

INSTALLATION MANUAL

(Do not print this title page, Print the manual in black-and-white)

P/N: ORAN Remote Radio Unit (ORRU)

Version number: 1.0

Revision	Date	Prepared	Checked	Approved	Description
1.0	8-Jun-22	YC.G	XF.L	H.H	Initial Release

ORAN Remote Radio Unit

ORRU Installation Manual



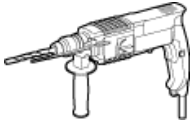





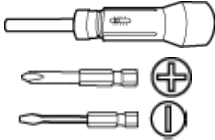
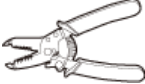

Before installing an ORRU, you must be familiar with its exterior, ports, indicators, installation options and installation clearance requirements.








1 Installation Preparations

This chapter describes the reference documents, tools, and instruments that must be ready before the installation. In addition, it specifies the skills and prerequisites that installation engineers must have.

1.1. Tools and Instruments

You must prepare the following tools and instruments before the installation.

Item	Description	Remark
1	Hammer drill (a ϕ 13.5~14)	
2	Rubber Hammer	
3	Adjustable wrench (size: 32mm)	
4	Torque wrench (size:16mm / 20mm / 22mm)	
5	Combination wrench (size:16mm / 20mm / 22mm)	
6	Phillips screwdriver (M3 to M6)	
7	Torque screwdriver kit (Cross head and flat-head M3 to M6)	
8	Wire stripper	
9	Pliers	

10	Safety gloves	
11	Measuring tape	
12	Multimeter	
13	Knife	
14	Safety helmet	
15	Safety goggles	
16	Flash lights	

1.2. Install Accessories for ORRU

No.	Description	Quantity	Remarks
1	ORRU equipment	1	
2	Grounding Cable	1	
3	M10x150, Bolt, HEX HD, SS304	4	
4	SW10 SW, SC LCK, SS304	4	
5	W10 Washer, Plain, SS304	4	
6	Mounting Bracket 1	1	
7	Mounting Bracket 2	1	
8	Mounting Bracket 3	2	
9	M10x100D-SS-JB/ZQ 4763	4	
10	M6x20-SS-GB/T 9074, SCREW ASSY	5	
11	2 Ways Power Plug 26A	1	

2 Information about the installation

Before installing an ORRU, you must be familiar with its exterior, ports, indicators, installation options and installation clearance requirements.

2.1 ORRU Exterior

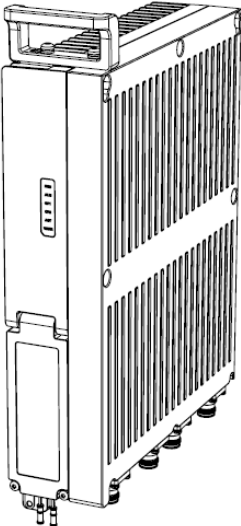


Figure2-1 ORRU exterior

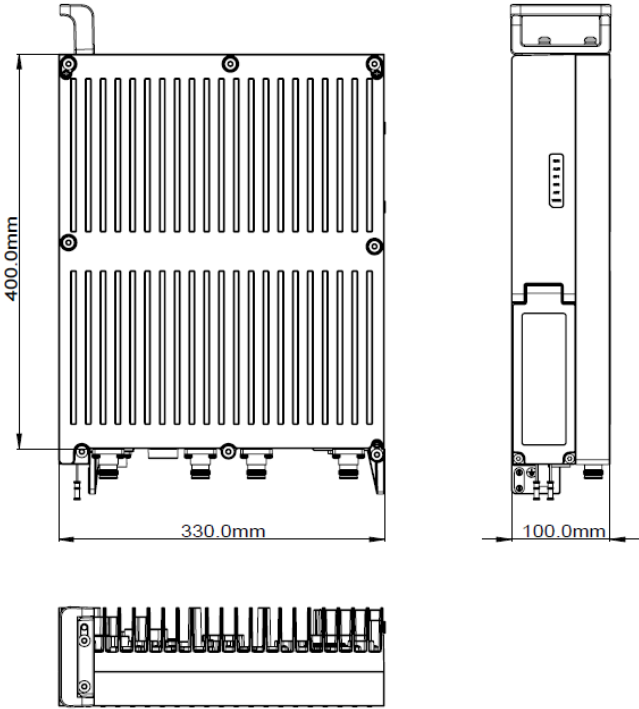


Figure2-2 ORRU dimensions

2.2 ORRU Ports

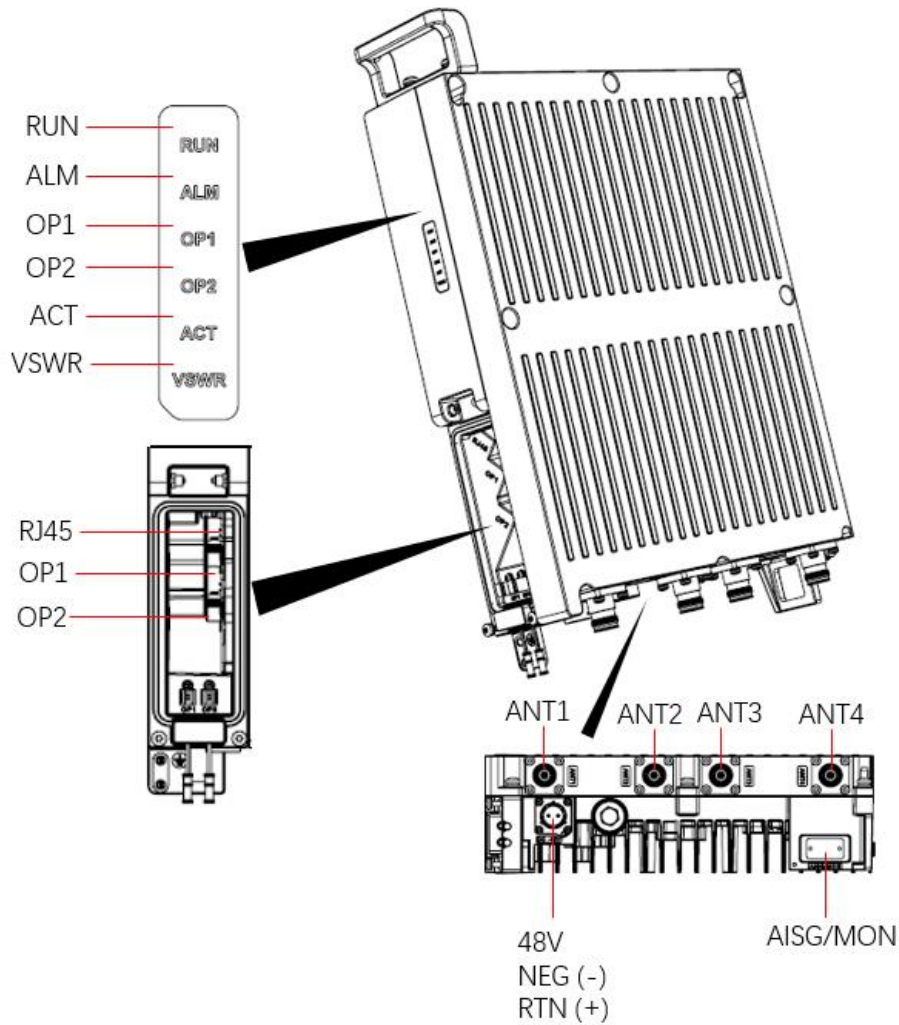


Figure2-3 Ports and indicators on the ORRU panels

Table 2-1 Ports and indicators on the ORRU panels

Item	Silkscreen	Remarks
(1) Ports in the cabling cavity	RTN (+)	Power supply socket, for details about ORRU power cable experience and specifications see ORRU Power Cable.
	NEG (-)	
	RJ45	Debug port
	OP1	Optical/electrical port 0, connected to the DU
	OP2	Optical/electrical port 1, connected to the DU
(2) Bottom ports	ANT1	TX/RX port 1

	ANT2	TX/RX port 2
	ANT3	TX/RX port 3
	ANT4	TX/RX port 4
	AISG/MON	AISG port
(3) Indicators	RUN	For details, See 2-2 ORRU Indicators
	ALM	
	ACT	
	VSWR	
	OP1	
	OP2	

Table 2-2 ORRU Indicators

Indicator	Color	Status	Meaning
PWR	Green	Steady on	There is 48V power input, and the power module is normal, which is directly controlled by the hardware.
		Steady off	No 48V power input or abnormal power module, directly controlled by hardware
RUN	Green	Steady on	Single board failure.
		Steady off	
		Slow Blinking (on for 1s and off for 1s)	Single board normal operation
		Fast Blinking (on for 0.1s and off for 0.1s)	The single board is starting up and loading the software or upgrading the software.
ALM	Red	Steady on	Serious alarm
		Steady off	No alarm
		Slow Blinking (on for 1s and off for 1s)	General alarm, alarm severity is lower than that of normally bright state.

ACT	Green	Steady on	The work is normal.
		Steady off	Not activated or carrier not activated
VSWR	Red	Steady on	Serious alarm, VSWR (Voltage Standing Wave Ratio) affecting use
		Steady off	No VSWR alarm
		Slow Blinking (on for 1s and off for 1s)	General VSWR alarm does not affect usage
OP1	Green	Steady on	OP1 link is normal.
		Steady off	Abnormal transceiver of optical module
		Slow Blinking (on for 1s and off for 1s)	OP1 out of lock (possible causes: dual-mode clock interlock, OP1 interface rate mismatch, etc.)
		Slow Blinking (on for 0.1s and off for 0.1s)	The optical module is not in place or the power supply of the optical module is powered down
OP2	Green	Steady on	OP2 link is normal
		Steady off	Abnormal transceiver of optical module
		Slow Blinking (on for 1s and off for 1s)	OP2 out of lock (possible causes: dual-mode clock interlock, OP1 interface rate mismatch, etc.)
		Slow Blinking (on for 0.1s and off for 0.1s)	The optical module is not in place or the power supply of the optical module is powered down

3 ORRU Installation Scenarios

An ORRU can be installed on a wall and pole. Installation scenarios must meet heat-dissipation and waterproofing requirements of the ORRU.

3.1 Installing an ORRU on a wall

The wall for installing ORRUs must meet the following requirements:

- For each ORRU, the wall must be able to bear a weight four times heavier than the ORRU's weight and the bolts' pulling force of 1.25 kN vertical to the wall.
- Expansion bolts must be tightened to 30 N•m to ensure that the bolts work properly and the wall remains intact.

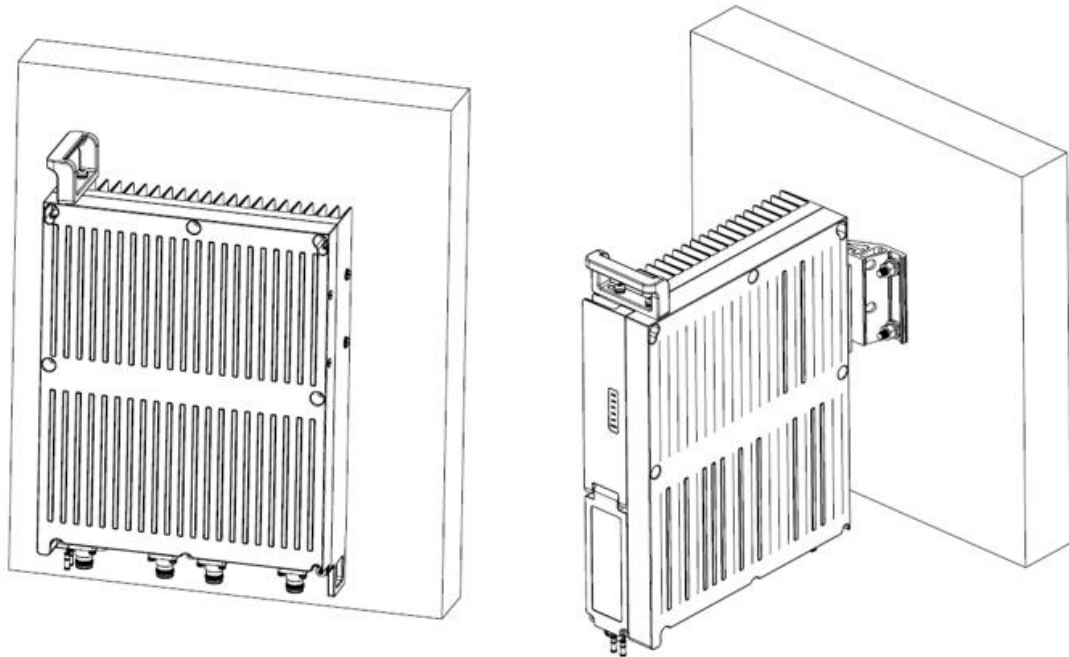


Figure 3-1 Single ORRU installed on a wall

3.1.1 Clearance for a Single ORRU

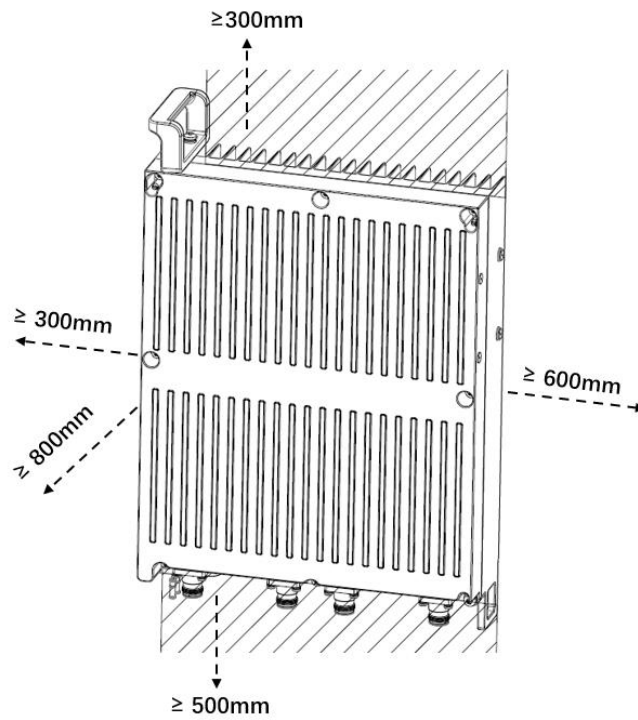


Figure 3-2 Recommended clearance for installing an ORRU.

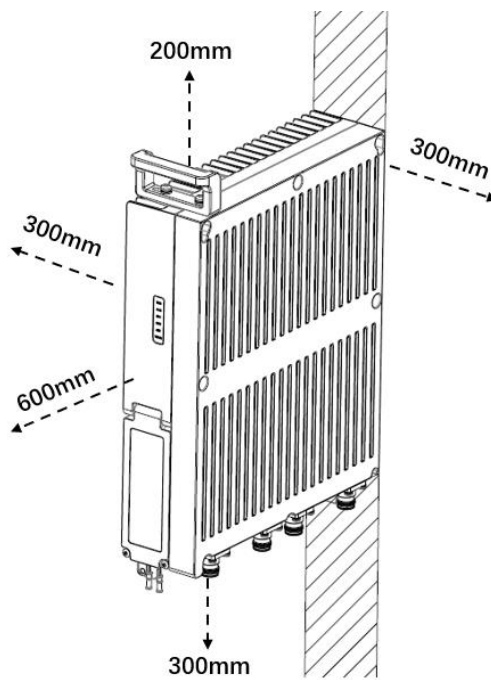


Figure 3-3 Recommended clearance for in side-mounted an ORRU

3.1.2 Clearance for Three or More ORRUs

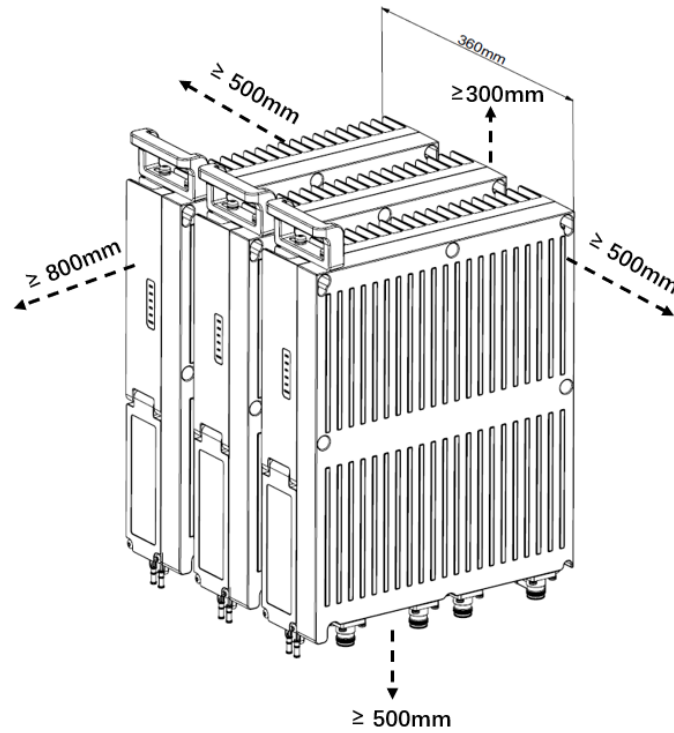


Figure 3-4 Recommended clearances for three or more ORRUs installed

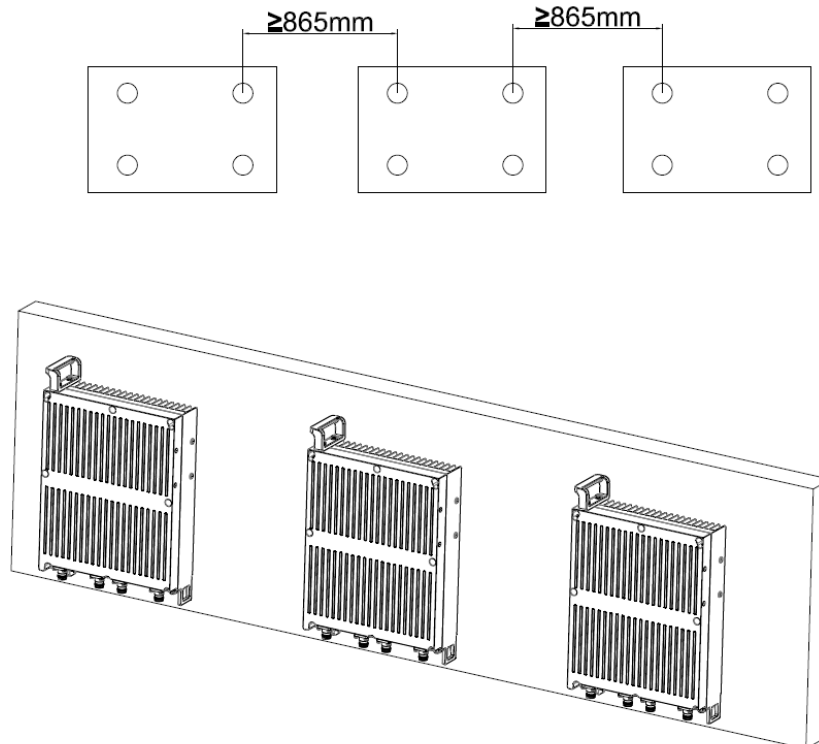


Figure 3-5 Recommended clearances for three or more ORRUs installed in standard mode on a wall

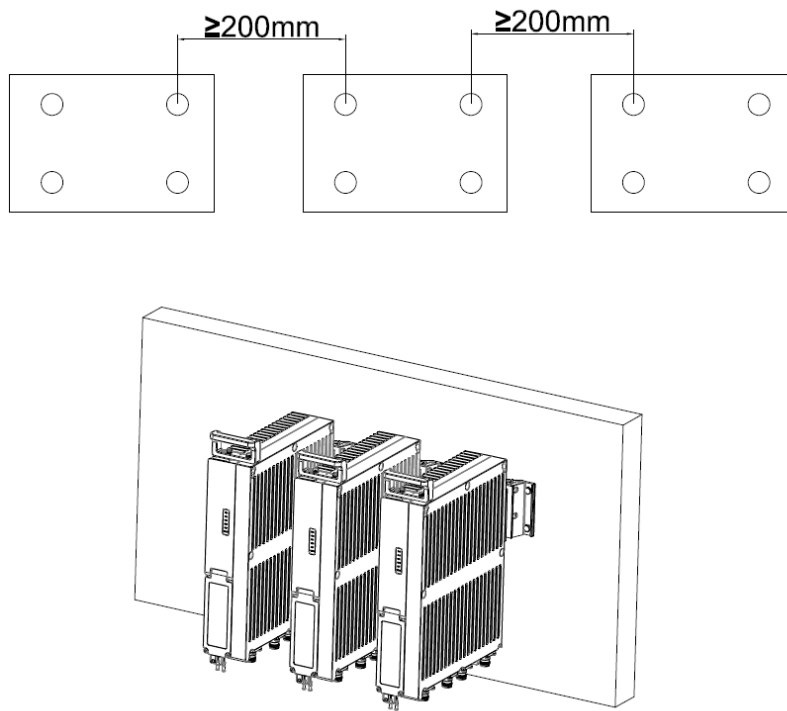


Figure 3-6 Recommended clearances for three or more ORRUs installed in side-mounted mode on a wall

3.1.3 Installation Spacing Between ORRUs

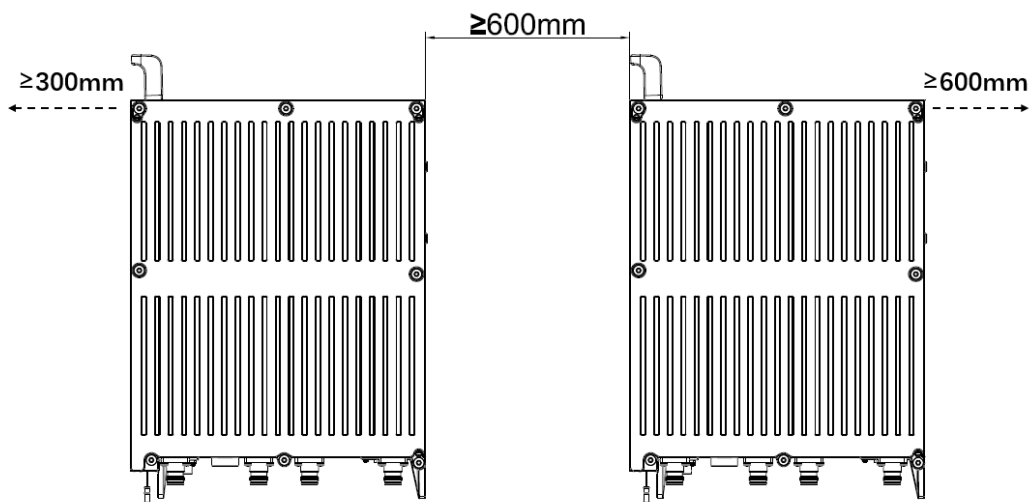


Figure 3-7 Recommended horizontal spacing between ORRUs

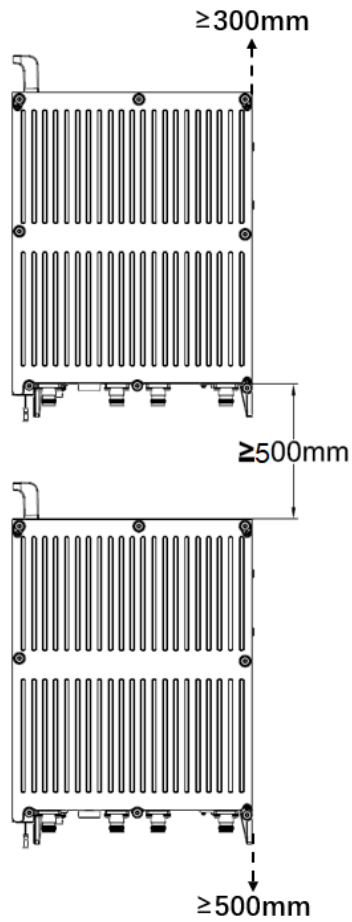


Figure 3-8 Recommended vertical spacing between ORRUs

3.1.4 Installing an ORRU on a Wall

Step 1: Disassemble the ORRU mounting brackets, as shown in [Figure 3-9](#).

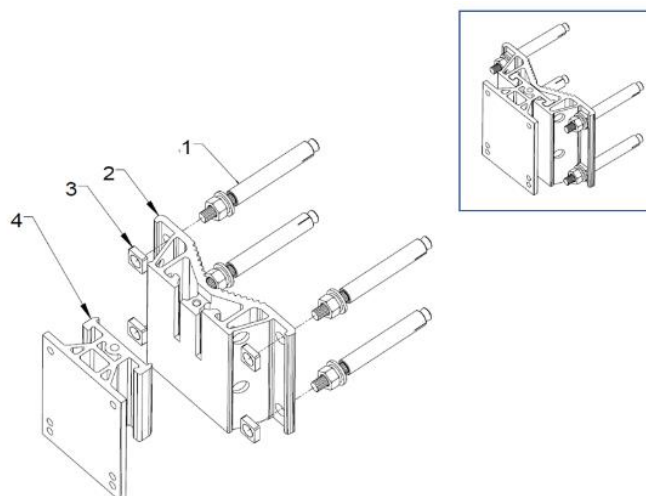


Figure 3-9 Disassembling the ORRU mounting brackets

(1) Anchor bolts (2) Installation bracket (3) Square washer (6) Main bracket

Step 2: Place the installation bracket against the wall, use a level to verify that the installation bracket is placed horizontally, and then mark anchor points with a marker, as shown in **Figure 3-10**.

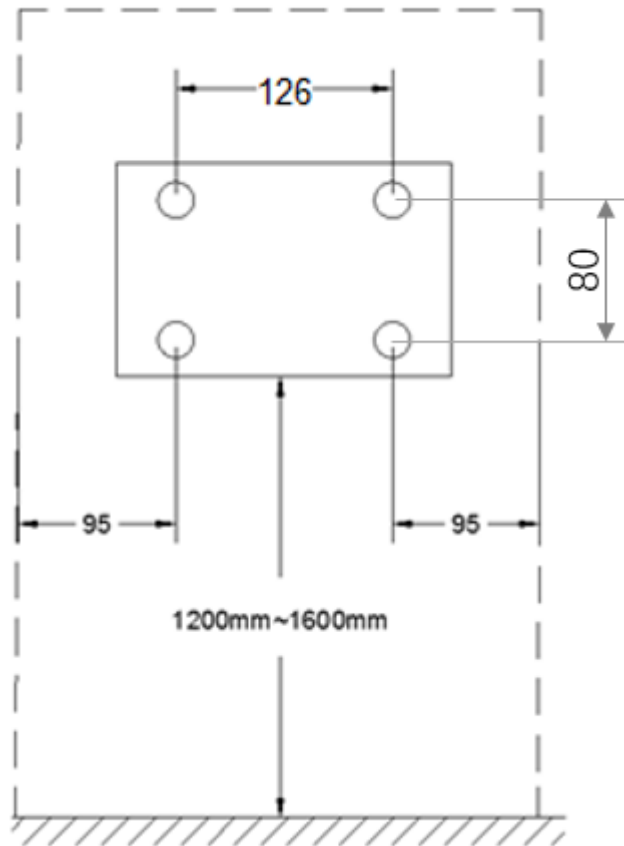


Figure 3-10 Marking anchor points

Step 3: Drill holes at the anchor points, and then insert expansion anchor bolts, as shown in **Figure 3-11**.

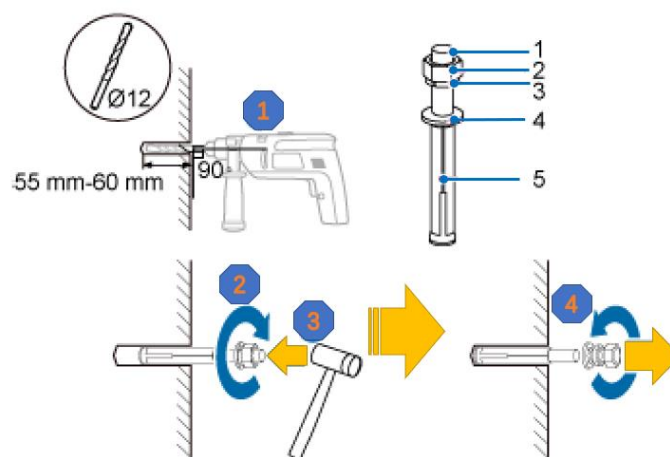


Figure 3-11 Drilling holes and inserting expansion anchor bolts

(1) M10×100 bolt (2) Nut (3) Spring washer (4) Flat washer (5) Expansion sleeve

Step 4: Install the installation bracket on the expansion anchor bolts, place the flat washers, spring washers, and nuts through the expansion anchor bolts and then use a torque socket to tighten the nuts, as shown in **Figure 3-12**.

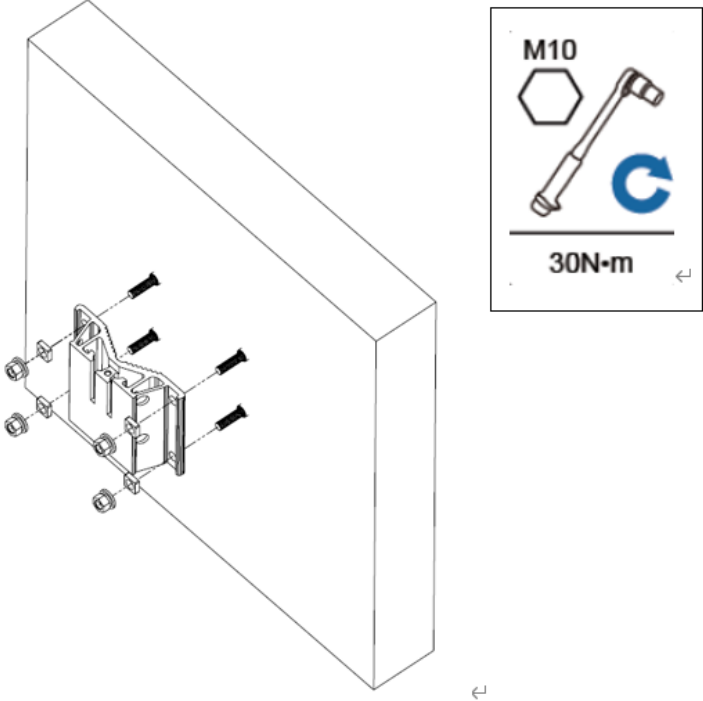


Figure 3-12 Installing the installation bracket on the anchor bolts

Step 5: Use hexagon torque screwdriver to install the main bracket onto the rear of the ORRU, and tighten the four stainless screws, as shown in **Figure 3-13**.

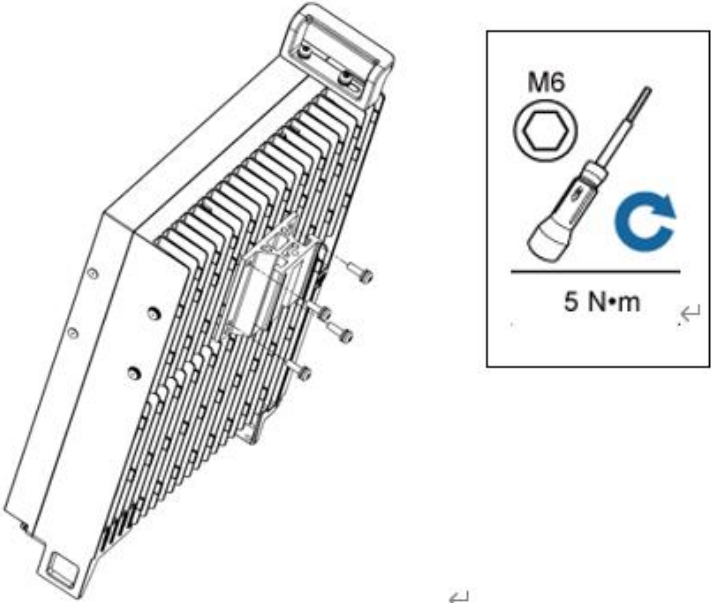


Figure 3-13 Installing the bracket onto the rear of the ORRU

Step 6: Install the ORRU onto the main bracket and tighten the M6 stainless screws as shown in [Figure 3-14](#) and [Figure 3-15](#).

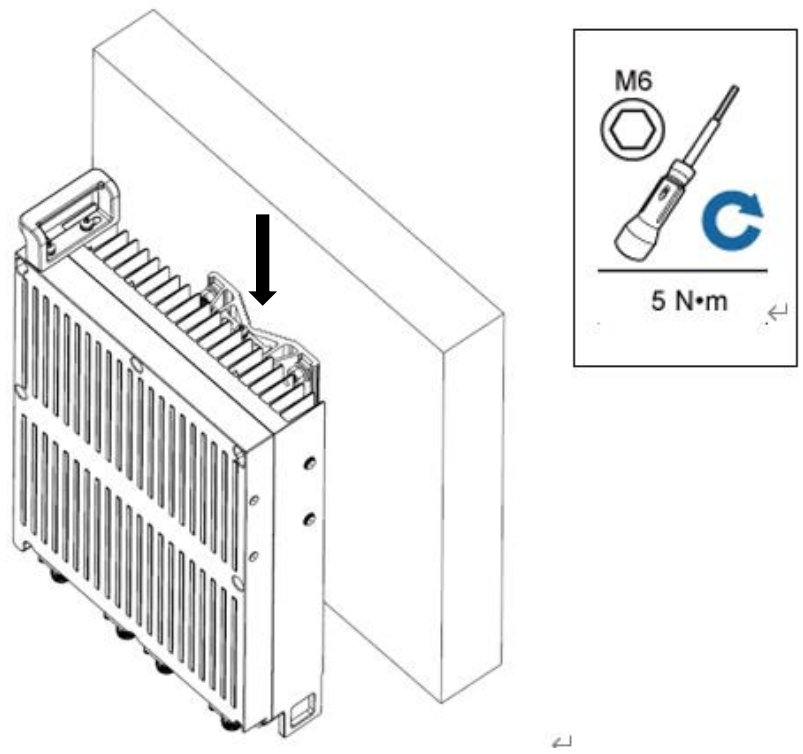


Figure 3-14 Installing the ORRU onto the main bracket

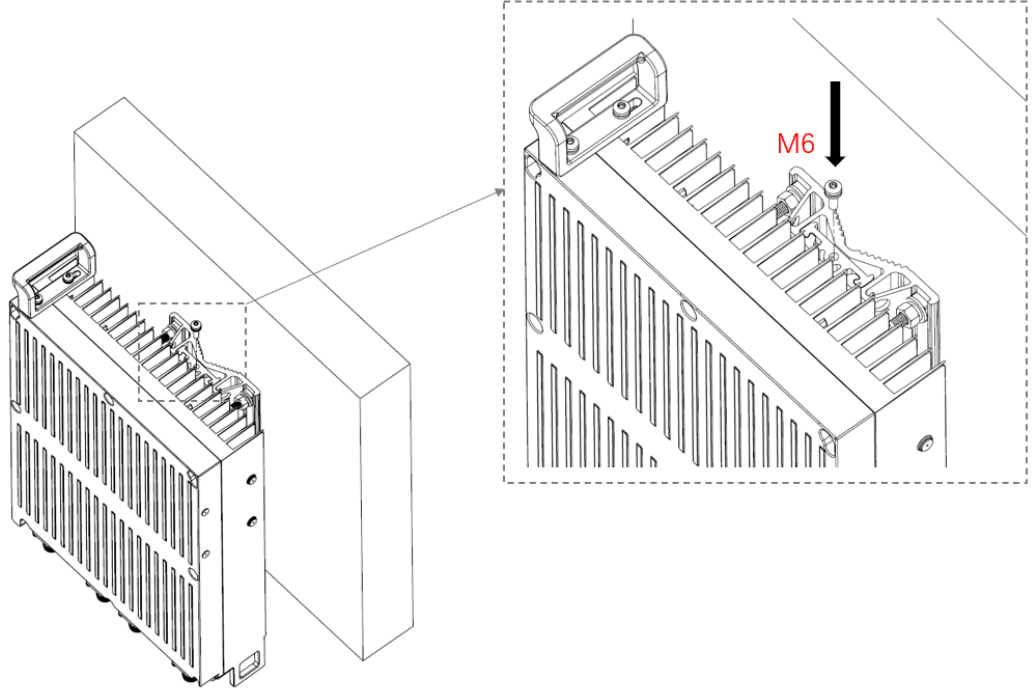


Figure 3-15 Tighten the M6 screw onto the bracket

3.2. Installing an ORRU on a Pole

- The diameter of a pole for installing an ORRU ranges from 60 mm to 120 mm, the recommended diameter is 80 mm.
- The recommended thickness of the pole wall is 3.5 mm or above.

3.2.1 Mounting Kits for an ORRU mounted on a pole

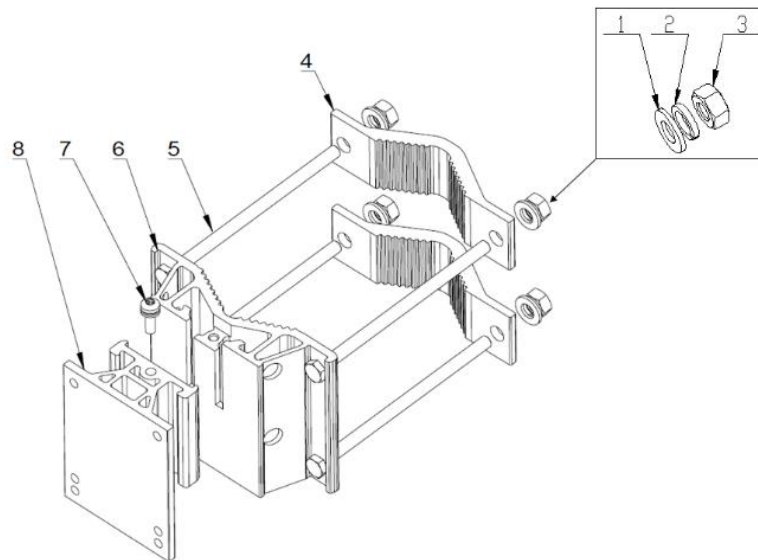


Figure 3-16 Pole mounting kit of ORRU

- (1) Thick flat washer (2) Spring washer (3) Standard M10 nut (4) Auxiliary bracket (5) Square-neck bolt (6) Pole installation bracket (7) Inner hexagon screw (8) Main bracket

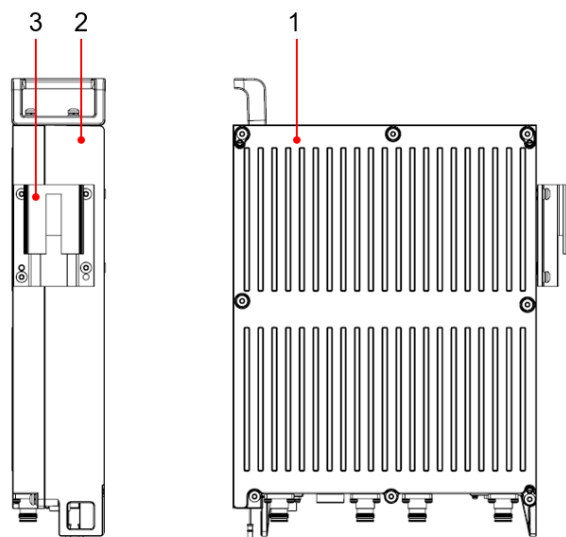


Figure 3-17 Front and side view of an ORRU

- (1) Front view (2) Side view (3) Main Bracket

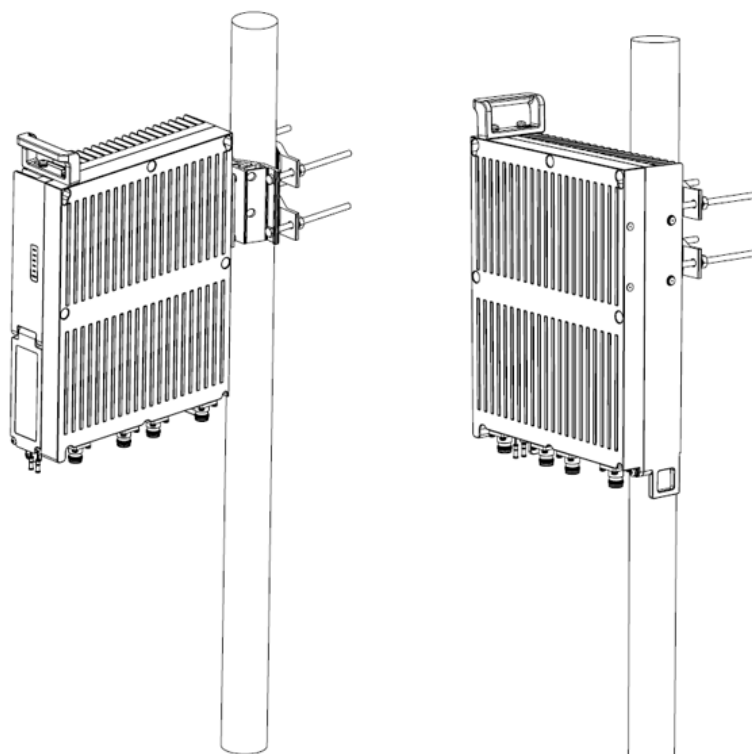


Figure 3-18 An ORRU Installed on a Pole

3.2.2 Installing an ORRU on a Pole

Step 1: Determine a position for installing the mounting brackets., recommended that the mounting kits be installed at a position 1200 mm to 1600 mm high above the ground.

Step 2: Installing the mounting brackets onto the pole and tighten the nuts on the bolts, as shown in [Figure 3-19](#).

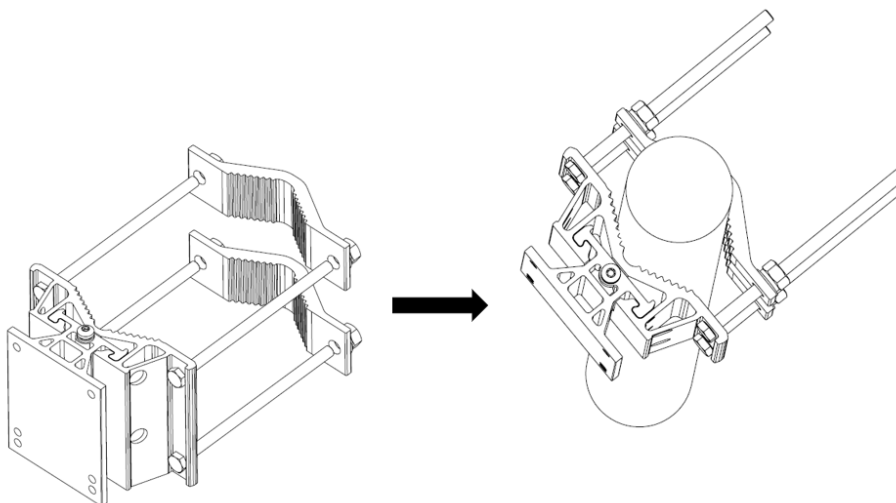


Figure 3-19 Installing the ORRU mounting brackets

Step 3: Install the main bracket onto the rear side of ORRU and tighten the M6 screws as shown in [Figure 3-20](#).

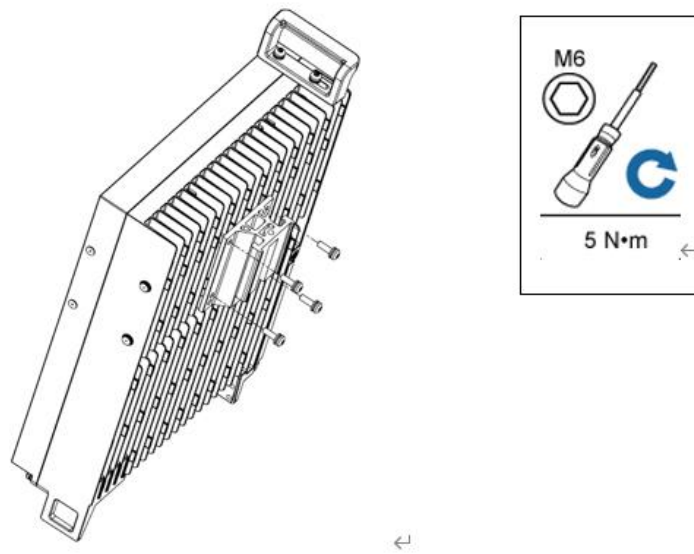


Figure 3-20 Installing the main bracket onto the rear side of ORRU

Step 3: Install the ORRU onto the Pole and tighten the M6 screws as shown in [Figure 3-21](#) and [Figure 3-22](#).

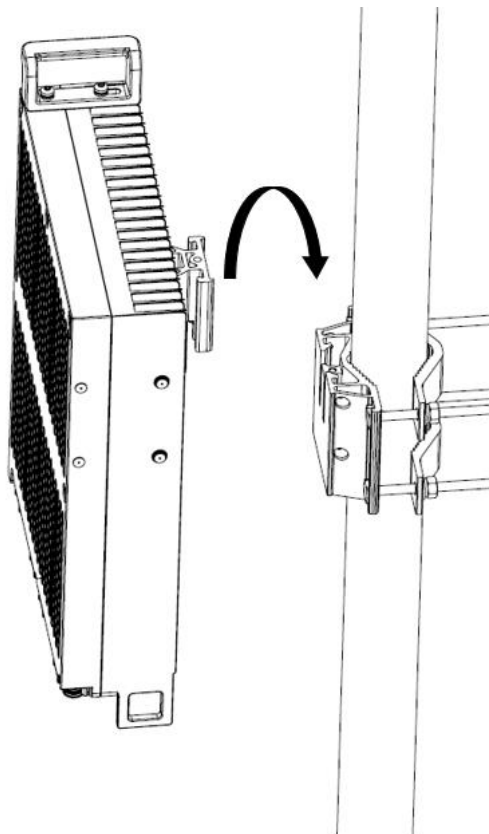


Figure 3-21 Installing the ORRU onto the Pole

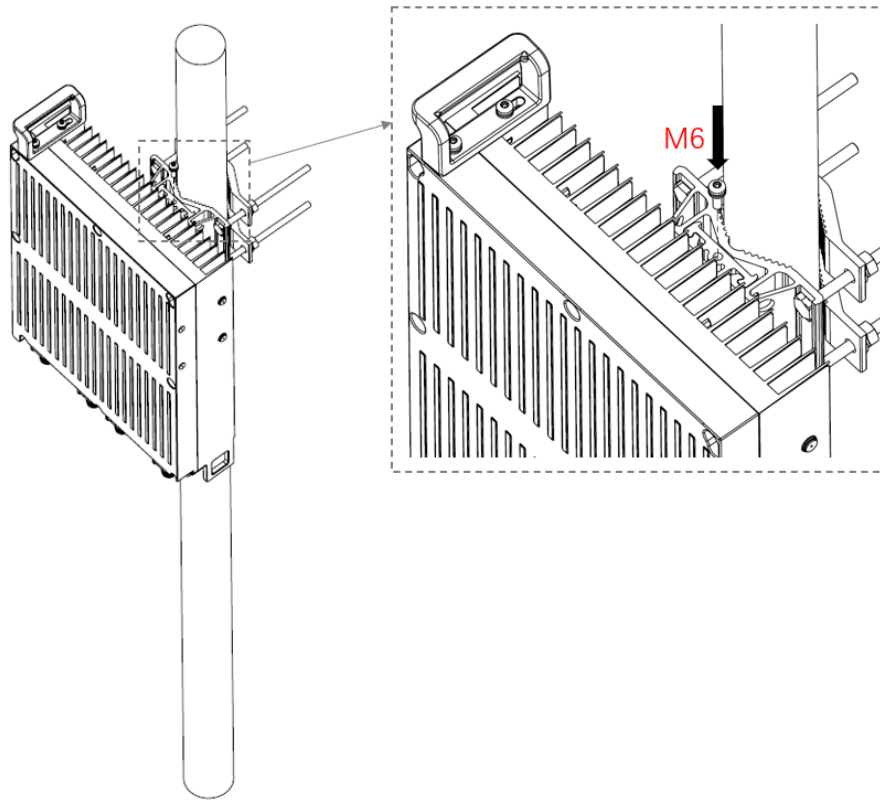


Figure 3-22 Tighten the M6 screw onto the bracket

4 ORRU Cable Connections

NOTE: The ORRU does not support power cable cascading.

4.1. Cable Installation sketch diagrams.

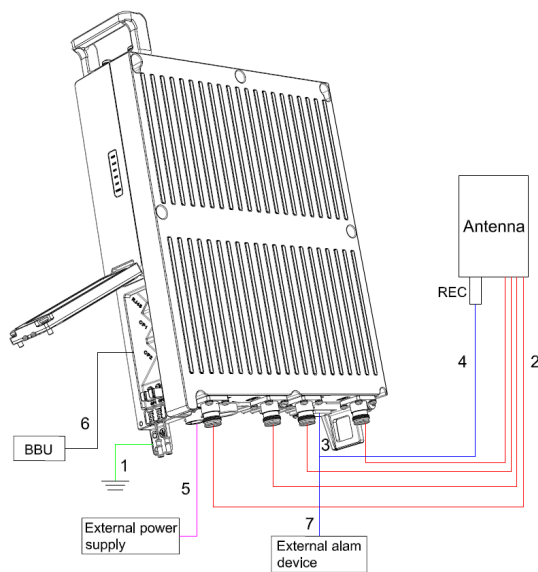


Figure 4-1 Cable connections of a single-mode ORRU

(1) ORRU PGND cable (2) ORRU RF jumper (3) ORRU AISG multi-wire cable (4) ORRU AISG extension cable (5) ORRU power cable (6) CPRI optical fiber (7) ORRU alarm cable

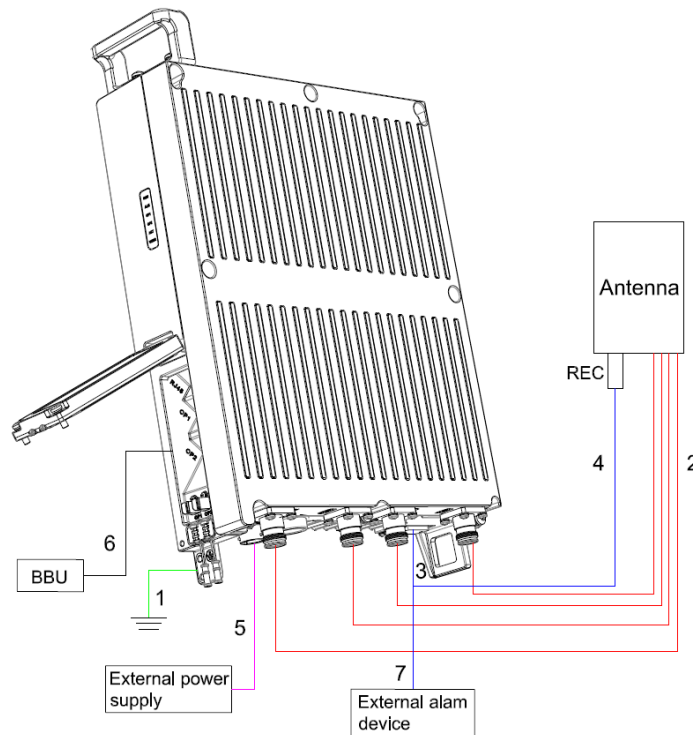


Figure 4-2 Cable connections of a multimode ORRU

(1) ORRU PGND cable (2) ORRU RF jumper (3) ORRU AISG multi-wire cable (4) ORRU AISG extension cable (5) ORRU power cable (6) CPRI optical fiber (7) ORRU alarm cable

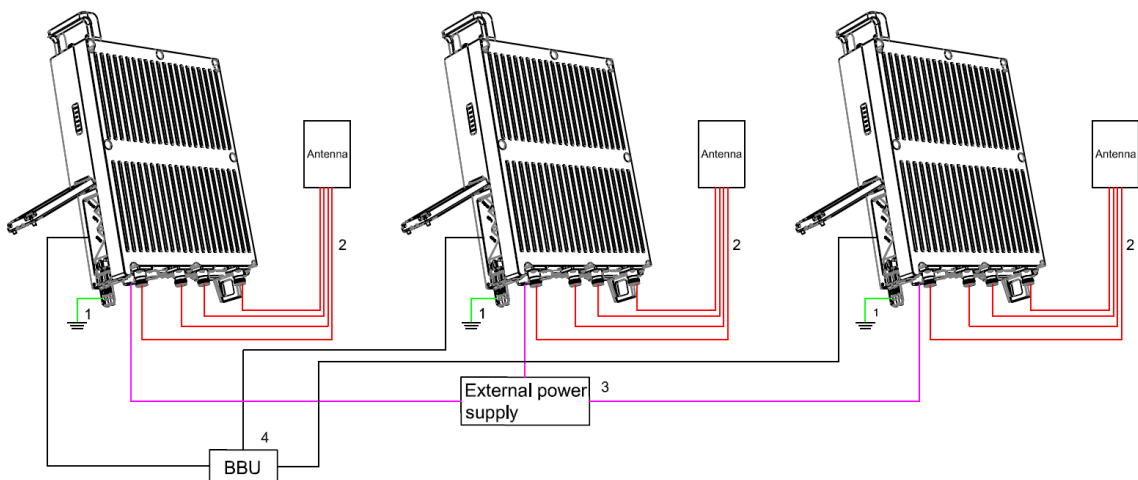


Figure 4-3 Cable connections of multiple single-mode ORRUs

(1) ORRU PGND cable (2) ORRU RF jumper (3) ORRU power cable (4) CPRI optical fiber

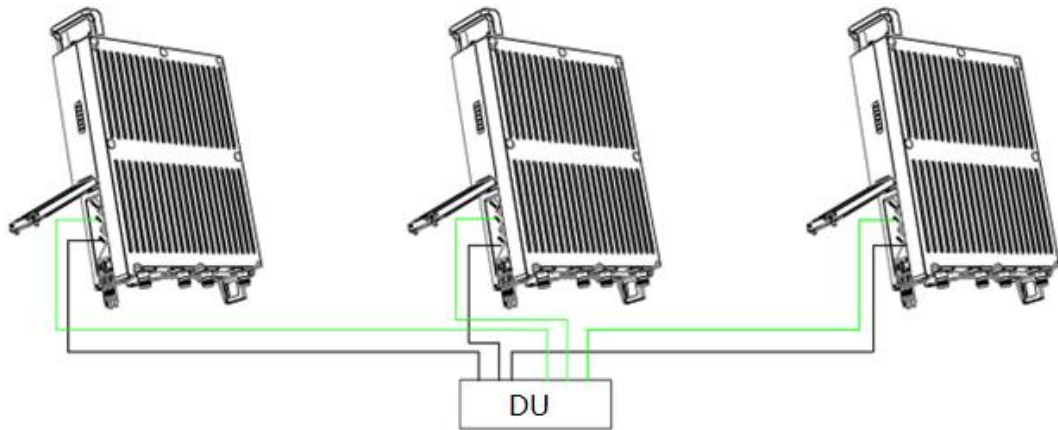


Figure 4-4 Cable connections of multiple multimode ORRUs

4.2. ORRU Cables

Table 4-1 ORRU cables

Cable	One End		The Other End	
	Connector	Installation Position	Connector	Installation Position
ORRU PGND Cable	OT terminal (M6, 6 mm ²)	Ground terminal on the ORRU	OT terminal	Ground terminal on the ground bar
ORRU Power Cable	2 ways connector (pressfit type)	NEG (-) and RTN (+) ports on the ORRU	Depending on the power supply equipment	External power equipment
ORRU Alarm Cable	DB15 male connector	EXT_ALM port on the ORRU	Cord end terminal	External alarm device
CPRI Fiber Optic Cable	LC connector	CPRI port on the ORRU	LC connector	CPRI port on aboard in the BBU
ORRU RF Jumper	4.3-10 male connector	RF ports on the ORRU	4.3-10 male connector	Antenna
ORRU AISG Cable	DB15 waterproof male connector	AISG port on the ORRU	Standard AISG female connector	Standard AISG male connector

ORRU AISG Extension Cable	Standard AISG male connector	Standard AISG female connector on the AISG	Standard AISG Female connector	Standard AISG male connector on the RCU
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4.3. Installing an ORRU PGND Cable.

Step 1: Install the ORRU PGND cable. Connect the M6 OT terminal of the ORRU PGND cable to a ground terminal at the ORRU bottom side as shown [Figure 4-5](#).

Step 2: Label the installed cable according to the instructions.

Step 3: Waterproof both ends of the interface.

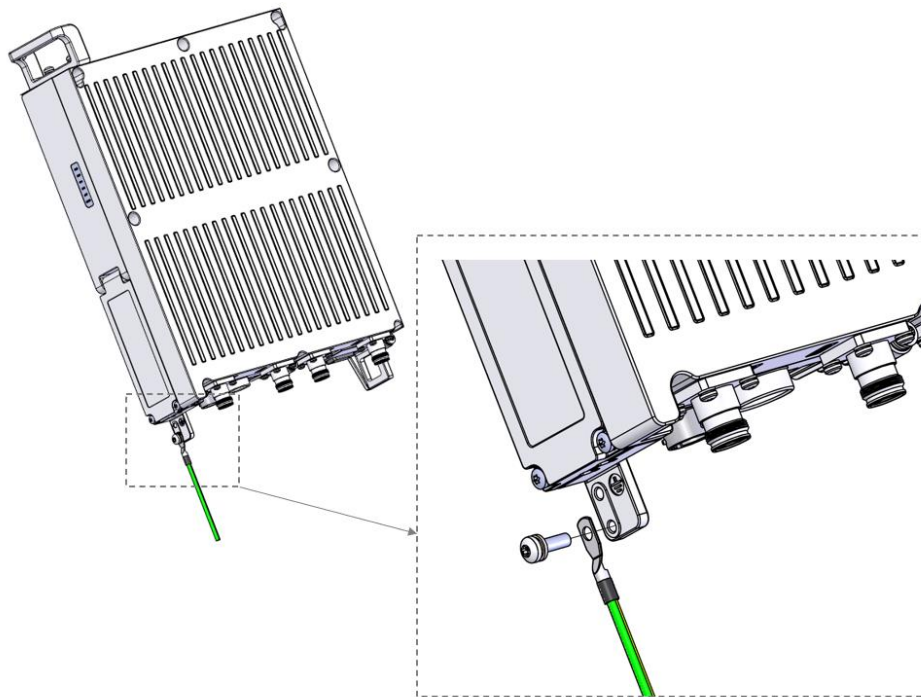


Figure 4-5 Installing ORRU PGND Cable

4.4. Installing an ORRU AISG and Alarm Cable.

NOTE: The AISG Cable and Alarm Cable are integrated into a DB15 connector on ORRU side.

Step 1: Loosen the cap screws and open the cap of the AISG connector as shown in [Figure4-6](#).

Step 2: Install the ASIG Cable and tighten the screw as shown in [Figure4-6](#).

Step 3: Waterproof both ends of the interface.

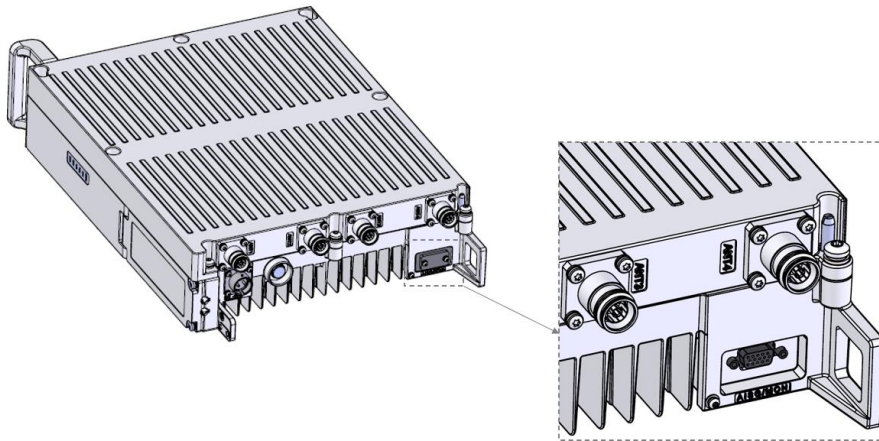


Figure 4-6 Loosen screws and open the AISG connector cap

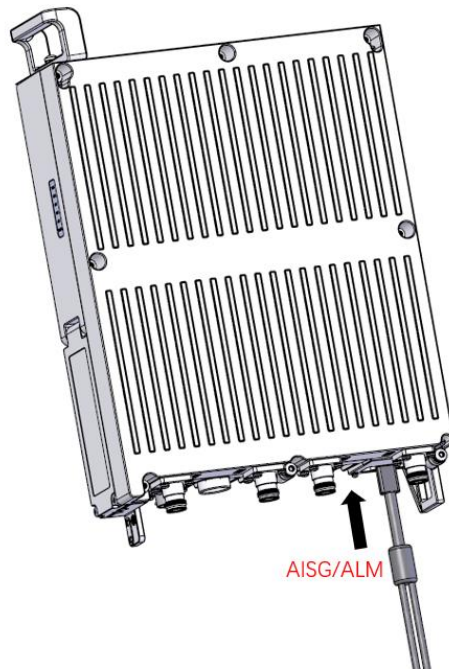
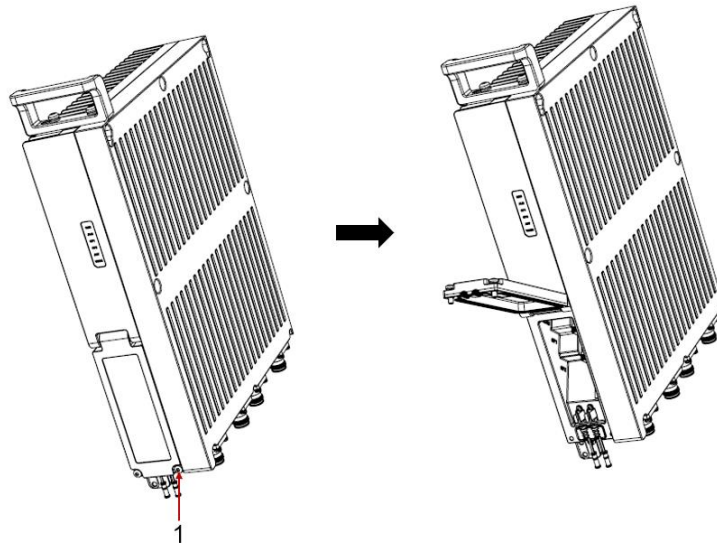


Figure 4-7 Install an AISG and Alarm Cable

4.5. Installing a CPRI optical Cable.

NOTE: Open the cover plate of ORRU housing side and wear ESD gloves before install a CPRI optical cable.

Step 1: Loosen the M5 locking screw and opening the cover plate of ORRU housing side, as shown in [Figure4-8](#).



(1) M5 Locking screw

Figure 4-8 Opening the cover plate of the ORRU housing side

Step 2: Insert the optical module into the CPRI port on the ORRU and install the CPRI cables into the optical module as shown in [Figure 4-9](#).

Step 3: Closed the cover plate and tighten the M5 screws, then waterproof both ends of the interface.

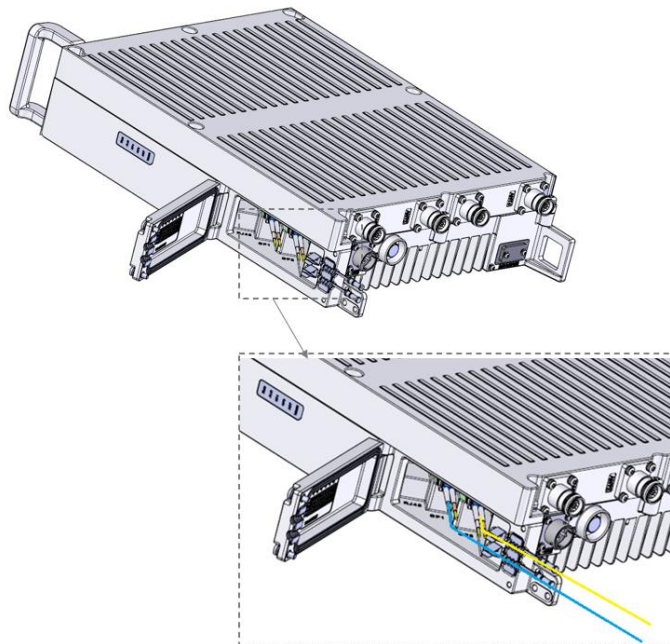


Figure 4-9 Installing the optical module and CPRI cable

4.6. Installing a Power Supply Cable.

NOTE: The ORRU Power supply is 2ways DC-48V input, and the power supply connector is pressfit type, below steps for how to install an ORRU power cable.

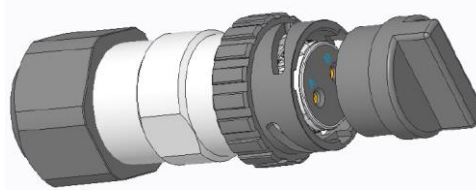


Figure 4-10 Connector diagram

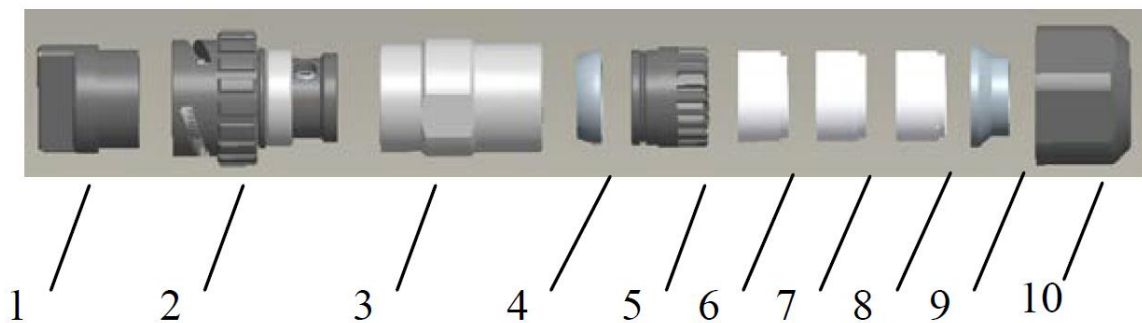


Figure 4-11 Connector package contents

(1) Dust cap (2) Coupling shell (3) Shell (4) Shielding ring (5) Plastic clip (6) Sealing rubber (7) Sealing rubber (8) Hold-down ring (9) Nut

Tips:

- a) In addition to parts 6/8/9 and the rest are assembled.
- b) No.6 sealing rubber for cable OD 6~9mm.
- c) No.7 sealing rubber for cable OD 9~14mm.
- d) No.8 sealing rubber for cable OD 14~18mm.
(No.6,7,8 can choose one)
- e) The female pin can handle 2.5 to 10mm².
- f) Hold-down ring for cable OD under 10mm.

4.6.1. Cable stripping detail.

Step 1: Determine the length of the power cable for different operations based on the labels, as shown in [Figure 4-12](#).

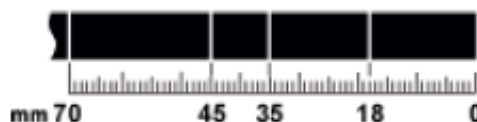


Figure 4-12 Determining the length of the power cable

Step 2: Strip the specified length of the sheath off the power cable, don't cut the shielding braid, as shown in [Figure 4-13](#).

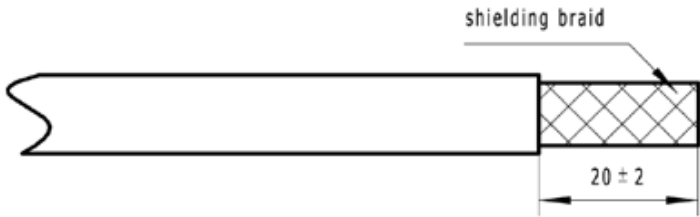


Figure 4-13 Stripping the specified length of sheath

Step 3: Remove individual fractured shielding wire, fold back the shielding braid and fix it on the outer jacket with adhesive tape, remove the inner insulation, as shown in [Figure 4-14](#).

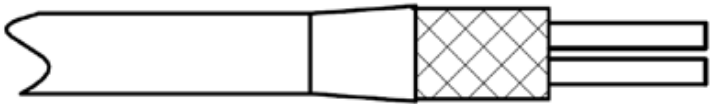


Figure 4-14 Stripping the shielding wire

Step 4: Strip the inner jacket of the conductor per dimension shown, as shown in [Figure 4-15](#).

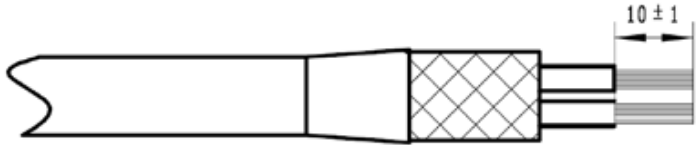


Figure 4-15 Stripping the sheath off each core wire

4.6.2. Cable installing detail.

Step 1: Slide the components 3/4/5/6 (or 7 / or 8) /9 /10 over the cable . as shown in [Figure 4-16](#).

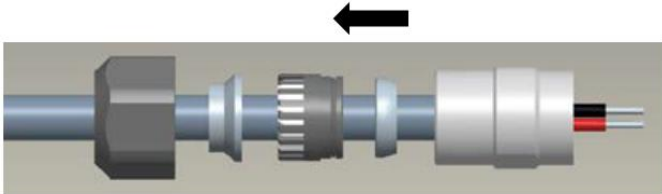


Figure 4-16 Slide the components

Step 2: Use torx screwdriver T15 to terminate the 2 conductors in the corresponding contacts A / B in the front plug assembly, as shown in [Figure 4-17](#).

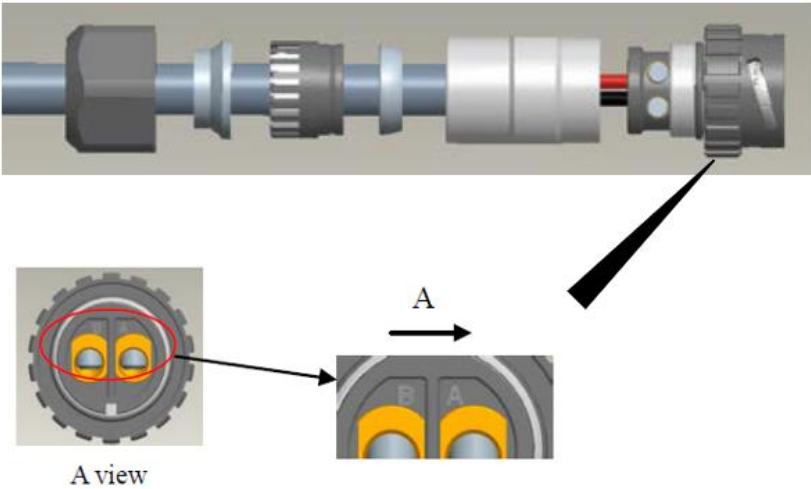


Figure 4-17 Wire assemble

Step 3: Mate the dust cap onto the front plug (2) and assemble the shell(3) into position using an M25 spanner torque: 6 to 8 N·m, as shown in [Figure 4-18](#).

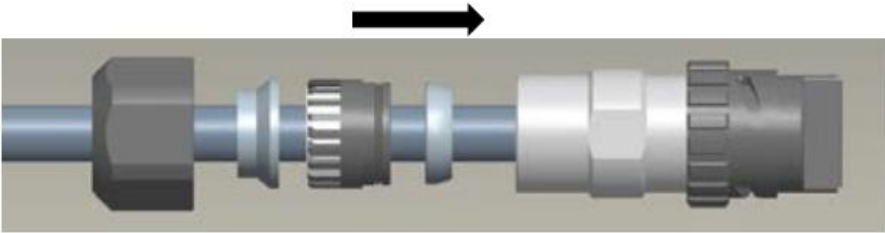


Figure 4-18 Wire assemble

Step 4: Spread open the shielding braid and slide down the shielding ring (4) into position so that the entire shielding braid is equally pressed around. Between the shielding ring and the inside surface of the shell (3) , extra length of the shielding braid should be folded around and into the ID of the shielding ring, as shown in [Figure 4-19](#).

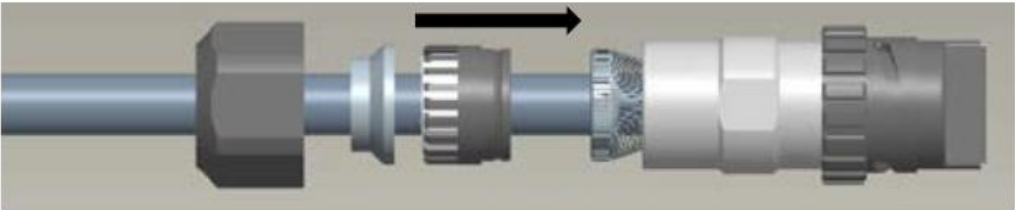


Figure 4-19 Shielding ring assemble

Step 4: Press the Plastic clip (5) down into a tightly seated position into the shell (3). Assemble the nut (10) onto the shell (3) and tighten using an M25 and M30 spanner as shown. Torque: 8 to 16N·m, as shown in [Figure 4-20](#).

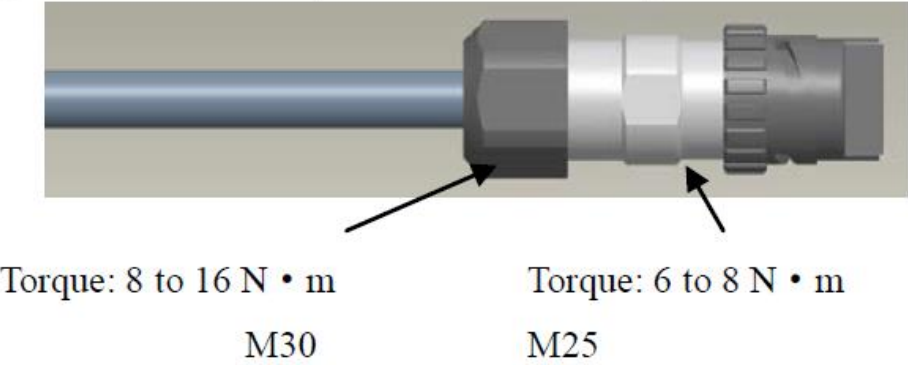


Figure 4-20 Wire assemble

4.6.3. Power Cable installing on an ORRU.

Step 1: Install the Power supply cable into the connector on ORRU side and locked the plug with socket as shown in [Figure4-21](#).

Step 2: Label the install cable.

Step 3: Waterproof both ends of the interface.

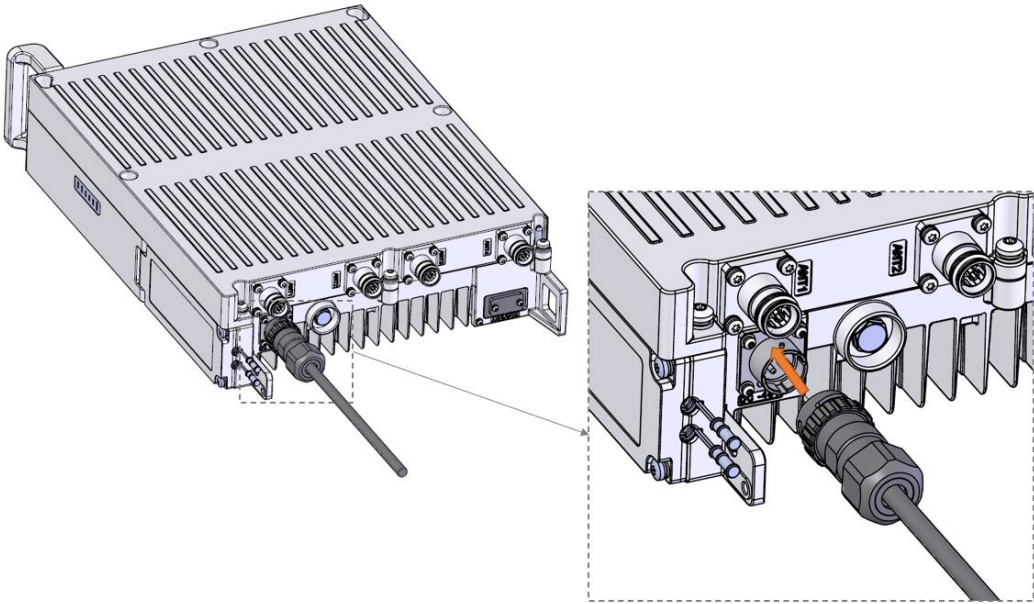



Figure 4-21 Installing the power supply cable

 **DANGER**

Do not reversely connect the positive and negative poles. Reverse connection of positive and negative poles may result in equipment malfunctions or personal injury. Therefore, check the power cable connection before powering on the ORRU.

4.7. Installing an ORRU RF Jumper.

Step 1: Install the 4.3-10 connector on the ORRU RF jumper to the ANT port and use a torque wrench to tighten the connector as shown in [Figure 4-22](#).

Step 2: Install the other end of the RF jumper to the external antenna system.

Step 3: Use the waterproof tape and PVC insulation tape to waterproof both ends of the connector refer to the [Figure 4-23](#).

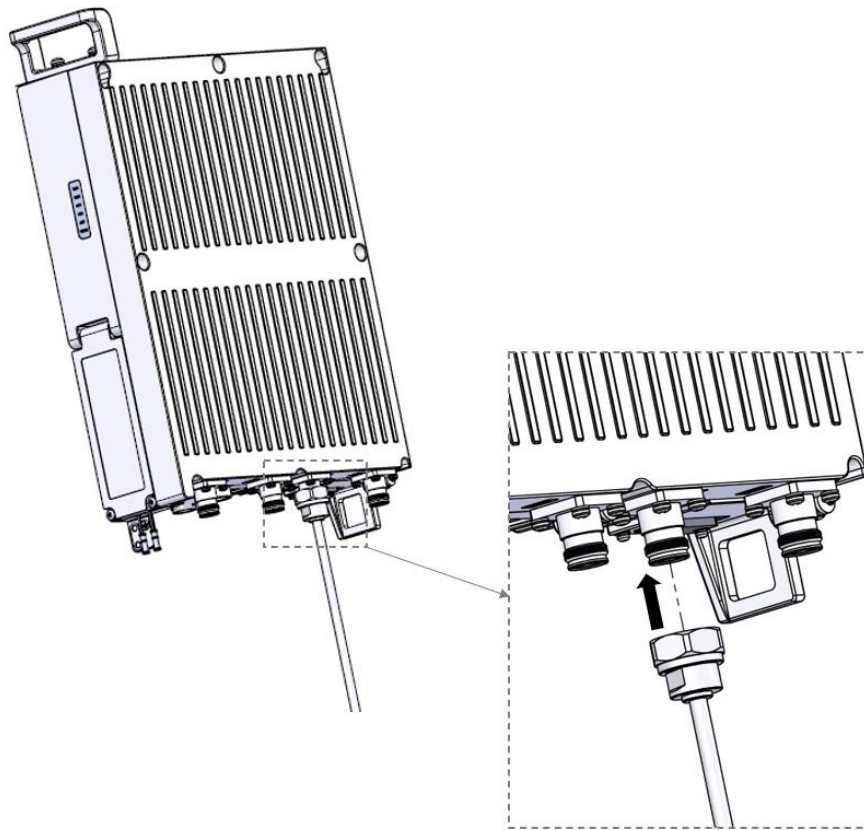


Figure 4-22 Installing the RF Jumper

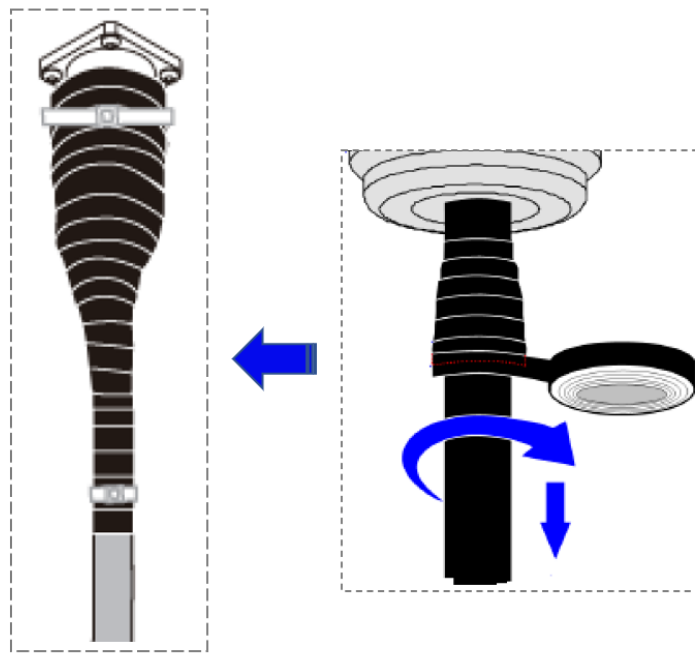


Figure 4-23 Waterproofing a connector of RF jumper

5 Checking the ORRU Installation.

NOTE: After an ORRU is installed, recheck the installation, make sure that installations are meet the engineering install requirements.

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