

HUAWEI

Airbridge BTS3606&3606A CDMA Base Station
Installation Manual – BTS3606A Cabinet Installation

V200R001

Airbridge BTS3606&3606A CDMA Base Station Installation Manual

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About This Manual

Release Notes

This manual applies to Airbridge BTS3606A CDMA Base Station V200R001.

Related Manuals

The related manuals are listed in the following table.

Manual	Content
Airbridge BTS3606&3606A CDMA Base Station Technical Manual	Covers the system description, system architecture and principles, interface protocols, and services flows of the BTS3606/BTS3606A.
Airbridge BTS3606&3606A CDMA Base Station Installation Manual	Covers the hardware installation, software installation and commissioning, and installation reference for the BTS3606/BTS3606A.
Airbridge BTS3606&3606A CDMA Base Station Data Configuration Manual	Introduces the data configuration tasks and configuration procedures of the BTS3606/BTS3606A.
Airbridge BTS3606&3606A CDMA Base Station Maintenance Manual	Introduces the routine/emergency maintenance, troubleshooting, and part replacement procedures as well as common operations involved in the BTS3606/BTS3606A maintenance.

Organization

The manual introduces the installation procedures of the Airbridge BTS3606A CDMA Base Station. It is divided into six chapters:

Chapter 1 Installation Preparations introduces how to arrange the personnel, check the installation environment, prepare project plan, make kickoff coordination, and conduct the unpacking check.

Chapter 2 Installing Cabinet Base or Channel Steel introduces the physical features of the base for BTS3606A cabinet and the installation procedures.

Chapter 3 Installing Cabinet and Cabinet Equipment introduces how to install the BTS3606A cabinet and the battery cabinet, how to install/remove the cabinet doors, and how to install the boards/modules and the batteries.

Chapter 4 Installing Outdoor Transmission and Power Interface Boxes introduces the structures of the outdoor transmission and power interface boxes, the installation procedures, and the usage of the two interface boxes.

Chapter 5 Installing Cables introduces the categories of cables installed on site, cable distribution methods, description of water-proof components, and procedures of connecting various cables in BTS3606A cabinet, battery cabinet, and combined cabinets.

Chapter 6 Checking Cabinet Installation provides the installation checklists after the cabinet equipment is installed.

Intended Audience

The manual is intended for the following readers:

- Installation engineers and technicians
- Operation and maintenance personnel

Conventions

The manual uses the following conventions:

I. General conventions

Convention	Description
Arial	Normal paragraphs are in Arial.
Boldface	Headings are in Boldface .
Courier New	Terminal Display is in Courier New.

II. Command conventions

Convention	Description
Boldface	The keywords of a command line are in Boldface .
<i>italic</i>	Command arguments are in <i>italic</i> .
[]	Items (keywords or arguments) in square brackets [] are optional.

Convention	Description
{ 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.
[x y ...] *	Optional alternative items are grouped in square brackets and separated by vertical bars. Many or none can be selected.
#	A line starting with the # sign is comments.

III. GUI conventions

Convention	Description
Boldface	Button names and menu items are in Boldface. For example, click OK .
/	Multi-level menus are in bold and separated by forward slashes. For example, select the File/Create/Folder menu.

Convention	Description
< >	Button names are inside angle brackets. For example, click the <OK> button.
[]	Window names, menu items, data table and field names are inside square brackets. For example, pop up the [New User] window.
/	Multi-level menus are separated by forward slashes. For example, [File/Create/Folder].

IV. Keyboard operation

Format	Description
<Key>	Press the key with the key name inside angle brackets. For example, <Enter>, <Tab>, <Backspace>, or <A>.
<Key1+Key2>	Press the keys concurrently. For example, <Ctrl+Alt+A> means the three keys should be pressed concurrently.
<Key1, Key2>	Press the keys in turn. For example, <Alt, A> means the two keys should be pressed in turn.

V. Mouse operation

Action	Description
Select	Press and hold the primary mouse button (left mouse button by default).
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.

VI. Symbols

Eye-catching symbols are also used in the manual to highlight the points worthy of special attention during the operation. They are defined as follows:



Caution, Warning, Danger: Means reader be extremely careful during the operation.



Note, Comment, Tip, Knowhow, Thought: Means a complementary description.

Environmental Protection

This product has been designed to comply with the requirements on environmental protection. For the proper storage, use and disposal of this product, national laws and regulations must be observed.

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Chapter 1 Installation Preparations

This chapter introduces the preparations before BTS3606A installation from the following aspects:

- Project Files
- Tools and Instruments
- Installation Conditions
- Unpacking

1.1 Project Files

Table 1-1 lists the technical documents useful for the hardware installation.

Table 1-1 Technical documents

Document type	Document name	Description
Installation guide	Network planning, construction drawings, cable connections	The design unit appointed by the customer must prepare the documents. The customers must provide a copy of the documents to Huawei prior to the equipment delivery.
	Site survey report	The report is filled in by Huawei survey engineers during site survey.
	Engineering design and construction drawings	The document is prepared by Huawei Construction Design Department according to the equipment configuration of a site. It is delivered to the site with the equipment.
	BTS3606A CDMA Outdoor Base Station Installation Customer Preparation Instruction	The document guides the customer to make preparations before cabinet installation.
Product manual	Airbridge BTS3606&3606A CDMA Base Station Installation Manual	The document must be provided by Huawei in the delivery.
Other related documentation	Contract	The document must be provided by Huawei in the delivery.
	List of equipment configurations	
	Delivery list	

1.2 Tools and Instruments

Table 1-2 lists the tools and instruments needed for the installation.

Table 1-2 Tools and instruments

General tools	Measuring instruments	Long tape, 50 m ribbon tape, 5 m measuring tape, and 400 mm level bar
	Marking instruments	Marking pen, ink fountain, and pencil
	Drilling tools	Percussion drill with matching bits of $\phi 6$, $\phi 8$, $\phi 10$, $\phi 12$, $\phi 14$, and $\phi 16$; dust cleaner
	Clamping tools	Flathead screwdrivers (M3 – M6) Cross screwdrivers (M3 – M6) Adjustable wrenches Socket wrenches (M6, M8, M12, M14, M17, and M19) Double offset ring spanner (M6, M8, M12, M14, M17, and M19) Combination wrenches (M17 and M19) A set of inner hexagon spanners Special wrench
	Pliers	A pair of sharp nose pliers, a pair of diagonal pliers, a pair of pincer pliers, electric hand drill, file, hacksaw, crowbar, rubber hammer, and nail hammer
	Auxiliary tools	Hairbrush, a pair of tweezers, paper knife, bellow, plumb, soldering iron, tin wires, fork, ladder, heat blower, solder absorber, insulating tape, power connector board with 3 single-phase sockets, 3 two-phase sockets, and 3 three-phase sockets (current capacity > 15 A)
Special tools	An earth resistance tester, antistatic wrist strap, a pair of antistatic gloves, wire stripper, a clamping pincers, a feeder cutter, a pair of crimping pliers for SMB, RJ-45 connector crimping pliers, wire punchdown tool, wire cutter, a non-conductive screwdriver, safety knife, stripper for 75 Ω coaxial cables, a pair of connector crimping pliers for 75 Ω coaxial cables, and a pair of multi-purpose crimping pliers	
Instruments	A multi meter, 500 V megaohm meter (for testing the insulation resistance), BER tester, and optical power meter	

Note:

The equipment supplier provides the tool list and consults to the customer to specify the tool provider. The wire punchdown tool is delivered along with the cabinet. Check the meters to ensure that they are qualified for use.

1.3 Installation Conditions

The project supervisor must do the following:

- Check the construction conditions.
- Fill out the Installation Environment Checklist.
- Sign the Kickoff Agreement with the customer if all conditions are ready.
- Formulate the Project Installation Plan.

If the installation is not prepared as required, fill out the *Onsite Work Liaison Form* to declare the reason for kickoff postpone.

If the customer needs immediate kickoff, require the time when the installation will be prepared.

1.3.1 Site Requirements

Check the installation site with respect to its area, height and load-bearing capacity. If the site cannot satisfy these requirements, it is advised to re-plan the engineering.

1.3.2 Load-bearing Capacity Requirements

The BTS3606A must be installed on a stable and level cement floor. The weight capacity of the floor must satisfy the weight requirement of the cabinet. If the BTS3606A is installed on the rooftop, the weight capacity of the rooftop must meet the weight requirement of the cabinet.

If the installation site cannot satisfy this requirement, it is necessary to fortify it with a cement base. The following provides the engineering requirements.

I. Cement Base of BTS3606A Single Cabinet

For the BTS3606A cabinet installation, the cement base can be made according to the appearance and size illustrated in Figure 1-2. For the height of the cement base, the local environmental condition must be taken into consideration. Make sure that the cabinet will not suffer water penetration during heavy rain or flood, and in the season of

heavy snow, the snow will not cover the lowest air inlet on the cabinet. It is suggested that the depth of the cement base be larger than 100 mm.

When finish making a cement base, it is necessary to measure its levelness and plainness. The levelness is required to be equal to or smaller than 5 mm, and the surface plainness is required to be equal to or smaller than 5 mm.

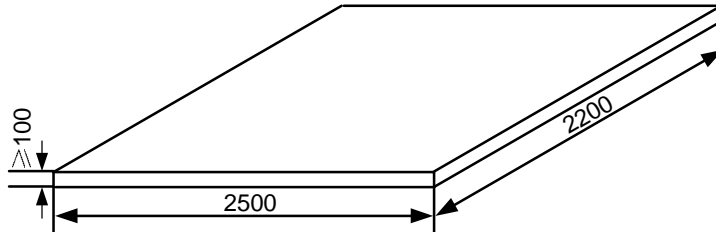


Figure 1-1 Dimensions of cement base of BTS3606A single cabinet (unit: mm)

II. Cement Base of BTS3606A Cabinet and Auxiliary Battery Cabinet

If the auxiliary battery cabinet is selected, the cement base can be made according to the appearance and dimensions illustrated in Figure 1-2. The requirements are the same as those for a BTS3606A single cabinet in thickness, levelness, and smoothness.

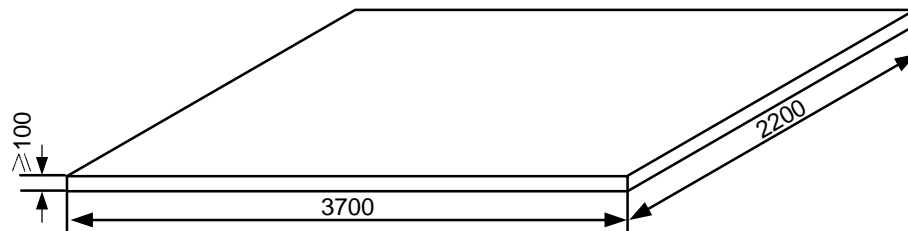


Figure 1-2 Dimensions of cement base of BTS3606A cabinet and auxiliary battery cabinet (unit: mm)

III. Cement Base of Auxiliary Battery Cabinet in Capacity Expansion

If you have installed a BTS3606A cabinet, and if you want to expand its battery capacity by installing an auxiliary battery cabinet, you will have to add the length of the cement base for the BTS3606A cabinet. See Figure 1-2 for the requirements in appearance and dimension. The requirements are the same as those for a BTS3606A cabinet in thickness, levelness, and smoothness.

1.3.3 Space Requirements

For specific requirements on installation space, see Chapter 2 "Installing Cabinet Base or Channel Steel".

1.3.4 Power Supply and Grounding Requirements

For the BTS3606A, power supply must meet the following requirements:

- There are complete AC power supply facilities and the following power requirements are met:
 - In the 220 V AC power input mode, the working voltage range of the cabinet is 176 V AC to 264 V AC or 47 Hz to 63 Hz, and a voltage stabilizer needs to be configured.
 - In the 110 V AC power input mode, the working voltage range of the cabinet is 90 V AC to 135 V AC or 47 Hz to 63 Hz, and a voltage stabilizer needs to be configured.
- Besides main supply, there must be a diesel engine supplying standby power.
- The remote power cables from the BTS3606A are usually routed overhead. The last segment of cables connected to the BTS3606A must be no more than 50 m long and are routed underground.
- AC power distribution switches and AC power cables must be ready for use.
- The AC power distribution system must have an independent AC safety ground.
- The AC neutral line is not allowed to be connected to any protection ground of communications facilities.

1.3.5 Requirements for Transmission System

Check that the transmission system is ready from the following aspects:

- The accessed transmission system is commissioned and the capacity meets the engineering requirements.
- The trunk cables must not be routed overhead outside the equipment room. You must use double-layer shielded cables or metal-coated cables. The outer layer or the metal coat of the shielded cables must be connected to the grounding bar outside the equipment room.

1.3.6 Requirements for Antenna System

Check that the antenna system is ready from the following aspects:

- The antenna stands are installed as required.
- The lightning arrester of the antenna system is installed and grounded as required.

1.4 Unpacking

This section describes the requirements and procedures of unpacking wooden cases and cartons.

1.4.1 Unpacking Requirements

After the project begins, the project supervisor must check the products together with the customer.

Check the following points:

- The total number of products is consistent with the packing list attached to the packing case.
- The arrival place is the installation site.
- The packing case is in good condition.
- The cabinet is placed upside down.

If the outer package is damaged or soaked; or the equipment is soaked and becomes rusty, stop unpacking and find the cause. Feed back the situation to the local Huawei Representative Office.

Note:

To protect the equipment and find out the cause, move the unpacked equipment indoor for proper storage, and take a photo for the storage site, the rusty or corroded equipment, packing cases, packaging materials. Keep these photos and store the unpacked packing cases and packaging materials.

If the outer package is in good condition, follow the procedure below to unpack and check the equipment:

- 1) Unpack the case labeled "contains Packing List", and take out the Packing List. Check the case according to the Packing List.
- 2) If shortage and miscarriage occur, fill in the Cargo Shortage and Miscarriage Report.
- 3) If cargo damage occurs, fill in the Cargo Replacement Application Form.
- 4) Sign the Packing List together with the customer.



Caution:

- When transporting and moving equipment, components, or parts, avoid them from colliding with doors, walls or shelves.
 - Never touch the uncoated surface of equipment, parts, or components with sweat soaked or dirty gloves.
-

1.4.2 Unpacking Wooden Case



Caution:

Do not put the wooden case upside down. Otherwise, the equipment will suffer severe damages.

Wooden cases are generally used to pack heavy objects like racks, batteries, and so on. A rack is usually packed with wooden boards, steel edges, tongues and foamed angle wraps.

It is recommended to move the packing case into or near the equipment room (if possible) to avoid damage to the cabinet during the transportation. The unpacking procedure is as follows:

- 1) Insert one end of the ejector lever into a hole of the tongue on the cover of the wooden case.
- 2) Turn the ejector lever to straighten the tongue, as shown in Figure 1-3. You can also use a screwdriver or a hammer to handle the tongue.

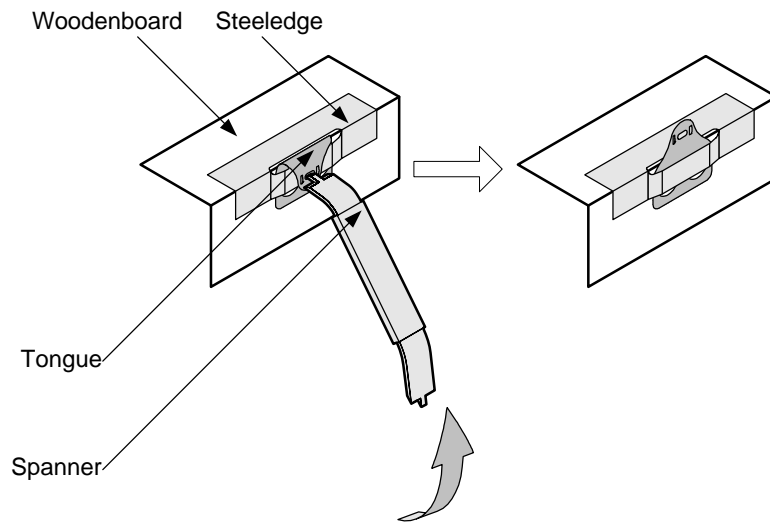


Figure 1-3 Straightening the tongues

- 3) After straightening all the tongues on the cover, remove the cover, as shown in Figure 1-4.

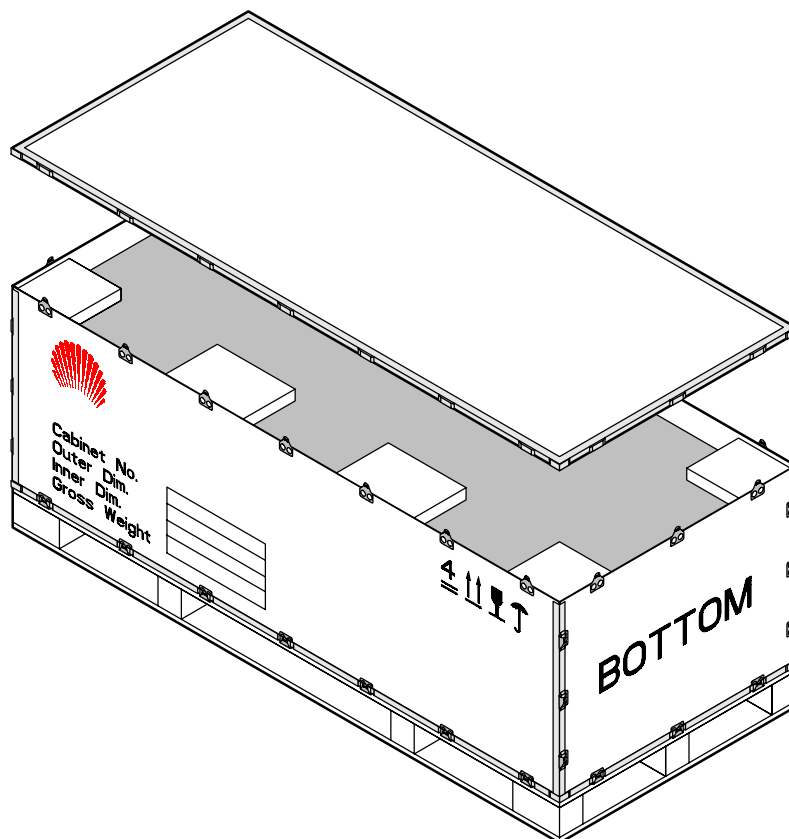


Figure 1-4 Removing the cover

- 4) Straighten all the tongues that join the wooden boards around the wooden case and remove the wooden boards, as shown in Figure 1-5.

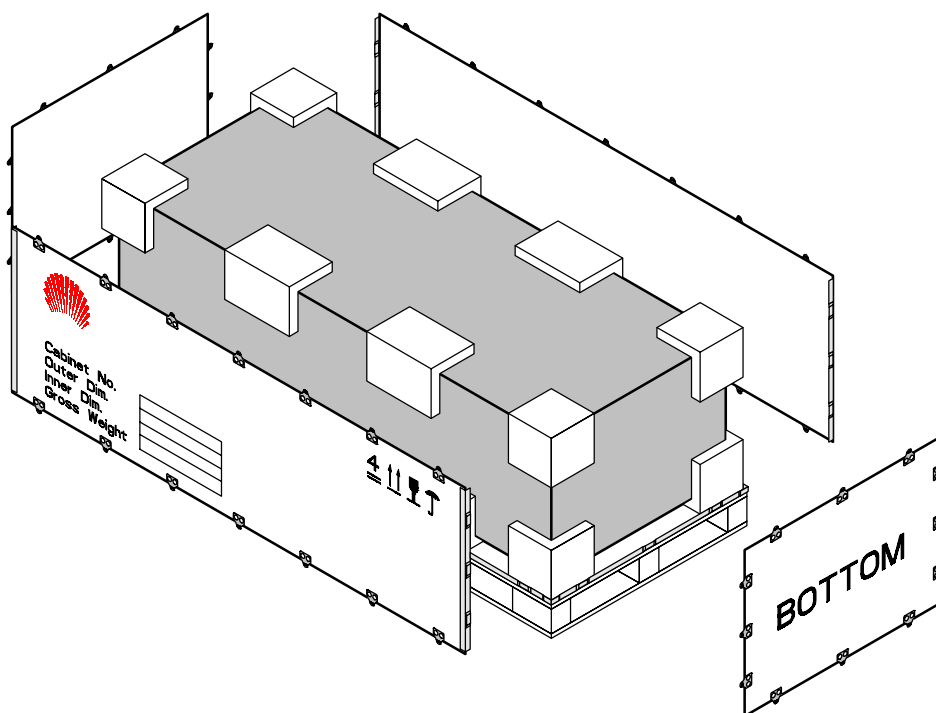


Figure 1-5 Removing all left wooden boards

- 5) Unpack other cases in the same way.

When handling the cabinet, hold on the solid places such as the upper cable rack or bone frame. Do not use too much force on places with poor rigidity, such as cable supports, cable fixing beams, to avoid any damage to the cabinet or any accident.

Remove the lining board of the rack at the place where the cabinet is to be installed. Otherwise, boards and signal cables may be damaged in the conveyance.

1.4.3 Unpacking Carton

Cartons are usually used to pack cables, circuit boards and terminal devices. During transportation, these circuit boards are usually put in anti-static bags. When unpacking the circuit boards, you need to take anti-static measures to avoid any damage to these boards.

Meanwhile, pay attention to the temperature and humidity of the environment. To keep the anti-static bag dry, you need to put desiccant in the bags so that it can absorb moisture in the bags. After transporting the equipment to a place with higher temperature and humidity, do not unpack it immediately until 30 minutes later.

Otherwise, moisture will condense on the surface of the equipment, causing damage to it.

To open a carton, proceed as follows:

- 1) Check the types and quantity of boards inside the carton according to labels.
- 2) Cut the straps using diagonal pliers.
- 3) Cut the tapes along the seams of the carton cover using a knife. To avoid damaging equipment inside, do not apply too much force.
- 4) Open the carton and take out the foam materials.
- 5) View the labels of boards, and check whether the number of boards is consistent with what is specified on the label of the carton. Then, take out the boards.
- 6) Check the number and type of boards against the Packing List, and then accept them.

Figure 1-6 shows a carton packed with boards.

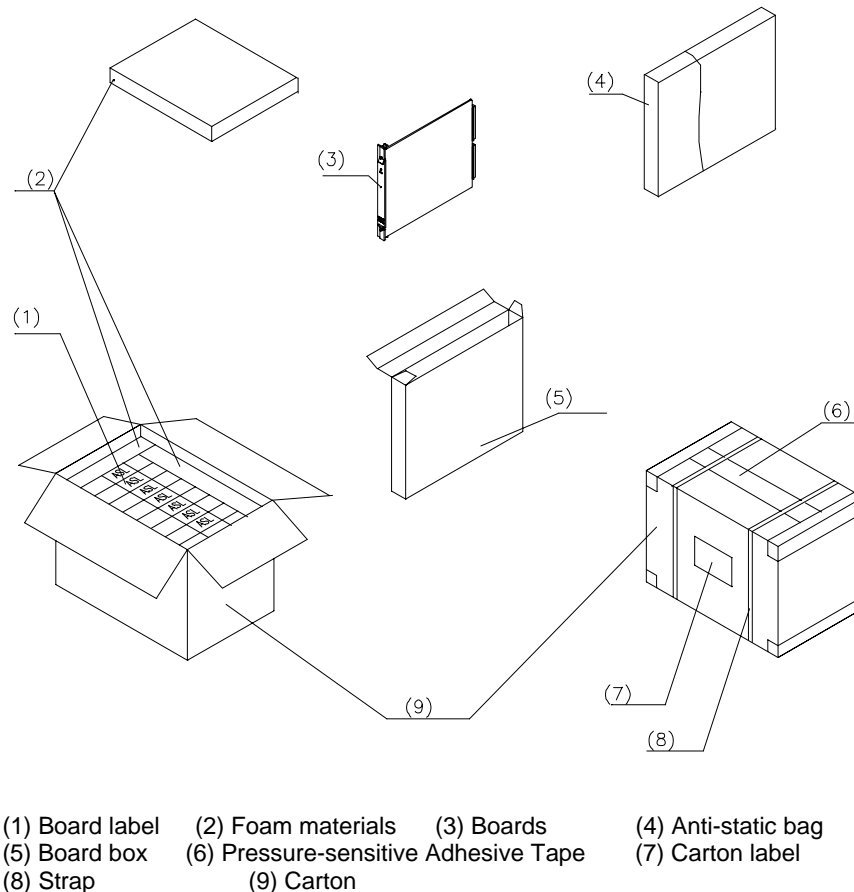


Figure 1-6 Carton packed with boards

Chapter 2 Installing Cabinet Base or Channel Steel

The BTS3606A is outdoor equipment. When it weights more than 800 kg, it must be installed on a cabinet base. When it weights less than 800 kg, it is installed on the channel steel.

This chapter introduces how to install the cabinet base and channel steel.

2.1 Introduction to Cabinet Base

The cabinet is mounted on the cement plinth with the help of the cabinet base. The cabinet base also facilitates the cabling and keeps the rodent outside the cabinet.

2.1.1 Base for BTS3606A Cabinet

Figure 2-1 shows the outline and dimensions of the base. The base is made up of channel-section steel of 200 mm (8 in.) high. For the convenience of cabling, the channel-section steel is designed with square outlets.

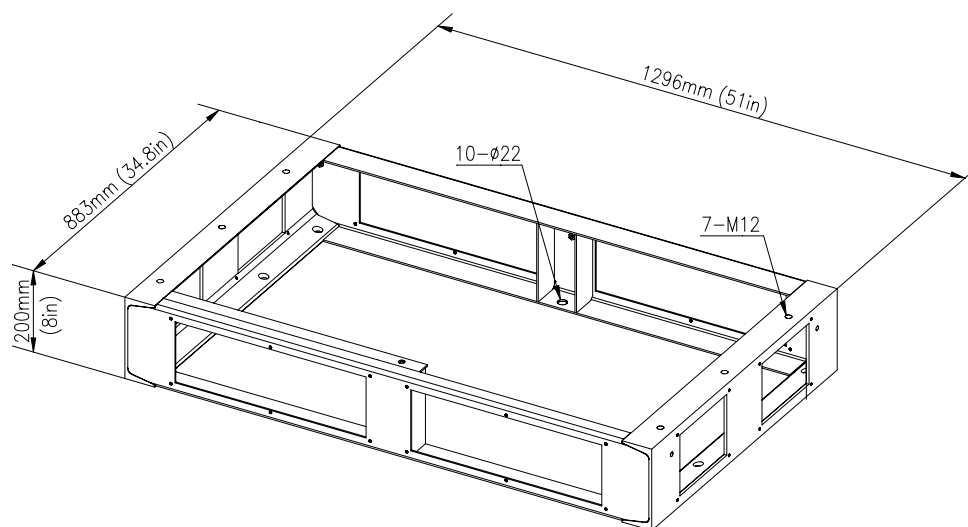


Figure 2-1 Outline and dimensions of the base for the BTS3606A cabinet

2.1.2 Base for Battery Cabinet

Figure 2-2 shows the outline and dimensions of the base. For the detailed specifications of the base, see section 2.1.1 “Base for BTS3606A Cabinet”.

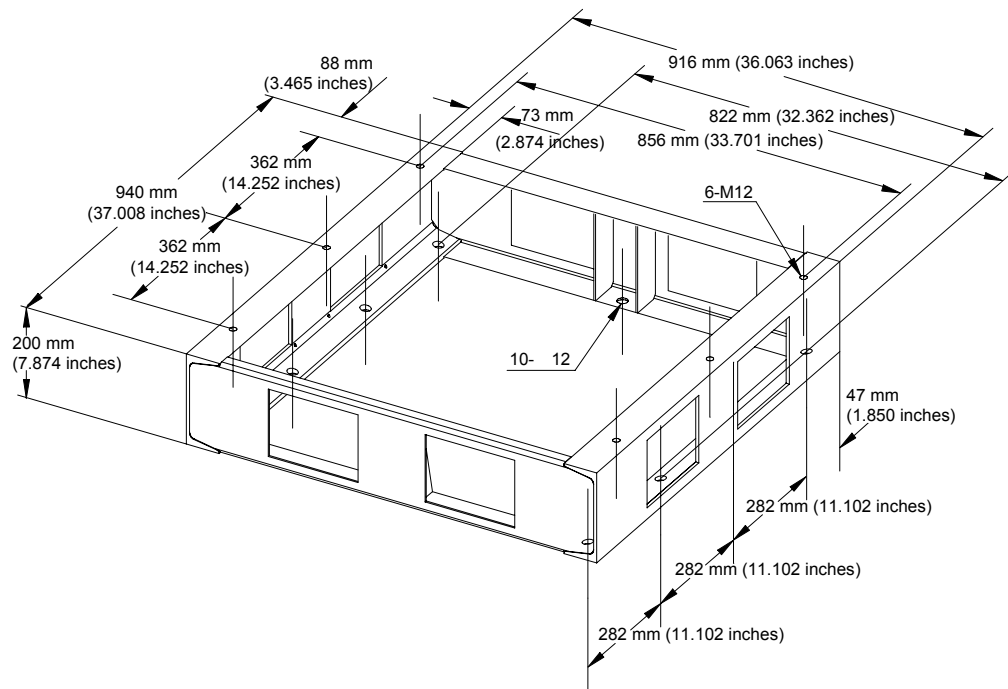


Figure 2-2 Outline and dimensions of the base for the battery cabinet

2.2 Installation Flowchart

Figure 2-3 illustrates the installation procedure.

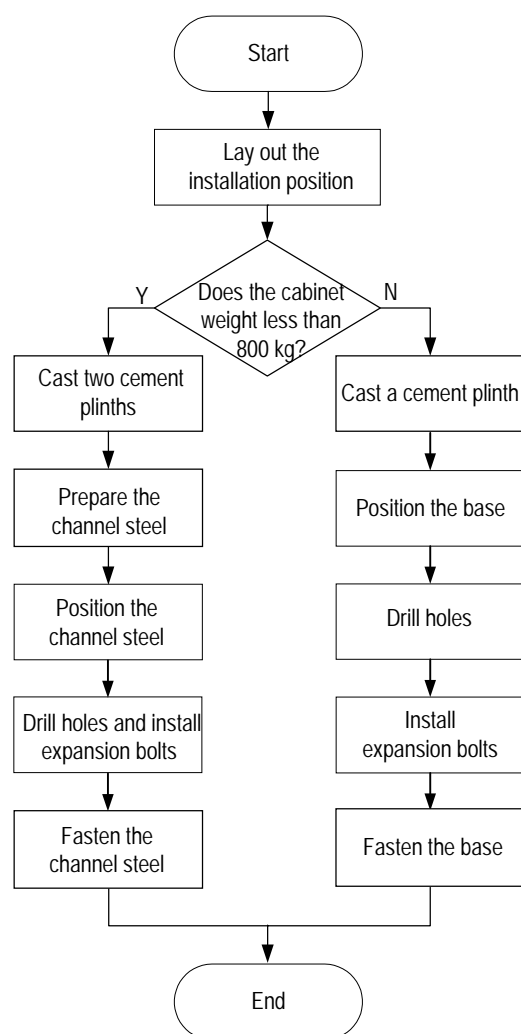


Figure 2-3 Installation flowchart

2.3 Installing Cabinet Base

This section introduces the procedure of installing a cabinet base, including:

- Laying out installation position
- Casting cement plinth
- Positioning the base
- Drilling holes and installing expansion bolts
- Fastening the base

2.3.1 Laying Out Installation Position

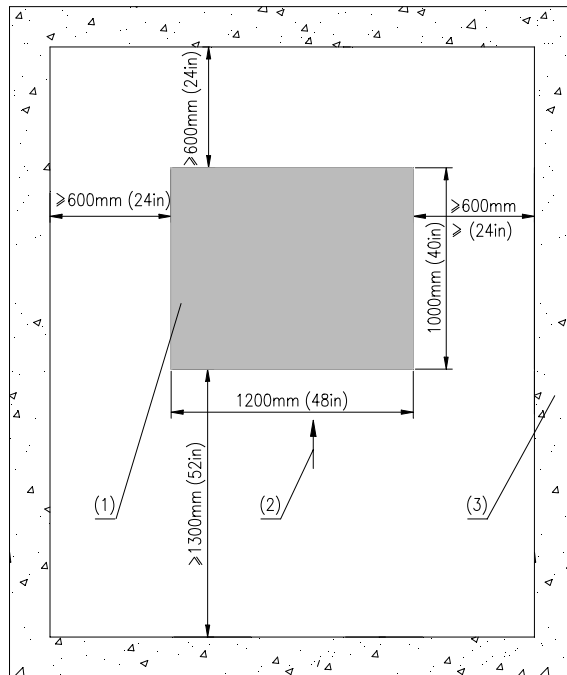
The layout of the BTS3606A cabinet varies with the configuration. The following shows the installation position of the BTS3606A cabinet in the following two cases:

- When only one BTS3606A cabinet is installed.
- When the BTS3606A cabinet is configured with a battery cabinet.

I. When There Is Only One BTS3606A Cabinet

When there is only one BTS3606A cabinet, install it according to Figure 2-4 to facilitate the installation and maintenance. The right side of the cabinet can be placed against the wall. It is recommended the distance be larger than 600 mm (24 in.).

To minimize the solar radiation, make sure that the front door faces the south or north.



(1) Cabinet (2) Front of the cabinet (3) Wall or other reference objects

Figure 2-4 Installation position for a BTS3606A cabinet

II. When the BTS3606A Is Configured with a Battery Cabinet

When the BTS3606A is configured with a battery cabinet, install the battery cabinet in the position as shown in Figure 2-5 to facilitate the installation and maintenance.

You need to place the battery cabinet in the same direction with the BTS3606A cabinet, and align it with the BTS3606A cabinet.

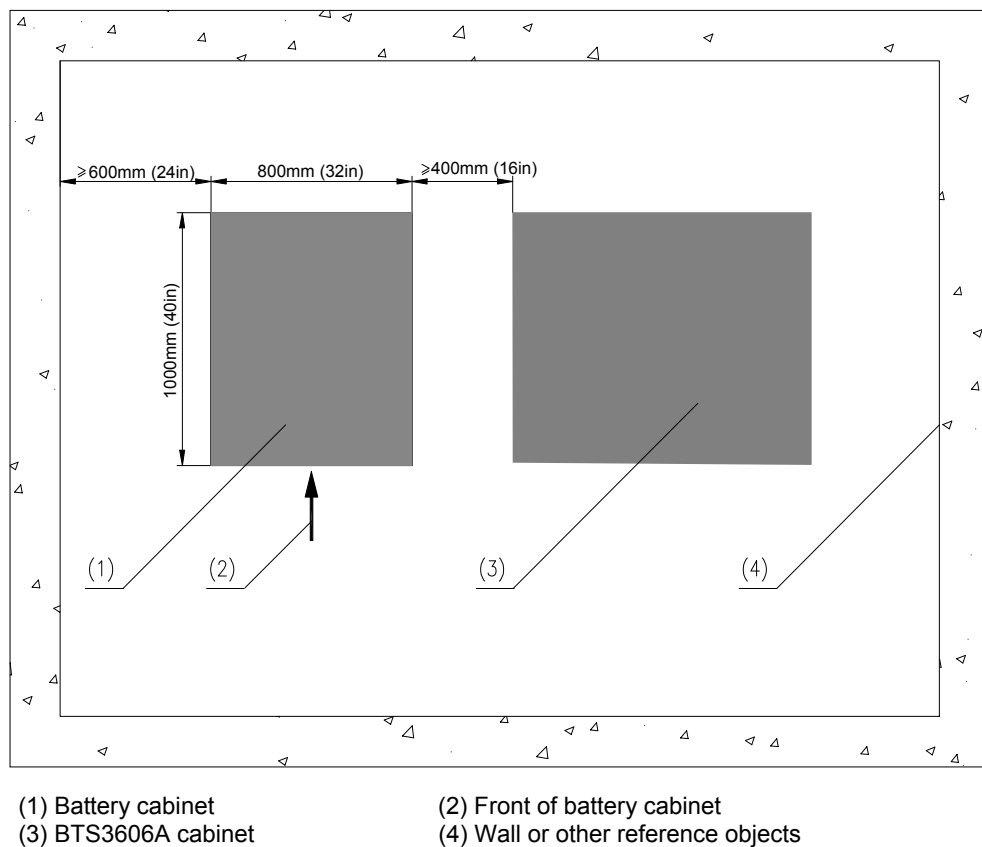


Figure 2-5 Installation position for a battery cabinet

2.3.2 Casting Cement Plinth

This section introduces how to cast cement plinth in different situations.

I. Casting Cement Plinth for a Single Cabinet

Cast the cement plinth as shown in Figure 2-6. The height of the cement plinth must meet the flood-protection requirement in local area. The plinth must be at least 100 mm (4 in.) higher than the ground surface and protect the cabinet against water penetration in the case of heavy rain or flood.

When casting the plinth, make sure that its level error is no more than 5 mm (0.2 in.).

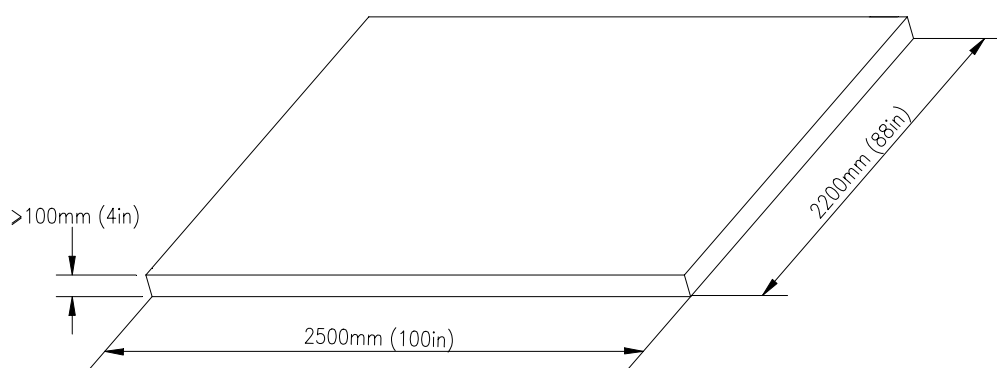


Figure 2-6 Dimensions of a cement plinth

II. Casting Cement Plinth When a Battery Cabinet Is Configured

During the installation of the BTS3606A cabinet, the cement plinth is cast according to the outline and dimensions shown in Figure 2-7. Space for installing a battery cabinet is reserved on the cement plinth.

If a battery cabinet is added due to capacity expansion, a new cement plinth will be cast. Figure 2-7 shows the total dimensions of cement plinths for battery cabinet and BTS3606A cabinet. Note that two plinths must be at the same level.

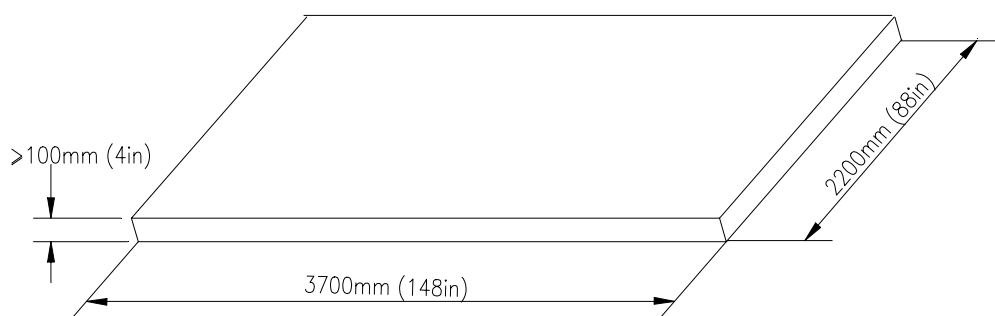


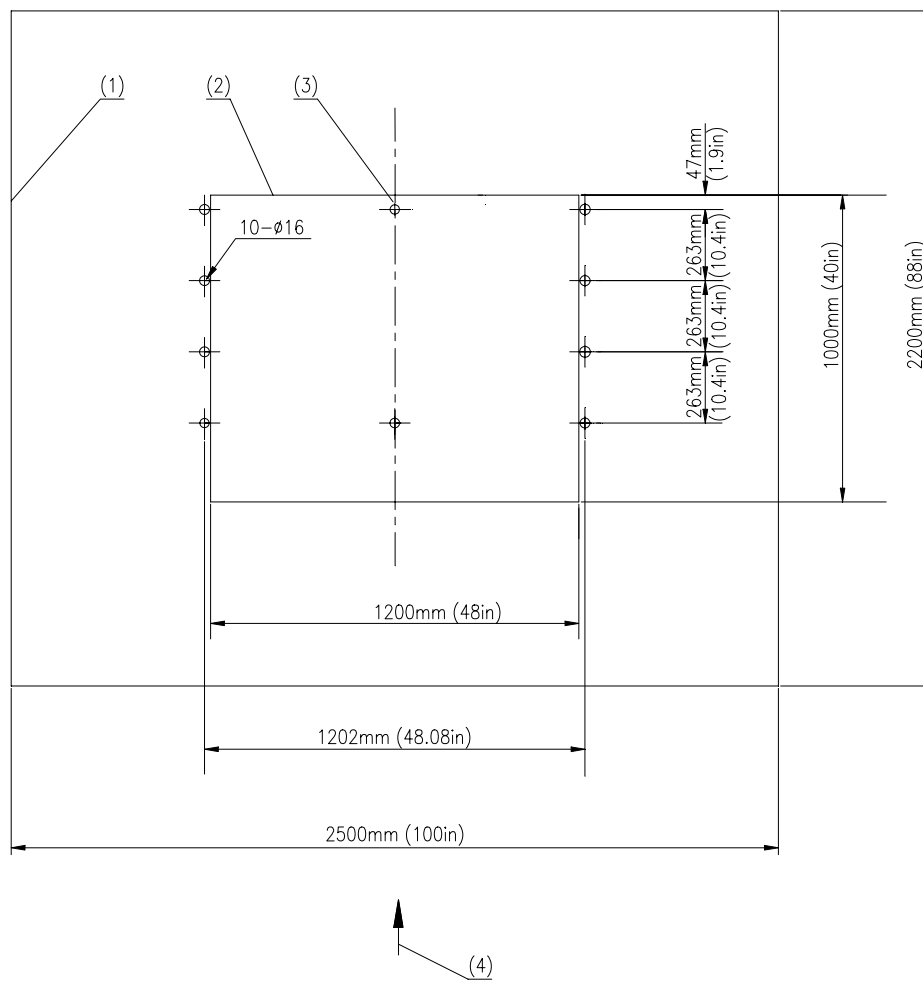
Figure 2-7 Dimensions of cement plinth for battery cabinet and BTS3606A cabinet

2.3.3 Positioning the Base

To position the base, proceed as follows:

- 1) Determine the installation position based on the predefined benchmark dimensions in project plane design.
- 2) Use a measuring tape to measure off the scribing points.
- 3) Mark out the installation holes one by one as designed.
- 4) Measure the distance between holes again.

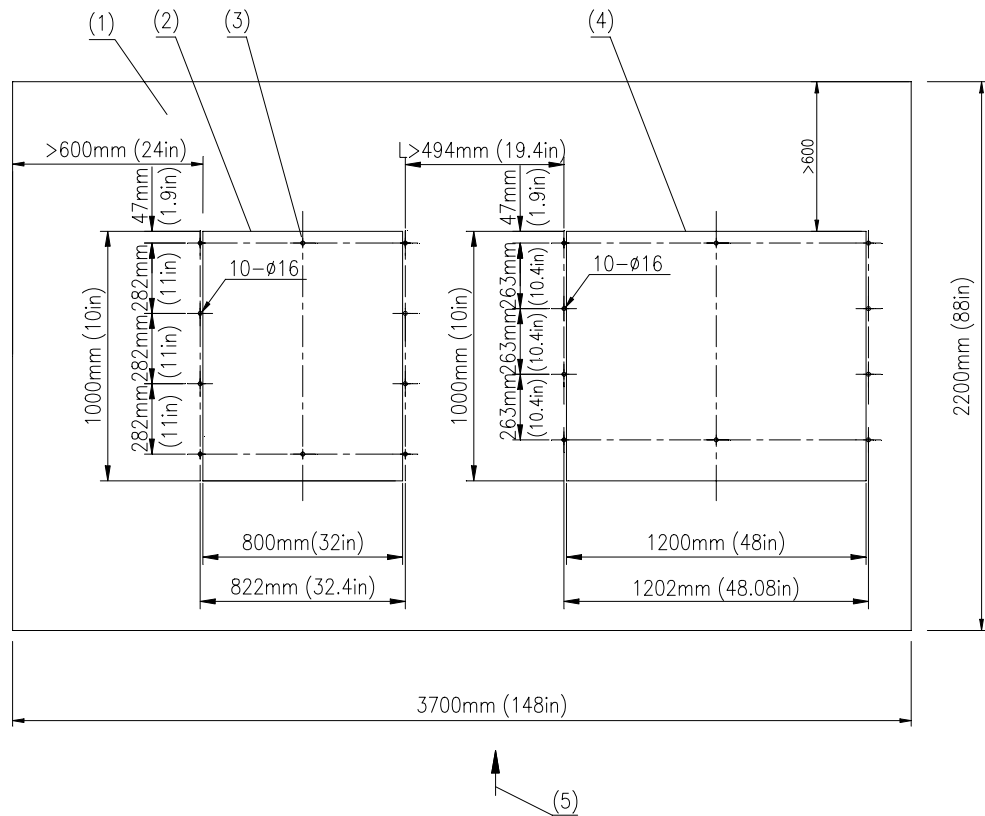
Figure 2-8 illustrates the installation holes of expansion bolts during the installation of a BTS3606A cabinet.



- (1) Cement plinth
- (2) Outline of the cabinet
- (3) Installation hole of the expansion bolt
- (4) Front of the cabinet

Figure 2-8 Layout and dimensions of installation holes for a BTS3606A cabinet

Figure 2-9 illustrates the installation holes of expansion bolts when a battery cabinet is configured.



- (1) Cement plinth
- (2) Outline of the battery cabinet
- (3) Installation hole of the expansion bolt
- (4) Position of the BTS3606A cabinet
- (5) Front of the cabinet

Figure 2-9 Layout of installation holes when a battery cabinet is configured

2.3.4 Drilling Holes and Installing Expansion Bolts



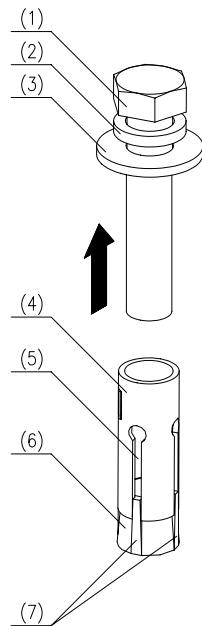
Caution:

- Bury the upper side of expansion tube in the ground. Otherwise, the cabinet may not be able to sit firmly on the ground.
- The depth of the hole must range from 52 mm (2.08 in.) to 60 mm (2.4 in.) (the length of the expansion tube plus that of the drill bit). Otherwise, the expansion bolt cannot be fastened.
- All holes must have the same depth. Before measuring the depth of the hole, remove the dust inside the hole to measure the net depth.
- If the floor is too hard and smooth to settle the drill bit, punch a pit with a chisel to help position the hole.

To drill holes and install expansion bolts, proceed as follows:

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- 1) Use the M12 expansion bolt and $\phi 16$ bit.
- 2) Hold the drill stock firmly with two hands, and keep the drill bit vertical to the ground to drill a hole.
- 3) Clean the dust with a vacuum cleaner when drilling.
- 4) Disassemble the expansion bolt and remove the M12 x 70 bolt, spring washer, and plain washer, as shown in Figure 2-10.



- | | | |
|--------------------|-------------------|------------------|
| (1) M12 x 70 bolt | (2) Spring washer | (3) Plain washer |
| (4) Expansion tube | (5) Guiding slot | (6) Nut |
| (7) Guiding rib | | |

Figure 2-10 Disassembling expansion bolts

- 5) Feed the tube and the nut into the hole vertically and make sure that the guiding rib on the nut meets the guiding slot of the tube. See Figure 2-11.
- 6) Hammer the tube until it is completely buried in the ground.

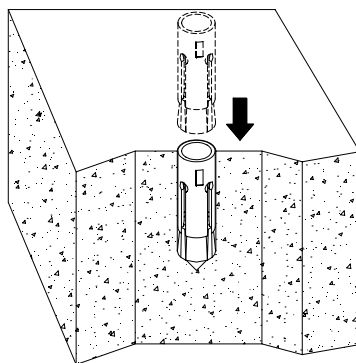


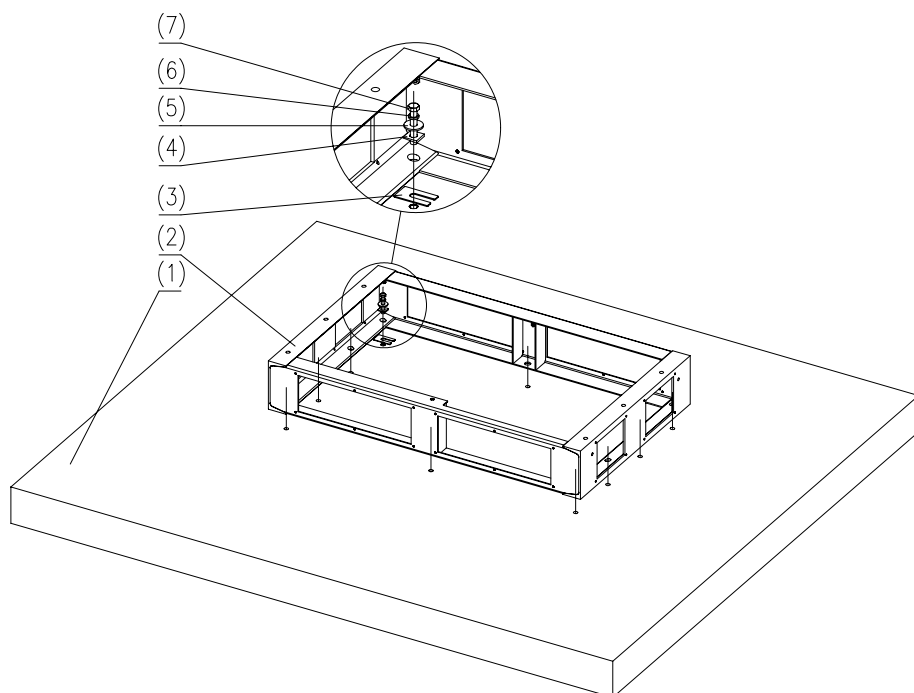
Figure 2-11 Installing the expansion bolt and expansion tube

2.3.5 Fastening the Base

To fasten the base, proceed as follows:

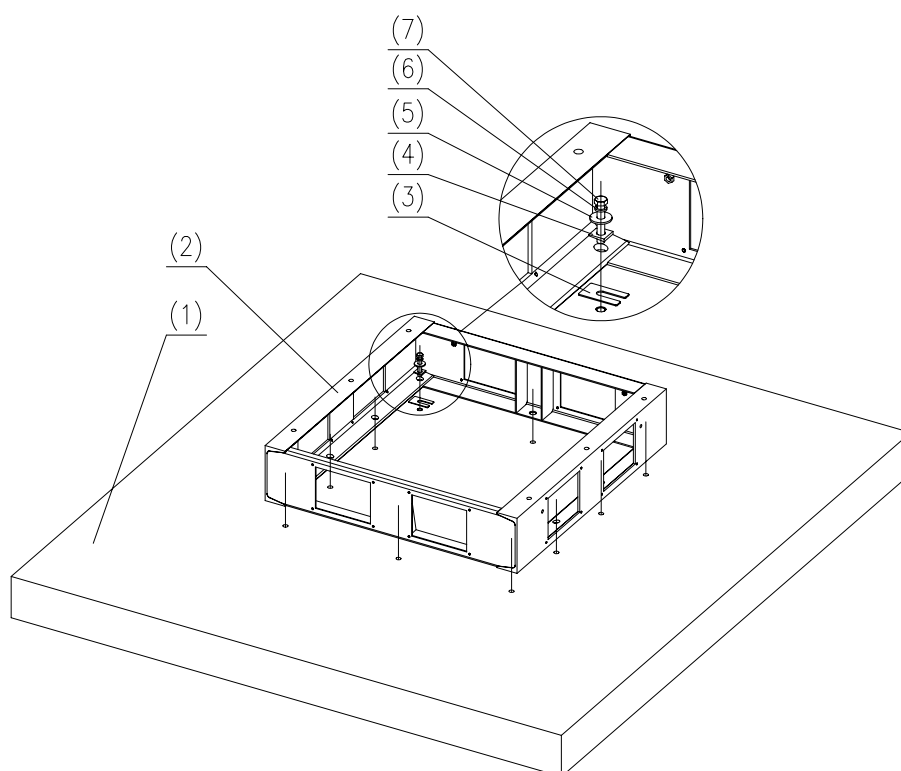
- 1) Disassemble the cabling rack, rodent-resistant plate and anti-slip plate.
- 2) Put the base on the cement plinth.
- 3) Match the holes at the bottom of the base with those on the plinth.
- 4) Level the cabinet by adding washers under the base.
- 5) Fasten the base on the plinth using M12 x 70 bolts, spring washer, big plain washer, and square taper washer.

The fastening base of BTS3606A cabinet is shown in Figure 2-12, and that of battery cabinet is shown in Figure 2-13.



- | | | | |
|-------------------------|----------------------|-------------------|----------------------------|
| (1) Cement plinth | (2) Base | (3) Washer | (4) Square taper washer 12 |
| (5) Big plain washer 12 | (6) Spring washer 12 | (7) M12 x 70 bolt | |

Figure 2-12 Fastening the base of BTS3606A



(1) Cement plinth (2) Base (3) Washer (4) Square taper washer 12
(5) Big plain washer 12 (6) Spring washer 12 (7) M12 x 70 bolt

Figure 2-13 Fastening the base of battery cabinet

2.4 Installing Channel Steel

This section introduces the procedure of installing the channel steel, including:

- Laying out installation position
- Casting cement plinths
- Preparing the channel steel
- Positioning the channel steel
- Drilling holes and installing expansion bolts
- Fastening the channel steel

Note:

The cross section of the channel steel must be 200 mm (7.87 in.) x 73 mm (2.87 in.) x 7 mm (0.28 in.).

If the equipment is installed inside a building or on the top of a building, the bearing capacity of the building must be verified according to the weight and installation position of the equipment. If the bearing capacity is insufficient, reinforce the building.

2.4.1 Laying out Installation Position

For details, see section 2.3.1 "Laying Out Installation Position".

2.4.2 Casting Cement Plinths

Determine the position of the wall or beam that bears the BTS3606A. Then cast two cement plinths on the floor or platform right above the bearing wall or the beam.

The cement plinth must be 100 mm in height and the distance between two cement plinths must be less than 6 m.

2.4.3 Preparing Channel Steel

Determine the length of channel steel according to the distance between cement plinths, as shown in Figure 2-14

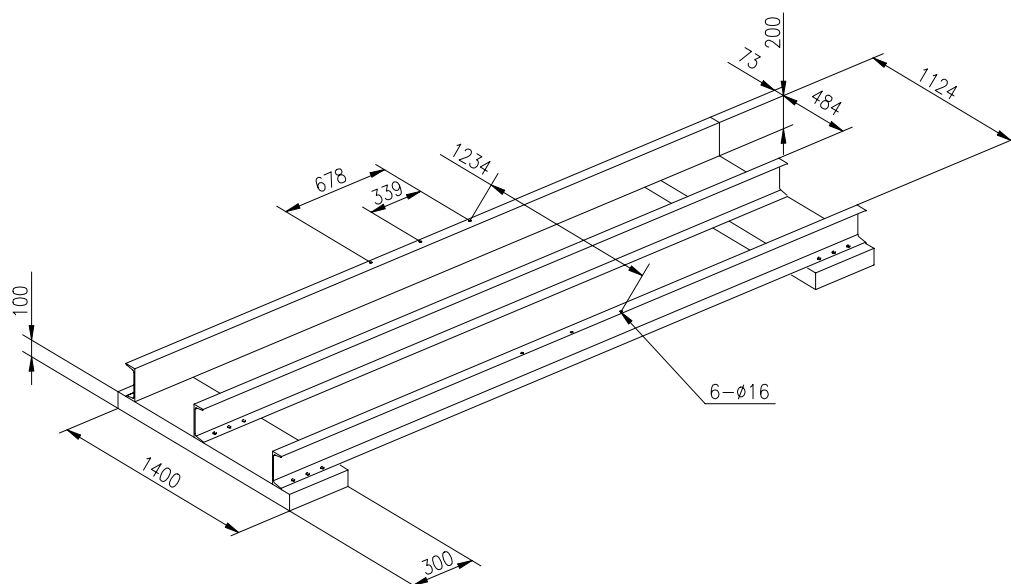


Figure 2-14 Preparing channel steel

2.4.4 Positioning Channel Steel

Drill twenty four $\Phi 16$ holes on the channel steel according to Figure 2-14.

2.4.5 Drilling Holes and Installing Expansion Bolts

For instructions on drilling holes and installing expansion bolts, see section 2.3.4 "Drilling Holes and Installing Expansion Bolts".

2.4.6 Fastening Channel Steel

Use one of the following methods to secure the channel steel on the cement plinths:

- Cast the channel steel and the cement plinths together with cement.
- Fasten the channel steel on the cement plinths with expansion bolts.

After the channel steel are fastened, measure the upper levels of the three pieces of channel steel and make sure their upper levels are on the same plane.

Chapter 3 Installing Cabinet and Cabinet Equipment

This chapter introduces how to install the BTS3606A cabinet, the battery cabinet, and the equipment inside these cabinets.

3.1 Installation of Cabinet

During the installation of combined cabinets, the extension cabinet is installed in the same way as the basic cabinet.

To install the basic cabinet, proceed as follows:

- 1) Position the cabinet.
- 2) Level the cabinet.
- 3) Fasten the cabinet.
- 4) Install accessories.

3.1.1 Positioning Cabinet

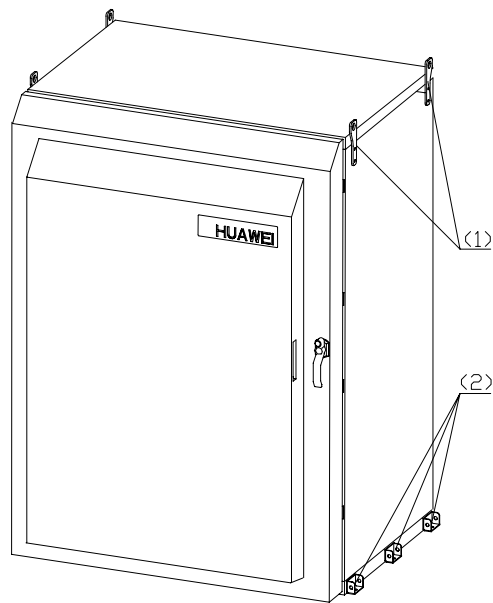
Lift and place slowly the cabinet over the base and align the installation holes on the bottom of the cabinet with those on the base.



Caution:

- An empty cabinet weighs 450 kg (992 lb.). Confirm the lifting capability of the lifting equipment beforehand.
 - When lifting the cabinet, make sure that all the four lugs are reliably hooked, the angle between the lifting rope and the top of the cabinet is at least 60°, and the cabinet is level. Installers must stay away from the cabinet when lifting it and make sure that the front and rear doors are closed.
 - When installing the cabinet in bad conditions (for example, when there is strong wind), pay extra attention to the gravity center of the cabinet to prevent the cabinet from slanting.
-

If the cabinet cannot be lifted on site, position the cabinet according to the bearing points shown in Figure 3-1 and site characteristics.



(1) Lug (2) Mount angle

Figure 3-1 Cabinet bearing points

3.1.2 Leveling Cabinet

To level the cabinet, proceed as follows:

- 1) Use a level bar to check the levelness of the cabinet in both the latitudinal and longitudinal directions.
- 2) Observe whether the level vial is in the middle of the level bar.
 - If there is no error, fasten the cabinet by following the instructions in section 3.1.3 "Fastening Cabinet".
 - If an error exists, lift the cabinet.
- 3) Adjust the levelness by adding washers between the cabinet and base, as shown in Figure 3-2 and Figure 3-3.

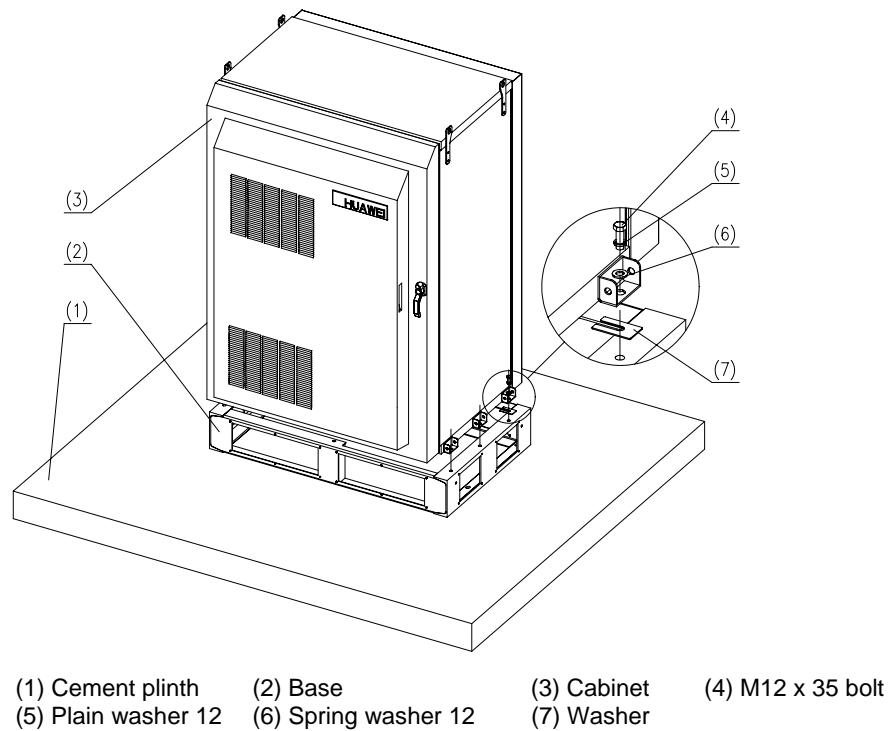


Figure 3-2 Leveling a BTS3606A cabinet (Installing cabinet on base)

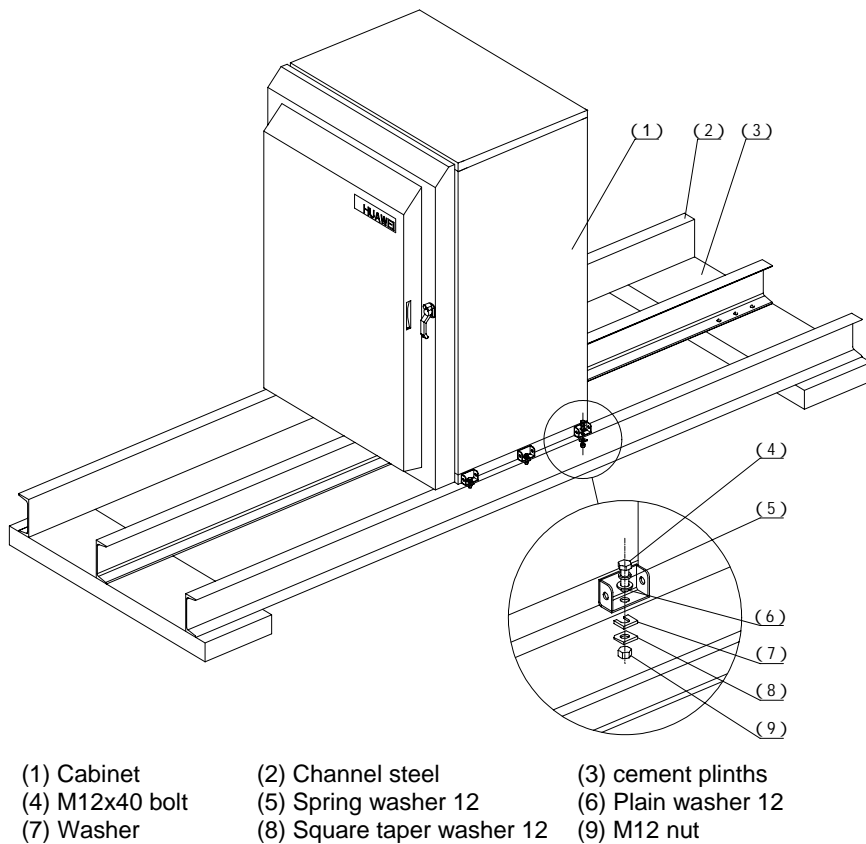


Figure 3-3 Leveling a BTS3606A cabinet (Installing cabinet on channel steel)

3.1.3 Fastening Cabinet

Note:

- Do not open the front door unless it is ensured that the cabinet is level.
- If the front door keeps open for a long time, use a solid object to support the lower part of the door to prevent the deformation of the door.
- Before you close the front door, lift the support bar and slide it along the rail.

To fasten the cabinet, proceed as follows:

- 1) Fasten the cabinet on the base using M12 x 35 bolts, spring washers, and plain washers, as shown in Figure 3-2.
- 2) Unlock and open the door as shown in Figure 3-4.

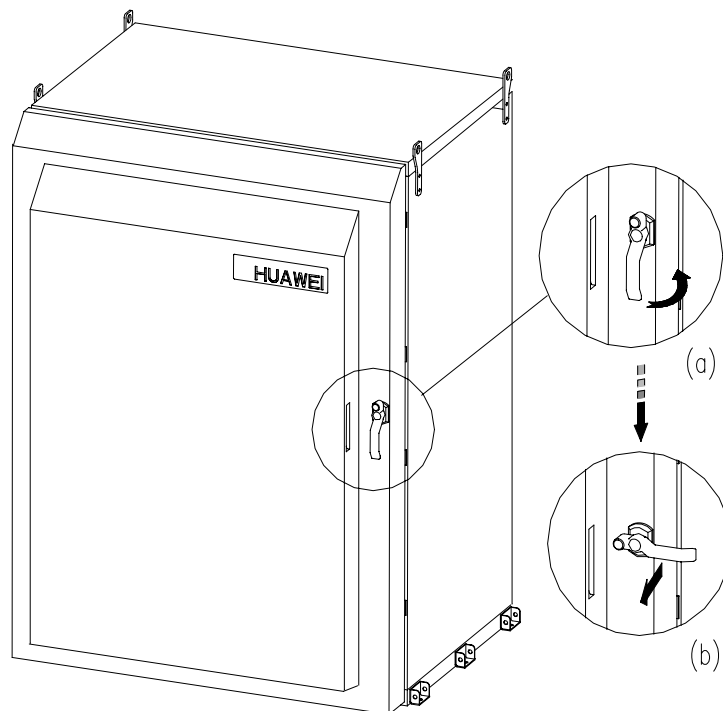


Figure 3-4 Opening the front door

- 3) Fix the front door at a suitable angle with the support bar on the top of the door.

Note:

- The front door can be fully opened to 120°.
- The support bar can be fixed at an angle of 90° or 120°.

- 4) Fix one end of the bar on the rail with a fixing bolt as shown in Figure 3-5. The other end of the bar is fixed on the cabinet with a screw.

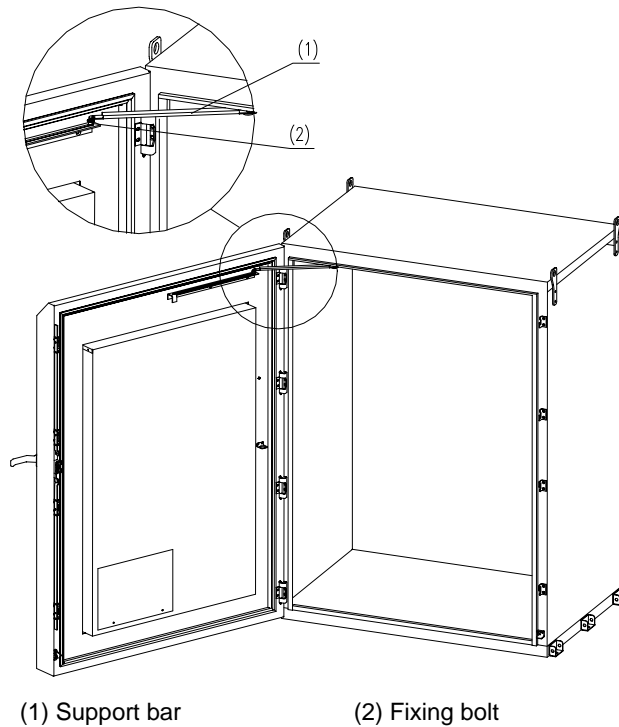
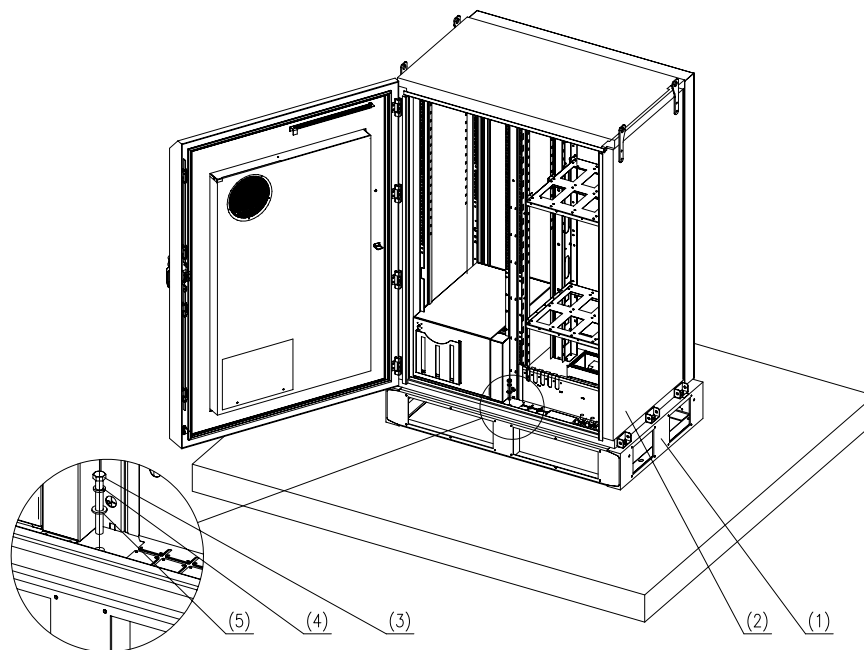


Figure 3-5 Fixing the front door

- 5) Assemble an M12 x 100 bolt with spring washer 12 and plain washer 12.
6) Install the assembled burglary-resisting bolt. See Figure 3-6.



- (1) Base (2) Cabinet (3) M12 x 100 bolt
(4) Spring washer 12 (5) Plain washer

Figure 3-6 Installing the burglary-resisting bolt

Note:

Step 6 applies to the installation of BTS3606A cabinet on a base only.

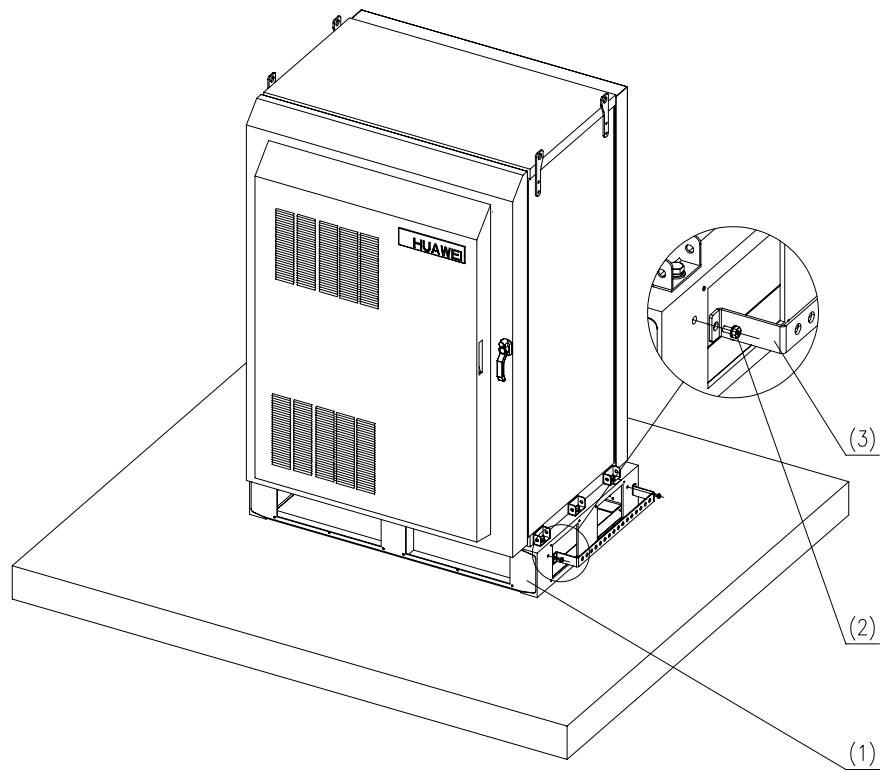
3.1.4 Installing Accessories

Note:

This section applies to the installation of BTS3606A cabinet on a base only.

To install accessories including a cabling rack and a rodent-resistant plate, proceed as follows:

- 1) Position the cabling rack according to the cable outlet.
- 2) Mount the cabling rack on the base using M8 x 12 screws, as shown in Figure 3-7.



(1) Base (2) M8x20 screw (3) Cabling rack

Figure 3-7 Mounting cabling rack

- 3) On the rodent-resistant plate, cut an opening where the cable is led out or led in according to the shape of cables.
- 4) Mount the rodent-resistant plate on the base using M6 x 12 screws, as shown in Figure 3-8.

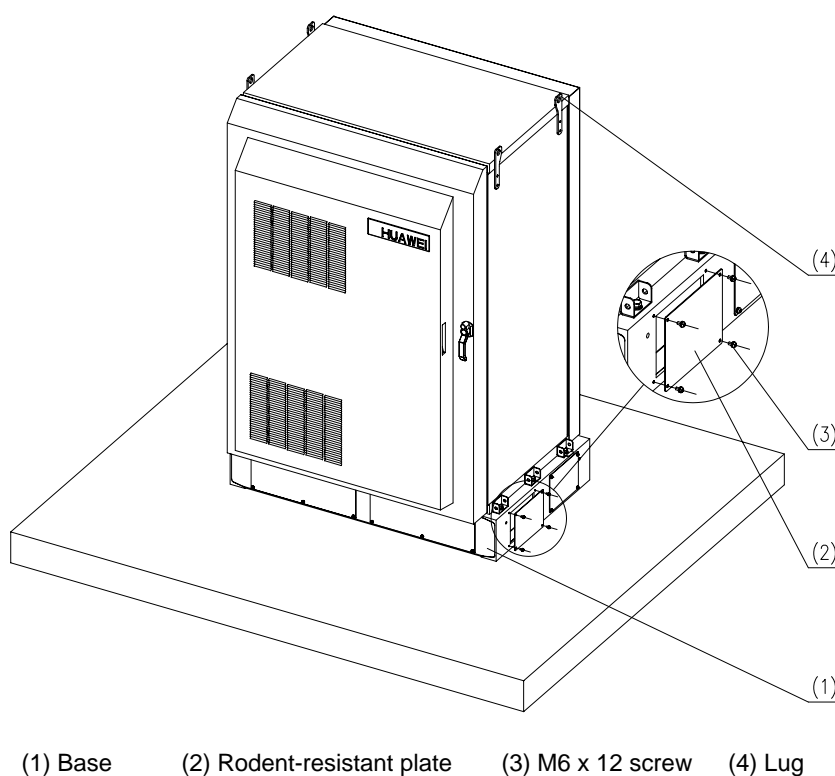


Figure 3-8 Mounting the rodent-resistant plate

3.1.5 Removing Lugs (Optional)

After the cabinet is installed, remove the lugs. Use nylon gaskets and bolts delivered with the equipment to fill the holes on the lugs and then keep the lugs in the tool box.

3.2 Installation of Auxiliary Battery Cabinet

The auxiliary battery cabinet is installed in the same method as the BTS3606A cabinet. The following presents the reference and details the differences.

3.2.1 Positioning Cabinet

See section 3.1.1 “Positioning Cabinet”.



Caution:

An empty cabinet weighs 300 kg (662 lb.). Confirm the lifting capability of the lifting equipment beforehand.

3.2.2 Leveling Cabinet

See section 3.1.2 “Leveling Cabinet”.

Figure 3-9 shows how to level the cabinet.

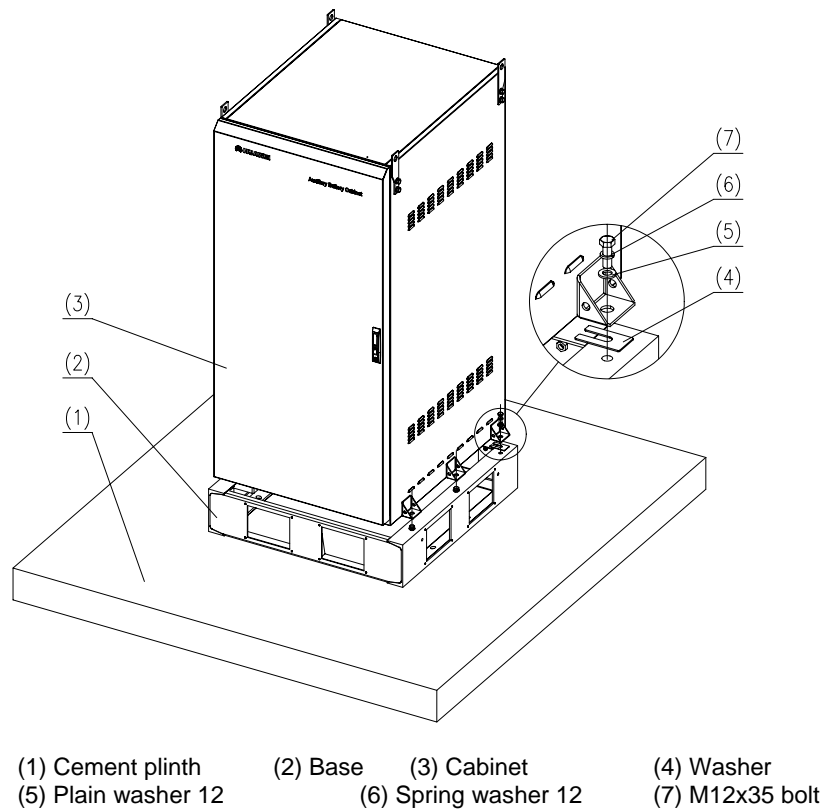


Figure 3-9 Leveling a cabinet (battery cabinet)

3.2.3 Fastening Cabinet

See section 3.1.3 “Fastening Cabinet”.

3.2.4 Installing Accessories

The accessories of the battery cabinet also include cabling rack, anti-slip plate, and rodent-resistant plate. To install them, see section 3.1.4 “Installing Accessories”.

Figure 3-10 shows how to mount the cabling rack.

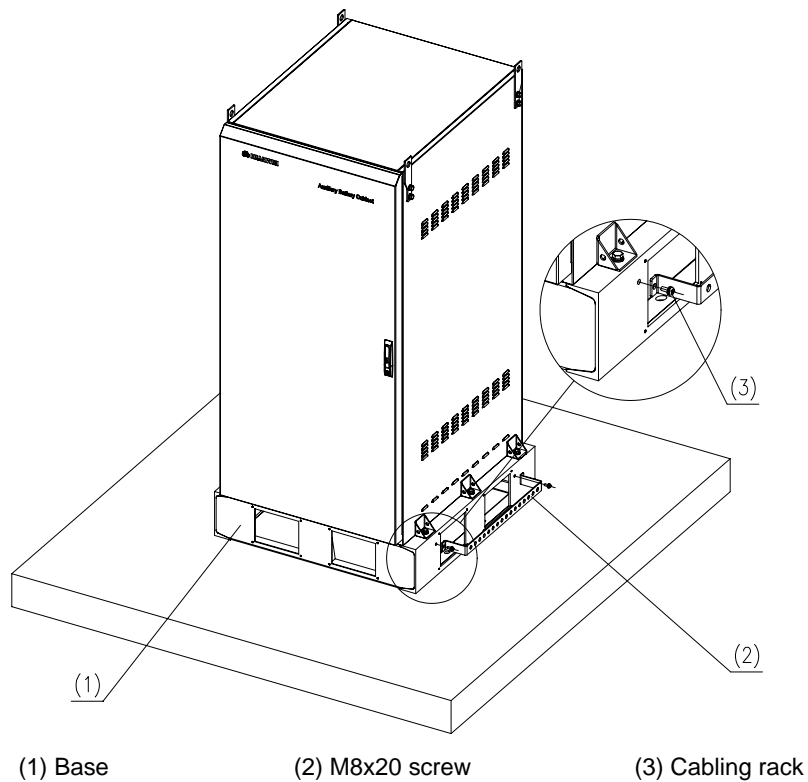


Figure 3-10 Mounting the cabling rack

Figure 3-11 shows how to mount the rodent-resistant plate.

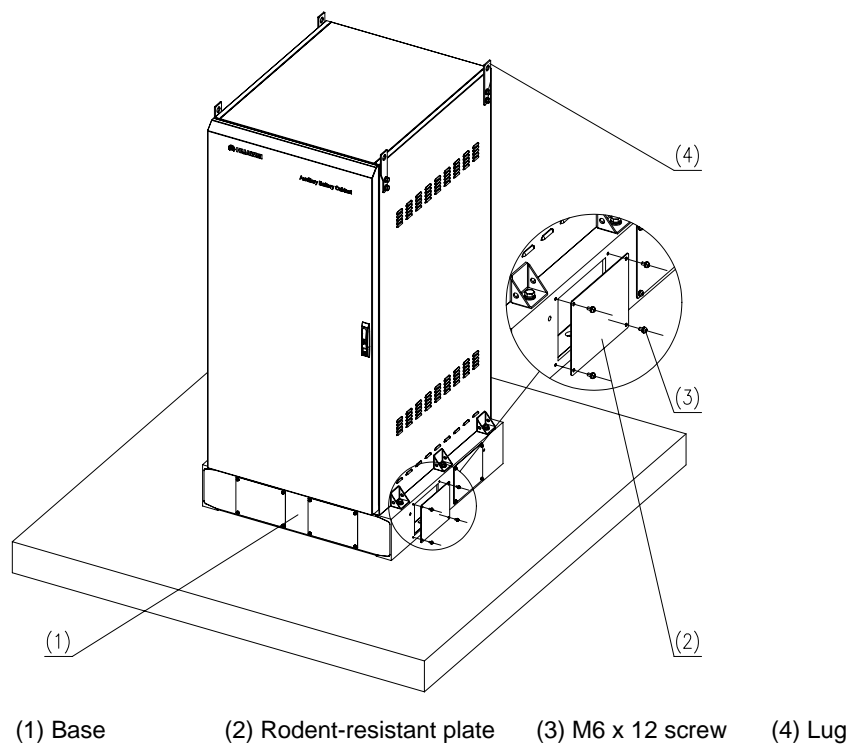


Figure 3-11 Mounting rodent-resistant plate

3.2.5 Removing Lugs

After the cabinet is installed, remove the lugs. Use the filler blocks delivered with the equipment to fill the holes on the lugs and then keep the lugs in the tool box.

3.3 Installation and Removal of BTS3606A Cabinet Front Door

The front and rear doors of the BTS3606A cabinet have been installed before delivery. The following describes how to remove cabinet doors. You can follow the reverse order to install the doors.

3.3.1 Removing Front Door



Caution:

- The front door is large and heavy. You need lifting equipment such as a lifting jack to install or remove it.
 - Avoid tipping over the front door when installing or removing the front door. Accidents may result.
 - The air-conditioner is attached inside the front door. Therefore, never put the front door flatly on the ground during the installation or removal.
 - Make sure the angle between the vertical plane and the front door is laid vertical or the slope angle is less than 20°.
-

To remove the front door, proceed as follows:

- 1) Remove all the cables and hinges on the front door.
- 2) Remove the bolts of the support bar on the front door.
- 3) Lift the support bar from the rail on the front door.
- 4) Remove the circlip on the latch.
- 5) Lift the front door lightly using the lifting equipment.
- 6) Remove the latch from the side of the front door.
- 7) Lift the front door vertically.

3.3.2 Removing Rear Door

The rear door of the cabinet is normally not removed during the routine maintenance. But if the cabinet cannot be lifted, remove the rear door to reduce the weight of the cabinet for transportation.

 **Caution:**

Disconnect all the cables on the rear door before removing the rear door.

To remove the rear door of the BTS3606A, proceed as follows:

- 1) Use the dedicated spanner attached to the BTS3606A cabinet to remove the M6 screws on the rear door.
- 2) Remove the rear door slowly.

3.4 Installation of Cabinet Equipment

 **Caution:**

- Insert the boards according to the nameplates to avoid any mistake.
 - Avoid touching printed circuit boards (PCBs) and components other than jumpers and DIP switches.
 - Insert the board vertically and gently lest the pins and components on the backplane be damaged.
-

Before installing boards and modules, check the DIP switches on the backplane or boards are correctly set. For example, make sure the DIP switch on the BCIM is correctly set according to the silk-screen before installing the board.

When a dummy panel is installed on the slot, unscrew the bolts and remove the dummy panel before installing the board. It is recommended to remove a dummy panel at a time and then install a board accordingly.

3.4.1 Installing Boards in Baseband Subrack

Baseband boards include the CCPM/CECM, BCIM, and BCKM.

 **Note:**

Slots for the channel processing boards are marked as CEM. The CEM can be a CCPM or a CECM.

To install the boards in the baseband subrack, proceed as follows:

- 1) Check the cleanness of the subracks and clean them up.

- 2) Wear an antistatic wrist strap and ground it by inserting its grounding plug to the antistatic jack on the side door post of the cabinet.
- 3) Check whether there are any tilted, missing or broken pins on the backplane.
 - If any pin is tilted, straighten it. Use the sharp-nose pliers to straighten pins in the case of emergency.
 - If any pin is missing or broken, replace the backplane.
- 4) Make sure the ejector levers on the front panel are in the state as shown in Figure 3-12.

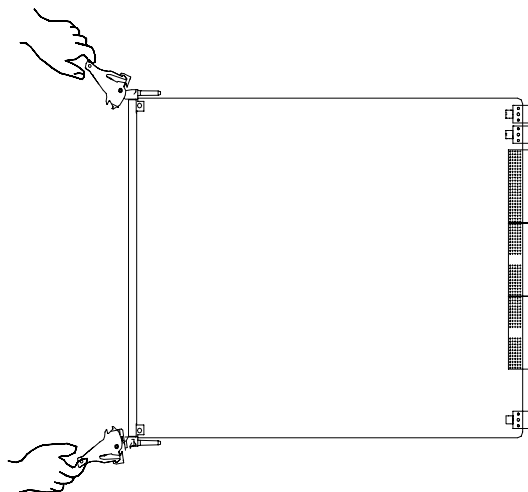


Figure 3-12 Installing a board (1)

- 5) Hold the upper ejector lever on the front panel with one hand and uplift the board with the other. With reference to the name on the nameplate, put the board on the corresponding guide rail.
- 6) Hold the two ejector levers and insert the board along the guide rail gently till it is in position.
- 7) Turn the two ejector levers towards the middle of the panel simultaneously to fix the board. See Figure 3-13.

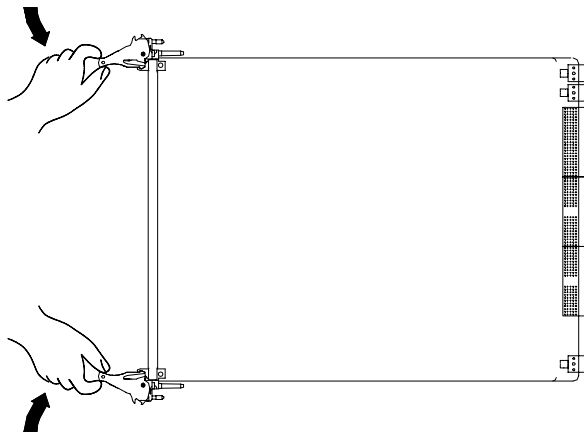


Figure 3-13 Installing a board (2)

- 8) Tighten the screws clockwise on the front panel. See Figure 3-14.

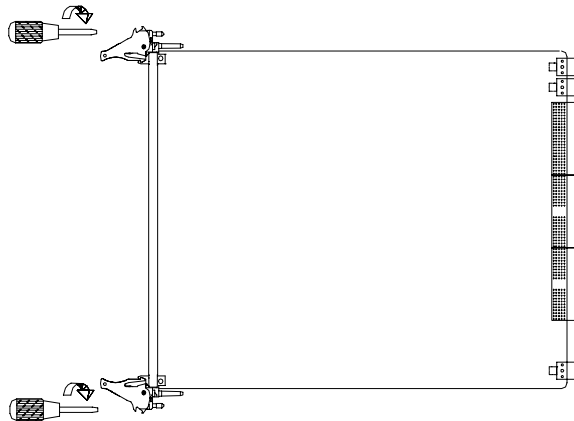


Figure 3-14 Installing a board (3)

3.4.2 Installing Modules in RF Subrack

Modules in the RF subrack include CCDU, CTRM/CMTR, CMPA/CHPA. Their installation procedures are similar.



Caution:

The transmit and receive performance of the BTS may degrade if the screws are fastened before the CTRM/CMTR, CCDU, and other RF modules are placed in position.

To install a module in the RF subrack, proceed as follows:

- 1) Check the cleanness of the subrack and clean it up.
- 2) Wear the antistatic wrist strap.
- 3) Align the RF module with the relevant subrack.
- 4) Insert the module gently along the corresponding guide rail until resistance is felt.
- 5) Fasten all screws onto the panel one by one and ensure that the module panel is in seamless contact with the cabinet subrack.
- 6) Mount the RF fan module onto the front panel of the RF module.
- 7) Fasten the screws appropriately on the front panel of the RF fan module.

Note:

The modules are removed in the reverse order of installing them.

3.4.3 Installing Power Module

The power module includes DC/DC unit, AC/DC unit and PMU. Their installation procedures are similar.

To install a power module, proceed as follows:

- 1) Clean up the cabinet and the subrack.
- 2) Wear the antistatic wrist strap.
- 3) Remove the dummy panel.
- 4) Align the board with the corresponding guide rail according to the board name on the nameplate.
- 5) Insert the board along the corresponding guide rail until resistance is felt.
- 6) Tighten the captive screws on the panel.

Note:

- Upon the installation of the PSU_{AC/DC}, an anti-slip lock instead of captive screws is used. Turn the anti-slip lock on the panel to a side with the lock icon to fix PSU_{AC/DC}.
 - The upper and lower subracks must have the same number of PSU_{AC/DC} modules no matter whether the power supply is the three-phase or single-phase one.
 - Never tighten the captive screw by force if it is too tight to screw down. If necessary, reinstall the module and align the mounting holes in the module with those in the subrack.
-

3.4.4 Installing Built-in Batteries

The built-in batteries are installed after the batteries are connected with each other. For installation method, see section 5.10, "Installing Built-in Batteries".

 **Note:**

If the battery power is available, built-in batteries can be spared.

3.4.5 Installing Built-in Transmission Equipment

The BTS3606A can employ transmission modes such as SDH, HDSL, microwave, or E1/T1. In addition to E1 transmission mode compliant with G.703 standard, it also provides space and interfaces for built-in transmission equipment. You can install the transmission equipment as needed.

The BTS3606A cabinet must meet the following requirements:

- The reserved space in the cabinet is 19 in. wide, 6 U high, and 600 mm (24 in.) deep. (1 U = 44.45 mm, IEC297)
- The cable outlets are also reserved for cables of microwave, SDH, and E1 equipment.
- The BTS3606A can provide –48 V DC power for the transmission equipment.

3.5 Installation or Removal of Auxiliary Battery Cabinet Doors

The front and rear doors of the auxiliary battery cabinet have been installed before delivery. During the installation and maintenance of the cabinet, it is not necessary to reinstall the rear door.

The following introduces how to open the front door and how to remove the rear door. The installation procedures of the rear door are reverse of the removal procedures. After finishing the installation, turn the burglary-resisting handle back to the original position.

3.5.1 Opening the Front Door

 **Caution:**

Before closing the door, lift and slide the support bar along the rail.

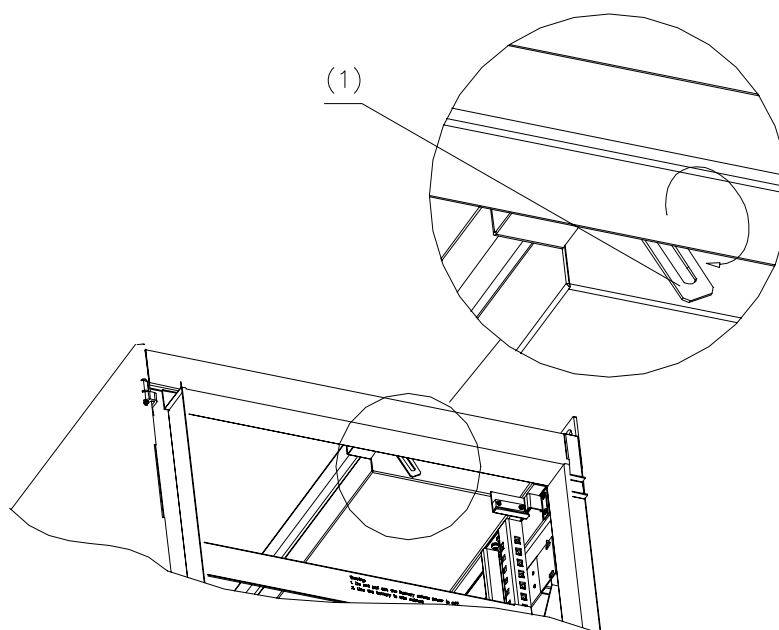
To open the front door, proceed as follows:

- 1) Unlock the door with the key.
- 2) Pull the handle outwards to open the door.
- 3) Move the support bar along a rail to the end.
- 4) Fasten the front door.

3.5.2 Removing the Rear Door

To remove the rear door, proceed as follows:

- 1) Rotate burglary-resisting handle from the front door to unlock the rear door, as shown in Figure 3-15.



(1) Lock of the rear door

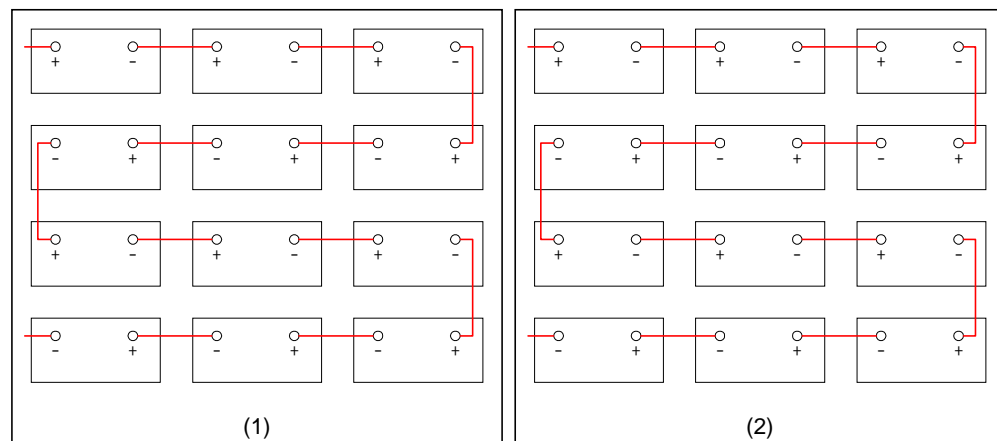
Figure 3-15 Unlocking the rear door

- 2) Unscrew the four M6 bolts on the panel of the rear door.
- 3) Put aside the bolts.
- 4) Remove the rear door.

3.6 Installation of Batteries in Auxiliary Battery Cabinet

 **Caution:**

Arrange the batteries according to the positive and negative terminals as shown in Figure 3-16. Otherwise, it is possible that the battery cables cannot be connected properly.



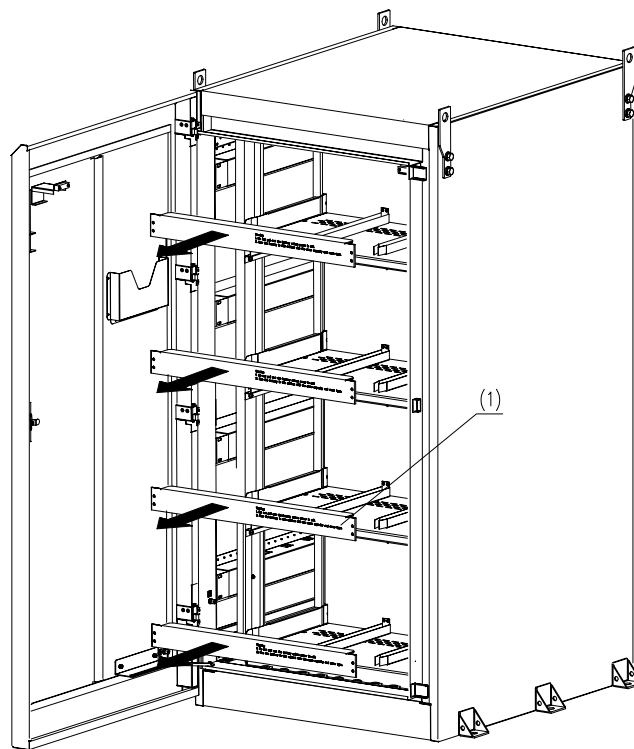
(1) Front view

(2) Rear view

Figure 3-16 Installing batteries

To install batteries in an auxiliary battery cabinet, proceed as follows:

- 1) Remove the baffle plates in front of each battery subrack, as shown in Figure 3-17.



(1) Baffle plate

Figure 3-17 Removing baffle plates

- 2) Put the batteries into the cabinet. Be sure that the side of the battery with connecting terminals must face outward.
- 3) Install the baffle plates in front of the subrack to prevent the batteries from falling down.

3.7 Illustration of Cabinets After Installed on Cement Plinth

Figure 3-18 illustrates the BTS3606A cabinet after it is installed on the cement plinth.

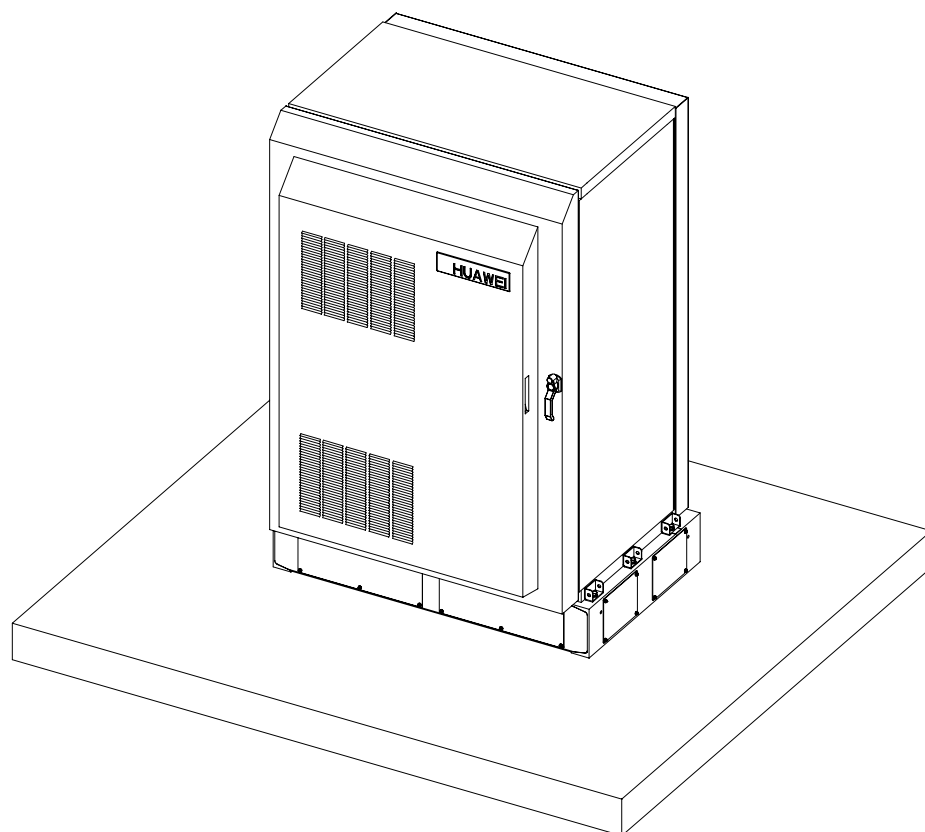


Figure 3-18 BTS3606A cabinet installed on cement plinth

Figure 3-19 illustrates the auxiliary battery cabinet after it is installed on the cement plinth.

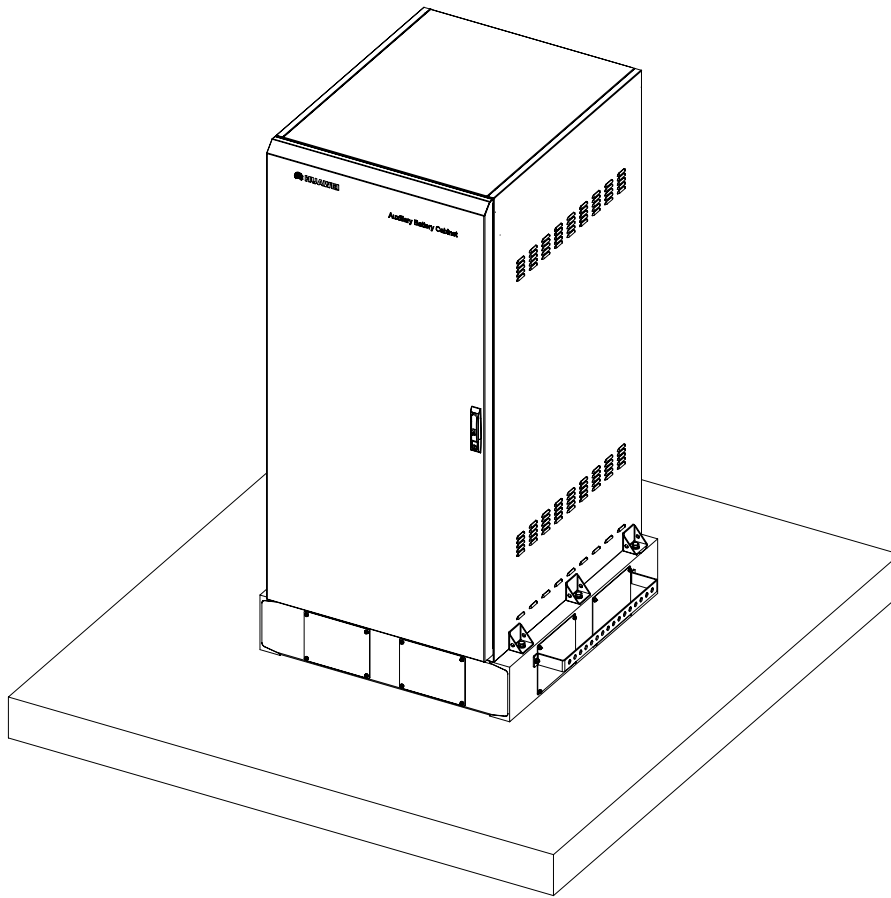


Figure 3-19 Auxiliary battery cabinet installed on cement plinth

Chapter 4 Installing Outdoor Transmission and Power Interface Boxes

This chapter introduces the functional structure of the outdoor transmission and power interface boxes and their installation procedures.

4.1 Introduction to Outdoor Transmission and Power Interface Boxes

This section introduces the structure and components of the outdoor transmission and power interface boxes.

4.1.1 Outdoor Transmission Interface Box

There are two types of TSI-DDF/ODF transmission interface box:

- 75Ω transmission interface box
- 120Ω transmission interface box

Figure 4-1 shows the structure of a 75Ω transmission interface box.

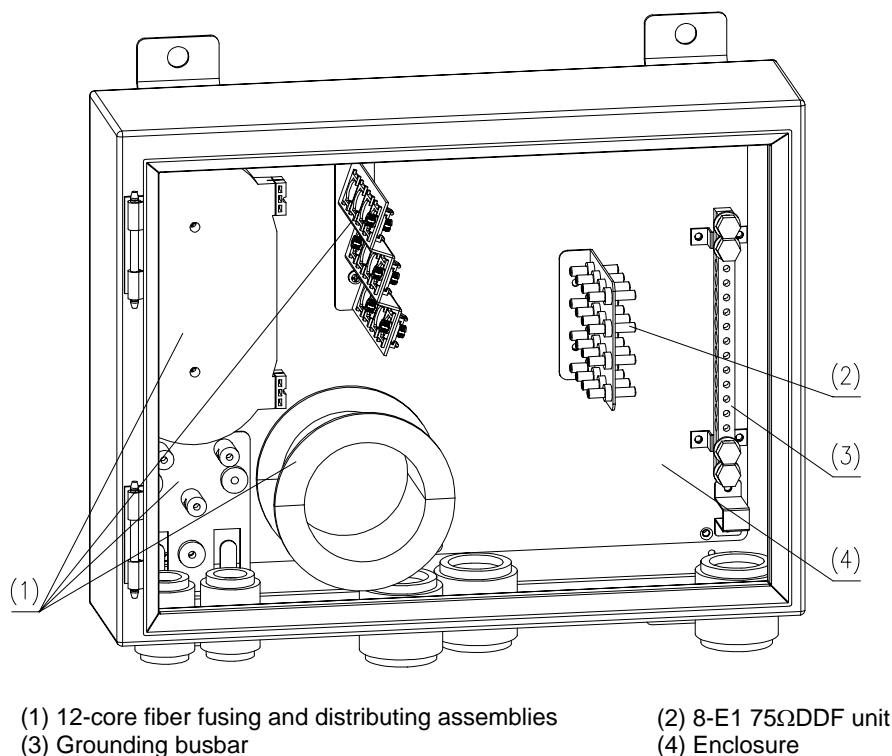
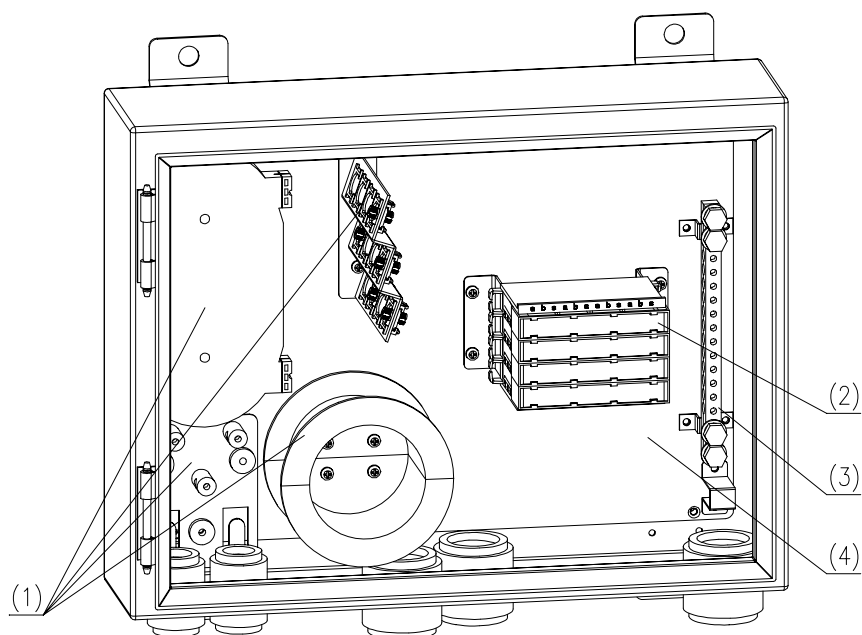


Figure 4-1 Structure of 75Ω transmission interface box

Figure 4-2 shows the structure of a 120Ω transmission interface box.



- (1) 12-core fiber fusing and distributing assemblies (2) 8-E1 120Ω DDF unit
(3) Grounding busbar (4) Enclosure

Figure 4-2 Structure of 120Ω transmission interface box

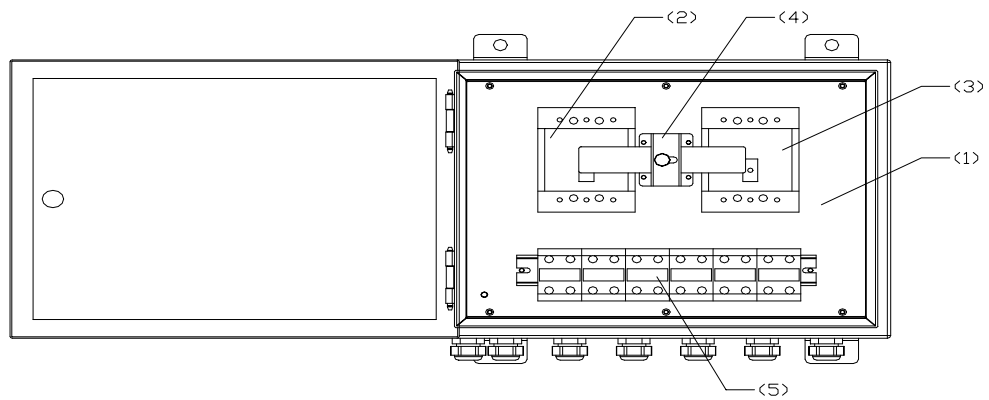
Table 4-1 lists the specifications of the transmission interface box.

Table 4-1 Specifications of the TSI-DDF/ODF transmission interface box

Name	TSI-DDF/ODF transmission interface box
Dimensions (Length x Width x Height)	420 mm (16.5 in.) x 378 mm (14.9 in.) x 125 mm (4.9 in.)
Weight (in default configuration)	4.92 kg (10.85 lb.)
Components	Enclosure
	Grounding busbar
	8-loop module bar (optional)
	75Ω DDF unit (optional)
	120Ω DDF unit (optional)
	12-core fiber fusing and distributing assemblies (optional)

4.1.2 Outdoor Power Interface Box

Figure 4-3 illustrates the structure of a power interface box.



- (1) Enclosure (2) Mains air breaker (3) Diesel air breaker
(4) Air breaker interlock device (5) Input/output terminal bar

Figure 4-3 Internal structure of PSI power interface box

Table 4-2 lists the specifications of the power interface box.

Table 4-2 Specifications of the PSI power interface box

Name	PSI power interface box
Dimensions (Length x Width x Height)	420 mm (16.5 in.) x 378 mm (14.9 in.) x 125 mm (4.9 in.)
Default configuration	Enclosure
	Mains air breaker
	Input/output terminal bar
Weight (in default configuration)	4.54 kg (10.01 lb.)
Components	Enclosure
	Mains air breaker
	Input/output terminal bar
	Diesel air breaker assemblies (optional)

Figure 4-4 shows the default configuration of the power interface box.

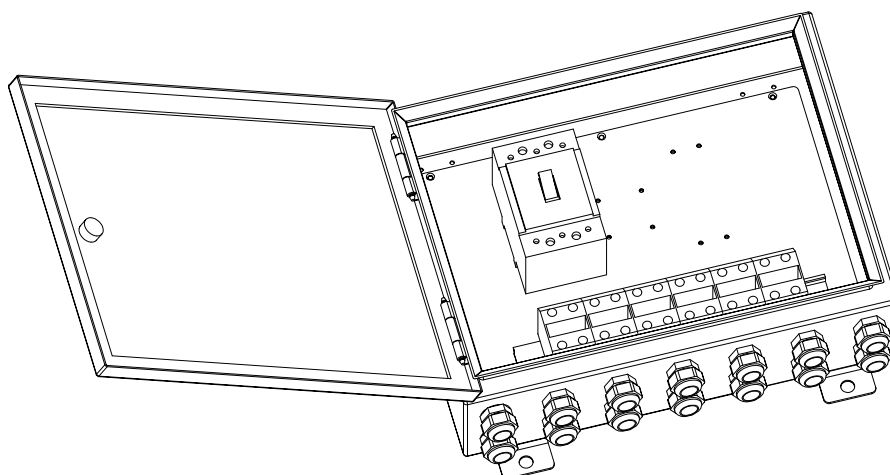


Figure 4-4 Default configuration of PSI power interface box

4.2 Installing Outdoor Transmission and Power Interface Box



Caution:

When installing the transmission interface box, the length of the cable between the box and BTS3606A cabinet must be less than 7 m (240 in.).

Since TSI-DDF/ODF transmission interface box and PSI power interface box are outdoor equipment, their enclosures can be mounted on wall or on steel pole as needed.

The following respectively introduces how to mount the transmission interface box on the wall and on the steel pole.

4.2.1 Mounting Transmission Interface Box on the Wall



Note:

Use the M8 expansion bolts to fasten the transmission interface box and the percussion drill with a $\phi 10$ drill bit to drill holes.

To install the transmission interface box on the wall, proceed as follows:

- 1) Position the transmission interface box according to the project requirement.
- 2) Stick the lineate paper template delivered with the box to the wall.
- 3) Mark installation holes of the four expansion bolts on the wall surface, as shown in Figure 4-5.

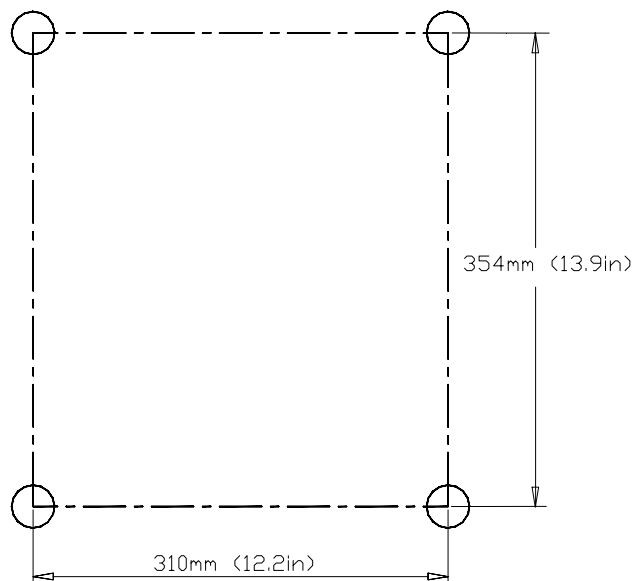
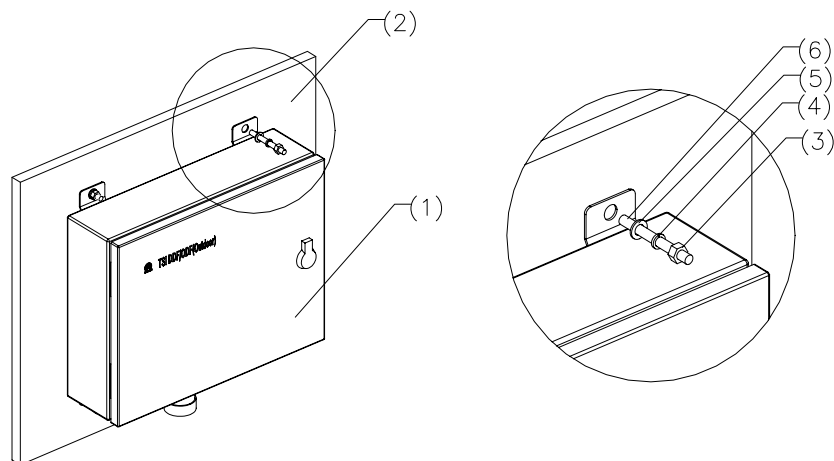


Figure 4-5 Installation holes of expansion bolts

- 4) Drill holes and install expansion bolts by following the instruction in section 2.3.4 “Drilling Holes and Installing Expansion Bolts”.
- 5) Align the four installation holes of the transmission interface box with the corresponding expansion bolts.
- 6) Lead the bolts through the corresponding holes.
- 7) Put plain washers, spring washers, and nuts onto the expansion bolts.

See Figure 4-6.



- | | |
|--------------------------------|----------------------------|
| (1) Transmission interface box | (2) Wall |
| (3) M8 nut | (4) Spring washer 8 |
| (5) Plain washer 8 | (6) M8 x 80 expansion bolt |

Figure 4-6 Mounting transmission interface box on the wall

- 8) Adjust the location of the box.
- 9) Tighten the nuts to 13.4 N m (116 in. lbs).

4.2.2 Mounting Transmission Interface Box on the Steel Pole

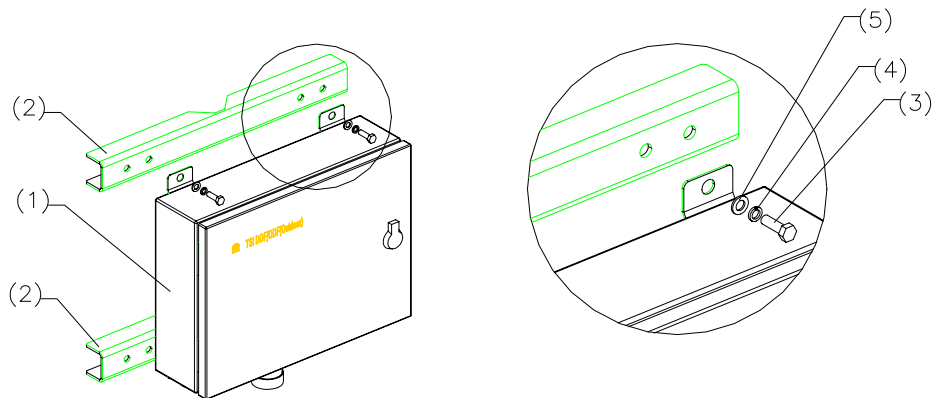


Caution:

The outer diameter of the steel pole must range from 60 mm (2.4 in.) to 114 mm (4.5 in.).

To mount the transmission interface box on the steel pole, proceed as follows:

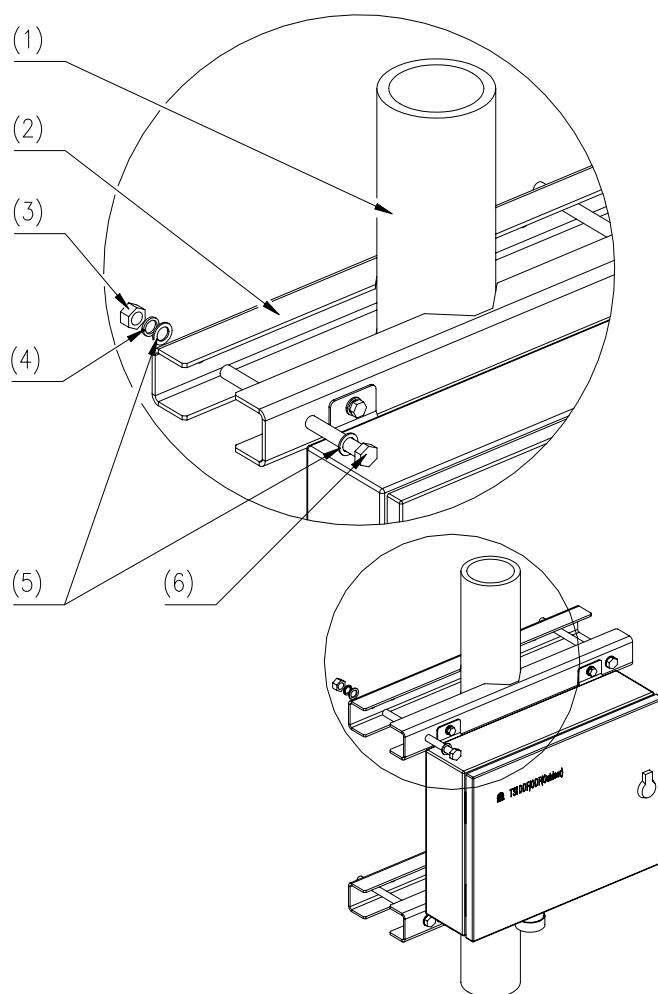
- 1) Assemble the transmission interface box and the beam using M8 x 25 bolts, spring washers, and plain washers. See Figure 4-7.



- | | |
|--|---------------------|
| (1) Outdoor transmission interface box | (2) Beam |
| (3) M8 x 25 bolt | (4) Spring washer 8 |
| (5) Plain washer 8 | |

Figure 4-7 Assembling the beam

- 2) Place the fixed beam and box on the steel pole.
- 3) Mount fasteners.
- 4) Lead a long M10 bolt through the beam and the fastener. See Figure 4-8.



- | | | |
|---------------------|----------------------|-------------------|
| (1) Steel pole | (2) Beam | (3) M10 nut |
| (4) Plain washer 10 | (5) Spring washer 10 | (6) Long M10 bolt |

Figure 4-8 Mounting transmission interface box on the steel pole

- 5) Install the plain washer, spring washer, and nut on the long bolt. See Figure 4-8.
- 6) Tighten the nut to 26.5 N·m (119.7 in. lbs) with a wrench.

4.3 Using Internal Components of Transmission Interface Box

This section explains how to use:

- 120Ω DDF unit
- 75Ω DDF unit
- Grounding busbar
- 12-core fiber fusing and distributing assemblies

4.3.1 Using 120Ω DDF Unit

To use the 120Ω DDF unit, proceed as follows:

- 1) Route cables to corresponding cable bands through the cabling holes on both sides of the 120Ω DDF unit, and then connect the cables.
- 2) Take off the identifier board on the 120Ω DDF unit while clamping cables.
Pay attention to the difference between “a”, “b”, and “s”. The “s” is a grounding cable.
- 3) After clamping cables, cover the identifier board. See Figure 4-9 and Figure 4-10.

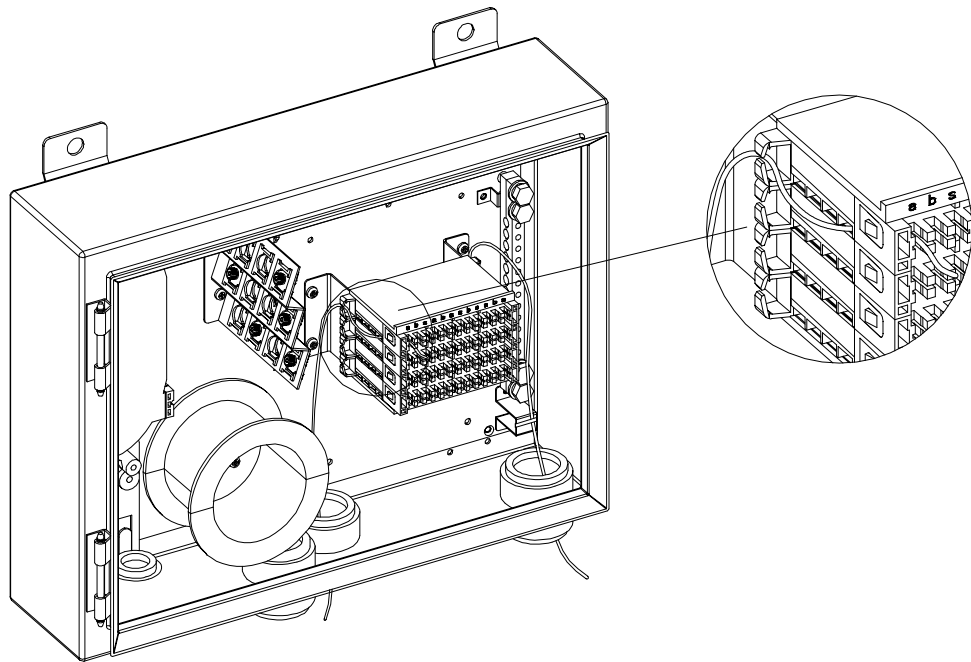


Figure 4-9 Cabling diagram after 120Ω DDF unit is installed (a)

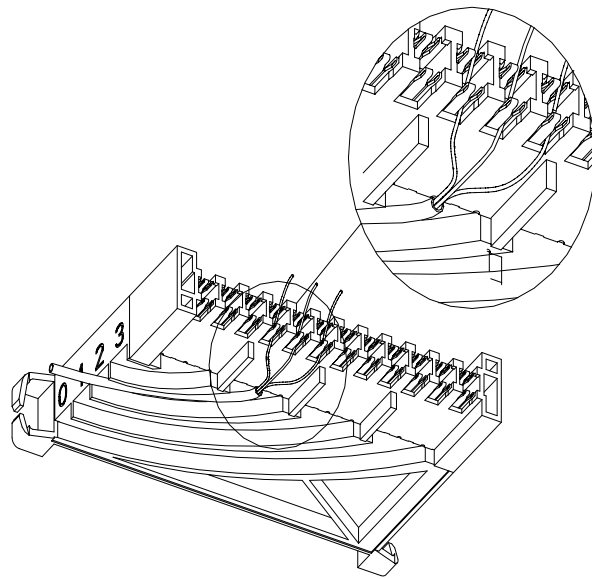


Figure 4-10 Cabling diagram after 120Ω DDF unit is installed (b)

4.3.2 Using 75Ω DDF Unit

Connect cables according to the actual requirements. Figure 4-11 illustrates the cabling diagram after the installation of the 75Ω DDF unit.

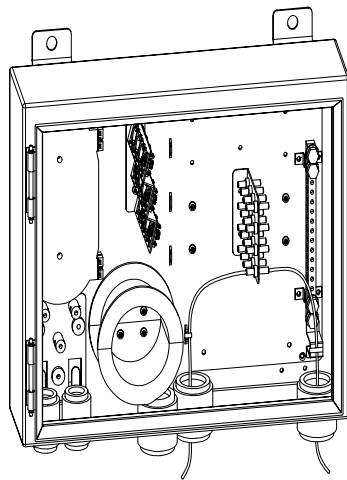


Figure 4-11 Cabling diagram after 75Ω DDF unit is installed

4.3.3 Using Grounding Busbar

Figure 4-12 shows the outline of a grounding busbar.

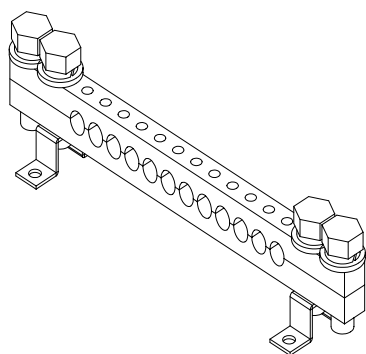


Figure 4-12 Grounding busbar

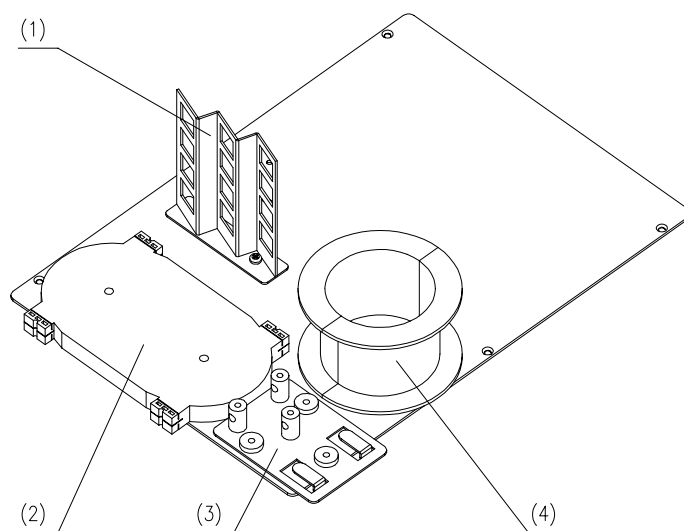
To install the grounding busbar, proceed as follows:

- 1) Loosen the fastening screw on the two ends.
- 2) Strip the shielded cable and put it in relevant slot.
- 3) Fasten the screws on both ends.
- 4) Tighten and press the screws on the corresponding slot.

4.3.4 Using 12-Core Fiber Fusing and Distributing Assemblies

Figure 4-13 shows the 12-core fiber fusing and distributing assemblies, including:

- One optical fiber fixture
- One 12-core optical fiber fusing box
- One 12-core optical fiber adapter installation support
- Two semi-circular fiber management tray



- (1) 12-core optical fiber adapter installation support (2) 12-core optical fiber fusing box
(3) Optical fiber fixture (4) Semi-circular fiber management tray

Figure 4-13 Structure of 12-core fiber fusing and distributing assemblies

To use the 12-core fiber fusing and distributing assemblies, proceed as follows:

- 1) Lead the optical fiber through the waterproof locknut at the cable inlet and then into the enclosure.
- 2) On the optical fiber fixture, fix and strip the optical fiber, and then ground the core.
- 3) Take protective measures for the naked fiber coming out from the optical fiber fixture, then coil it on the 12-core optical fiber fusing box, and fuse it with the tail fiber.
- 4) Lead the tail fiber from the optical fiber fusing box to the cable distribution unit (that is, 12-core optical fiber adapter installation support) to connect it with the adapter of the cable distribution unit.
- 5) Lead the fiber jumper from the equipment through the fiber access saddle to the fiber management tray and coil it.
- 6) Route the fiber jumper into the cable distribution unit to connect with the tail fiber, as shown in Figure 4-14.

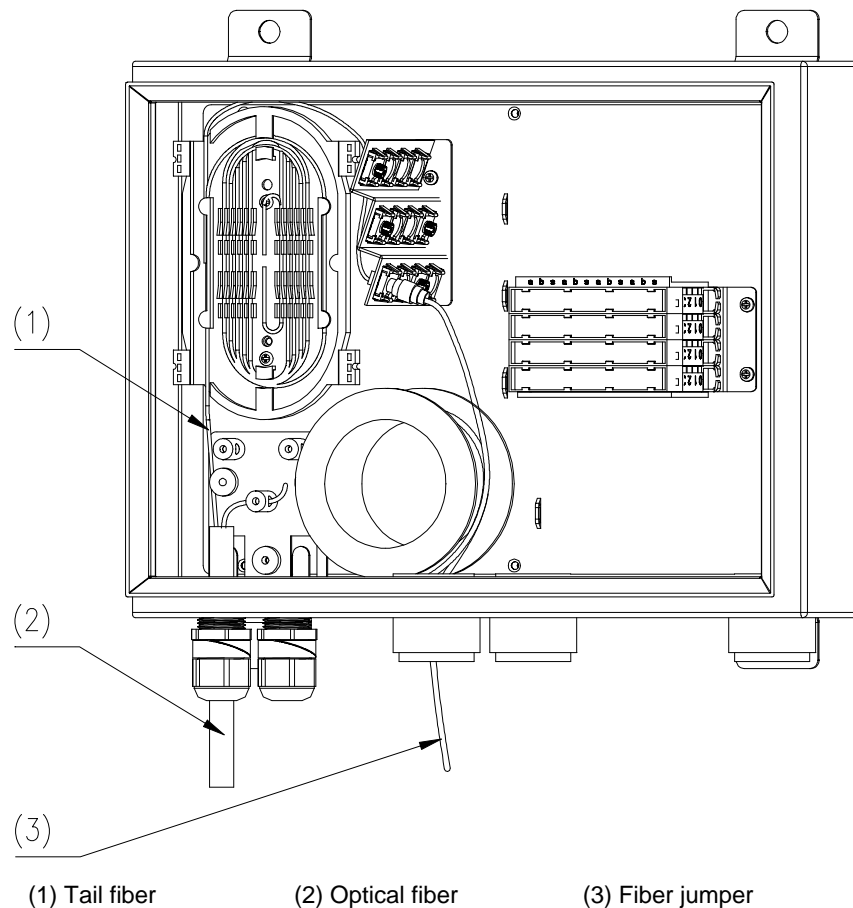


Figure 4-14 Cabling diagram after 12-core fiber fusing and distributing assemblies are installed

4.4 Installing Outdoor Power Input Components

This section explains how to install:

- Diesel air breaker assemblies
- Grounding cable for enclosure
- Input components of single-phase mains and diesel
- Single-phase mains input components
- Input components of three-phase mains and diesel
- Three-phase mains input components

4.4.1 Installing Diesel Air Breaker Assemblies

Diesel air breaker assemblies include diesel air breaker and air breaker interlock device. When the power is supplied through a diesel, you need to install air breakers, air breaker interlock device, and auxiliary internal connection cables on site.

Note:

The air breaker interlock device is designed to ensure that either of the two air breakers is opened in any case.

To mount the diesel air breaker assemblies, proceed as follows:

- 1) Fasten the diesel air breaker onto the enclosure with screws. See Figure 4-15.

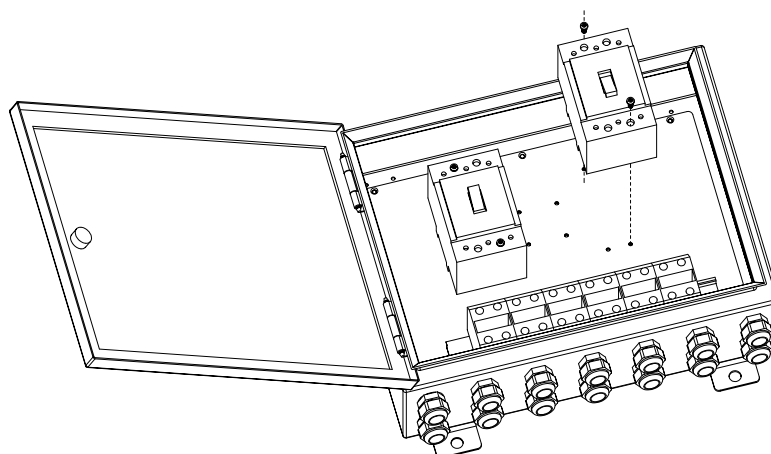
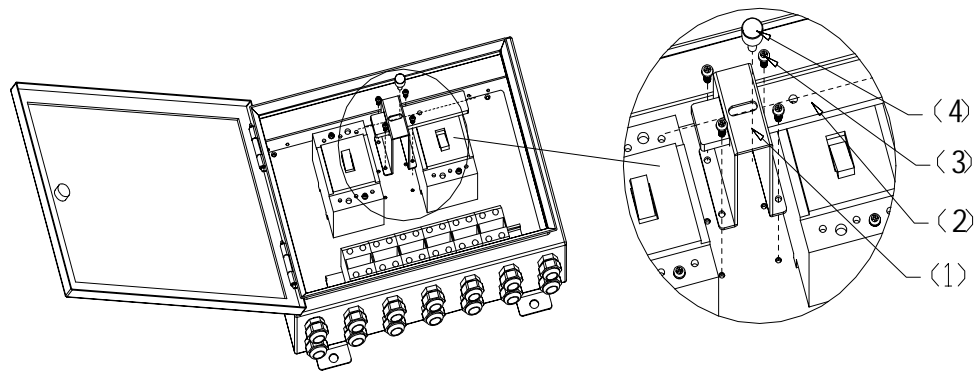


Figure 4-15 Mounting diesel air breaker

- 2) Mount the support of the air breaker interlock device onto the enclosure with screws.
- 3) Lock the sliding block with locknuts. See Figure 4-16.



(1) Support (2) Gliding block (3) Screw (4) Nut

Figure 4-16 Mounting air breaker interlock device

- 4) Loosen locknuts.
- 5) Move the sliding block right and left, and adjust one air breaker until it is closed.
- 6) Tighten the locknuts. See Figure 4-17.

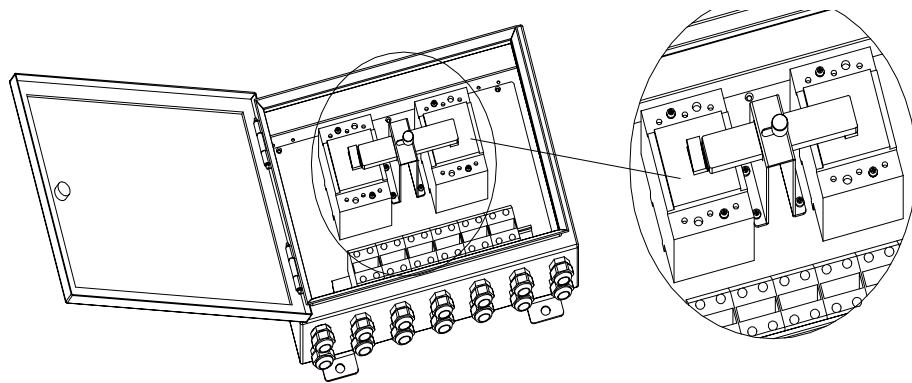
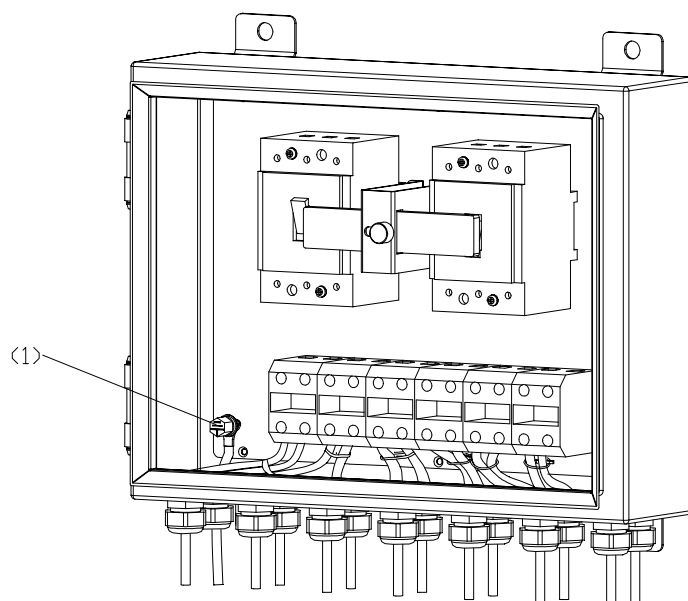


Figure 4-17 Operating air breaker interlock device

4.4.2 Installing Grounding Cable for Enclosure

After installing power interface box, you need to ground the enclosure. Figure 4-18 illustrates the grounding point and cable bundling.



(1) Grounding nut

Figure 4-18 Installing grounding cable for enclosure

4.4.3 Installing Input Components of Single-phase Mains and Diesel

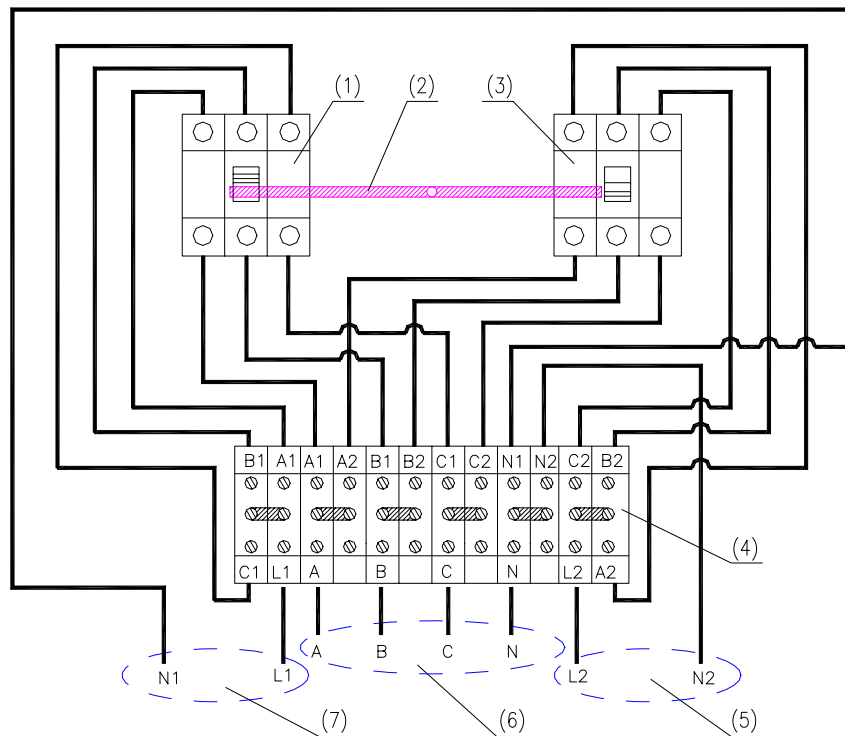


Caution:

Make sure that the connection of neutral line (N) and live line (L) are correct. If they are inversely connected, accidents may result.

To install input components of single-phase mains and diesel, proceed as follows:

- 1) Unpack the power interface box and the air breaker assemblies of the diesel.
- 2) Check that enclosure, mains air breaker, diesel air breaker, air breaker interlock device, and input/output terminal block are all available.
- 3) Mount the diesel air breaker assemblies onto the enclosure by following the instruction in section 4.4 "Installing Outdoor Power Input Components".
- 4) Connect the load live line to terminal A, B, or C, and the neutral line to terminal N, as shown in Figure 4-19.



- (1) Mains input air breaker (2) Air breaker interlock device
 (3) Single-phase diesel input air breaker (4) Connecting busbar
 (5) Single-phase diesel input (6) Power output (7) Mains input

Figure 4-19 Input of single-phase mains and diesel

- 5) Connect the neutral line for mains input to terminal N1, and the live line to terminal L1, as shown in Figure 4-19.
- 6) Connect the neutral line for diesel input to terminal N2, and the live line to terminal L2, as shown in Figure 4-19.

4.4.4 Installing Single-phase Mains Input Components



Caution:

Make sure that the connections of neutral line (N) and live line (L) are correct. If they are inversely connected, accident may result.

To install the single-phase mains input components, proceed as follows:

- 1) Unpack the power interface box.
- 2) Check that enclosure, mains air breaker, and input/output terminal block are all available.
- 3) Connect the load live line to terminal A, B, or C, and the neutral line to terminal N, as shown in Figure 4-20.

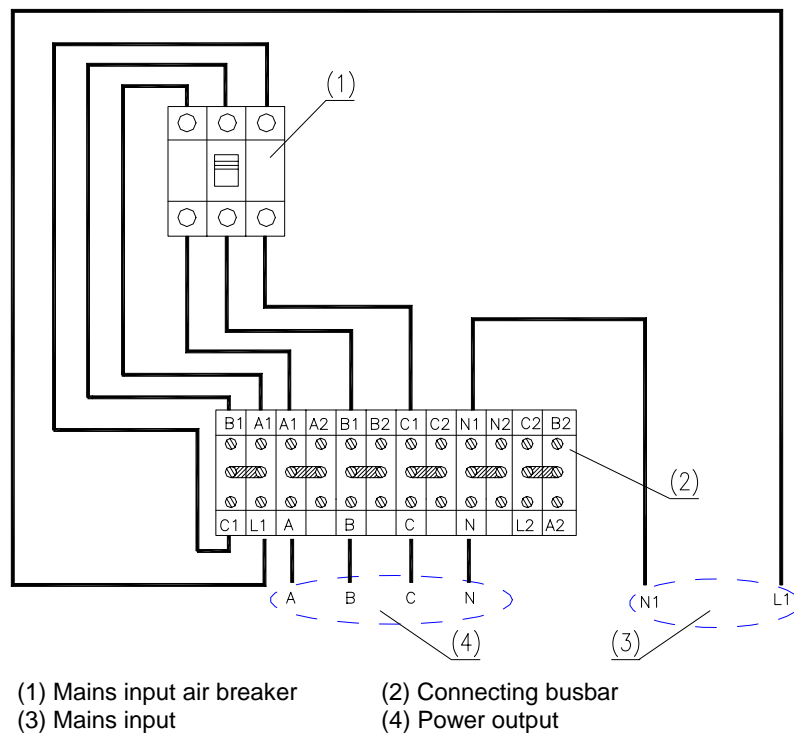


Figure 4-20 Input of single-phase mains

- 4) Connect the neutral line for mains input to terminal N1, and the live line to terminal L1, as shown in Figure 4-20.

4.4.5 Installing Input Components of Three-phase Mains and Diesel

To install the input components of three-phase mains and diesel, proceed as follows:

- 1) Unpack the power interface box and the air breaker assemblies of the diesel.
- 2) Check that enclosure, mains air breaker, diesel air breaker, air breaker interlock device, and input/output terminal block are all available.
- 3) Mount the diesel air breaker assemblies onto the enclosure by following the instruction in section 4.4 "Installing Outdoor Power Input Components".
- 4) Lead phase-A, phase-B, and phase-C wires in the corresponding output terminals among A, B, and C respectively, as shown in Figure 4-21.

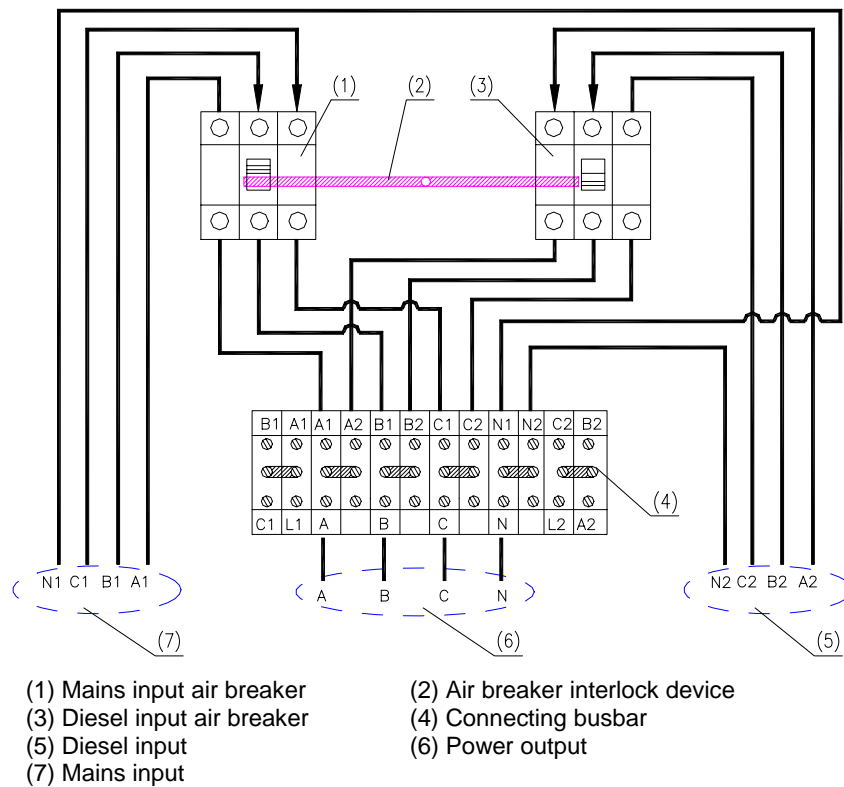


Figure 4-21 Input of three-phase mains and three-phase diesel

- 5) Connect the neutral line to terminal N, as shown in Figure 4-21.
- 6) Lead the mains input in the input terminal of the mains input air breaker directly, as shown in Figure 4-21.
 - a) Lead the neutral line of the mains input in the neutral input terminal N1 for the mains input.
 - b) Lead phase-A, phase-B, and phase-C wires of the mains input respectively in corresponding input terminals A1, B1, and C1 for the mains input.
- 7) Lead the diesel input in the input terminal of its air breaker directly, as illustrated in Figure 4-21.
 - a) Lead the neutral line of the generator input in the neutral input terminal N2 for the diesel input.
 - b) Lead phase-A, phase-B, and phase-C wires of the generator input respectively in the corresponding input terminals A1, B2, and C2 for the diesel input.

4.4.6 Installing Three-phase Mains Input Components

To install the three-phase mains input components, proceed as follows:

- 1) Unpack the power interface box.
- 2) Check that enclosure, mains air breaker, and input/output terminal block are all available.

- 3) Lead phase-A, phase-B, and phase-C wires in the corresponding output terminals among A, B, and C respectively, as shown in Figure 4-22.

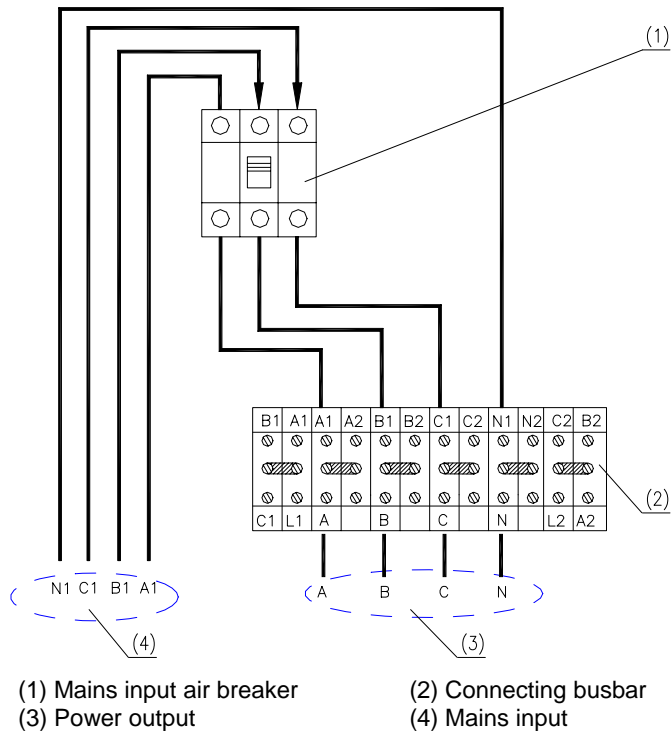


Figure 4-22 Input of three-phase mains

- 4) Connect the neutral line to neutral line output terminal N, as shown in Figure 4-22.
- 5) Lead the mains input in the input terminal of the mains input air breaker directly, as illustrated in Figure 4-22.
- Lead the neutral line of the mains input in the neutral input terminal N1 for the mains input.
 - Lead phase-A, phase-B, and phase-C wires of the mains input respectively in corresponding input terminals A1, B1, and C1 for the mains input.

Chapter 5 Installing Cables

This chapter introduces the cables used for deployment of the BTS3606A and their installation procedures.

5.1 Types of Cables and Related Concepts

This section introduces the cables used for BTS3606A deployment, and concepts of cable inlet and cable distribution region, and then provides cabling diagrams.

5.1.1 Types of Cables for BTS3606A Deployment

Table 5-1 lists cables used for BTS3606A deployment.

Table 5-1 Cables to be installed for deployment

Type of cable	Description	Color	Specification
RF cable	Jumper between CDU/DFU/DDU and the front inlet of the cabinet	Black	1/4 in. DIN connectors on both ends of the cable. The DIN-male connector connects to the CDU/DFU/DDU.
	Jumper between the inlet of the cabinet and the feeder	Black	1/2 in. Din connector on both ends of the cable.
	RF cable between CDDU/CHPA/CTRM	Black	1/4 in. The two ends of a RF cable are DIN connectors. The external connector is a DIN-female connector.
	RF cable between CDDU/CMPA/CMTR	Black	1/4 in. The two ends of a RF cable are DIN connectors. The external connector is a DIN-female connector.
Transmission cable	75Ω E1	White	75Ω coaxial cable
	120Ω E1	White	120Ω twisted pair
	100Ω T1	White	100Ω twisted pair

Type of cable	Description	Color	Specification
Optical fiber	Single-mode optical fiber, connecting ODU3601C externally	Orange	2 x Φ 2 mm (0.08 in.)
GPS/ GLONASS cable	GPS/GLONASS synchronous clock cable (inside the cabinet)	Black	Φ 4 mm (0.16 in.) (The external connector is an N-female one.)
	GPS/GLONASS synchronous clock cable (outside the cabinet)	Black	1/4 in. One end is an N-male connector, and the other end is an N-female connector.
Power cable	Two-phase power cable (110 V), including two cable L and one cable N.	L: Red N: black	L: 35 mm ² (41.86 ft ²) (cross-sectional area) N: 35 mm ² (41.86 ft ²) (cross-sectional area)
	Three-phase power cable (220 V), including three cable L and one cable N	L: Red N: black	L: 16 mm ² (19.14 ft ²) (cross-sectional area) N: 25 mm ² (29.9 ft ²) (cross-sectional area)
	One-phase power cable(220 V), including one cable L and one cable N	L: Red N: black	L: 25 mm ² (29.9 ft ²) (cross-sectional area) N: 25 mm ² (29.9 ft ²) (cross-sectional area)
Cabinet PGND cable	PGND cable	Yellow-green	Cross-sectional area: 25 mm ² (29.9 ft ²)

Type of cable	Description	Color	Specification
Storage battery cable	Internal connection cable of the storage battery box	Provided by battery suppliers	Cross-sectional area: 25 mm ² (29.9 ft ²)
	Internal –48 V GND power cable from the storage battery to the fuse and internal –48 V power cable from the fuse to the power subrack	–48 V GND: Black –48 V: Blue	Cross-sectional area: 25 mm ² (29.9 ft ²)
	Internal alarm cable of the storage-battery box	White	External diameter: Φ 4 mm (0.08 in.)
	External power cable from the extended battery cabinet to the basic cabinet	–48 GND: Black –48 V: Blue	Cross-sectional area: 35 mm ² (41.86 ft ²)
	External equipotential PGND cable from the extended battery cabinet to the basic cabinet	Yellow-green	Cross-sectional area: 35 mm ² (41.86 ft ²)
	External access alarm cable and temperature alarm cable of the extended battery cabinet	4-core cables including black, white, red, and green cables. The white and green cables are used to connect the access control cable. The red and black cables are used to connect the temperature sensor cable.	–

Note:

- This manual does not describe cables in the cabinet backplane as they are connected before delivery.
 - For installation procedure of the feeder, see *Airbridge BTS3606&3606A CDMA Base Station Installation Manual – Antenna & Feeder Installation*.
 - The specifications of the feeder and the jumper between the cabinet cable inlet and the feeder depend on the antenna configured.
-

5.1.2 Related Concepts

This section explains the concepts of the cable inlet and cable distribution region.

I. Cable Inlet

Cable inlet is the entrance where the cables are led into the cabinet.

All external cables of the BTS3606A are led into the cabinet from the inlets on the front part at the bottom of the cabinet.

II. Cable Distribution Region

Cable distribution region refers to the area where external cables connect to the BTS3606A cabinet.

The BTS3606A cabinet allows front maintenance. Except that RF cables and GPS/GLONASS synchronous clock jumpers, all cables are led in from the inlets on the front part at the bottom of the cabinet.

5.2 Cabling Diagram



Caution:

- Ensure that the power supply is off before installing cables. Hot-line operation is prohibited.
 - The installation sequence of cables depends on the onsite situation.
-

Figure 5-1 shows the front cabling diagram of the BTS3606A cabinet and Figure 5-2 the rear cabling diagram of the BTS3606A cabinet. These two diagrams describe reference positions of all cables.

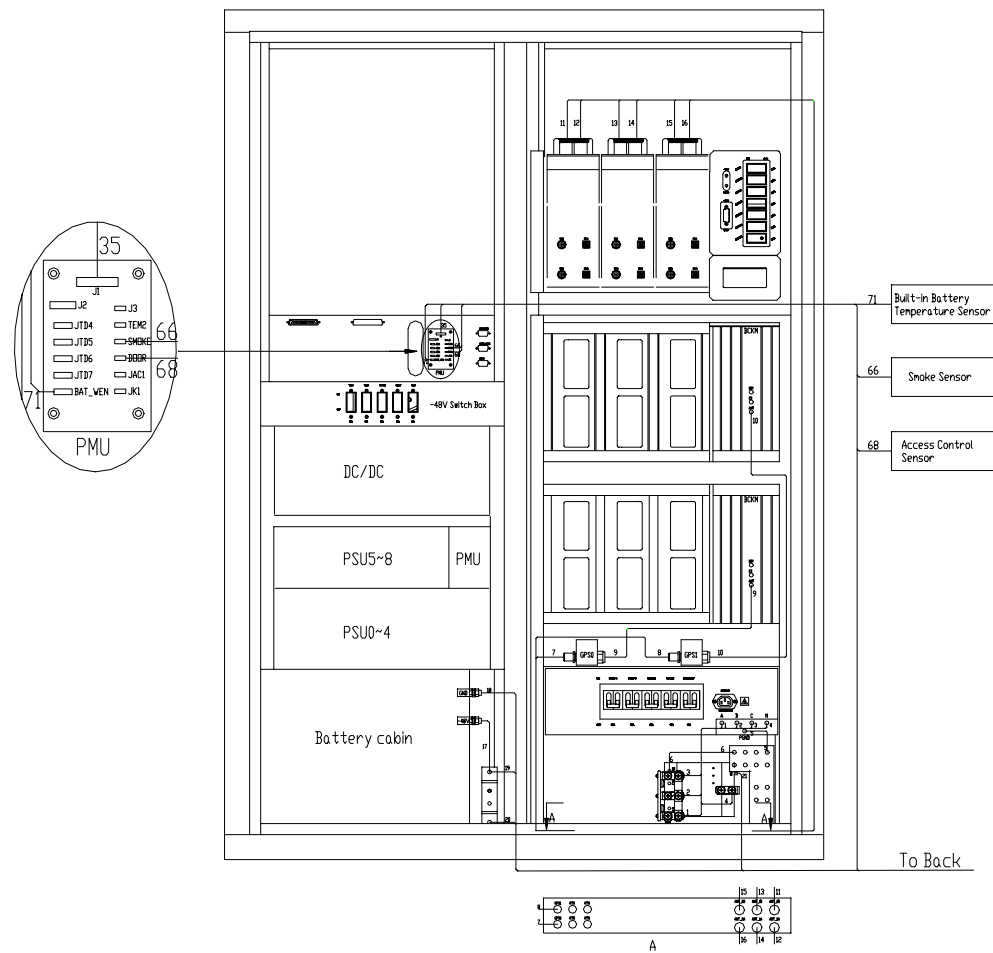


Figure 5-1 Front cabling diagram of the BTS3606A cabinet

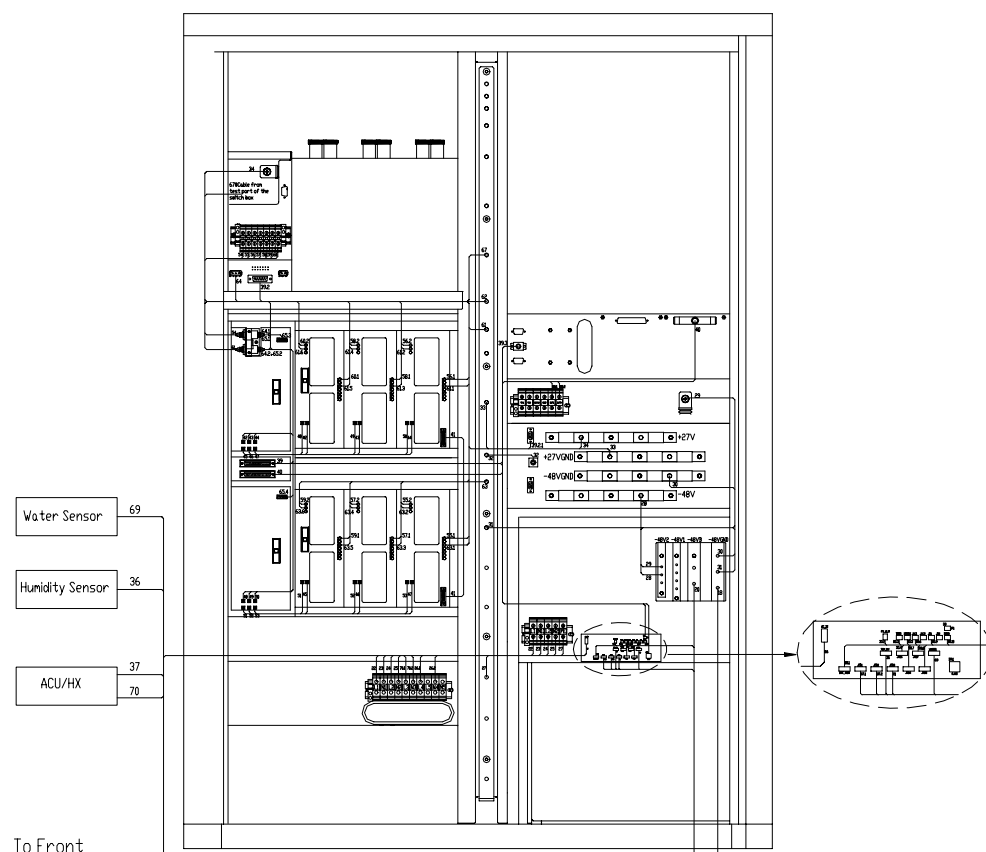


Figure 5-2 Rear cabling diagram of the BTS3606A cabinet

Table 5-2 details the cable numbering scheme.

Table 5-2 BTS3606A cable numbering scheme

Cable No.	Cable name
5 and 32	PGND cable of AC filter
6 and 27	PGND cable
62 and 63	+27 V GND input cable of RF module
20	–48 V power cable from the PSU _{AC/DC} subrack to the fuse
42 – 53	RF cable
41	Serial-port cable of RF subrack
55	+27 V power input cable of CRFM0
56	+27 V power input cable of CRFM1
57	+27 V power input cable of CRFM2
58	+27 V power input cable of CRFM3
59	+27 V power input cable of CRFM4

Cable No.	Cable name
60	+27 V power input cable of CRFM5
64	Power input cable of baseband fan box
65	Power input cable of the baseband subrack
54	+27 V power input cable of the baseband filter
26	L1-phase test alarm cable
38	Signal cable of the battery control switch
36	Alarm cable of the humidity sensor
66	Alarm cable of the smoke sensor
21	Alarm cable of the AC lightning arrester
37	Air conditioner alarm cable
19	Fuse alarm cable
1 – 4	Power cable from the lightning arrester to the AC filter
22 – 25	Power cable from the AC power distribution box to the PSU _{AC/DC} subrack
28	–48 V power cable from PSU _{AC/DC} subrack to the PSU _{DC/DC} subrack
31 and 30	–48 V GND cable
29	–48 V power cable from the PSU _{AC/DC} subrack to the –48 V switch box
33	+27 V GND cable
35	Alarm cable from the conversion board to the PMU
7 – 10	GPS RF cable
34	+27 V power cable
11 – 16	Antenna jumper
40	E1/T1 cable
67	Power cable on the test port of the +27 V switch box
61	+27 V GND input cable of baseband filter
39	Alarm cable of baseband subrack
18	–48 V GND cable from the PSU _{AC/DC} subrack to the battery
17	–48 V power cable from the fuse to the battery

5.3 Installing RF Cables

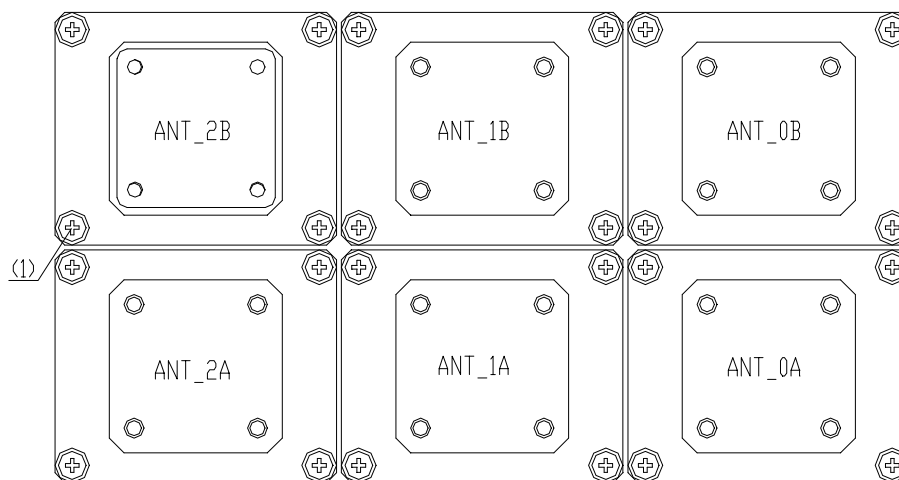
The RF cables to be installed on site include:

- RF jumper to feeder
- RF cables between CDDU/CHPA/CTRM (single-channel)
- RF cables between CDDU/CMPA/CMTR (multi-channel)

5.3.1 Connecting RF Jumper to Feeder

If the BTS3606A operates in diversity receiving mode using two antennas, the connecting procedure is as follows:

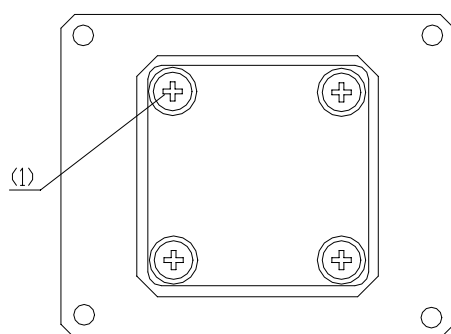
- 1) Remove all screws on the inlet/outlet and keep them properly, as shown in Figure 5-3.



(1) Screws on the inlet/outlet

Figure 5-3 Inlet/outlet of RF cables

- 2) Turn over the inlet/outlet panel, as shown in Figure 5-4.

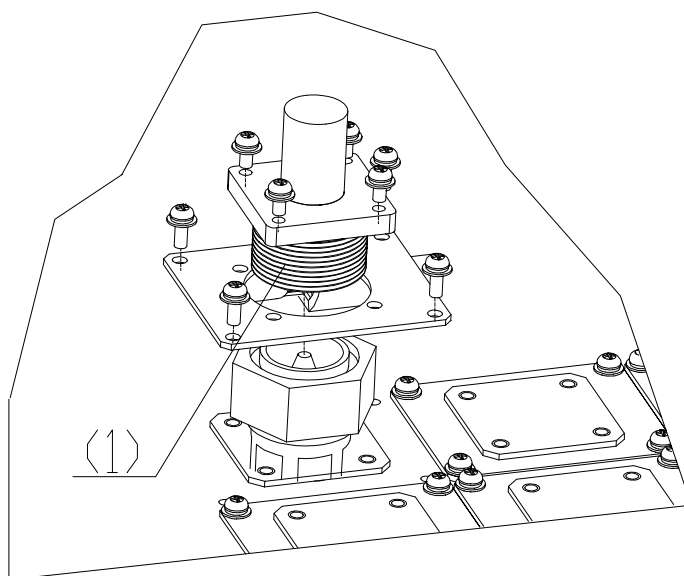


(1) Internal screws on the inlet/outlet

Figure 5-4 Inlet/outlet panel after turnover

- 3) Remove the four screws inside, as shown in Figure 5-4.
- 4) Lead the Din connector of the RF jumper to the inlet according to the inlet ID and connect it to the feeder under the base.

- 5) Coat the silicon gel on the connector for waterproof treatment, as shown in Figure 5-5.



(1) Wiping the silicon gel

Figure 5-5 Installing RF cables

- 6) Place the inlet panel back to its original position after installation.
- 7) Fasten screws and make waterproof treatment.
- 8) Connect the other end of the RF jumper inside the cabinet to GPS_1 and GPS_2 of the CDDU on the top of the cabinet according to the numbering of the jumper.
- 9) Repeat the above procedure to finish the connection of the reset RF jumpers.

5.3.2 Installing RF Cable Between CDDU/CHPA/CTRM (Single-Channel)

The connection of RF cables varies with the configurations of RF modules. Table 5-3 lists the typical configuration of a single cabinet.

Table 5-3 Typical configuration of a single cabinet

Typical configuration	Quantity of CDDU	Quantity of CHPA	Diversity LNA status in CTRM	Quantity of CPCM
O(1)	1	1	Normal amplification	–
O(2)	1	2	Bypass	–
S(1/1/1)	3	3	Normal amplification	–
S(2/2/2)	3	6	Bypass	–

Typical configuration	Quantity of CDDU	Quantity of CHPA	Diversity LNA status in CTRM	Quantity of CPCM
O(1) power synthesis	1	2	Normal amplification	1
S(1/1/1) power synthesis	3	6	Normal amplification	3

 **Caution:**

Watch out for the sharp edges on the RF fan panel during the installation of RF cables lest it hurt your fingers.

When installing the RF cable, connect connectors not used to the matched load and secure the connector of the RF cable.

Fasten the connector of the jumper gently using a wrench. Ensure that each connector is well connected.

Avoid bending cables in a small radian. The bending radius must be more than 30 mm (0.12 in.). Try to lay cables in parallel to make them tidy.

Following describes the connection of RF cables in various typical configurations.

I. O(1) Configuration

The O(1) refers to an omni cell with one carrier.

Figure 5-6 shows RF cable connections, indicated by the blue lines.

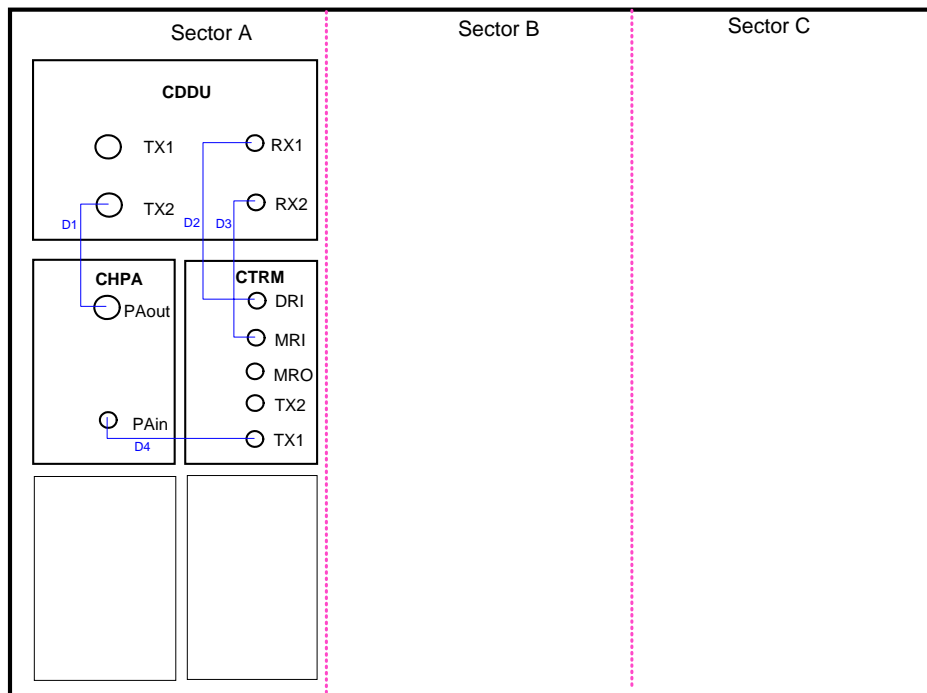


Figure 5-6 O(1) configuration

II. O(2) Configuration

The O(2) refers to an omni cell with two carriers.

Figure 5-7 shows RF cable connections, indicated by the blue lines.

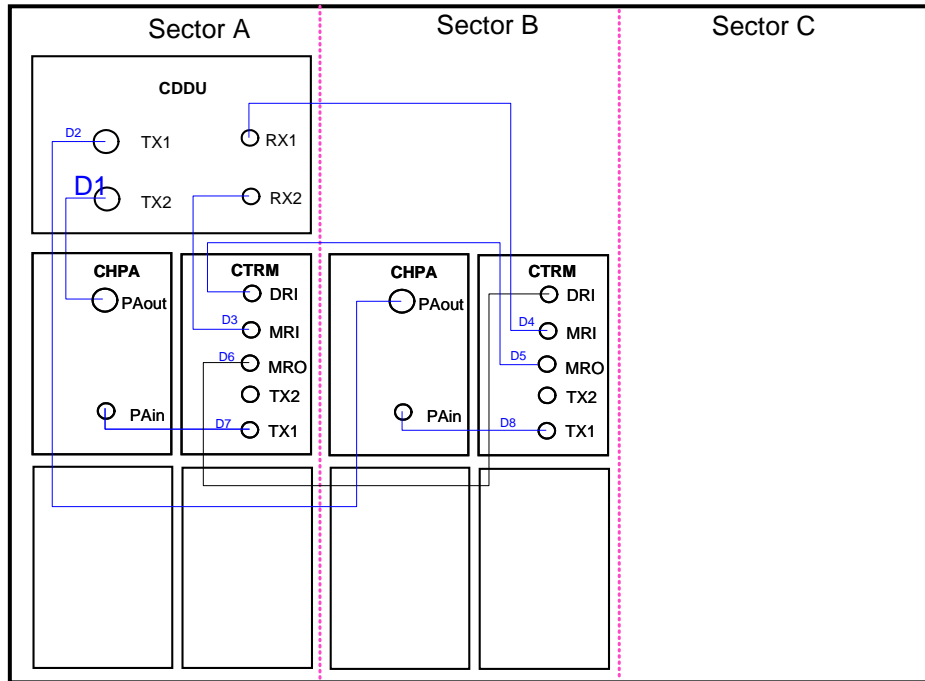


Figure 5-7 O(2) configuration

III. S(1/1/1) Configuration

The S(1/1/1) refers to three sectors, each of which is configured with one carrier.

Figure 5-8 shows RF cable connections, indicated by the blue lines.

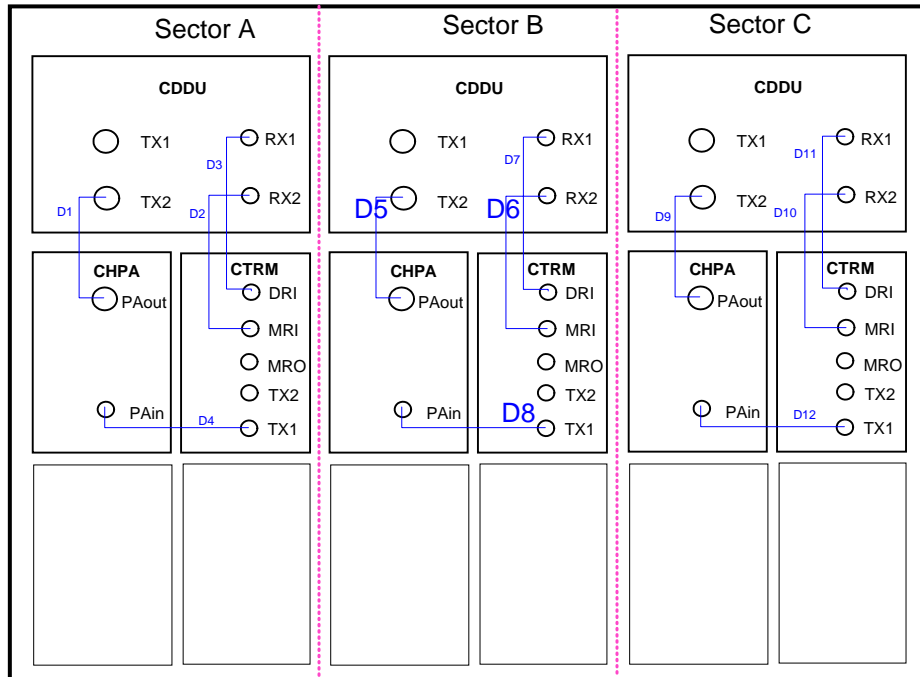


Figure 5-8 S(1/1/1) configuration

IV. S(2/2/2) Configuration

The S(2/2/2) refers to three sectors, each configured with two carriers.

Figure 5-9 shows RF cable connections, indicated by the blue lines.

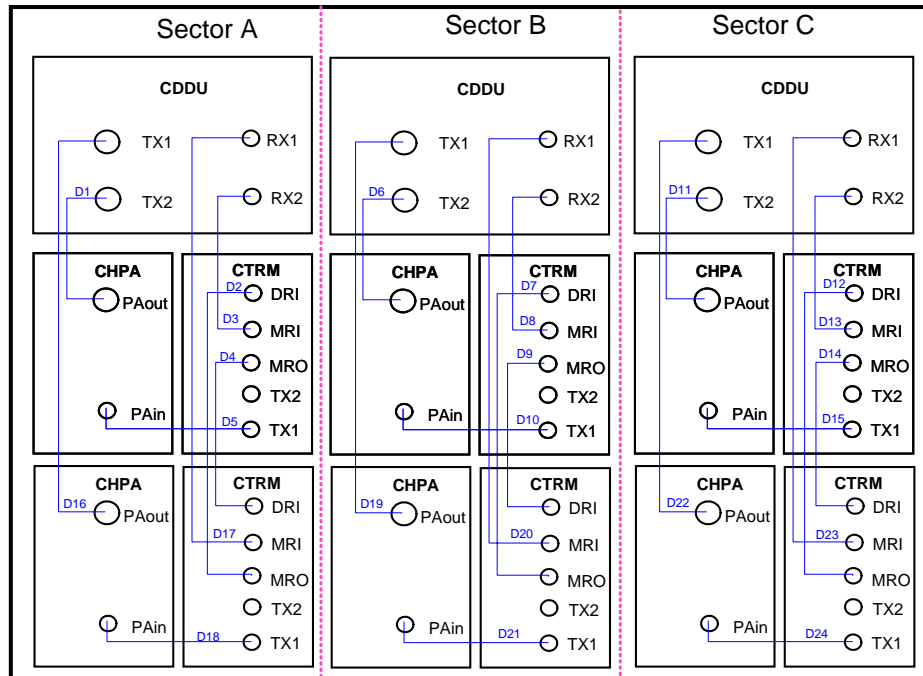


Figure 5-9 S(2/2/2) configuration

V. O(1) Power Synthesis

Figure 5-10 illustrates the connections of RF cables for the power synthesis in the case of O(1) configuration. The connections are indicated by blue lines.

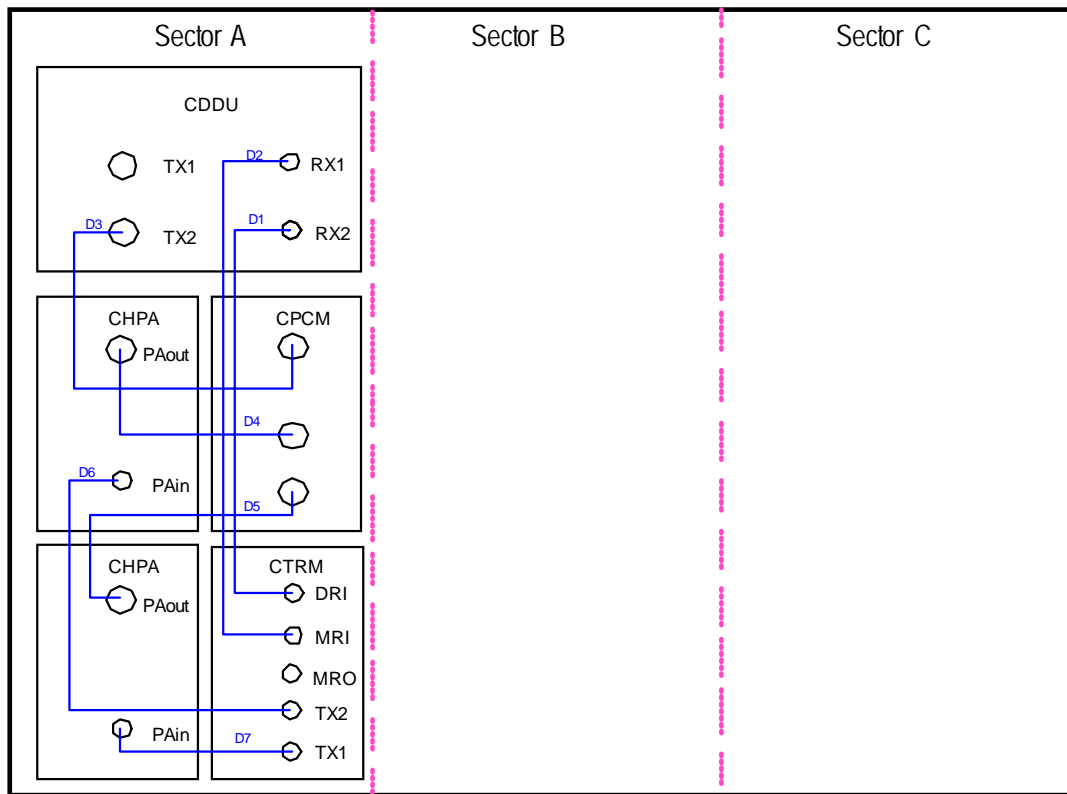


Figure 5-10 O(1) power synthesis

VI. S(1/1/1) Power Synthesis

Figure 5-11 illustrates the connections of RF cables for the power synthesis in the case of S(1/1/1) configuration. The connections are indicated by blue lines.

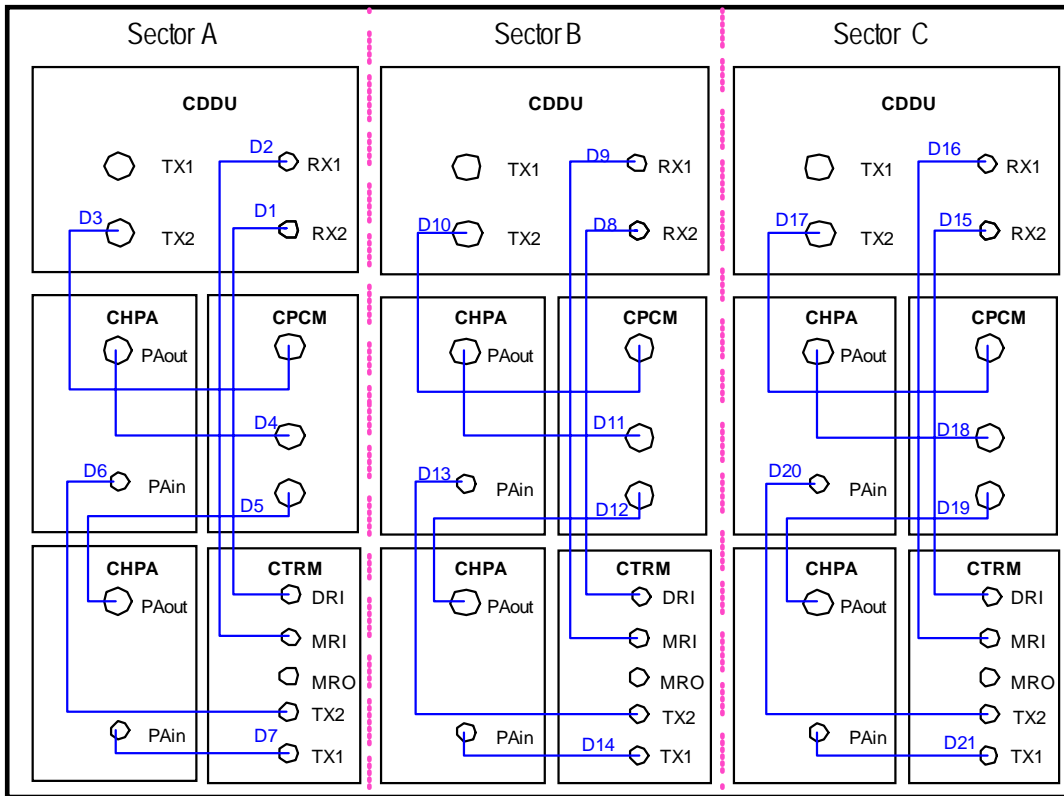


Figure 5-11 S(1/1/1) power synthesis

5.3.3 Installing RF Cable Between CDDU/CHPA/CTRM (Multi-Channel)

To enable the BTS3606 to support the multi-channel mode, replace the CHPAs with the CMPAs and the CTRMs with the CMTRs

Note:

If the BTS3606 supports the multi-channel mode, it does not support the power synthesis function.

The following describes the connections of the RF cables in various typical configurations.

I. O(1) Configuration

The O(1) refers to an omni cell with one carrier. Figure 5-12 shows RF cable connections, indicated by blue lines.

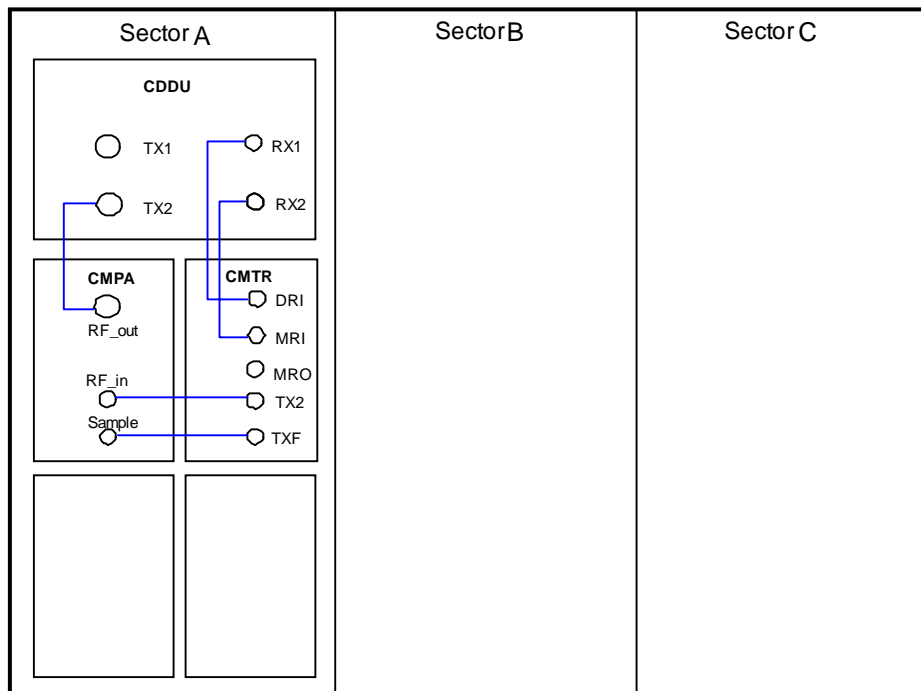


Figure 5-12 O(1) configuration

II. O(2) Configuration

The O(2) refers to an omni cell with two carriers. Figure 5-13 shows RF cable connections, indicated by blue lines.

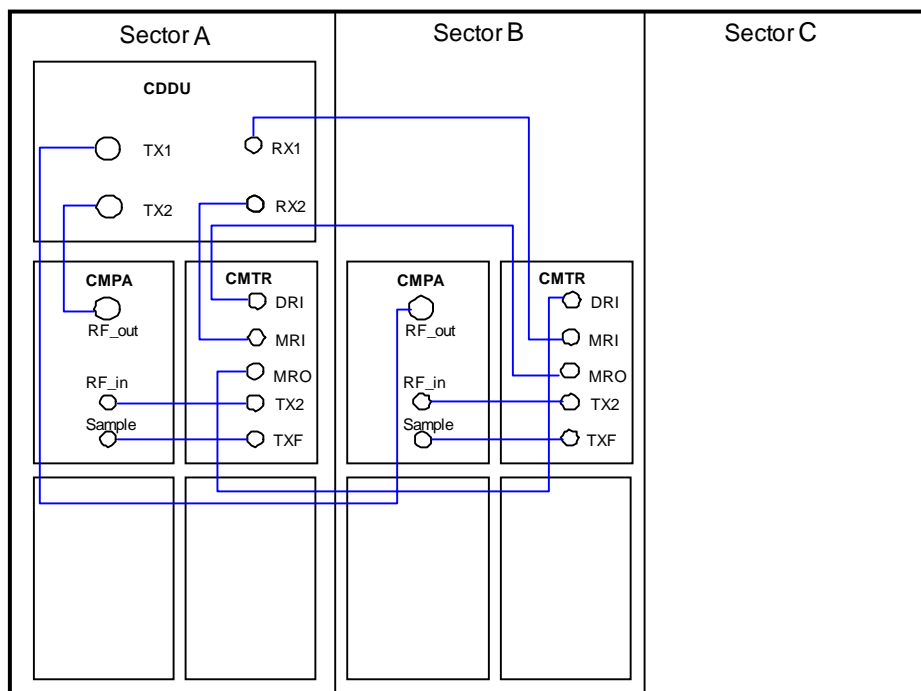


Figure 5-13 O(2) configuration

III. S(1/1/1), Low-Power S(2/2/2), and Low-Power S(3/3/3) Configurations

Figure 5-14 shows RF cable connections for the S(1/1/1) configuration, indicated by blue lines. RF cable connections for the low-power S(2/2/2) configuration and low-power S(3/3/3) are the same as that for S(1/1/1) configuration, but the settings of software parameters are different.

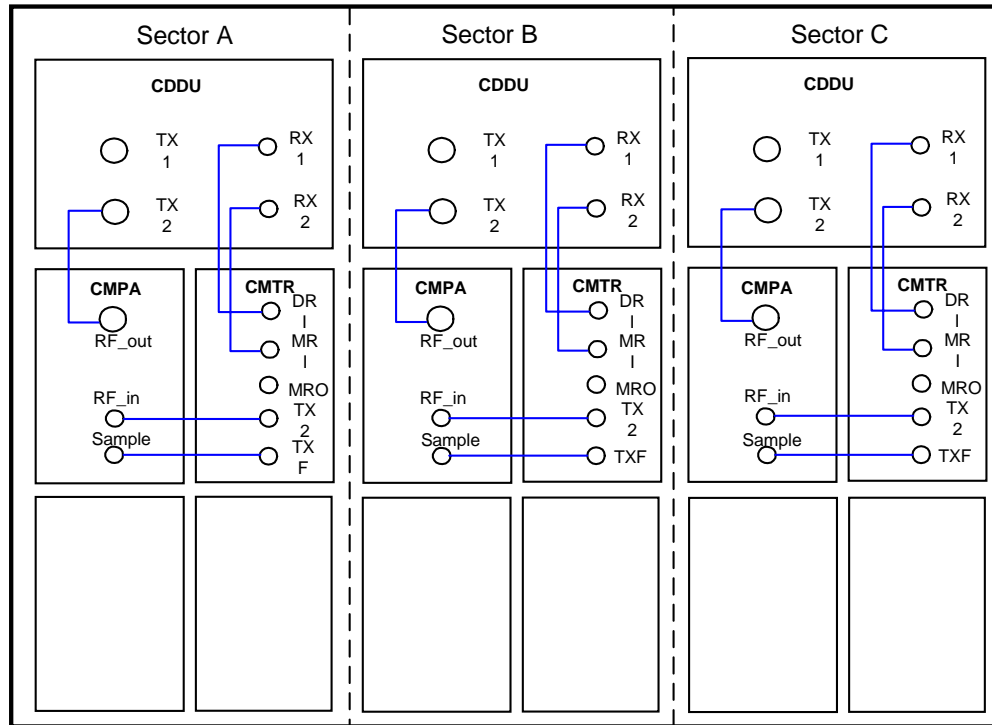


Figure 5-14 S(1/1/1), Low-Power S(2/2/2), and Low-Power S(3/3/3) configuration

IV. High-Power S(2/2/2), High-Power S(3/3/3), S(4/4/4), S(5/5/5), and S(6/6/6) Configurations

Figure 5-15 shows RF cable connections for the high-power S(2/2/2) configuration, indicated by blue lines. RF cable connections for the rest configurations are the same as that for the high-power S(2/2/2) configuration, but the settings of software parameters are different.

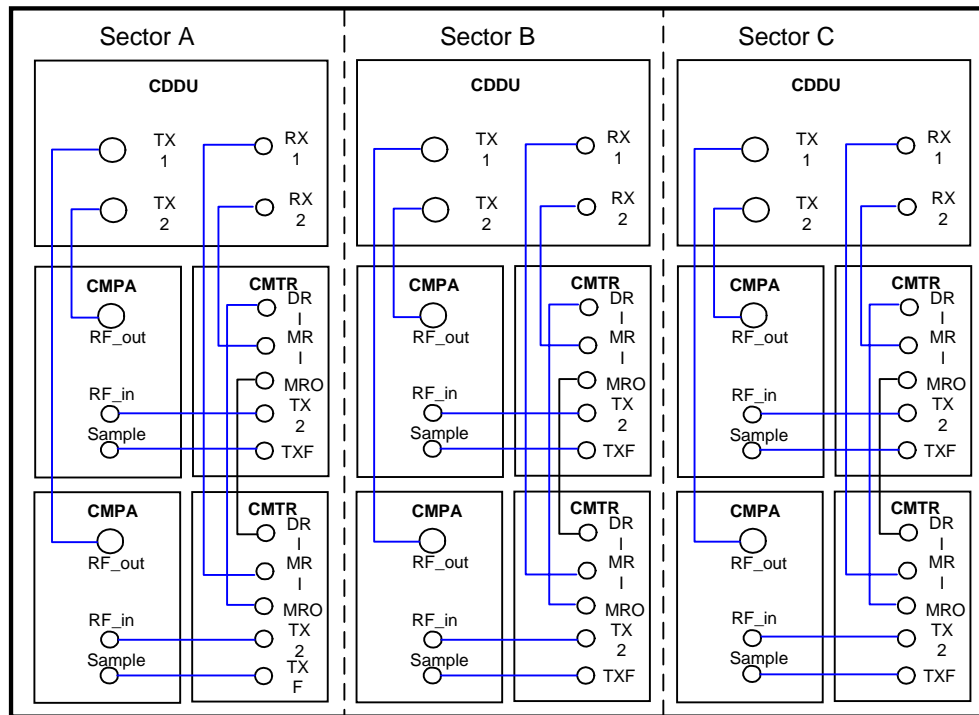


Figure 5-15 High-Power S(2/2/2), High-Power S(3/3/3), S(4/4/4), S(5/5/5), and S(6/6/6) configuration

5.4 Installing E1/T1 Cables

The installation of E1/T1 cables involves the following tasks:

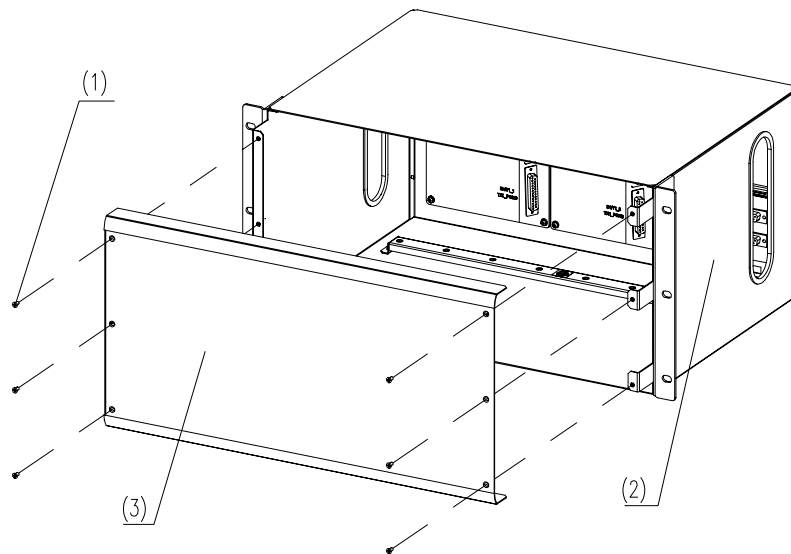
- Planning the installation position of E1/T1 cables
- Waterproofing E1/T1 cables
- Shielding E1/T1 cables
- Connecting E1/T1 cables

This section describes these four steps in detail.

5.4.1 Planning Installation Position of E1/T1 Cables

To plan the installation position of E1/T1 cables, proceed as follows:

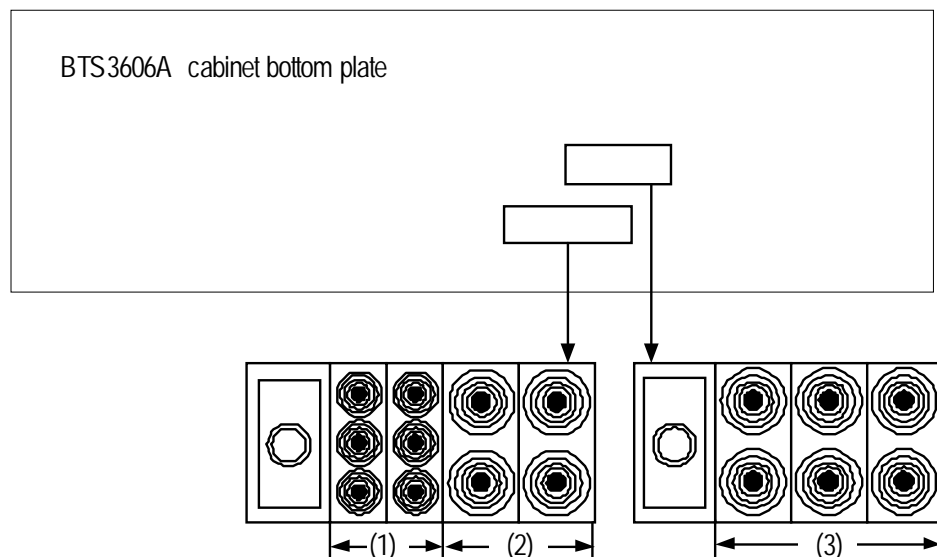
- 1) Remove the front panel of the lightning protection box, as shown in Figure 5-16.



(1) M3 screw (2) Lightning protection box (3) Front panel

Figure 5-16 Removing front panel of lightning protection box (for E1/T1 cable installation)

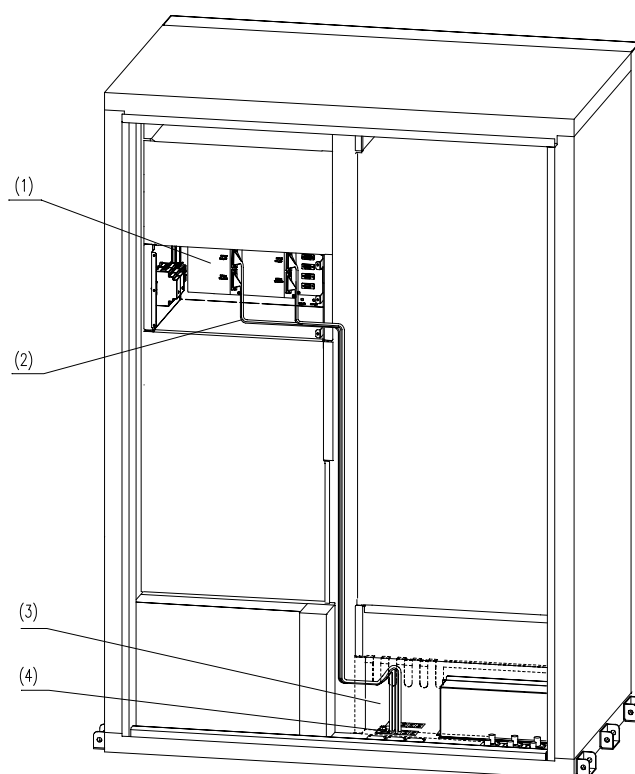
- 2) Determine the positions of waterproof modules for E1/T1 cables led into the cabinet, as shown in Figure 5-17.



(1) Installation position of E1/T1 cable and optical fiber
(2) Installation position of GPS clock cable or signal cable (optional)
(3) Installation position of signal cable (optional)

Figure 5-17 Distribution of waterproof components at the cabinet bottom

- 3) Cut E1/T1 cables according to the actual cabling path.
- 4) Route the E1/T1 cables as shown in Figure 5-18 in compliance with cabling principles.



(1) NESP (2) E1/T1 cable (3) Baffle at cable access area
(4) Waterproof module

Figure 5-18 Routing E1/T1 cables

- 5) Position the cables and bundle them onto the cabling rack in the cabinet.

5.4.2 Installing Waterproof Components

You must waterproof E1/T1 cables using waterproof components. This section introduces the composition and installation tools and principles of waterproof components.

I. Introduction to Waterproof Components

Waterproof components consist of the following parts:

- 1) Frame

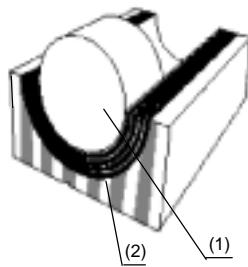
The frame is already installed at the bottom of the BTS3606A cabinet.

- 2) Sealing module

Sealing modules are made of blue rubber and used to separate cables. There are two types of sealing modules: common sealing module and filler module.

- Common sealing module

Figure 5-19 is the cross-sectional view of half a common sealing module.



(1) Filling (2) Core layer

Figure 5-19 Sealing module

Take out the filling when you install cables. You need to put it in the sealing module when you are not using the module to separate cables.

The core layer is blue and black multi-layer rubber. You can strip each layer by hand until the internal diameter of the module fits the cable, as shown in Figure 5-20.

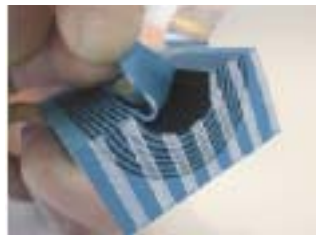
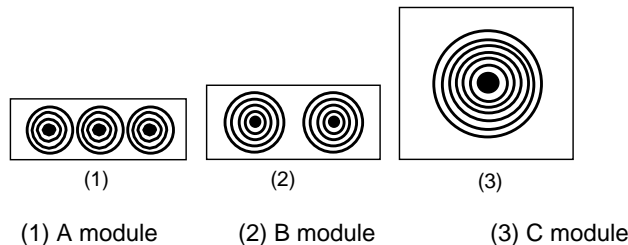


Figure 5-20 Stripping the core layer of the sealing module

There are three types of sealing modules:

- CM 15w40: 15 mm (0.59 in.) x 40 mm (1.6 in.) x 30 mm (1.2 in.) (Length x Width x Depth)
- CM 20w40: 20 mm (0.08 in.) x 40 mm (1.6 in.) x 30 mm (1.2 in.) (Length x Width x Depth)
- CM 30w40: 30 mm (1.2 in.) x 40 mm (1.6 in.) x 30 mm (1.2 in.) (Length x Width x Depth)

Figure 5-21 shows different types of common sealing modules.



(1) A module (2) B module (3) C module

Figure 5-21 Front view of common sealing module

Table 5-4 lists the specifications of these three modules and their functions.

Table 5-4 Specifications of common sealing module

Type	Available diameter of cables (mm)	Function	Quantity per cabinet
A module	3.7 mm to 9.7 mm (0.15 in. to 0.38 in.)	Separates optical fiber and alarm cables	2
B module	3.7 mm to 13.5 mm (0.15 in. to 0.53 in.)	Separates E1 and microwave transmission cables	8
C module	11.5 mm to 22.5 mm (0.45 in. to 0.89 in.)	Separates external power cables and PGND cables	9

- Filler module

The filler module is used to fill the space where cables are not routed through on the frame. Figure 5-22 shows the appearance of a filler module.

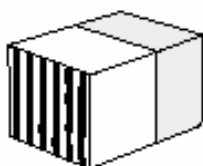


Figure 5-22 Filler module

There are two types of filler modules. Table 5-5 lists their differences.

Table 5-5 Filler module specifications

Specifications	Dimensions (Length x Width x Depth)	Quantity per cabinet
Type 1	5mm x 40mm x 30mm (0.2 in. x 1.6 in. x 1.2 in.)	1
Type 2	10mm x 40mm x 30mm (0.4 in. x 1.6 in. x 1.2 in.)	3

3) Fastening Module

The fastening module is an auxiliary part of the waterproof frame. It is used to lock all the modules on the frame to ensure a sound waterproof effect. Figure 5-23 shows the appearance of a fastening module.



(1) Nut after the module is fastened

Figure 5-23 Fastening module

II. Installation Tools and Installation Requirements

To install the waterproof components, you need to use dedicated tools and note the installation requirements.

- Installation tools

Lubricant is used for installing waterproof components.

Apply lubricant on the sealing module and the subrack where the module is installed to help inserting the module into the subrack.

To apply lubricant, proceed as follows:

- a) Use your index finger to press the bottom of the tube.
- b) Squeeze the lubricant out and apply it to the surface of the components, as shown in Figure 5-24.

You can also use your hand to daub the lubricant directly.

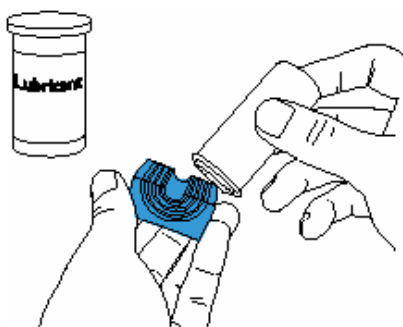


Figure 5-24 Lubricant

- Installation requirements

When installing the waterproof assemblies, note the following requirements:

- When installing the sealing modules and cables, install the sealing module far away from the fastening module first and finally the one closest to the fastening module.

- A lot of cable installation positions are reserved in areas 3 and 4. You can lead in the cable through the nearest sealing module.
- If no cable needs to be routed through the installation position reserved, you can replace the common sealing module with the filler module.
- Never miss any module or install the wrong module.
- Use the remaining filler modules for pre-pressing the module.

III. Installation Procedure

 **Caution:**

- Waterproof components take effect 24 hours later after they are installed. Install waterproof components in fine days to avoid water penetration.
 - Remove the rear door of the cabinet before installing waterproof components.
-

To install waterproof components, proceed as follows:

- 1) Work out positions for cables according to the installation rule, and select modules for cables to be installed.
- 2) Unpack the module, rip off the outer plastic film, and remove the filling as shown in Figure 5-25.

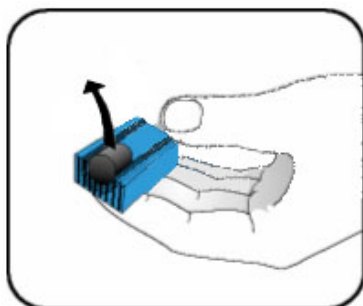


Figure 5-25 Removing the filling

- 3) Remove core layers.

A maximum of two to three cables can be routed through a medium or small module. Hence, estimate the number of core layers to be removed in advance.

 **Caution:**

- You cannot attach the core layers back to the sealing module once removing them. Otherwise, the module may become loose. If too many layers are removed and the two half units cannot join tightly to the cable, replace this module with a spare one.
- Remove the same number of layers from the upper half and lower half of each sealing module.

If you are using cables provided by Huawei, you can remove the core layers according to Table 5-6.

Table 5-6 Cables and number of layers to be removed

Cable	Module used	Number of layers to be removed
L wire (10 mm ² /11.96 ft ²)	B module	0
L wire (16 mm ² /19.14 ft ²)	C module	1
L wire (25 mm ² /29.9 ft ²)	C module	2
L wire (35 mm ² /41.86 ft ²)	C module	3
N wire (25 mm ² /29.9 ft ²)	C module	2
N wire (35 mm ² /41.86 ft ²)	C module	3
PGND cable (25 mm ² /29.9 ft ²)	C module	3
75Ω E1 cable	C module	2
120Ω E1 cable	B module	2
100Ω T1 cable	B module	2
Optical fiber	A module	2
–48 V power cable of the battery cabinet (35 mm ² /41.86 ft ²)	C module	3
GND cable of the battery cabinet (35 mm ² /41.86 ft ²)	C module	3
Bonding wire of the battery cabinet (16 mm ² /19.14 ft ²)	B module	4
Power cable of the heating plate in the battery cabinet	B module	4
Access control and temperature monitoring cable of the battery cabinet	B module	3

Cable	Module used	Number of layers to be removed
Signal cable		Diameters of these cables are too small. It is recommended you bound several cables with the heat-shrinkable tube and route them through the sealing module as one cable.

If you are using cable provided by other supplier, you need to measure the diameters of cables using vernier calipers and remove core layers according to Table 5-7.

Table 5-7 Cable diameters and number of layers to be removed

Cable diameter				Number of layers to be removed	
A module	3.5 mm to 4.8 mm (0.14 in. to 0.19 in.)	B module	3.2 mm to 5.0 mm (0.13 in. to 0.20 in.)	10.0 mm to 11.0 mm (0.40 in. to 0.43 in.)	0
	4.8 mm to 6.1 mm (0.19 in. to 0.24 in.)		5.0 mm to 6.1 mm (0.20 in. to 0.24 in.)	11.1 mm to 12.1 mm (0.43 in. to 0.48 in.)	1
	6.1 mm to 7.5 mm (0.24 in. to 0.29 in.)		6.1 mm to 7.4 mm (0.24 in. to 0.29 in.)	12.1 mm to 13.2 mm (0.48 in. to 0.52 in.)	2
	7.5 mm to 8.7 mm (0.29 in. to 0.34 in.)		7.4 mm to 8.8 mm (0.29 in. to 0.35 in.)	13.2 mm to 14.5 mm (0.52 in. to 0.57 in.)	3
	8.7 mm to 10.0 mm (0.34 in. to 0.40 in.)		8.8 mm to 10.1 mm (0.35 in. to 0.40 in.)	14.5 mm to 15.7 mm (0.57 in. to 0.62 in.)	4
	10.0 mm to 11.0 mm (0.40 in. to 0.43 in.)		10.1 mm to 11.5 mm (0.40 in. to 0.45 in.)	15.7 mm to 17.0 mm (0.62 in. to 0.67 in.)	5
			11.5 mm to 12.9 mm (0.45 in. to 0.50 in.)	17.0 mm to 18.2 mm (0.67 in. to 0.72 in.)	6
			12.9 mm to 14.2 mm (0.50 in. to 0.56 in.)	18.2 mm to 19.5 mm (0.72 in. to 0.77 in.)	7
			14.2 mm to 15.8 mm (0.56 in. to 0.62 in.)	19.5 mm to 20.8 mm (0.77 in. to 0.82 in.)	8
			15.8 mm to 16.5 mm (0.62 in. to 0.65 in.)	20.8 mm to 22.0 mm (0.82 in. to 0.87 in.)	9
				22.0 mm to 23.2 mm (0.87 in. to 0.91 in.)	10
				23.2 mm to 24.5 mm (0.91 in. to 0.96 in.)	11
		24.5 mm to 25.8 mm (0.96 in. to 1.02 in.)	12		

- 4) Use two halves of modules to clamp the cable and fit them together. Reserve a 0.1 mm to 1 mm (0.04 in.) long gap between the two halves of modules, as shown in Figure 5-26.

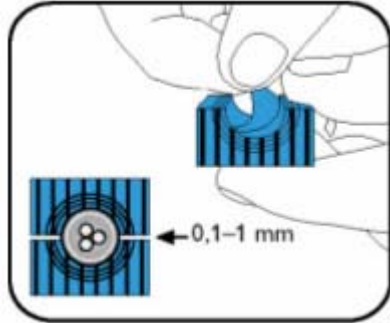


Figure 5-26 Stripping the core layer

- 5) Lubricate inside of the sealing module, as shown in Figure 5-27.
For methods of applying lubricant, see the section “Installation tool”.

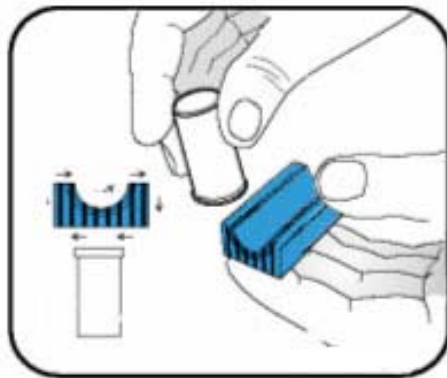


Figure 5-27 Daubing lubricant

- 6) Lead the cable into the cabinet through the frame.

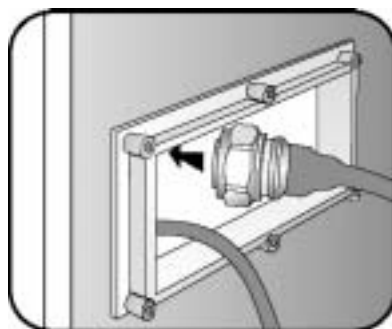


Figure 5-28 Leading the cable

- 7) Insert one half of the module from the bottom of the cabinet. Press the cable against the module and insert the other half of the module and press them with hands.

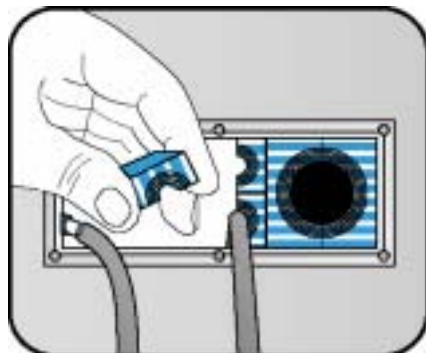


Figure 5-29 Installing the cable

- 8) Install other cables and sealing modules in sequence.

Note:

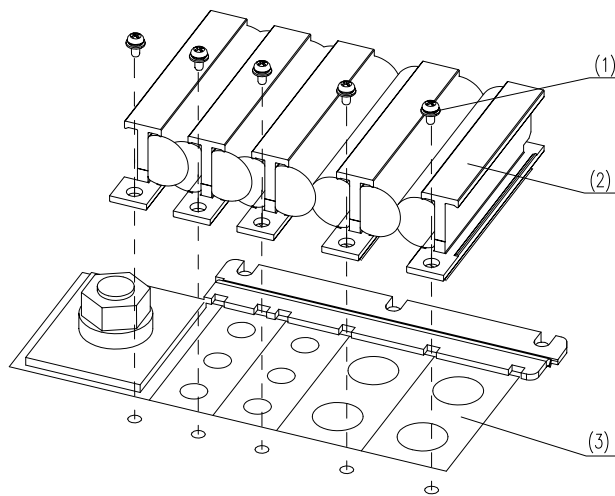
If the last module cannot be inserted to its position easily, press tight the modules installed already and try again.

- 9) Select a smaller module for pre-pressing.
Generally, the medium module is finally used according to the installation rule.
- 10) Insert the small module to the installation position. Lubricate the subrack if it is hard to insert the last module.
- 11) Use a wrench to fasten the nut to the fastener as tight as possible.
- 12) Unscrew the nut 10 to 15 minutes later.
- 13) Take out the small module, and insert the sealing module to be installed.
- 14) Fasten the nut of the fastener again.

5.4.3 Shielding E1/T1 Cables

To shield E1/T1 cables, proceed as follows:

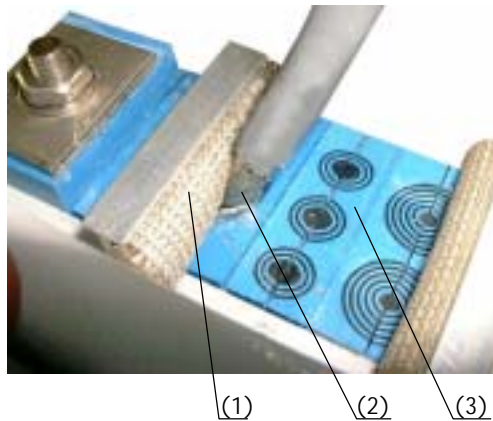
- 1) Remove the shielding clip on the waterproof module, as shown in Figure 5-30.



(1) M3 screw (2) Shielding clip (3) Waterproof module

Figure 5-30 Removing the shielding clip

- 2) Lead the E1/T1 cable through the waterproof module and press the waterproof module tightly against others by referring to section 5.4.2 "Installing Waterproof Components".
- 3) Inside the cabinet, peel off a small part of the outer skin of the E1/T1 cable above the waterproof module to expose the shielding layer, as shown in Figure 5-31.



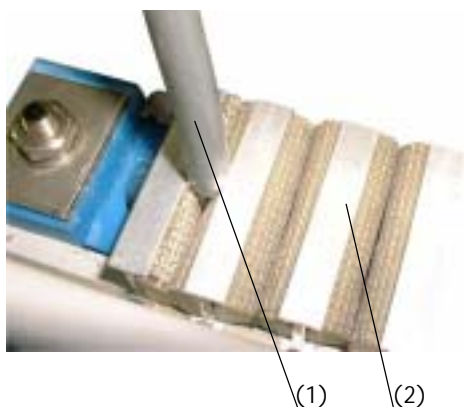
(1) Shielding clip (2) Shielding layer of the E1 cable (3) Waterproof module

Figure 5-31 Peeling off the outer skin of the E1 cable

 **Caution:**

- Do not leave any silicon gel on the shielding clip or the shielding layer of the E1/T1 cable.
- Keep the shielding layer intact when peeling off the outer skin of the cable. Peel off enough outer skin to ensure that the shielding layer is in complete contact with the shielding clip.

- 4) Check whether there is any space between waterproof modules. If yes, use silicon gel to block it.
- 5) Restore the shielding clip to its original position, as shown in Figure 5-32.



(1) E1/T1 cable (2) Shielding clip

Figure 5-32 Shielded E1/T1 cable

5.4.4 Connecting E1/T1 Cables

To connect E1/T1 cables, proceed as follows:

- 1) Connect one DB25 connector of each E1/T1 cable to the DB25 socket on the BSP according to the label on the E1/T1 cable and the label on the DB25 socket (in the sequence of E1/T1_0, E1/T1_1, E1/T1_2, and E1/T1_3). See Figure 5-33.

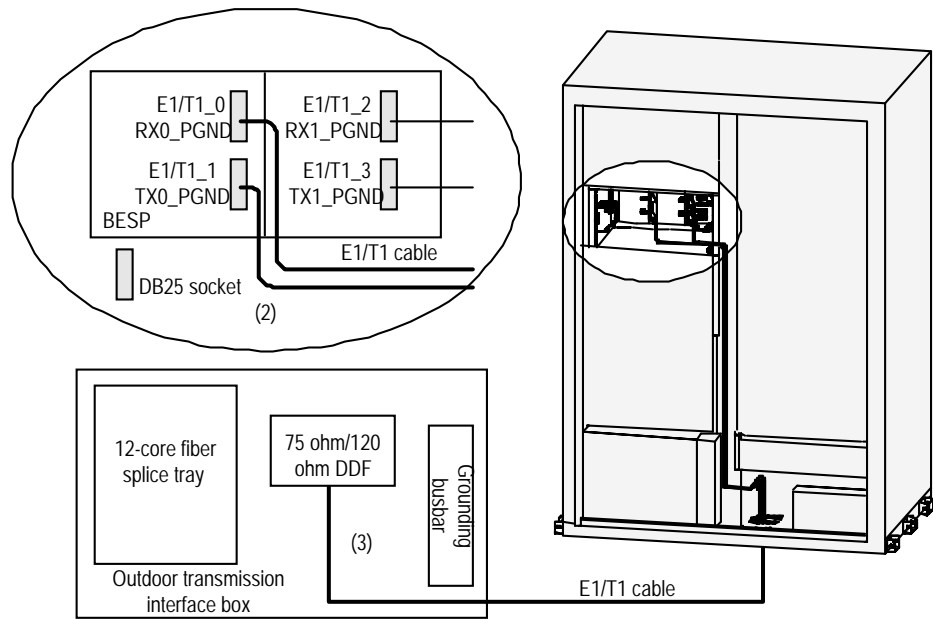


Figure 5-33 Connecting E1/T1 cables

- 2) Connect the other end of each E1/T1 cable to the outdoor transmission interface box of the DDF/ODF, as shown in Figure 5-33. For details, see Chapter 4 "Installing Outdoor Transmission and Power Interface Boxes".
- 3) After installing transmission cables, attach corresponding labels to cables according to numbers. For details, see *Airbridge BTS3606&3606A CDMA Base Station Installation Manual – Installation Reference*.

5.4.5 Connecting E1/T1 Trunks to Outdoor Transmission Interface Box

Connect the E1/T1 trunks to the outdoor transmission interface boxes of DDF/ODF after laying them out of the cabinet. See Chapter 4 "Installing Outdoor Transmission and Power Interface Boxes".

5.5 Installing Optical Fibers

This section introduces the cabling principles, and how to connect the optical fibers when the ODU3601C is cascaded.

5.5.1 Cabling Principles

Pay attention to the following items when installing the optical fibers:

- Bend optical fibers in a circle with a diameter no less than 8 cm. Bind optical fiber pairs neatly.

- Avoid turning while laying optical fibers. Route optical fibers as straight as possible. Lead optical fibers between cabinets through cabling racks, or through the top of cabinets if convenient.
- Put the redundant optical fibers in the fiber tray. Do not cross fibers.
- Lay optical fibers naturally. Do not pull or bind them by force. Bind fibers on the beam every 150 mm (6 in.).
- Labels at both ends of optical fibers must be clear. They must indicate the relationship between the RF module and the fiber port on the BRDM of the baseband subrack.
- Use corrugated plastic tubes to protect fibers when leading them out of the cabling rack.

5.5.2 Installing Optical Fibers Cascading the ODU3601C

When the ODU3601C is cascaded with the BTS3606A, you need to connect two ends of the optical fiber respectively to the optical interface of the CCPM on the BTS3606A and the optical interface of the MTRM on the ODU3601C.

5.6 Installing GPS Lightning Arrester and GPS Clock Cables

The GPS clock cables are bound to the bundling rack near the air intake box upon delivery.

To install the GPS lightning arrester and GPS clock cables,

- 1) Remove the panel on the air intake box.

The box already has the GPS clock cable attached as shown in Figure 5-34.

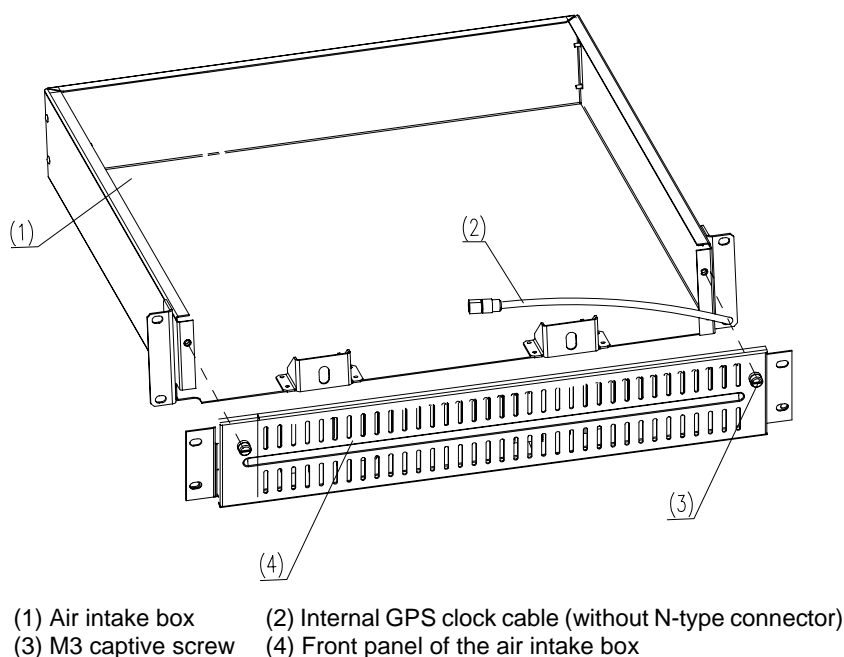
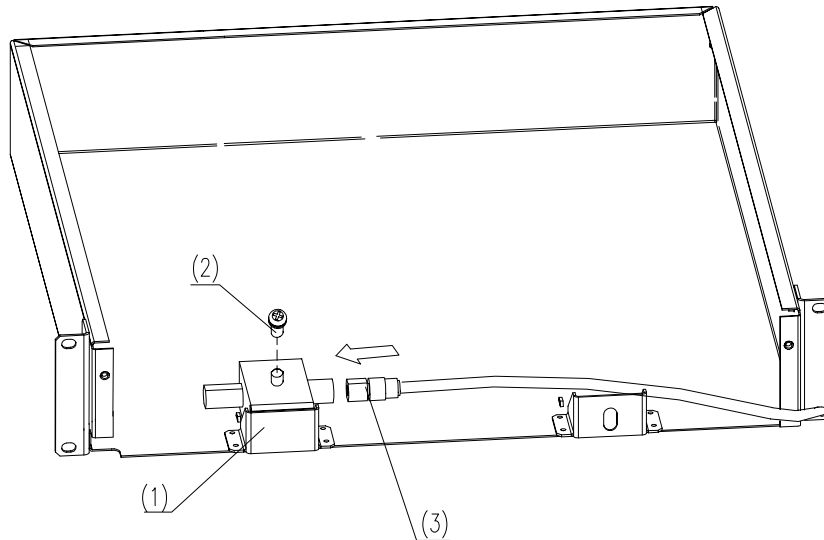


Figure 5-34 Removing the front panel of the air intake box

- 2) Remove the screws on the GPS lightning arrester.
- 3) Place the lightning arrester against the groove in the air intake box and fasten it using screws as shown in Figure 5-35.



(1) GPS lightning arrester (2) Screw that comes with the lightning arrester
(3) N-type connector

Figure 5-35 Installing GPS lightning arrester (1)

- 4) Connect the N-type connector of the internal GPS clock cable to the GPS lightning arrester as shown in Figure 5-35.
- 5) Lead the external GPS clock cable from the sealing module (see Figure 5-17 for the position of the inlet).
- 6) Route the cable along the column in the middle of the cabinet to the gap under the air intake box.
- 7) Connect the external GPS clock cable to the other end of the GPS lightning arrester, as shown in Figure 5-36.

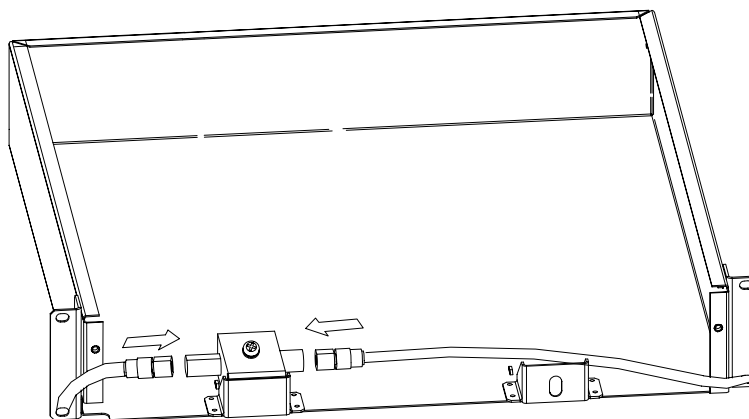


Figure 5-36 Installing GPS lightning arrester (2)

- 8) Install the front panel of the air intake box.

Note:

The other end of the GPS clock cable is connected to the “ANT” interface on the BCKM.

5.7 Installing Power Cables

The BTS3606A supports the three-phase 220 V input, two-phase 110 V input, and single-phase 220 V input. Table 5-8 lists the cables used for different kinds of power inputs.

Table 5-8 Power cable specifications

Input	Name of the power cable	Quantity	Cross-sectional area	Color
Two-phase 110 V	Live line (L)	2	35 mm ² (41.86 ft ²)	Red
	Null line (N)	1	35 mm ² (41.86 ft ²)	Black
Three-phase 220 V	Live line (L)	3	16 mm ² (19.14 ft ²)	Red
	Null line(N)	1	35 mm ² (41.86 ft ²)	Black
Single-phase 220 V	Live line (L)	1	25 mm ² (29.9 ft ²)	Red
	Null line(N)	1	25 mm ² (29.9 ft ²)	Black

5.7.1 Principles of Cabling Power Cables

Note the following principles when cabling power cables:

- Place power cables apart from other cables. Never bind them together with other cables.
- Measure the accurate distance from the connecting terminal of the power input to the outdoor power interface box before laying cables. Be sure to reserve enough cables, as shown in Figure 5-37.

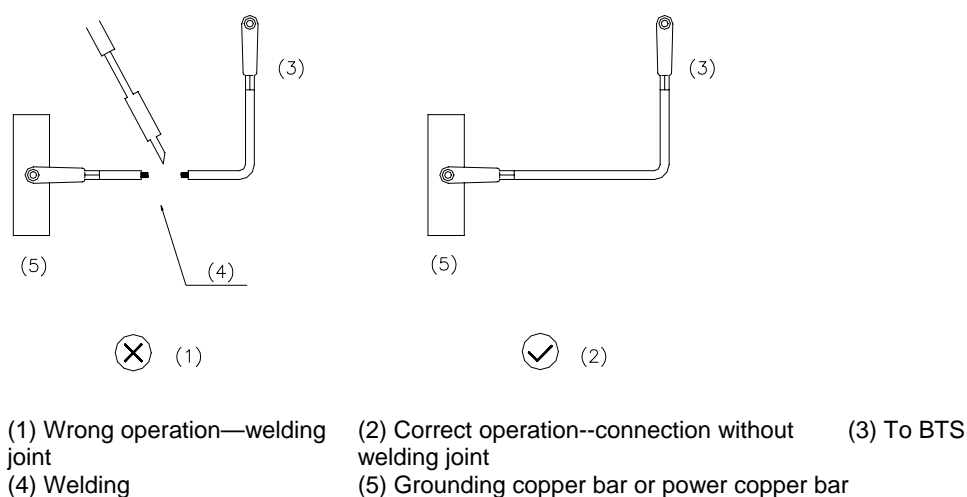


Figure 5-37 Wrong and correct operations



Caution:

If the cable is not long enough, replace a new one. It is not allowed to add connectors or welding joints to the cable.

- Measure the accurate distance from the AC power distribution box to the connecting terminal of the cabinet, and the distance from the PGND cable to the grounding bar inside the cabinet before laying cables. Make sure to reserve enough cables.
- Lay power cables and PGND cables apart from other cables. When paralleling power cables to other ones, make sure that the cable distance must be more than 30 mm (0.12 in.).
- In addition, insulate power cables and PGND cables before binding them on the metal cabling rack. Bind and bundle cables separately when routing them in the cabinet and cabling trough, or under the tunnel.
- Lay power cables and grounding cables straight and bind them in order when connecting them to the wiring terminal inside the cabinet. In addition, when connecting cables to wiring terminals, lay those far from the upper wiring terminal outside, and those near the upper wiring terminal inside.
- Reserve enough cables while laying the power cable and grounding cable inside the cable trough. Bundle cables every 200 mm (8 in.).
- Select 150 mm (6 in.) or 300 mm (12 in.) cable ties according to the quantity of cables. Cut the cable ties neatly.
- Use the corrugated plastic tube to protect connecting cables between the extended battery cabinet and BTS3606A cabinet. Bundle the corrugated tube with

black straps and distribute it horizontally or vertically. Bend the cable into a circular arc at the turning point.

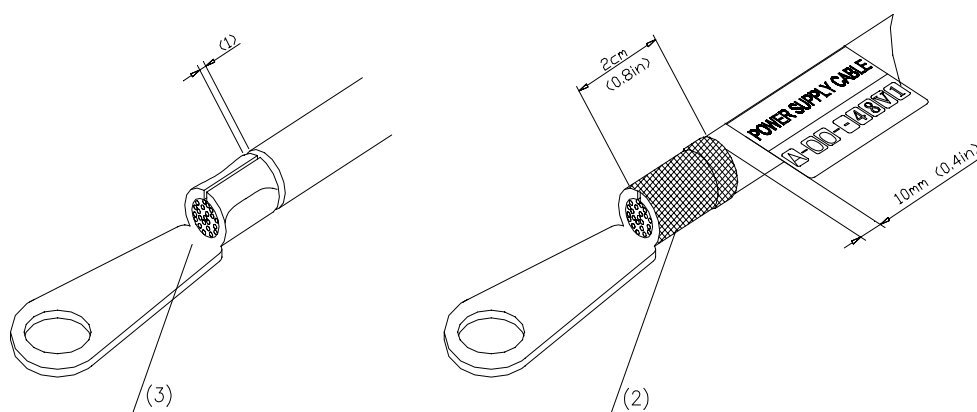
- Stick cables on power cable at 20 mm (0.8 in.) from both ends. For specifications of cable labels, see Chapter 9, “Engineering Labels for Cables” in the *Airbridge BTS3606&3606A CDMA Base Station Installation Manual – Installation Reference*.

5.7.2 Making Power Cables

Tools used to assemble power cables include: tape, wire nipper, paper knife, hydraulic pliers, insulating tapes, soldering iron, and solder wire.

To make power cables, proceed as follows:

- 1) Measure the distance from the input port of the lightning arrester to the corresponding binding post of the power distribution box according to the cabling route of power cables and grounding cables.
- 2) Cut power cables and grounding cables according to the distance measured and margins required.
- 3) Cut the insulating cover of each cable head using the paper knife. The length of the removed cover must be equal to that of the cable lug.
- 4) Tighten the lug with hydraulic pliers.
- 5) Coat the lug and the naked cable with insulating tape, as shown in Figure 5-38. Do not expose the lug and the naked cable.



- (1) The interval is not more than 1 mm (0.04 in.)
(2) The naked stubs are covered with cable caps.

- (2) Wrap up with tapes

Figure 5-38 Making lugs

5.7.3 Connecting Power Cables

This section introduces how to connect power cables when the three-phase power input and single-phase power input is used.

I. Installing Three-Phase Power Cable

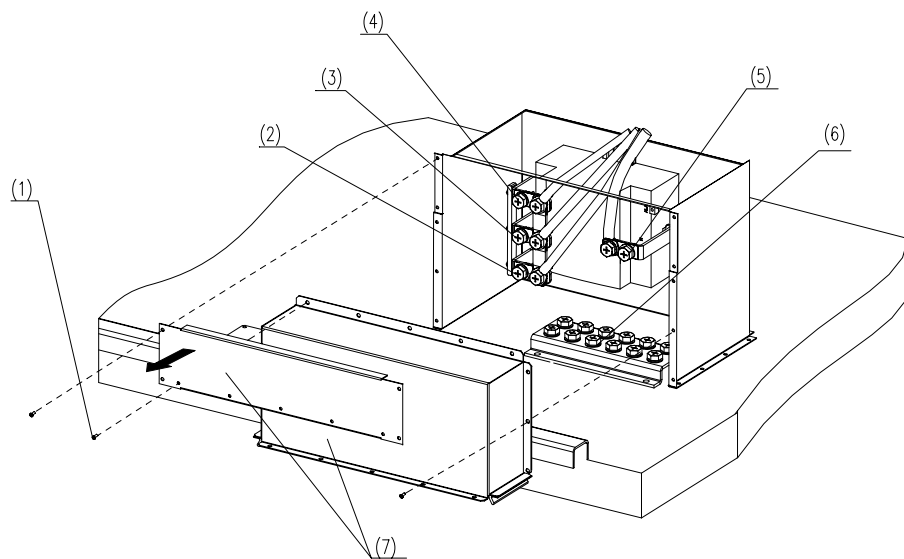


Caution:

Before connecting the power cable, cut off the AC power supply and the battery power supply to ensure the safety.

To install the three-phase power cable, proceed as follows:

- 1) Remove the cover of the power lightning protection filter to expose the N, L1, L2, and L3 terminals, as shown in Figure 5-39.



- | | | | |
|--------------|-------------------|--|--------|
| (1) M3 screw | (2) L1 | (3) L2 | (4) L3 |
| (5) N | (6) Grounding bar | (7) Cover of the power lightning protection filter | |

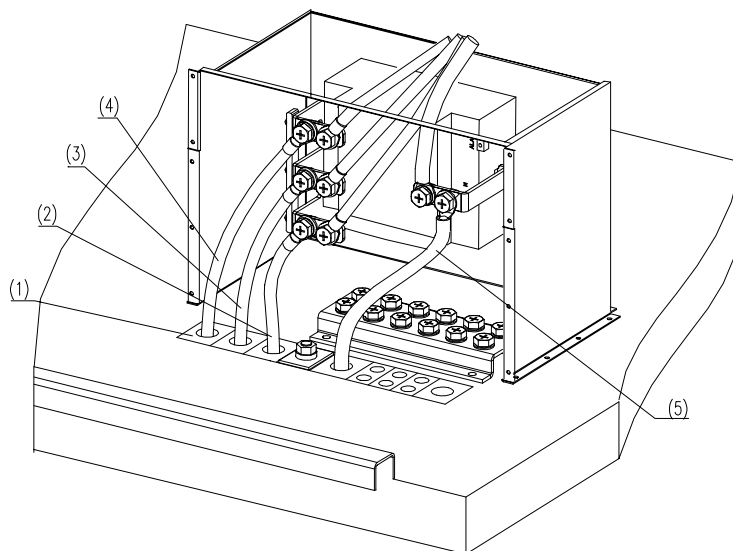
Figure 5-39 Removing the cover of the power lightning protection filter

- 2) Measure the distances between the external terminals (N, L1, L2, and L3 terminals) of the cabinet and the corresponding terminals on the DDF/ODF based on the actual routing of the cable.
- 3) Cut cables according to the distances measured.
- 4) Attach temporary labels on both ends of the cable.

You can fill the same contents as the formal labels to the temporary labels, or fill other contents as needed.

- 5) Route the power cable by referring to instructions in section 5.7.3 "Connecting Power Cables".
- 6) Prepare the OT terminal on one end of the external power cable by referring to instructions in section 5.7.2 "Making Power Cables".

- 7) Lead the L1, L2, L3, and N lines of the external power cable with the OT terminal into the cabinet through the cable inlet/outlet marked in Figure 5-40.
- 8) Respectively connect the three live lines (red) to L1, L2, and L3 terminals on the BESP, as shown in Figure 5-40.



- | | | |
|------------------------|-------------|-------------|
| (1) Cable inlet/outlet | (2) L1 line | (3) L2 line |
| (4) L3 line | (5) N line | |

Figure 5-40 Installing the L1, L2, L3, and N lines

- 9) Determine the length of the cable inside the cabinet and then seal the cable inlet/outlet with the plasticene.
- 10) Cover the cable inlet/outlet sealed with the plasticene.
- 11) Use the tool that comes with the equipment to connect the N line to the N terminal on the AC filter unit, as shown in Figure 5-40.
- 12) Connect the other end of the external power cable to the DDF/ODF.
- 13) Attach engineering labels at the places 20 mm (0.8 in.) to 50 mm (2 in.) away from the lugs on both ends of the power cable.

For detailed instructions, see Airbridge BTS3606&3606A CDMA Base Station Installation Manual – Installation Reference.

- 14) Connect the PGND cable of the main cabinet to the PGND connection point on the protection ground bar.

Note:

If the battery cabinet is configured, connect the PGND cable of the battery cabinet to the PGND connection point of the battery cabinet on the protection ground bar.

- 15) Restore the cover of the power lightning protection filter.

II. Installing Single-Phase Power Cable

When the single-phase power input is used, connect the power cable according to the procedure of installing the three-phase power cable. Then use the short-circuit sheets to serially connect the L1, L2, and L3 terminals on the lightning arrester, as shown in Figure 5-41 and Figure 5-42.

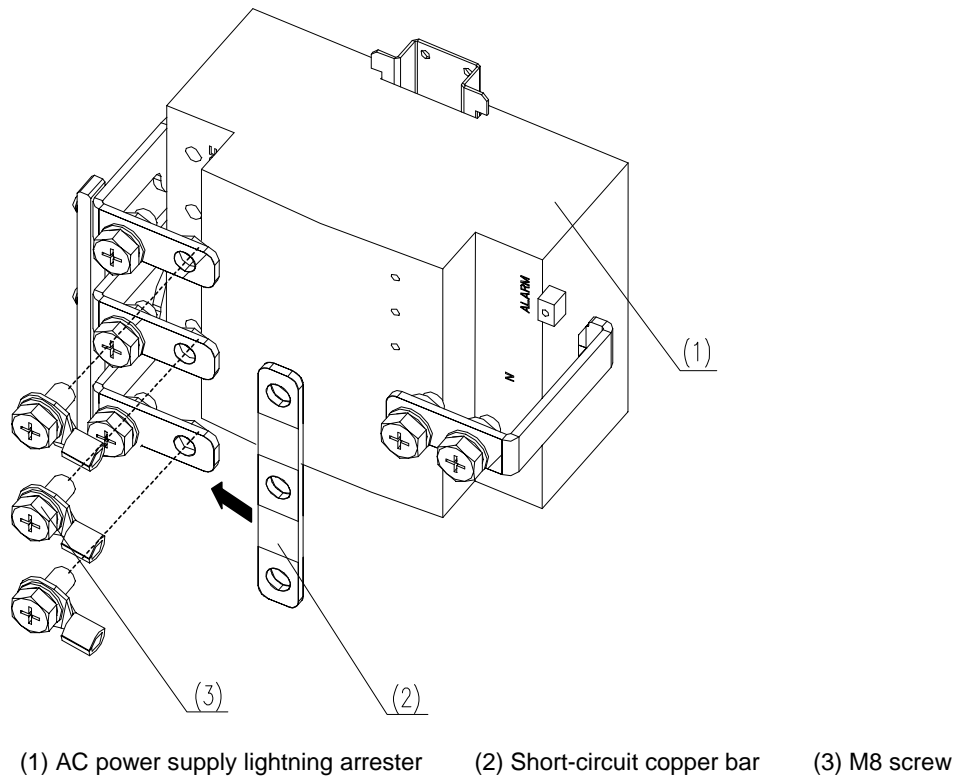
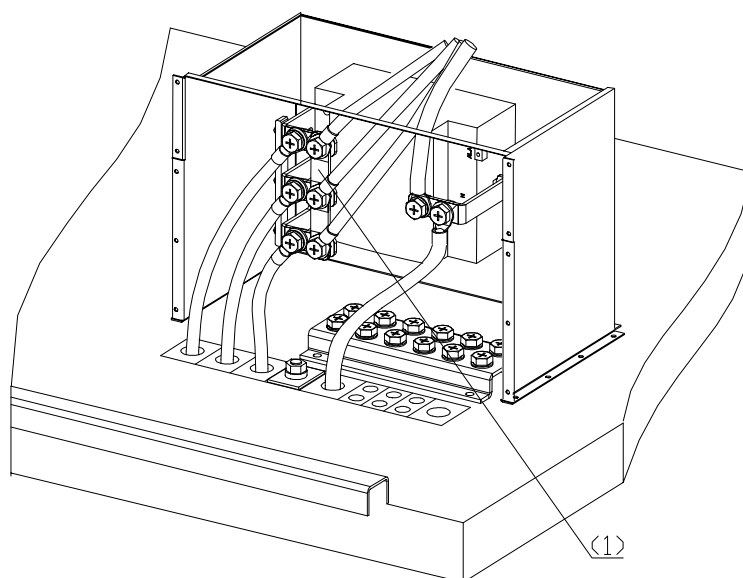


Figure 5-41 Installing short-circuit sheets (1)



(1) Short-circuit sheet

Figure 5-42 Installing short-circuit sheets (2)

Note:

You can find the short-circuit sheets delivered with the equipment in the tool box of the cabinet.

III. Installing Two-Phase Power Cable

When the two-phase 110 V power input is used, the lightning arrester used is different from that used in the case of three-phase or single-phase power supply.

Figure 5-43 shows the lightning arrester used in the case of two-phase power supply.

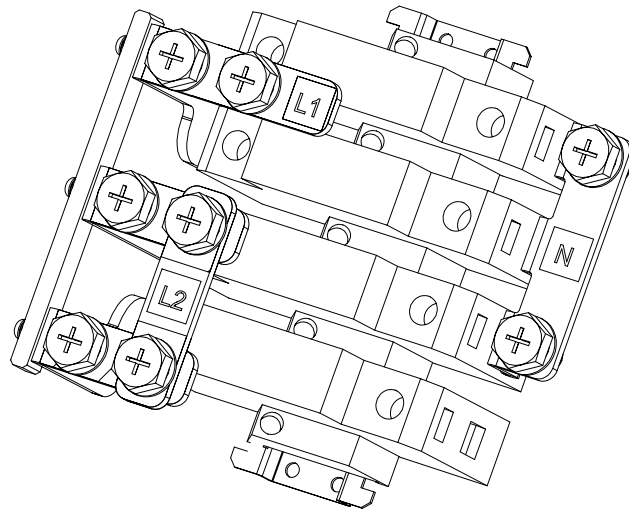


Figure 5-43 AC power lightning arrester used in the case of two-phase power supply

To connect the 110 V two-phase power cable, simply connect the L1, L2 and N lines to the corresponding L1, L2, and N terminals on the lightning arrester. The installation procedure and principles are the same as those in the case of three-phase power supply. For details, see section 5.7.3 I. "Installing Three-Phase Power Cable".



Figure 5-44 Connecting the 110 V power cables

5.8 Installing Cabinet PGND Cables

Both ends of the PGND cables for the cabinet are OT terminals (also called lugs). Figure 5-45 shows a PGND cable.

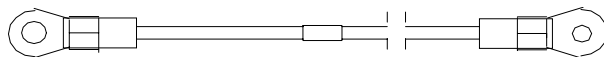


Figure 5-45 PGND cable of the cabinet

5.8.1 Making Cabinet PGND Cables

The two wiring terminals of the PGND cable must be made on site during the deployment. The method is the same as that of power cables. See section 5.7.2 “Making Power Cables”. Measure the cabling route of the PGND cable to determine its length.

5.8.2 Grounding Requirement

This section introduces the layout of the grounding system and requirement of grounding cables and grounding resistance.

I. Layout of Grounding System

The grounding network of BTS site area must be jointly designed.

During the engineering design of BTS, the grounding system can be divided into two independent systems: BTS system and cabling rack system. When planning the grounding system, design these two systems separately. Connect the grounding cable of BTS system to the grounding bar of the iron tower, and the cabling rack system to the ground with independent grounding cables.

II. Grounding Cables

In the BTS engineering design, the customer must provide two independent grounding cables: BTS grounding cable and cabling rack grounding cable. If the customer cannot provide these two grounding cables, or the steel bar of the building is used for grounding, lay these two grounding cables together, but ground them separately.

Use yellow-green cables with the cross-sectional area of 16 mm^2 - 25 mm^2 (19.14 ft^2 - 29.9 ft^2) as the grounding cables and lead them to the grounding grid.

It is required that the grounding resistance is less than five ohm for normal operation of BTS3606A.

Note:

The resistance of the grounding body must accord with the related regulation of the country or the operator's regulation on communication sites (or radio base station).

5.8.3 Connecting PGND Cable of the Cabinet

To connect the PGND cable of the cabinet, proceed as follows:

- 1) Measure the distance between the internal ground bar of the BTS3606A and the connector of the outdoor grounding bar according to the actual cabling path of PGND cables.
- 2) Cut PGND cables as needed.
- 3) Attach temporary labels to both ends of each cable. Note that the contents of temporary labels can be consistent with formal labels or defined by yourself.
- 4) Route the PGND cables according to cabling craft requirements and engineering requirements.
- 5) Prepare PGND cables for the cabinet following the instructions in section 5.8.1 "Making Cabinet PGND Cables".
- 6) Lead one end of a PGND cable into the cabinet from the inlet of the waterproof module. Connect it to the grounding bar inside the cabinet. Fasten the OT terminal of the PGND cable using spring washers and screws.
- 7) Connect the other end of the PGND cable to the grounding copper bar (specified by the customer) outside the cabinet.
- 8) After installing PGND cables, attach corresponding labels to the points 20 mm to 50 mm away from both ends of PGND cables according to numbers.

5.9 Installing Built-in Batteries



Caution:

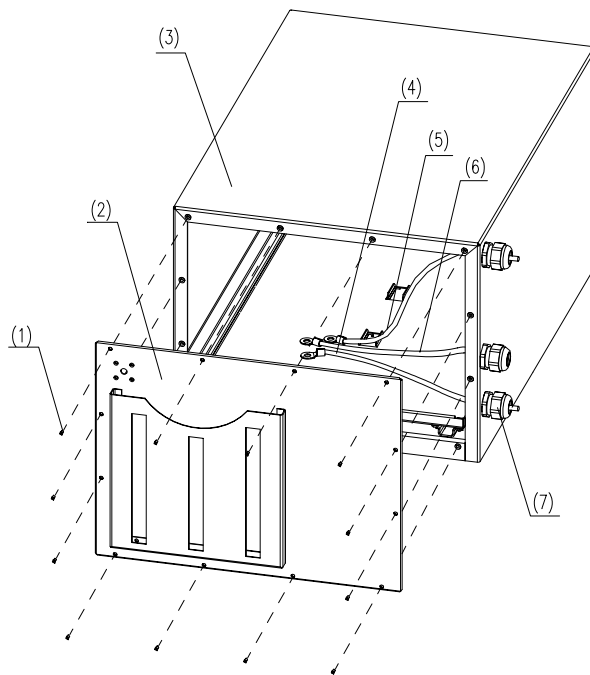
- Before connecting the battery cable, turn off the BAT switch in the DC power distribution subrack of the BTS3606A cabinet.
 - Disconnect the fuse before connecting the batteries. Avoid the occurrence of short circuit when connecting the cables. Connect the –48 V cables first and then the GND cables.
 - Before powering on the cabinet, check whether the batteries are well connected. If not, use the heat-shrinkable tubes to protect the naked terminals between the PMU to the –48 V GND and between the fuse to the –48 V power cable of the battery. Otherwise, short circuit might result.
-

BTS3606A built-in batteries are four 48V, 65 Ah batteries.

To install the built-in batteries in the battery cabin, proceed as follows:

- 1) Loosen the screws on the cover of the built-in battery cabin.
- 2) Remove the cover and save the screws for later installation.

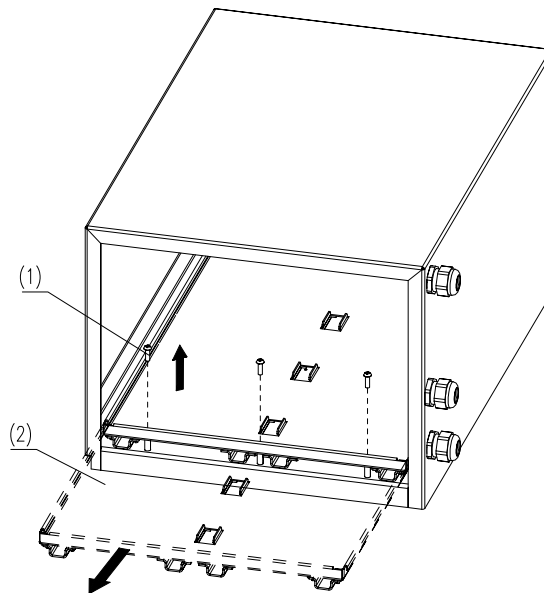
Now, you can see that the temperature monitoring cable, the GND cable, and –48V cables with OT terminals are pre-installed inside the cabin, as shown in Figure 5-46.



(1) M3 screw (2) Cover of the battery cabin (3) Battery cabin (4) -48 V cable
(5) GND cable (6) Temperature monitoring cable (7) Closing plug

Figure 5-46 Removing the cover the battery cabin

- 3) Remove the three M5 screws on the sliding plate inside the cabin and pull out the sliding plate, as shown in Figure 5-47.



(1) M5 screw (2) Sliding plate

Figure 5-47 Pulling out the sliding plate

- 4) Place two batteries on the front part of the sliding plate and connect the batteries as show in Figure 5-48.
- 5) Connect the cable between two batteries.
- 6) Install the protection caps on the positive and negative terminals of the battery.

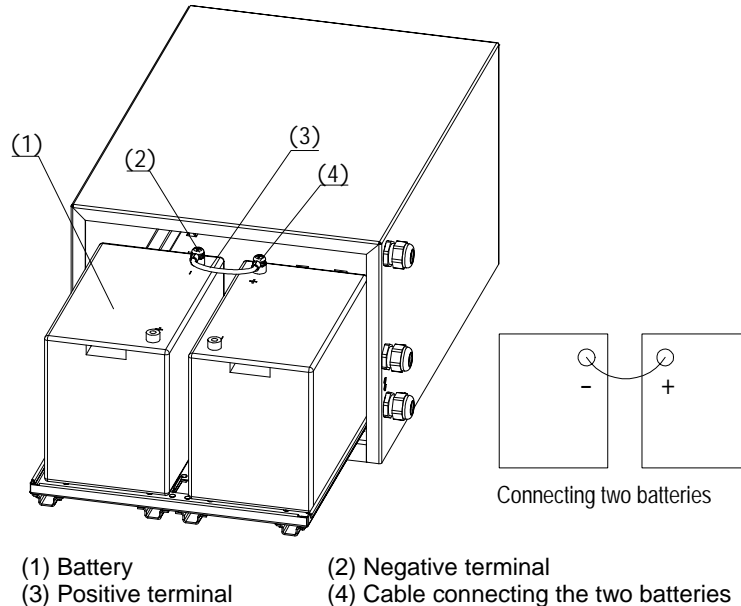


Figure 5-48 Placing and connecting two batteries

- 7) Push the two batteries to the end of the cabin, as shown in Figure 5-49.

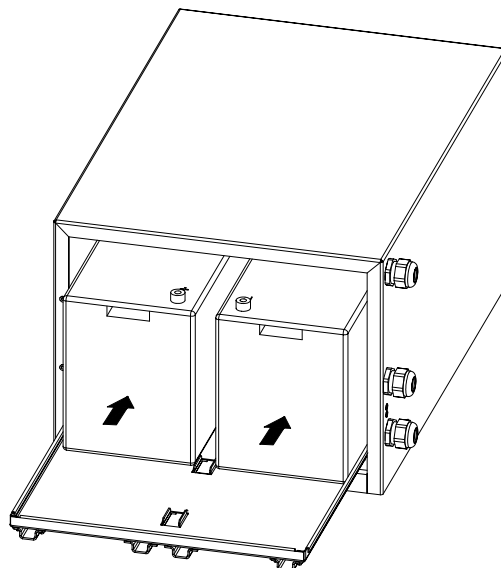
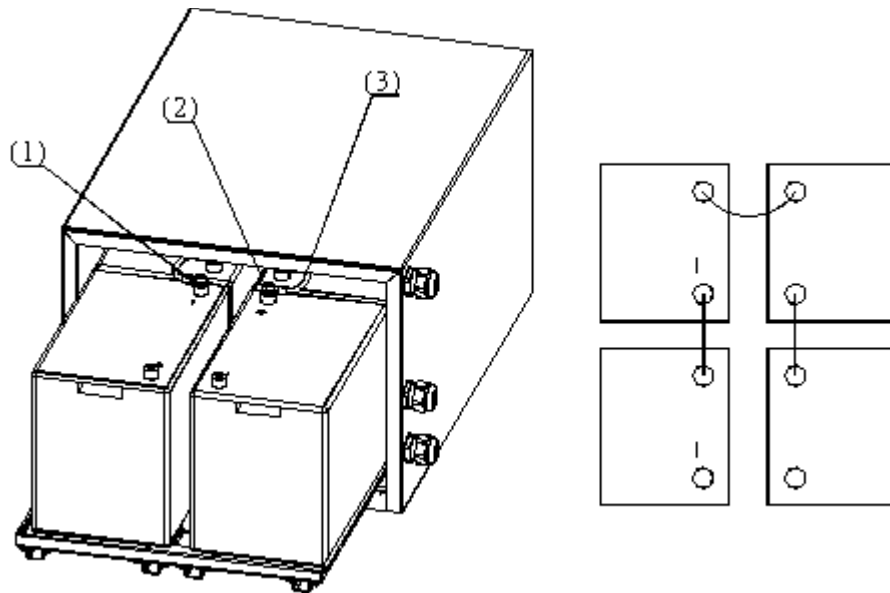


Figure 5-49 Pushing the batteries inside the cabin

- 8) Pull out the sliding plate again.
- 9) Place another two batteries on the front part of the sliding plate and connect the two batteries as shown in Figure 5-48.

The red terminal connects to the positive pole and the black terminal connects to the negative pole.



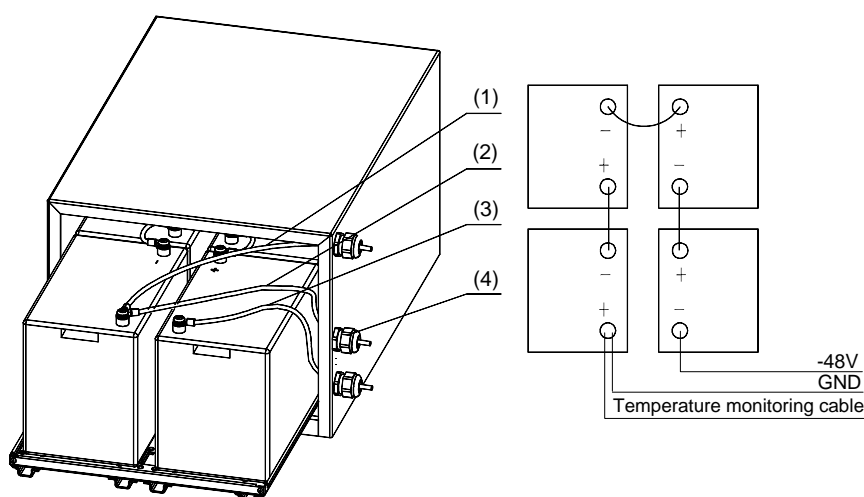
(1) Negative terminal (2) Positive terminal (3) Connection cable between batteries

Figure 5-50 Placing another two batteries

 **Caution:**

Place the batteries according to the positions indicated in Figure 5-48 to avoid wrong connection.

- 10) Connect the GND cable and the temperature monitoring cable to the positive terminal of the battery and the -48 V cable to the negative terminal, as shown in Figure 5-51.



- (1) GND cable (2) Temperature monitoring cable
(3) -48 V cable (4) Closing plug

Figure 5-51 Connecting the rest cables

- 11) Apply silicon gel onto the two electric poles connecting the -48 V cable and the GND cable for waterproof purpose.
- 12) Push the sliding plate inside the cabin and user to three M5 screws previously removed to fix the cover of the battery cabin.
- 13) Fasten the closing plug of the temperature monitoring cable.

Note:

- If battery cabinet is configured, place the terminals inside the battery cabinet to connect to the battery cabinet.
 - Install heat-shrinkable tube on the battery terminals that are not connected with any cables to prevent electrical leakage.
-

5.10 Installing Cables of Battery Cabinet

This section introduces the physical features of the battery cabinet cables and how to connect the cables inside the cabinet, between cabinets, and to the BTS3606 cabinet.

5.10.1 Introduction to Cables of Battery Cabinet

Table 5-9 describes cables in the battery cabinet.

Table 5-9 Description of cables in battery cabinet

Cable name	Cable description
Positive cable	The positive cable of the battery cabinet is a black GND cable of 121 mm (4.76 in.) long.
Negative cable	The negative cable of the battery cabinet is a blue –48 V cable of 121 mm (4.76 in.) long.
Connecting cable of storage battery	The connecting cable of the storage battery in the battery cabinet is a black cable. It is used to connect the adjacent two storage batteries and put in different layers to connect storage batteries or in the cabinet to connect the front and back storage batteries.
Access control and temperature sensor cable	The access control and temperature sensor cable is a 4-pin cable. One end of the cable has four naked wires, and the other end has a 2-pin socket and two naked cables. These four cables are white, green, red and black cables. Figure 5-52 shows the size of cables.
PGND cable	The PGND cable of the storage battery is a yellow-green cable (cross-sectional area: 16 mm ² (19.14 ft ²)).

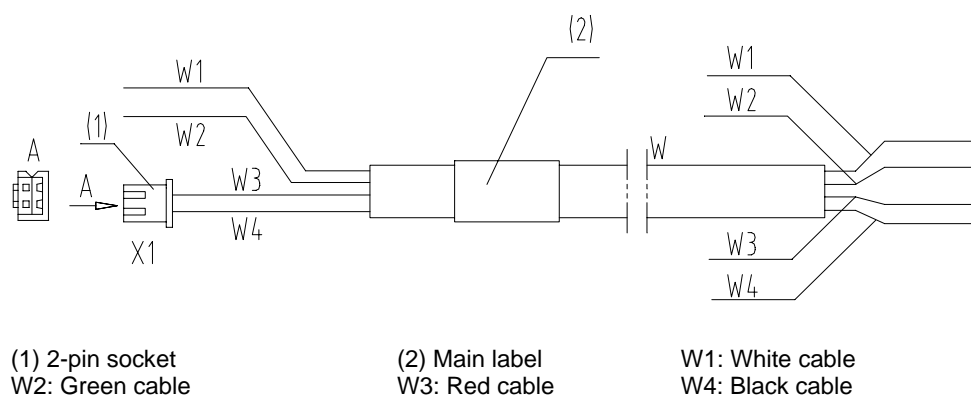
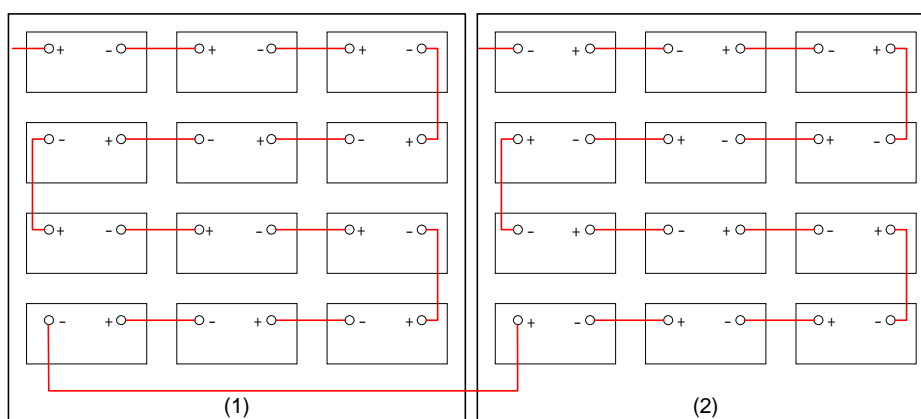


Figure 5-52 Access control and temperature sensor cable

5.10.2 Installing Internal Cables of the Battery Cabinet

To install internal cables of battery cabinet, proceed as follows:

- 1) Connect cables between modules in the same shelf according to the silk screen in the front door of the battery cabinet according to Figure 5-53.



(1) The front view (2) The rear view

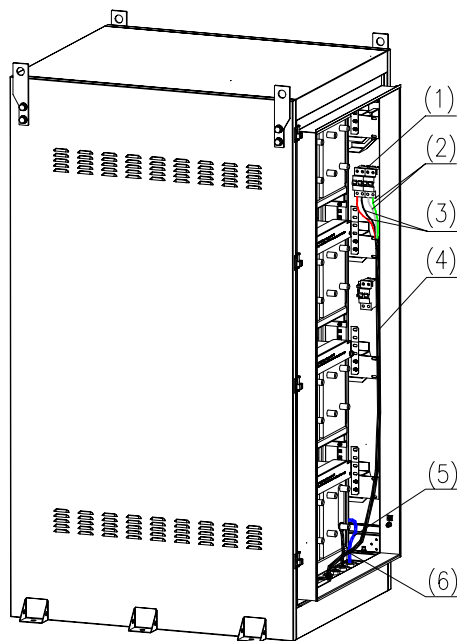
Figure 5-53 Connecting cables in the extended battery cabinet

- 2) Fasten cables with the socket wrench.
- 3) Connect cables between the up and down shelves of storage battery modules according to Figure 5-53.
- 4) Fasten cables with the socket wrench.
- 5) Connect cables between the front and rear modules of the storage battery according to Figure 5-53.
- 6) Fasten cables with the socket wrench.
- 7) Paint the positive and negative terminals of the storage batteries with Vaseline to make them waterproof.
- 8) Cap the terminals for protection.

5.10.3 Installing External Cables of the Battery Cabinet

To install external cables of battery cabinet, proceed as follows:

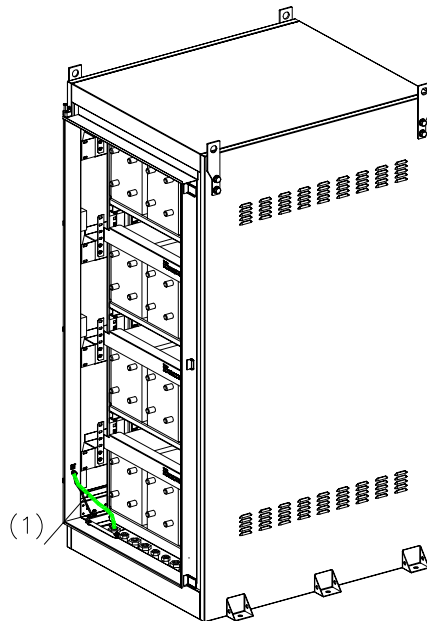
- 1) Insert the four naked cables of the access control and temperature sensor cable to the corresponding terminals of the sensor. See Figure 5-54.
 - White and green cables are access control sensor cables.
 - Red and black cables are temperature sensor cables.



- (1) Wiring terminal
- (2) Access control sensor cable
- (3) Access temperature sensor cable
- (4) Alarm cable
- (5) -48 V power cable (blue)
- (6) Black GND cable

Figure 5-54 Connecting external cables of the battery cabinet

- 2) Connect one end of the grounding cable in the battery cabinet to the connection point on the wall. See Figure 5-55.

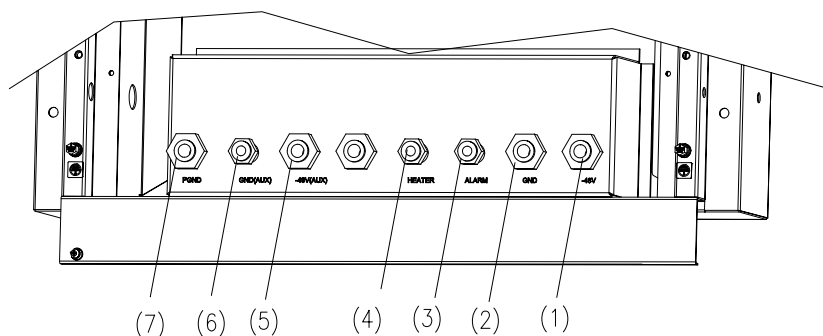


- (1) Yellow-green PGND cable

Figure 5-55 Connecting PGND cables of the battery cabinet

- 3) Lead the positive cable, the negative cable, the access control and temperature sensor cable, and the grounding cable out of the outlet at the bottom of the cabinet. Connect them to the BTS3606A cabinet.

For positions of the outlets, see Figure 5-56.



- (1) Outlet of –48 V power cable (2) Outlet of GND cable
 (3) Outlet of access control and temperature alarm cable
 (4) Outlet of hot plate power cable (5) Auxiliary outlet of –48 V power cable
 (6) Auxiliary outlet of GND cable (7) Outlet of PGND cable

Figure 5-56 Outlets of the battery cabinet

- 4) Paint the wiring terminals of the access control and temperature sensor and the air-break switch with silicon gel to make them waterproof.

5.10.4 Installing Cables between Battery Cabinet and BTS3606A Cabinet

Lead cables of the battery cabinet through its pedestal. Connect them to the basic cabinet of BTS3606A through waterproof components at the bottom of the BTS3606A cabinet.

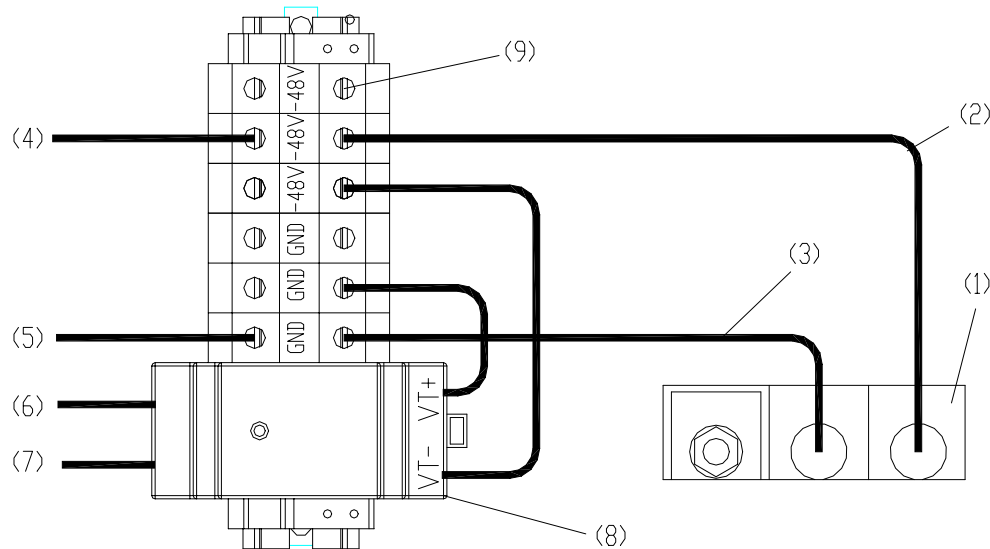
Table 5-10 provides the connection positions.

Table 5-10 Connection of external cables of the storage battery

Cable name	Connection position
Positive cable	GND wiring terminal inside the BTS3606A cabinet
Negative cable	–48 V wiring terminal inside the BTS3606A cabinet
Access control alarm cable	2-pin connector (green) of the column at the back of BTS3606A cabinet. The connector is bound to the column in the front of the cabinet.
Temperature sensor cable	2-pin socket (white) from the BTS3606A power monitoring board. The socket is bund at the bundling rack of the waterproof module at the bottom of the cabinet.
PGND cable	Grounding bar of BTS3606A cabinet

The connection procedure is as follows:

- 1) Lead the positive cable of the battery cabinet through waterproof components and connect with the GND wiring terminal.
- 2) Lead the negative cable of the storage battery through waterproof components and connect to the –48 V wiring terminal.
- 3) Connect the –48 V wiring terminal to the "VT-" terminal of DC lightning arrester, as shown in Figure 5-57.



- | | |
|--|--|
| (1) Waterproof components at the back of the basic cabinet | (3) Positive cable of the battery cabinet |
| (2) Negative cable of the battery cabinet | (5) GND cable (wiring terminal: filter) |
| (4) –48 V power cable (wiring terminal to filter) | (6) Alarm cable (lightning arrester to feed-through capacitor) |
| (7) PGND cable of the lightning arrester | (8) DC lightning arrester |
| (9) Wiring terminal block | |

Figure 5-57 Connecting cables of battery cabinet to DC lightning arrester

- 4) Connect the GND wiring terminal to the "VT+" terminal of DC lightning arrester, as shown in Figure 5-57.
- 5) Lead the alarm cable out of the front end of DC lightning arrester to connect with the feed-through capacitor, as shown in Figure 5-57.
- 6) Lead the PGND cable out of the front end of DC lightning arrester to connect with the protection ground bar, as shown in Figure 5-57.
- 7) Lead the power cable from the –48 V wiring terminal to the –48 V filter, as shown in Figure 5-57.
- 8) Lead the grounding cable from the GND wiring terminal to the –48 V filter, as shown in Figure 5-57.
- 9) Lead the blue power cable from the upper part of the –48 V filter to the fuse to complete the installation of power cables.

- 10) Lead the black grounding cable from the upper part of GND filter to the –48 V GND grounding bar of AC/DC power subrack to complete the installation of grounding cable.

Chapter 6 Checking Cabinet Installation

6.1 Check Before Power-on

You need to check the installation of the equipment and cables before powering on the BTS3606A.

6.1.1 Equipment Installation Check

Table 6-1 lists check items for equipment installation.

Table 6-1 Equipment installation checklist

SN	Check item
1	The rack is placed according to the design drawing.
2	The rack and base are firmly connected. The rack is stable after installation.
3	The horizontal and vertical errors of the cabinet are less than 3 mm (0.12 in.).
4	All the screws are fastened. Check whether there are plain washer and spring washer for the screws and whether the spring washer is on the plain washer.
5	The rack components are not loosed or get damaged and the connecting cables are not damaged or broken.
6	The cabinet is clean and tidy.
7	The surface of the equipment is clean, the external paint is in good condition, and the labels or marks are correct, clear and tidy.
8	The front door of the cabinet can be closed or opened smoothly.
9	The RF jumpers are placed according to sectors.
10	When leveling the base by adjusting bolts, use washers to enlarge the stress surface area to avoid distortion of the base.
11	The cover for the hole of the cabinet is installed.
12	There are no cable ties, stubs, desiccant bags on the cabling rack and the base of the rack. All equipment is clean and tidy.
13	The lifting lugs of the cabinet are intact. If the paint drops, paint them again.
14	The waterproof measures are taken.
15	The board in the front of the cabinet is fastened.
16	AC/DC modules are properly installed. Especially, when the BTS is configured into S(1/1/1), two of the five configured AC/DC modules must be installed in the upper subrack and the rest three in the lower subrack.

SN	Check item
17	When the single-phase power supply is used, check whether the short-circuit sheet to serially connect the power wires of the lightning arrester: L1, L2, and L3.
18	Check whether there is any scratch on the surface of the cabinet.

6.1.2 Cable Installation Check

Table 6-2 lists check items for cable installation.

Table 6-2 Cable installation checklist

SN	Check item
1	The connectors of the trunks are firmly fastened.
2	The connectors of the trunks are intact.
3	The power cable, grounding cable, trunk and RF cable are in good condition.
4	The RF cable connectors are installed in position. Otherwise, the standing wave ratio will be abnormal.
5	The transverse cabling part of RF cables are laid inside the cabling trough.
6	The cables are correctly connected according to the cabinet cabling diagram in <i>Airbridge BTS3606&3606A CDMA Base Station Hardware Description Manual</i> .
7	The cables are bound tidily. The interval between cable ties is even. The cables are properly fastened. The direction of the cable ties is the same.
8	The redundant cable ties are removed, and all the indoor cable ties are cut without sharp ends.
9	Marks on both ends of the cable are clear and legible.
10	The grounding cables of the cabinet are in good contact. (You can use a multimeter to test the connection).
11	All the power cables and grounding cables are copper-core cables and the line width of each type of cable are in compliance with the requirement.
12	The power cables or the grounding cables are not inversely connected or short-circuited.
13	Power cables and grounding cables are bundled separately from other cables.
14	The power cables and grounding cables are correctly labeled.
15	There is no tie-in on the power cables or on the grounding cables.
16	No disconnectable device, such as switches and fuses, are set in the electrical circuit of the grounding system.

SN	Check item
17	Redundant part of power cables and grounding cables are cut instead of coiled up.
18	The copper lugs at both ends of the power cable and grounding cable are welded or crimped firmly.
19	The naked wires at the connection terminals and lug handles are insulated by insulation tape or thermal shrinkage barrel.
20	Flat washers and spring washers are added at all connection terminals. The connection terminals are securely installed and are in good contact.
21	The BTS working ground, protection ground, and the lightning protection ground share a group of grounding conductor.
22	The iron tower of BTS and the equipment share the same grounding network.
23	Cables inside the battery cabinet are correctly connected.
24	The alarm cables are correctly connected.

6.2 Power-on Check



Caution:

Power-on check involves high-voltage operation. Be extremely careful when conducting the power-on check. Any direct contact with the input voltage or indirect contact through damp objects might endanger your life.

Before turning on the primary power supply, do the following:

- 1) Measure the resistance between the external power supply and the ground.
- 2) Check that the equipment is not short-circuited.

6.2.1 Power-on Check of Primary Power Supply

Proceed as follows to conduct the power-on check of the primary power supply:

- 1) Check that all boards, modules, and fans snap in positions.
- 2) Switch on the primary power supply.
- 3) Turn on four air breakers in the AC power distribution box of the BTS3606A in the sequence of PSU0~4, PSU5~8, HX/ACU, and S-SOCKET.

Figure 6-1 shows the positions of the four air breakers.

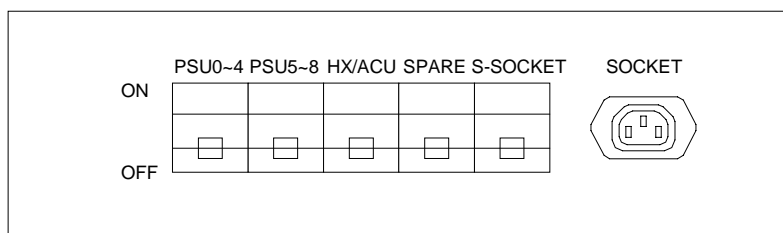


Figure 6-1 Front panel of the AC power distribution box

- 4) Set the multimeter to the voltage scale.
- 5) Measure the voltage of the socket marked with SOCKET in the AC power distribution box.
- 6) Check whether the voltage ranges from 90 V AC to 135V AC (110 V AC) or from 176 V AC to 264 V AC (220 V AC).

If yes, it indicates that the primary power supply works normally. Otherwise, the primary power supply is faulty. In this case, you must look for fault causes carefully.

6.2.2 Power-on Check of Power Modules

Proceed as follows to conduct the power-on check of the power modules:

- 1) Disassemble the AC input power box to check that the AC three-phase cables are correctly connected.
- 2) Power on the AC power distribution box.
- 3) Check the voltages of the three-phase cables and the phase voltages.
- 4) Check that all the PSUs are well-connected with the motherboard.
- 5) Switch on the primary power supply to check that indicators of power modules are normal.

In the normal case,

- VIN indicator is on.
 - ALM indicator is off.
 - VO indicator is on.
- 6) Set the multimeter to the voltage scale. Measure the output voltage at the voltage test port on the AC power distribution box of the main equipment to check that it is normal and within the range of 19 V to 29 V.
 - 7) Switch off the primary power supply if the voltage is unstable or beyond the range.
 - 8) Clear the fault and power on again until the voltage is normal.

6.2.3 Power-on Check of Air Conditioner

Proceed as follows to conduct the power-on check of the air conditioner:

- 1) Switch off the BAT switch on the AC power distribution box.

- 2) Set the multimeter to the voltage scale. Connect the negative pole of the probe to the positive pole (in red) of the battery group, and the positive pole of the probe to the negative (in black) of the battery group.
- 3) Perform different operations according different measured values as described in Table 6-3.

Table 6-3 Measured values and corresponding operations

Measured value	Operation
Measured value > 0	Indicates that the –48 V power cable and GND cable of the battery are not connected properly. Connect them properly and measure again.
Measured value = 0	Indicates that the cable connection is incorrect or the battery is faulty. Connect cables correctly, clear battery faults, and measure again.
$-43.2\text{ V} < \text{Measured value} < 0$	Check whether long-term storage of the battery results in self-discharge and low voltage. If yes, switch off the BAT switch on the AC power distribution box and perform the next step. If no, check whether the battery is faulty. After the fault is cleared, measure again.
$-57.6\text{ V} \leq \text{Measured value} \leq -43.2\text{ V}$	Indicates connections are correct. Switch off the BAT switch on the AC power distribution box and perform the next step.

- 4) Switch off the AC power supply and check whether the BTS3606A works normally.
- 5) Check the statuses of the board indicators to see whether the BTS3606A is running properly.

If not, switch off the BAT switch. After the fault is cleared, power on the BTS3606A again until it works normally.

6.2.4 Power-on Check of Integrated Equipment

Proceed as follows to conduct the power-on check of the integrated equipment:

- 1) Switch off all the power supplies on the AC power distribution box of the main equipment.
- 2) Check that all the boards are inserted into slots.
- 3) Switch on the power supplies on the AC power distribution box sequentially and power on the boards and modules sequentially.
- 4) Check whether the indicators of the boards and modules are normal.

If PWR indicator is on, the power supply is normal. If it is off, the power supply is faulty or the indicator is damaged.

If any exception condition appears during the process, switch off the power supply immediately. Power on again according to the above procedure after the fault is cleared.

- 5) Open the rear door of the basic cabinet and check whether the voltage connecting the AC filter is around -48 V .

If the boards and modules are normal, the preliminary check is passed.

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