Manual
for
TFAH-ES70/80/50
and
TFAH-ES70/80

MN024-15

DISCLAIMER:

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CommScope reserves the right to change all hardware and software characteristics without notice.

Andrew Wireless Systems GmbH, 12-December-2013

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1.1. ABOUT COMMSCOPE

CommScope is the foremost supplier of one-stop, end-to-end radio frequency (RF) solutions. Part of the *CommScope* portfolio are complete solutions for wireless infrastructure from top-of-the-tower base station antennas to cable systems and cabinets, RF site solutions, signal distribution, and network optimization.

CommScope has global engineering and manufacturing facilities. In addition, it maintains field engineering offices throughout the world.

Andrew Wireless Systems GmbH based in Buchdorf/ Germany, which is part of *CommScope*, is a leading manufacturer of coverage equipment for mobile radio networks, specializing in high performance, RF and optical repeaters. Our optical distributed networks and RF repeater systems provide coverage and capacity solution for wireless networks in both indoor installations and outdoor environments, e.g. tunnels, subways, in-trains, airport buildings, stadiums, skyscrapers, shopping malls, hotels and conference rooms.

Andrew Wireless Systems GmbH operates a quality management system in compliance with the requirements of ISO 9001 and TL 9000. All equipment is manufactured using highly reliable material. To maintain highest quality of the products, comprehensive quality monitoring is conducted at all fabrication stages. Finished products leave the factory only after a thorough final acceptance test, accompanied by a test certificate guaranteeing optimal operation.

This product meets the requirements of the R&TTE directive and the Declaration of Conformity (DoC) itself. A current version of the CE DoC is included in this manual CD delivered *. Any updated version of the DoC is available upon request from the local sales offices or directly from *CommScope* via the local Customer Support at one of the addresses listed in the following chapter.

According to the DoC, our "CE"-marked equipment can be used in all member states of the European Union.

☞ **Note**: **Exceptions of and national deviations from this intended use may be possible. To observe corresponding local particularities and regulations, please refer to the respective documents (also in national language) which are included in the manual CD delivered.**

* In case the Declaration of Conformity (DoC) for the product was not included in the manual CD delivered, it is available upon request from the local sales offices or directly from *CommScope at one of the addresses listed in the following chapter*.

To make the most of this product, we recommend you carefully read the instructions in this manual and commission the system only according to these instructions.

For technical assistance and support, please also contact the local office or *CommScope* directly at one of the addresses listed in the following chapter.

1.2. INTERNATIONAL CONTACT ADDRESSES FOR CUSTOMER SUPPORT

Americas:

Canada	
CommScope Canada	
Mail	505 Consumers Road, Suite 803 Toronto M2J 4V8 Canada
Phone	+1-905-878-3457 (Office) +1-416-721-5058 (Cell)
Fax	+1-905-878-3297
E-mail	wisupport@commscope.com

United States	
Andrew LLC, A CommScope Company	
Mail	620 North Greenfield Parkway Garner, NC 27529 U.S.A.
Phone	+1-888-297-6433
Fax	+1-919-329-8950
E-mail	wisupport@commscope.com

Caribbean & South American Region (CALA)	
CommScope Cabos do Brasil Ltda.	
Mail	CALA Tech Support for *Distributed Coverage & Capacity Solutions (DCCS) products*: Rua Guaporanga, 49 Praça Seca – Rio de Janeiro – RJ ZIP: 21320-180 Brazil
Phone	+1-815-546-7154 (Cell) +55-15-9104-7722 (Office)
Fax	+ 55-15-2102-4001
E-mail	wisupport@commscope.com

Caribbean (CALA) & Central American Region	
CommScope Mexico S.A. de C.V.	
Mail	CALA Tech Support for *Distributed Coverage & Capacity Solutions (DCCS) products*: Av. Insurgentes Sur 688, Piso 6 Col. Del Valle, CP: 03100 Mexico City Mexico
Phone	+52-1-55-5419-5260 (Cell) +52-55-1346-1900 (Office)
Fax	+52-55-1346-1901
E-mail	wisupport@commscope.com

APAC Countries:

China, India and Rest of Asia	
Andrew International Corporation	
Mail	Room 915, 9/F Chevalier Commercial Centre 8 Wang Hoi Rd Kowloon Bay Hong Kong
Phone	+852-3106-6100
Fax	+852-2751-7800
E-mail	wisupport.China@commscope.com

Australia & New Zealand	
Andrew Corporation (Australia) Pty Ltd.	
Mail	Unit 1 153 Barry Road Campbellfield VIC 3061 Australia
Phone	+613-9300-7969
Fax	+613-9357-9110
E-mail	wisupport.Australia@commscope.com

Europe:

United Kingdom	
Andrew Wireless Systems UK Ltd	
Mail	Unit 15, Ilex Building Mulberry Business Park Fishponds Road Wokingham Berkshire RG41 2GY England
Phone	+44-1189-366-792
Fax	+44-1189-366-773
E-mail	wisupport.uk@commscope.com

Scandinavia	
Andrew Norway (AMNW)	
Mail	P.O. Box 3066 Osloveien 10 Hoenefoss 3501 Norway
Phone	+ 47 32-12-3530
Fax	+ 47 32-12-3531
E-mail	wisupport@commscope.com

Germany	
Andrew Wireless Systems GmbH	
Mail	Industriering 10 86675 Buchdorf Germany
Phone	+49-9099-69-0
Fax	+49-9099-69-930
E-mail	wisupport@commscope.com

France	
CommScope France	
Mail	Immeuble Le Lavoisier 4, Place des Vosges 92052 Courbevoie France
Phone	+33-1 82 97 04 00
Fax	+33-1 47 89 45 25
E-mail	wisupport@commscope.com

Austria	
Andrew Wireless Systems (Austria) GmbH	
Mail	Weglgasse 10 2320 Wien-Schwechat Austria
Phone	+43-1706-39-99-10
Fax	+43-1706-39-99-9
E-mail	wisupport.austria@commscope.com

Switzerland	
CommScope Wireless Systems AG	
Mail	Tiergartenweg 1 CH-4710 Balsthal Switzerland
Phone	+41-62-386-1260
Fax	+41-62-386-1261
E-mail	wisupport.ch@commscope.com

Italy	
CommScope Italy S.r.l., Faenza, Italy	
Mail	Via Mengolina, 20 48018 Faenza (RA) Italy
Phone	+39-0546-697111
Fax	+39-0546-682768
E-mail	wisupport.italia@commscope.com

Iberia Region - Spain & Portugal	
Andrew España S.A. A CommScope Company	
Mail	Avda. de Europa, 4 - 2ª pta. Parque Empresarial de la Moraleja Alcobendas, Madrid 28108 Spain
Phone	+34-91-745-20 40
Fax	+34-91-661-87 02
E-mail	wisupport.iberia@commscope.com

Czech Republic	
CommScope Solutions Czech Republic C-Com, spol. s r.o	
Mail	U Moruší 888 53006 Pardubice Czech Republic
Phone	+49 871 9659171 (Office) +49 171 4001166 (Mobile)
Fax	+49 871 9659172
E-mail	wisupport@commscope.com

Africa & Middle East:

Middle East & North Africa	
CommScope Solutions International Inc. (Branch)	
Mail	PO Box 48 78 22 Unit 3206, Floor 32, Jumeirah Business Center 5, Jumeirah Lakes Towers, Dubai United Arab Emirates
Phone	+971 4 390 09 80
Fax	+971 4 390 86 23
E-mail	wisupport@commscope.com

South Africa	
Andrew Wireless Solutions Africa (PTY) LTD	
Mail	11 Commerce Crescent West Eastgate, Sandton PO Box 786117 Sandton 2146 South Africa
Phone	+ 27 11-719-6000
Fax	+ 27 11-444-5393
E-mail	wisupport@commscope.com

Table1 List of international contact addresses

2.

2.1. CASE U REMOTE UNIT

2.1.1. Specifications

Dimensions: mm 500 x 480 x 205

(inches 19.7 x 18.9 x 8.1)

Weight: Please refer to the Remote Unit dedicated e-catalog entry in order to know the updated data about the weight of your Case U Remote Unit.

Figure 2-1 Case U Remote Unit

Case U Remote Units are available with and without the red cover, which serves for indication of public safety services equipment.

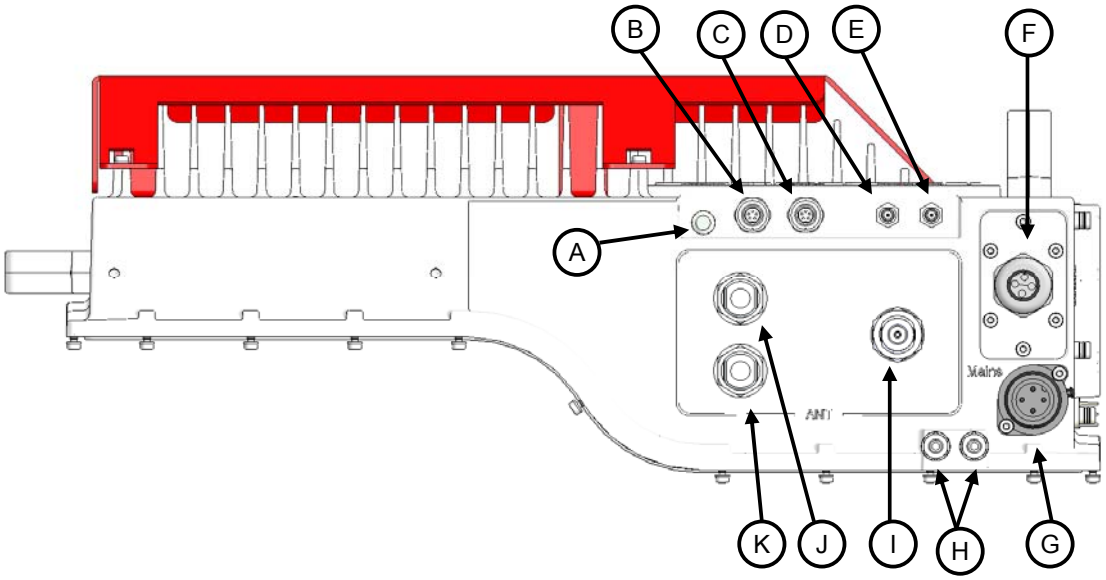


Figure 2-2 Case U connectors

A	Status LED	G	Power supply connector
B	Alarms lower band	H	Grounding bolts
C	Alarms higher band(s)	I	UL/DL antenna port higher band(s)
D	Expansion UL port	J	UL lower band, not connected in 2 band
E	Expansion DL port	K	DL lower band, not connected in 2 band
F	UL / DL optical ports		

Antenna Port

In the two band configuration the RU has one duplexed N-female antenna port Ⓘ for transmitting and receiving signals to and from distributed antennas. In the three band configuration the RU also has two non-duplexed N-female antenna ports Ⓙ and Ⓚ for UL and DL. These RF ports can be connected directly to an antenna (i.e. using RF jumper cables) or through splitters, allowing additional antennas to be fed by the RU.

Status LED

The status LED provides a visual warning of an alarm condition. The color of the LED indicates the severity of the alarm.

Expansion Ports

The Expansion UL and Expansion DL ports Ⓓ Ⓕ are QMA female connectors that are used to connect to a CommScope expansion unit to provide additional bands.

Optical Ports

The LC-APC optical connectors Ⓕ are used to send and receive the signals between the RU and the Master Unit's OTRx modules.

- A DL optical port receives downlink signals from the MU OTRx.
- A UL optical port transmits uplink signals to the MU OTRx.

Mains Connector

The RU receives its power through the Mains connector Ⓖ. The type of connector is dependent on the RU model. A 4-pin Amphenol connector is used for AC models and standard DC models. A 7-pin Amphenol connector is used for DC models powered by a dual cable supply.

Alarm connectors

The RU has two alarm relay outputs that can be used report alarms to external devices. The Alarm connectors Ⓑ, lower band and Ⓒ, higher bands are 5-pin Binder connectors.

2.1.2. Health and Safety

1. **Danger**: Obey all general and regional installation and safety regulations relating to work on high voltage installations, as well as regulations covering correct use of tools and personal protective equipment.

2. **Danger:** Before opening the unit, disconnect mains power.

3. **Danger:** Laser radiation! Do not stare into the beam; do not view it directly or with optical instruments.

4. **Danger:** Due to power dissipation, the Remote Unit may reach a very high temperature. Do not operate this equipment on or close to flammable materials. Use caution when servicing the unit.

5. **Warning:** Read and obey all the warning labels attached to the unit. Make sure that all warning labels are kept in a legible condition. Replace any missing or damaged labels.

6. **Warning:** It is the responsibility of the network provider to implement prevention measures to avoid health hazards associated with radiation from the antenna(s) connected to the unit.

7. **Warning:** Only authorized and trained personnel are allowed to open the unit and get access to the inside.

8. **Warning:** Only license holders for the respective frequency range are allowed to operate this unit.

9. **Warning**: Make sure the repeater settings are correct for the intended use (refer to the manufacturer product information) and regulatory requirements are met.

10. **Warning**: Use this equipment only for the purpose specified by the manufacturer. Do not carry out any modifications or fit any spare parts, which are not sold or recommended by the manufacturer. This could cause fires, electric shock, or other injuries.

11. **Warning:** For installations which have to comply with European EN50385 exposure compliance requirements, the following Power Density limits/guidelines (mW/cm²) according to ICNIRP are valid:
    - 0.2 for frequencies from 10 MHz to 400 MHz
    - F (MHz) / 2000 for frequencies from 400 MHz to 2 GHz
    - 1 for frequencies from 2 GHz to 300 GHz

12. **Warning:** For installations, which have to comply with FCC RF exposure requirements, the antenna selection and installation must be completed in a way to ensure compliance with those FCC requirements. Depending on the RF frequency, rated output power, antenna gain, and the loss between the repeater and antenna, the minimum distance D to be maintained between the antenna location and human beings is calculated according to this formula:

$$D_{[cm]} = \sqrt{\frac{P_{[mW]}}{4 * \pi * PD_{[mW/cm^2]}}}$$

where

- P (mW) is the radiated power at the antenna, i.e. the max. rated repeater output power in addition to the antenna gain minus the loss between the repeater and the antenna.
- PD (mW/cm²) is the allowed Power Density limit acc. to 47 CFR 1.1310 (B) for general population / uncontrolled exposures which is
    - F (MHz) / 1500 for frequencies from 300MHz to 1500MHz
    - 1 for frequencies from 1500MHz to 100.000MHz

RF exposure compliance may need to be addressed at the time of licensing, as required by the responsible FCC Bureau(s), including antenna co-location requirements of 1.1307(b)(3).

13. **Caution**: Installation of this equipment is in full responsibility of the installer, who has also the responsibility, that cables and couplers are calculated into the maximum gain of the antennas, so that this value, which is filed in the FCC Grant and can be requested from the FCC data base, is not exceeded. The industrial boosters are shipped only as a naked booster without any installation devices or antennas as it needs for professional installation.
14. **Caution:** Only suitably qualified personnel are allowed to work on this unit and only after becoming familiar with all safety notices, installation, operation and maintenance procedures contained in this manual.
15. **Caution:** Keep operating instructions within easy reach and make them available to all users.
16. **Caution**: Corresponding local particularities and regulations must be observed. For national deviations, please refer to the respective documents included in the manual CD that is delivered with the unit.
17. **Caution**: Although the Remote Unit is internally protected against overvoltage, it is strongly recommended to ground (earth) the antenna cables close to the repeater's antenna connectors for protection against atmospheric discharge.
18. **Caution**: ESD precautions must be observed! Before commencing maintenance work, use the available grounding (earthing) system to connect ESD protection measures.

19. **Note:** For a Class A digital device or peripheral:

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

20. **Note:** This unit complies with European standard EN60950.

Equipment Symbols Used / Compliance

Please observe the meanings of the following symbols used in our equipment and the compliance warnings:

Symbol	Compliance	Meaning / Warning
---	**FCC**	For industrial (Part 20) signal booster: WARNING: This is NOT a CONSUMER device. It is designed for installation by FCC LICENSEES and QUALIFIED INSTALLERS. You MUST have an FCC LICENSE or express consent of an FCC Licensee to operate this device. Unauthorized use may result in significant forfeiture penalties, including penalties in excess of $100,000 for each continuing violation.
		For (Part 90) signal booster: WARNING: This is NOT a CONSUMER device. It is designed for installation by FCC LICENSEES and QUALIFIED INSTALLERS. You MUST have an FCC LICENSE or express consent of an FCC Licensee to operate this device. You MUST register Class B signal boosters (as defined in 47 CFR 90.219) online at www.fcc.gov/signal-boosters/registration. Unauthorized use may result in significant forfeiture penalties, including penalties in excess of $100,000 for each continuing violation.
	**CE**	Alert sign to R&TTE To be sold exclusively to mobile operators or authorized installers – no harmonized frequency bands, operation requires license. Intended use: EU and EFTA countries
CE 0700		Indicates conformity with the R&TTE directive 1999/5/EC certified by the notified body no. 0700.

2.1.3. TFAx Case U Mechanical Installation

Each Case U Remote Unit kit includes:

1. a RU TFAx
2. a power supply plug

1. **Warning: Do not install the unit in a way or at a place where the specifications outlined in the Environmental and Safety Specifications leaflet of the supplier are not met.**
2. **WARNING: IMPROPER INSTALLATION CAN LEAD TO EQUIPMENT FALLING CAUSING SERIOUS PERSONAL INJURY OR DAMAGE TO EQUIPMENT. The installer must verify that the supporting surface will safely support the combined load of the electronic equipment and all attached hardware and components. The screws and dowels (wall anchors) used should also be appropriate for the structure of the supporting wall.**
3. **Warning: It is recommended to use the mounting hardware delivered by the manufacturer only. If different mounting hardware is used, the specifications for stationary use of the Remote Unit must not be exceeded.**
4. ☞ **Note: Exceeding the specified load limits may cause the loss of warranty!**
5. **Warning: The unit is considerably heavy. Ensure there is adequate manpower to handle the weight of the system.**
6. **Caution: Due to power dissipation, the Remote Unit may reach a very high temperature. Ensure sufficient airflow for ventilation.**
7. **Note: When connecting and mounting the cables (RF, optical, mains, ...) ensure that no water can penetrate into the unit through these cables.**
8. **Note: Observe all additional rules or restrictions regarding mounting that apply to specific Remote Unit types.**

If any different or additional mounting material is used, ensure that the mounting remains as safe as the mounting designed by the manufacturer. Ensure that the static and dynamic strengths are adequate for the environmental conditions of the site. The mounting itself must not vibrate, swing or move in any way that might cause damage to the Remote Unit.

Specified torques must be observed for certain mounting procedures according to the following table:

Type	***Pins***	***Hex nuts***	***Screws***
Thread	M 6	M 6	M6
Specified torques	3.3 Nm	3.3 Nm	3.3 Nm

Table 2 Specified torques

Wall-Mounting

1. Check the suitability of the wall-mounting kit and the wall.

2. Install the wall-mounting bracket using 4 M6 screw anchors (not included*) or suitable lag bolts according to the drilling layout. Confirm that the bracket is securely fastened to the wall. **Installer must verify that the supporting surface will safely support the combined load of the electronic equipment and all attached hardware and components.**

   * The M6 screw anchors are not included as part of the RU delivery because the suitable type depends on the on-site conditions (wall structure and materials). Use screw anchors that are appropriate for the mounting surface.

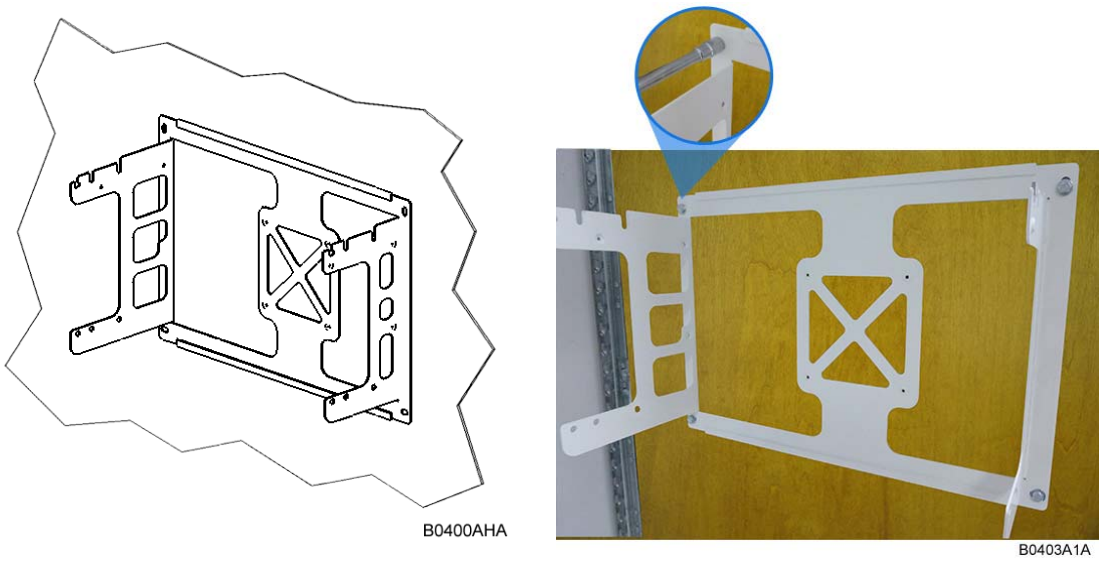


Figure 2-3 Wall-mounting bracket

3. Attach an M6 threaded pin to the Remote Unit by inserting it into the threaded hole adjacent to the power supply and turning it clockwise. Tighten the pin securely with a socket wrench.

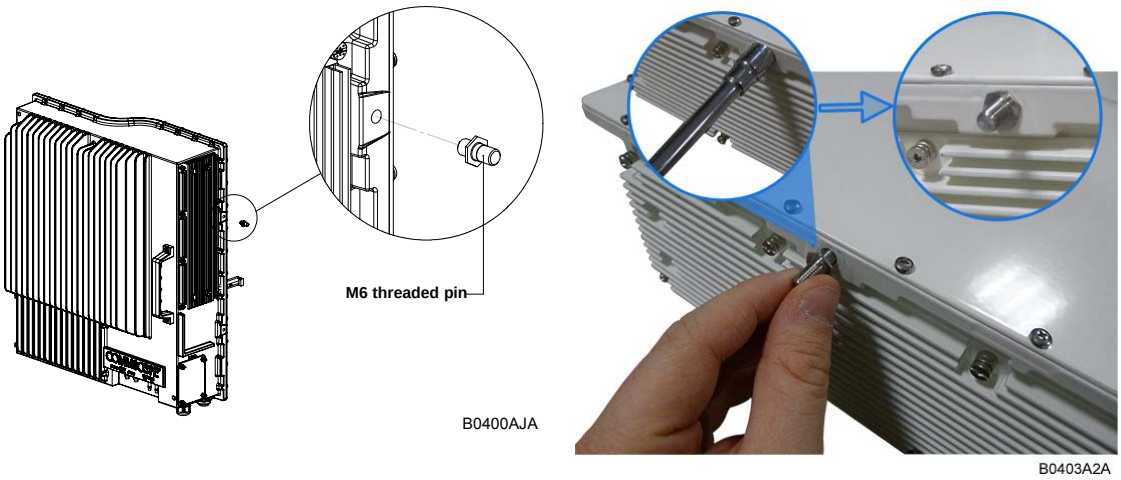


Figure 2-4 RU threaded pin power supply side

4. Attach an M6 threaded pin to the Remote Unit by inserting it into the threaded hole above the handle and turning it clockwise. Tighten the pin securely with a socket wrench.

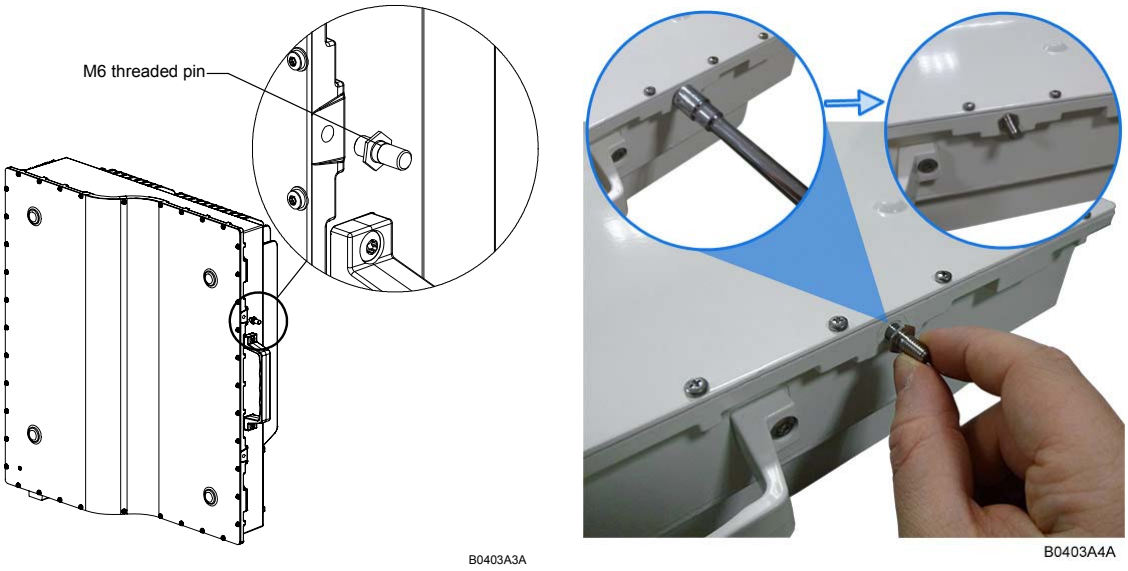


Figure 2-5 RU threaded pin narrow side

2.1.4. Wall Mounting Procedure

1. Follow the instructions for mounting the bracket and installing the threaded pins in *chapter 0.*
2. Install the Remote Unit on the wall-mounting bracket by lifting the RU into place and using both handles and lowering it down onto the bracket. The M6 pins must align with the slots in the bracket to support the RU.

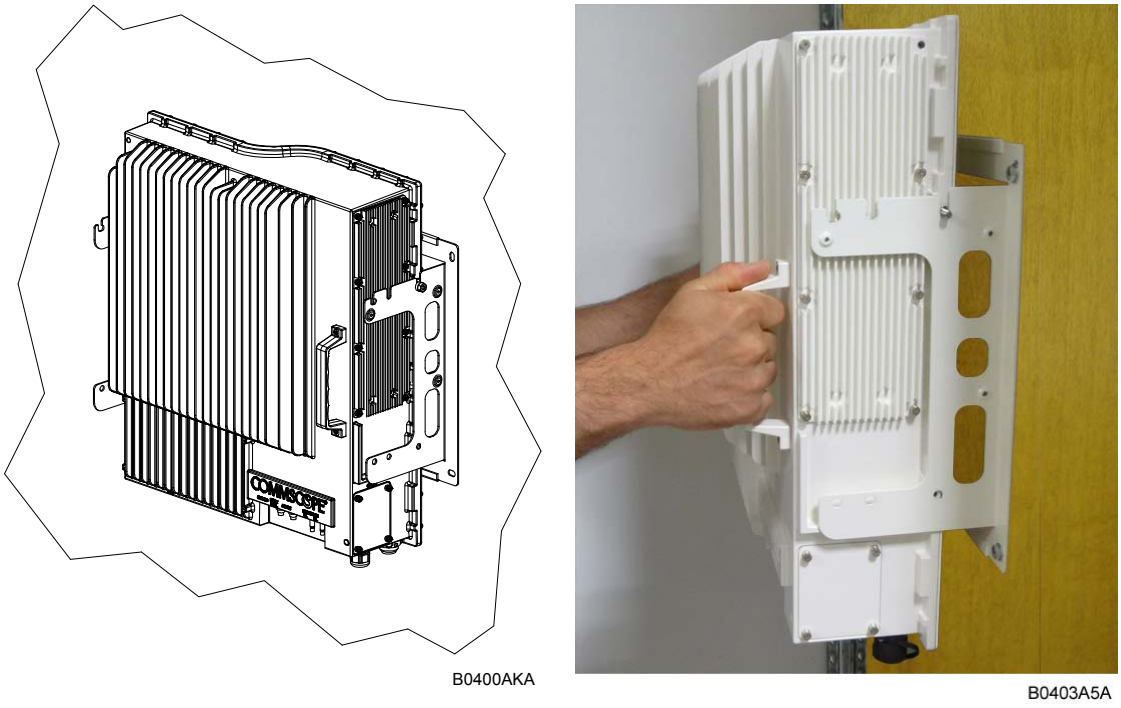


Figure 2-6 Place RU onto wall mounting bracket

3. Fasten the lower section of the Remote Unit to the bracket using a washer and an M6x12 screw (on both sides). Slide a washer over each screw and then insert the screw and tighten it securely.

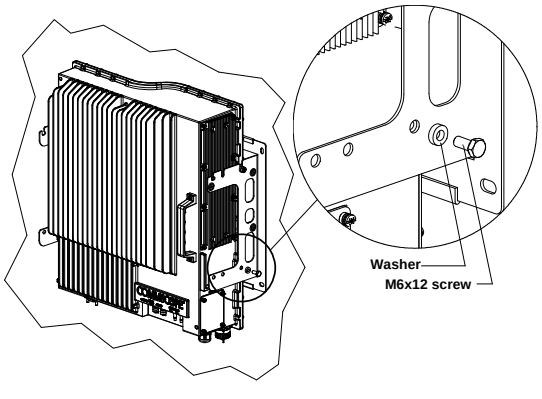


Figure 2-7 Install M6x12 screws and washers for single mount

4. Fasten the Remote Unit to the bracket using a washer and M6 nut. Slide the washer over the threaded pins that you installed previously (chapter *0*) and then screw the nut onto the pins (on both sides) and tighten securely.

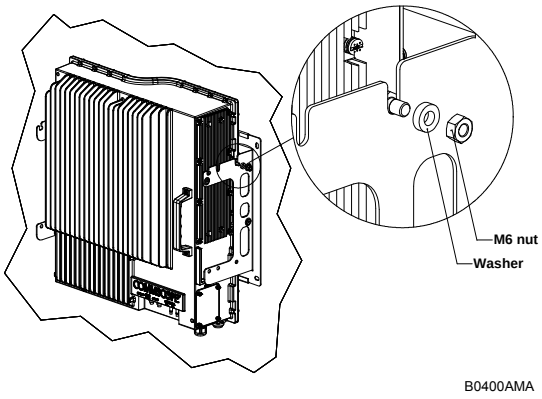


Figure 2-8 Attach M6 nut to threaded pins for single mount

5. Confirm that all screws and nuts have been fastened and the unit is securely mounted to the wall.

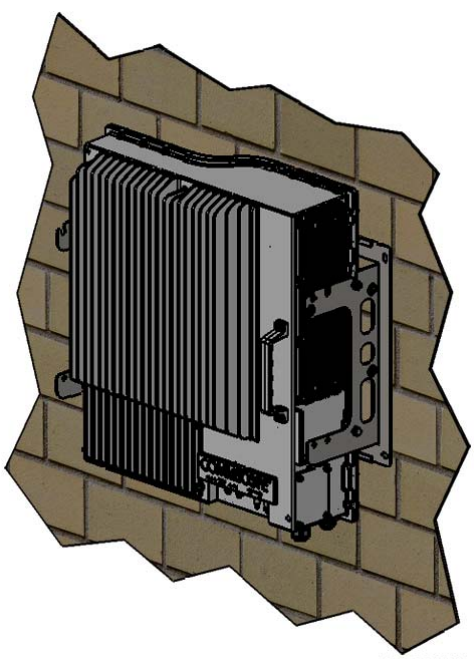


Figure 2-9 Completed RU Mount

2.1.5. TFAx Case U Electrical Installation

2.1.5.1. General

1. **Warning:** This unit contains dangerous voltages. Loss of life, severe personal injury, or property damage can be the result if the instructions contained in this manual are not followed.

2. **Caution:** It is compulsory to ground (earth) the unit before connecting the power supply. A grounding bolt is provided on the cabinet to connect the ground-bonding cable.

3. **Caution:** Although the remote unit is internally protected against overvoltage, it is strongly recommended to ground (earth) the antenna cables close to the antenna connectors of the remote unit for protection against atmospheric discharge. In areas with strong lightning, it is strongly recommended to install additional lightning protection.

4. **Caution:** If the mains connector of the remote unit is not easily accessible, a disconnect device in the mains power circuit must be provided within easy reach.

5. **Caution:** Before connecting or disconnecting the mains connector at the remote unit, ensure that mains power supply is disconnected.

6. **Caution:** Make sure that an appropriate circuit breaker acting as a disconnect device (as required by IEC/EN60950-1) and an overcurrent limiting device are connected between mains power and the Remote Unit.

7. **Caution:** A connection of the mains supply to a power socket requires the power socket to be nearby the remote unit.

8. **Caution:** Incorrectly wired connections can destroy electrical and electronic components.

9. **Caution:** To avoid corrosion at the connectors caused by electrochemical processes, the material of the cable connectors must not cause a higher potential difference than 0.6 V (see electrochemical contact series).

10. **Note:** Use an appropriate torque wrench for the coupling torque of N-type connectors (2 Nm / 1.5 lb/ft), with 13/16 in opening to tighten the N-type antenna connectors. For example, use torque wrench of item no. 244379 available from the *CommScope e-catalog*. Do NOT use your hands or any other tool (e.g. a pair of pliers)! This might cause damage to the connector and lead to a malfunction of the Remote Unit.

11. **Caution:** For unstabilized electric networks, which frequently generate spikes, the use of a voltage limiting device is advised.

12. **Caution:** The unit complies with the surge requirement according to EN 61000-4-5 (fine protection); however, installation of an additional medium (via local supply connection) and/or coarse protection (external surge protection) is recommended depending on the individual application in order to avoid damage caused by overcurrent.

13. **Caution:** Observe the labels on the front panels before connecting or disconnecting any cables.

2.1.5.2. Grounding (Earthing)

The RU must be grounded (earthed).

1. Connect an earth-bonding cable to the grounding bolt(s) connection provided on the outside of the remote unit (near the Mains connector) as shown in **Fehler! Verweisquelle konnte nicht gefunden werden.**. Do not use the grounding connection to connect external devices.

Figure 2-10 Grounding bolts

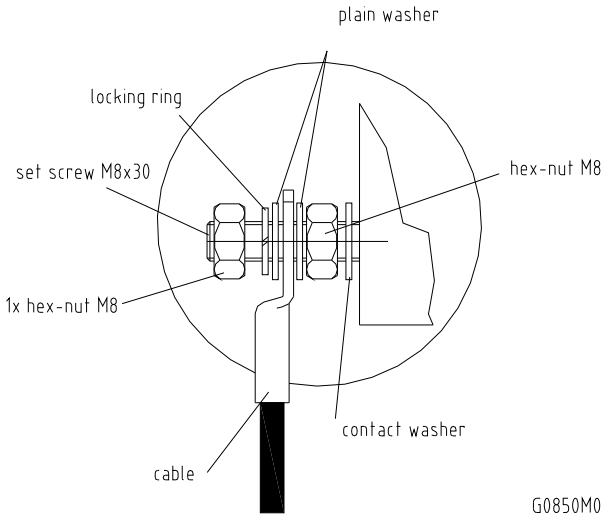


Figure 2-11 Grounding bolt, schematic view

2. After loosening the hex nut, connect the earth-bonding cable between the two washers as illustrated in the figures above.

3. Then, fasten all parts again by tightening the hex nut.

4. Connect the other end of the ground wire to a suitable permanent ground following local electrical code practices.

2.1.5.3. Mains Power Connection

Before connecting electrical power to the units, the system must be grounded (earthed) as described in the previous chapter.

The Mains power must be connected to the Mains connector of the unit for operation of the RU. A power cable is delivered with each RU. The type of power cable delivered is dependent on the type of power supply in the RU.

The AC power cable is a 3.2 m (10.5 ft) 16 AWG cable with a 4-pin Amphenol C016 series plug on one end to connect to the RU Mains connector. The other end of the cable is un-terminated with 3 end splices to connect to the AC power source. A 10 m (33.7 ft) AC power cable is also available as an option. The AC power cable is shown in **Fehler! Verweisquelle konnte nicht gefunden werden.**.

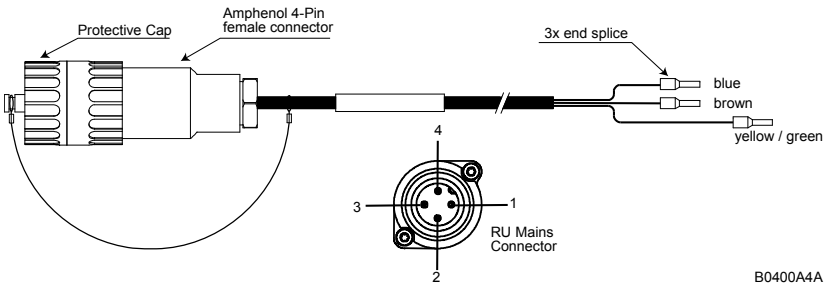


Figure 2-12 AC power cable

4-Pin Amphenol C016 Series		
Pin	**Name**	**Color**
1	Phase	Brown
2	Neutral	Blue
3	n.c.	n.c
4	Ground	Yellow / Green

Table 3 AC power cable

The standard DC power cable is a 3.2 m (10.5 ft) 13 AWG cable with a 4-pin Amphenol C016 series plug on one end to connect to the RU Mains connector. The other end of the cable is un-terminated with 2 end splices to connect to the -48 Vdc power source. The standard DC power cable is shown in **Fehler! Verweisquelle konnte nicht gefunden werden.**.

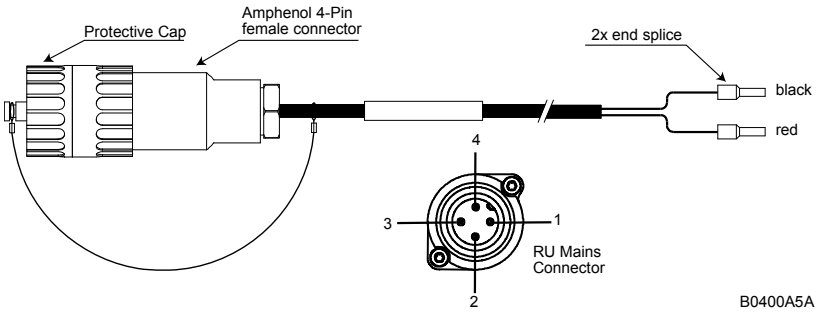


Figure 2-13 DC power cable

4-Pin Amphenol C016 Series		
Pin	**Name**	**Color**
1	n.c	n.c
2	–48V	Black
3	0V	Red
4	n.c.	n.c

Table 4 DC power cable

The Vdc/100 power cable is available for locations where the power drawn on each cable must be limited to a maximum of 100 VA. This cable is a 3.2 m (10.5 ft) 16 AWG cable with a 7-pin Amphenol C016 series plug on one end to connect to the RU Mains connector. The other end of the cable is un-terminated with 4 end splices to connect to the -48 Vdc power source.

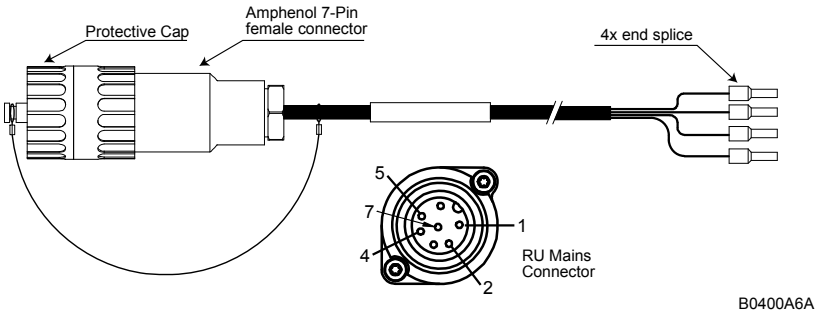


Figure 2-14 Vdc/100 power cable

7-Pin Amphenol C016 Series		
Pin	**Name**	**Color**
1	0V	White
2	–48V	Black
3	n.c.	-
4	0V	Red
5	–48V	Green
6	n.c	-
7	n.c	-

Table 5 Vdc/100 power cable

For the AC power supply connection, a minimum cross section of 1.5 mm^2 is required and for the DC power supply connection, a minimum cross section of 2.5 mm^2 is required. Each wire must observe the applicable national regulations regarding loop impedance, voltage drop, and methods of installation. Make sure to connect the correct voltage to the unit.

☞ **Note: Do not connect or disconnect the power cable at the mains connector while power is on. Turn off mains* power before connecting the power cable at the remote unit, then, engage mains power again.**

* Mains power must be interruptible with an external mains breaker. For the mains breaker, observe the following recommendation:

120 Volt / 20 Amp max. or 240 Volt / 16 Amp, single-phase, 50 / 60 Hz AC service is needed, i.e. the external AC breaker should be 20 Amps max. for 120-Volt service or 16 Amps for 240-Volt service.

For the DC power supply, observe the local regulations of the DC service provider.

Use the following method to install and connect the Mains power to the RU:

1. Locate the Mains power cable that was delivered with the RU.
2. Locate or install a suitable power junction box or receptacle near the RU and route the power cable from the power source to the RU. Do not connect the cable to the RU's Mains connector at this time. The power source must be interruptible.
3. The Mains cable must be properly secured observing local regulations and electrical codes. Be sure to allow enough slack in the cable at the RU to plug or unplug the cable into the Mains connector of the RU.
4. Wire the power cable to the junction box or receptacle. Refer to the color code and pin numbers shown in **Fehler! Verweisquelle konnte nicht gefunden werden.** (AC cable), **Fehler! Verweisquelle konnte nicht gefunden werden.** (DC cable), or **Fehler! Verweisquelle konnte nicht gefunden werden.** (Vdc/100 cable) depending on the type of power supply used by the RU.
5. With the cable's Mains plug disconnected from the RU, turn the circuit breaker on, unscrew the plug's protective cover, and carefully test the plug with a voltmeter to ensure that the voltage and polarity are correct.
6. Once the testing has been completed, turn off the circuit breaker.
7. Unscrew the protective cover from the Mains connector of the RU.
8. Insert the plug into the Mains connector (**Fehler! Verweisquelle konnte nicht gefunden werden.**) and tighten the clamping ring until it is hand tight. Do not over-tighten the clamping ring.

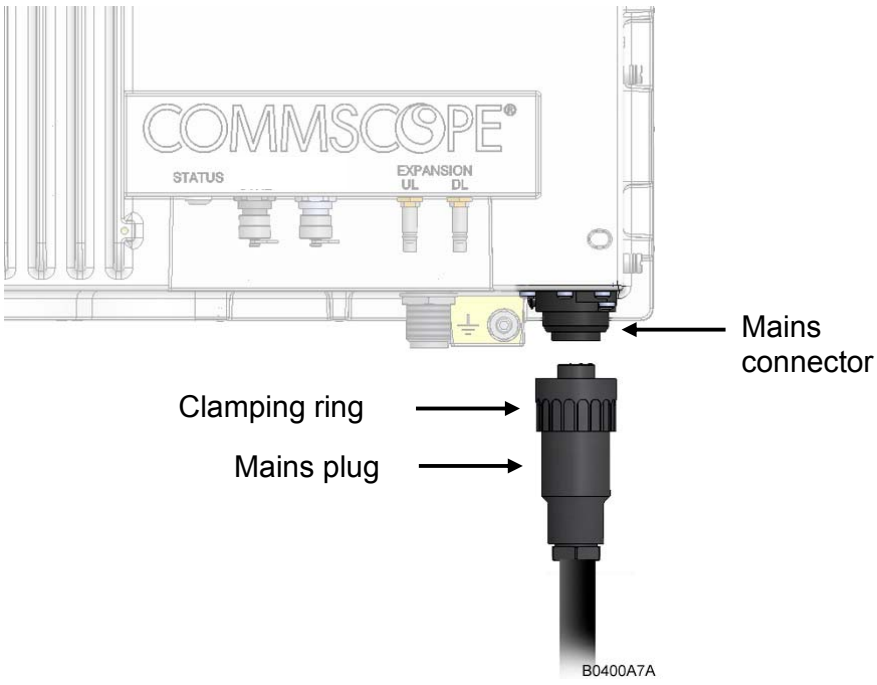


Figure 2-15 Connect Mains plug

2.1.5.4. Antenna Connection

The Remote Unit has one N-type antenna connector(s) (**Fehler! Verweisquelle konnte nicht gefunden werden.**). For mounting the cable connector, it is recommended to refer to the corresponding documentation of the connector manufacturer. The bending radius of the antenna cables must remain within the given specifications.

The selection of cable and antenna is an important consideration. On the one hand, a cable with higher loss is less expensive but, on the other hand, it impairs performance.

Use an appropriate torque wrench for the coupling torque of N-type connectors (2 N-m / 1.5 lb/ft), with 13/16 in opening to tighten the N-type antenna connectors. For example, use torque wrench of item no. 244379 available from the *CommScope e-catalog*. Do NOT use your hands or any other tool (e.g. a pair of pliers)! This might cause damage to the connector and lead to a malfunction of the Remote Unit.

To minimize passive inter-modulation (PIM) distortion, attention must be paid to the physical condition of the connector junctions. Do not use connectors that show signs of corrosion on the metal surface. Prevent the ingress of water into the connector. Attach and torque the connectors properly.

1. Route the antenna cable from the antenna or splitter to the base of the RU.
2. Cut the cable to length and terminate the cable with an N-type male connector.
3. Remove the red plastic protective cover from the N-type female connector.
4. Using an appropriate torque wrench, connect the cable to the antenna port of the RU.

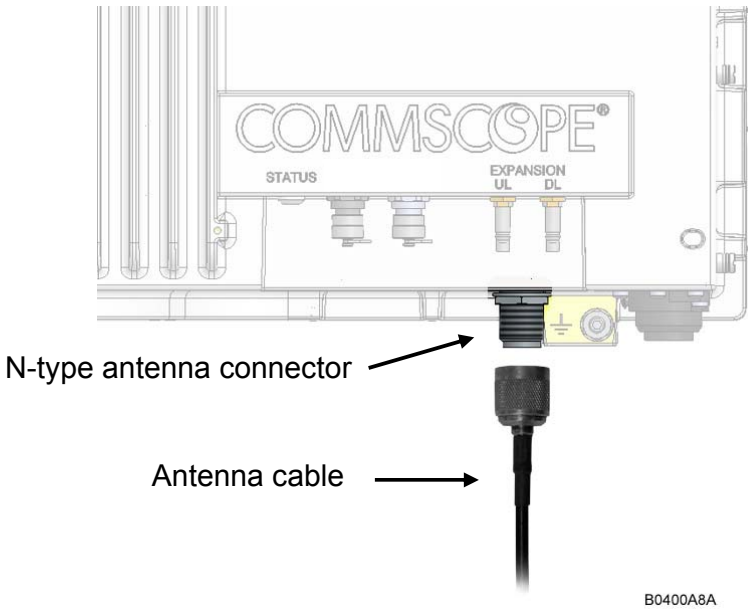
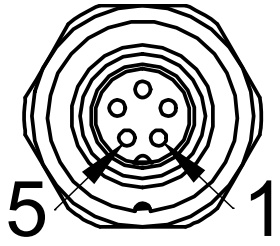


Figure 2-16 N-type antenna connection

2.1.5.5. Alarm Ports

The Alarm port provides alarm contacts that are used to report alarms generated by the RU to external equipment. The connector is a 5-pin Binder 712 series connector.



B0400AZA

Figure 2-17 Alarm Connector

5-Pin Binder 712 Series	
Pin	**Assignment**
1	EXT1_Alarm
2	EXT1_GND
3	n.c.
4	EXT2_Alarm
5	EXT_GND

Table 6 Alarm Connector

2.2. LOW POWER RU OPTICAL INSTALLATION

2.2.1. Optical-Fiber-Cable Connection - Rules

Main optical system parameters:

Fiber:

- Single mode fiber, type is 9.5/125 µm
- Fiber-cable connectors LC/APC

ION-U system:

- The pigtails for the connection between Master Unit and Remote Unit must have a sufficient length. Protection for the optical fibers must be provided where the fibers feed into the units.
- The system attenuation of the optical fibers, including the connectors, must not exceed 5 dB.

System attenuation and attenuation of optical components must be determined. This can be achieved by measuring attenuation and reflection with an appropriate measuring instrument. For pigtails, a total value of < 0.4 dB (measured to a reference plug) can be assumed due to the dead zone of the reflectometer. These measurements must be made with a sufficient length of optical fiber, at the input and output of the device which has to be measured.

Fiber-System Installation:

Fiber-cable connectors have to be of the same type (LC/APC) as the connectors used for the unit. The fiber-optic cables are connected to the optical transceiver.

Angled connectors are not compatible with straight optical connectors; non-compatibility of connectors will result in permanent damage to both connectors.

Before connecting the fiber cables, follow the procedure below to ensure optimized performance. It is important for these procedures to be carried out with care:

- Remove fiber-optic protective caps just before making the fiber connections. Do not leave any LC/APC connectors open as they may attract dirt. Unused optical connectors must always be covered by their caps.

- Do not bend the fiber-optic cable in a tight radius (< 5 cm) as this may cause damage to the cable and interrupt transmission.

- Using high-grade alcohol and lint-free cotton cleaning swabs, clean the end of the fiber-optic cable that will be inserted in the optical connectors on the donor interface box. Use a fiber end-face inspection tool to scan both, the class fiber and its surrounding area.

- Check for dirt on the cladding, chips/pits, dirt on the ferrule, and scratches.

- Connect the fiber-optic cables by inserting the cable end into the laser receptacle.

- Do not use any index-matching gels or fluids of any kind in these connectors. Gels are intended for laboratory use and attract dirt in the field.

☞ **Note:** **Care should be taken when connecting and disconnecting fiber-optic cables - use the connector housing to plug or unplug a fiber. Scratches and dust significantly affect system performance and may permanently damage the connector. Always use protective caps on fiber-optic connectors not in use.**

Cleaning Procedure for Fiber-Optical Components:

Any contamination in the fiber connection results in additional optical transmission loss which could cause whole system failure. It is thus recommended that every fiber connector be inspected and cleaned prior to mating.
The goal is to eliminate any dust or contamination and to provide a clean environment for the fiber-optic connection.

When you clean fiber components, always complete the following steps carefully:

1. Turn off the ION-U system (laser sources) before you inspect fiber connectors.

Never look into a fiber while the system lasers are on!

2. Check the connectors or adapters with a fiberscope before cleaning.
3. If the connector is dirty, clean it with a lint-free wipe (dry cleaning).
4. Inspect the connector.
5. If the connector is still dirty, repeat the dry cleaning technique.
6. Inspect the connector.
7. If the connector is still dirty, clean it with 99% isopropyl alcohol (wet cleaning) followed immediately with a dry clean in order to ensure no residue is left on the surface.
8. Repeat steps 5 through 7 until surface is clean.

Note: For a more detailed description, please refer to:
http://www.cisco.com/en/US/tech/tk482/tk876/technologies_white_paper09186a0080254eba.shtml

2.2.2. Optical cable installation

1. Locate the Optics connector cover on the lower right side of the RU. Loosen the four cover screws, remove the cover, and set it aside. Removing this cover allows access to the UP and DL optical connectors.

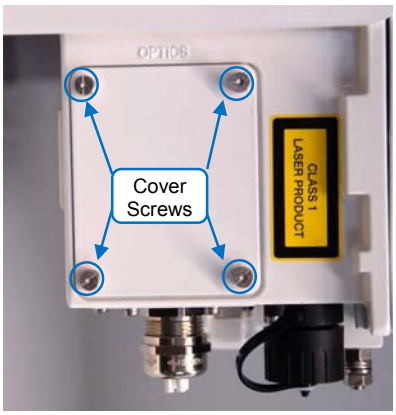


Figure 2-18 Remove optics cover

2. Remove the sealing nut from the optical cable gland at the bottom of the RU.

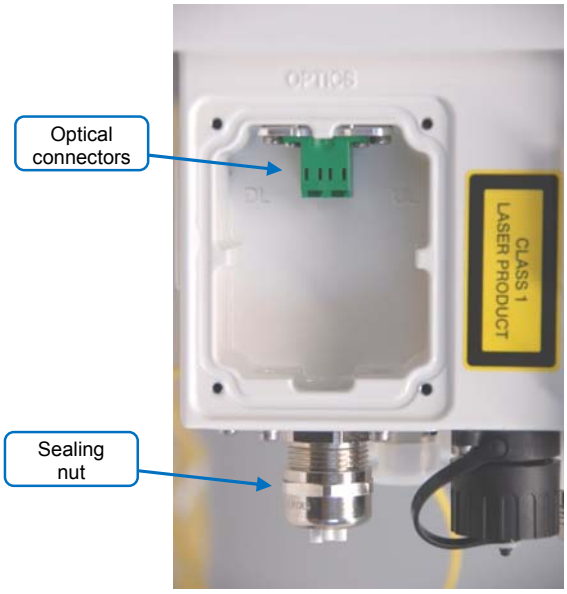


Figure 2-19 Remove sealing nut

3. Remove the split-seal and clamp jacket.

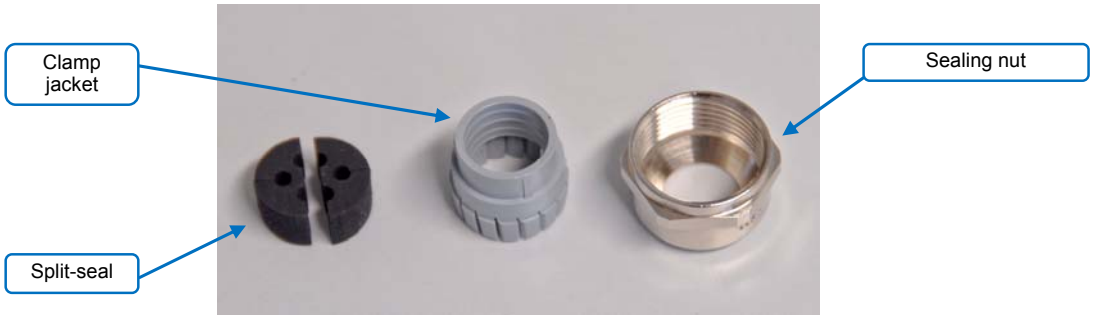


Figure 2-20 Split-seal and clamp jacket

4. Insert the optical cables through the sealing nut and the clamp jacket.

5. Then insert the optical cables through the opening in the cabinet.

6. Connect the optical cables to the proper UL and DL LC/APC connectors.

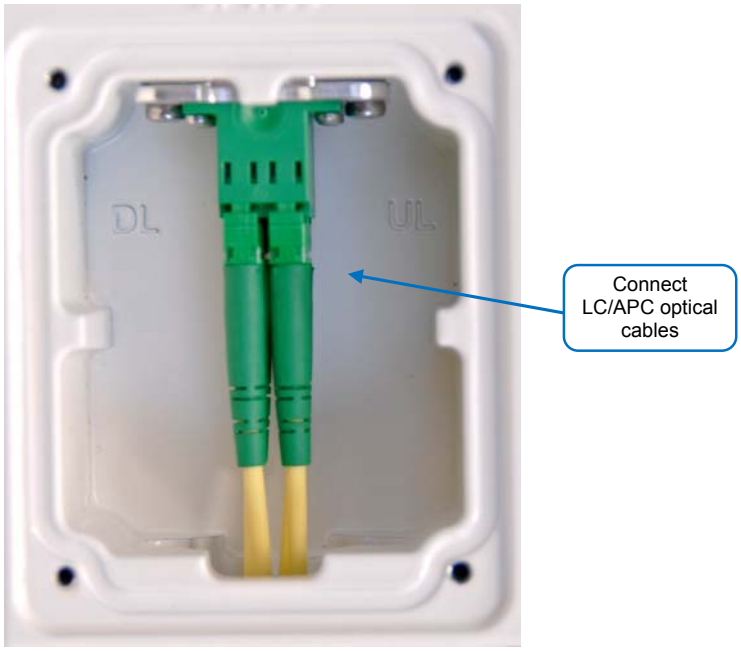


Figure 2-21 Optical cables connected

7. Separate the two halves of the split-seal. Place one cable into the hole and the other in the groove of each half of the split-seal. Insert the spit seal into the clamp jacket.

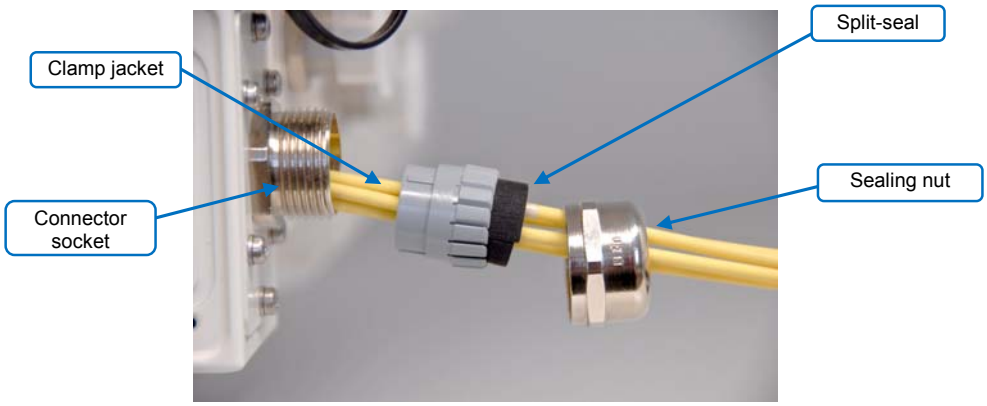


Figure 2-22 Place cables into split-seal

8. Insert the clamp jacket with split seal to the connector socket and fasten them with the sealing nut.

Figure 2-23 Optical cable installed

9. Replace the optics metal cover and tighten the four screws that were loosened in step 1.

2.2.3. RU Power Supply Replacement

The power supply for the RU is a field replaceable module. The type of power supply used by the RU (AC, DC, or Vdc/100) is dependent on the model number of the RU.

Before starting any maintenance on the RU, read the health and safety warnings in *chapter 4.2.1.*

1. Switch off the circuit breaker supplying power to the RU.
2. Once you have confirmed that the power has been shutdown, remove Mains power connector from the RU.

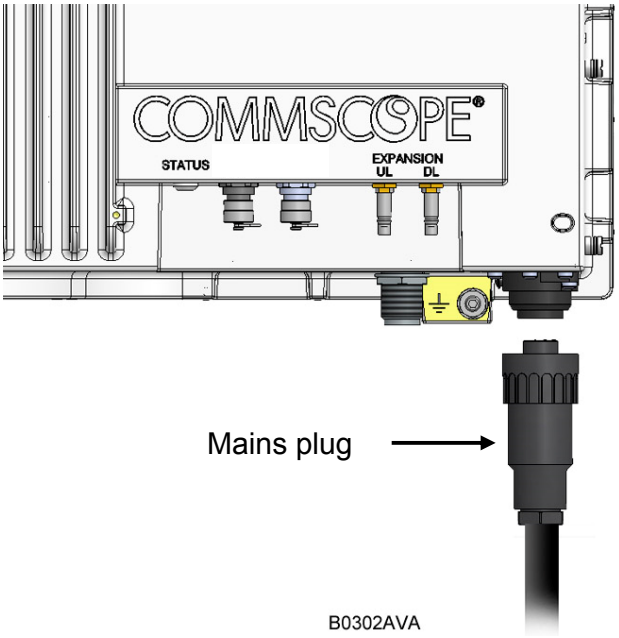


Figure 2-24 Disconnect Mains power

3. Locate the power supply on the right side of the Remote Unit.

Figure 2-25 RU power supply location

4. Use a #2 Phillips head or slotted screwdriver to loosen the 8 universal slot/Phillips captive power supply screws and carefully remove the supply. The weight of the power supply must be supported as you loosen the screws to prevent damage to the supply.

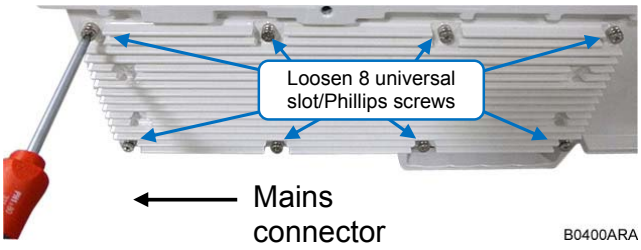


Figure 2-26 8 RU power supply screws

5. Carefully remove the power supply from the unit. Do not attempt to support the weight of the supply with the attached input and output cables.

Figure 2-27 RU power supply with cables

6. Locate the input cable connector for the power supply on the right side of the supply.
7. Loosen the 3 Phillips head terminal screws and remove the connector.

Figure 2-28 RU power supply input cable

8. Locate the output connector for the power supply on the left side of the supply.
9. Loosen the 2 Phillips head screws and remove the output connector.

Figure 2-29 RU power supply output cable

10. Remove the defective supply.

Figure 2-30 RU with power supply removed

11. Replace the defective power supply with the new power supply.
    It is very important to confirm that the replacement supply is the same type as the original supply. **The AC, DC, and Vdc/100 supplies are not interchangeable.**
12. Reconnect the input and output connectors, and tighten the associated terminal screws.

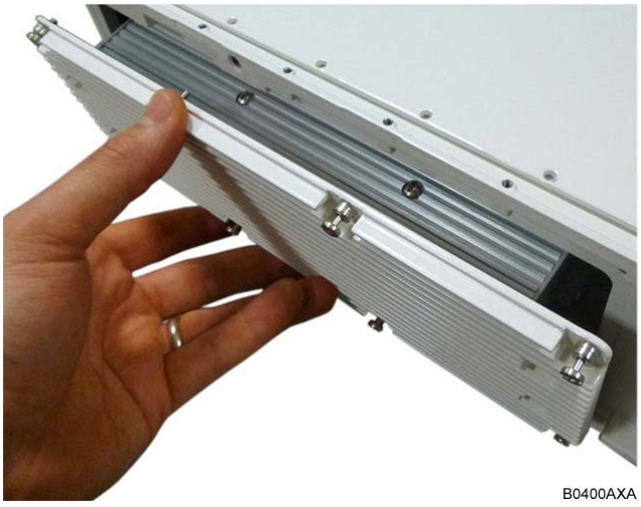


Figure 2-31 RU with replacement power supply

13. Insert the power supply into the RU carefully to avoid damaging any cables. The supply must be supported until the 8 universal slot/Phillips captive power supply screws have been tightened.
14. Tighten the 8 universal slot/Phillips captive power supply screws.

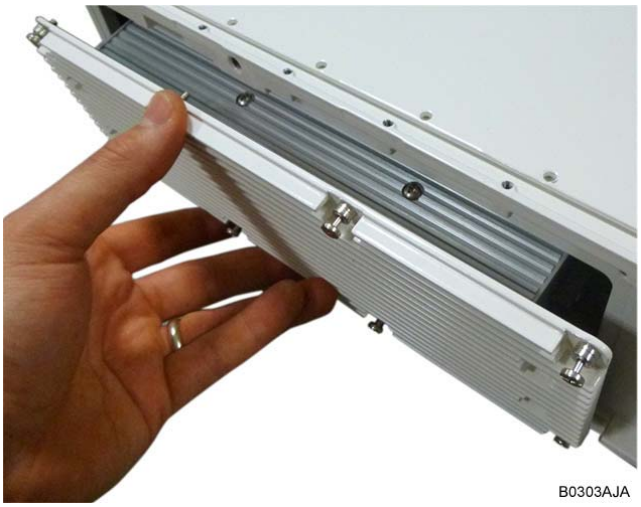


Figure 2-32 RU insert power supply

15. Reconnect the Mains power plug.
16. Switch on the breaker and check the RU for proper operation.

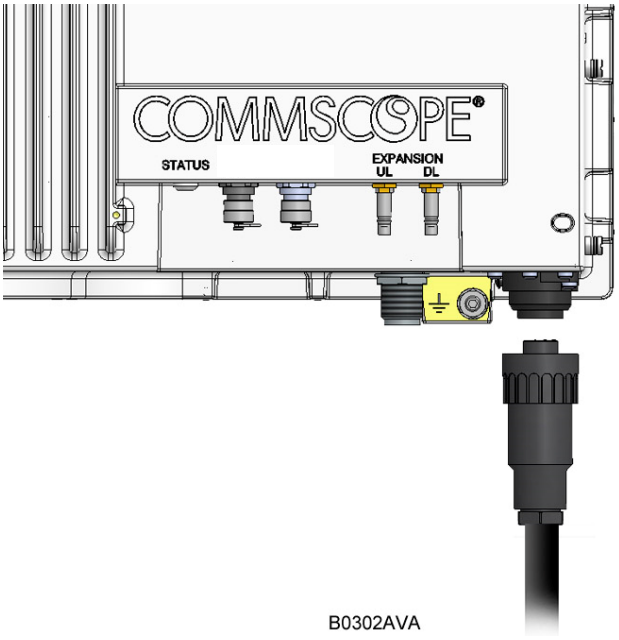


Figure 2-33 Reconnect Mains power

3. TECHNICAL SUPPORT

3.1. CONTACT ADDRESSES

The ION-B is developed by:

Commscope Italy Srl
Via Pier De Crescenzi 40
48018 Faenza, Italy
Tel: +39.0546.697111
Fax: +39.0546.682768

For further information about the product, please write to:

IONB.support@andrew.com

3.2. RETURNING EQUIPMENT

Before returning any equipment to the manufacturer for repairation or replacement, the customer should give prior notice to the manufacturer and ask for the 'Return Material Authorisation' (RMA request).

RMA REQUEST FORM

Company name
Address
Contact person
Invoice number
Delivery note
№ of pieces
Model [1)]
Serial Number [1)]
Lot[1)]
Year[1)]
Description of the failure/ defect

[1)] Please refer to the serial label

Upon accepting your RMA request, the manufacturer will assign you a unique RMA code. You will therefore be able to return the equipment to the manufacturer. Please remember that:

- each piece of equipment must be packaged with care before shipment;
- a copy of the RMA request form must be included with the returning equipment, with clear indication of the RMA code you received from the manufacturer.

The returned pieces are able to be repaired (where possible) or replaced (when no repairations can be carried out). These operations are performed under warranty (please see the warranty conditions specified in the sales contract) or out-of-warranty. In the latter case, we will send you a bill for equipment repairation or replacement.

When returning the repaired or replaced equipment, the manufacturer will issue a check report, which will be included in the packaging together with the returned pieces. The customer will be informed of any corrective actions suggested for quality assurance.