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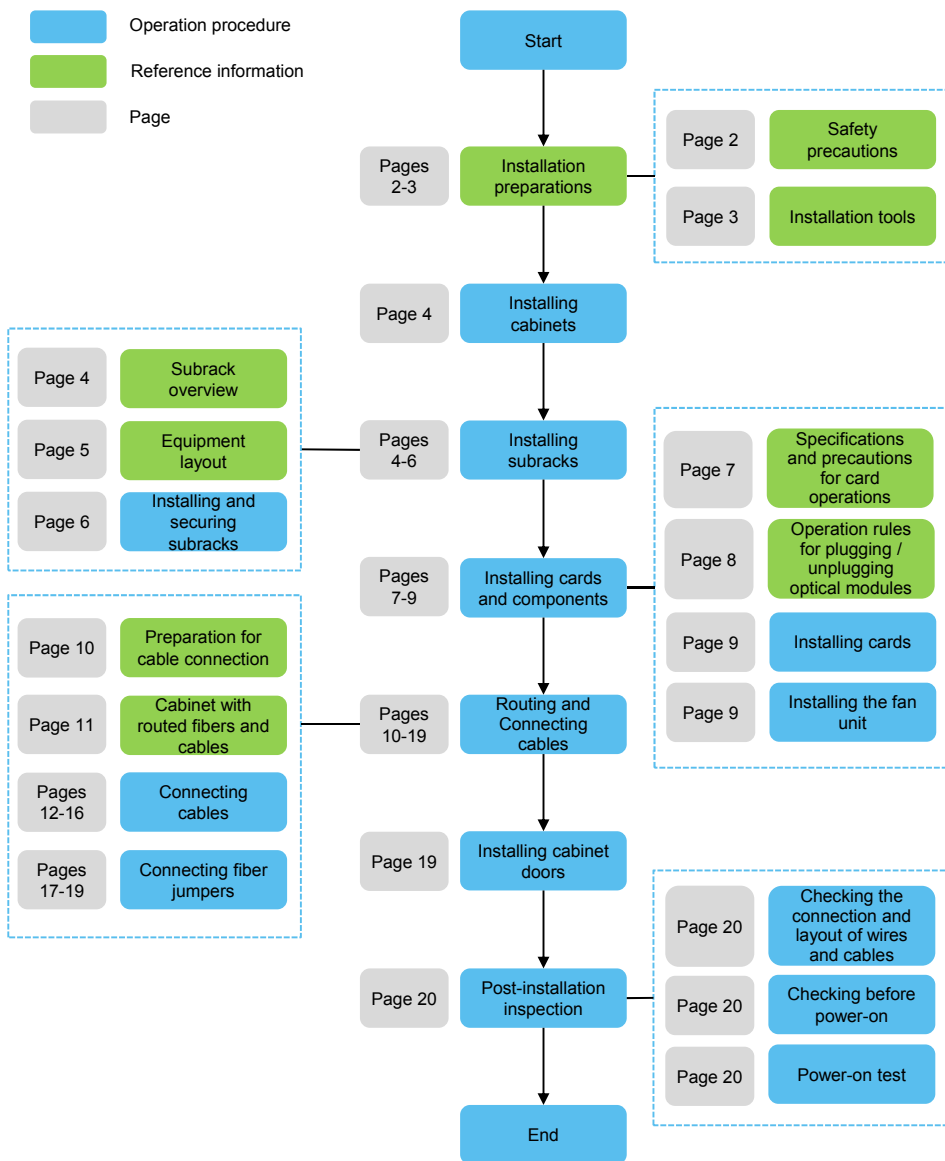
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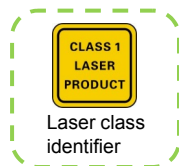




Warning

Laser Safety

To prevent laser radiation from injuring eyes, do not look into the end face of the fiber or fiber connector directly with naked eyes.



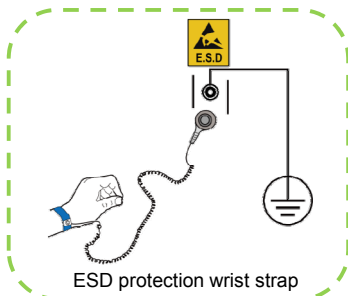
Caution

ESD Protection

- ◆ Carpets or other materials that easily generate static electricity should not be used on the floor of the equipment room.
- ◆ Do not touch any component or wires on cards, or metal conductors in sockets. ESD protection measures should be taken if it is necessary to touch the card during maintenance.



ESD protection gloves



ESD protection wrist strap



Caution

Grounding Requirements

Before the equipment is powered on, the cabinet protection earth ground cable and subrack protection earth ground cable should be well grounded. Check and ensure that the insulation resistance and ground resistance meet the specification.



Caution

Binding Cables

- ◆ Different types of cables on the installation site should be laid out independently and bound separately. Please note that optical fibers should be bound with dedicated fiber binding straps.
- ◆ Exercise care if you must bend fibers. If bends are necessary, the fiber bending radius should not be smaller than 10 D ("D" refers to the optical cable diameter) and should not be smaller than 30 mm.
- ◆ The cables are bound with proper and equal spacing between them. The cable binders are arranged in good order. The extra parts of the binders are cut from the root without leaving sharp points.



Caution

Inspection Prior to Installation

Prior to equipment installation, please inspect the equipment room, cabinet, power supply, cables (especially the earth ground cable), and supporting facilities. After confirming that the conditions for installation are satisfactory, start the work following the project designing documents.



Ladder



Vacuum cleaner



Electric drill



Drilling bit



Long tape



Marker pen



Spirit level



File



Knife



Claw hammer



Cross screwdriver



Flat screwdriver



Crimping pliers



Sharp nose pliers



Diagonal pliers



Wire stripper



Combination wrench



M6 to M12 socket wrench



Torque wrench



Fiber puller



Multimeter



Optical power meter



Network cable tester



Error detector



ESD protection gloves



ESD protection wrist strap



Insulating tape



Cable tie

Fiber binding strap

4 Installing Cabinets



Instruction

The AN6000-17 can be installed in the following cabinets. Please refer to the corresponding manuals for the procedures of installing the cabinets.

Cabinet Model	Manual Description
21-inch 300 mm-deep cabinets (404000068 to 404000071)	<i>Quick Installation Guide for the 21-inch Cabinet (300 mm-deep) (404000068 to 404000071)</i>
21-inch 340 mm-deep cabinets (404000596 to 404000599)	<i>Quick Installation Guide for the 21-inch Cabinet (340 mm-deep) (404000596 to 404000599)</i>
21-inch 600 mm-deep cabinets (4102584 to 4102581)	<i>Quick Installation Guide for the 21-inch Cabinet (600 mm-deep) (4102584 to 4102581)</i>

5 Installing Subracks

5.1 Subrack Overview

Subrack Structure



No.	Description	Function
①	Horizontal fan card slot	Houses the fan card.
②	Vertical card slot	Houses the card to implement the equipment functions.
③	ESD protection fastener	Connects with the ESD protection device.
④	Mounting ear	Secures the subrack in a cabinet.
⑤	Fiber puller hanger	Holds the fiber puller.
⑥	Earth ground point on the subrack	Connects with the subrack earth ground cable.

Note 1: The mounting ears of the AN6000-17 are integrated with the side panels of the equipment.

Subrack Dimensions

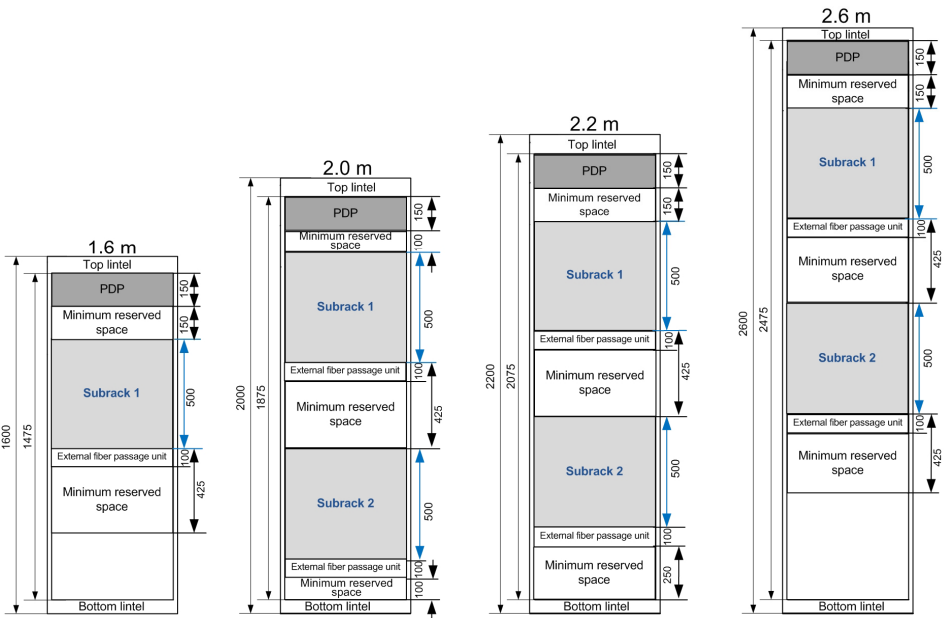
Description	Dimensions (H × W × D)
Subrack with mounting ears for 21-inch cabinet	486 mm × 530 mm × 282 mm

Rules for Arranging Subracks

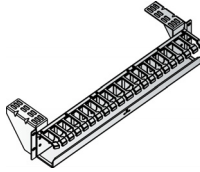
- ◆ When multiple AN6000-17 subracks are to be installed in a cabinet, arrange the subracks from the top down if the top access wiring mode is used, and arrange the subracks from the bottom up if the floor access wiring mode is used. Generally, the top access wiring mode is used.
- ◆ A 2.6 m-high or 2.2 m-high cabinet can house two AN6000-17 subracks at most.
- ◆ Subracks are mounted on the front vertical mounting flanges in 21-inch cabinets.
- ◆ The distance between every two mounting holes on the front vertical mounting flange in a 21-inch cabinet is 1 SU (25 mm).

Example of Arranging Subracks in a 21-inch Cabinet

Unit: mm



Installing Components



Fiber Passage Unit (Integrated with Slide Rails)

Marker pen



Panel screw



Flat screwdriver

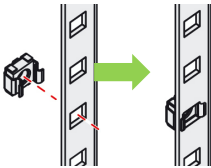


Cross screwdriver

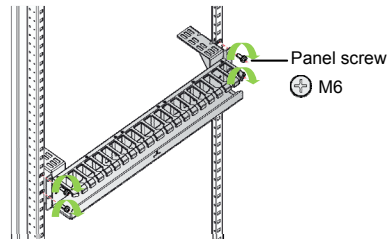


Procedure

- 1 Mark the positions for mounting the subrack and the fiber passage unit on the vertical mounting flanges of the cabinet. Then install the floating nuts.



- 2 Install the fiber passage unit.



- 3 Push the subrack into the cabinet along the slide rails.
- 4 Install the panel screws to secure the subrack.



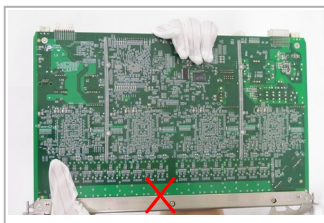
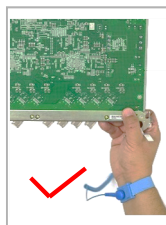
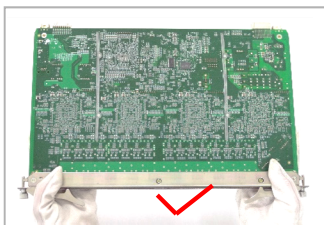
Correct Way to Install Screws

- 1 Insert the cable plug completely into the desired interface so that the end face of the plug aligns with the card panel surface.
- 2 Pre-tighten the screw: Tighten the screw with moderate force, making sure that the screwdriver is on the same line with the screw.
- 3 Make sure that the screw threads can get a good grip (the resistance encountered is small), and tighten the screw carefully.

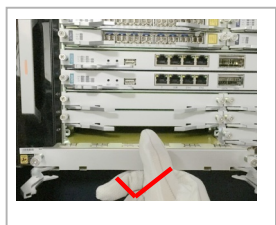


**Caution**

- ◆ Do not contact cards with bare hands. Always wear ESD protection gloves or ESD protection wrist strap when operating on cards.
- ◆ When holding a card, put your hands on its panel, and do not touch any components or wires on a card, or metal conductors in a socket.



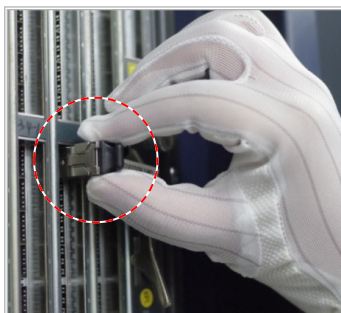
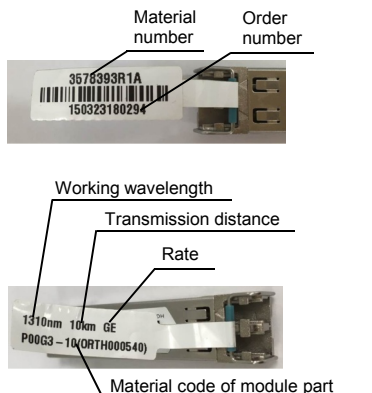
- ◆ All vacant slots in the subrack should be installed with dummy panels. When you unplug a dummy panel, make sure that you will plug it back in five minutes.
- ◆ Use care when plugging a card. The card cannot be inserted if not properly oriented.
- ◆ The cards are valuable and fragile. Please treat them with great care.
- ◆ Prevent the circuit surfaces of cards from contacting each other to avoid shorting or scratching.
- ◆ If the unpacked card is a spare card, it will not be installed immediately. Pack the card with its original ESD protection bag and put it in a dry and cool place, keeping it away from sunlight and strong electromagnetic radiation sources.



7 Operation Rules for Plugging / Unplugging Optical Modules

7.1 Plugging the Optical Module

- 1 Hold the optical module, and plug it into the card along the EMI cage.



7.2 Unplugging the Optical Module

- 1 Grab the optical module handle with the hooked end of the fiber puller, and draw it out to detach the optical module from the EMI cage.



Fiber puller

Pulling the
optical module
(hooked end)



Pulling the
optical fiber



Caution

While pulling the optical module, hold the fiber puller tightly so that the module will not fall down.



8 Installing Cards and Components

8.1 Installing Cards

! Caution

- ◆ Before installing a card, check the pins and card connector on the backplane.
- ◆ Follow the rules for installing cards.
- ◆ If resistance is encountered when you are plugging a card, pull out the card and check whether the card direction, slot, and card type are correct. Do not force in a card in such a case.
- ◆ The core switch card, power card and CIOA card have color marks on both ends. Apply the cards to the slots with the same color marks to prevent mismatch.
- ◆ Apply dummy panels to the slots not holding cards. The procedures for installing the dummy panels are the same as those for installing common cards.

ESD protection gloves / wrist strap



Cross
screwdriver



Captive
screw



- 1** Open the latches, align the upper and lower edges of the card with the slide rails in the slot (with the component side of the card facing left), and push the card in along the slide rails slowly.



- 2** Push the card to its position, and close and secure the card's latches as shown in the figure below.



- 3** Tighten the captive screws on the card panel to lock the card.



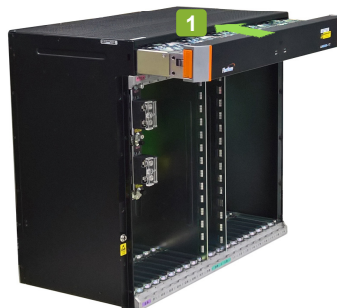
8.2 Installing the Fan Unit

! Caution

- ◆ Do not operate forcefully; especially do not exert excessive force when installing the fan unit.
- ◆ Do not touch the fan blades when the fan unit is running.

- 1** Hold the fan unit and align the slide rails on both sides of the fan unit with the slide rail grooves for the fan unit on the subrack respectively. Push the fan unit slowly and completely into the subrack.

ESD protection gloves /
wrist strap





Instruction

- ◆ Internal cables are connected inside the cabinet. Usually they have been connected before delivery. Installers should check the connection of internal cables on site. The items to check include whether the cable distribution is reasonable, whether the wires and cables are properly and neatly arranged, whether the plugs are connected firmly, whether incorrect or poor insertion exists, and whether any part is missing.
- ◆ The installers can choose the top access wiring mode or the floor access wiring mode according to the equipment room and the installation site conditions (This guide uses the top access wiring mode as an example for description).
- ◆ The AN6000-17 uses the PDP850A (3000064).



Note

- ◆ Before laying out wires and cables, you need to remove the front panel of the PDP. If space is limited for operations, remove the baffle at the bottom of the PDP.
- ◆ After you have completed layout of wires and cables, restore the front panel and baffle to their original places.

Preparing Wiring Holes on the Cabinet



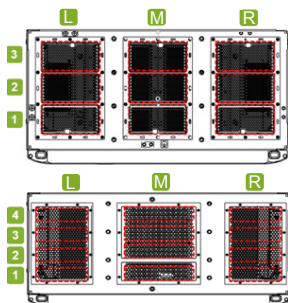
Instruction

- ◆ For a cabinet equipped with mouseproof hop-pockets on the top, fasten the mouseproof hop-pockets after external wires and cables are led into the cabinet and well arranged.
- ◆ For a cabinet equipped with cover plate on the top or bottom of the cabinet, determine the position, size and number of wiring holes according to the wiring plan. Pierce the cover plate with diagonal pliers at desired positions to make wiring holes. The following introduces how to make wiring holes on the top of the cabinet.
 - ▶ Prepare the holes from near to far in sequence.
 - ▶ Polish the raw edges of holes so that they will not cut hands or cables.

Fastening the mouseproof hop-pockets on the top of the cabinet

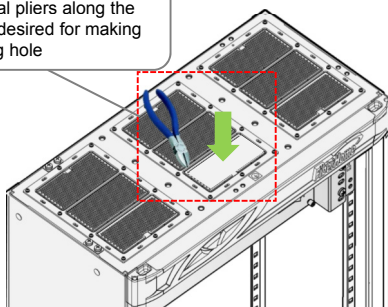


Recommended Areas and Sequence for Making Wiring Holes

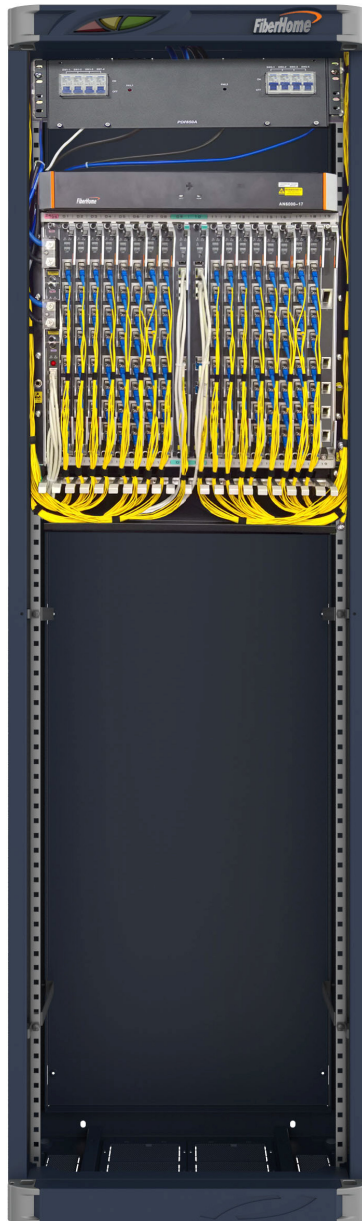


Making a Wiring Hole

Pierce the cover plate with diagonal pliers along the edges desired for making a wiring hole

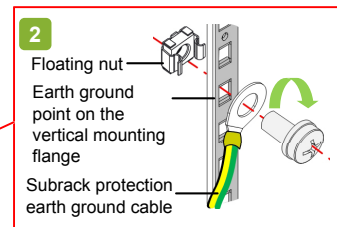
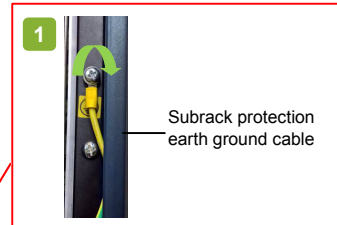
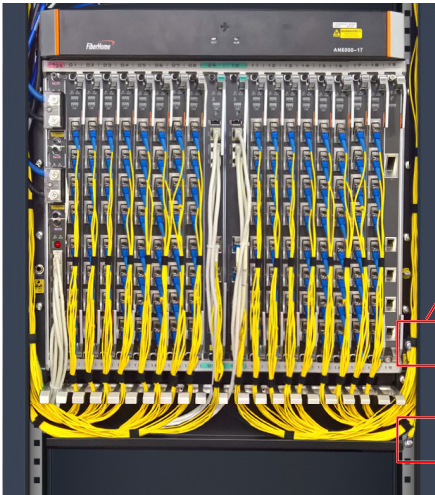
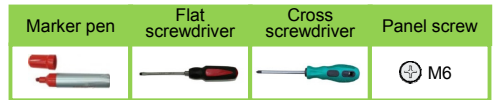


A Subrack for PON Service



11 Connecting Power Cables and Protection Earth Ground Cables

11.1 Connecting the Subrack Protection Earth Ground Cable



11.2 Connecting the External Power Cable



Warning

- ◆ Make sure the external power supply is shut off before connecting the power cable. Do not connect the cabinet power cable when it is powered.
- ◆ Make sure the DC input is cut off; identify the switches to be used.
- ◆ Never expose the joining part of the power cable and the power connector unless necessary.
- ◆ If the bonding resistance between the ground cable of the equipment and the earth ground bar is higher than 0.1 ohm, the ground cable should be re-arranged.




Caution

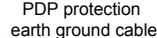
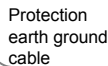
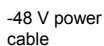
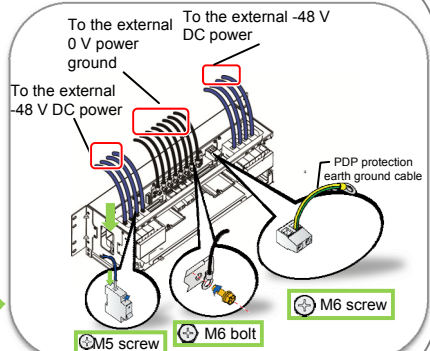
- ◆ With the premise that the cables must be arranged in compliance with the route, the power cables should be processed on site according to the "shortest" route principle.
- ◆ The power cables should be made of a continuous segment of copper core with no intermediate connections.







-
- To the earth ground bar in the equipment room
- To the power supply device in the equipment room
- M6 screw
- Earth ground point on the cabinet top

-

- 



Screw/bolt	Captive screw
 M5/M6	 M3
Socket wrench	Cross screwdriver
	

"Cut-Wrap-Crimp-Insulate"

- 
- 1

- 
- 2

-

- 4
- 
- Insulating tape/heat-shrinkable tube

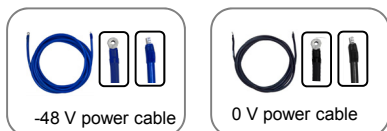
Caution

- ◆ Make sure that the power control switches for the corresponding subrack on the PDP are placed in the OFF position before laying the power cables.
- ◆ Completely insert the cord end terminals into the terminal blocks on the PDP. To ensure good connection, the metal part exposed should not exceed one sixth of the overall metal length. The length of the exposed insulation covering or metal part of terminals in the same row or batch should be equal whenever possible.
- ◆ Do not press the insulation covering of the cord end terminals, which may cause poor electrical connection.
- ◆ Make sure the side with a larger area of the cord end terminal contacts with the terminal block.
- ◆ After you have completed connection of the power cables, attach a label indicating the cable information to both ends of each cable, 1 cm to 2 cm away from the connector on each end.

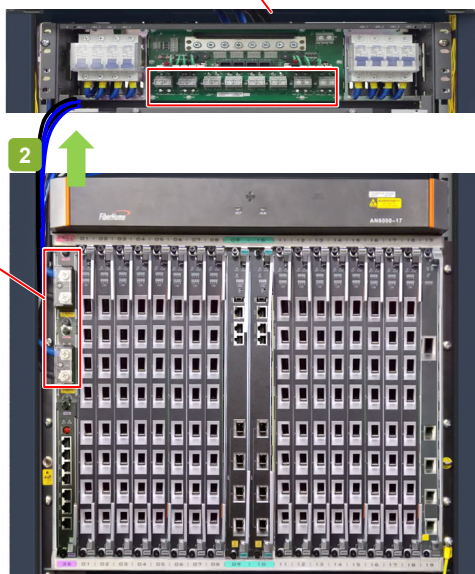
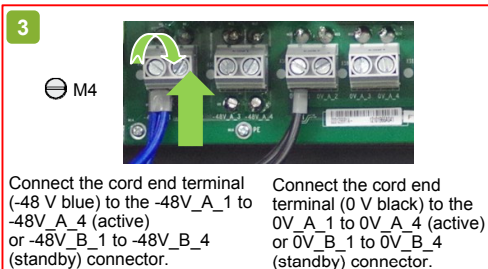
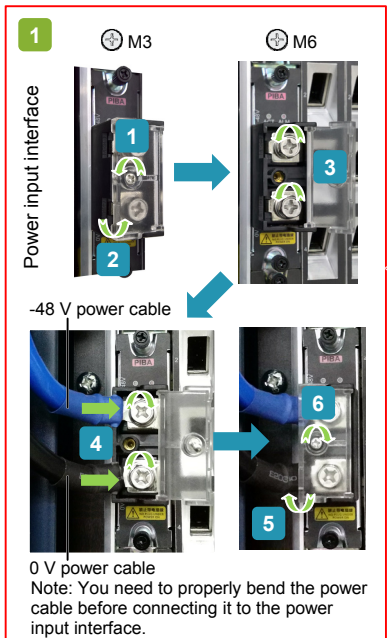


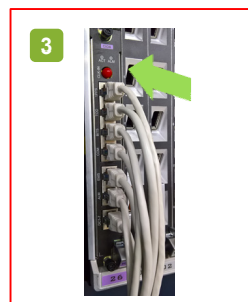
Instruction

The figures below illustrate how to connect the subrack power cables to the subrack and the PDP850A (3000064).



Cross screwdriver	Flat screwdriver	Screw/bolt
		M3/M5/M6
		M4



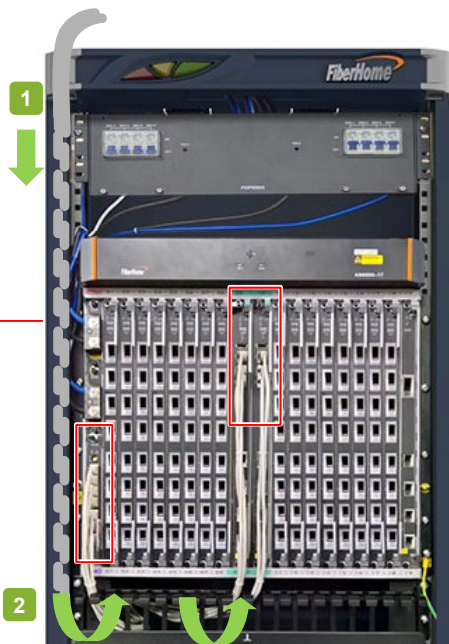


Instruction

Route the network cables behind the vertical mounting flange, in the space between the subrack side panel and the cabinet side panel. Lead them to the bottom of the subrack, thread them through the wiring holes of the fiber passage unit, and then connect them to the desired cards.

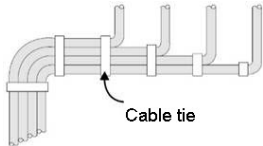
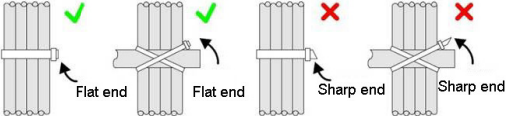
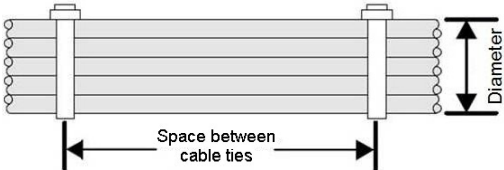
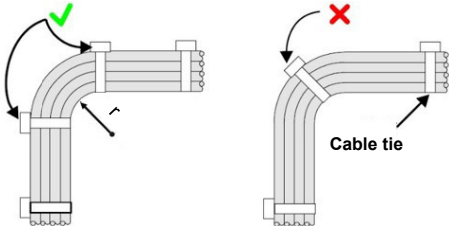
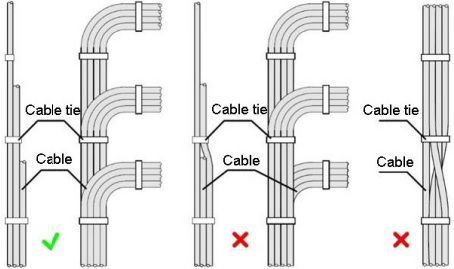
Connection

Connected to the Opposite End Equipment



Subrack Side (RJ-45)	Opposite Side (RJ-45 / Bare Wire)
SFP+ ports 1-4 of the HSCA card	Connected to the IP network for uplink.
Ports 2-5 of the KU1A card	
Ports 1-8 of the HU8A card	
ETH interface of the HSCA card	Connected to the out-of-band network management computer to implement network management monitoring.
EMS interface of the CIOA card	
ESC interface of the HSCA card	Connected to the environment monitoring device to report the external environment status to the network management system.
ALM interface of the CIOA card	Connected to one of the terminals XS1 to XS4 on the PDP850A (3000064) to output the subrack alarms to the PDP.
1PPS/TOD interface of the CIOA card	Connected to the external clock device. ^{Note 1}
DC1-7 interface of the CIOA card	Connected to the dry contact device. ^{Note 1}
Note 1: The cable end to be connected is the bare wire.	

Rules for Binding Cables

Rules for Binding Cables	Illustration
<ul style="list-style-type: none"> Keep the bound cables neat. The horizontal cables should be bound with proper and equal spacing between them. 	
<ul style="list-style-type: none"> Do not join several cable ties to make a longer one and bind cables with it, which may reduce the binding force. The cable ties are arranged in good order. The extra parts of the binders are cut from the root without leaving sharp points. 	
<p>When binding cables, abide by the following rules for the space between cable ties:</p> <ul style="list-style-type: none"> When the diameter of the cable bunch is less than 10 mm, the space between cable ties should be 150 mm; When the diameter of the cable bunch is between 10 mm and 30 mm, the space between cable ties should be 200 mm; When the diameter of the cable bunch is equal to or larger than 30 mm, the space between cable ties should be 300 mm. 	
<ul style="list-style-type: none"> When binding the bent cables, do not bind them midway through the bend; otherwise, the cores inside the cables may be broken. The bending radius of the cables (R) shall meet the following requirements ("D" refers to the cable diameter): <ul style="list-style-type: none"> Cables for general use: $R \geq 2D$; RF cables: $R \geq 15D$ in common conditions; $R \geq 10D$ in extreme conditions. 	
<ul style="list-style-type: none"> The cables inside the cabinet should be arranged from far to near. That is, lay the cables to the farthestmost end first, putting them on the bottom layer in the wiring area. Do not cross or twist the cables whenever possible. 	

13 Connecting the Optical Fiber Jumper



Note

Select the right type of the optical fiber jumper according to the type of the optical interfaces on the local equipment and opposite end equipment. The optical interfaces on the AN6000-17 correspond to two types of optical fiber connectors: LC/PC and SC/PC (SC/APC).



LC/PC Optical Fiber Connector



SC/PC Optical Fiber Connector



Caution

See the table below for the major specifications and appearance of the commonly used LC/PC and SC/PC optical fiber connectors. When the equipment is mounted in a 300 mm-deep cabinet, it is advisable to use the short optical fiber connectors.

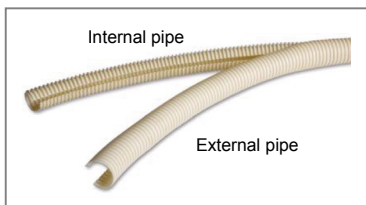
Type	Short Optical Fiber Connector	Long Optical Fiber Connector
LC/PC	<p>31 mm</p>	<p>48 mm</p>
SC/PC	<p>39 mm</p>	<p>55 mm</p>

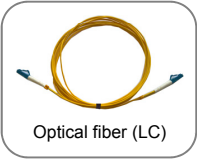
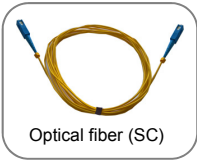
13.1 Connecting the External Optical Fibers



Caution

- ◆ The open corrugated pipes should not be overloaded with optical fibers. An open corrugated pipe with the diameter of 32 mm should carry no more than 60 optical fibers with the diameter of 2 mm.
- ◆ It is recommended that the corrugated pipe inside the cabinet should be about 10 cm long.
- ◆ Arrange the corrugated pipe outside the cabinet according to the conditions of the equipment room.

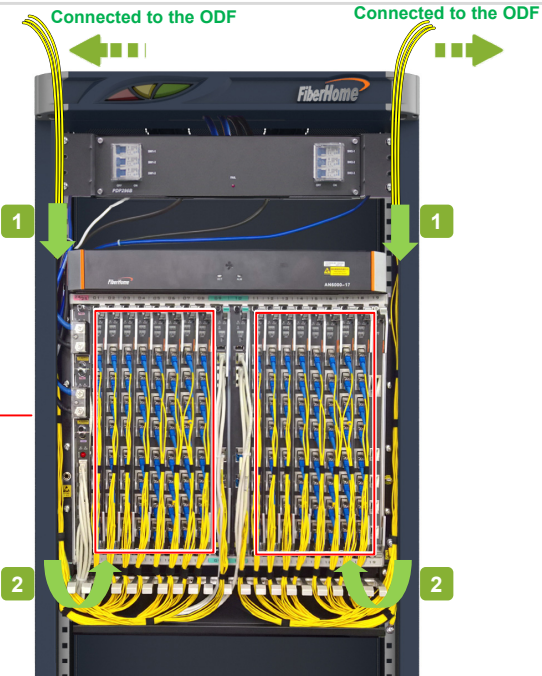




Instruction

Route the fiber jumpers in the slots 1 to 8 along the front vertical mounting flange on the left side of the cabinet and those in the slots 11 to 19 along the front vertical mounting flange on the right side of the cabinet.

Connection



Connector	Subrack Side	Opposite End Side
SC/PC type connector	Ports 1-8 of the EX8A/GX8A/GM8A card	Connected to the remote ONUs to provide the 10G EPON/XG-PON/ GPON & XG-PON Combo downlink channels.
LC/PC type connector	SFP+ ports 1-4 of the HSCA card	Connected to the IP network to provide the GE, 10GE and 100G optical channels.
	Ports 1, 2-5 of the KU1A card	
	Ports 1-8 of the HU8A card	

- 1 After the connection of optical fibers is completed, installers should bind the optical fibers at the entrance of the cabinet and at the point near the fiber passage area with dedicated fiber binding straps to secure them.
- 2 Connect the optical fibers on the ODF side.
- 3 Remove the temporary labels; make project labels and attach them to both ends of the optical fiber.
- 4 The optical interfaces not connected with fiber pigtails should be covered with anti-dust caps. The fiber pigtails not connected with optical interfaces should be covered with pigtail caps.



Caution

Do not leave the labels between two cards, which may affect the electrical conductivity between cards.

Rules for Binding Optical Fibers

Rules for Binding Optical Fibers	Illustration
<ul style="list-style-type: none"> When binding a bunch of optical fibers, keep the space between the fiber binding straps to be 20 cm. 	
<ul style="list-style-type: none"> Do not twist, bend, stretch or squeeze optical fibers when connecting them. The fiber bending radius should not be smaller than 10 D ("D" refers to the optical cable diameter) and should not be smaller than 30 mm. 	
<ul style="list-style-type: none"> The optical fibers should contact the loop side of the fiber binding strap and not contact the hook side. Tidy up the optical fibers before binding them. Bind the optical fibers with fiber binding straps with appropriate tightness. Do not cross or twist the optical fibers whenever possible. 	

14 Installing the Cabinet Door



Instruction

The AN6000-17 can be installed in the following cabinets. Please refer to the corresponding manuals for the procedures of installing the cabinet doors.



Caution

Exercise care in operation especially when closing or opening the doors to avoid damage to the cables.

Cabinet Model	Manual Description
21-inch 300 mm-deep cabinets (404000068 to 404000071)	<i>Quick Installation Guide for the 21-inch Cabinet (300 mm-deep)</i> (404000068 to 404000071)
21-inch 340 mm-deep cabinets (404000596 to 404000599)	<i>Quick Installation Guide for the 21-inch Cabinet (340 mm-deep)</i> (404000596 to 404000599)
21-inch 600 mm-deep cabinets (4102584 to 4102581)	<i>Quick Installation Guide for the 21-inch Cabinet (600 mm-deep)</i> (4102584 to 4102581)

15 Post Installation Inspection

15.1 Checking the Connection and Layout of Wires and Cables



Caution

When the connection and layout of the cables and wires are completed, installers should conduct the connectivity test and ensure that the signals are transmitted normally.

No.	Items to Check	Means
1	The specifications, routes, cross-sectional areas, and positions of the cables arranged are compliant with the construction plan drawing. The cables are arranged in good order, without damage to their sheath.	Visual inspection
2	The plugs of the cables are clean and intact; and the plugs made onsite are up to standard. The plugs are all connected correctly and firmly.	Visual inspection
3	When cables must be arranged along the upper part of the cabinet, the distance between them and the ventilation hole on the cabinet top should be no less than 10 cm. If the distance between the cabling rack and the cabinet is larger than 0.8 m, installers should set up a cabling ladder.	Visual inspection
4	Layout of the fiber pigtails: <ul style="list-style-type: none">● The fiber pigtails are not arranged too closely to each other or intertwined at the turning points. The paired fiber pigtails are bound after being arranged in order. Do not bind with too much force and leave pressure marks on the fiber pigtails.● Fiber pigtails can move forward or backward freely in the fiber fastener but cannot bend in right angle.● After the fiber pigtails are arranged, do not put any cables or other objects upon them.	Visual inspection

15.2 Checking Before Power-on



Caution

The AN6000-17 uses -48 V DC power supply with an acceptable voltage range from -40 V to -57 V. Before powering on the equipment, installers should

1. Confirm that the cabinet power cables are correctly connected with the external power supply equipment.
2. Confirm that all the wires and cables are connected correctly.
3. Place all power switches on the PDP in the OFF position.
4. Disconnect all cards inside the subrack but leave them on their slots.
5. Disconnect the fan unit inside the subrack but leave it on its slot.

15.3 Power-on Test

1. Measure the voltage between the -48 V and the 0 V connectors in the external power input area of the PDP. The normal value should be between -40 V and -57 V.
2. Place all the branch output switches on the PDP in the ON position.
3. Confirm that the subrack has no abnormal sound or smell.
4. Insert the fan unit. The fan unit will start running as soon as it is inserted, and air movement will begin.
5. Insert the cards into the subrack in sequence and the cards will be electrified normally in two or three minutes. Then the indicator LEDs of all cards in the subrack should be in normal working status.
 - ① Check whether the ACT indicator LED on the card is illuminated, which stands for normal power on.
 - ② Check whether the alarm indicator LED on the card is OFF, which indicates no alarm.

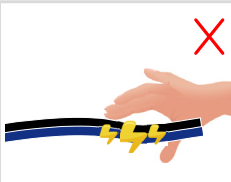


Instruction

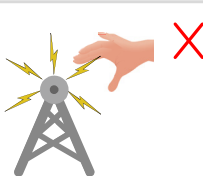
The power-off procedures for the AN6000-17 are reverse to those of power-on.



Do not install / operate the equipment or lay cables during a lightning storm.



Do not connect or remove the power cable while it is powered.



Direct or indirect contact (through damp objects) with high voltage power supply can cause bodily harm and should be avoided.



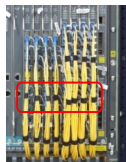
Promptly report any conditions that may lead to security problems.



The vacant slots should be covered with dummy panels to prevent foreign objects from entering the equipment and ensure normal air circulation.



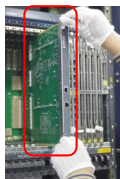
The power cables should be separated from signal cables.



Do not bind optical fibers with cable ties. Use the black fiber binding strap instead.



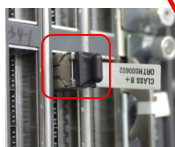
Tidy up big bundles of cables, avoid crossing or twisting them whenever possible.



When plugging / unplugging a card, exercise care and align the card with the slide rails.



Put an anti-dust cap on an unused optical fiber.



Put an anti-dust cap on an unused optical module.



Do not twist, bend, stretch or squeeze optical fibers during installation. The bending radius of the optical fibers should be no smaller than 10 D (D: optical cable diameter).



Install rat guards at the top and bottom of the cabinet or fasten the mouseproof hop-pockets after connection of the cables is completed.



Keep the cabinet door closed in daily operations.



Do not place the labels between two cards, which may affect the electrical conductivity between the cards.



Reserve proper margins between cable connectors and the first binding points, so that the cables can be easily plugged or unplugged and that stress will not be produced at the connecting points.