

Prepared (also subject responsible if other) / XKUEMHU		No. 50/1531-LZA 701 0001 Uen		
Approved CBC/ XRX ( Jan-Erik Thillberg)	Checked	Date 2009-03-09	Rev C	Reference

## Installation Instruction

### RBS 2111 Second Generation, RRU-N

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## 1 Introduction

This chapter describes the installation of the RRU-N Second Generation, and the connection of the RRU-N to other existing site products.

The RRU-N Second Generation consists of the following RRUs:

- RRUN8-22
- RRUN9P-22
- RRUN9E-22
- RRUN18-22
- RRUN19-22

## 2 Tools and Documentation

This chapter contains lists of all tools and instruments recommended for the complete installation of the RRU-N.

### 2.1 Tools for Installation of RRU-N

The tools required for the installation of RRU-N are shown in the table below.

Table 1 Tools Required

Product Name	Description	Product Number
Tool set, Installation Tools	Personal tools	LTT 601 156/1
Tool set	Crimping tool for grounding	LTT 601 86
Hammer drill or Cordless hammer drill	230 V AC	LTT 601 146/1
	Cordless 230 V AC	LTT 601 147/1
Torque wrench	for N connectors	LSS 103 25/1

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Product Name	Description	Product Number
Other tools needed	Torque Set, 0.5–4 Nm for bits	LTT 601 145/1
	Torque Set, 5–25 Nm	LTT 601 140/1
	Torque Set, 20–100 Nm	LTT 601 141/1
	Open-ended torque head (U-key), 16 mm	LSB 107 12/6
	Open-ended torque head (U-key), 16 mm	LSB 107 12/5

## 2.2 Documentation

The following documentation is referenced in this document.

Ensure that the following documents are read and understood:

- Personal Health and Safety Information, 124 46–2885
- System Safety Information, 124 46–2886

Ensure that the following documents are available:

- Site Installation Documentation, specific for the site
- Site Installation Material & Tools Catalogue, EN/LZT 751 0014
- Verifying RBS Installations at Site, 4/1532–LZA 701 0001
- RBS Product Description, 198/1551-LZA 701 0001
- Verifying Antenna Systems, 1/1532-LZA 701 0001
- Installing Hardware for TG Synchronization, 42/1531-LZA 701 0001
- Installation Instruction, RBS 2111 Second Generation, MU-12, 51/1531-LZA 701 0001
- Grounding Guidelines for RBS Sites, EN/LZT 735 0018

## 3 Installation RRU-N

### Introduction

This chapter describes how to install the RRU-N.

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## Target Group

The target group for this instruction is personnel involved in the installation of an RRU-N.

### 3.1

## Prerequisites

This section describes the prerequisites for installation.

### Preconditions

Before starting site work, ensure the following conditions have been fulfilled:

- Site access permission received.
- Ordered RRU-N, equipment, specified tools and other necessary facilities have been delivered.
- Site power is available.
- Site grounding point is available.

**Note:** The terms earthing and grounding are synonymous.

- Antenna system installed.
- During outdoor installation, protection for the RBS is available in case of bad weather.

**Note:** If the surrounding temperature changes between hot and cold after installation, to avoid humidity damage, the RRU-N must not be left without power for more than 48 hours.

## Equipment

The instructions in this document describe the installation, or use, of the following:

- RRU-N
- Front Sunshield
- Mounting fixtures for mast and pole mounting (alternative)
- Brackets for wall mounting (alternative)
- Drilling template for wall mounting (when wall mounting alternative is used)
- Grounding kit
- Power cable
- Jumper cables

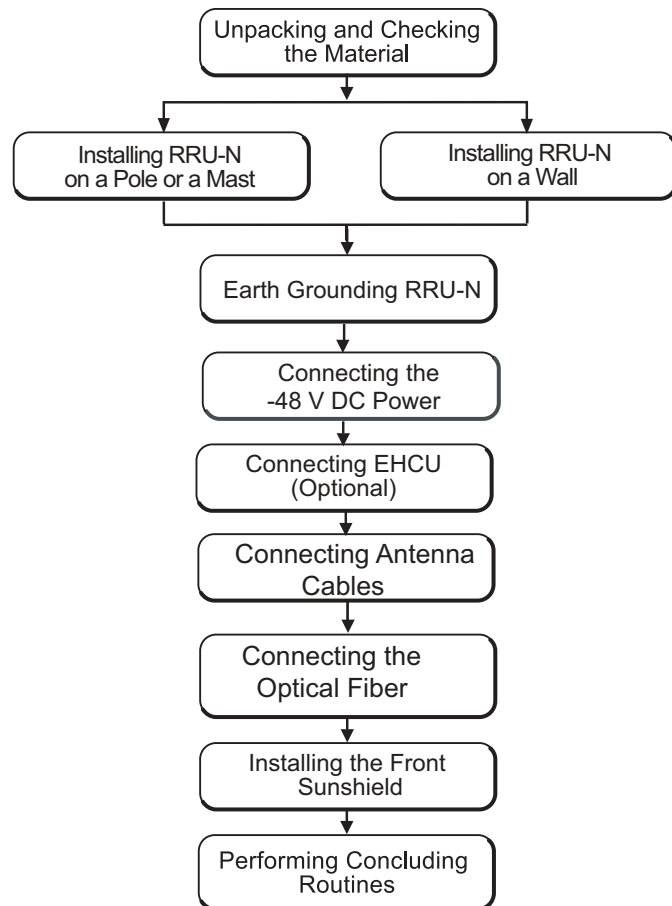
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- Optical fiber cable (for connection to Main Unit)

If any of the above preconditions cannot be complied with, contact the site supervisor or the person responsible for the activity that has been missed.

## 3.2 Installation Procedure

This section describes the installation procedure for the RRU-N.



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Figure 1 Workflow for Installing the RRU-N

**Note:** The cover on the RRU-N needs to be released before connecting cables and be fitted back after. For convenience, keep the cover open until all of the cables are connected.

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### 3.2.1 Unpacking and Checking the Material

This section provides information for unpacking and checking the material.

The RRU-N cabinet is transported in a crate.

1. Examine the packaging for damage. If it has been damaged, then make an immediate complaint to the transport company. It is recommended to take a photo of the damage, which will improve the CLAIMS process.
2. Check that the items delivered correspond to the packing list. For more information, see Verifying RBS Installations at Site.
3. Unpack the RRU-N.

**Note:** The weight of the RRU-N with the sunshield is 16.5 kg.

4. Dispose of the crate in accordance with local regulations or Ericsson recommendations.

### 3.2.2 Installing RRU-N on a Pole or a Mast



#### Warning!

Risk for falling objects, work at height in progress. Falling objects can cause serious injury or even be fatal. Always wear a helmet and avoid standing in the danger area.

**Note:** The following precautions must be taken when working at height:

- Safety belt and safety helmet must be used.
- Adequate protective clothing is essential in cold weather.
- All lifting devices must be tested and approved.
- A doctor's certificate for such work must be obtained.

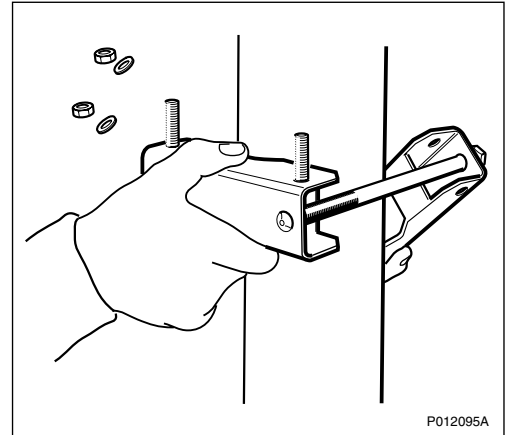
To install the RRU-N on a pole or a mast, perform the following steps:

**Note:** Ensure that the threads on all stainless steel fixtures are treated with anti-seize thread lubricant to minimize the risk of the nuts seizing.

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1. Place the upper mounting fixture in the correct position on the pole.

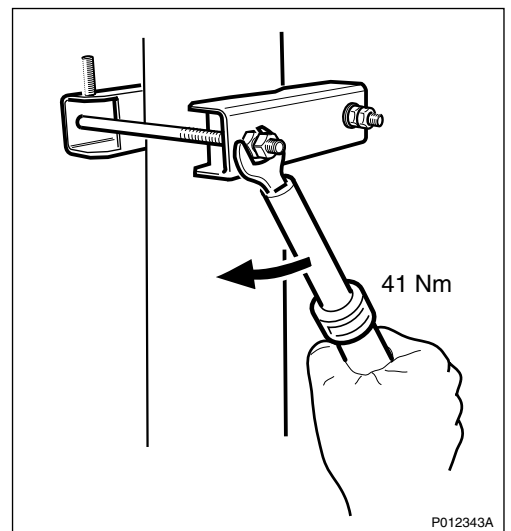
**Note:** The washers and nuts for the studs must be saved for later use.



2. Fasten the washers and nuts by screwing them finger tight to the clamp bolts.

Adjust the mounting fixture so that the clamp bolts run parallel on each side of the pole.

Tighten the inner M10 nuts to a torque of 41 Nm using a torque wrench fitted with a 16 mm open-ended torque head.

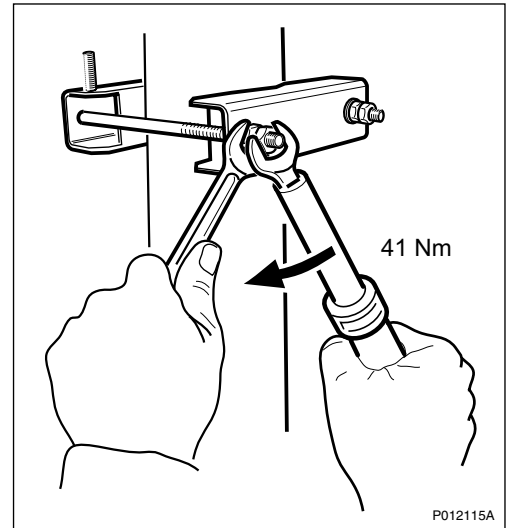




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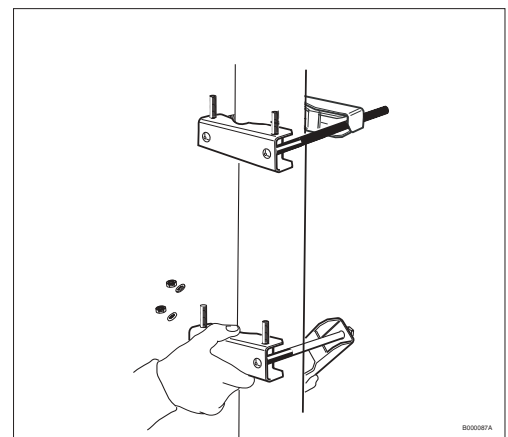
3. Tighten the outer nuts using both a torque wrench and an open-ended wrench (both 16 mm), as shown in the picture. Tighten the outer nut on each clamp bolt to a torque of 41 Nm.

**Note:** The wrench holding the inner nuts must be held in position while tightening the outer nuts.



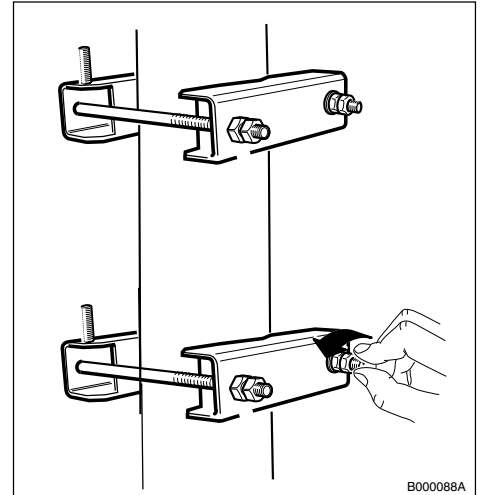
4. Place the lower mounting fixture on the pole, 500 mm below the upper mounting fixture.

**Note:** The washers and nuts for the studs must be saved for later use (step 8).



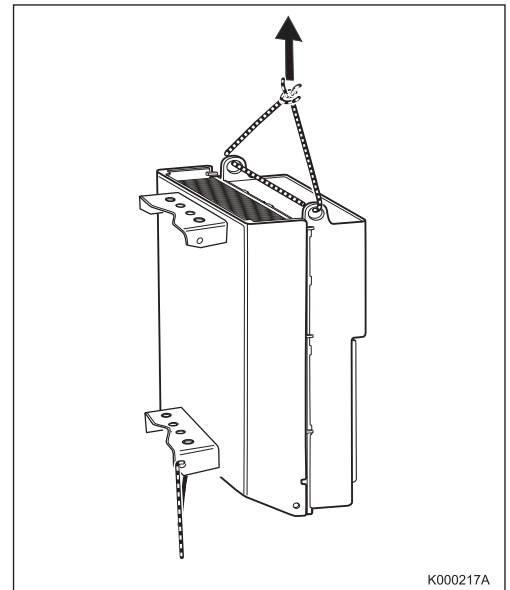
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5. Fasten the washers and nuts until finger tight to the clamp bolts.



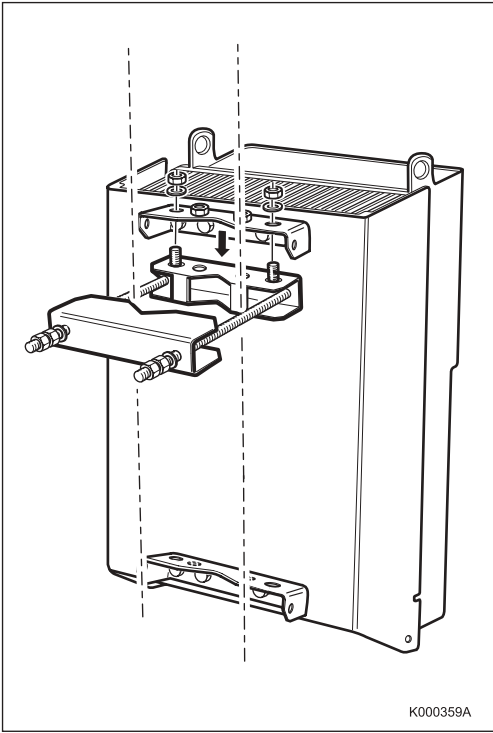
6. Hoist the RRU-N up to its position on the mast or pole.

Attach a rope to the eyes of the RRU-N to lift it up. Attach another rope to the hole in the lower part of the rear mounting bracket, and pull it while hoisting the RRU-N to ensure that the RRU-N does not swing loose.



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7. Hook the RRU-N onto the stud bolts of the upper mounting fixture. Fit the washers and nuts on the stud bolts, and tighten them finger tight.

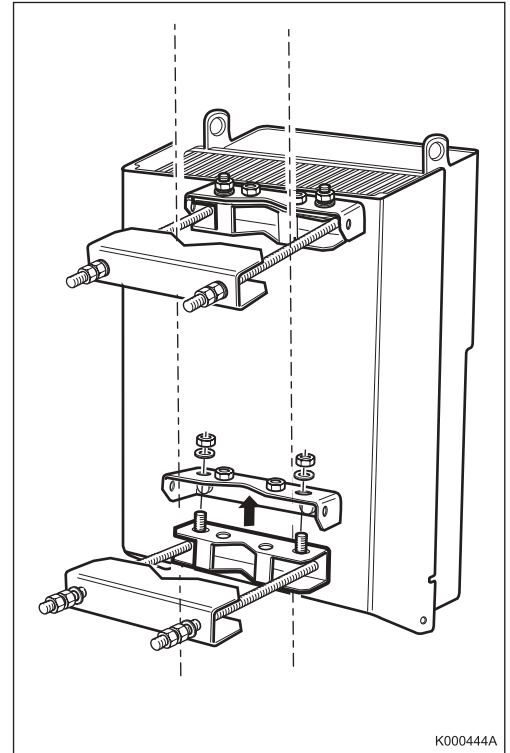


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8. Loosen the clamp on the lower mounting fixture and lift the mounting fixture to the lower support of the RRU-N.

Fit the washers and nuts on the stud bolts, and tighten them finger tight.

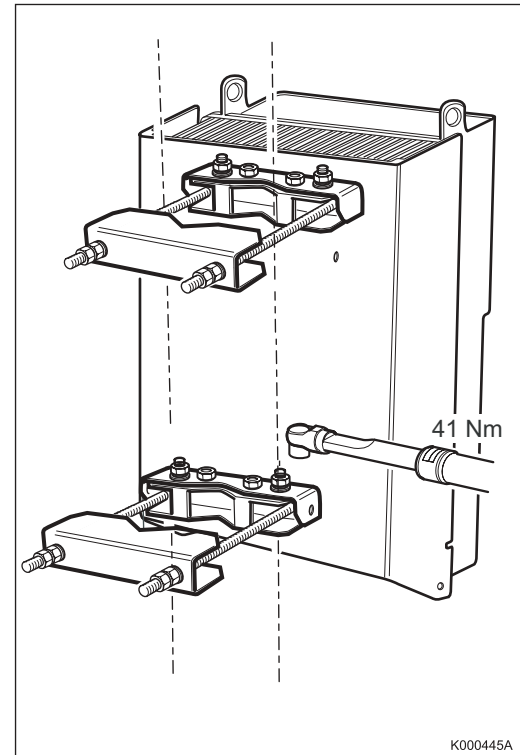
Tighten the clamp on the lower mounting fixture finger tight.



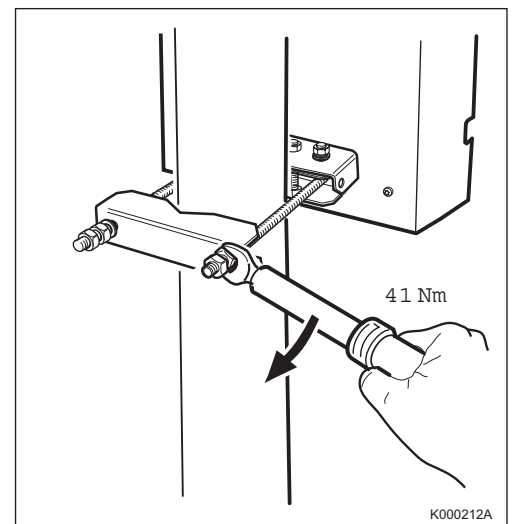
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9. Tighten the two M10 nuts on the lower support to a torque of 41 Nm, using a torque wrench fitted with a 16 mm socket.



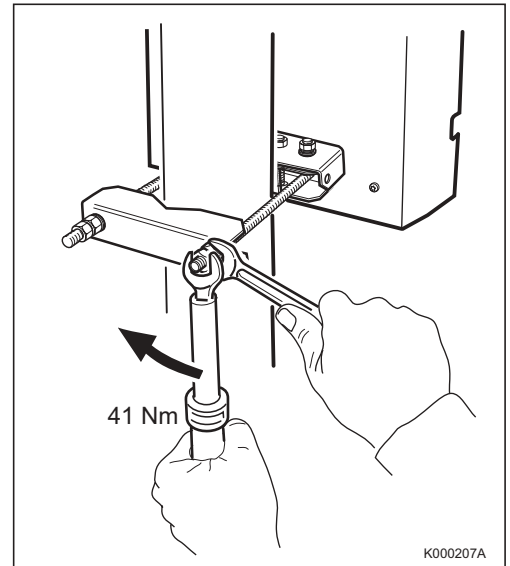
10. On each clamp bolt of the lower mounting fixture, tighten the inner M10 nuts to a torque of 41 Nm, using a torque wrench fitted with 16 mm open end head.



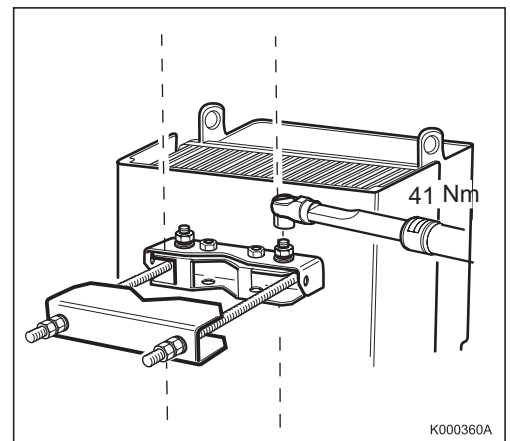
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11. If necessary, adjust the position of the RRU-N before tightening the outer nuts.

Tighten the outer nuts using both a torque wrench and an open end wrench (both 16 mm), as shown in the picture. Tighten the outer nut on each clamp bolt to a torque of 41 Nm. The wrench holding the inner nuts must be held in position while the outer nuts are being tightened.



12. Tighten the two M10 nuts on the upper support to a torque of 41 Nm, using a torque wrench fitted with a 16 mm socket.



### 3.2.3 Installing RRU-N on a Wall

To install the RRU-N on a wall, perform the following steps:

1. Use a spirit level to align the marking template sheet supplied with the RRU-N and mark the position of the holes.

The measurements for the hole positions are shown in the figure below.

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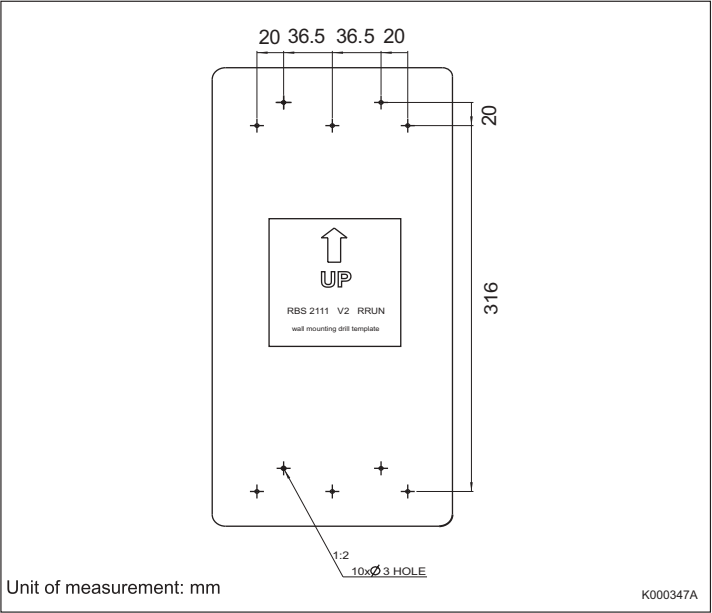


Figure 2 Measurements for Hole Positions

**Note:** Bolts or plugs, for securing the wall brackets to the wall are not delivered with the unit. These must be specified and purchased by the site engineering department.

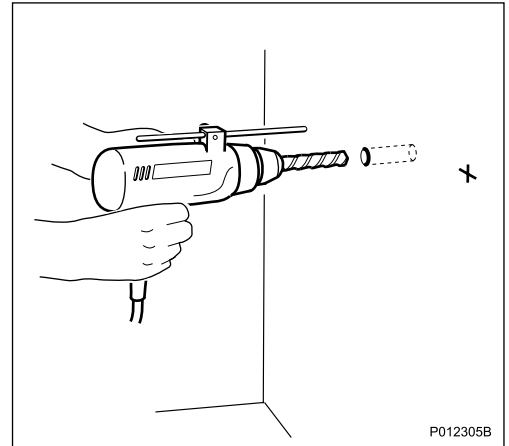
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2. Drill the mounting holes in the wall, and insert a plug into each hole.

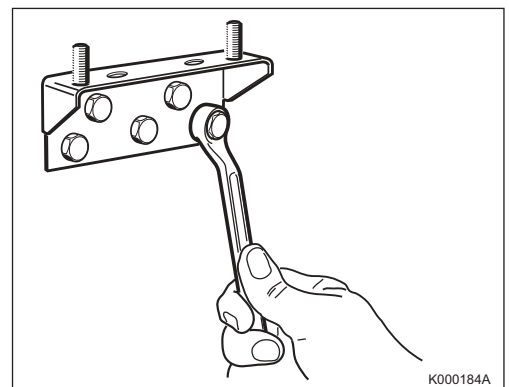
Use the depth restrictor, fitted to the hammer drill, to regulate the depth of each hole.

**Note:** An industrial vacuum cleaner is to be used for removing dust and debris created during drilling.

**Note:** Use enough bolts to support the brackets. The number of bolts depends upon the wall material, as specified by site engineering department.



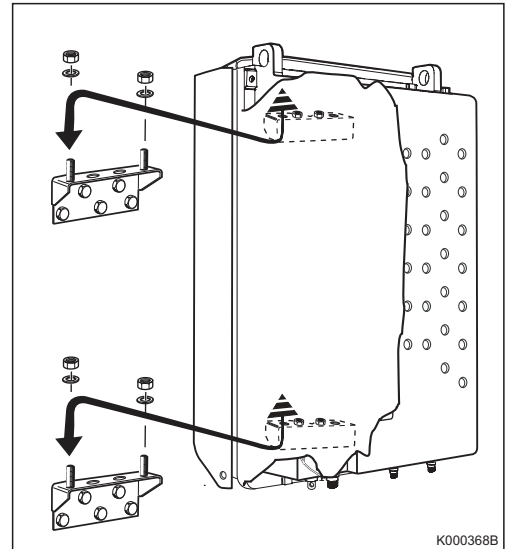
3. Position the upper and lower bracket over the drilled holes and insert the bolts or nuts. Use a spirit level to adjust the horizontal position, and tighten them according to the recommendation given by the site engineering.





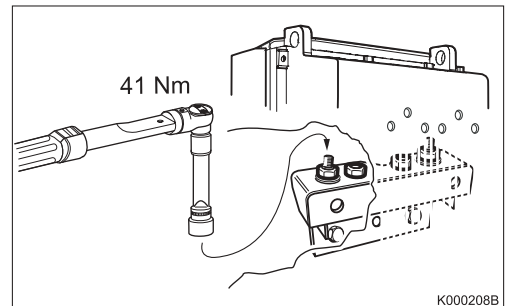
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4. Hook the RRU-N onto the stud bolts on the wall brackets.



5. Mount the washers and the nuts onto the stud bolts on the upper bracket.

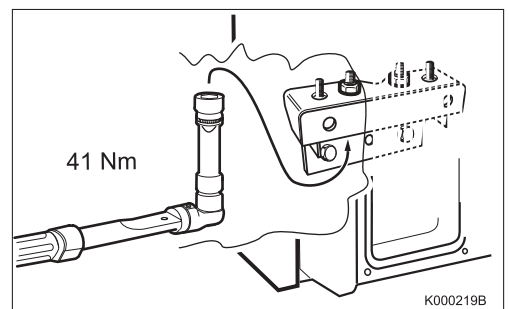
Tighten the M10 nuts to a torque of 41 Nm, using a torque wrench fitted with a 16 mm socket.



**Note:** Due to restricted space, use a 3/8-inch 250 mm extension bar.

6. Insert the bolts into the nuts on the lower brackets. Tighten the bolts to a torque of 41 Nm, using a torque wrench fitted with a 16 mm socket.

**Note:** Due to restricted space, use a 3/8-inch 250 mm extension bar.



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### 3.2.4 Earth Grounding RRU-N



#### Caution!

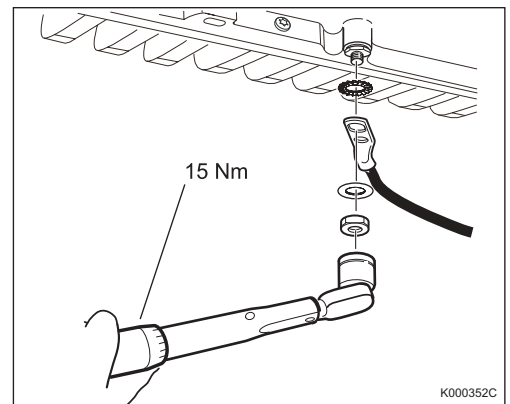
**Do!** Products not connected to ground risk being damaged by overvoltage or overcurrent. Always connect products to ground according to instructions.

For general information about grounding principles, see document Grounding Guidelines for RBS Site.

For information about grounding installation, see document Grounding Material Installation Instruction.

To connect the grounding cable to the RRU-N, perform the following steps:

1. Route the grounding cable from the site grounding system to the RRU-N grounding point.
2. Loosen the M8 nut and connect the ground cable. The serrated washer must be placed between the bolt and the cable lug of the grounding cable. Tighten the nut to 15 Nm, using a torque wrench fitted with a 13 mm socket.



### 3.2.5 Connecting the -48 V DC Power



#### Caution!

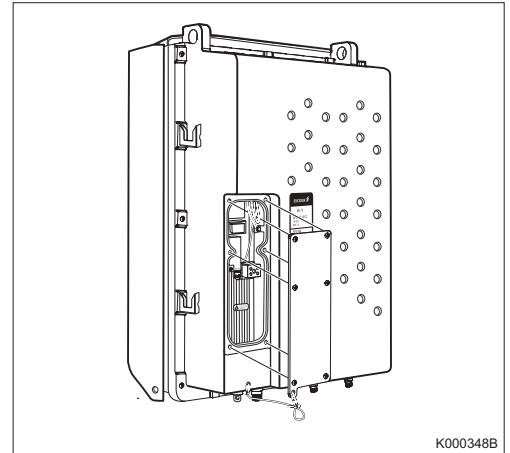
**Stop!** Do not install or modify AC or DC powered equipment unless you are a qualified and authorized electrician. Improper installation work can seriously damage the equipment.

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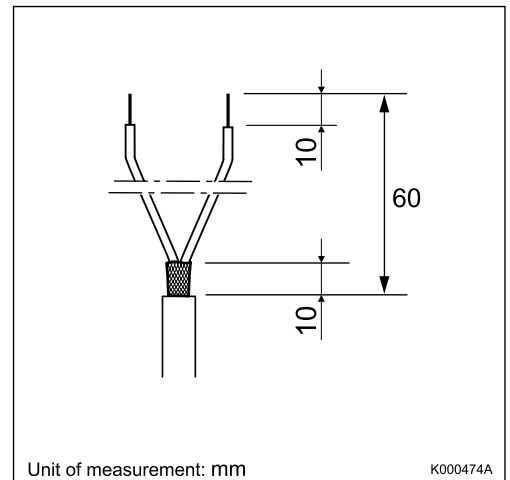
To connect the -48 V DC power to the RRU-N, perform the following steps:

1. Ensure that the external DC power is switched off before connecting the cable.
2. Loosen the six captive screws on the cover of the RRU-N, and release the cover.

**Note:** The cover is attached to the RRU-N by means of a short cord, so the cover can be released and allowed to hang free.



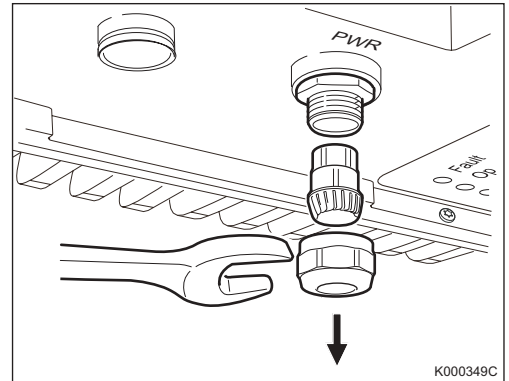
3. Cut the power supply cables to the appropriate length.
4. Strip approximately 60 mm of the outer layer of insulation from the power cable. Leave approximately 10 mm of the inner conductors.



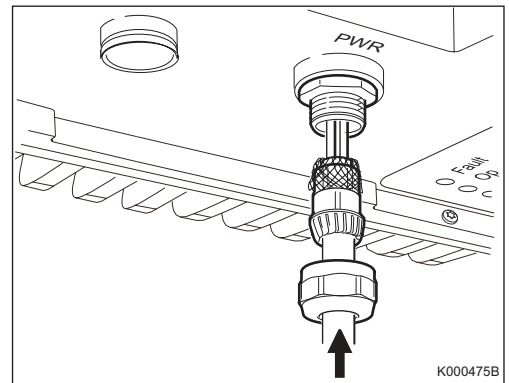
Unit of measurement: mm

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5. Remove the cable gland nut from the cable gland using a 24 mm open-ended wrench. Remove the protective plug and the inner seal from the cable gland (marked PWR).



6. Route the cable through the nut, the inner seal and the gland of the RRU-N. Wrap the cable shield around the lower part of the inner seal, as shown in the figure. Turn the inner seal so that the guide lines up with the groove, and then insert it into the gland. Do not tighten the gland yet.



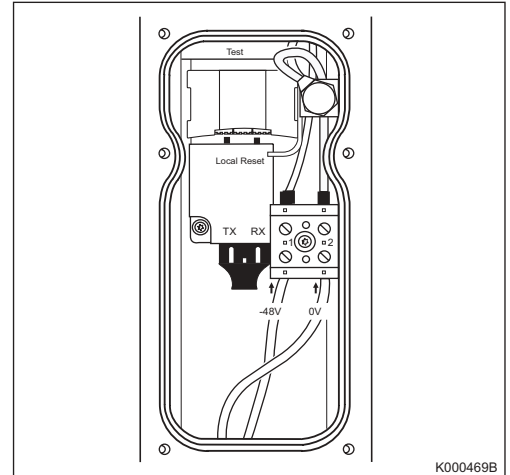
**Note:** Ensure that the cable has already been attached to the pole, mast or wall with cable ties or straps.

**Note:** Be very careful to ensure that the nut does not slide down the cable making it impossible to reach.

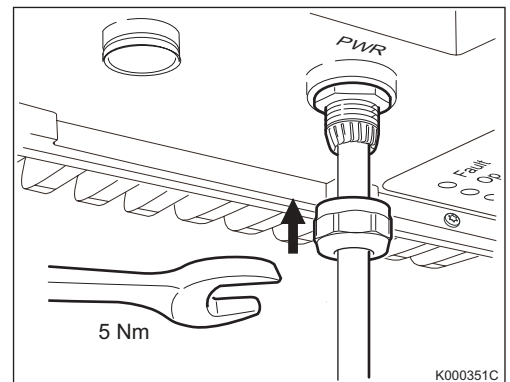
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7. Connect the conductors as shown in the picture. Tighten the wire connected to the terminal block to a torque of 0.8 Nm.

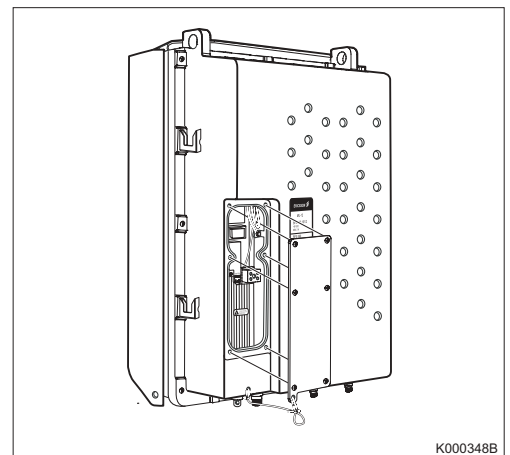
**Note:** Ensure that the wires are connected to the correct polarities.



8. Fasten the cable gland nut and tighten it properly using a 20 mm or 24 mm open-ended wrench. Ensure that the cable gland is sealed.



9. Fit the RRU-N cover into position and tighten the captive screws to a torque of 1 Nm, using a torque driver fitted with a Torx bit T20.



If the RRU-N is equipped with an PSU-AC to adopt the AC power, perform the steps in Section 5 on page 30.

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### 3.2.6 Connecting Optical Fiber Cable and Setting RRU-N Configuration



#### Caution!

**Stop!** This product contains components sensitive to ESD. Use an approved ESD wrist strap, connected to the product grounding point, to avoid damaging these components.

**Note:** The cables are fiber optic and must be handled with care. The minimum allowed bending radius for the fiber optical cables is 50 mm. The minimum allowed bending radius for each individual fiber is 20 mm.

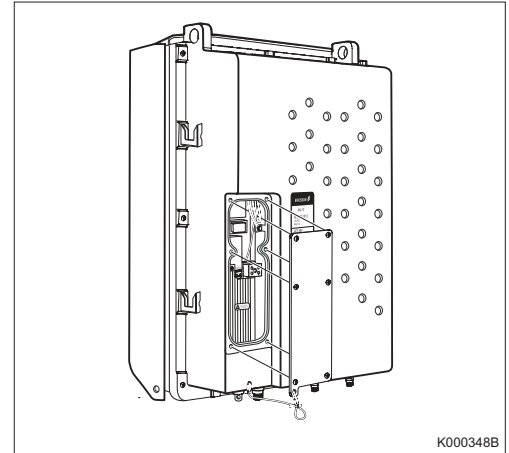
**Note:** Avoid damaging the cable by attaching the pulling wire properly. The pulling force must not exceed 300 N.

To connect the optical fiber cable to the RBS 2111 RRU-N, perform the following steps:

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1. Loosen the six captive screws on the cover of the RRU-N, and release the cover.

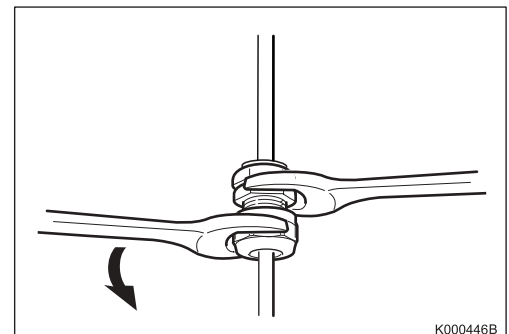
**Note:** The cover is attached to the RRU-N by means of a short cord, so the cover can be released and allowed to hang free.



2. Loosen the optical fiber cable gland nut from the cable gland, using 18 mm open-ended wrenches.

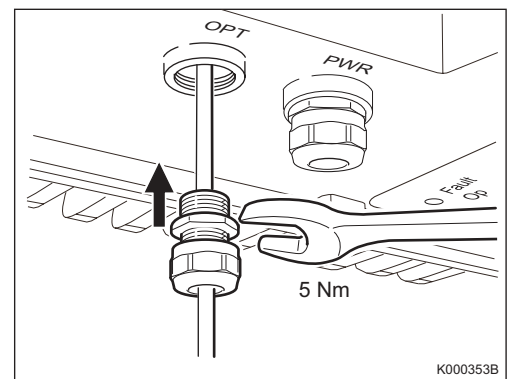
**Note:** The available cable end to be used is labeled RRU-N.

**Note:** Be very careful to ensure that the nut does not slide down the cable making it impossible to reach.



3. Remove the protective cap from the cable entry marked OPT, using a flat bladed screw driver or a coin. Remove the nut from the cable gland and route each jumper of the optical fiber cable through the cable entry.

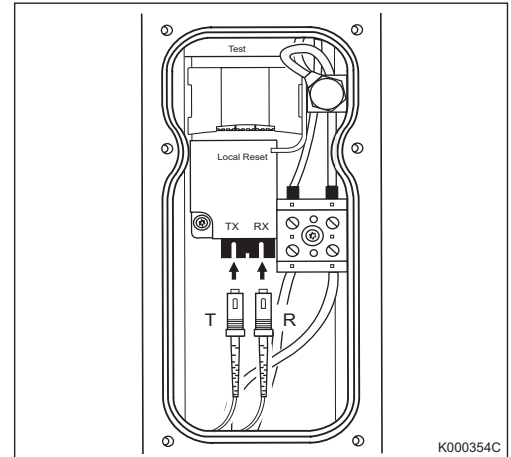
Screw the gland into the cable entry and tighten it properly, using an 18 mm open end wrench. Ensure that the cable gland is sealed.



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4. Route the fiber optical cables to the connectors inside the RRU-N as shown in the picture. Remove the protective caps on the fibers and the connectors. Insert the cable into the specified connectors of the RRU-N.

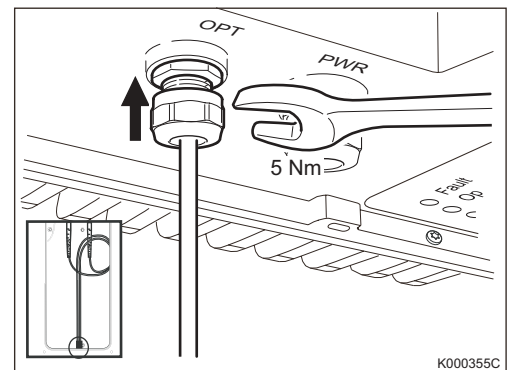
**Note:** Do not touch the end of the optical connectors after the protective caps are removed.



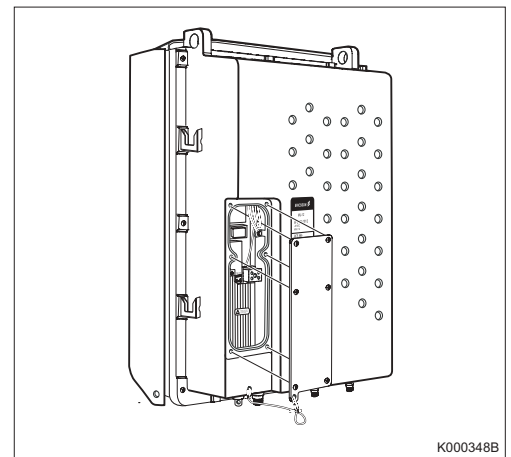
5. Adjust the cable so that a small part of the cable jacket is visible inside the RRU-N.

Fasten the cable gland nut and tighten it properly using a 17 mm open end wrench. Ensure that the cable gland is sealed.

**Note:** The cable must be attached to the pole, mast or wall with cable ties or straps.



6. Fit the RRU-N cover into position and tighten the captive screws to a torque of 1 Nm, using a torque driver fitted with a Torx bit T20.





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### 3.2.7 Connecting Antenna Cables



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#### Caution!

**Stop!** This product contains components sensitive to ESD. Use an approved ESD wrist strap, connected to the product grounding point, to avoid damaging these components.

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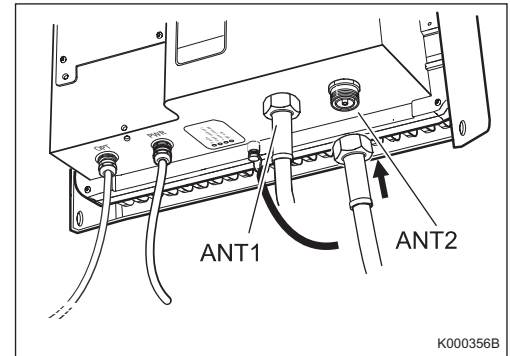
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**Note:** The antenna system must have been tested. For more information, see Verifying Antenna Systems, 1/1532-LZA 701 0001.

To connect the antenna cables between the antenna system and the RRU-N, perform the following steps:

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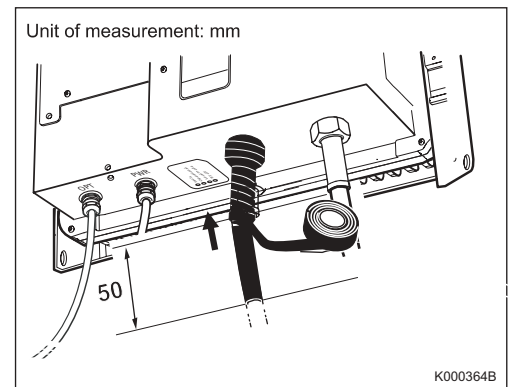
1. Remove the protective caps of the antenna connectors (marked ANT1 and ANT2) at the bottom of the RRU-N. Connect the antenna cables to the connectors. Tighten them to a torque of 2.7 Nm, using a torque wrench.



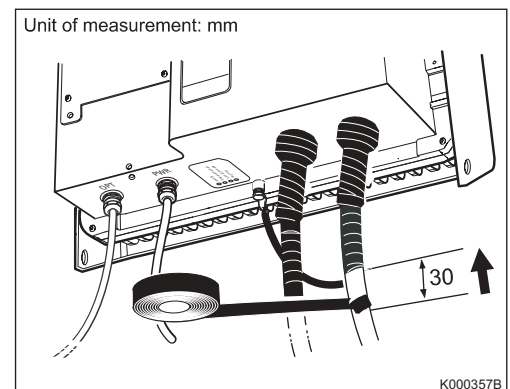
**Note:** The allowed minimum bending radius must be taken into consideration when installing and connecting the antenna cables.

2. Start to apply the self-amalgamating (self-fusing) tape approximately 50 mm below the lower edge of each connector. Overlap each turn by 50%. Proceed all the way up to the edge of the RRU-N.

Vary the stretching of the tape and avoid spaces.



3. Apply two, half-overlapped, slightly-stretched layers of electrotape. For each layer, start 30 mm below the lower end of the self-amalgamating (self-fusing) tape and proceed all the way up to the edge of the RRU-N.

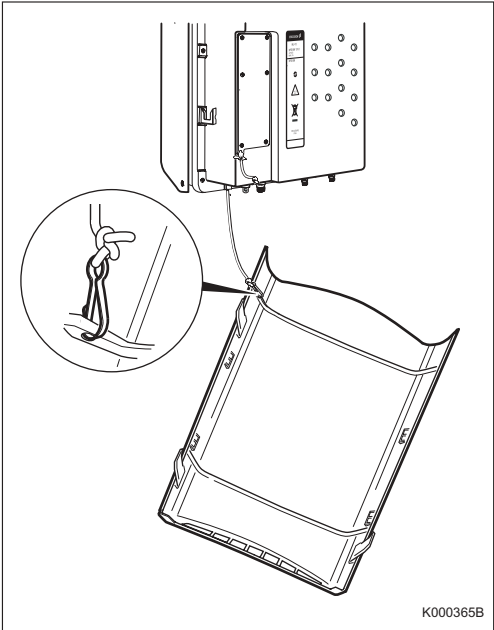


### 3.2.8 Installing the Front Sunshield

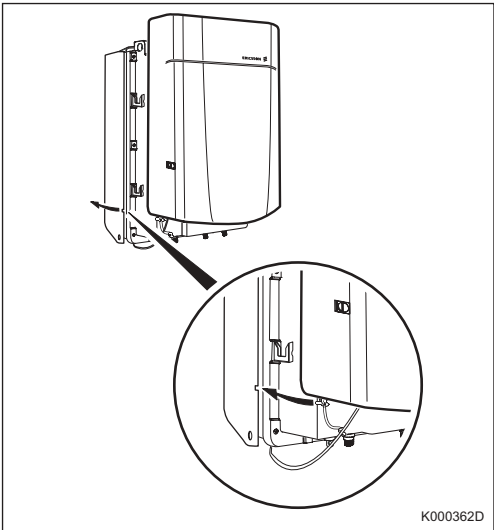
To attach the front sunshield to RRU-N, perform the following steps:

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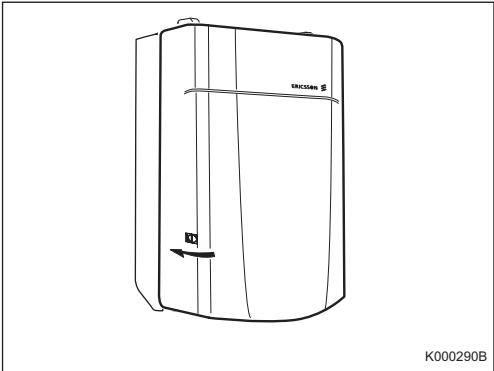
1. Attach the cord from the RRU-N to the inside of the front sunshield.



2. Attach the front sunshield by pressing it carefully on both sides and slide down into the fixed position.



3. Push the buttons of the rear sunshield backward to lock the RRU-N.



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## 4

## Optional Installation External Splitter/Highway Function



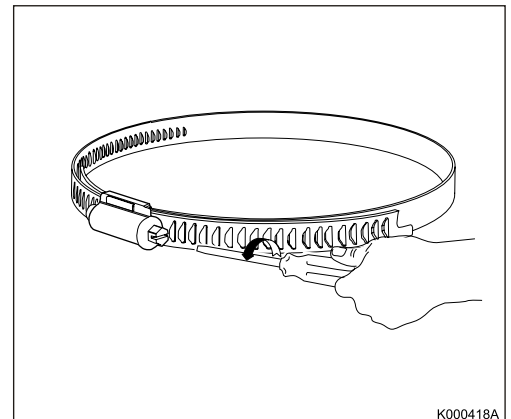
### Caution!

**Stop!** This product contains components sensitive to ESD. Use an approved ESD wrist strap, connected to the product grounding point, to avoid damaging these components.

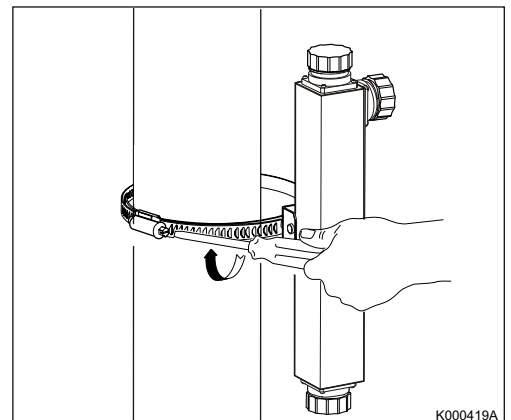
**Note:** The antenna system must have been tested. For more information, see Verifying Antenna Systems, 1/1532-LZA 701 0001.

This section describes how to install the external splitter on a pole/mast and how to connect the cables.

1. Loosen the screw of the mounting clamp, using a flat 6 mm screwdriver.



2. Route each of the mounting clamp through the mounting plate of the splitter. Place them in the correct position on the pole and tighten the screw.

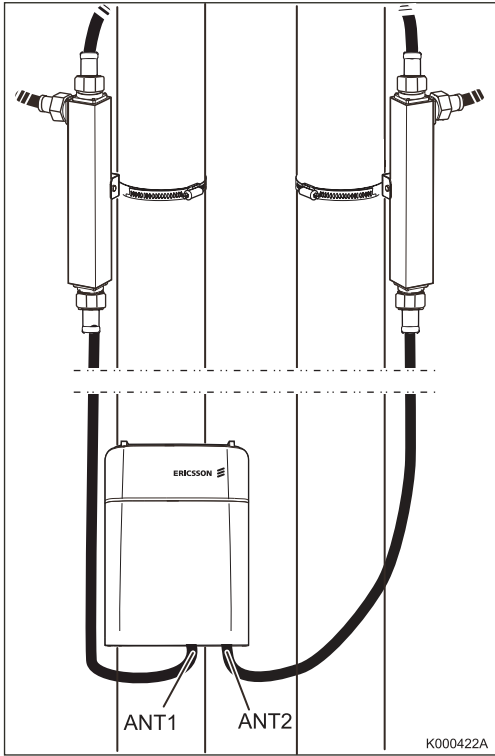


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3. Remove the protective caps of the antenna connectors (marked ANT1 and ANT2) on the RRU-N and on the splitters.

Connect the antenna cables to the connectors of the splitters. Tighten them to a torque of 2.7 Nm, using a torque wrench.

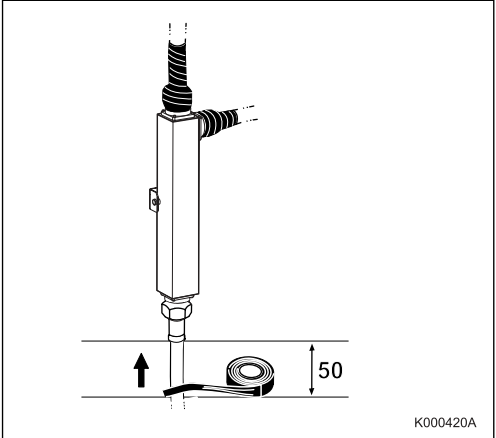
**Note:** The allowed minimum bending radius must be taken into consideration when installing and connecting the antenna cables.



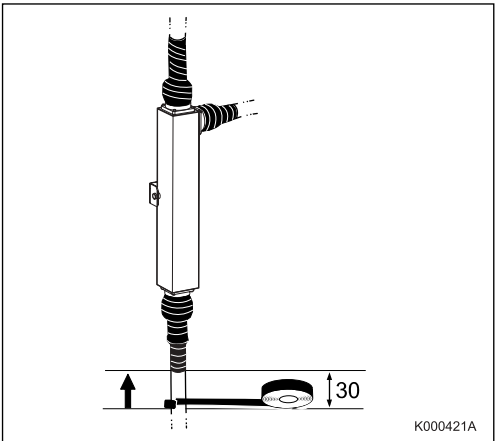
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4. Start to apply the self-amalgamating (self-fusing) tape approximately 50 mm below the lower edge of each connector. Overlap each turn by 50%. Proceed all the way up to the edge of the splitters.

Vary the stretching of the tape and avoid spaces.



5. Apply two, half-overlapped, slightly-stretched layers of electrotape. For each layer, start 30 mm below the lower end of the self-amalgamating (self-fusing) tape and proceed all the way up to the edge of the splitters.



5

**Optional Installation Power Supply Unit-AC Kits**



**Caution!**

**Stop!** Do not install or modify AC or DC powered equipment unless you are a qualified and authorized electrician. Improper installation work can seriously damage the equipment.

The RRU-N should be equipped with Power Supply Unit-AC (PSU-AC) kits to adopt the AC power. The PSU-AC can be ordered as an optional part.

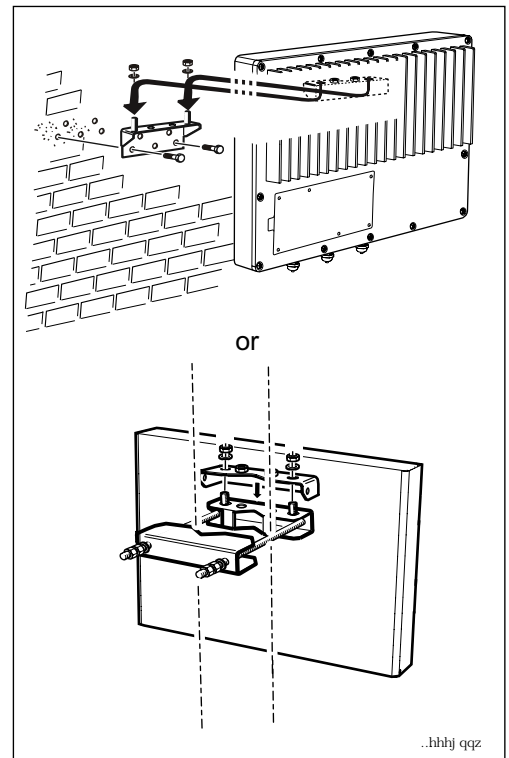
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This section describes how to install the external PSU-AC on a wall, on a pole, or a mast and how to connect the cables.

**Note:** Ericsson provides two types of PSU-AC: PSU-AC-1 and PSU-AC-2.  
The PSU-AC-1 installation are shown as the example.

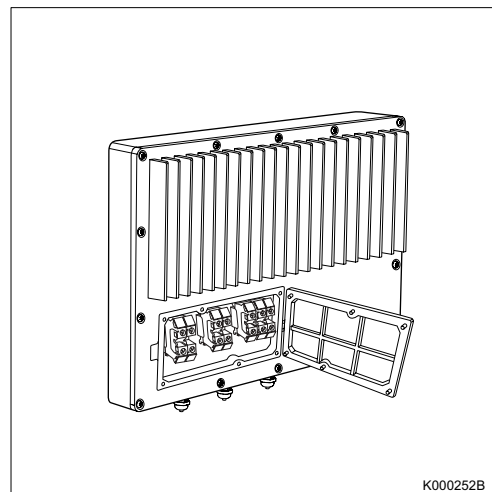
1. Ensure that the external AC power is switched off before connecting the cable.
2. Mount the PSU-AC on a wall, a pole, or a mast.

Tighten the M10 nuts to a torque of 25 Nm, using a torque wrench fitted with a 16 mm socket.



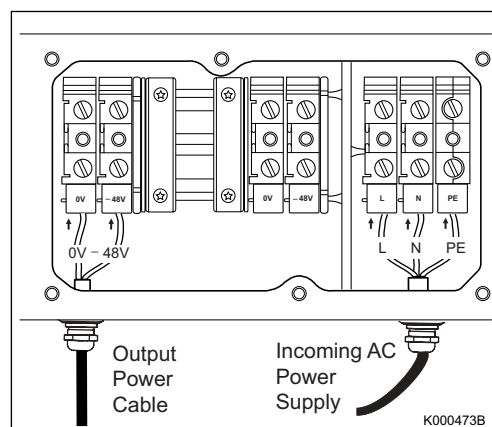
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3. Loosen the captive screws on the cover of the PSU-AC, and open the cover.



4. Connect the conductors as shown in the picture. Tighten the wire connected to the terminal block to a torque of 1.0 – 1.2 Nm.

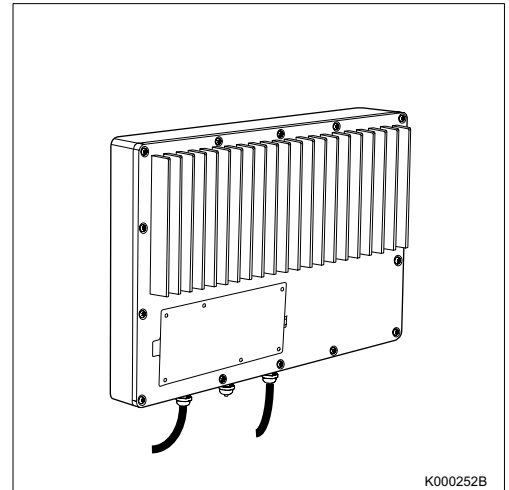
**Note:** Ensure that the wires are connected to the correct polarities respectively.





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5. Fit the PSU-AC cover into position and tighten the captive screws to a torque of 1 Nm, using a torque driver fitted with a Torx bit T20.



6. Connect the other conductors of the DC power cable to the RRU-N. See Page 21 for more information.

## 6 Optional Installation External Hybrid Combining Unit

The RRU-N should be equipped with External Hybrid Combiner Unit (EHCU) to achieve the combined configuration. The EHCU can be ordered as an optional part.

**Note:** The antenna system must have been tested. For more information, see Verifying Antenna Systems, 1/1532-LZA 701 0001.

### 6.1 Mounting EHCU

The EHCU can be mounted indoor or outdoor, either on a wall, on a pole or on a cable ladder. The four mounting hooks also make it possible to mount the unit on a double or triangular mounting bracket.

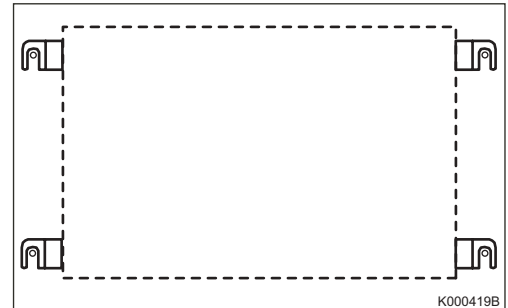
This section describes how to mount the external EHCU on a wall, a pole, or a mast.

#### 6.1.1 Mounting on a Wall or other Flat Surface

To mount the external EHCU on a wall or other flat surface, perform the following steps:

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1. Use the footprint of the combiner to mark the positions of the screw holes. Mount the combiner with four suitable screws (diameter < 6 mm).

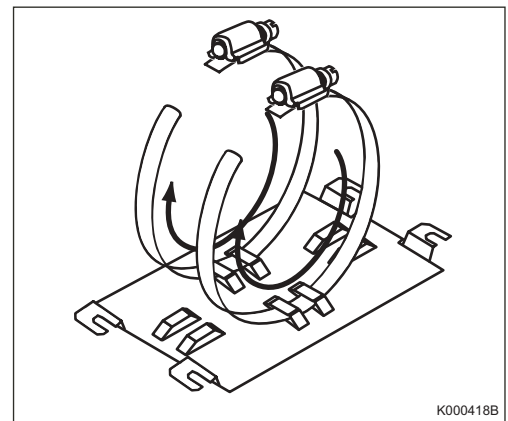


### 6.1.2 Mounting on a Pole or a Mast

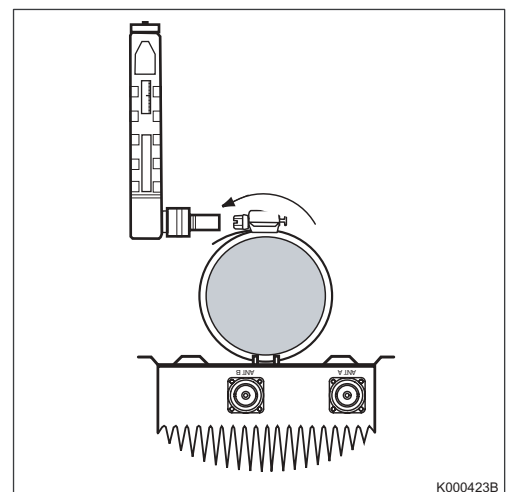
To mount the external EHCU on a pole or a mast, perform the following steps:

1. Enter the free ends of the clamps into the openings in the mounting bracket and pass them through as shown. The diameter of the pole may vary between 40 and 160 mm.

**Note:** The two pieces of pole clamps must be ordered separately.



2. Apply the clamps around the pole. Insert the free end of the clamp into and through the screw-nipple. Tighten the screw to 5.5 Nm.



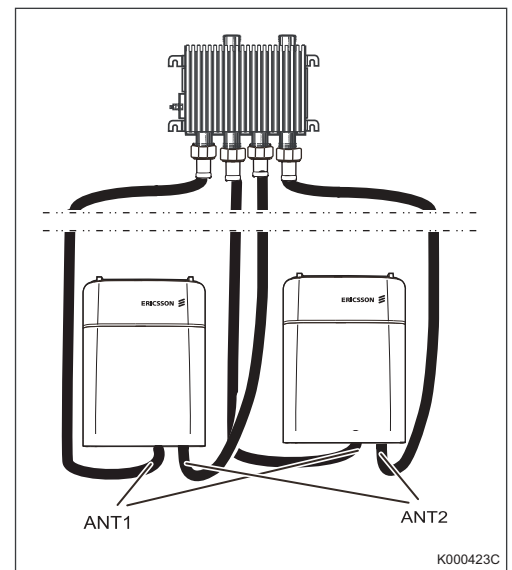
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## 6.2 Connecting Cables

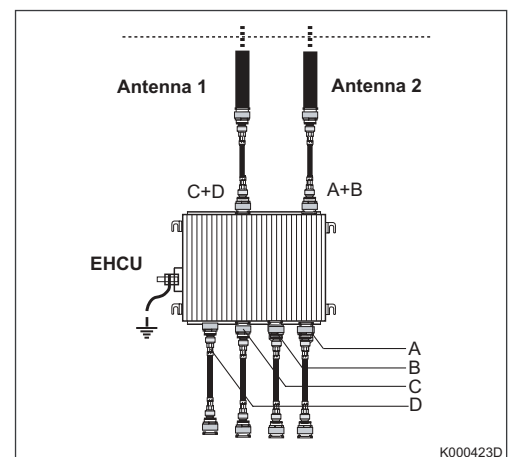
This section describes how to connect the cables from the EHCU to the RRU-Ns and the antennas.

**Note:** The cable connections are various depend on different configurations. See the document RF Connections for more information. The following shows one configuration as an example.

1. Connect four jumper cables between the RRU-Ns and the EHCU. Tighten them to a torque of 25 Nm, using a torque wrench.



2. Install the two jumper cables to the EHCU antenna connectors.



## 7 Performing Concluding Routines

This chapter describes the routines to be completed before leaving the site.

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**Note:** Ericsson strongly advises that when cleaning up after installing the RBS, the personnel performing the installation pay particular attention to the environment. Primarily, recycle all waste materials that can be recycled and sort waste so that it can be disposed of according to local regulations.

Table 2 Objects to Be Recycled or Disposed of After RBS Installation

Item	Sort or Recycle?
Cable insulation from crimping, brazing or welding	Sorted with plastics
Packing chips	
Foam	
Polystyrene	
Bubble plastic	
Cable tie clippings	
Paper and wood	Paper recycling
Waste metal from cable ladders	Recycled or sorted as metals
Pieces of cable	
Nuts, bolts, washers and screws	

**Note:** All packing material should be recycled, and shock absorbers disposed of, in accordance with local recycling regulations.

## 7.1

### Updating the Site Installation Documentation

**Note:** Any deviations from the information in the Site Installation Documentation that have occurred during the installation phase (for example, floor plans or site configurations) must be documented and sent to the person responsible for Site Installation Engineering.

1. Check the *Site Installation Documentation* for deviations from the installation.
2. Update the documents with the changes that apply.
3. Send the documents to the person responsible for Site Installation Engineering.

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## 7.2 Performing Final Checks

Before leaving the site, make sure that the following tasks have been completed:

Table 3 Checklist

Check the following:	OK
1. All cables are properly routed and connected.	
2. All sunshields are properly installed.	
3. The site is clear of waste materials.	
4. The Site Installation Documentation is updated.	
5. The modified Site Installation Documentation has been handed over to the person responsible for the site.	
6. The RBS is powered up if the surrounding temperature changes between hot and cold and the RBS installation is not completed within 48 hours.	

## 8 Verifying the Installation

To verify the RBS installation, follow the instructions in the document Verifying RBS Installations at Site.