

**DBS3900 IBS  
V100R001C02  
DRH3985A&3917A&3919A  
Installation Guide**

**Issue**      **Draft A**  
**Date**        **2013-09-16**

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# About This Document

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## Purpose

This document describes the process of installing DC DRH3985A, DRH3917A and DRH3919A (referred to as DRH in this document).

## Product Version

The following table lists the product version related to this document for DRH3985A, DRH3917A and DRH3919A.

Product Name	Product Version
DBS3900 IBS	V100R001C02

## Intended Audience

This document is intended for:

Base station installation engineers

## Organization

### [1 Changes in the DRH3985A &3917A&3919A Installation Guide](#)

This chapter describes the changes in the *DRH3985A&3917A&3919A Installation Guide*.

### [2 Installation Preparations](#)

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

### [3 Information About the Installation](#)

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

### [4 Unpacking the Equipment](#)

This chapter describes how to unpack and check the delivered equipment to ensure that all the materials are included and intact.

### 5 Installation Process

The installation process involves installing a DRH and DRH cables, checking the DRH hardware installation, and powering on the DRH.

### 6 Installing the DRH

This chapter describes the procedure for installing the DRH. The DRH can be installed on a pole, U-steel, angle steel, wall, or an IFS06. The procedure for installing the DRH varies depending on installation options.

### 7 Installing DRH Cables

This chapter describes the procedure for installing DRH cables.

### 8 Checking the DRH Hardware Installation

After a DRH is installed, check the hardware installation.

### 9 Powering On a DRH

After all the devices are installed, check the power-on status of a DRH.






### 10 Appendix

This section describes the procedure for adding an easy power receptacle (pressfit type) connector.

## Conventions

### Symbol Conventions

The symbols that may be found in this document are defined as follows.

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

## General Conventions

Convention	Description
Times New Roman	Normal paragraphs are in Times New Roman.
<b>Boldface</b>	Names of files, directories, folders, and users are in <b>boldface</b> . For example, log in as user <b>root</b> .
<i>Italic</i>	Book titles are in <i>italics</i> .
Courier New	Terminal display is in Courier New.

## Command Conventions

Convention	Description
<b>Boldface</b>	The keywords of a command line are in <b>boldface</b> .
<i>Italic</i>	Command arguments are in <i>italics</i> .
[ ]	Items (keywords or arguments) in square brackets [ ] are optional.
{ x   y   ... }	Alternative items are grouped in braces and separated by vertical bars. One is selected.
[ x   y   ... ]	Optional alternative items are grouped in square brackets and separated by vertical bars. One or none is selected.
{ x   y   ... } *	Alternative items are grouped in braces and separated by vertical bars. A minimum of one or a maximum of all can be selected.

## GUI Conventions

Convention	Description
<b>Boldface</b>	Buttons, menus, parameters, tabs, windows, and dialog titles are in <b>boldface</b> . For example, click <b>OK</b> .
>	Multi-level menus are in <b>boldface</b> and separated by the ">" signs. For example, choose <b>File &gt; Create &gt; Folder</b> .

## Keyboard Operation

Format	Description
<b>Key</b>	Press the key. For example, press <b>Enter</b> and press <b>Tab</b> .

Format	Description
<b>Key 1+Key 2</b>	Press the keys concurrently. For example, pressing <b>Ctrl+Alt+A</b> means the three keys should be pressed concurrently.
<b>Key 1, Key 2</b>	Press the keys in turn. For example, pressing <b>Alt, A</b> means the two keys should be pressed in turn.

## Mouse Operation

Action	Description
Click	Select and release the primary mouse button without moving the pointer.
Double-click	Press the primary mouse button twice continuously and quickly without moving the pointer.
Drag	Press and hold the primary mouse button and move the pointer to a certain position.

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# 1 Changes in the DRH3985A &3917A&3919A Installation Guide

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This chapter describes the changes in the *DRH3985A&3917A&3919A Installation Guide*.

## Draft A (2013-09-16)

This is a draft.

# 2 Installation Preparations

## About This Chapter

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

### 2.1 Reference Documents

Before the installation, you must be familiar with reference documents.

### 2.2 Tools and Instruments

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

### 2.3 Skills and Requirements for Onsite Personnel

Onsite personnel must be qualified and trained. Before performing any operation, onsite personnel must be familiar with correct operation methods and safety precautions.

## 2.1 Reference Documents

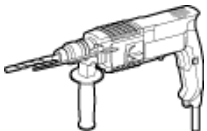
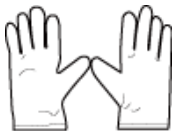
Before the installation, you must be familiar with reference documents.







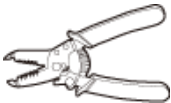











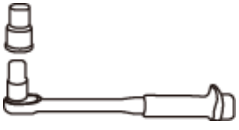



The following reference documents are required during DRH installation:

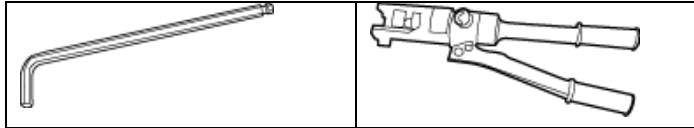
- DRH3917A&DRH3919A&DRH3919B&DRH3985A Hardware Description

## 2.2 Tools and Instruments

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

<p>Hammer drill (a <math>\phi</math>12 bit)</p> 	<p>ESD gloves</p> 	<p>Vacuum cleaner</p>
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Heat gun 	Phillips screwdriver (M3 to M6) 	Flat-head screwdriver (M3 to M6) 
Rubber mallet 	COAX crimping tool 	Wire stripper 
Utility knife 	Cable cutter 	Adjustable wrench (size $\geq 32$ mm [1.26 in.])  Torque wrench  Size: 16 mm (0.63 in.) and 32 mm (1.26 in.) Combination wrench  Size: 16 mm (0.63 in.) and 32 mm (1.26 in.)
Level 	Torque screwdriver   5 mm  5 mm  (M3 to M6)  (M3 to M6)	Torque socket 
Multimeter 	Marker (diameter $\leq 10$ mm [0.39 in.]) 	Measuring tape 
Inner hexagon wrench	Hydraulic pliers	



## 2.3 Skills and Requirements for Onsite Personnel

Onsite personnel must be qualified and trained. Before performing any operation, onsite personnel must be familiar with correct operation methods and safety precautions.

Before the installation, pay attention to the following items:

- The customer's technical engineers must be trained by Huawei and be familiar with the proper installation and operation methods.
- The number of onsite personnel depends on the engineering schedule and installation environment. Generally, only three to five onsite personnel are necessary.

# 3 Information About the Installation

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## About This Chapter

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

### [3.1 DRH Exterior](#)

This section describes the exterior and dimensions of a DRH.

### [3.2 DRH Ports](#)

This section describes ports on the DRH panels. A DRH has a bottom panel, cabling cavity panel, and indicator panel.

### [3.3 DRH Indicators](#)

This section describes six indicators on a DRH. They indicate the running status.

### [3.4 Installation Scenarios](#)

A DRH can be installed on a pole, U-steel, angle steel, wall, or IFS06. Installation scenarios must meet heat-dissipation and waterproofing requirements of the DRH.

### [3.5 Installation Clearance Requirements of a DRH](#)

This section describes the requirements for the installation clearance of a single DRH and multiple DRHs and the requirements for the installation spacing between DRHs.

## 3.1 DRH Exterior

This section describes the exterior and dimensions of a DRH.

[Figure 3-1](#) shows a DRH.

**Figure 3-1** DRH exterior

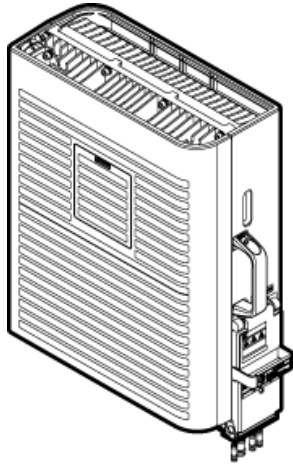
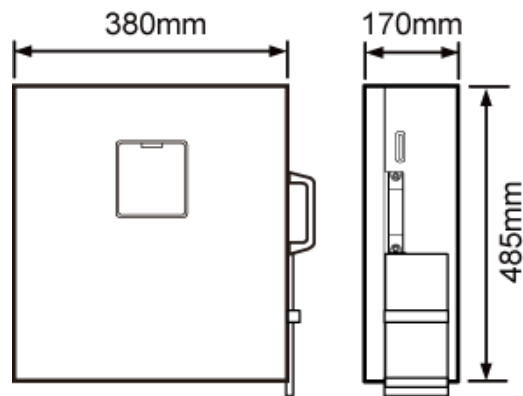


Figure 3-2 shows DRH dimensions.

**Figure 3-2** DRH dimensions



## 3.2 DRH Ports

This section describes ports on the DRH panels. A DRH has a bottom panel, cabling cavity panel, and indicator panel.

Figure 3-3 shows the ports on the DRH panels.

**Figure 3-3** Ports on the DRH panels

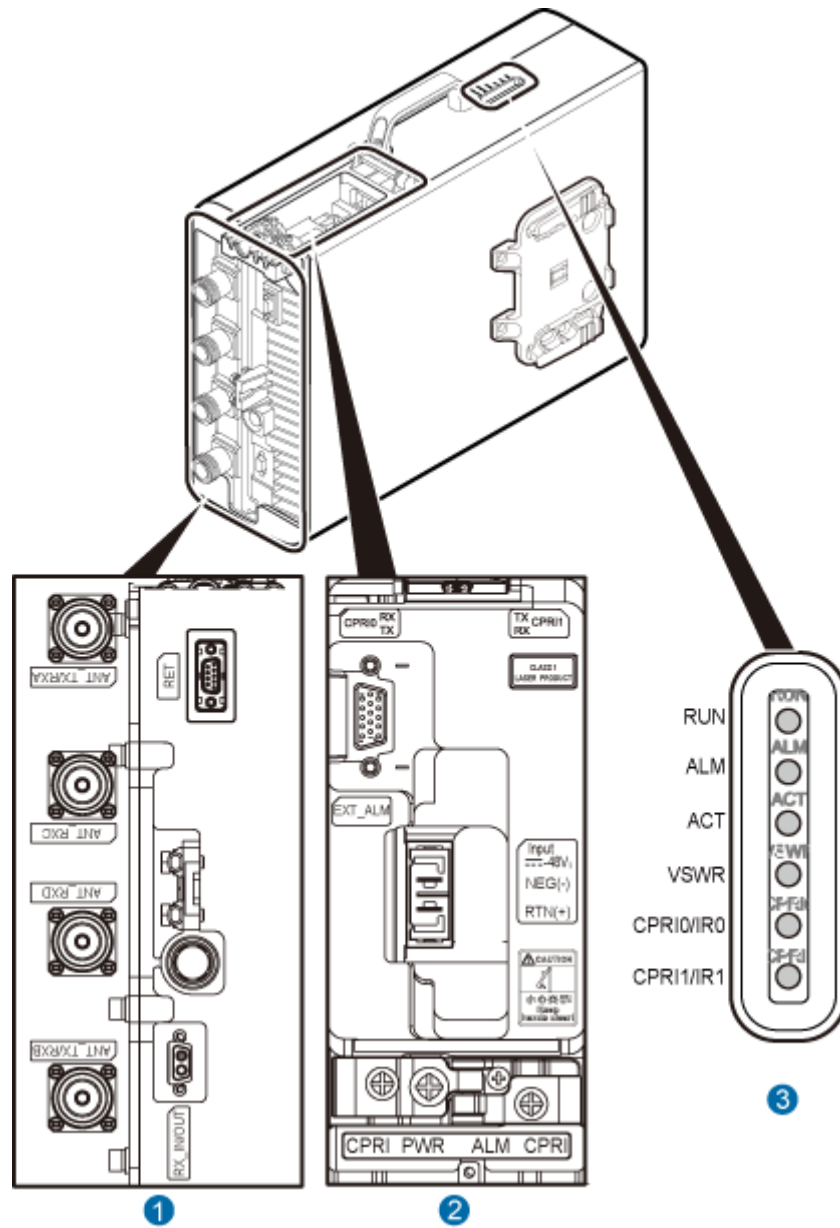


Table 3-1 describes ports and indicators on the DRH panels.

**Table 3-1** Ports and indicators on the DRH panels

Item	Silkscreen	Description
(1) Ports at the bottom	ANT_TX/RXA	TX/RX port A
	ANT_TX/RXB	TX/RX port B
	ANT_TX/RXC	Unused on the DRH
	ANT_TX/RXD	Unused on the DRH

Item	Silkscreen	Description
	RX_IN/OUT	Unused on the DRH
	RET	Unused on the DRH
(2) Ports in the cabling cavity	RTN(+)	Power supply socket
	NEG(-)	
	CPRI0	Optical/electrical port 0
	CPRI1	Optical/electrical port 1
	EXT_ALM	Alarm monitoring port used for monitoring one RS485 signal and two dry contact signals
(3) Indicators	RUN	See <a href="#">3.3 DRH Indicators</a> .
	ALM	
	ACT	
	VSWR	
	CPRI0/IR0	
	CPRI1/IR1	

[Table 3-2](#) describes how to use the RF ports.

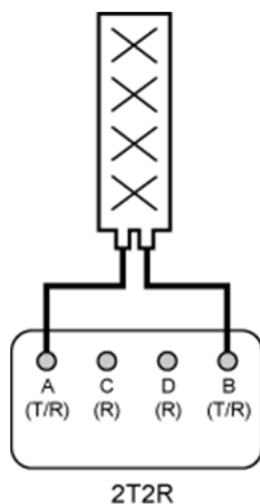
**Table 3-2** Usage of the RF ports

TX/RX Channel	Number of RF Ports	Mode of RF Ports	Description
2T2R	2	Combination of ANT_TX/RXA and ANT_TX/RXB	Single sector

[Figure 3-4](#) describes how to use the RF ports.



**Figure 3-4** Usage of the RF ports



## 3.3 DRH Indicators

This section describes six indicators on a DRH. They indicate the running status.

For detailed positions of DRH indicators, see [3.2 DRH Ports](#).

[Table 3-3](#) describes DRH indicators.

**Table 3-3** DRH indicators

Indicator	Color	Status	Meaning
RUN	Green	Steady on	There is power supply, but the module is faulty.
		Steady off	There is no power supply, or the module is faulty.
		Blinking (on for 1s and off for 1s)	The board is functioning properly.
		Blinking (on for 0.125s and off for 0.125s)	Software is being loaded to the module, or the module is not started.
ALM	Red	Steady on	Alarms are generated, and the module must be replaced.
		Blinking (on for 1s and off for 1s)	Alarms are generated. The alarms may be caused by the faults on the related boards or ports. Therefore, you need to locate the fault before deciding whether to replace the module.
		Steady off	No alarm is generated.

Indicator	Color	Status	Meaning
ACT	Green	Steady on	The module is running properly with TX channels enabled or the software is being loaded without DRH running.
		Blinking (on for 1s and off for 1s)	The module is running properly with TX channels disabled.
VSWR	Red	Steady off	No Voltage Standing Wave Ratio (VSWR) alarm is generated.
		Blinking (on for 1s and off for 1s)	VSWR alarms are generated on the ANT_TX/RXB port.
		Steady on	VSWR alarms are generated on the ANT_TX/RXA port.
		Blinking (on for 0.125s and off for 0.125s)	VSWR alarms are generated on the ANT_TX/RXA and ANT_TX/RXB ports.
CPRI0/IR0	Red or green	Steady green	The CPRI link is functioning properly.
		Steady red	An optical module fails to transmit or receive signals because the optical module is faulty or the fiber optic cable is broken.
		Blinking red (on for 1s and off for 1s)	The CPRI link is out of lock because of a failure in clock lock between two modes or mismatched data rates over CPRI ports.
		Steady off	The optical module cannot be detected, or the optical module is powered off.
CPRI1/IR1	Red or green	Steady green	The CPRI link is functioning properly.
		Steady red	An optical module fails to transmit or receive signals because the optical module is faulty or the fiber optic cable is broken.
		Blinking red (on for 1s and off for 1s)	The CPRI link is out of lock because of a failure in clock lock between two modes or mismatched data rates over CPRI ports.
		Steady off	The optical module cannot be detected, or the optical module is powered off.

## 3.4 Installation Scenarios

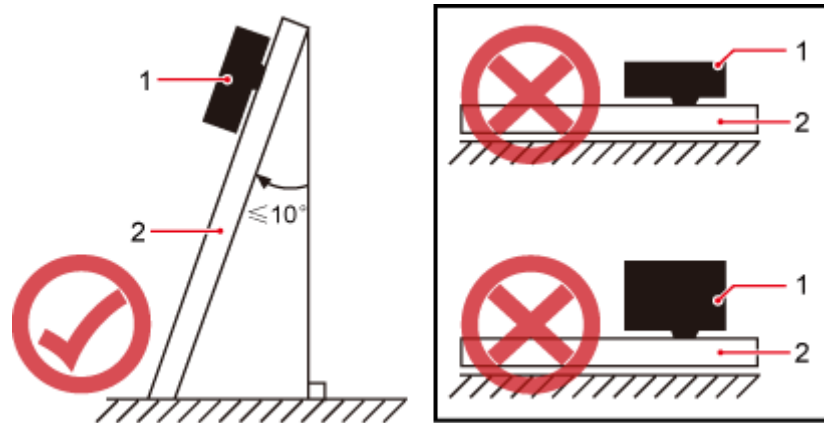
A DRH can be installed on a pole, U-steel, angle steel, wall, or IFS06. Installation scenarios must meet heat-dissipation and waterproofing requirements of the DRH.

## Requirements for the Installation Scenarios

### Method of installation:

- To ensure the heat dissipation of the DRH and waterproofing of the ports at the bottom of the DRH, the vertical deviation angle of a DRH must be less than or equal to 10 degrees, as shown in [Figure 3-5](#).
- U-steel and angle steel support the standard or reverse installation of a single DRH only.

**Figure 3-5** Requirements for the vertical deviation angle of a DRH



(1) DRH      (2) Installation support (pole, U-steel, angle steel, or wall)

## Installing a DRH on a Pole

[Figure 3-6](#) shows the diameter of a pole for installing a DRH.

**Figure 3-6** Diameter of a pole

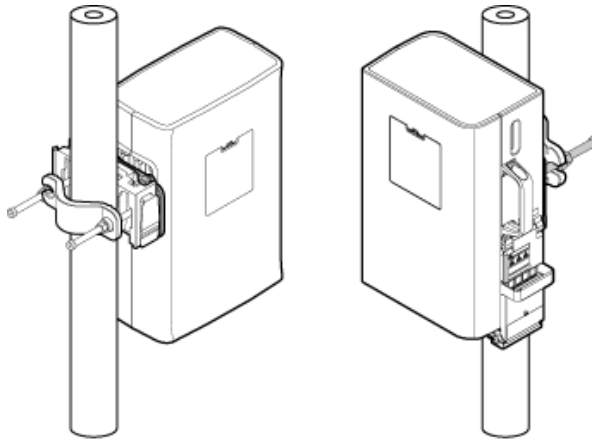


 **CAUTION**

- The diameter of a pole for installing a DRH ranges from 60 mm (2.36 in.) to 114 mm (4.49 in.). The recommended diameter is 80 mm (3.15 in.).
- When the diameter of a pole ranges from 60 mm (2.36 in.) to 76 mm (2.99 in.), a maximum of three DRHs can be installed on the pole.
- Only a pole whose diameter ranges from 76 mm (2.99 in.) to 114 mm (4.49 in.) supports more than three DRHs.
- The recommended thickness of the wall of a pole is 3.5 mm (0.14 in.) or above.

A single DRH can be installed in either side-mounted or standard mode. [Figure 3-7](#) shows a single DRH installed on a pole.

**Figure 3-7** A single DRH installed on a pole



Two DRHs can be installed next to each other at the same level or vertically at different levels. [Figure 3-8](#) shows two DRHs installed on a pole.

**Figure 3-8** Two DRHs installed on a pole

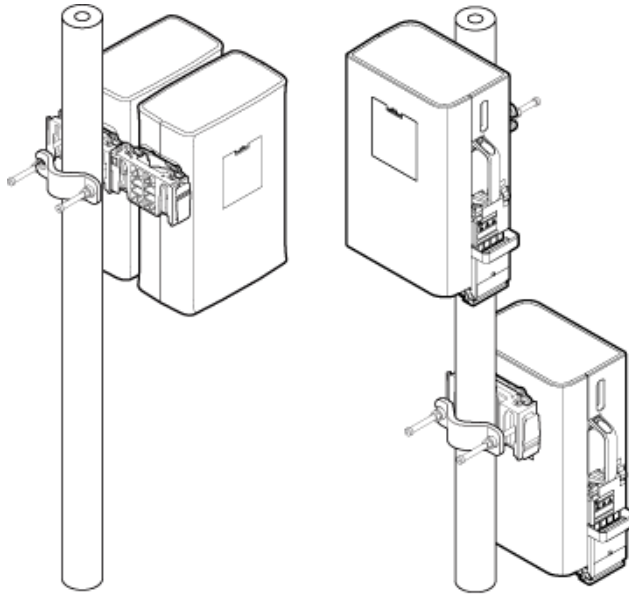
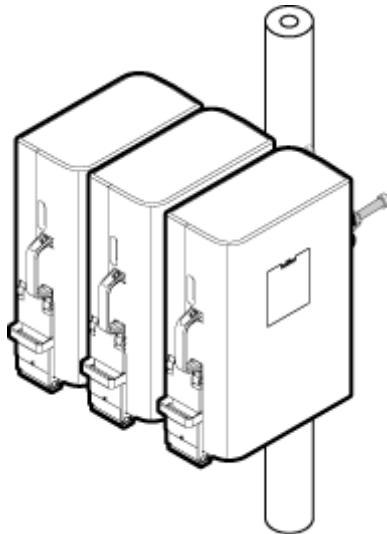
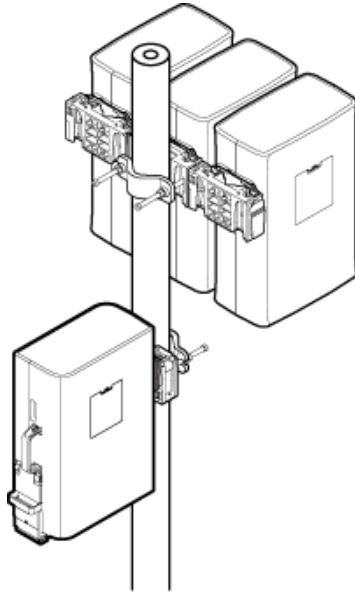


Figure 3-9, Figure 3-10, and Figure 3-11 show three or more DRHs installed on a pole.

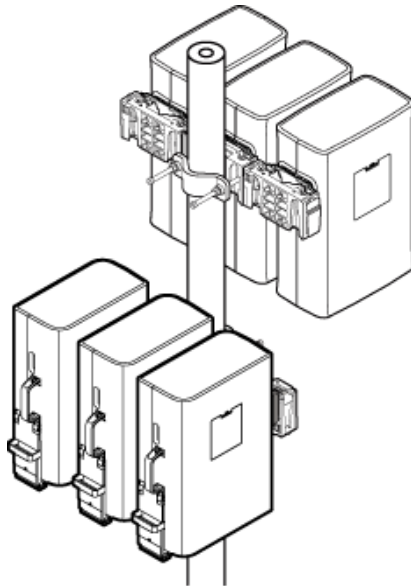
**Figure 3-9** Three DRHs installed on a pole



**Figure 3-10** Four DRHs installed on a pole



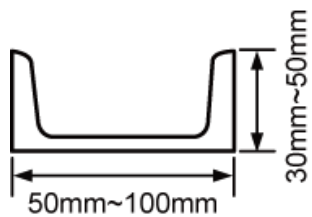
**Figure 3-11** Six DRHs installed on a pole



## Installing a DRH on U-steel

Figure 3-12 shows U-steel specifications.

**Figure 3-12** U-steel specifications



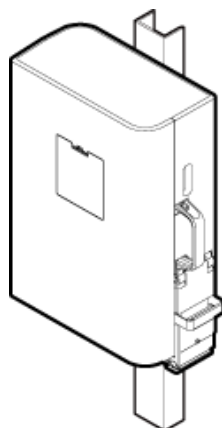
### CAUTION

It is recommended that only one DRH be installed on one U-steel.

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Figure 3-13 shows a DRH installed on U-steel.

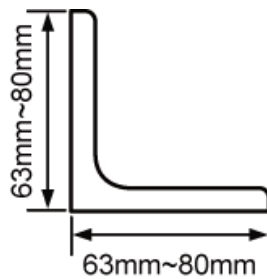
**Figure 3-13** DRH installed on U-steel



## Installing a DRH on Angle Steel

Figure 3-14 shows angle steel specifications.

**Figure 3-14** Angle steel specifications

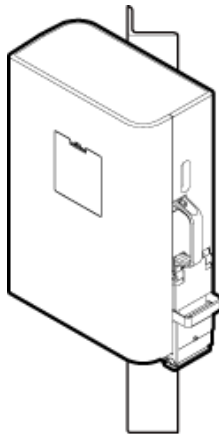


### CAUTION

It is recommended that only one DRH be installed on one angle steel.

Figure 3-15 shows a DRH installed on angle steel.

**Figure 3-15** DRH installed on angle steel



## Installing a DRH on a Wall

The wall for installing DRHs must meet the following requirements:

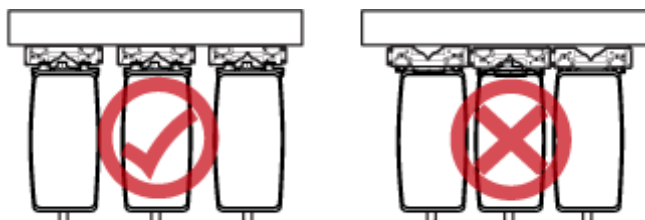
- For each DRH, the wall must be able to bear a weight four times the DRH's weight and the bolts' pulling force of 1.25 kN (281.25 lbf) vertical to the wall.
- Expansion bolts must be tightened to 15 N m (132.76 lbf in.) so that the bolts stay secured without damaging the wall.



 **CAUTION**

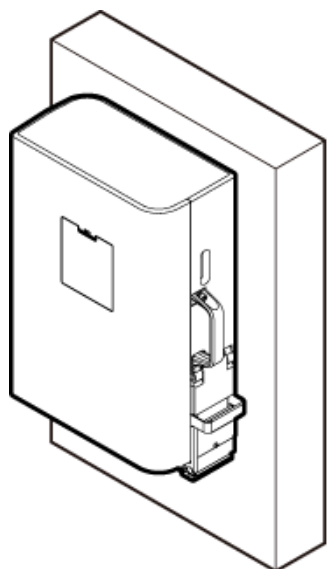
The mounting brackets for multiple DRHs cannot be combined when the DRHs are installed on a wall in side-mounted mode, as shown in [Figure 3-16](#).

**Figure 3-16** Correct installation of mounting brackets for multiple DRHs



[Figure 3-17](#) shows a DRH installed on a wall.

**Figure 3-17** DRH installed on a wall



## Installing a DRH on an IFS06

In an IFS06 scenario:

- The upper and lower adjustable beams on an IFS06 can be moved up and down to fit for heights of DRHs.
- The IFS06 supports at least three DRHs when the ambient temperature is higher than or equal to the lowest operating temperature of the DRH and at least 5 °C (41 °F) lower than the highest operating temperature of the DRH. The IFS06 supports a maximum of six DRHs when the ambient temperature is higher than or equal to the lowest operating temperature of the DRH and at least 10 °C (50 °F) lower than the highest operating temperature of the DRH.

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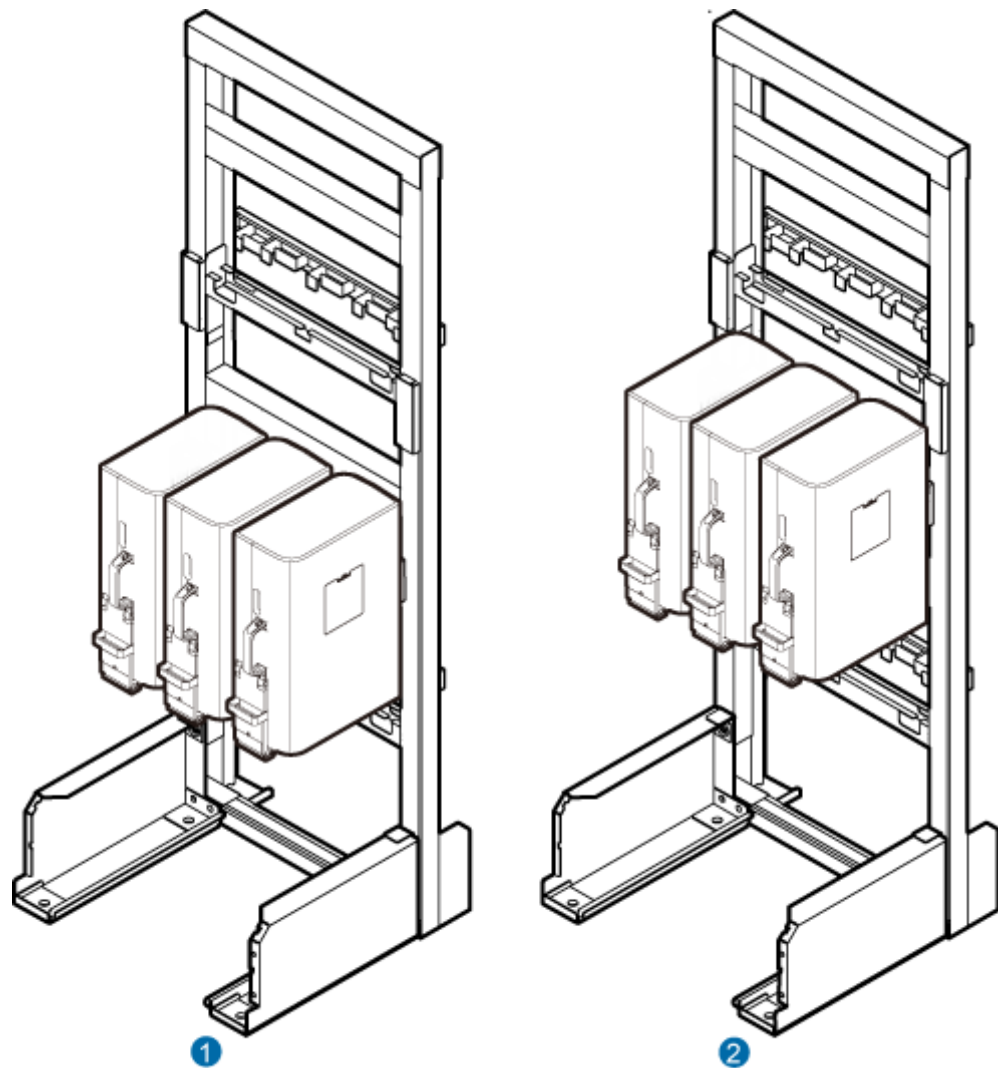
 **CAUTION**

The mounting brackets for multiple DRHs cannot be combined when the DRHs are installed on an IFS06, as shown in [Figure 3-16](#).

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[Figure 3-18](#) and [Figure 3-19](#) show DRHs installed on an IFS06.

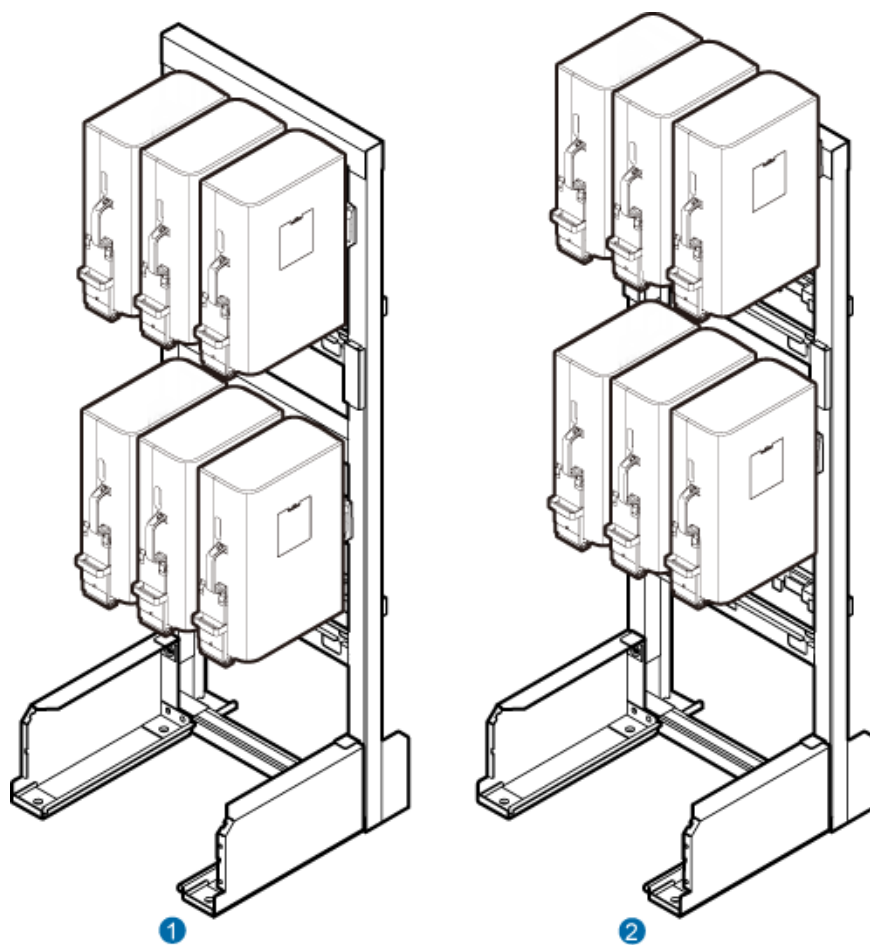
**Figure 3-18** Three DRHs installed on an IFS06



(1) Height-restricted scenario

(2) Height-unrestricted scenario

**Figure 3-19** Six DRHs installed on an IFS06



(1) Height-restricted scenario

(2) Height-unrestricted scenario

## 3.5 Installation Clearance Requirements of a DRH

This section describes the requirements for the installation clearance of a single DRH and multiple DRHs and the requirements for the installation spacing between DRHs.

### 3.5.1 Clearance for a Single DRH

This section describes the recommended and minimum clearance for a single DRH.



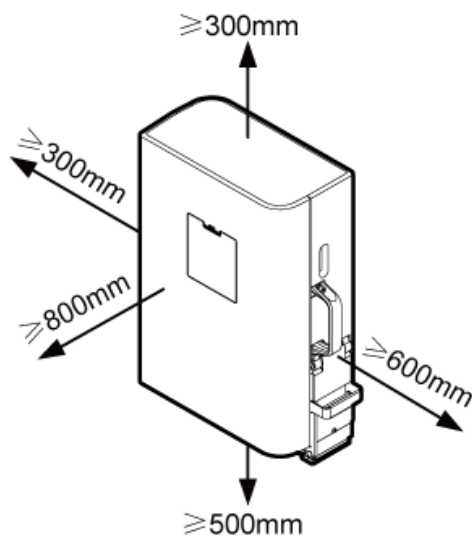
**NOTE**

- The recommended clearance ensures normal running and provides an appropriate space for operation and maintenance (OM). If there is sufficient space, leave the recommended clearance after installing the equipment.
- The minimum clearance ensures normal running and heat dissipation, but OM activities such as checking indicator status and opening the cabling cavity cannot be properly conducted. If the installation space is restricted, leave the minimum clearance after installing the equipment.

## Recommended Clearance for a Single DRH

Figure 3-20 shows the recommended clearance for a single DRH.

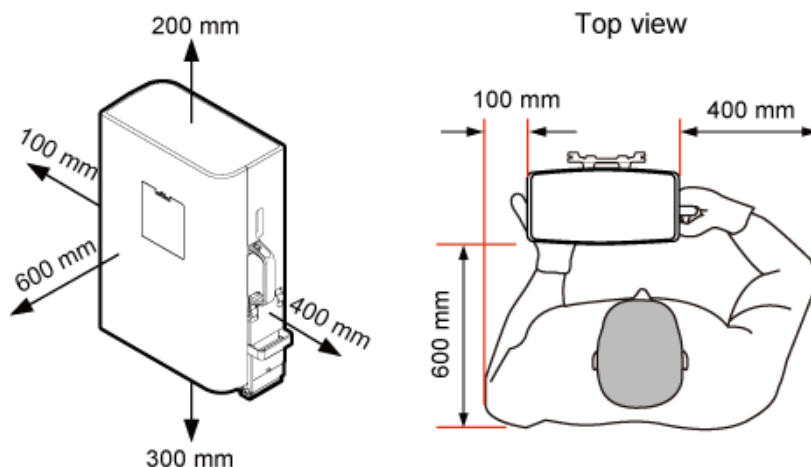
**Figure 3-20** Recommended clearance for a single DRH



## Minimum Clearance for a Single DRH

Figure 3-21 shows the minimum clearance for a single DRH.

**Figure 3-21** Minimum clearance for a single DRH



## 3.5.2 Clearances for Three or More DRHs

This section describes the recommended and minimum clearances for three or more DRHs.

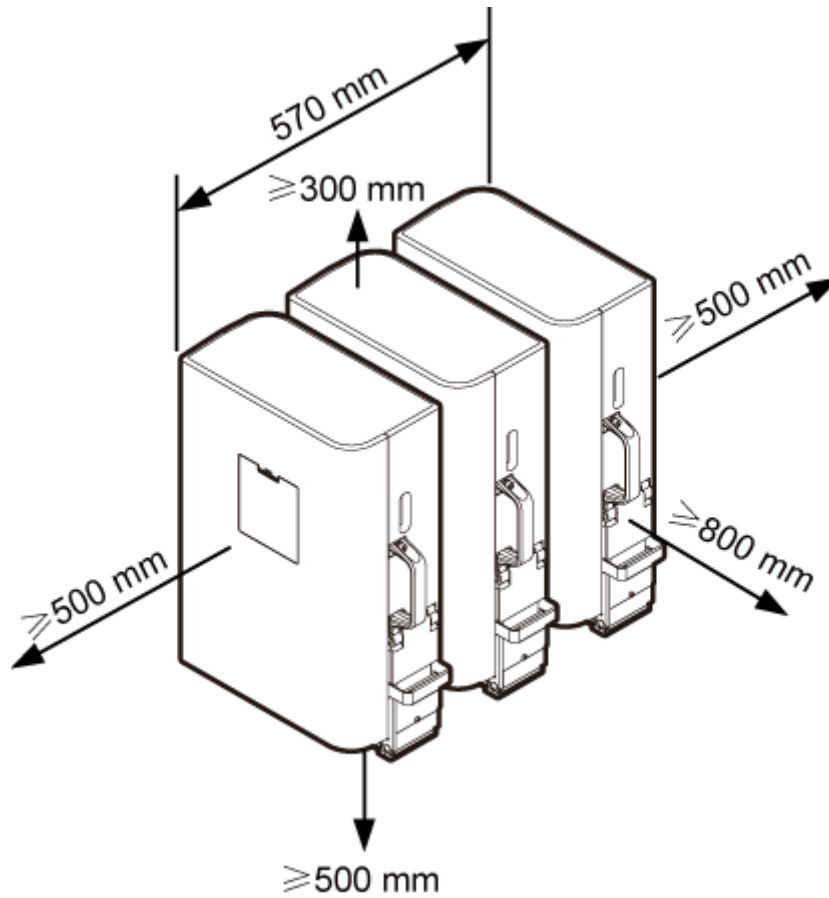
 **NOTE**

- The recommended clearances ensure normal running and provide an appropriate space for operation and maintenance (OM). If there is sufficient space, retain the recommended clearances.
- The minimum clearances ensure normal running and heat dissipation but do not allow OM activities such as checking indicator status and opening the cabling cavity. If the installation space is insufficient, retain the minimum clearances after the installation.

### Recommended Clearances for Three or More DRHs Installed on a Pole

[Figure 3-22](#) shows the recommended clearances for multiple DRHs installed in centralized mode.

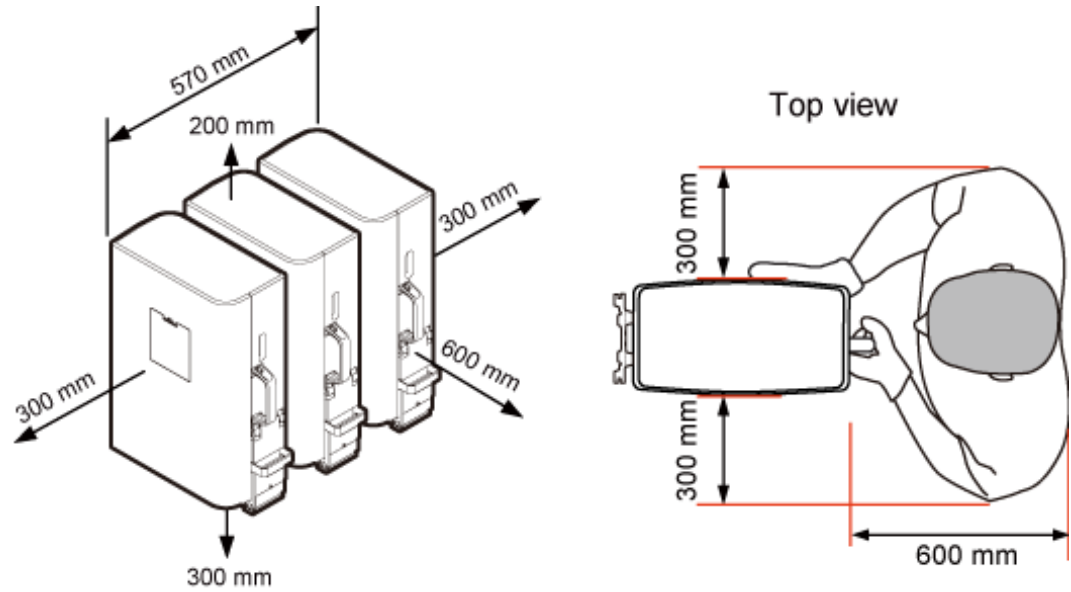
**Figure 3-22** Recommended clearances for three or more DRHs installed on a pole



### Minimum Clearances for Three or More DRHs Installed on a Pole

[Figure 3-23](#) shows the minimum clearances for multiple DRHs installed in centralized mode.

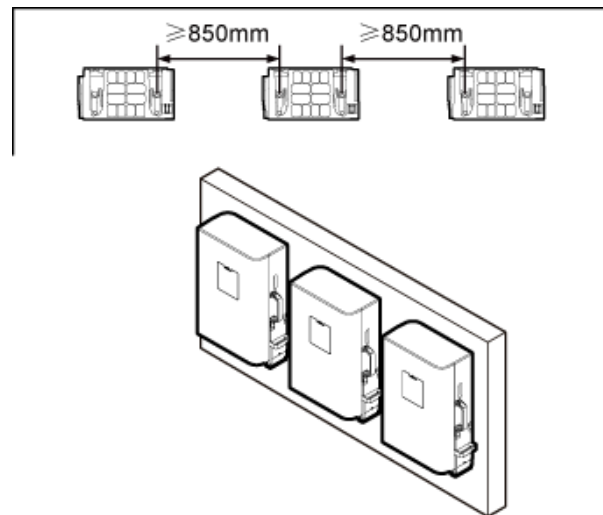
**Figure 3-23** Minimum clearances for three or more DRHs installed on a pole



## Recommended Clearances for Three or More DRHs Installed on a Wall in Standard Mode

Figure 3-24 shows the recommended clearances for multiple DRHs installed on a wall in standard mode.

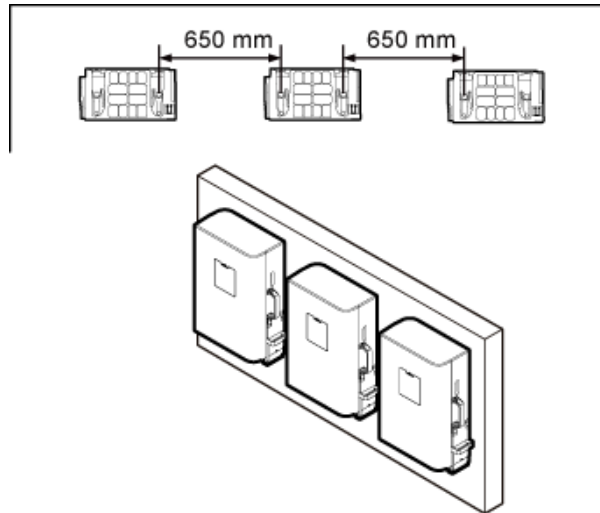
**Figure 3-24** Recommended clearances for three or more DRHs installed on a wall in standard mode



## Minimum Clearances for Three or More DRHs Installed on a Wall in Standard Mode

Figure 3-25 shows the minimum clearances for three or more DRHs installed on a wall in standard mode.

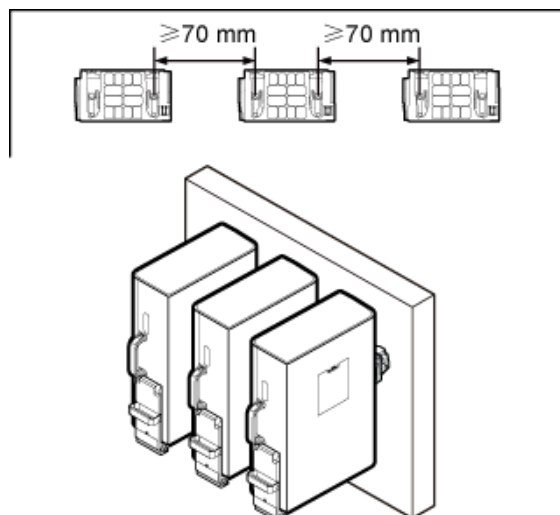
**Figure 3-25** Minimum clearances for three or more DRHs installed on a wall in standard mode



## Recommended Clearances for Three or More DRHs Installed on a Wall in Side-Mounted Mode

Figure 3-26 shows the recommended clearances for three or more DRHs side-mounted on a wall.

**Figure 3-26** Recommended clearances for three or more DRHs installed on a wall in side-mounted mode





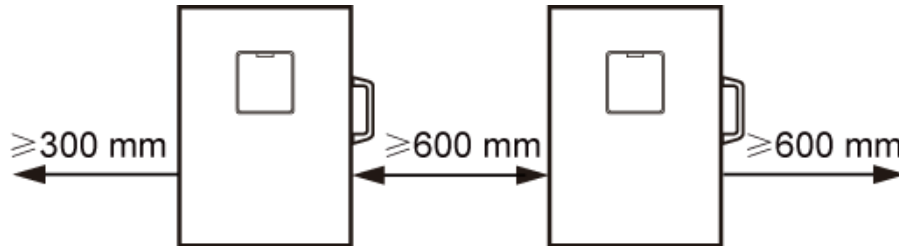
### 3.5.3 Installation Spacing Between DRHs

This section describes the horizontal and vertical spacing between DRHs.

#### Recommended Horizontal Spacing Between DRHs

Figure 3-27 shows the recommended horizontal spacing between DRHs.

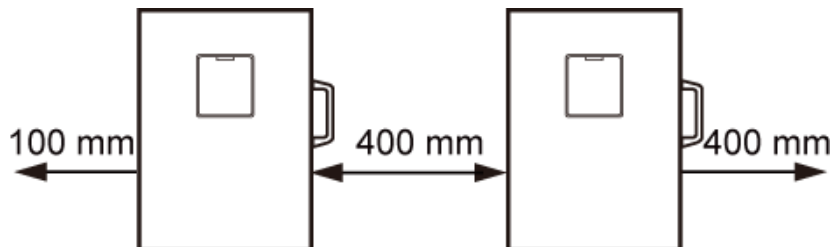
Figure 3-27 Recommended horizontal spacing between DRHs



#### Minimum Horizontal Spacing Between DRHs

Figure 3-28 shows the minimum horizontal spacing between DRHs.

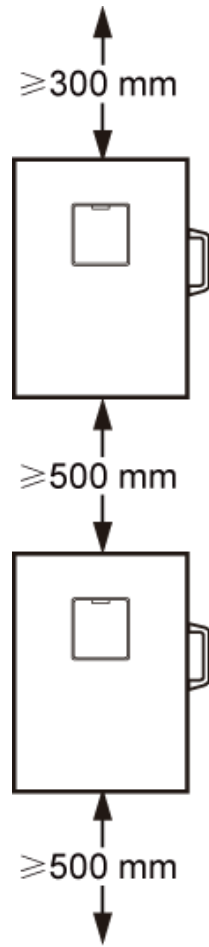
Figure 3-28 Minimum horizontal spacing between DRHs



#### Recommended Vertical Spacing Between DRHs

Figure 3-29 shows the recommended vertical spacing between DRHs.

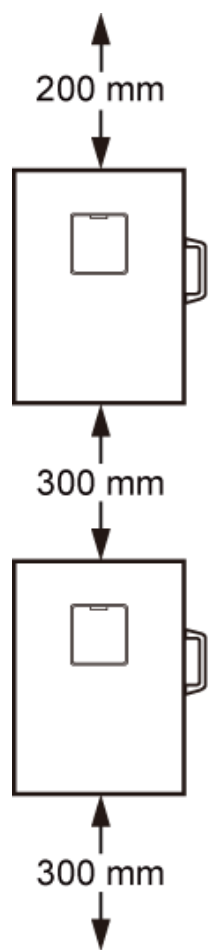
**Figure 3-29** Recommended vertical spacing between DRHs



### Minimum Vertical Spacing Between DRHs

Figure 3-30 shows the minimum vertical spacing between DRHs.

**Figure 3-30** Minimum vertical spacing between DRHs



# 4 Unpacking the Equipment

This chapter describes how to unpack and check the delivered equipment to ensure that all the materials are included and intact.

## Context



### NOTE

When transporting, moving, or installing the equipment, components, or parts, you must:

- Prevent them from colliding with doors, walls, shelves, or other objects.
- Wear clean gloves, and avoid touching the equipment, components, or parts with bare hands, sweat-soaked gloves, or dirty gloves.

## Procedure

**Step 1** Check the total number of articles in each case according to the packing list.

If ...	Then ...
The total number tallies with the packing list	Go to <a href="#">Step 2</a> .
The total number does not tally with the packing list	Find out the cause and report any missing articles to the local Huawei office.

**Step 2** Check the exterior of the packing case.

If ...	Then ...
The outer packing is intact	Go to <a href="#">Step 3</a> .
The outer packing is severely damaged or soaked	Find out the cause and report it to the local Huawei office.
The shockwatch label is red	Stop unpacking the wooden crate, and then report it to the transportation company.

**Step 3** Check the type and quantity of the equipment in the cases according to the packing list.

If ...	Then ...
Types and quantity of the article tally with those on the packing list	Sign the <i>Packing List</i> with the customer.
Either shipment shortage, wrong shipment or damaged articles.	Report to the local Huawei office.



### WARNING

- To protect the equipment and prevent damage to the equipment, you are advised to keep the unpacked equipment and packing materials indoors, take photos of the stocking environment, packing case or carton, packing materials, and any rusted or eroded equipment, and then file the photos.
- Verify that the insulation layers of all DRH cables are intact. If the insulation layers are damaged or broken, water will penetrate into the cables, which may cause damages to DRHs or human injury.

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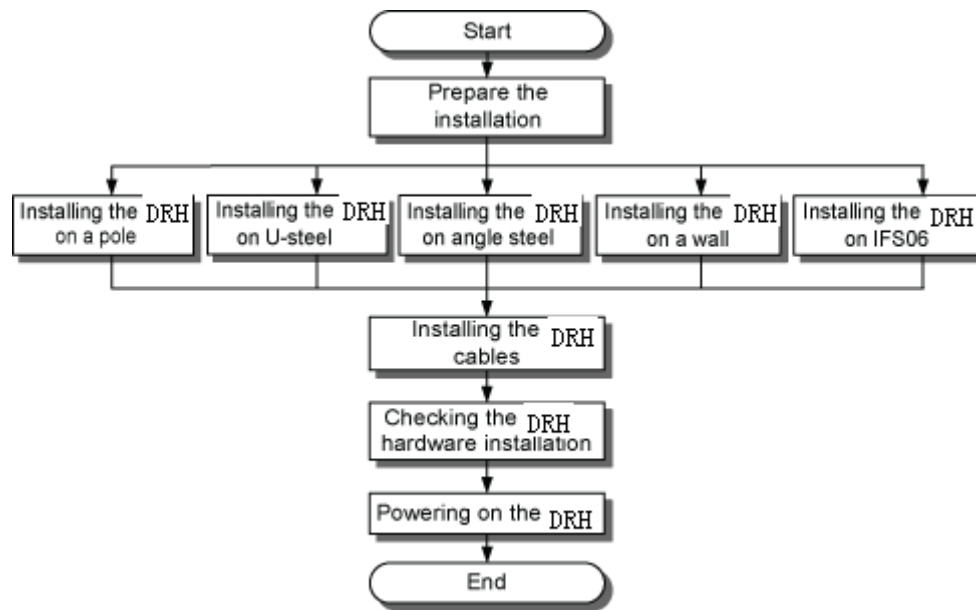
----End

# 5 Installation Process

The installation process involves installing a DRH and DRH cables, checking the DRH hardware installation, and powering on the DRH.

Figure 5-1 shows the process of installing a DRH.

Figure 5-1 Process of installing a DRH



---

# 6 Installing the DRH

---

## About This Chapter

This chapter describes the procedure for installing the DRH. The DRH can be installed on a pole, U-steel, angle steel, wall, or an IFS06. The procedure for installing the DRH varies depending on installation options.

### 6.1 Mounting Kits for a DRH

This section describes the bracket assembly and the attachment plate for a DRH.

### 6.2 Installing the DRH on a Pole

One or more DRHs can be installed on a pole.

### 6.3 Installing the DRH on U-steel

This section describes the procedure and precautions for installing the DRH on U-steel. U-steel can be installed either on the ground only one DRH can be installed on a piece of U-steel. A DRH on U-steel is installed in standard mode by default.

### 6.4 Installing the DRH on Angle Steel

This section describes the procedure and precautions for installing the DRH on angle steel. Angle steel can be installed either on the ground only one DRH can be installed on a piece of angle steel. A DRH on angle steel is installed in standard mode by default.

### 6.5 Installing the DRH on a Wall

This section describes the procedure and precautions for installing the DRH on a wall. A DRH on a wall is installed in standard mode by default.

### 6.6 Installing a DRH on an IFS06

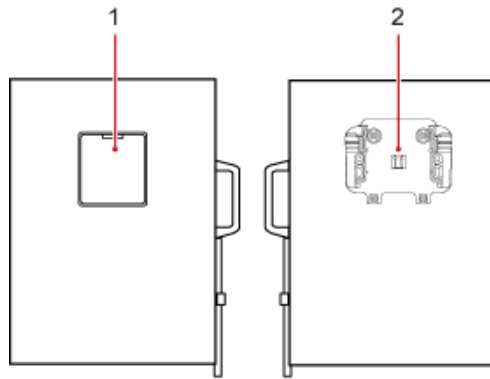
This section describes the procedure and precautions for installing a DRH on an IFS06.

## 6.1 Mounting Kits for a DRH

This section describes the bracket assembly and the attachment plate for a DRH.

Figure 6-1 shows the front and rear view of a DRH.

**Figure 6-1** Front and rear view of a DRH

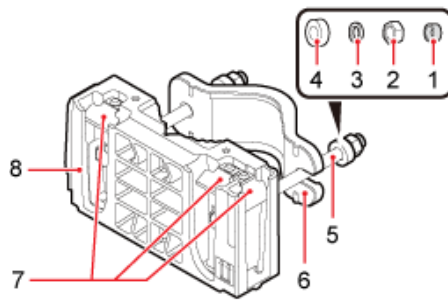


(1) Cover plate

(2) Attachment plate

Figure 6-2 shows the bracket assembly for a DRH.

**Figure 6-2** Common DRH mounting kit



(1) Plastic cap

(2) Standard M10  
nut

(3) Spring washer

(4) Thick flat  
washer

(5) M10x150  
bolt

(6) Auxiliary  
bracket

(7) Hoist clamp on the main  
bracket

(8) Main bracket

## 6.2 Installing the DRH on a Pole

One or more DRHs can be installed on a pole.

### 6.2.1 Installing a Single DRH

This section describes the procedure and precautions for installing a single DRH on a pole. A single DRH can be installed on a pole in standard or side-mounted mode.

#### Prerequisites

The hoist clamp on the main bracket is secured properly.



---

 **CAUTION**

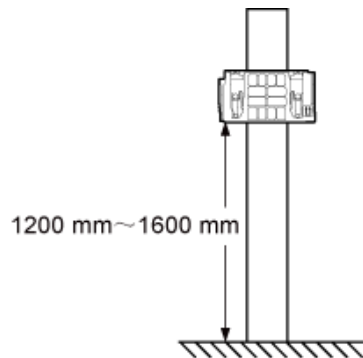
- Do not stand the DRH upright because the RF ports cannot support the weight of the DRH.
  - Place a foam pad or cardboard under the DRH to protect the DRH housing from damage during the installation.
- 

## Procedure

**Step 1** Determine a position for installing the mounting bracket.

- If the DRH must be installed on a pole secured on the ground, see [Figure 6-3](#) to determine a position.

**Figure 6-3** Distance between the mounting bracket and the ground

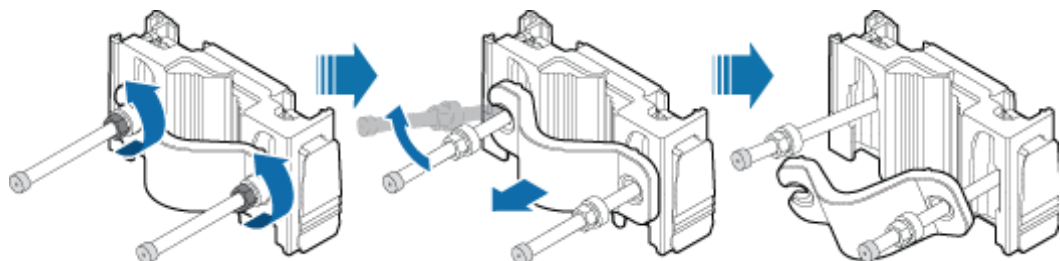


 **NOTE**

It is recommended that the mounting bracket be 1,200 mm (47.24 in.) to 1,600 mm (62.99 in.) above the ground.

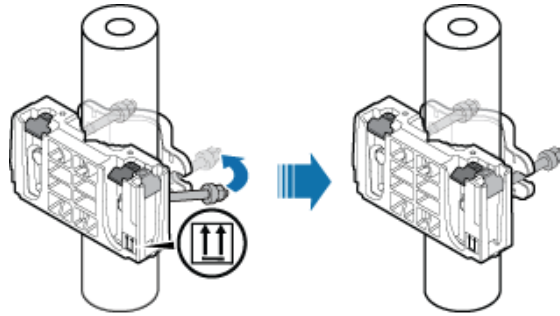
**Step 2** Loosen the two M10 nuts on the mounting brackets and move the M10x150 bolt out of the trough on the auxiliary bracket, as shown in [Figure 6-4](#).

**Figure 6-4** Moving the bolt out of the trough



**Step 3** Slide the main and auxiliary brackets onto the pole and fit a bolt into the trough, as shown in [Figure 6-5](#).

**Figure 6-5** Sliding the main and auxiliary brackets onto the pole



---

 **CAUTION**

Ensure that the arrows on the main bracket are pointing up.

---

- Step 4** Use a 16 mm (0.63 in.) torque wrench to tighten the two M10 nuts to 40 N·m (354.03 lbf·in.) so that the main and auxiliary brackets are tightly secured onto the pole, as shown in [Figure 6-6](#).

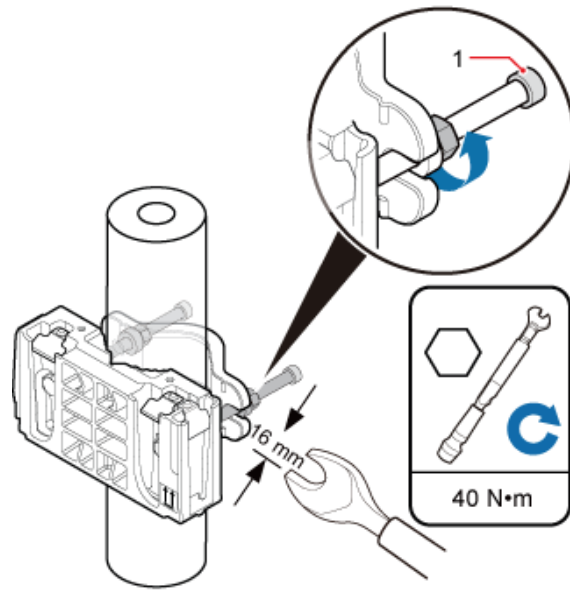
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 **CAUTION**

Tighten the nuts on the two bolts alternatively. After the main and auxiliary brackets are secured properly, measure the spacing between the brackets on both sides and ensure that the spacing is the same on the two sides.

---

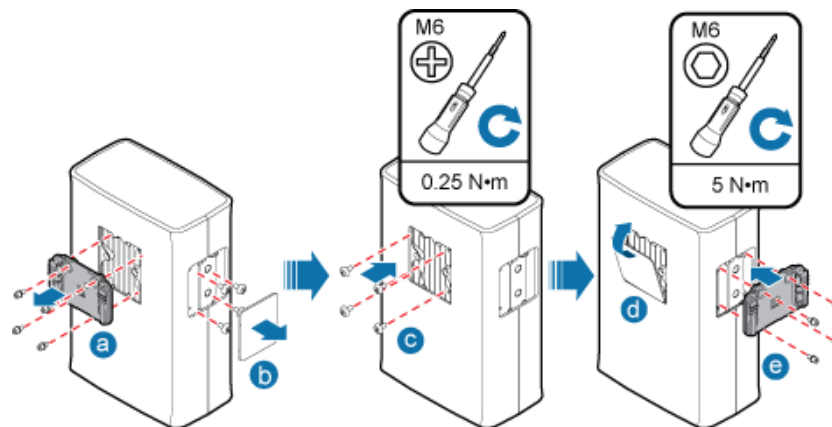
**Figure 6-6** Securing the main and auxiliary brackets onto the pole



(1) Plastic cap

**Step 5 Optional:** If a DRH is to be installed in side-mounted mode, interchange the attachment plate and stainless steel screws at the rear of the DRH with the cover plate and plastic screws on one side of the DRH, as shown in [Figure 6-7](#).

**Figure 6-7** Interchanging the attachment plate at the rear of the DRH with the cover plate on one side of the DRH



1. Use an inner hexagon screwdriver to remove the attachment plate from the rear of the DRH.
2. Remove the cover plate from one side of the DRH, and use a Phillips screwdriver to remove the plastic screws from the DRH.
3. Install the plastic screws onto the rear of the DRH, and use a torque screwdriver to tighten the screws to 0.25 N m (2.21 lbf in.).

4. Install the cover plate onto the rear of the DRH.
5. Install the attachment plate onto the side of the DRH, and use a torque screwdriver to tighten the stainless steel screws on the attachment plate to 5 N·m (44.25 lbf·in.).

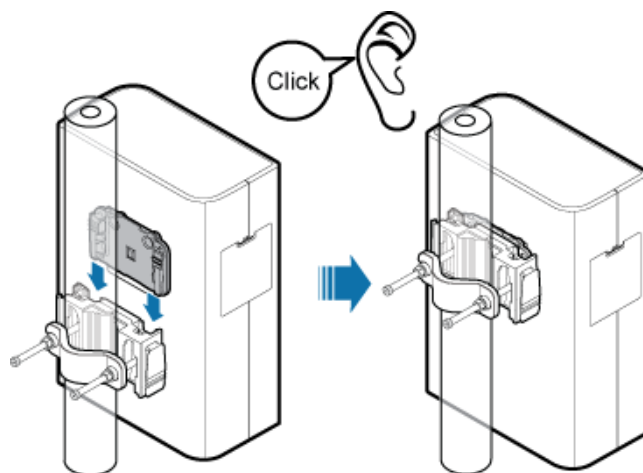
**Step 6** Install the DRH onto the main bracket, as shown in [Figure 6-8](#).



**NOTE**

This section describes the standard installation of a DRH. The method is similar for side-mounted installation.

**Figure 6-8** Installing the DRH onto the main bracket



----End

## 6.2.2 Installing Two DRHs

This section describes the procedure and precautions for installing two DRHs on a pole. On a pole, two DRHs can be installed next to each other at the same level on a pole or vertically at different levels.

### Prerequisites

The hoist clamp on the main bracket is secured properly.

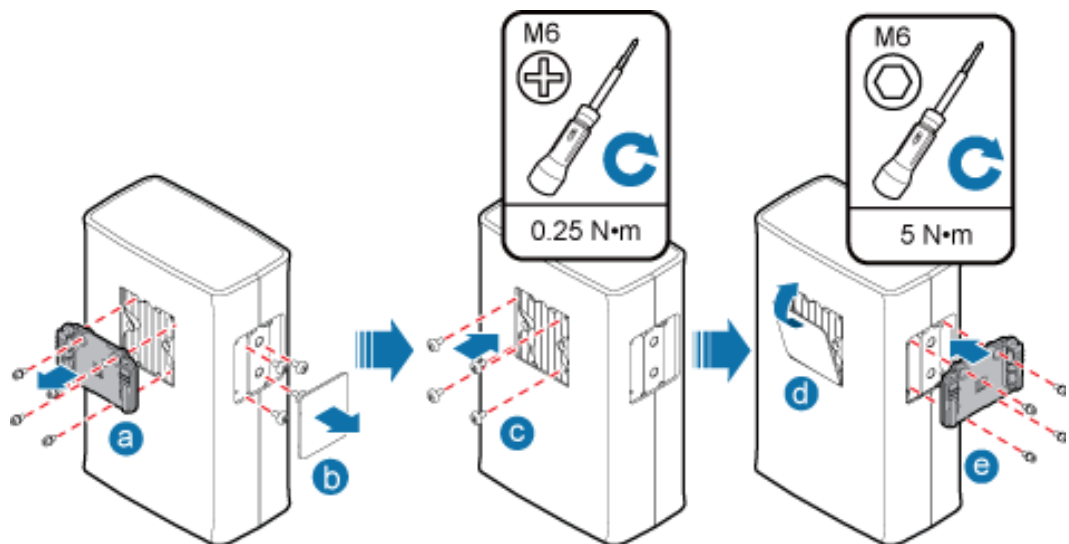
## CAUTION

- Do not stand the DRH upright because the RF ports cannot support the weight of the DRH.
- Place a foam pad or cardboard under the DRH to protect the DRH housing from damage during the installation.

## Procedure

- Installing two DRHs next to each other at the same level (recommended)
1. Install one pair of main and auxiliary brackets on a pole. For details, see [6.2.1 Installing a Single DRH](#).
  2. Interchange the attachment plate and stainless steel screws at the rear of the DRH with the cover plate and plastic screws on one side of the DRH, as shown in [Figure 6-9](#).

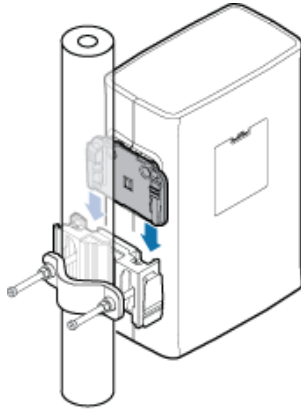
**Figure 6-9** Interchanging the attachment plate at the rear of the DRH with the cover plate on one side of the DRH



- (a) Use an inner hexagon screwdriver to remove the attachment plate from the rear of the DRH.
- (b) Remove the cover plate from one side of the DRH, and use a Phillips screwdriver to remove the plastic screws from the DRH.
- (c) Install the plastic screws to the rear of the DRH, and use a torque screwdriver to tighten the screws to 0.25 N m (2.21 lbf in.).
- (d) Install the cover plate onto the rear of the DRH.
- (e) Install the attachment plate to the side of the DRH, and use a torque screwdriver to tighten the stainless steel screws on the attachment plate to 5 N m (44.25 lbf in.).

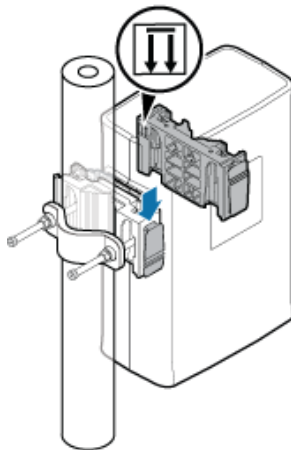
3. Install the first DRH onto the main bracket, as shown in [Figure 6-10](#).

**Figure 6-10** Installing the first DRH onto the main bracket



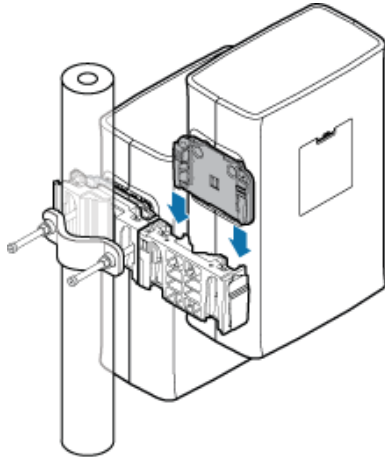
4. Install the second main bracket on one side of the first main bracket, as shown in [Figure 6-11](#).

**Figure 6-11** Installing the second main bracket



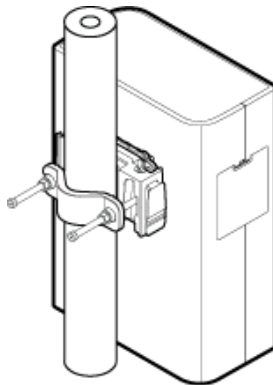
5. Install the second DRH on the second main bracket, as shown in [Figure 6-12](#).

**Figure 6-12** Installing the second DRH onto the second main bracket



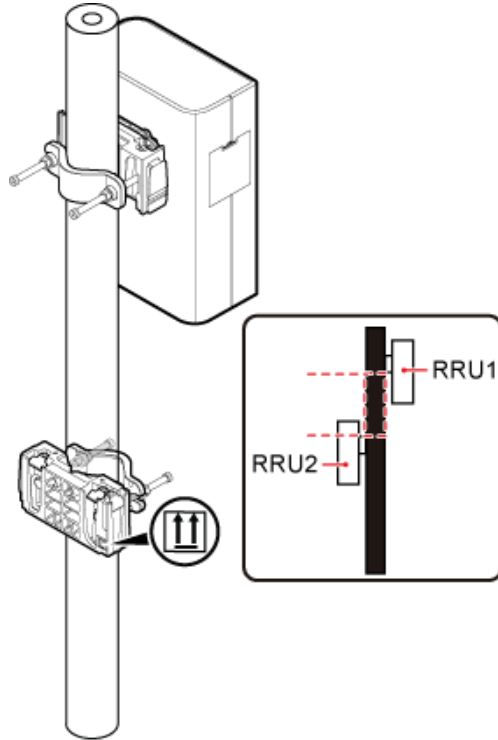
- Installing two DRHs independently
  1. Install the first DRH onto the main bracket, as shown in [Figure 6-13](#). For details, see [6.2.1 Installing a Single DRH](#).

**Figure 6-13** Installing the first DRH onto the main bracket



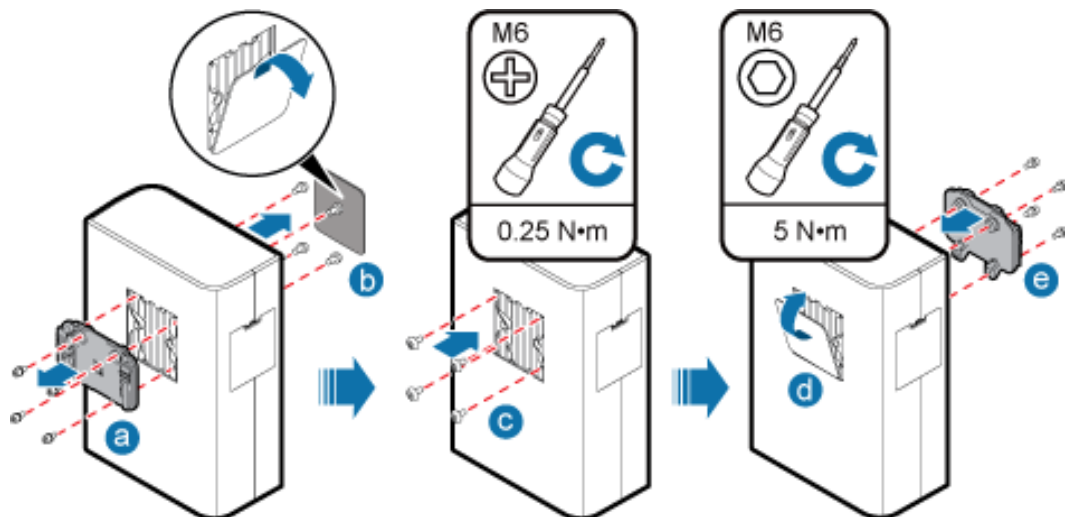
2. Install the second set of DRH mounting brackets above or below the first set of DRH mounting brackets and maintain a space equal to or greater than the height of a DRH between the two sets of brackets, as shown in [Figure 6-14](#).

**Figure 6-14** Installing the second set of DRH mounting brackets



3. Interchange the cover plate and plastic screws on the front of the second DRH with the attachment plate and stainless steel screws at the rear of the second DRH, as shown in [Figure 6-15](#).

**Figure 6-15** Interchanging the cover plate on the front of the second DRH with the attachment plate at the rear of the second DRH



- (a) Use an inner hexagon screwdriver to remove the attachment plate from the rear of the DRH.



- (b) Remove the cover plate from the front of the DRH, and use a Phillips screwdriver to remove the plastic screws from the DRH.
- (c) Install the plastic screws to the rear of the DRH, and use a torque screwdriver to tighten the screws to 0.25 N·m (2.21 lbf·in.).
- (d) Install the cover plate onto the rear of the DRH.
- (e) Install the attachment plate to the front of the DRH, and use a torque screwdriver to tighten the stainless steel screws on the attachment plate to 5 N·m (44.25 lbf·in.).

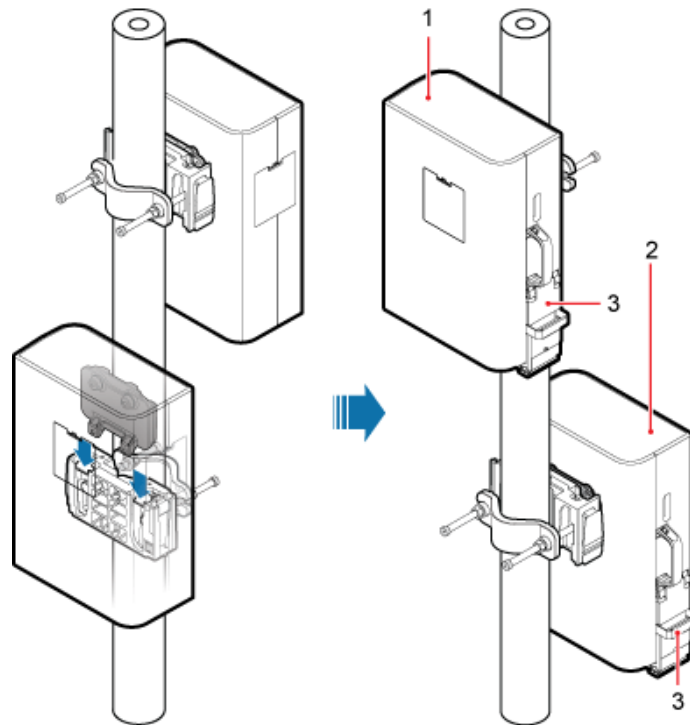
4. Install the second DRH onto the main bracket, as shown in [Figure 6-16](#).



**NOTE**

When you install two DRHs vertically at different levels and in different directions on a pole, ensure that the cabling cavities of these two DRHs face the same direction.

**Figure 6-16** Installing the second DRH onto the main bracket



(1) DRH installed in standard mode

(2) DRH installed in reverse mode

(3) Cabling cavity

----End

## 6.2.3 Installing Three or More DRHs

The section describes the procedure and precautions for installing three or more DRHs on a pole. Before installing three or more DRHs together on a pole, move the attachment plates from the front of the DRHs to the side of the DRHs.

### Prerequisites

The hoist clamp on the main bracket is secured properly.



- Do not stand the DRH upright because the RF ports cannot support the weight of the DRH.
  - Place a foam pad or cardboard under the DRH to protect the DRH housing from damage during the installation.
- 

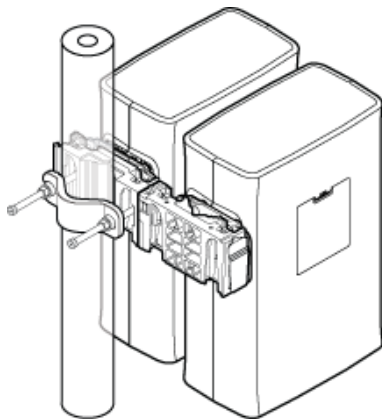
### Context

- A pole supports the installation of three, four, or six DRHs. The procedures for installing them are the same. Following is the procedure of installing four DRHs on a pole.

### Procedure

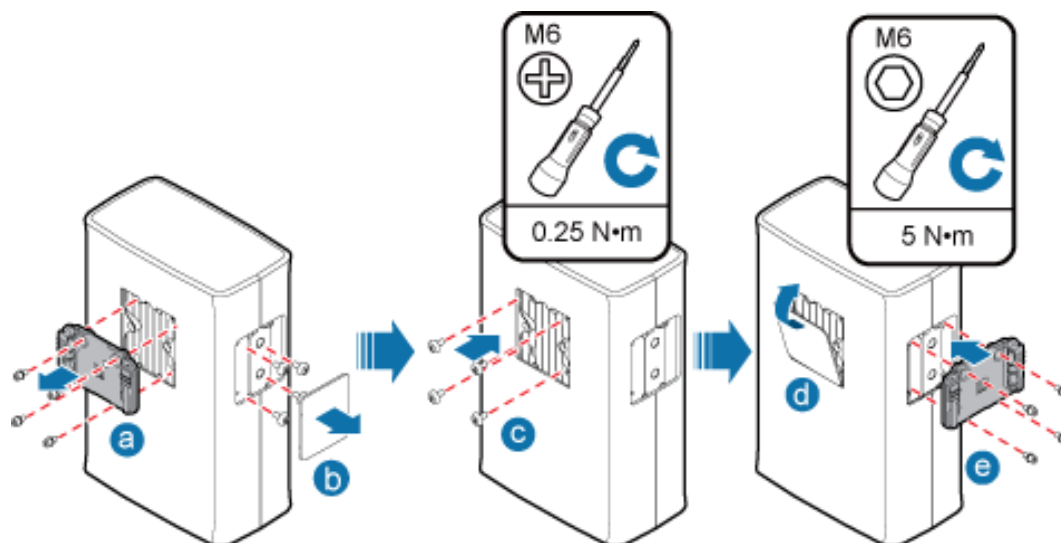
- Step 1** Install the two DRHs, as shown in [Figure 6-17](#). For the installation procedure, see "Installing two DRHs next to each other at the same level" in [6.2.2 Installing Two DRHs](#).

**Figure 6-17** Two DRHs installed on a pole



- Step 2** Interchange the attachment plate and stainless steel screws at the rear of the DRH with the cover plate and plastic screws on one side of the DRH, as shown in [Figure 6-18](#).

**Figure 6-18** Interchanging the attachment plate at the rear of the DRH with the cover plate on one side of the DRH



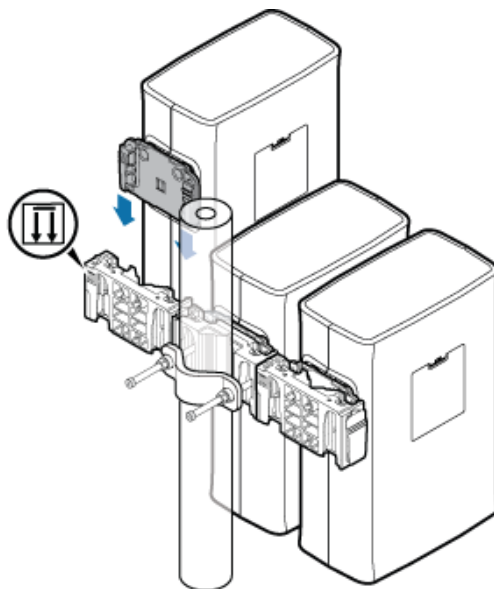
- (a) Use an inner hexagon screwdriver to remove the attachment plate from the rear of the DRH.
- (b) Remove the cover plate from one side of the DRH, and use a Phillips screwdriver to remove the plastic screws from the DRH.
- (c) Install the plastic screws to the rear of the DRH, and use a torque screwdriver to tighten the screws to 0.25 N m (2.21 lbf in.).
- (d) Install the cover plate onto the rear of the DRH.
- (e) Install the attachment plate to the side of the DRH, and use a torque screwdriver to tighten the stainless steel screws on the attachment plate to 5 N m (44.25 lbf in.).

**Step 3** Install the third main bracket, and install the third DRH on the third main bracket, as shown in [Figure 6-19](#).



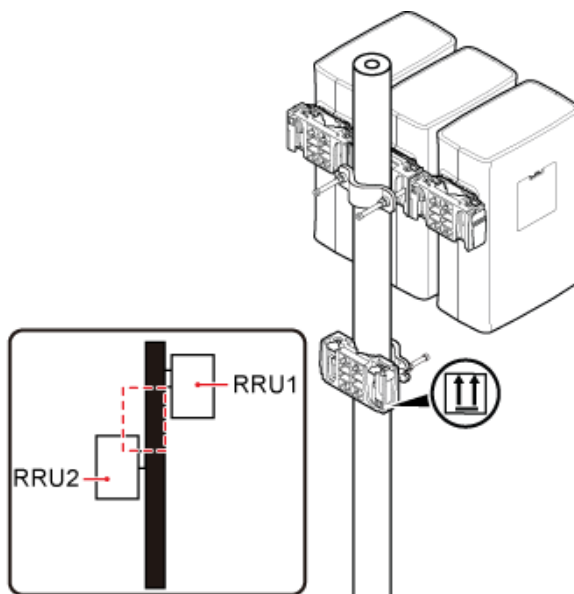
When installing the third main bracket, ensure that the arrows on the main bracket are pointing down.

**Figure 6-19** Installing the third DRH onto the third main bracket



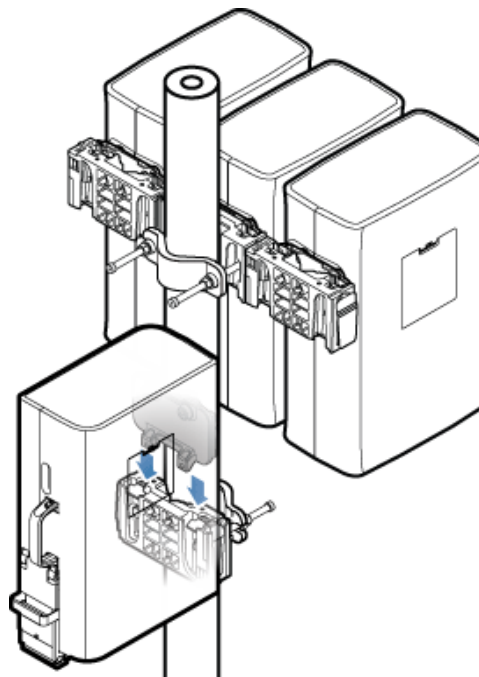
**Step 4** Install the second set of DRH mounting brackets above or below the first set of DRH mounting brackets and maintain a space equal to or greater than the height of a DRH between the two sets of brackets, as shown in [Figure 6-20](#).

**Figure 6-20** Installing the second set of DRH mounting brackets



**Step 5** Install the fourth DRH onto the fourth main bracket, as shown in [Figure 6-21](#).

**Figure 6-21** Installing the fourth DRH onto the fourth main bracket



----End

## 6.3 Installing the DRH on U-steel

This section describes the procedure and precautions for installing the DRH on U-steel. U-steel can be installed either on the ground only one DRH can be installed on a piece of U-steel. A DRH on U-steel is installed in standard mode by default.

### Prerequisites

The hoist clamp on the main bracket is secured properly.



### CAUTION

- Do not stand the DRH upright because the RF ports cannot support the weight of the DRH.
  - Place a foam pad or cardboard under the DRH to protect the DRH housing from damage during the installation.
- 

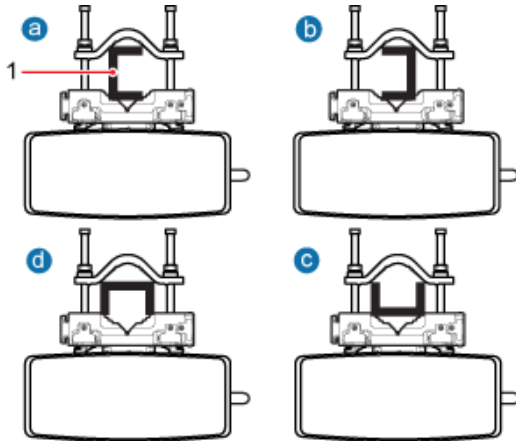
### Context

[Figure 6-22](#) shows the top view of the DRH installed on U-steel.

 **CAUTION**

When the width of the narrower edges of the U-steel is less than 40 mm (1.57 in.), only the a and b modes are supported.

**Figure 6-22** Top view of the DRH



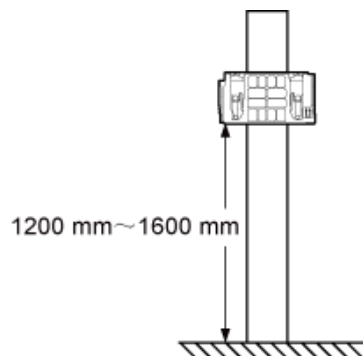
(1) U-steel

## Procedure

**Step 1** Determine a position for installing the mounting bracket.

- If the DRH must be installed on U-steel secured on the ground, see [Figure 6-23](#) to determine a position.

**Figure 6-23** Distance between the main bracket and the ground

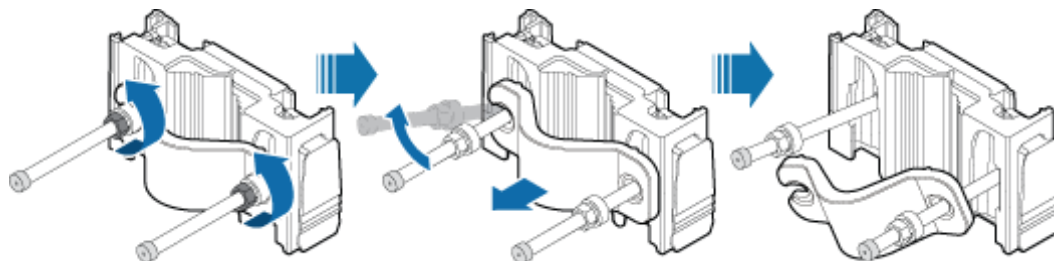


 **NOTE**

It is recommended that the mounting bracket be 1,200 mm (47.24 in.) to 1,600 mm (62.99 in.) above the ground.

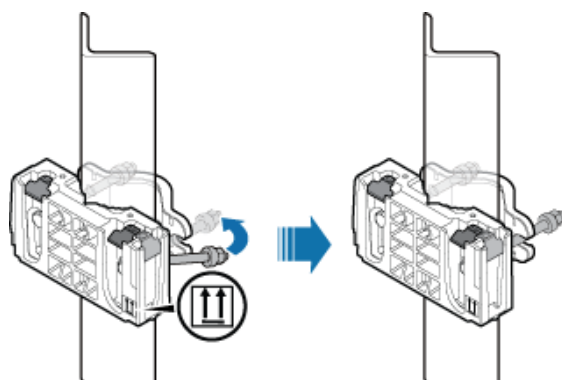
- Step 2** Loosen the two M10 nuts on the mounting brackets and move the M10x150 bolt out of the trough on the auxiliary bracket, as shown in [Figure 6-24](#).

**Figure 6-24** Moving the bolt out of the trough



- Step 3** Slide the main and auxiliary brackets onto the U-steel and fit a bolt into the trough, as shown in [Figure 6-25](#).

**Figure 6-25** Sliding the main and auxiliary brackets onto the U-steel



**CAUTION**

Ensure that the arrows on the main bracket are pointing up.

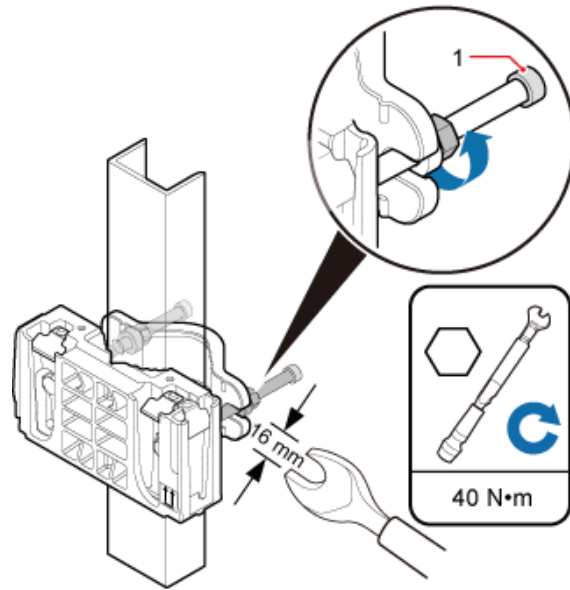
- Step 4** Use a 16 mm (0.63 in.) torque wrench to tighten the two M10 nuts to 40 N m (354.03 lbf in.) so that the main and auxiliary brackets are tightly secured onto the U-steel, as shown in [Figure 6-26](#).



**CAUTION**

Tighten the nuts on the two bolts alternatively. After the main and auxiliary brackets are secured properly, measure the spacing between the brackets on both sides and ensure that the spacing is the same on the two sides.

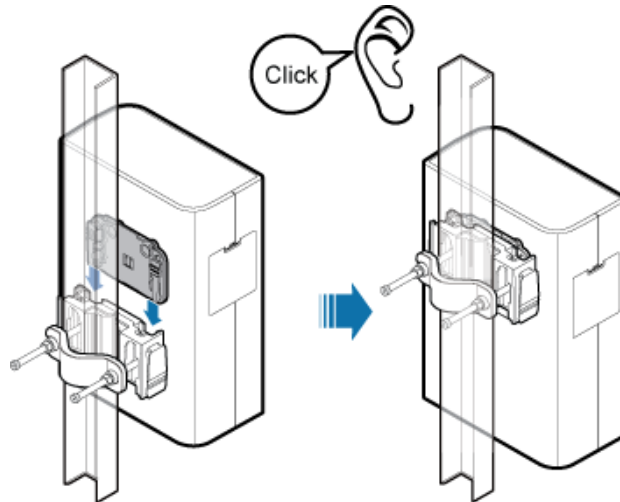
**Figure 6-26** Securing the main and auxiliary brackets onto the U-steel



(1) Plastic cap

**Step 5** Install the DRH onto the main bracket, as shown in [Figure 6-27](#).

**Figure 6-27** Installing the DRH onto the main bracket



----End



## 6.4 Installing the DRH on Angle Steel

This section describes the procedure and precautions for installing the DRH on angle steel. Angle steel can be installed either on the ground only one DRH can be installed on a piece of angle steel. A DRH on angle steel is installed in standard mode by default.

### Prerequisites

The hoist clamp on the main bracket is secured properly.

---

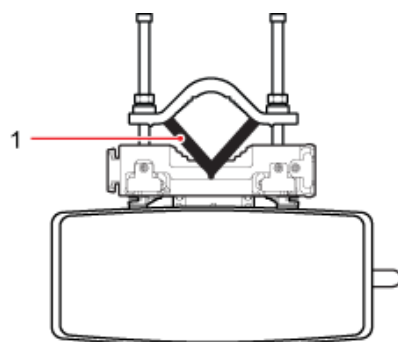
### CAUTION

- Do not stand the DRH upright because the RF ports cannot support the weight of the DRH.
  - Place a foam pad or cardboard under the DRH to protect the DRH housing from damage during the installation.
- 

### Context

Figure 6-28 shows the top view of the DRH installed on angle steel.

**Figure 6-28** Top view of the DRH



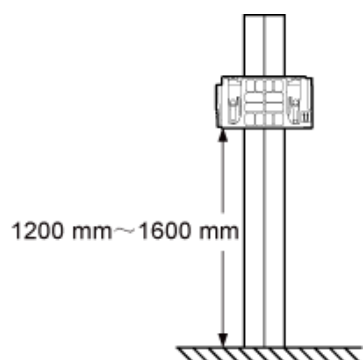
(1) Angle steel

### Procedure

**Step 1** Determine a position for installing the mounting bracket.

- If the DRH must be installed on angle steel secured on the ground, see [Figure 6-29](#) to determine a position.

**Figure 6-29** Distance between the mounting bracket and the ground

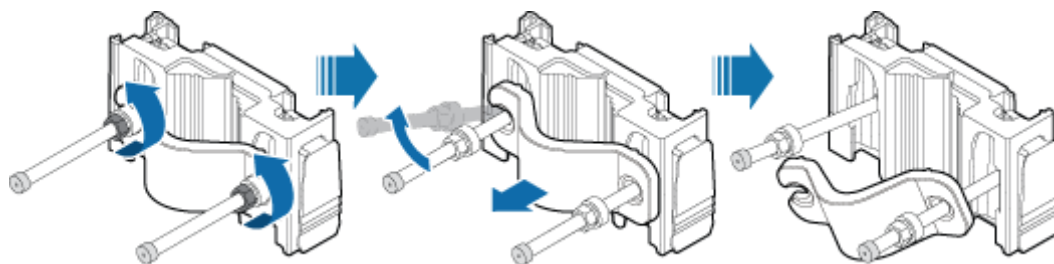


**NOTE**

It is recommended that the mounting bracket be 1,200 mm (47.24 in.) to 1,600 mm (62.99 in.) above the ground.

- Step 2** Loosen the two M10 nuts on the mounting brackets and move the M10x150 bolt out of the trough on the auxiliary bracket, as shown in [Figure 6-30](#).

**Figure 6-30** Moving the bolt out of the trough



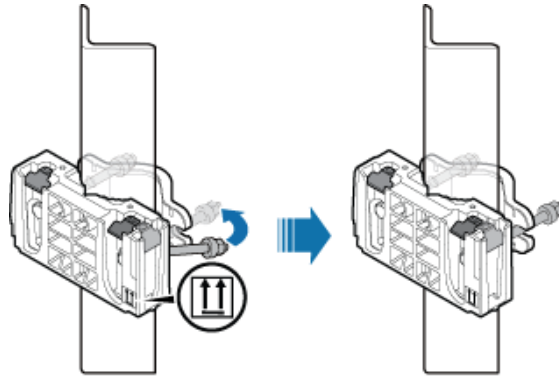
- Step 3** Slide the main and auxiliary brackets onto the angle steel and fit a bolt into the trough, as shown in [Figure 6-31](#).



**CAUTION**

Ensure that the arrows on the main bracket are pointing up.

**Figure 6-31** Sliding the main and auxiliary brackets onto the angle steel



**Step 4** Use a 16 mm (0.63 in.) torque wrench to tighten the two M10 nuts to 40 N·m (354.03 lbf in.) so that the main and auxiliary brackets are tightly secured onto the angle steel, as shown in [Figure 6-32](#).

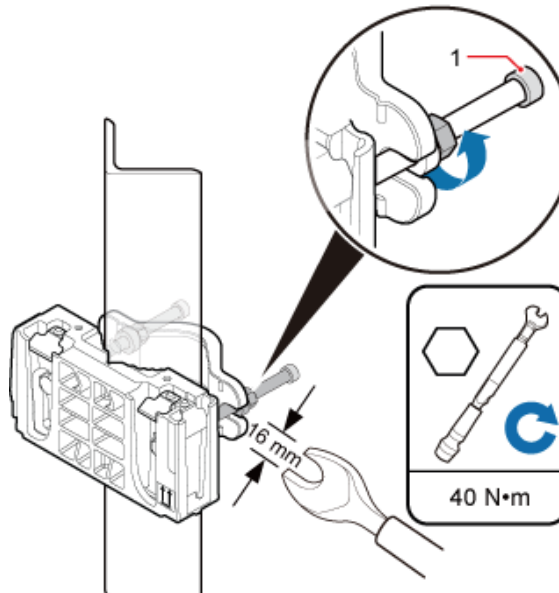
---

 **CAUTION**

Tighten the nuts on the two bolts alternatively. After the main and auxiliary brackets are secured properly, measure the spacing between the brackets on both sides and ensure that the spacing is the same on the two sides.

---

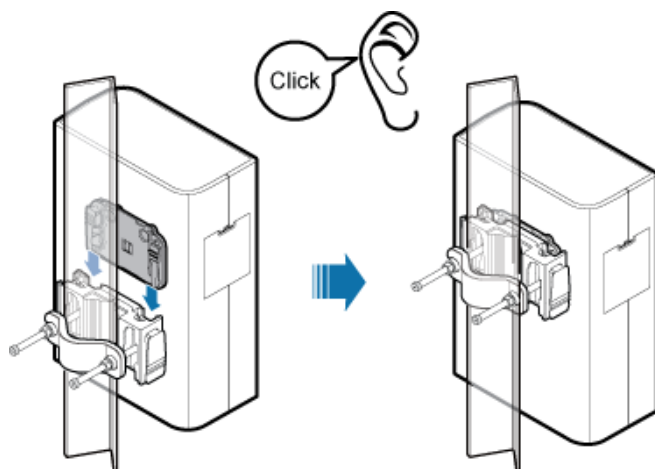
**Figure 6-32** Securing the main and auxiliary brackets onto the angle steel



(1) Plastic cap

**Step 5** Install the DRH onto the main bracket, as shown in [Figure 6-33](#).

**Figure 6-33** Installing the DRH onto the main bracket



----End

## 6.5 Installing the DRH on a Wall

This section describes the procedure and precautions for installing the DRH on a wall. A DRH on a wall is installed in standard mode by default.

### Prerequisites

The hoist clamp on the main bracket is secured properly.



### CAUTION

- Do not stand the DRH upright because the RF ports cannot support the weight of the DRH.
  - Place a foam pad or cardboard under the DRH to protect the DRH housing from damage during the installation.
  - When installing DRHs on a wall, do not combine the mounting brackets for multiple DRHs together.
- 

### Context

The wall on which DRHs are installed must meet the following requirements:

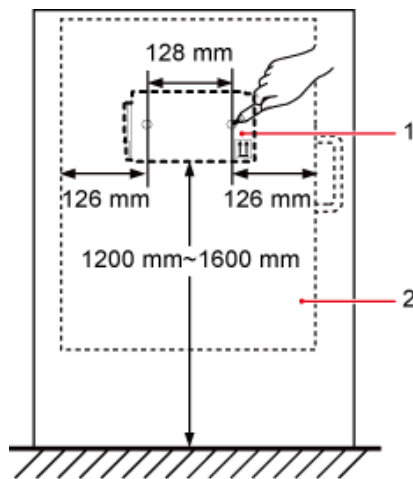
- For each DRH, the wall must be able to bear a weight four times the DRH's weight and the bolts' pulling force of 1.25 kN (281.25 lbf) vertical to the wall.

- Expansion bolts must be tightened to 15 N m (132.76 lbf in.) so that the bolts stay secured without damaging the wall.

## Procedure

- Step 1** Remove the plastic cap, M10 nut, spring washer, thick flat washer, auxiliary bracket, and M10x150 bolt one by one. Reserve the main bracket for the wall-mounted installation.
- Step 2** Place the main bracket against the wall, use a level to verify that the main bracket is placed horizontally, and use a maker to mark anchor points, as shown in [Figure 6-34](#).

**Figure 6-34** Marking anchor points



(1) Main bracket

(2) DRH

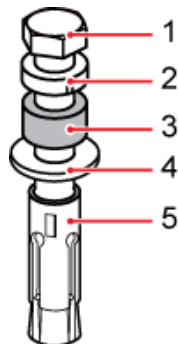


### NOTE

It is recommended that the main bracket be 1,200 mm (47.24 in.) to 1,600 mm (62.99 in.) above the ground.

- Step 3** [Figure 6-35](#) shows the expansion bolt assemblies. Drill holes at the anchor points, and then install expansion bolt assemblies, as shown in [Figure 6-36](#).

**Figure 6-35** Expansion bolt assembly



(1) M8x85 bolt

(2) Spring

(3) Plastic tube

(4) Flat washer

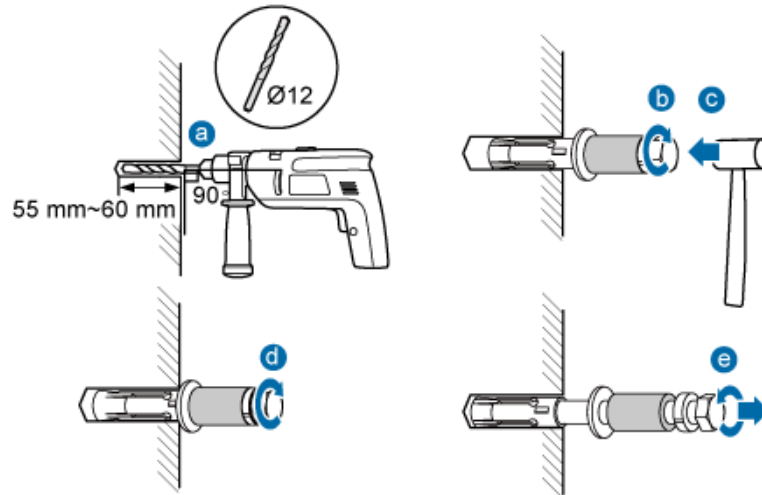
(5) Expansion

washer 8

8

tube

**Figure 6-36** Drilling a hole and inserting an expansion bolt assembly



1. Use a hammer drill with a  $\Phi 12$  bit to drill holes vertically at the marked anchor points. Ensure that the depth of each hole ranges from 55 mm (2.17 in.) to 60 mm (2.36 in.).

---

 **CAUTION**

Take proper safety measures to protect your eyes and respiratory tract against the dust before drilling holes.

2. Tighten an expansion bolt slightly and place it vertically into each hole.
3. Hit the expansion bolt with a rubber mallet until the expansion tube completely enters the hole.
4. Partially tighten the expansion bolts clockwise.
5. Rotate the bolts counterclockwise to loosen them, and remove each M8x85 bolt, spring washer, plastic tube, and flat washer in sequence.

 **NOTE**

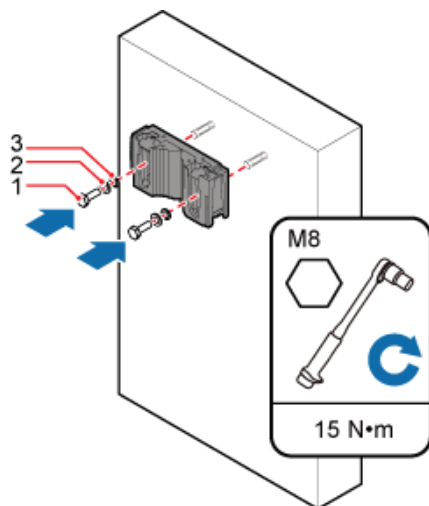
After removing the expansion bolts, dispose of the plastic tubes.

- Step 4** Use the removed flat washers, spring washers, and two M8x85 expansion bolts to secure the main bracket onto the holes. Then use an M8 torque socket to tighten the expansion bolts with a torque of 15 N m (132.76 lbf in.), as shown in [Figure 6-37](#).

 **CAUTION**

Ensure that the arrows on the main bracket are pointing down.

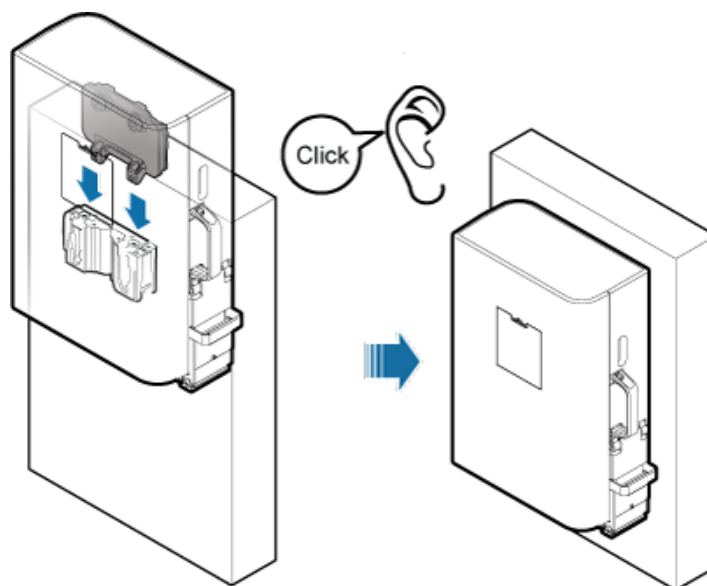
**Figure 6-37** Installing the main bracket



(1) M8x85 expansion bolt	(2) Spring washer	(3) Flat washer
--------------------------	-------------------	-----------------

**Step 5** Install the DRH onto the main bracket, as shown in [Figure 6-38](#).

**Figure 6-38** Installing the DRH onto the main bracket



----End

## 6.6 Installing a DRH on an IFS06

This section describes the procedure and precautions for installing a DRH on an IFS06.

### Prerequisites

The hoist clamp on the main bracket is secured properly.



### CAUTION

- Do not stand the DRH upright because the RF ports cannot support the weight of the DRH.
  - Place a foam pad or cardboard under a DRH to protect the DRH housing from damage during the installation.
- 

### Context

- The upper and lower adjustable beams on an IFS06 can be moved up and down to fit for heights of DRHs.
- DRHs can be installed on an IFS06 only when the ambient temperature is higher than or equal to the lowest working temperature of the DRH and at least 5 °C (41 °F) lower than the highest working temperature of the DRH. In this scenario, the IFS06 supports at least three DRHs. When the ambient temperature is higher than or equal to the lowest working temperature of the DRH and at least 10 °C (50 °F) lower than the highest working temperature of the DRH, the IFS06 supports a maximum of six DRHs.
- Install DRHs in the sequence from bottom to top and from left to right.
- This section describes how to install a DRH in height-unrestricted scenarios. The procedure for installing a DRH in height-restricted scenarios is the same as that in height-unrestricted scenarios.
- When installing the main bracket, you need to use the M10x50 bolts delivered with the IFS06.
- Rubber washers are easily compressed or broken, whereas do not need to be replaced.

### Procedure

- Step 1** Remove the plastic cap, M10 nut, spring washer, thick flat washer, auxiliary bracket, and M10x150 bolt one by one. Reserve the main bracket on the IFS06.
- Step 2** Use the M10x50 bolts delivered with the IFS06 to secure the main bracket to the IFS06, and then use an M10 torque socket wrench to secure the bolts to 30 N·m (265.52 lbf·in.).



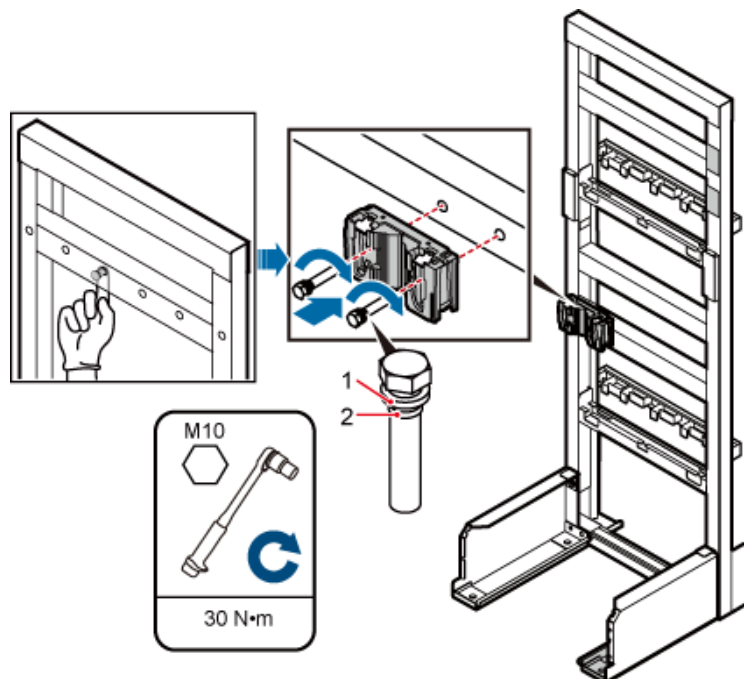
 **CAUTION**

Ensure that the arrows on the main bracket are pointing up.

- Height-restricted scenarios

Use one finger to push and remove the rubber plugs on the beam and then install the main bracket, as shown in [Figure 6-39](#).

**Figure 6-39** Installing the main bracket in height-restricted scenarios



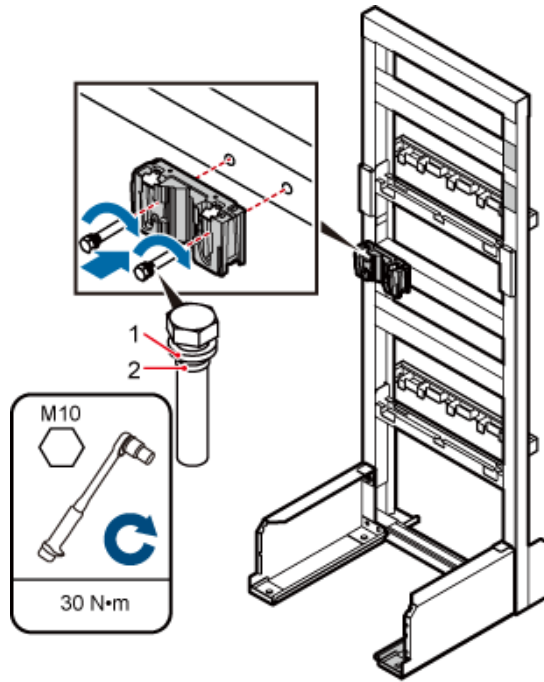
(1) Spring washer

(2) Rubber washer

- Height-unrestricted scenarios

Install the main bracket, as shown in [Figure 6-40](#).

**Figure 6-40** Installing the main bracket in height-unrestricted scenarios

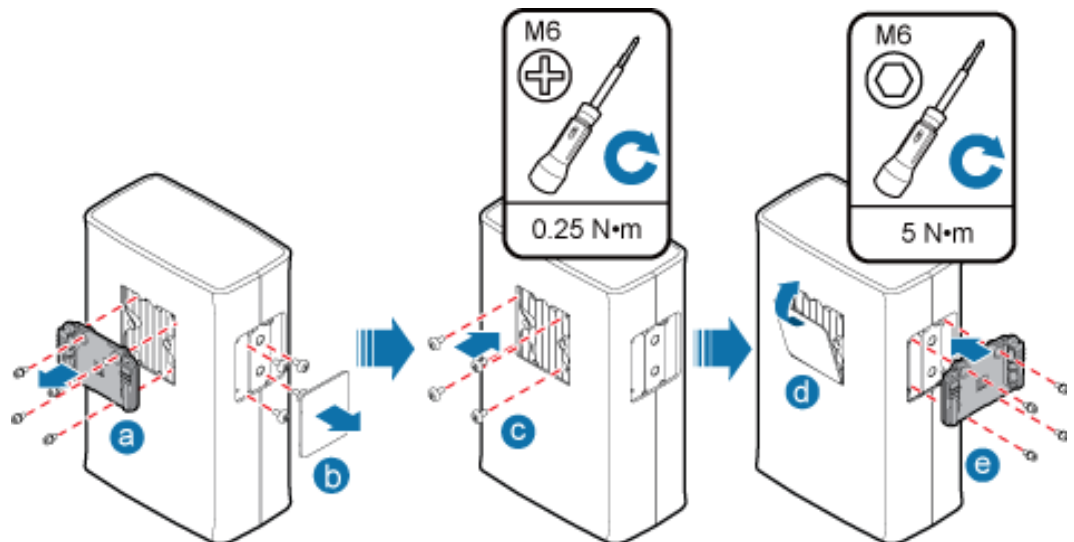


(1) Spring washer

(2) Rubber washer

**Step 3** Interchange the attachment plate and stainless steel screws at the rear of the DRH with the cover plate and plastic screws on one side of the DRH, as shown in [Figure 6-9](#).

**Figure 6-41** Interchanging the attachment plate at the rear of the DRH with the cover plate on one side of the DRH

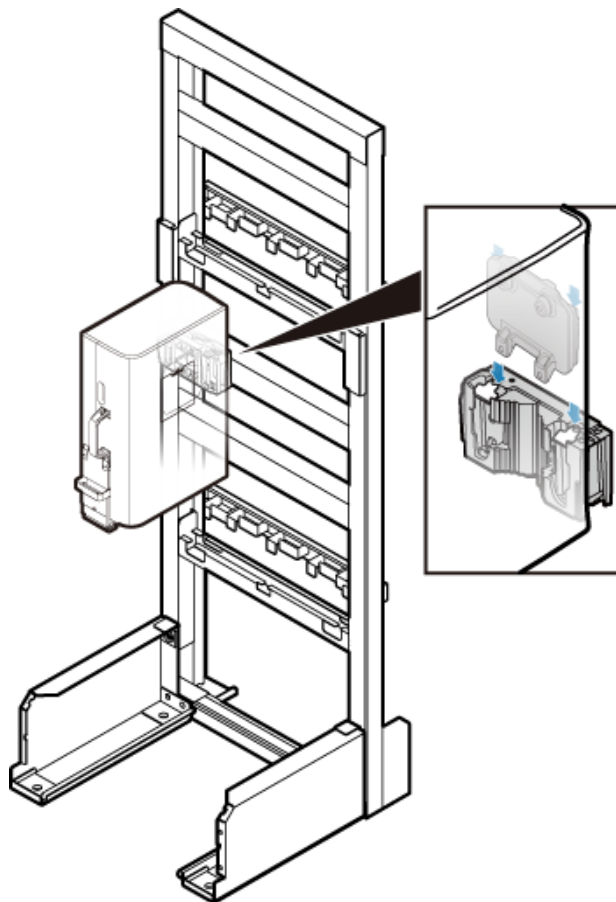


(a) Use an inner hexagon screwdriver to remove the attachment plate from the rear of the DRH.

- (b) Remove the cover plate from one side of the DRH, and use a Phillips screwdriver to remove the plastic screws from the DRH.
- (c) Install the plastic screws to the rear of the DRH, and use a torque screwdriver to tighten the screws to 0.25 N·m (2.21 lbf in.).
- (d) Install the cover plate onto the rear of the DRH.
- (e) Install the attachment plate to the side of the DRH, and use a torque screwdriver to tighten the stainless steel screws on the attachment plate to 5 N·m (44.25 lbf in.).

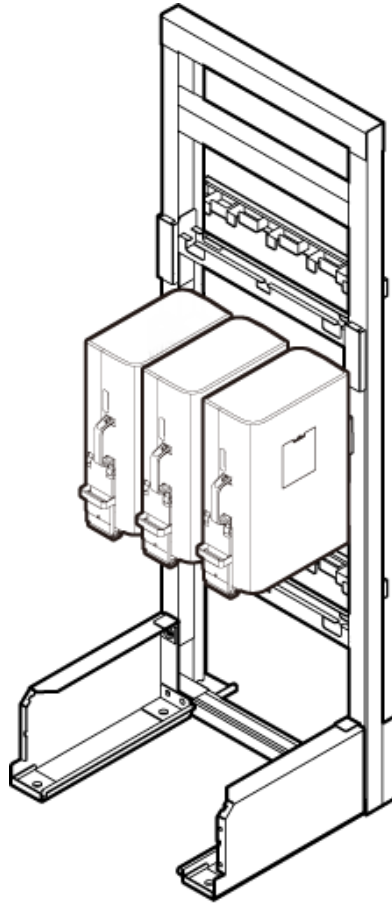
**Step 4** Install the DRH onto the main bracket, as shown in [Figure 6-42](#).

**Figure 6-42** Installing the DRH onto the main bracket



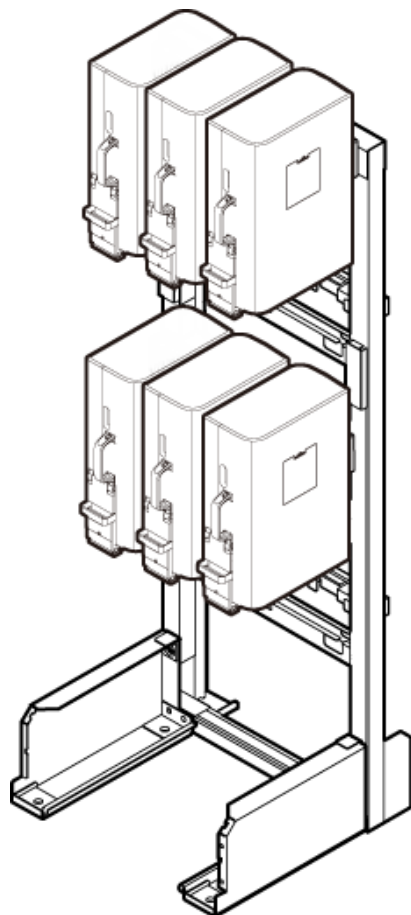
**Step 5** Repeat the steps above to install DRHs on the lower level from left to right, as shown in [Figure 6-43](#).

**Figure 6-43** Installing DRHs on the lower level



**Step 6 Optional:** When the ambient temperature is equal to or higher than the lowest operating temperature of the DRH and at least 10 °C (50 °F) lower than the highest operating temperature of the DRH, repeat the preceding steps to install the DRHs on the higher level, as shown in [Figure 6-44](#).

**Figure 6-44** Installing DRHs on the higher level



----End

# 7 Installing DRH Cables

---

## About This Chapter

This chapter describes the procedure for installing DRH cables.

### 7.1 Cabling Requirements

Cables must be routed according to the specified cabling requirements to prevent signal interference.

### 7.2 Cable Connections

This section describes the cable connections for a single DRH and multiple DRHs.

### 7.3 Installation Process

This section describes the process of installing DRH cables.

### 7.4 DRH Cable List

This section describes DRH cable connections.

### 7.5 Installing a DRH PGND Cable

This section describes the procedure for installing a DRH PGND cable.

### 7.6 Installing a DRH RF Jumper

This section describes the procedure for installing a DRH RF jumper.

### 7.7 Opening the Cover Plate of a DRH Cabling Cavity

This section describes the procedure for opening the cover plate of a DRH cabling cavity.

### 7.8 Installing a DRH Power Cable

This section describes the procedure for installing a DRH power cable.

### 7.9 Installing a CPRI Fiber Optic Cable

This section describes the procedure for installing a CPRI fiber optic cable.

### 7.10 Installing a DRH Alarm Cable

This section describes the procedure for installing a DRH alarm cable.

### 7.11 Closing the Cover Plate of a DRH Cabling Cavity

This section describes the procedure for closing the cover plate of a DRH cabling cavity.

## 7.1 Cabling Requirements

Cables must be routed according to the specified cabling requirements to prevent signal interference.



### NOTE

If a cable listed below is not required, skip the routing requirements of the cable.

### General Cabling Requirements

#### Requirements for Bending Radius

- The bending radius of the 7/8" feeder must be more than 250 mm (9.84 in.), and the bending radius of the 5/4" feeder must be more than 380 mm (14.96 in.).
- The bending radius of the 1/4" jumper must be more than 35 mm (1.38 in.). The bending radius of the super-flexible 1/2" jumper must be more than 50 mm (1.97 in.), and the bending radius of the ordinary 1/2" jumper must be more than 127 mm (5 in.).
- The bending radius of the power cable or PGND cable must be at least three times the diameter of the cable.
- The bending radius of a fiber optic cable is at least 20 times the diameter of the fiber optic cable, and the minimum bending radius of the breakout cable at each end of the fiber optic cable is 30 mm (1.18 in.).
- The bending radius of the signal cable must be at least five times the diameter of the cable.

#### Requirements for Cable Binding

- The same types of cable must be bound together.
- Different types of cable must be separately routed with the minimum spacing of 30 mm (1.18 in.) and cannot be entangled.
- The cables must be bound tightly and neatly. The sheaths of the cables must not be damaged.
- Cable ties are installed in the same direction, and those at the same horizontal line must be in a straight line.
- The excess of indoor cable ties is trimmed off, and the excess of outdoor cable ties allows about 5 mm (0.2 in.), without remaining rough edges.
- Labels or nameplates must be attached to both ends, joints, or turns of cables after they are installed.

#### Security Requirements

- Cables should be placed away from sharp objects or wall burrs. If these positions are inevitable, protect the cables with protection pipes.
- Cables must be routed away from heat sources, or heat-insulation materials are added between cables and heat sources.
- Sufficient slack (recommended for about 0.1 m [0.33 ft]) is provided in cables at turns or the position close to a device, facilitating cable and device maintenance.

#### Indoor Cabling Requirements

- Cables are routed indoors through the feeder window.
- Drip loops must be made outside the feeder window, and the requirements for the minimum bending radius are met.
- When cables are routed indoors, engineers are required indoors for cooperation.
- The feeder window must be waterproofed.

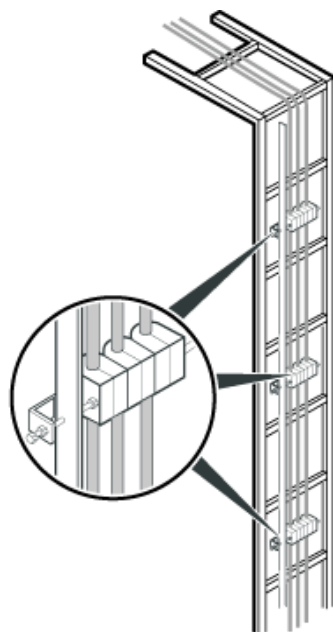
## Outdoor Cabling Requirements

- Cables routed outdoors must be led through a pipe when they may be damaged.
- AC power cables, transmission cables, and cables buried in the ground must be protected.
- If cables at the cabinet bottom need to be routed through a pipe along the ground, lead the pipe into the cabinet base for about 30 mm (1.18 in.) to 50 mm (1.97 in.), not into the cabinet. Block the pipe with waterproof tape or silicon gel, and secure the pipe to the cable hole at the cabinet bottom with metal piece.
- If cables at the cabinet bottom need to be routed through a pipe along the metal cable trough, do not lead the pipe into the cabinet base. The cable trough must be sealed and routed through the cable hole at the cabinet bottom.
- When routing DRH cables, ensure that the highest positions of the routes of all DRH cables (except RF cables and AISG cables) must be lower than the bottom of the DRH.
- Cables are secured with cable clips.
- Cables are routed neatly along the specified cabling direction and secured with cable clips.
- The positions for cable clips are determined onsite. For example, the cable clips for the 7/8" feeder are installed at the spacing of 1.5 m (4.92 ft) to 2 m (6.56 ft) in the same direction, and the cable clips for the power cables are installed at the spacing of 1.5 m (4.92 ft) to 2 m (6.56 ft) in the same direction.
- Cable clips must be vertical with cables, and the cables in a cable clip must be parallel.
- After routing cables neatly and correctly, tighten the screws on cable clips.

Secure cables on the cable tray, as shown in [Figure 7-1](#).



**Figure 7-1** Securing cables on the cable tray



## 7.1.1 Special Cabling Requirements

### Cabling Requirements for Power Cables

- Power cables must be installed in the position specified in engineering design documents.
- If the length of power cables is insufficient, replace the cables rather than adding connectors or soldering joints to lengthen the cables.
- Cables must be routed by only qualified and trained personnel before all preparations are made.
- Cables are routed in an untangled and orderly fashion.

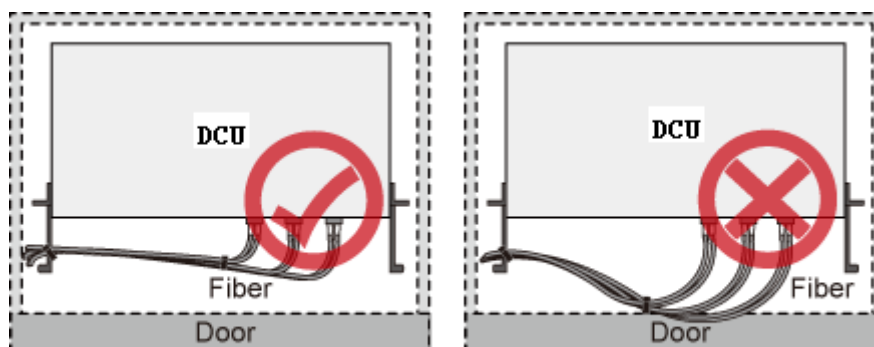
### Cabling Requirements for PGND Cables

- PGND cables for the base station must be connected to the same ground bar.
- PGND cables must be buried in the ground or routed indoors. They should not be routed overhead before they are led into the equipment room.
- The exterior of the coaxial wire and the shield layer of the shielded cable must have proper electrical contact with the metal surface of the equipment to which they are connected.
- PGND cables and signal cables must be installed in an untangled and orderly fashion. A certain distance must be reserved between them to prevent interference from each other.
- Fuses or switches must not be installed on the PGND cables.
- Other devices must not be used for electrical connections of the PGND cables.
- All the metal parts in the housing of the equipment must be reliably connected to the ground terminal.

### Cabling Requirements for Fiber Optic Cables

- Fiber optic cables must be routed by at least three qualified and trained personnel before all preparations are made.
- Fiber optic cables are used within the temperature range of -40 °C to 60 °C. If the current temperature is out of the range, make protection measures or route the cables again.
- Cables are routed in an untangled and orderly fashion.
- Do not bind fiber optic cables at turns.
- Do not stretch, step on, or place heavy objects on fiber optic cables. Keep the cables away from sharp objects.
- When fiber optic cables are routed, the excess of the cables must be coiled around special devices, such as a fiber coiler.
- When coiling fiber optic cables, apply even strength. Do not bend the cables with force.
- Vacant optical connectors must be covered with dustproof caps.
- Fiber optic cables cannot be squeezed by the cabinet door when routed through the cabinet, as shown in [Figure 7-2](#).

**Figure 7-2** CPRI fiber optic cables routed through the cabinet



## 7.2 Cable Connections

This section describes the cable connections for DRHs.

### NOTE

- A lower-level DRH obtains power directly from the external power system, but not from an upper-level DRH using a power cable.

[Figure 7-3](#) shows the cable connections for a single DRH.

**Figure 7-3** Cable connections for a single DRH

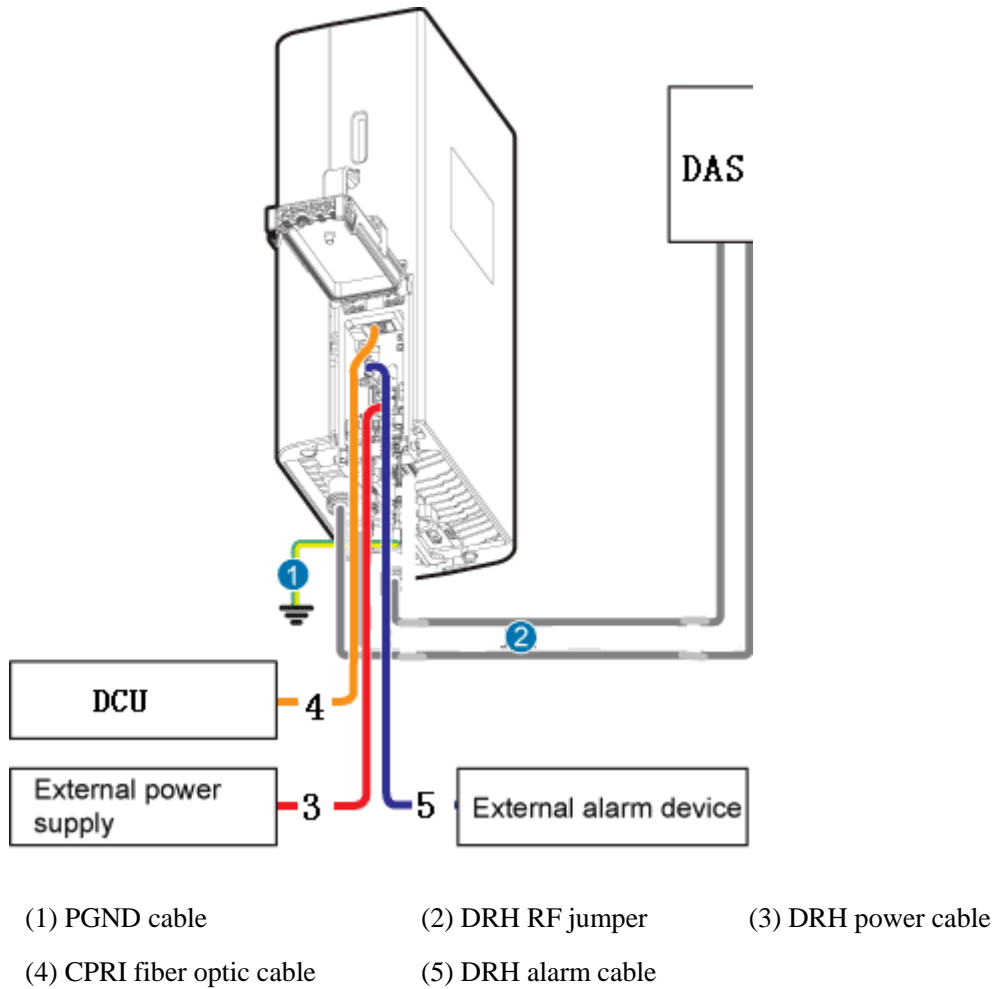
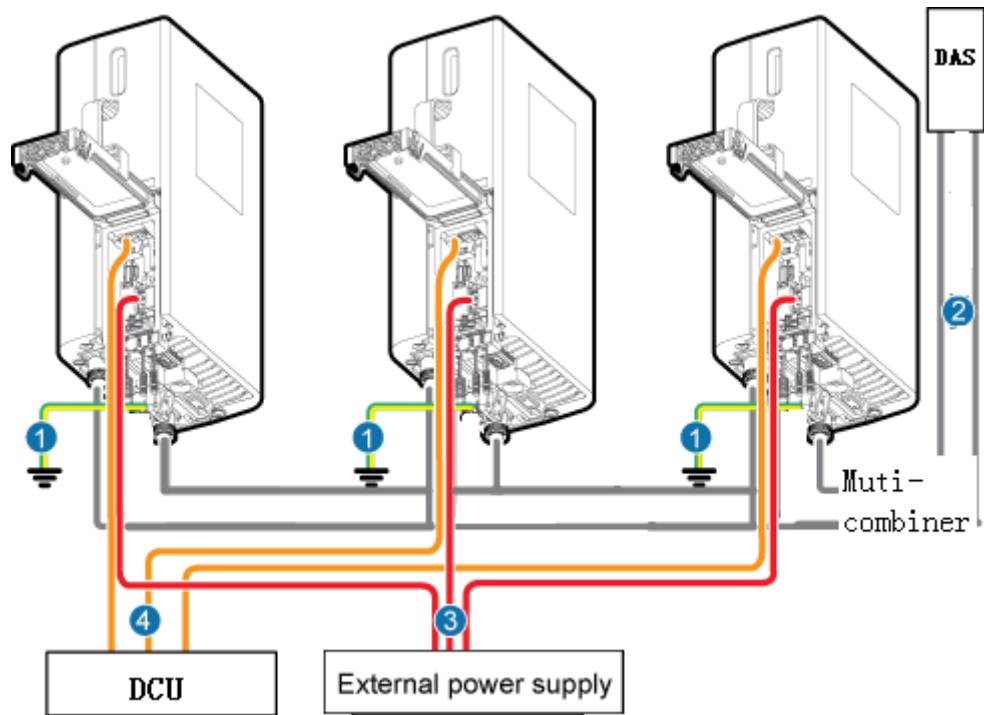


Figure 7-4 shows the cable connections for DRHs.

**Figure 7-4** Cable connections for DRHs



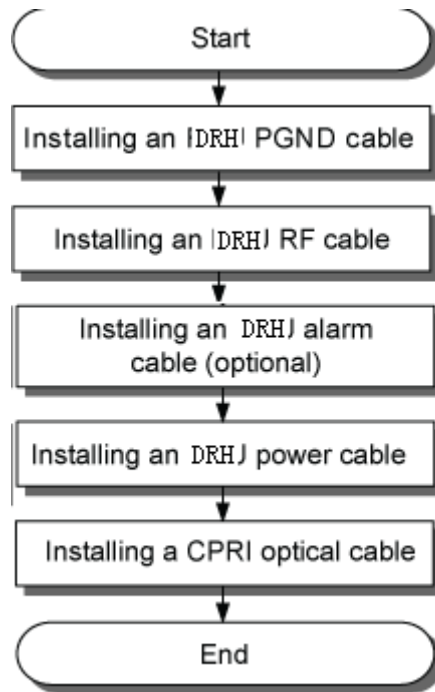
- |                            |                   |                     |
|----------------------------|-------------------|---------------------|
| (1) PGND cable             | (2) DRH RF jumper | (3) DRH power cable |
| (4) CPRI fiber optic cable | -                 | -                   |

## 7.3 Installation Process

This section describes the process of installing DRH cables.

[Figure 7-5](#) shows the process of installing DRH cables.

**Figure 7-5** Process of installing DRH cables



## 7.4 DRH Cable List

This section describes DRH cable connections.

[Table 7-1](#) lists DRH cables.

**Table 7-1** DRH cables

One End		The Other End	
Connector	Installation Position	Connector	Installation Position
OT terminal (M6, 16 mm <sup>2</sup> or 0.025 in. <sup>2</sup> )	Ground terminal on the DRH	OT terminal (M8, 16 mm <sup>2</sup> or 0.025 in. <sup>2</sup> )	Ground terminal on the ground bar
Tool-less female connector (pressfit type)	NEG(-) and RTN(+) ports on the DRH	Depending on the power supply equipment	External power equipment
DB15 waterproof male connector	EXT_ALM port on the DRH	Cord end terminal	External alarm device

One End		The Other End	
Connector	Installation Position	Connector	Installation Position
DLC connector	CPRI0 port on the DRH	DLC connector	CPRI port on a board in the DCU or CPRI1 port on the upper-level DRH
	CPRI1 port on the DRH		CPRI0 port on the lower-level DRH
DIN male connector	ANT_TX/RX A or ANT_TX/RX B port on the DRH	DIN or N male connector	Muti-combiner or DAS system

## 7.5 Installing a DRH PGND Cable

This section describes the procedure for installing a DRH PGND cable.

### Context

The cross-sectional area of a DRH PGND cable is 16 mm<sup>2</sup> (0.025 in.<sup>2</sup>). The cable has an M6 OT terminal at one end and an M8 terminal at the other end.

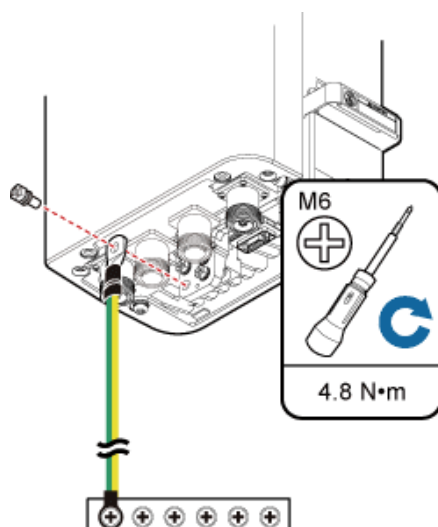
### Procedure

**Step 1** According to the actual cable route, cut the PGND cable into a proper length to prepare a DRH PGND cable. Then add an OT terminal at each end of the cable according to the instructions in *Assembling the OT Terminal and the Power Cable*.

**Step 2** Install the DRH PGND cable.

Connect the M6 OT terminal at one end of the PGND cable to the ground terminal at the DRH bottom and the M8 OT terminal at the other end to the external ground bar, as shown in [Figure 7-6](#).

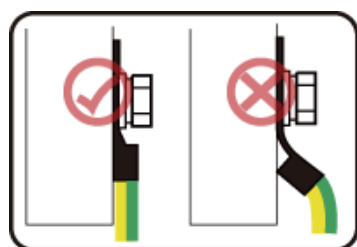
**Figure 7-6** Installing a DRH PGND cable



 **NOTE**

Crimp OT terminals in correct positions, as shown in [Figure 7-7](#).

**Figure 7-7** Correct position of an OT terminal



**Step 3** Label the installed cables according to the instructions in [Attaching a Cable-Tying Label](#).

----End

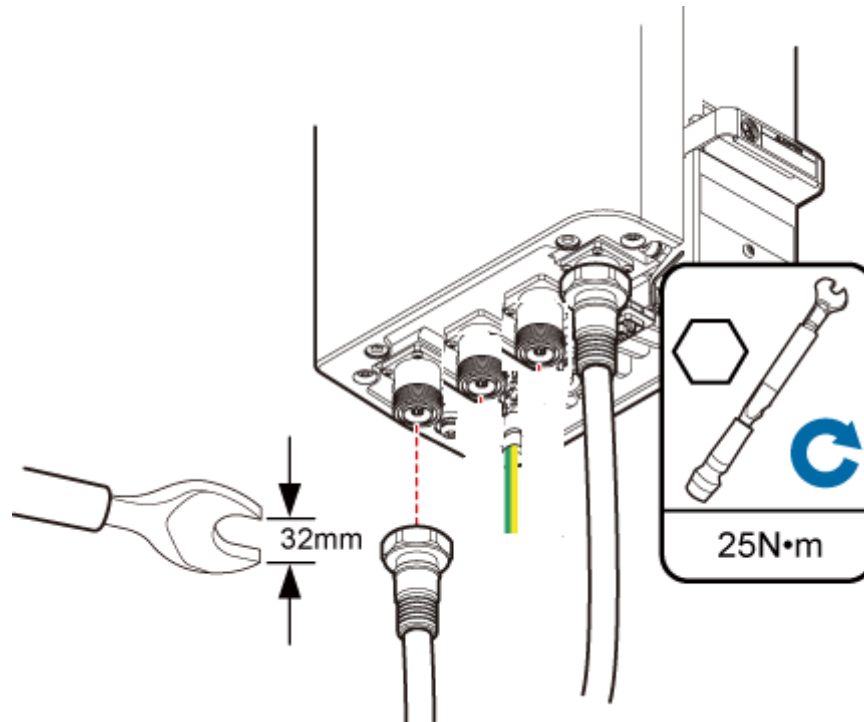
## 7.6 Installing a DRH RF Jumper

This section describes the procedure for installing a DRH RF jumper.

### Procedure

**Step 1** Connect the DIN male connector at one end of the DRH RF jumper to the ANT port on the DRH, and use a torque wrench to tighten the connector to 25 N m (221.27 lbf in.), as shown in [Figure 7-8](#).

**Figure 7-8** Installing a DRH RF Jumper



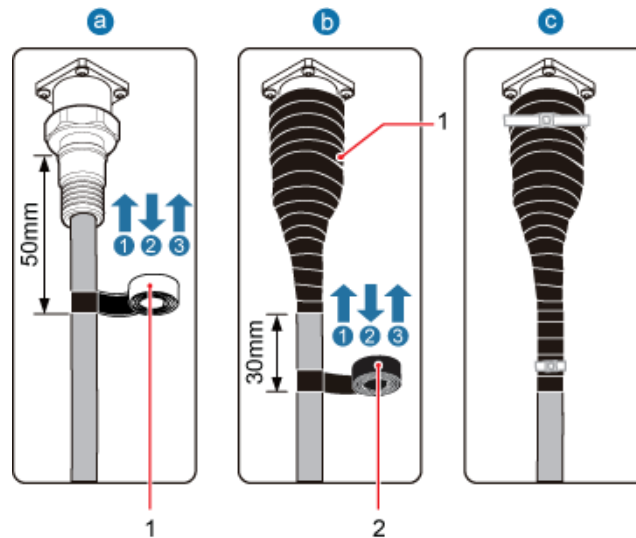
 **CAUTION**

On AC-powered electric railways, such as high speed railways, when leaky cables are connected to DRHs installed in tunnels, high-voltage-resistance DC blocks must be installed between DRH RF jumpers and the leaky cables to protect the DRHs against damage.

- Step 2** Link the other end of the RF jumper to the external Multi-combiner or DAS system.
- Step 3** Waterproof the connectors of the RF jumper by referring to [Figure 7-9](#).



**Figure 7-9** Waterproofing a connector of the RF jumper



(1) Waterproof tape	(2) PVC insulation tape
---------------------	-------------------------

**NOTE**

- Before wrapping waterproof tape, stretch the tape evenly until the length of the tape becomes twice its original length.
- Do not stretch the PVC insulation tape when wrapping the PVC insulation tape.
- Wrap each layer of tape around the connector tightly and neatly, and ensure that each layer of tape overlaps more than 50% of the preceding layer. Ensure that neighboring layers are stuck to each other.
- Ensure that the adhesive surface of the tape overlaps the lower layer.
- When cutting off the cable ties, reserve a redundant length of 3 mm (0.12 in.) to 5 mm (0.2 in.).

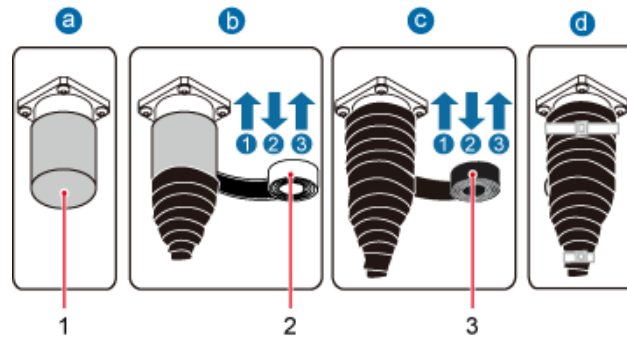
1. Wrap three layers of waterproof tape on the connector, first from bottom up, then from top down, and finally from bottom up. Start wrapping the connector at a position 50 mm (1.97 in.) away below the bottom of the connector to the top of the connector, first from bottom up, then from top down, and finally from bottom up. Cut off the redundant tape after three layers are wrapped. Wrap each layer of tape around the connector tightly.
2. Wrap three layers of PVC insulation tape. Start the wrapping at a position 30 mm (1.18 in.) away below the bottom of the waterproof tape to the top of the connector, first from bottom up, then from top down, and finally from bottom up. Cut off the redundant tape after three layers are wrapped. Wrap each layer of tape around the connector tightly.
3. Start binding cable ties to the cable at a position 3 mm (0.12 in.) to 5 mm (0.2 in.) away from one end of the PVC insulation tape.

**Step 4** Check the dustproof caps on antenna connectors. In outdoor scenarios, dustproof caps must be waterproofed, as shown in [Figure 7-10](#).

 **CAUTION**

If ANT\_TX/RXC or ANT\_TX/RXD is not used, do not remove dustproof caps from vacant antenna connectors. If the DRH is used outdoors, wrap waterproof tapes of If ANT\_TX/RXC and ANT\_TX/RXD.

**Figure 7-10** Waterproofing a dustproof cap



(1) Dustproof cap

(2) Waterproof tape

(3) PVC insulation tape

 **NOTE**

- Before wrapping waterproof tape, stretch the tape evenly until the length of the tape becomes twice its original length.
- Do not stretch the PVC insulation tape when wrapping the PVC insulation tape.
- Wrap each layer of tape around the connector tightly and neatly, and ensure that each layer of tape overlaps more than 50% of the preceding layer. Ensure that neighboring layers are stuck to each other.
- Ensure that the adhesive surface of the tape overlaps the lower layer.
- When cutting off the cable ties, reserve a redundant length of 3 mm (0.12 in.) to 5 mm (0.2 in.).

1. Verify that dustproof caps are not removed.
2. Wrap three layers of waterproof tape on the connector, first from bottom up, then from top down, and finally from bottom up. Wrap each connector with three layers of waterproof tape, from bottom up, then from top down, and finally from bottom up. Do not cut the tape until all the three layers of the tape are already wrapped. Cut off the redundant tape after three layers are wrapped. Wrap each layer of tape around the connector tightly.
3. Wrap three layers of PVC insulation tape. Wrap each connector with three layers of waterproof tape, from bottom up, then from top down, and finally from bottom up. Do not cut the tape until all the three layers of the tape are already wrapped. Cut off the redundant tape after three layers are wrapped. Wrap each layer of tape around the connector tightly.
4. Start binding cable ties to the cable at a position 3 mm (0.12 in.) to 5 mm (0.2 in.) away from one end of the PVC insulation tape.

**Step 5** Route the cables according to the instructions in [7.1 Cabling Requirements](#), and then use cable ties to bind the cables.

**Step 6** Label the installed cables according to the instructions in [Attaching a Sign Plate Label](#).

**Step 7** Attach color-coding to the installed RF jumper according to the instructions in Attaching the Color Ring.

----End

## 7.7 Opening the Cover Plate of a DRH Cabling Cavity

This section describes the procedure for opening the cover plate of a DRH cabling cavity.

### Procedure

**Step 1** Wear ESD gloves.

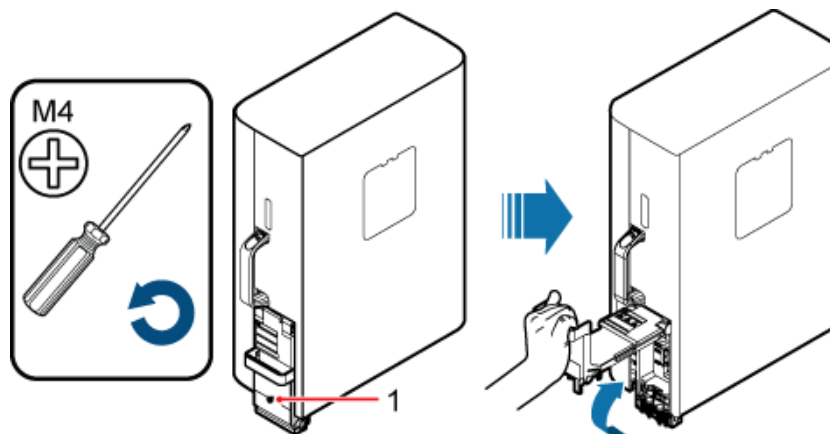


Take proper ESD protection measures, for example, wear ESD gloves, to prevent electrostatic damage to the boards, modules, or electronic components.

---

**Step 2** Loosen the protection screw on the cover plate of the DRH cabling cavity using an M4 Phillips screwdriver, and then lower the handle to open the cover plate, as shown in [Figure 7-11](#).

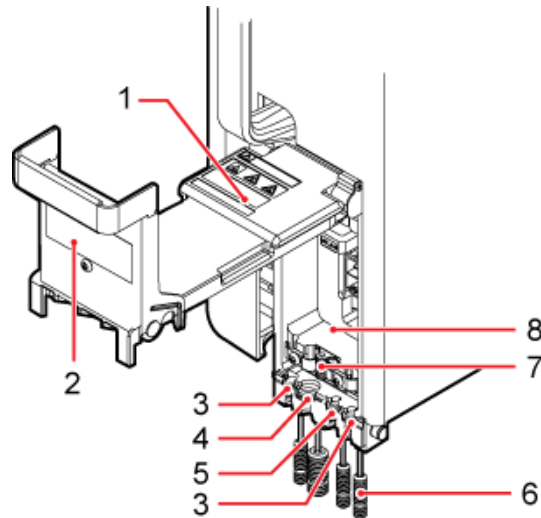
**Figure 7-11** Opening the cover plate of the DRH cabling cavity



(1) Protection screw

[Figure 7-12](#) shows the DRH cabling cavity.

**Figure 7-12** DRH cabling cavity



- |                                      |                                      |  |
|--------------------------------------|--------------------------------------|--|
| (1) Cover plate                      | (2) Cable diagram on labels          | (3) Cable trough for the fiber optic cable |
| (4) Cable trough for the power cable | (5) Cable trough for the alarm cable | (6) Waterproof block                       |
| (7) Clip                             | (8) Cabling cavity                   | -  |

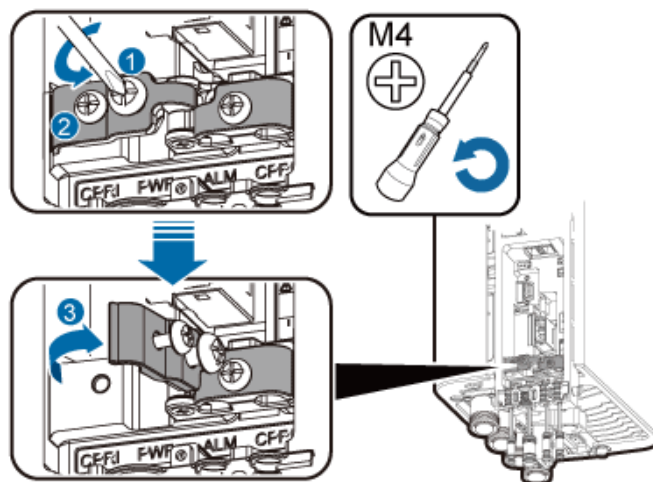
**Step 3** Loosen the screws on the clip using an M4 Phillips screwdriver, and open the clip, as shown [Figure 7-13](#).



**NOTE**

Open the clip only for the associated cable.

**Figure 7-13** Opening clips



**Step 4** Remove the waterproof block.



**NOTE**

Remove only the waterproof blocks for the cables to be installed.

----End

## 7.8 Installing a DRH Power Cable

This section describes the procedure for installing a DRH power cable.

### Prerequisites

- A tool-less female connector (pressfit type) is added to the DRH power cable on the DRH side. For details, see [10.1 Adding a Tool-Less Female Connector \(Pressfit Type\) to the DRH Power Cable on the DRH Side](#).

### Context

If a power device provided by the customer is used, the recommended specification of the circuit breaker on this power device is 15 A to 30 A.

There are three types of DRH power cables in terms of cross-sectional areas: 5.3 mm<sup>2</sup> (0.008 in.<sup>2</sup>) (10 AWG) and 8.2 mm<sup>2</sup> (0.013 in.<sup>2</sup>) (8 AWG) complying with North American standards and 6 mm<sup>2</sup> (0.009 in.<sup>2</sup>) complying with European standards.

[Table 7-2](#) describes the DRH power cable.

**Table 7-2** DRH power cable

Cable	On the DRH Side	On the Power Device Side	Power Device	Color
DRH power cable	Tool-less female connector (pressfit type)	Tool-less female connector (pressfit type)	EPU	A cable with a black jacket and two wires inside <ul style="list-style-type: none"> <li>• North American standards: The RTN(+) wire is black and the RNEG(-) wire is blue.</li> <li>• European standards: The RTN(+) wire is brown and the RNEG(-) wire is blue.</li> </ul>
		EPC5 connector	DCD U-12 B	



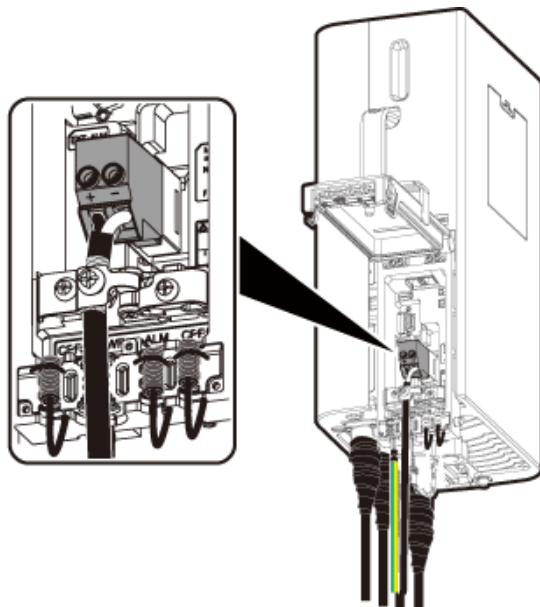
### WARNING

Ensure that the DRH power cable must be connected to the DRH first and then to the power device. The operations in the reverse sequence may cause component damage or personal injury.

## Procedure

- Step 1** Connect the tool-less female connector (pressfit type) at one end of the DRH power cable to the power supply socket on the DRH, as shown in [Figure 7-14](#).

**Figure 7-14** Installing a DRH power cable



---

 **CAUTION**

Ensure that the exposed shield layer of the power cable is properly tightened using the clip.

---

- Step 2** Connect the connector at the other end of the DRH power cable to the corresponding position on the power device.

 **NOTE**

- A DCDU-12B can supply power to a maximum of six DRHs. Ensure that the DRH power cable is connected to one of LOAD0 to LOAD5 ports on the DCDU-12B.
- One EPU can supply power to a maximum of six DRHs. Ensure that the DRH power cable is connected to one of DRH0 to DRH5 ports on the EPU.
- When the DRH power cable is connected to the EPU, the blue core wire in the tool-less female connector (pressfit type) is connected to the upper port on the EPU, and the black/brown core wire is connected to the lower port on the EPU.

- Step 3** Route the cable according to the instructions in [7.1 Cabling Requirements](#), and then use a cable tie to bind the cable.

- Step 4** Label the installed cable according to the instructions in [Attaching a Cable-Tying Label](#).

----End

## 7.9 Installing a CPRI Fiber Optic Cable

This section describes the procedure for installing a CPRI fiber optic cable.

### Prerequisites

Before the installation, verify that the single-mode optical module is used.



The optical modules to be installed must match CPRI rates.

---

### Context

- A CPRI fiber optic cable transmits CPRI signals between a BBU and a DRH.
- For details about CPRI fiber optic cable connections, see section "CPRI Cable Connections" in the *DCU3900 Hardware Description*.

### Procedure

- Step 1** Lower the pullers of two optical modules, insert one optical module into the CPRI0 port on the DRH and the other optical module into the CPRI port on the BBU, and raise the pullers, as shown in [Figure 7-15](#).

**Figure 7-15** Installing an optical module

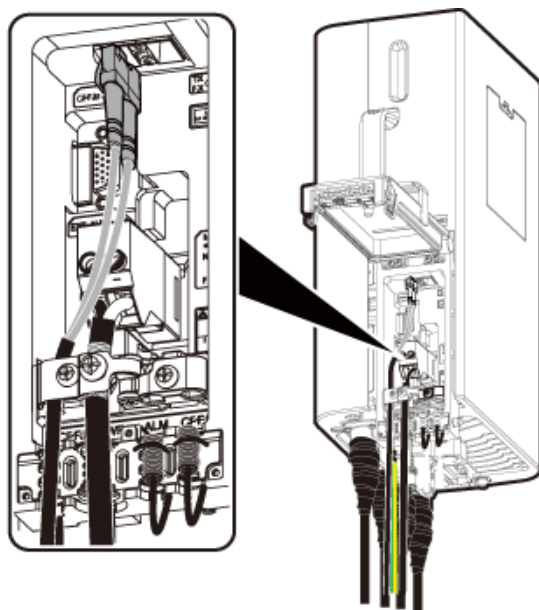


The performance of an optical module that is exposed to the air for more than 20 minutes may be abnormal. Therefore, you must insert a fiber optic cable into an unpacked optical module within 20 minutes.

---

- Step 2** Connect the end labeled 1A and 1B of the fiber optic cable to the optical module on the DRH side, as shown in [Figure 7-16](#).

**Figure 7-16** Installing a CPRI fiber optic cable



### CAUTION

- To avoid any damage to fiber optic cables, the cables connected to the DRH must be installed according to the installation process. For details about the installation process, see [7.3 Installation Process](#).
- If only one fiber optic cable is required, secure the fiber optic cable into the cable clip near the power cable to leave some slack at the bend.

**Step 3** Connect the end labeled 2A and 2B of the fiber optic cable to the optical module on the BBU side.

**Step 4** Route the cables according to the instructions in [7.1 Cabling Requirements](#), and then use cable ties to bind the cables.

**Step 5** Label the installed cables according to the instructions in [Attaching an L-Shaped Label](#).

----End

## 7.10 Installing a DRH Alarm Cable

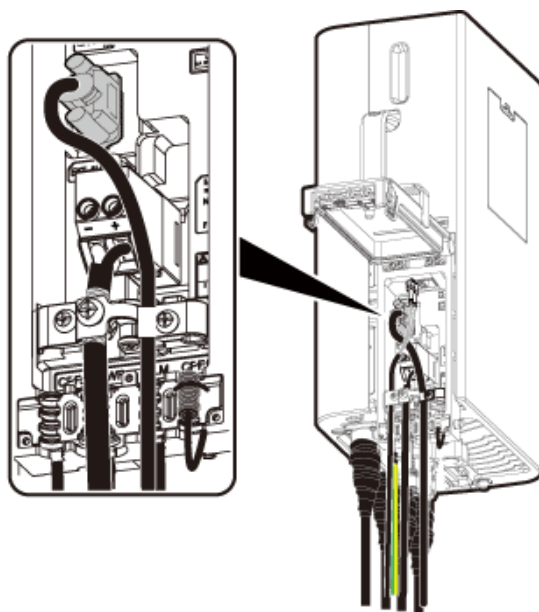
This section describes the procedure for installing a DRH alarm cable.

### Procedure

**Step 1** Connect the DB15 connector at one end of the DRH alarm cable to the EXT\_ALM port on the DRH, as shown in [Figure 7-17](#).



**Figure 7-17** Installing a DRH alarm cable



- Step 2** Connect the eight cord end terminals at the other end to external alarm devices.
  - Step 3** Route the cables according to the instructions in [7.1 Cabling Requirements](#), and then use cable ties to bind the cables.
  - Step 4** Label the installed cables according to the instructions in [Attaching an L-Shaped Label](#).
- End

## 7.11 Closing the Cover Plate of a DRH Cabling Cavity

This section describes the procedure for closing the cover plate of a DRH cabling cavity.

### Procedure

- Step 1** Close the clips for the installed cables. Use an M4 torque screwdriver to tighten the screws on each clip to 1.4 N m (12.39 lbf in.), as shown in [Figure 7-18](#).

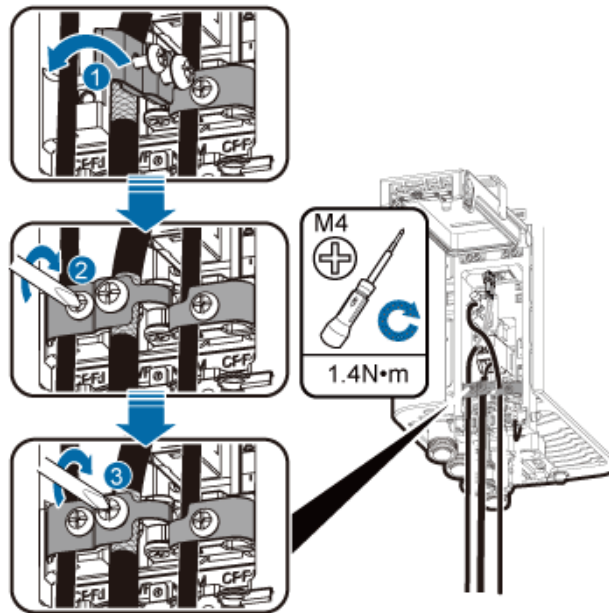


### CAUTION

Ensure that the exposed shield layer of the power cable is properly tightened using the clip.

---

**Figure 7-18** Closing clips



**Step 2** Insert waterproof blocks into vacant cable troughs in the cabling cavity, as shown in [Figure 7-19](#).

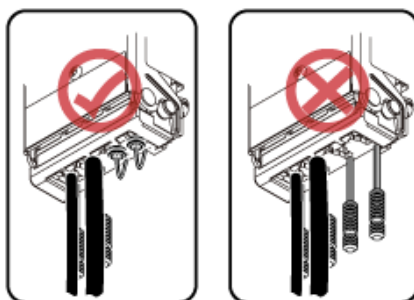
---

 **CAUTION**

Ensure that cables and waterproof blocks are properly inserted into troughs.

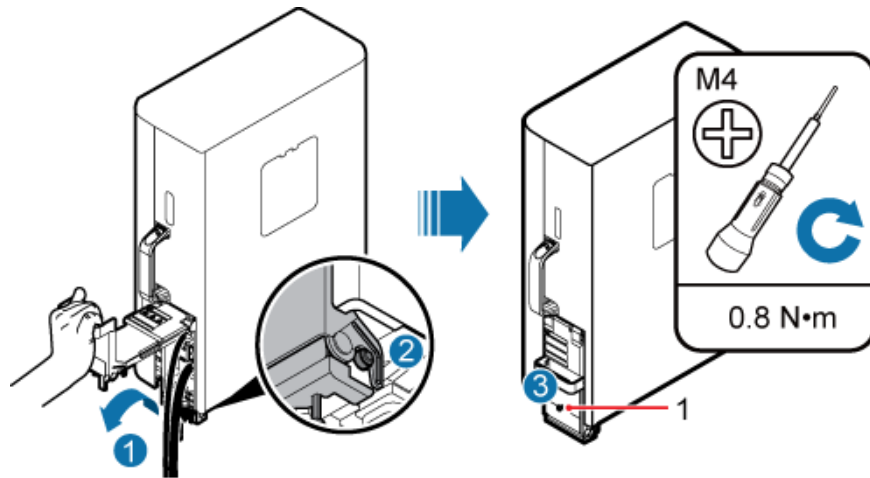
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**Figure 7-19** Correct placement of waterproof blocks



**Step 3** Close the cover plate of the DRH cabling cavity. Use an M4 torque screwdriver to tighten the screws on the cover plate to 0.8 N m (7.08 lbf in.) in the sequence shown in [Figure 7-20](#).

**Figure 7-20** Closing the cover plate of a DRH cabling cavity



(1) Protection screw

**Step 4** Take off the ESD gloves, and pack up all the tools.

----End

# 8

## Checking the DRH Hardware Installation

After a DRH is installed, check the hardware installation.

Table 8-1 provides the checklist for the DRH hardware installation.

**Table 8-1** Checklist for the DRH hardware installation

SN	Item
1	The position for each device conforms to the engineering drawing and meets the space requirement. Sufficient space is reserved for equipment maintenance.
2	The DRH is securely installed.
3	The cover plate is securely installed on the DRH cabling cavity.
4	Waterproof blocks are securely installed in vacant cable troughs of the DRH cabling cavity, and the cover plate for the cabling cavity is securely installed. In addition, vacant RF ports are covered with dustproof caps and the caps are tightened.
5	There are no connectors or joints on each power cable or PGND cable.
6	The terminals at two ends of each power cable or PGND cable are securely soldered or crimped.
7	None of power cables and PGND cables can be short-circuited or reversely connected. In addition, these cables are not damaged or broken.
8	Power cables and PGND cables are separately bound from other cables.
9	The protection grounding of the DRH and the surge protection grounding of the building share one group of ground conductors.
10	The connectors of each signal cable are intact and securely linked, and these cables are not damaged or broken.
11	Labels are correct, legible, and complete at both ends of each cable, feeder, and jumper.

# 9 Powering On a DRH

---

After all the devices are installed, check the power-on status of a DRH.



After you unpack a DRH, you must power on it within 24 hours. If you power off the DRH for maintenance, you must restore power to the DRH within 24 hours.

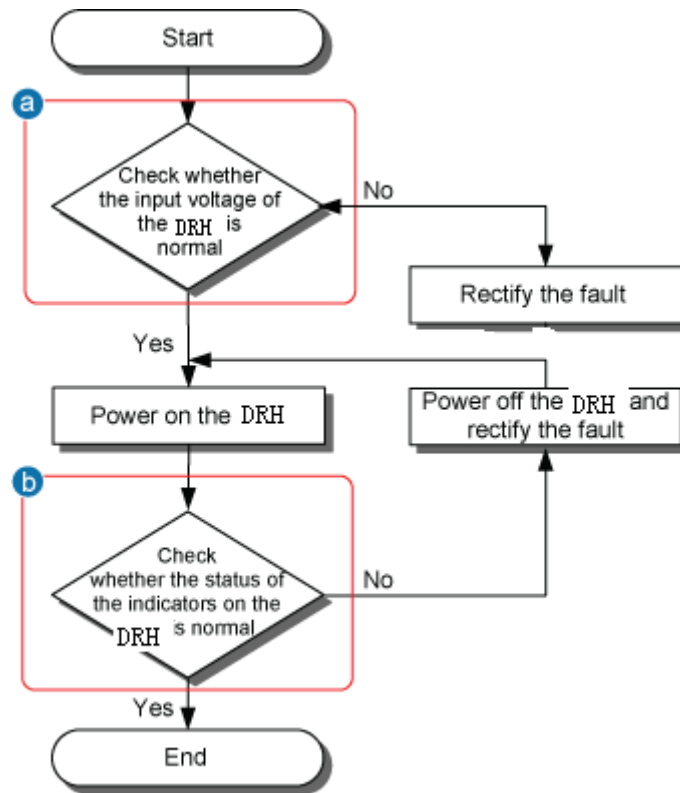
---

[Figure 9-1](#) shows the DRH power-on check process.



For details about how to power on a DRH, see *Powering On a DRH*. For details about how to power off a DRH, see section "Powering-Off the DRH" in *DRH Maintenance Guide*.

Figure 9-1 DRH power-on check process



(a) The normal input voltage of a DRH is -48 V DC. The voltage of the external power supply should range from -36 V DC to -57 V DC.

(b) The RUN indicator on the DRH is on for 1s and off for 1s. The ALM indicator is steady off.

---

# 10 Appendix

---

## About This Chapter

This section describes the procedure for adding an easy power receptacle (pressfit type) connector.

### [10.1 Adding a Tool-Less Female Connector \(Pressfit Type\) to the DRH Power Cable on the DRH Side](#)

This section describes the procedure for adding a tool-less female connector (pressfit type) to the DRH power cable on the DRH side.

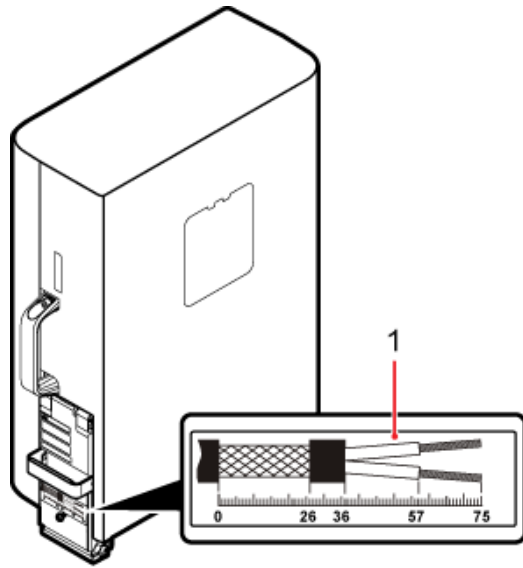
## 10.1 Adding a Tool-Less Female Connector (Pressfit Type) to the DRH Power Cable on the DRH Side

This section describes the procedure for adding a tool-less female connector (pressfit type) to the DRH power cable on the DRH side.

### Context

[Figure 10-1](#) shows the cable diagram on labels.

**Figure 10-1** Cable diagram on labels

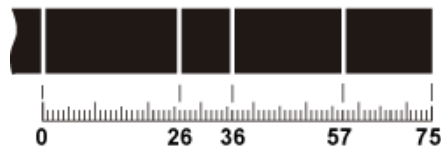


(1) Cable diagram on labels

## Procedure

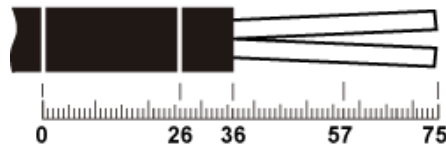
- Step 1** Determine the length of the power cable for different operations based on the labels, as shown in [Figure 10-2](#).

**Figure 10-2** Determining the length of the power cable



- Step 2** Strip the specified length of the sheath off the power cable, as shown in [Figure 10-3](#).

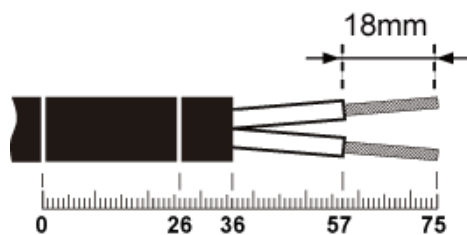
**Figure 10-3** Stripping the specified length of sheath



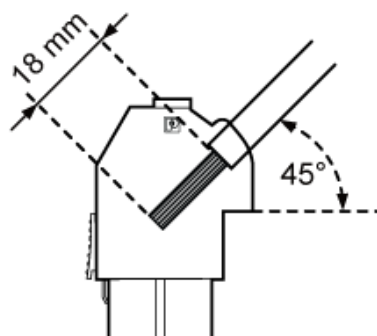
- Step 3** Strip a specified length of sheath off each core wire. The length must be consistent with the length of the notch in the tool-less female connector (pressfit type), as shown in [Figure 10-4](#).



**Figure 10-4** Stripping the sheath off each core wire



**Figure 10-5** Matched length



**Step 4** Add a tool-less female connector (pressfit type) to two core wires.

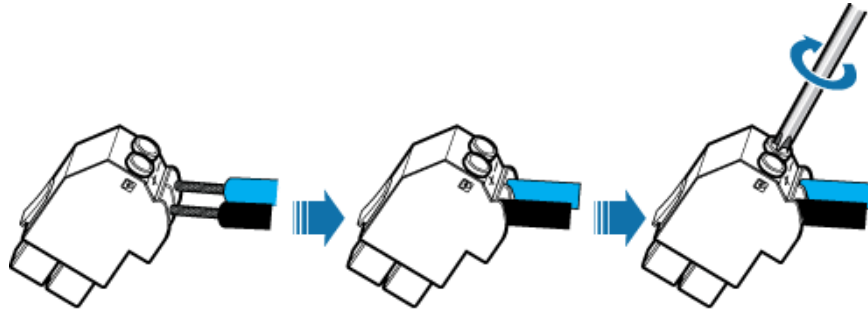
1. Tighten the screws using a Phillips screwdriver, as shown in [Figure 10-6](#).

**Figure 10-6** Tightening screws



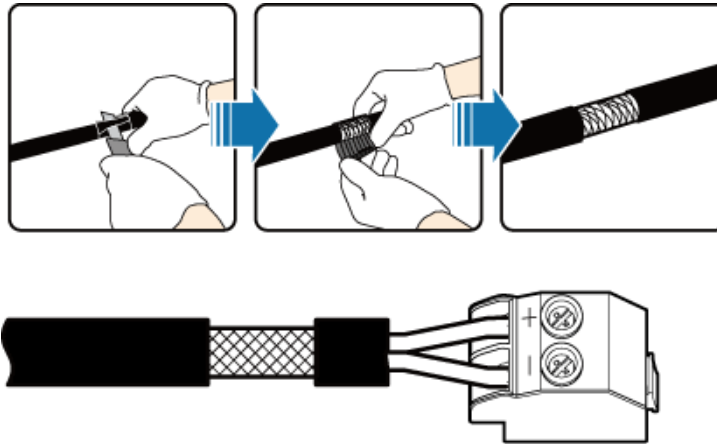
2. Connect the blue core wire labeled NEG(-) to the - port and the black/brown core wire labeled RTN(+) to the + port on the tool-less female connector (pressfit type), and then tighten the screws using a Phillips screwdriver, as shown in [Figure 10-7](#).

**Figure 10-7** Adding a tool-less female connector (pressfit type) to two core wires



**Step 5** Strip the specified length of the sheath off the power cable to expose the intact shield layer, as shown in [Figure 10-8](#).

**Figure 10-8** Stripping the sheath off the power cable



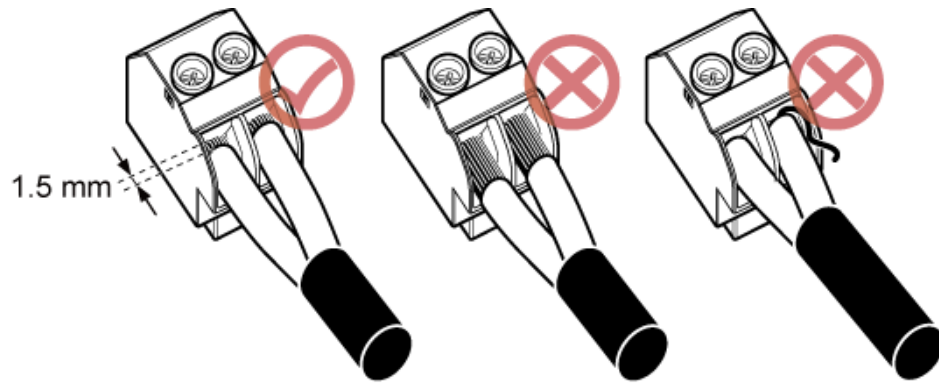
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 **CAUTION**

Each core wire is exposed outside the tool-less female connector (pressfit type) for 1.5 mm (0.059 [in.]), as shown in [Figure 10-9](#).

---

**Figure 10-9** Inserting core wires into the tool-less female connector (pressfit type)



----End