CAUTION

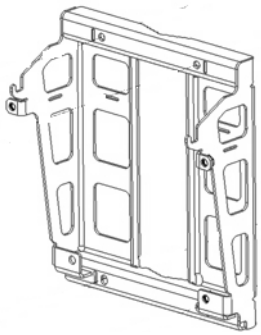
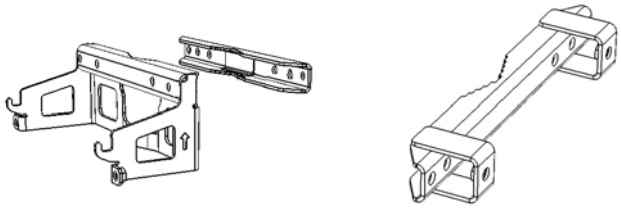
ONLY experienced installation professionals who are familiar with local building and safety codes and, wherever applicable, are licensed by the appropriate government regulatory authorities should install outdoor units and antennas. Failure to do so may void the product warranty and may expose the end user or Service Provider to legal and financial liabilities. The manufacturer and its resellers or distributors are not liable for injury, damage or regulation violations associated with the installation of outdoor units or antennas.

Up to three 2x2 or 4x2 ODUs can be mounted on poles and on L-shape masts. The following installation options are available:

- Pole mounting one unit
- Pole mounting two units
- Pole mounting two units (back to back)
- L-shape mast mounting - two units

Each of the above options has two kit options: one with a carriage and another with two carrying brackets. Refer to the installation procedure matching the supplied pole mount kit:

Table 1: Installation Options according to Pole Mount Kit

Pole mount kit	Refer to
Including the following carriage 	“Pole Mount - Option 1” on page 3
Including the following carrying brackets 	“Pole Mount - Option 2” on page 11

AU-ODU Package Content

- 2x2/4x2 ODU (weight 15.5 kg; ±1.5 kg)
- Four M10x30 screws
- Sun guard (ordered separately) for ODUs with an external filter
- Pole Mounting Kit:
  - One Carriage (weight ~9.5 kg) or two carrying brackets (weight ~6 kg)
  - Four M10x265 threaded rods
  - Eight M10 nuts
  - One M6x12 grounding screw
  - Eight M10 spring washers
  - Eight M10 flat washers
  - Two M10 clamps for 1.5”-6” poles
- This Quick Installation Guide

L-shape Mast Mounting Kit for Two ODUs (Optional)

- Two mounting brackets with an adapter for the L-shape mast of 60-100 mm
- Two mounting brackets for an L-shape mast of 60-100 mm
- Eight M12 spring washers
- 12 M12 flat washers
- Four M12 threaded rods, SAE1045 L=140

- 12 M12 hex nuts x 1.75 DIN 934

Total weight: ~18 kg

Pole Mounting Kit for Three ODUs (Optional)

There are separate kits for 6"-8" poles and 10"-14" poles.

- Six mounting brackets (with flat slides for mounting the carriage) - for 6"-8" or 10"-14" poles
- Two mounting brackets (without flat slides) - for 6"-8" or 10"-14" poles
- Eight M12 threaded rods, L=140 (for 14" pole use L=160)
- 16 M12 spring washers
- 24 M12 flat washers
- 16 hex nuts M12 x 1.75 DIN 934
- Eight hex nuts M12 x 1.75 DIN 439

Total weight (excluding carriage): 60 kg

IMPORTANT

- The weight of each ODU is 15.5 kg (±1 kg) and the weight of the Pole Mounting Kit is approximately 6 kg. Plan the installation accordingly. It is recommended to use a harness to lift the units.
- Install the ODUs using the supplied kit only.

Additional Installation Requirements

Before installation, make sure the following items are available:

- A sun guard for ODUs with an external filter
- IF cables with two TNC connectors on either side for connecting the ODU to the AU (refer to the Installation Manual for details on IF cable types and length)
- Grounding cable with an appropriate termination
- Antenna(s) (up to 4, according to installation requirements) and RF cables for connecting the antenna(s) to the ODU
- Colored marking tapes for the cables
- Installation tools and materials, including appropriate means (e.g. a 1.5" to 6" pole, a harness) for installing the ODU and antenna(s)
- Socket wrench kit
- Anti-oxidant protective grease

The following table provides references to the appropriate procedure depending on configuration:

Table 2: Pole Mount Installation Options

Option	Pole/Mast Type	Accessories	Refer to
One Unit			
	1.5”-6”	Pole mount kit with clamps	Option 1 - “Pole Mounting One ODU” on page 4 Option 2- “Pole Mounting One ODU” on page 13
	6”-8”	Longer threaded rods (not supplied)	
	8”-14”	Metal bands (not supplied)	
Two Units			
	1.5”-6”	Pole mount kit with clamps	Option 1 - “Pole Mounting Two ODUs” on page 5 Option 2 - “Pole Mounting Two ODUs” on page 14
	6”-8”	Longer threaded rods (not supplied)	
	8”-14”	Metal bands (not supplied)	

Table 2: Pole Mount Installation Options (Continued)

Option	Pole/Mast Type	Accessories	Refer to
	L-shaped	L-shape mast kit	Option 1 - "L-shape Mast Mounting - Two ODUs" on page 8 Option 2 - "L-shape Mast Mounting - Two ODUs" on page 16
Three Units			
	6"-8"	Pole mount kit for three ODUs for 6"-8" poles	Option 1 - "Pole Mounting Three ODUs" on page 6 Option 2 - "Pole Mounting Three ODUs" on page 18
	10"-14"	Pole mount kit for three ODUs for 10"-14" poles	

Equipment Location Guidelines

Select the optimal locations for the ODU using the following guidelines:

- The ODU location should enable easy access to the unit for installation and testing
- The higher the placement of the antenna, the better the achievable link quality
- The antenna should be installed so as to provide coverage to the intended service area.
- The ODU should be installed as close as possible to the antenna.
- The installation of more than two ODUs can be carried out in one of the following ways:

1. Position the third ODU directly beneath one of the two ODUs, with a distance of 30 cm between the top and bottom carriage to allow easy routing of the cables.
2. Position the third ODU at an angle below the two ODUs. No minimum distance is required.
3. Use the pole mount kit for three ODUs.

NOTE

When mounting several ODUs on a pole, make sure that at least one side of the pole is clear, to enable easy access to all the ODUs.

Installation Guidelines

- The ODU can be mounted on a 1.5" to 14" pole depending on the pole construction.
- To install two ODUs, mount the two carriages (or upper carrying brackets) on the same threaded rods without using the clamps.
- When installing an ODU directly beneath another ODU, maintain a distance of at least 30 cm between the carriages to allow easy routing of the cables.
- When mounting several ODUs on a pole, make sure that at least one side of the pole is clear, to enable easy access to all the ODUs.
- Sun guard requirements: The sun guard is already assembled on the ODU. A different sun guard (ordered separately) is required for ODUs with an external filter.

Pole Mount - Option 1

A. Preparing the ODU for Pole Mounting

Before lifting the ODU to the pole:

1. Open the packaging and remove the ODU and screws.
2. Apply protective grease on all nuts, bolts, and lugs for additional protection against corrosion.
3. Insert the four M10x30 screws into the designated holes.

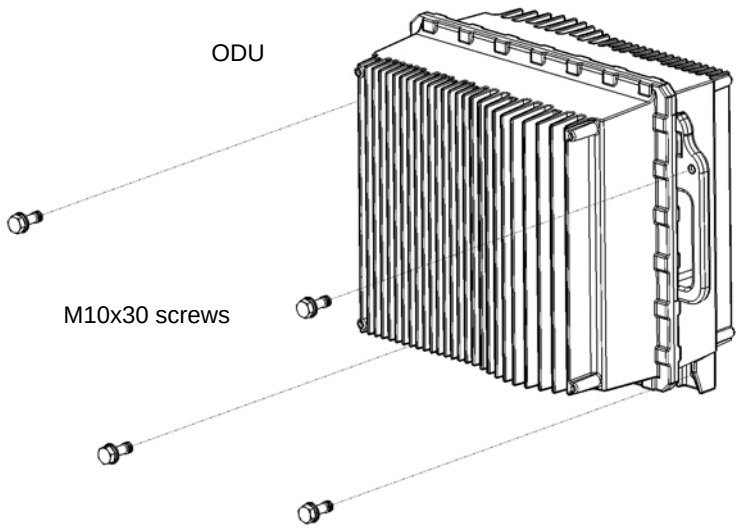


Figure 1: Preparing the 2x2/4x2 ODU for Installation

B. Pole Mounting One ODU

1. Prepare the ODU for pole mounting as shown in Figure 1.
2. Position the carriage on the pole at the desired location.
3. Thread the four M10x265 threaded rods through the carriage and the rear clamps (Figure 2).
4. Tighten on both sides using the supplied washers, spring washers and nuts. Apply torque of 20 [N*m] (177 [lbs*in]).

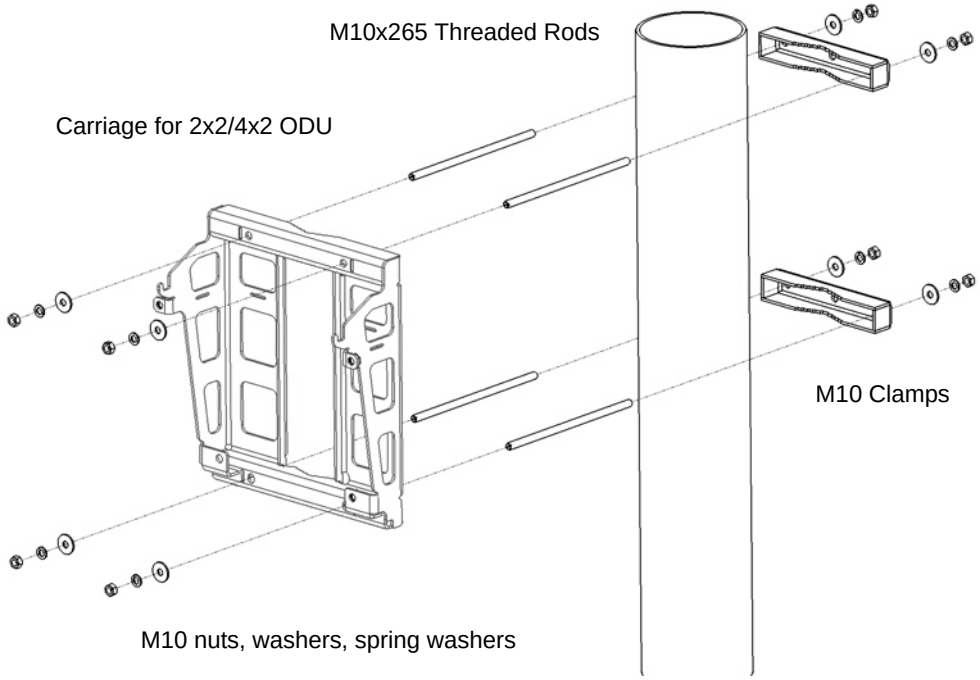


Figure 2: Mounting the Single 2x2/4x2 ODU Carriage on a Pole

5. Hang the ODU on the carriage and tighten the four M10x30 screws (Figure 3). Apply torque of 20 [N*m] (177 [lbs*in]). It is recommended to use a harness to lift the unit when hanging it on the carriage.

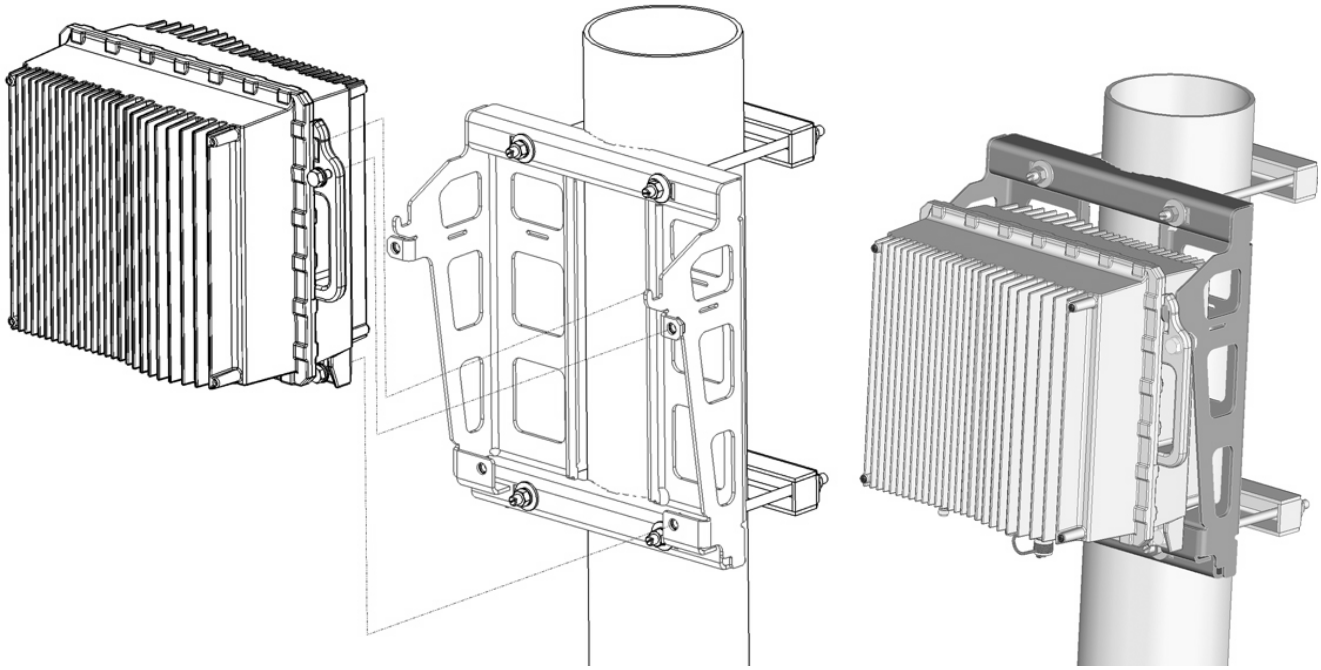


Figure 3: Mounting the ODU

C. Pole Mounting Two ODUs

For this installation configuration use two pole mounting kits for one ODU, excluding the M10 clamps and four threaded rods.

1. Prepare the two ODUs for installation as shown in Figure 1.
2. Position one carriage at the desired location on the pole.
3. Thread the four M10x265 threaded rods through one carriage and tighten using the supplied washers, spring washers and nuts.
4. Lean the carriage vertically on the pole and position the second carriage in parallel to the first one (Figure 4).
5. Thread the rods through the second carriage (Figure 4).
6. Tighten using the washers, spring washers and nuts. Apply torque of 20 [N*m] (177 [lbs*in]).

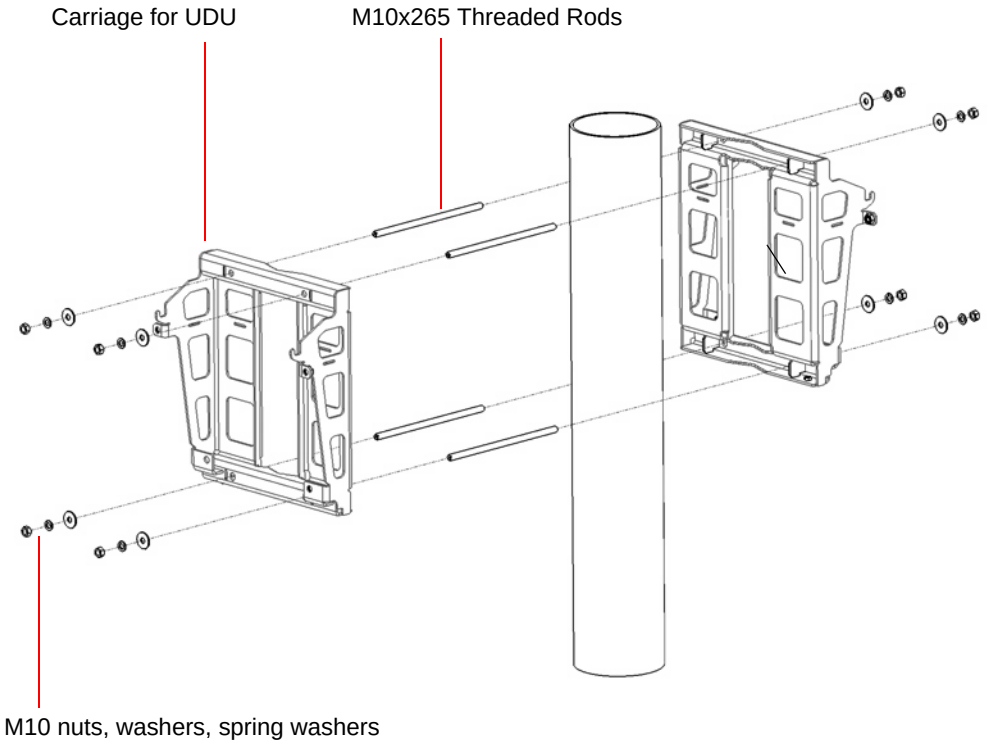


Figure 4: Mounting Two Carriages on the Pole

7 Hang the ODUs on the carriages and tighten the M10x30 screws (Figure 5 and Figure 6). Apply torque of 20 [N*m] (177 [lbs*in]). It is recommended to use a harness to lift the unit when hanging it on the carriage.

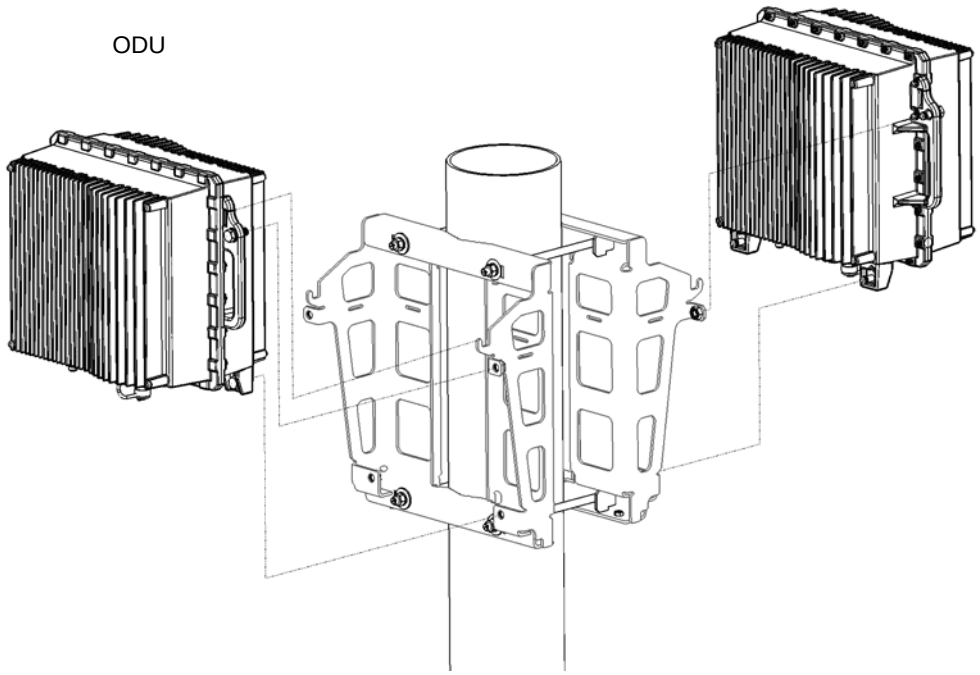


Figure 5: Mounting the Two ODUs

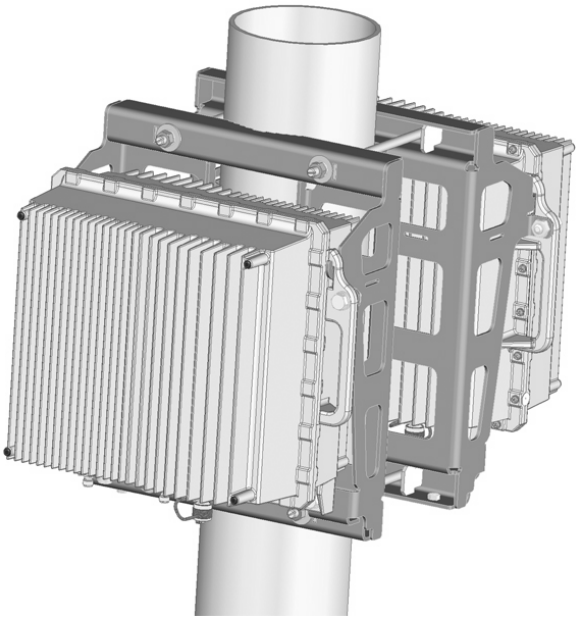


Figure 6: Two ODUs Mounted on the Pole

D. Pole Mounting Three ODUs

1 Prepare the three ODUs for installation as shown in Figure 1.

2 Assemble the mounting brackets at the desired location on the pole:

- **a** Assemble the four upper brackets, three brackets with the flat slides facing downward and one without it (see Figure 7). Tighten the screws.
- **b** Attach one carriage to the flat slide of the bracket and use the threaded rods and supplied M12 washers, spring washers and nuts to fasten the carriage to the bracket (Figure 8). Apply torque of 53 [N*m] (465 [lbs*in]). Repeat for the other carriages.
- **c** Assemble the lower brackets, three brackets with the flat slides facing upward and one without it. Slightly tighten the screws.

d Adjust the lower brackets position until they are aligned and parallel to the upper ones and tighten the screws.

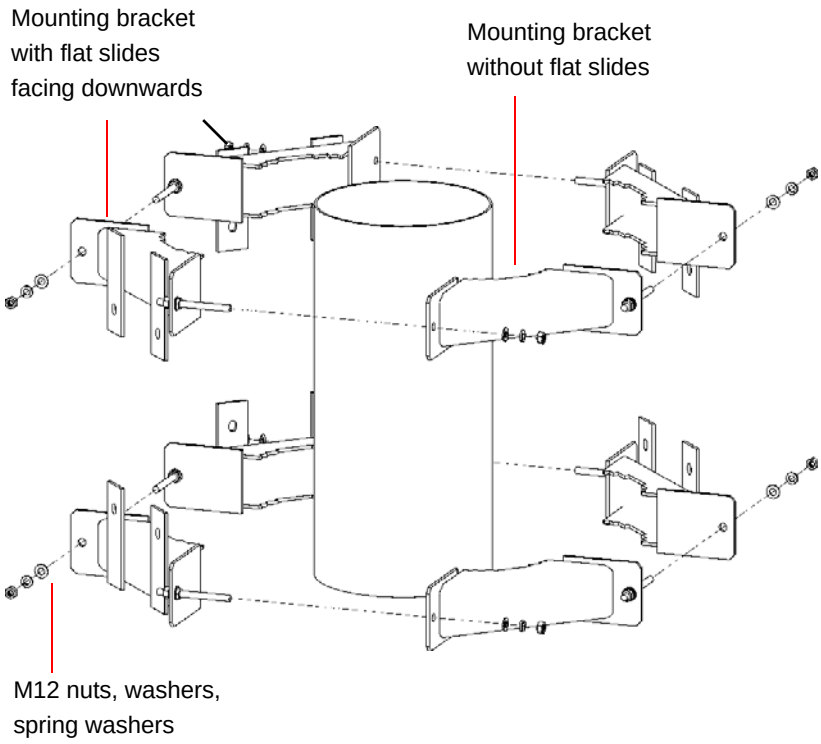


Figure 7: Assembling the Mounting Brackets

3 Assemble the carriages on the brackets. Use the M12 nuts with washers and spring washers to fasten the carriage to the brackets (see Figure 8).

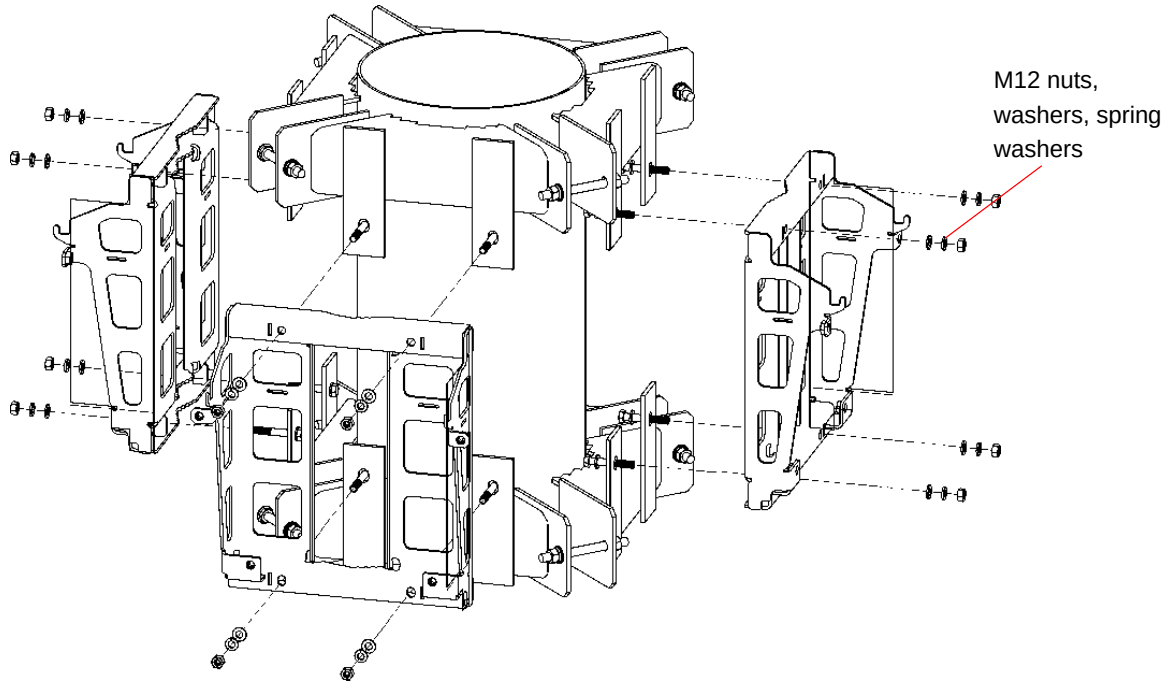


Figure 8: Mounting Three Carriages on the Pole

4 Hang the ODUs on the carriages (it is recommended to use a harness for lifting)

5 Tighten the M10x30 screws (Figure 9 and Figure 10). Apply torque of 20 [N*m] (177 [lbs*in]).

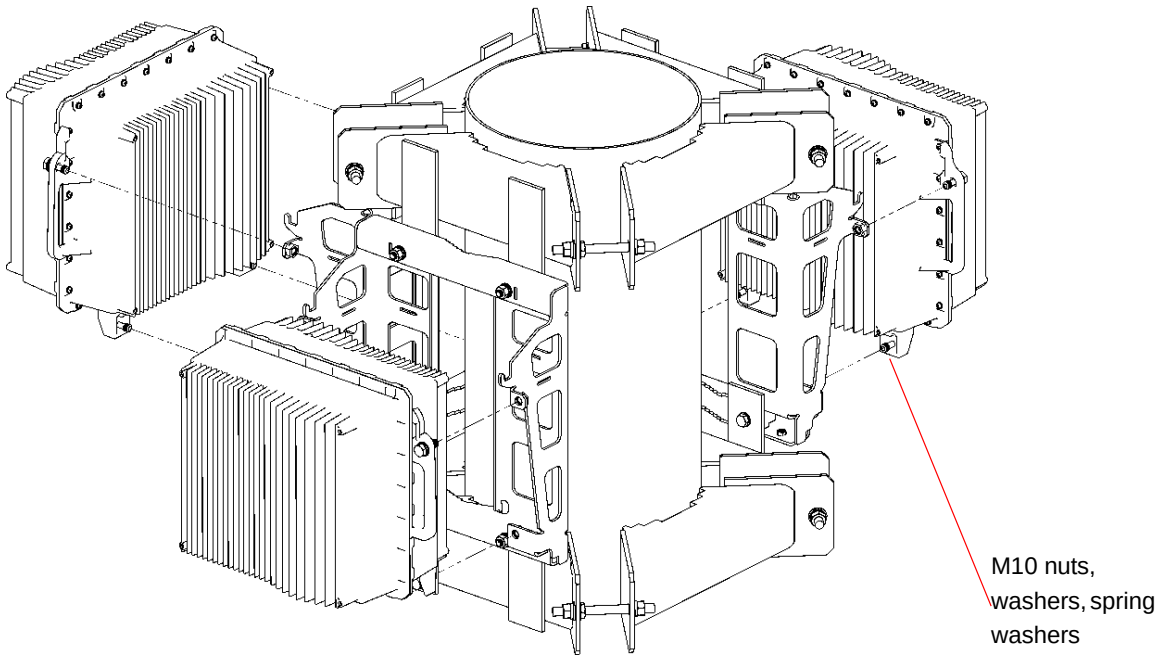


Figure 9: Mounting the Three 2x2/4x2 ODUs

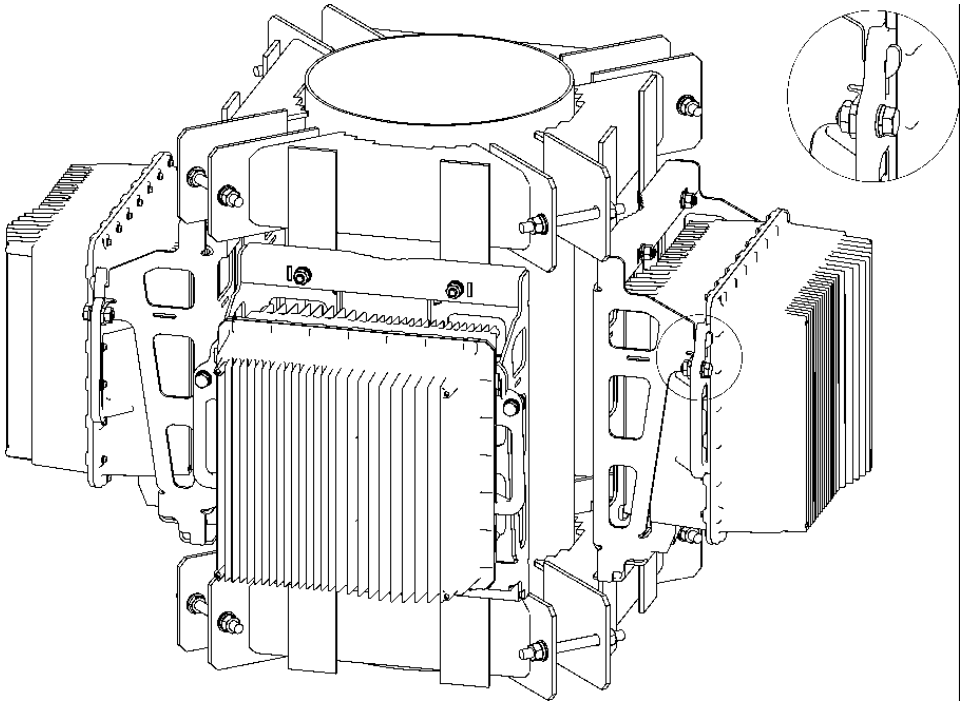


Figure 10: Three 2x2/4x2 ODUs Mounted on the Pole

E. L-shape Mast Mounting - Two ODUs

1. Prepare the two ODUs for installation as shown in Figure 1.
2. Assemble the mounting brackets at the desired location on the L-shape mast, as shown in Figure 11. Tighten using the supplied washers, spring washers and nuts. Apply torque of 53 [N*m] (465 [lbs*in]).

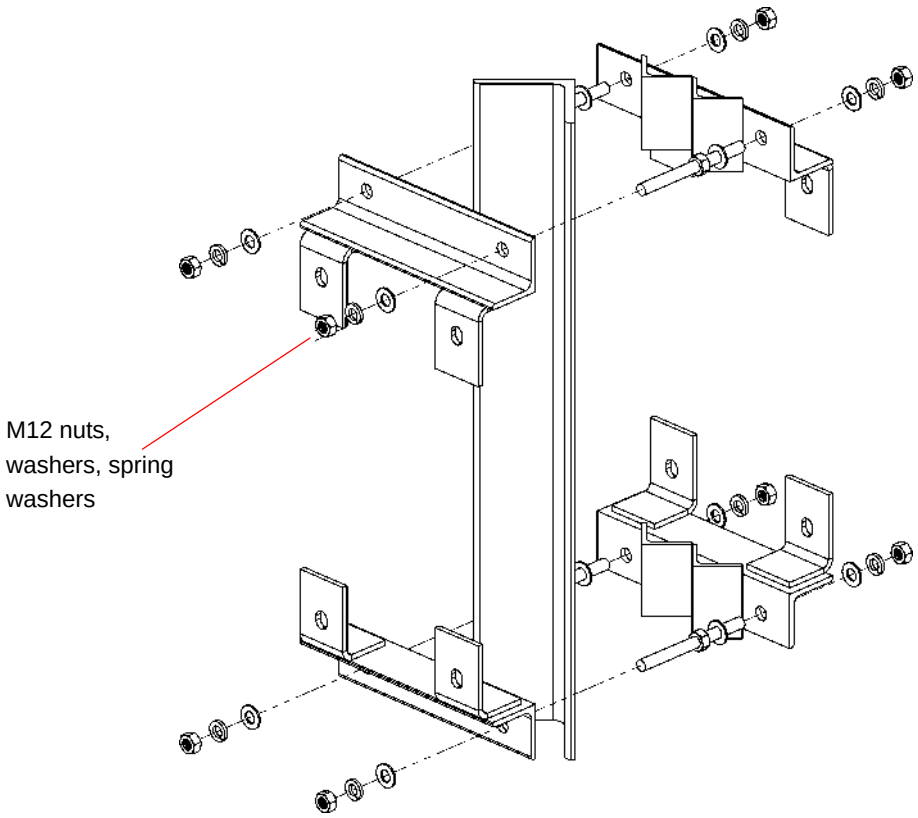


Figure 11: Assembling the Mounting Brackets

3 Thread the four M12 threaded rods through one carriage and bracket, and tighten using the supplied washers, spring washers and nuts. Apply torque of 53 [N*m] (465 [lbs*in]). Repeat for the second carriage (Figure 12).

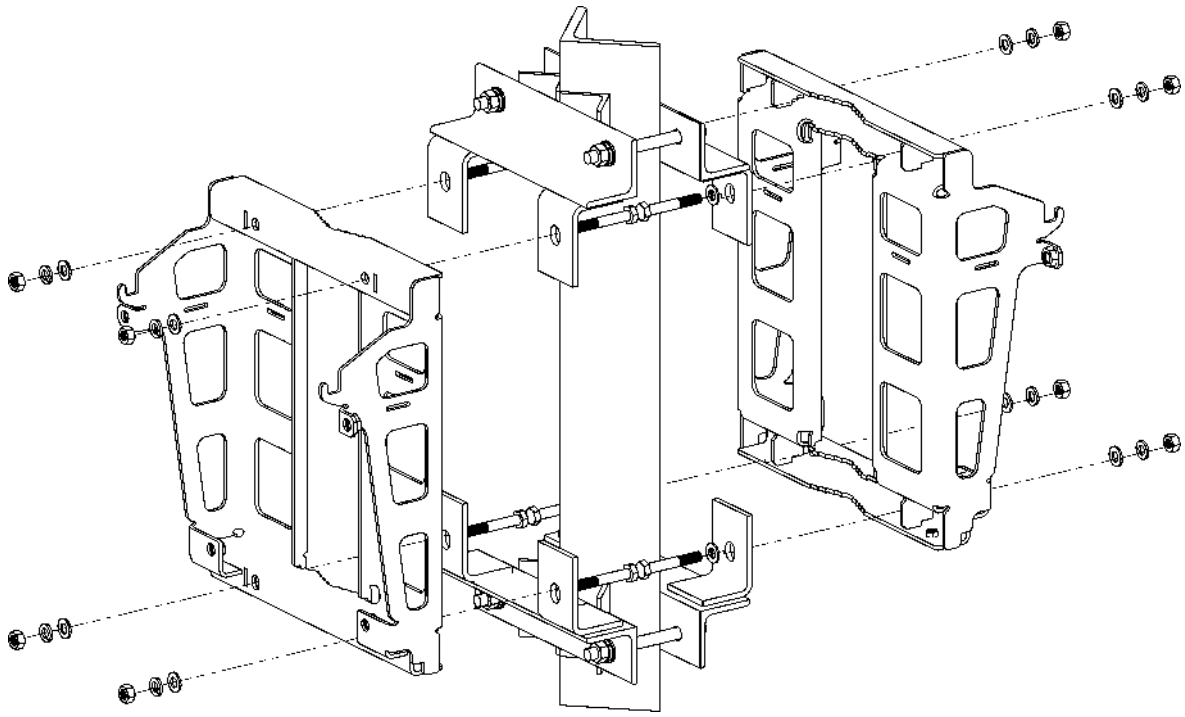


Figure 12: Mounting the Carriages on the L-shape Mast

4 Hang the ODUs on the carriages. It is recommended to use a harness for lifting the units.

5 Tighten the M10x30 screws (Figure 13 and Figure 14). Apply torque of 20 [N*m] (177 [lbs*in]).

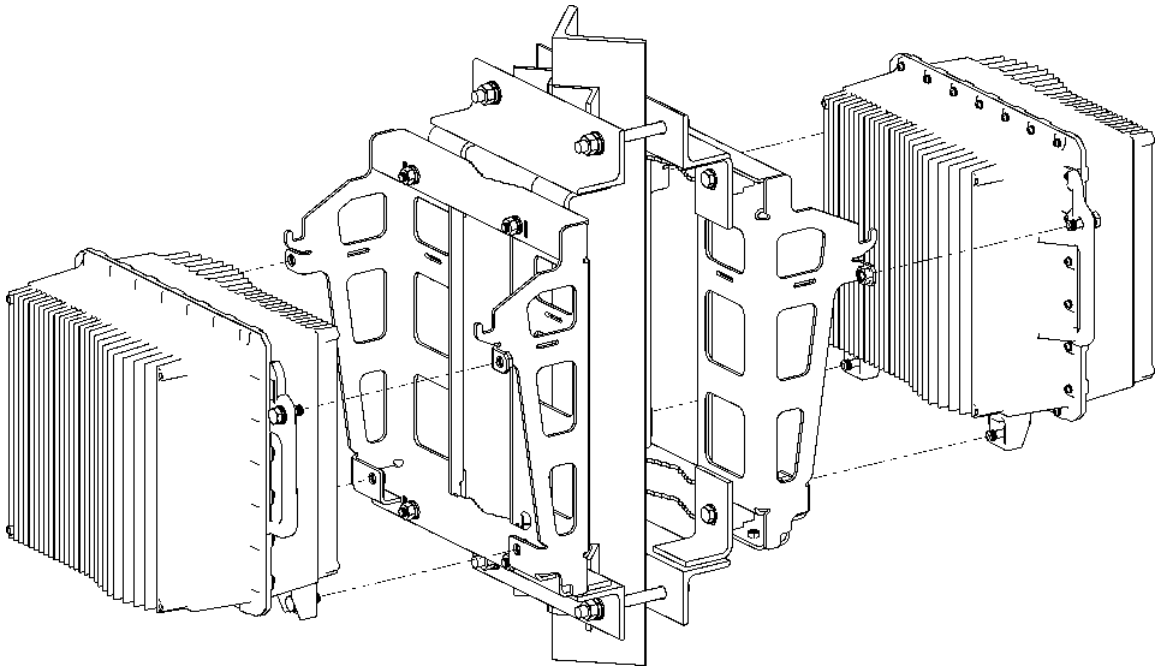


Figure 13: Mounting the ODUs on the Carriages

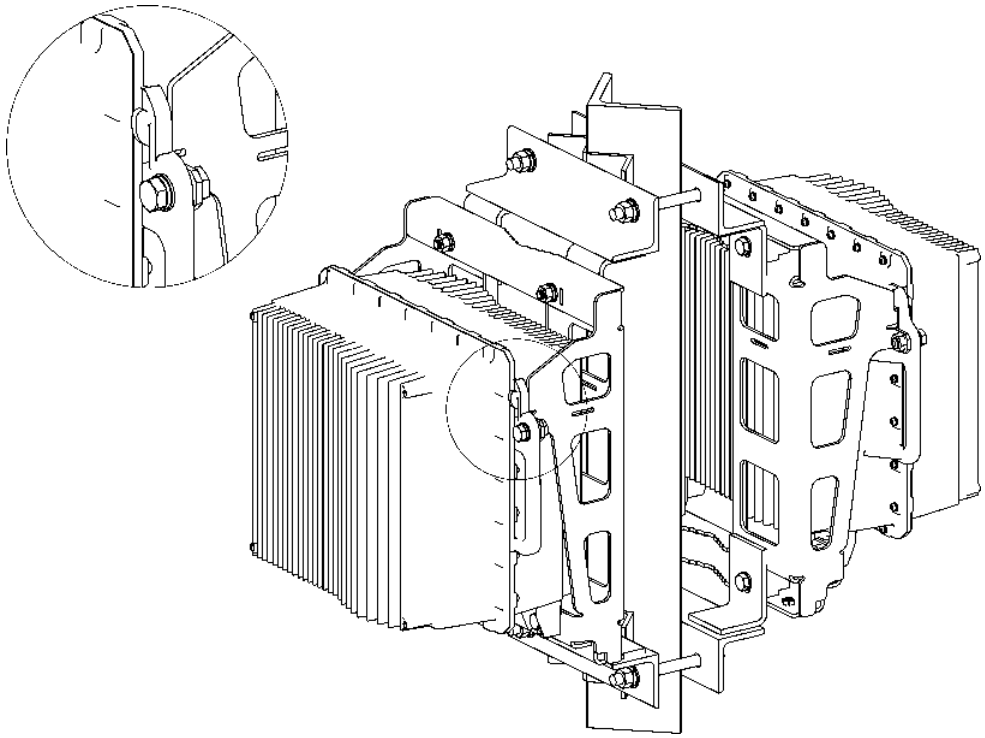


Figure 14: Two 2x2/4x2 ODUs Mounted on the L-shape Mast

Pole Mount - Option 2

A. Preparing the ODU for Pole Mounting

Before lifting the ODU to the pole:

1. Open the packaging and remove the ODU and screws.
2. Apply protective grease on all nuts, bolts, and lugs for additional protection against corrosion.
3. Insert the four M10x30 screws into the designated holes.

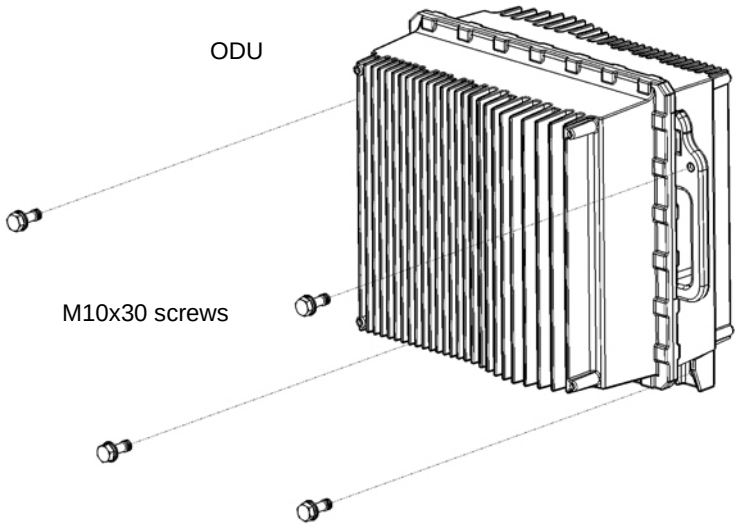


Figure 15: Preparing the 4x2 ODU for Installation

4. Assemble the lower carrying bracket to the ODU using two lower M10x30 (already inserted to the ODU) and washers and spring washers.

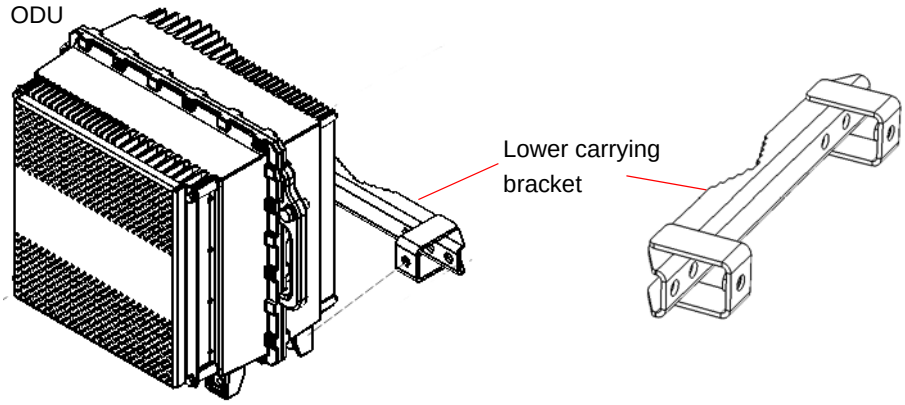


Figure 16: Assembling the Lower Carrying Bracket

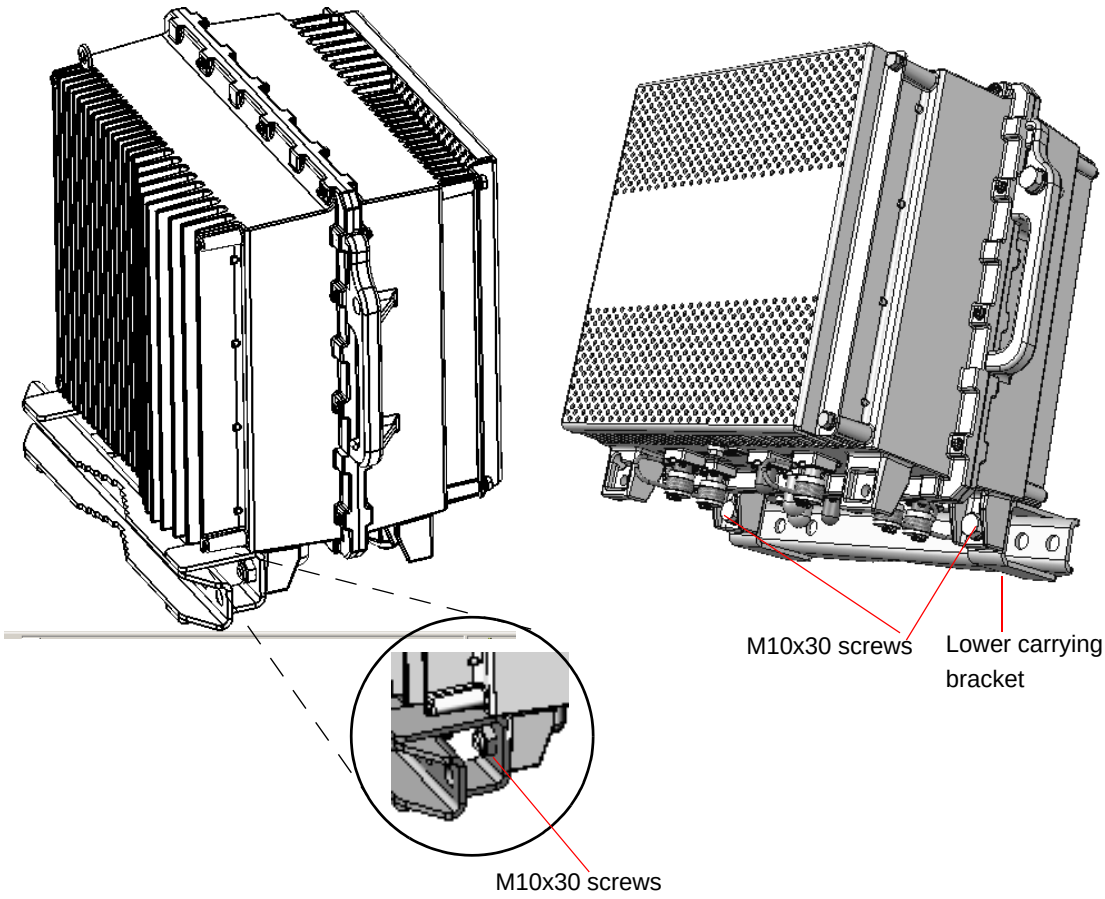


Figure 17: The Lower Carrying Bracket Assembled on the ODU

For fastening the lower screws use the 1/2” DR 250 mm extension bar from the socket wrench set: Assemble the plug socket on the no. 17, insert the sliding head into the plug socket and fasten the screw (Figure 18).

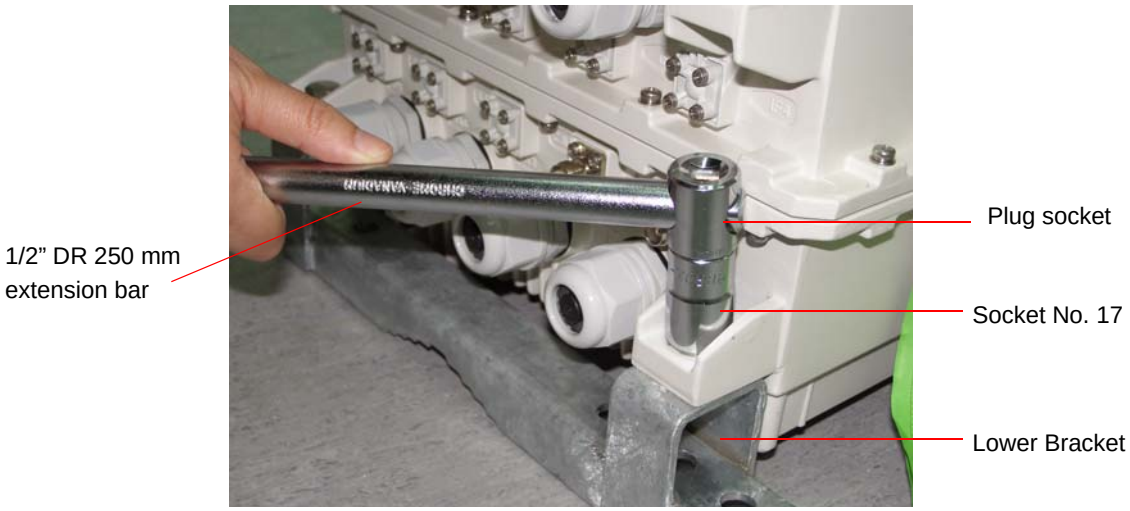


Figure 18: Fastening the Lower Screw

B. Pole Mounting One ODU

1 Assemble two threaded rods on the lower bracket using the supplied screws, washers and spring washers. Consider the pole radius when deciding on the location of the rods (either outer or inner holes).

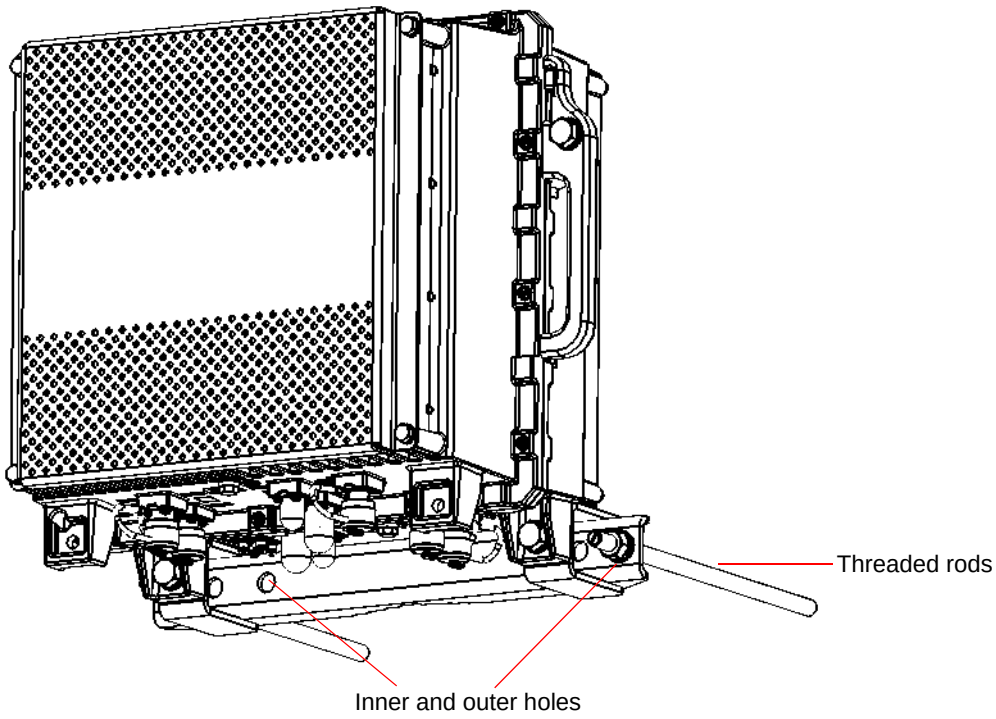


Figure 19: Assembling Threaded Rods to Lower Bracket

2 Prepare the upper carrying bracket and the upper clamp for mounting on the pole: insert one threaded rod through the bracket and clamp and fasten the screws, washers and spring washers (Figure 20). Do not over-tighten.

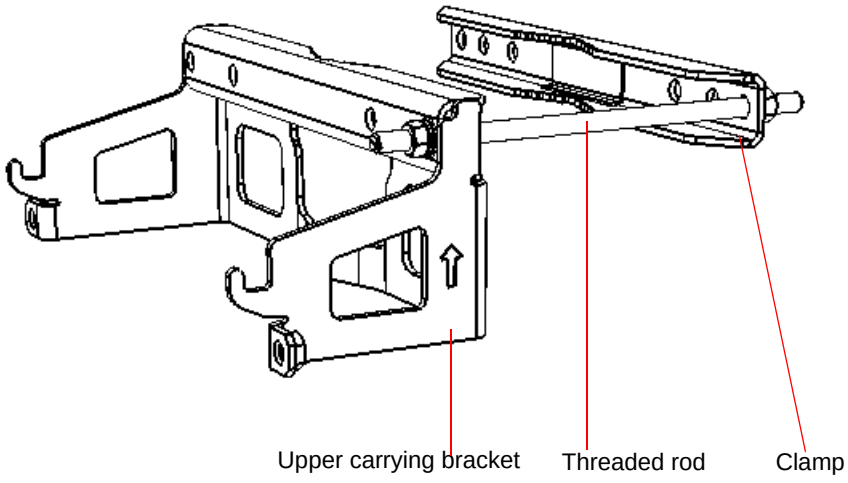


Figure 20: Preparing the Upper Carrying Bracket

3 On the pole, assemble the upper carrying bracket: Thread the other threaded rod through the bracket and the clamp; tighten using the supplied washers, spring washers and nuts (Figure 21). Apply torque of 20 [N*m] (177 [lbs*in]).

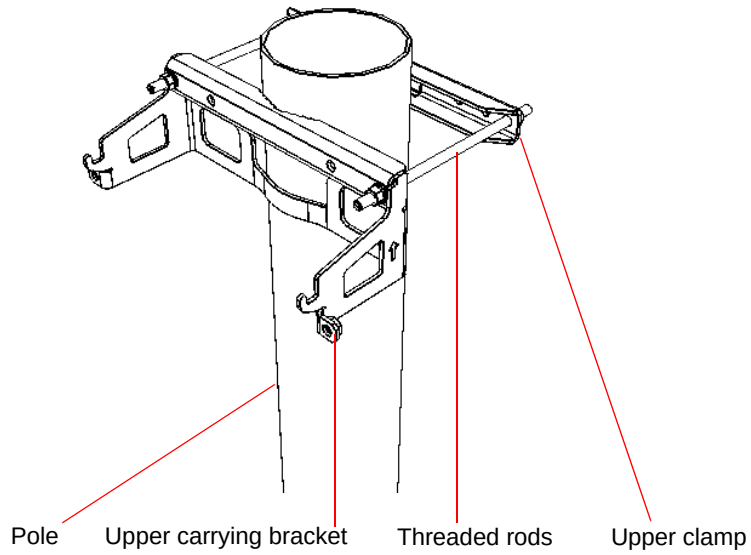


Figure 21: Assembling Upper Carrying Bracket and Clamp on the Pole

4 Hang the ODU on the upper carrying bracket and tighten the two M10x30 screws. Apply torque of 20 [N*m] (177 [lbs*in]). It is recommended to use a harness to lift the unit.

5 Attach the lower clamp to the lower carrying bracket and tighten using the supplied washers, spring washers and nuts (Figure 22).

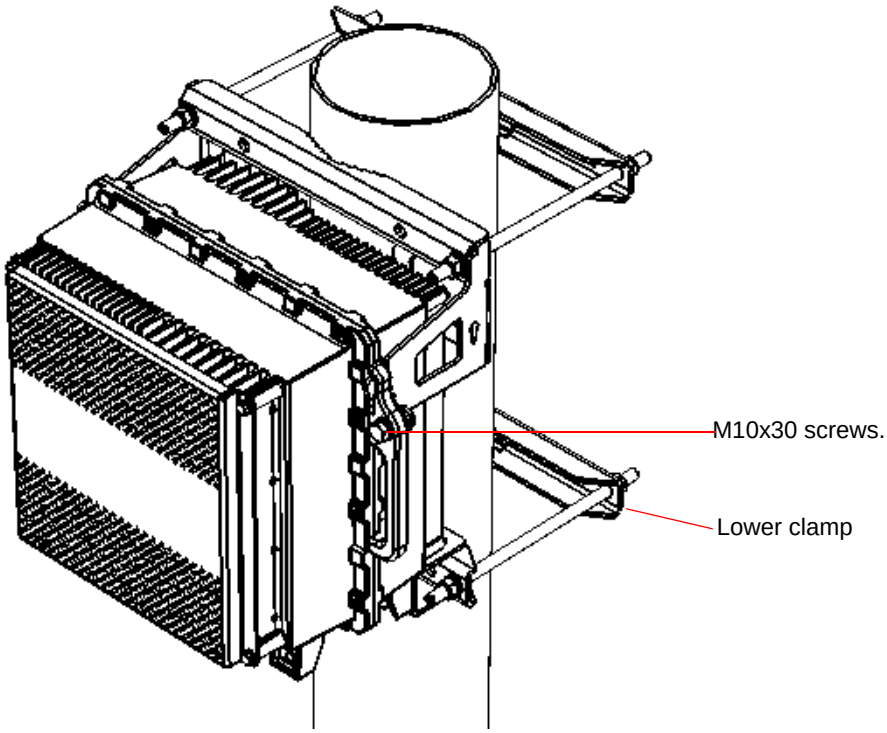


Figure 22: One ODU Assembled on the Pole

C. Pole Mounting Two ODUs

For this configuration use two pole mounting kits for one ODU, excluding the M10 clamps and four threaded rods.

1 Prepare the ODUs as described in "Preparing the ODU for Pole Mounting" on page 11.

2 Assemble the two upper carrying brackets on the pole: thread two threaded rods through both brackets. Tighten using the supplied washers, spring washers and nuts.

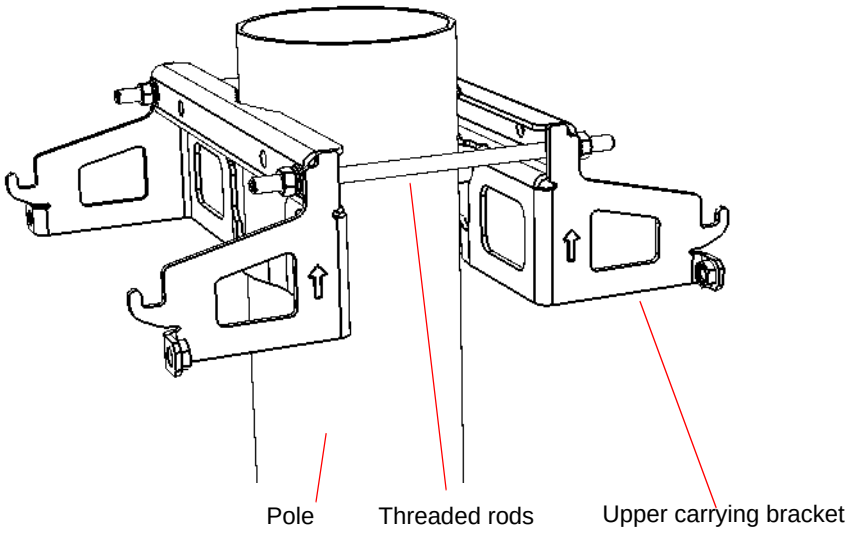


Figure 23: Assembling Upper Carrying Bracket on the Pole

3 Hang the ODU on the upper carrying bracket and tighten the two M10x30 screws. Apply torque of 20 [N*m] (177 [lbs*in]). It is recommended to use a harness to lift the unit.

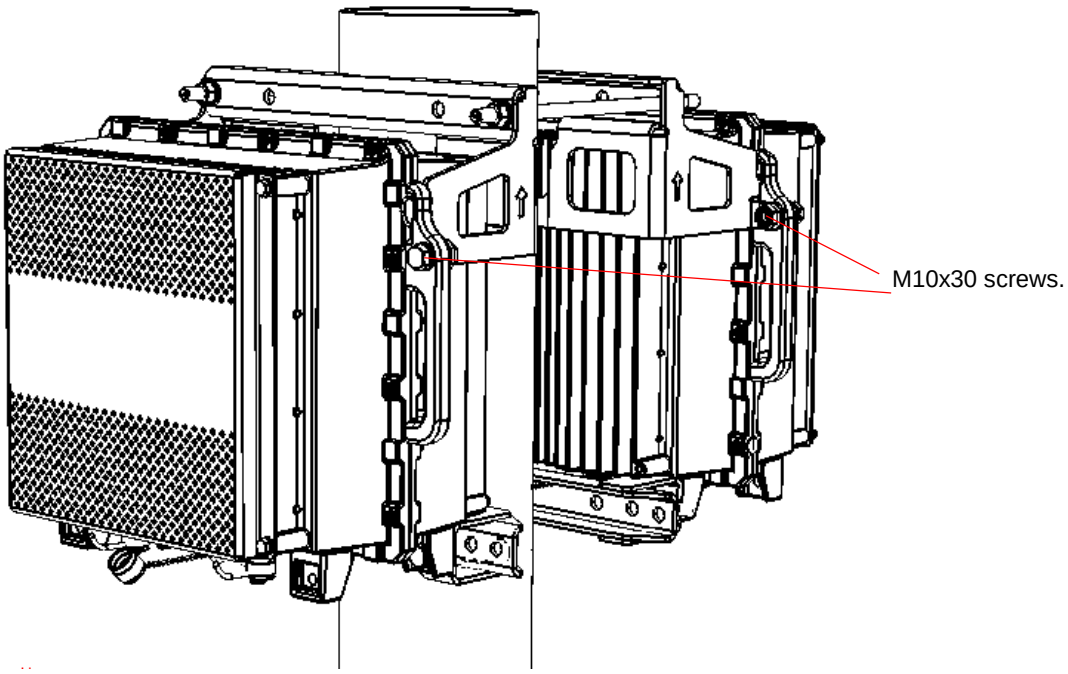


Figure 24: Two ODUs Assembled on Upper Brackets

4 Thread the other two threaded rods through both lower brackets. Tighten using the supplied washers, spring washers and nuts.

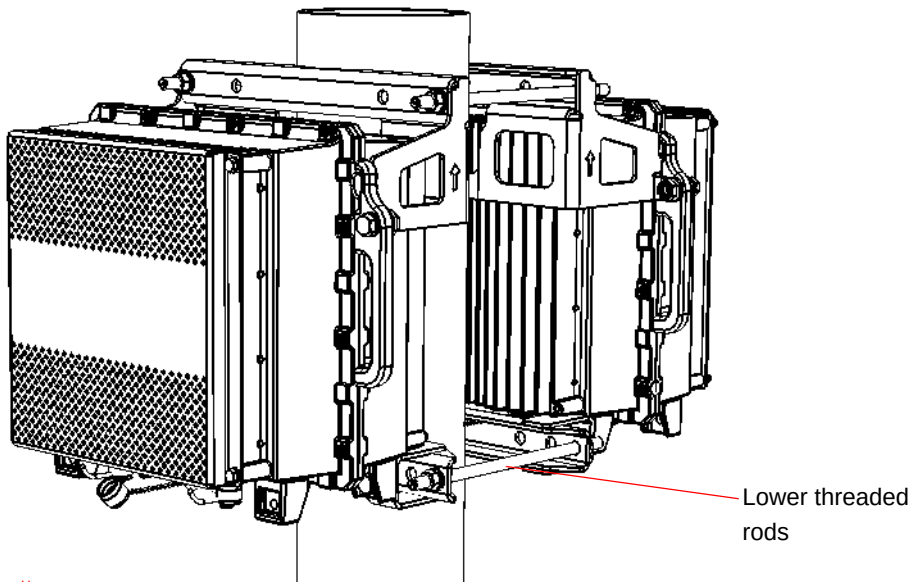


Figure 25: Two ODUs Assembled on the Pole

D. L-shape Mast Mounting - Two ODUs

1 Prepare the ODUs as described in "Preparing the ODU for Pole Mounting" on page 11.

2 Assemble the lower mast mount brackets with the lower carrying brackets on the ODU using the M12 screws, washers, and spring washers (Figure 26).

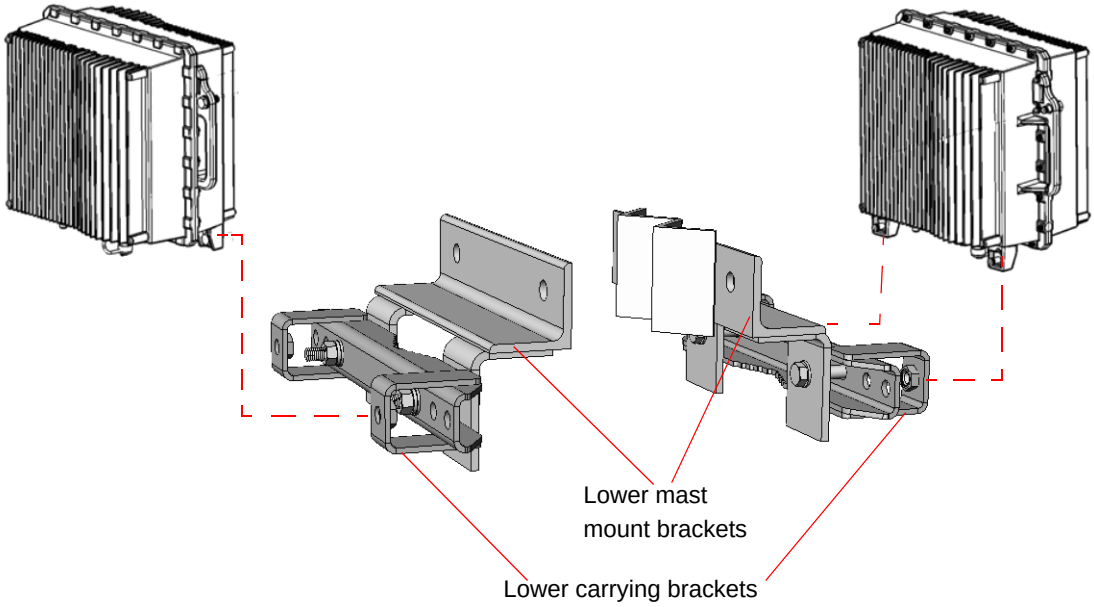


Figure 26: Assembling the Lower Pole Mount Brackets and Lower Carrying Brackets

3 Assemble the upper mounting brackets at the desired location on the L-shape mast. Tighten using the supplied washers, spring washers and M12 nuts (Figure 27). Apply torque of 53 [N*m] (465 [lbs*in]).

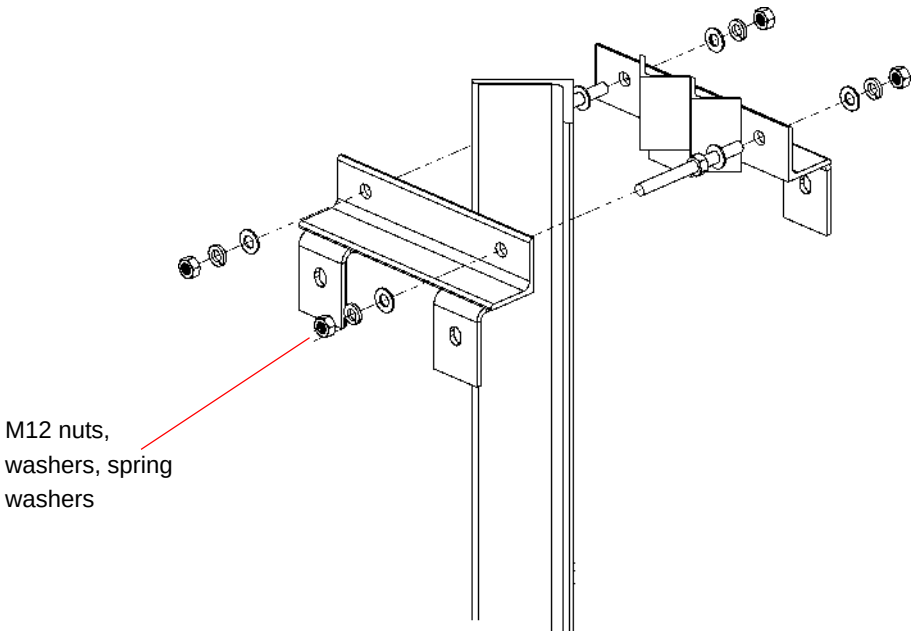


Figure 27: Assembling the Upper Mounting Brackets

4 Assemble the upper carrying brackets on the upper mast brackets (Figure 28).

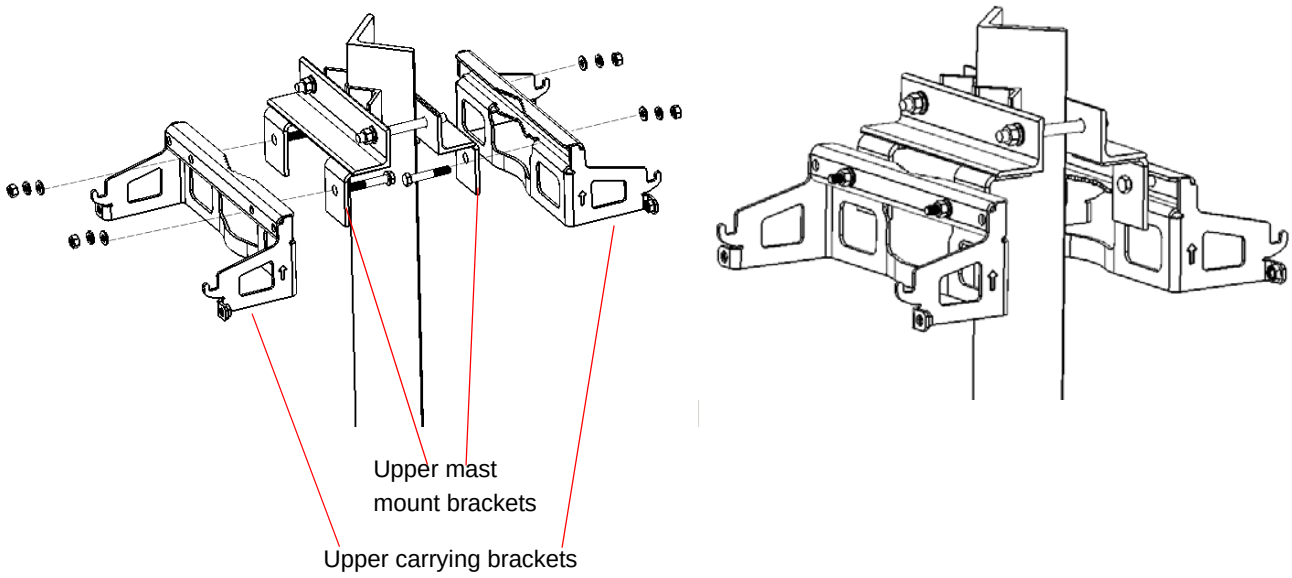


Figure 28: Assembling the Upper Carrying Brackets on the Mounting Brackets

5 Hang the ODU on the upper carrying bracket and tighten the two M10x30 screws. Apply torque of 20 [N*m] (177 [lbs*in]). It is recommended to use a harness to lift the unit.

6 Thread the other two threaded rods through both lower brackets. Tighten using the supplied washers, spring washers and nuts (Figure 29).

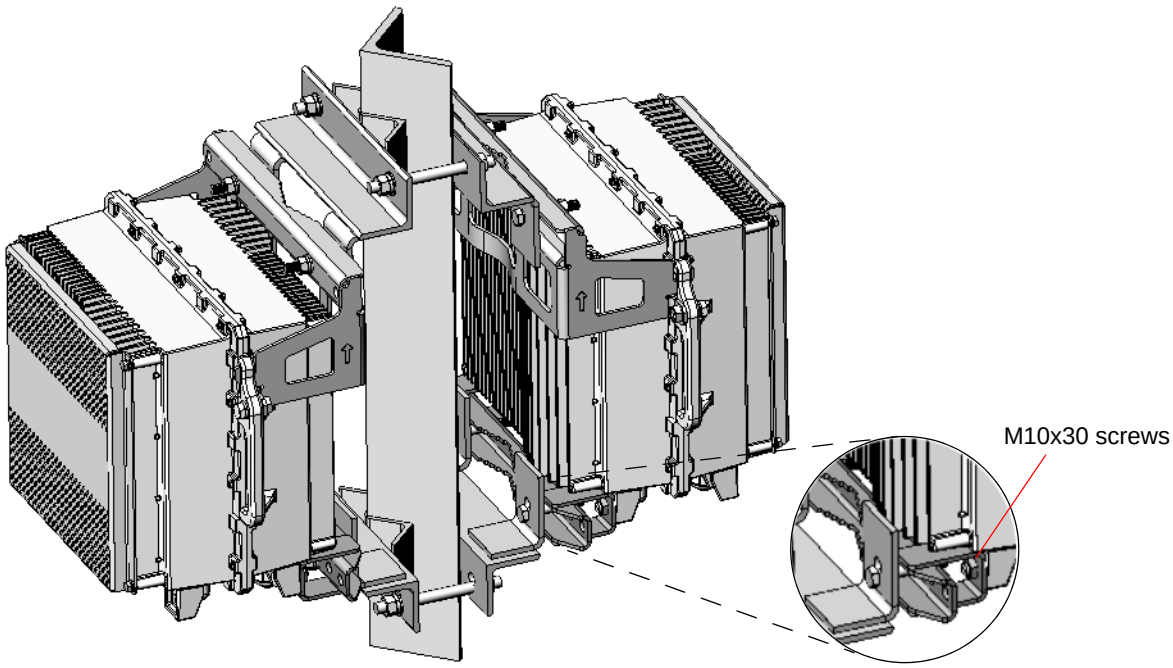


Figure 29: Two ODUs Assembled on an L-shape Mast

E. Pole Mounting Three ODUs

1 Prepare the ODUs as described in “Preparing the ODU for Pole Mounting” on page 11.

2 Assemble the upper mounting brackets at the desired location on the pole, three brackets with the flat slides facing downward and one without it. Tighten the screws (Figure 30).

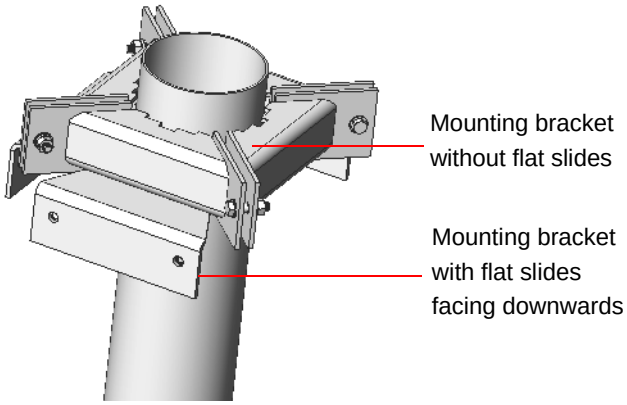


Figure 30: Assembling the Upper Mounting Brackets

3 Assemble the three upper carrying brackets on the mounting brackets and fasten using the supplied screws, washers and spring washers (Figure 31).

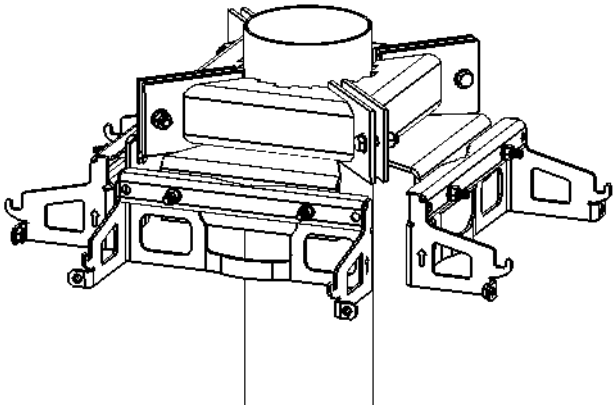


Figure 31: Upper Carrying Brackets Assembled on the Pole

4 Hang the ODU on the upper carrying bracket and tighten the two M10x30 screws. Apply torque of 20 [N*m] (177 [lbs*in]). It is recommended to use a harness to lift the unit.

5 Insert the threaded rods through all lower brackets. Tighten using the supplied washers, spring washers and nuts (Figure 32).

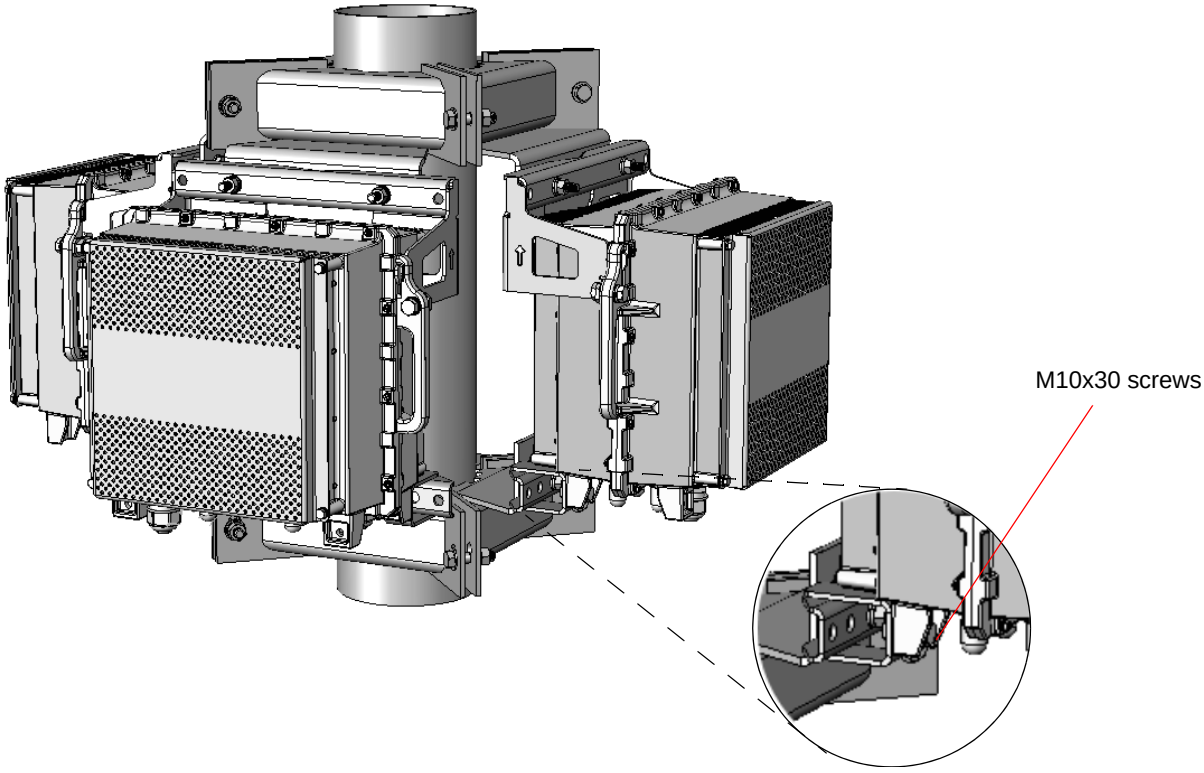


Figure 32: Three ODUs Assembled on the Pole

Sun Guard Installation

The ODU is shipped with the sun guard already installed. When installing an external filter on the ODU, you need to remove the existing sun guard, install the external filter and install a different sun guard suitable for ODUs with an external filter.

CAUTION

To avoid damage to the Sun Guard, assemble it after the ODUs are mounted on the pole. The maximum width of the metal band is 14 mm.

1 Attach the Sun Guard to the front of the ODU using the four M6x16 screws supplied with the Sun Guard.

2 Tighten the screws using an M10 wrench and apply torque of 6.4 [N*m] (55.3 [lbs*in]).

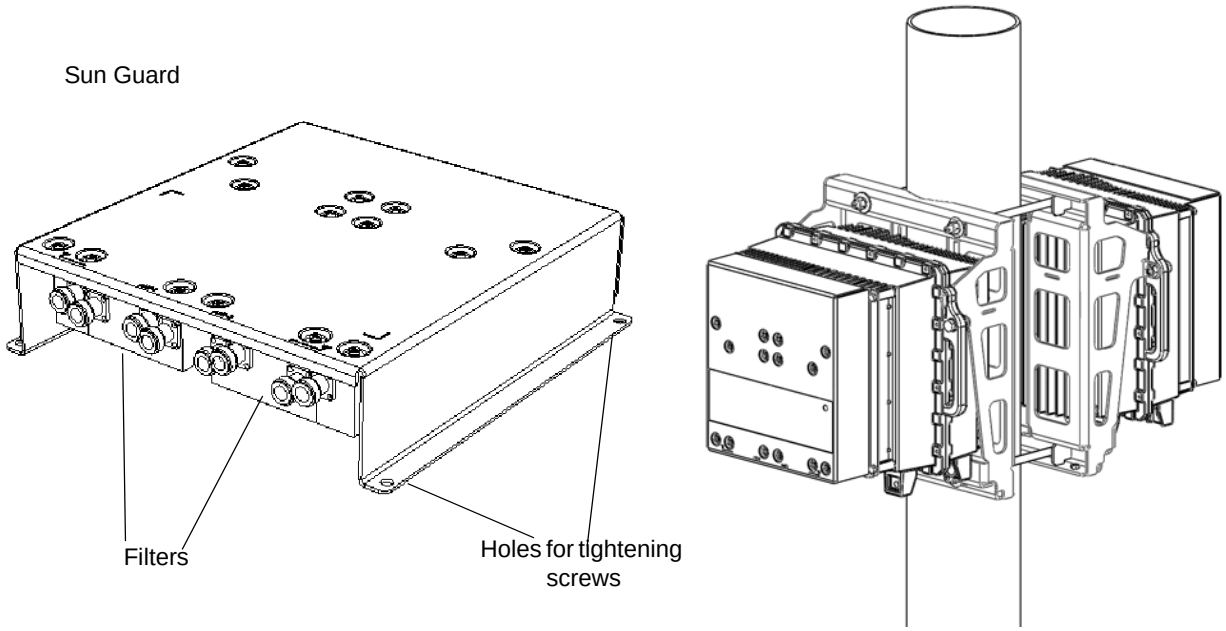


Figure 33: Two ODUs with External Filter and Sun Guard Mounted on the Pole

Connecting the Cables

A. ODU Connectors and LEDs

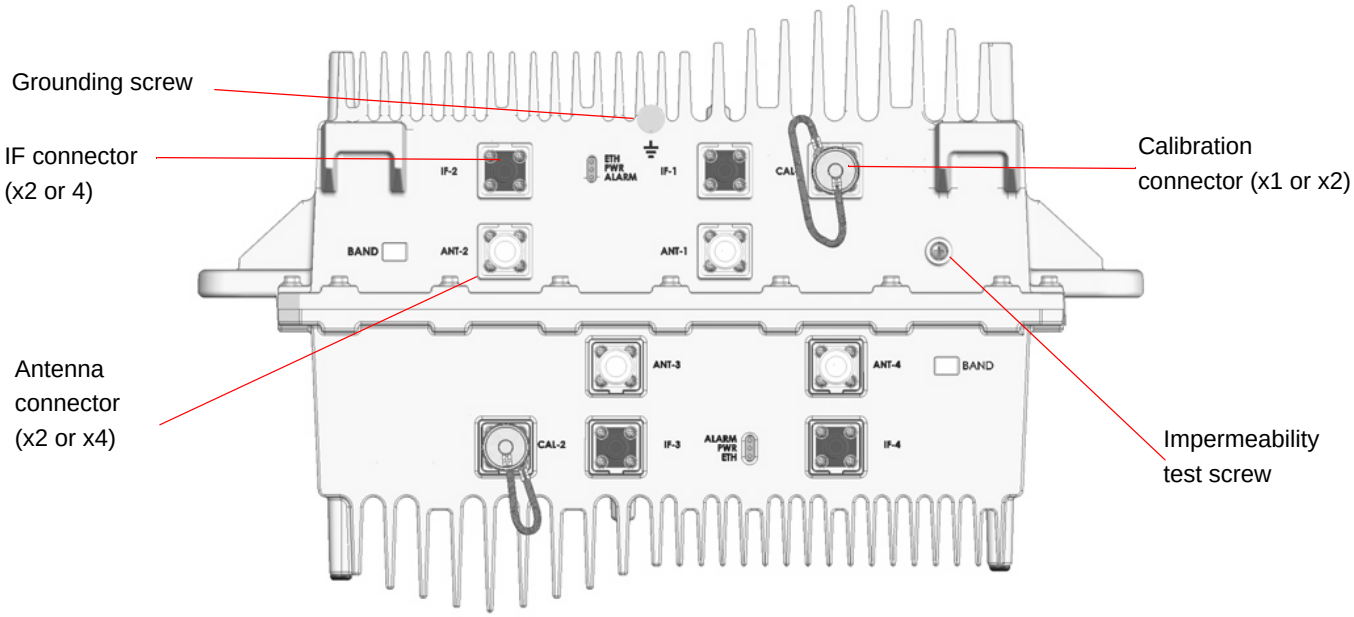


Figure 34: Bottom Panel of 2x2 or 4x2 ODU

CAUTION

Do not open the impermeability test screw - you may impair the sealing of the unit against moisture and humidity.

Table 3: ODU LEDs

Name	Description	Functionality
PWR	Power indication	■ Off - Power failure ■ Green - Power to ODU is OK, internal 3.3 VDC power supply is OK.
ALARM	AU-ODU communication and synthesizer status indication	■ Off - AU-ODU communication is OK, synthesizer is locked. ■ Red - AU-ODU communication failure or synthesizer is not locked
ETH	Wireless link traffic	Green when there is traffic on the wireless link

Table 4: ODU Connectors

Name	Connector	Functionality
IF-1 and IF-3 or IF-1 to IF-4	2 or 4 x TNC jack	Connection to the AU or ODU Power Feeder
ANT-1 and ANT-3 or ANT-1 to ANT-4	2 or 4 x N-Type jack, 50 Ohm	Connection to an external antenna
⏚ (GND)	Grounding screw	Connection to ground (earth)
CAL-1, CAL-2		Not used in current release

B. Connecting the Grounding Cable

1 Connect the grounding cable to the grounding screw ⏚ located at the bottom panel of the AU-ODU. Use an M10 wrench and apply torque of 6.4 [N*m] (55.3 [lbs*in]).

NOTE

Do not pull the cable to avoid stretching it. Leave enough cable length between the strip and the connection on both sides of the cable.

2 Use cable strips to attach the cable to the pole.

3 Connect the other end of the grounding cable to a good ground (earth) connection.

C. Connecting the Antenna RF Cable

If you use an ODU with an external filter, refer to “Connecting the Antenna to a 4x2 ODU with an External Filter” on page 24

1 Connect the straight end N-Type male connector to the antenna female connector (see Figure 35). Apply torque of 1.7 [N*m]/15.00 [Lbf*in].

2 Connect the 90° angle connector to the RF (ANT1/2 or 1-4) connector located at the bottom panel of the ODU (see Figure 35).

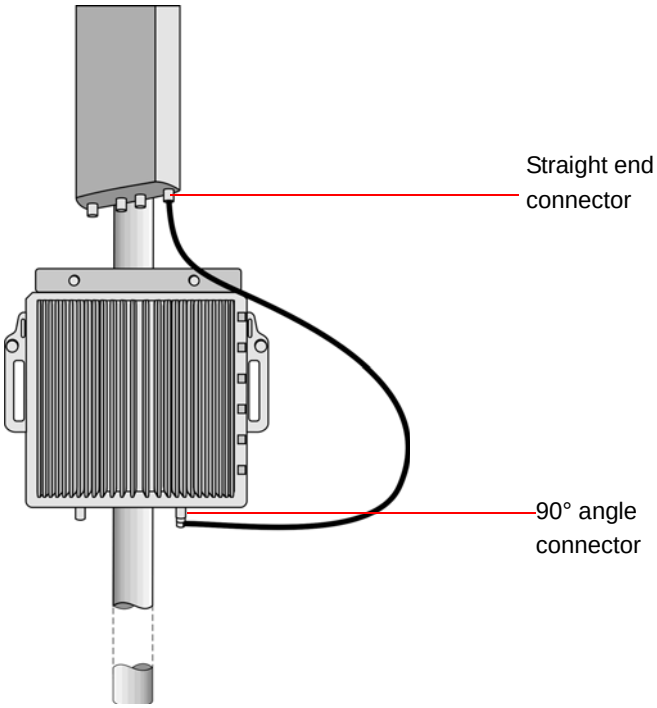


Figure 35: Antenna Cable Connection for 2x2/4/2 ODU

3 For connecting more than one antenna or a 4-port antenna to 2x2/4x2 ODUs, note the connection configuration (for 4x2 ODU with two dual-slant antennas, see Figure 36).

4 Fix the Antenna cable onto the pole using a cable strip.

- » Use additional cable strips to route the cable such that water can accumulate on the cable bends, away from the unit.
- » When routing the cable, do not exceed the minimum bending radius in the cable specifications.

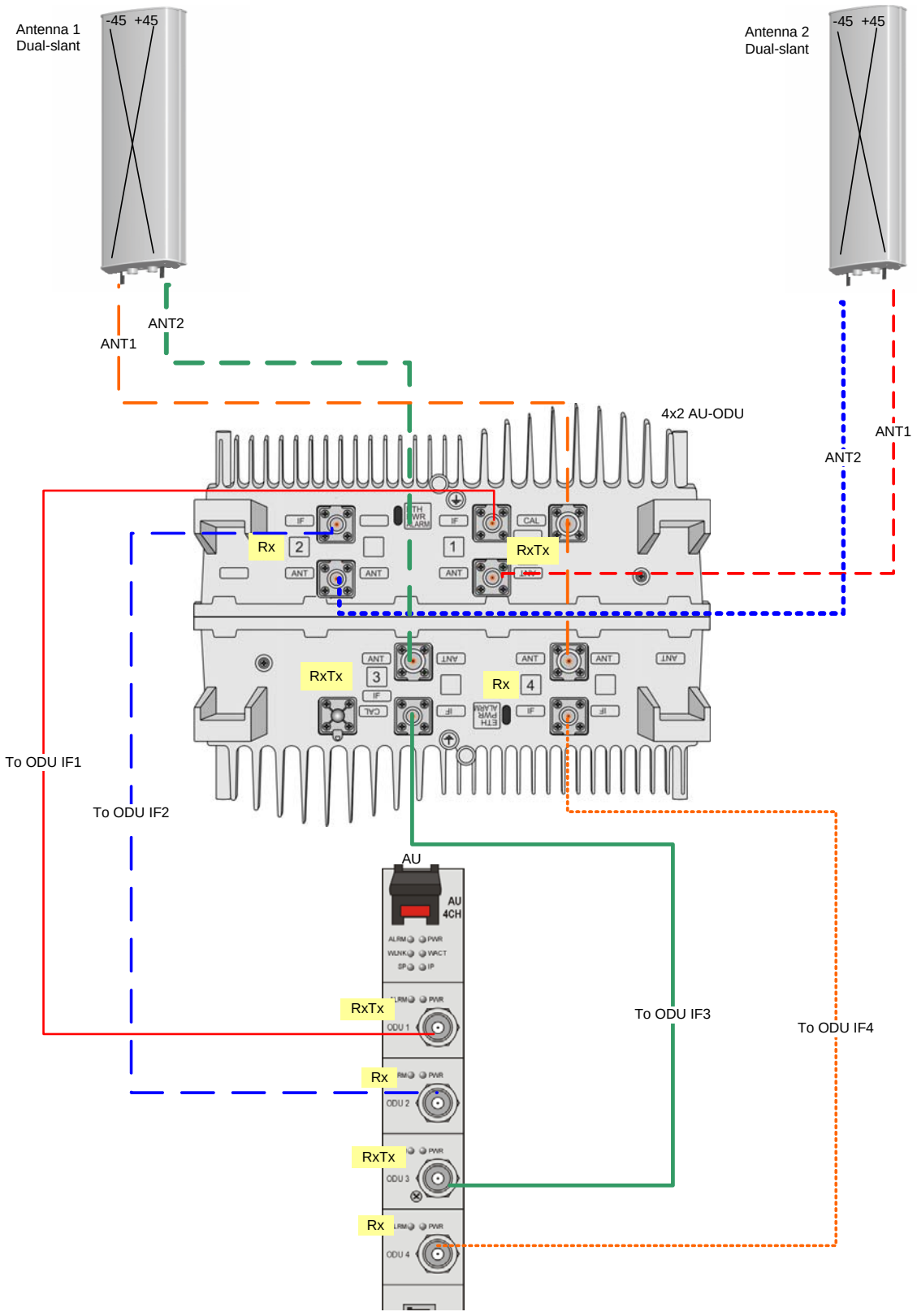


Figure 36: Antenna Connection Diagram (4x2 ODU)

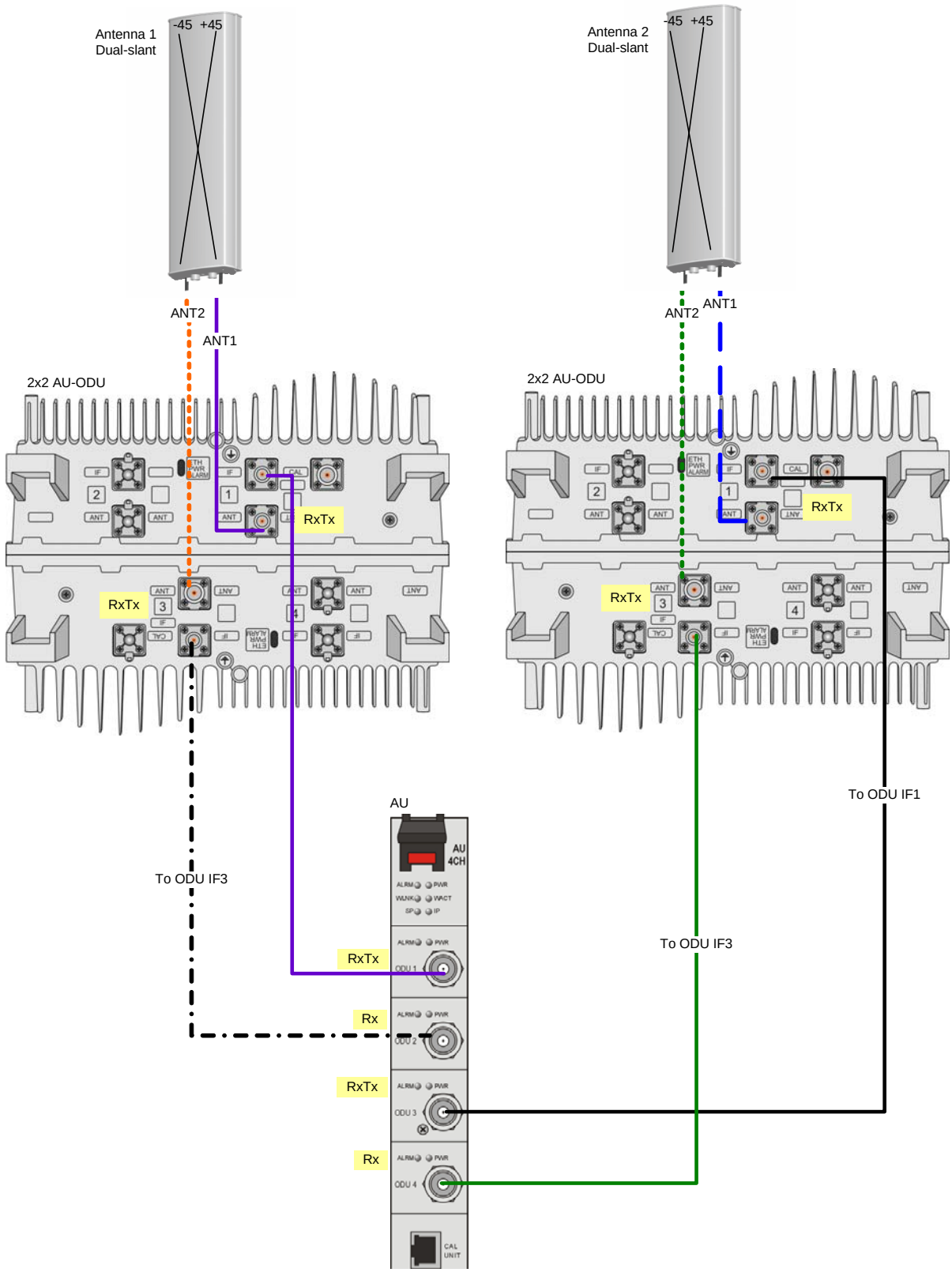


Figure 37: Antenna Connection Diagram (2x2 ODU)

Connecting the Antenna to a 4x2 ODU with an External Filter

This 2.5 GHz ODU type is shipped with the sun-guard already installed, and includes two 40 cm cables and a Band Pass Filter attached to the sun-guard.

1. Remove the sealing caps from the ODU and filter connectors.
2. Connect one end of the first cable to ANT-1 port of the ODU, and the other end to ANT-1 IN port of the external filter.
3. Connect one end of the second cable to ANT-3 port of the ODU to ANT-3 IN port of the external filter.

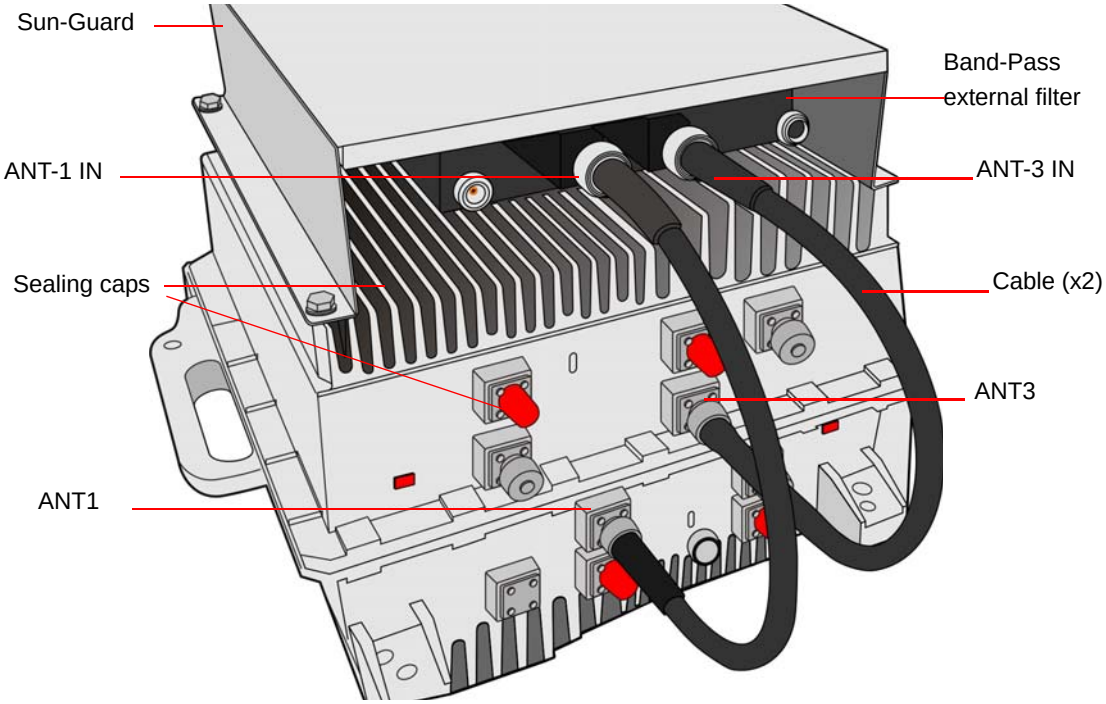


Figure 38: Connection from ODU to Filter

4 Connect one end of the first antenna cable to ANT-1 OUT port of the external filter, and the other end to antenna 1.

5 Connect one end of the second antenna cable to ANT-3 OUT port of the external filter, and the other end to antenna 3.

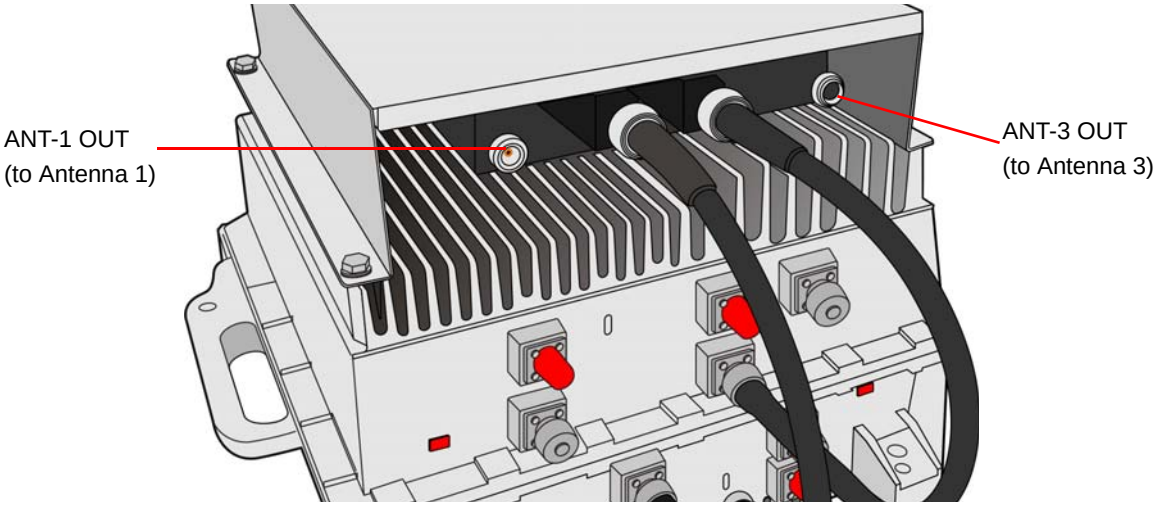


Figure 39: Connection from Filter to Antennas 1 and 3

6 Connect one end of the third antenna cable to ANT-2 port of the ODU, and the other end to antenna 2;

7 Connect one end of the fourth antenna cable to ANT-4 port of the ODU, and the other end to antenna 4.

D. Connecting the ODU IF Cables

Follow these guidelines when connecting the cables:

- To avoid transmissions at undesired frequencies, verify that the frequency and bandwidth parameters are properly configured before connecting the IF cables.
- Close the TNC connectors of the ODU and IDU by hand only without using any tool.
- When routing the coaxial cable, leave a service loop at the antenna so there will sufficient length of coaxial cable to replace a faulty connector, when necessary.
- Secure the coaxial cable so that there is no mechanical stress at the antenna connection. Follow the superstructure with the coaxial cable to its base to the building.
- If the coaxial cable requires suspension from the ODU to the building, use a stranded wire to support the coaxial cable weight. (The support will prevent a migration of the coaxial cable's inner conductor to the shield).
- Before connecting the IF cable, make sure that the length of the IF cable is sufficient to reach the BTS.

- An optional IF Combiner is available for transmitting signals from two AUs to a single ODU in the same BTS. For using this option, refer to the IF Combiner Installation Quick Guide.

To connect the ODU IF cable:

1 Connect the male TNC connector of the IF cable to the female TNC connector on the ODU (IF connector).

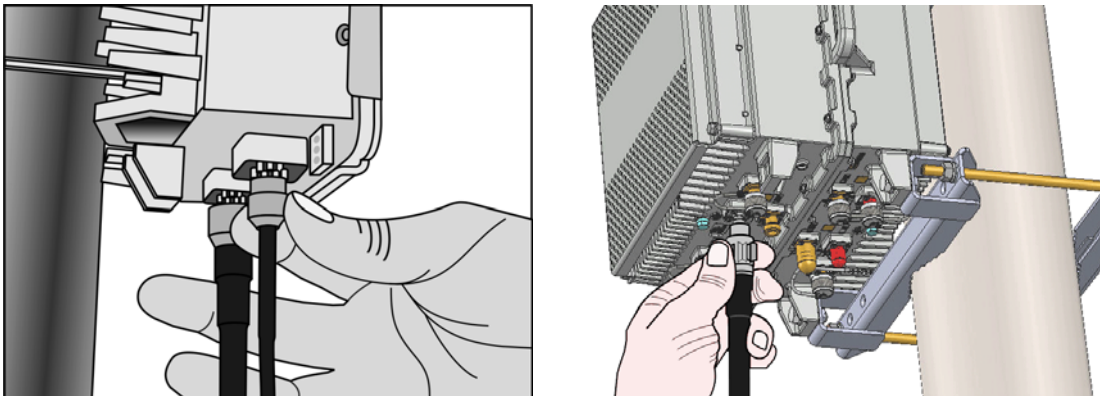


Figure 40: Connecting the IF Cable

2 Attach colored marking tape to the cable for simplified identification and maintenance.

3 Connect the other end of the IF cable to the ODU connector at the designated AU front panel.

IMPORTANT

- Connect each IF connector to its corresponding ODU port. That is, connect IF-1 on the ODU to ODU 1 on the AU, IF-2 to ODU 2, etc.
- When there is more than one ODU and the system is operating, first connect IF-1 and 3 to ODU ports 1 and 3 and then connect IF-2 and 4 to ODU ports 2 and 4.

CAUTION

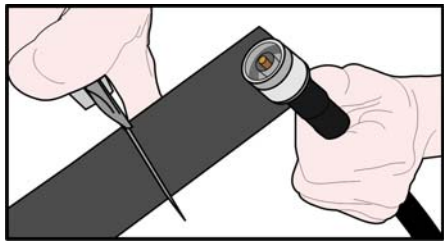
Do not connect IF cables to the calibration (CAL-1 and CAL-2) connectors.

4 Verify proper operation through the LED indicators of the AUs on the BTS.

Sealing the Outdoor Connectors

- All sealings and weather-proofing must comply with the IP-67 standard.
- Seal all outdoor connectors that are not supplied with sealing glands to protect against rain and moisture.
- Seal all grounding points on the IF cables.
- Use high quality sealing material such as Scotchfil™ Electrical Insulation Putty from 3M (or equivalent) over-wrapped with a UV resistant outdoor rated tape (e.g. Super 33+ or Super 88 vinyl Electrical Tape).
- Use high quality cold shrink sleeves to seal connectors.

1 Cut the cold shrink sleeve to size. Take into account the size of the unit's connector and additional 2.5 cm (0.5 in.).

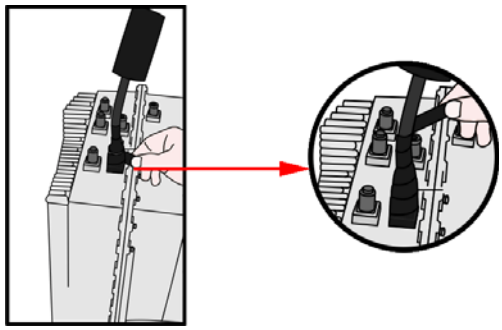


2 Slide the cold shrink sleeve onto the cable before connecting the cable.

3 Connect the cable.

4 Attach the mastic tape (Scotchfil™ Electrical Insulation Putty) and wrap it around the connector butting up against the connector. Do not over stretch.

5 Squeeze to tighten the mastic sealer. Make sure there are no air bubbles.



6 Slide the cold shrink sleeve on top of the connector. Make sure that the sleeve covers both cable connector and unit connector.

7 Pull the cord slowly to shrink the sleeve.