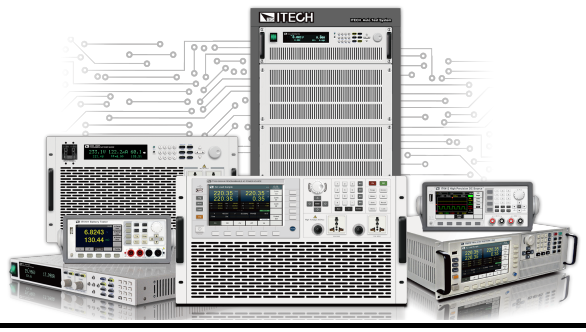
IT6000 Series

Cabinet Assembly Instruction



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Manual Part Number

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Note

A NOTE sign denotes important hint. It calls attention to tips or supplementary information that is essential for users to refer to.

Content

1 About this manual

Thank you for using this product. This manual will introduce how to connect multiple single units (one master and multiple slaves) in parallel and how to assemble them in the cabinet for expanding current, power specifications.

Note

"One master and multiple slaves" means that there is only one instrument with operating panel (namely, the master) in the parallel system, and the other instruments have no operating panels (namely, the slaves). In the "one master and multiple slaves" system, you only need to operate the master's front panel.

- Taking the ITECH standard 27U cabinet as an example, the assembly steps for one master and five slaves will be described below. If you assemble a cabinet with other number of single units in parallel connection (such as one master and two slaves), the assembly types and methods are the same, apart from the difference in the number of required parts.
- Before assembly, it is recommended to carefully read the contents in 2.2 Preparation Before Assembly for preparation before assembly.
- Before introduction of each assembly link, this manual provides "Prerequisites". Please read "Prerequisites" carefully to quickly master the assembly principles and related precautions.
- The graphics in this manual are only for reference. Please subject to the actual shipping for the single unit, accessory appearance and quantity.

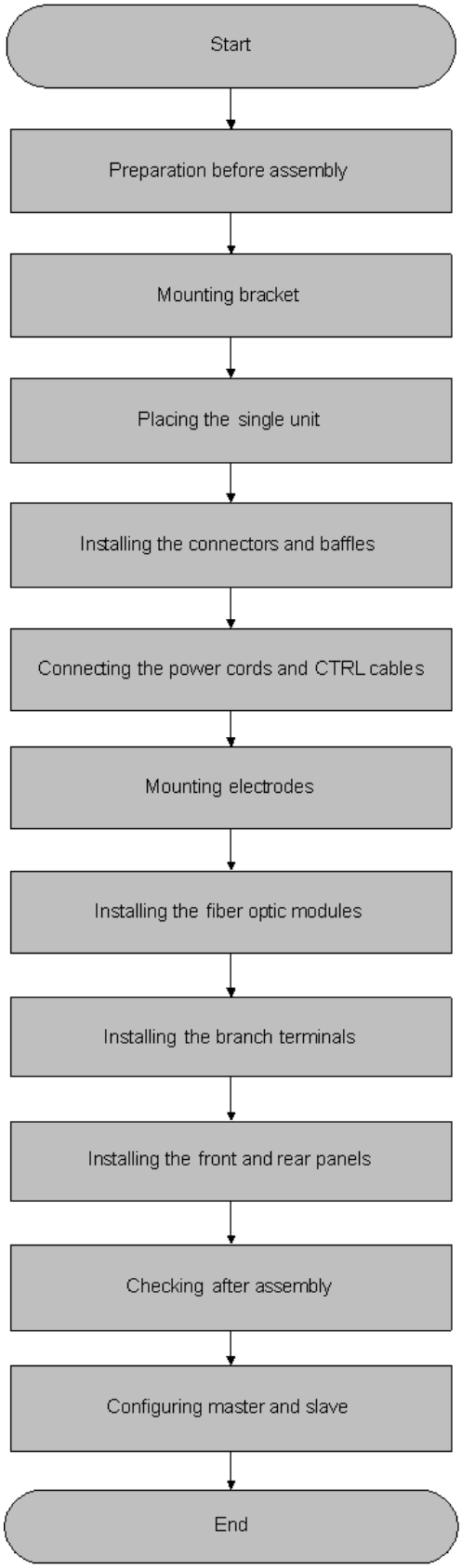
This series of instrument also has *User Manual* and *Programming Guide*. Please get access to related manuals for details.

2 Assembling the Cabinet

2.1 Main Assembly Process

The main assembly process for one master and multiple slaves is as shown in Figure 2–1 One master and multiple slaves.

Figure 2–1 One master and multiple slaves



2.2 Preparation Before Assembly

2.2.1 Safety Precautions

For personal and equipment safety, please follow the equipment mark and "Safety Precautions" in the Manual before assembly, operation and maintenance of equipment.

The **Warning**, **Caution** in the Manual are not intended to include all safety precautions to be followed, which only serve as supplementary of all safety precautions.

Environment safety

CAUTION

- **It is prohibited to assemble equipment in high-density dust environment.**
- **Ensure that the temperature and humidity in the assembly site are within the range of temperature and humidity in which the instrument can work properly. For details, refer to the User Manual of corresponding products.**
- **Ensure that the assembly environment is well-ventilated. Do not block the air inlet at the front of the instrument or the air outlet at the rear of the instrument.**
- **At least 12 inches (30.5 cm) must be left on the front and back of the cabinet to ensure sufficient air circulation.**
- **When three or more instruments are assembled in the cabinet, at least 3U (1U = 44.45 mm) space must be left in the bottom layer of the cabinet for deconcentrator installation and line connection.**

Electrical safety

WARNING

- **Power-on assembly is strictly prohibited to avoid personal injury.**
- **It is forbidden to supply power to the equipment before cabinet assembly and wiring are completed.**
- **To prevent electric shock and fire, please use the power cords provided by ITECH.**
- **Refer to the connection steps of power cords in this Manual, and correctly ground each single unit. Disconnection of protection (grounding) wire or the grounding protection terminal will result in a potential shock hazard, which may cause personal injury or death.**
- **During equipment assembly and operation, take all safety precautions, and ensure that all connections are done by qualified persons familiar with related risks. Improper operation can cause fatal injury and equipment damage.**

Mechanical safety

CAUTION

- **Before installing the instrument on the cabinet, at first, determine that the cabinet and bracket are fixed to prevent the cabinet from inclining or collapsing due to unstable center of gravity, which may cause crashing injury or instrument damage.**
- **When carrying heavy objects, be prepared to bear the load to avoid sprains or injuries caused by heavy objects.**
- **Be careful when pulling a single unit from the cabinet, and mind other single units that may be unstably mounted on the cabinet to avoid crushing or crashing injury.**

WARNING

It is prohibited to drill holes on the instrument without authorization. Unqualified drills may damage the electromagnetic shielding property of the instrument or internal cables. In addition, metal filings from drilling may cause short circuit of the PCB or other faults.

2.2.2 Pre-assembly Inspection

Check the Assembly Site

The assembly site requirements are as shown in the table below.

Item	Requirement
Cleanliness requirements	This instrument should be assembled in clear, tidy and well-ventilated site. Water seepage or leakage is prohibited in the assembly site.
Temperature/ humidity requirements	Ensure that the temperature and humidity in the assembly site are within the range of temperature and humidity in which the instrument can work properly. For details, refer to the User Manual of corresponding products.
Requirements for resistance to corrosive gas conditions	The assembly site should be free of acidic, alkaline or other corrosive gases.
Heat dissipation space requirements	At least 12 inches (30.5 cm) must be left on the front and back of the cabinet to ensure sufficient air circulation.

Checking the Power Supply Conditions

The requirements for AC input power supply are as shown in the table below.

Item	Requirement
Voltage requirements	The working voltage supplied to the assembled cabinet should be within the normal working voltage range of the cabinet: • 198V - 264V (Derating 50%) • 342V - 528V (Three-phase four-wire system) Frequency: 47Hz - 63Hz
Cable requirements	The power cords in the shipping package can only be used with the single unit in this package, and should not be used in other devices.

Checking the Cabinet

The requirements for assembling cabinets are as shown in the table below.

Item	Requirement
Width requirements	Standard 19-inch cabinet is required. The overall size of this series of instrument conforms to the industry standard, which can be installed in a 19-inch standard cabinet.
Height requirements	Self-purchased cabinets must have adequate installation space. When three or more instruments are assembled in the cabinet, at least 3U (1U = 44.45 mm) space must be left in the bottom layer of the cabinet for deconcentrator installation and line connection. For example, if the total number of single units is 6, the inner space height in the cabinet is at least 3 × 6 + 3 = 21U.
Other requirements	If the left and right sides of the cabinet are equipped with panels, you should remove the left and right panels and place them in appropriate locations. After assembly is completed, install the side panels back to their original positions. Be careful when removing side panels. Any disassembled part must be put in place to ensure that it can be found during restoration. The side panels should be properly placed to prevent them from falling, which may cause panel damage or personal injury.

Checking the Package

During cabinet assembly, besides multiple single units in same specifications, main assembly accessories include electrode bars, heavy-load cabinet connectors, baffles, various cable harness combinations, branch terminals, as well as screws and nuts of different specifications. The quantity of different types of accessories may differ. Therefore, before assembling the cabinet, please check model and quantity of each accessory by checking the accessory list. In case of any discrepancy, loss or appearance wear and tear, contact the authorized local dealer or ITECH service team.

The accessory list comprises all parts required for installing the instruments into the cabinet (excluding the cabinet). Each part has a unique ITECH material number. You can compare the actual object with the material number in the list. Meanwhile, some major parts are illustrated briefly below to help you quickly identify them.

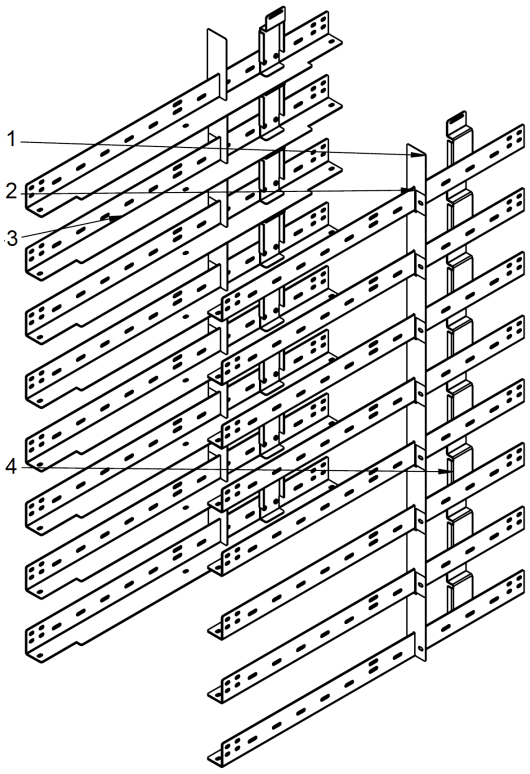
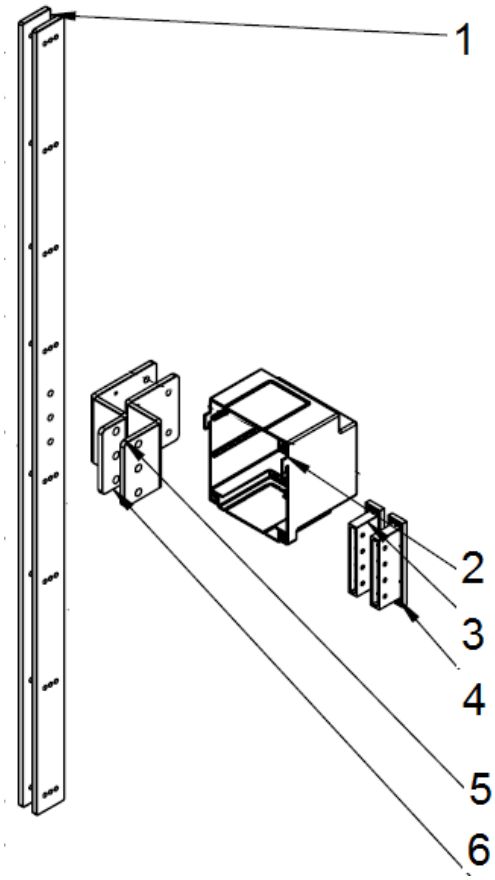
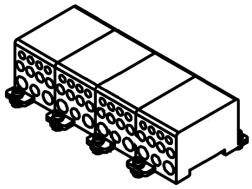
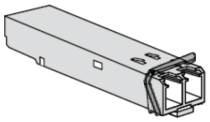
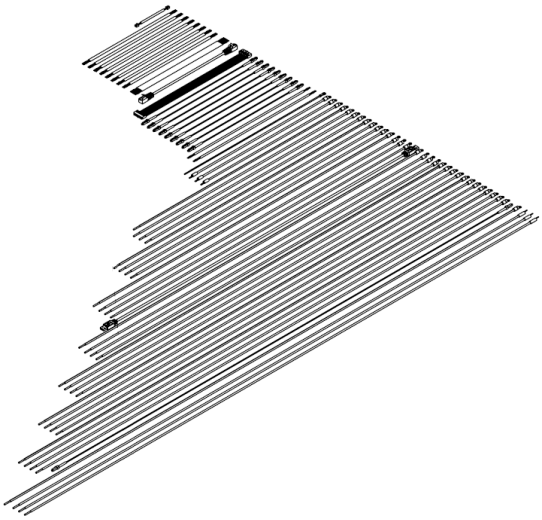
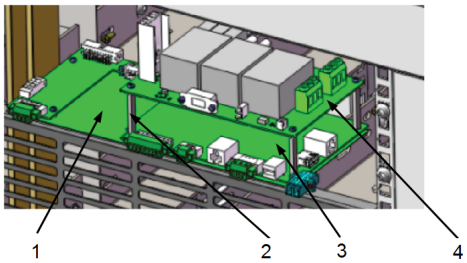
Figure	Material No/ Name	Assembly link
	1. 205566: baffles 2. 205573: baffles 3. 203156: bracket 4. 204735: 3U cabinet connectors	2.3.1 Mounting Bracket, 2.3.3 Installing the Connectors and Baffles
	1. 206480/ 204601: long electrode bar 2. 206098: electrode protection cover 3. 204166: insulating material combination (red) 4. 204192: insulating material combination (black) 5. 206481: electrodes 6. 206482: electrodes	2.3.5 Installing the Electrodes

Figure	Material No/ Name	Assembly link
	105082: decon-centrator (also called branch terminal)	2.3.7 Installing the Branch Terminals
	105214: fiber optic modules	2.3.6 Installing the Fiber Optic Modules
	All cable harness combination	2.3.4 Connecting the Power Cords and CTRL Cables, 2.3.6 Installing the Fiber Optic Modules, 2.3.7 Installing the Branch Terminals
	1. 206714: epoxy resin board 2. 203737: stanchion 3. 502646: cabinet interface board (PCB) 4. 502708: cabinet relay board	2.3.8 Installing the Front and Rear Panels

2.2.3 Preparing Tools and Accessories

Before assembly, except the accessory package supplied with the instrument, you need to prepare the following tools and accessories to be used in assembly.

Tools to be prepared before assembly are as shown in the table below.

Tools	Description	Picture
Antistatic gloves	Used for anti-static protection.	
Safety gloves	Used for protecting hands.	
Steel tape	Used for measuring length.	
Diagonal pliers	Used for cutting the insulating bushes and cable binding buckles.	
Multimeter	Used for testing the insulation of the cabinet/equipment, cable connection and other electrical properties (including voltage, current and resistance).	
Internal hexagonal wrench (combined)	Used for tightening the inner hexagon screws. The screw specifications include: M8 × 16, M4 × 10, M6 × 16. The wrench specifications depend on different specifications of screws.	
Cross-point screw driver (combined)	Used for tightening the cross disc head screws (M2 × 6, M3 × 6, M4 × 10), cross recessed pan head screws with waisted shanks (M4 × 12), and cage nuts (KD-KM-M6). The screwdriver specifications depend on different specifications of screws.	
Screwdriver	Used for loosening/tightening screws on the green pluggable terminal block of the rear panel.	

Accessories to be prepared before assembly are as shown in the table below.

Accessories	Description	Picture
Nylon cable tie	Used for binding cables.	
Insulating tape	Used for isolating electric wires and other conductors.	

2.3 Starting Assembly

2.3.1 Mounting Bracket

Taking the assembly steps for one master and five slaves of ITECH standard 27U cabinet as an example, the bracket installing steps are introduced below.

Prerequisites

- For ITECH standard cabinet, taking the screw hole at the side of the cabinet as a reference, 1U = 3 holes; and 3U = 9 holes.
- Count the screw holes at the side the cabinet from up to bottom. Install the bracket when you count the seventh hole and the eighth hole, and skip the ninth hole. Then, continue to count downwards from 1, and install the next bracket when you count the seventh and the eighth holes, and so on.
- The bracket installation requires cage nut combination (KD-KM-M6). Each group has one cage nut + one M6 screw.
- During installation, ensure that the brackets at the left and right sides of the cabinet are aligned horizontally.
- At least 3U space must be reserved at the lowest layer of the cabinet for deconcentrator installation and line connection.

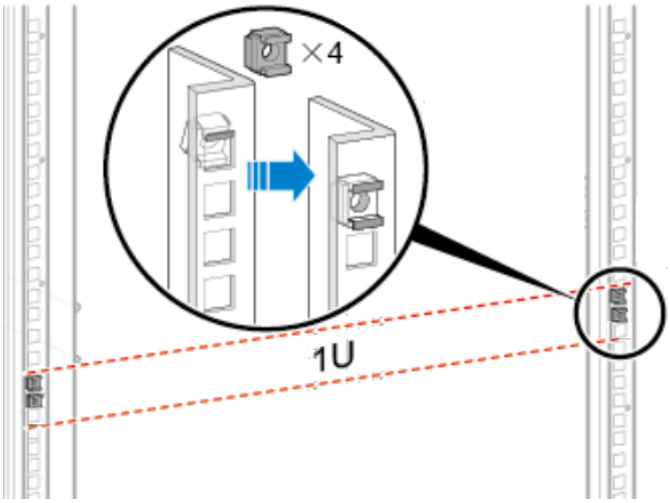
Preparing tools and accessories

Tools and accessories required for installing the bracket are as shown in the table below. For specific accessories, refer to the sticker marked with ITECH material code in the accessory package supplied with the instrument.

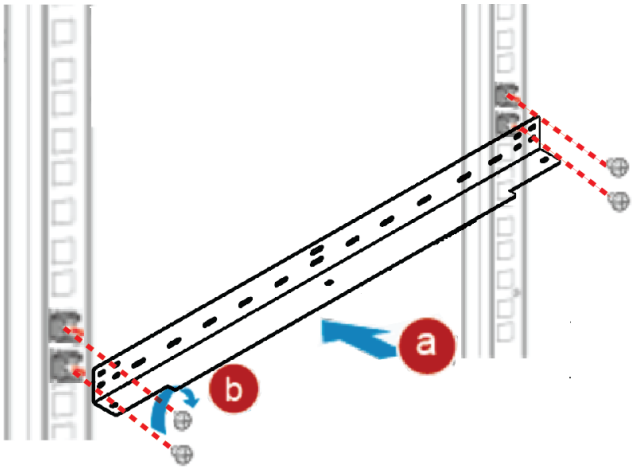
Tool / Accessory	ITECH material code	Quantity
Steel tape	Used for measuring length (To be supplied by the user).	1
Bracket	203156	Each single unit needs two brackets. The total number of brackets = total number of single units × 2.
Cage nuts KD-KM-M6	201010	Each bracket needs four groups of cage nuts. The total number of cage nuts = total number of brackets × 4.
Cross-point screw driver	Used for tightening cage nuts KD-KM-M6 (To be supplied by the user).	1

Steps

1. Refer to Prerequisites, or use a steel tape for measurement so as to mark the bracket installing position.
2. Referring to the figure below, install the cage nuts to the side screw holes of the cabinet.



3. Refer to the figure below to install a bracket.

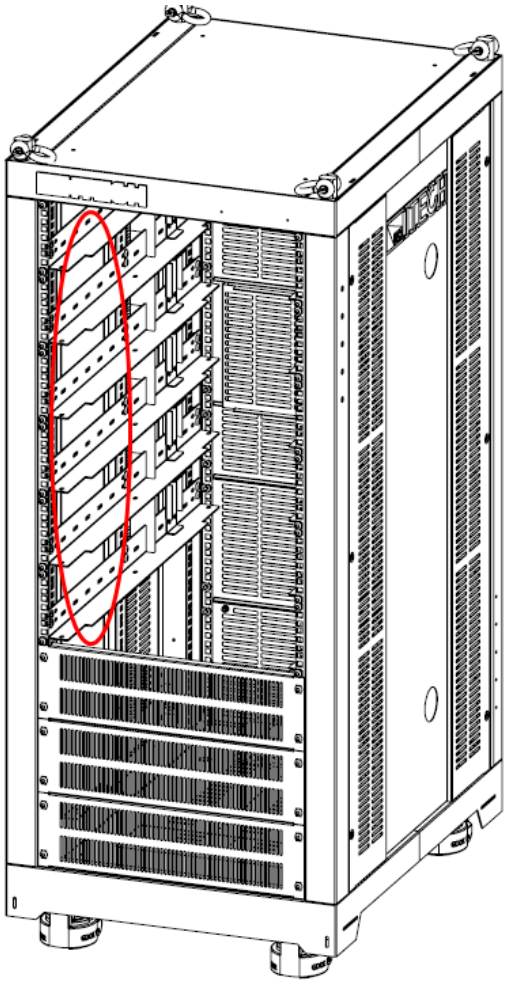


a. Take one bracket. Hold the bracket with your hands to align the installing holes of the bracket with the cage nuts on the cabinet's square strip.

b. Hold the bracket with one hand, and hold a cross screwdriver with the other hand to fix the bracket to cabinet's square-hole stripe with M6 screws (2 screws at both sides of the bracket).

4. Follow the same method to install the remaining brackets.

   The assembled bracket is as shown in the red circle part in the figure below.



5. Check whether all screws are tightened, and whether brackets at left and right sides are horizontally aligned.

2.3.2 Placing the Single Units

Prerequisites

WARNING

Danger to hands and feet. To avoid personal injury and damage to the instrument, always use a sturdy cart or other suitable device to move the instrument. Do not lift the instrument alone; always use two people to lift the instrument.

- After the single unit is placed inside the cabinet, the holes surrounding the left and right handles of the single unit will be aligned with the holes on the cabinet rack (front view). You need to tighten them firmly with the cage nut combination (KD-KM-M6). Therefore, before placing the single unit, you need to install the cage nuts on the cabinet's square strip. After the single unit is placed, tighten it with M6 screws.
- Taking the single unit on the top of the cabinet (namely, the master) as an example, count the screw holes on the cabinet from top to bottom, and install the cage nuts on positions of the first and the ninth holes. Then, continue to count downwards from 1 and count to the ninth hole, and install the next cage nut on positions of the first and the ninth holes, and so on.

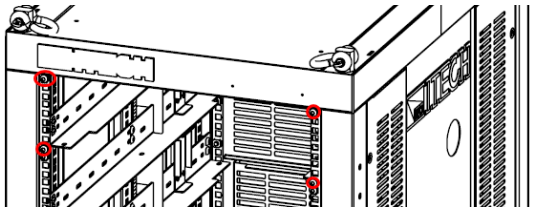
Preparing tools and accessories

Tools and accessories required for installing the single unit are as shown in the table below.

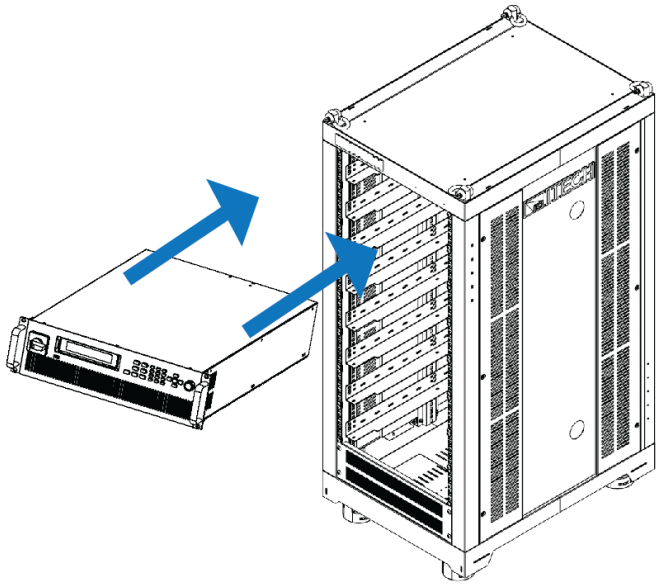
Tool / Accessory	ITECH material code	Quantity
Trolley	Used for moving the single unit (To be supplied by the user).	1
Cage nuts KD-KM-M6	201010	Each single unit needs four groups of cage nuts. The total number of cage nuts = total number of single units × 4.
Cross-point screw driver	Used for tightening cage nuts KD-KM-M6 (To be supplied by the user).	1

Steps

1. Referring to Prerequisites, install the master's cage nuts in the position marked by the red circle in the figure below.



2. Referring to the figure below, place the master inside the cabinet.



3. Repeat the steps above to assemble the remaining single units (namely, slaves).

4. Use a cross screwdriver to fix M6 screws on the cabinet front panel.

   The finished effect is as shown in the figure below.

Note

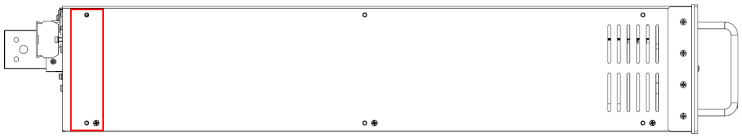
The above figure only serves as an example. The actual appearance of the cabinet and master shall be subject to the real product.

2.3.3 Installing the Connectors and Baffles

When all single units are placed in the cabinet, it is necessary to install the heavy-load cabinet connectors (3U) and the baffles.

Prerequisites

- The 3U cabinet connectors are installed to fix the single unit to prevent the instrument from displacement due to operating vibration.
- The baffles are installed to prevent the hot wind generated by the instrument rear panel from back flowing to the front part of the cabinet.
- A cabinet connector is installed at the left and right sides of each single unit. It is installed in the hole on the rear shell of the single unit, as shown in the figure below.



- A baffle is installed at the left and right sides of each single unit, which is re-commenced to be installed near the rear portion of the single unit as much as possible.

Note

A baffle with 129.1 mm × 45.5 mm × 1.2 mm is installed at the left and right sides of the uppermost single unit of the cabinet. For other single units, baffles with 176.15 mm × 45.5 mm × 21.3 mm are installed at the left and right sides.

- Inner hexagon combination screws are used to install the baffles and the connectors. Each group includes 1 inner hexagon screw M4 × 10 + 1 spring washer Φ4 + 1 plain washer Φ4. During installation, place the inner hexagon combination screws in successive (The spring washers are placed between the screws and the plain washers). Then, tighten the screws.

Preparing tools and accessories

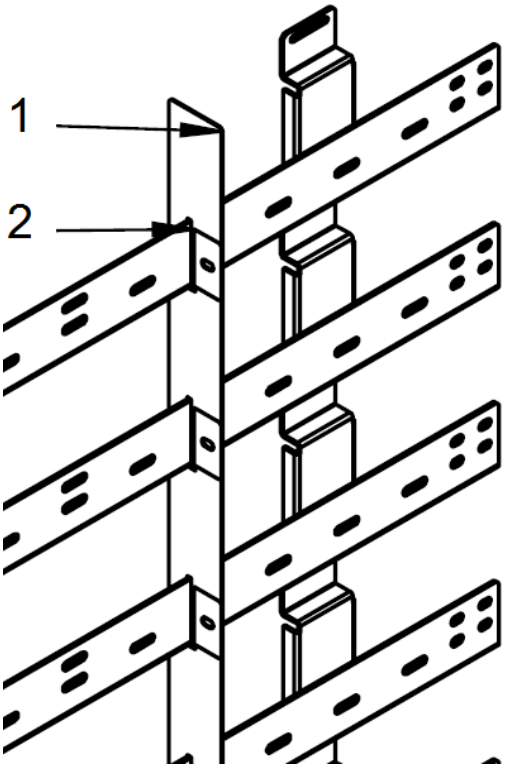
Tools and accessories required for installing the connectors and the baffles are as shown in the table below.

Tool / Accessory	ITECH material code	Quantity
3U cabinet connectors	204735	Total number of single units × 2
Baffles (Specifications: 129.1 mm × 45.5 mm × 1.2 mm)	205566	2
Baffles (Specifications: 176.15 mm × 45.5 mm × 21.3 mm)	205573	(Total number of single units - 1) × 2
Inner hexagon screws M4 × 10	200776	Total number of single units × 8
Plain washer Φ4	200811	Total number of single units × 8
Spring washer Φ4	200804	Total number of single units × 8
Internal hexagonal wrench	Used for tightening the inner hexagon screw M4 (To be supplied by the user).	1

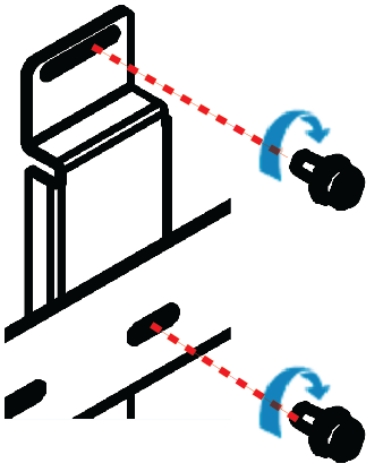
Steps

1. Referring to the description in the Prerequisites, mark the installing positions of the connectors and the baffles, and place all baffles and connectors in corresponding positions.

   Baffles are recommended to be installed in the Positions 1, 2 marked in the figure below.



2. Refer to the figure below to install the connectors.

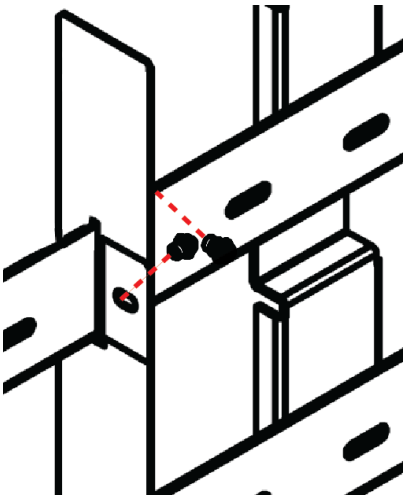


   a. Align the connectors to the holes on the rear portion of the single unit case and the bracket.

b. Place the inner hexagon combination screws in the holes.

c. Use the internal hexagonal wrench to tighten the screws.

3. Refer to the figure below to install the baffles.



a. Align the holes between the baffles and the bracket, and between the baffles.

b. Place two groups of inner hexagon screws in the holes.

c. Use the internal hexagonal wrench to tighten the screws, as shown in the figure below.

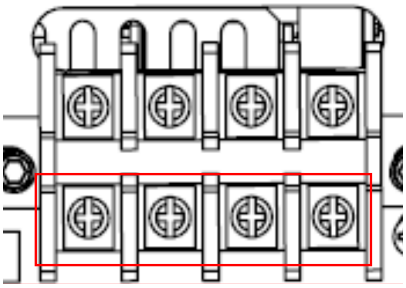
2.3.4 Connecting the Power Cords and CTRL Cables

Prerequisites

- **About AC input power cords**

– The AC input terminals of each single unit are L1, L2, L3, PE, which are connected to three live wires (red) and one grounding wire (yellow green).

– The connection methods of power cords of each single unit are the same. Use a cross-point screw to loosen the screws in positions shown in the figure below, and connect them to one end of the cable harness with round terminal, and tighten the screws.



– The cable harness connected to each single unit is getting shorter for internal single units from up to bottom of the cabinet.

Note

In this manual, taking 6 single units as an example to list material numbers of all power cord harness, which may be different from the actual material numbers of the ones you received. You can identify them based on the cable harness length.

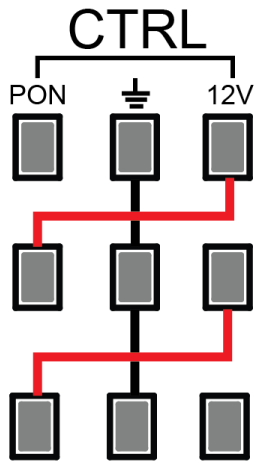
– After AC input power cords of each single unit are connected, it is necessary to connect these cable harnesses to the deconcentrators, and then connect to the power supply system (namely, AC distribution box). For details of this part of operation, please refer to 2.3.7 Installing the Branch Terminals.

- **About CTRL cables**

– Control cables are used for controlling synchronous powering-on of all single units. When the cabinet is connected to the AC power supply, you only need to rotate the power supply switch on the master front panel to synchronously turn on the power supply switches of all slaves.

– The terminal blocks of CTRL cables are CTRL (PON/GND/12V) terminals located on the single unit's rear panel.

– Wiring rules are as follows: Connect the GND/12V of the first single unit to the second single unit's GND/PON, and the second single unit's GND/12V to the third single unit's GND/PON, and so on, until the last single unit is connected. The wiring diagram is as shown below.



Note

The CTRL cable (105117) harness in the accessory package is red/yellow/black three-core. You only need to connect the red/black dual-core cable, and cut the yellow cable with diagonal pliers.

– The connection methods of CTRL cables for each single unit are the same: Use a normal screwdriver to loosen the terminal screws, connect the cable harness, and tighten the screws.

Preparing tools and accessories

Tools and accessories required for connecting the power cords and the CTRL cables are as shown in the table below.

Tool / Accessory	ITECH material code	Quantity
Cold-pressed terminal cable harness (1,750 mm, red)	105234	3
Cold-pressed terminal cable harness (1,750 mm, green yellow)	105230	1
Cold-pressed terminal cable harness (1,600 mm, red)	105240	3
Cold-pressed terminal cable harness (1,600 mm, green yellow)	105231	1

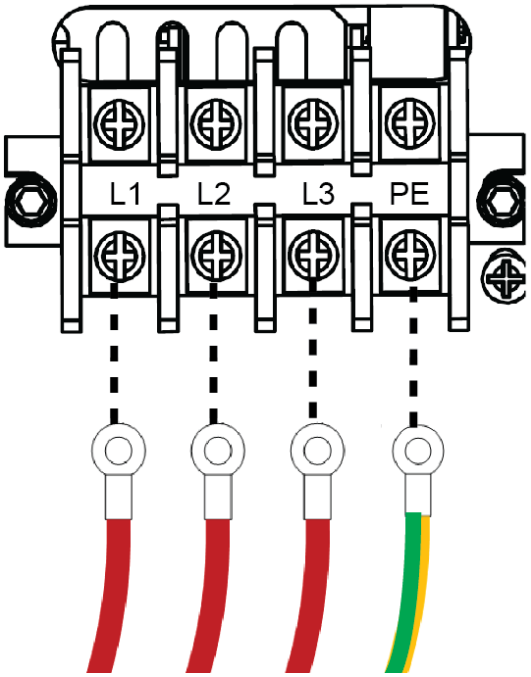
Tool / Accessory	ITECH material code	Quantity
Cold-pressed terminal cable harness (1,450 mm, red)	105235	3
Cold-pressed terminal cable harness (1,450 mm, green yellow)	105232	1
Cold-pressed terminal cable harness (1,300 mm, red)	105236	3
Cold-pressed terminal cable harness (1,300 mm, green yellow)	105233	1
Cold-pressed terminal cable harness (1,150 mm, red)	105126	3
Cold-pressed terminal cable harness (1,150 mm, green yellow)	105122	1
Cold-pressed terminal cable harness (1,000 mm, red)	105127	3
Cold-pressed terminal cable harness (1,000 mm, green yellow)	105123	1
CTRL cable harness	105117	= (Total number of single units - 1)
Cross-point screw driver	Used for loosening/ tightening the input terminal screws of the AC power supply (To be supplied by the user).	1
Normal screwdriver	Used for loosening/ tightening the screws of the CTRL terminals (To be supplied by the user).	1

Tool / Accessory	ITECH material code	Quantity
Nylon cable tie	Used for binding cable harness (To be supplied by the user).	1
Diagonal pliers	Used for cutting the binding buckles on the cable harness (To be supplied by the user).	1

Steps

1. Referring to the description in Prerequisites, connect the power cords to the AC input terminals of the single unit's rear panel successively.

   Taking one single unit as an example, the wiring method is as shown in the figure below.



   a. Use a cross-point screw to loosen and remove the screws and washers from the AC input terminals.

   b. Place the end of the power cord with round terminal between the washer and the AC terminal.

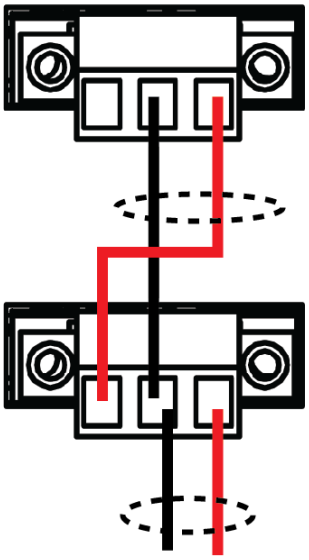
   c. Use a cross-point screw driver to tighten the screws.

Note

For each single unit, the length of the cable harness connected to four AC terminals are the same; for all single units inside the cabinet, the length of the cable harness gradually decreases from up to bottom. Please connect them based on shipped cable harnesses.

2. Referring to the description in Prerequisites, connect the control cable harnesses successively.

   Taking the connection of the first and second single unit as an example, the wiring method is as shown in the figure below.



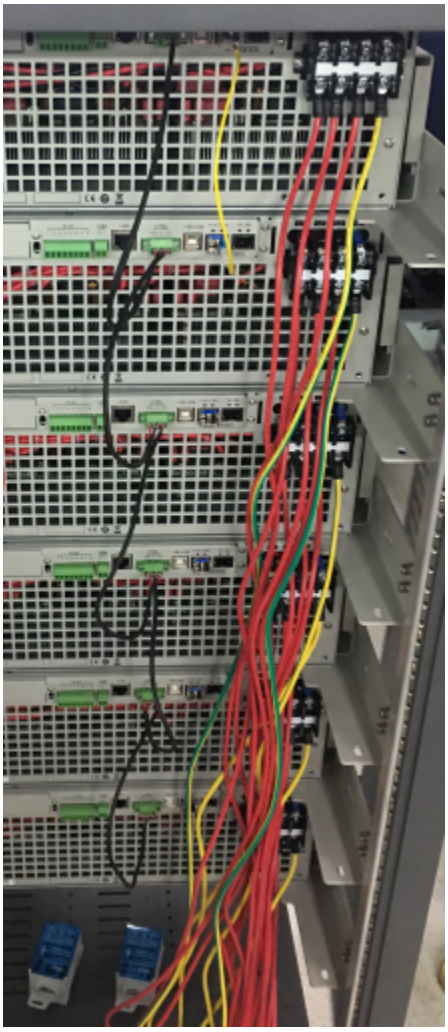
   a. Use a normal screwdriver to loosen the GND/12V terminals of the first single unit, and the PON/GND/12V terminals of the second single unit.

   b. Insert the black and red cable harness of one CTRL cable into the first single unit's GND and 12V terminals respectively, and tighten the screws. Then, insert the black and red cable harness on the other end of the CTRL cable into the GND and PON terminals of the second single unit.

   c. Insert the black and red cable harness of the other CTRL cable into the second single unit's GND and 12V terminals respectively.

   d. Use a normal screwdriver to tighten the PON/GND/12V terminals of the second single unit.

   After the connection of power cords and CTRL cables, the effect is as shown in the figure below.



3. After the connection of power cords and the CTRL cables, use Nylon cable ties to bind the cable harness by section, and place them at the side of the cabinet.

Note

The aim is to prevent intertwine and disorder of power cords and the CTRL cables from influencing the connection of other cable harnesses.

2.3.5 Installing the Electrodes

Prerequisites

- After 3U single units of IT6000 series are connected in parallel, a higher output/input capacity will be achieved.
- Between multiple single units, use two strip electrodes to connect positive and negative electrodes of all single units in parallel, and connect two cranked electrodes and insulating materials. Lead the connection points of the positive and negative electrodes out of the cabinet for safe isolation.

- The length and material number of strip electrodes in the assembly accessory package depend on the number of single units in parallel and the cabinet size. Supporting information of strip electrodes provided by ITECH is as shown below:
  - 15U cabinet: The material number of the strip electrode is 204601.
  - 27U cabinet: The material number of the strip electrode is 206480.

CAUTION

It is recommended that two persons coordinate for installing the strip electrodes and cranked electrodes. One person holds the electrode strips with two hands and aligns the screw holes, and holds screws firmly, and the other person tightens corresponding screws with a screwdriver.

Preparing tools and accessories

Tools and accessories required for installing the electrodes are as shown in the table below.

Tool / Accessory	ITECH material code	Quantity
Electrode strip	204601/206480	2
Cranked electrode (negative)	206481	1
Cranked electrode (positive)	206482	1
Insulating material (red)	204166	1
Insulating material (black)	204192	1
Cabinet rear panel (with positive and negative marks)	206509	1
Electrode shield	206098	1
Cross recessed pan head screws with waisted shanks M4 × 12	206508	2
Inner hexagon screws M6 × 16	200786	Each single unit needs 4 screws. Total number

Tool / Accessory	ITECH material code	Quantity
		of screws = Total number of single units × 4
Spring washer ¢ 6	200806	= Total number of inner hexagon screws M6
Plain washer ¢ 6	200813	= Total number of inner hexagon screws M6
Inner hexagon screws M8 × 16	206285	10
Spring washer Φ8	200806	
Plain washer Φ8	200813	
Small cross recessed pan head assembly screws M3 × 6	200713	8
Cross-head screws M4 × 10	206766	4
Cage nuts KD-KM-M6	201010	4
Internal hexagonal wrench (combined)	Used for tightening the inner hexagon screws M6 and M8 (To be supplied by the user).	1
Cross-point screw driver (combined)	Used for tightening the cross-head screws M3, M4 and M6 (To be supplied by the user).	1

Steps

1. Use the strip electrodes to connect the positive and negative electrodes of all single units in parallel.

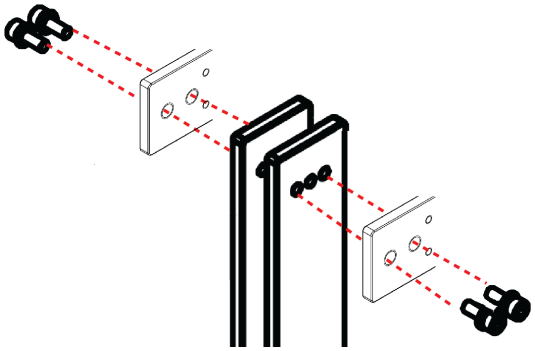
   Taking one single unit as an example, the operation steps are as follows:

   a. Use the internal hexagonal wrench to disassemble the screws (M6) on the positive and negative electrodes of the single unit, and properly keep them.

b. Extract the strip electrodes, and align the screw holes with the holes on the single unit electrodes.

   Place two strip electrodes between the positive and negative electrodes of the single unit.

c. Referring to the figure below, use the internal hexagonal wrench to tighten 4 inner hexagon combination screws (M6 + spring washer + plain washer).

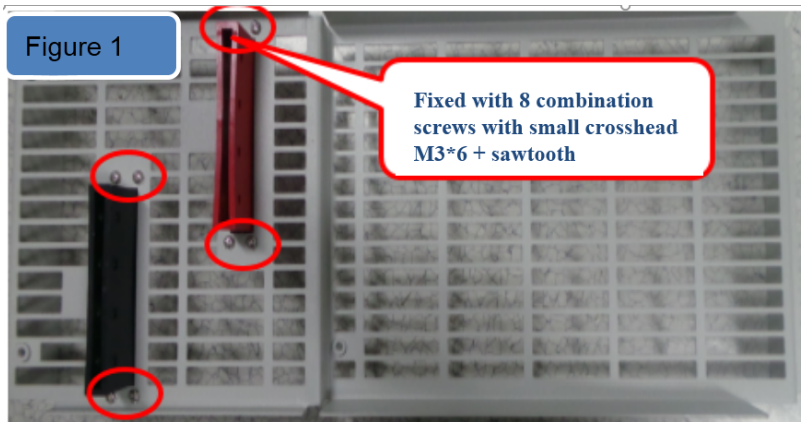


2. Assemble the cranked electrodes, the insulating materials, and the rear panel marked with positive and negative electrodes.

   a. Extract the rear panel marked with positive and negative electrodes, the insulating materials, and cranked electrodes.

   b. Insert the insulating materials into the openings of the rear panel based on corresponding relationship.

   c. Referring to the picture below, insert 8 cross disc head screws M3 into the screw holes, and use a cross-point screw driver to tighten them.



Note

The above figure only serves as an example. The actual appearance shall be subject to the real product.

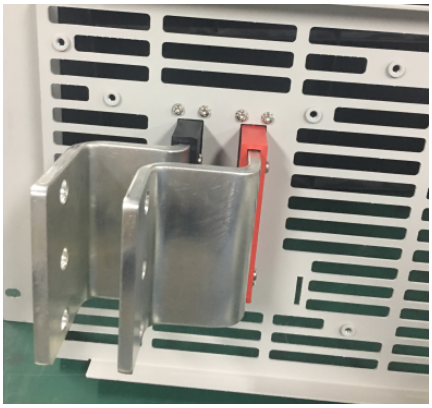
   d. Insert the positive and negative cranked electrodes between the insulating materials, and align the screw holes.

e. Referring to the figure below, use a cross-head screw M4 to tighten the ranked electrodes and insulating materials.

f. Use the internal hexagonal wrench to tighten 4 inner hexagon combination screws (M8 + spring washer + plain washer) on the cranked electrode to connect the DUT.

   Install 2 screws on the positive and negative cranked electrodes each.

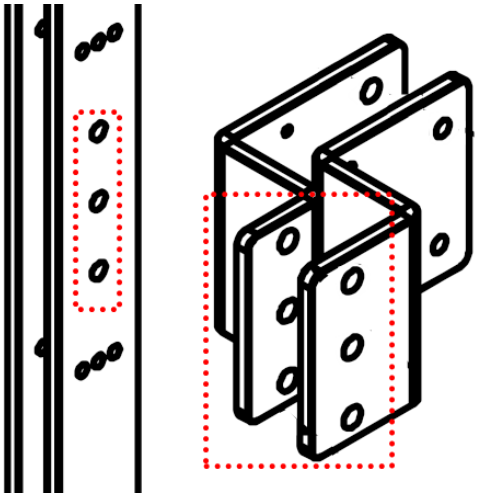
The front and reverse side of the assembled panel are as shown below.



3. Assemble the cranked electrodes on the rear panel with insulating materials to the strip electrodes.

   a. Use 4 cage nuts (KD-KM-M6) to install the cranked electrodes on the rear panel with insulating materials on the rear side of the cabinet.

      During installation, ensure that the 3 holes of the ranked electrode are aligned with the 3 holes of the strip electrodes one by one. As shown below.



Note

The installation steps for the cage nuts (KD-KM-M6) have been described before, which will not be repeated.

   b. Use the internal hexagonal wrench to tighten 6 inner hexagon combination screws (M8 + spring washer + plain washer). Tighten the strip electrode and the cranked electrode.

      Install 3 groups of screws on both sides.

4. Install the electrode shield.

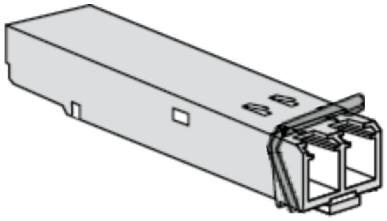
   a. Put the electrode shield in a correct position, and align the screw holes on the left and right bottom corners of the shield to the installing holes on the rear panel.

b. Use a cross-point screw driver to place 2 cross recessed pan head screws with waisted shanks M4 into the hole and tighten them.

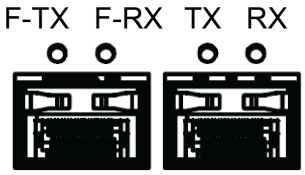
2.3.6 Installing the Fiber Optic Modules

Prerequisites

- **About fiber optic modules**
  - Fiber optic module (“optic module” for short) is used for the data transmission and communication of single units in parallel connection, which features strong anti-interference capacity.

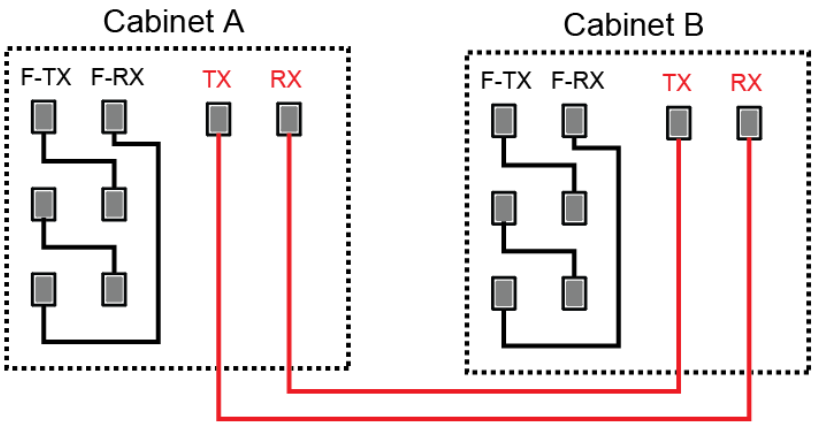


  - There are two fiber optic module interfaces on the rear panel of the single unit: F-TX and F-RX are inner loop communication interfaces of the optical fiber used for communication of single units inside the cabinet; TX and RX are outer loop communication interfaces of the optical fiber used for communication between cabinets.



  - You need to install the two fiber optic modules to the F-TX and F-RX, TX and RX interfaces on the rear panel of the master respectively. For each slave, you only need to install one fiber optic module to the F-TX and F-RX interfaces. Therefore, the number of used fiber optic modules = Total number of units in parallel + 1.

- **About fiber optic cable**
  - After the fiber optic modules are inserted, you also need to connect the fiber optic cables based on specified wiring method. The wiring diagram is as shown below.

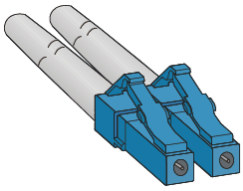


Note

As shown in the above figure, black wiring indicates the communication between single units inside the cabinet, while the red wiring indicates the communication between cabinets.

– Taking 6 single units in parallel as an example, 5 short optical fibers and 1 long optical fiber are required to connect the optical fiber inner loop. Short optical fibers are used for connecting the F-TX and F-RX of 2 nearby single units, and the long optical fiber is used for connecting the F-TX and F-RX of the bottom and top single unit.

– The connectors at both ends of the optical fiber are as shown in the figure below.



CAUTION

- **Please always use the optic modules supplied with the instrument. Third-party optic modules may cause unstable operation as their reliability cannot be guaranteed.**
- **Optic modules are electrostatic sensitive devices. During operation, anti-static precautions should be adopted during operation to avoid damage.**
- **The optic modules cannot be inserted reversely. If one optic module cannot be inserted completely in one direction, do not push hard. Overturn the optic module by 180 degrees and insert it again.**
- **Be careful to plug and unplug the optical fiber. Do not damage the head of the optical fiber.**
- **Do not bend or unfold fiber optic cables with great force. When the cable harness is too long, please circle the cable harness around, and bind it.**

Preparing tools and accessories

Tools and accessories required for installing the optic modules are as shown in the table below.

Tool / Accessory	ITECH material code	Quantity
Antistatic gloves	Used for static electricity prevention (To be supplied by the user).	1
Optic module	105214	= (Total number of single units + 1)
Fiber optic cable (short)	105133	= (Total number of single units - 1)
Fiber optic cable (long)	105132	1

Tool / Accessory	ITECH material code	Quantity
Nylon cable tie	Used for binding cables (To be supplied by the user).	1
Diagonal pliers	Used for cutting the binding buckles on the fiber optic cables (To be supplied by the user).	1

Steps

1. Referring to the description in Prerequisites, insert the optic modules into the fiber interfaces on the rear panel of 6 single units successively.

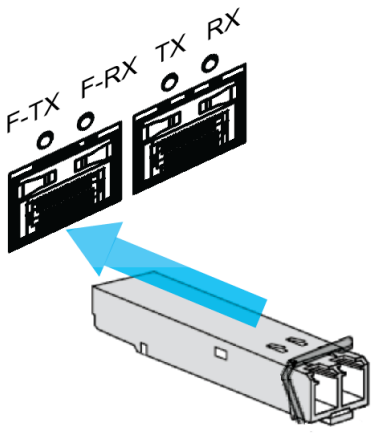
   For master, two optic modules need to be inserted. For slave, only insert the optic module into the F-TX and F-RX interfaces.

   Taking one optic module as an example, the operation steps are as follows:

   a. Wear the antistatic gloves and extract the optic module.

   b. Remove the dustproof plug from the optic module connector.

   c. Insert the optic module into the F-TX and F-RX interfaces. As shown below.



Note

Slowly insert the optic module into the interface until you hear a “click”, which indicates that the optic module is installed in place.

2. Referring to the description in Prerequisites, connect the fiber optic cables successively.

Taking the connection of one fiber optic cable as an example, the operation steps are as follows:

a. Extract the fiber optic cable.

b. Remove the dustproof plug from the optical fiber connector.

c. Connect one end to the F-TX interface of the single unit.

d. Connect the other end to the F-RX interface of next single unit.

3. After all fiber optic cables are connected, gently circle the long cable harness into a circle, and use Nylon cable ties to bind the cable harness.

Note

The aim is to prevent intertwine and displacement of harness, which may cause poor contact.

2.3.7 Installing the Branch Terminals

Prerequisites

- Deconcentrator (also called branch terminal) is a part for facilitating wire/cable connection. It has holes on both sides to insert the cable, and has screws for tightening or loosening the cable connection. During cabinet assembly, the branch terminal is installed to facilitate the connection and maintenance of AC input power cords inside and outside the cabinet, and make the connection of cables far apart more secure.
- The branch terminal referred to in this manual is the input end of which has 1 big hole, and the output end of which has 11 small holes (indicating that there are 11 terminal blocks).
  - **Input end**

    It is connected to the utility power supply system. For this series of instrument, every two single units have one four-core power cord supplied with the instrument. If 6 single units are used, 3 cords are required.
  - **Output end**

    Connect to the AC terminals of the 6 single units in the cabinet. The AC input power supply of this series of single unit adopts three-phase four-wire system. The L1, L2, L3, PE cable harnesses of 6 single units are connected to the output ends of 4 branch terminals respectively. Taking the connection of the branch terminal of the L1 cable harness as an example, connect the 6 holes of the output ends to the L1 cable harness of 6 single units.

Preparing tools and accessories

Tools and accessories required for installing the branch terminals are as shown in the table below.

Tool / Accessory	ITECH material code	Quantity
Branch terminals	105082	4
Inner hexagon screws M4 × 10	200776	8
Plain washer Φ4	200811	
Spring washer Φ4	200804	
Cabinet grounding wire	105340	1
Four-core power cords	105249	Total number of single units/2 (If it is not divisible, the result is rounded and then plus 1.)
Cabinet rear panel (the bottom panel with a U-shape hole)	206510	1
U-shaped grommet	206248	4
Grounding rod	204611	1
Cage nuts KD-KM-M6	201010	4
Internal hexagonal wrench (combined)	Used for loosening/ tightening the inner hexagon screws M5, M8, M4, M3, and M6 (To be supplied by the user).	1
Nylon cable tie	Used for binding cables (To be supplied by the user).	1

Tool / Accessory	ITECH material code	Quantity
Insulating tape	Used for isolating wires and other conductors (To be supplied by the user).	1
Diagonal pliers	Used for cutting the insulating bushes and cable binding buckles. (To be supplied by the user).	1

Steps

1. Place the four deconcentrators in a row on cabinet bottom, and ensure that the holes on the cabinet's bottom panel are aligned with the installing holes at front and rear of the deconcentrators.

   The input terminal orients toward the outside of the cabinet, and the output end orients toward the inside of the cabinet.

2. Place the 8 inner deconcentrator screws M4 in the mounting holes at front and end of the deconcentrators respectively, and tighten them with the internal hexagonal wrench.

   Note

   You can insert a parallel connection part (if any) between two adjacent branch terminals.

3. Use the internal hexagonal wrench to loosen the screws on the output ends of the branch terminals.

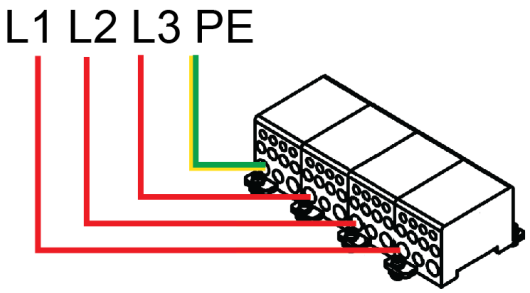
   Note

   Loosen 6 screws for branch terminals corresponding to L1, L2, L3; and loosen 7 screws for branch terminals corresponding to PE (In addition to the PE cable harness of 6 single units, there is one grounding cable harness of the cabinet to be connected.)

4. Connect one end of the single unit's AC input power cord to the output end of the branch terminals by sequence.

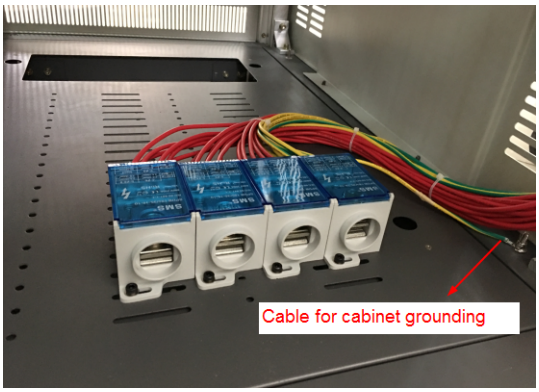
   The other end of the single unit's AC input power cord has been connected to the single unit's rear panel. For details, refer to 2.3.4 Connecting the Power Cords and CTRL Cables.

Taking the wiring of one single unit as an example, the wiring method is as shown in the figure below.



5. Connect the cabinet grounding wire to the output end of the PE branch terminal.
6. After all wires in the output end are connected, use the internal hexagonal wrench to tighten the screws.
7. Sort out the cable harnesses, and use Nylon cable ties to bind them.

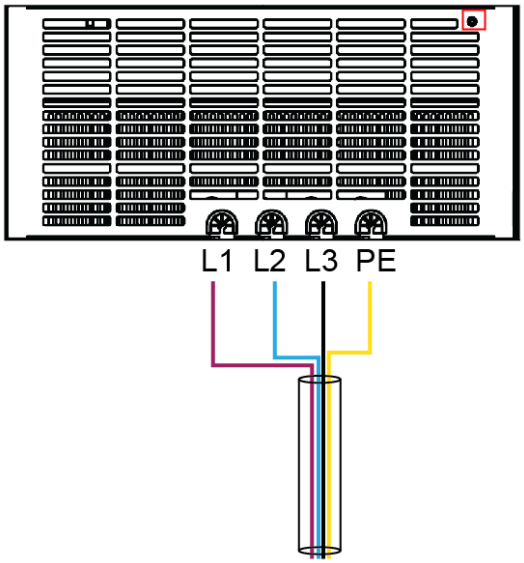
   After the above operation, the effect is as shown in the figure below.



8. Use the internal hexagonal wrench to loosen the screws at the input terminal of the branch terminals.
9. Connect four-core power cords supplied with the instrument.
   a. Use diagonal pliers to cut the black insulated sleeves outside the power cords to appropriate position so that the four cable harnesses inside can be connected to the input terminals of the four branch terminals, which will smoothly pass through the grommet on the cabinet rear panel.
   b. Mount 4 U-shaped grommets to the grommet hole of the cabinet rear panel.

      Correspond to L1, L2, L3, and PE successively from left to right.
   c. Pass through 3 four-core power cords through the rear panel grommet successively.

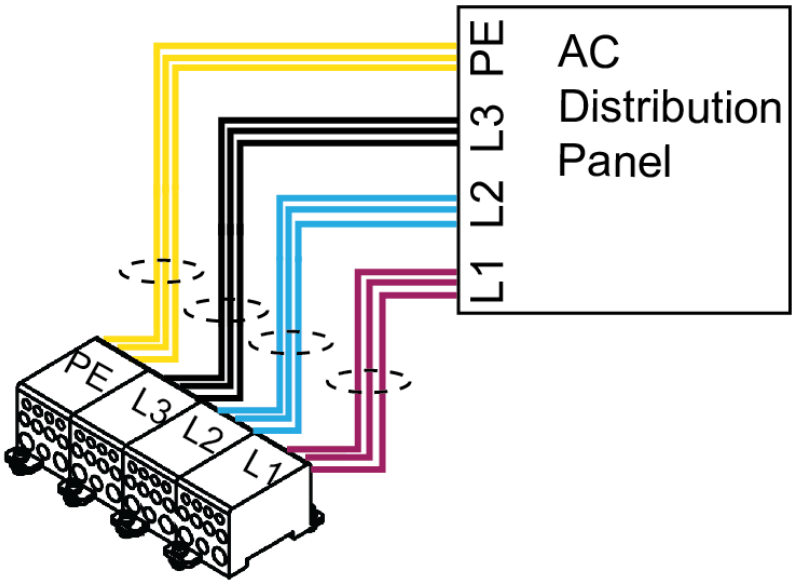
      Taking one four-core power cord as an example, the operation diagram is as follows.



d. Mount the cabinet grounding rod to the position as shown in the red box in the above figure.

e. Connect 3 four-core power cords into the branch terminal's input terminal.

   Connect the brown cable harness to L1, blue cable harness to L2, black cable harness to L3, and yellow cable harness to PE. The wiring diagram is as shown below.



Note

Before connection, you can use the insulating tape to bind the cable harness with same color of the three power cords together to make wiring convenient and firm.

WARNING

The above is only wiring diagram. Do not directly connect the other end of the four-core power cord to the AC distribution box. After the entire cabinet is completely assembled, connect it.

10. Use the internal hexagonal wrench to tighten the screws at the input terminal of the branch terminals.
11. Use 4 cage nuts (KD-KM-M6) to install the rear panel with grommet to the cabinet.

2.3.8 Installing the Front and Rear Panels

Prerequisites

- **Cabinet front panel**

  The cabinet front panel supplied with the instrument can be installed in any place of cabinet where the single unit is not located. The number of front panels provided is different based on the system with different number of units in parallel, which is subject to the shipping list. Taking the ITECH standard 27U cabinet with 6 single units in parallel as an example, 3 front panels should be mounted.

- **Cabinet rear panel**

  In this chapter, 2 types of rear panels shown below need to be installed:

  – Panels requiring no other parts

    The number and material number of the panels may differ based on the system with different number of single units in parallel, which is subject to the actual shipment.

  – Panels to be installed with a PCB

    Before installing the panel on the cabinet, please install the PCB and relay board, and connect them to the master (rear panel terminal) of the parallel system with communication cable or other cables.

Note

- The panel is installed corresponding to the location where the master is located in the cabinet.
- This panel is mounted to lead the related wiring terminals of the master rear panel outside the cabinet to facilitate the connection to PC, and parallel connection between cabinets.

Preparing tools and accessories

Tools and accessories required for installing the front and rear panels are as shown in the table below.

Tool / Accessory	ITECH material code	Quantity
Cabinet rear panel (PCB required)	206716	1
Cabinet supporting plate	206717	1
Cabinet relay board	502708	1
Cabinet interface board (PCB)	502646	1
Epoxy resin board	206714	1
Stanchion	203737	4
Cross disc head screws M3 × 6	200712	15
Green pluggable terminal block	103651, 102903, 102351, 100601	2 for each
Adapter	105345	1
Cross disc head screws M2 × 6	200707	2
Cable harness combination (Used for connecting the single unit's rear panel terminal and the PCB)	105116, 105117, 100475, 104112, 104691, 105118, 105133	Use two 105133 fiber optic cables and 105118 two-core cables each, and use one cable for other models.
Cabinet rear panel (No other parts are required)	27U cabinet: 204952, 206443, 204992 15U cabinet: 204991	1 for each

Tool / Accessory	ITECH material code	Quantity
Cabinet front panel	205327	N(against actual condition)
Cage nuts KD-KM-M6	201010	32
Internal hexagonal wrench (combined)	Used for loosening/ tightening the inner hexagon screws M6 (To be supplied by the user).	1
Cross-point screw driver (combined)	Used for loosening/ tightening the cross disc head screws M3 and M2 (To be supplied by the user).	1
Normal screwdriver	Used for loosening/ tightening the screws on the green pluggable terminal block (To be supplied by the user).	1

Steps

1. Assemble the rear panel with a PCB.
   a. Install the epoxy resin board on the supporting plate.

      Remove the sticker from the side of epoxy resin board with glue, and paste it on the supporting plate.

   b. Install the PCB.

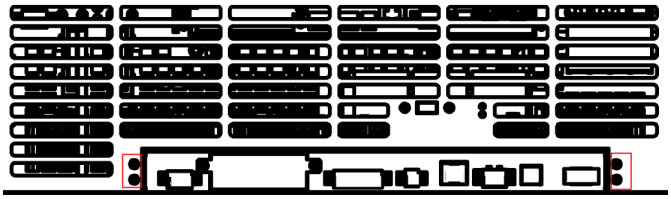
      Use a cross-point screw driver to tighten 7 cross disc head screws M3.

   c. Install the stanchion.

   d. Install the cabinet relay board.

      Use a cross-point screw driver to tighten 4 cross disc head screws M3.

   e. Referring to the figure below, use a cross-point screw driver and 4 cross disc head screws M3 to install the assembled supporting plate on the rear panel.



f. Use a cross-point screw driver and 2 cross disc head screws M2 to install the adapter on the rear panel as shown in the figure below.

2. Connect the cable harnesses (105116, 105117, 105118) to the green pluggable terminal blocks (103651, 102903, 102351, 100601).

   a. Take four pluggable terminal blocks from the accessory package.

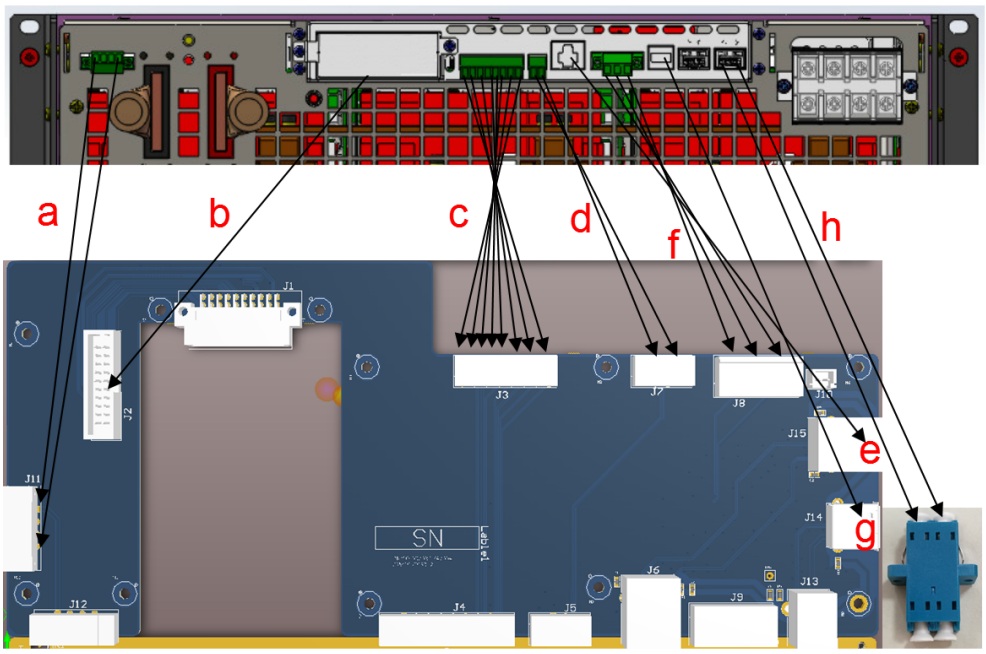
   b. Based on the following corresponding relationship, connect the cable harness to the pluggable terminal block.

   - Connect the 8-core cable (105116) to the 8 pins of 102351
   - Connect the 3-core cable (105117) to the 3 pins of 103651.
   - Connect the 2-core cable (105118) to the 2 pins of 102903
   - Connect the 2-core cable (105118) to the first and fourth pin of the 100601.

CAUTION

During wiring, please pay attention to the corresponding relationship between cable harness color and each pin. When the other end of the cable harness is connected to the rear panel terminal of the master, ensure that the same wiring method is used, and the color and pin number of the cable harness must be corresponded to each other one-to-one.

3. Referring to the figure below, connect the master's rear panel and the corresponding interface on the PCB.



Cables marked in the diagram are as shown below:

a. 2-core cable (105118) connected to the 4-pin terminal

b. 20-core flexible flat cable (100475)

c. 8-core cable (105116) connected to the 8-pin terminal

d. 2-core cable (105118) connected to the 2-pin terminal

e. Standard Ethernet cable (104112)

f. 3-core cable (105117) connected to the 3-pin terminal

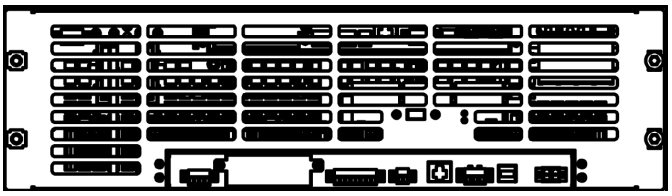
g. USB data wire (104691)

h. Two fiber optic cables (105133)

4. Use the cage nuts (KD-KM-M6) to install the assembled rear panel on the corresponding position of the cabinet.

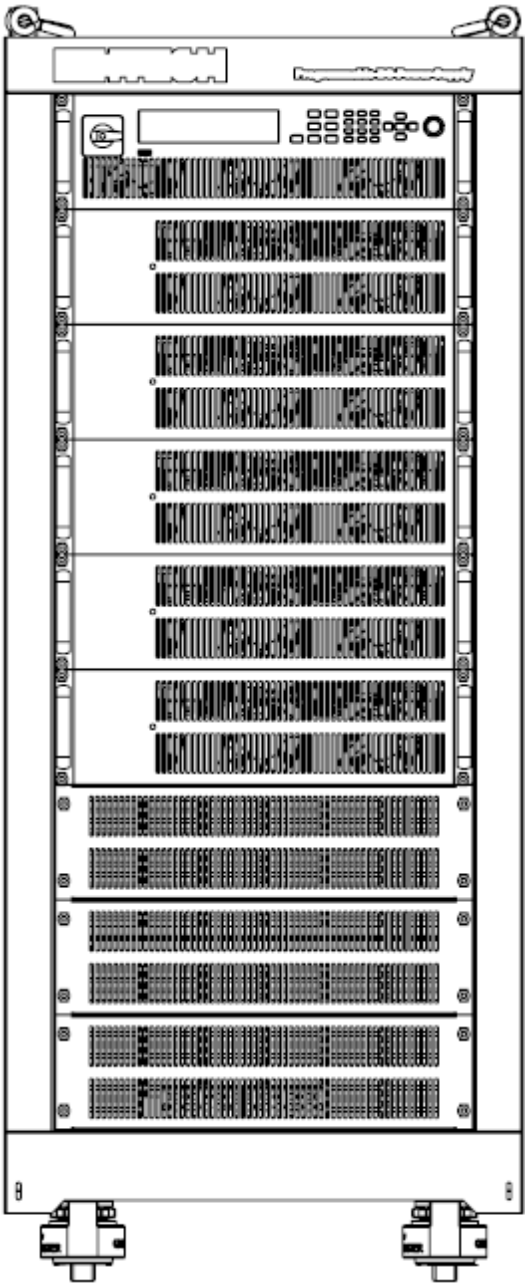
5. Install the 4 green pluggable terminal blocks on the rear panel interface.

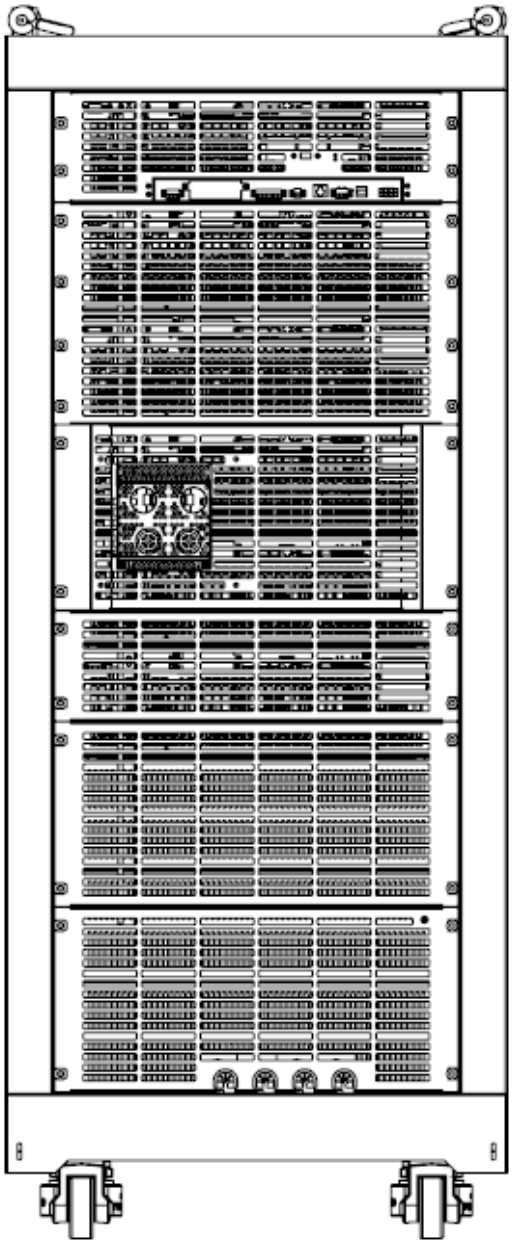
   After installation, the effect is as shown in the figure below.



6. Use the cage nuts (KD-KM-M6) to assemble the rest front and rear panels.

   After assembly, the front and rear panels of the entire cabinet are shown in the figure below.





Note

If your cabinet has left and right panels, please remember to install them back to the original places after cabinet assembly.

3 Checking After Assembly

Check the Cabinet

No.	Items	Methods
1	The installation positions of single unit, cable harness, and structural components should conform to the description and requirements in the manual.	Check the installing position.
2	The power cords and grounding wires should be straight and bound in order. Leave appropriate space at the turning point, and do not tighten them up.	Check the installing position.
3	The equipment surface should be free of handprint, stains and scratches.	Check
4	All screws should be fixed correctly without loosening or damage.	Check
5	Do not place any other articles on the cabinet.	Check
6	Ensure that the rear part of the cabinet has sufficient heat dissipation space. Do not block the condenser hole inside the cabinet with cable harness.	Measurement and checking
7	The power cords should be free of damage, breakage and intermediate connectors, and should be connected firmly.	Check
8	The grounding rod of the cabinet rear panel has been installed correctly.	Check the installing position.

Check the Cable Connections

No.	Items	Methods
1	Check whether the AC input terminals (L1, L2, L3, PE) of each single unit are correctly connected to the four branch terminals (L1, L2, L3, PE).	1. Adjust the digital multimeter to the short-circuit. 2. Place the red and black test leads into the AC input terminals of the single unit (such as L1) and the output end of the branch terminals (L1). 3. Observe whether the multimeter is displayed as 0 or a short beep is generated. If yes, the cable is connected correctly; otherwise, reconnect the cable.
2	Check if there is a short circuit between any two of the four branch terminals (L1, L2, L3, PE).	1. Adjust the digital multimeter to the short-circuit. 2. Place the red and black test leads into the output ends of any two branch terminals (such as L1 and L2). 3. Observe whether the multimeter is displayed as 0 or a short beep is generated. If yes, the cable connection is abnormal and needs to be checked; otherwise, there is no short circuit between any two of the branch terminals.
3	Check if there is a short circuit between the positive and negative electrodes after parallel connection.	1. Adjust the digital multimeter to the short-circuit. 2. Place the red and black test leads on the positive and negative electrodes. 3. Observe whether the multimeter is displayed as 0 or a short beep is generated.

No.	Items	Methods
		If yes, the electrodes are short-circuited and need to be checked; otherwise, no short circuit occurs between the electrodes.

4 Configuring the Master and Slave

Prerequisites

After the cabinet is assembled, you need to connect the cabinet to the power supply system, and power it on. After the instrument is powered on, enter the menu to carry out related configurations. And functional verification after configuration. Therefore, please carefully read the following safety precautions.

WARNING

- **Ensure that the supply voltage is consistent with the rated input voltage of the instrument (cabinet).**
- **Be sure to connect the power cord to the AC distribution box with protective grounding. Do not use terminal board without protective grounding.**
- **Ensure that the cabinet's grounding wires have been connected correctly.**
- **AC mains connections must be made by a qualified electrician who knows about 3- phase mains circuits and all applicable safety standards and requirements.**
- **Compliance to all regulations for the operation of the instrument and connection to the public grid of energy regenerative equipment (except for the IT6000D series) is required. Connections must be made by a qualified electrician who knows about energy back-feeding equipment to ensure that all applicable safety requirements have been applied and all necessary conditions have been met.**
- **Ensure that all terminals connections are either insulated or covered using the safety covers, so that no accidental contact with lethal voltages can occur.**
- **Before connecting test cables, be sure to switch off the instrument.**
- **To avoid electrical shock, before testing, please make sure the rating values of the testing cables, and do not measure the current that higher than the rating value. All test cables shall be capable of withstanding the maximum short circuit current of the instrument without causing overheat.**
- **If several units under test are provided, each pair of wires shall safely withstand the rated short circuit current of the instrument.**
- **Do not short the battery when connecting or disconnecting the battery testing circuit. Short circuit may cause severe accident.**
- **For the instrument can be used to sink current, hazardous voltages from an external energy source such as a battery may be present on the output/input terminals even with the instrument power off. Provision must be made to disconnect the external energy source before touching the output/input or sense terminals.**
- **During wiring, check that the positive and negative poles of the test cables are properly and tightly connected. Do not connect the positive pole and disconnect the negative pole.**

Steps

1. After the AC input power cables are connected, turn on the switch of the AC distribution box.
2. Turn on the power switch on the front panel of the Master unit.
3. After the “Networking” prompt appears on the interface, press the combination key of **[Shift]** + Left + Right.
4. Enter the password **1118** and press **[Enter]**.
5. Set the total number of units in parallel, such as **Inner Number = 6**, and press **[Enter]**.
6. Turn off the power switch on the front panel of the Master unit. After the power is turned off completely, turn on the power switch again.

   After the instrument is restarted, the parallel operation is complete.

Follow-up Operation

- **Check whether the parallel is successful**

  1. Press the composite keys **[Shift]+[P-set]** (System) on the front panel to enter the system menu.
  2. Press the Up/Down key or turn the knob to select the **System Info** and press **[Enter]**.
  3. Press the Up/Down key or turn the knob to select the **Current Max** to check the maximum current value.

     If the total current value after parallel is displayed, it indicates that the parallel operation is successful; otherwise, it indicates that the parallel operation fails, and the specific reason needs to be checked.

- **Check the output/input function**

  Note

  Take the IT6000C series power supply as an example to describe how to check the output. The test methods of other series models are the same. For more features, please refer to the product's user manual.

  – **Device under test is not connected**

  1. Press the composite keys **[Shift]+[V-set]** (Config) on the front panel to enter the configuration menu.

2. Select the **Mode** and press **[Enter]**.
3. Select the CV priority and set the output voltage to 20V, then turn on the output.
4. Use a multimeter to measure the output terminals to check if it matches the actual output.

   If yes, proceed to the next step; otherwise, the specific reason should be checked.
5. Set the output voltage to the rated voltage and check if it matches the actual output.

   If yes, proceed to the next steps (**Device under test is connected**); otherwise, the specific reason should be checked.

– **Device under test is connected**

1. Ensure that the power switch of the instrument and the switch of the AC power distribution box are turned off.
2. Connect the device under test with appropriate test cables.
3. Turn on the switch of the AC power distribution box and the power switch of the instrument.
4. Press the composite keys **[Shift]+[V-set]** (Config) on the front panel to enter the configuration menu.
5. Select the **Mode** and press **[Enter]**.
6. Select the CV priority, and set **Vs = 50V**, **I+ = 12A**.
7. Set the DUT to work in CC mode and set the load current to 2A.
8. Check whether the instrument can be loaded normally and whether the voltage and current are displayed correctly.

   If the instrument is working normally at a small current (2A), proceed to the next step; otherwise, the specific reason should be checked.
9. Set the load current of the DUT as its rated value, and adjust the voltage and current settings of the instrument according to the actual power of the DUT.
10. Check whether the instrument can be loaded normally and whether the voltage and current are displayed correctly.

    If the instrument can work normally even at a high current, it means that the instrument after parallel operation is working properly; otherwise, the specific reason should be checked.

5 Parallel Between Cabinets

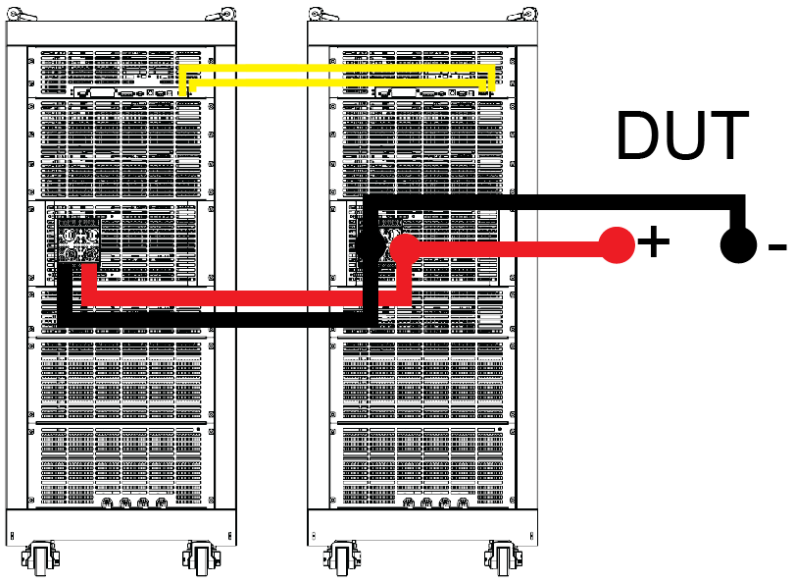
Prerequisites

This series of products supports parallel connection between the assembled cabinets for higher power and current output/input capability. This section describes the operation steps by taking the parallel connection between two cabinets as an example. Before paralleling the cabinet, please confirm the following:

- The models of the 3U units included in the two cabinets must be identical; the total number of 3U units included in the two cabinets can be different, such as cabinet A (one master four slaves) and cabinet B (one master five slaves).
- The assembled cabinet can also be regarded as a unit (one master). Therefore, before paralleling the cabinet, confirm whether the system versions of the two cabinets are identical.

  Methods as below:

  1. Press the composite keys **[Shift]+[P-set]** (System) on the front panel to enter the system menu.
  2. Press the Up/Down key or turn the knob to select the **System Info** and press **[Enter]**.
  3. Check whether the **Main Ver**, **Ctrl1 Ver**, **Ctrl2 Ver** version numbers of the two cabinets are the same.
- A schematic diagram of the parallel connection between the two cabinets is shown below.



Note

The yellow wiring indicates the cable connection for the fiber outer ring interface (TX and RX).

Steps

1. Referring to the description in Prerequisites to complete the cables connection, then turn on the switch of the AC power distribution box.
2. Turn on the power switch on the front panel of the cabinet separately.
3. Configure the master cabinet.
   a. Press the composite keys **[Shift]+[P-set]** (System) on the front panel to enter the system menu.
   b. Press the Up/Down key or turn the knob to select the **Parallel** and press **[Enter]**.
   c. Press the Left / Right key or turn the knob to select the **Master** and press **[Enter]**.
   d. Set the value of **Total** (i.e. the total number of parallel cabinets) and press **[Enter]**.
4. Configure the slave cabinet.
   a. Press the composite keys **[Shift]+[P-set]** (System) on the front panel to enter the system menu.
   b. Press the Up/Down key or turn the knob to select the **Parallel** and press **[Enter]**.
   c. Press the Left / Right key or turn the knob to select the **Slave** and press **[Enter]**.
5. Turn off the power switch on the front panel of the cabinet in turn. After the power is turned off completely, turn on the power switch again.

   After the cabinets are restarted, the parallel operation is complete.

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1. Refer to accompanying data disk and relevant manual.
2. Visit ITECH website: www.itechate.com.
3. Select the most convenient contact method, for further information.