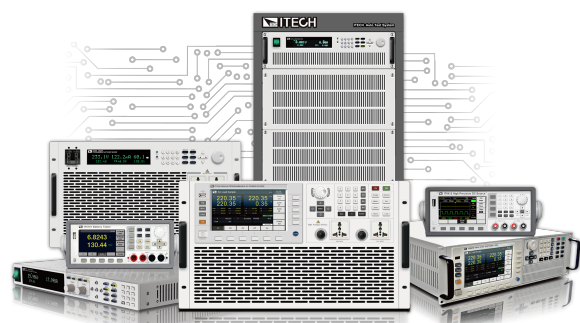


IT6000 Series

Parallel Assembly Instruction



Model: IT6000 Series
Version: V1.2/08,2019

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Manual Part Number



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Safety Notices

CAUTION

A CAUTION sign denotes a hazard. It calls attention to an operating procedure or practice that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION sign until the indicated conditions are fully understood and met.

WARNING

A WARNING sign denotes a hazard. It calls attention to an operating procedure or practice that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING sign until the indicated conditions are fully understood and met.



Note

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

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1 About this manual

Thank you for using this product. This manual will introduce how to connect multiple single units in parallel for expanding current, power specifications.

- Before assembly, it is recommended to carefully read the contents in [2.1 Preparation Before Assembly](#) for preparation before assembly.
- The graphics in this manual are only for reference. Please subject to the actual shipping for the single unit, accessory appearance and quantity.
- In order to facilitate you to quickly understand the assembly steps, the “Master” mentioned in the assembly process refers to the instrument with the operation panel, and the “Slave” refers to the instrument without the operation panel. Different from the concept mentioned when configuring the master-slave relationship after parallel assembly, please pay attention to the distinction.

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

2 Parallel Assembly

- ◆ Preparation Before Assembly
- ◆ Starting Assembly

2.1 Preparation Before Assembly

2.1.1 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 instrument to ensure sufficient air circulation.
-

Electrical safety

WARNING

- Power-on assembly is strictly prohibited to avoid personal injury.
 - It is forbidden to supply power to the equipment before 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 bottom plate, at first, determine that the bottom plate and the casters have been fixed to prevent the instrument 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 out, and mind other single units that may be unstably mounted 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.

Optical fiber anti-static

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.

2.1.2 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.

Item	Requirement
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 instrument to ensure sufficient air circulation.

Checking the Power Supply Conditions

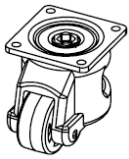
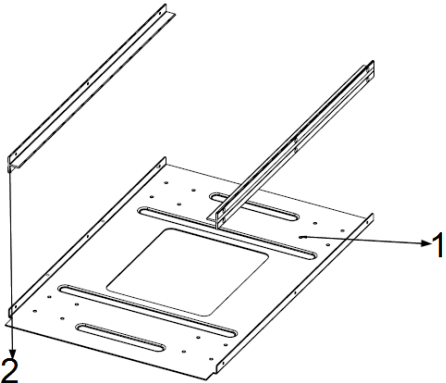
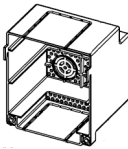
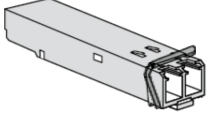
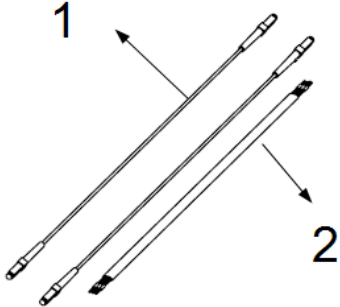
The requirements for AC input power supply are as shown in the table below.

Item	Requirement
Voltage requirements	The working voltage supplied to the assembled instrument should be within the normal working voltage range: 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 Package

During assembly, besides multiple single units in same specifications, main assembly accessories include electrode bars, various cable harness combinations, as well as screws and nuts of different specifications. The quantity of different types of accessories may differ. Therefore, before assembling, 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. 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
	202807: Casters	Mounting the fixed bottom plate
	1. 206226: Fixed bottom plate 2. 206228: Side bracket	
	205809: Parallel electrodes	Mounting elec- trodes and protective covers
	206098: Protec- tive cover	
	105214: Fiber Module	Install fiber op- tic modules
	1. 105133: Fiber optic harness 2. 105117: Cold- pressed termi- nal harness	Connect fiber optic cables and control cables

2.1.3 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.	

Tools	Description	Picture
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.	

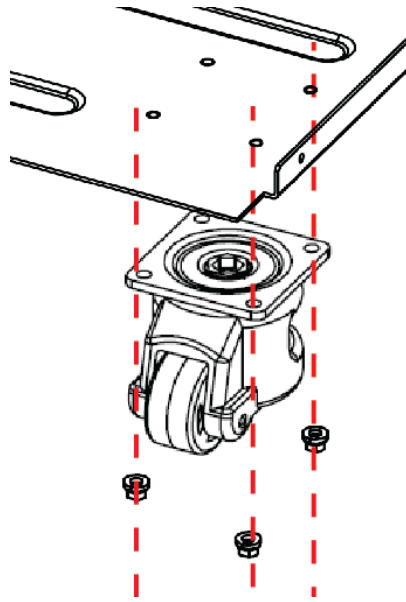
2.2 Starting Assembly

The following is a detailed description of the parallel steps that do not need to be assembled into the cabinet:

1. Assemble the casters and bottom plate.

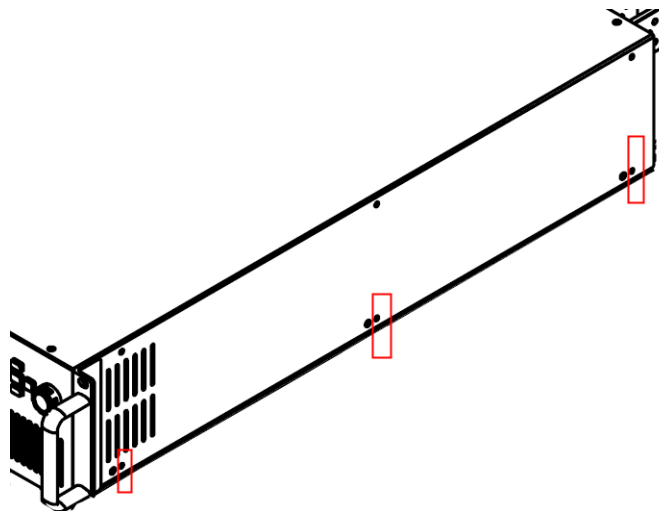
Taking the assembly of one caster as an example, the operation steps are as follows. The other three casters are assembled in the same way.

- a. Align the holes between the casters (202807) and the fixed bottom plate (206226).
- b. Use the internal hexagonal wrench to lock the M5 nut (200824), the spring washer Φ5 (200805), and the flat washer Φ5 (200812) to the caster and bottom plate. As shown below.



2. Place the single units, assembled side brackets.

- a. Place a single unit on the fixed bottom plate and ensure that the holes on the sides of the single unit (as shown below) align with the holes on the bottom plate.



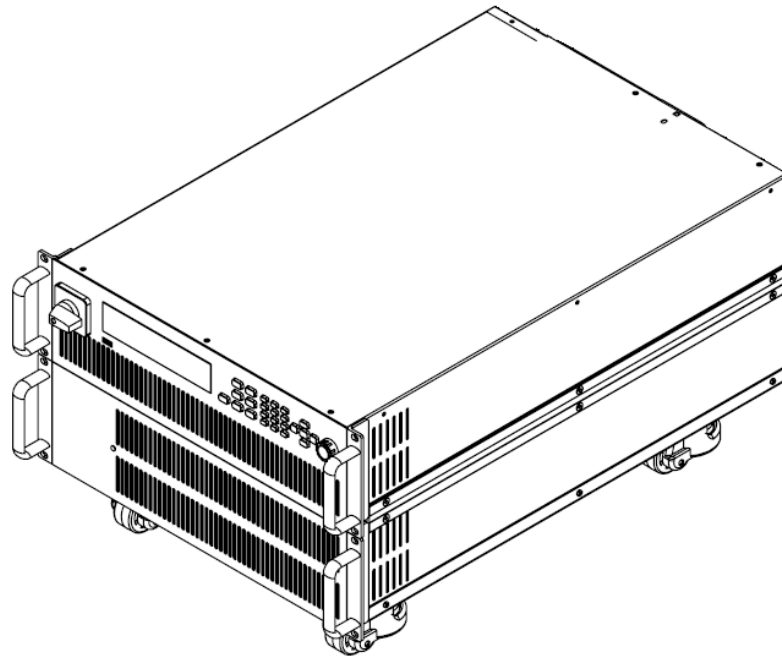
- b. Use a cross-point screw driver to lock the six cross disc head screws M4×10 (200731) to the bottom plate and the side of the single unit.
- c. Place the two side brackets (206228) on the left and right sides of the single unit and ensure the screw holes are aligned.
- d. Use a cross-point screw driver to lock the 12 countersunk head screws M4×10 (200750) to the side bracket and the single unit.



Note

The above steps are the stacking steps of two single units. If there are still separate units to be stacked, the same steps can be used.

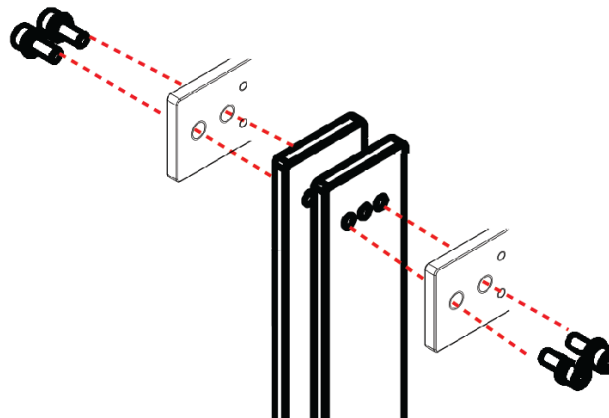
The assembly is completed as shown below.



3. Install the electrodes and the protective covers.

The following is an example of two adjacent single units to introduce the installation of parallel electrodes.

- a. Remove the screws from the electrodes of the single unit.
- b. Referring to the figure below, use the internal hexagonal wrench to lock the four inner hexagon screws M6×16 (200786), the spring washers $\phi 6$ (200806), the plain washers $\phi 6$ (200813) to the parallel electrodes (205809) and the single unit electrodes.



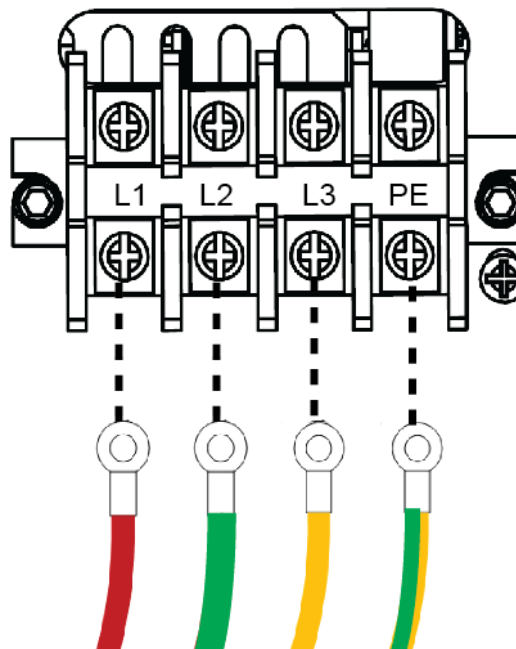
- c. Install the hole plugs (206507) to the electrode shield (206098).
 - d. Use a cross-point screw driver to lock the cross recessed pan head screws with waisted shanks M4×12(206508) to the electrode shield.
4. Connect the power cords and CTRL cables.



Note

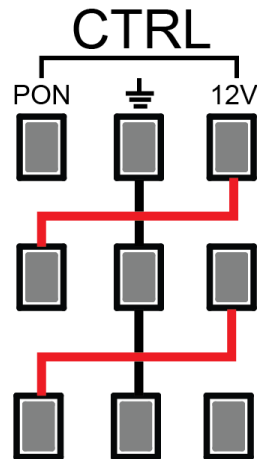
When the master unit (with operation panel) and the slave unit (without operation panel) are connected in parallel, the control cables need to be connected to realize the synchronous power-on or power-off control of the master to the slave. There is no need to connect control cables between the master unit (with operation panel).

- You need to connect the power cables to each single unit in parallel, and the wiring method is the same as that of the single unit. The red, green and yellow wires are live wires, which are correspondingly connected to the L1, L2 and L3 terminals of power input on the rear panel of the instrument; the yellow-green wire is grounding wire, which is connected to the PE terminal of power input on the rear panel. The schematic is shown below.



- The wiring diagram of the control cables is as follows. Connect the control cables only when the master unit and slave unit are connected in parallel.

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

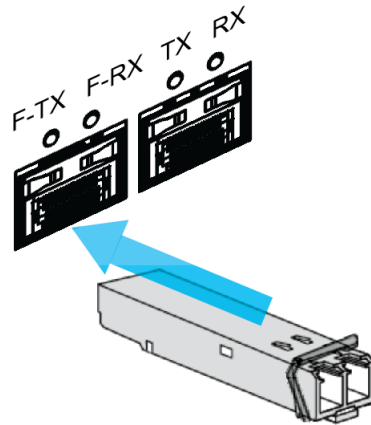
The CTRL cable (105117) harness in the accessory package is red/yellow/black three-core. You only need to connect the red/black dual-core cable, and cut the yellow cable with diagonal pliers.

5. Use a cross-point screw driver to tighten the cross recessed pan head screws with waisted shanks M4×12 (206508) to lock the AC input terminal cover (206097), and pull the power cords out of the cover hole.
6. Install the fiber optic modules.

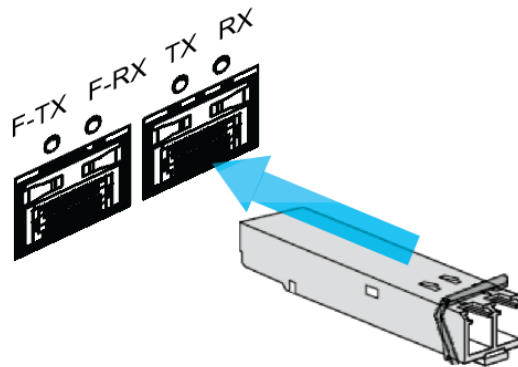
There are two fiber optic module interfaces on the rear panel of the single unit: F-TX and F-RX are inner loop communication interfaces of the optical fiber used for communication between master unit and slave unit; TX and RX are outer loop communication interfaces of the optical fiber used for communication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



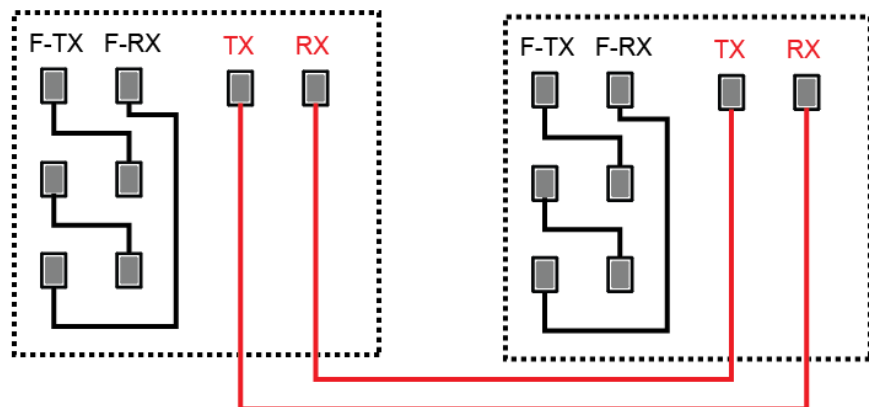
- a. According to the single unit to be connected in parallel, select the position where the fiber module (105214) is inserted.
 - Select the fiber inner loop for the parallel between the master unit and slave unit. The installation diagram of the fiber module is as follows.



- Select the fiber outer loop for the parallel between the master unit and master unit. The installation diagram of the fiber module is as follows.



- Connect the fiber optic cables (105133) based on specified wiring method. The wiring diagram is as shown below.

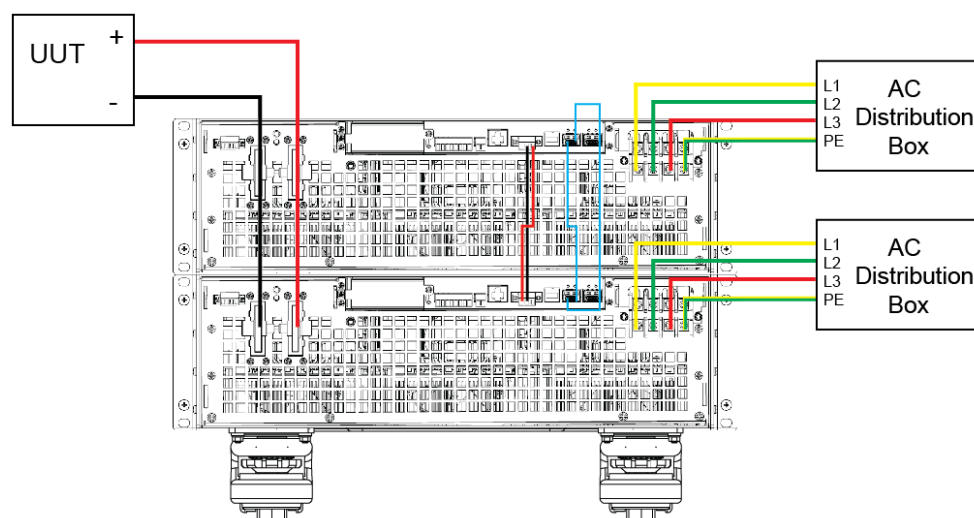


Note

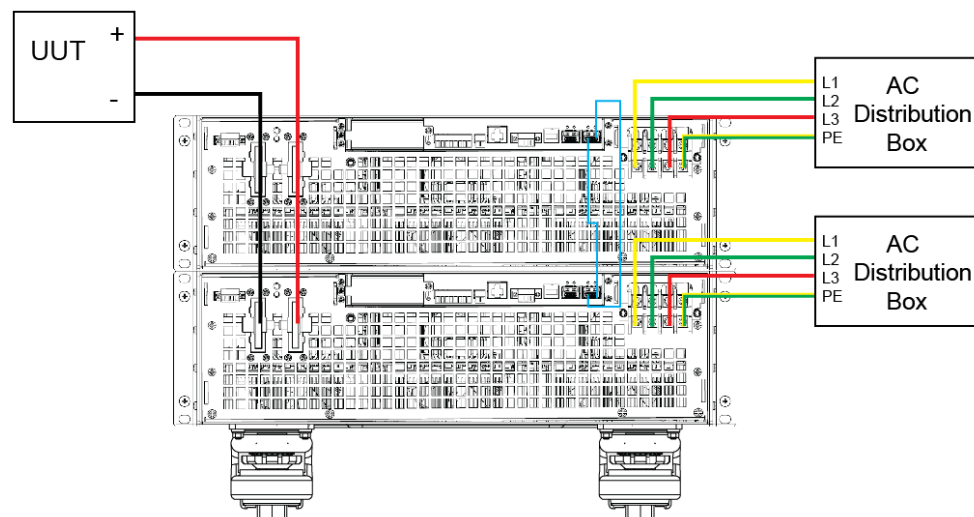
As shown in the above figure, black wiring indicates the communication between fiber inner loop, while the red wiring indicates the communication between fiber outer loop.

After the above operation is completed, the illustration is as follows.

- One master unit and one slave unit



- Two master units



3

Checking After Assembly

The checking contents and methods after parallel assembly are shown in the table below.

No.	Items	Methods
1	The installation positions of single unit, cable harness 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 instrument.	Check
6	Ensure that the rear part of the instrument has sufficient heat dissipation space. Do not block the condenser hole 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

4 Configuring the Master and Slave

Prerequisites

After the instrument is assembled, you need to connect the instrument 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.**
- **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 instrument'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

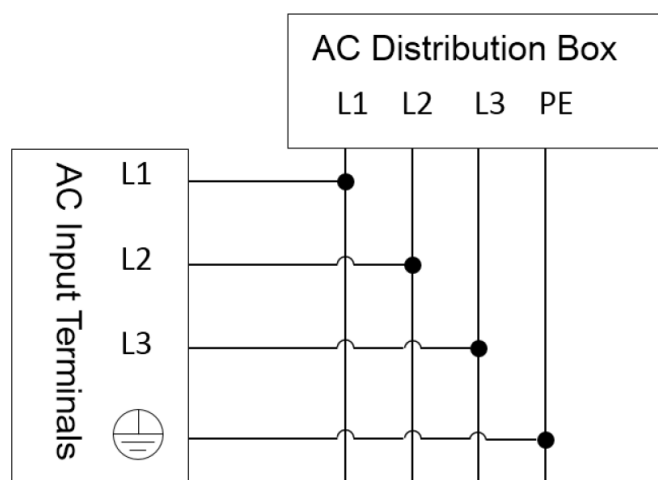
Only one master unit (with operation panel):

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 = 2**, 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.

Multiple master units (with operation panel) are connected in parallel:

1. Turn off the switch of the AC power distribution box.
2. Connect the power cables of the single unit to the AC power distribution box.
The wiring diagram is as follows.



3. Turn on the switch of the AC power distribution box.
4. Turn on the power switch on the front panel of the single unit.



Note

If each single unit in parallel has a power switch, it needs to be turned on in turn.

5. Configure the Master mode.
 - 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 units) and press **[Enter]**.
6. Configure the Slave mode.
 - 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]**.
7. Turn off the power switch on the front panel of the single 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.

Contact Us

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2. Visit ITECH website: www.itechate.com.
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