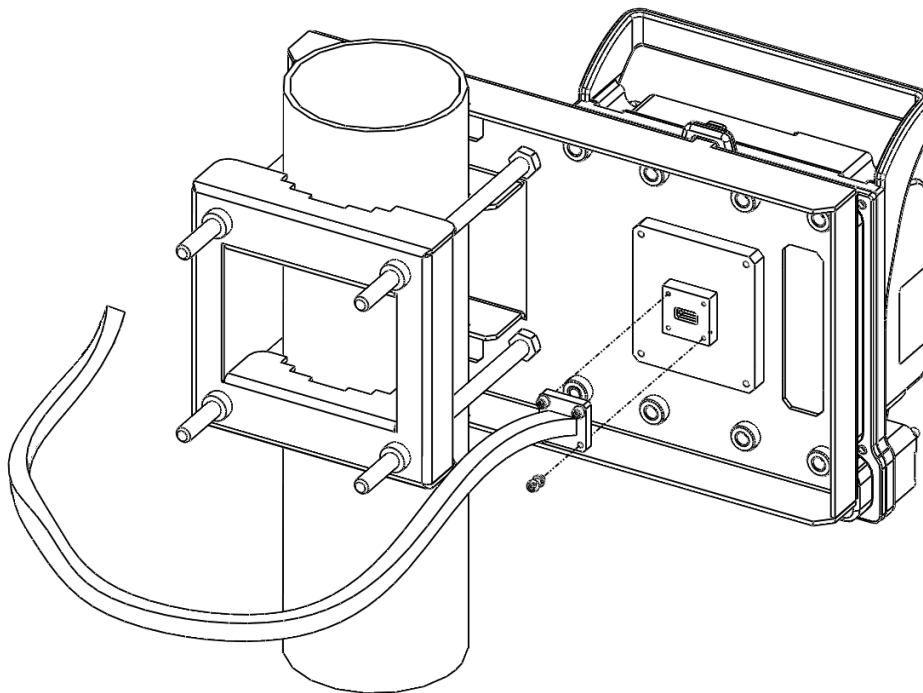
- 1 Mount the ODU Adaptor supplied with the ODU Remote Pole Mount kit using the four flat screws supplied with the ODU Adaptor kit.

Generic Installation Procedures and Notes

- 2 Mount the NetStream Primo using the four captive screws and washers supplied, assembled, in the NetStream Primo.



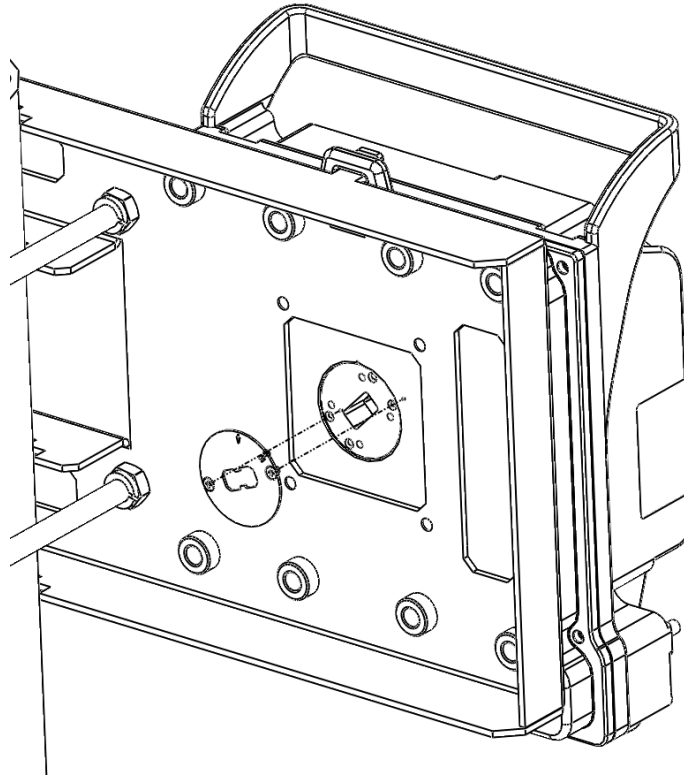
- 3 Connect the Flexible Waveguide and sealing O-Ring supplied with the Flexible Waveguide Imperial kit to the ODU Adaptor. Tighten the four screws supplied with the Flexible Waveguide Imperial kit.



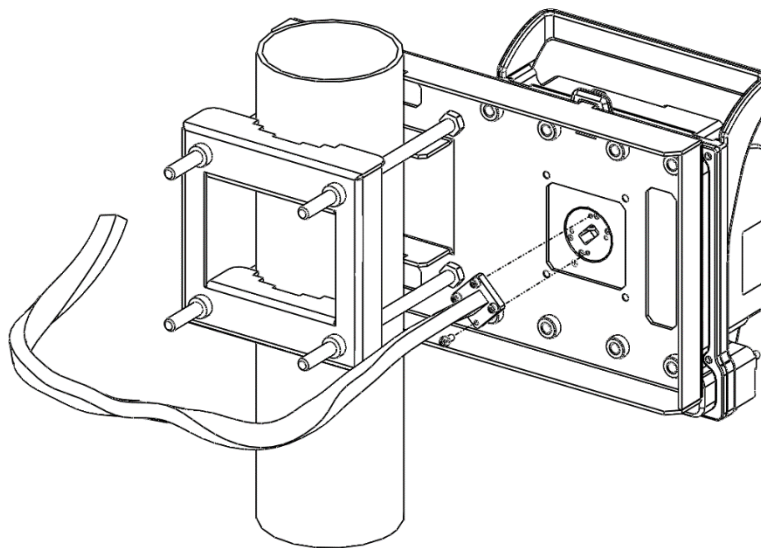
5.3.3. Remote Mount Installation with an Imperial Waveguide – 18-42 GHz

Generic Installation Procedures and Notes

- 1 Loosen the 2 screws, and remove the twist.



- 2 Mount the NetStream Primo Radio to the ODU Pole Mount Bracket using the four captive screws and washers supplied, assembled, in the NetStream Primo.
- 3 Connect the Flexible Waveguide and sealing O-Ring supplied with the Flexible Waveguide Imperial kit. Tighten the four metric screws supplied with the ODU Adaptor kit.



6. NetStream Primo Detailed Configurations Description

6.1. 1+0 Direct Mount Installation

List of Items

Item	Description	Quantity	Remarks
1	NetStream Primo RADIO	1	

Required Tools

The following tools are required for the NetStream Primo installation:

- Metric offset hexagon key wrench #6
- Phillips #2 screwdriver

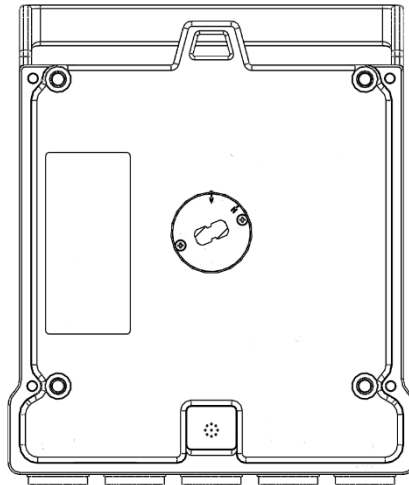
NetStream Primo Detailed Configurations Description

Procedure

To install the NetStream Primo in a direct mount 1+0 configuration:

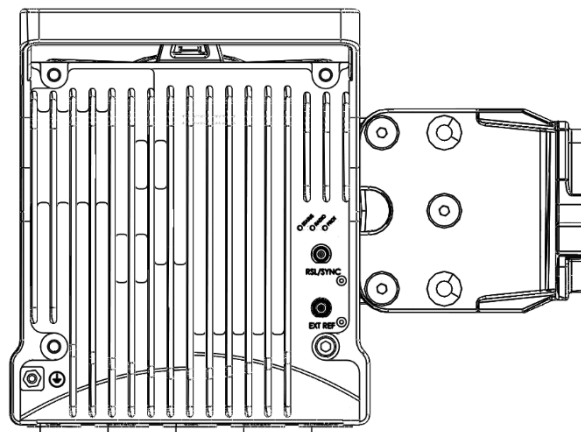


Do not remove the transparent pressure window located on the antenna interface.



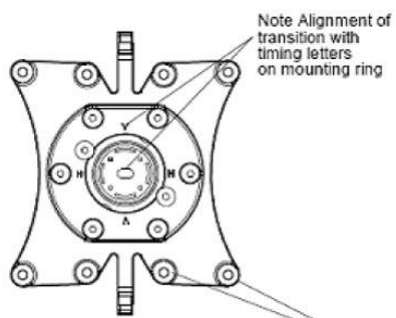
If necessary, change the antenna polarization by rotating the unit in accordance with the relevant antenna installation guide.

Horizontal / Vertical Pole



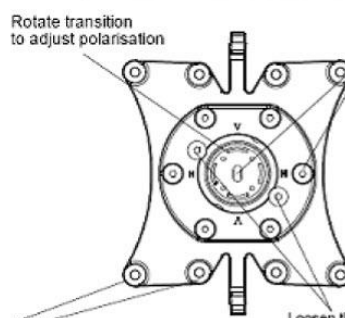
NetStream Primo Detailed Configurations Description

VERTICALLY POLARISED



Note Alignment of transition with timing letters on mounting ring

HORIZONTALLY POLARISED



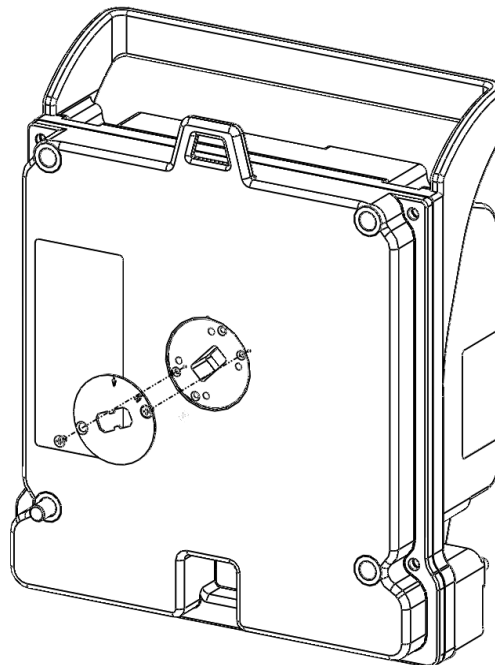
Rotate transition to adjust polarisation

Note Alignment of transition with timing letters on mounting ring

Torque M8 ODU/Coupler hardware to 12Nm.

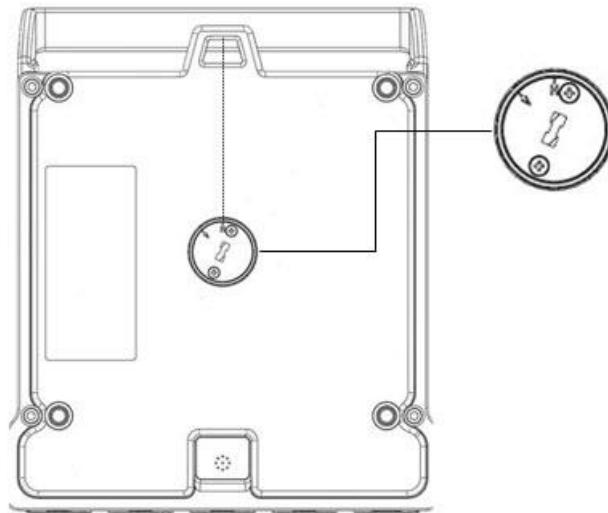
Loosen the two c'sk screws and remove to adjust polarisation. Make sure the screws seat correctly in the alignment notches on transition rim. Tighten to a torque of 5Nm (3.69 lb-ft)

Twist orientation:

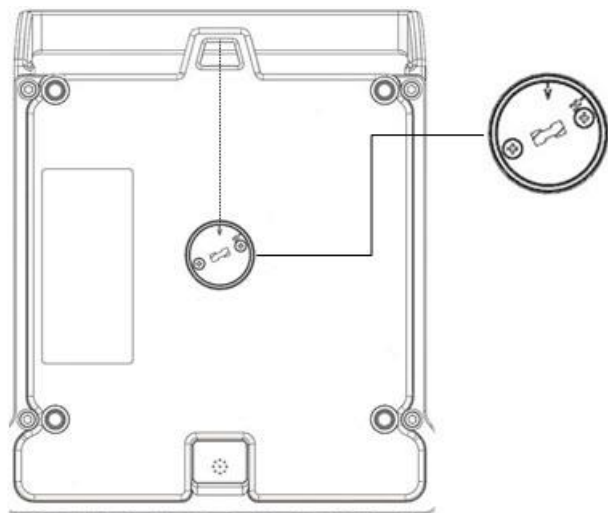


- For horizontal polarization, locate the twist with the letter “H” vertical to the hook cover and fasten the two screws.

NetStream Primo Detailed Configurations Description

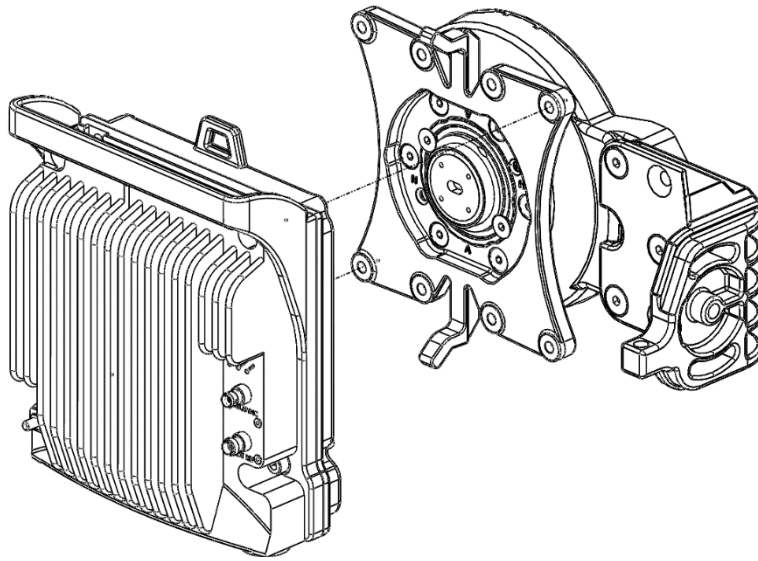


- For vertical polarization, locate the twist with the letter “V” vertical to the hook cover and fasten the two screws.



- 1 Mount the NetStream Primo on the antenna using the four M8 captive screws and washers that are supplied, assembled, in the NetStream Primo, and tighten the screws.

NetStream Primo Detailed Configurations Description



Note

Make sure the polarization mounting direction of the NetStream Primo is correct.

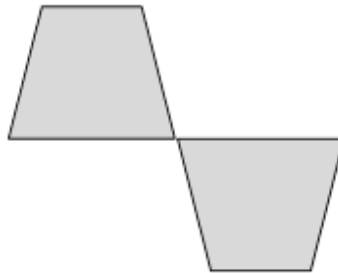
6.2. 2+0 Dual Polarization Direct Mount



Note

This procedure can also be used for 1+0DP HW ready for 2+0DP configuration.

ACAP



List of Items

Item	Description	Quantity	Remarks
1	NetStream Primo RADIO	1	
2	ODU OMT kit	1	

Required Tools

- Metric offset hexagon key set
- Metric wrench key set

Procedure

- 1 Prior to the installation, follow the antenna manufacturer's instructions to use the circular adaptor. (Remove the existing rectangular transition, swap the O-ring, and install the circular transition instead.)

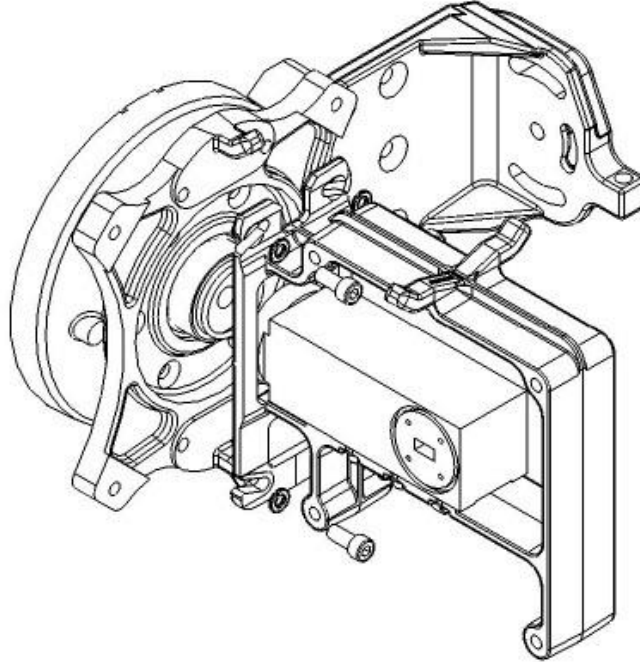
Circular Adaptor



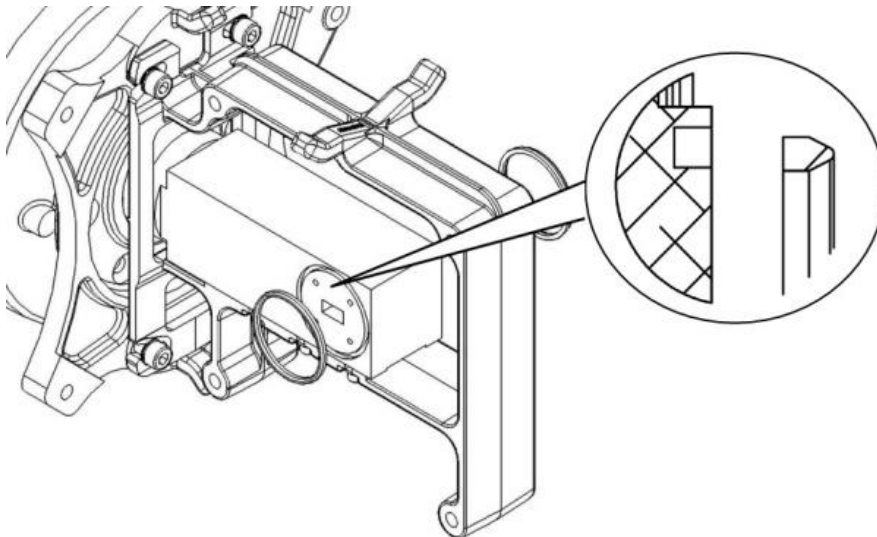
NetStream Primo Detailed Configurations Description

- 2 Connect the ODU OMT Kit to the antenna and secure it with four screws. Verify the existence of the O-ring.

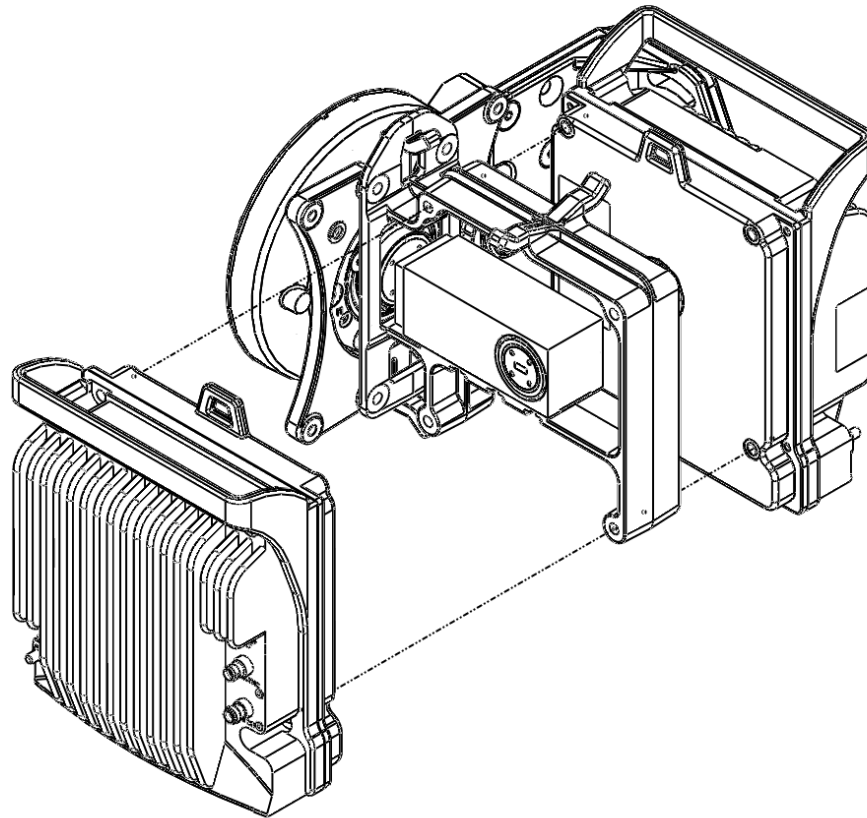
Connect OMT Kit to Antenna



- 3 Mount the two O-Rings supplied with the ODU OMT kit on the OMT body. Make sure the mounting direction is correct, as shown in the section view.



- 4 Mount both RFUs, using the four M8 captive screws and washers supplied, assembled, in the NetStream Primo, through the radio and OMT holder, and tighten the screws. Make sure the polarization mounting direction is correct.



- 5 Tilt the entire assembly, as described in the dual polarization link alignment procedure, to achieve maximum XPD (Cross Polar Differentiation). After link alignment, tighten the four M8 screws left open in step 2 above.

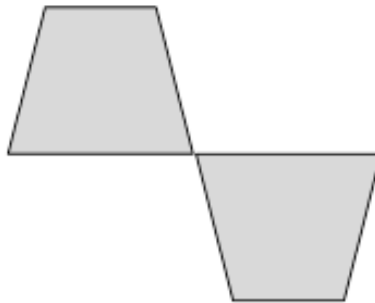
6.3. 2+0 Dual Polarization Remote Mount



Note

This procedure can also be used for 1+0DP HW ready for 2+0DP configuration.

ACAP



List of Items

Item	Description	Quantity	Remarks
1	NetStream Primo RADIO	1	
2	ODU OMT kit	1	
3	FLEXIBLE WG KIT	2	
4	ODU POLE MOUNT KIT	1	
5	ODU REMOTE MOUNT ADAPTOR KIT	1	From 6-13GHz

Required Tools

- Metric offset hexagon key set
- Metric wrench key set
- Phillips #1, #2 screwdriver

6.3.1. Common Installation Procedures

- 1 Prior to the installation, follow the antenna manufacturer’s instructions to use the circular adaptor. (Remove the existing rectangular transition, swap the O-ring, and install the circular transition instead.)

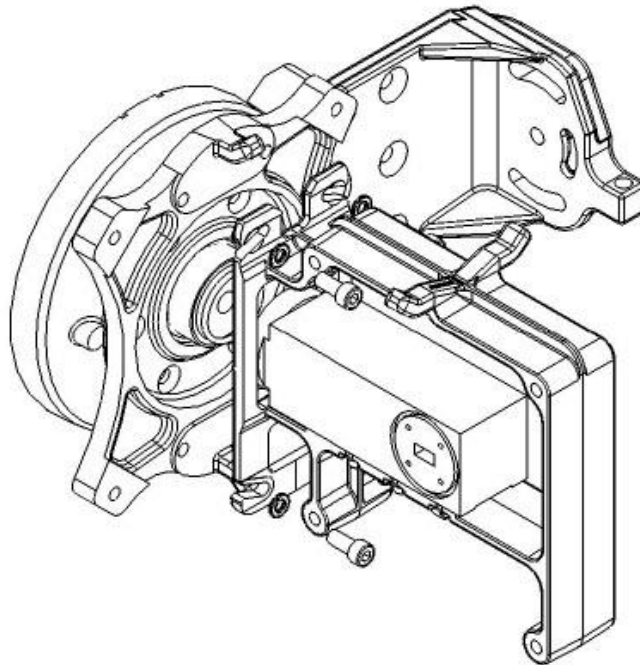
NetStream Primo Detailed Configurations Description

Circular Adaptor



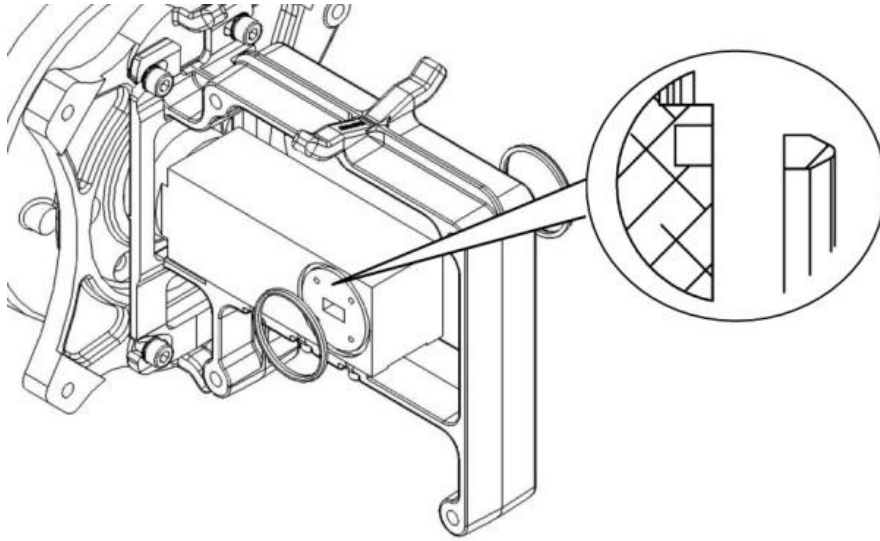
- 2 Connect the ODU OMT Kit to the antenna and secure it with four screws. Verify the existence of the O-ring.

Connect OMT Kit to Antenna



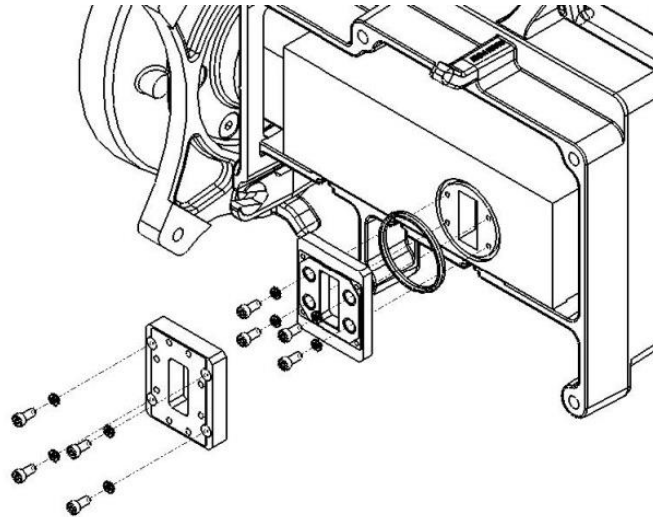
- 3 Mount the two O-Rings supplied with the OCU COUPLER kit on the OMT body. Make sure the mounting direction is correct, as shown in the section view.

NetStream Primo Detailed Configurations Description



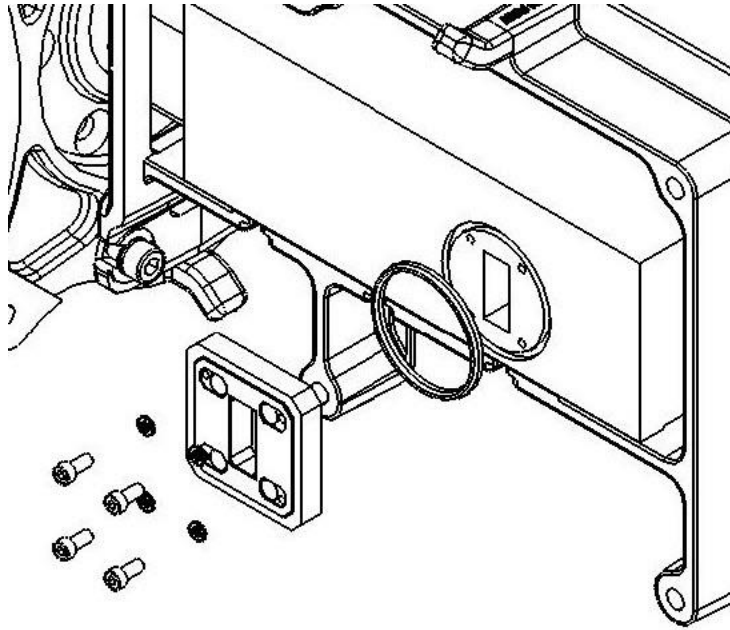
This procedure is applicable for all remote mount configurations that involve an OMT.

- 1 For 6Ghz (UDR70):
 - i Mount the O-Ring supplied with the OMT kit.
 - ii Mount OMT Adaptor #1 on the OMT, and tighten using four M4 screws and washers (supplied with the OMT adaptor kit).
 - iii Mount OMT Adaptor #2 on OMT Adaptor #1, and tighten using four M4 screws and washers (supplied with the OMT adaptor kit).

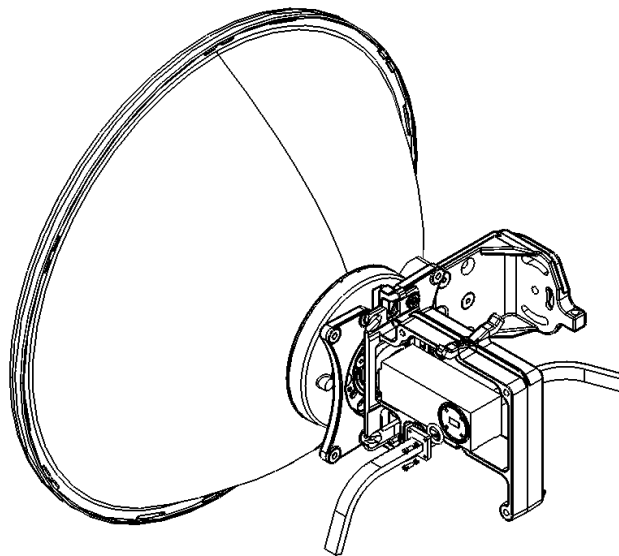


- iv Mount the flexible waveguide as usual.
- 2 For 7-11 GHz (UBR84 and UBR100):
 - i Mount the O-Ring supplied with the OMT kit.
 - ii Mount the OMT adaptor, with its installed sealing gasket, on the OMT, and tighten using the four M4 screws and washers supplied with the OMT Adaptor kit.

NetStream Primo Detailed Configurations Description

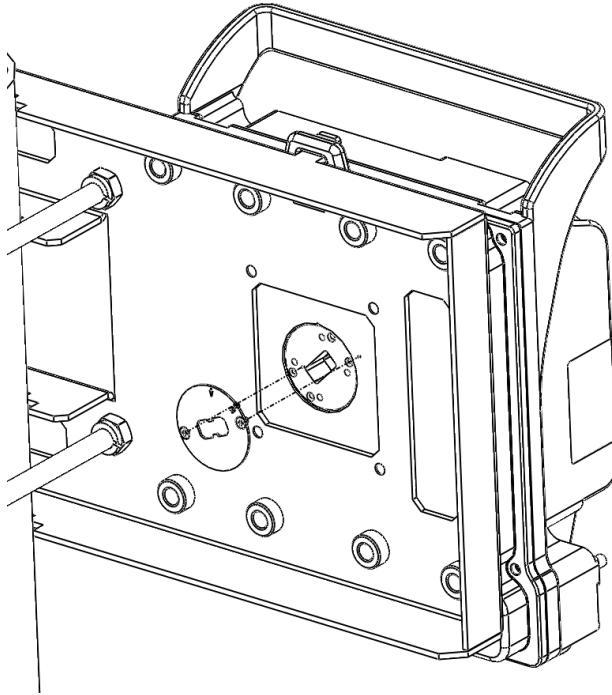


- iii Mount the flexible waveguide without its gasket (only for the OMT side).
- 3 For 13 GHz (UBR120) to 42 GHz (UG383/U), connect the flexible waveguide and its gasket (supplied with the Flexible WG Kit) directly to the OMT port.

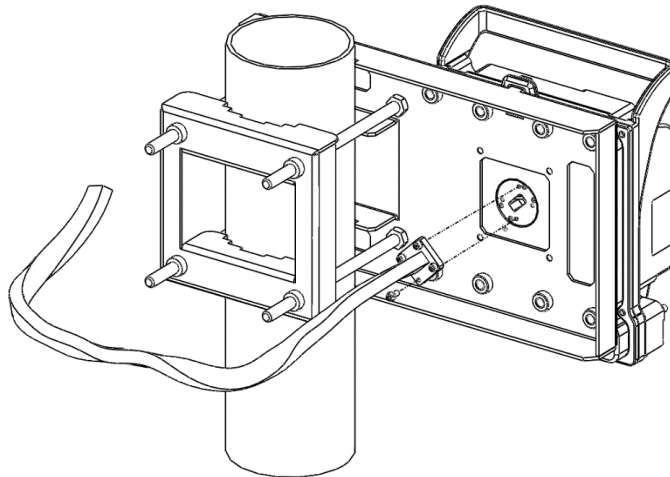


NetStream Primo Detailed Configurations Description

- 4 Loosen the 2 screws, and remove the twist.



- 5 Mount the NetStream Primo Radio to ODU Pole Mount Bracket using the four captive screws and washers supplied, assembled, in the NetStream Primo.
- 6 Connect the Flexible Waveguide and sealing O-Ring supplied with the Flexible Waveguide Imperial kit. Tighten the four metric screws supplied with the ODU Adaptor kit.



Note

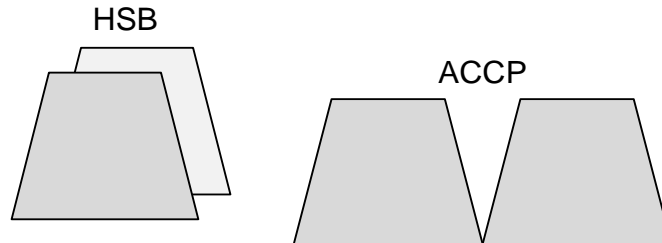
Remote Configuration Frequencies 13-42 GHz do not require adaptors.
Frequencies 6-13 GHz require remote mount adaptors.

6.4. 1+1HSB/2+0 Single Polarization Direct Mount



Note

This procedure can also be used for 1+0SP HW ready for 2+0 SP configuration.



List of Items

Item	Description	Quantity	Remarks
1	NetStream Primo RADIO	1	
2	OCU Coupler/Splitter KIT	1	For 1+1HSB configuration, a coupler should be used
3	ODU TWIST KIT	1	

Required Tools

The following tools are required for the installation:

- Metric offset hexagon key wrench #6
- Phillips #2 screwdriver
- Metric offset hexagon key wrench #2.5 and #3

Procedure

In 1+1 direct mount installation, the NetStream Primo is attached to a coupler. To install a NetStream Primo in a direct mount 1+1 configuration:

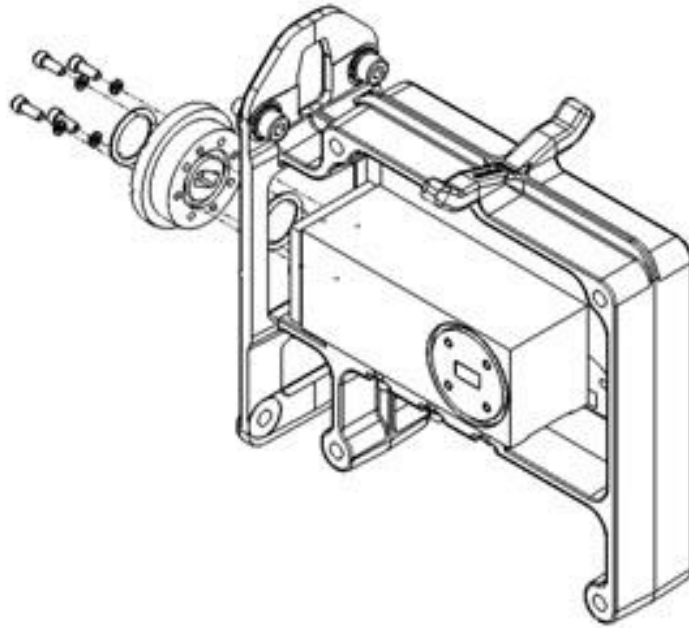


Note

For 15 and 18 GHz frequencies, two O-Rings are supplied in the Twist kit and should be mounted in the twist grooves.

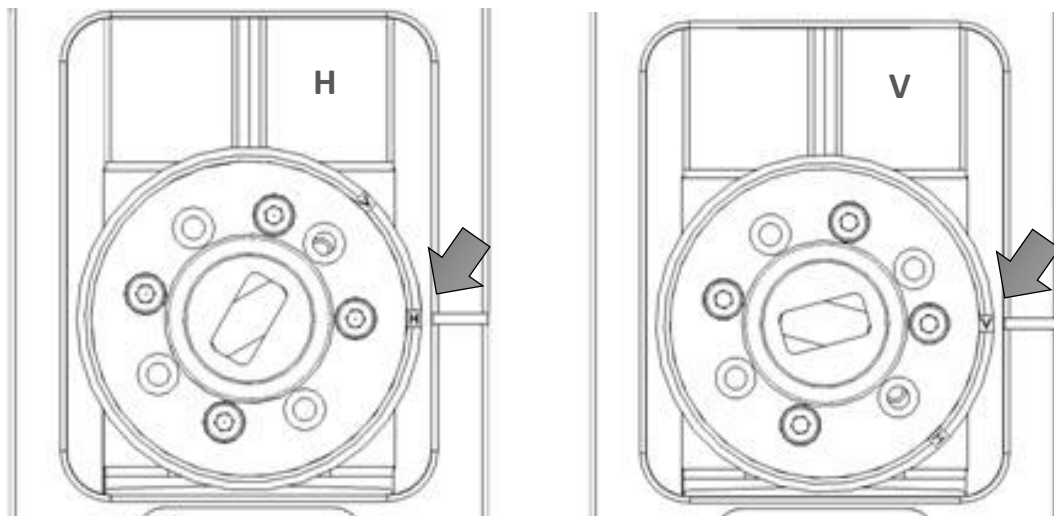
For 6 GHz frequency, a gasket is used instead of an O-Ring. The gasket should be mounted between the twist and the OCU Coupler kit.

- 1 Mount the twist to the coupler using the O-Ring and four screws supplied in the Twist kit, and tighten the screws.



Note

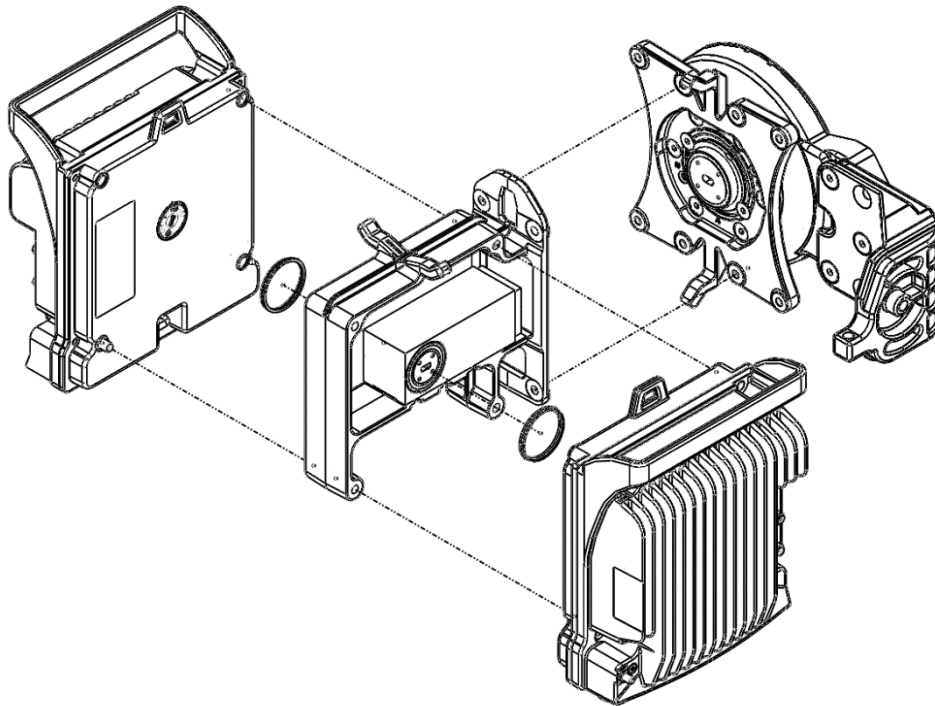
Make sure the polarization mounting direction of the twist to the coupler is according to the antenna polarization.



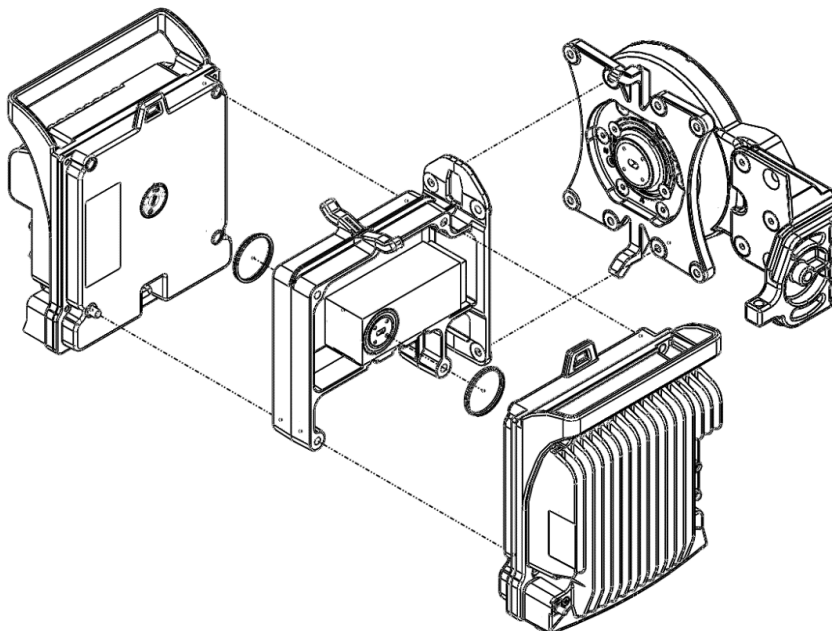
- 2 Mount the coupler radio on the antenna using the four M8 screws and washers supplied with the OCU Coupler kit, and tighten the screws.
- 3 Mount the two O-Rings supplied with the OCU Coupler kit, as shown in the following figure.



NetStream Primo Detailed Configurations Description



- 4 Mount the NetStream Primo to the body of the coupler using the four M8 captive screws and washers that are supplied, assembled, in the NetStream Primo, and tighten the screws.

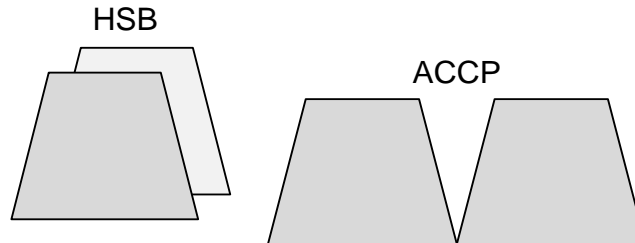


6.5. 1+1HSB/ 2+0 Single Polarization Remote Mount



Note

This procedure can also be used for 1+0SP HW ready for 2+0SP configuration.



List of Items

Item	Description	Quantity	Remarks
1	NetStream Primo RADIO	1	
3	ODU POLE MOUNT KIT	1	
4	OCU COUPLER/ SPLITTER KIT	1	For 1+1HSB configuration, a coupler should be used
5	FLEXIBLE WG METRIC KIT	1	

Required Tools

The following tools are required for the installation:

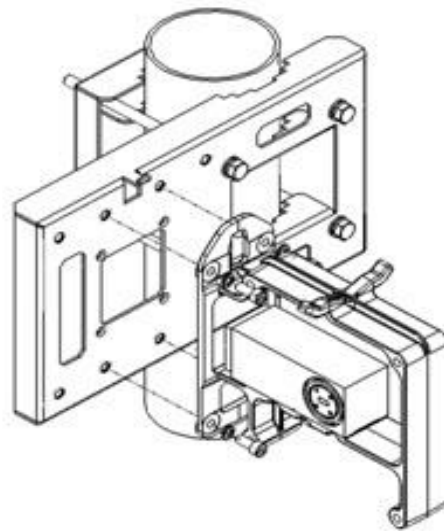
- Metric offset hexagon key wrench #6
- Phillips #2 screwdriver
- Metric offset hexagon key wrench #2.5 and #3

Procedure

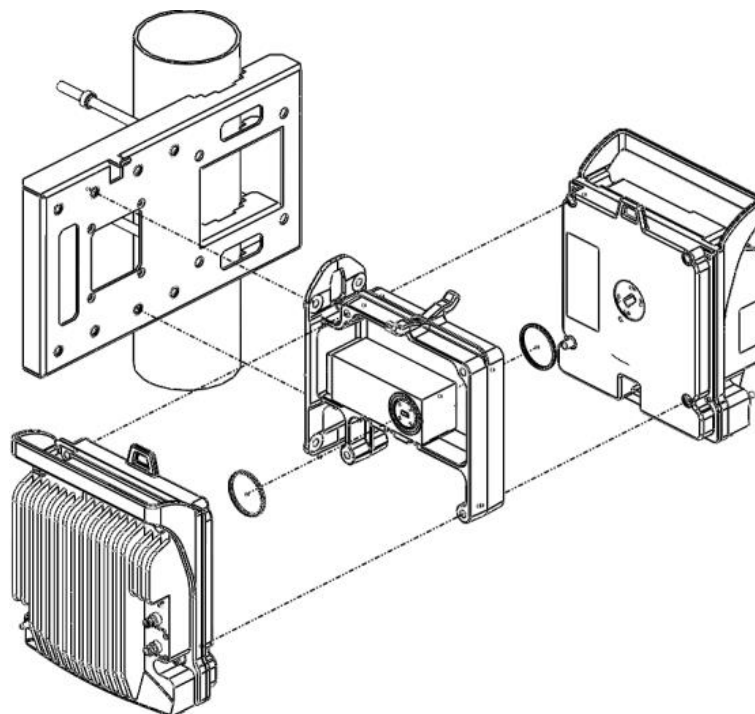
In 1+1 remote mount installation, the NetStream Primo radios are attached to a coupler, while the coupler is connected to the antenna via flexible WG. To install the NetStream Primo in a remote mount 1+1 configuration:

- 1 Mount the OCU Coupler to the ODU pole mount bracket using the four M8 screws and washers supplied with the OCU Coupler kit, and tighten the screws.

NetStream Primo Detailed Configurations Description



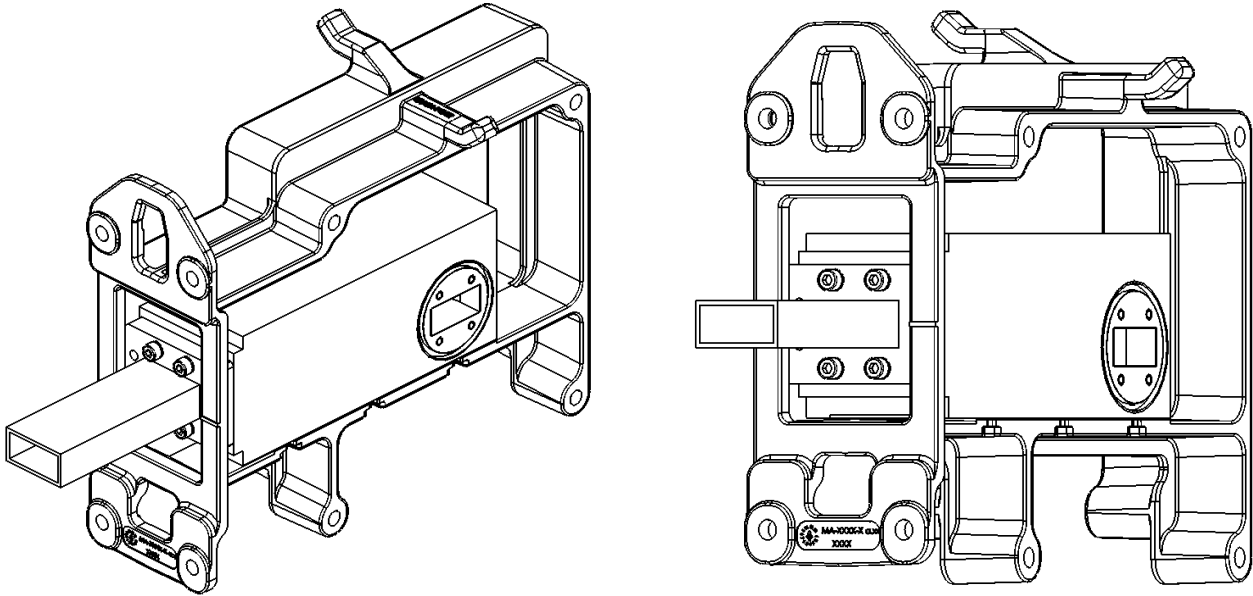
- 2 Mount the two O-Rings supplied with the Coupler kit, according to the Coupler kit instructions.
- 3 Mount the NetStream Primo radio to the body of the coupler using the four M8 captive screws and washers that are supplied, assembled, in the NetStream Primo, and tighten the screws.



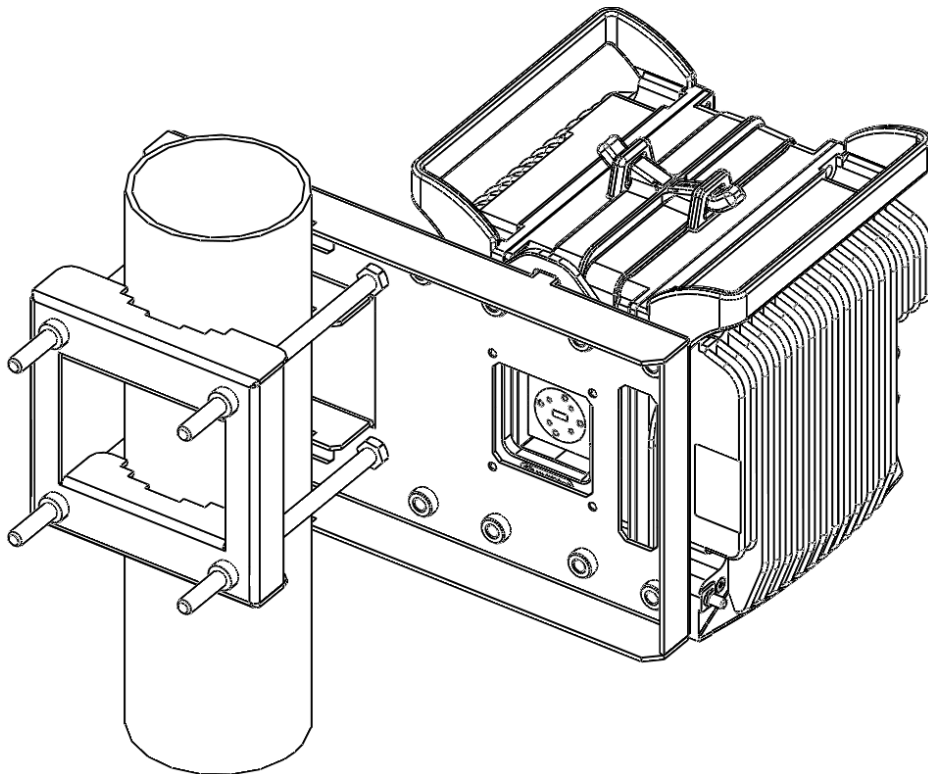
- 4 Place the O-Ring in the flexible waveguide flange groove.
- 5 Mount the flexible waveguide on the coupler, and tighten the screws and washers.



For 6 GHz, only 4 screws should be used, as shown in the pictures below.



- 6 Place the O-Ring in the other end of the flexible waveguide flange groove.
- 7 Mount the flexible waveguide on the antenna, and tighten the screws and washers.



7. Installing NetStream Primo on Third-Party Antenna Adaptors

Since the NetStream Primo uses the same antennas as ODU, it can utilize the 3rd party mediation devices much in the same way they are used with ODU installations.

Special attention must be taken in assembling these configurations, as the 3rd party adaptors can be used only for single polarization configurations. Dual polarization configurations can be accommodated neither with ODU nor with NetStream Primo.

In general once the correct 3rd party adaptor has been selected and installed on the antenna, the interface now is identical to a generic single pol. ODU interface. From this moment forth it is ready for any subsequent NetStream Primo configuration.

The following table describes available adaptors:

Installing NetStream Primo on Third-Party Antenna Adaptors

Other Vendors Antennas	6GHz	7-8GHz	10-11GHz	13GHz	15GHz	18GHz	23GHz	26GHz	28-31GHz	32GHz	38GHz
ODU - NEC Adaptor kit (PASOLINK NEO)		ADPT_ODU7_8-NC_ANT		ADPT_ODU13_15-NC_ANT		ADPT_ODU18_26-NEC_ANT					
ODU - ERICSSON Adaptor kit (RAU1)				ADPT_ODU13-ERCS_RAU1_ANT	ADPT_ODU15-ERCS_RAU1_ANT	ADPT_ODU18-ERCS_RAU1_ANT	ADPT_ODU23-26-ERCS_RAU1_ANT		ADPT_ODU28-38-ERCS_RAU1_ANT		
ODU - ERICSSON Adaptor kit (RAU2)				ADPT_ODU13-ERCS_ANT	ADPT_ODU15-ERCS_ANT	ADPT_ODU18-ERCS_ANT	ADPT_ODU23-ERCS_ANT		ADPT_ODU28_38-ERCS_ANT		
ODU - SRAL (SIEMENS) Adaptor kit						ADPT_ODU18_26-SRAL_ANT			ADPT_ODU28_38-SRAL_ANT		
ODU-NSN (Flexihopper) ADAPTOR KIT		ADPT_ODU7_8-N_ANT		ADPT_ODU13-N_ANT	ADPT_ODU15-N_ANT	ADPT_ODU18_26-N_ANT					ADPT_ODU38-N_ANT
ODU - ALU Adapter Kit				ADPT_ODU13-ALU_Melody		ADPT_ODU18-ALU_Melody					
NS PRIMO/DIPLOC/s and ODU - Dragonwave Adapter Kit			ADPT-CIRC-ODU_11-DW	ADPT-CIRC-ODU_13-DW		ADPT-CIRC-ODU_18-DW	ADPT-CIRC-ODU_23-DW				
ODU - INTRACOM ADAPTOR KIT						ADPT_ODU18-INTRACOM_ANT					
NS PRIMO/DIPLOC/s and ODU REMEC adapter kit	ADPT_NetStream Primo_ODU6_Remec					ADPT_ODU18_REMEC_SINGLE_POLE					
ODU - Huawei Antenna Adaptor kit		ADPT_ODU7_8-HUAW_ANT	ADPT_ODU10_11-HUAW_ANT								
NetStream Primo/ODU EXALT ADAPTOR KIT						ADPT_ODU18_EXALT_ANT					

Installing NetStream Primo on Third-Party Antenna Adaptors

NetStream Primo/ODU SAF ANTENNA ADAPTOR KIT			ADPT_ODU11_SAF_ANT		ADPT_ODU15_SAF_ANT						
Kit for converting a ValuLine 3 antenna for integration with ODU (ValuLine 3 antennas only). For important information on when these kits can be used, refer to <i>Special Note on Converting ValuLine 3 Antennas</i> on page 89.	VINTA-6W-CR4	VINTA-7W-CR4	VINTA-11W-CR4	VINTA-13-CR4	VINTA-15-CR4	VINTA-18-CR4	VINTA-23-CR4	VINTA-26-CR4	VINTA-28-CR4	VINTA-32-CR4	VINTA-38-CR4

- For instructions how to install these third-party adaptors, refer to the [FIPS 140-2](#)



Note

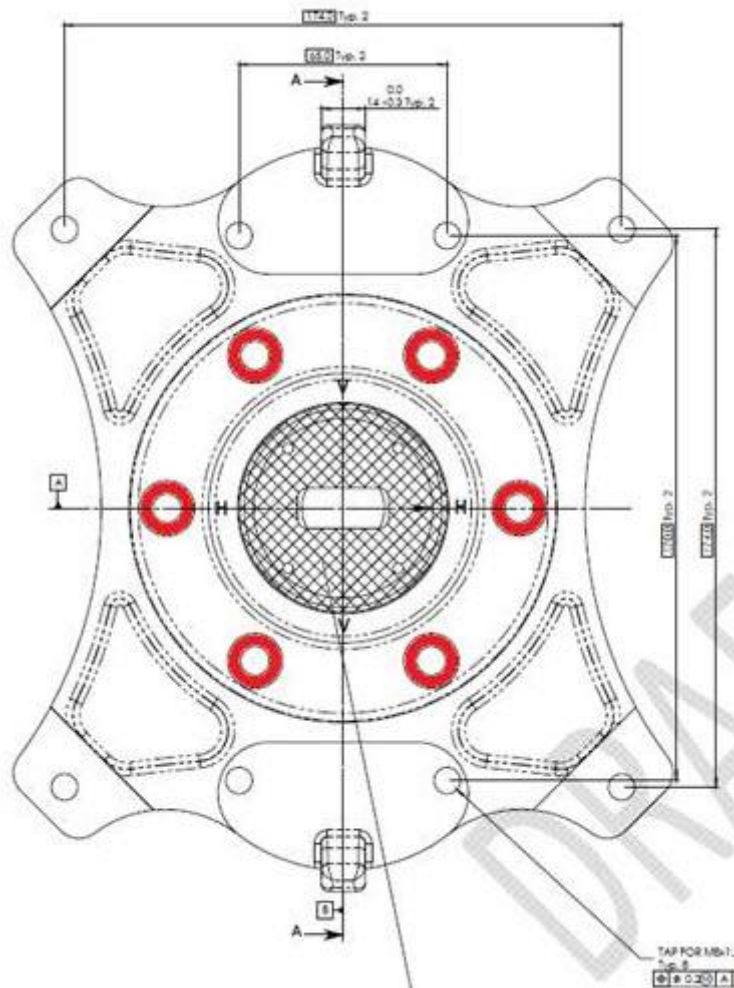
Installation Guide, DOC-00017708.

7.1. Special Note on Converting ValuLine 3 Antennas

Part numbers for ValuLine 3 antenna conversion kits are valid for most ValuLine 3 antennas, integrated or non-integrated. These conversion kits can also be used to convert Andrew ValuLine 3 antennas with the old Nera Evolution interface to ODU. The kits support the majority of Andrew's ValuLine 3 antennas, 1-6ft. However, since there are some unique cases in which Andrew provided special antennas which are not supported by these adaptors, it is recommended that you supply your Netronics representative with a picture of the current antenna (back plain side), in order to confirm the antenna's compatibility prior to implementing this solution.

You can also check the following to determine whether the antenna is compatible with the conversion kit:

- Verify that the antenna is, in fact, a ValuLine 3 antenna.
- Verify that the back plate of the antenna has in its holding plate the six mounting holes shown in red in the figure below.



8. Appendix A: Mediation Device Losses

NetStream Primo Mediation Device Losses

Configuration	Interfaces		6-8 GHz	11 GHz	13-15 GHz	18-26 GHz	28-42 GHz
Flex WG	Remote Mount antenna	Added on remote mount configurations	0.5	0.5	1.2	1.5	1.5
1+0	Direct Mount	Integrated antenna	0.2	0.2	0.4	0.5	0.5
OMT	Direct Mount	Integrated antenna	0.3	0.3	0.3	0.5	0.5
Splitter	Direct Mount	Integrated antenna	3.3	3.4	3.4	3.4	3.5



The antenna interface is always the NetStream Primo interface. If other antennas are to be used, an adaptor with a 0.1 dB loss should be considered. The numbers above represent the typical loss per component.

9. Appendix B: Acceptance & Commissioning Procedures

This chapter provides Netronics' recommended Acceptance and Commissioning Procedure for NS PRIMO/DIPLO. Acceptance and commissioning should be performed after initial setup is complete.

The purpose of this procedure is to verify correct installation and operation of the installed link and the interoperability with customer end equipment.

Netronics' Acceptance and Commissioning procedure includes the following stages:

- Site Acceptance Procedure
- Commissioning of Radio Link

The Site Acceptance Procedure is a checklist that summarizes the installation requirements of the site at which the products were installed.

The commissioning tests cover the required configuration information that should be recorded, and the tests that should be performed on the radio link.

9.1. Site Acceptance Procedure

The purpose of the following procedures is to verify that all installation requirements were noted and checked. Following this procedure will ensure proper, long-lasting, and safe operation of the product.

The checklist below summarizes the installation requirements of the site.

SITE ACCEPTANCE CHECKLIST	
1. SITE INFORMATION	
Customer:	
Radio model:	
Site name:	
Site code:	
Radio link code:	
Site address:	
2. ANTENNA MOUNTING	
Antenna mount type:	
Mount is of sufficient height to clear local obstructions	OK
Mount is safely positioned to not cause a safety hazard	OK
Mount is secure and perpendicular	OK
Mount is grounded as per site specifications	OK
All steelwork is Galvanized or Stainless Steel as appropriate	OK
3. ANTENNA	
Antenna type (model and size):	
Antenna is securely fixed to mount	OK
Antenna is grounded as per site specifications	OK
Antenna sway braces are installed correctly (where applicable)	OK
Antenna Radome is securely fitted (where applicable)	OK
Water drain plugs are fitted and removed, as appropriate	OK
Antenna sealing O-Ring is properly fitted and not damaged	OK
Antenna/Launch unit polarization is as per link requirements	OK

Appendix B: Acceptance & Commissioning Procedures

SITE ACCEPTANCE CHECKLIST (continued)	
4. OUTDOOR UNIT	
Type of ODU mount:	(Direct or Remote mount)
ODU is securely mounted to the antenna or pole	OK
ODU is grounded as per installation instructions	OK
ODU's polarization is as per link requirements	OK
ODU is installed properly and has no physical damage	OK
<i>For Remote-Mount Only:</i>	
Remote mount kit is securely mounted to the pole	OK
Flexible waveguide has no physical damage and connectors are sealed	OK
All flexible waveguide bolts are secured using washers and lock-washers, as appropriate	OK
Flexible waveguide is secured to the pole	OK
6. CAT5/Fiber Optic CABLE	
Overall cable length:	
Cable type:	
CAT5 connectors assembled properly on the cable	OK
Cable connected securely to ODU and IDU	OK
Cable connector is covered by gland and secure by cable tie at the ODU	OK
At the ODU, cable has a service/drip loop to prevent moisture from entering the connector	OK
Cable is secured using suitable restraints to fixed points at regular intervals (0.5 m recommended)	OK
Cable has no sharp bends, kinks, or crushed areas. All bends are per manufacturer specifications	OK
Grounding is as per site specifications	OK
Cable point-of-entry to building/shelter is weather-proof	OK
Cable ends are properly labeled	OK

Appendix B: Acceptance & Commissioning Procedures

SITE ACCEPTANCE CHECKLIST (continued)	
7. FLEXIBLE WAVEGUIDE	
Overall flexible WG length:	
Flexible WG type:	
Flexible WG is connected securely to ODU and Antenna	OK
Flexible WG connector is weather-proofed (sealed) at the ODU	OK
At the ODU, the flexible WG has a service/drip loop to prevent moisture from entering the connector	OK
Flexible WG is secured using suitable restraints to fixed points at regular intervals (0.5 m recommended)	OK
Flexible WG has no sharp bends, kinks, or crushed areas. All bends are per manufacturer specifications	OK
Flexible WG point-of-entry to building/shelter is weather-proof	OK
Flexible WG ends are properly labeled	OK
8. DC POWER SUPPLY - Two Inputs	
Measured DC voltage input to the IDU:	(-40.5 to -60 VDC)
Power-Supply maximum current:	
Power-Supply is properly grounded	OK
DC power backup type:	
IDU DC connector is secure and the DC input leads are correctly terminated (no bare wires are visible)	OK
IDU DC connector (+) and (GND) leads are shorted and GND is grounded	OK
9. RACK INSTALLATION	
Rack is mounted to the shelter floor with four screws	OK
Rack is mounted to the shelter wall with two screws	OK

SITE ACCEPTANCE CHECKLIST (continued)	
10. REMARKS/NOTES	
11. GENERAL INFORMATION	

Appendix B: Acceptance & Commissioning Procedures

Site accepted by:	Name:
	Title:
	Company:
	Signature:
	Date:
Site approved by:	Name:
	Title:
	Company:
	Signature:
	Date:

9.2. Site Acceptance Checklist Notes

The following notes provide important additional information about the Site Acceptance Checklist.

1 Antenna Mounting

- Mounting pole is of sufficient height to clear local obstructions, such as parapets, window cleaning gantries, and lift housings.
- Mounting Pole is of sufficient height, and is safely positioned, so as not to cause a safety hazard. No person should be able to walk in front of, or look directly into the path of the microwave radio beam. Where possible, the pole should be away from the edge of the building.
- Mounting pole is secure and perpendicular. A pole that is not perpendicular may cause problems during antenna alignment.
- Mounting pole is grounded as per site specifications. All operators and site owners have specific requirements regarding the grounding of installations. As a minimum, typical requirements are such that any metal structure must be connected to the existing lightning protection ground of the building. Where it extends beyond the 45 degree cone of protection of existing lightning conductors, additional lightning protectors should be installed.
- All steelwork is Galvanized or Stainless Steel, as appropriate to prevent corrosion.

2 Antenna

- Antenna is grounded as per site specifications. See the third point in the Antenna Mounting section above.
- Antenna sway braces are fitted and installed correctly, where applicable. Typically, for an antenna of 1.2 m or larger, an extra sway brace is fitted to the mounting frame of the antenna. This sway brace should not be mounted to the same pole as the antenna, but should be installed directly back to the tower or an alternative point.
- Antenna Water Drain Plugs are fitted and removed, where appropriate. Some antennas have moisture drain plugs installed at various points around the antenna. The purpose of these plugs is to allow any moisture that forms on the inside of the antenna or radome to drip out and prevent a pool within the antenna. Only the plugs at the bottom of the antenna, after installation, should be removed. All other plugs should be left in position.

3 ODU (Outdoor Unit)

- The ODU is grounded as per installation instructions. See the third point in the Antenna Mounting section above.
- The ODU polarization is as per link requirements and matches the polarization of the antenna.
- The main traffic connections are correctly terminated and crimped as per cable and connector manufacturer instructions. All fiber optic patch leads should be routed carefully and efficiently, using conduits to prevent damage to the cables.

Appendix B: Acceptance & Commissioning Procedures

- All other user terminations are secure and correctly terminated.
- All labeling is complete as per site requirements. Labeling is specific to each customer. At a site with only one installation, labeling may be unnecessary. However, at sites with multiple installations, correct and adequate labeling is essential for future maintenance operations.

Typical labeling requirements include:

Antenna labels - for link identity and bearing

ODU labels - for link identity, frequency, and polarization

Cat5/Fiber cable labels - for link identity, close to the ODU, switch, and either end of any joint

Switch labels - for link identity

9.3. Radio Link Commissioning Procedure

9.3.1. Scope

This section describes the recommended commissioning tests for NS PRIMO/DIPLO radio link in a 1+0 configuration.

The purpose of the commissioning tests is to verify correct and proper operation of the product.

9.3.2. Commissioning Test

The following tests should be performed on each installed link.

9.3.2.1. Link Verification

- Received Signal Level (RSL) is up to +/- 4 dB from the expected (calculated) level at both ends of the link.
- Radio Bit Error Rate (BER) is $10E^{-11}$ or higher.
- If working with ATPC, ATPC is operating as expected (RSL = reference level).

9.3.2.2. Ethernet Line Interfaces Test

- Connect Ethernet Packet Analyzer to the GbE port. Use physical loop at remote end (or connect second analyzer). Run Packet Loss test for at least one hour (load rate as per Netronics' specifications for the chosen MRMC).
- Connect Ethernet Packet Analyzer to the FE port. Use physical loop at remote end (or connect second analyzer). Run Packet Loss test for at least one hour (load rate as per Netronics' specifications for the chosen MRMC).

9.3.2.3. Interoperability Verification

- Connect customer end equipment to the line interfaces, and verify correct operation.
- Further interoperability tests should be performed in accordance with the specific requirements of the connected end equipment.

9.3.2.4. Management Verification

- Launch the HTTP management and verify that you can manage the link and that you are able to perform changes to the link configuration (frequency channel, Tx power, system name, time & date, etc.)
- Verify that correct parameters are reported when performing the above.
- Verify that there are no active alarms on the link.
- If the management station is located at a remote site (Network Operation Center), verify that the management station can manage the link and receive traps.

9.4. NS PRIMO/DIPLO Commissioning Log

Appendix B: Acceptance & Commissioning Procedures

The Commissioning Log is an integral part of the commissioning procedure and should be filled in for each installed link.

The Commissioning Log gathers all relevant information regarding the installed link and contains a checklist of all recommended commissioning tests.

Maintaining the Commissioning Log is important for tracking your installations, and to provide essential data for Netronics Networks.

Upon completing the Commissioning Log, send the log to Netronics support center at support@netronics-networks.com.

NS PRIMO/DIPLO LINK COMMISSIONING LOG		
1. GENERAL INFORMATION		
Customer:		
Radio model:		
Configuration:		
Radio link code:		
Site 1 name & add:		
Site 2 name & add:		
2. ODU/RFU	Site 1	Site 2
ODU model:		
ODU p/n:		
ODU s/n:		
ODU SW:		
Tx frequency (MHz):		
Rx frequency (MHz):		
Link ID:		
Tx power (dBm):		
ATPC on/off:		
ATPC ref level:		
ODU Polarization:		
3. ANTENNA AND ODU MOUNT	Site 1	Site 2
Antenna vendor and model:		
Antenna size:		
Mounting type:		
Mounting losses:		
4. LINK PARAMETERS	Site 1	Site 2
Link distance:		

Appendix B: Acceptance & Commissioning Procedures

Rain zone:		
Expected RSL (dBm):		
Expected Diversity RSL (dBm):		
RSL Main (dBm):		
RSL Diversity (dBm):		
Deviation from exp?		
RSL \leq 4 dB?		
5. COMMISSIONING TESTS	Site 1	Site 2
Line loopback:	Pass	Pass
ODU loopback:	Pass	Pass
Radio BER:	Pass	Pass
FE test:	Pass	Pass
GbE test:	Pass	Pass
6. MANAGEMENT CONFIGURATION	Site 1	Site 2
Eth IP Address:		
Eth IP mask:		
Default router:		
In-band VLAN		
7. REMARKS/NOTES		
8. INSTALLATION INFORMATION		
Installed by:	Name:	
	Company:	
	Date:	
	Signature:	
Commissioned by:	Name:	
	Company:	
	Date:	
	Signature:	