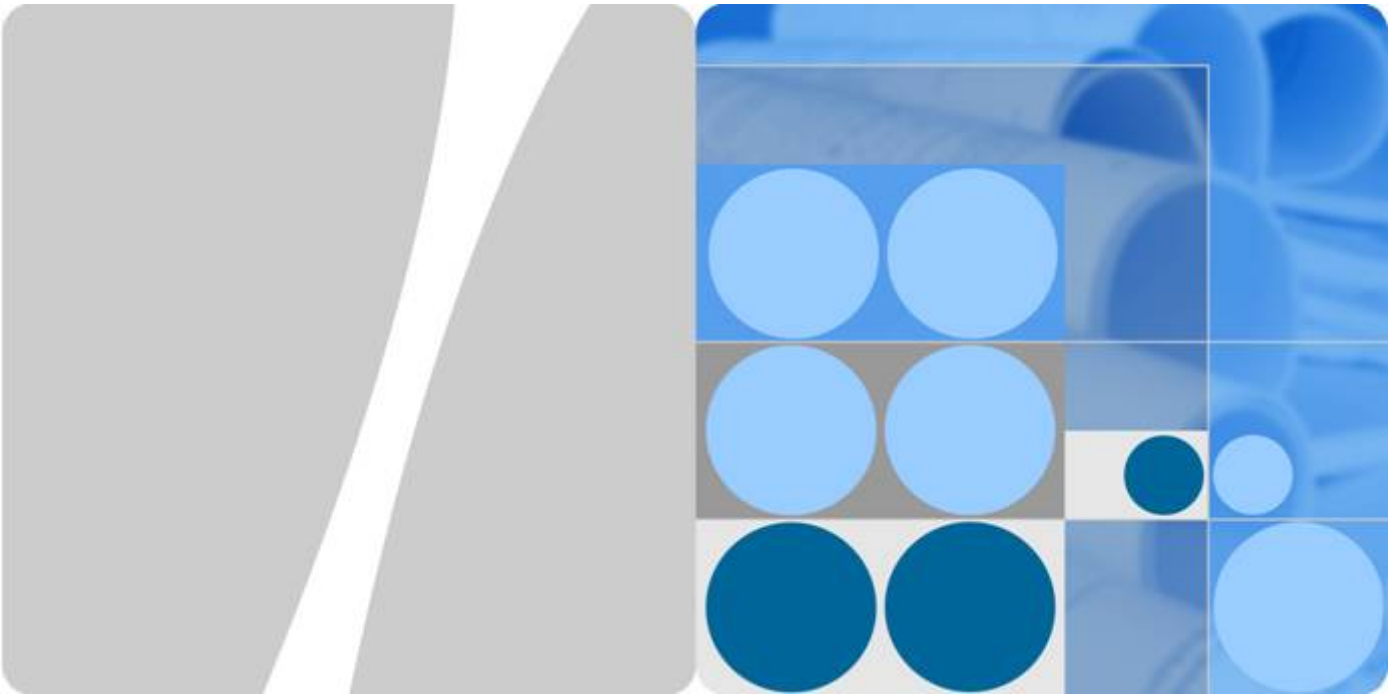

BTS3902E WCDMA

Installation Guide

Issue Draft A

Date 2011-06-30

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About This Document

Purpose

This document describes the procedures for installing a BTS3902E in different scenarios. It also provides checklists for hardware installation.

Product Version

The following table lists the product version related to this document.

Product Name	Product Version
BTS3902E WCDMA (referred to as BTS3902E in this document)	V200R013

Intended Audience

This document is intended for:

- Base station installation engineers

Organization

1 Changes in the BTS3902E WCDMA Installation Guide

This chapter describes the changes in the *BTS3902E WCDMA Installation Guide*.

2 Installation Preparations

This chapter describes instrument preparations, and skills and qualifications that installation engineers must possess.

3 Information About the Installation

This chapter describes the information that you must be familiar with before installing a BTS3902E, including the BTS3902E exterior, ports, installation options, physical supports, and installation clearance requirements.

4 Unpacking the Equipment

Unpack and check the delivered equipment to ensure that all the materials are included and intact.

5 Obtaining the ESN

The Electronic Serial Number (ESN) is a unique identifier of a Network Element (NE). Record the ESN for later commissioning of the base station before installation.

6 Installation Process

The BTS3902E installation process involves installing a BTS3902E and related cables, checking the BTS3902E hardware installation, and powering on the BTS3902E.

7 Installing a BTS3902E

This section describes the procedures for installing a BTS3902E. The BTS3902E can be installed on a pole, wall, or wood pole depending on the installation environment.

8 Installing an AC Surge Protection Box and Related Cables

This chapter describes the dimensions, installation clearance requirements, and installation options of an AC surge protection box. It also describes the procedure for installing the surge protection box. An AC surge protection box can be configured when a BTS3902E is installed outdoors.

9 Installing Cables

This chapter describes the procedure and precautions for installing the PGND cables, power cables, and transmission cables for a BTS3902E in various scenarios. Based on actual requirements, and it also describes how to install an optional monitoring signal cable as required.

Conventions

Symbol Conventions

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

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

General Conventions

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

Convention	Description
Times New Roman	Normal paragraphs are in Times New Roman.
Boldface	Names of files, directories, folders, and users are in **boldface**. For example, log in as user **root**.
Italic	Book titles are in *italics*.
`Courier New`	Examples of information displayed on the screen are in Courier New.

Command Conventions

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

Convention	Description
Boldface	The keywords of a command line are in **boldface**.
Italic	Command arguments are in *italics*.
[ ]	Items (keywords or arguments) in brackets [ ] are optional.
{ x | y | ... }	Optional items are grouped in braces and separated by vertical bars. One item is selected.
[x | y | ...]	Optional items are grouped in brackets and separated by vertical bars. One item is selected or no item is selected.
{ x | y | ... }*	Optional items are grouped in braces and separated by vertical bars. A minimum of one item or a maximum of all items can be selected.
[x | y | ...]*	Optional items are grouped in brackets and separated by vertical bars. Several items or no item can be selected.

GUI Conventions

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

Convention	Description
Boldface	Buttons, menus, parameters, tabs, window, and dialog titles are in **boldface**. For example, click **OK**.
>	Multi-level menus are in **boldface** and separated by the ">" signs. For example, choose **File** > **Create** > **Folder**.

Keyboard Operations

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

Format	Description
Key	Press the key. For example, press **Enter** and press **Tab**.
Key 1+**Key 2**	Press the keys concurrently. For example, pressing **Ctrl**+**Alt**+**A** means the three keys should be pressed concurrently.
Key 1, **Key 2**	Press the keys in turn. For example, pressing **Alt**, **A** means the two keys should be pressed in turn.

Mouse Operations

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

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.

Contents

Figures

Tables

1 Changes in the BTS3902E WCDMA Installation Guide

This chapter describes the changes in the *BTS3902E WCDMA Installation Guide*.

Draft A (2011-06-30)

This is the draft.

2 Installation Preparations

About This Chapter

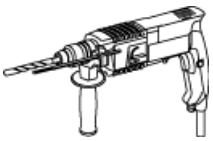
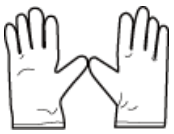
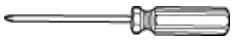
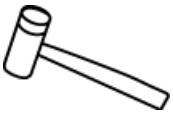
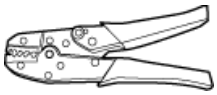
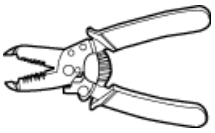
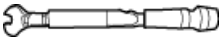
This chapter describes instrument preparations, and skills and qualifications that installation engineers must possess.

2.1 Tools and Instruments
All required tools and instruments must be ready before the installation.

2.2 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 Tools and Instruments

All required tools and instruments must be ready before the installation.

Hammer drill (with a φ 12 bit, φ 14 bit, and φ 18 bit) 	Electrostatic discharge (ESD) gloves 	Vacuum cleaner 
Heat gun 	Phillips screwdriver (M3 to M6) 	Flat-head screwdriver (M3 to M6) 
Rubber mallet 	COAX crimping tool 	Wire stripper 
Utility knife 	Wire clippers 	Adjustable wrench (capacity ⩾ 32 mm [1.26 in.]) 
Level 	Torque screwdriver   5 mm (0.2 in.)  (M3 to M6)  (M3 to M6)	Torque wrench  Capacity: 17 mm (0.67 in.) or 21 mm (0.83 in.)
Combination wrench  Capacity: 17 mm [0.67 in.] or 21 mm [0.83 in.]	Inner hexagon wrench 	Measuring tape 

Multimeter 	Marker (diameter ≤ 10 mm [0.39 in.]) 	—

2.2 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

About This Chapter

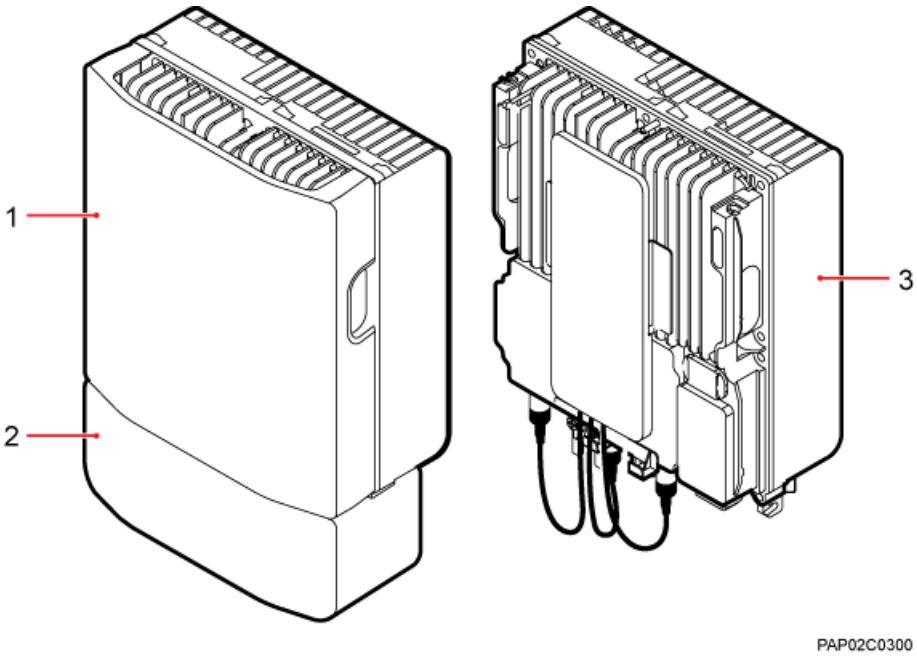
This chapter describes the information that you must be familiar with before installing a BTS3902E, including the BTS3902E exterior, ports, installation options, physical supports, and installation clearance requirements.

3.1 BTS3902E Exterior

Th BTS3902E has a modular design with its ports on the bottom.

Figure 3-1 shows the BTS3902E. The BTS3902E on the left has a housing, and the BTS3902E on the right does not have a housing. The camouflage shell is optional.

Figure 3-1 BTS3902E



(1) Upper housing (2) Camouflage shell (3) BTS3902E

Figure 3-2 shows the dimensions of a BTS3902E without a housing, and **Figure 3-3**shows the dimensions of a BTS3902E with a housing.

Figure 3-2 Dimensions of a BTS3902E without a housing

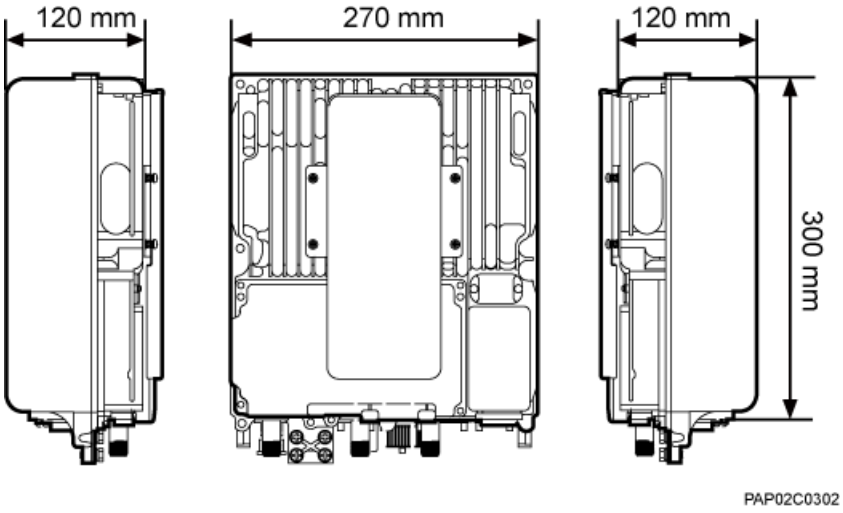
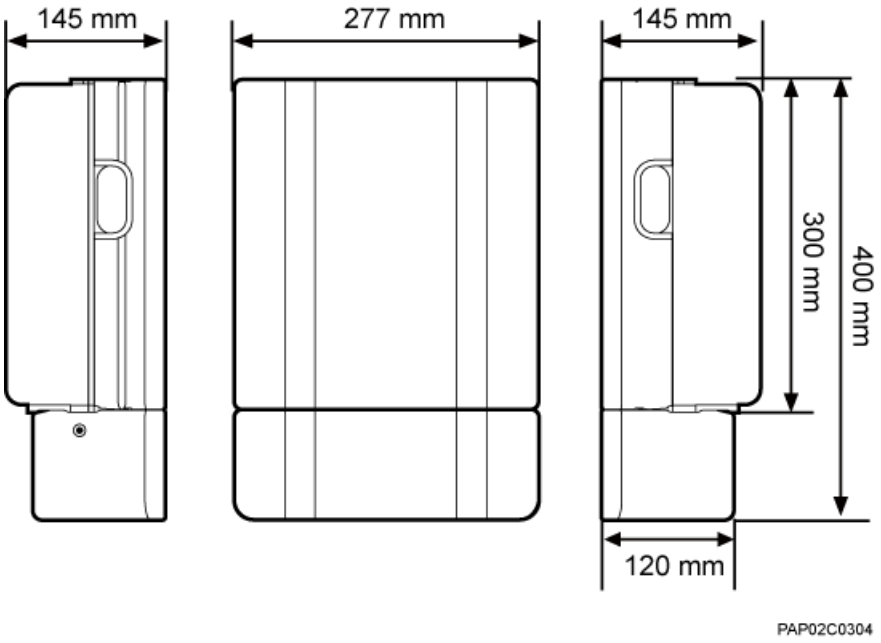


Figure 3-3 Dimensions of a BTS3902E with a housing and antennas



3.2 BTS3902E Ports

The BTS3902E ports are on the bottom, and the indicators are in the indicator on the front.

Figure 3-4 shows the positions of the BTS3902E ports and indicators.

Figure 3-4 Positions of the BTS3902E ports and indicators

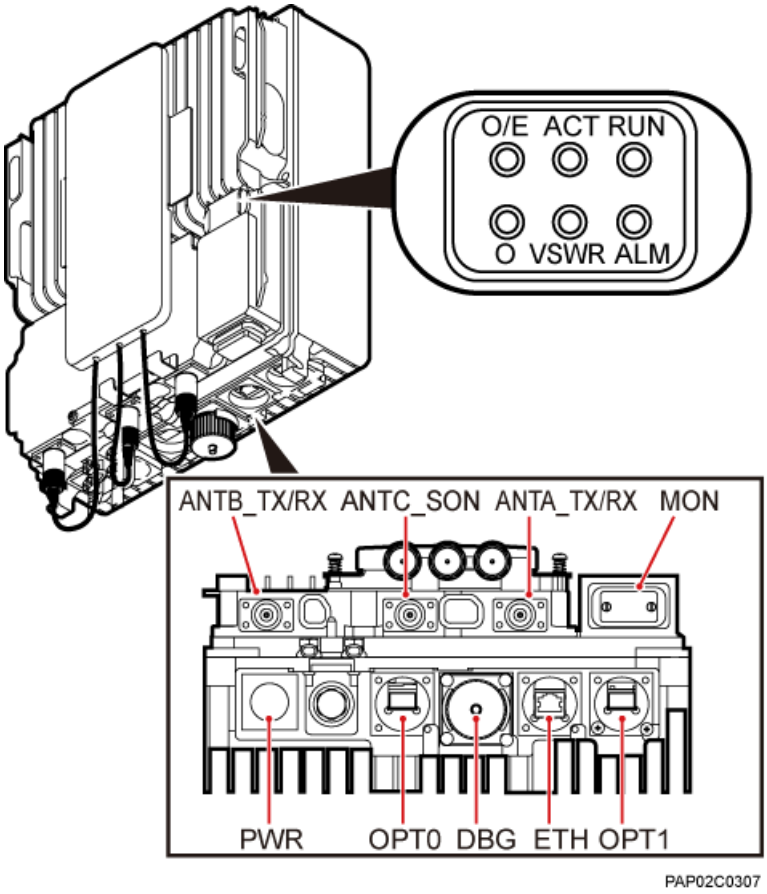


Table 3-1 describes the BTS3902E ports and indicators.

Table 3-1 BTS3902E ports and indicators

Item	Label	Description
Ports	ANTA_TX/RX	TX/RX port A
	ANTB_TX/RX	TX/RX port B
	ANTC_SON	SON antenna port
	ETH	FE/GE electrical port
	OPT0	FE/GE optical port
	OPT1	FE/GE optical port
	MON	Environment monitoring port for an RS485 input and four dry contact inputs.
	PWR	Power supply port
	DBG	Port for commissioning, clock test, or software upgrade

Item	Label	Description
Indicators	RUN	For details, see BTS3902E Indicators.
	ALM	
	ACT	
	VSWR	
	O/E	
	O	

3.3 BTS3902E Indicators

A BTS3902E has six indicators, which indicate the running status of the BTS3902E.

For details about the indicator positions on the BTS3902E panel, see BTS3902E Ports.

Table 3-2 describes BTS3902E indicators.

Table 3-2 BTS3902E indicators

Indicator	Color	Status	Description
RUN	Green	Steady on	There is power supply, but the BTS3902E is faulty.
		Off	There is no power supply, or the BTS3902E is faulty.
		Blinking (on for 1s and off for 1s)	The BTS3902E is working properly.
		Blinking (on for 0.125s and off for 0.125s)	Software is being loaded to the BTS3902E, or the BTS3902E is not started.
ALM	Red	Steady on	Alarms are generated, and the BTS3902E 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, the necessity for BTS3902E replacement is uncertain.
		Off	No alarm is generated.
ACT	Green	Steady on	The BTS3902E is working properly with TX channels enabled.
		Blinking (on for 1s and off for 1s)	The BTS3902E is working properly with TX channels disabled.

Indicator	Color	Status	Description
VSWR	Red	Off	No VSWR alarm is generated.
		Blinking red (on for 1s and off for 1s)	VSWR alarms are generated on the ANTB_TX/RX port.
		Steady red	VSWR alarms are generated on the ANTA_TX/RX port.
		Blinking red (on for 0.125s and off for 0.125s)	VSWR alarms are generated on the ANTA_TX/RX and ANTB_TX/RX ports.
O/E	Green	Steady on	The OPT1 or ETH port is connected properly.
		Blinking (on for 0.125s and off for 0.125s)	The OPT1 or ETH port is transmitting or receiving data.
		Off	The OPT1 or ETH port is connected improperly.
O	Green	Steady on	The OPT0 port is connected properly.
		Blinking (on for 0.125s and off for 0.125s)	The OPT0 port is transmitting or receiving data.
		Off	The OPT0 port is connected improperly.

3.4 BTS3902E Installation Options

This section describes the BTS3902E installation options. A BTS3902E can be installed on a pole, wall, or wood pole.

Installing a BTS3902E on a Pole with the Diameter of 60 mm to 114 mm (2.36 in. to 4.49 in.)

Figure 3-5 shows the diameter of a pole for installing a BTS3902E.

CAUTION

- The recommended diameter is 80 mm (3.15 in.).

Figure 3-5 Diameter of a pole

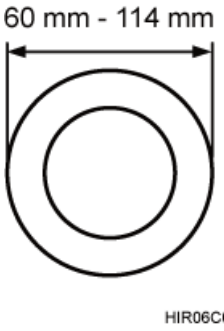
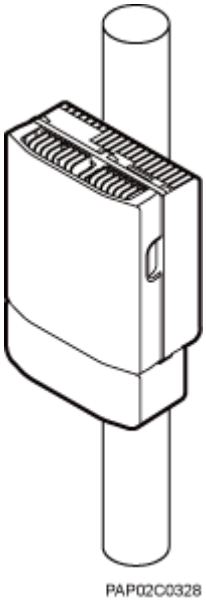


Figure 3-6 shows a BTS3902E installed on a pole.

Figure 3-6 BTS3902E installed on a pole



Installing a BTS3902E on a Pole with the Diameter of 114 mm to 400 mm (4.49 in. to 15.75 in.)

Figure 3-7 shows the diameter of a pole for installing a BTS3902E.

Figure 3-7 Diameter of a pole

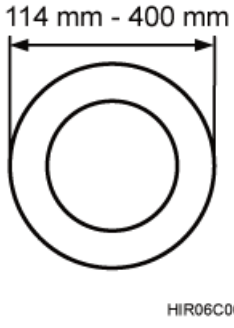
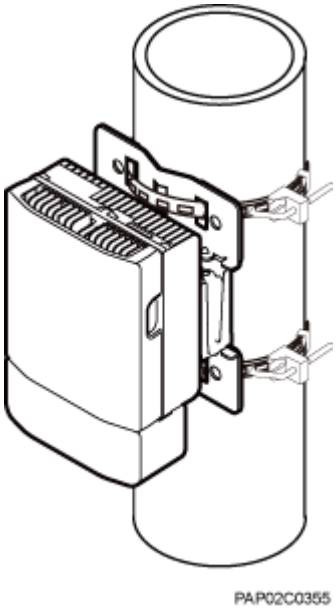


Figure 3-8 shows a BTS3902E installed on a pole.

Figure 3-8 BTS3902E installed on a pole



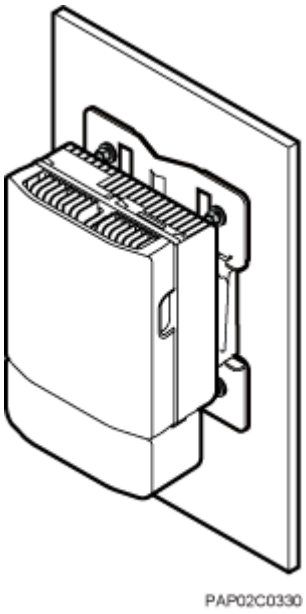
Installing a BTS3902E on a Wall

The wall on a BTS3902E is installed must meet the following requirements:

- When a single BTS3902E is installed, the wall has a capacity of bearing at least four times the weight of the BTS3902E.
- Expansion bolts must be tightened to 30 N·m (265.52 lbf·in.) to ensure the bolts work properly and the wall remains intact without cracks in it.

Figure 3-9 shows a BTS3902E installed on a wall.

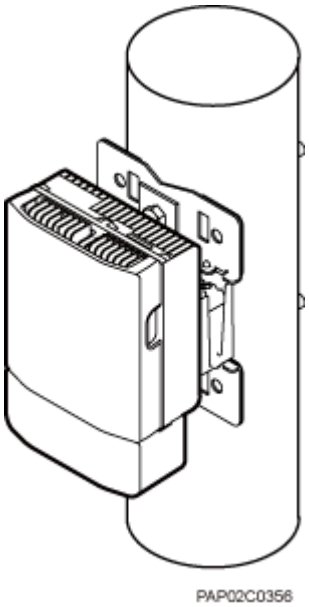
Figure 3-9 BTS3902E installed on a wall



Installing a BTS3902E on a Wood Pole

Figure 3-10 shows a BTS3902E installed on a wood pole.

Figure 3-10 BTS3902E installed on a wood pole



3.5 Installation Clearance Requirements

This section describes the clearance requirements for installing a BTS3902E on a pole, wall, or wood pole.

Figure 3-11 shows the recommended installation clearance for a single BTS3902E.

Figure 3-11 Recommended installation clearance for a single BTS3902E

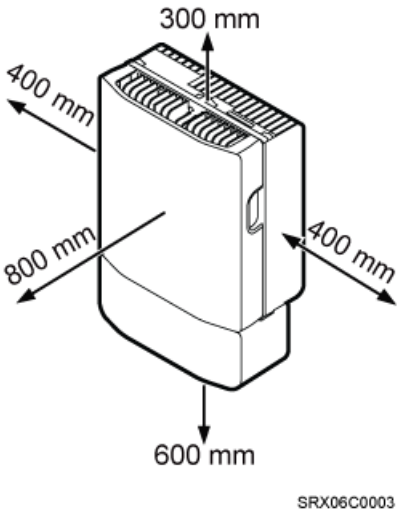


Figure 3-12 shows the minimum installation clearance for a single BTS3902E.

Figure 3-12 Minimum installation clearance for a single BTS3902E

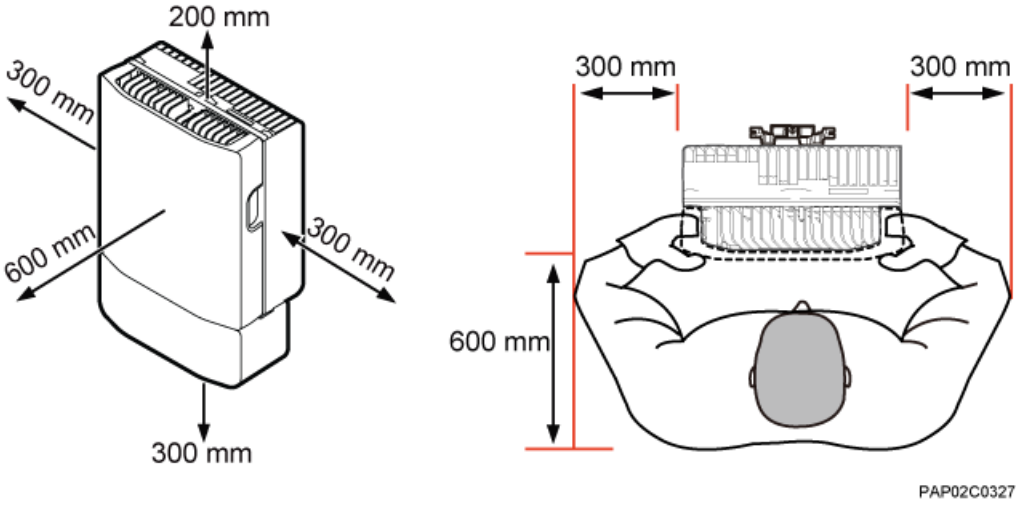


Figure 3-13 shows the recommended installation clearance for two BTS3902Es installed side by side.

Figure 3-13 Recommended installation clearance for two BTS3902Es installed side by side

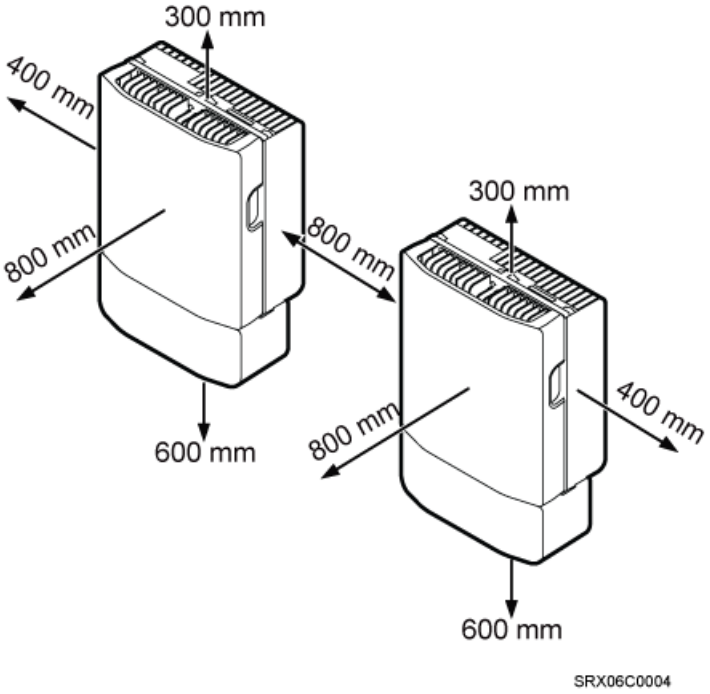


Figure 3-14 shows the minimum installation clearance for two BTS3902Es installed side by side.

Figure 3-14 Minimum installation clearance for two BTS3902Es installed side by side

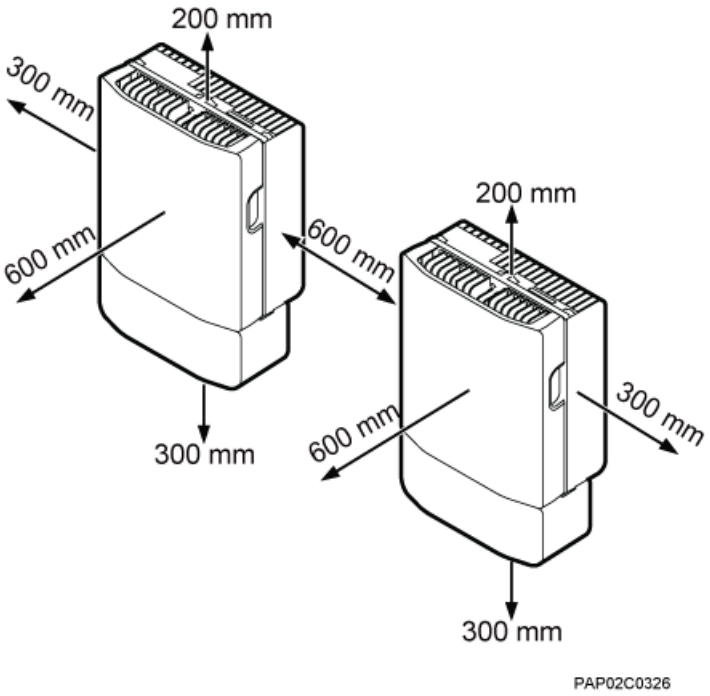
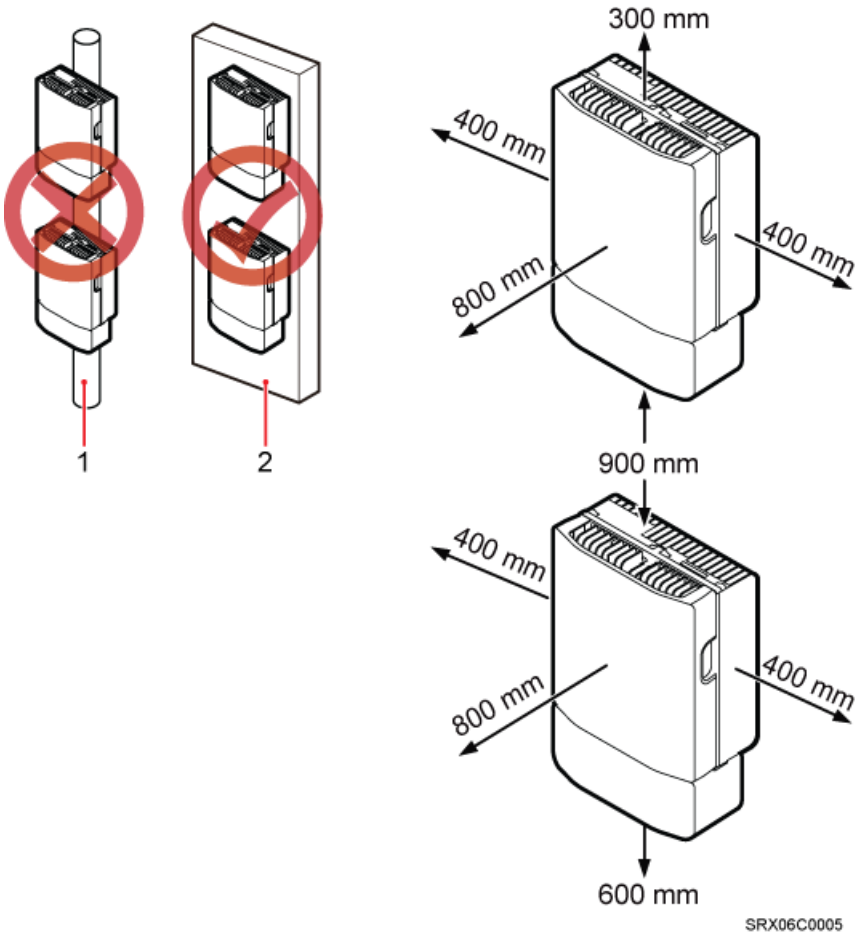


Figure 3-15 shows the recommended installation clearance for two BTS3902Es installed in a vertical line.

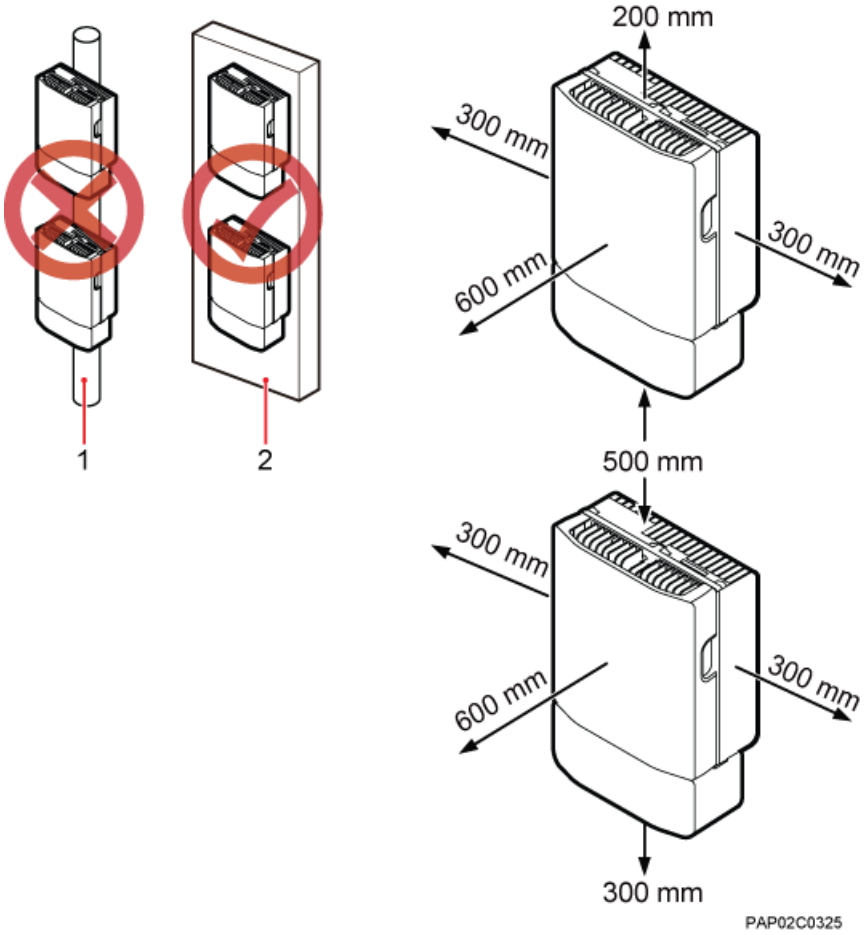
Figure 3-15 Recommended installation clearance for two BTS3902Es installed in a vertical line



(1) Pole (2) Wall

Figure 3-16 shows the minimum installation clearance for two BTS3902Es installed in a vertical line.

Figure 3-16 Minimum installation clearance for two BTS3902Es installed in a vertical line



(1) Pole (2) Wall

4 Unpacking the Equipment

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 **Step 2**.
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 **Step 3**.
The outer packing is severely damaged or soaked	Find out the cause and report it to the local Huawei office.

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 *Packing List* with the customer.
There is any shipment shortage or wrong shipment	Fill in and submit the *Cargo Shortage and Mishandling Report*.
Articles are damaged.	Fill in and submit the *Article Replacement Report*.

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.

----End

5 Obtaining the ESN

The Electronic Serial Number (ESN) is a unique identifier of a Network Element (NE). Record the ESN for later commissioning of the base station before installation.

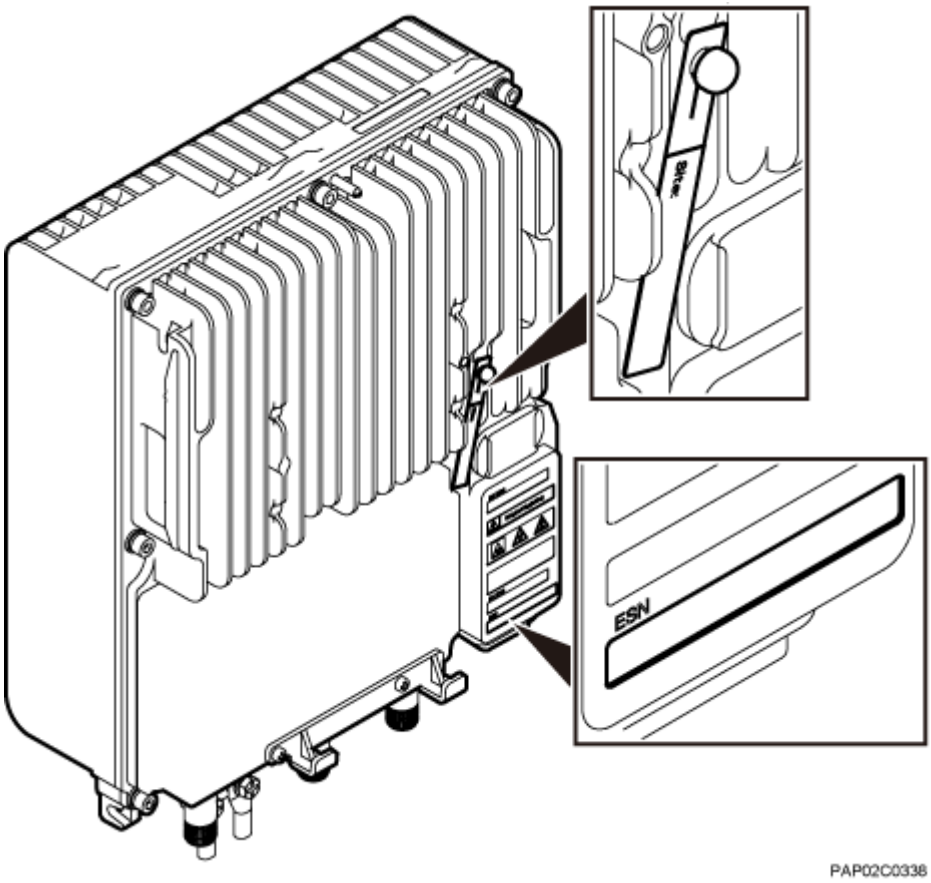
Procedure

Step 1 Use an M4 Phillips screwdriver to loosen the two captive screws on the housing, and then move the upper housing until it is stopped.

Step 2 Record the ESN on the BTS3902E.

- The ESN is printed on the label and BTS3902E. You must remove the label to record the site information on the side labeled Site on the label, as shown in **Figure 5-1**.

Figure 5-1 Obtaining the ESN



Step 3 Report the ESN to the engineer for the commissioning of the base station.

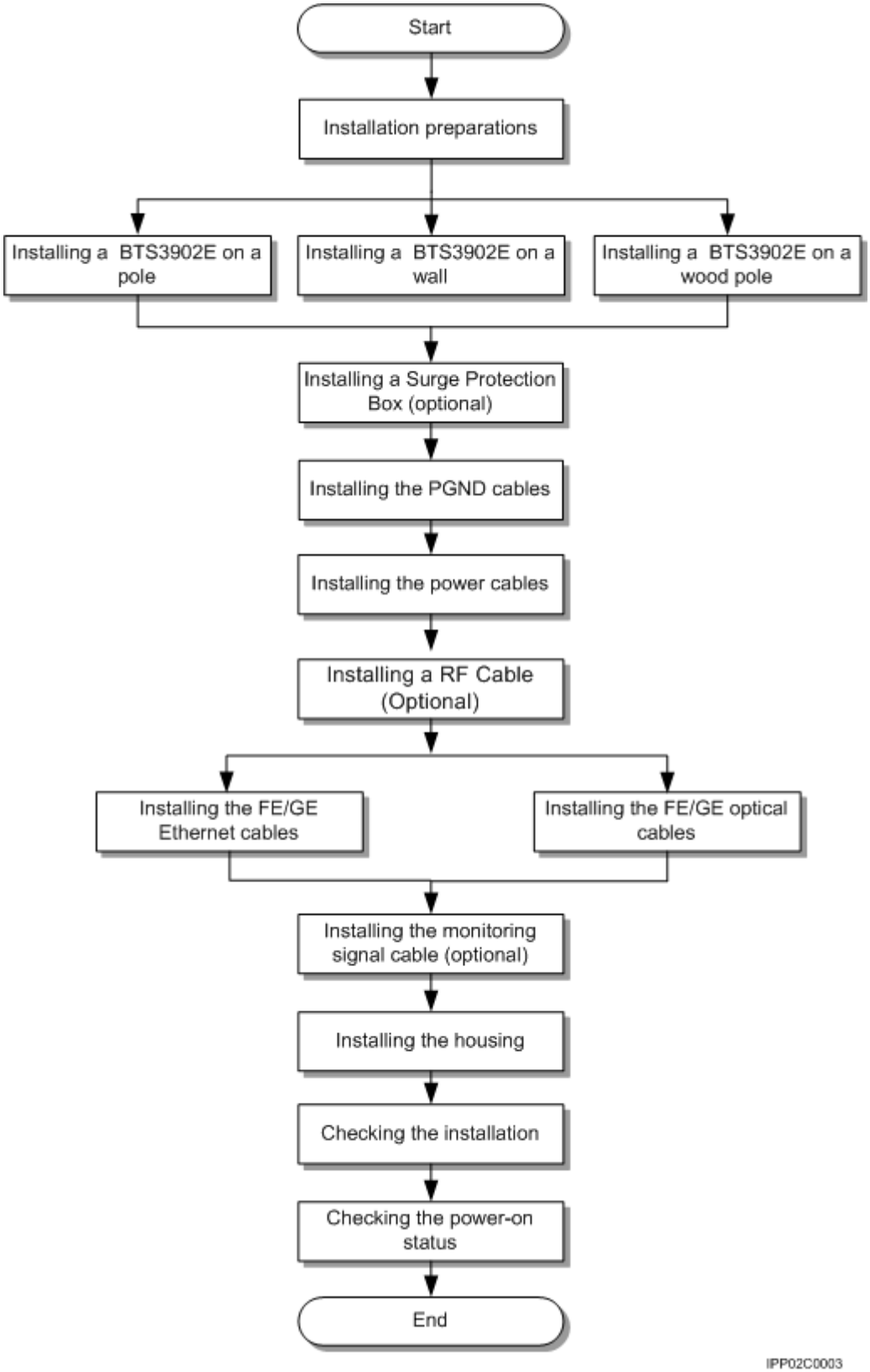
----End

6 Installation Process

The BTS3902E installation process involves installing a BTS3902E and related cables, checking the BTS3902E hardware installation, and powering on the BTS3902E.

Figure 6-1 shows the process of installing a BTS3902E.

Figure 6-1 Process of installing the BTS3902E



7 Installing a BTS3902E

About This Chapter

This section describes the procedures for installing a BTS3902E. The BTS3902E can be installed on a pole, wall, or wood pole depending on the installation environment.

7.1 Mounting Kits for Installing a BTS3902E
This section describes the brackets and attachment plate for installing a BTS3902E.

7.2 Installing a BTS3902E on a Pole with the Diameter of 60 mm to 114 mm (2.36 in. to 4.49 in.)
This section describes the procedure and precautions for installing a BTS3902E on a pole with the diameter of 60 mm to 114 mm (2.36 in. to 4.49 in.).

7.3 Installing a BTS3902E on a Pole with the Diameter of 114 mm to 400 mm (4.49 in. to 15.75 in.)
This section describes the procedure and precautions for installing a BTS3902E on a pole with the diameter of 114 mm to 400 mm (4.49 in. to 15.75 in.).

7.4 Installing a BTS3902E on a Wall
This section describes the procedure and precautions for installing a BTS3902E on a wall.

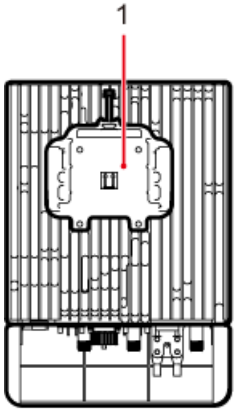
7.5 Installing a BTS3902E on a Wood Pole
This section describes the procedure and precautions for installing a BTS3902E on a wood pole.

7.1 Mounting Kits for Installing a BTS3902E

This section describes the brackets and attachment plate for installing a BTS3902E.

Figure 7-1 shows the rear of a BTS3902E.

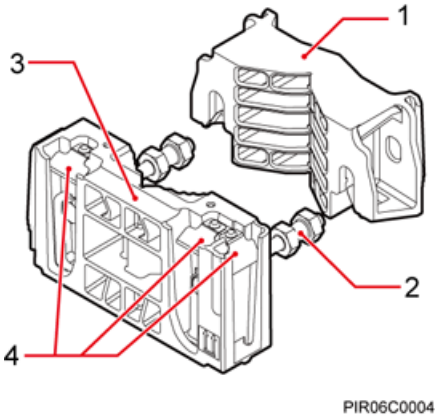
Figure 7-1 Rear of a BTS3902E



(1) Attachment plate

Figure 7-2 shows the mounting bracket assembly for installing a BTS3902E.

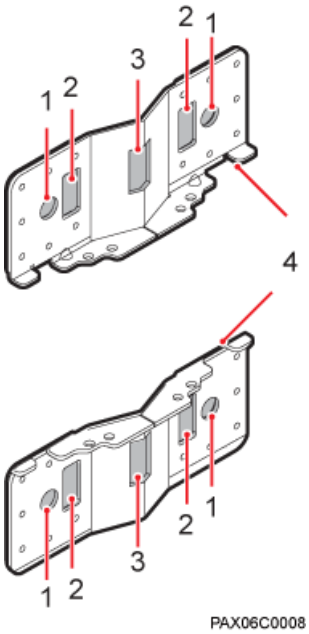
Figure 7-2 Mounting bracket assembly for installing a BTS3902E



(1) Auxiliary mounting bracket (2) Dual-nut bolt assembly (3) Main mounting bracket (4) Hoist clamp on the main mounting bracket

Figure 7-3 shows the adapting plate assembly for installing a BTS3902E.

Figure 7-3 Adapting plate assembly for installing a BTS3902E



(1) Mounting hole group A (2) Mounting hole group B (3) Mounting hole group C (4) Adapting plates

7.2 Installing a BTS3902E on a Pole with the Diameter of 60 mm to 114 mm (2.36 in. to 4.49 in.)

This section describes the procedure and precautions for installing a BTS3902E on a pole with the diameter of 60 mm to 114 mm (2.36 in. to 4.49 in.).

Context

NOTE

It is recommended that the BTS3902E be installed 8000 mm to 15000 mm (315 in. to 590.6 in.) above the floor.

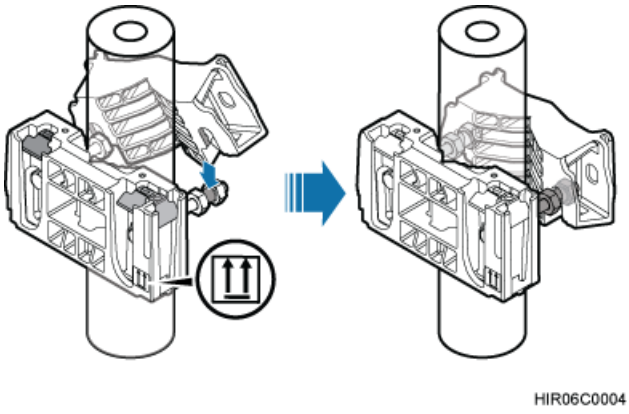
Procedure

Step 1 Determine the position for installing the main mounting bracket.

Step 2 Fit one end of the auxiliary mounting bracket to one dual-nut bolt assembly of the main mounting bracket.

Step 3 Install the bracket assembly on the pole, and then fit the other end of the auxiliary mounting bracket to the other dual-nut bolt assembly, as shown in **Figure 7-4**.

Figure 7-4 Installing the bracket assembly

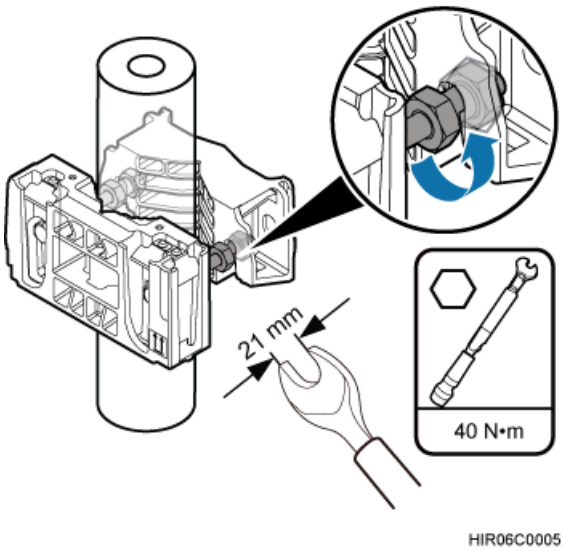


Step 4 Using a torque wrench, tighten the nuts to 40 N·m (354.03 lbf·in.) to secure the bracket assembly onto the pole, as shown in **Figure 7-5**.

CAUTION

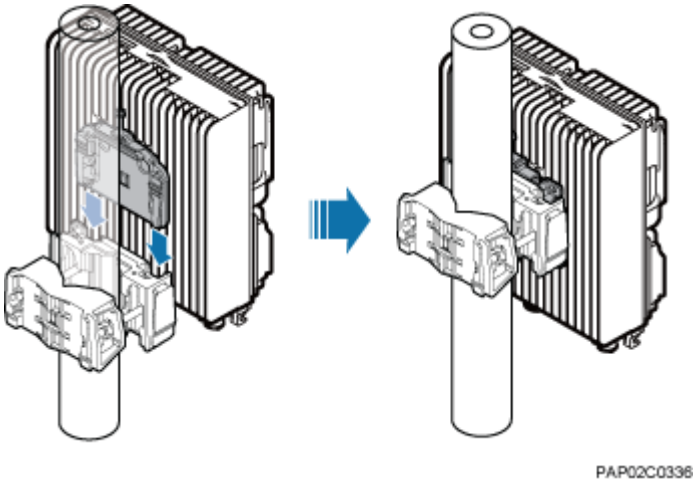
Tighten the two dual-nut bolt assemblies alternatively. After the main and auxiliary brackets are secured properly, measure the spacing between the brackets on both sides and ensure that the spacing is the same on the two sides.

Figure 7-5 Securing the bracket assembly onto the pole



Step 5 Install the BTS3902E on the main mounting bracket until the BTS3902E snaps shut, as shown in **Figure 7-6**.

Figure 7-6 Installing the BTS3902E on the main mounting bracket



----End

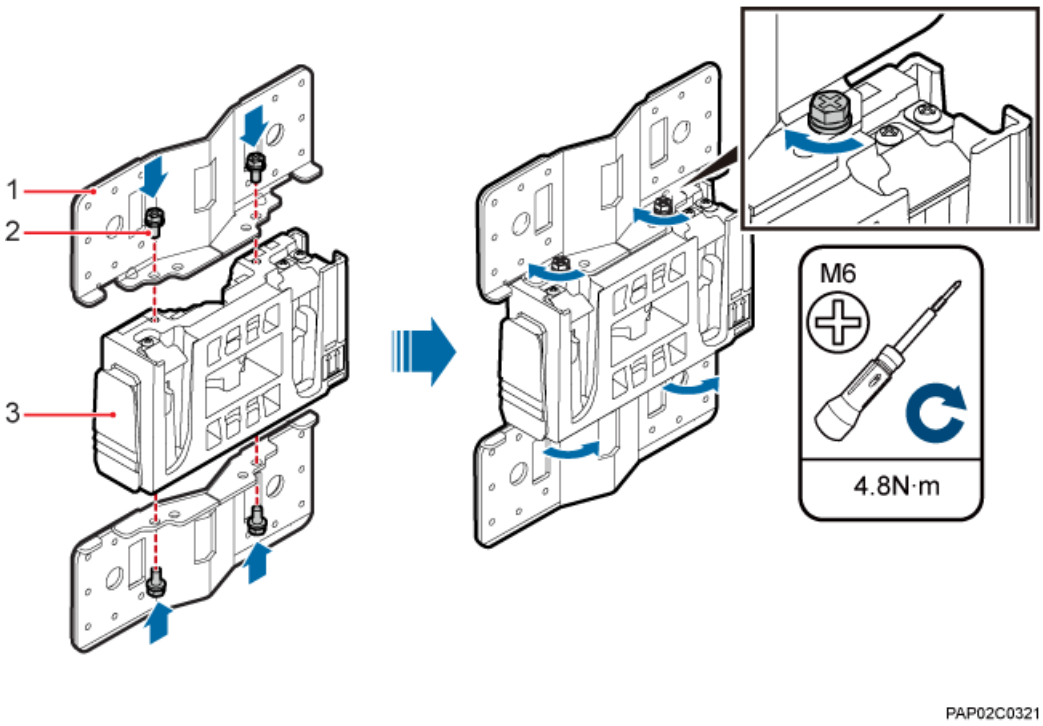
7.3 Installing a BTS3902E on a Pole with the Diameter of 114 mm to 400 mm (4.49 in. to 15.75 in.)

This section describes the procedure and precautions for installing a BTS3902E on a pole with the diameter of 114 mm to 400 mm (4.49 in. to 15.75 in.).

Procedure

Step 1 Install two adapting plates on the top and bottom of the main mounting bracket. Tighten two M6x14 screws to 4.8 N·m (42.48 lbf·in.) to secure each of the plate, as shown in **Figure 7-7**.

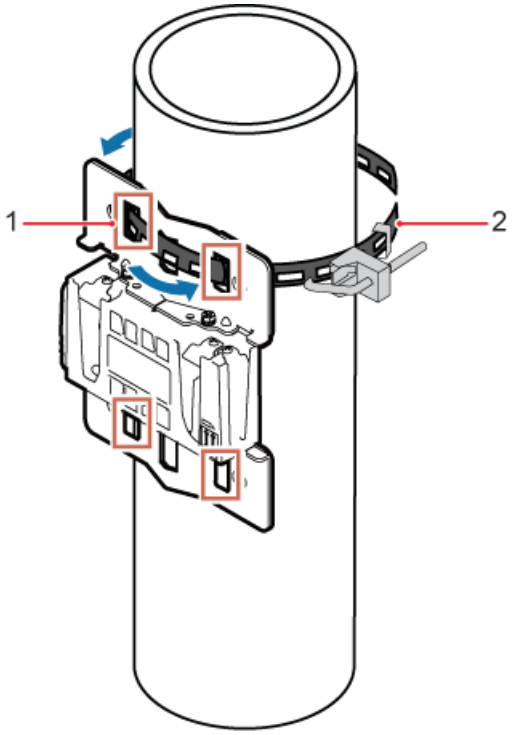
Figure 7-7 Installing the adapting plate assembly



(1) Adapting plate (2) Screw (3) Main mounting bracket

Step 2 Install two hose clamps through the mounting hole group B of the adapting plates, as shown in **Figure 7-8**.

Figure 7-8 Installing the hose clamps



(1) Mounting hole group B (2) Hose clamp

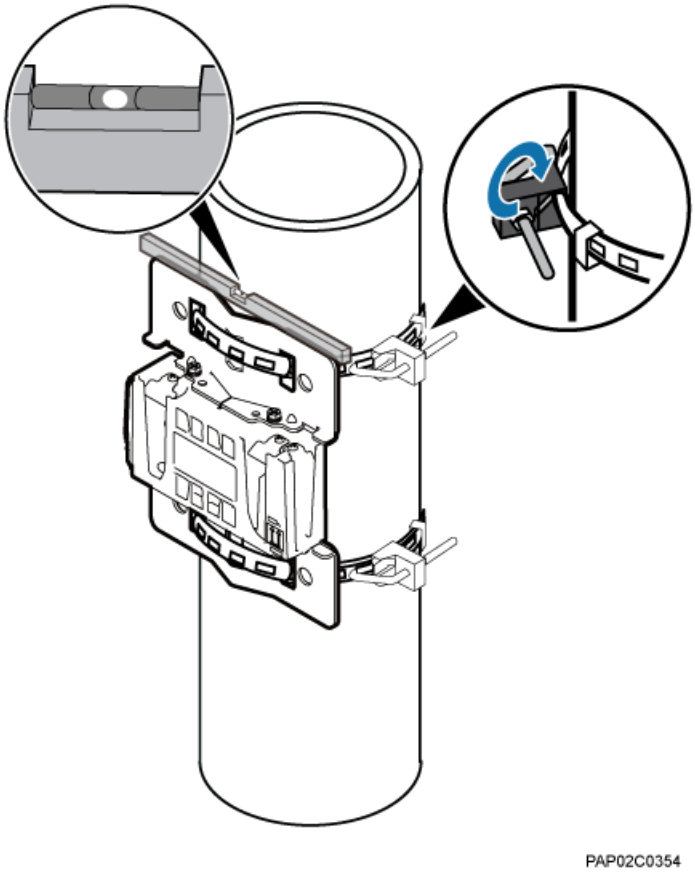
Step 3 Install the securing piece, as shown in **Figure 7-9**.

1. Secure the hose clamp.
2. Use a level to check whether the adapting plate is on a horizontal plane.

NOTE

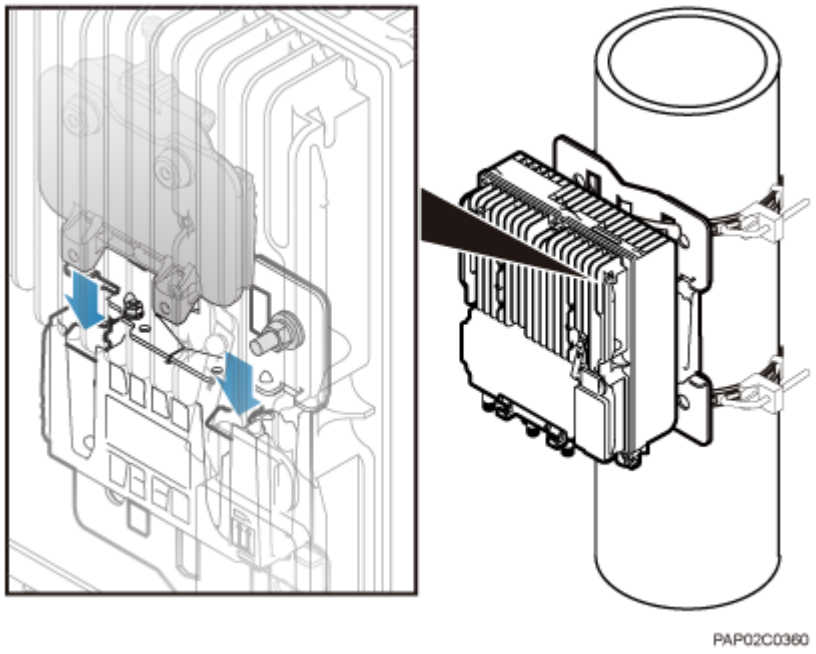
Secure the upper hose clamp before securing the lower clamp.

Figure 7-9 Securing the hose clamp



Step 4 Install the BTS3902E on the main mounting bracket until the BTS3902E snaps shut, as shown in **Figure 7-10**.

Figure 7-10 Installing the BTS3902E on the main mounting bracket



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7.4 Installing a BTS3902E on a Wall

This section describes the procedure and precautions for installing a BTS3902E on a wall.

Context

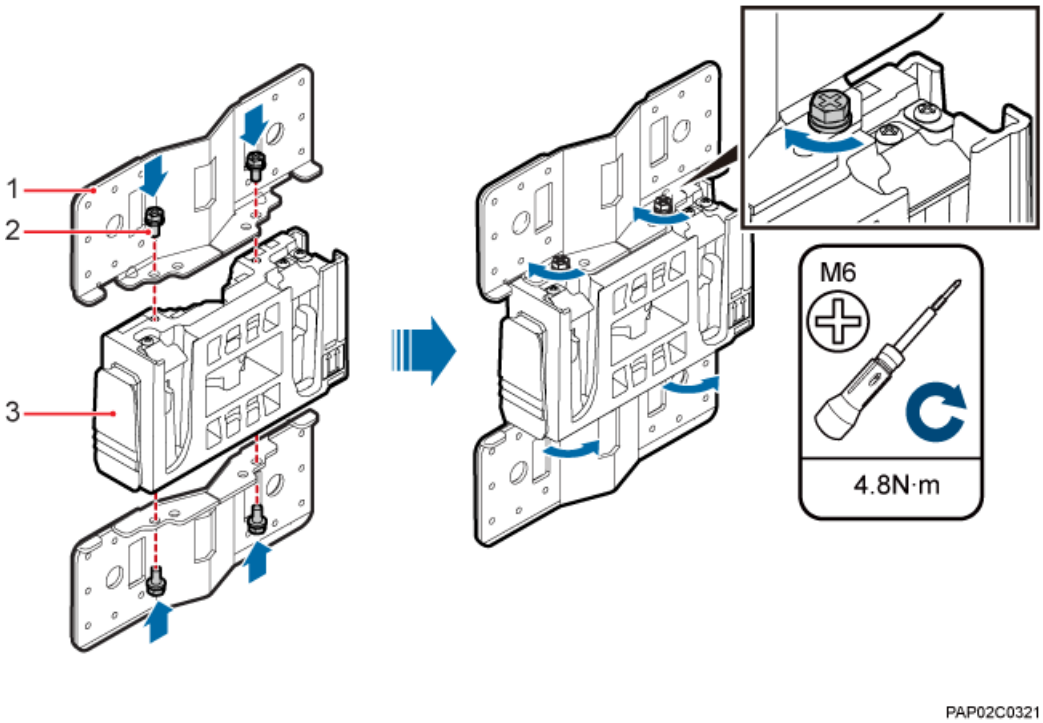
CAUTION

You must use adjustable torque tools to tighten all the screws and nuts to the requirements described in this document.

Procedure

Step 1 Install two adapting plates on the top and bottom of the main mounting bracket. Tighten two M6x14 screws to 4.8 N·m (42.48 lbf·in.) to secure each of the plate, as shown in **Figure 7-11**.

Figure 7-11 Installing the adapting plate assembly



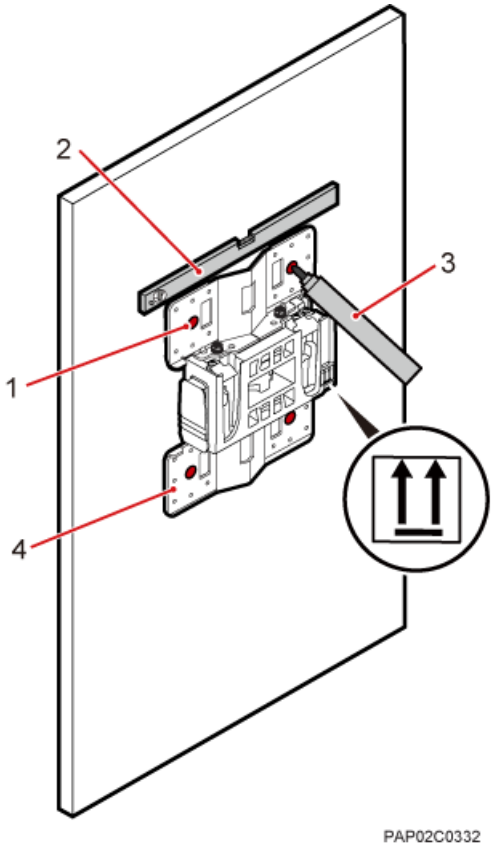
(1) Adapting plate (2) Screw (3) Main mounting bracket

Step 2 Place the adapting plates against the wall, use a level to verify that the plates are horizontal, and then mark anchor points using a marker, as shown in **Figure 7-12**.

NOTE

It is recommended that the BTS3902E be installed 8000 mm to 15000 mm (315 in. to 590.6 in.) above the floor.

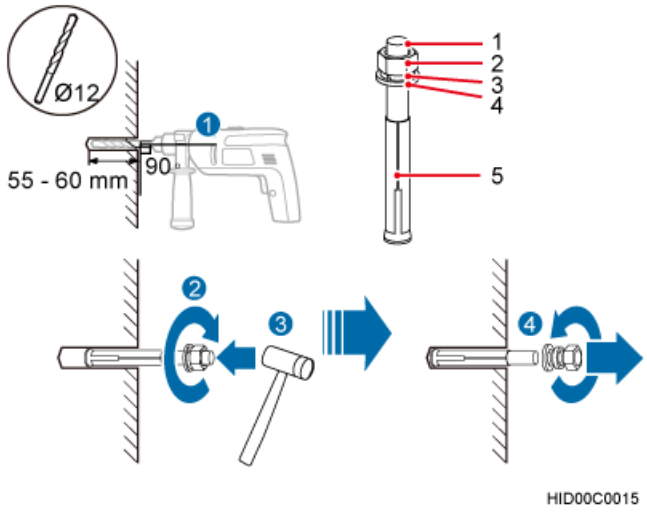
Figure 7-12 Marking the anchor points



(1) Mounting hole group A (2) Level (3) Marker (4) Adapting plate

Step 3 Drill holes at the anchor points, and then install expansion bolt assemblies, as shown in **Figure 7-13**.

Figure 7-13 Drilling a hole and installing an expansion bolt assembly



(1) M10x80 bolt (2) Nut (3) Spring washer (4) Flat washer (5) Expansion tube

1. Use a hammer drill with a φ12 bit to drill holes perpendicularly with the wall at the marked anchor points. Ensure that the depth of each hole ranges from 55 mm to 60 mm (2.17 in. to 2.36 in.).

WARNING

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

2. Use a vacuum cleaner to clear dust inside and around the holes, and then measure the inter-hole spacing. If the spacing is too wide or too narrow, drill holes again.
3. Tighten each expansion bolt slightly and place them perpendicularly into each hole.
4. Hit the expansion bolt using a rubber mallet to enable the expansion tube to completely enter the hole.
5. Remove the M10x80 bolt, spring washer, and flat washer from each expansion bolt assembly in sequence.

CAUTION

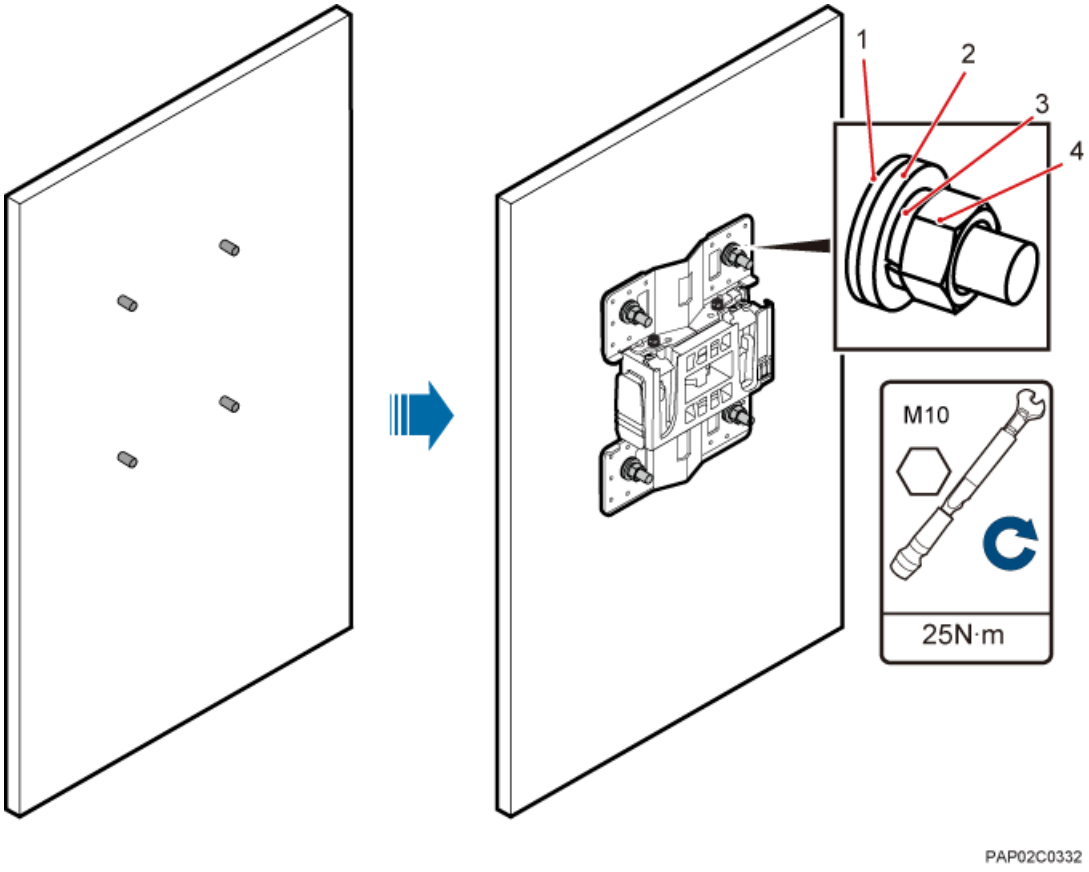
After disassembling an expansion bolt assembly, ensure that the top of the expansion tube is on the same level as the wall. Otherwise, the BTS3902E cannot be installed on the wall evenly and securely.

Step 4 Fit the mounting piece on the expansion bolt, and then use a combination wrench (17 mm [0.67 in.]) to tighten the expansion bolt to 25 N·m (221.27 lbf·in.), as shown in **Figure 7-14**.

CAUTION

Ensure that the arrow on the main mounting bracket points upwards when installing the securing piece.

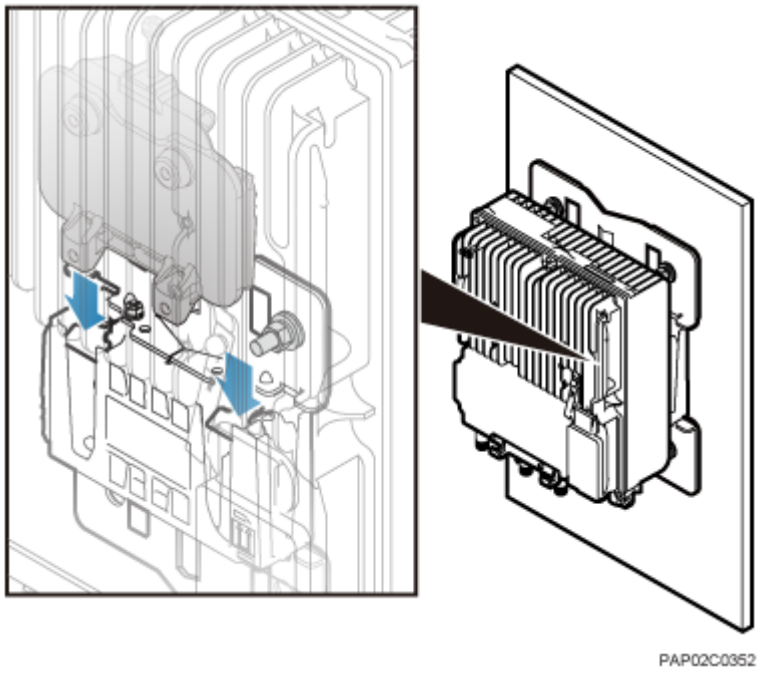
Figure 7-14 Fitting the mounting piece on the expansion bolt



(1) Insulation washer (2) Large flat washer (3) Spring washer (4) Nut

Step 5 Install the BTS3902E on the main mounting bracket until the BTS3902E snaps shut, as shown in **Figure 7-15**.

Figure 7-15 Installing the BTS3902E on the main mounting bracket



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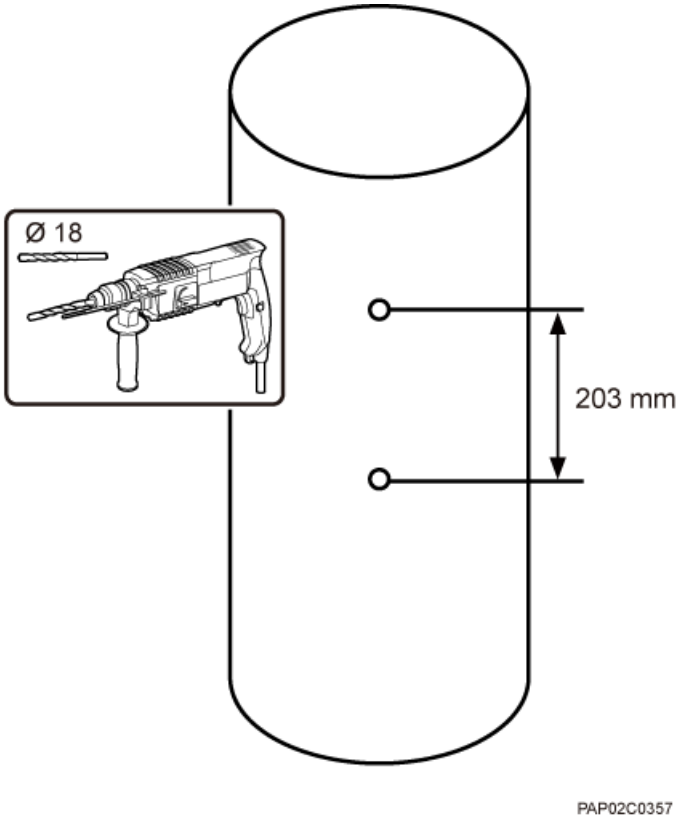
7.5 Installing a BTS3902E on a Wood Pole

This section describes the procedure and precautions for installing a BTS3902E on a wood pole.

Procedure

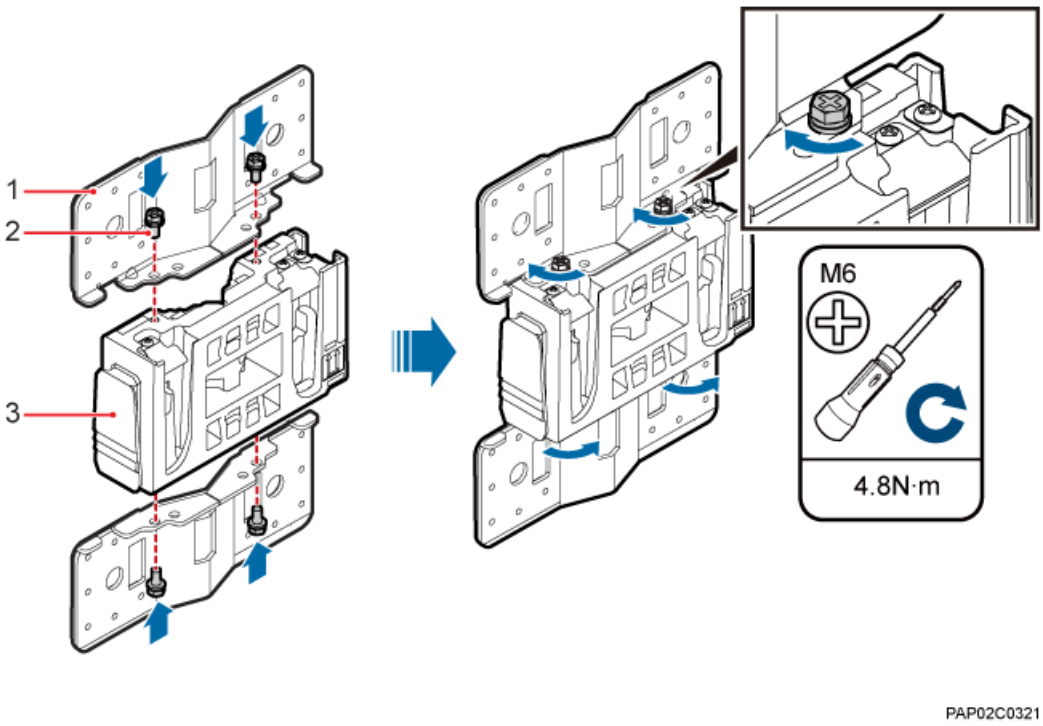
Step 1 Drill two holes with the diameter of 18 mm (0.71 in.) on the middle axis of the wood pole, ensuring that the inter-hole spacing is 203 mm (7.99 in.), as shown in **Figure 7-16**.

Figure 7-16 Drilling holes



Step 2 Install two adapting plates on the top and bottom of the main mounting bracket. Tighten two M6x14 screws to 4.8 N·m (42.48 lbf·in.) to secure each of the plate, as shown in **Figure 7-17**.

Figure 7-17 Installing the adapting plate assembly

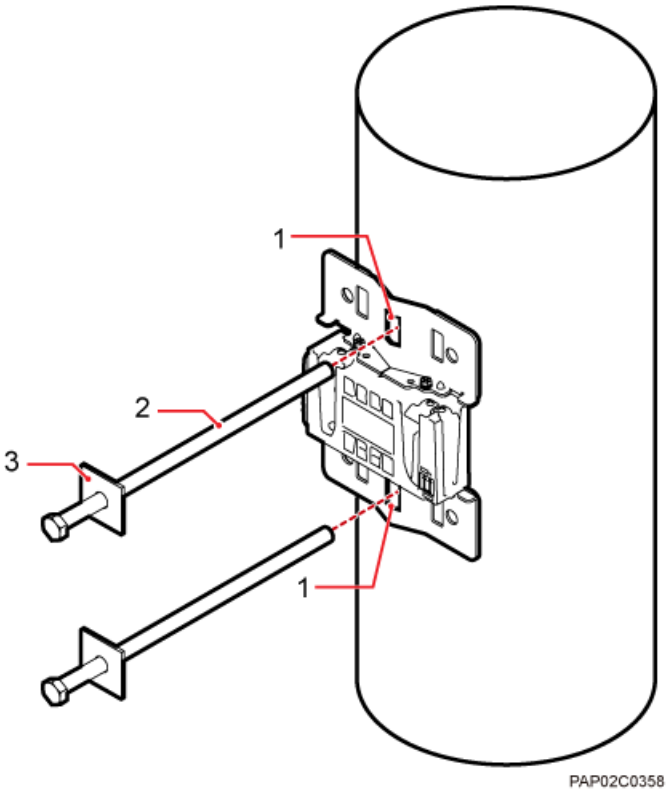


(1) Adapting plate (2) Screw (3) Main mounting bracket

Step 3 Install the securing piece, as shown in **Figure 7-18**.

1. Align the mounting hole group C with the mounting holes in the wood pole.
2. Lead the two long M16 bolts with spacers through the upper and lower mounting holes.

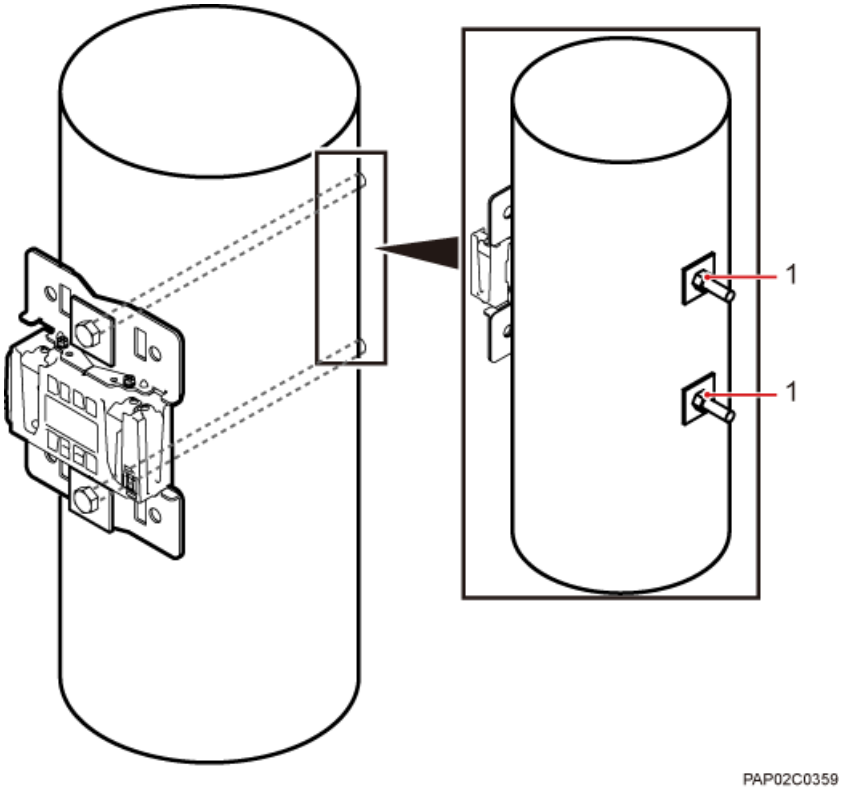
Figure 7-18 Securing the securing pieces



(1) Mounting hole group C (2) Bolt (3) Spacer

Step 4 Tighten the nuts to 80 N·m (708.06 lbf·in.), as shown in **Figure 7-19**.

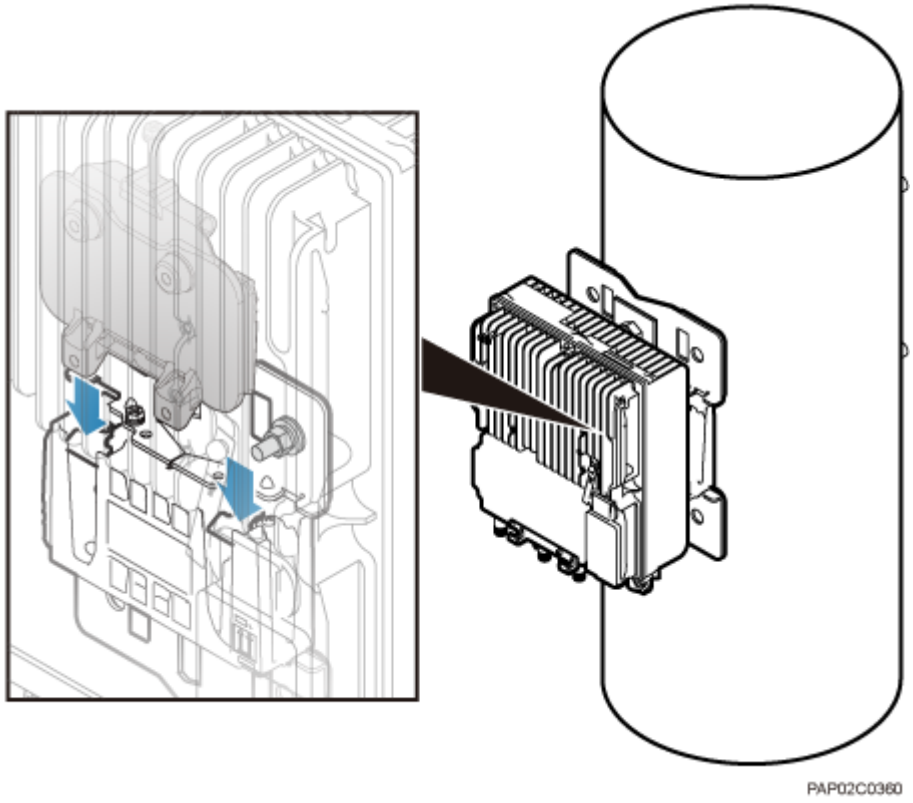
Figure 7-19 Tightening nuts



(1) Nut

Step 5 Install the BTS3902E on the main mounting bracket until the BTS3902E snaps shut, as shown in **Figure 7-20**.

Figure 7-20 Installing the BTS3902E on the main mounting bracket



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8 Installing an AC Surge Protection Box and Related Cables

About This Chapter

This chapter describes the dimensions, installation clearance requirements, and installation options of an AC surge protection box. It also describes the procedure for installing the surge protection box. An AC surge protection box can be configured when a BTS3902E is installed outdoors.

8.1 Dimensions and Installation Clearance Requirements of an AC Surge Protection Box
This section describes the dimensions and installation clearance requirements for an AC surge protection box.

8.2 Installation Options of an AC Surge Protection Box
This section describes installation options of an AC surge protection box. An AC surge protection box can be installed on a pole, wall, or wood pole.

8.3 Installing an AC Surge Protection Box
This section describes the procedure for installing an AC surge protection box.

8.4 Installing Cables for an AC Surge Protection Box
This section describes the procedure for installing cables for an AC surge protection box.

8.1 Dimensions and Installation Clearance Requirements of an AC Surge Protection Box

This section describes the dimensions and installation clearance requirements for an AC surge protection box.

Figure 8-1 shows the dimensions of an AC surge protection box.

Figure 8-1 Dimensions of an AC surge protection box

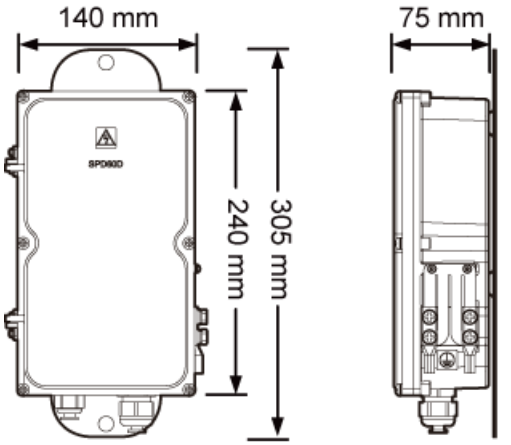


Figure 8-2 shows the recommended installation clearance for an AC surge protection box.

Figure 8-2 Recommended installation clearance for an AC surge protection box

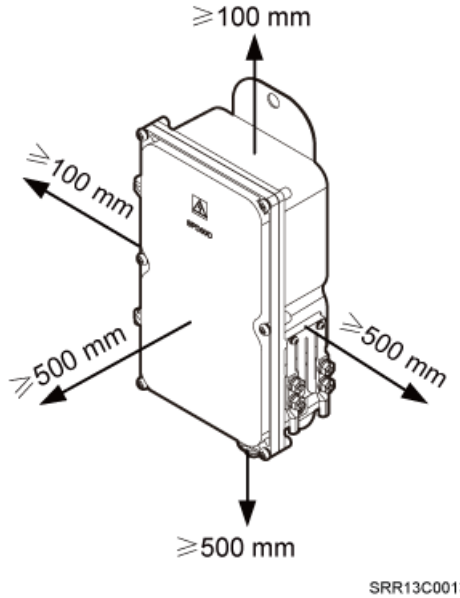
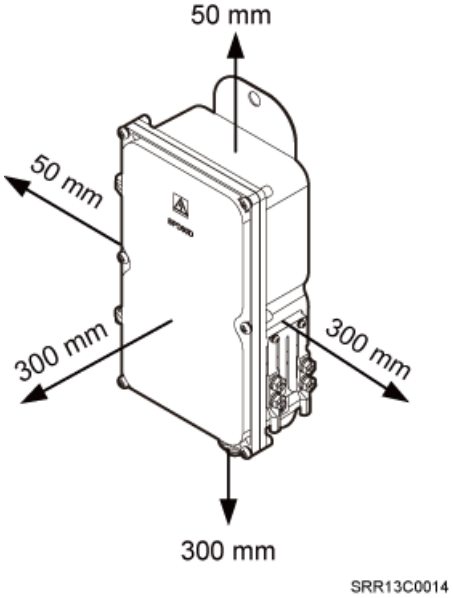


Figure 8-3 shows the minimum installation clearance for an AC surge protection box.

Figure 8-3 Minimum installation clearance for an AC surge protection box



8.2 Installation Options of an AC Surge Protection Box

This section describes installation options of an AC surge protection box. An AC surge protection box can be installed on a pole, wall, or wood pole.

Installing an AC Surge Protection Box on a Pole with the Diameter of 60 mm to 114 mm (2.36 in. to 4.49 in.)

Figure 8-4 shows the diameter of a pole for installing an AC surge protection box.

Figure 8-4 Diameter of a pole

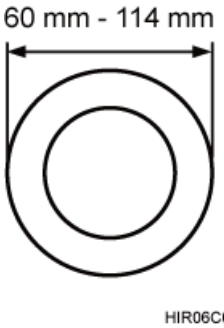
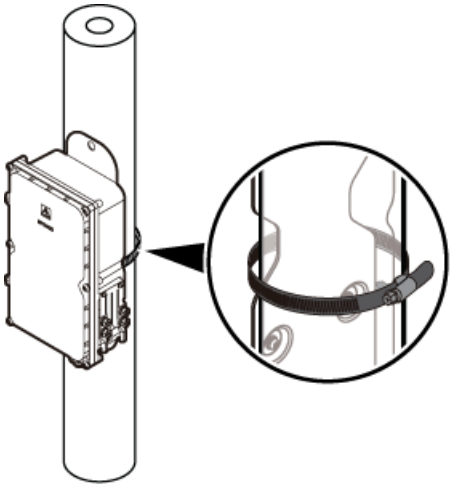


Figure 8-5 shows an AC surge protection box installed on a pole.

Figure 8-5 AC surge protection box installed on a pole



Installing an AC Surge Protection Box on a Pole with the Diameter of 114 mm to 400 mm (4.49 in. to 15.75 in.)

Figure 8-6 shows the diameter of a pole for installing an AC surge protection box.

Figure 8-6 Diameter of a pole

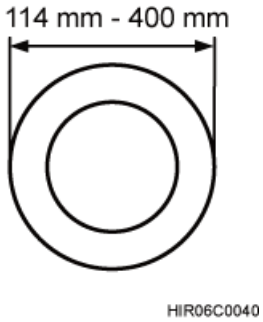
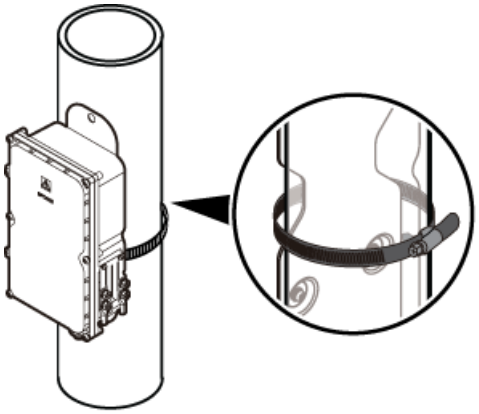


Figure 8-7 shows an AC surge protection box installed on a pole.

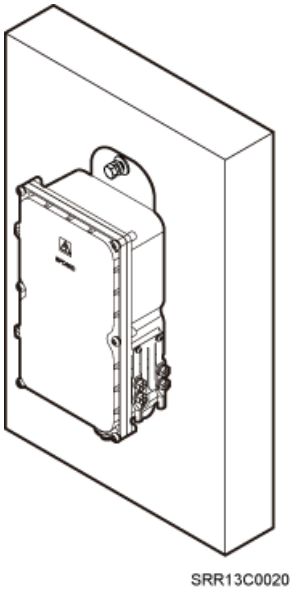
Figure 8-7 AC surge protection box installed on a pole



Installing an AC Surge Protection Box on a Wall

Figure 8-8 shows an AC surge protection box installed on a wall.

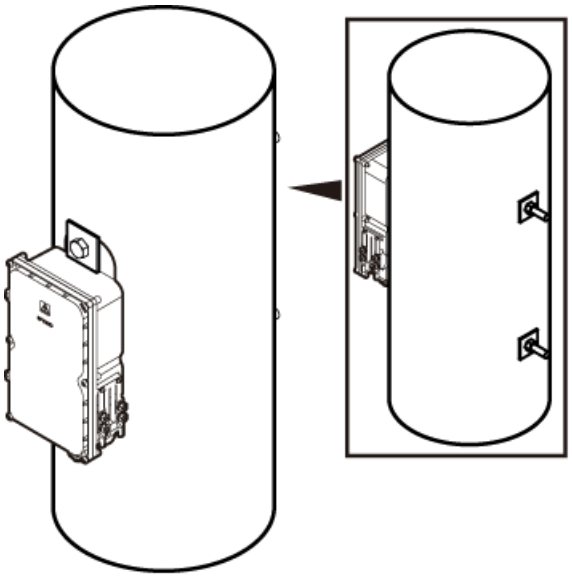
Figure 8-8 AC surge protection box installed on a wall



Installing an AC Surge Protection Box on a Wood Pole

Figure 8-9 shows an AC surge protection box installed on a wood pole.

Figure 8-9 AC surge protection box installed on a wood pole



8.3 Installing an AC Surge Protection Box

This section describes the procedure for installing an AC surge protection box.

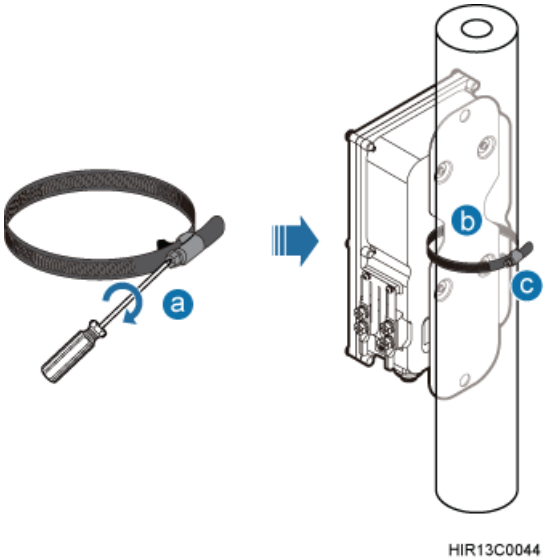
Procedure

- Install an AC surge protection box on a pole, as shown in **Figure 8-10**.

  NOTE

  - When the diameter of the pole ranges from 60 mm to 114 mm (2.36 in. to 4.49 in.), the hose clamps delivered with the AC surge protection box is used.
  - When the diameter of the pole ranges from 114 mm to 400 mm (4.49 in. to 15.75 in.), the hose clamps purchased locally is used.

Figure 8-10 Installing the AC surge protection box on a pole



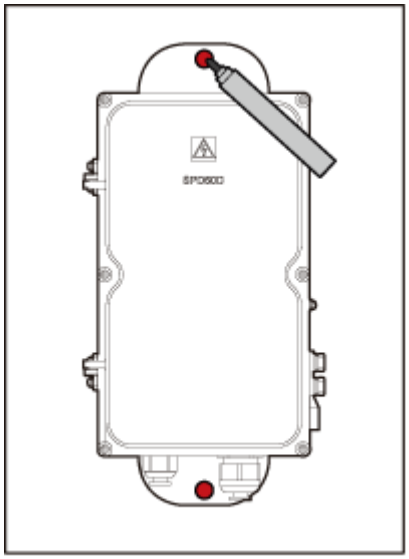
1. Loosen the hose clamp.
2. Lead the clamp through the gap between the rear mounting plate and the case of the AC surge protection box.
3. Install the hose clamp around the pole, and secure the clamp.

NOTE

If the diameter of the pole around which the clamp is installed is small, cut the extra part of the clamp.

- Install an AC surge protection box on a wall.
  1. Place the rear mounting plate of the AC surge protection box against the wall, use a level to verify that the plate is horizontal, and then mark anchor points using a marker, as shown in **Figure 8-11**.

     Figure 8-11 Marking the anchor points

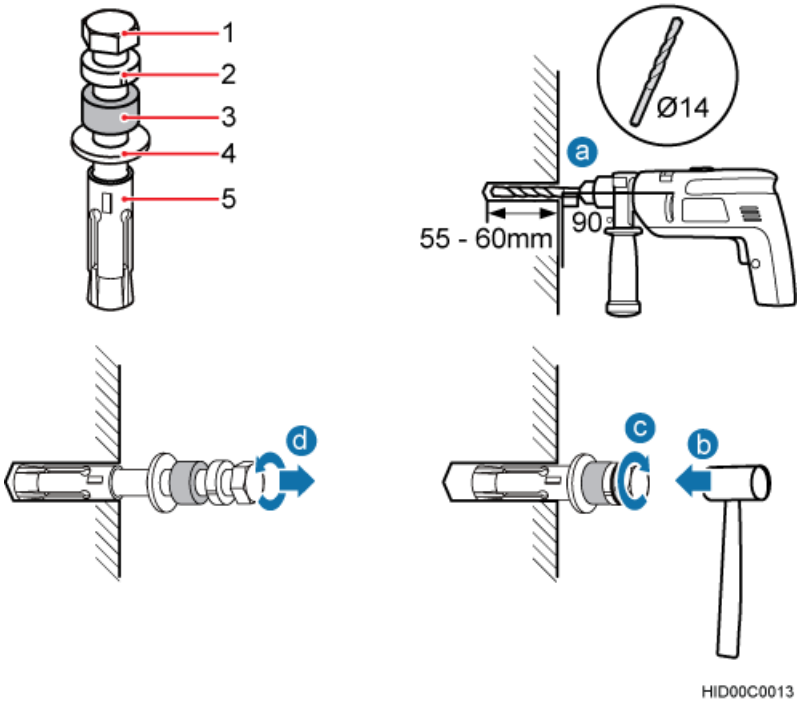
     

  2. Use a hammer drill with a Ø14 bit to drill holes at the anchor points, and install expansion bolts, as shown in **Figure 8-12**.

     NOTE

     After disassembling the expansion bolt assemblies, discard the plastic tubes.

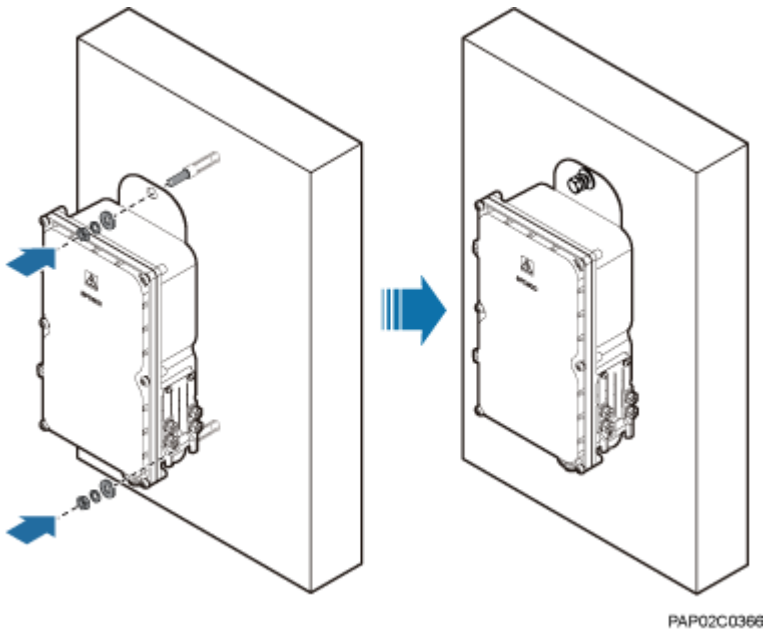
Figure 8-12 Installing an expansion bolt



(1) M10x65 bolt (2) Spring washer 10 (3) Plastic tube (4) Flat washer 10 (5) Expansion tube

3. Align the AC surge protection box with the holes in the wall, and tighten the expansion bolts to 30 N·m (265.52 lbf·in.), as shown in **Figure 8-13**.

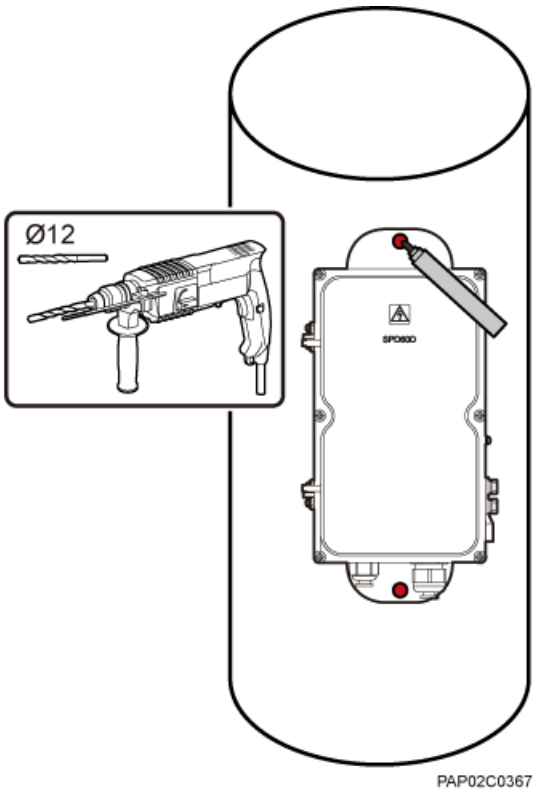
Figure 8-13 Installing an AC surge protection box



- Install an AC surge protection box on a wood pole.

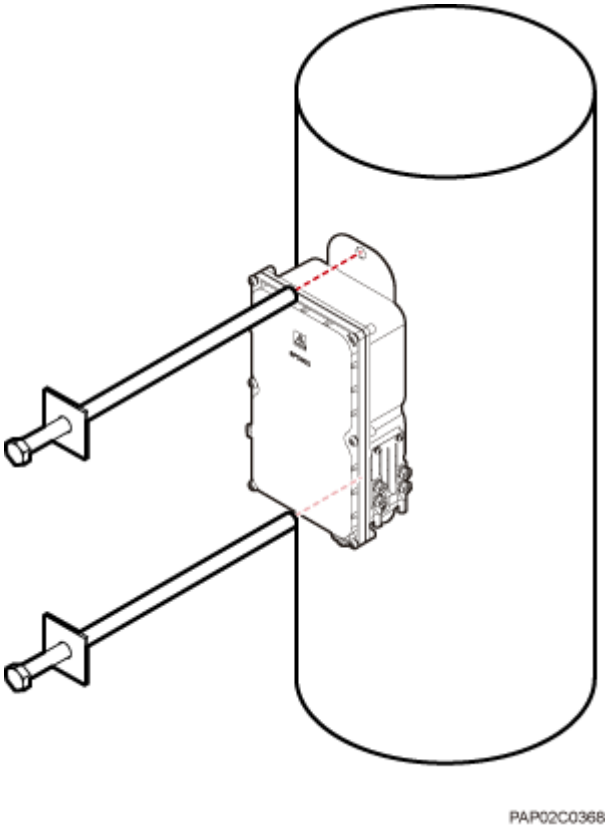
1. Place the rear mounting plate of the AC surge protection box against the wood pole, determine the anchor points on the middle axis, and then mark the anchor points.
2. Drill holes with the diameter of 12 mm (0.47 in.) at the anchor points through the wood pole, as shown in **Figure 8-14**.

Figure 8-14 Drilling holes



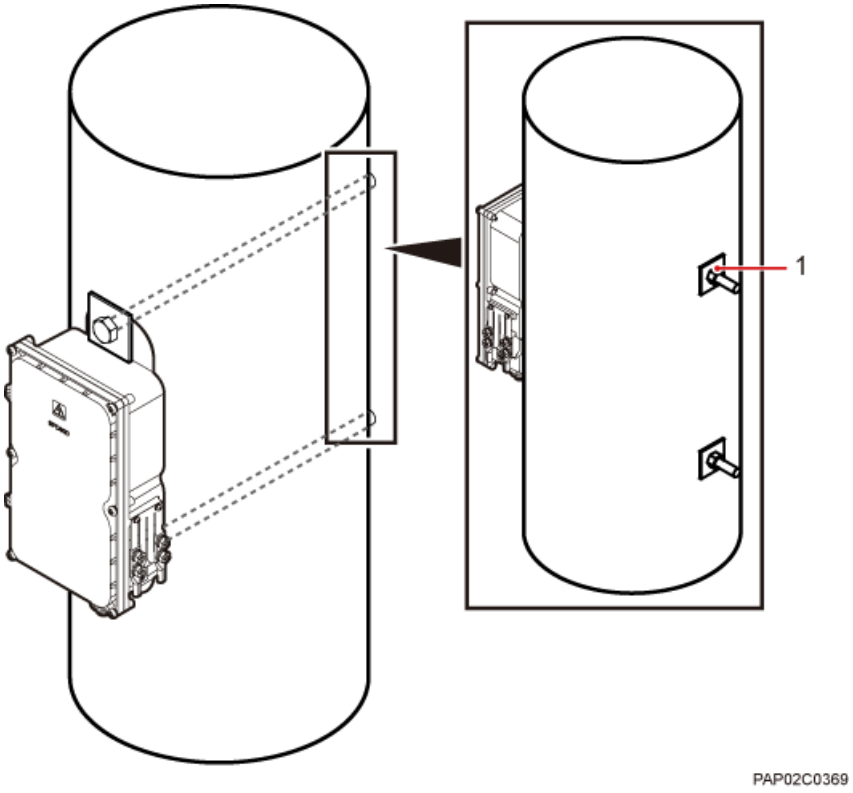
3. Align the AC surge protection box with the holes in the wood pole, lead the two long M10 bolts with spacers through the two mounting holes and holes, and then install the bolts on the wood pole, as shown in **Figure 8-15**.

Figure 8-15 Installing the AC surge protection box on the wood pole



4. Tighten the nuts to 30 N·m (265.52 lbf·in.), as shown in **Figure 8-16**.

Figure 8-16 Tightening the nuts



(1) Nut

----End

8.4 Installing Cables for an AC Surge Protection Box

This section describes the procedure for installing cables for an AC surge protection box.

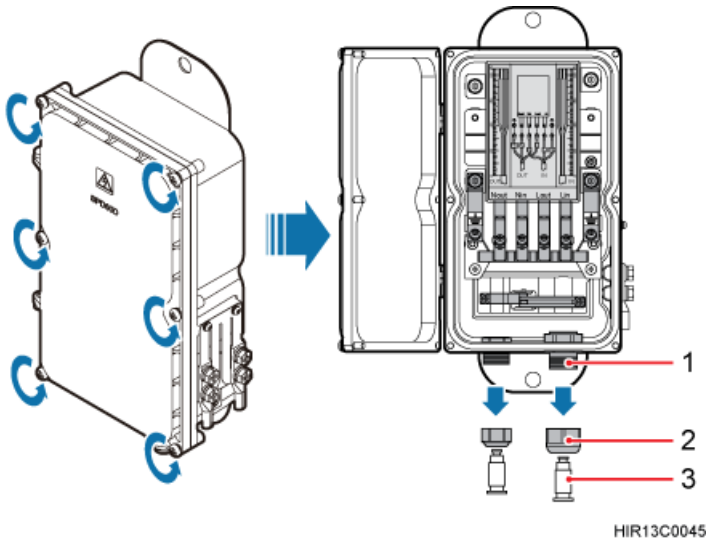
Prerequisite

Add OT terminals to the power cables for the AC surge protection box on the surge protection box side. For details, see Adding OT Terminals to the Power Cable Connected to the AC Surge Protection Box.

Procedure

Step 1 Loosen the screws on the AC surge protection box using the M4 Phillips screwdriver and open the cover plate. Then, remove the thread-lock sealing nut from the PG connector of the surge protection box, and store waterproof blocks properly, as shown in **Figure 8-17**.

Figure 8-17 Opening the cover plate of the AC surge protection box



(1) PG connector (2) Thread-lock sealing nut of the PG connector (3) Waterproof block

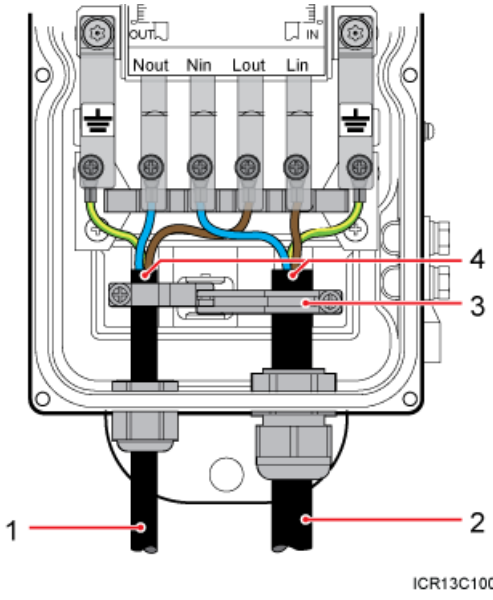
NOTE

Do not use the removed thread-lock sealing nut of the PG connector with the thread-lock sealing nuts on other surge protection boxes.

Step 2 Glide the thread-lock sealing nut and then the PG connector over the power cable.

Step 3 Connect the power cables to the AC surge protection box, as shown in **Figure 8-18**. The power cable on the left connects the BTS3902E and the AC surge protection box, and the power cable on the right connects the AC surge protection box and the external power device.

Figure 8-18 Cable connections of the AC surge protection box



(1) Power cable between the BTS3902E and the AC surge protection box (2) Power cable between the AC surge protection box and the external power device (3) Clip (4) Insulation layer

1. Lead the power cable between the surge protection box and the external power device through the PG connector labeled IN. Connect the OT terminals of the brown, blue, and yellow/green core wires to the Lin, Nin, and GND ports on the surge protection box respectively.
2. Route the power cable between the BTS3902E and the AC surge protection box through the PG connector labeled OUT. Connect the OT terminals of the blue, brown, and green and yellow wires to the Nout, Lout, and GND ports in the AC surge protection box, respectively.
3. Tighten the thread-lock sealing nut, and then use a wrench to tighten the PG connector to ensure it is waterproofed properly.

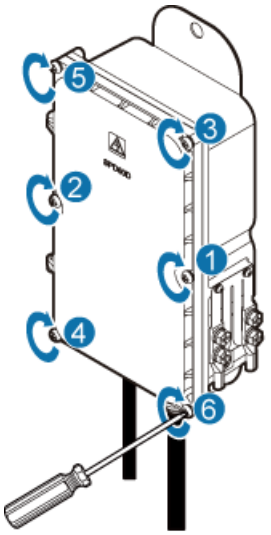
Step 4 Fasten the power cables using clips.

NOTE

Ensure that the insulation layer of each power cable is fastened using clips.

Step 5 Close the cover plate of the surge protection box and tighten the screw to 1.4 N·m (123.91 lbf.in.) using an M4 Phillips screwdriver, as shown in **Figure 8-19**.

Figure 8-19 Closing the cover plate of the AC surge protection box

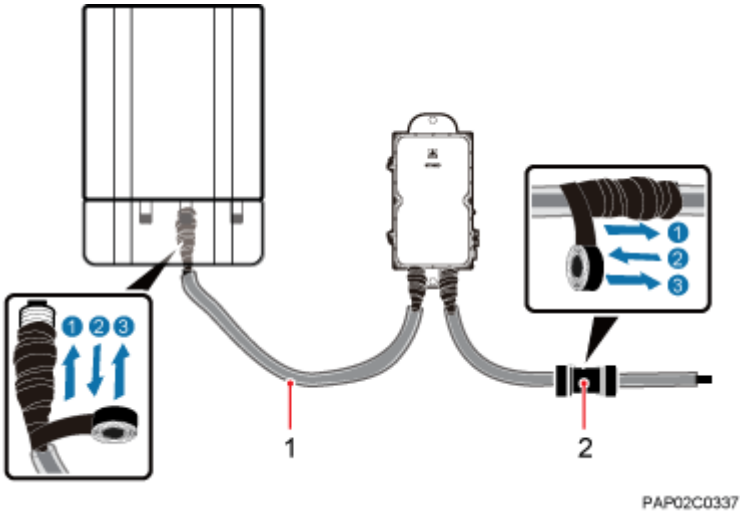


Step 6 Wrap the joints of the corrugated pipe and power cables using waterproof tape and polyvinyl chloride (PVC) insulation tape, as shown in **Figure 8-20**. Wrap the joints using waterproof tape before using PVC insulation tape.

TIP

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. When wrapping tape, be sure that each layer of tape overlaps more than 50% of the preceding layer.

Figure 8-20 Securing AC power cables

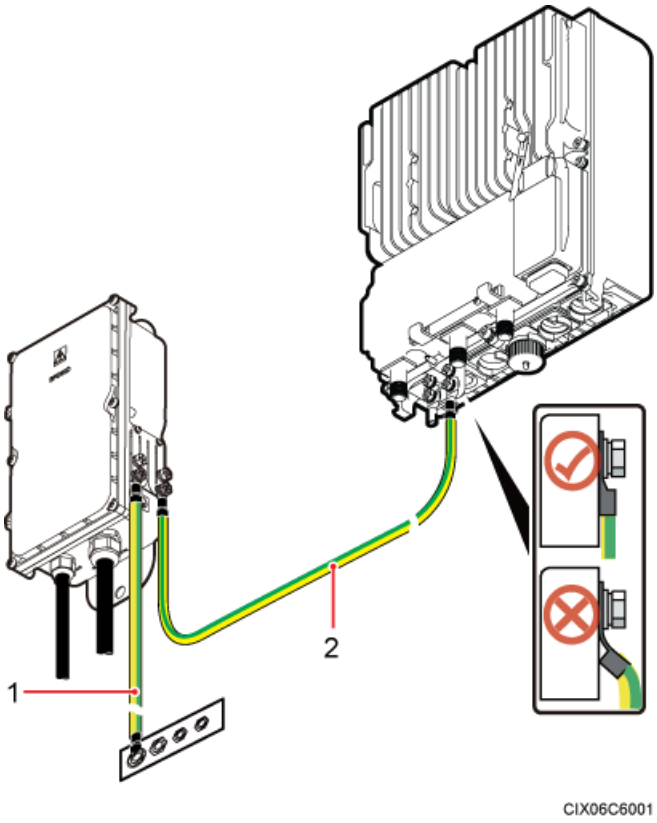


(1) Corrugated pipe (2) Connector between corrugated pipes

Step 7 Bind the cables using cable ties at equal spacing of 30 cm (11.81 in.) and verify that the bend radius of the corrugated pipe is not less than 60 mm (2.36 in.).

Step 8 Install the PGND cable and equipotential cable, as shown in **Figure 8-21**.

Figure 8-21 Installing the PGND cable and equipotential cable



(1) PGND cable (2) Equipotential cable

----End

9 Installing Cables

About This Chapter

This chapter describes the procedure and precautions for installing the PGND cables, power cables, and transmission cables for a BTS3902E in various scenarios. Based on actual requirements, and it also describes how to install an optional monitoring signal cable as required.

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

9.2 Cable Connections
The cable connections of the BTS3902E vary depending on the number of BTS3902Es and the BTS3902E port.

9.3 Installing a PGND Cable and Equipotential Cable
The protection ground (PGND) cable and equipotential cable must be installed based on actual requirements.

9.4 Installing a BTS3902E Power Cable
A BTS3902E power cable connects the BTS3902E to an external power device, feeding external power into the BTS3902E.

9.5 (Optional) Installing a BTS3902E RF Jumper
You must install a radio frequency (RF) jumper when a BTS3902E uses an external antenna.

9.6 Installing Transmission Cables
When a BTS3902E is installed outdoors, a fast Ethernet or gigabit Ethernet (FE/GE) cable or FE/GE fiber optic cable must be installed based on actual requirements.

9.7 Installing the Housing
This chapter describes the procedures for installing the upper housing and optional camouflage shell for a BTS3902E after the BTS3902E and related cables are installed.

9.8 Checking the BTS3902E Hardware Installation
This chapter describes how to check the hardware installation after a BTS3902E is installed.

9.9 Performing a Power-On Check on the BTS3902E
This chapter describes the procedure for performing a power-on check on the BTS3902E.

9.10 Appendix

This section describes the procedure for adding an easy power receptacle (pressfit type) connector.This section describes the procedure for adding OT terminals.This section describes the procedure for adding OT terminals to the surge protection box side of the power cable for the AC surge protection box.

9.1 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

The bending radius of the cables must meet the following specifications:

- 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 five times the diameter of the cable.
- The bending radius of an fiber optic cable is at least 20 times the diameter of the fiber optic cable.
- The bending radius of the signal cable must be at least five times the diameter of the cable.

The cables must be bound as follows:

- The cables must be bound tightly and neatly. The sheaths of the cables must not be damaged.
- The cable ties must face the same direction, and those at the same horizontal line must be in a straight line. Extra length of cable ties must be cut.
- Labels or nameplates must be attached to the cables after they are installed.

The cables must be routed as follows:

- Different types of cables must be installed in an untangled and orderly fashion.
- Different types of cables must be routed in parallel or separated by special objects.

Special Cabling Requirements

Cabling requirements for power cables are as follows:

- Multiple power cables must be bound when routed.
- 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.

Cabling requirements for PGND cables are as follows:

- 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 are as follows:

- 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 extra length 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.

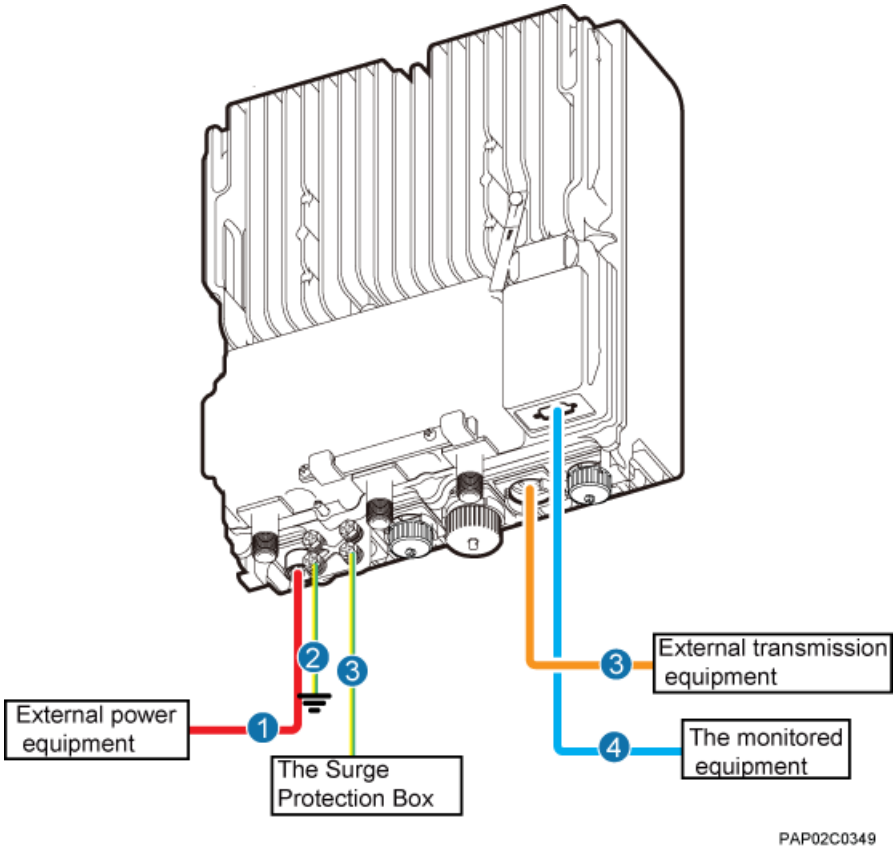
9.2 Cable Connections

The cable connections of the BTS3902E vary depending on the number of BTS3902Es and the BTS3902E port.

Cable Connections of the BTS3902E

Figure 9-1 shows the cable connections of a single BTS3902E implementing transmission over an electrical port.

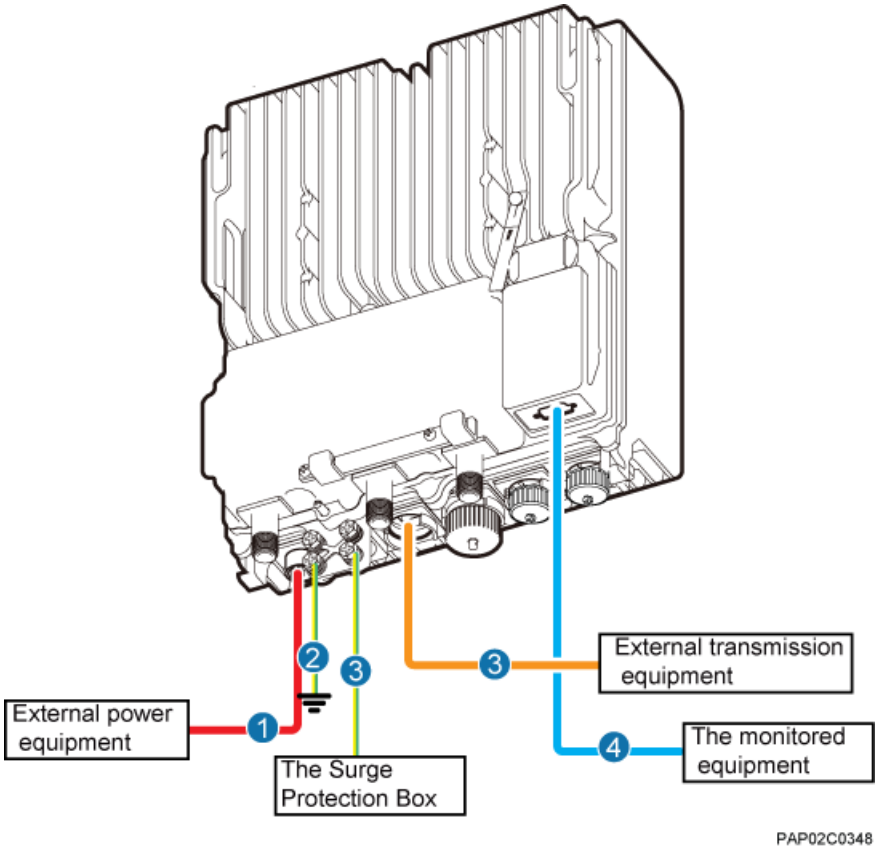
Figure 9-1 Cable connections of a single BTS3902E implementing transmission over an electrical port



(1) BTS3902E power cable	(2) PGND cable (optional)	(3) Equipotential cable (optional)
(4) Fast Ethernet or gigabit Ethernet (FE/GE) cable	(5) BTS3902E monitoring signal cable (optional)	—

Figure 9-2 shows the cable connections of a single BTS3902E implementing transmission over an optical port.

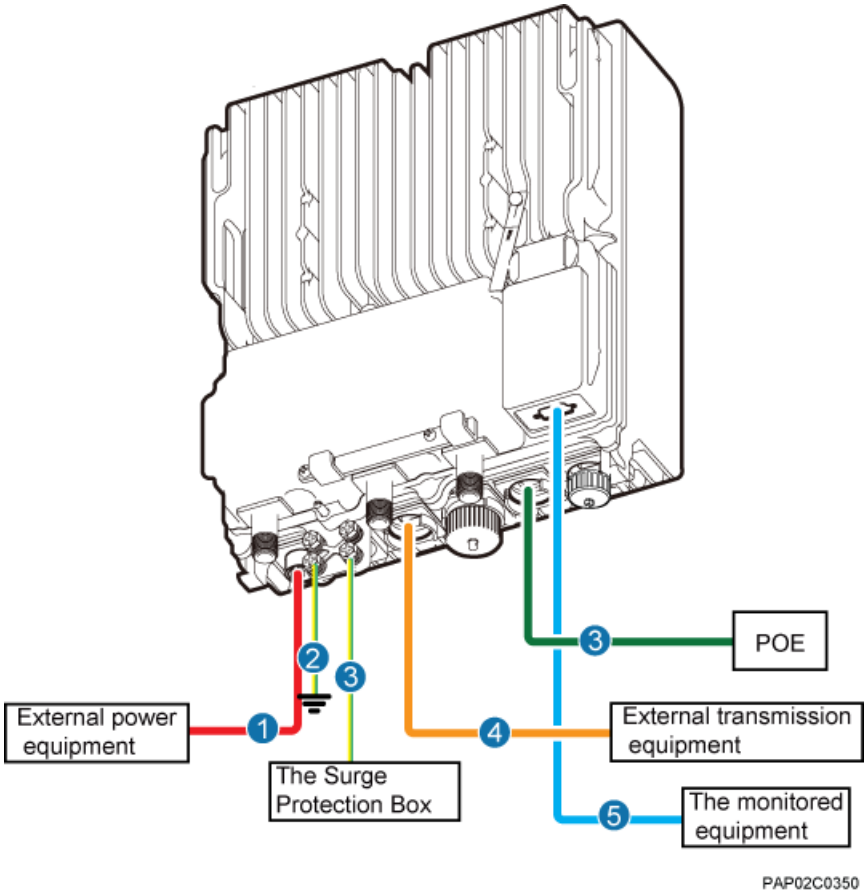
Figure 9-2 Cable connections of a single BTS3902E implementing transmission over an optical port



(1) BTS3902E power cable	(2) PGND cable (optional)	(3) Equipotential cable (optional)
(4) FE/GE fiber optic cable	(5) BTS3902E monitoring signal cable (optional)	—

Figure 9-3 shows the cable connections of a single BTS3902E implementing power over Ethernet (POE) over an electrical port and transmission using a fiber optic cable.

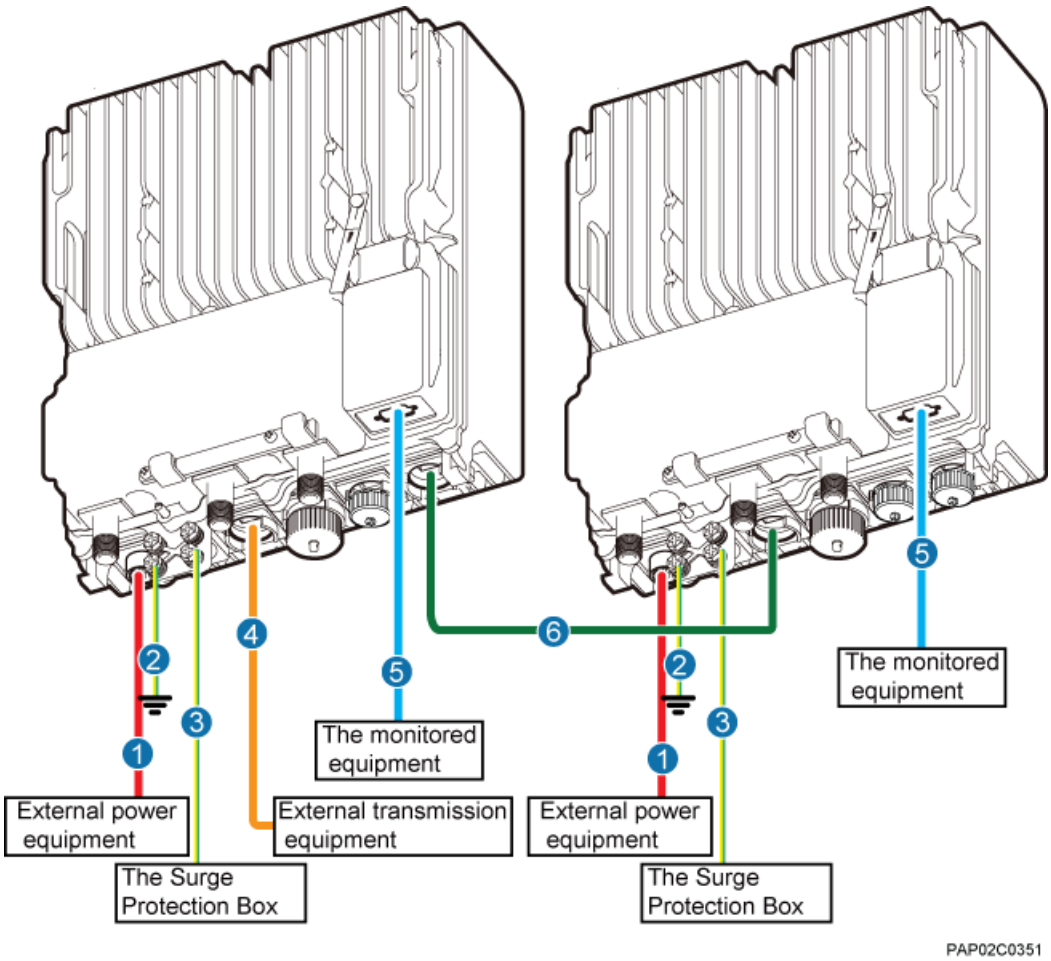
Figure 9-3 Cable connections of a single BTS3902E implementing POE over an electrical port and transmission using a fiber optic cable



(1) BTS3902E power cable
(2) PGND cable (optional)
(3) Equipotential cable (optional)
(4) FE/GE cable
(5) FE/GE fiber optic cable
(6) BTS3902E monitoring signal cable (optional)

Figure 9-4 shows the cable connections of two BTS3902Es implementing transmission and cascading using fiber optic cables.

Figure 9-4 Cable connections of two BTS3902Es implementing transmission and cascading using fiber optic cables



(1) BTS3902E power cable
(2) PGND cable (optional)
(3) Equipotential cable (optional)
(4) FE/GE fiber optic cable
(5) BTS3902E monitoring signal cable (optional)
(6) FE/GE fiber optic cable for cascading

9.3 Installing a PGND Cable and Equipotential Cable

The protection ground (PGND) cable and equipotential cable must be installed based on actual requirements.

Context

Table 9-1 lists the specifications of the PGND cable and equipotential cable.

Table 9-1 Specifications of the BTS3902E PGND cable and equipotential cable

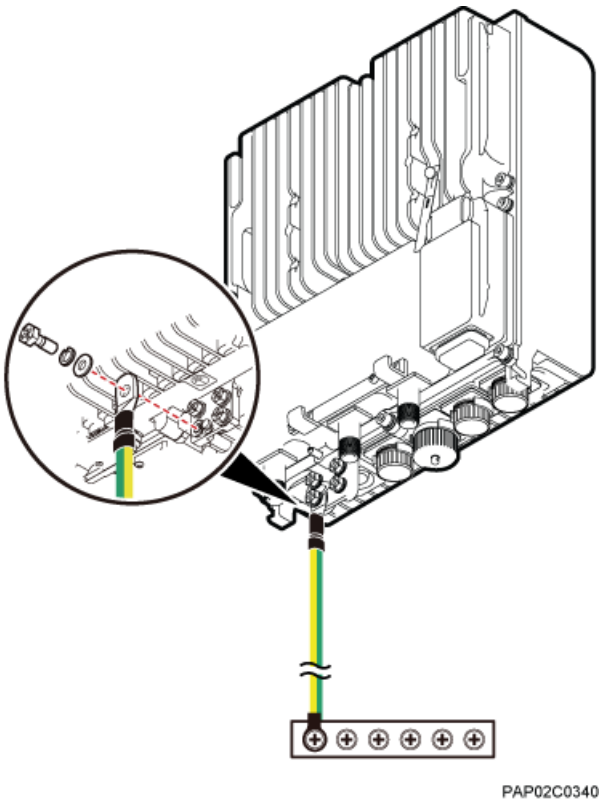
Cable	One End	The Other End	Remarks
PGND cable	OT terminal (M6, 16 mm^2 [0.025 $in.^2$])	OT terminal (M6, 16 mm^2 [0.025 $in.^2$])	Green and yellow

Cable	One End	The Other End	Remarks
Equipotential cable	OT terminal (M6, 16 mm^2 [0.025 in.^{2}])	OT terminal (M6, 16 mm^2 [0.025 in.^{2}])	Green and yellow

Procedure

- Install the PGND cable when no AC surge protection box is installed, as shown in **Figure 9-5**.
  1. Connect one end of the BTS3902E PGND terminal to the ground cable on the BTS3902E and the other end to the external ground bar.

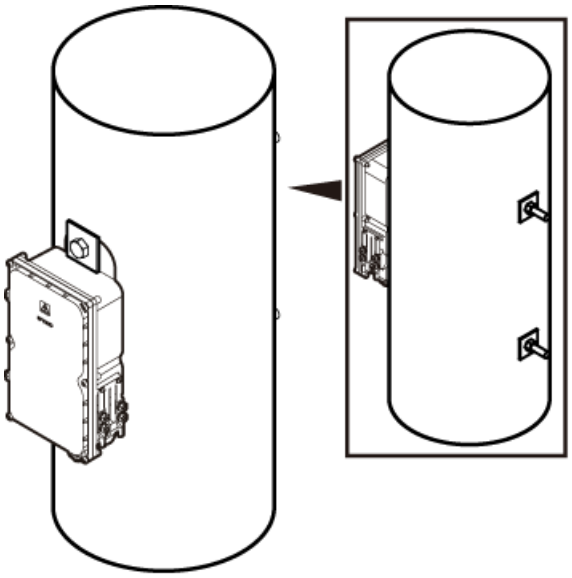
Figure 9-5 Installing the BTS3902E PGND cable



NOTE

When installing the PGND cable, tightly press the OT terminal in the correct direction, as shown in **Figure 9-6**.

Figure 8-9 AC surge protection box installed on a wood pole



8.3 Installing an AC Surge Protection Box

This section describes the procedure for installing an AC surge protection box.

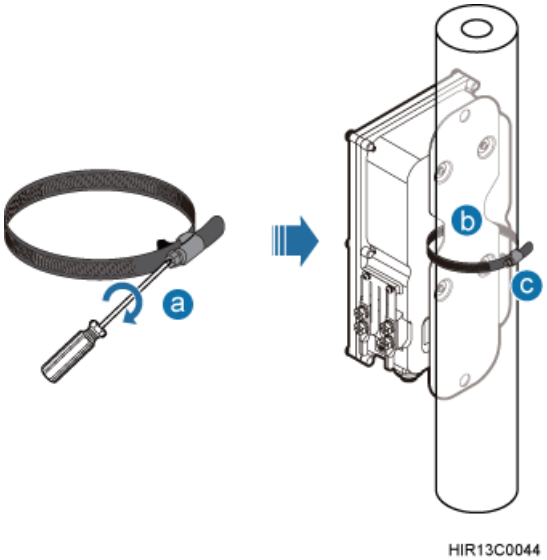
Procedure

- Install an AC surge protection box on a pole, as shown in **Figure 8-10**.

  NOTE

  - When the diameter of the pole ranges from 60 mm to 114 mm (2.36 in. to 4.49 in.), the hose clamps delivered with the AC surge protection box is used.
  - When the diameter of the pole ranges from 114 mm to 400 mm (4.49 in. to 15.75 in.), the hose clamps purchased locally is used.

Figure 8-10 Installing the AC surge protection box on a pole



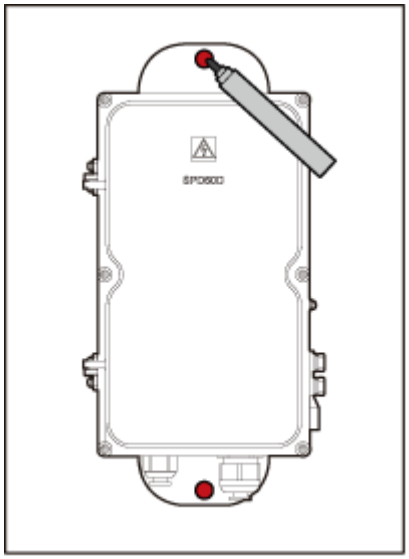
1. Loosen the hose clamp.
2. Lead the clamp through the gap between the rear mounting plate and the case of the AC surge protection box.
3. Install the hose clamp around the pole, and secure the clamp.

NOTE

If the diameter of the pole around which the clamp is installed is small, cut the extra part of the clamp.

- Install an AC surge protection box on a wall.
  1. Place the rear mounting plate of the AC surge protection box against the wall, use a level to verify that the plate is horizontal, and then mark anchor points using a marker, as shown in **Figure 8-11**.

     Figure 8-11 Marking the anchor points

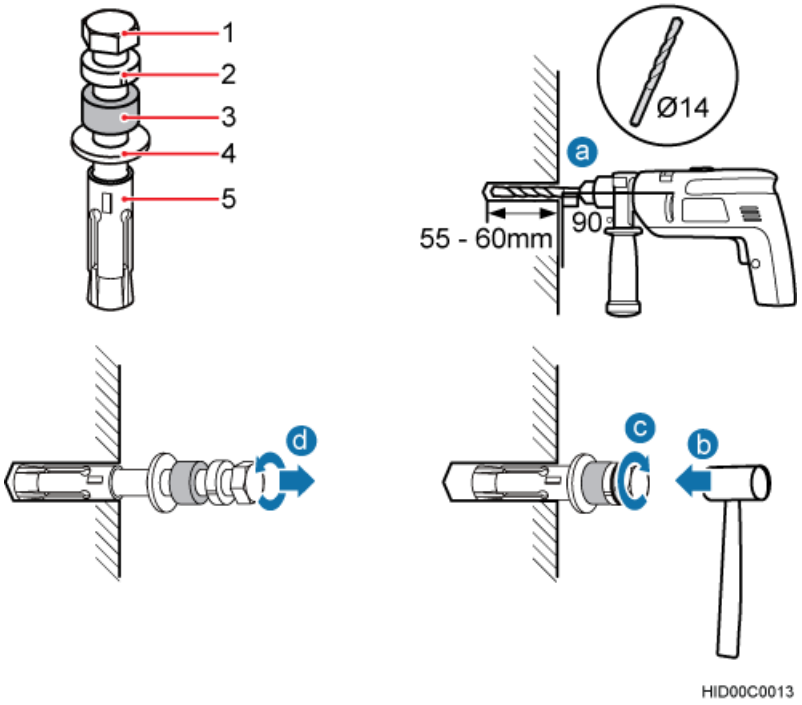
     

  2. Use a hammer drill with a Ø14 bit to drill holes at the anchor points, and install expansion bolts, as shown in **Figure 8-12**.

     NOTE

     After disassembling the expansion bolt assemblies, discard the plastic tubes.

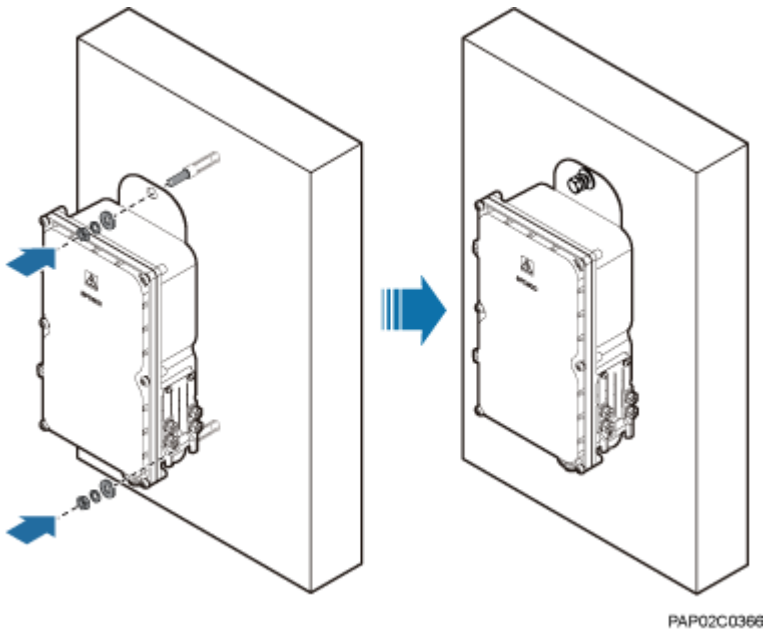
Figure 8-12 Installing an expansion bolt



(1) M10x65 bolt (2) Spring washer 10 (3) Plastic tube (4) Flat washer 10 (5) Expansion tube

3. Align the AC surge protection box with the holes in the wall, and tighten the expansion bolts to 30 N·m (265.52 lbf·in.), as shown in **Figure 8-13**.

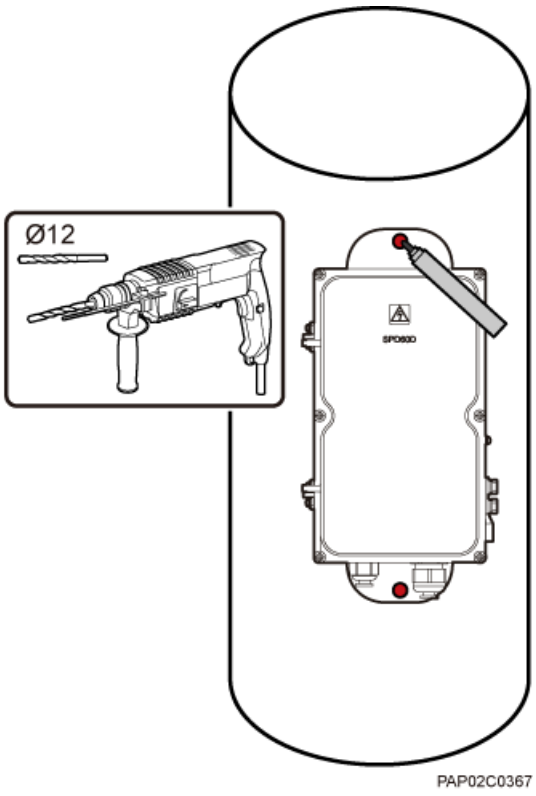
Figure 8-13 Installing an AC surge protection box



- Install an AC surge protection box on a wood pole.

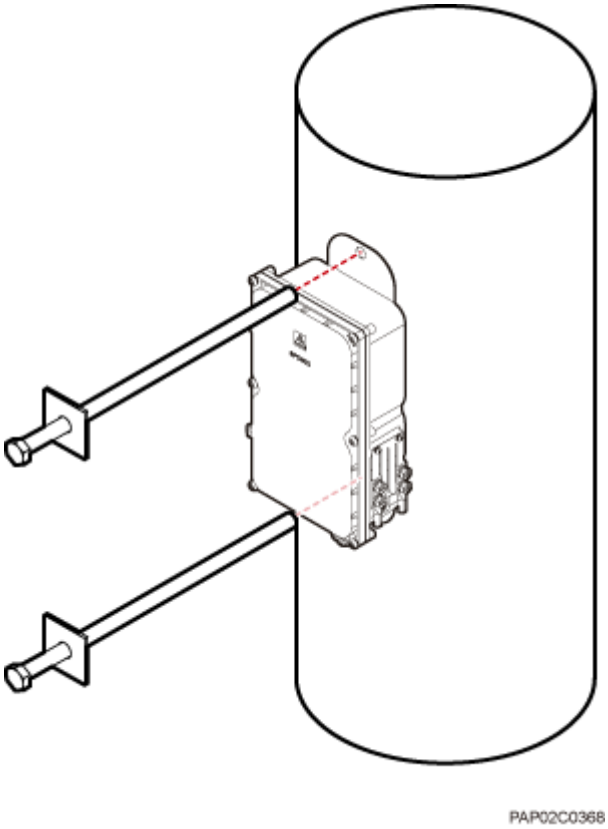
1. Place the rear mounting plate of the AC surge protection box against the wood pole, determine the anchor points on the middle axis, and then mark the anchor points.
2. Drill holes with the diameter of 12 mm (0.47 in.) at the anchor points through the wood pole, as shown in **Figure 8-14**.

Figure 8-14 Drilling holes



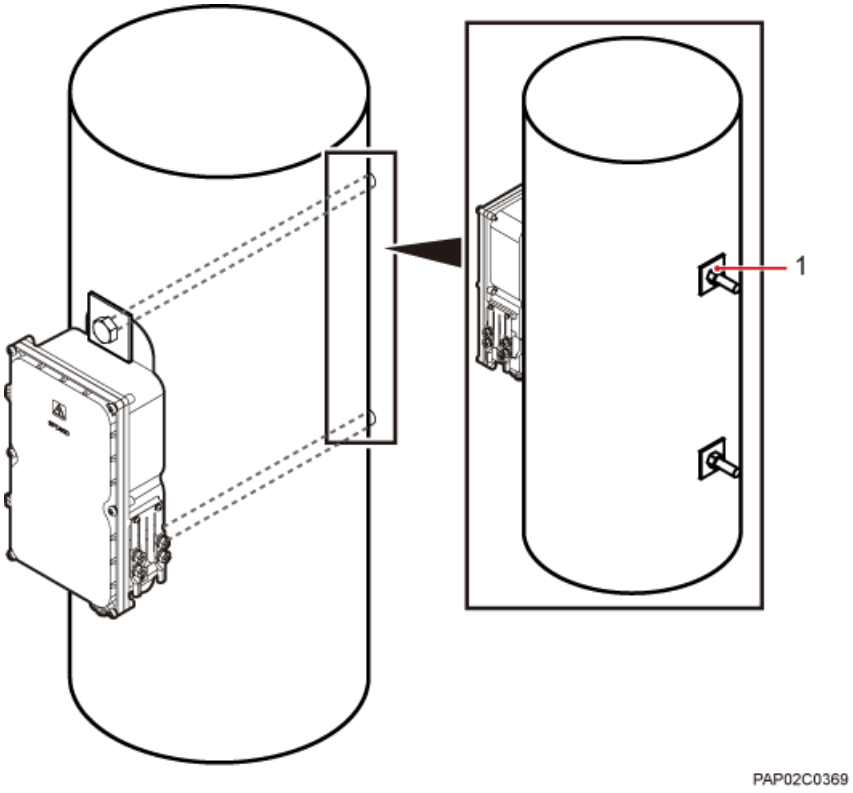
3. Align the AC surge protection box with the holes in the wood pole, lead the two long M10 bolts with spacers through the two mounting holes and holes, and then install the bolts on the wood pole, as shown in **Figure 8-15**.

Figure 8-15 Installing the AC surge protection box on the wood pole



4. Tighten the nuts to 30 N·m (265.52 lbf·in.), as shown in **Figure 8-16**.

Figure 8-16 Tightening the nuts



(1) Nut

----End

8.4 Installing Cables for an AC Surge Protection Box

This section describes the procedure for installing cables for an AC surge protection box.

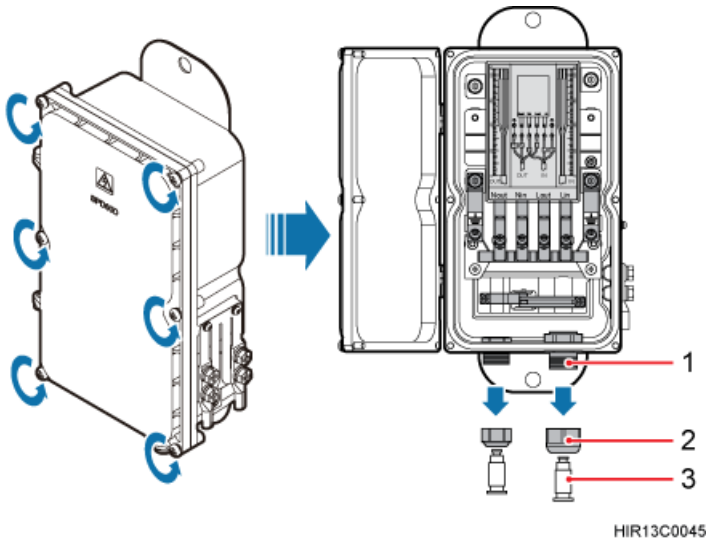
Prerequisite

Add OT terminals to the power cables for the AC surge protection box on the surge protection box side. For details, see Adding OT Terminals to the Power Cable Connected to the AC Surge Protection Box.

Procedure

Step 1 Loosen the screws on the AC surge protection box using the M4 Phillips screwdriver and open the cover plate. Then, remove the thread-lock sealing nut from the PG connector of the surge protection box, and store waterproof blocks properly, as shown in **Figure 8-17**.

Figure 8-17 Opening the cover plate of the AC surge protection box



(1) PG connector (2) Thread-lock sealing nut of the PG connector (3) Waterproof block

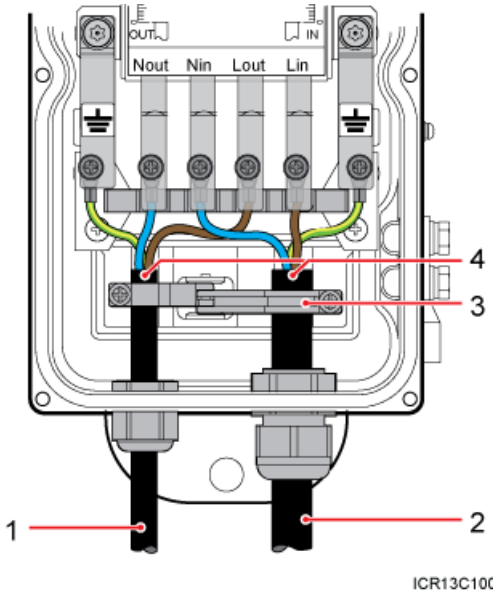
NOTE

Do not use the removed thread-lock sealing nut of the PG connector with the thread-lock sealing nuts on other surge protection boxes.

Step 2 Glide the thread-lock sealing nut and then the PG connector over the power cable.

Step 3 Connect the power cables to the AC surge protection box, as shown in **Figure 8-18**. The power cable on the left connects the BTS3902E and the AC surge protection box, and the power cable on the right connects the AC surge protection box and the external power device.

Figure 8-18 Cable connections of the AC surge protection box



(1) Power cable between the BTS3902E and the AC surge protection box (2) Power cable between the AC surge protection box and the external power device (3) Clip (4) Insulation layer

1. Lead the power cable between the surge protection box and the external power device through the PG connector labeled IN. Connect the OT terminals of the brown, blue, and yellow/green core wires to the Lin, Nin, and GND ports on the surge protection box respectively.
2. Route the power cable between the BTS3902E and the AC surge protection box through the PG connector labeled OUT. Connect the OT terminals of the blue, brown, and green and yellow wires to the Nout, Lout, and GND ports in the AC surge protection box, respectively.
3. Tighten the thread-lock sealing nut, and then use a wrench to tighten the PG connector to ensure it is waterproofed properly.

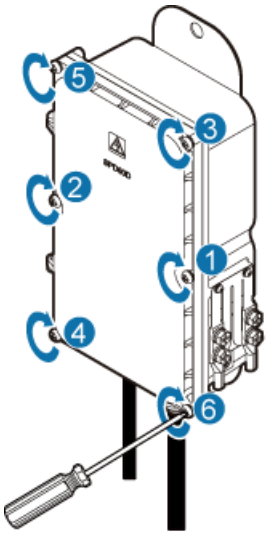
Step 4 Fasten the power cables using clips.

NOTE

Ensure that the insulation layer of each power cable is fastened using clips.

Step 5 Close the cover plate of the surge protection box and tighten the screw to 1.4 N·m (123.91 lbf.in.) using an M4 Phillips screwdriver, as shown in **Figure 8-19**.

Figure 8-19 Closing the cover plate of the AC surge protection box

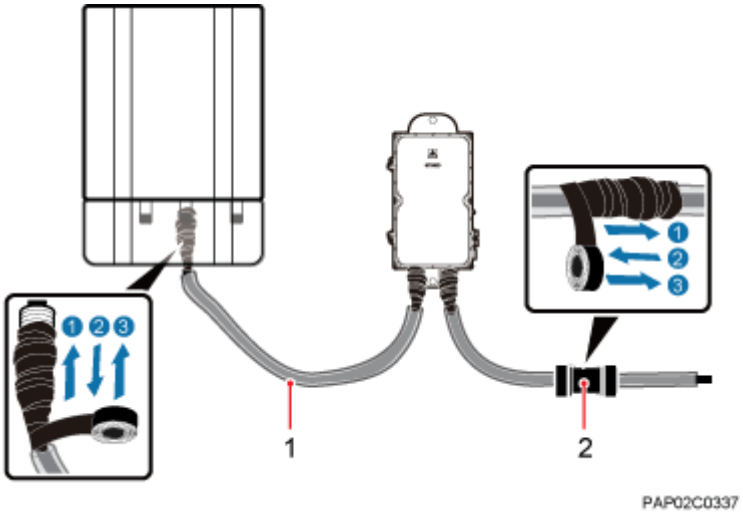


Step 6 Wrap the joints of the corrugated pipe and power cables using waterproof tape and polyvinyl chloride (PVC) insulation tape, as shown in **Figure 8-20**. Wrap the joints using waterproof tape before using PVC insulation tape.

TIP

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. When wrapping tape, be sure that each layer of tape overlaps more than 50% of the preceding layer.

Figure 8-20 Securing AC power cables

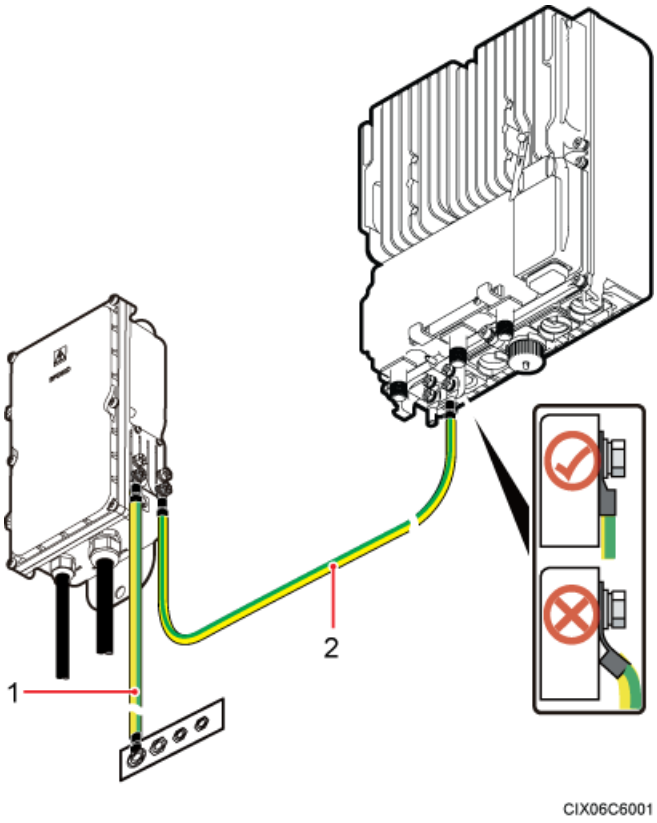


(1) Corrugated pipe (2) Connector between corrugated pipes

Step 7 Bind the cables using cable ties at equal spacing of 30 cm (11.81 in.) and verify that the bend radius of the corrugated pipe is not less than 60 mm (2.36 in.).

Step 8 Install the PGND cable and equipotential cable, as shown in **Figure 8-21**.

Figure 8-21 Installing the PGND cable and equipotential cable



(1) PGND cable (2) Equipotential cable

----End

9 Installing Cables

About This Chapter

This chapter describes the procedure and precautions for installing the PGND cables, power cables, and transmission cables for a BTS3902E in various scenarios. Based on actual requirements, and it also describes how to install an optional monitoring signal cable as required.

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

9.2 Cable Connections
The cable connections of the BTS3902E vary depending on the number of BTS3902Es and the BTS3902E port.

9.3 Installing a PGND Cable and Equipotential Cable
The protection ground (PGND) cable and equipotential cable must be installed based on actual requirements.

9.4 Installing a BTS3902E Power Cable
A BTS3902E power cable connects the BTS3902E to an external power device, feeding external power into the BTS3902E.

9.5 (Optional) Installing a BTS3902E RF Jumper
You must install a radio frequency (RF) jumper when a BTS3902E uses an external antenna.

9.6 Installing Transmission Cables
When a BTS3902E is installed outdoors, a fast Ethernet or gigabit Ethernet (FE/GE) cable or FE/GE fiber optic cable must be installed based on actual requirements.

9.7 Installing the Housing
This chapter describes the procedures for installing the upper housing and optional camouflage shell for a BTS3902E after the BTS3902E and related cables are installed.

9.8 Checking the BTS3902E Hardware Installation
This chapter describes how to check the hardware installation after a BTS3902E is installed.

9.9 Performing a Power-On Check on the BTS3902E
This chapter describes the procedure for performing a power-on check on the BTS3902E.

9.10 Appendix

This section describes the procedure for adding an easy power receptacle (pressfit type) connector.This section describes the procedure for adding OT terminals.This section describes the procedure for adding OT terminals to the surge protection box side of the power cable for the AC surge protection box.

9.1 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

The bending radius of the cables must meet the following specifications:

- 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 five times the diameter of the cable.
- The bending radius of an fiber optic cable is at least 20 times the diameter of the fiber optic cable.
- The bending radius of the signal cable must be at least five times the diameter of the cable.

The cables must be bound as follows:

- The cables must be bound tightly and neatly. The sheaths of the cables must not be damaged.
- The cable ties must face the same direction, and those at the same horizontal line must be in a straight line. Extra length of cable ties must be cut.
- Labels or nameplates must be attached to the cables after they are installed.

The cables must be routed as follows:

- Different types of cables must be installed in an untangled and orderly fashion.
- Different types of cables must be routed in parallel or separated by special objects.

Special Cabling Requirements

Cabling requirements for power cables are as follows:

- Multiple power cables must be bound when routed.
- 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.

Cabling requirements for PGND cables are as follows:

- 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 are as follows:

- 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 extra length 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.

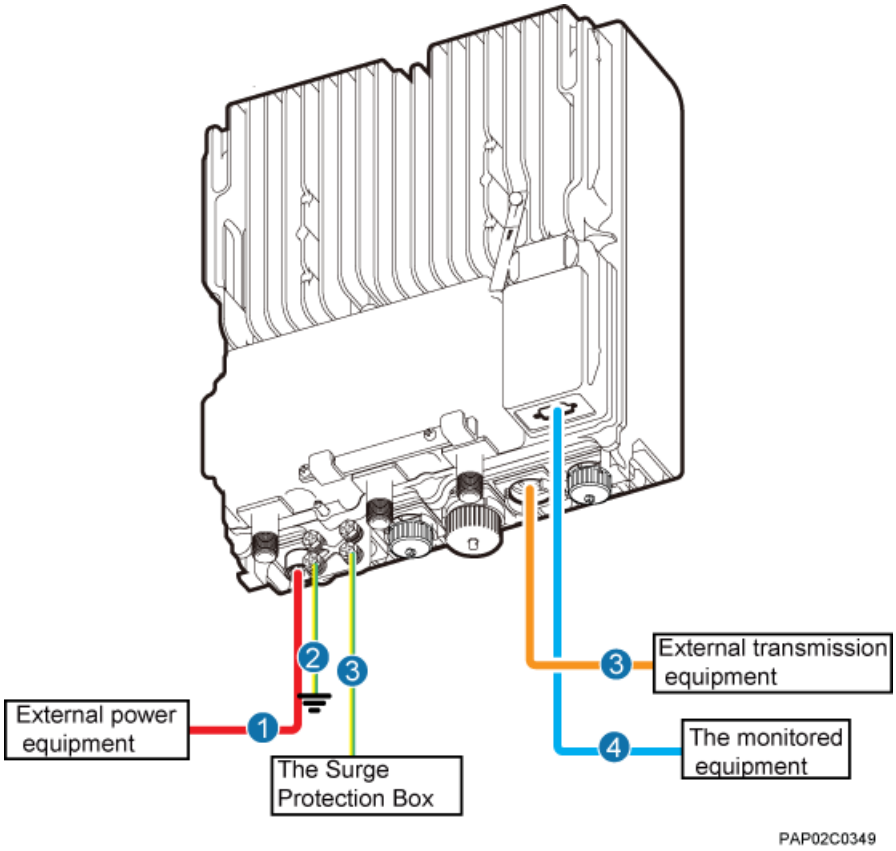
9.2 Cable Connections

The cable connections of the BTS3902E vary depending on the number of BTS3902Es and the BTS3902E port.

Cable Connections of the BTS3902E

Figure 9-1 shows the cable connections of a single BTS3902E implementing transmission over an electrical port.

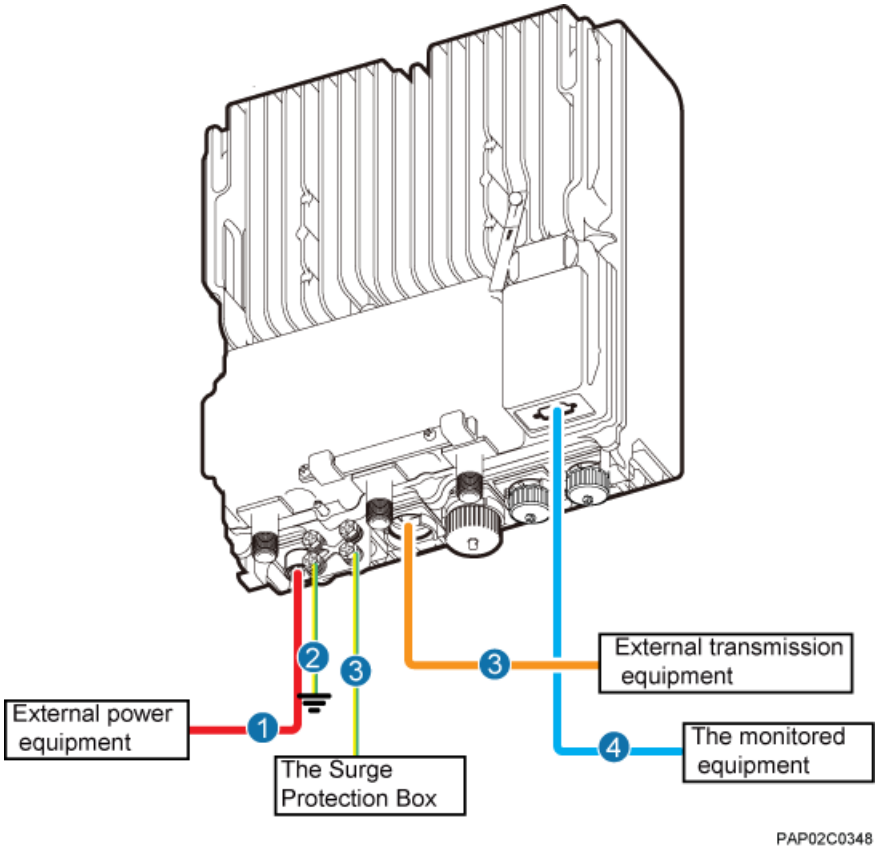
Figure 9-1 Cable connections of a single BTS3902E implementing transmission over an electrical port



(1) BTS3902E power cable	(2) PGND cable (optional)	(3) Equipotential cable (optional)
(4) Fast Ethernet or gigabit Ethernet (FE/GE) cable	(5) BTS3902E monitoring signal cable (optional)	—

Figure 9-2 shows the cable connections of a single BTS3902E implementing transmission over an optical port.

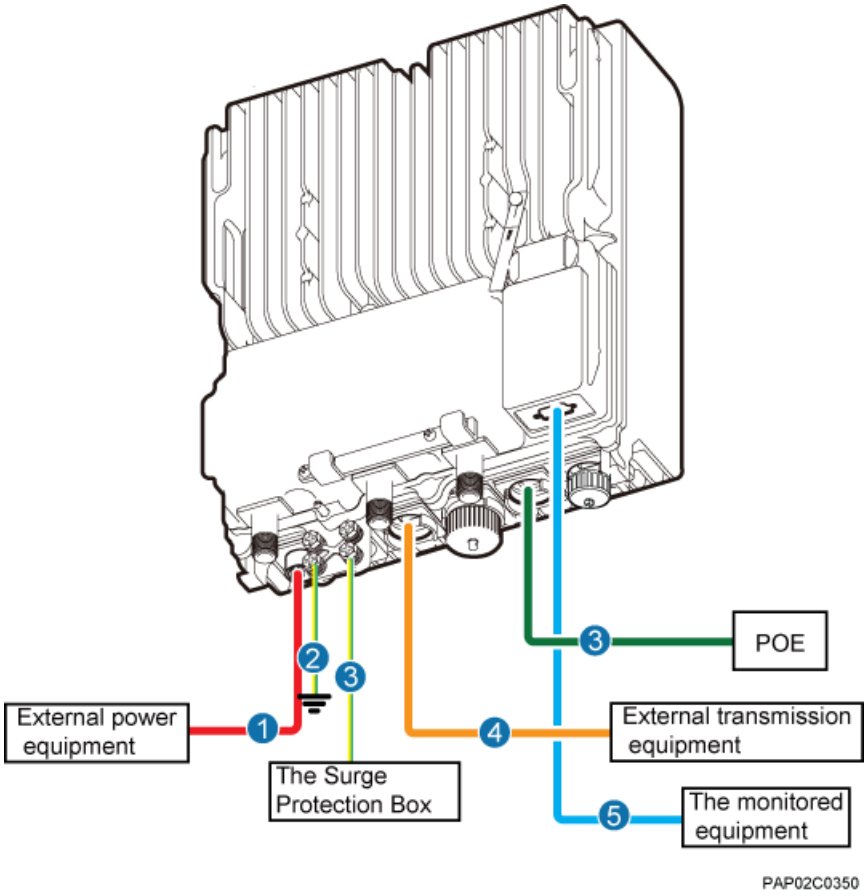
Figure 9-2 Cable connections of a single BTS3902E implementing transmission over an optical port



(1) BTS3902E power cable	(2) PGND cable (optional)	(3) Equipotential cable (optional)
(4) FE/GE fiber optic cable	(5) BTS3902E monitoring signal cable (optional)	—

Figure 9-3 shows the cable connections of a single BTS3902E implementing power over Ethernet (POE) over an electrical port and transmission using a fiber optic cable.

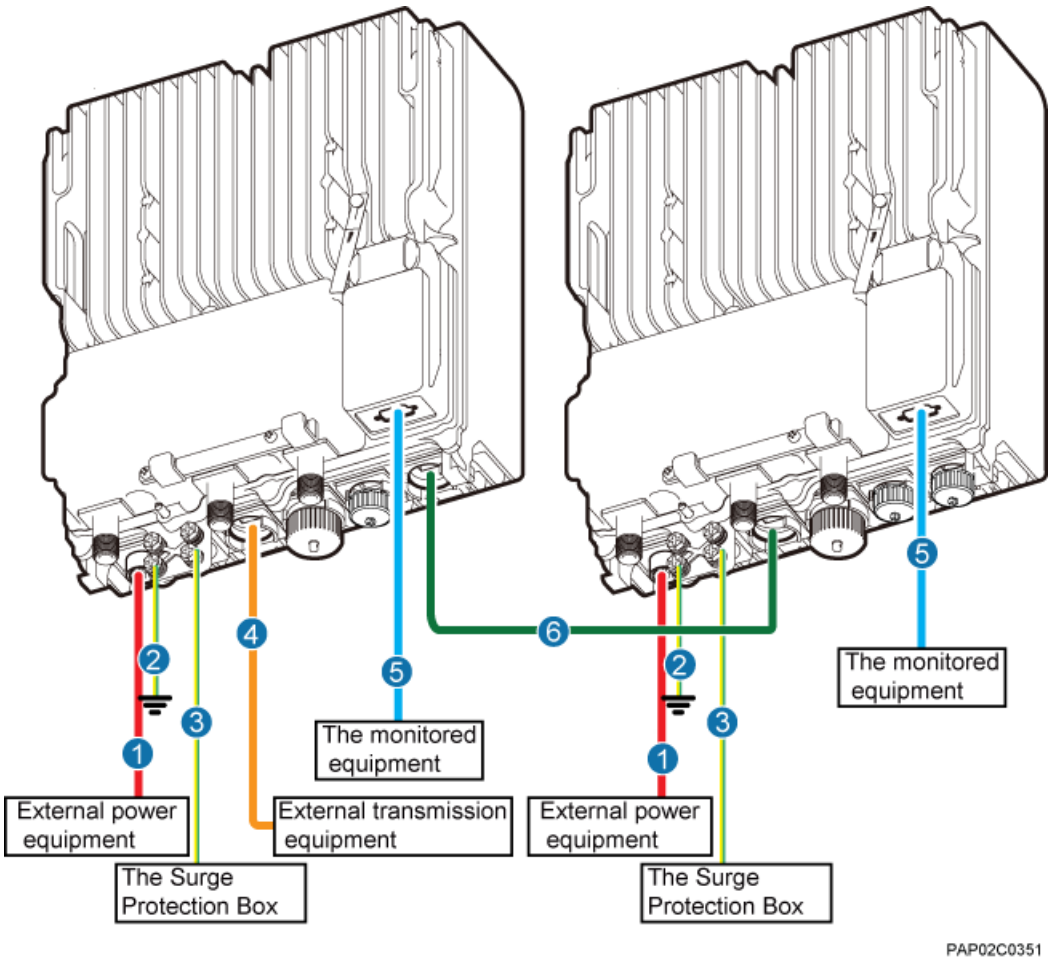
Figure 9-3 Cable connections of a single BTS3902E implementing POE over an electrical port and transmission using a fiber optic cable



(1) BTS3902E power cable
(2) PGND cable (optional)
(3) Equipotential cable (optional)
(4) FE/GE cable
(5) FE/GE fiber optic cable
(6) BTS3902E monitoring signal cable (optional)

Figure 9-4 shows the cable connections of two BTS3902Es implementing transmission and cascading using fiber optic cables.

Figure 9-4 Cable connections of two BTS3902Es implementing transmission and cascading using fiber optic cables



(1) BTS3902E power cable
(2) PGND cable (optional)
(3) Equipotential cable (optional)
(4) FE/GE fiber optic cable
(5) BTS3902E monitoring signal cable (optional)
(6) FE/GE fiber optic cable for cascading

9.3 Installing a PGND Cable and Equipotential Cable

The protection ground (PGND) cable and equipotential cable must be installed based on actual requirements.

Context

Table 9-1 lists the specifications of the PGND cable and equipotential cable.

Table 9-1 Specifications of the BTS3902E PGND cable and equipotential cable

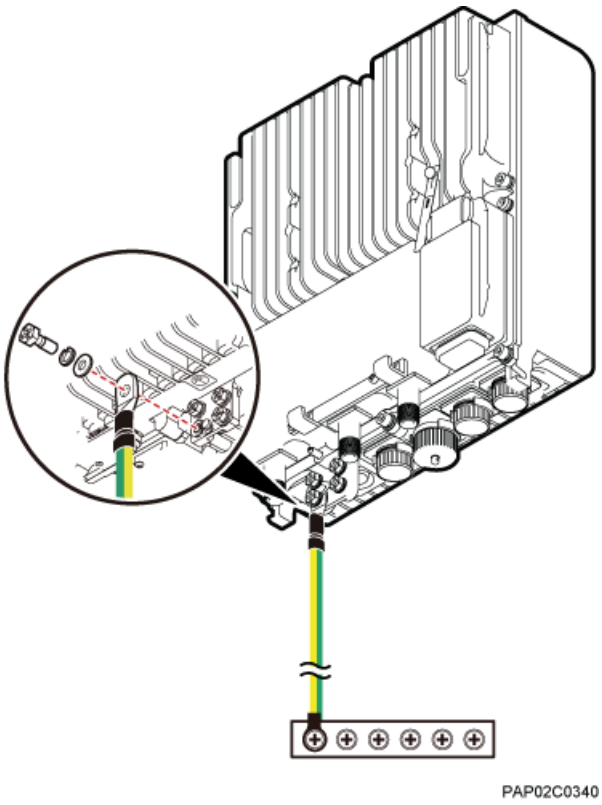
Cable	One End	The Other End	Remarks
PGND cable	OT terminal (M6, 16 mm^2 [0.025 $in.^2$])	OT terminal (M6, 16 mm^2 [0.025 $in.^2$])	Green and yellow

Cable	One End	The Other End	Remarks
Equipotential cable	OT terminal (M6, 16 mm^2 [0.025 in.^{2}])	OT terminal (M6, 16 mm^2 [0.025 in.^{2}])	Green and yellow

Procedure

- Install the PGND cable when no AC surge protection box is installed, as shown in **Figure 9-5**.
  1. Connect one end of the BTS3902E PGND terminal to the ground cable on the BTS3902E and the other end to the external ground bar.

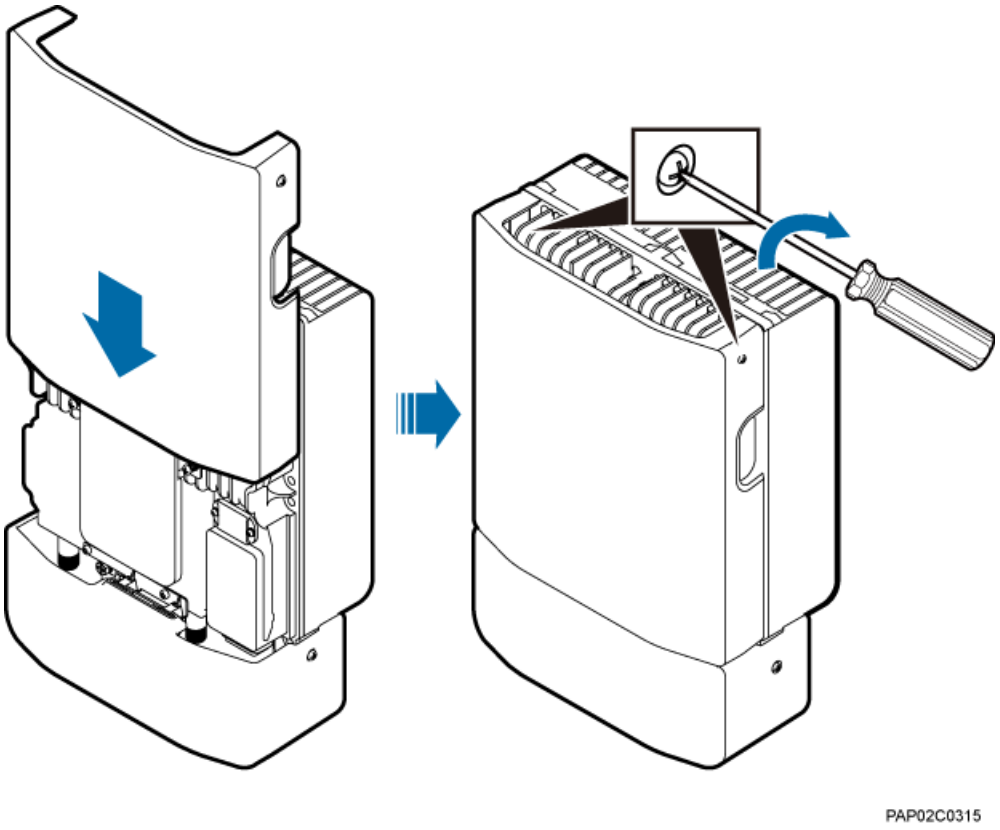
Figure 9-5 Installing the BTS3902E PGND cable



NOTE

When installing the PGND cable, tightly press the OT terminal in the correct direction, as shown in **Figure 9-6**.

Figure 9-25 Closing the housing and tightening the screws



----End

9.8 Checking the BTS3902E Hardware Installation

This chapter describes how to check the hardware installation after a BTS3902E is installed.

Table 9-3 provides the checklist for the BTS3902E hardware installation.

Table 9-3 Checklist for the BTS3902E 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 BTS3902E is securely installed and the installed BTS3902E has a housing.
3	In the wall-mounted scenario, the holes of the mounting bracket are well aligned with the holes of the expansion bolt assemblies. In addition, the adapting plates are secured on the wall evenly and steadily.
4	In the pole-mounted scenario, the supports for the mounting brackets are secured on the pole.

SN	Item
5	The horizontal error of the BTS3902E is less than 3 mm (0.12 in.), and the vertical error is not more than 3 mm (0.12 in.).
6	The outdoor cables are properly installed. The vacant ports are covered with waterproof caps, and the caps are waterproofed.
7	None of power cables and PGND cables is 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	All BTS3902E-related modules are connected to the closest ground bar using PGND cables.
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.

Table 9-4 provides the checklist for the installation of an AC surge protection box.

Table 9-4 Checklist for the installation of an AC surge protection box

SN	Item
1	The PG connectors for routing cables on an AC surge protection box are securely installed.
2	The waterproof fillers on an AC surge protection box are not stripped or broken.
3	OT terminals are securely linked to the cables connecting to an AC surge protection box. Cable sheaths are not damaged, and the extra length of each cable is cut without sharp edges.
4	PG connectors are tightened, and waterproof rings are secured.
5	The six screws on the cabling cavity for an AC surge protection box are tightened properly.
6	The axis between the cover plate for and the case of an AC surge protection box is not broken, and the surface of the protection box is not scratched.
7	The cable connections for an AC surge protection box meet the requirements in the operation guide. The cover plate for the cabling cavity is closed after OT terminals are tightened.
8	An AC surge protection box is powered off before installation and maintenance.
9	The protection grounding of an AC surge protection box and the surge protection grounding of a building share one group of ground conductors.
10	An AC surge protection box must be installed or maintained in dry conditions.

9.9 Performing a Power-On Check on the BTS3902E

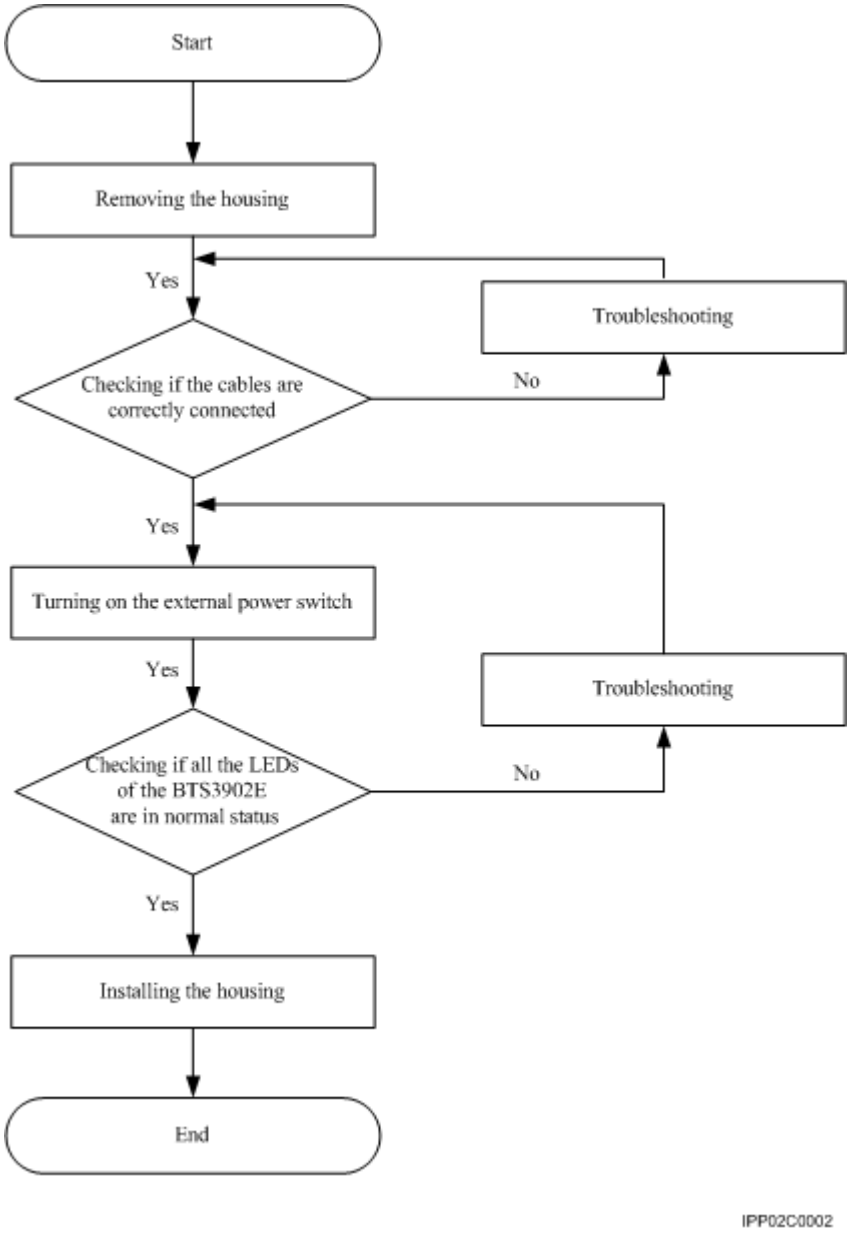
This chapter describes the procedure for performing a power-on check on the BTS3902E.

CAUTION

After you unpack a BTS3902E, you must power it on within 24 hours. If you power off the BTS3902E for maintenance, you must restore power to it within 24 hours.

Figure 9-26 shows the BTS3902E power-on check procedure.

Figure 9-26 BTS3902E power-on check procedure



9.10 Appendix

This section describes the procedure for adding an easy power receptacle (pressfit type) connector.This section describes the procedure for adding OT terminals.This section describes the procedure for adding OT terminals to the surge protection box side of the power cable for the AC surge protection box.

9.10.1 Adding OT Terminals to the Power Cable Connected to the AC Surge Protection Box
This section describes the procedure for adding OT terminals to the power cable connected to the AC surge protection box.

9.10.2 Installing a Ground Clip
This section describes how to install a ground clip on a fast Ethernet or gigabit Ethernet (FE/GE) cable.

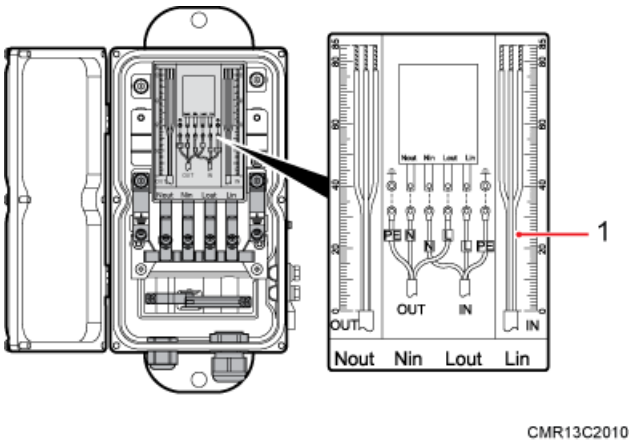
9.10.1 Adding OT Terminals to the Power Cable Connected to the AC Surge Protection Box

This section describes the procedure for adding OT terminals to the power cable connected to the AC surge protection box.

Context

Figure 9-27 shows the cable diagram on labels.

Figure 9-27 Cable diagram on labels



(1) Cable diagram on labels

Procedure

Step 1 Cut the cable to the required length based on the actual cable route.

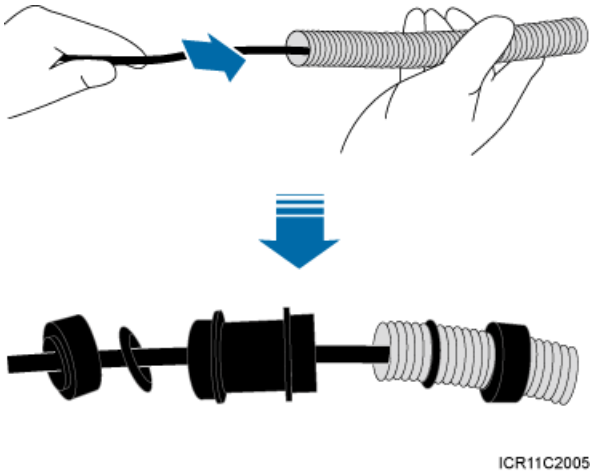
Step 2 If the power cable is longer than or equal to 5 m (16.4 ft.), cut the corrugated pipe into multiple 5-meter-long pieces; if the cable is shorter than 5 m (16.4 ft.), cut the corrugated pipe based on the actual length of the power cable.

NOTE

Following is based on the power cable longer than or equal to 5 m (16.4 ft.).

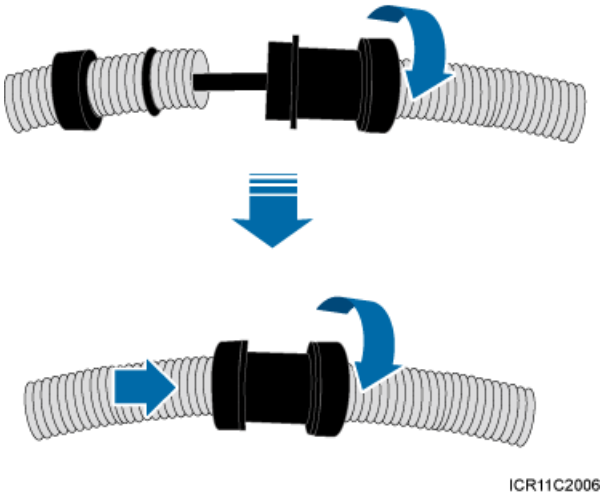
Step 3 Lead the power cable through corrugated pipes, and add a connector between two corrugated pipes, as shown in **Figure 9-28**.

Figure 9-28 Leading the power cable through corrugated pipes



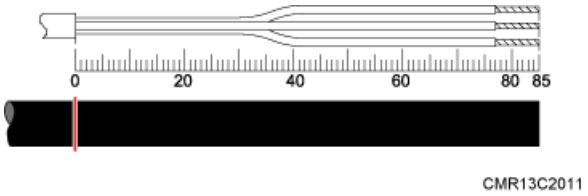
Step 4 Join the corrugated pipes, as shown in **Figure 9-29**.

Figure 9-29 Joining corrugated pipes



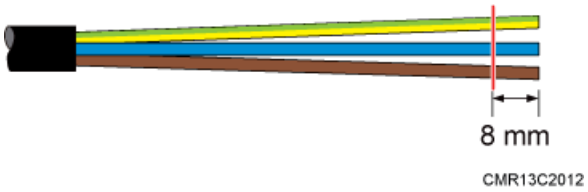
Step 5 Determine the length of the power cable for different operations based on the labels, as shown in **Figure 9-30**.

Figure 9-30 Determining the length of the power cable



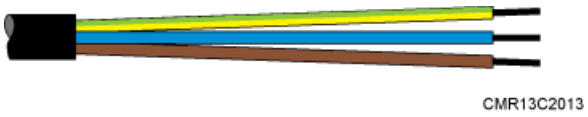
Step 6 Use a utility knife to strip the specified length of the sheath and shield layer off the power cable, as shown in **Figure 9-31**.

Figure 9-31 Stripping the specified length of the sheath and shield layer



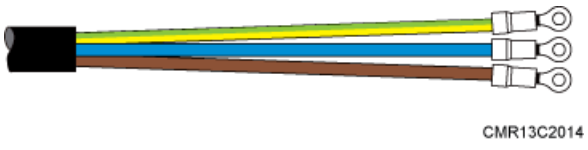
Step 7 Strip the sheath off each core wire, as shown in **Figure 9-32**.

Figure 9-32 Stripping the sheath off each core wire



Step 8 Add OT terminals to the three core wires, as shown in **Figure 9-33**.

Figure 9-33 Adding OT terminals



----End

9.10.2 Installing a Ground Clip

This section describes how to install a ground clip on a fast Ethernet or gigabit Ethernet (FE/GE) cable.

Procedure

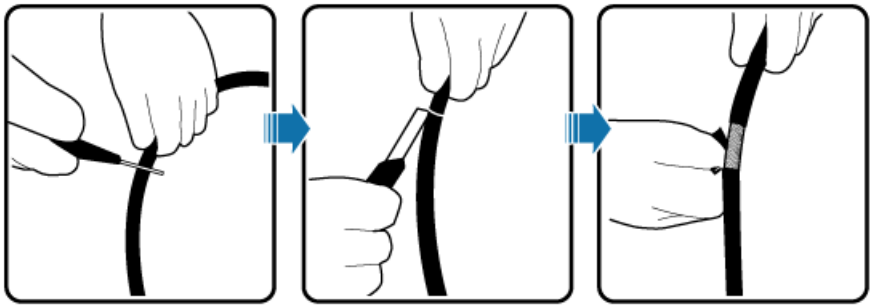
Step 1 Determine the position for installing the ground clip on the cable based on the actual cable route.

Step 2 Use a utility knife to strip the sheath off the FE/GE cable for about 32 mm to expose the shield layer, as shown in **Figure 9-34**.

CAUTION

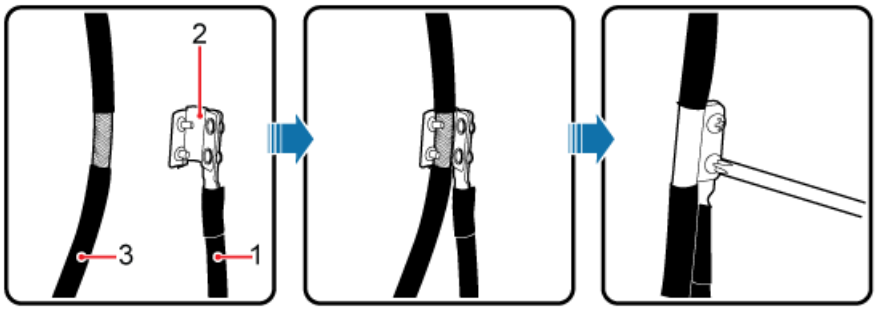
Do not damage the shield layer when stripping the sheath off the cable.

Figure 9-34 Stripping the sheath off the FE/GE cable



Step 3 Install the ground clip on the shield layer of the cable, and then use a screwdriver to tighten the screws on the ground clip, as shown in **Figure 9-35**.

Figure 9-35 Tightening the screws on a ground clip



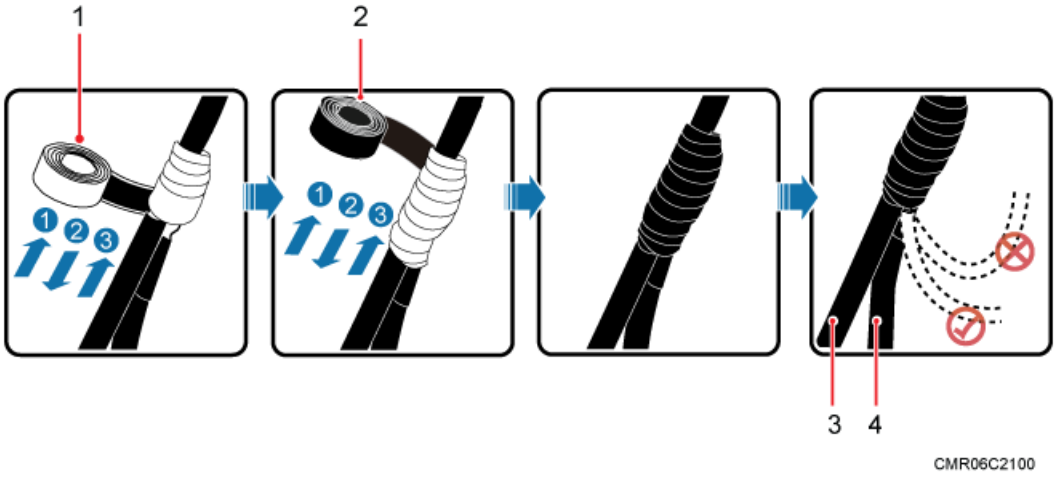
(1) Ground cable (2) Ground clip (3) FE/GE cable

Step 4 Wrap three layers of waterproof tape and three layers of polyvinyl chloride (PVC) insulation tape at the ground clip.

CAUTION

- Wrap the tape around the clip 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. When wrapping tape, be sure that each layer of tape overlaps more than 50% of the preceding layer.
- The degree between the ground cable and the FE/GE cable is not greater than 15°. When the FE/GE cable is routed vertically, the ground cable must be routed downwards.

Figure 9-36 Wrapping waterproof tape and PVC insulation tape



(1) Waterproof tape (2) PVC insulation tape (3) FE/GE cable (4) Ground cable

Step 5 Connect the ground cable to an external ground bar.

----End