



RRU3808 V200

Installation Guide

Issue: 04

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HUAWEI TECHNOLOGIES Co., Ltd.



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Safety Information

■ Following All Safety Precautions

Before any operation, read the instructions and precautions in this document carefully to minimize the possibility of accidents.

The Danger, Caution, and Note items in the documents do not cover all the safety precautions that must be followed. They only provide the generic safety precautions for operations.

When operating Huawei products and equipment, you must comply with safety precautions and special safety instructions related to corresponding equipment provided by Huawei. The safety precautions in the document are related to only Huawei products. Huawei is not liable for any consequence that results from the violation of universal regulations for safety operations and safety codes on design, production, and equipment use.

■ Complying with the Local Safety Regulations

When operating the device, comply with the local safety regulations. The safety precautions provided in the documents are supplementary.

■ Qualified Personnel Only

The personnel in charge of installation and maintenance must be trained and master the correct operating methods and safety precautions before beginning work.

■ Symbols

| | |
|---|--|
|  DANGER | <i>Indicates a hazard with a high level of risk, which if not avoided, will result in death or serious injury.</i> |
|  WARNING | <i>Indicates a hazard with a medium or low level of risk, which if not avoided, could result in minor or moderate injury.</i> |
|  CAUTION | <i>Indicates a potentially hazardous situation, which if not avoided, could result in equipment damage, data loss, performance degradation, or unexpected results.</i> |
|  TIP | <i>Indicates a tip that may help you solve a problem or save time.</i> |
|  NOTE | <i>Provides additional information to emphasize or supplement important points of the main text.</i> |

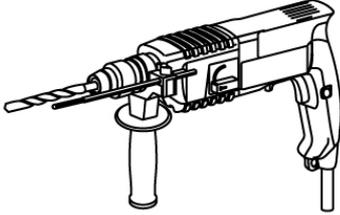
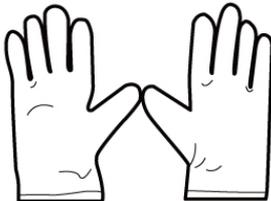
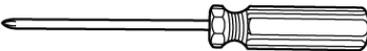
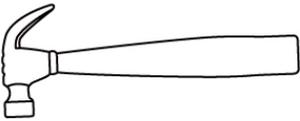
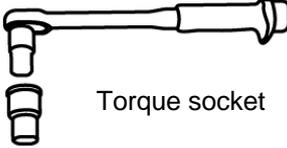
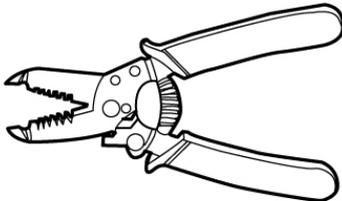
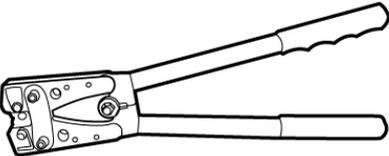
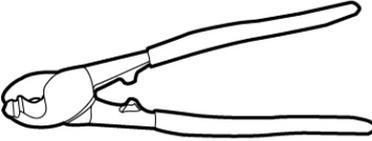
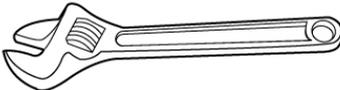
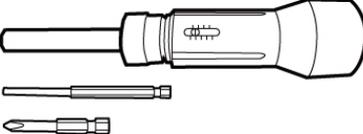
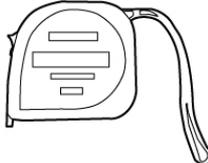
■ Safety of Personnel

- The high voltage power supply provides power for running the system. Direct contact with the high voltage power supply or contact through damp objects may result in fatal danger.
- Non-standard and improper high voltage operations may result in fire and electric shock.
- In a thunderstorm, do not perform operations on high voltage and AC power supply facilities or on a steel tower and mast.
- Ground the device before powering on the device. Otherwise, the personnel and device are in danger.
- Power off the device before performing operations on the power supply equipment.
- High power radio-frequency signals are harmful to human body. Before installing or maintaining an antenna on a steel tower or mast with a large number of transmitter antennas, the operator should coordinate with all parties to ensure that the transmitter antennas are shut down.
- When handling optical fibers, do not stand close to, or look into the optical fiber outlet with unaided eyes.
- Protect yourself when drilling holes. Flying dust may hurt your eyes or you may inhale the dust.
- Power off the batteries before connecting the cables to the batteries. Otherwise, casualties may occur.
- When working at a height, be cautious about falling objects.

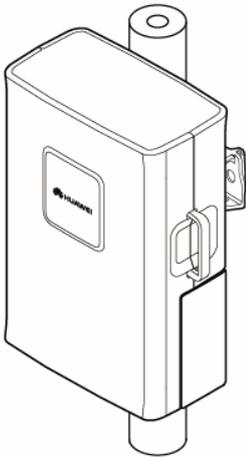
■ Device Safety

- Check the electrical connection of the device before operation and ensure that the device is reliably grounded.
- The static electricity generated by the human body may damage the electrostatic sensitive components on the circuit board, such as the large-scale integrated circuit (LIC). Wear an electrostatic discharge (ESD) wrist strap or ESD gloves when performing the operation.
- When working on batteries, take measures to prevent short circuits in the batteries and electrolyte spill/loss. The electrolyte may erode metal and boards, or even cause rust of the equipment or short circuits in the boards.
- When the equipment is unpacked, it must be powered on in 24 hours. The maximum duration of the power-off state of the equipment is 24 hours during maintenance.

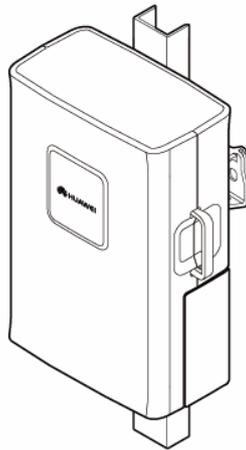
Installation Tools

| | | |
|---|---|---|
|  <p>Hammer drill (with bit 14)</p> |  <p>ESD gloves</p> |  <p>Vacuum cleaner</p> |
|  <p>Heat gun</p> |  <p>Phillips screwdriver (M3~M6)</p> |  <p>Flat-head screwdriver (M3~M6)</p> |
|  <p>Claw hammer</p> |  <p>Knife</p>  <p>Torque socket</p> |  <p>Wire stripper</p> |
|  <p>Power cable crimping pliers</p> |  <p>Wire cutter</p> |  <p>Adjustable wrench (with the diameter of at least 32 mm)</p> |
|  <p>Torque wrench</p>  <p>Level</p> |  <p>Torque screwdriver</p> |  <p>Combination wrench (21mm~21mm) for pole installation (17mm~17mm) for wall installation</p> |
|  <p>Multimeter</p> |  <p>Marking pen (with the diameter of no more than 10 mm)</p> |  <p>Measuring tape</p> |

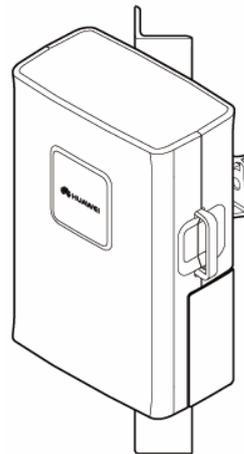
Installation Options



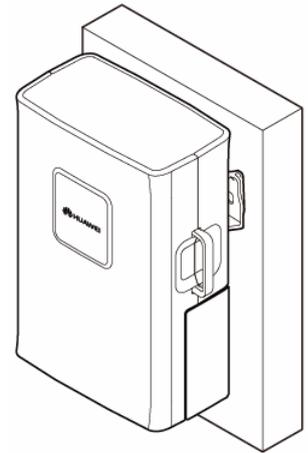
On a metal pole



On a U-steel

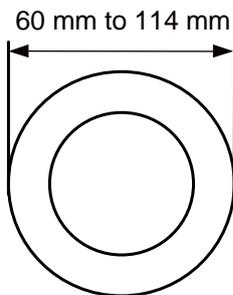


On an angle steel

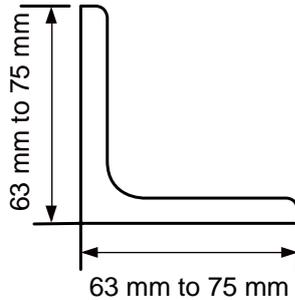


On a wall

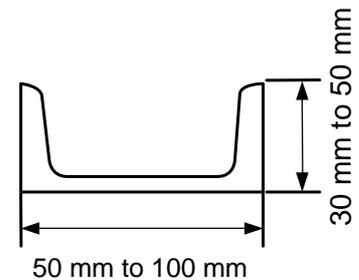
The following figure describes the specifications for the metal pole, angle steel, and U-steel where the RRU is installed.



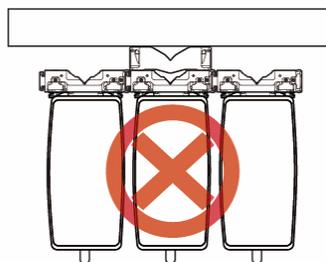
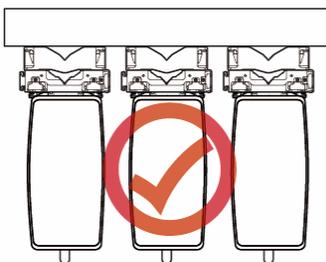
Metal pole



Angle steel

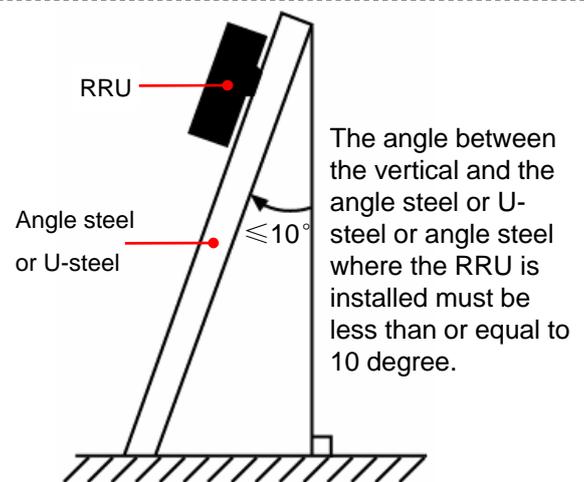


U-steel



WARNING

The brackets cannot be combined when the RRUs are installed on the wall.

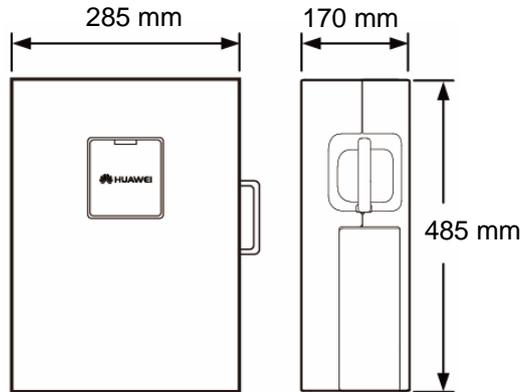


WARNING

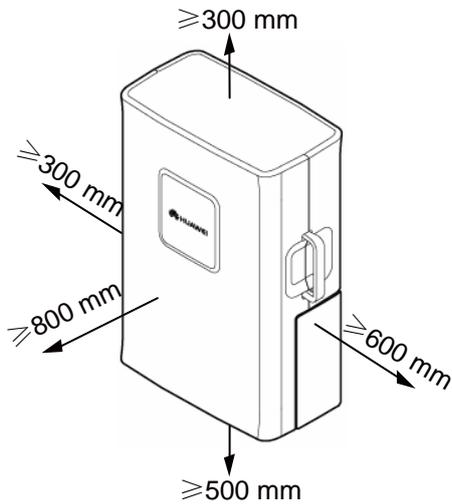
- A maximum of two RRUs can be installed on a metal pole with a diameter of 60 mm to 75 mm, and the installation mode must be standard mode. Three or more RRUs must be installed on a metal pole with a diameter of 76 mm to 114 mm in a centralized way.
- It is recommended that only one RRU be installed on a U-steel or an angle steel.
- When installed on a tower, one RRU can be installed only in standard mode or reverse mode rather than side-mounted. Two RRUs cannot be installed in back-to-back mode.

Dimensions and Installation Clearance

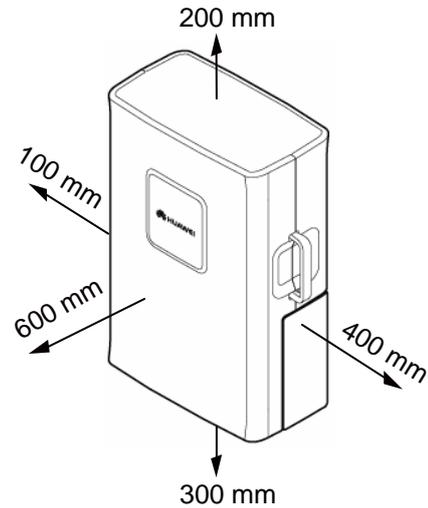
a Dimensions of the RRU



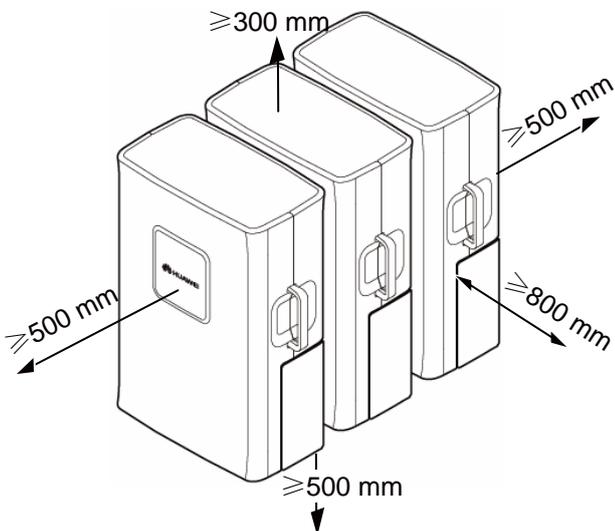
b Recommended Clearance for a Single RRU



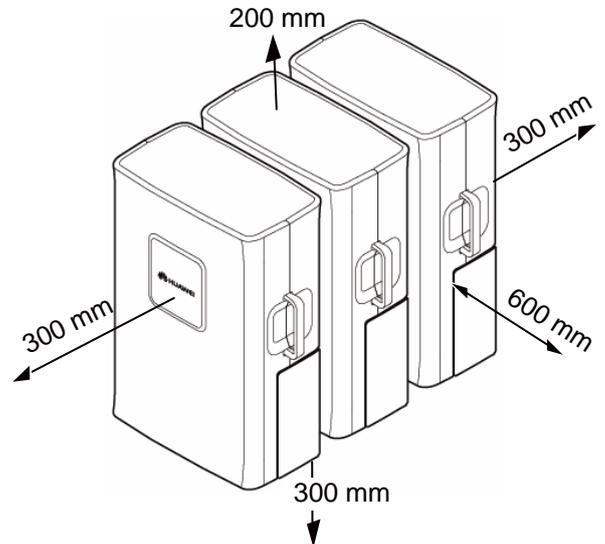
c Minimum Clearance for a Single RRU



d Recommended Clearance for Multiple Centralized RRUs



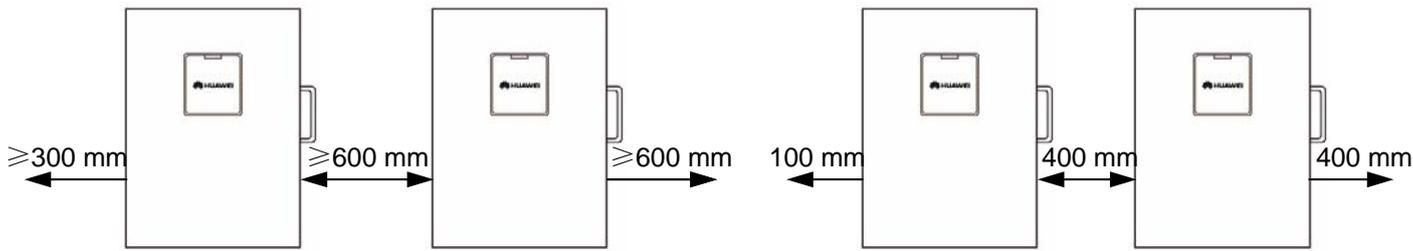
e Minimum Clearance for Multiple Centralized RRUs



Dimensions and Installation Clearance

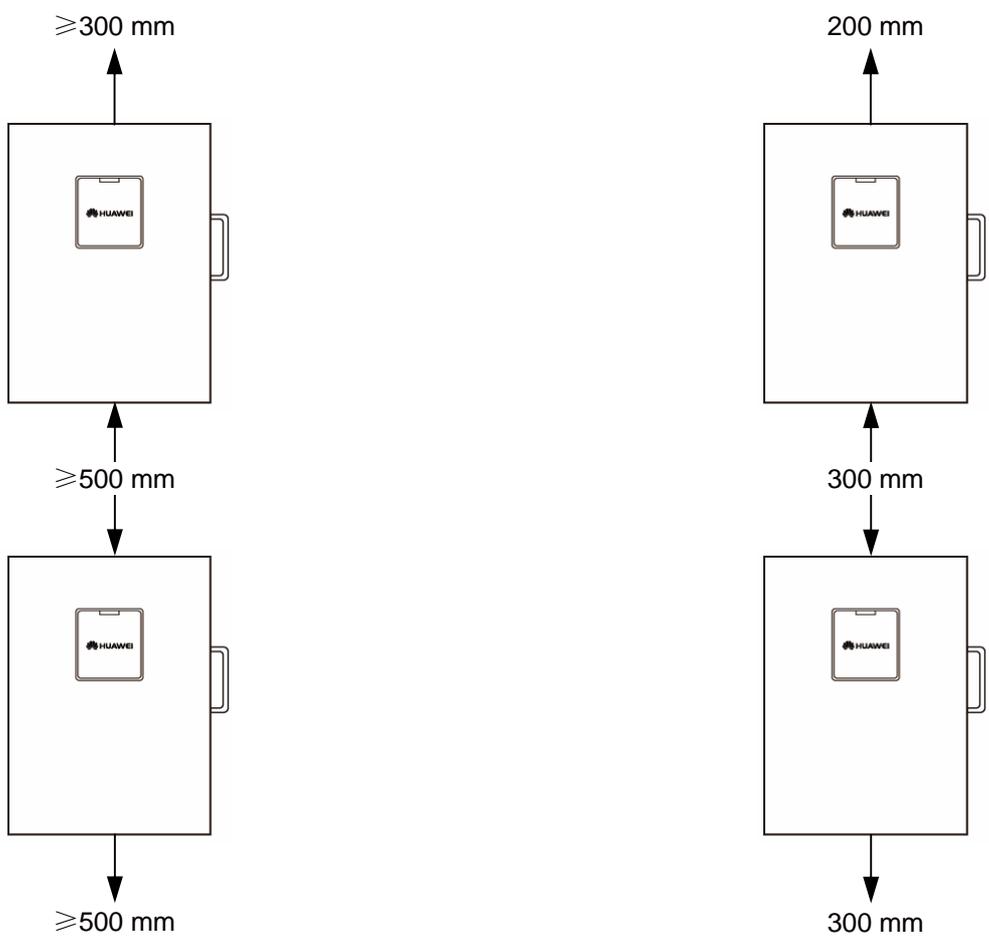
f Recommended Horizontal Spacing for Two RRUs Installed in Parallel

g Minimum Horizontal Spacing for Two RRUs Installed in Parallel

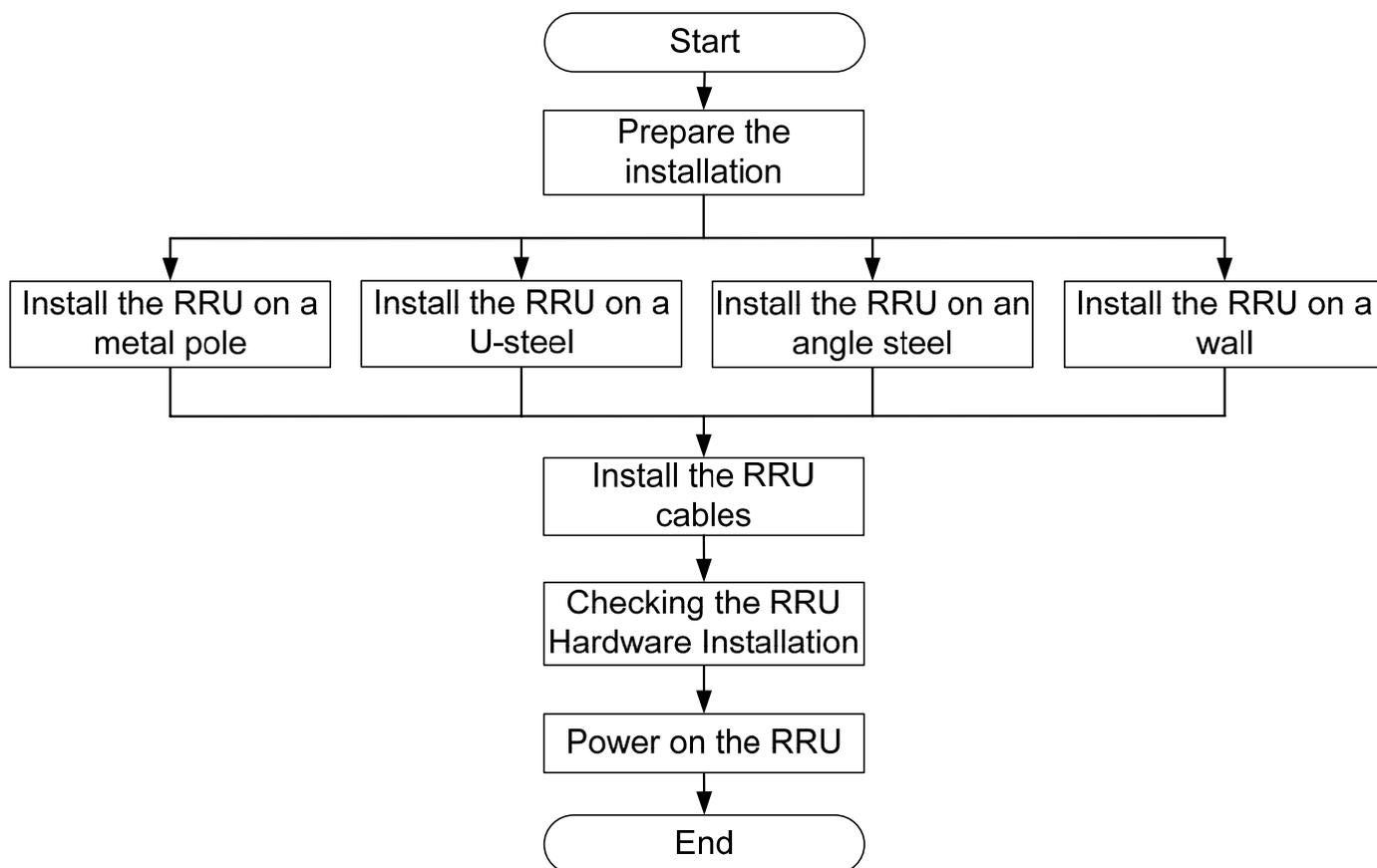


h Recommended Vertical Spacing for Two RRUs Installed in Parallel

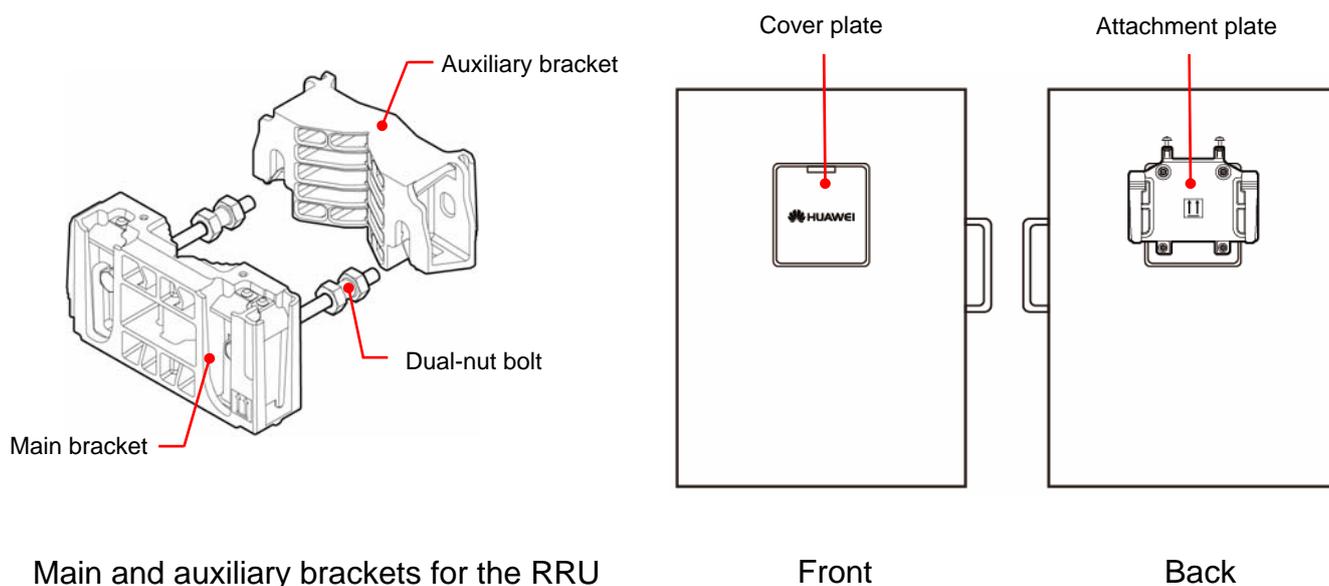
i Minimum Vertical Spacing for Two RRUs Installed in Parallel



Installation Procedure



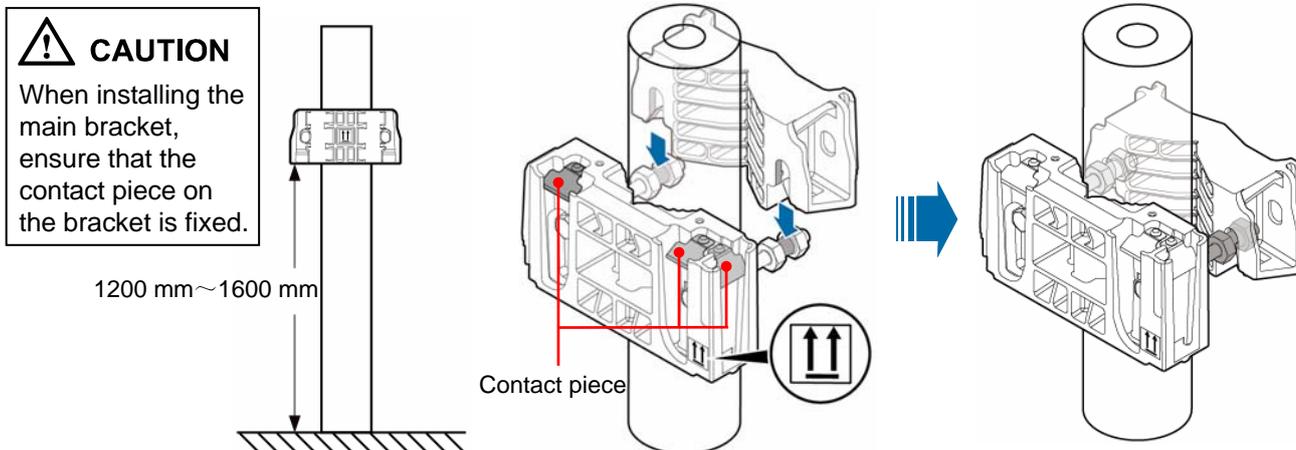
Preparing the Installation



Installing the RRU on a Metal Pole

a Installing a Single RRU on a Metal Pole

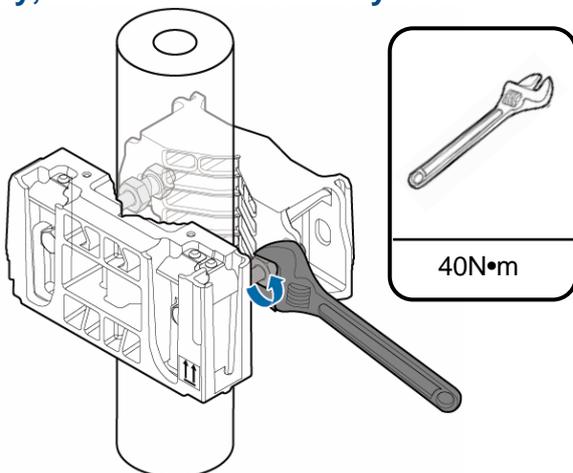
1. Install the main bracket.



TIP

You may fit one end of the auxiliary bracket on one dual-nut bolt assembly and then the other end on the other dual-nut bolt assembly during the installation.

2. Use an adjustable wrench to tighten the nut until the fastening torque is 40 N·m. In this way, the main and auxiliary brackets are secured on the pole.



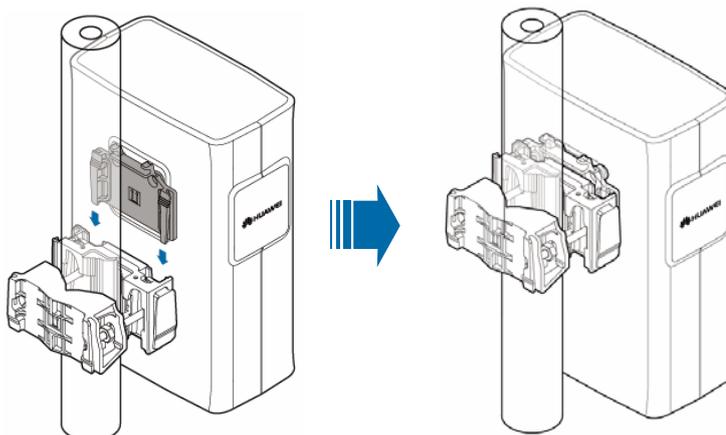
CAUTION

Fasten the two dual-nut bolt assemblies alternatively. After the brackets are secure, use a tape to measure the spacing between the main bracket and the auxiliary bracket at the two sides and ensure that the spacing is the same.

3. Install the RRU on the main bracket. When you hear click sound, you can infer that the RRU is in position.

CAUTION

- The weight-bearing capacity of the RF ports at the bottom of the RRU is low. Do not place the RRU at its bottom.
- During the operation, place the foam pad or cardboard under the RRU to prevent any damage to the housing of the RRU.

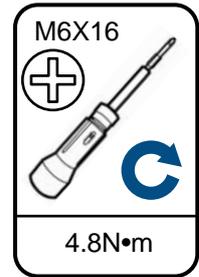
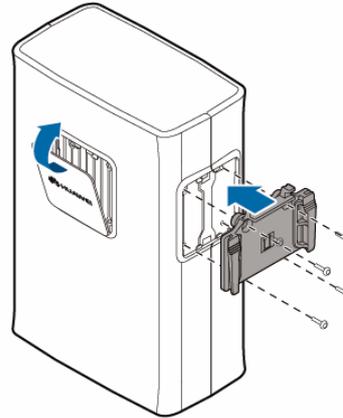
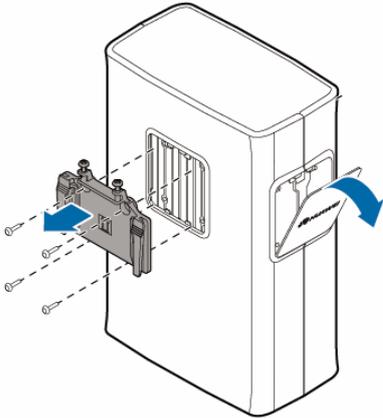


Installing the RRU on a Metal Pole

C Installing Multiple RRUs in Centralized Mode

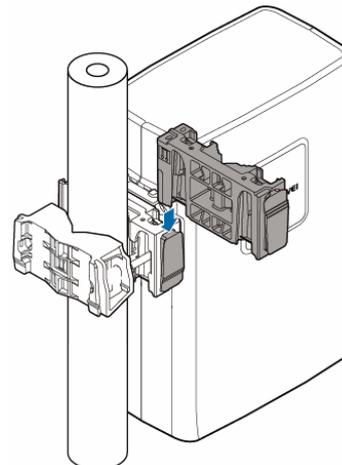
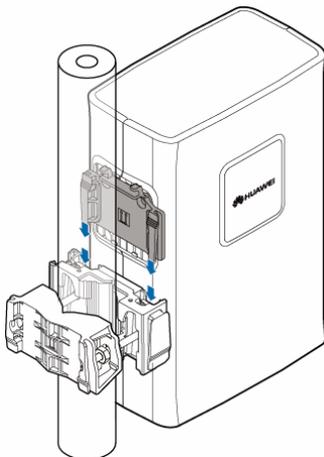
1. Install the main fixture and the auxiliary fixture. For details, see page 8 [Installing a Single RRU in Ordinary Mode](#).

2. Relocate the attachment plate.



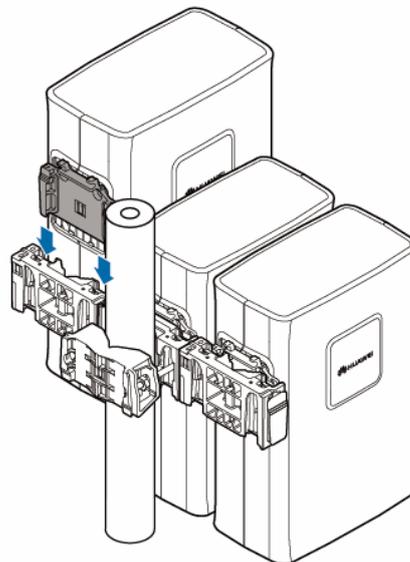
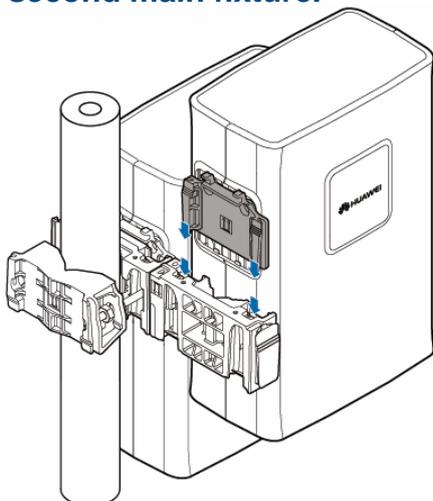
3. Fit the tabs on the attachment plate of the RRU into the anchor slots on the main fixture.

4. Install the second main fixture.



5. Fit the tabs on the attachment plate of the second RRU into the anchor slots on the second main fixture.

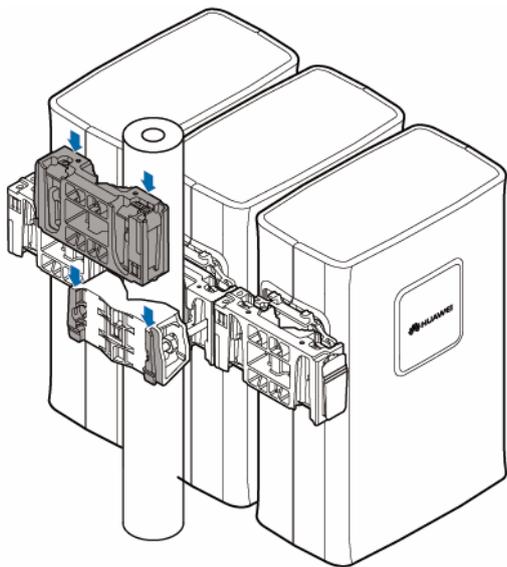
6. Install the third RRU.



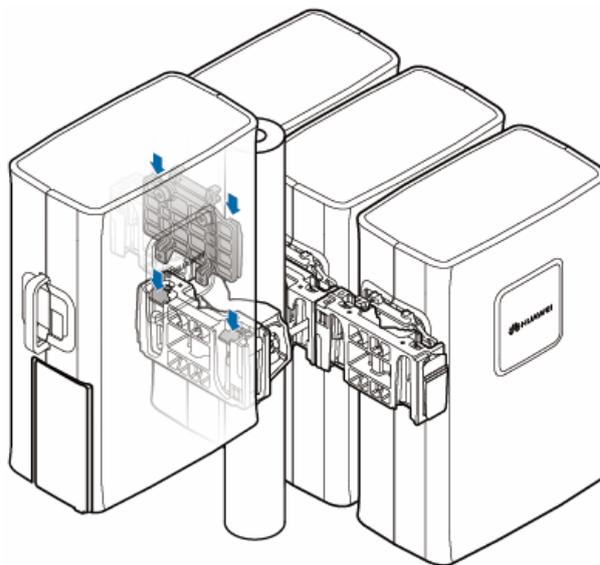
Installing the RRU on a Metal Pole

C Installing Multiple RRUs in Centralized Mode

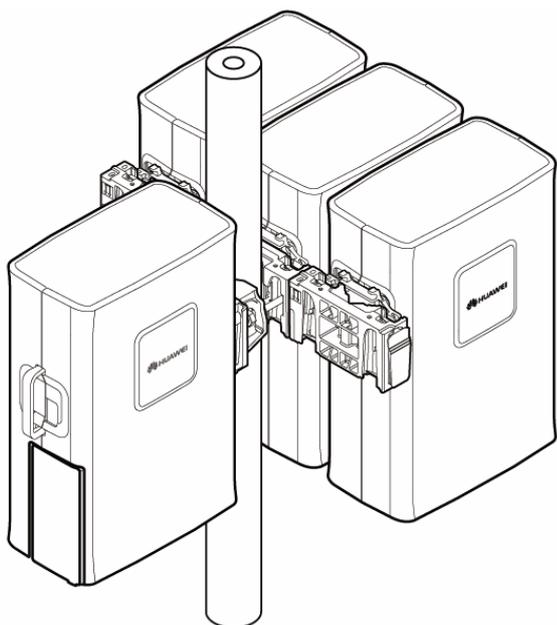
7. Install the fourth main fixture.



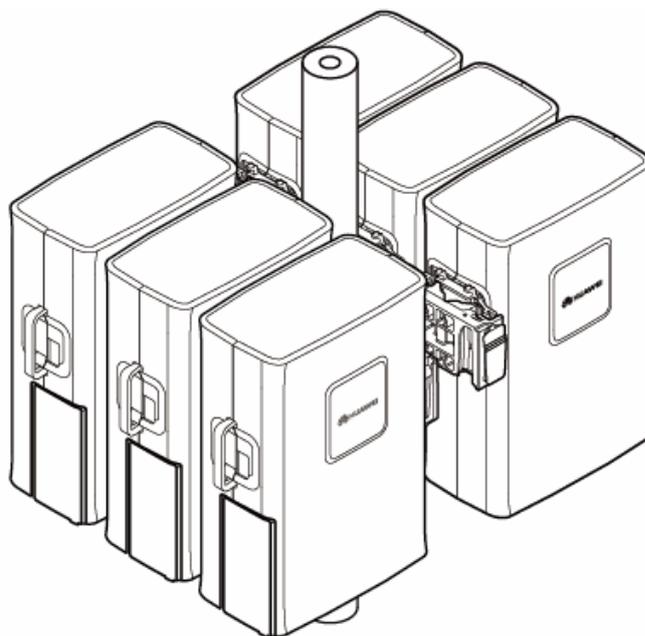
8. Fit the tabs on the attachment plate of the fourth RRU into the anchor slots on the fourth main fixture.



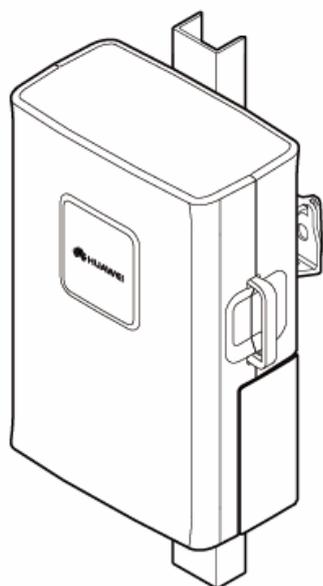
9. Four RRUs installed in centralized mode.



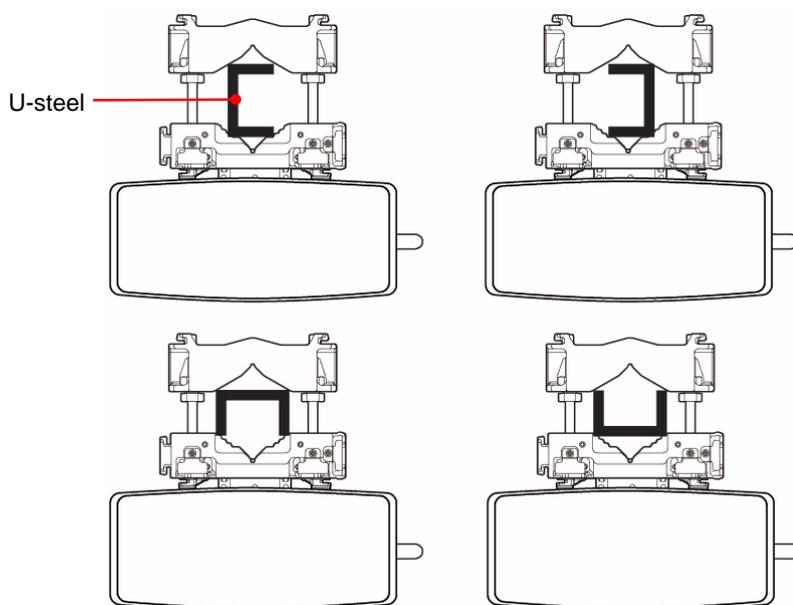
10. Six RRUs installed in centralized mode.



Installing the RRU on a U-Steel



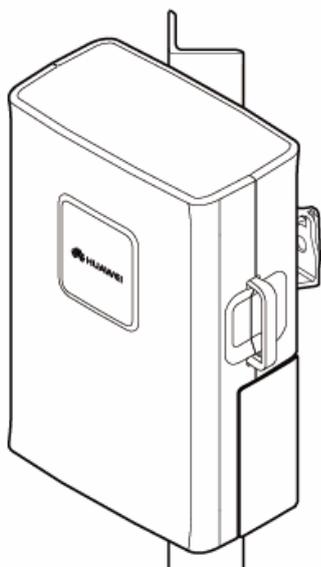
Plan view



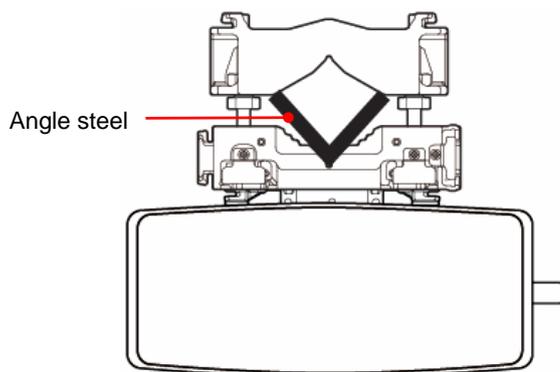
NOTE

- The procedure for installing the RRU on a U-steel is the same as that for installing the RRU on a metal pole.
- It is recommended that only one RRU be installed on a U-steel.

Installing the RRU on an Angle Steel



Plan view

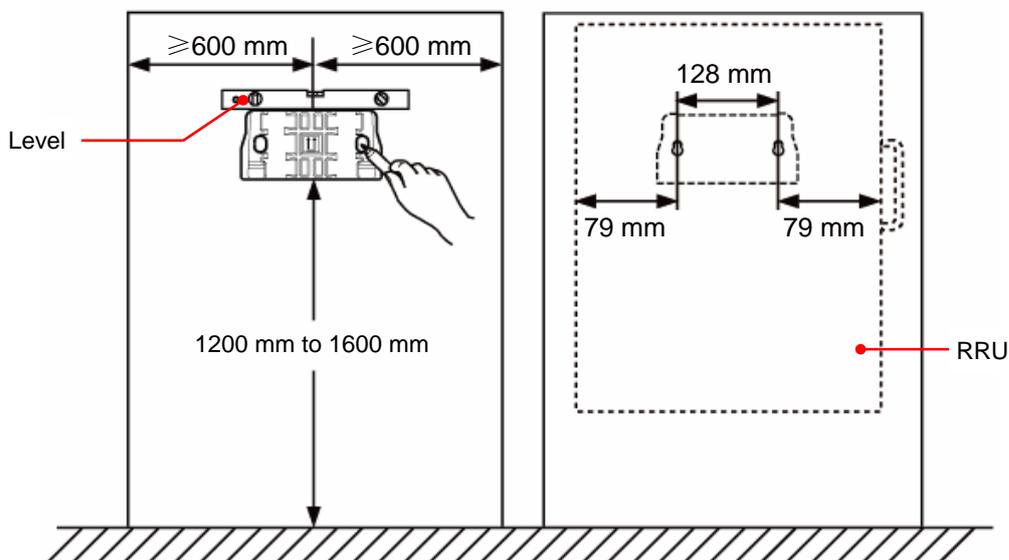


NOTE

- The procedure for installing the RRU on an angle steel is the same as that for installing the RRU on a metal pole.
- It is recommended that only one RRU be installed on an angle steel.

Installing the RRU on a Wall

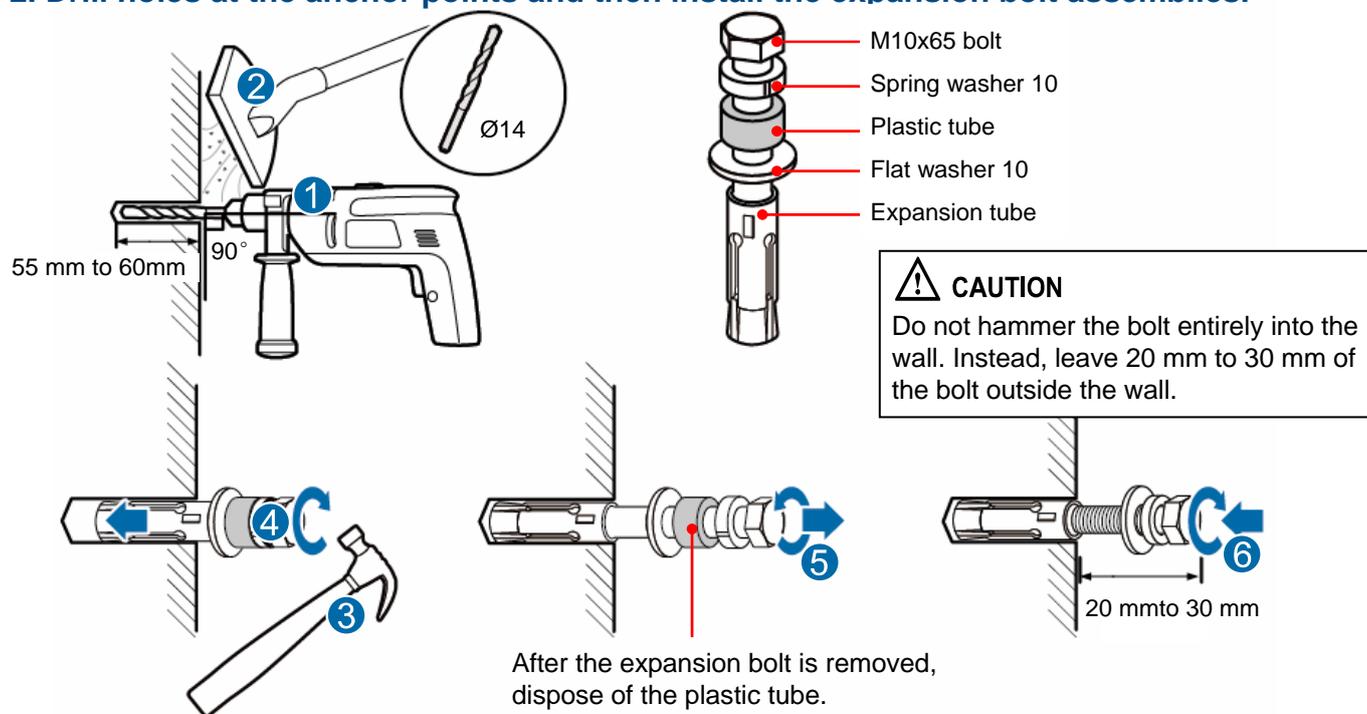
1. Place the auxiliary bracket at the installation position. Use a level to check that the auxiliary bracket is placed horizontally. Then, mark the anchor points by using a marking pen.



NOTE

- It is recommended that the auxiliary bracket be 1,200 mm to 1,600 mm above the ground.
- The RRUs cannot be installed on a wall in centralized mode. Therefore, expansion bolt assemblies should be prepared for each RRU.

2. Drill holes at the anchor points and then install the expansion bolt assemblies.



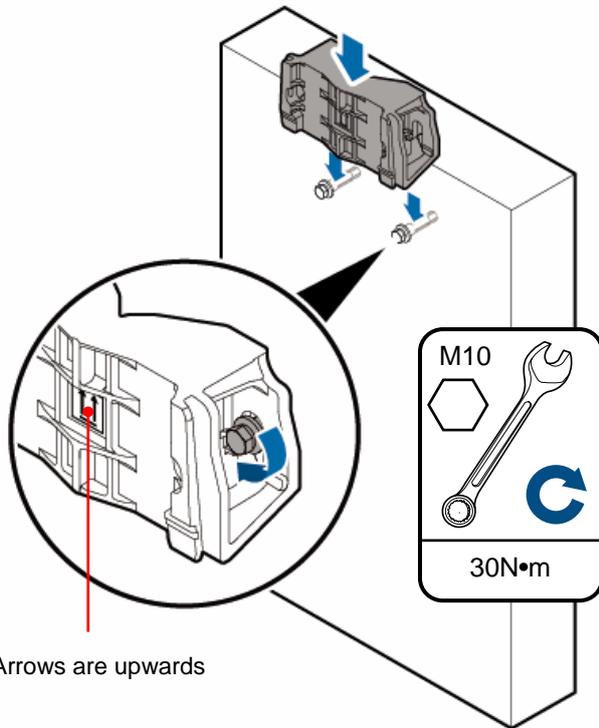
NOTE

When the RRU is installed on a wall, the requirements are as follows:

- For one RRU, the wall has a weight-bearing capacity of 76 kg.
- The fastening torque of the expansion bolt reaches 30 N·m, the expansion bolt works properly, and no damages such as cracks are on the wall.

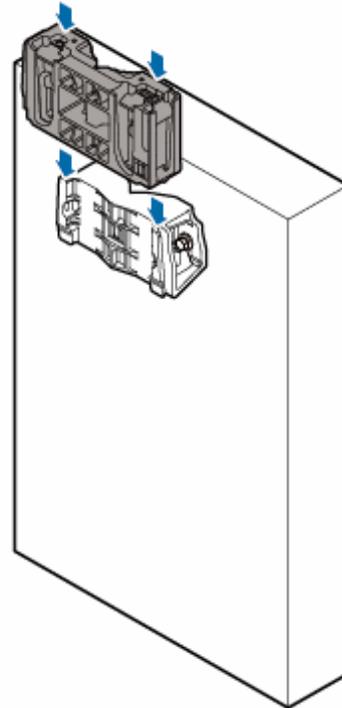
Installing the RRU on a Wall

3. Fit the auxiliary bracket on the expansion bolts downward, and then tighten the bolts by using a combination wrench 17 mm.

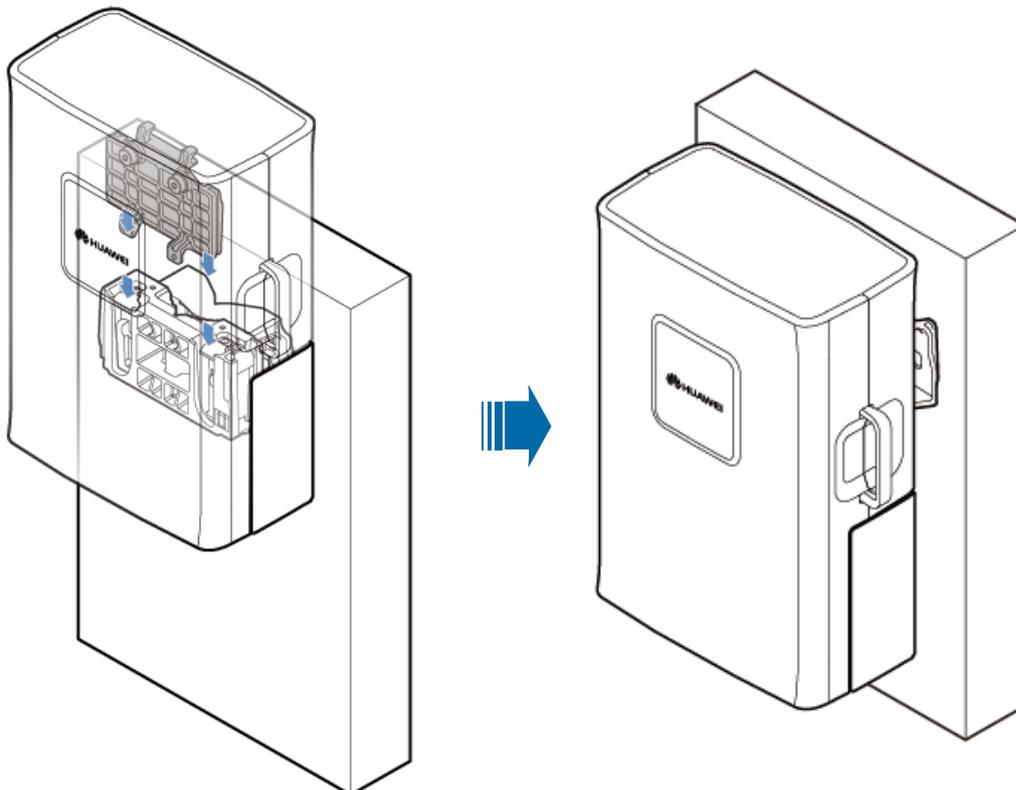


Arrows are upwards

4. Install the main bracket.



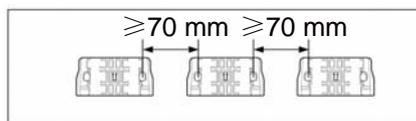
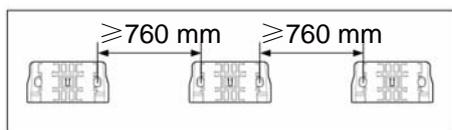
5. Install the RRU.



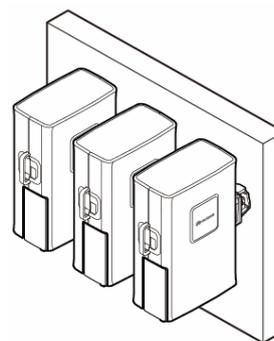
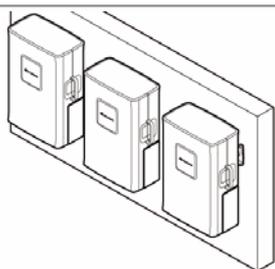
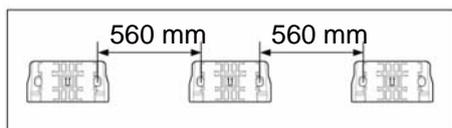
Installing the RRU on a Wall

6. Install multiple RRUs.

Recommended Clearance :



Minimum Clearance:



Installing the RRU Cables

a RRU Cable Connections

Cable List

| Cable | Connector Type | Connector to... |
|--|--------------------------------|---|
| a PGND cable (16mm ²) | OT terminal (M6) | Grounding bolt on the RRU |
| | OT terminal (M8) | Nearest grounding bar |
| b RRU RF jumper | DIN male connector | Ports labeled ANT_TX/RXA and ANT_TX/RXB on the RRU (Only the ANT_TX/RXA port supports the OOK signal). |
| | DIN male connector | Feeder or antenna |
| c DC RRU power cable (North American standard: 3.3 mm ² European standard: 4 mm ²) | Two OT terminals (M4) | The blue OT terminal is connected to socket labeled NEG(-)0 in the RRU cabling cavity. And the black OT terminal is connected to socket labeled RTN(+).0. |
| | Bare wire | External power supply |
| d CPRI optical cable | DLC connector | The connectors labeled 1A and 1B are connected to the optical module on the port labeled CPRI_W on the RRU |
| | DLC connector | The connectors labeled 2A and 2B are connected to port labeled CPRI0, CPRI1 or CPRI2 on the LBBP board of the BBU. |
| e AISG multi-wire cable between the RRU and the RCU | Waterproof DB9 connector | Port labeled RET/MON on the RRU |
| | Standard AISG female connector | Standard AISG male connector of the AISG extension cable or RCU |
| f AISG extended cable between the RRU and the RCU | Standard AISG male connector | Standard AISG female connector of the AISG multi-wire cable |
| | Standard AISG female connector | Standard AISG male connector of the RCU |

Installing the RRU Cables

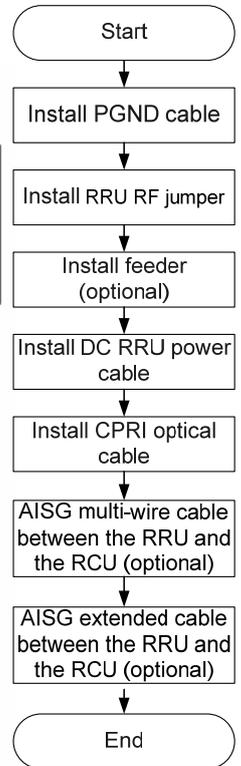
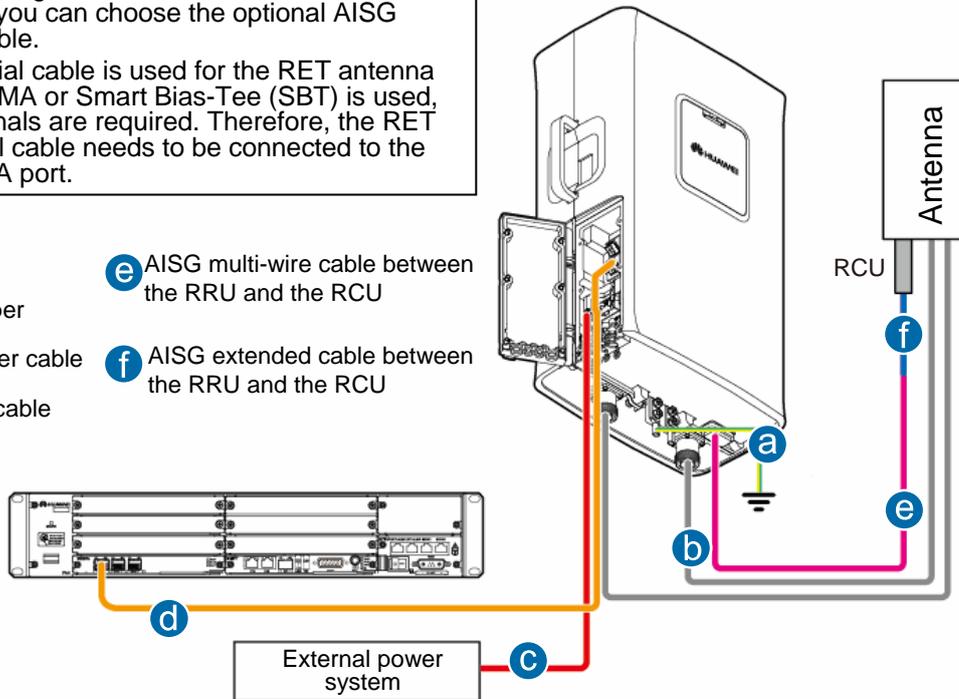
a RRU Cable Connections

Single RRU

NOTE

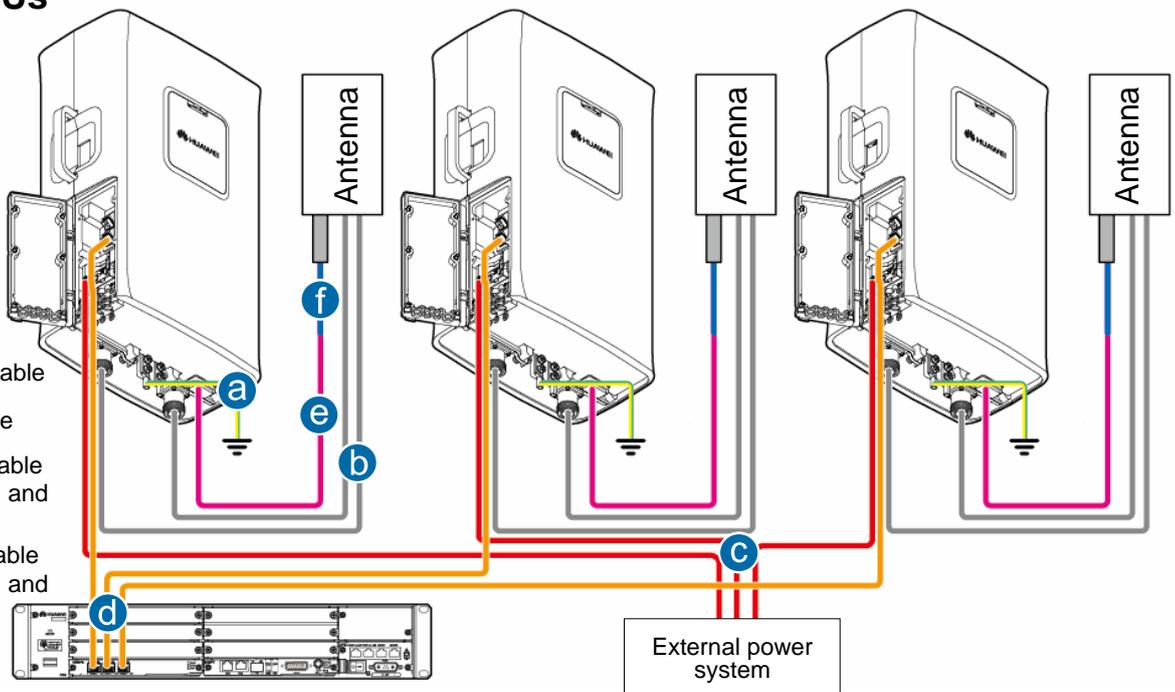
- When the length of the AISG multi-wire cable is not enough, you can choose the optional AISG extension cable.
- If the coaxial cable is used for the RET antenna when the STMA or Smart Bias-Tee (SBT) is used, the OOK signals are required. Therefore, the RET control signal cable needs to be connected to the ANT_TX/RXA port.

- a** PGND cable
- b** RRU RF jumper
- c** DC RRU power cable
- d** CPRI optical cable
- e** AISG multi-wire cable between the RRU and the RCU
- f** AISG extended cable between the RRU and the RCU



Multiple RRUs

- a** PGND cable
- b** RRU RF jumper
- c** DC RRU power cable
- d** CPRI optical cable
- e** AISG multi-wire cable between the RRU and the RCU
- f** AISG extended cable between the RRU and the RCU

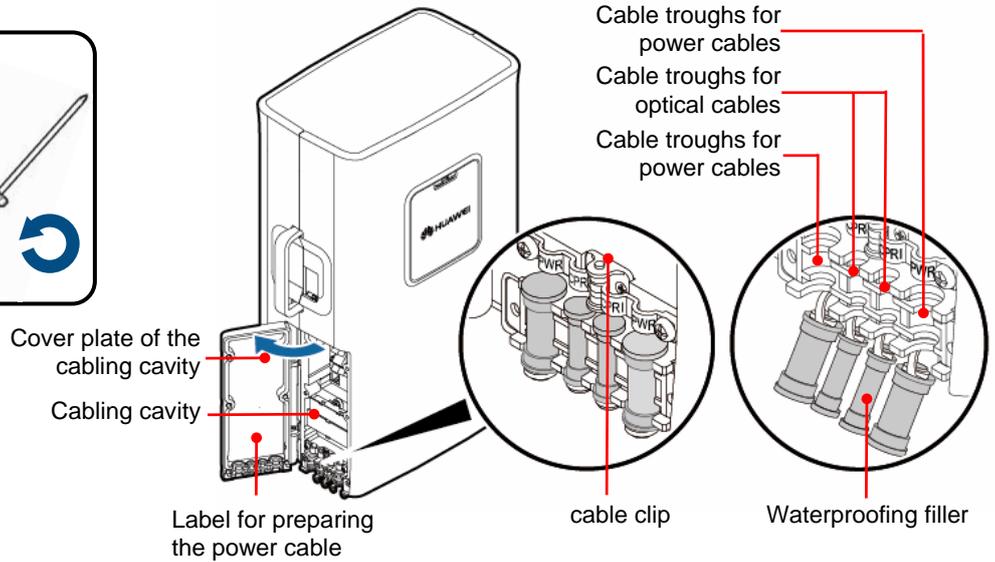
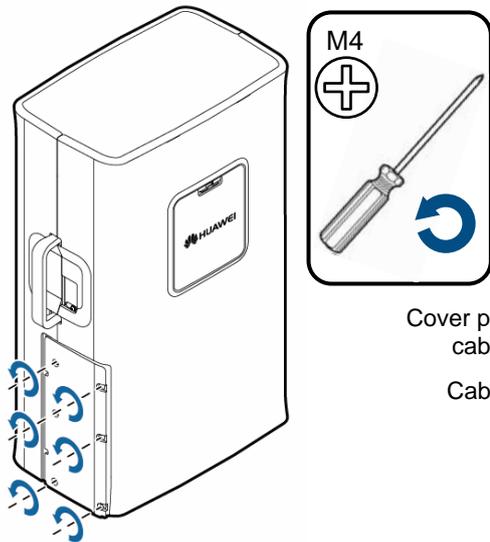


NOTE

For detail information of the cable, see [Cable List](#) on Page 15.

Installing the RRU Cables

b Opening the Cover Plate of the RRU Cabling Cavity



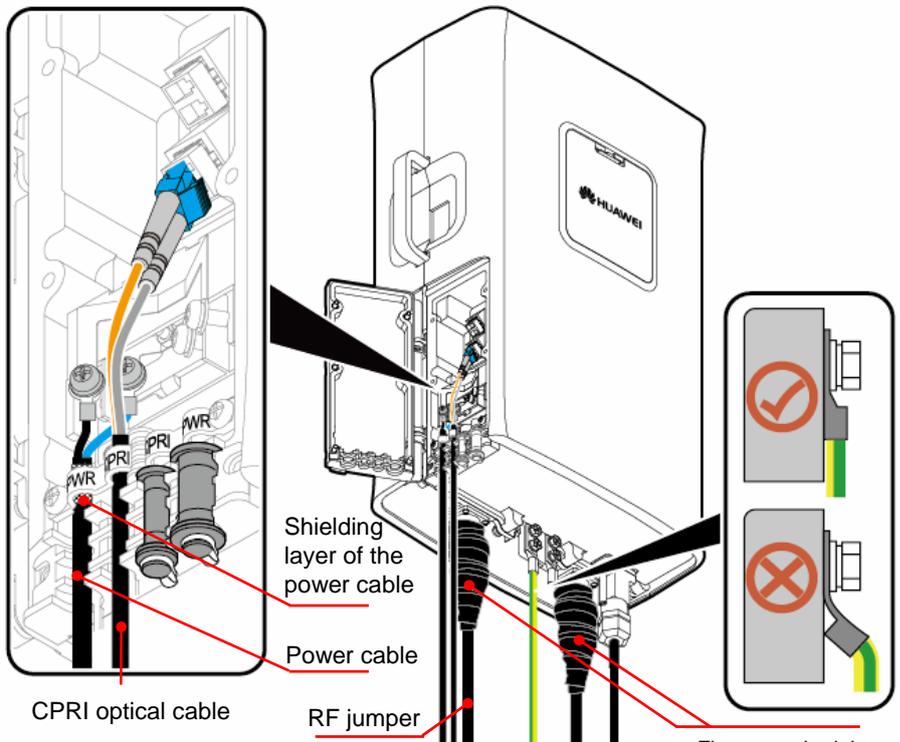
d Cable Connections on the RRU

CAUTION

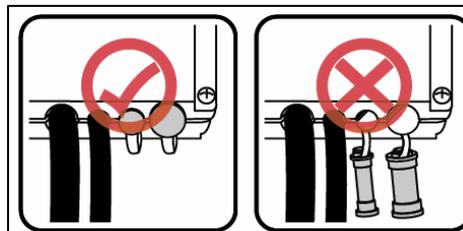
- Use the power cable clip to press the shielding layer tightly and ensure that the lower part of the shielding layer does not exceed the position shown in the preceding figure.
- Ground the shielding layer at the other end of the power cable.
- Do not remove the dustproof cap from the idle antenna port, and use the waterproof tape to wrap the joint.

NOTE

- For details on how to add OT terminals to the power cable of the RRU, see page 23 "Adding OT Terminals by Using a Wire Stripper."
- When wrapping the waterproof tape, apply even force to extend the tape until the width of the tape is 1/2 of the original width.
- Wrap the joint spirally upward, downward, and then upward again. In other words, the joint is wrapped by three layers of the tape. Ensure that the two immediate layers overlap with each other about half the width of the tape. For details, see page 25 "Waterproofing Outdoor Cables."
- Install the optical module before installing the optical cables. For details, see page 25 "Installing the Optical Module."



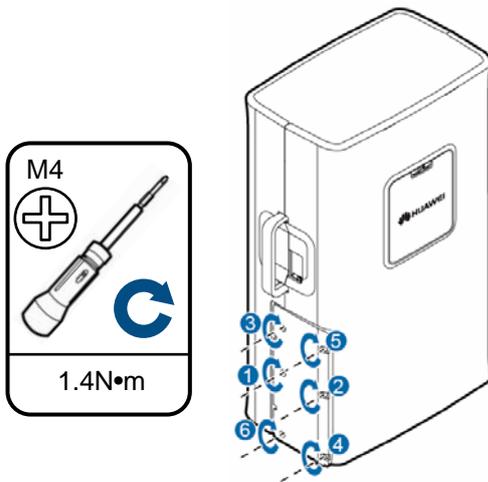
First wrap the joint with the waterproof tape, and then wrap the joint with the PVC insulating tape.



After the cables are installed on the RRU, insert the waterproofing fillers into the idle cable troughs.

Installing the RRU Cables

e Closing the Cover Plate of the RRU Cabling Cavity

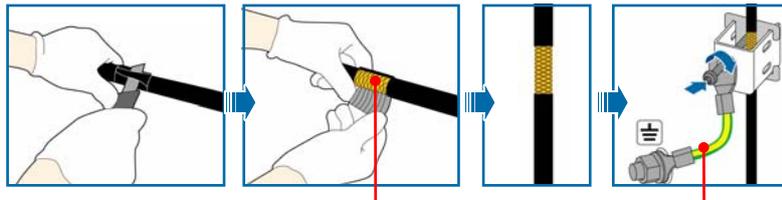


CAUTION

- The screws on the cover plate should be tightened until the fastening torque is 1.4 N·m.
- Tighten the screws on the cover plate of the cabling cavity in the sequence shown in the figure.

f RRU+APM30/APM30H (Ver.A)

Grounding the shielding layer of the power cable:

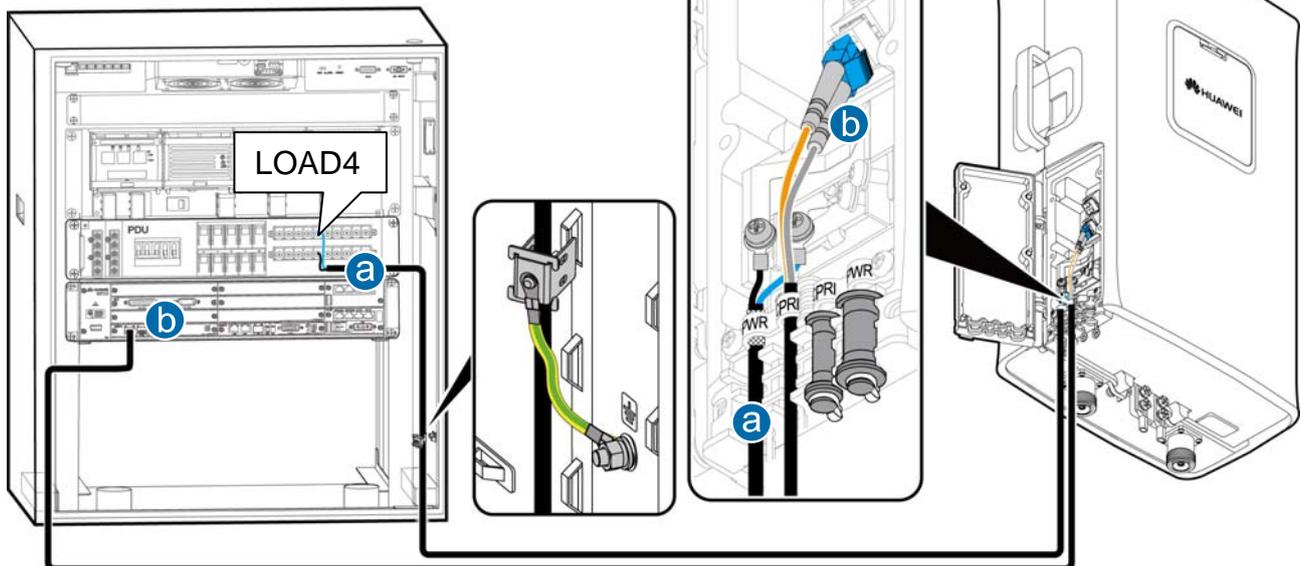


a DC RRU power cable

Metal Shielding layer (25 mm)

PGND cable

b CPRI optical cable



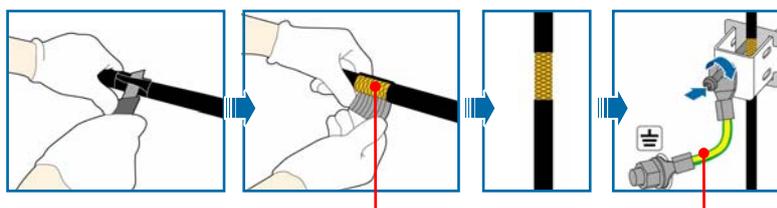
NOTE

- The DC RRU power cable is connected to one of the LOAD4 to LOAD9 terminals of the PDU.
- Strip the jacket of the DC RRU power cable for a small part, press the exposed shielding layer on the strap, and then connect the PGND cable on the strap to the nearest grounding bolt on the side in the APM30/APM30H(Ver.A).

Installing the RRU Cables

g RRU+APM30(+24V) / APM30H(Ver.B, +24V)

Grounding the shielding layer of the power cable:

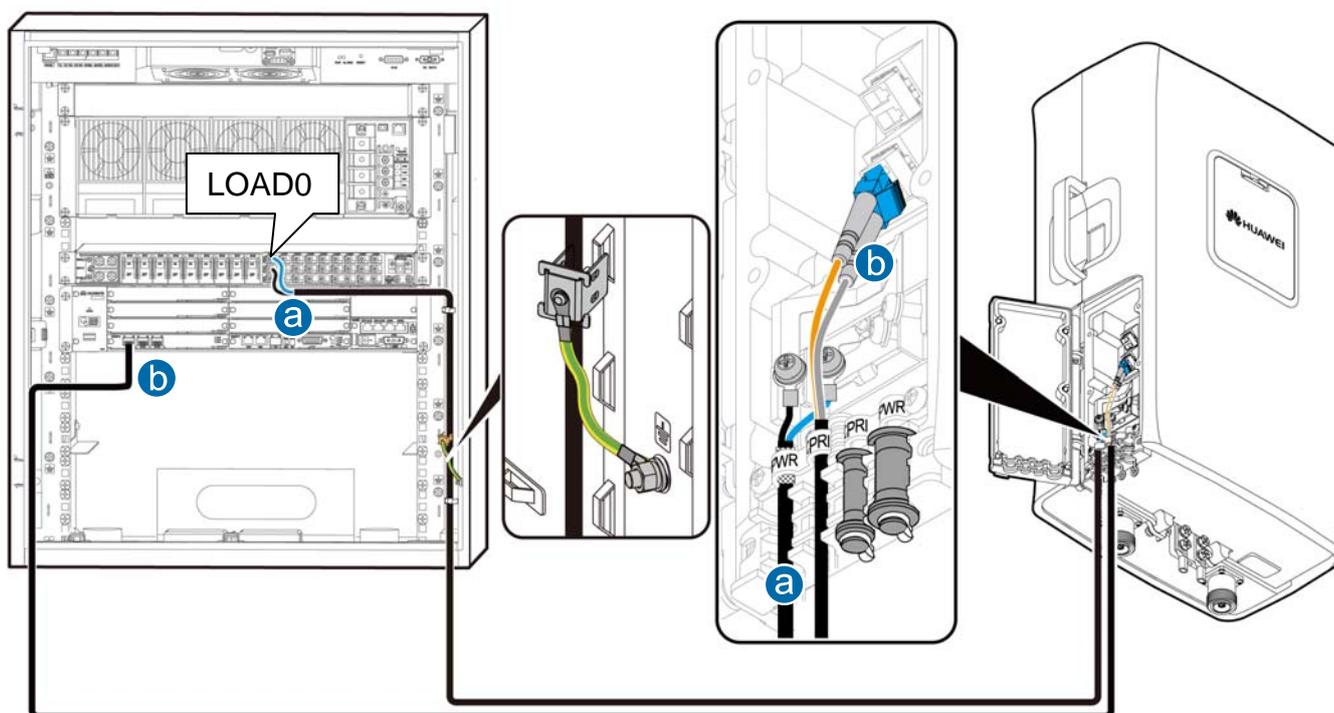


Metal Shielding layer (25 mm)

PGND cable

a DC RRU power cable

b CPRI optical cable



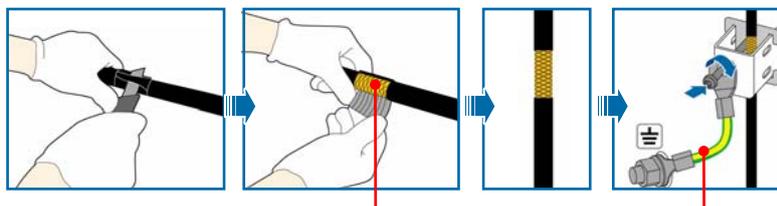
NOTE

- Strip the jacket of the DC RRU power cable for a small part, press the exposed shielding layer on the strap, and then connect the PGND cable on the strap to the nearest grounding bolt on the side in the APM30.
- The DC RRU power cable is connected to one of the LOAD0 to LOAD5 terminals of the DCDU-03B.

Installing the RRU Cables

h RRU+APM30H (Ver.B)

Grounding the shielding layer of the power cable:

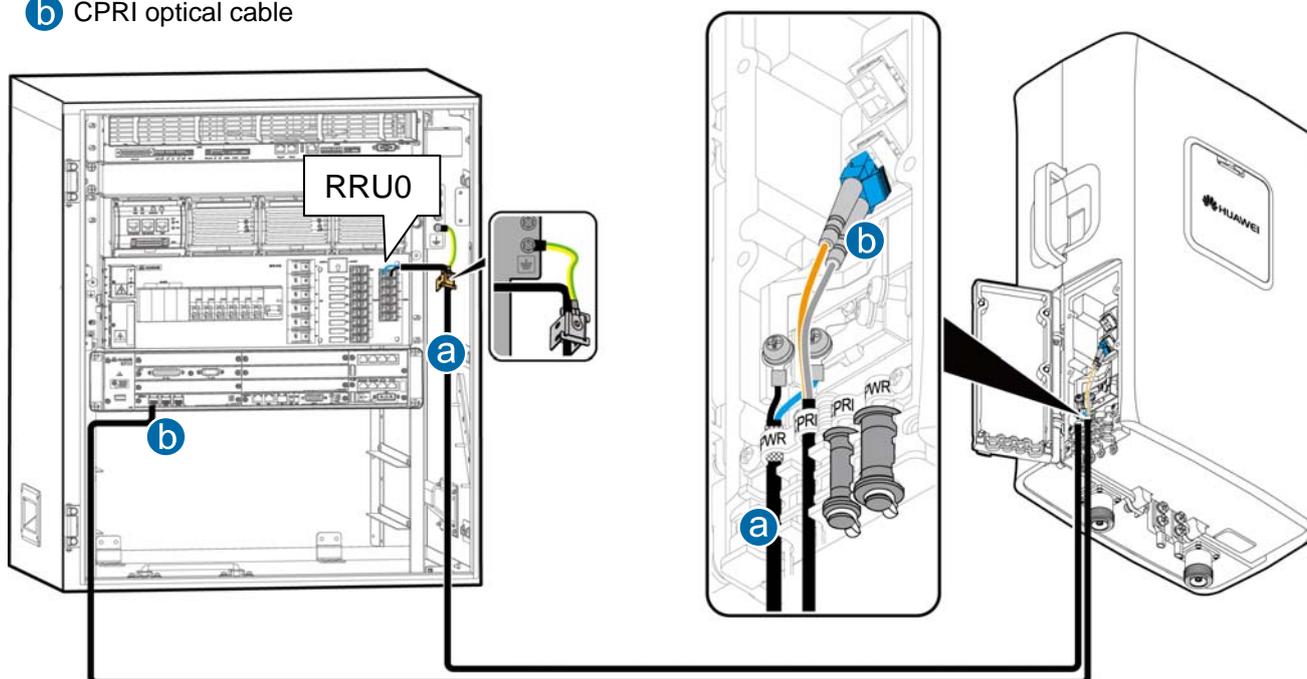


Metal Shielding layer (25 mm)

PGND cable

a DC RRU power cable

b CPRI optical cable



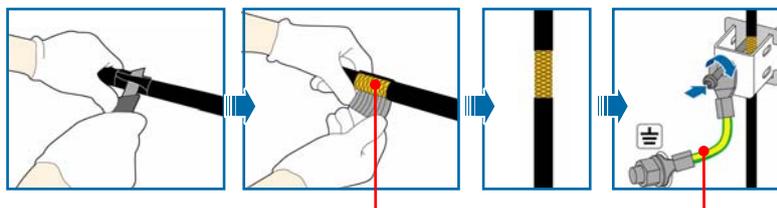
NOTE

- The DC RRU power cable is connected to one of the RRU0 to RRU5 terminals of the PDU.
- Strip the jacket of the DC RRU power cable for a small part, press the exposed shielding layer on the strap, and then connect the PGND cable on the strap to the nearest grounding bolt on the side in the APM30H(Ver.B).

Installing the RRU Cables

i RRU+TMC

Grounding the shielding layer of the power cable:

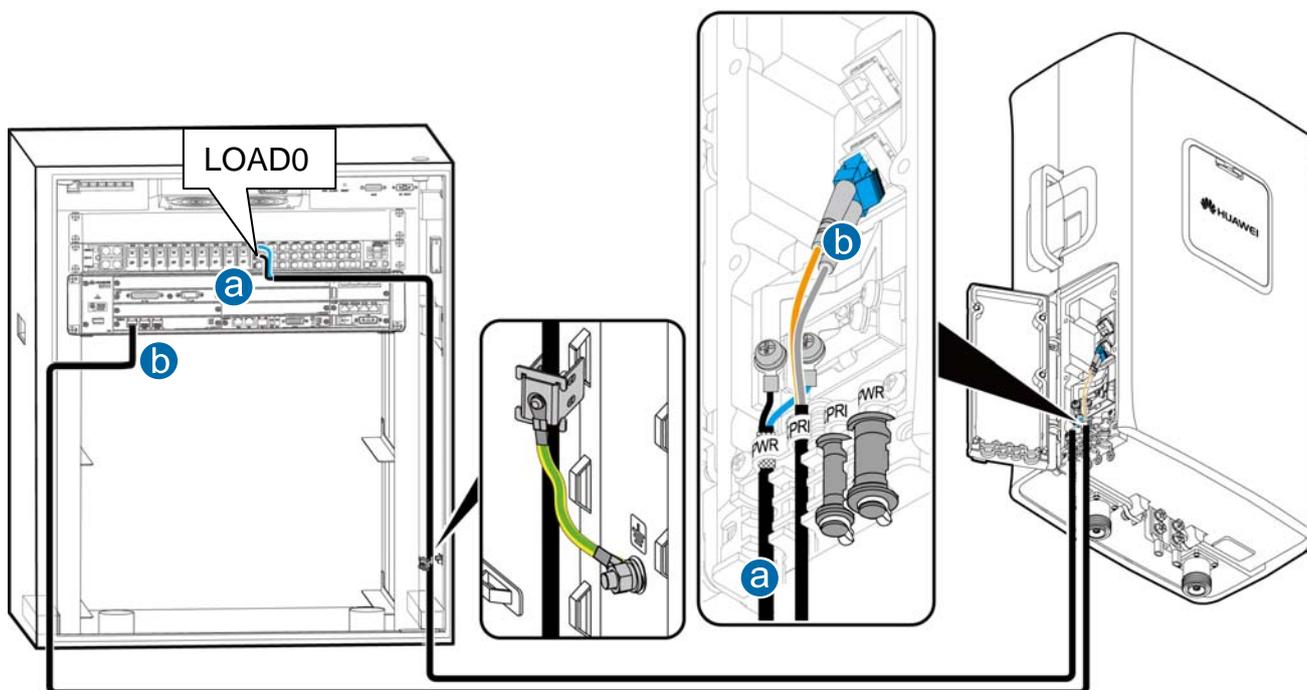


Metal Shielding layer (25 mm)

PGND cable

a DC RRU power cable

b CPRI optical cable



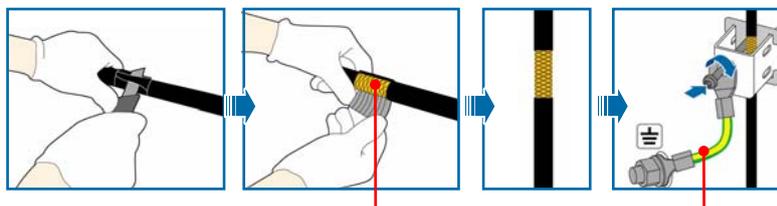
NOTE

The DC RRU power cable is connected to one of the LOAD0 to LOAD5 terminals of the DCDU-03B.

Installing the RRU Cables

j RRU+TMC11H(Ver.A) / TMC11H(Ver.B)

Grounding the shielding layer of the power cable:

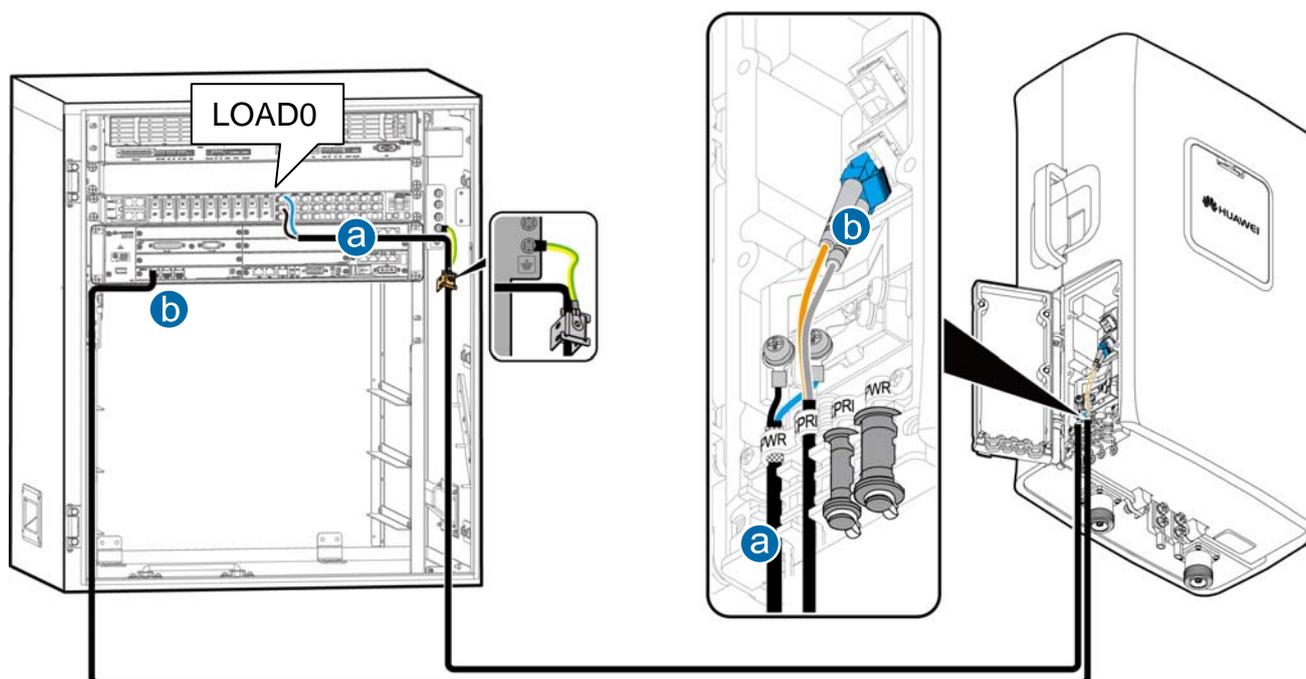


Metal Shielding layer (25 mm)

PGND cable

a DC RRU power cable

b CPRI optical cable



NOTE

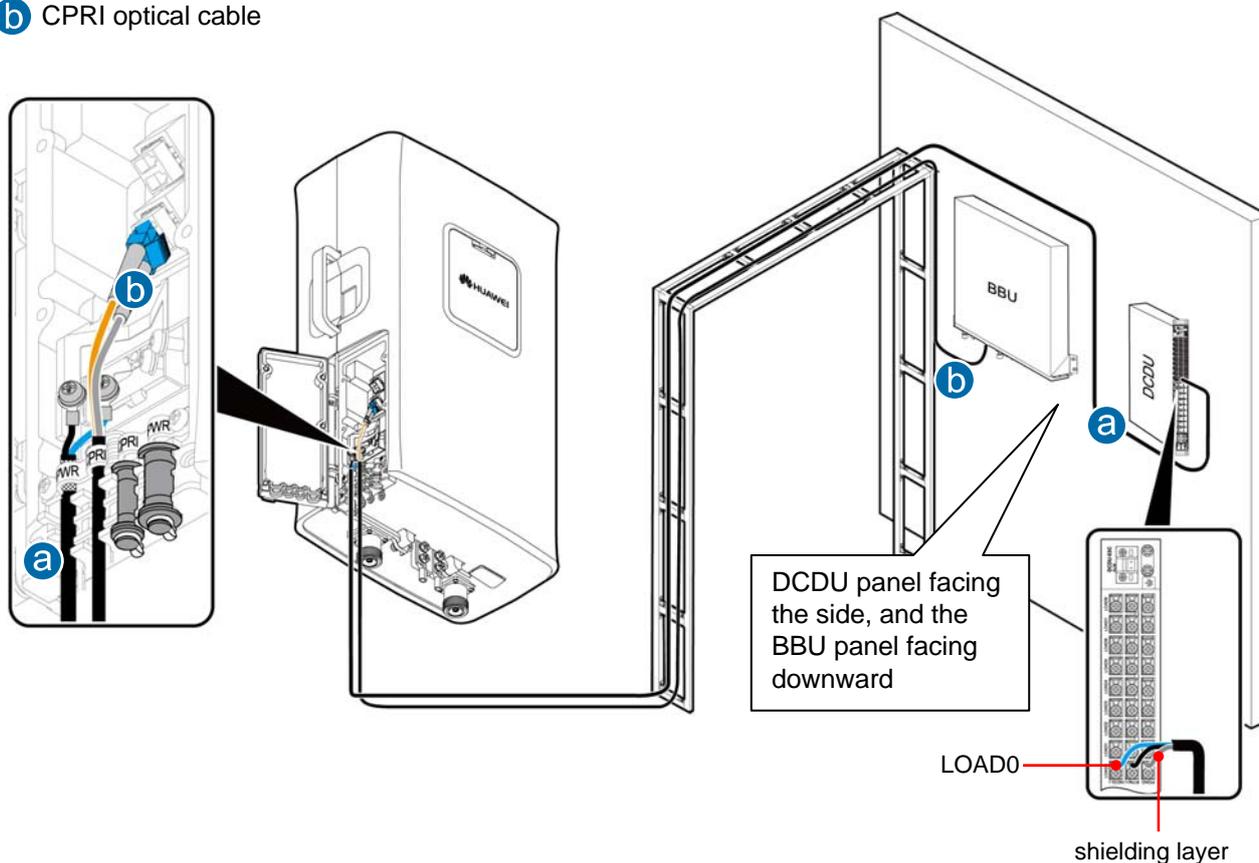
The DC RRU power cable is connected to one of the LOAD0 to LOAD5 terminals of the DCDCU-03B.

Installing the RRU Cables

K RRU+BBU Installed Against the Wall

a DC RRU power cable

b CPRI optical cable



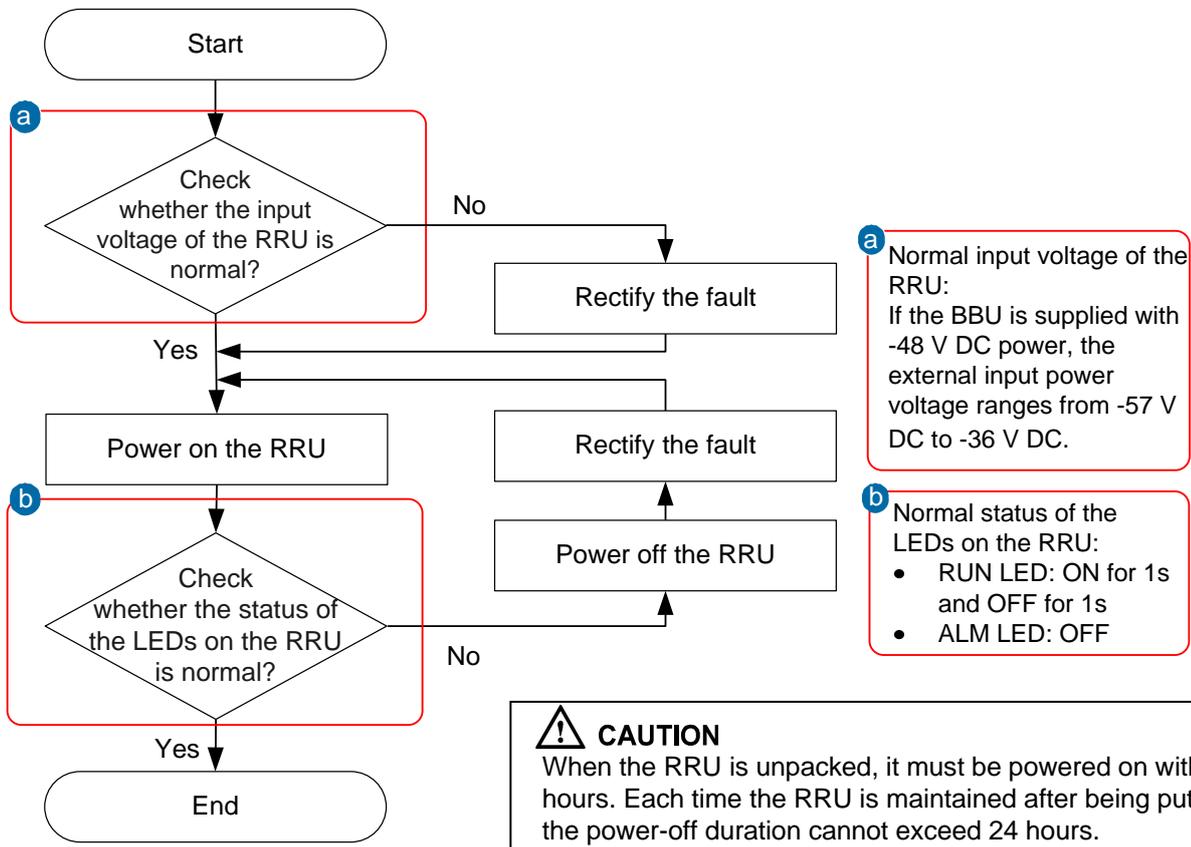
NOTE

- When connecting the DC RRU power cable to the DCDU-03B you must add an OT terminal to the shielding layer. Then, fix the OT terminal to the corresponding GND terminal of the DCDU-03B. For details on how to add an OT terminal, see page 27 Adding OT Terminals to the Shielding Layer of the DC RRU Power Cable.
- The DC RRU power cable is connected to one of the LOAD0 to LOAD5 terminals of the DCDU-03B.

RRU Hardware Installation Checklist

| No. | Items |
|-----|---|
| 1 | The position for each equipment conforms to the engineering design and meets the space requirement. Sufficient space is reserved for equipment maintenance. |
| 2 | The RRU is properly installed. |
| 3 | The cover plate is fastened to the RRU cabling cavity. |
| 4 | Waterproof check: The empty cable troughs in the cabling cavity of the RRU are waterproofed. The cover plate is tightly buckled on the cabling cavity of the RRU. The RF ports that are not connected with RF cables are capped and waterproofed. The waterproof caps are fastened. |
| 5 | No joint lies in the middle of the power cable or the PGND cable. |
| 6 | The lugs at both ends of the power cable or the PGND cable are securely soldered or crimped. |
| 7 | The power cable and PGND cable are not short-circuited or reversely connected and are not damaged or broken. |
| 8 | The power cable, PGND cable and other cables need to be bound separately. |
| 9 | The working grounding and protection grounding of the base station and the lightning protection grounding of the building share one group of grounding conductors. |
| 10 | The connectors of signal cables are intact and securely linked. And the signal cables are not damaged or broken. |
| 11 | All labels, tags, and nameplates are correct, legible, and complete. All the labels at both ends of the cables, jumpers and feeders are legible. |

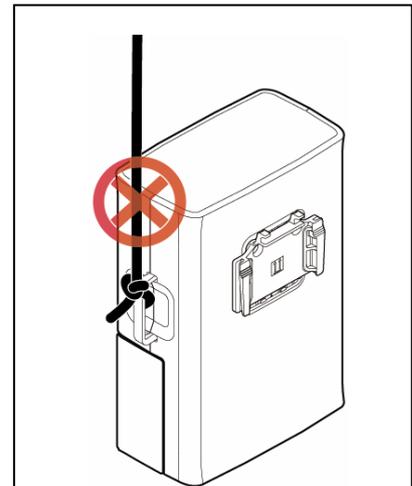
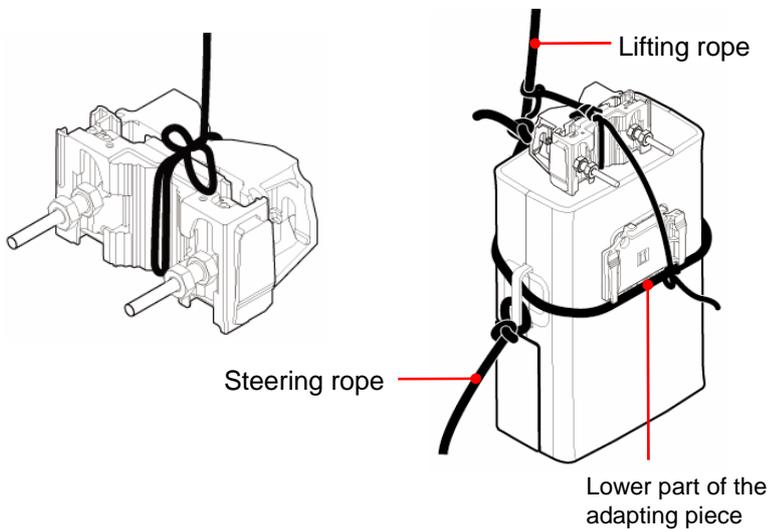
Powering On the RRU



Appendix

a Binding the RRU and Installation Components

1. Bind the RRU by leading the lifting rope along the lower part of the adapting piece and through the handle, bind the main and auxiliary brackets with the lifting rope, and then bind the steering rope with the handle of the RRU, as shown in the following figures.



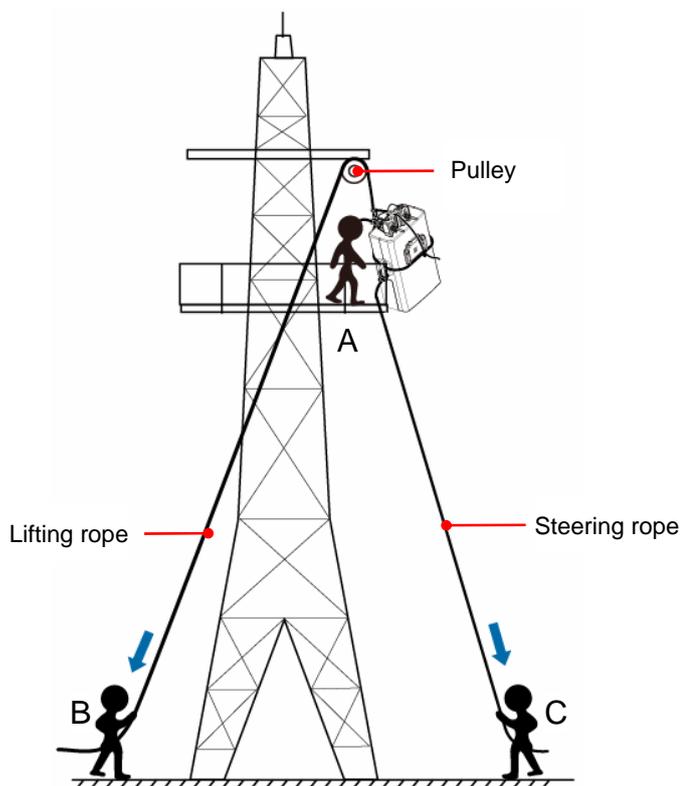
⚠ CAUTION

- When lifting the RRU and installation components to the tower, prevent the RRU from colliding with the tower.
- Lift the RRU to the tower before it is installed on the metal pole, angle steel, or U-steel.

⚠ CAUTION

- Do not bind the lifting rope only on the handle when lifting the RRU.

2. Lift the RRU and installation components to the tower.



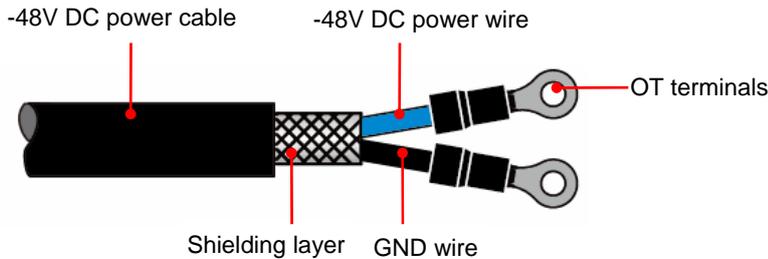
📖 NOTE

- Installer A climbs onto the tower. Then, installer A fixes the pulley to the support of the tower platform and leads the lifting rope through the pulley.
- Installer C uses a lifting rope to bind the RRU and installation components as shown in the preceding figure and then ties a knot in the steering rope at the handle of the RRU.
- Installer B pulls the lifting rope, and at the same time, installer C pulls the steering rope away from the tower to prevent the RRU and installation components from colliding with the tower.
- Installer A holds the RRU and installation components and untie the ropes.

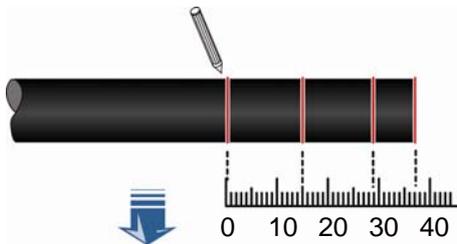
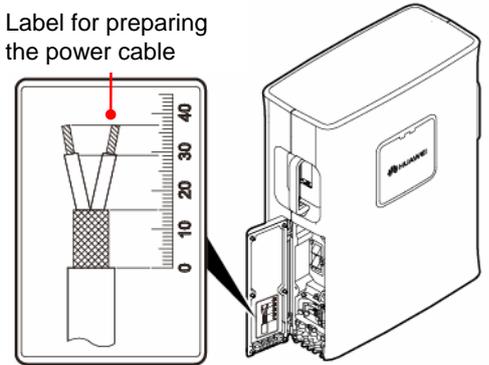
Appendix

b Adding OT Terminals by Using a Wire Stripper (Recommended)

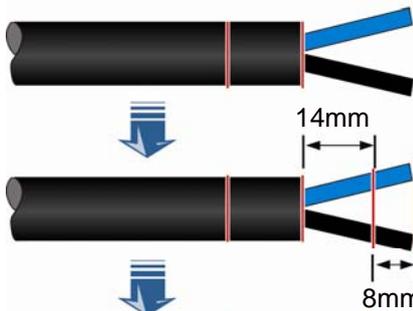
Adding the OT terminals to the power cable involves adding OT terminals to the DC RRU power cable and adding OT terminals to the shielding layer of the DC RRU power cable.



Label for preparing the power cable



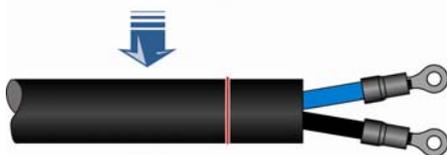
Determine lengths of power cables for different operations according to the scales on the inner side of the cover plate of the cabling cavity.



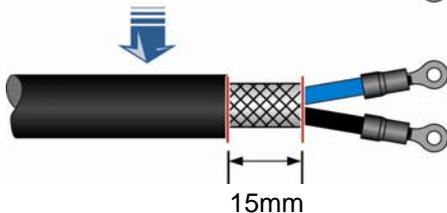
Based on the determined length, remove the jacket and shielding layer off the power cable.



Remove the jacket from each wire.



Add an OT terminal to each wire.



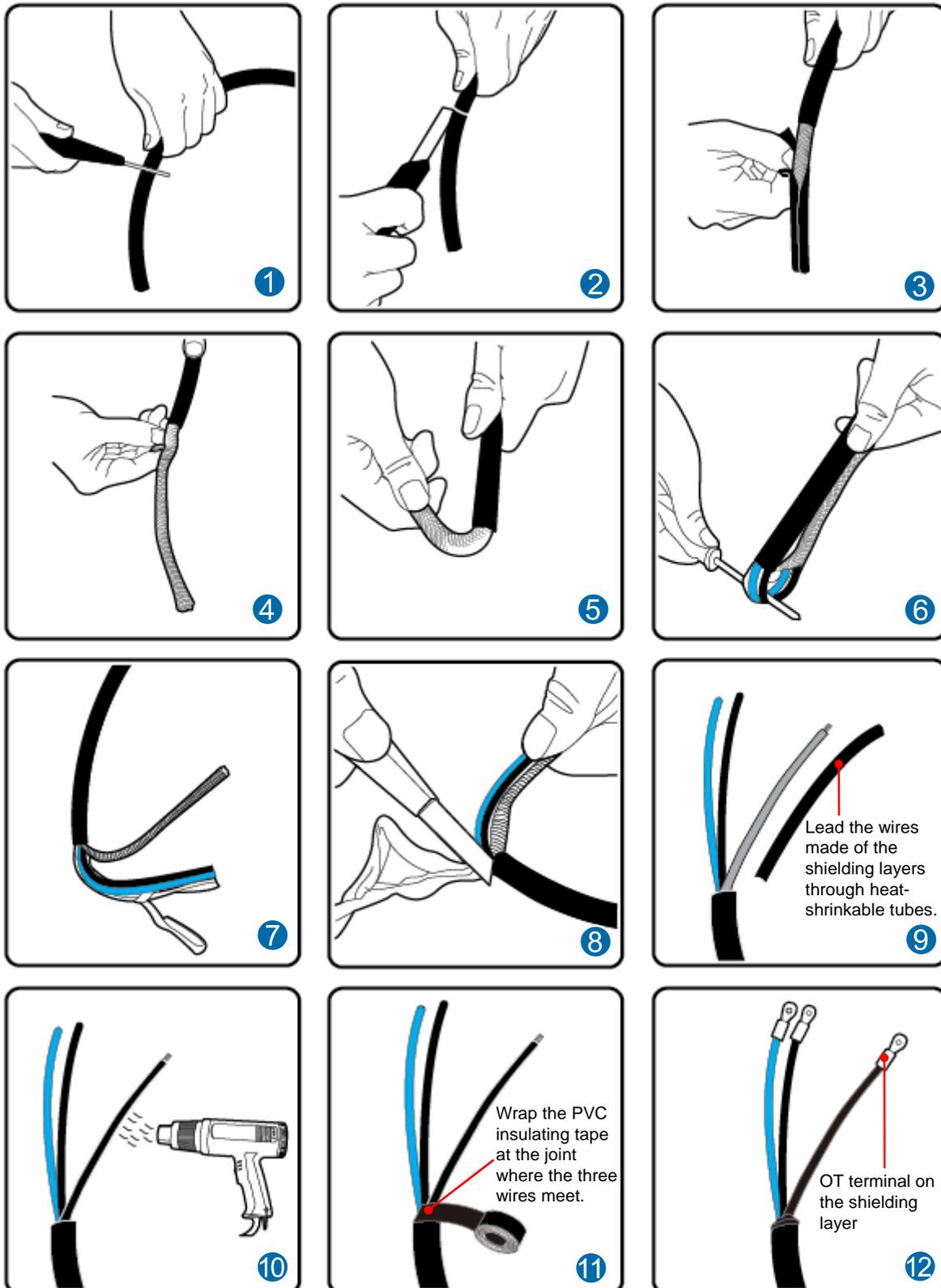
Strip a 15 mm jacket off the power cable to reveal the shielding layer of the power cable

CAUTION

The OT terminals must be added to the power cable before the RRU is installed on a metal pole.

Appendix

C Adding OT Terminals to the Shielding Layer of the DC RRU Power Cable



⚠ WARNING

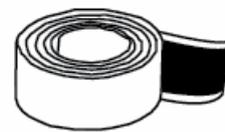
Do not damage the shielding layer of the power cable when cutting around the jacket.

Appendix

d Waterproofing Outdoor Cables

⚠ CAUTION

- The waterproof tape should be wrapped for an extra length of 20 mm away from the connectors at both ends.
- The tapes should be wrapped around the connector from the lower part to the upper part. When wrapped for another layer, the tapes may not be cut.
- When wrapping the waterproof tape, apply even force to extend the tape until the width of the tape is 1/2 of the original width.
- When wrapping the waterproof tape, ensure that the upper layer of the tape covers at least 50% of the lower layer.
- The insulating tape should be wrapped for an extra length of 20 mm away from the connectors at both ends.
- The last layer of the waterproof tape should be wrapped from the lower part to the upper part to prevent rainwater from infiltrating into the tape.

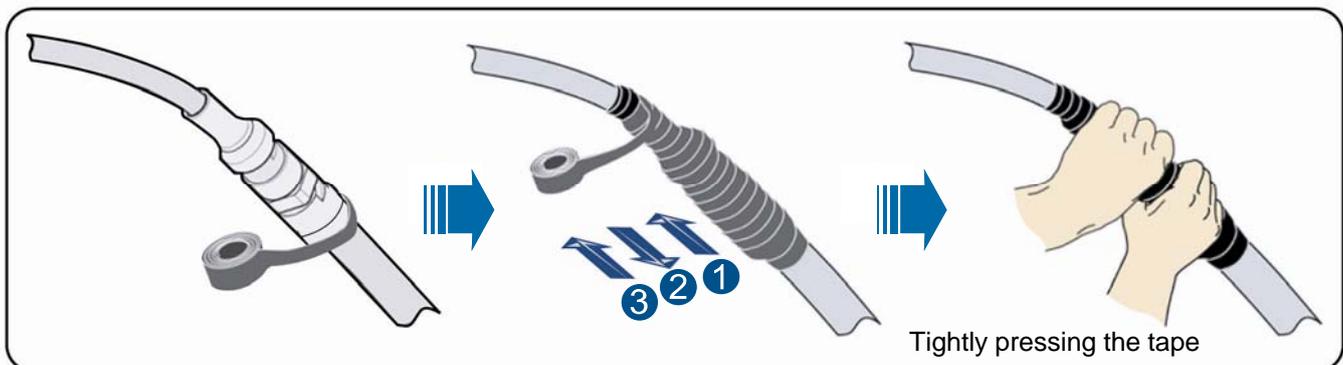


Waterproof tape

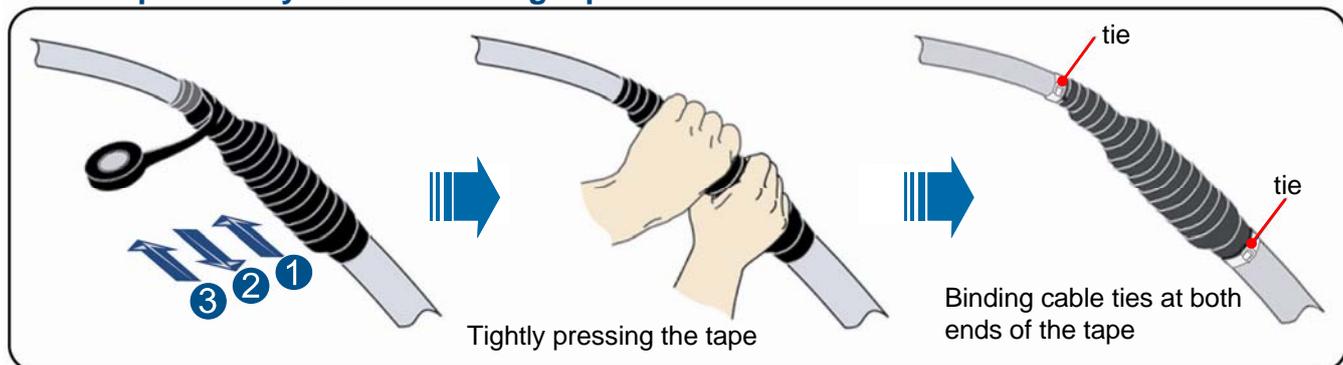


Insulating tape

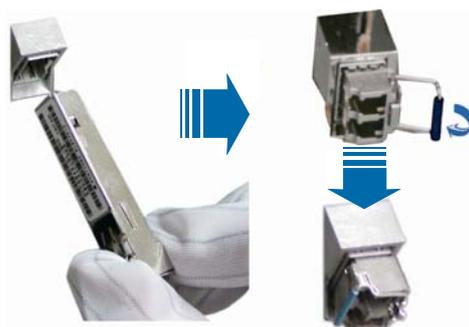
1. Wrap three layers of waterproof tape.



2. Wrap three layers of insulating tape.



e Installing the Optical Module



Appendix

f Pin Assignment of the RRU AISG Extension cable

| Pin of the AISG male connector | Pin of the AISG female connector | Wire Color | Wire Type | Instruction |
|--------------------------------|----------------------------------|--------------|--------------|-------------|
| X1.1 | X2.1 | White/blue | Twisted pair | +12V |
| | | Blue | | |
| X1.7 | X2.7 | White/orange | Twisted pair | DC Return A |
| | | Orange | | |
| X1.3 | X2.3 | White/green | Twisted pair | RS485 B |
| X1.5 | X2.5 | Green | | RS485 A |
| X1.6 | X2.6 | White/brown | Twisted pair | +24V |
| | | Brown | | |

Change History

This describes the changes in the *RRU3808 Installation Guide*.

●04 (2010-03-05)

This is the fourth commercial release.

Compared with issue 03 (2009-12-10) of V200, the description on the cross-section area of the RRU power cable is added.

●03 (2009-12-10)

This is the third commercial release.

Compared with issue 02 (2009-09-25) of V200, the installation scenarios of APM30H(Ver.B), APM30H(Ver.B, +24V), TMC11H(Ver.B) are added.

●02 (2009-09-25)

This is the second commercial release.

Compared with issue 01 (2009-08-04) of V200, the requirements for installation support structure are modified.

●01 (2009-08-04)

This is the initial commercial release.

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