



NetStream Diplo

Installation Guide

Revision: 2.01
Update: August 2016

This document contains information that is proprietary to Netronics Technologies Inc.

No part of this publication may be reproduced, modified, or distributed without prior written authorization of Netronics Communications LLC.

This document is provided as is, without warranty of any kind.

Statement of Conditions

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

Netronics shall not be liable for errors contained herein or for incidental or consequential damage in connection with the furnishing, performance, or use of this document or equipment supplied with it.

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.

Copyright © 2016 by Netronics. All rights reserved.

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.

Table of Contents

| | |
|--|-----------|
| 1. Before You Start..... | 2 |
| 1.1. Important Notes..... | 2 |
| 1.2. Safety Precautions & Declared Material | 2 |
| 1.3. Pre-Installation Instructions..... | 4 |
| 2. Product Hardware Description..... | 5 |
| 2.1. NetStream Diplo Hardware Overview..... | 5 |
| 2.2. MultiCore Mediation Devices (MCMD)..... | 10 |
| 2.3. PoE Injector | 11 |
| 2.4. System Components | 12 |
| 2.5. Adaptors and Installation Kits | 14 |
| 2.6. Antenna Connection | 20 |
| 2.7. Power Specifications | 21 |
| 2.8. Environmental Specifications..... | 21 |
| 3. Cable Installation and Grounding..... | 22 |
| 3.1. Minimum and Maximum Cable Diameter..... | 22 |
| 3.2. Cable Grounding..... | 22 |
| 3.3. Power Source | 24 |
| 3.4. Surge Protection..... | 25 |
| 3.5. Available Cable Options | 25 |
| 3.6. Securing the Cables | 30 |
| 3.7. Special Instructions for use of Glands..... | 31 |
| 3.8. Connecting an Optical Fiber Cable and SFP | 37 |
| 3.9. Connecting a DC Power Cable..... | 41 |
| 3.10. Connecting the Ethernet Cable | 44 |
| 3.11. Management Connection for 4x4 MIMO and 1+1/2+2 HSB Configurations | 50 |
| 4. PoE Injector Installation and Connection..... | 52 |
| 4.1. PoE Injector Cable Connection..... | 52 |
| 4.2. PoE Injector Grounding | 53 |
| 4.3. PoE Injector Wall Mount Installation | 53 |
| 4.4. PoE Injector Pole Mount Installation | 55 |
| 4.5. PoE Injector 19" Rack Installation | 56 |
| 4.6. PoE Injector ETSI Rack Installation | 58 |
| 5. Generic Installation Procedures | 60 |
| 5.1. General Notes Concerning All Installation Procedures | 60 |
| 5.2. Torque Requirements | 60 |
| 5.3. NetStream Diplo DC Pole Mount Procedure..... | 60 |
| 5.4. Remote Mount Installation for Single Polarization with an Imperial Waveguide .. | 62 |
| 5.5. Management Connection for MIMO and Protection Configurations | 67 |
| 6. Installation Procedures per Configuration Type..... | 70 |
| 6.1. MultiCore 2+0 Dual Polarization Direct Mount..... | 70 |
| 6.2. MultiCore 2+0 Dual Polarization Remote Mount..... | 73 |
| 6.3. MultiCore 2+0 Single Polarization Direct Mount | 77 |

| | | |
|-----------|--|------------|
| 6.4. | MultiCore 2+0 Single Polarization Remote Mount | 80 |
| 6.5. | MultiCore 2+2 HSB Double Polarization Direct Mount | 85 |
| 6.6. | MultiCore 2+2 HSB Double Polarization Remote Mount | 89 |
| 6.7. | MultiCore 2+2 HSB Single Polarization Direct Mount | 96 |
| 6.8. | MultiCore 2+2 HSB Single Polarization Remote Mount | 100 |
| 6.9. | 2 x MultiCore 2+0 Dual Polarization Direct Mount | 107 |
| 6.10. | 2 x MultiCore 2+0 Dual Polarization Remote Mount | 110 |
| 6.11. | 2 x MultiCore 2+0 Single Polarization Direct Mount | 116 |
| 6.12. | 2x2 LoS MIMO Direct Mount..... | 119 |
| 6.13. | 2x2 LoS MIMO Remote Mount..... | 124 |
| 6.14. | 4x4 LoS MIMO Direct Mount..... | 128 |
| 6.15. | 4+0 Dual Polarization, 2+2HSB Single/Dual Polarization Direct Mount..... | 133 |
| 6.16. | 4+0 Dual Polarization, 2+2HSB Dual Polarization Remote Mount | 135 |
| 6.17. | 2+2HSB Single Polarization Remote Mount | 141 |
| 6.18. | Dual Circulator Multi-Carrier Kit Installation..... | 145 |
| 7. | Installing NetStream Diplo on Third-Party Antenna Adaptors | 151 |
| 7.1. | Special Note on Converting ValuLine 3 Antennas..... | 153 |
| 8. | Appendix A: Mediation Device Losses | 154 |
| 9. | Appendix B: Acceptance & Commissioning Procedures..... | 156 |
| 9.1. | Site Acceptance Procedure | 157 |
| 9.2. | Site Acceptance Checklist Notes | 160 |
| 9.3. | Radio Link Commissioning Procedure | 162 |
| 9.4. | NS PRIMO/DIPLO Commissioning Log..... | 163 |

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 Diplo is intended for installation in a restricted access location.
- NetStream Diplo 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



Warning

General Equipment Precautions

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 Diplo, 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 Diplo 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.

**Warning**

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.

1.2.1. 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 Diplo 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.

1.2.2. 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 Diplo 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.

**Warning**

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

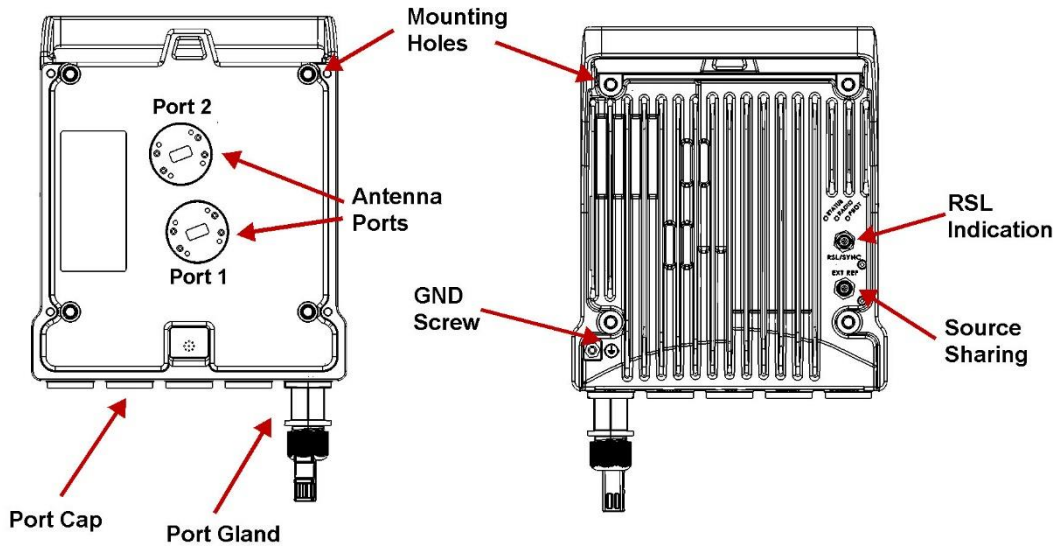
Check the packing lists and ensure that correct parts numbers quantities of goods have arrived. Inspect for any damage on the cases and equipment. Report any damage or discrepancy to a Netronics representative, by e-mail or fax.

2. Product Hardware Description

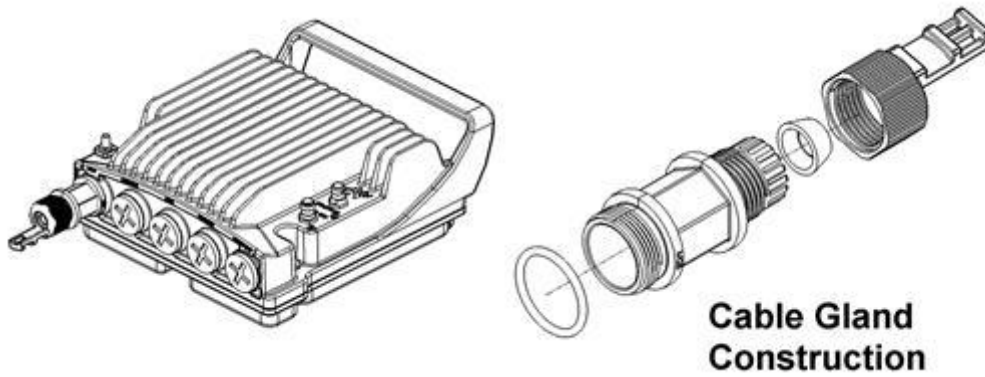
2.1. NetStream Diplo Hardware Overview

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

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

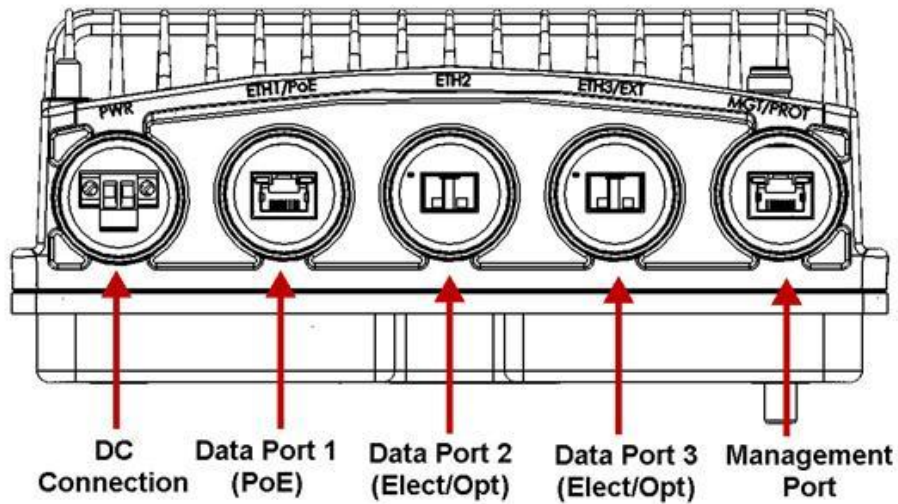


Cable Gland Construction



2.1.1. NetStream Diplo Interfaces

NetStream Diplo Interfaces



- Data Port 1 for GbE traffic:
 - Electric: 10/100/1000Base-T. Supports PoE.
 - Optical: 1000Base-SX (or X-LX-ZX/XD)
- Data Port 2 for GbE traffic:
 - Electric: 10/100/1000Base-T
 - Optical: 1000Base-SX (or X-LX-ZX/XD)
- Data Port 3 for GbE traffic/expansion port:
 - Electric: 10/100/1000Base-T
 - Optical: 1000Base-SX (or X-LX-ZX/XD)
- Power interface (-48VDC)
- Management Port: 10/100Base-T
- 2 RF Interfaces : Standard interface per frequency band
- RSL interface: BNC connector
- Source sharing: TNC connector
- Grounding screw

2.1.2. Channel-Port Mapping to Polarization

Two transceiver chains and two diplexers are embedded in each NetStream Diplo unit. In most cases, both diplexers are the same exact type. When the diplexers are the same type, radio ports 1 and 2 cover the exact same frequency range.

In the 6-11GHz frequency bands, where channelization and diplexers are relatively narrow, a single NetStream Diplo unit might have to operate in two channels that are not covered by the same diplexer.

When this is required, the NetStream Diplo can be ordered with two different diplexer types to cover two different channel ranges within the same frequency band.

A NetStream Diplo with the same type of diplexer assembled on both transceiver chains has the following marketing model structure:

- **Example:** NetStream Diplo-HP-6L-252A-**1W4**-H-ESX

In this example, **1W4** indicates that both transceivers cover channels 1 through 4.

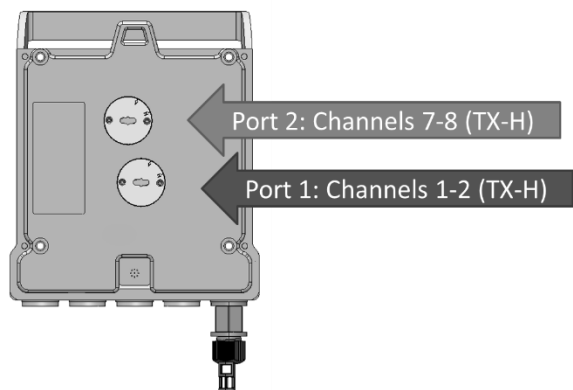
A NetStream Diplo with two different types of diplexers has the following marketing model structure:

- **Example:** NetStream Diplo-HP-6L-252A-**1W27W8**-H-ESX

In this example, **1W27W8** indicates that channels 1 through 2 are covered by Port1, while channels 7 through 8 are covered by Port2.

A NetStream Diplo assembly for this example would look as follows:

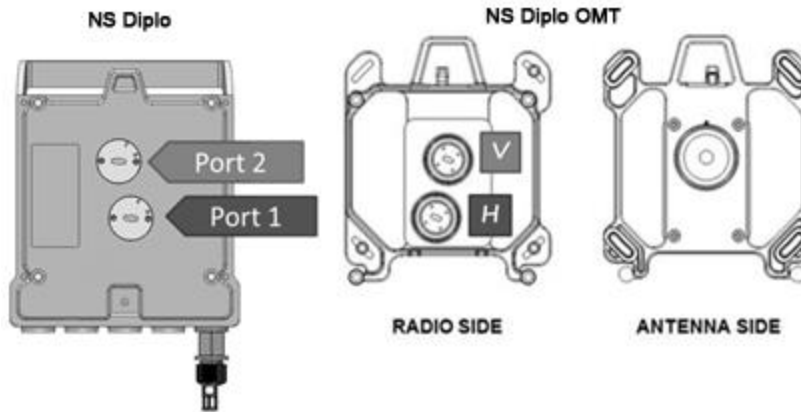
| Radio Port ID (EMS ID) | Channels Coverage |
|------------------------|-------------------|
| Port 2 | Ch 7-8 |
| Port 1 | Ch 1-2 |



The same orientation is maintained for TX-H and TX-L units.

When installing a NetStream Diplo unit with two different diplexers in a Multicore 2+0 DP Direct Mount configuration, the V and H ports of the OMT are mechanically connected to Port 2 and 1 respectively.

This means that in the above example, V polarization is covered by channels 7 through 8 (Port 2) and H polarization is covered by channels 1 through 2 (Port 1).

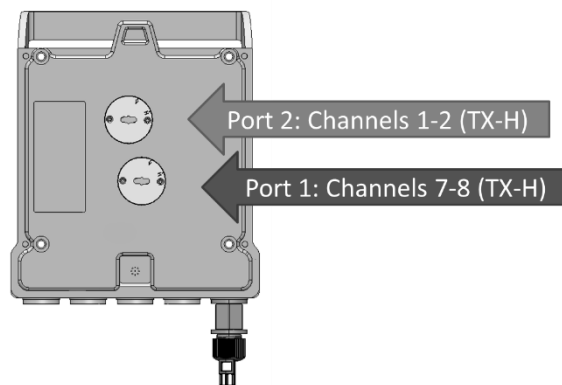


To assign the channels to different polarizations, a different system with a different marketing model should be ordered.

The following marketing model represents a system in which V polarization is covered by channels 1 through 2 (Port 2) and H polarization is covered by channels 7 through 8 (Port 1):

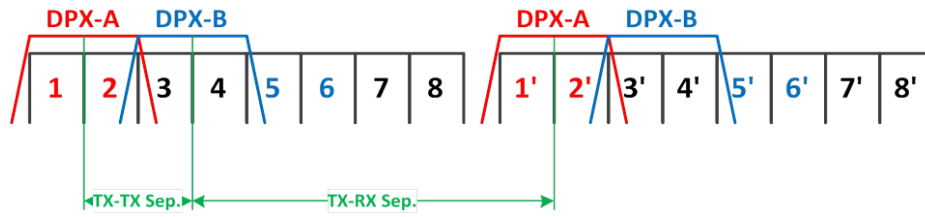
NetStream Diplo-HP-6L-252A-7W81W2-H-ESX:

| Radio Port ID (EMS ID) | Channels Coverage |
|------------------------|-------------------|
| Port 2 | Ch 1-2 |
| Port 1 | Ch 7-8 |



Please note that when selecting two operational channels that are not covered by the same diplexer, certain TX-TX separation and TX-RX separation criteria should be met.

Separation Criteria when Working with Two Diplexer Types



Because diplexer coverage and channelization plans vary in different parts of the world for specific applications, please consult with Netronics pre-sales representatives for support.

2.2. MultiCore Mediation Devices (MCMD)

The MultiCore Mediation Devices (MCMD) are designed to offer a simple and compact solution for a direct mount installation of the dual-carrier NetStream Diplo on a standard NetStream Primo/Diplo ODU antenna.

NetStream Diplo is equipped with two antenna ports, which mandates the use of the following MCMDs for direct mount connections. The specific MCMDs depend on the configuration.

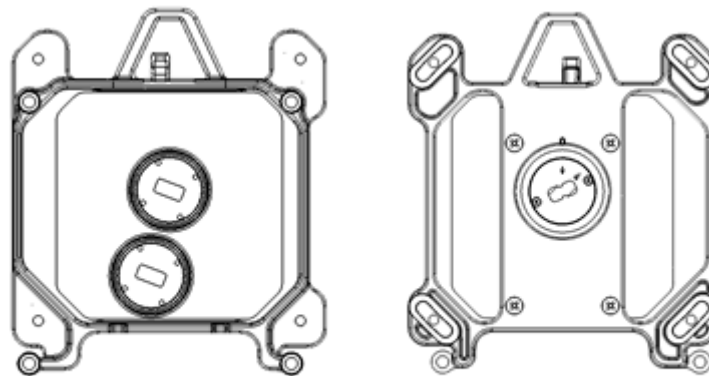
The following describes some of the available MCMDs. For a full list of components, refer to *System Components* on page 12.



MCMDs must be connected to the NetStream Diplo using a Grounding Jumper. See *Grounding for MultiCore Mediation Devices* on page 23.

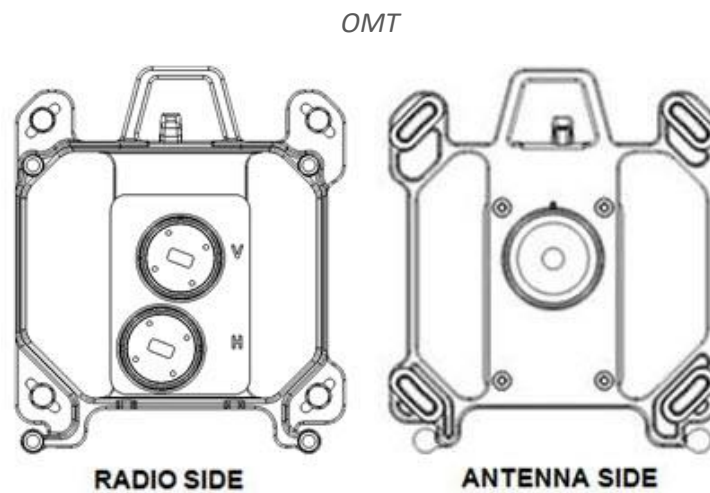
| MCMD type | Functionality |
|-----------|--|
| Splitter | Combines the two carriers using the same polarization |
| OMT | Combines the two carriers on alternate polarizations (H,V) |

Splitter



RADIO SIDE

ANTENNA SIDE

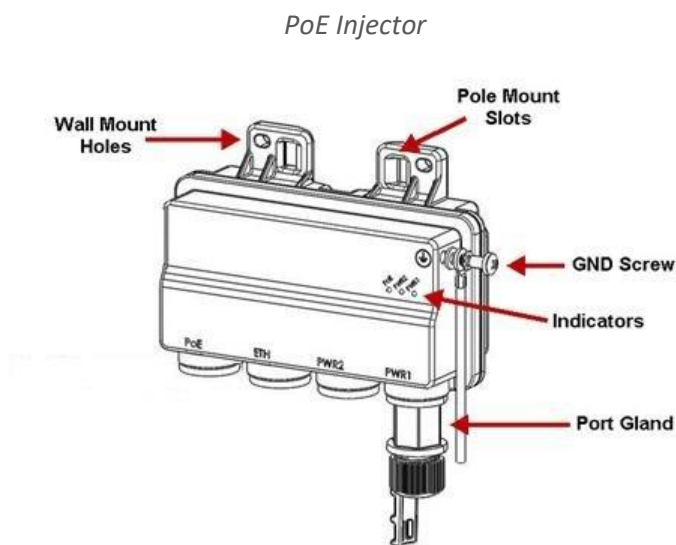


2.3. PoE Injector

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



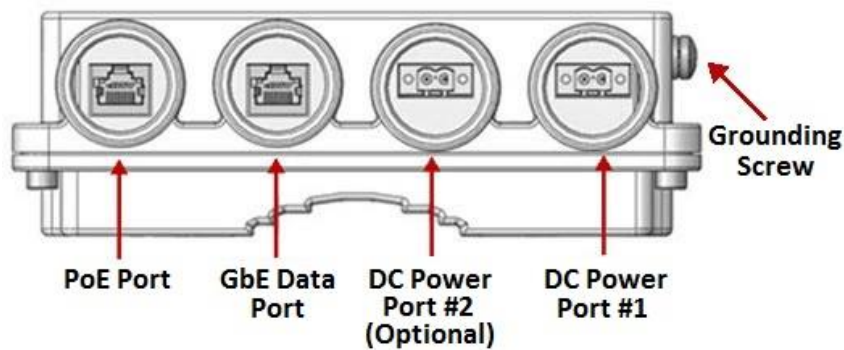
Two models of the PoE Injector are available:

- **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 $\pm(40-60)V$.

2.3.1. 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



2.4. System Components

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



The availability of the installation components follows the NetStream Diplo frequency rollout as stated in the published roadmap. The presence of a specific component in this manual does not indicate that it is available for ordering. Please consult with your respective pre-sales engineer for specific component availability.

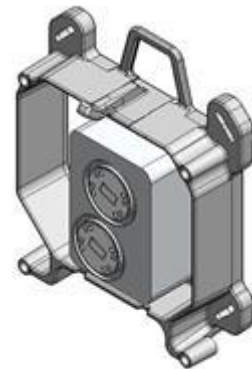
NetStream Diplo



Dual Core Coupler/Splitter



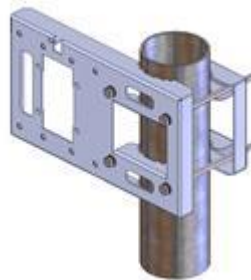
DC OMT



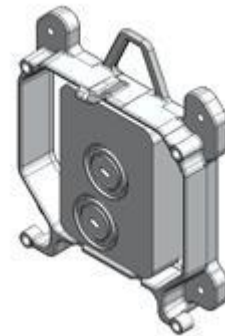
Remote Pole Mount



Remote Dual Pole Mount



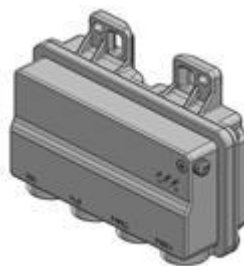
DC Splitter



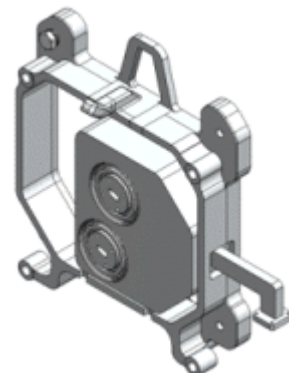
Adaptor for 6-13 GHz



PoE Injector



Dual Core Mediation Device



2.5. Adaptors and Installation Kits

6 GHz – 18 GHz

| Description | 6 GHz | 7-8 GHz | 10-11 GHz | 13 GHz | 15 GHz | 18 GHz |
|---|-------------------------------------|---------------------------------------|---|--------------------------------------|--------------------------------------|--------------------------------------|
| NetStream Diplo DUAL COUPLER KIT | NetStream Diplo_DUAL_CPLR_kit_6G | NetStream Diplo_DUAL_CPLR_kit_7-8G | NetStream Diplo_DUAL_CPLR_kit_10-11G | NetStream Diplo_DUAL_CPLR_kit_13G | NetStream Diplo_DUAL_CPLR_kit_15G | NetStream Diplo_DUAL_CPLR_kit_18G |
| NetStream Diplo DUAL SPLITTER KIT | NetStream Diplo_DUAL_SPLTR_kit_6G | NetStream Diplo_DUAL_SPLTR_kit_7-8G | NetStream Diplo_DUAL_SPLTR_kit_10-11G | NetStream Diplo_DUAL_SPLTR_kit_13G | NetStream Diplo_DUAL_SPLTR_kit_15G | NetStream Diplo_DUAL_SPLTR_kit_18G |
| NetStream Diplo SPLITTER KIT | NetStream Diplo_SPLT_kit_6G | NetStream Diplo_SPLT_kit_7-8G | NetStream Diplo_SPLT_kit_10-11G | NetStream Diplo_SPLT_kit_13G | NetStream Diplo_SPLT_kit_15G | NetStream Diplo_SPLT_kit_18G |
| NetStream Diplo OMT KIT | NetStream Diplo_OMT_kit_6G | NetStream Diplo_OMT_kit_7-8G | NetStream Diplo_OMT_kit_10-11G | NetStream Diplo_OMT_kit_13G | NetStream Diplo_OMT_kit_15G | NetStream Diplo_OMT_kit_18G |
| NetStream Diplo DUAL CORE KIT | NetStream Diplo_DUAL_CORE_MD_kit_6G | NetStream Diplo_DUAL_CORE_MD_kit_7_8G | NetStream Diplo_DUAL_CORE_MD_kit_10-11G | NetStream Diplo_DUAL_CORE_MD_kit_13G | NetStream Diplo_DUAL_CORE_MD_kit_15G | NetStream Diplo_DUAL_CORE_MD_kit_18G |
| NetStream Diplo DC ADAPTOR REMOTE MOUNT KIT | NetStream Diplo_6G_Rmt_Mnt_adpt | NetStream Diplo_7-8G_Rmt_Mnt_adpt | NetStream Diplo_10-11G_Rmt_Mnt_adpt | NetStream Diplo_13G_Rmt_Mnt_adpt | | |
| NetStream Diplo DC REMOTE MOUNT OMT ADAPTOR KIT | NetStream Diplo_RM_OMT_6G_adpt | NetStream Diplo_RM_OMT_7_8G_adpt | NetStream Diplo_RM_OMT_10-11G_adpt | | | |

23 GHz – 38 GHz

| Description | 23 GHz | 26 GHz | 28-31 GHz | 32 GHz | 38 GHz |
|-----------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| NetStream Diplo DUAL COUPLER KIT | NetStream Diplo_DUAL_CPLR_kit_23G | NetStream Diplo_DUAL_CPLR_kit_26G | NetStream Diplo_DUAL_CPLR_kit_28G | NetStream Diplo_DUAL_CPLR_kit_32G | NetStream Diplo_DUAL_CPLR_kit_38G |
| NetStream Diplo DUAL SPLITTER KIT | NetStream Diplo_DUAL_SPLTR_kit_23G | NetStream Diplo_DUAL_SPLTR_kit_26G | NetStream Diplo_DUAL_SPLTR_kit_28G | NetStream Diplo_DUAL_SPLTR_kit_32G | NetStream Diplo_DUAL_SPLTR_kit_38G |
| NetStream Diplo SPLITTER KIT | NetStream Diplo_SPLT_kit_23G | NetStream Diplo_SPLT_kit_26G | NetStream Diplo_SPLT_kit_28G | NetStream Diplo_SPLT_kit_32G | NetStream Diplo_SPLT_kit_38G |
| NetStream Diplo OMT KIT | NetStream Diplo_OMT_kit_23G | NetStream Diplo_OMT_kit_26G | NetStream Diplo_OMT_kit_28G | NetStream Diplo_OMT_kit_32G | NetStream Diplo_OMT_kit_38G |
| NetStream Diplo DUAL CORE KIT | NetStream Diplo_DUAL_CORE_MD_kit_23G | NetStream Diplo_DUAL_CORE_MD_kit_26G | NetStream Diplo_DUAL_CORE_MD_kit_28G | NetStream Diplo_DUAL_CORE_MD_kit_32G | NetStream Diplo_DUAL_CORE_MD_kit_38G |

Remote Mount - 6 GHz – 15 GHz

| Remote Mount | 6GHz | 7-8GHz | 10-11GHz | 13GHz | 15GHz |
|---|-------------------------------------|-----------------------|-------------------------|----------------------|----------------------|
| NetStream Primo/Diplo ODU REMOTE MOUNT KIT | NetStream Primo/Diplo ODU-PoleMount | | | | |
| NetStream Diplo DC REMOTE MOUNT KIT | NetStream Diplo-Pole-Mount | | | | |
| NetStream Primo/Diplo ODU ADAPTOR REMOTE MOUNT KIT | ODU-C6-RM_ADAPT | ODU-C7_8-RM_ADAPT | ODU-C10_11-RM_ADAPT | ODU-C13-RM_ADAPT | |
| NetStream Primo/Diplo 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 |
| NetStream Primo/Diplo ODU ADAPTOR TO FLEX WG (IMPERIAL) KIT | ADPT_ODU-C6-RM_mill | ADPT_ODU-C7_8-RM_mill | ADPT_ODU-C10_11-RM_mill | ADPT_ODU-C13-RM_mill | ADPT_ODU-C15-RM_mill |

Remote Mount - 18 GHz – 42 GHz

| Remote Mount | 18GHz | 23GHz | 26GHz | 28-31GHz | 32GHz | 38GHz | 42GHz |
|---|-------------------------------------|-------|-------|-------------------------|-------|-------|---------------|
| ODU-C REMOTE MOUNT KIT | NetStream Primo/Diplo ODU-PoleMount | | | | | | |
| NetStream Diplo DC REMOTE MOUNT KIT | NetStream Diplo-Pole-Mount | | | | | | |
| NetStream Primo/Diplo ODU ADAPTOR REMOTE MOUNT KIT | | | | | | | |
| NetStream Primo/Diplo ODU WG Kit | Flx-WG-3FT-18-26 | | | Flx-WG-3FT-28-38 | | | Flx-WG-3FT-42 |
| NetStream Primo/Diplo ODU ADAPTOR TO FLEX WG (IMPERIAL) KIT | ADPT_ODU-C18_26-RM_mill | | | ADPT_ODU-C28_38-RM_mill | | | |

1500P Adaptors - 6GHz – 23 GHz

| 1500P Adaptors | 6GHz | 7-8GHz | 10-11GHz | 13GHz | 15GHz | 18GHz | 23GHz |
|---|------|--------|--------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| NetStream Primo/Diplo ODU-PHOSPHORUS DM ADAPTOR KIT | | | ADPT_ODU-C10_11-DM_1500P | ADPT_ODU-C13-DM_1500P | ADPT_ODU-C15-DM_1500P | ADPT_ODU-C18-DM_1500P | ADPT_ODU-C23-DM_1500P |

1500P Adaptors - 26GHz – 42GHz

| 1500P Adaptors | 26GHz | 28-31GHz | 32GHz | 38GHz | 42GHz |
|---------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-------|
| ODU-C-PHOSPHORUS DM ADAPTOR KIT | ADPT_ODU-C26-DM_1500P | ADPT_ODU-C28-DM_1500P | ADPT_ODU-C32-DM_1500P | ADPT_ODU-C38-DM_1500P | NA |

Imperial to mm Transitions – 6GHz – 15GHz

| Imperial to mm Transitions | 6GHz | 7-8GHz | 10-11GHz | 13GHz | 15GHz |
|------------------------------------|---------------------|-----------------------|-------------------------|----------------------|----------------------|
| ODU-C ADAPTOR KIT TO IMPERIAL ANT. | ADPT_ODU-C6-RM_Imp | ADPT_ODU-C7_8-RM_Imp | ADPT_ODU-C10_11-RM_Imp | ADPT_ODU-C13-RM_Imp | ADPT_ODU-C15-RM_Imp |
| ODU-C ADAPTOR KIT TO IMP WG | ADPT_ODU-C6-RM_mill | ADPT_ODU-C7_8-RM_mill | ADPT_ODU-C10_11-RM_mill | ADPT_ODU-C13-RM_mill | ADPT_ODU-C15-RM_mill |

Imperial to mm Transitions – 18GHz – 42GHz

| Imperial to mm Transitions | 18GHz | 23GHz | 26GHz | 28-31GHz | 32GHz | 38GHz | 42GHz |
|------------------------------------|-------------------------|-------|-------|-------------------------|-------|-------|-------|
| ODU-C ADAPTOR KIT TO IMPERIAL ANT. | ADPT_ODU-C18_26-RM_Imp | | | ADPT_ODU-C28_38-RM_Imp | | NA | |
| ODU-C ADAPTOR KIT TO IMP WG | ADPT_ODU-C18_26-RM_mill | | | ADPT_ODU-C28_38-RM_mill | | NA | |

Antenna Circ. Adapters for OMT – 6GHz – 18GHz



Note

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.

| Antenna Circ. Adapters for OMT | 6GHz | 7-8GHz | 10-11GHz | 13GHz | 15GHz | 18GHz |
|--------------------------------|--|--------------------------|----------------------------|-------------------------|-------------------------|-------------------------|
| Andrew | ODU-C6-OMT-INT-A | ODU-C7_8-OMT-INT-A | ODU-C10_11-OMT-INT-A | ODU-C13-OMT-INT-A | ODU-C15-OMT-INT-A | ODU-C18-OMT-INT-A |
| RFS 1-6FT | ODU-C6-OMT-INT-1_6FT-R | ODU-C7_8-OMT-INT-1_6FT-R | ODU-C10_11-OMT-INT-1_6FT-R | ODU-C13-OMT-INT-1_6FT-R | ODU-C15-OMT-INT-1_6FT-R | ODU-C18-OMT-INT-1_6FT-R |
| Radio Waves | ODU-C6L-OMT-INT-RW /ODU-C6H-OMT-INT-RW | ODU-C7_8-OMT-INT-RW | ODU-C10_11-OMT-INT-RW | ODU-C13-OMT-INT-RW | ODU-C15-OMT-INT-RW | ODU-C18-OMT-INT-RW |
| Shenglu | | ODU-C7_8-OMT-INT-SH | ODU-C10_11-OMT-INT-SH | ODU-C13-OMT-INT-SH | ODU-C15-OMT-INT-SH | ODU-C18-OMT-INT-SH |
| LEAX | ODU-C6-OMT-INT-CR1 | ODU-C7_8-OMT-INT-CR1 | ODU-C10_11-OMT-INT-CR1 | ODU-C13-OMT-INT-CR1 | ODU-C15-OMT-INT-CR1 | ODU-C18-OMT-INT-CR1 |
| Xian Putian | ODU-C6-OMT-INT-CR | ODU-C7_8-OMT-INT-CR | ODU-C10_11-OMT-INT-CR | ODU-C13-OMT-INT-CR | ODU-C15-OMT-INT-CR | ODU-C18-OMT-INT-CR |
| Xian Putian (OEM branding) | ODU-C6-OMT-INT-X | ODU-C7_8-OMT-INT-X | ODU-C10_11-OMT-INT-X | ODU-C13-OMT-INT-X | ODU-C15-OMT-INT-X | ODU-C18-OMT-INT-X |

Antenna Circ. Adapters for OMT – 23GHz – 42GHz



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.

| Antenna Circ. Adapters for OMT | 23GHz | 26GHz | 28GHz | 32GHz | 38GHz | 42GHz |
|--------------------------------|-------------------------|-------------------------|--------------------|-------------------------|-------------------------|-------------------|
| Andrew | ODU-C23-OMT-INT-A | ODU-C26-OMT-INT-A | ODU-C28-OMT-INT-A | ODU-C32-OMT-INT-A | ODU-C38-OMT-INT-A | ODU-C42-OMT-INT-A |
| RFS 1-6FT | ODU-C23-OMT-INT-1_6FT-R | ODU-C26-OMT-INT-1_6FT-R | | ODU-C32-OMT-INT-1_6FT-R | ODU-C38-OMT-INT-1_6FT-R | NA |
| Radio Waves | ODU-C23-OMT-INT-RW | ODU-C26-OMT-INT-RW | ODU-C28-OMT-INT-RW | NA | ODU-C38-OMT-INT-RW | NA |

| | | | | | | |
|----------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Shenglu | ODU-C23-OMT-INT-SH | ODU-C26-OMT-INT-SH | | | | |
| ODU-C23-OMT-INT-CR1 | ODU-C26-OMT-INT-CR1 | ODU-C28-OMT-INT-CR1 | ODU-C32-OMT-INT-CR1 | ODU-C38-OMT-INT-CR1 | ODU-C42-OMT-INT-CR1 | ODU-C23-OMT-INT-CR1 |
| Xian Putian | ODU-C23-OMT-INT-CR | ODU-C26-OMT-INT-CR | ODU-C28-OMT-INT-CR | ODU-C32-OMT-INT-CR | ODU-C38-OMT-INT-CR | NA |
| Xian Putian (OEM branding) | ODU-C23-OMT-INT-X | ODU-C26-OMT-INT-X | ODU-C28-OMT-INT-X | ODU-C32-OMT-INT-X | ODU-C38-OMT-INT-X | NA |

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 |

2.6. Antenna Connection

NetStream Diplo 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 Diplo to the antenna interface.

2.7. Power Specifications

2.7.1. 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.

2.7.2. 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.

2.8. 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 Diplo unit and the PoE Injector.

3.2. Cable Grounding

Cables must be grounded as follows:

- For optical (SFP) cables (see *Connecting an Optical Fiber Cable and SFP* on page 37), no grounding is required.
- For Ethernet cables, the cable should be grounded to the antenna tower every 50m, using the kit CAT5E_gnd_kit.



3.2.1. Grounding Procedure

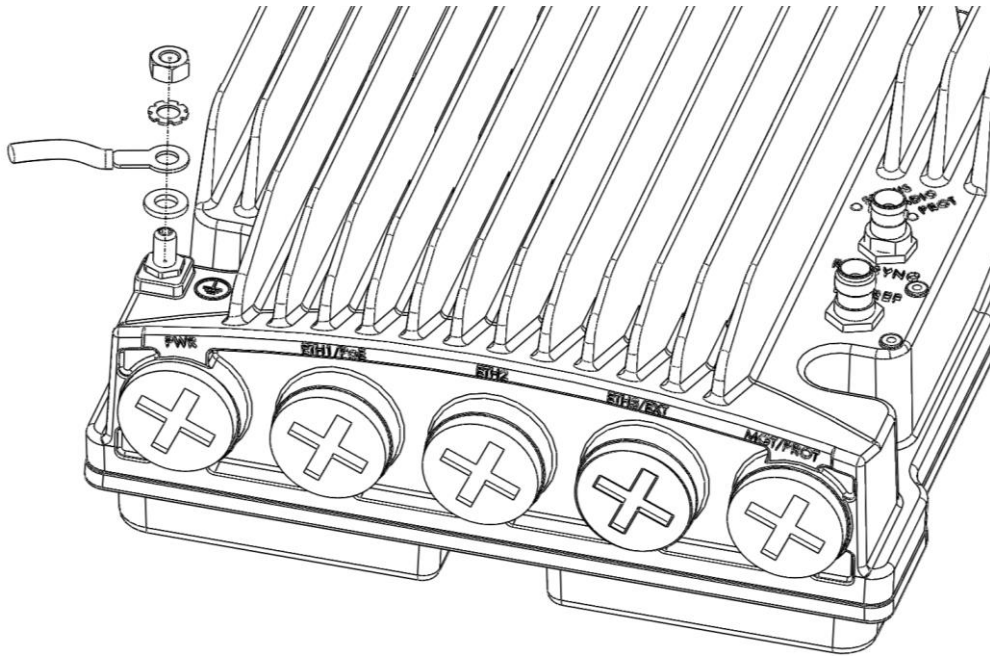
Required Tools

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

Procedure

- 1 On the front of each NetStream Diplo 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 Diplo 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.

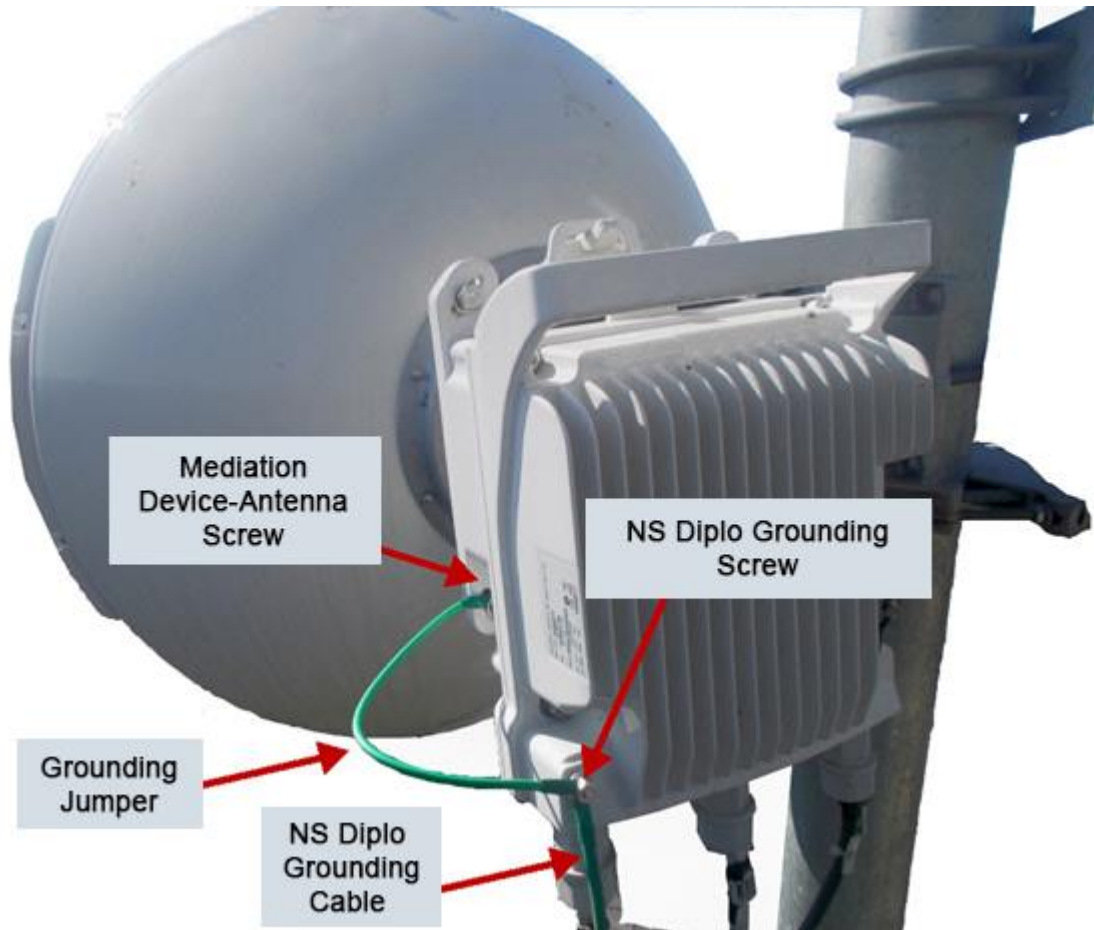
3.2.2. Grounding for MultiCore Mediation Devices

MultiCore Mediation Devices (MCMDs) must be connected to the NetStream Diplo using a Grounding Jumper, to ensure proper grounding of the MCMD. To connect the Grounding Jumper:

- 1 When you secure the MCMD to the antenna, connect one end of the Grounding Jumper to the lower left screw that connects the MCMD to the antenna.

Cable Installation and Grounding

- When you perform the NetStream Diplo grounding procedure described in section 3.2.1, connect the other end of the Grounding Jumper to the NetStream Diplo grounding screw, along with the NetStream Diplo grounding cable. The order in which you place the two cables is not important.



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 Diplo power supply.

Any other connection may cause damage to the system!



Note

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

3.4. Surge Protection

NetStream Diplo includes built-in surge protection for its Ethernet and power interfaces. NetStream Diplo's surge protection implementation complies with the standards set forth in the *Surge Protection* Requirements section of the NetStream Diplo Technical Description, provided the Ethernet cables were prepared according to the instructions in *Connecting the Ethernet Cable* on page 44.

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 Diplo unit.

3.5. Available Cable Options

3.5.1. Fiber Optic Cables - Single Mode

| Marketing P/N | Description |
|--|--|
| NS DIPLO/PRIMO_FO_SM_LC2LC_ARM_7m | CABLE,FO,DUAL LC/LC,7M,SM,55mm OPEN END,M28 GLAND,ARMORED,OU |
| NS DIPLO/PRIMO_FO_SM_LC2LC_ARM_15m | CABLE,FO,DUAL LC/LC,15M,SM,55mm OPEN END,M28 GLAND,ARMORED,O |
| NS DIPLO/PRIMO_FO_SM_LC2LC_ARM_30m | CABLE,FO,DUAL LC/LC,30M,SM,55mm OPEN END,M28 GLAND,ARMORED,O |
| NS DIPLO/PRIMO_FO_SM_LC2LC_ARM_50m | CABLE,FO,DUAL LC/LC,50M,SM,55mm OPEN END,M28 GLAND,ARMORED,O |
| NS DIPLO/PRIMO_FO_SM_LC2LC_ARM_70m | CABLE,FO,DUAL LC/LC,70M,SM,55mm OPEN END,M28 GLAND,ARMORED,O |
| NS DIPLO/PRIMO_FO_SM_LC2LC_ARM_80m | CABLE,FO,DUAL LC/LC,80M,SM,55mm OPEN END,M28 GLAND,ARMORED,O |
| NS DIPLO/PRIMO_FO_SM_LC2LC_ARM_100m | CABLE,FO,DUAL LC/LC,100M,SM,55mm OPEN END,M28 GLAND,ARMORED |
| NS DIPLO/PRIMO_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 DIPLO/PRIMO_FO_MM_LC2LC_ARM_7m | CABLE,FO,DUAL LC/LC,7M,MM,55mm OPEN END,M28 GLAND,ARMORED,OU |
| NS DIPLO/PRIMO_FO_MM_LC2LC_ARM_15m | CABLE,FO,DUAL LC/LC,15M,MM,55mm OPEN END,M28 GLAND,ARMORED,O |

Cable Installation and Grounding

| | |
|--|--|
| NS DIPLO/PRIMO_FO_MM_LC2LC_ARM_20m | CABLE,FO,DUAL LC/LC,20M,MM,55mm OPEN END,M28 GLAND,ARMORED |
| NS DIPLO/PRIMO_FO_MM_LC2LC_ARM_30m | CABLE,FO,DUAL LC/LC,30M,MM,55mm OPEN END,M28 GLAND,ARMORED,O |
| NS DIPLO/PRIMO_FO_MM_LC2LC_ARM_50m | CABLE,FO,DUAL LC/LC,50M,MM,55mm OPEN END,M28 GLAND,ARMORED,O |
| NS DIPLO/PRIMO_FO_MM_LC2LC_ARM_80m | CABLE,FO,DUAL LC/LC,80M,MM,55mm OPEN END,M28 GLAND,ARMORED,O |
| NS DIPLO/PRIMO_FO_MM_LC2LC_ARM_100m | CABLE,FO,DUAL LC/LC,100M,MM,55mm OPEN END,M28 GLAND,ARMORED |
| NS DIPLO/PRIMO_FO_MM_LC2LC_ARM_150m | CABLE,FO,DUAL LC/LC,150M,MM,55mm OPEN END,M28 GLAND,ARMORED |
| NS DIPLO/PRIMO_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

| Marketing P/N | Description |
|-----------------------------|--|
| Outdoor_DC_cbl_2x18AWG_drum | CABLE,305M,OUTDOOR_DC_CBL_2X18AWG_DRUM |
| NetStream Diplo_DC_Conn | NetStream Diplo_DC_Conn |

3.5.4. Cables for MIMO Connections

| Marketing P/N | Description |
|--------------------------------------|---|
| DATA_SHRNG_KIT_5m | CABLE,SFP,4x4MIMO_DATA_SHARING_KIT_5M |
| DATA_SHRNG_KIT_10m | CABLE,SFP,4x4MIMO_DATA_SHARING_KIT_10M |
| DATA_SHRNG_KIT_20m | CABLE,SFP,4x4MIMO_DATA_SHARING_KIT_20M |
| DATA_SHRNG_KIT_30m | CABLE,SFP,4x4MIMO_DATA_SHARING_KIT_30M |
| SOURCE_SHARING_5M | Source_Sharing_5m |
| SOURCE_SHARING_10M | Source_Sharing_10m |
| SOURCE_SHARING_20M | Source_Sharing_20m |
| SOURCE_SHARING_30M | Source_Sharing_30m |
| NS DIPLO/PRIMO_MIMO_Prot_mng_cbl_5m | NetStream Diplo MIMO or Prot management cable 5m |
| NS DIPLO/PRIMO_MIMO_Prot_mng_cbl_10m | NetStream Diplo MIMO or Prot management cable 10m |
| NS DIPLO/PRIMO_MIMO_Prot_mng_cbl_20m | NetStream Diplo MIMO or Prot management cable 20m |
| NS DIPLO/PRIMO_MIMO_Prot_mng_cbl_30m | NetStream Diplo MIMO or Prot management cable 30m |
| NS DIPLO/PRIMO_MIMO_Prot_mng_spltr | NetStream Diplo MIMO or Prot management odu spltr |

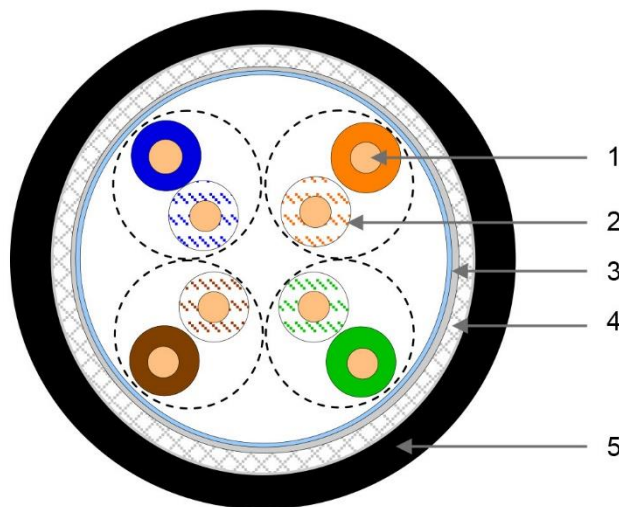
3.5.5. Ethernet Cable and Specifications

| 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
- [5]Jacket

Cable Installation and Grounding

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

Glands Kit

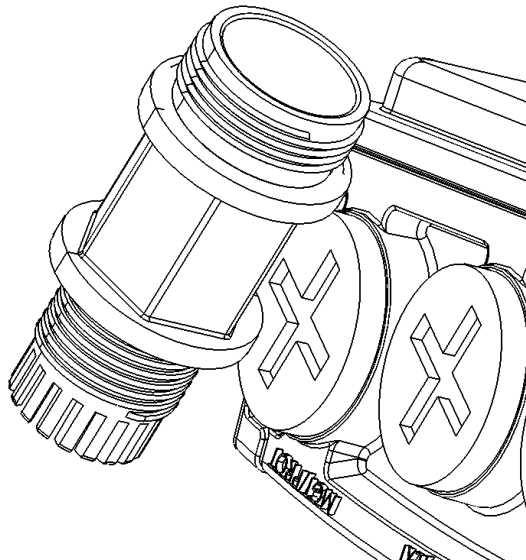
| Marketing Model | Marketing Description |
|---------------------------|------------------------------|
| NS DIPLO/PRIMO_Glands_kit | NS DIPLO/PRIMO_Glands_x5_kit |

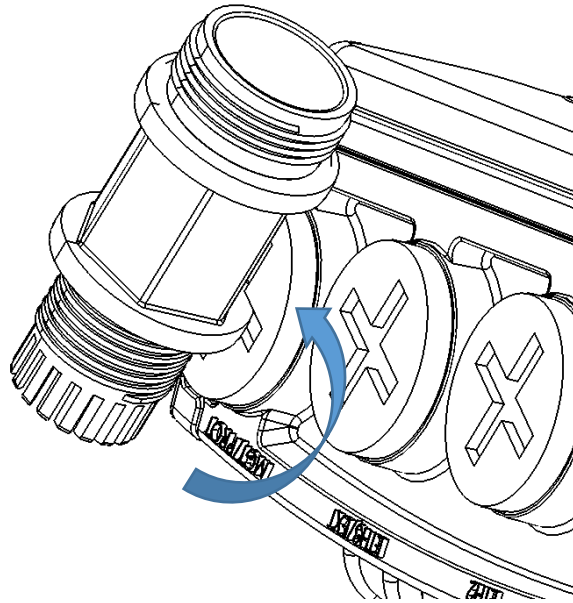
In addition, gland caps can be ordered to protect the cable and connector from damage when elevating the cable and gland to the radio unit. See Step 5 in Section 3.7.1, *General Installation Procedure*. Gland caps are ordered separately, in kits of 10 caps each.

Gland Cap

| Marketing Model | Marketing Description |
|-----------------------|---|
| Cable_Prot_10Caps_kit | Cable protective caps kit 10 pcs, NetStream Diplo/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

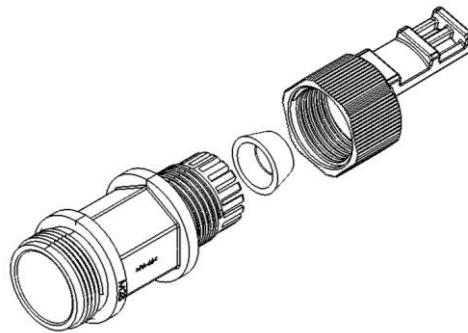




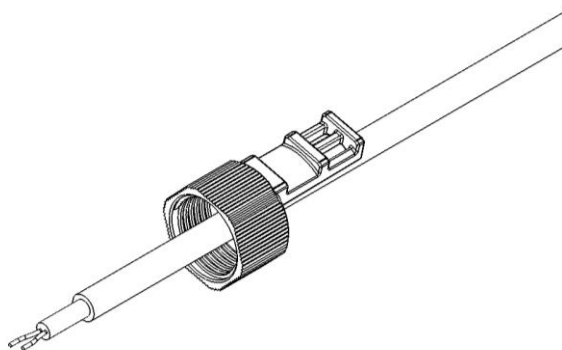
3.7.1. General Installation Procedure

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.

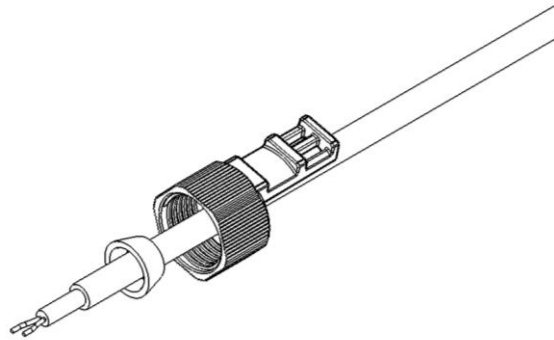


- 2 Slide the gland cap into the cable.

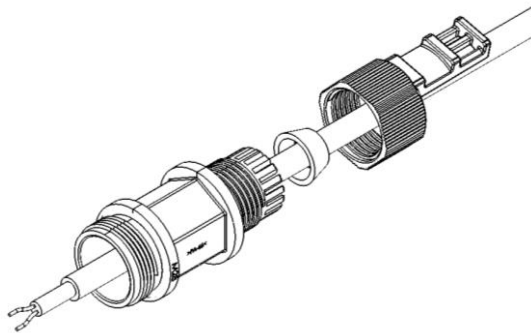


Cable Installation and Grounding

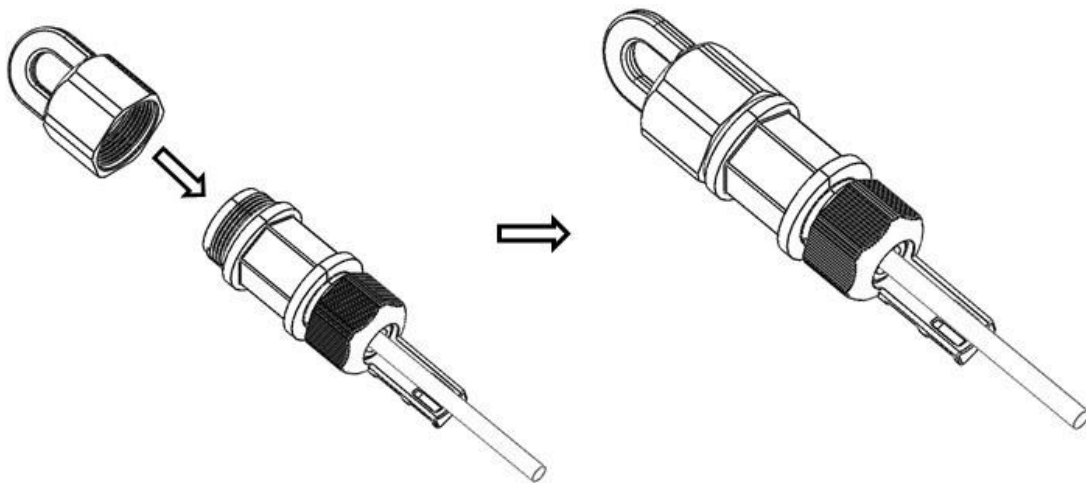
- 3 Slide the gland rubber into the cable.



- 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.

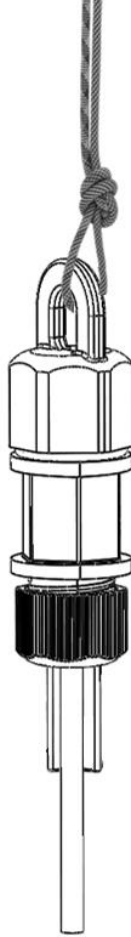


- 5 Optionally, after securing the cable into the body of the gland, you can close the other side of the gland with an M28 gland cap. The gland cap protects the cable and connector from damage when elevating the cable and gland to the radio unit.



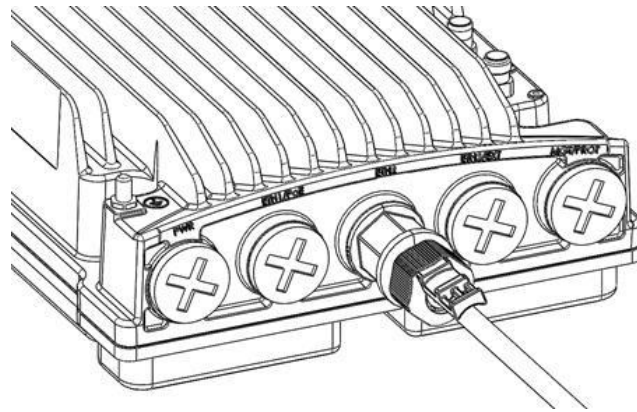
Cable Installation and Grounding

- 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.



- 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.

Cable Installation and Grounding



Note

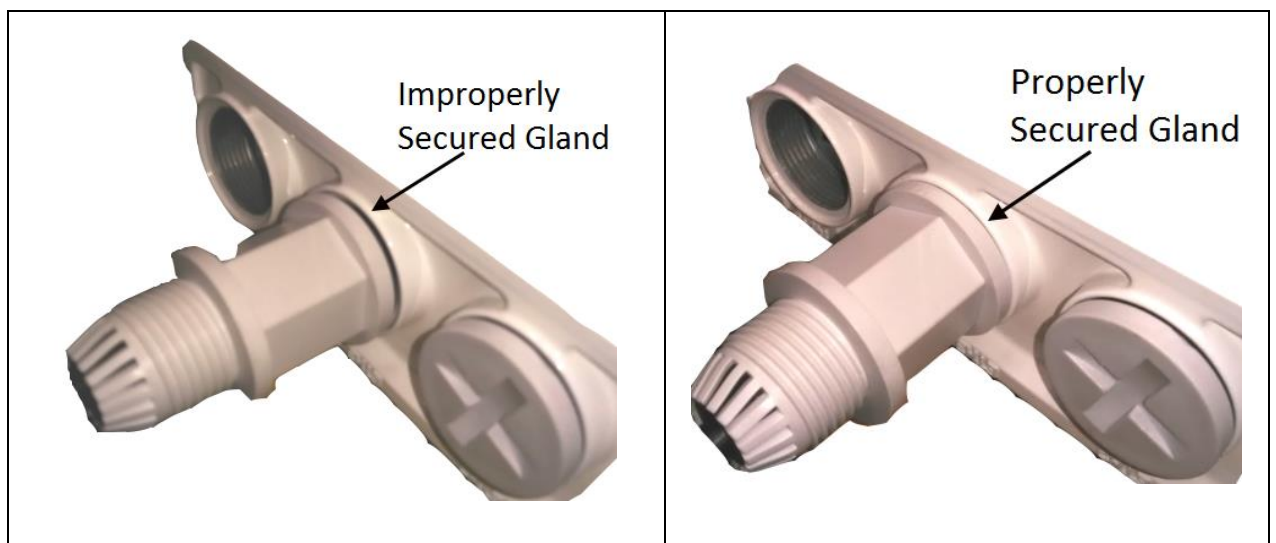
Before tightening the gland, make sure the gland is aligned with the tapped hole in the unit. Tightening the gland at an angle can ruin the thread on the gland and prevent proper sealing of the interface.

- 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

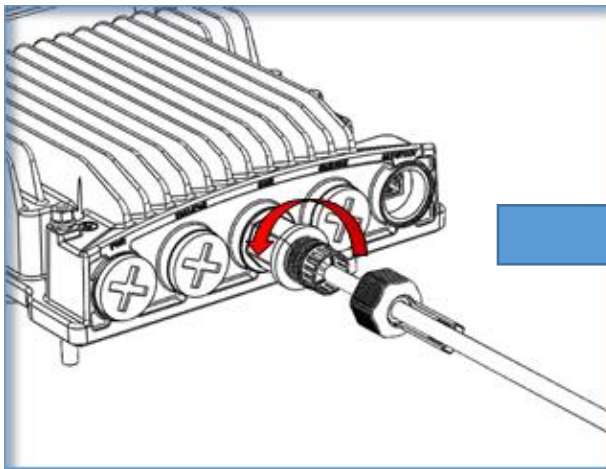
- 11 Tighten the rear portion of the gland onto the main part of the gland and make sure that the main part of the gland does not have an additional swivel after the rear portion is secured.



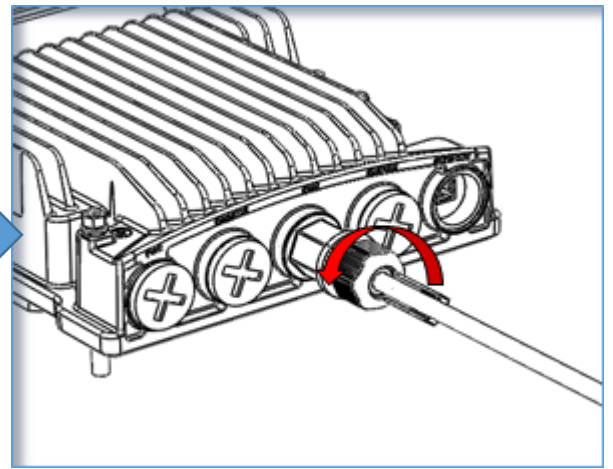
Note

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

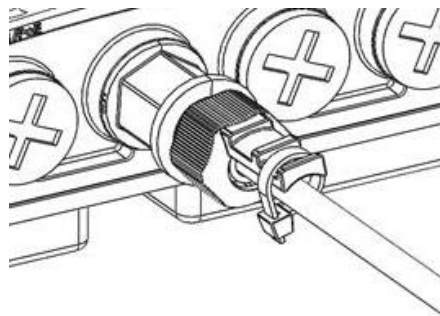
Tightening the Front Portion of the Gland



Tightening the Rear Portion of the Gland



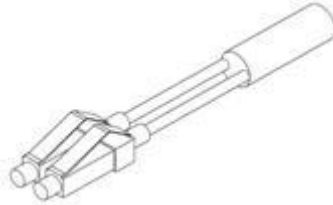
- 12 Secure the cable to the lip of the gland using a tie wrap.



3.8. Connecting an Optical Fiber Cable and SFP

To connect an optical fiber cable and the SFP transceiver:

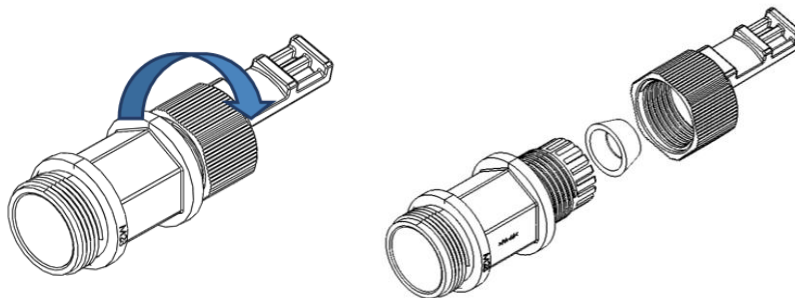
- 1 Use a pre-assembled cable.



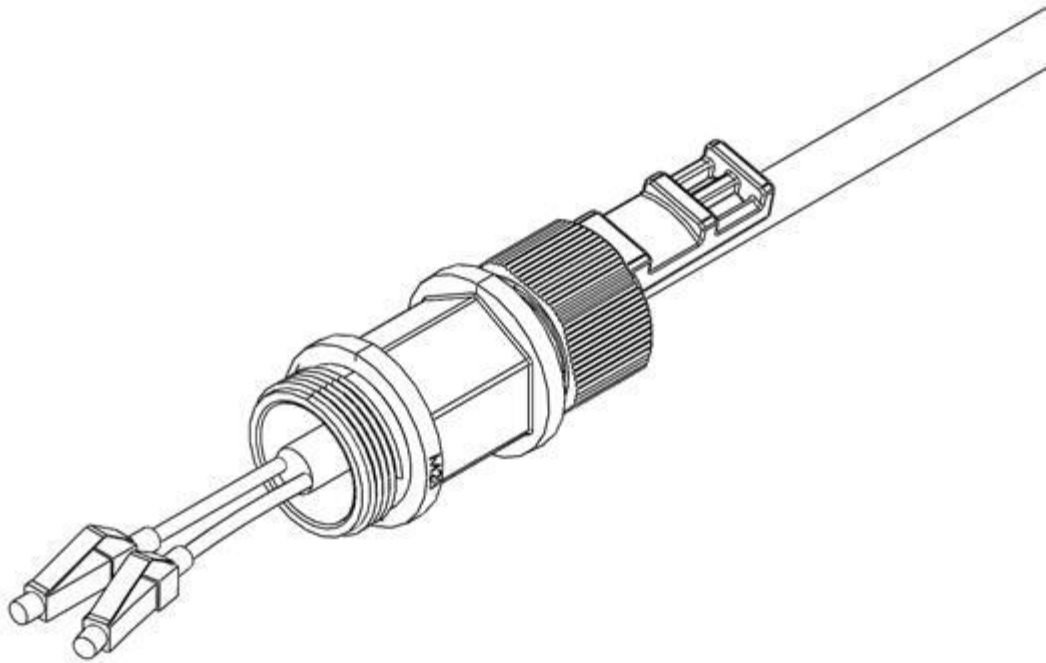
- 2 Split the connector into two separate blue units (one for each wire).



- 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.

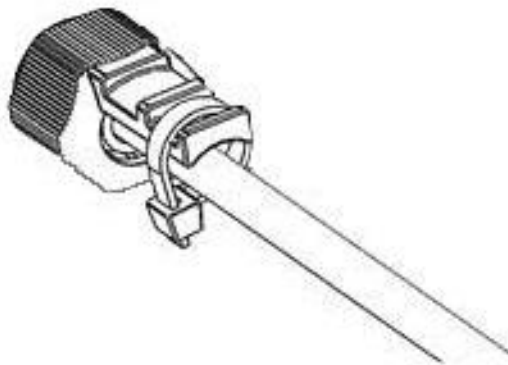


- 7 Secure the cable to the lip of the gland using a tie wrap.

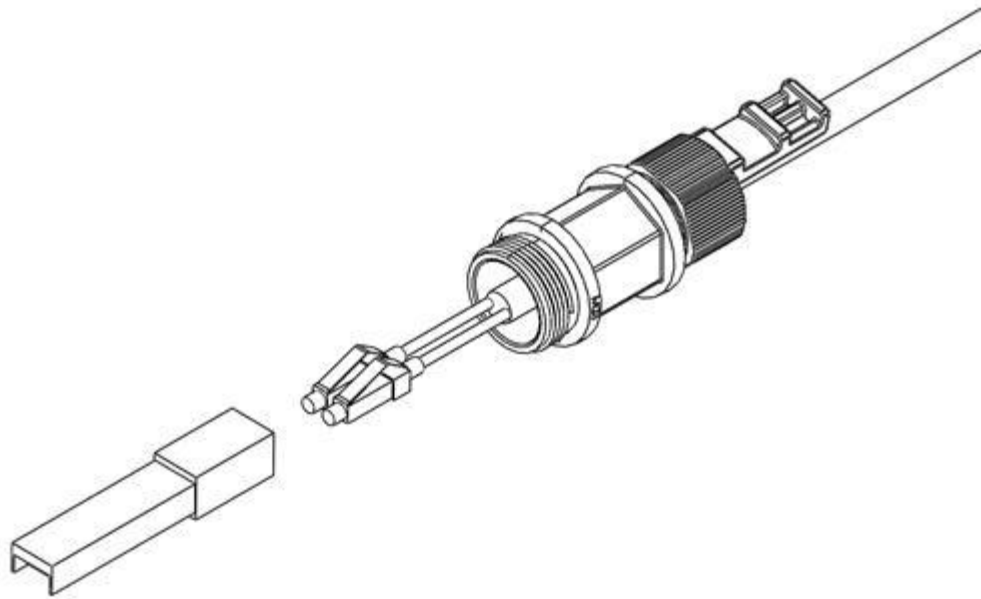


Note

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.



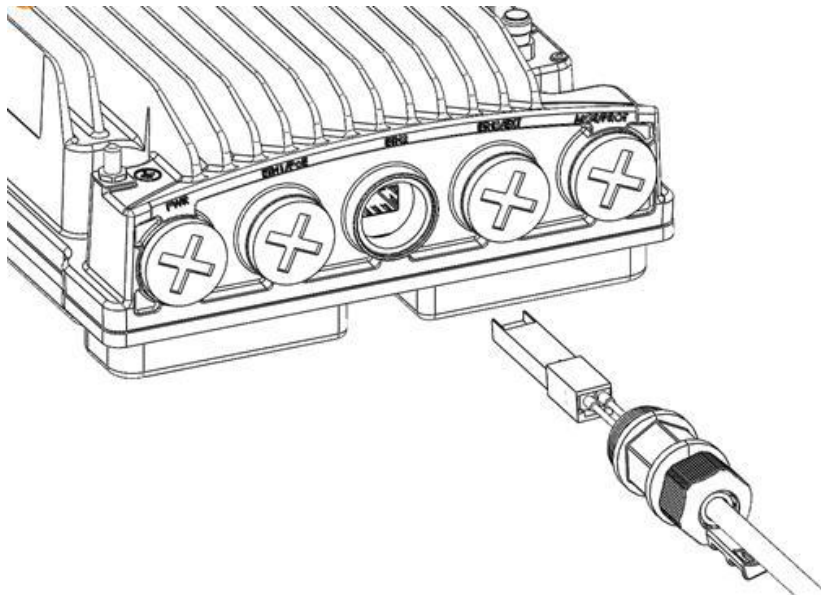
- 9 Remove the tie wrap securing the cable to the gland.



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 Diplo plug connector.



Cable Installation and Grounding

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

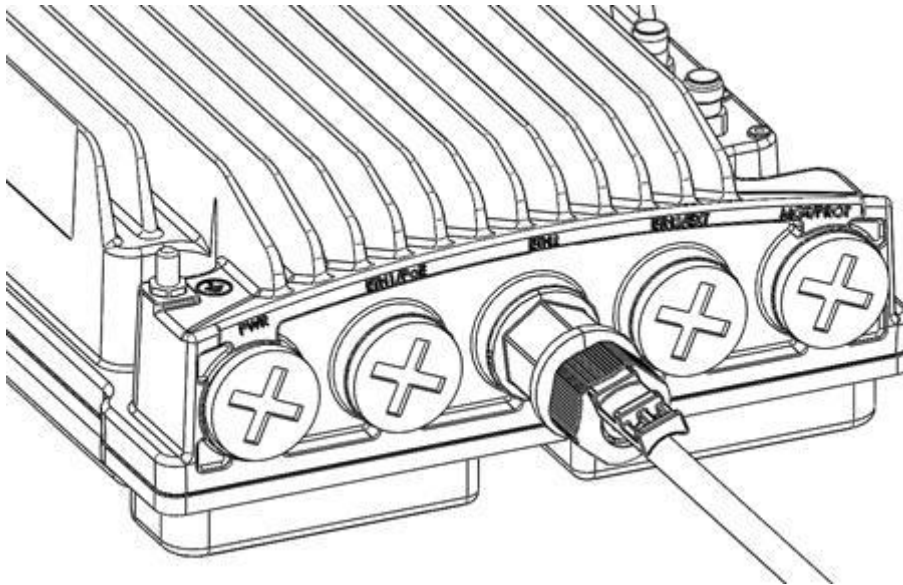


Note

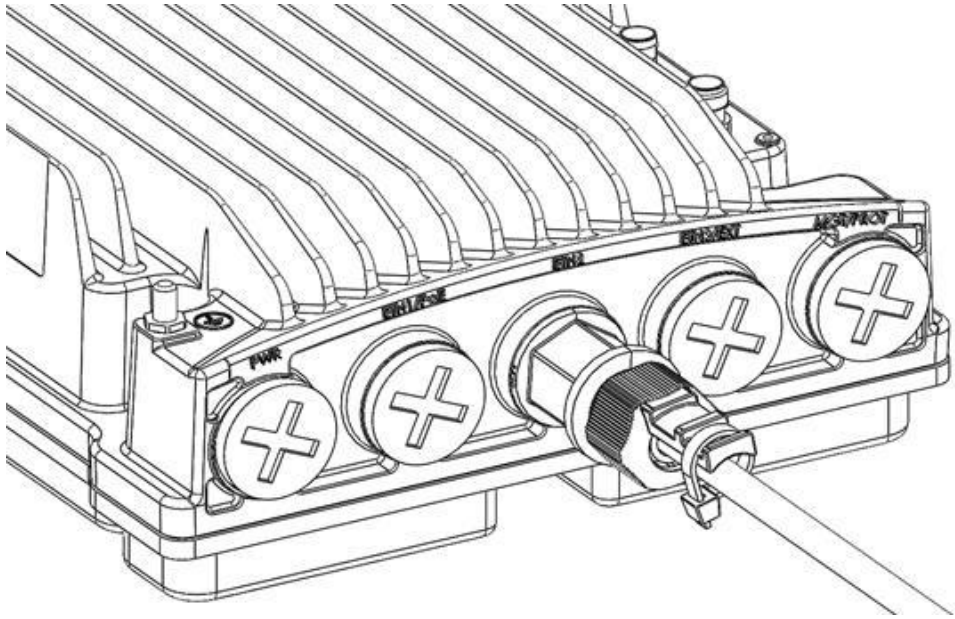
Before tightening the gland, make sure the gland is aligned with the tapped hole in the unit.

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

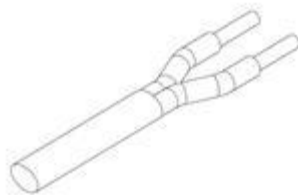


Note

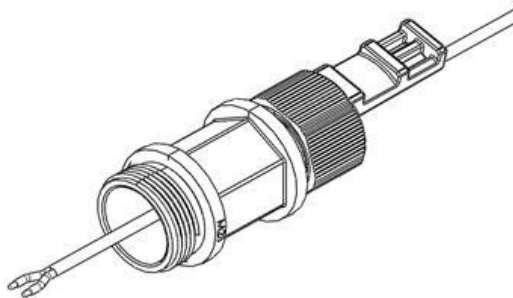
The DC power cable and connector must be ordered separately. See *DC Cable and Connector* on page 26.

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.

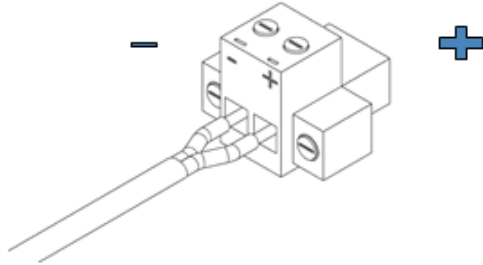


- 3 Insert the power cable into the gland.

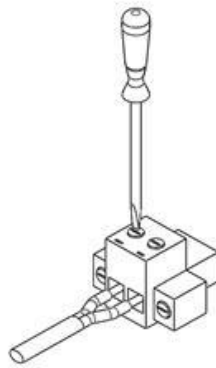


Cable Installation and Grounding

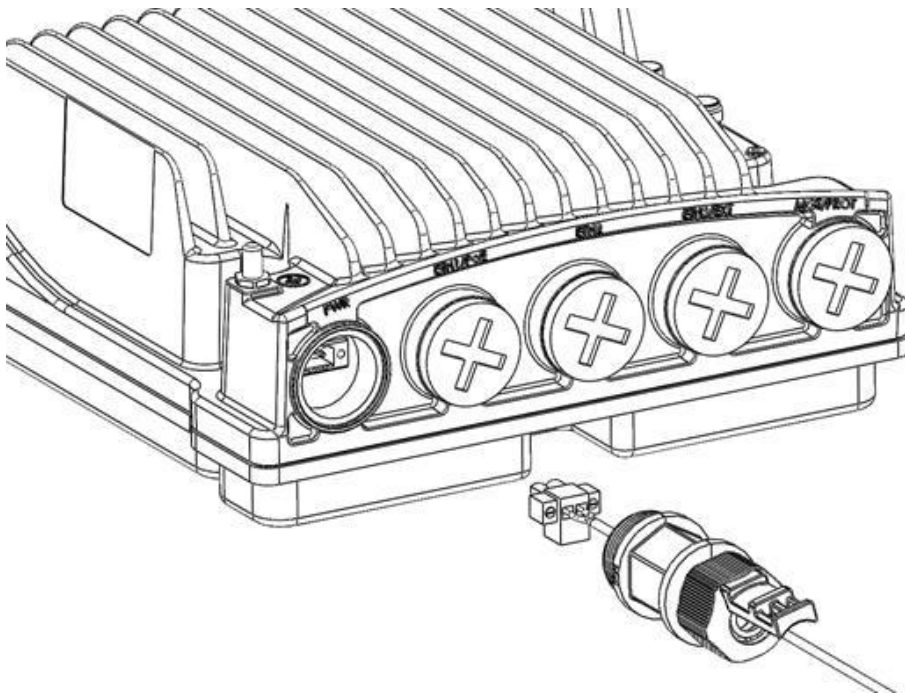
- 4 Insert the power cable wires into the power connector.
- 5 Match “+” and “-” to the red and black cord colors according to the power supply connection cord colors.



- 6 Tighten the two top screws.

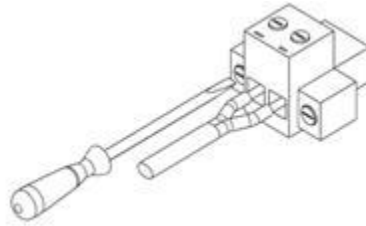


- 7 Plug the power cable with connector into the NetStream Diplo power connector.



Cable Installation and Grounding

- 8 Tighten the two front screws.

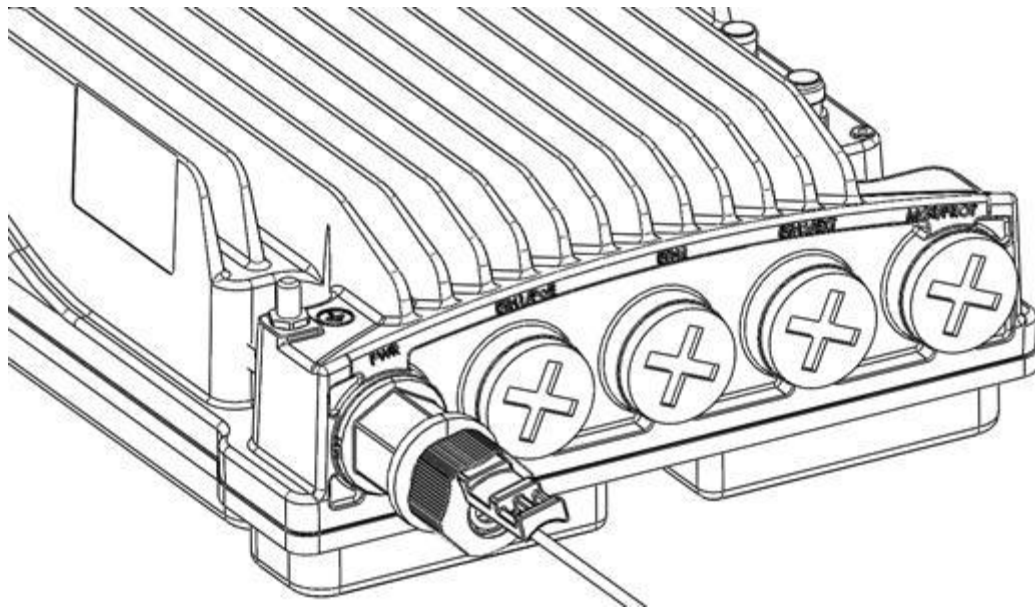


- 9 Screw the gland into the radio unit

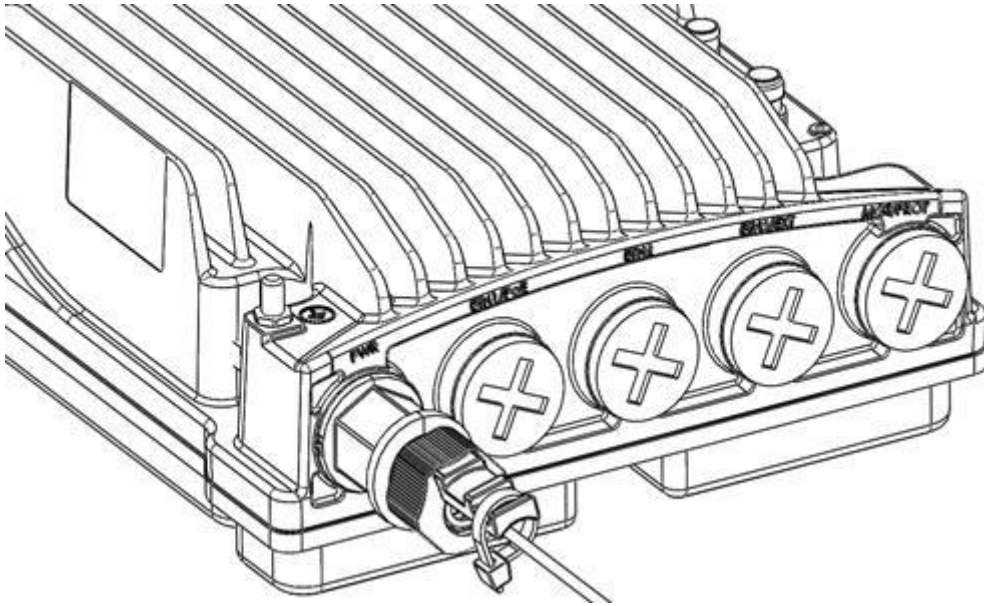


Note

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

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 Diplo*.

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 Diplo*.



Note

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



Note

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



Cable Installation and Grounding

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 32.
- 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.



- 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

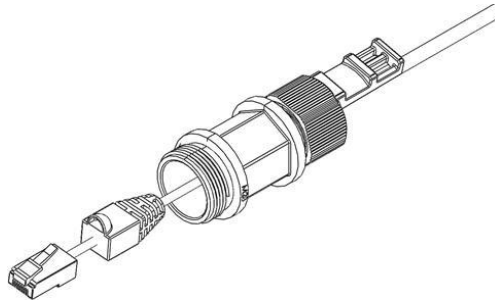
Cord colors should be matched to the same pins on both ends of the cable.

- 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 shield 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 3.5.6, *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.

Cable Installation and Grounding



- 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 shield 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

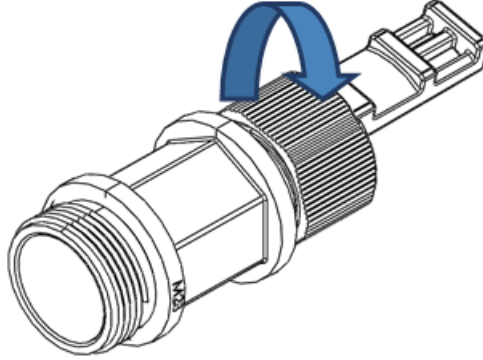
It is recommended that the newly prepared cable be tested with a Cable Analyzer such as the FLUKE DTX-1800 (or the equivalent), to make sure the cable complies with ANSI/TIA/EIA-568-B-2. Make sure to verify both connectivity and grounding continuity at both ends of the cable.

Cable Installation and Grounding

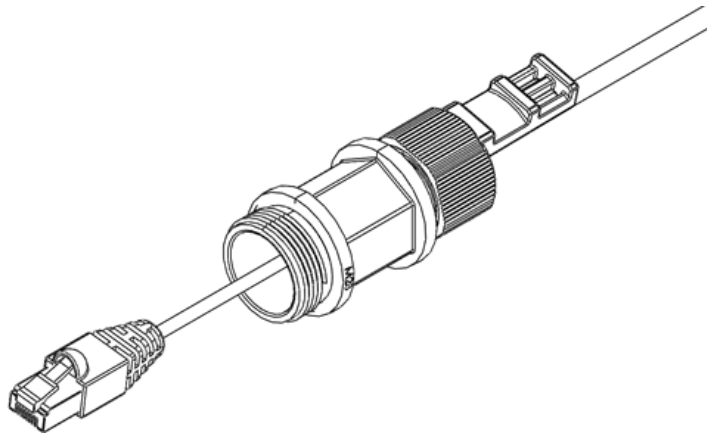
3.10.2. Preparing the Ethernet Cable Already Assembled

To prepare the Ethernet cable already assembled:

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



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



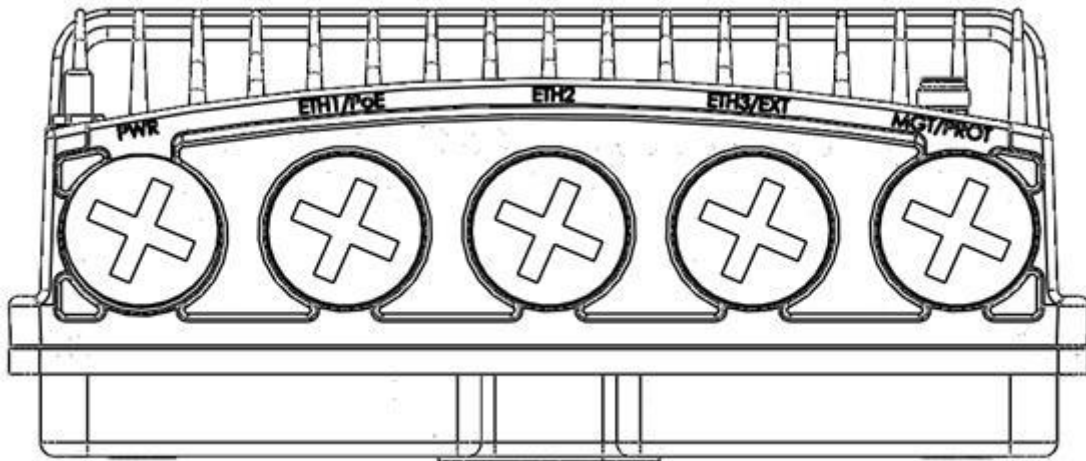
- 3 Insert the CAT5E cable into the gland body.

3.10.3. Connection of Ethernet Cable to NetStream Diplo

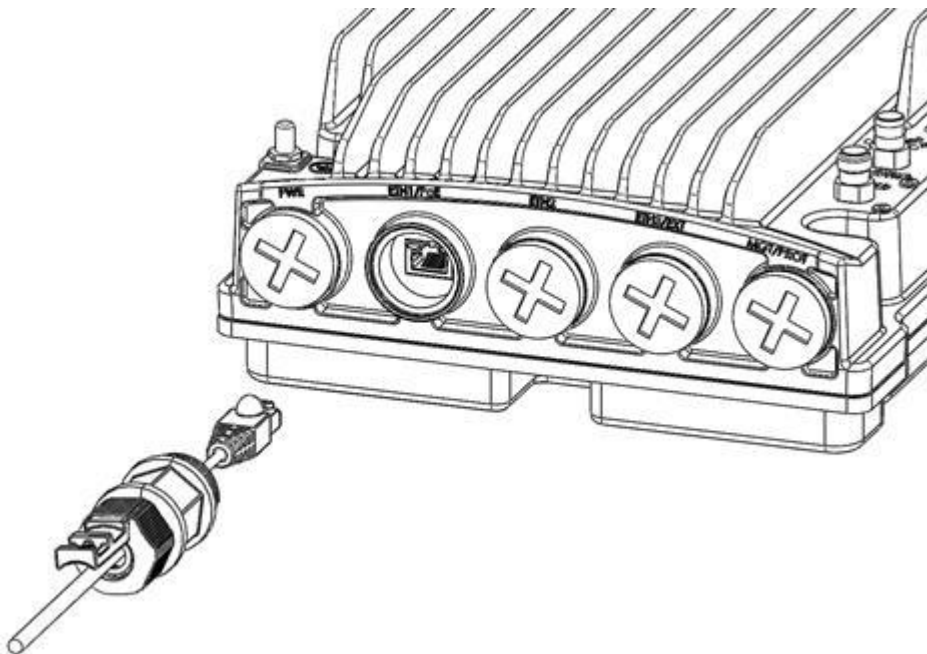
To connect the Ethernet cable to the NetStream Diplo:

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

Cable Installation and Grounding



- 2 Connect the CAT5E cable to the NetStream Diplo.



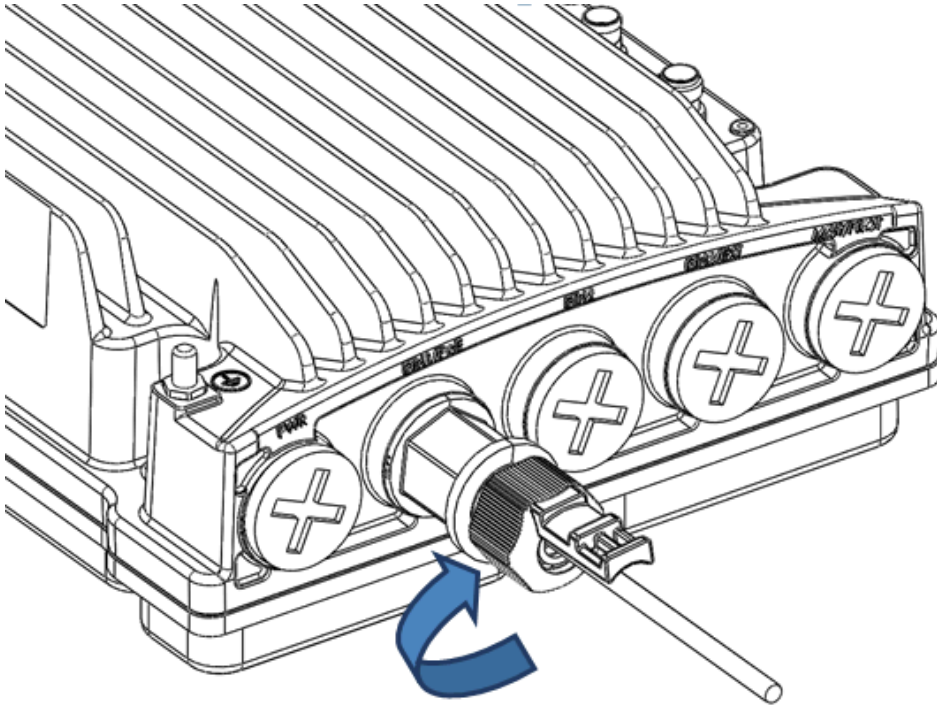
- 3 Screw the gland into the radio unit.



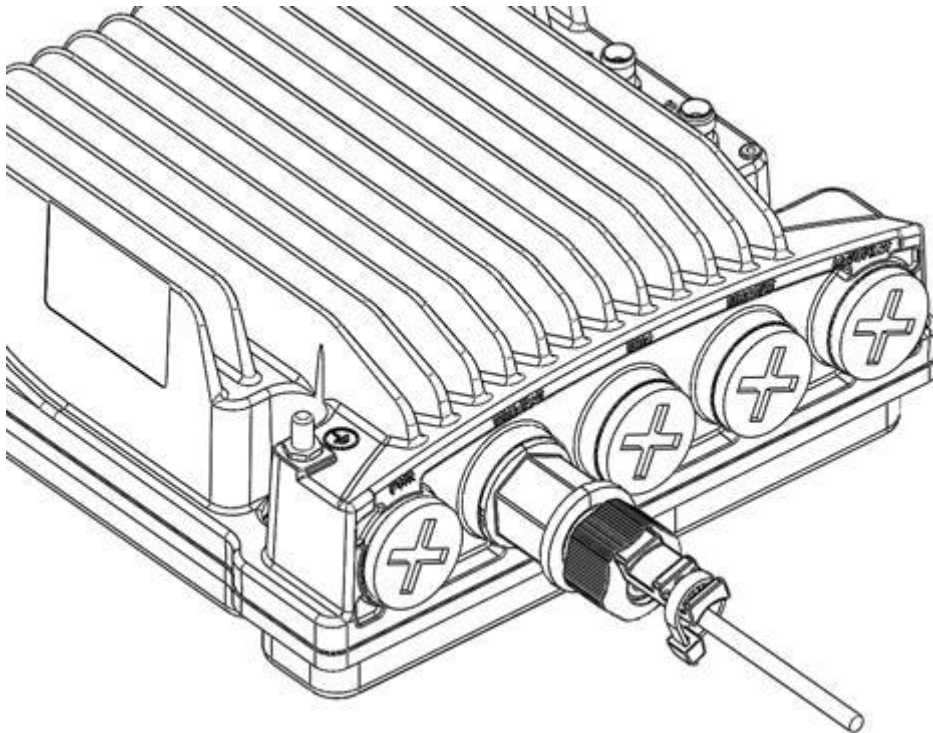
Note

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 4x4 MIMO and 1+1/2+2 HSB Configurations

In 4x4 MIMO and all 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 Diplo units and provide management access to each unit.

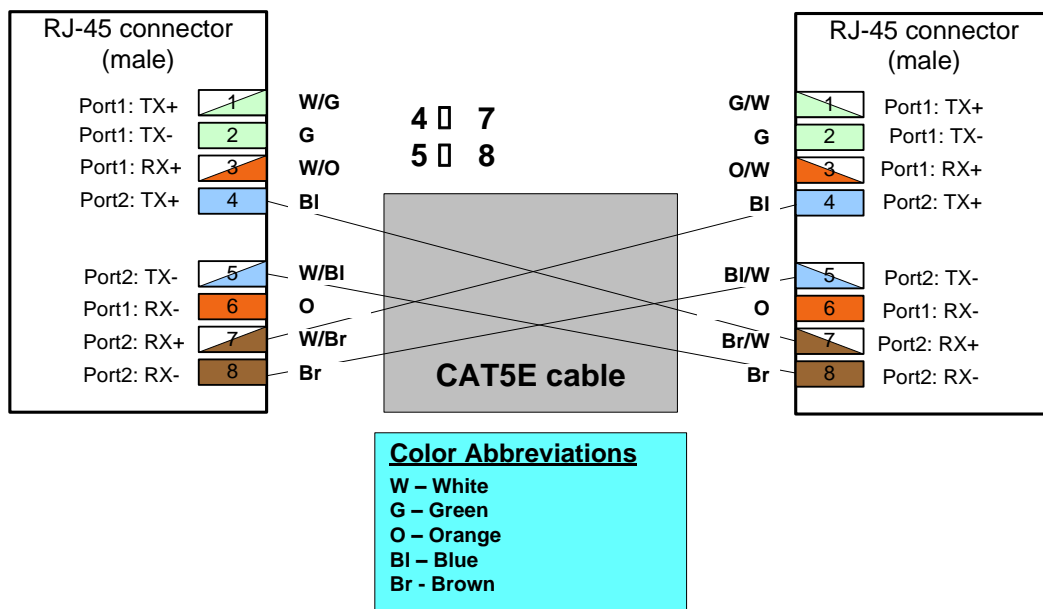
The MIMO/Protection signaling cables are available pre-assembled from Netronics in various lengths, but users can also prepare them in the field.

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

3.11.1. Preparing a MIMO/Protection Signaling Cable

The MIMO/Protection signaling cables require the following pinouts.

MIMO/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 44.

3.11.2. Connecting the MIMO/Protection Splitters and Protection Signaling Cable

Each splitter has three ports:

Cable Installation and Grounding

- System plug (“Sys”) – The system plug should be connected to the NetStream Diplo’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.

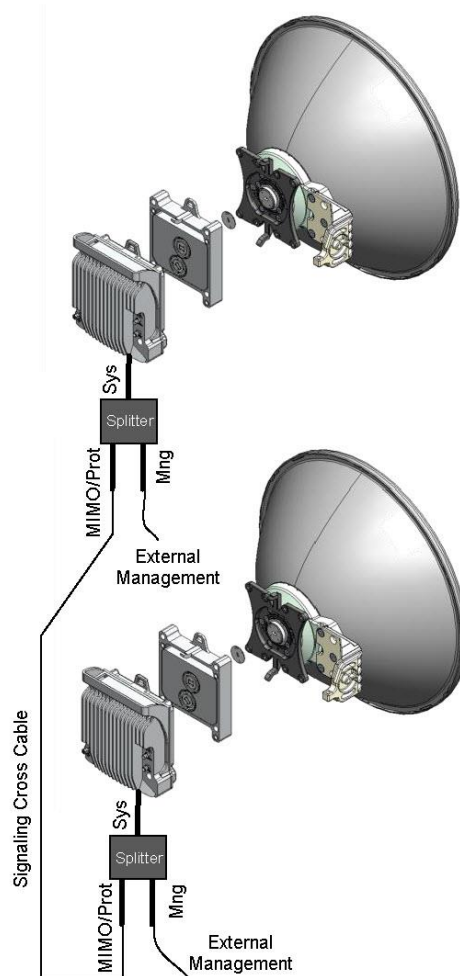


Even for systems that use in-band management, initial configuration of a 4x4 MIMO and any HSB protection configuration must be performed manually using out-of-band management.

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

The following figure demonstrates a 4x4 MIMO configuration in which both NetStream Diplo units are connected to an external management station and to each other, using two splitters.

4x4 MIMO or HSB Protection Configuration with External Management



4. PoE Injector Installation and Connection

4.1. PoE Injector Cable Connection

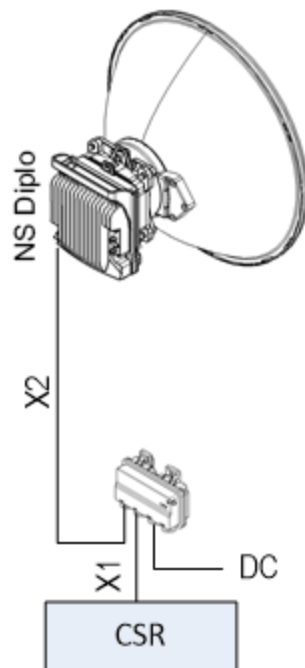
The PoE Injector cables are connected similar to the NetStream Diplo.

- To connect the Ethernet (CAT5E) cable to the PoE or Data port, refer to *Connection of Ethernet Cable to NetStream Diplo* on page 47.
- To connect the DC power cable to the power port or dual feed port, refer to *Connecting a DC Power Cable* on page 41. This cable is not supplied with the PoE Injector.
- The total length of the cable between the NetStream Diplo port and the Switch/Router the device is connected to should not exceed 100m/328ft. This length includes the connection between the NetStream Diplo and the PoE Injector ($X1 + X2 \leq 100\text{m}/328\text{ft}$ in the figure below).



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

| 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 DIPLO/PRIMO_3xGlands_kit | NS DIPLO/PRIMO_3xGlands_kit |
| NS DIPLO/PRIMO_Glands_kit | NS DIPLO/PRIMO_Glands_x5_kit |

Required Tools

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

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.

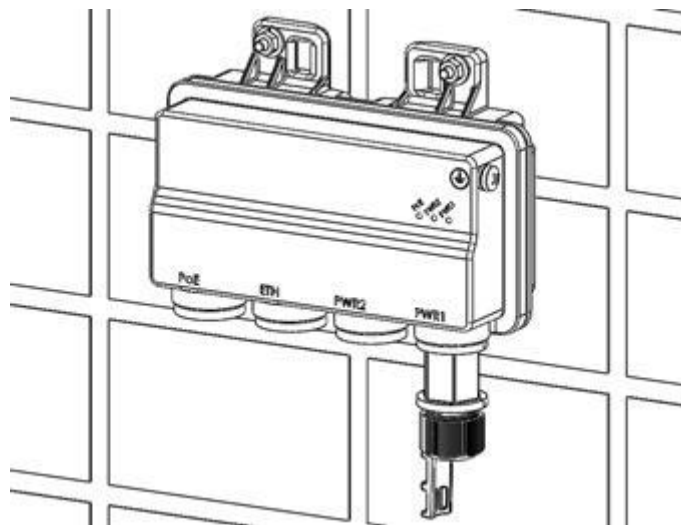
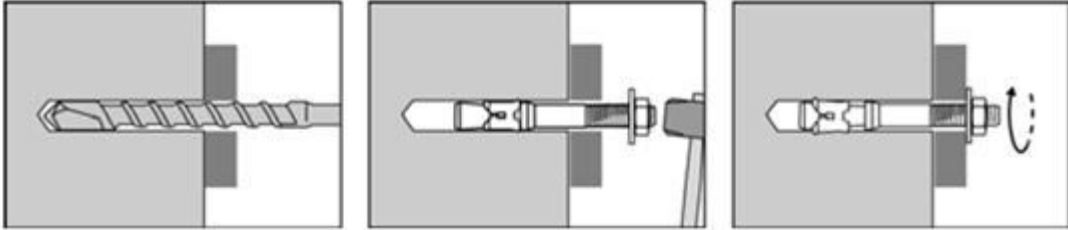


Note

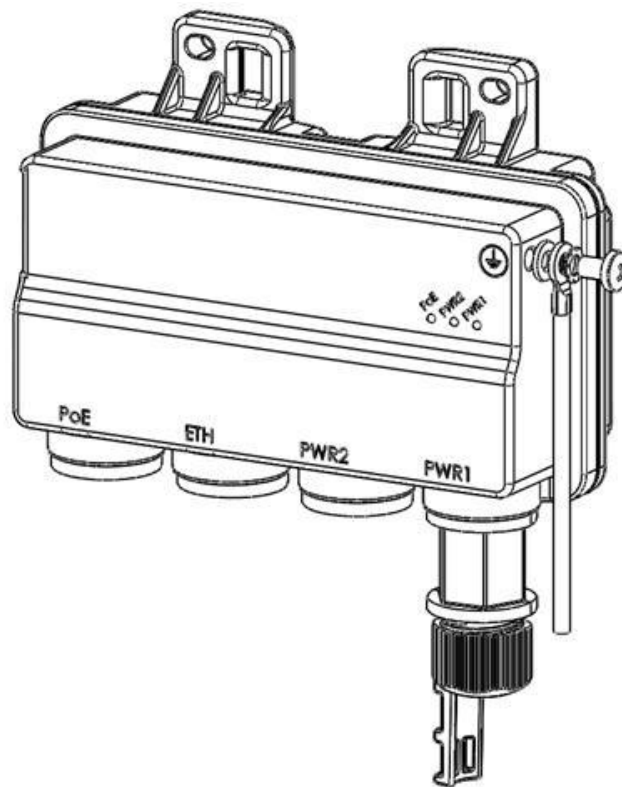
Use Anchor Stainless Steel with flanged Hexagonal nut M6X70.

PoE Injector Installation and Connection

- 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

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.

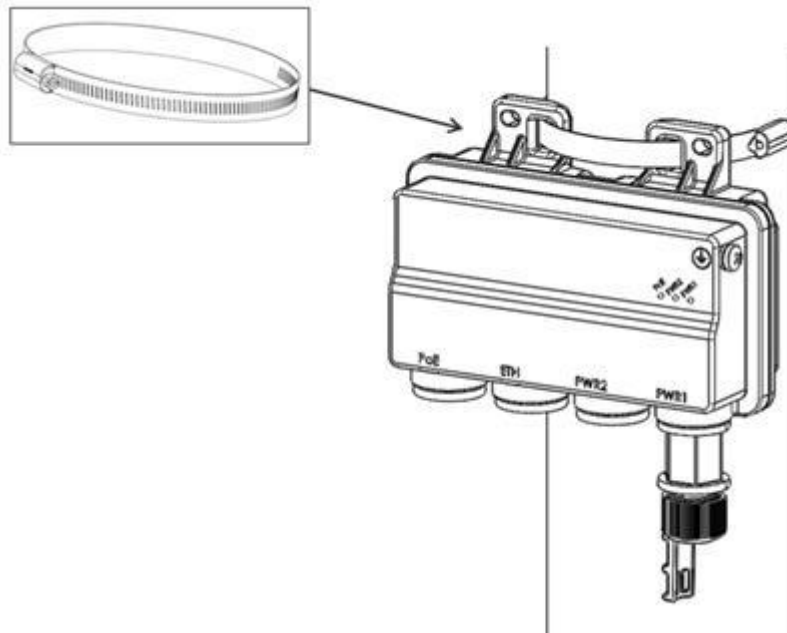


Note

The Hose Clamp is not supplied with PoE injector kit.

PoE Injector Installation and Connection

- 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 | |

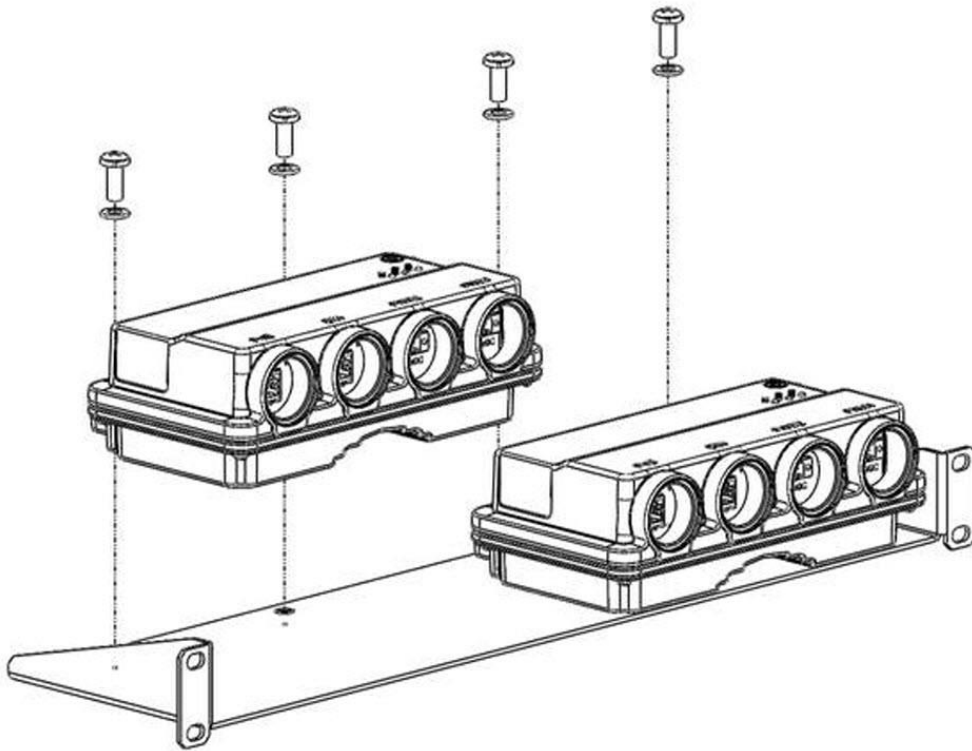
Required Tools

- Philips Screwdriver

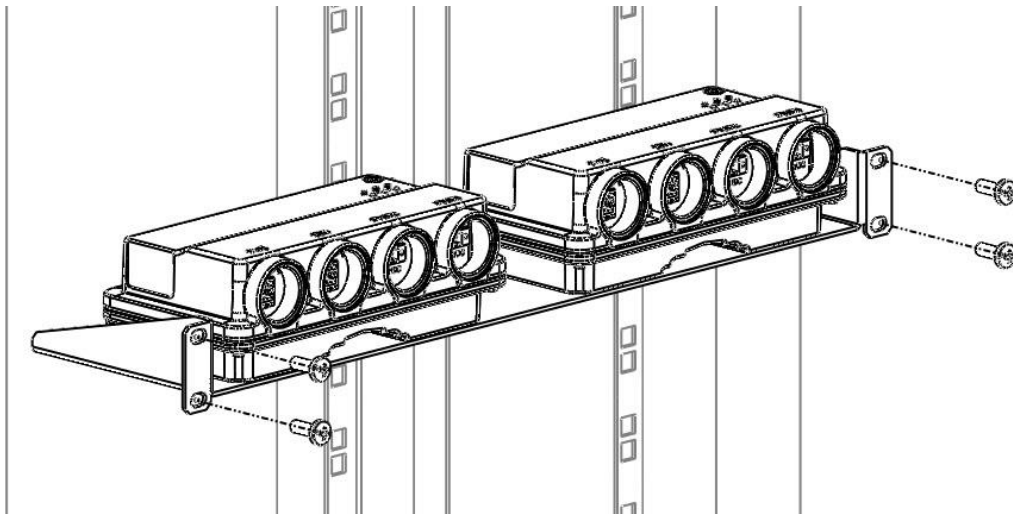
To mount the PoE Injector on a rack:

- 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.

PoE Injector Installation and Connection



- 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

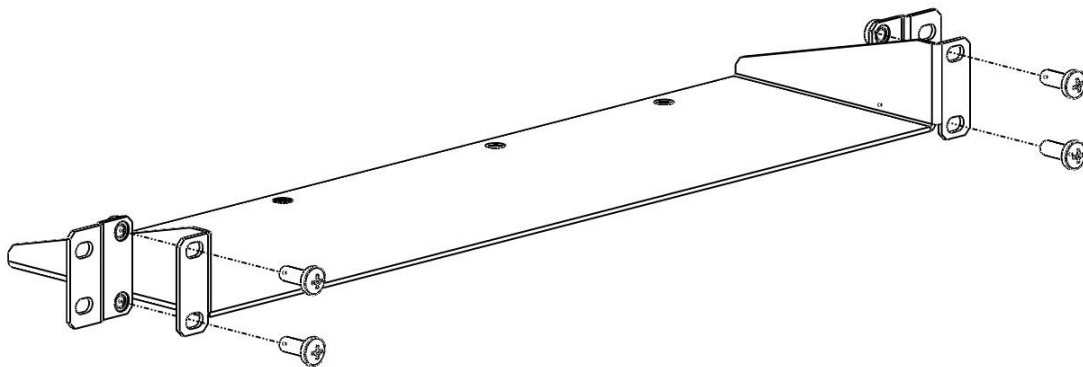
| Item | Description | Quantity | Remarks |
|------|----------------------------------|----------|---------|
| 1 | PoE Injector | 1 | |
| 2 | PoE Injector ETSI Rack Mount Kit | 1 | |

Required Tools

- Philips Screwdriver

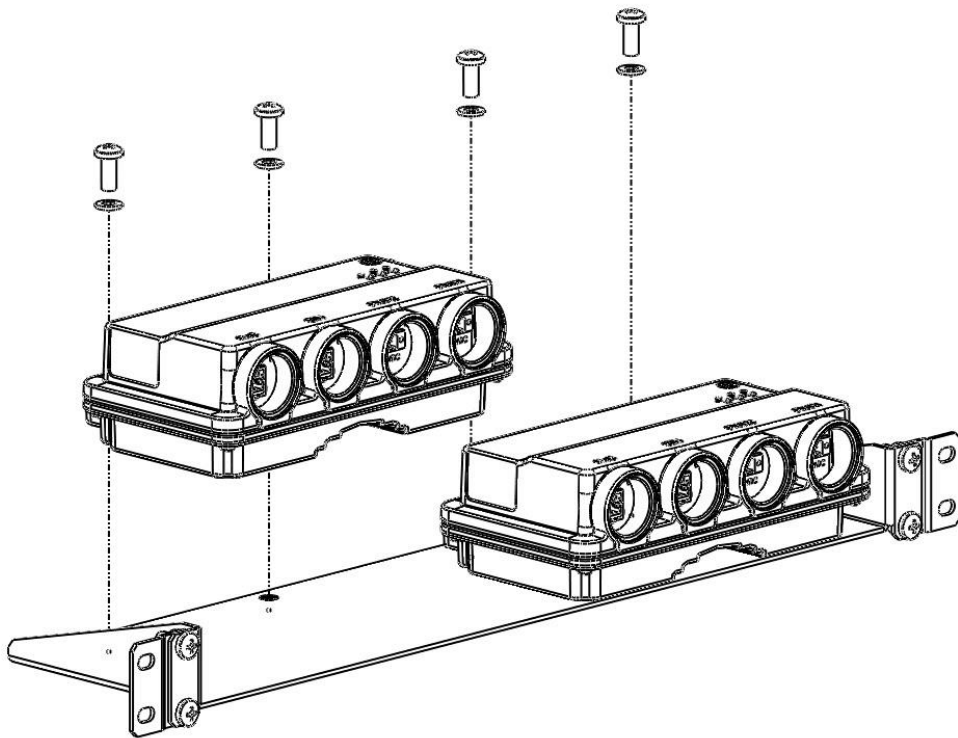
To mount the PoE Injector to an ETSI rack:

- 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.

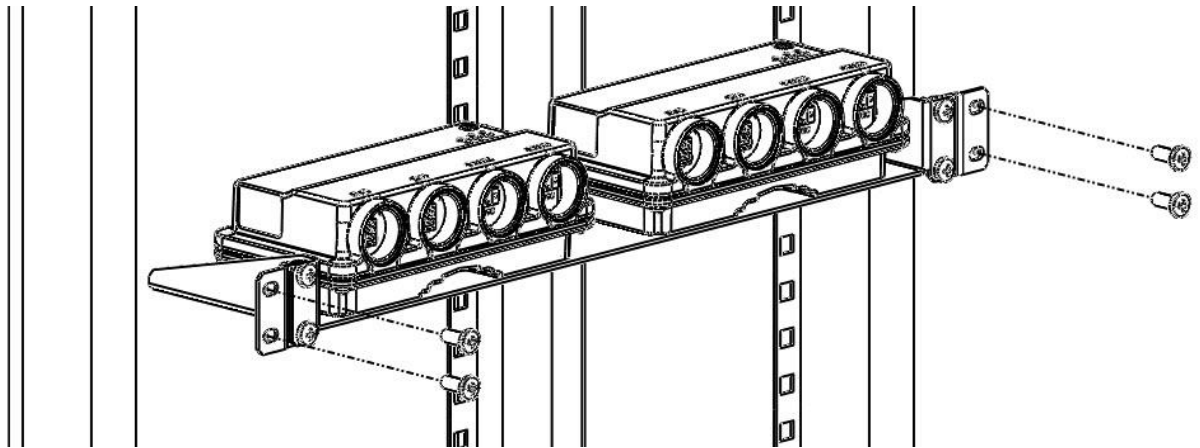


- 3 Mount the PoE Injector on the adaptor through the wall mounting holes using M6 screws and washers.

PoE Injector Installation and Connection



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



Note

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

5. Generic Installation Procedures

5.1. General Notes Concerning All Installation Procedures

Since the NetStream Diplo architecture is of a Dual Core nature, each dual core configuration can be considered as single core configuration hardware ready for its dual core counterpart. Therefore, you should follow the same procedure for *2+0 SP* installation, if you want to install a *1+0 SP HW ready for 2+0 SP*.

One of the major benefits of the NetStream Diplo and the dual core architecture is that upgrading can be done remotely by uploading the correct software license.

5.2. 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

5.3. NetStream Diplo DC Pole Mount Procedure



Note

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

List of Items

| Item | Description | Quantity | Remarks |
|------|---|----------|--------------|
| 1 | NetStream Diplo DC POLE MOUNT KIT | 1 | |
| 2 | NetStream Diplo DC REMOTE MOUNT ADAPTOR KIT | 1 | From 6-13GHz |

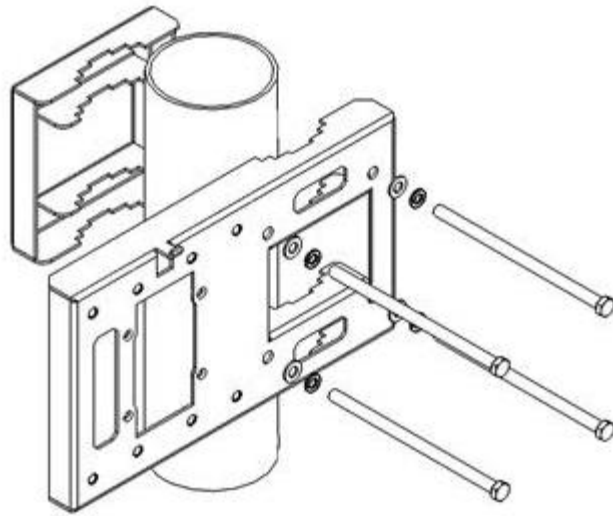
Required Tools

- Metric offset wrench key wrench set

To install the NetStream Diplo pole mount:

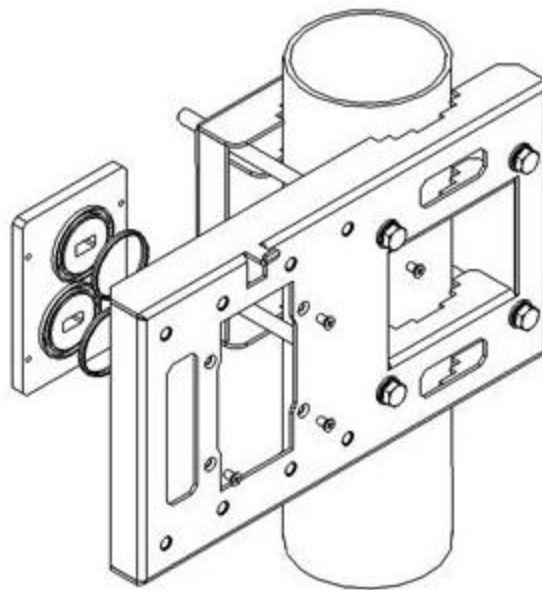
Mount and tighten the NetStream Diplo DC pole mount to a pole with a diameter of 114 mm using the four washers and screws supplied with the NetStream Diplo DC pole mount kit.

Generic Installation Procedures



For 6-13 GHz Only

Mount and tighten the NetStream Diplo Remote Mount Adaptor plate (supplied in NetStream Diplo Adaptor Remote Mount kit) to the NetStream Diplo Pole Mount using the four flat screws supplied with the NetStream Diplo Adaptor Remote Mount kit.



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

List of Items

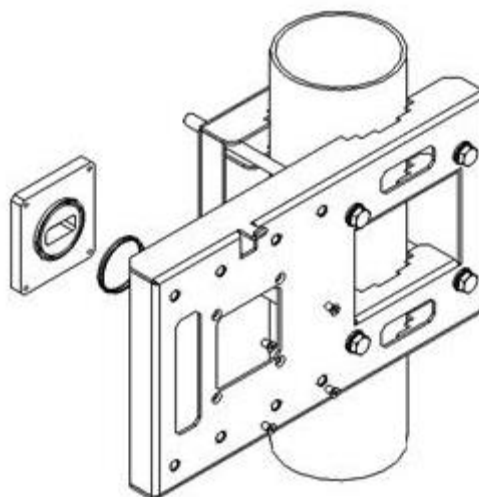
| Item | Description | Quantity | Remarks |
|------|--|----------|---------------|
| 1 | NetStream Diplo RADIO | 1 | |
| 2 | NetStream Primo/Diplo ODU ADAPTATION KIT TO FLEXIBLE WG IMPERIAL | 1 | From 6-13 GHz |
| 3 | NetStream Primo/Diplo ODU REMOTE POLE MOUNT KIT | 1 | |
| 4 | NetStream Diplo SPLITTER KIT | 1 | |

Required Tools

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

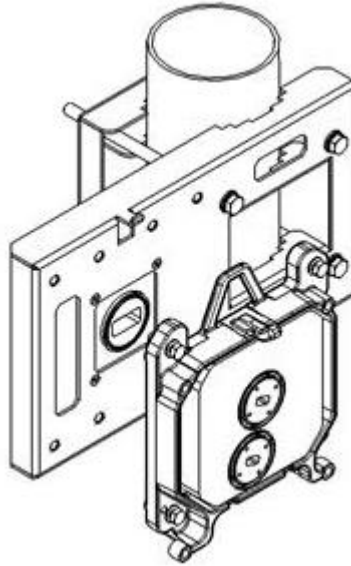
5.4.1. 6-13GHz Installation Procedure

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

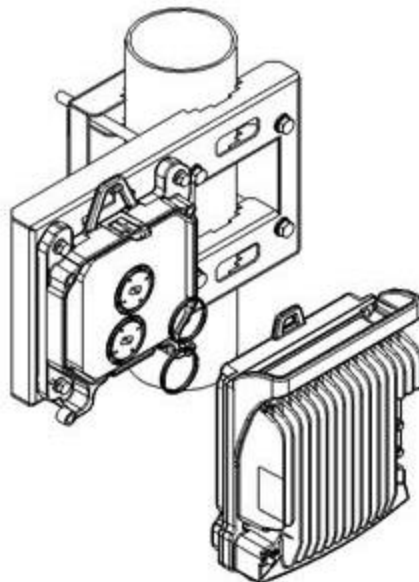


Generic Installation Procedures

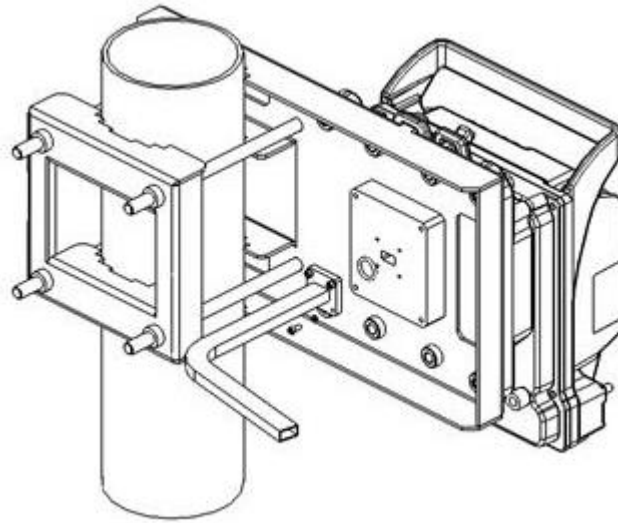
- 2 Mount and tighten the NetStream Diplo Splitter to the NetStream Primo/Diplo ODU Remote Pole Mount using the four captive screws and washers that are assembled to the NetStream Diplo Splitter kit.



- 3 Mount and tighten the NetStream Diplo radio to the NetStream Diplo Splitter using the four captive screws and washers that are assembled to the NetStream Diplo radio. Pay attention that the O-rings are mounted on the NetStream Diplo Splitter kit.

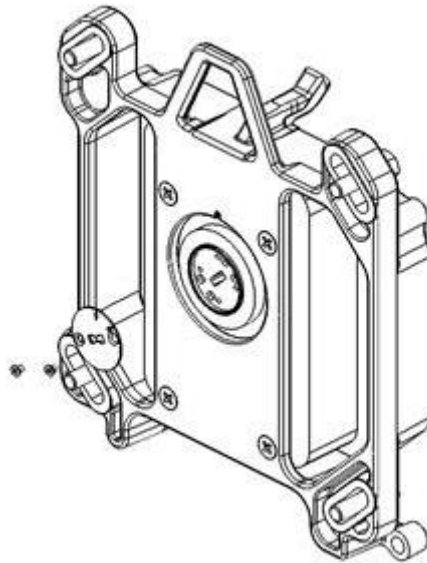


- 4 Connect the Flexible Waveguide and Sealing Gasket supplied with the Flexible Waveguide Imperial Kit to the NetStream Primo/Diplo ODU Adaptor plate. Tighten the four screws supplied with the Flexible Waveguide Imperial Kit.



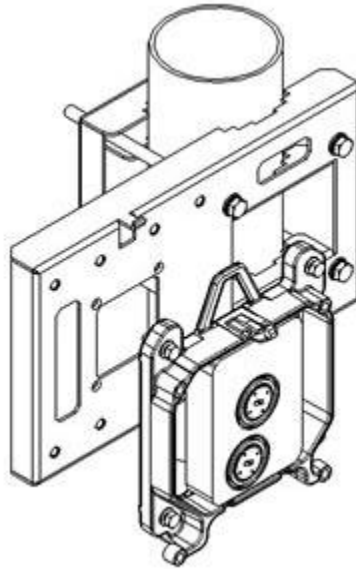
5.4.2. 15-42GHz Installation Procedure

- 1 Loosen the two screws, and remove the twist plate from the NetStream Diplo Splitter.

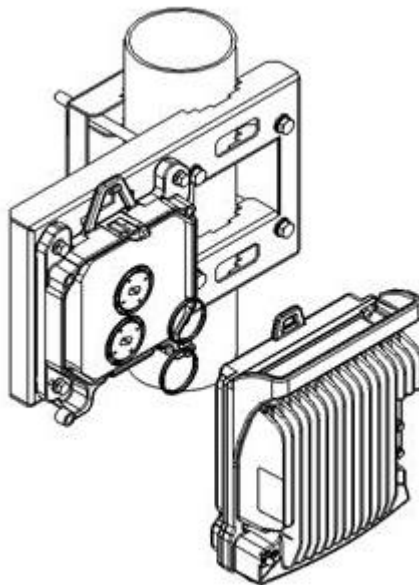


- 2 Mount and tighten the NetStream Diplo Splitter to the NetStream Primo/Diplo ODU Remote Pole Mount using the four captive screws and washers that are assembled to the NetStream Diplo Splitter kit.

Generic Installation Procedures

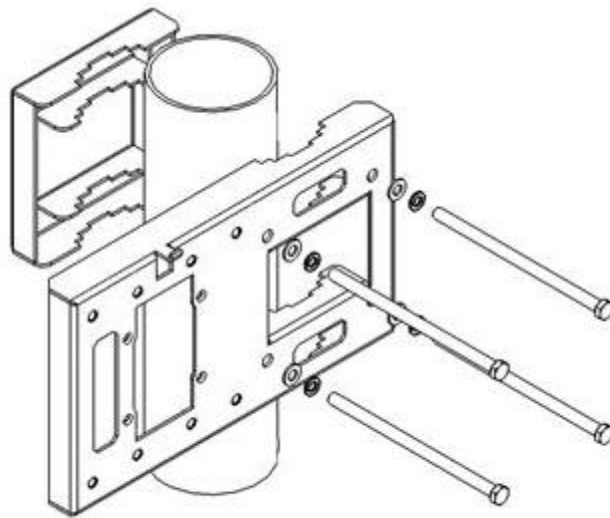
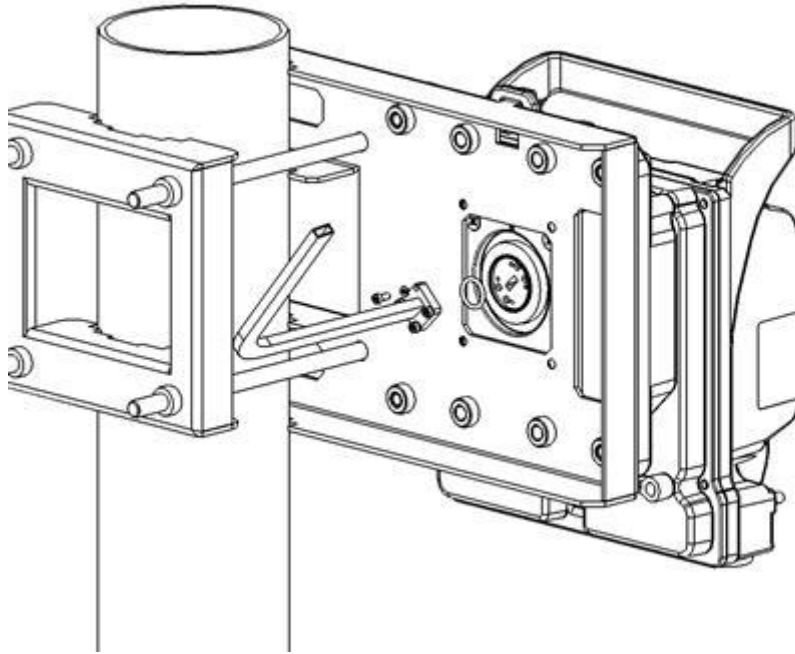


- 3 Mount and tighten the NetStream Diplo radio to the NetStream Diplo Splitter using the four captive screws and washers that are assembled to the NetStream Diplo radio. Make sure the O-rings are mounted on the NetStream Diplo Splitter kit.



- 4 Connect the Flexible Waveguide and Sealing O-ring supplied with the Flexible Waveguide Imperial Kit to the NetStream Diplo Splitter kit. Tighten the four screws supplied with the NetStream Primo/Diplo ODU Adaptation kit to the Flexible Waveguide Imperial.

Generic Installation Procedures



5.5. Management Connection for MIMO and Protection Configurations

In MIMO and all HSB protection configurations, a special signaling cable must be used to connect the management ports (MGT/PROT) of the two NetStream Diplo units.

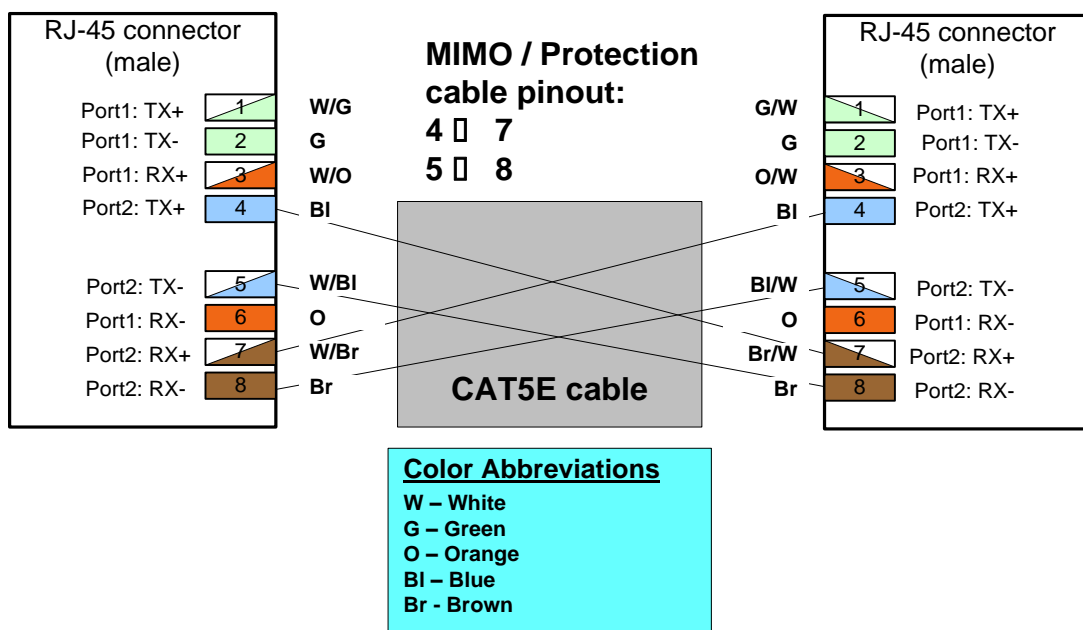
When Out-of-Band management is used, a splitter must be used to connect the management ports to local management and to each other.

The MIMO/Protection signaling cables are available pre-assembled from Netronics in various lengths (refer to *Cables for MIMO Connections* on page 26), but you can also prepare them in the field.

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

5.5.1. Preparing a MIMO/Protection Signaling Cable

To prepare your own MIMO/Protection signaling cables, follow the instructions in *Preparing the Ethernet Cable and Plug-in Field* on page 44. You must use the following pinouts:



5.5.2. Connecting a MIMO/Protection Signaling Cable

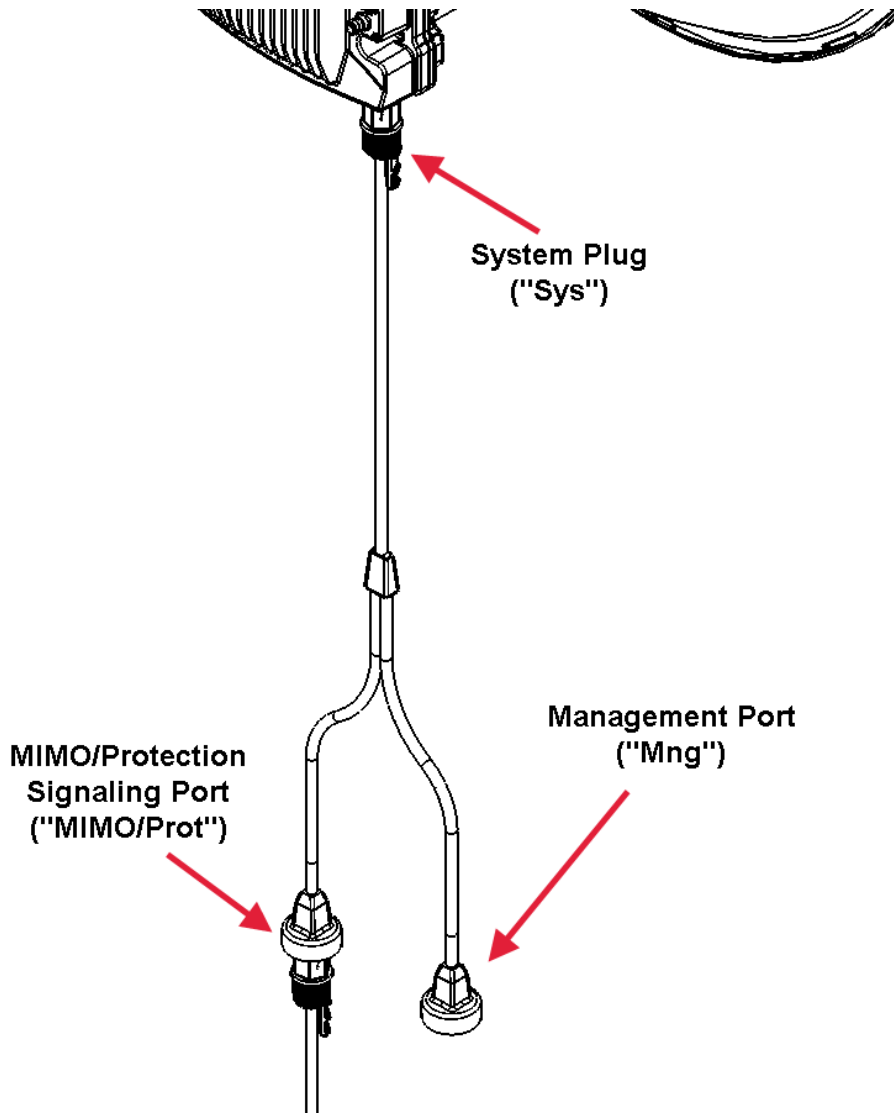
This option should be used when you plan to manage the system using in-band management.

The MIMO/Protection signaling cable should be connected between the management ports of two NetStream Diplo units operating in either MIMO or HSB protection mode. The physical cable connection is the same as connecting a CAT5E cable to a system data or management port. For details, refer to *Connecting the Ethernet Cable* on page 44.

5.5.3. Connecting a MIMO/Protection Splitter

This option should be used when you plan to manage the system using out-of-band (external) management rather than in-band management.

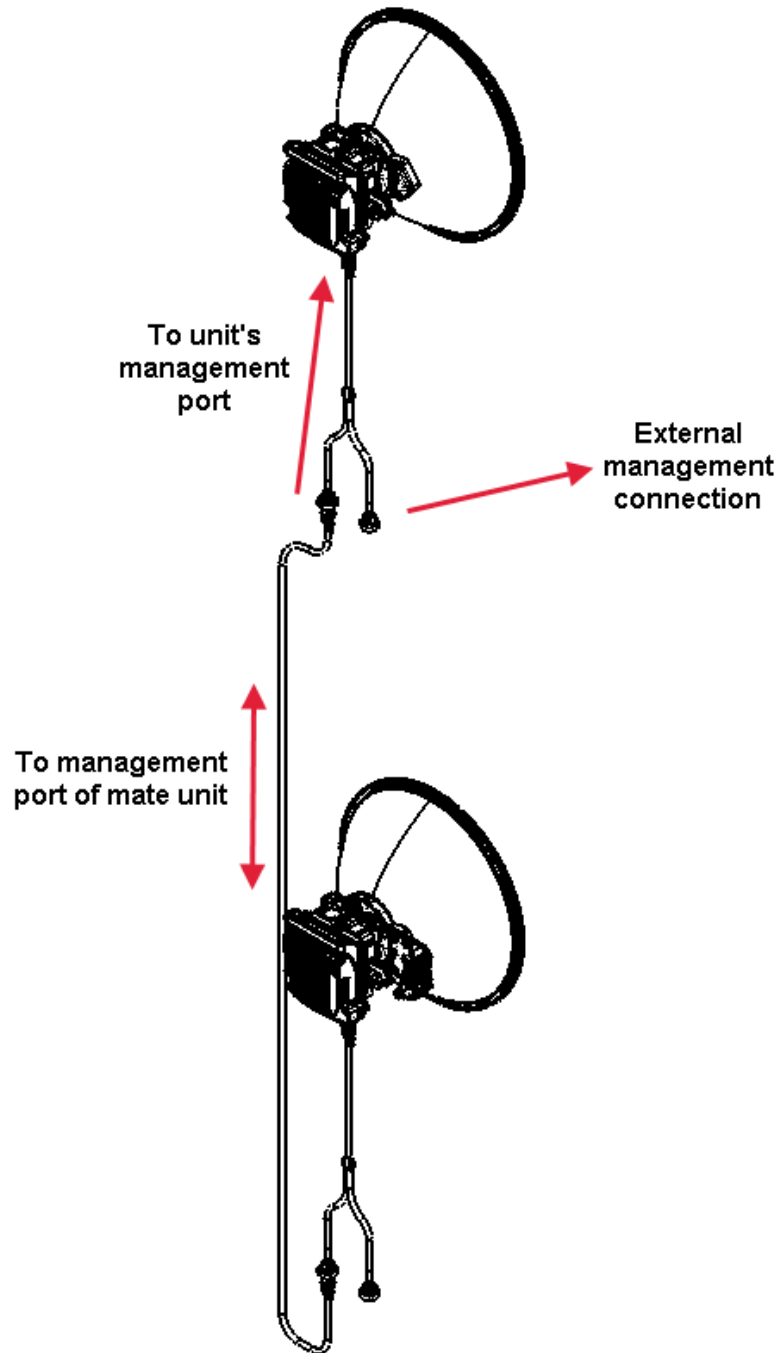
The splitter has three ports, as shown in the following figure.



- System plug ("Sys") – The system plug should be connected to the NetStream Diplo'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.
- MIMO/Protection signaling port ("MIMO/Prot") – A standard CAT5E cable or a MIMO/Protection signaling cable should be connected between this port and the other "MIMO/Prot" port of the second splitter on the mate NetStream Diplo unit.

Generic Installation Procedures

The following figures demonstrate a 4x4 MIMO configuration in which both NetStream Diplo units are connected to an external management station and to each other, using two splitters.



6. Installation Procedures per Configuration Type

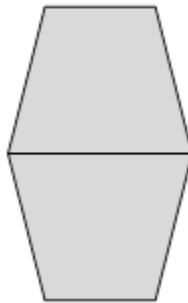
6.1. MultiCore 2+0 Dual Polarization Direct Mount



Note

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

CCDP



List of Items

| Item | Description | Quantity | Remarks |
|------|-------------------------|----------|--------------------|
| 1 | NetStream Diplo RADIO | 1 | |
| 2 | NetStream Diplo OMT kit | 1 | |
| 3 | CIRC./CIRC. ADAPTOR | 1 | Per Antenna Vendor |

Required Tools

- Metric offset hexagon key set
- Metric wrench key set

Insertion Loss

| Mediation Devices | Signal Path / Remarks | Insertion Loss [dB] | | | | | |
|-------------------|--|---------------------|--------|-----------|--------|-----------|-----------|
| | | 6-8 GHz | 11 GHz | 13-15 GHz | 18 GHz | 23-26 GHz | 28-42 GHz |
| OMT | Each NetStream Diplo antenna port to Mediation device antenna port | 0.3 | 0.3 | 0.3 | 0.3 | 0.5 | 0.5 |

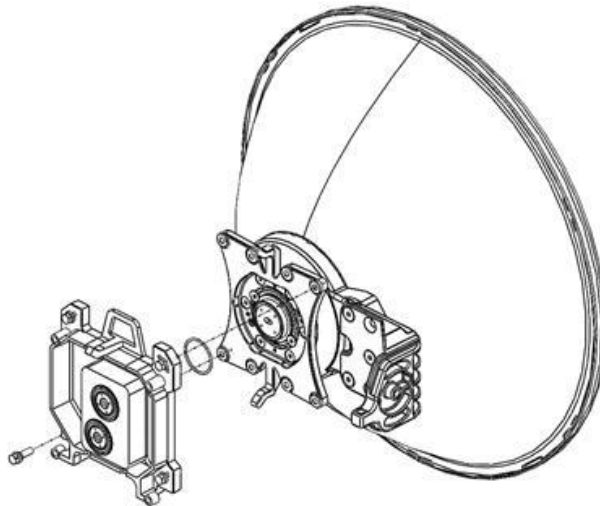
Installation Procedures per Configuration Type

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.)

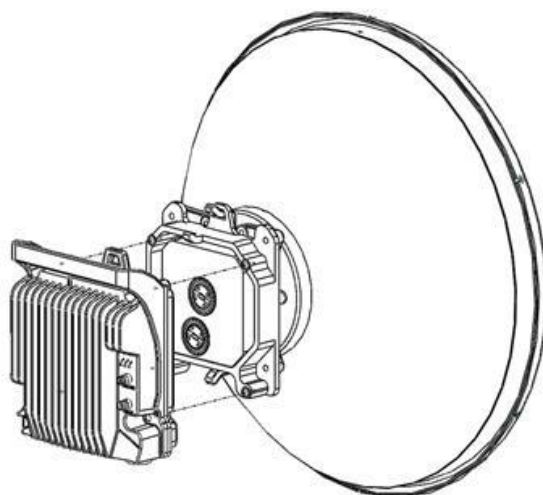


- 2 Connect the OMT Kit to the antenna and secure it with four screws. Verify the existence of the O-ring.



- 3 Connect the NetStream Diplo DC radio to the OMT Kit using the four M8 captive screws and washers supplied, and tighten the screws.

Installation Procedures per Configuration Type



6.2. MultiCore 2+0 Dual Polarization Remote Mount

This procedure is for use with Interface antennas, up to six feet.

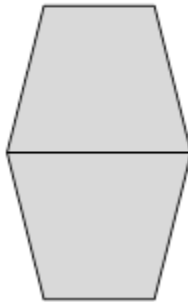
For standard interface antennas (six feet and larger), no OMT and no Circ./Circ. Adaptor are used, and the flexible waveguides are connected directly to the antenna flanges. For instructions how to connect the waveguides to the antenna flanges, refer to the antenna vendor's documentation.



Note

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

CCDP



List of Items

| Item | Description | Quantity | Remarks |
|------|---|----------|---|
| 1 | NetStream Diplo RADIO | 1 | |
| 2 | NetStream Diplo OMT kit | 1 | Not used for standard interface antennas (six feet and larger). |
| 3 | FLEXIBLE WG KIT | 2 | |
| 4 | NetStream Diplo DC POLE MOUNT KIT | 1 | |
| 5 | NetStream Diplo DC REMOTE MOUNT ADAPTOR KIT | 1 | From 6-13GHz |
| 6 | Circ./Circ. Adaptor | 1 | Per Antenna Vendor. Not used for standard interface antennas (six feet and larger). |

Required Tools

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

Installation Procedures per Configuration Type

Insertion Loss

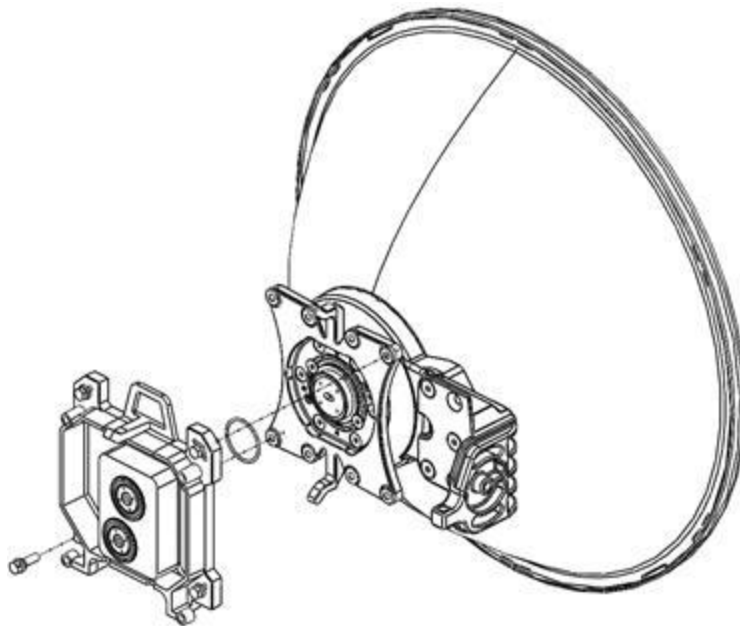
| Mediation Devices | Signal Path / Remarks | Insertion Loss [dB] | | | | | |
|-------------------|--|---------------------|--------|-----------|--------|-----------|-----------|
| | | 6-8 GHz | 11 GHz | 13-15 GHz | 18 GHz | 23-26 GHz | 28-42 GHz |
| OMT and two WGs | Each NetStream Diplo antenna port to Mediation device antenna port | 0.8 | 0.8 | 1.5 | 1.5 | 1.7 | 2.0 |

6.2.1. Common Installation

- 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.)

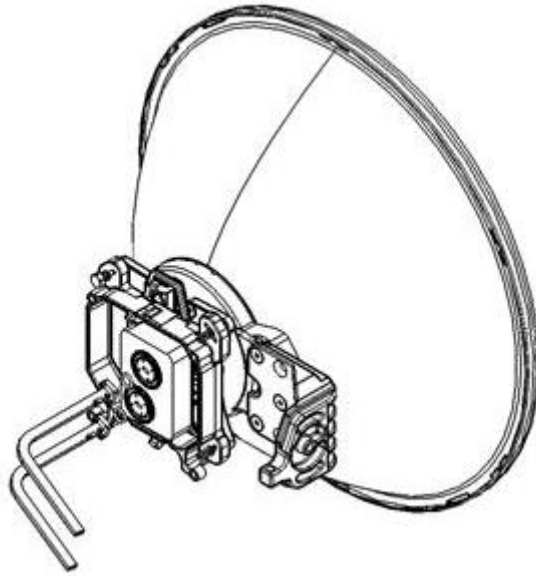


- 2 Connect the OMT Kit to the antenna and secure it with four screws. Verify the existence of the O-ring.



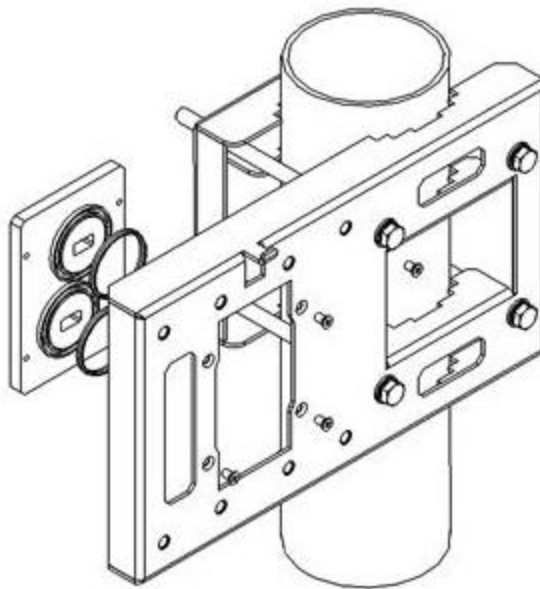
- 3 Mount and tighten the O-ring and the Flexible WG to NetStream Diplo OMT ports using the four screws supplied with the Flexible WG kit.

Installation Procedures per Configuration Type



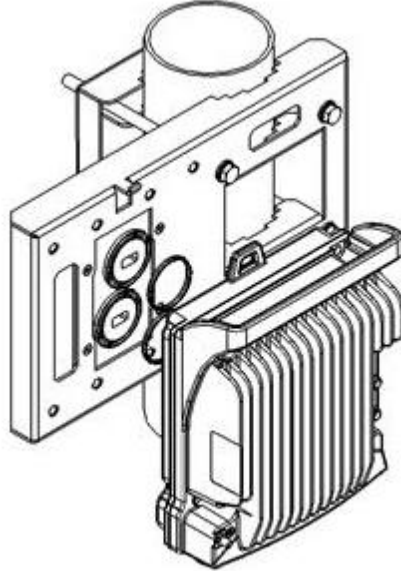
6.2.2. 6-13 GHz

- 1 Mount and tighten the NetStream Diplo Remote Mount Adaptor plate (supplied in NetStream Diplo Adaptor Remote Mount kit) to the NetStream Diplo Pole Mount using the four flat screws supplied with the NetStream Diplo Adaptor Remote Mount kit.

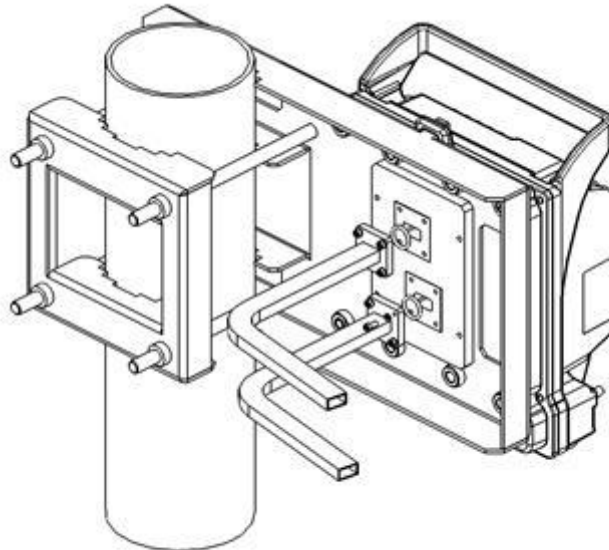


Installation Procedures per Configuration Type

- 2 Mount and tighten the NetStream Diplo to the NetStream Diplo Pole Mount using the four captive screws and washers that are supplied with the NetStream Diplo. Pay attention that the O-rings are mounted on the NetStream Diplo Remote Mount Adaptor.



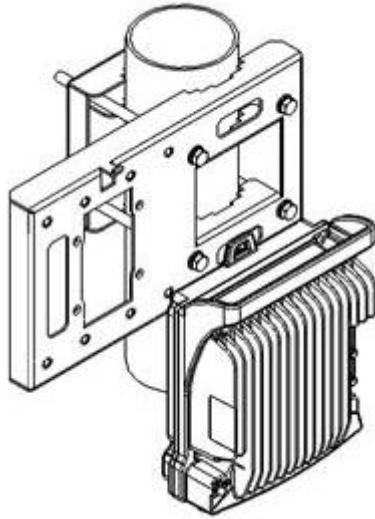
- 3 Mount and tighten both Flexible WGs with their O-ring to the NetStream Diplo Remote Mount Adaptor ports using the four screws supplied with each Flexible WG kit.



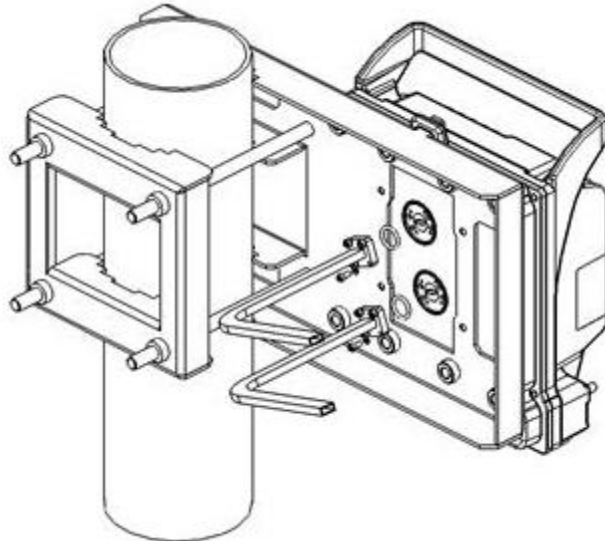
Installation Procedures per Configuration Type

6.2.3. 15-42 GHz

- 1 Mount and tighten the NetStream Diplo to the NetStream Diplo DC Pole Mount using the four screws assembled on the NetStream Diplo.



- 2 Mount and tighten the O-ring and the Flexible WG to NetStream Diplo radio ports using the four screws supplied with the Flexible WG kit.



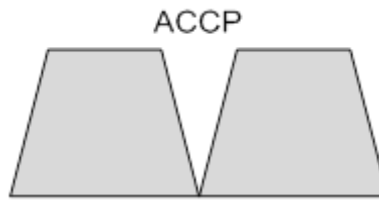
6.3. MultiCore 2+0 Single Polarization Direct Mount



Note

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

Installation Procedures per Configuration Type



List of Items

| Item | Description | Quantity | Remarks |
|------|------------------------------|----------|---------|
| 1 | NetStream Diplo RADIO | 1 | |
| 2 | NetStream Diplo Splitter KIT | 1 | |

Required Tools

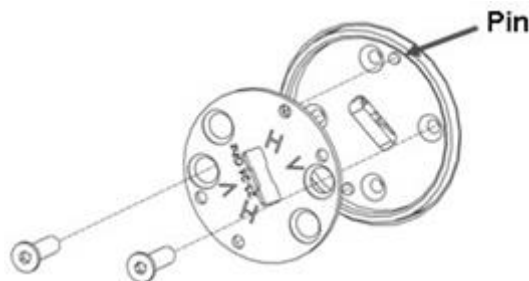
- Metric offset hexagon key set
- Phillips #1, #2 screwdriver

Insertion Loss

| Mediation Devices | Signal Path / Remarks | Insertion Loss [dB] | | | | | |
|-------------------|-----------------------|---------------------|--------|-----------|--------|-----------|-----------|
| | | 6-8 GHz | 11 GHz | 13-15 GHz | 18 GHz | 23-26 GHz | 28-42 GHz |
| Splitter | Radio to antenna port | 3.5 | 3.5 | 3.5 | 3.7 | 3.7 | 4.0 |

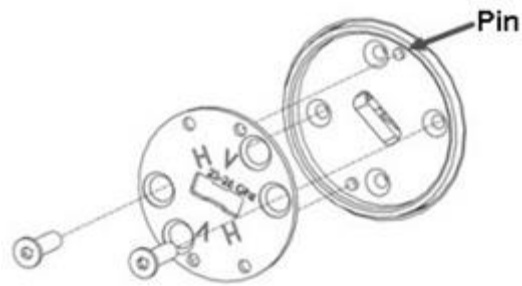
Procedure

- 1 Adjust the twist on the Splitter Kit. Perform one of the following steps, according to the required polarization (horizontal or vertical).
 - For horizontal polarization, locate the holes above and below the letter "H" on the pins and fasten the two screws.

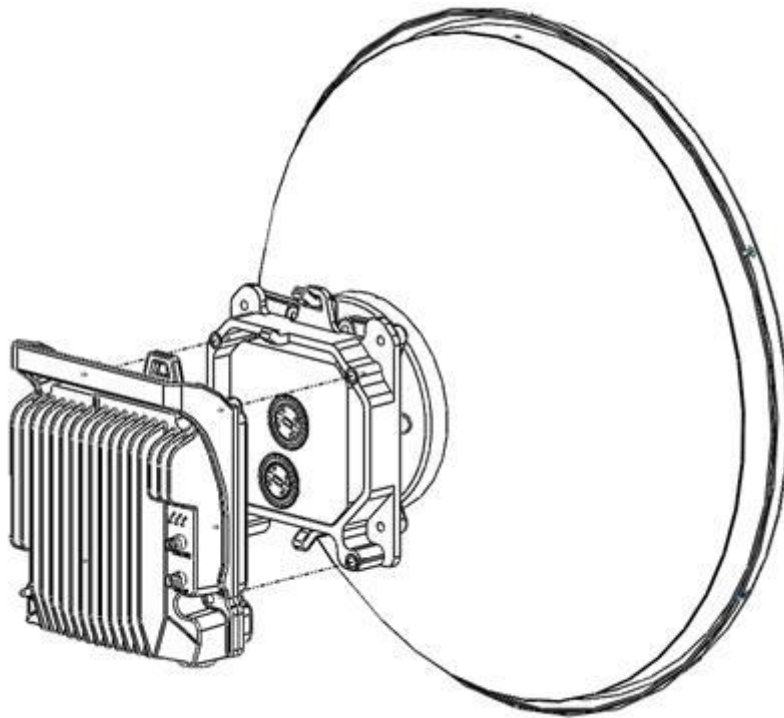


- For vertical polarization, locate the holes above and below the letter "V" on the pins and fasten the two screws.

Installation Procedures per Configuration Type



- 2 Mount and tighten the NetStream Diplo Splitter Kit on the antenna using the four M8 screws and washers.
- 3 Mount and tighten the NetStream Diplo to the NetStream Diplo Splitter Kit using the four M8 captive screws and washers supplied.

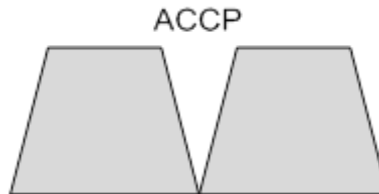


6.4. MultiCore 2+0 Single Polarization Remote Mount



Note

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



List of Items

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

Required Tools

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

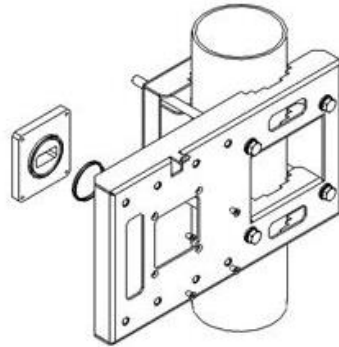
Insertion Loss

| Mediation Devices | Signal Path / Remarks | Insertion Loss [dB] | | | | | |
|---------------------|-----------------------|---------------------|--------|-----------|--------|-----------|-----------|
| | | 6-8 GHz | 11 GHz | 13-15 GHz | 18 GHz | 23-26 GHz | 28-42 GHz |
| Splitter and one WG | Radio to antenna port | 4.0 | 4.0 | 4.7 | 4.9 | 5.2 | 5.5 |

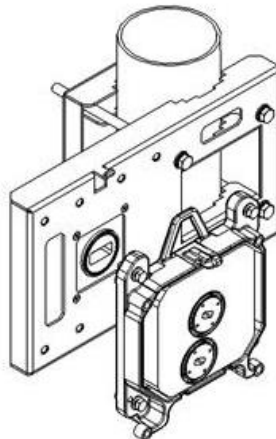
Installation Procedures per Configuration Type

6.4.1. 6-13 GHz

- 1 Mount and tighten the NetStream Primo/Diplo ODU Remote Mount Adaptor plate (supplied in NetStream Primo/Diplo ODU Adaptor Remote Mount kit) to the NetStream Primo/Diplo ODU Pole Mount using the four flat screws supplied with the NetStream Primo/Diplo ODU Adaptor Remote Mount kit.

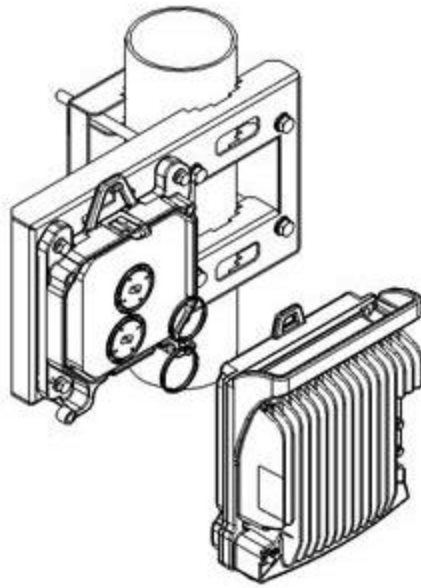


- 2 Mount and tighten the NetStream Diplo Splitter to the NetStream Primo/Diplo ODU Pole Mount using the four captive screws and washers that are assembled to the NetStream Diplo Splitter kit.

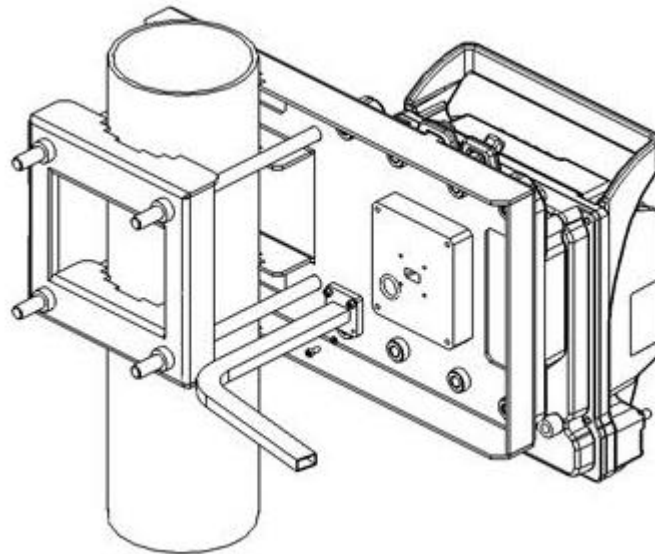


- 3 Mount and tighten the NetStream Diplo to the NetStream Diplo Splitter using the four captive screws and washers that are assembled to the NetStream Diplo radio. Pay attention that the O-rings are mounted on the NetStream Diplo Splitter kit.

Installation Procedures per Configuration Type



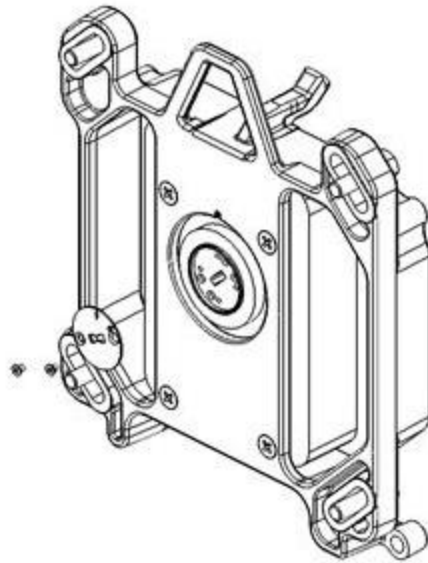
- 4 Connect the Flexible Waveguide and Sealing Gasket supplied with the Flexible Waveguide Kit to the NetStream Primo/Diplo ODU Adaptor plate. Tighten the four screws supplied with the Flexible Waveguide Kit.



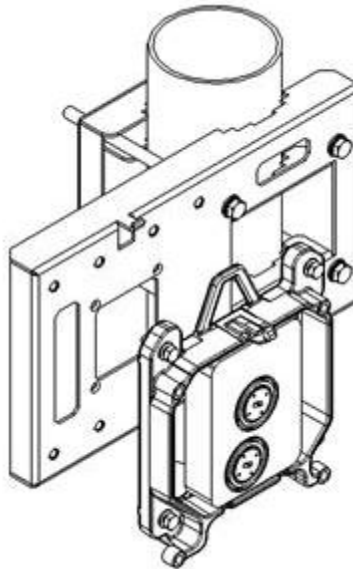
6.4.2. 15-42 GHz

- 1 Loosen the two screws and remove the twist plate from the NetStream Diplo Splitter.

Installation Procedures per Configuration Type

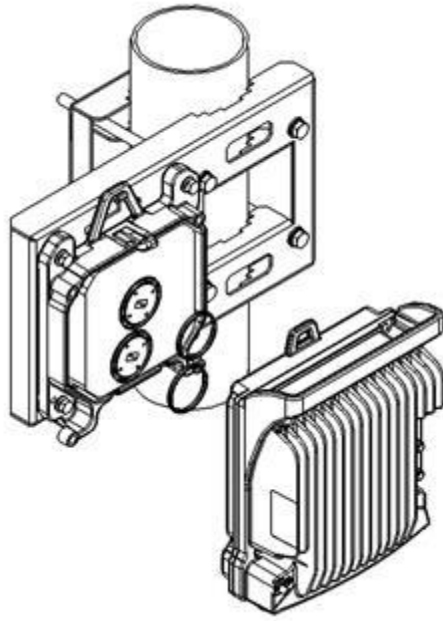


- 2 Mount and tighten the NetStream Diplo Splitter to the NetStream Primo/Diplo ODU Pole Mount using the four captive screws and washers that are assembled to the NetStream Diplo Splitter kit.

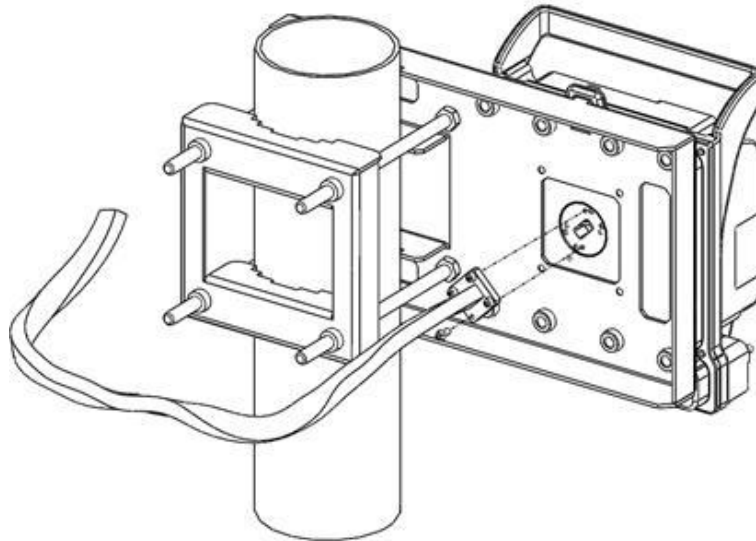


- 3 Mount and tighten the NetStream Diplo to the NetStream Diplo Splitter using the four captive screws and washers that are assembled to the NetStream Diplo. Pay attention that the O-rings are mounted on the NetStream Diplo Splitter kit.

Installation Procedures per Configuration Type



- 4 Connect the Flexible Waveguide and Sealing Gasket supplied with the Flexible Waveguide Kit to the NetStream Diplo Splitter kit. Tighten the four screws supplied with the Flexible Waveguide kit.



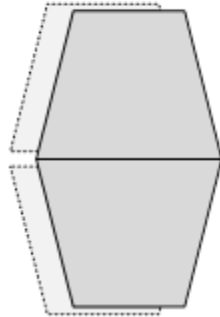
6.5. MultiCore 2+2 HSB Double Polarization Direct Mount



Note

This procedure can also be used for 2 x MultiCore 1+1 HSB DP HW ready for MultiCore 2+2 HSB DP configurations.

CCDP - Protected



List of Items

| Item | Description | Quantity | Remarks |
|------|----------------------------------|----------|--------------------|
| 1 | NetStream Diplo RADIO | 2 | |
| 2 | NetStream Diplo OMT KIT | 1 | |
| 3 | NetStream Diplo DUAL COUPLER KIT | 1 | |
| 4 | CIRC./CIRC. ADAPTOR | 1 | Per Antenna Vendor |

Required Tools

- Metric offset hexagon key set
- Metric wrench key set

Insertion Loss

| Mediation Devices | Signal Path / Remarks | Insertion Loss [dB] | | | | | |
|------------------------|-----------------------|---------------------|--------|-----------|--------|-----------|-----------|
| | | 6-8 GHz | 11 GHz | 13-15 GHz | 18 GHz | 23-26 GHz | 28-42 GHz |
| Double Coupler and OMT | Main Paths | 1.6 | 1.6 | 1.6 | 1.9 | 1.9 | 2.5 |
| | Secondary Paths | 6.2 | 6.2 | 6.2 | 6.3 | 6.3 | 6.5 |

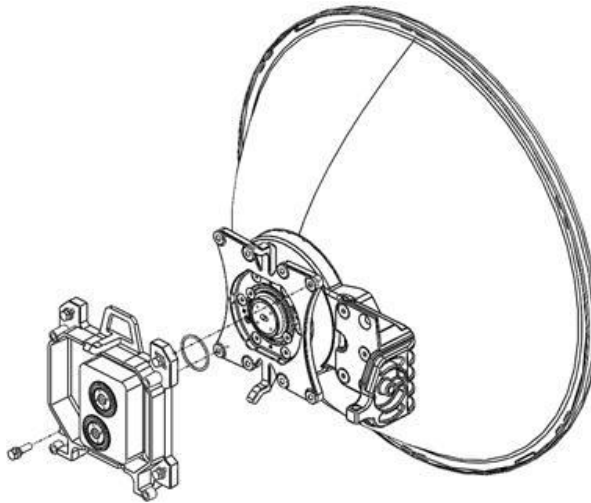
Installation Procedures per Configuration Type

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.)

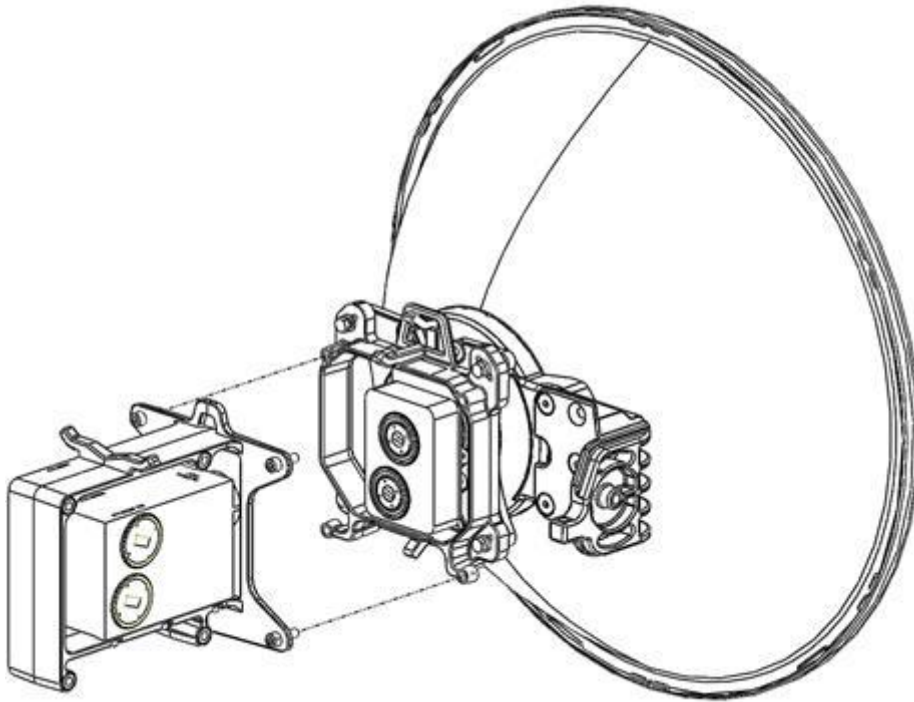


- 2 Connect the NetStream Diplo OMT Kit to the antenna and secure it with four screws. Verify existence of the O-ring.

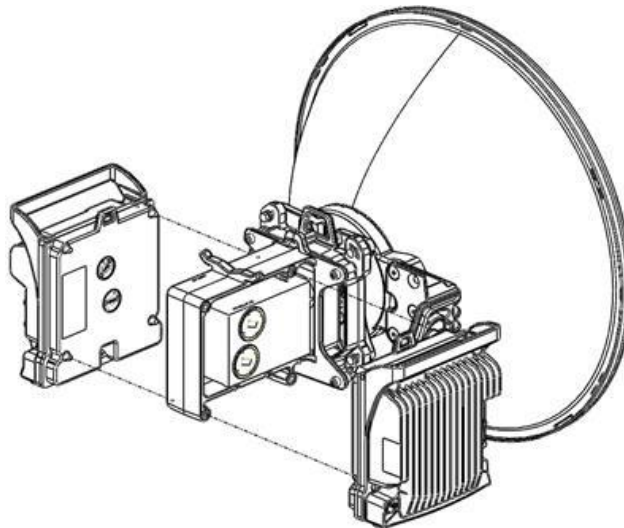


- 3 Connect the NetStream Diplo Dual Coupler Kit to the OMT Kit using four M8 screws and washers, and tighten the screws.

Installation Procedures per Configuration Type

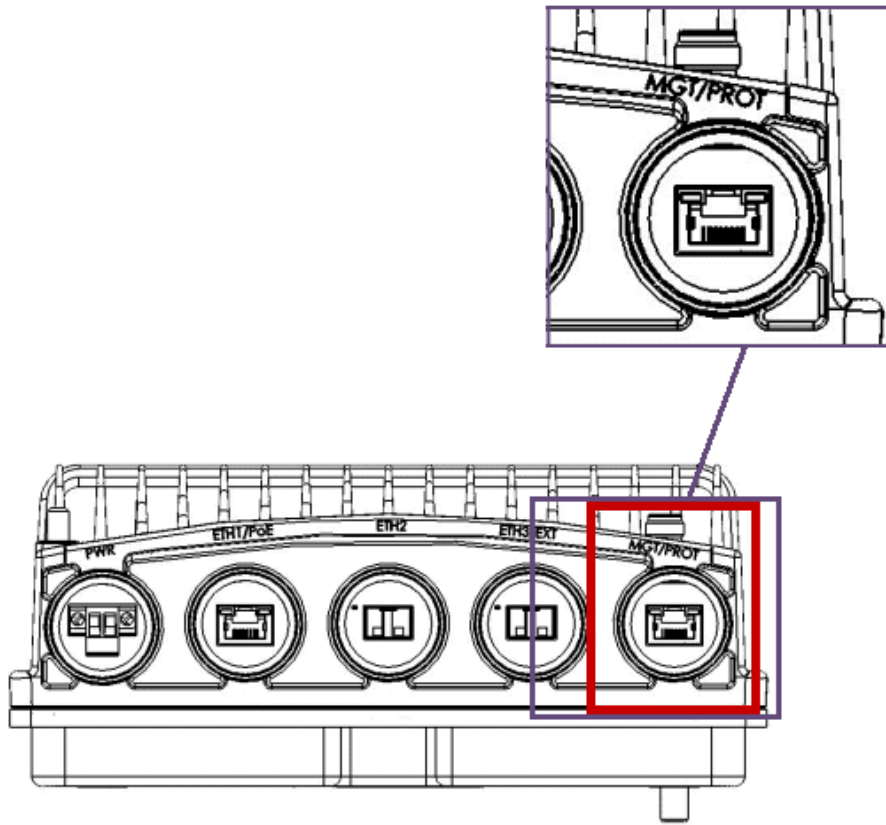


- 4 Mount and tighten the NetStream Diplo DC radio unit to both sides of the Dual Coupler Kit using the supplied captive screws and washers. Pay attention that the O-rings are correctly mounted on the radio ports of the NetStream Diplo Dual Coupler.



- 5 Connect the MIMO signaling cable between the management ports of both units. For additional instructions on preparing and connecting this cable, refer to *Management Connection for MIMO and Protection Configurations* on page 67.

Installation Procedures per Configuration Type



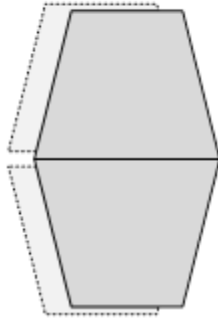
6.6. MultiCore 2+2 HSB Double Polarization Remote Mount



Note

This procedure can also be used for 2x MultiCore 1+1 HSB DP HW ready for MultiCore 2+2 HSB DP configurations.

CCDP - Protected



List of Items

| Item | Description | Quantity | Remarks |
|------|---|----------|---------------------|
| 1 | NetStream Diplo RADIO | 2 | |
| 2 | NetStream Diplo OMT KIT | 1 | |
| 3 | NetStream Diplo DUAL COUPLER KIT | 1 | |
| 4 | FLEXIBLE WG KIT | 2 | |
| 5 | NetStream Diplo DC POLE MOUNT KIT | 1 | |
| 6 | NetStream Diplo DC REMOTE MOUNT ADAPTOR KIT | 1 | From 6-13GHz |
| 7 | CIRC./CIRC. ADAPTOR | 1 | Per Antenna Vendor. |

Required Tools

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

Installation Procedures per Configuration Type

Insertion Loss

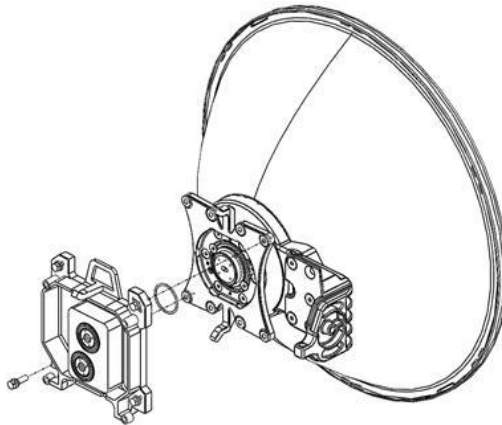
| Mediation Devices | Signal Path / Remarks | Insertion Loss [dB] | | | | | |
|---------------------------------|-----------------------|---------------------|--------|-----------|--------|-----------|-----------|
| | | 6-8 GHz | 11 GHz | 13-15 GHz | 18 GHz | 23-26 GHz | 28-42 GHz |
| Double Coupler, OMT and two WGs | Main Paths | 2.1 | 2.1 | 2.8 | 3.1 | 3.4 | 4 |
| | Secondary Paths | 6.7 | 6.7 | 7.4 | 7.5 | 7.8 | 8 |

6.6.1. Common Installation

- 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.)

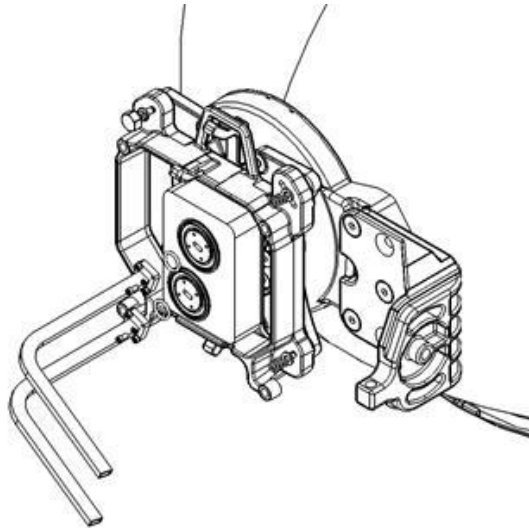


- 2 Connect the OMT Kit to the antenna and secure it with four screws. Verify the existence of the O-ring.

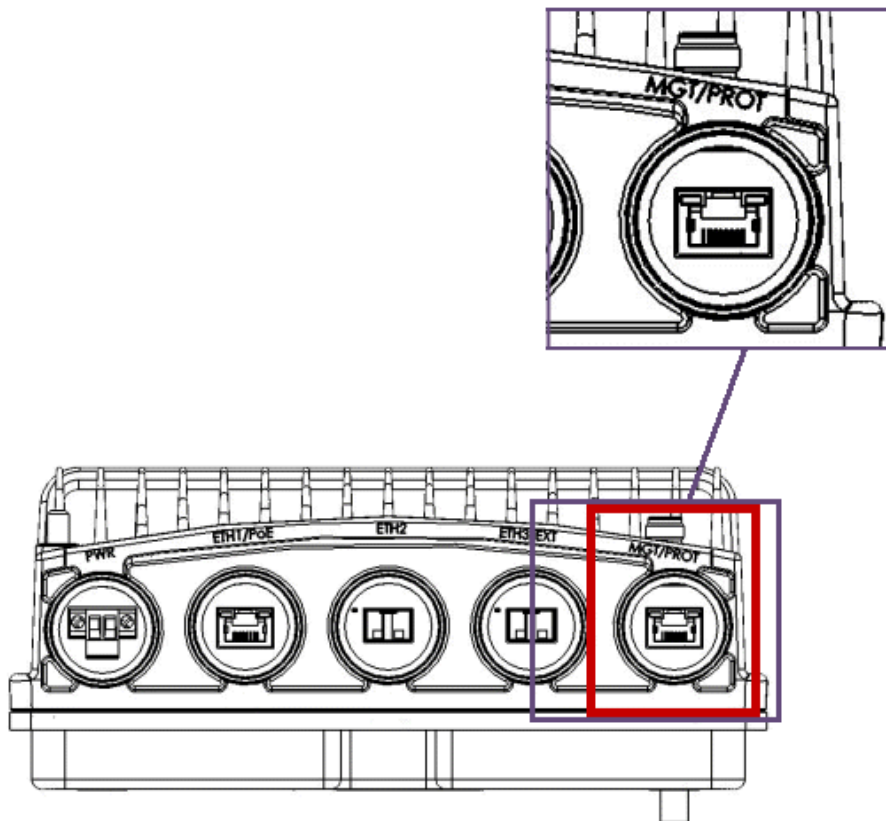


- 3 Mount and tighten the O-ring and the Flexible WG to NetStream Diplo OMT ports using the four screws supplied with the Flexible WG kit.

Installation Procedures per Configuration Type



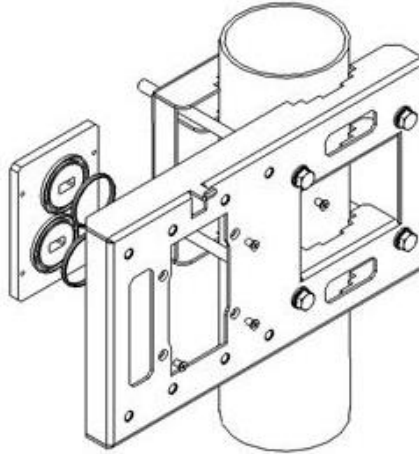
- 4 Connect the protection signaling cable between the management ports of both units. For additional instructions on preparing and connecting this cable, refer to *Management Connection for MIMO and Protection Configurations* on page 67.



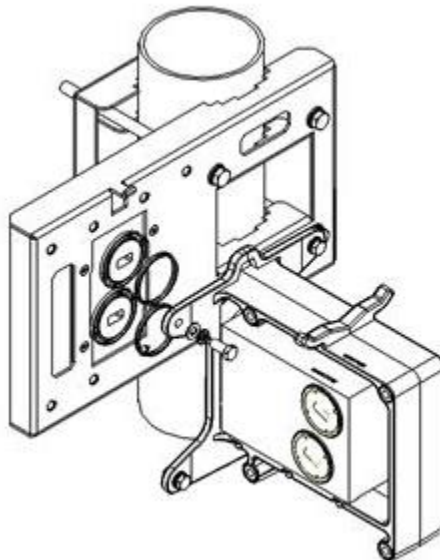
Installation Procedures per Configuration Type

6.6.2. 6-13 GHz

- 1 Mount and tighten the NetStream Diplo Remote Mount Adaptor plate (supplied in NetStream Diplo Adaptor Remote Mount kit) to the NetStream Diplo Pole Mount using the four flat screws supplied with the NetStream Diplo Adaptor Remote Mount kit.

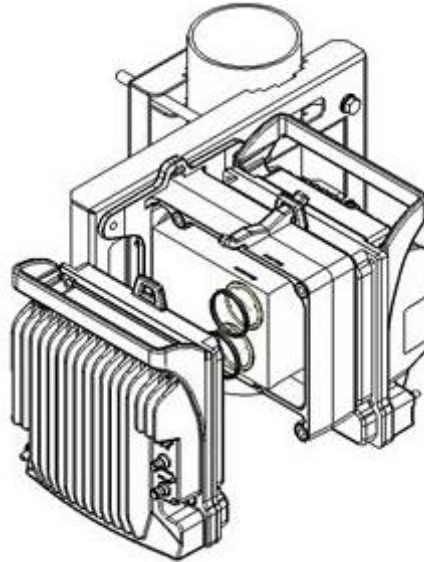


- 2 Mount and tighten the NetStream Diplo Dual Coupler to the NetStream Diplo Pole Mount using the four screws and washers that are supplied with the NetStream Diplo Dual Coupler kit. Pay attention that the O-rings are mounted on the NetStream Diplo Remote Mount Adaptor.

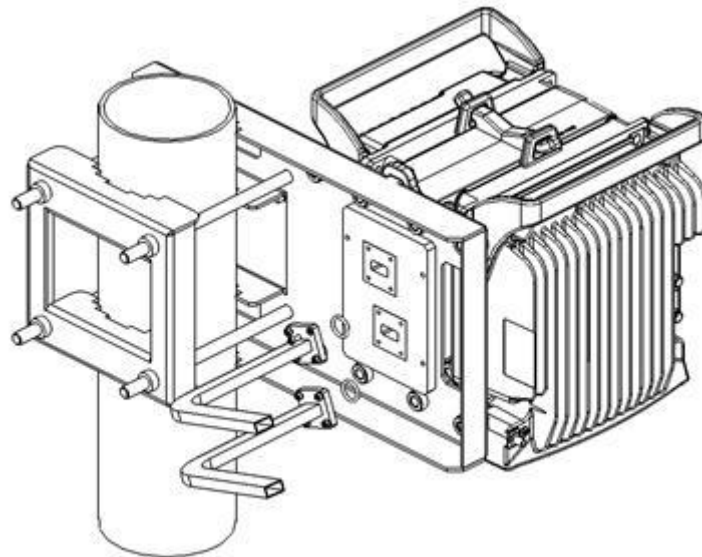


Installation Procedures per Configuration Type

- 3 Mount and tighten the NetStream Diplo radios on each side of the NetStream Diplo Dual Coupler using the screws assembled on NetStream Diplo radio. Pay attention that the O-rings are correctly assembled on the radio port of the NetStream Diplo Dual coupler.



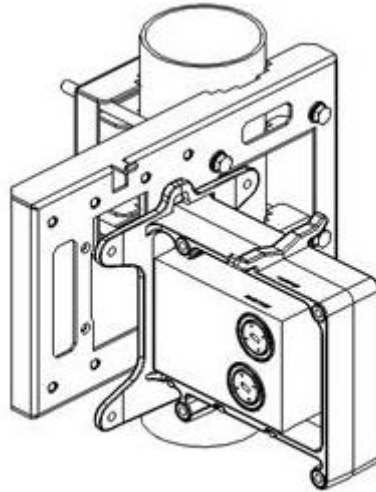
- 4 Connect both Flexible Waveguides and Sealing Gaskets supplied with each Flexible Waveguide Kit to the NetStream Diplo Dual Coupler antenna ports. Tighten the screws and washers supplied with the Flexible Waveguide Kit.



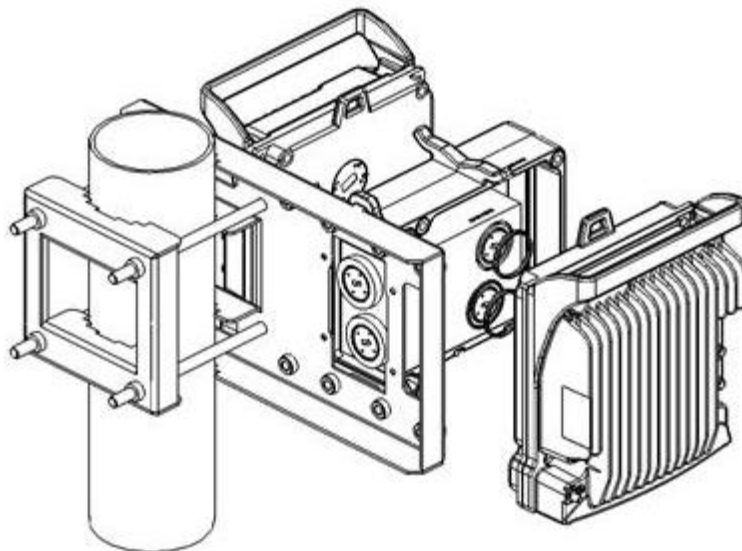
Installation Procedures per Configuration Type

6.6.3. 15-42 GHz

- 1 Mount and tighten the NetStream Diplo Dual Coupler to NetStream Diplo DC Pole Mount using the four screws and washers supplied with NetStream Diplo Dual Coupler kit.

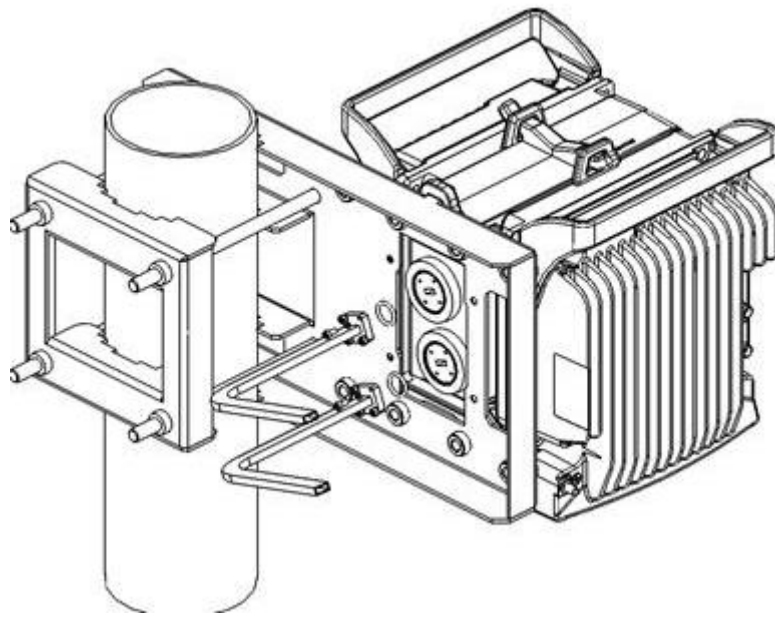


- 2 Mount and tighten the NetStream Diplo radios on each side of the NetStream Diplo Dual Coupler using the screws assembled on NS Diplo/PrimoC radio. Pay attention that the O-rings are correctly assembled on the radio port of the NetStream Diplo Dual coupler.



- 3 Mount the O-ring and the Flexible WG to NetStream Diplo Dual Coupler ports using the four screws supplied with the Flexible WG kit.

Installation Procedures per Configuration Type

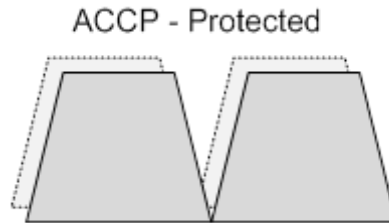


6.7. MultiCore 2+2 HSB Single Polarization Direct Mount



Note

This procedure can also be used for 2 x MultiCore 1+1 HSB SP HW ready for MultiCore 2+2 HSB SP configurations.



List of Items

| Item | Description | Quantity | Remarks |
|------|------------------------------|----------|---------|
| 1 | NetStream Diplo RADIO | 2 | |
| 2 | NetStream Diplo SPLITTER KIT | 1 | |
| 3 | DUAL COUPLER KIT | 1 | |

Required Tools

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

Insertion Loss

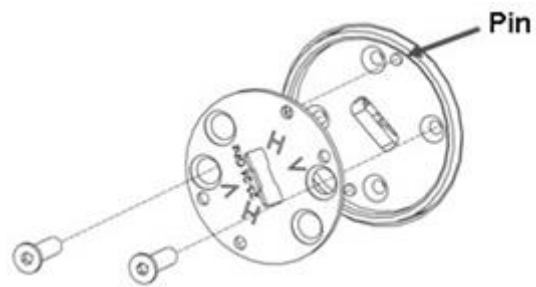
| Mediation Devices | Signal Path / Remarks | Insertion Loss [dB] | | | | | |
|-----------------------------|-----------------------|---------------------|--------|-----------|--------|-----------|-----------|
| | | 6-8 GHz | 11 GHz | 13-15 GHz | 18 GHz | 23-26 GHz | 28-42 GHz |
| Double Coupler and Splitter | Main Paths | 4.9 | 4.9 | 4.9 | 5.3 | 5.3 | 6 |
| | Secondary Paths | 9.5 | 9.5 | 9.5 | 9.7 | 9.7 | 10 |

Procedure

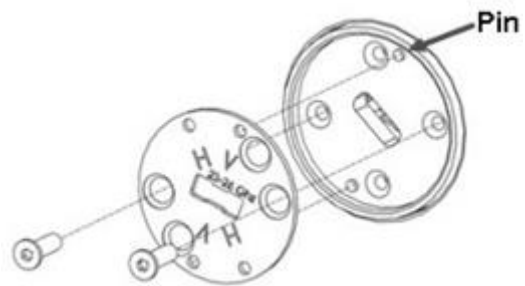
- 1 Adjust the twist on the Splitter Kit. Perform one of the procedures below, according to the required polarization (horizontal or vertical).

Horizontal polarization: Locate the holes above and below the letter “H” on the pins and fasten the two screws.

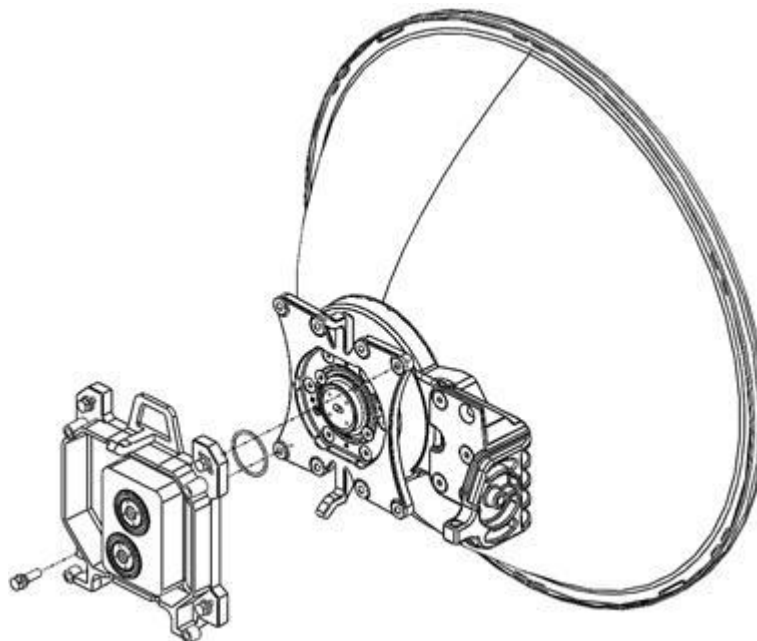
Installation Procedures per Configuration Type



Vertical polarization: Locate the holes above and below the letter “V” on the pins and fasten the two screws.

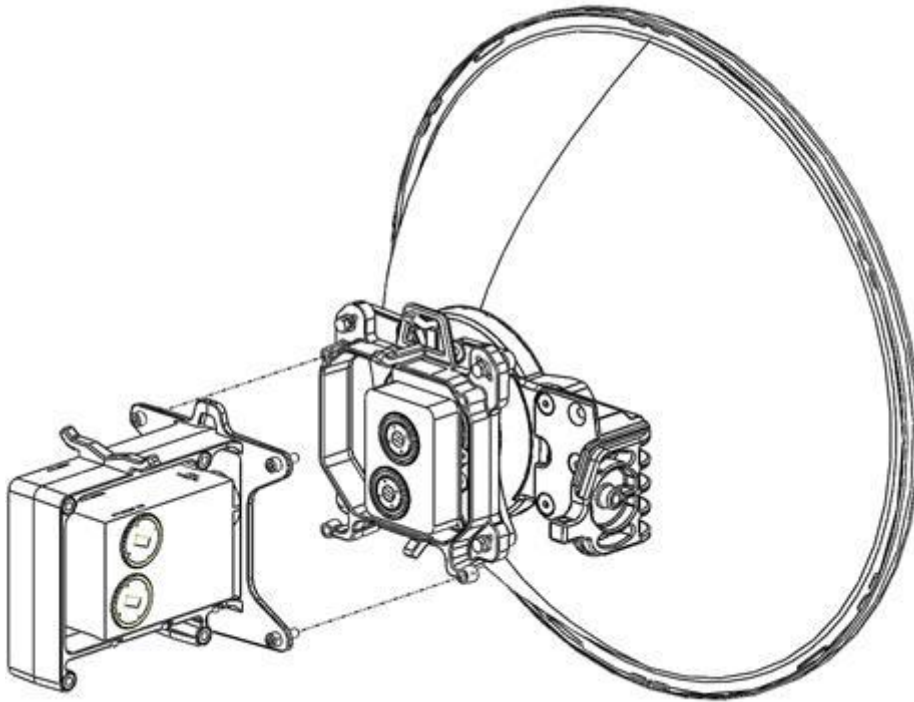


- 2 Mount the Splitter Kit on the antenna using four M8 screws and washers and tighten the screws.

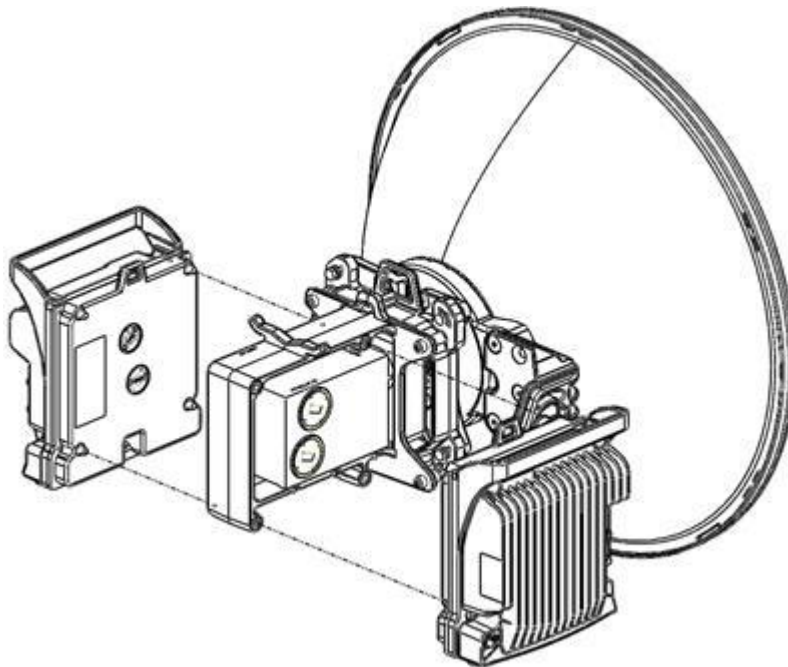


- 3 Connect the NetStream Diplo Dual Coupler Kit to the NetStream Diplo Splitter Kit using four M8 screws and washers and tighten the screws.

Installation Procedures per Configuration Type

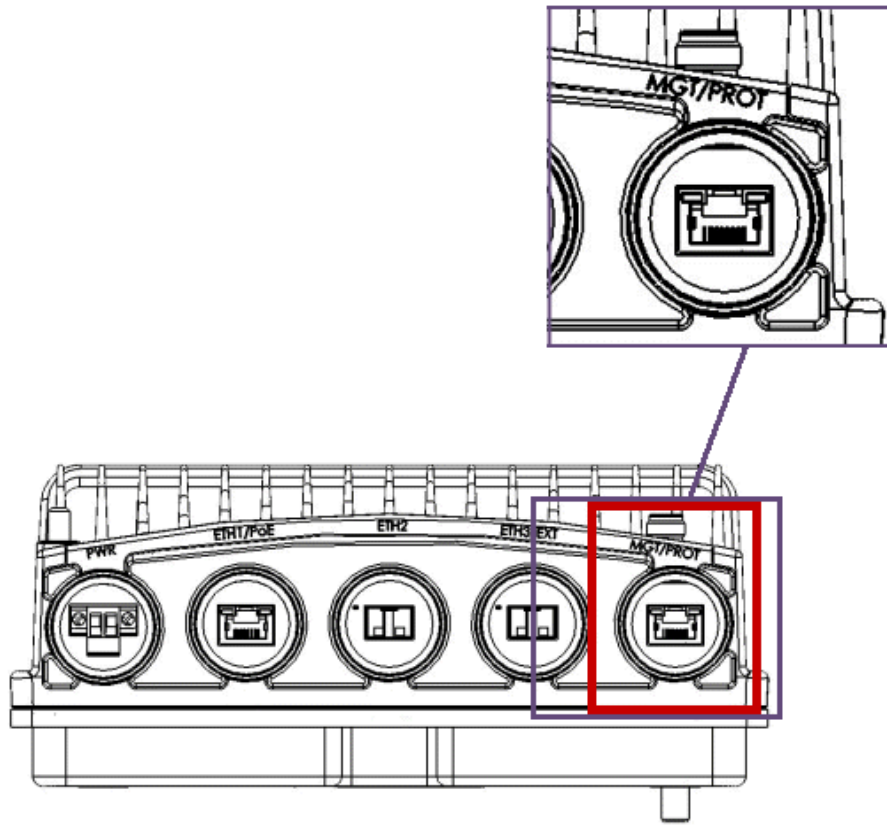


- 4 Connect the NetStream Diplo DC radio unit to both sides of the Dual Coupler Kit using the supplied captive screws and washers and tighten the screws.



- 5 Connect the protection signaling cable between the management ports of both units. For additional instructions on preparing and connecting this cable, refer to *Management Connection for MIMO and Protection Configurations* on page 67.

Installation Procedures per Configuration Type

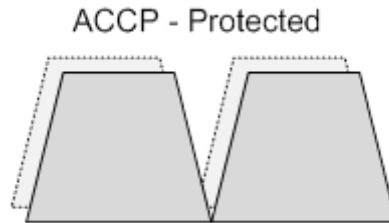


6.8. MultiCore 2+2 HSB Single Polarization Remote Mount



Note

This procedure can also be used for 2 x MultiCore 1+1 HSB SP HW ready for 2+2 HSB SP configuration.



List of Items

| Item | Description | Quantity | Remarks |
|------|--|----------|----------------|
| 1 | NetStream Diplo RADIO | 2 | |
| 2 | NetStream Diplo SPLITTER KIT | 1 | |
| 3 | NetStream Diplo DUAL COUPLER KIT | 1 | |
| 4 | FLEXIBLE WG KIT | 2 | |
| 5 | NetStream Primo/Diplo ODU POLE MOUNT KIT | 1 | |
| 6 | NetStream Primo/Diplo ODU REMOTE MOUNT ADAPTOR | 1 | From 6-13 GHz. |

Required Tools

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

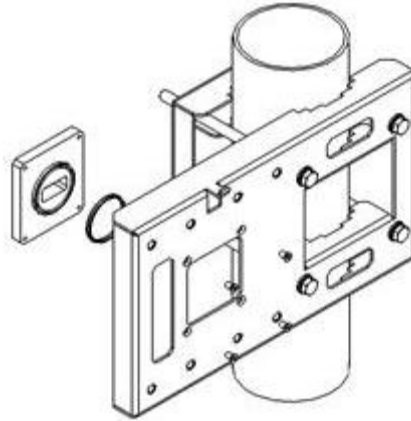
Insertion Loss

| Mediation Devices | Signal Path / Remarks | Insertion Loss [dB] | | | | | |
|---------------------------------|-----------------------|---------------------|--------|-----------|--------|-----------|-----------|
| | | 6-8 GHz | 11 GHz | 13-15 GHz | 18 GHz | 23-26 GHz | 28-42 GHz |
| Double Coupler, Splitter and WG | Main Paths | 5.4 | 5.4 | 6.1 | 6.5 | 6.8 | 7.5 |
| | Secondary Paths | 10 | 10 | 10.7 | 10.9 | 11.2 | 11.5 |

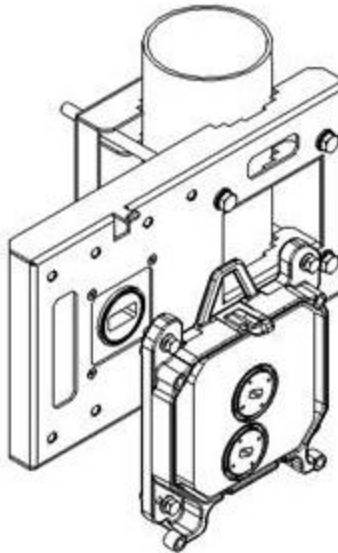
Installation Procedures per Configuration Type

6.8.1. 6-13 GHz

- 1 Mount and tighten the NetStream Primo/Diplo ODU Remote Mount Adaptor plate (supplied in NetStream Primo/Diplo ODU Adaptor Remote Mount kit) to the NetStream Primo/Diplo ODU Pole Mount using the four flat screws supplied with the NetStream Primo/Diplo ODU Adaptor Remote Mount kit.

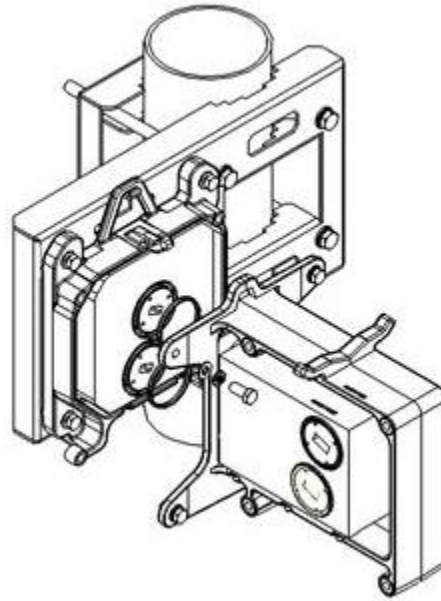


- 2 Mount and tighten the NetStream Diplo Splitter to the NetStream Primo/Diplo ODU Pole Mount using the four captive screws and washers that are assembled to the NetStream Diplo Splitter kit.

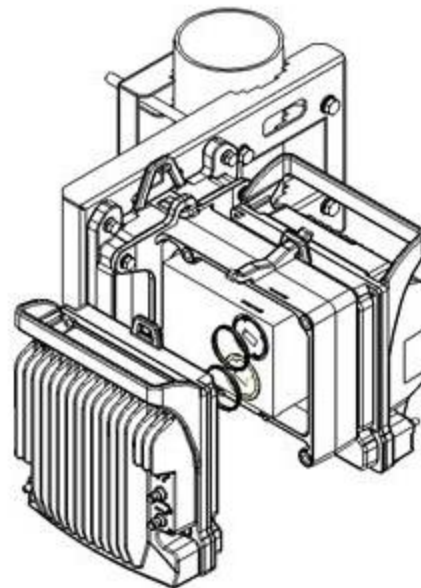


- 3 Mount and tighten the NetStream Diplo Dual Coupler to the NetStream Diplo Splitter using the four captive screws and washers that are supplied with the NetStream Diplo Dual Coupler kit. Pay attention that the O-rings are mounted on the NetStream Diplo Splitter.

Installation Procedures per Configuration Type

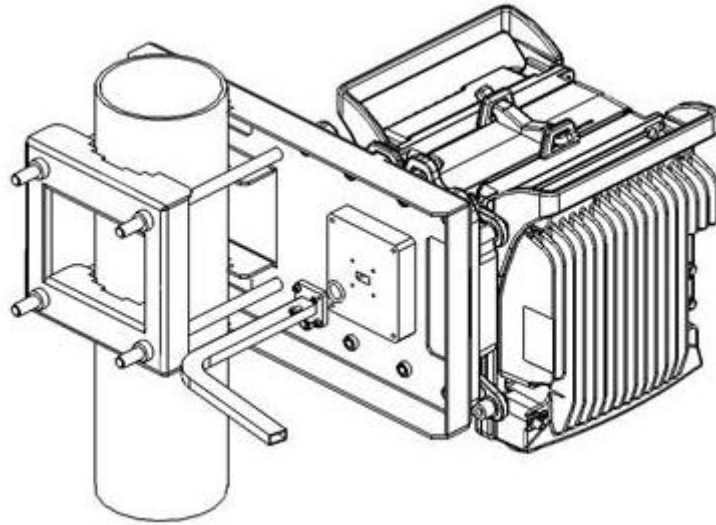


- 4 Mount and tighten the NetStream Diplo Radio to the NetStream Diplo Dual Coupler using the four screws and washers that are assembled to the NetStream Diplo Radio. Pay attention that the O-rings are mounted on the NetStream Diplo Dual Coupler.

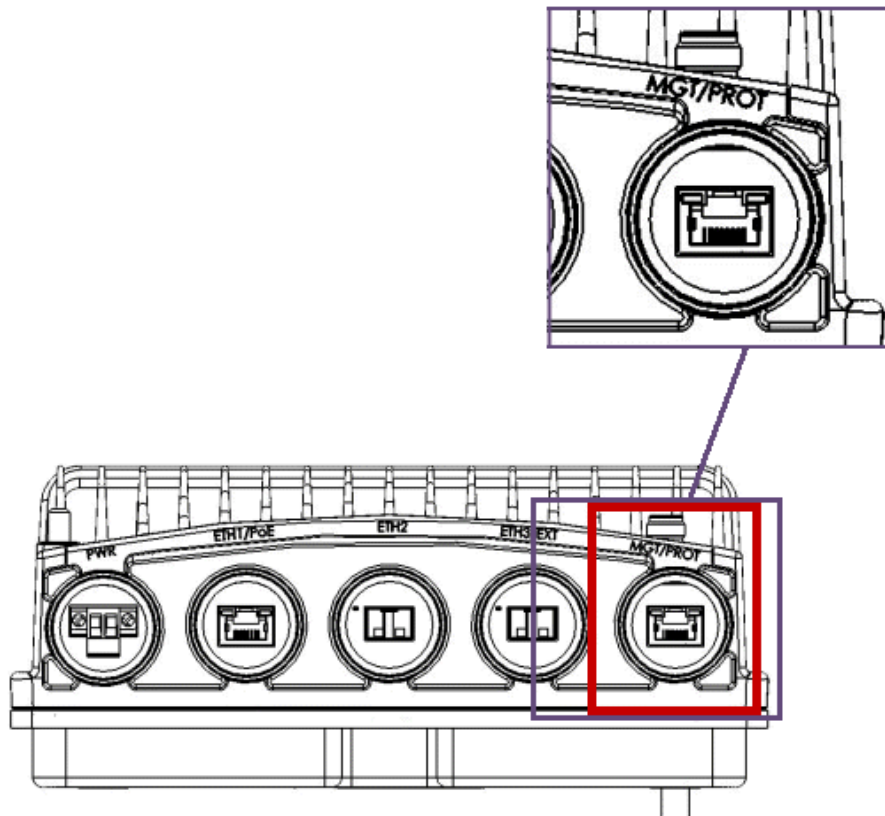


- 5 Connect the Flexible Waveguide and Sealing Gasket supplied with the Flexible Waveguide Kit to the NetStream Primo/Diplo ODU Adaptor plate. Tighten the four screws supplied with the Flexible Waveguide Kit.

Installation Procedures per Configuration Type



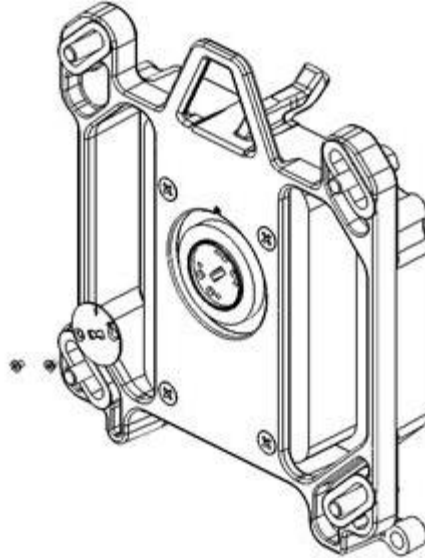
- 6 Connect the protection signaling cable between the management ports of both units. For additional instructions on preparing and connecting this cable, refer to *Management Connection for MIMO and Protection Configurations* on page 67.



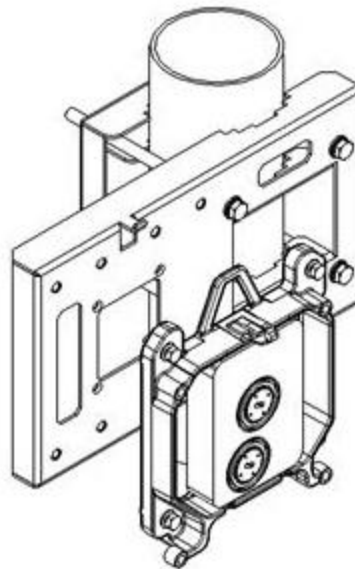
Installation Procedures per Configuration Type

6.8.2. 15-42 GHz

- 1 Loosen the two screws, and remove the twist plate from the NetStream Diplo Splitter.

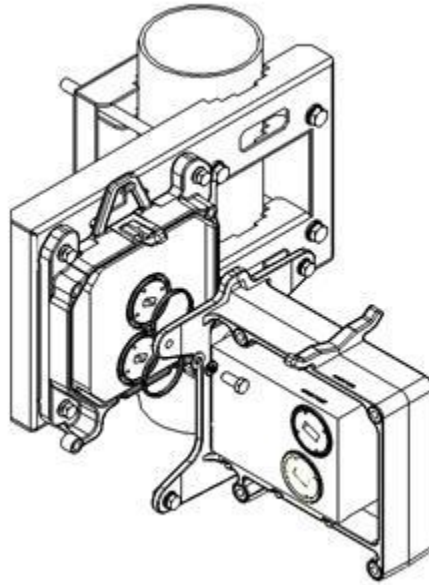


- 2 Mount and tighten the NetStream Diplo Splitter to the NetStream Primo/Diplo ODU Pole Mount using the four captive screws and washers that are assembled to the NetStream Diplo Splitter kit.

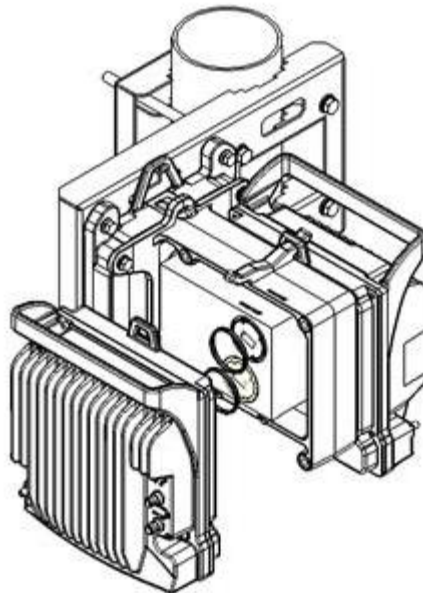


- 3 Mount and tighten the NetStream Diplo Dual Coupler to the NetStream Diplo Splitter using the four captive screws and washers that are supplied with the NetStream Diplo Dual Coupler kit. Pay attention that the O-rings are mounted on the NetStream Diplo Splitter.

Installation Procedures per Configuration Type

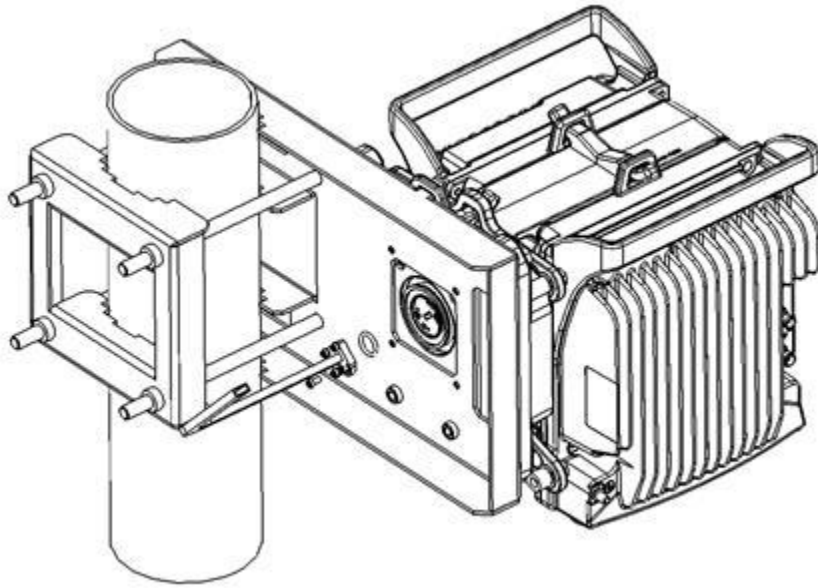


- 4 Mount and tighten the NetStream Diplo Radio to the NetStream Diplo Dual Coupler using the four screws and washers that are assembled to the NetStream Diplo radio. Pay attention that the O-rings are mounted on the NetStream Diplo Dual Coupler.

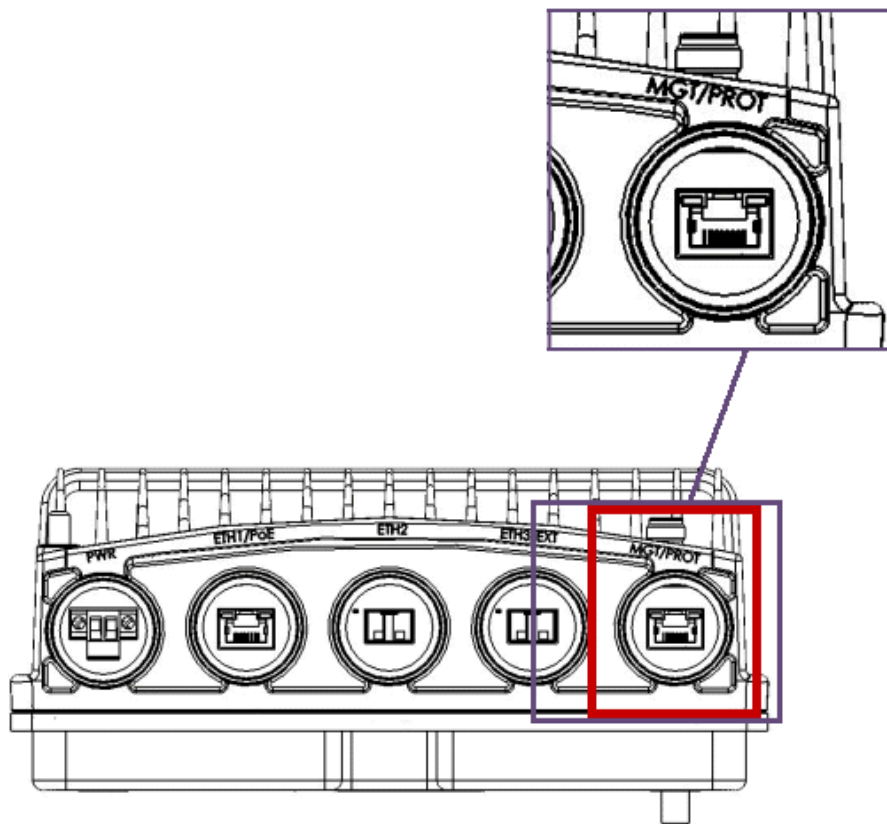


- 5 Connect the Flexible Waveguide and Sealing Gasket supplied with the Flexible Waveguide Kit to the NetStream Diplo Dual Coupler antenna port. Tighten the four screws supplied with the Flexible Waveguide kit.

Installation Procedures per Configuration Type



- 6 Connect the protection signaling cable between the management ports of both units. For additional instructions on preparing and connecting this cable, refer to *Management Connection for MIMO and Protection Configurations* on page 67.

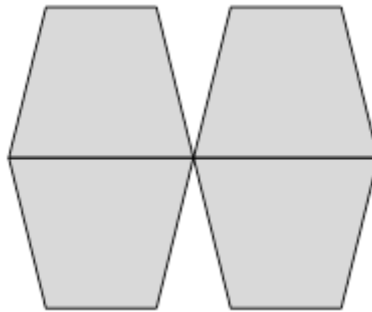


6.9. 2 x MultiCore 2+0 Dual Polarization Direct Mount



Note

This procedure can also be used for MultiCore 2+0 DP HW ready for 2 x MultiCore 2+0 DP configurations.



List of Items

| Item | Description | Quantity | Remarks |
|------|--|----------|--------------------|
| 1 | NetStream Diplo RADIO | 2 | |
| 2 | NetStream Diplo OMT KIT | 1 | |
| 3 | NetStream Diplo DUAL COUPLER or SPLITTER KIT | 1 | |
| 4 | CIRC./CIRC. ADAPTOR | 1 | Per Antenna Vendor |

Required Tools

- Metric offset hexagon key set
- Metric wrench key set

Insertion Loss

| Mediation Devices | Signal Path / Remarks | Insertion Loss [dB] | | | | | |
|-------------------------|-----------------------|---------------------|--------|-----------|--------|-----------|-----------|
| | | 6-8 GHz | 11 GHz | 13-15 GHz | 18 GHz | 23-26 GHz | 28-42 GHz |
| Double Splitter and OMT | Radio to antenna port | 3.8 | 3.8 | 3.8 | 4 | 4.2 | 4.5 |

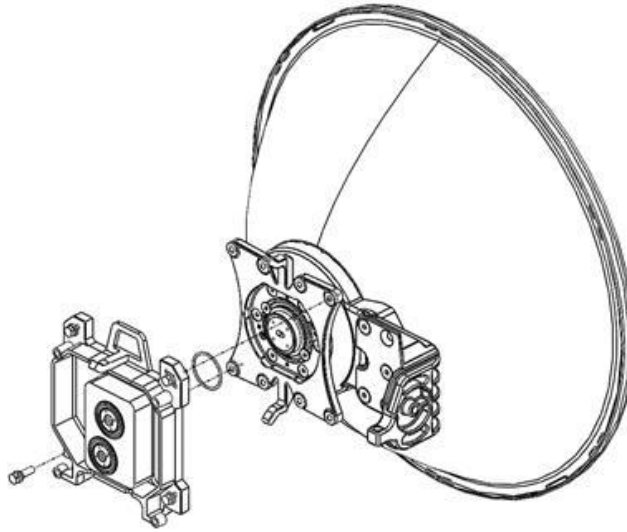
Procedure

- 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.)

Installation Procedures per Configuration Type

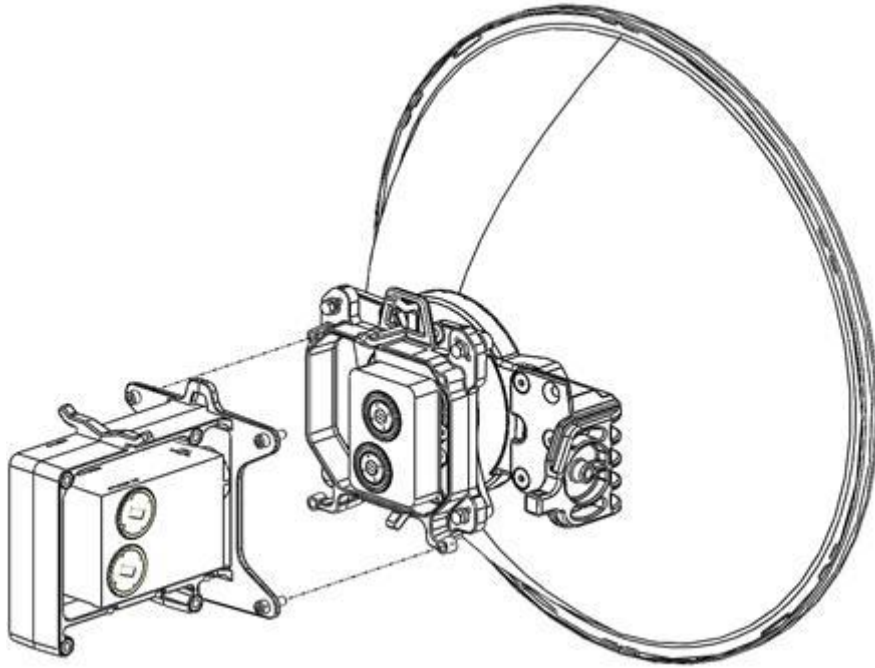


- 2 Connect the NetStream Diplo OMT Kit to the antenna and secure it with four screws. Verify existence of the O-ring.

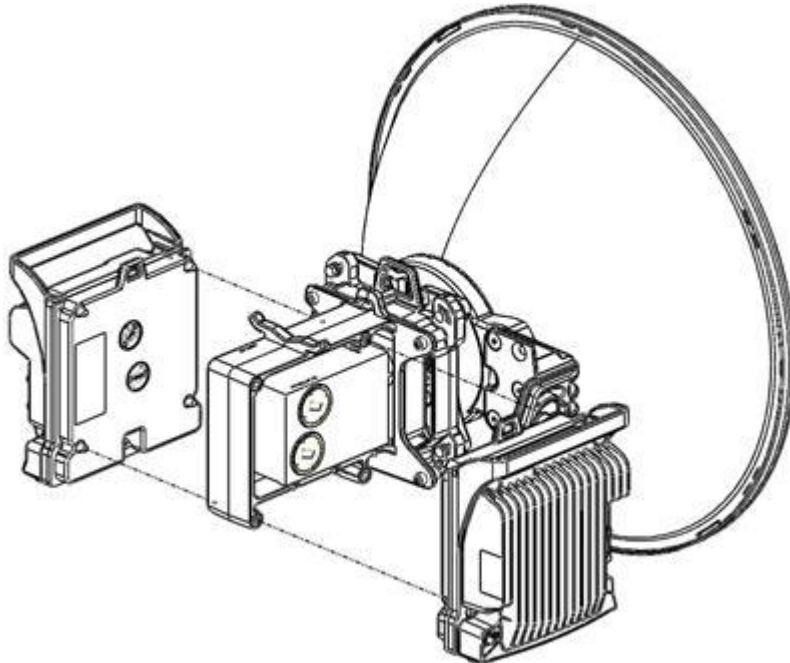


- 3 Connect the NetStream Diplo Dual Coupler Kit to the OMT Kit using four M8 screws and washers, and tighten the screws.

Installation Procedures per Configuration Type



- 4 Mount and tighten the NetStream Diplo DC radio unit to both sides of the Dual Coupler Kit using the supplied captive screws and washers. Pay attention that the O-rings are correctly mounted on the radio ports of the NetStream Diplo Dual Coupler.

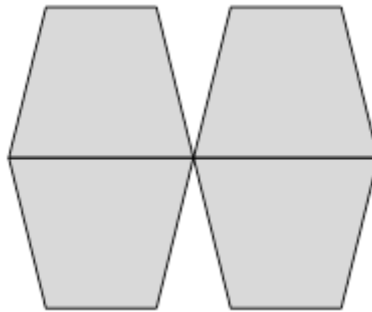


6.10. 2 x MultiCore 2+0 Dual Polarization Remote Mount



Note

This procedure can also be used for 2 x MultiCore 1+0 DP HW ready for 2 x MultiCore 2+0 DP configurations.



List of Items

| Item | Description | Quantity | Remarks |
|------|---|----------|--------------------|
| 1 | NetStream Diplo RADIO | 2 | |
| 2 | NetStream Diplo OMT KIT | 1 | |
| 3 | NetStream Diplo DUAL COUPLER OR DUAL SPLITTER KIT | 1 | |
| 4 | FLEXIBLE WG KIT | 2 | |
| 5 | NetStream Diplo DC POLE MOUNT KIT | 1 | |
| 6 | NetStream Diplo DC REMOTE MOUNT ADAPTOR KIT | 1 | From 6-13GHz |
| 7 | CIRC./CIRC. ADAPTOR | 1 | Per Antenna Vendor |

Required Tools

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

Installation Procedures per Configuration Type

Insertion Loss

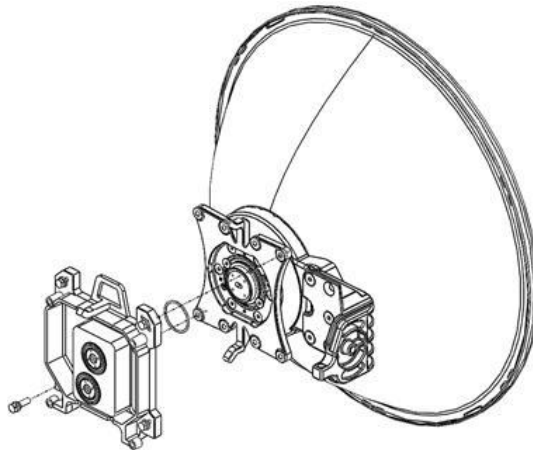
| Mediation Devices | Signal Path / Remarks | Insertion Loss [dB] | | | | | |
|----------------------------------|-----------------------|---------------------|--------|-----------|--------|-----------|-----------|
| | | 6-8 GHz | 11 GHz | 13-15 GHz | 18 GHz | 23-26 GHz | 28-42 GHz |
| Double Splitter, OMT and two WGs | Radio to antenna port | 4.3 | 4.3 | 5 | 5.2 | 5.7 | 6 |

6.10.1. Common Installation 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.)

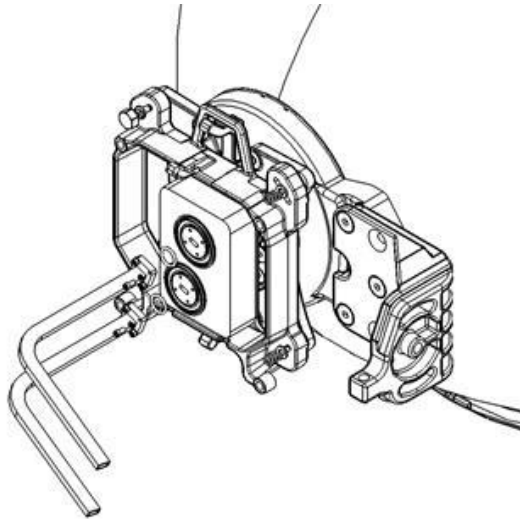


- 2 Connect the OMT Kit to the antenna and secure it with four screws. Verify the existence of the O-ring.



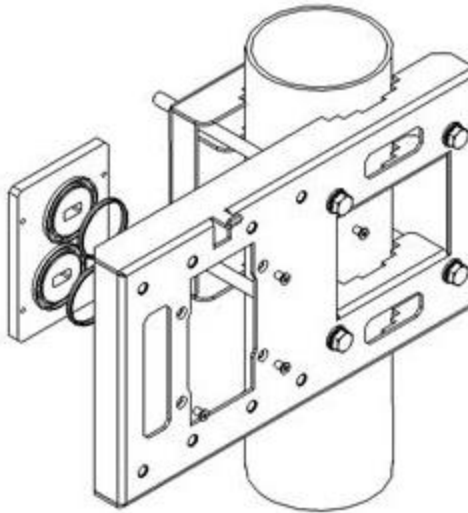
- 3 Mount and tighten the O-ring and the Flexible WG to NetStream Diplo OMT ports using the four screws supplied with the Flexible WG kit.

Installation Procedures per Configuration Type



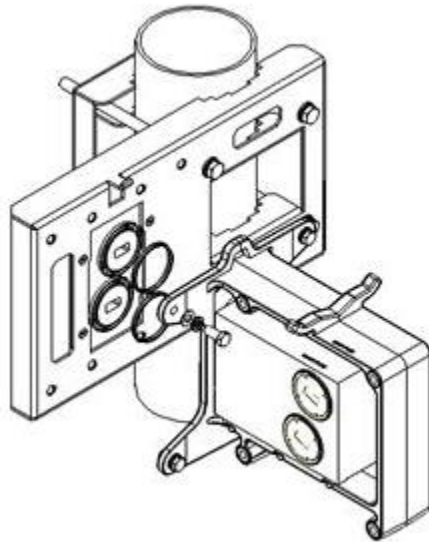
6.10.2. 6-13 GHz

- 1 Mount and tighten the NS PRIMO Remote Mount Adaptor plate (supplied in NetStream Diplo Adaptor Remote Mount kit) to the NetStream Diplo Pole Mount using the four flat screws supplied with the NetStream Diplo Adaptor Remote Mount kit.

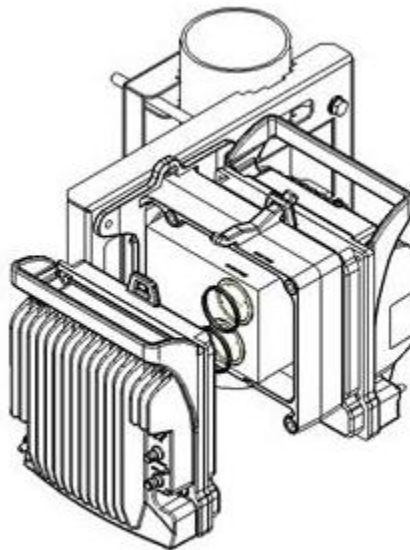


- 2 Mount and tighten the NetStream Diplo Dual Coupler to the NetStream Diplo Pole Mount using the four screws and washers that are supplied with the NetStream Diplo Dual Coupler kit. Pay attention that the O-rings are mounted on the NetStream Diplo Remote Mount Adaptor.

Installation Procedures per Configuration Type

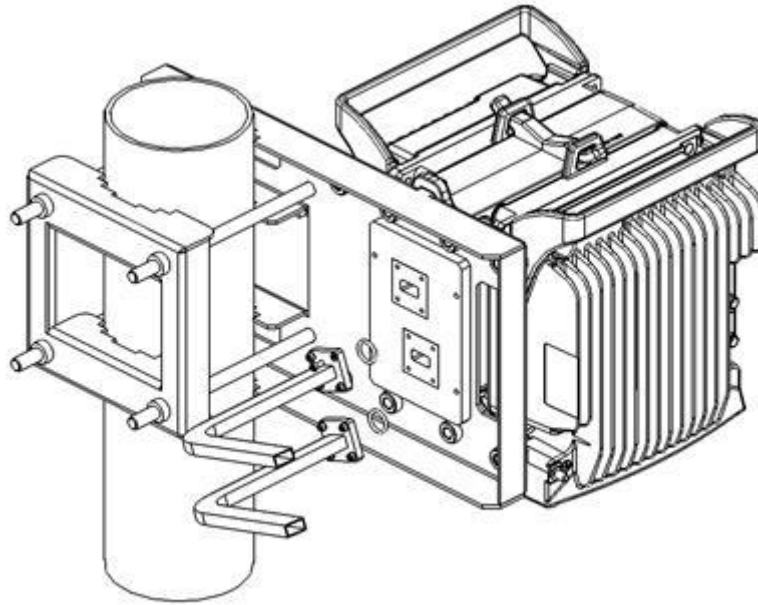


- 3 Mount and tighten the NetStream Diplo radios on each side of the NetStream Diplo Dual Coupler using the screws assembled on NetStream Diplo radio. Make sure that the O-rings are correctly assembled on the radio port of the NetStream Diplo Dual Coupler.



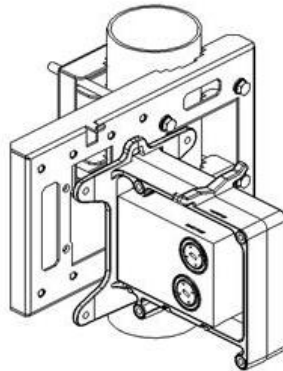
- 4 Connect both Flexible Waveguides and Sealing Gaskets supplied with each Flexible Waveguide Kit to the NetStream Diplo Dual Coupler antenna ports. Tighten the screws and washers supplied with the Flexible Waveguide Kit.

Installation Procedures per Configuration Type



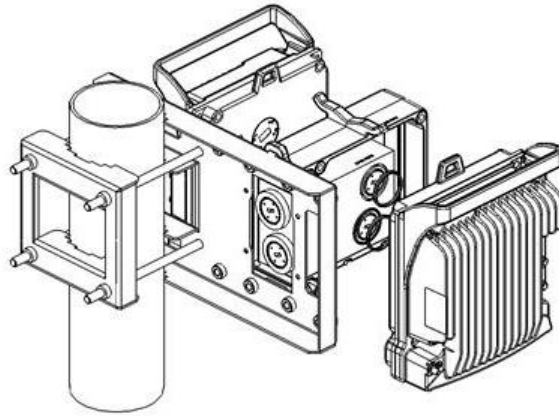
6.10.3. 15-42 GHz

- 1 Mount and tighten the NetStream Diplo Dual Coupler to NetStream Diplo DC Pole Mount using the four screws and washers supplied with NetStream Diplo Dual Coupler kit.

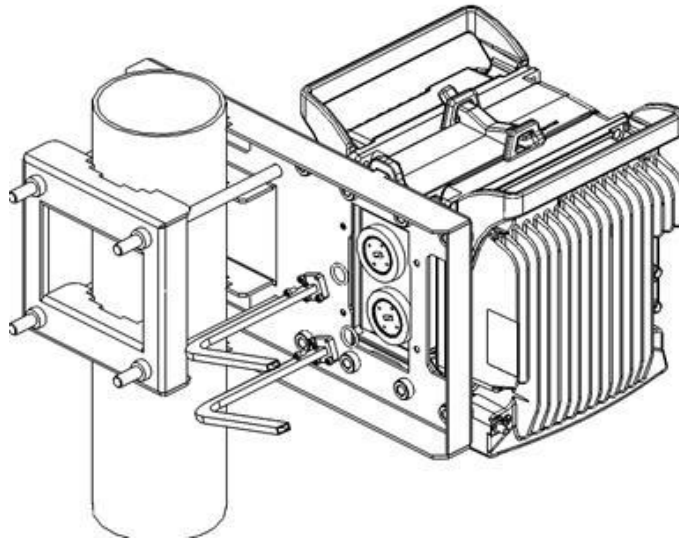


- 2 Mount and tighten the NetStream Diplo radios on each side of the NetStream Diplo Dual Coupler using the screws assembled on NetStream Diplo radio. Pay attention that the O-rings are correctly assembled on the radio port of the NetStream Diplo Dual Coupler.

Installation Procedures per Configuration Type



- 3 Mount the O-ring and the Flexible WG to NetStream Diplo Dual Coupler ports using the four screws supplied with the Flexible WG kit.

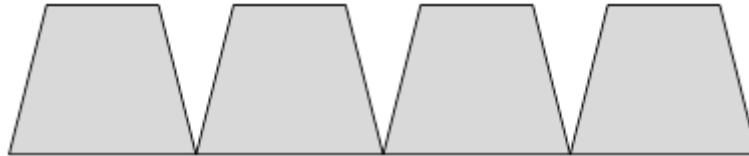


6.11. 2 x MultiCore 2+0 Single Polarization Direct Mount



Note

This procedure can also be used for 2 x MultiCore 1+0 SP HW ready for 2 x MultiCore 2+0 SP configurations.



List of Items

| Item | Description | Quantity | Remarks |
|------|-----------------------------------|----------|---------|
| 1 | NetStream Diplo RADIO | 2 | |
| 2 | NetStream Diplo Splitter Kit | 1 | |
| 3 | NetStream Diplo Dual Splitter Kit | 1 | |

Required Tools

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

Insertion Loss

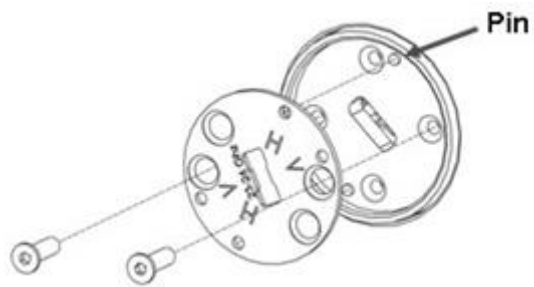
| Mediation Devices | Signal Path / Remarks | Insertion Loss [dB] | | | | | |
|------------------------------|-----------------------|---------------------|--------|-----------|--------|-----------|-----------|
| | | 6-8 GHz | 11 GHz | 13-15 GHz | 18 GHz | 23-26 GHz | 28-42 GHz |
| Double Splitter and splitter | Radio to antenna port | 7 | 7 | 7 | 7.4 | 7.4 | 8 |

Procedure

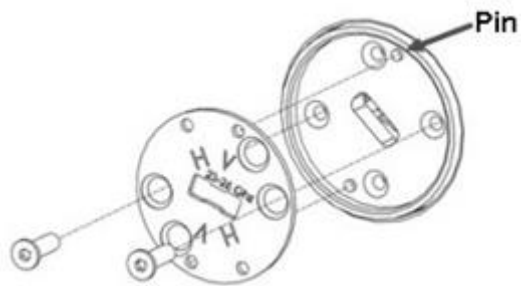
- 1 Adjust the twist on the NetStream Diplo Splitter Kit. Perform one of the procedures below according to the required polarization

Horizontal polarization: Locate the holes above and below the letter “H” on the pins and fasten the two screws.

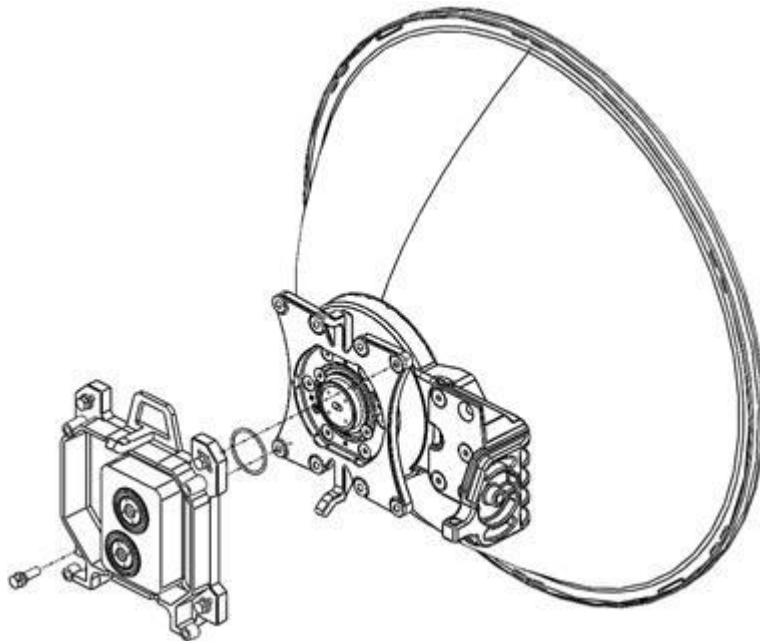
Installation Procedures per Configuration Type



Vertical polarization: Locate the holes above and below the letter “V” on the pins and fasten the two screws.

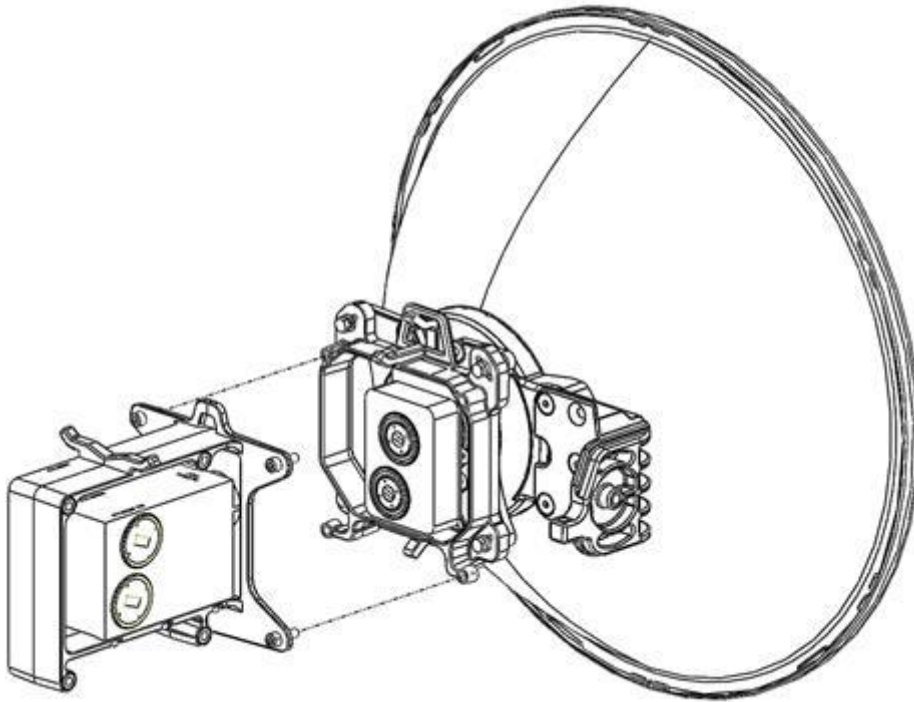


- 2 Mount the Splitter Kit on the antenna using four M8 screws and washers and tighten the screws.

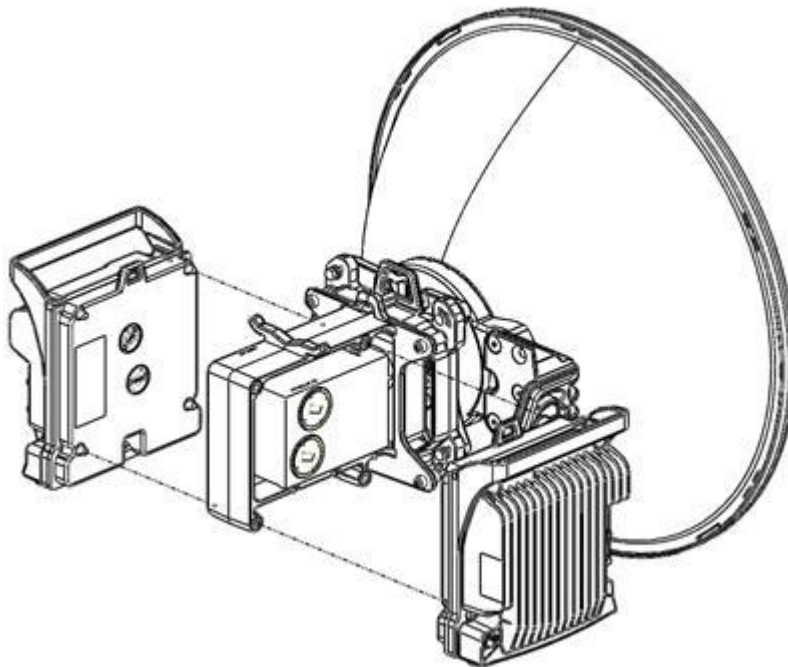


- 3 Connect the NetStream Diplo Dual Coupler Kit to the NetStream Diplo Splitter Kit using four M8 screws and washers and tighten the screws.

Installation Procedures per Configuration Type



- 4 Connect the NetStream Diplo DC radio unit to both sides of the Dual Coupler Kit using the supplied captive screws and washers and tighten the screws.

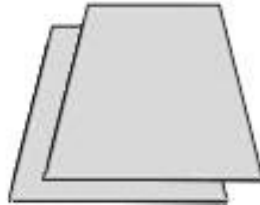


6.12. 2x2 LoS MIMO Direct Mount



Note

This procedure can also be used for 1+0 SD configurations.



List of Items

| Item | Description | Quantity | Remarks |
|------|-------------------------------|----------|----------|
| 1 | NetStream Diplo Radio | 1 | |
| 2 | NetStream Diplo Dual Core Kit | 1 | |
| 3 | Flexible WG Kit | 1 | Optional |
| 4 | Coax to WG Kit | 1 | Optional |

Required Tools

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

Insertion Loss

| Mediation Devices | Signal Path / Remarks | Insertion Loss [dB] | | | | | |
|-----------------------------------|-------------------------------|---|--------|-----------|--------|-----------|-----------|
| | | 6-8 GHz | 11 GHz | 13-15 GHz | 18 GHz | 23-26 GHz | 28-42 GHz |
| Dual Core Mediation Device and WG | Radio to antenna (upper path) | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.5 |
| | WG port to second antenna | Frequency band and WG length (antenna separation) dependent | | | | | |

Procedure

- 1 Adjust the twist on the dual core kit according to the required polarization.

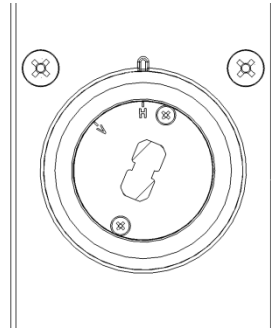


Note

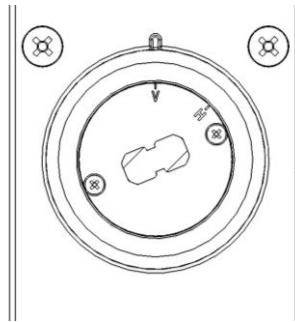
Make sure the polarization mounting direction of the twist to the dual core is according to the antenna polarization.

Installation Procedures per Configuration Type

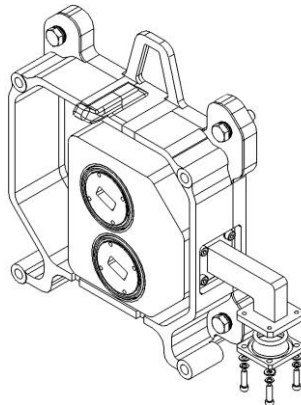
- For horizontal polarization, locate the holes above and below the letter “H” on the pins and fasten the two screws.



- For vertical polarization, locate the holes above and below the letter “V” on the pins and fasten the two screws.



- 2 If not required, remove the plate assembled to the bended part of the dual core kit.



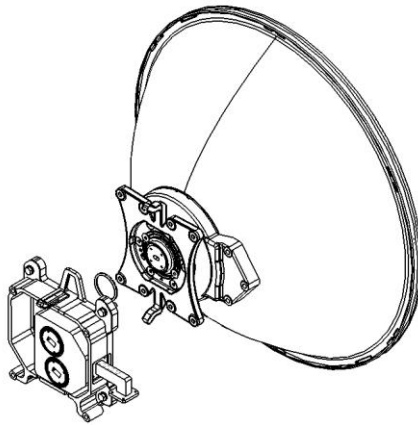
- 3 Mount and tighten the NetStream Diplo dual core kit on the antenna using the four M8 screws and washers.



Note

Verify that the O-ring is properly mounted between the antenna transition and the dual core.

Installation Procedures per Configuration Type

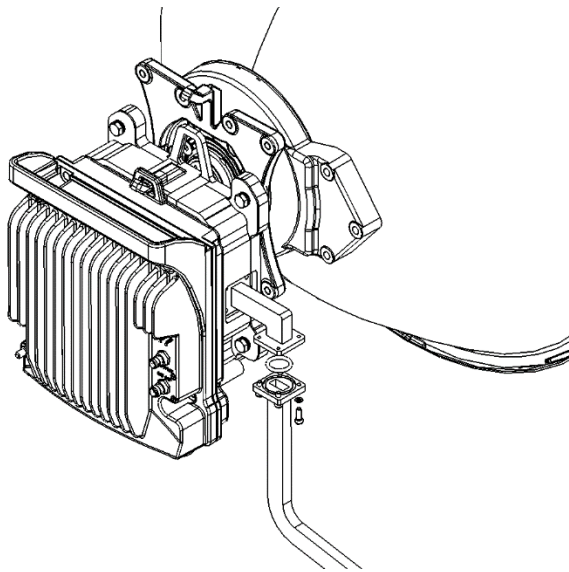


- 4 Connect the NetStream Diplo radio to the NetStream Diplo dual core kit using four M8 screws and washers and tighten the screws.



Note

Verify that the O-rings are properly mounted between the dual core and the radio.



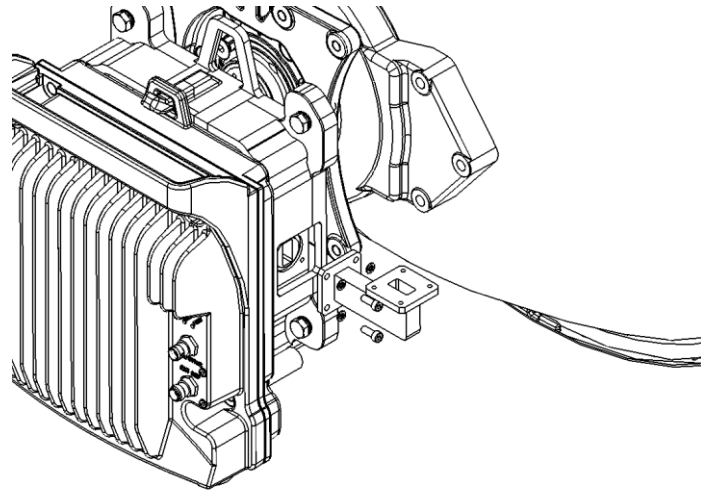
- 5 You can switch the orientation of the dual core flange connection by removing screws and rotating the bended part. Place back O-ring and tighten back screws.



Note

Verify that the O-rings are properly mounted between the dual core and the Coax to WG flange.

Installation Procedures per Configuration Type

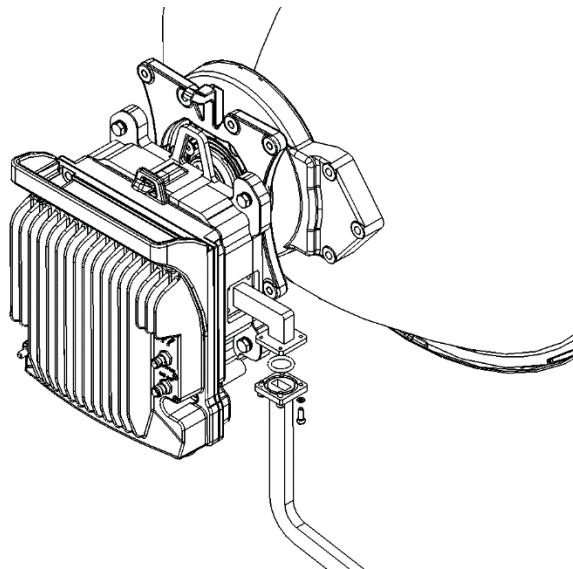


- 6 Connect the flexible waveguide to the NetStream Diplo dual core kit using O-ring, screws and washers supplied with flexible waveguide kit and tighten the screws.



Note

Verify that the O-rings are properly mounted between the dual core and the flexible waveguide flange.

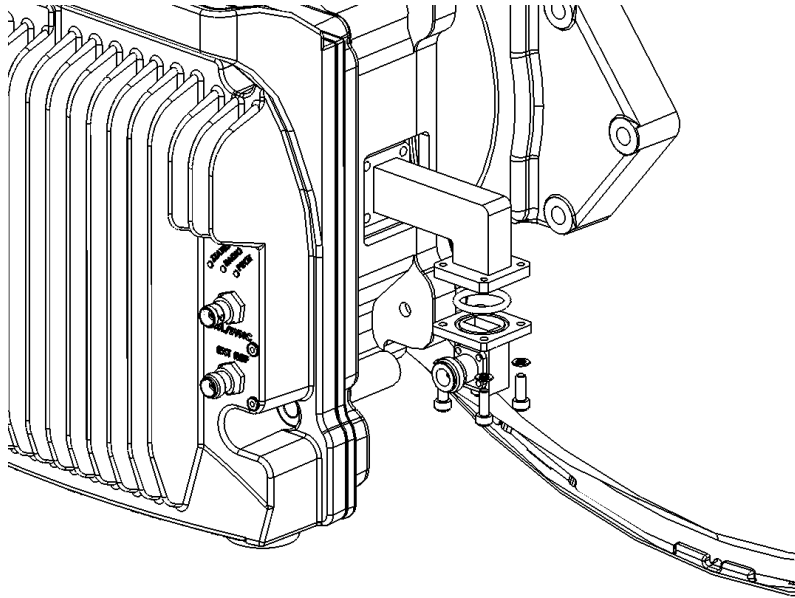


- 7 You can also connect the dual core flange to coax to WG adapter supplied separately. Place O-ring and tighten screws and washers supplied with Coax to WG adapter kit.



Note

Verify that the O-rings are properly mounted between the dual core and the Coax to WG flange.

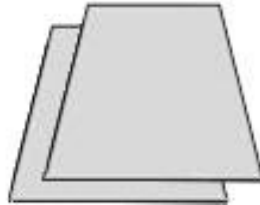


6.13. 2x2 LoS MIMO Remote Mount



Note

This procedure can also be used for 1+0 SD configurations.



List of Items

| Item | Description | Quantity | Remarks |
|------|--|----------|--------------|
| 1 | NetStream Diplo RADIO | 1 | |
| 2 | NetStream Diplo REMOTE MOUNT ADAPTOR KIT | 1 | From 6-13GHz |

Required Tools

- Metric offset hexagon key set
- Metric wrench key set

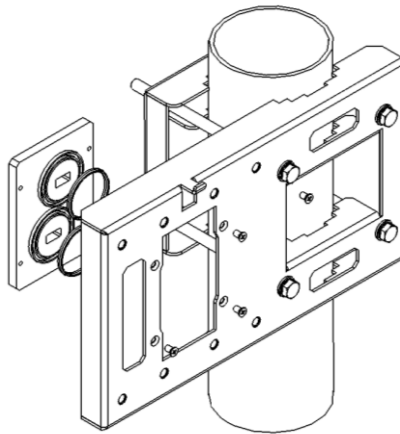
Insertion Loss

| Mediation Devices | Signal Path / Remarks | Insertion Loss [dB] | | | | | |
|-------------------|--|---|--------|-----------|--------|-----------|-----------|
| | | 6-8 GHz | 11 GHz | 13-15 GHz | 18 GHz | 23-26 GHz | 28-42 GHz |
| WGs | NetStream Diplo antenna port to antenna port | Frequency band and WG length (antenna separation) dependent | | | | | |

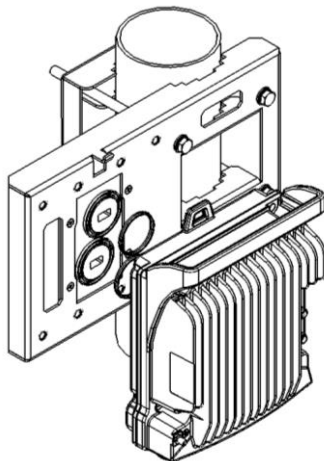
6.13.1. For 6-13 GHz

- 1 Mount and tighten the NETSTREAM DIPLO Remote Mount Adaptor plate (supplied in NetStream Diplo Adaptor Remote Mount kit) to the NetStream Diplo Pole Mount using the four flat screws supplied with the NetStream Diplo Adaptor Remote Mount kit.

Installation Procedures per Configuration Type

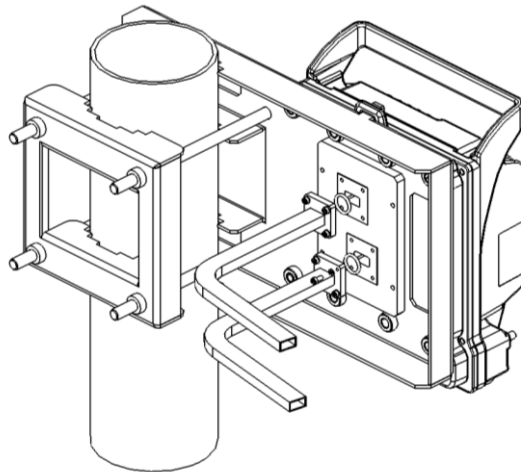


- 2 Mount and tighten the NetStream Diplo Radio to the NetStream Diplo Pole Mount using the four captive screws and washers that are supplied with the NetStream Diplo Radio. Pay attention that the O-rings are mounted on the NetStream Diplo Remote Mount Adaptor.



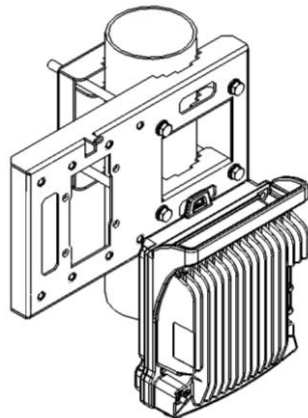
- 3 Mount and tighten both Flexible WGs with their O-ring to the NetStream Diplo Remote Mount Adaptor ports using the four screws supplied with each Flexible WG kit.

Installation Procedures per Configuration Type

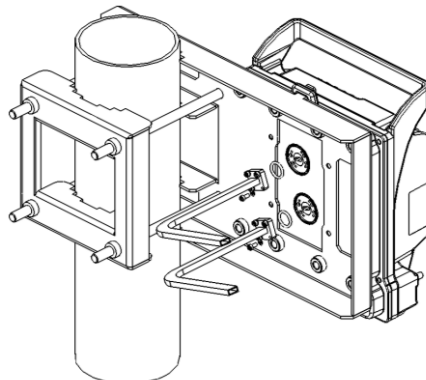


6.13.2. 15-42GHz

- 1 Mount and tighten the NetStream Diplo radio to the NetStream Diplo DC Pole Mount using the four screws assembled on the NetStream Diplo radio.

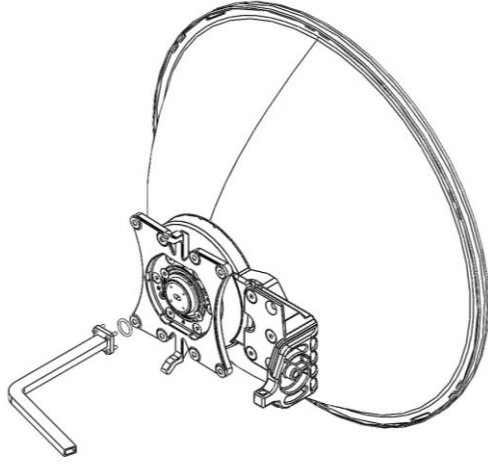


- 2 Mount and tighten the O-ring and the Flexible WG to NetStream Diplo radio ports using the four screws supplied with the Flexible WG kit.



Installation Procedures per Configuration Type

- 3 Mount and tighten the O-ring and flexible WG to both antenna ports using the four screws supplied with the flexible WG kit.



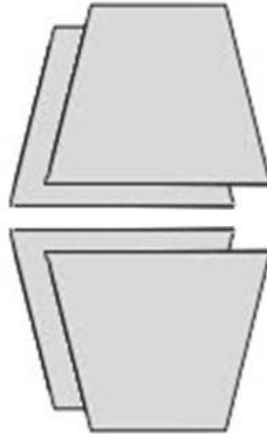
6.14. 4x4 LoS MIMO Direct Mount



Note

1) This procedure can also be used for MultiCore 2+0 SP HW ready for 2 x MultiCore 2+0 SP configurations.

2) This procedure can also be used for 2+2 SD configurations.



List of Items

| Item | Description | Quantity | Remarks |
|------|----------------------------|----------|--------------------|
| 1 | NetStream Diplo RADIO | 2 | |
| 2 | NetStream Diplo OMT KIT | 2 | |
| 3 | MIMO DATA CABLE | 1 | |
| 4 | SOURCE SHARING CABLE | 1 | |
| 5 | CAT5E MIMO SIGNALING CABLE | 1 | |
| 6 | CIRC./CIRC. ADAPTOR | 1 | Per Antenna Vendor |

Required Tools

- Metric offset hexagon key set
- Metric wrench key set

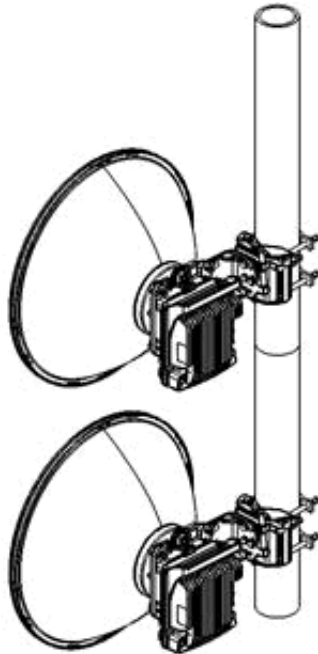
Installation Procedures per Configuration Type

Insertion Loss

| Mediation Devices | Signal Path / Remarks | Insertion Loss [dB] | | | | | |
|------------------------------|--|---------------------|--------|-----------|--------|-----------|-----------|
| | | 6-8 GHz | 11 GHz | 13-15 GHz | 18 GHz | 23-26 GHz | 28-42 GHz |
| OMT for each NetStream Diplo | Each NetStream Diplo antenna port to Mediation device antenna port | 0.3 | 0.3 | 0.3 | 0.3 | 0.5 | 0.5 |

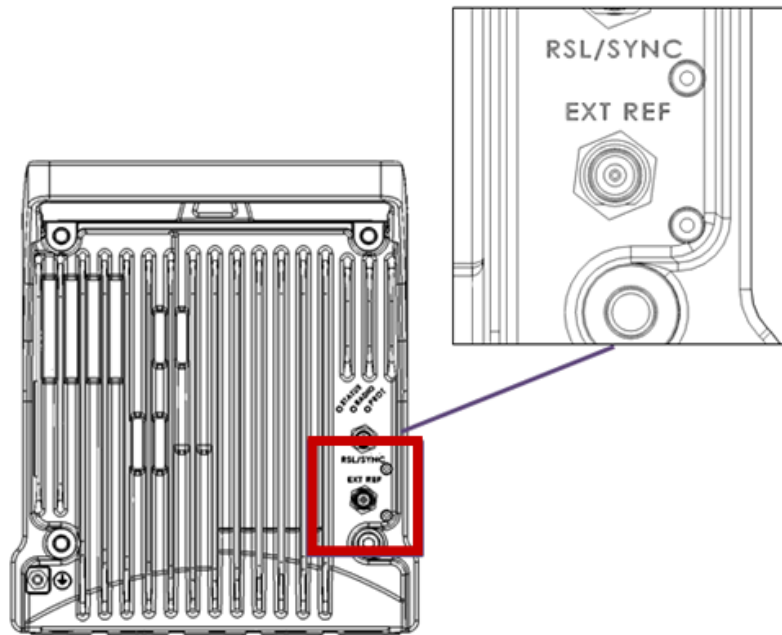
Procedure

- 1 For instructions on installation of the NS Primo OMT and radios, see *MultiCore 2+0 Dual Polarization Direct Mount* on page 70.



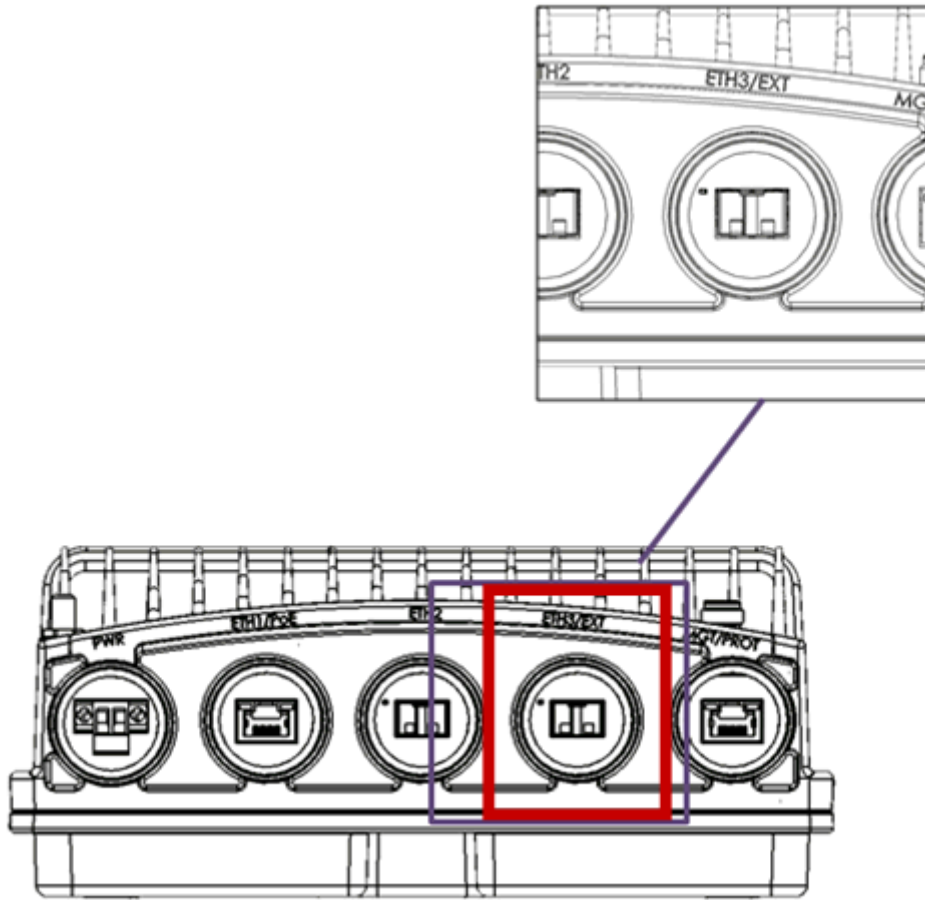
- 2 Connect the source sharing cable between both EXT REF NetStream Diplo radio connectors. The maximum torque for connecting this cable to the radio is 5Lb.in (0.5N.m).

Installation Procedures per Configuration Type



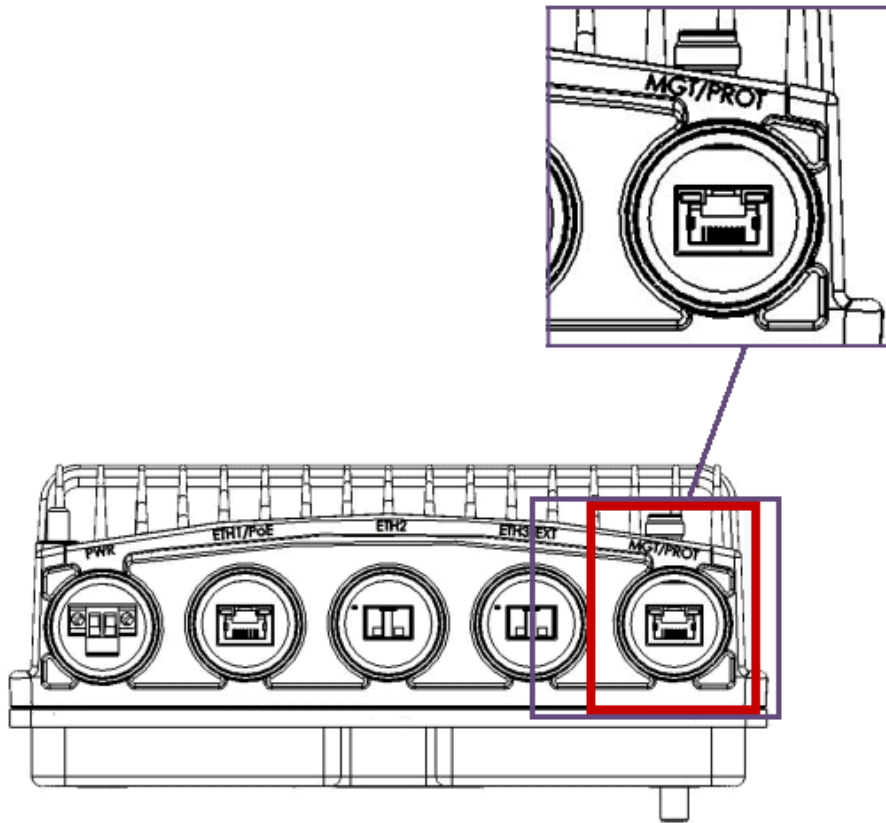
- 3 Connect the MIMO data sharing cable between both ETH3/EXT NetStream Diplo radio connectors.

Installation Procedures per Configuration Type



4. Connect the MIMO signaling cable between the management ports of both units. For additional instructions on preparing and connecting this cable, refer to *Management Connection for MIMO and Protection Configurations* on page 67.

Installation Procedures per Configuration Type



6.15. 4+0 Dual Polarization, 2+2HSB Single/Dual Polarization Direct Mount

List of Items

| Item | Description | Quantity | Remarks |
|------|--|----------|---------|
| 1 | NetStream Diplo Dual Coupler/Splitter/Circulator | 1 | |
| 2 | NetStream Diplo OMT/Splitter Kit | 1 | |
| 3 | NetStream Diplo Radios | 2 | |

Required Tools

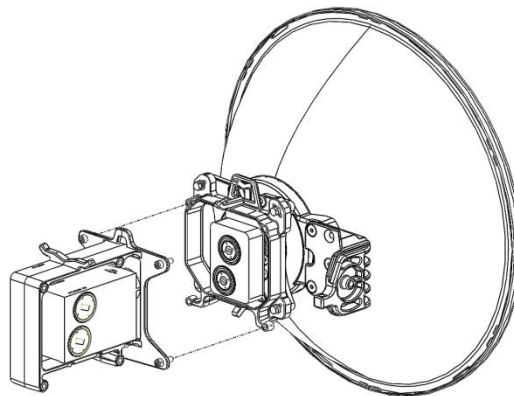
- Metric offset hexagon key set
- Metric wrench key set

Procedure

- 1 Once the OMT/Splitter is mounted to the antenna, connect the NetStream Diplo Dual Coupler/Splitter kit to the OMT kit using four M8 screws and washers, and tighten the screws.



Verify that the O-ring is properly mounted between the OMT/Splitter ports and the Dual Coupler/Splitter.



- 2 Connect the NetStream Diplo DC radios using the four M8 captive screws and washers supplied, and tighten the screws.



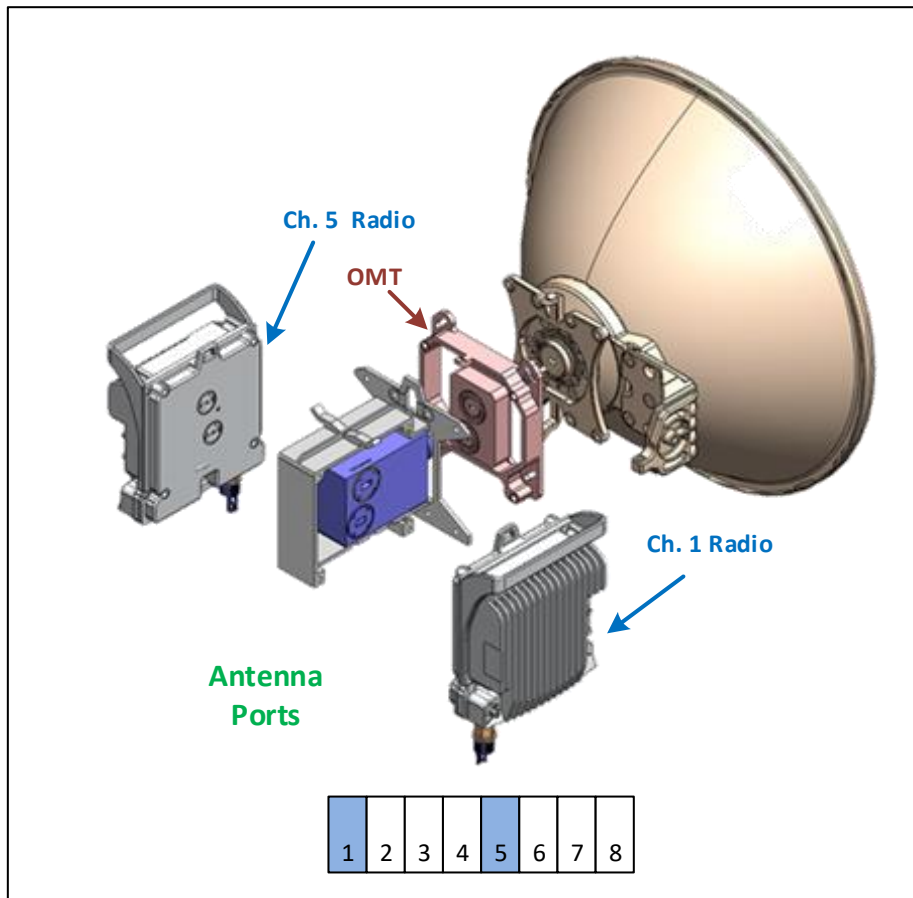
Verify that the O-rings are properly mounted between the Dual Coupler/Splitter ports and the radio.

Note

6.15.1. 4+0 with Dual Circulator (6-11GHz) Direct Mount

The following example illustrates a typical configuration, assuming that:

- The regulation specifies a channelization of 8 consecutive 28/38MHz channels (1-8 ch).
- The actual channels in use are channels 1,5.



6.16. 4+0 Dual Polarization, 2+2HSB Dual Polarization Remote Mount

List of Items

| Item | Description | Quantity | Remarks |
|------|---------------------------------------|----------|---------|
| 1 | NetStream Diplo OMT Kit | 1 | |
| 2 | Flexible Waveguide Kit | 2 | |
| 3 | NetStream Diplo Dual Coupler/Splitter | 1 | |

Required Tools

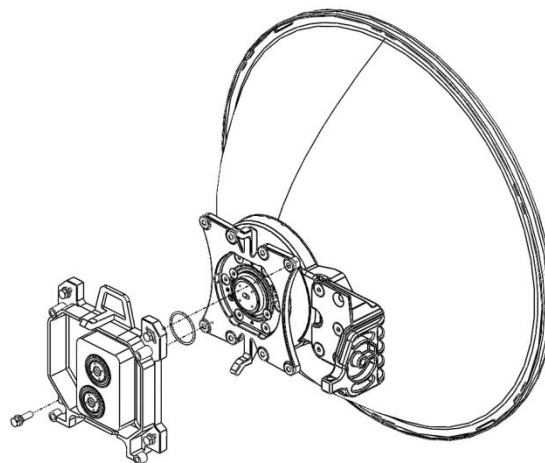
- Metric offset hexagon key set
- Metric wrench key set

Common Installation

- 1 Connect the OMT kit to the antenna and secure it with four screws.



Verify that the O-ring is properly mounted between the antenna transition and the OMT.

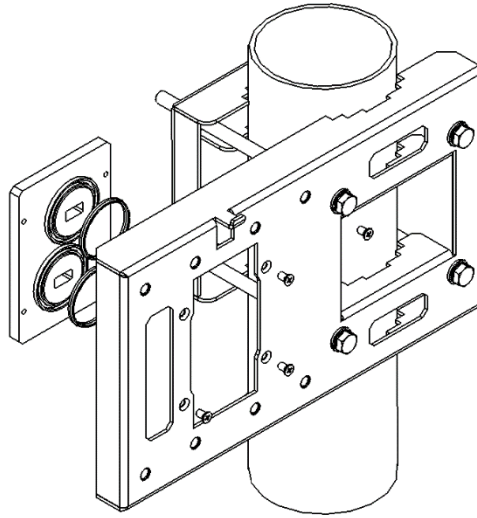


6.16.1. 6-13GHz

- 1 Mount and tighten the NETSTREAM DIPLO Remote Mount Adaptor plate (supplied in NetStream Diplo Adaptor Remote Mount kit) to the NetStream Diplo Pole Mount using the four flat screws supplied with the NetStream Diplo Adaptor Remote Mount kit.

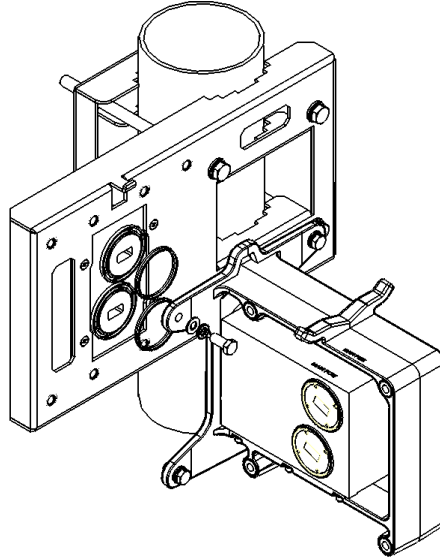
Installation Procedures per Configuration Type

Mount NetStream Diplo Remote Mount Adaptor Plate to NetStream Diplo Pole Mount



- 2 Mount and tighten the NetStream Diplo Dual Coupler to the NetStream Diplo Pole Mount using the four screws and washers that are supplied with the NetStream Diplo Dual Coupler kit. Pay attention that the O-rings are mounted on the NetStream Diplo Remote Mount Adaptor.

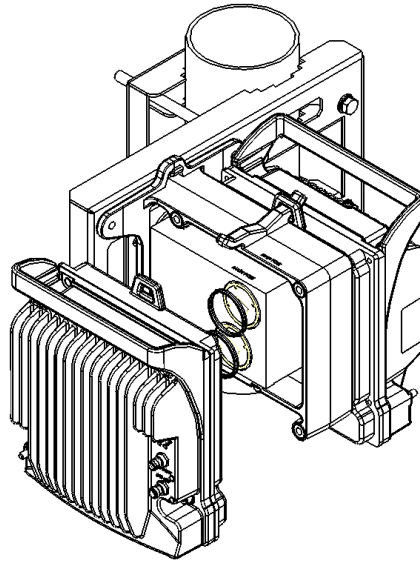
Mount NetStream Diplo Dual Coupler to the NetStream Diplo Pole Mount



- 3 Mount and tighten the NetStream Diplo radios on each side of the NetStream Diplo Dual Coupler using the screws assembled on NetStream Diplo radio. Make sure that the O-rings are correctly assembled on the radio port of the NetStream Diplo dual coupler.

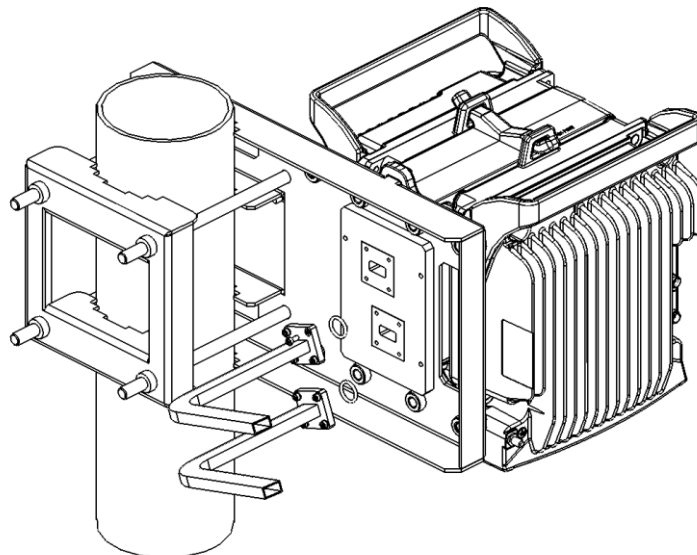
Installation Procedures per Configuration Type

Mount NetStream Diplo Radios on Each Side of the NetStream Diplo Dual Coupler



- 4 Connect both Flexible Waveguides and Sealing Gaskets supplied with each Flexible Waveguide Kit to the NetStream Diplo Dual Coupler antenna ports. Tighten the screws and washers supplied with the Flexible Waveguide Kit.

Connect Flexible Waveguides and Sealing Gaskets to NetStream Diplo Dual Coupler Antenna Ports

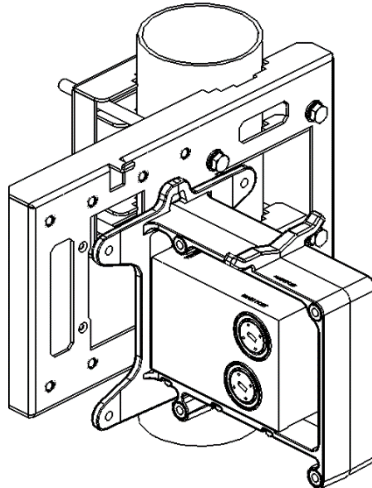


Installation Procedures per Configuration Type

6.16.2. 15-42GHz

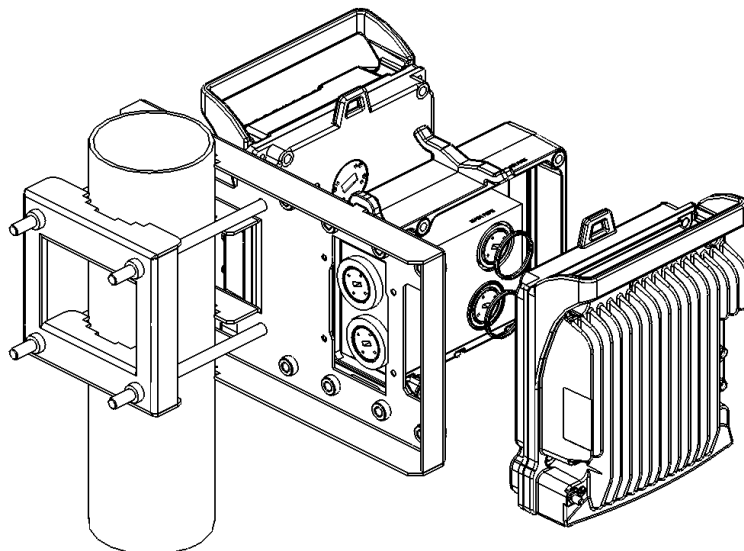
- 1 Mount and tighten the NetStream Diplo Dual Coupler to the NetStream Diplo DC Pole Mount using the four screws and washers supplied with the NetStream Diplo Dual Coupler kit.

Mount NetStream Diplo Dual Coupler to NetStream Diplo DC Pole Mount



- 2 Mount and tighten the NetStream Diplo radios on each side of the NetStream Diplo Dual Coupler using the screws assembled on the NetStream Diplo unit. Make sure that the O-rings are correctly assembled on the radio port of the NetStream Diplo Dual Coupler.

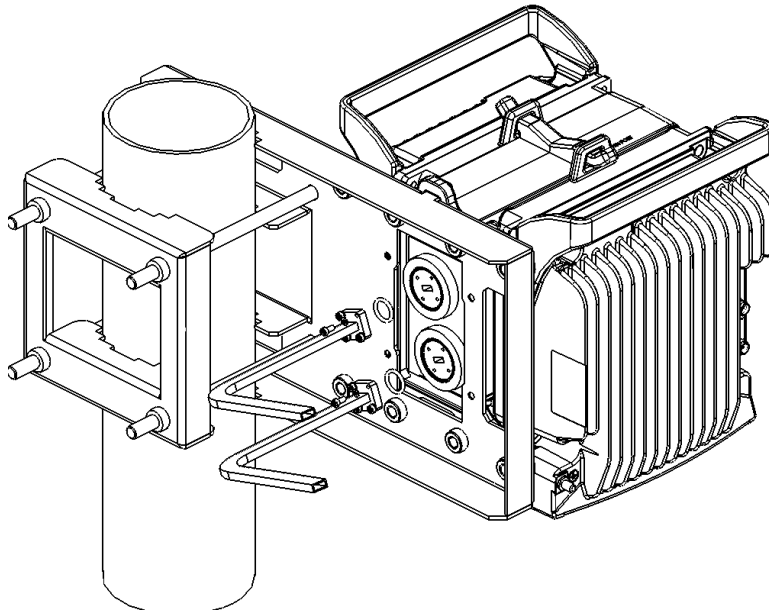
Mount NetStream Diplo Radios on NetStream Diplo Dual Coupler



- 3 Mount the O-ring and the Flexible Waveguides to the NetStream Diplo Dual Coupler ports using the four screws supplied with the Flexible Waveguide kits.

Installation Procedures per Configuration Type

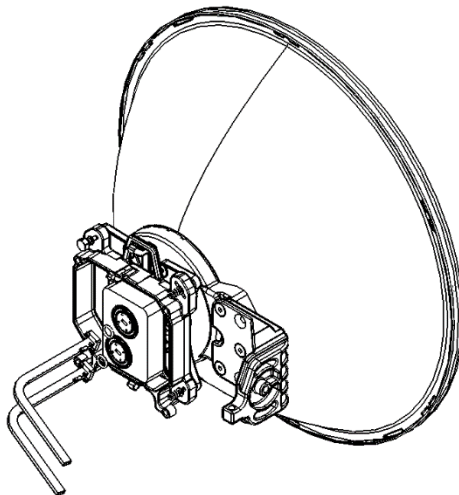
Mount O-ring and Flexible Waveguide to NetStream Diplo Dual Coupler Ports



- 4 Mount and tighten the O-ring and the Flexible Waveguides to the NetStream Diplo OMT ports using the four screws supplied with the Flexible Waveguide kits.



Verify that the O-rings are correctly mounted between the OMT ports and each Flexible Waveguide.

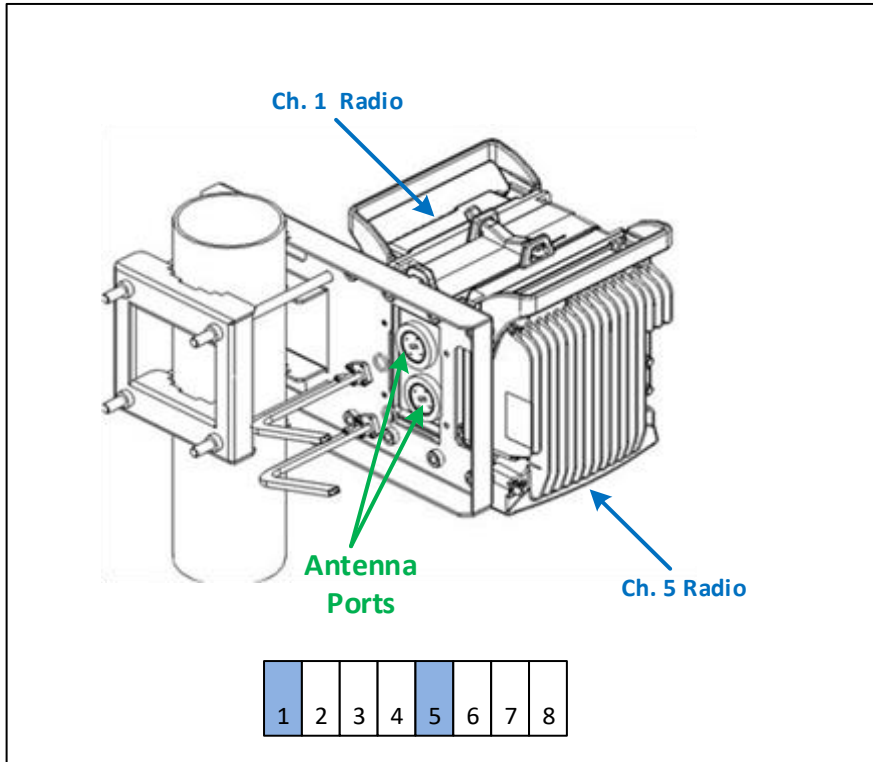


6.16.3. 4+0 with Dual Circulator (6-11GHz) Remote Mount

The following example illustrates a typical configuration, assuming that:

Installation Procedures per Configuration Type

- The regulation specifies a channelization of 8 consecutive 28/38MHz channels (1-8 ch).
- The actual channels in use are channels 1,5.

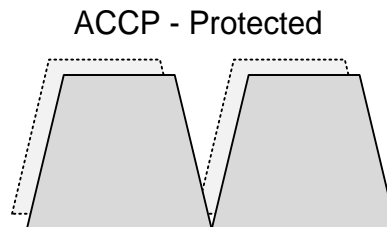


6.17. 2+2HSB Single Polarization Remote Mount



Note

This procedure can also be used for 1+1HSB SP HW ready for 2+2HSB SP configurations.



List of Items

| Item | Description | Quantity | Remarks |
|------|--|----------|---------|
| 1 | NetStream Diplo RADIO | 2 | |
| 2 | NetStream Diplo SPLITTER KIT | 1 | |
| 3 | NetStream Diplo DUAL COUPLER KIT | 1 | |
| 4 | FLEXIBLE WG KIT | 2 | |
| 5 | NetStream Primo/Diplo ODU POLE MOUNT KIT | 2 | |

Required Tools

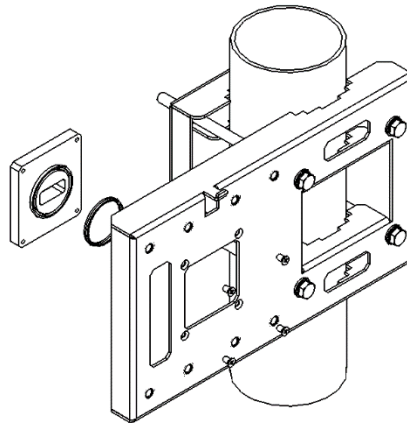
- Metric offset hexagon key set
- Metric wrench key set
- Phillips #1, #2 screwdriver

6.17.1. 6-13GHz

- 1 Mount and tighten the NetStream Primo/Diplo ODU Remote Mount Adaptor plate (supplied in the NetStream Primo/Diplo ODU Adaptor Remote Mount kit) to the NetStream Primo/Diplo ODU Pole Mount using the four flat screws supplied with the NetStream Primo/Diplo ODU Adaptor Remote Mount kit.

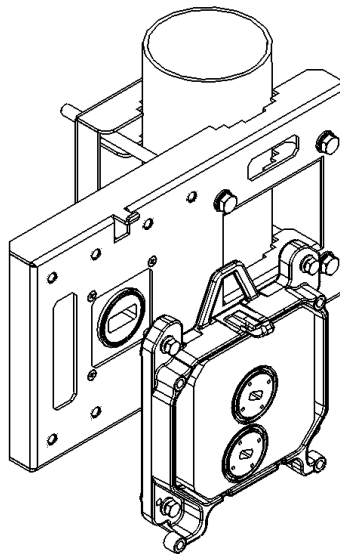
Installation Procedures per Configuration Type

Mount NetStream Primo/Diplo ODU Remote Mount Adaptor Plate to NetStream Primo/Diplo ODU Pole Mount



- 2 Mount and tighten the NetStream Diplo Splitter to the NetStream Primo/Diplo ODU Pole Mount using the four captive screws and washers that are assembled to the NetStream Diplo Splitter kit.

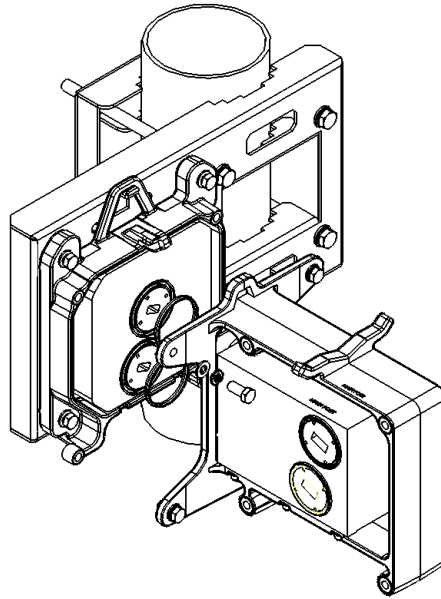
Mount NetStream Diplo Splitter to NetStream Primo/Diplo ODU Pole Mount



- 3 Mount and tighten the NetStream Diplo Dual Coupler to the NetStream Diplo Splitter using the four captive screws and washers that are supplied with the NetStream Diplo Dual Coupler kit. Make sure that the O-rings are mounted on the NetStream Diplo Splitter.

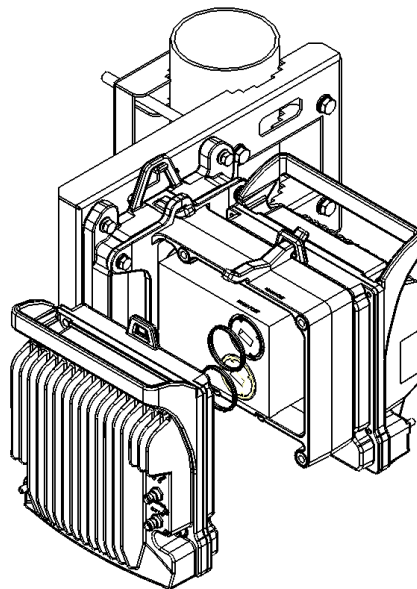
Installation Procedures per Configuration Type

Mount NetStream Diplo Dual Coupler to the NetStream Diplo Splitter



- 4 Mount and tighten the NetStream Diplo unit to the NetStream Diplo Dual Coupler using the four screws and washers that are assembled to the NetStream Diplo unit. Make sure that the O-rings are mounted on the NetStream Diplo Dual Coupler.

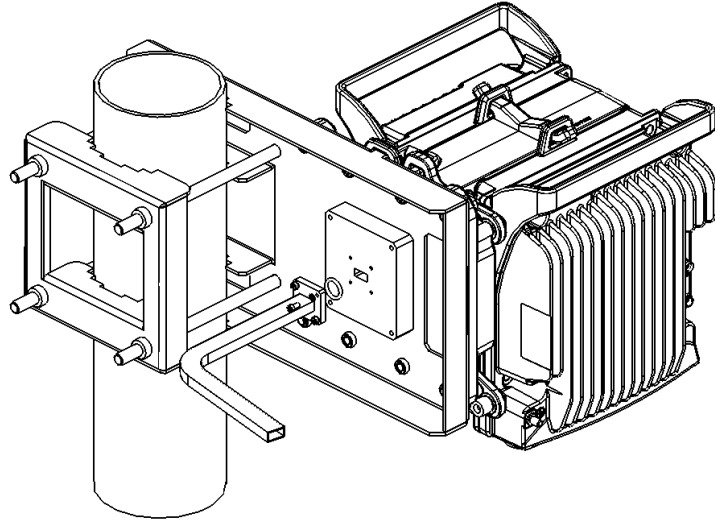
Mount NetStream Diplo Radio to the NetStream Diplo Dual Coupler



- 5 Connect the Flexible Waveguide and Sealing Gasket supplied with the Flexible Waveguide kit to the NetStream Primo/Diplo ODU Adaptor plate. Tighten the four screws supplied with the Flexible Waveguide kit.

Installation Procedures per Configuration Type

Mount Flexible Waveguide and Sealing Gasket to NetStream Primo/Diplo ODU Adaptor Plate



6.18. Dual Circulator Multi-Carrier Kit Installation

List of Items

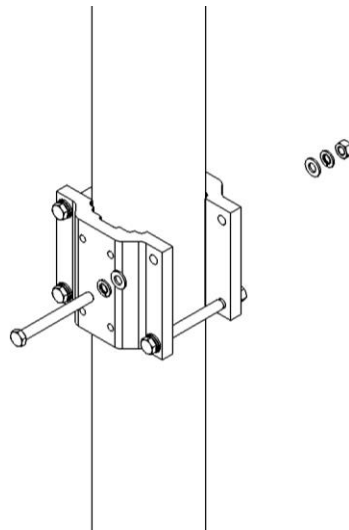
| Item | Description | Quantity | Remarks |
|------|--------------------------------------|----------|---------|
| 1 | NetStream Diplo RADIO | 4 | |
| 2 | NetStream Diplo_DUAL_CIRC_kit_xxG | 2 | |
| 3 | NetStream Diplo_MC_DUAL_CIRC_kit_xxG | 1 | |

Required Tools

- Metric offset hexagon key set
- Metric wrench key set

Procedure

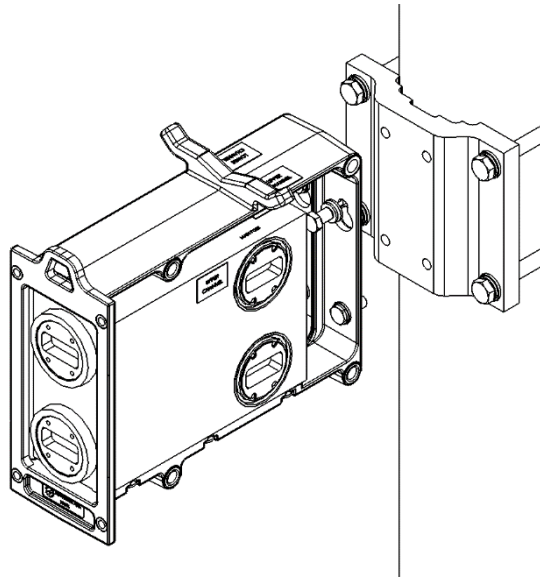
- 1 Mount and tighten the pillar adapter brackets to pole (supplied in NetStream Diplo Adaptor Remote Mount kit). Tighten the four M10 Hex screws and washers supplied within the kit.



6.18.1. 6-8 GHz

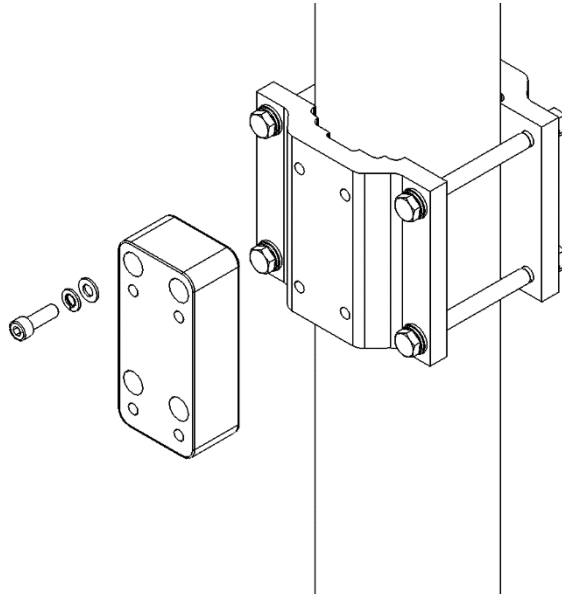
- 1 Mount and tighten the NetStream Diplo MC Dual Cir to the NetStream Diplo pillar adapter bracket using the four M8 Hex screws and washers supplied within the kit.

Installation Procedures per Configuration Type



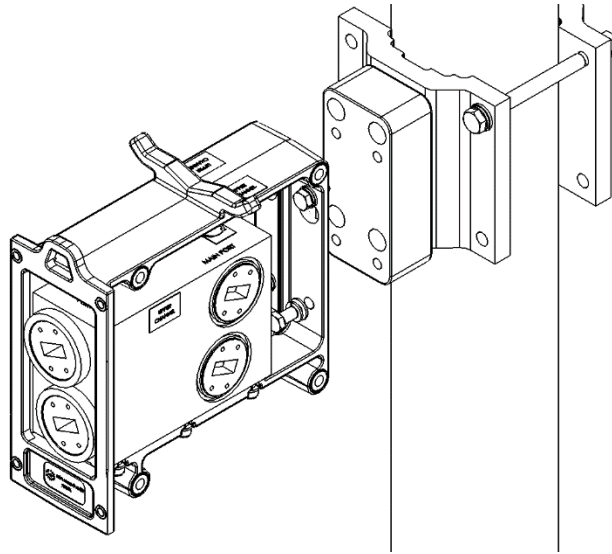
6.18.2. 11 GHz only

- 1 Mount and tighten the NetStream Diplo MC extender to the NetStream Diplo pillar adapter bracket using the four M8 Hex screws and washers supplied within the kit.



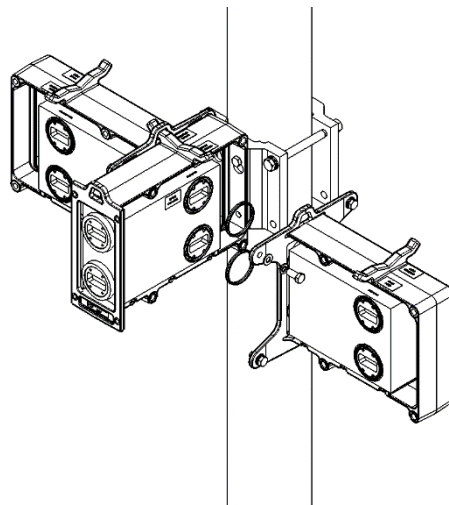
- 2 Mount and tighten the NetStream Diplo MC Dual Cir to the NetStream Diplo MC Extender using the four M8 Hex screws and washers supplied within the kit.

Installation Procedures per Configuration Type



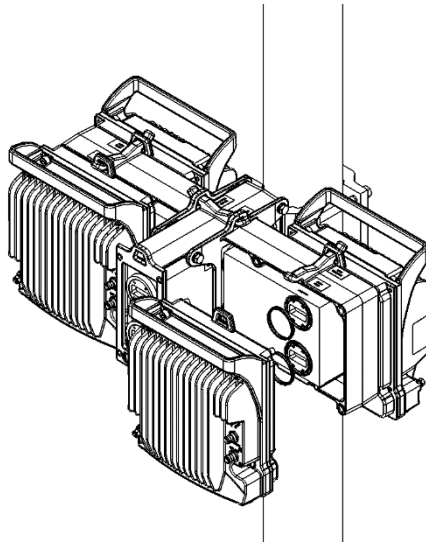
6.18.3. 6-11GHz

- 1 Mount and tighten the NetStream Diplo Dual Cir to each side of the NS PRIMO/DIPLO MC Dual Circ using the four M8 Hex screws and washers supplied in the NS PRIMO/DIPLO Dual Circ kit. Pay attention that the O-rings on the NetStream Diplo MC Dual Circ are well in place during the mounting.

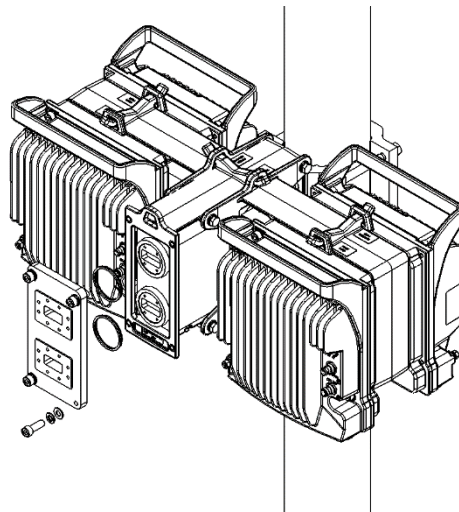


- 2 Mount and tighten the NetStream Diplo radios to each NetStream Diplo Dual Circ radio port using the four screws assembled on the NetStream Diplo radio. Pay attention that the O-rings on the NetStream Diplo Dual Circ are well in place during the mounting.

Installation Procedures per Configuration Type

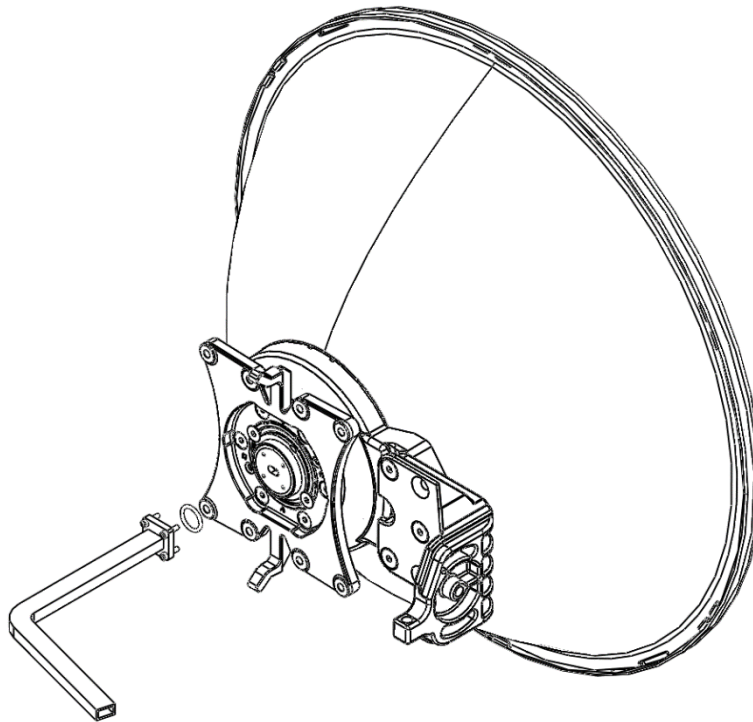


- 3 Mount and tighten the NetStream Diplo MC Remote mount adapter to the NetStream Diplo MC Dual Circ antenna ports using the four screws assembled on the NetStream Diplo radio. Pay attention that the O-rings on the NetStream Diplo MC Remote mount adapter are well in place during the mounting.



- 4 Mount and tighten the O-ring and the Flexible WG to the NetStream Diplo MC Remote mount adapter ports using the four screws supplied with the Flexible WG kit.
- 5 Mount and tighten the O-ring and flexible WG to both antenna ports using the four screws supplied with the flexible WG kit.

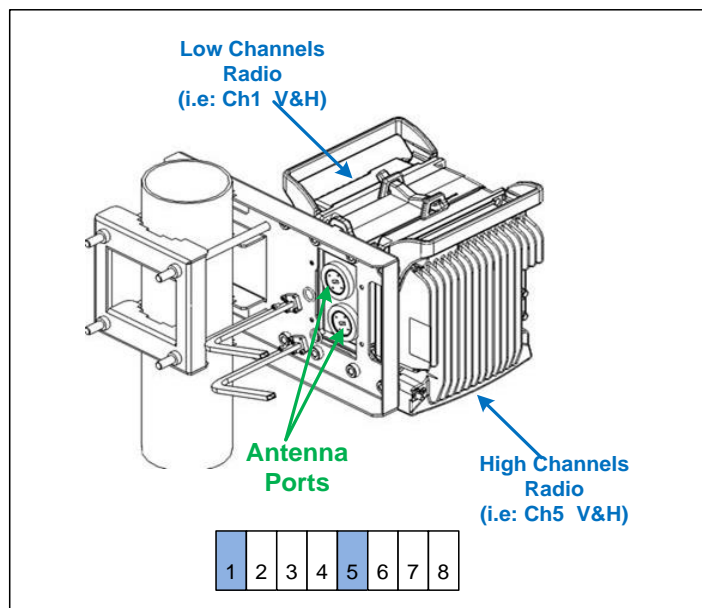
Installation Procedures per Configuration Type



The following example illustrates a typical configuration, assuming:

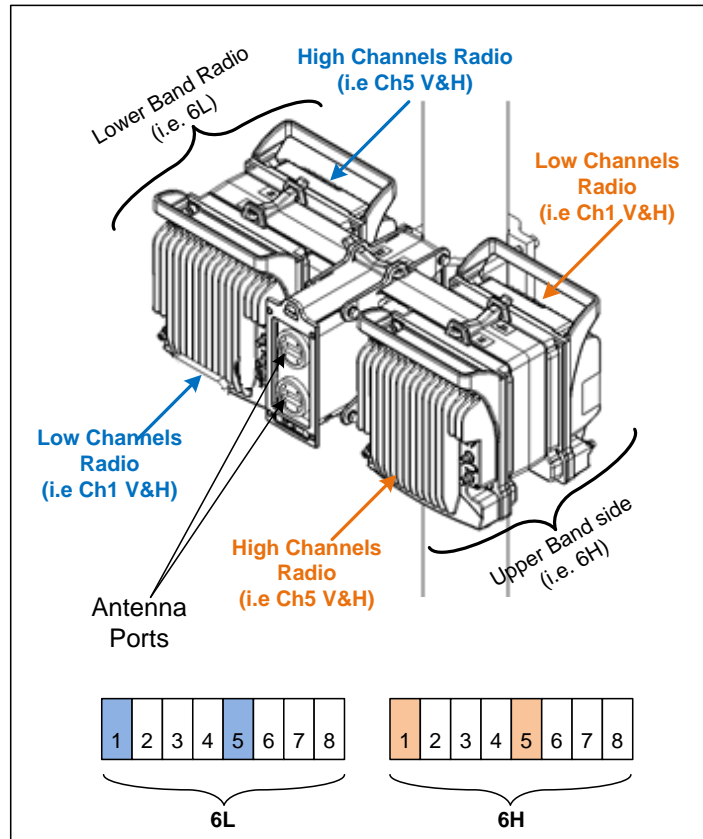
- The regulation specifies a channelization of 8 consecutive 28/30 MHz channels (1-8ch).
- The actual channels in use are channels 1, 5.

4+0 Configuration



Installation Procedures per Configuration Type

8+0 Configuration



7. Installing NetStream Diplo on Third-Party Antenna Adaptors

Since the NetStream Diplo uses the same antennas as NetStream Primo/Diplo ODU, it can utilize the 3rd party mediation devices much in the same way they are used with NetStream Primo/Diplo 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 NetStream Primo/Diplo ODU nor with NS PRIMO/DIPLO C.

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. NetStream Primo/Diplo ODU interface. From this moment forth it is ready for any subsequent NetStream Diplo configuration.

The following table describes available adaptors:

| Other Vendors Antennas | 6GHz | 7-8GHz | 10-11GHz | 13GHz | 15GHz | 18GHz | 23GHz | 26GHz | 28-31GHz | 32GHz | 38GHz |
|--|------|----------------------|----------|----------------------------|----------------------------|----------------------------|-------------------------------|-------|-------------------------------|-------|--------------------|
| NetStream Primo/Diplo ODU - NEC Adaptor kit (PASOLINK NEO) | | ADPT_ODU-C7_8-NC_ANT | | ADPT_ODU-C13_15-NC_ANT | | ADPT_ODU-C18_26-NEC_ANT | | | | | |
| NetStream Primo/Diplo ODU - ERICSSON Adaptor kit (RAU1) | | | | ADPT_ODU-C13-ERCS_RAU1_ANT | ADPT_ODU-C15-ERCS_RAU1_ANT | ADPT_ODU-C18-ERCS_RAU1_ANT | ADPT_ODU-C23-26-ERCS_RAU1_ANT | | ADPT_ODU-C28-38-ERCS_RAU1_ANT | | |
| NetStream Primo/Diplo ODU - ERICSSON Adaptor kit (RAU2) | | | | ADPT_ODU-C13-ERCS_ANT | ADPT_ODU-C15-ERCS_ANT | ADPT_ODU-C18-ERCS_ANT | ADPT_ODU-C23-ERCS_ANT | | ADPT_ODU-C28_38-ERCS_ANT | | |
| ODU-C - SRAL (SIEMENS) Adaptor kit | | | | | | ADPT_ODU-C18_26-SRAL_ANT | | | ADPT_ODU-C28_38-SRAL_ANT | | |
| NetStream Primo/Diplo ODU- NSN (Flexihopper) ADAPTOR KIT | | ADPT_ODU-C7_8-N_ANT | | ADPT_ODU-C13-N_ANT | ADPT_ODU-C15-N_ANT | ADPT_ODU-C18_26-N_ANT | | | | | ADPT_ODU-C38-N_ANT |
| ODU-C - ALU Adapter Kit | | | | ADPT_ODU-C13-ALU_Melody | | ADPT_ODU-C18-ALU_Melody | | | | | |

Installing NetStream Diplo on Third-Party Antenna Adaptors

| | | | | | | | | | | | |
|---|----------------------------|------------------------|--------------------------|--------------|--------------------------------|-----------------------|--------------|--------------|--------------|--------------|--------------|
| NetStream Diplo/S and NetStream Primo/Diplo ODU - Dragonwave Adapter Kit | | ADPT-CIRC-ODU-C_11-DW | ADPT-CIRC-ODU-C_13-DW | | ADPT-CIRC-ODU-C_18-DW | ADPT-CIRC-ODU-C_23-DW | | | | | |
| ODU-C - INTRACOM ADAPTOR KIT | | | | | ADPT_ODU-C18-INTRACOM_ANT | | | | | | |
| NetStream Diplo/s and ODU-C REMEC adapter kit | ADPT_NS_PRIMO_ODU-C6_Remec | | | | ADPT_ODU-C18_REMEC_SINGLE_POLE | | | | | | |
| ODU-C - Huawei Antenna Adaptor kit | | ADPT_ODU-C7_8-HUAW_ANT | ADPT_ODU-C10_11-HUAW_ANT | | | | | | | | |
| NS PRIMO/ODU-C EXALT ADAPTOR KIT | | | | | ADPT_ODU-C18_EXALT_ANT | | | | | | |
| NS PRIMO/ODU-C SAF ANTENNA ADAPTOR KIT | | | ADPT_ODU-C11_SAF_ANT | | ADPT_ODU-C15_SAF_ANT | | | | | | |
| Kit for converting a ValuLine 3 antenna for integration with ODU-C (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 153 | 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 |



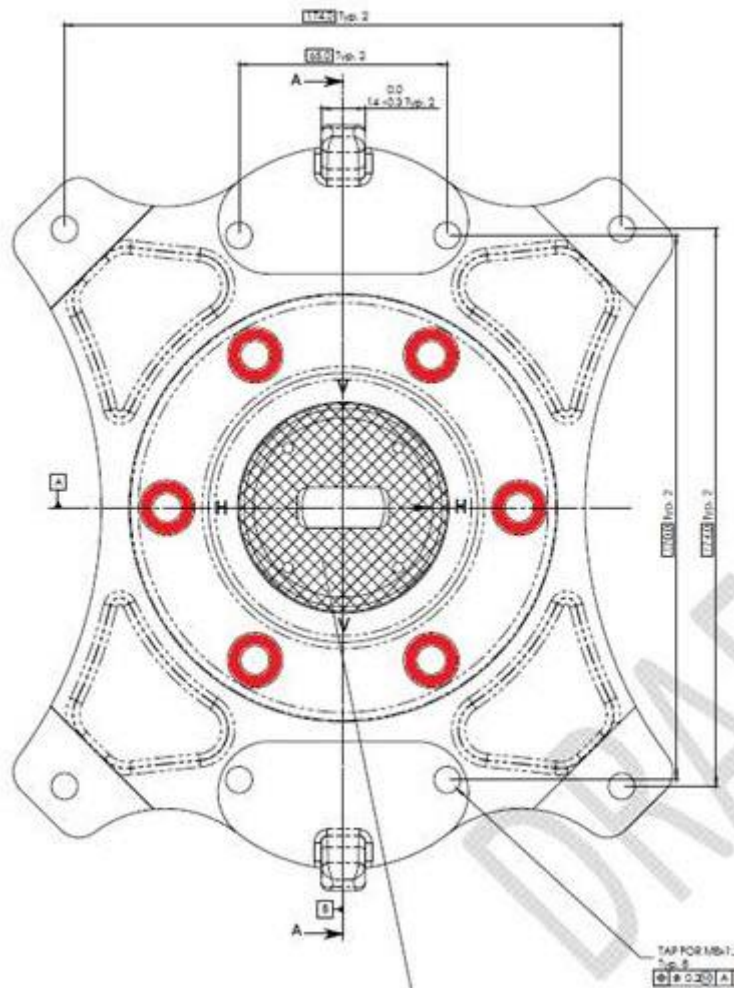
For instructions how to install these third-party adaptors, refer to the Netronics NetStream Primo/Diplo ODU Installation Guide, DOC-00017708.

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 NetStream Primo/Diplo 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:

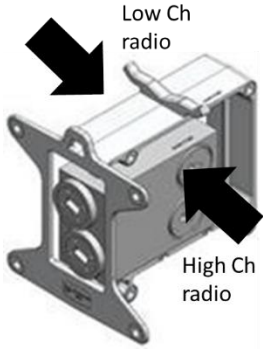
- Verify that the antenna is, in fact, a ValuLine 3 antenna.
- Verify that the back plate of the antenna has in its holding plate the six mounting holes shown in red in the figure below.



8. Appendix A: Mediation Device Losses

| Mediation Devices | Signal Path / Remarks | Insertion Loss [dB] | | | | | |
|---|---------------------------------|---------------------|--------|-----------|--------|-----------|-----------|
| | | 6-8 GHz | 11 GHz | 13-15 GHz | 18 GHz | 23-26 GHz | 28-42 GHz |
| Flex WG | 3ft / 1.2m | 0.5 | 0.5 | 1.2 | 1.2 | 1.5 | 1.5 |
| Dual Core Mediation Device  | Radio to antenna (upper path) | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.5 |
| OMT  | Radio to antenna ports (V or H) | 0.3 | 0.3 | 0.3 | 0.3 | 0.5 | 0.5 |
| Splitter  | Radio to antenna port | 3.5 | 3.5 | 3.5 | 3.7 | 3.7 | 4 |
| Double Coupler  | Main Paths | 1.4 | 1.4 | 1.4 | 1.6 | 1.6 | 2 |
| | Secondary Paths | 6 | 6 | 6 | 6 | 6 | 6 |
| Double Splitter  | Radio to antenna port | 3.5 | 3.5 | 3.5 | 3.7 | 3.7 | 4 |

Appendix A: Mediation Device Losses

| | | | | | | | |
|--|-------------------------------|------|------|----|----|----|----|
|  <p>Double Circ.</p> <p>Low Ch radio</p> <p>High Ch radio</p> | High Ch radio to antenna port | 0.15 | 0.15 | NA | NA | NA | NA |
| | Low Ch radio to antenna port | 0.8 | 0.8 | NA | NA | NA | NA |

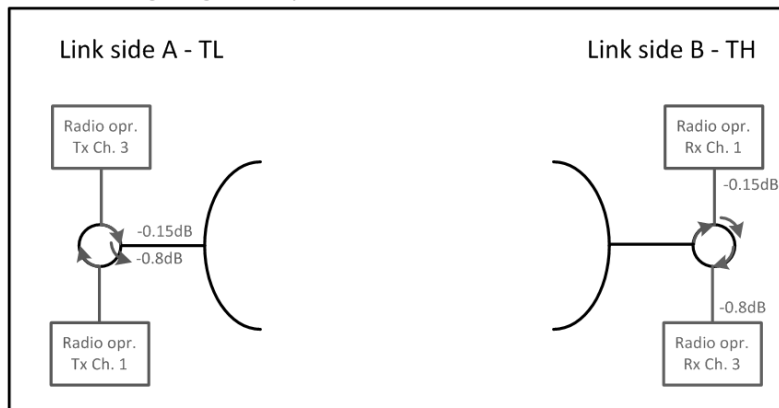


The antenna interface is always the NetStream Diplo interface.

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.

The following diagram explains the circulators insertion loss:



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 |

Appendix B: Acceptance & Commissioning Procedures

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

Appendix B: Acceptance & Commissioning Procedures

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.
- 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.

Appendix B: Acceptance & Commissioning Procedures

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

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/ODU | 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: | | |

Appendix B: Acceptance & Commissioning Procedures

| | | |
|------------------------------------|---------------|---------------|
| 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: | | |
| Rain zone: | | |
| Expected RSL (dBm): | | |
| Expected Diversity RSL (dBm): | | |
| RSL Main (dBm): | | |
| RSL Diversity (dBm): | | |
| Deviation from exp? | | |
| RSL ≤ 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: | |

Appendix B: Acceptance & Commissioning Procedures

| | |
|------------------|------------|
| Commissioned by: | Name: |
| | Company: |
| | Date: |
| | Signature: |