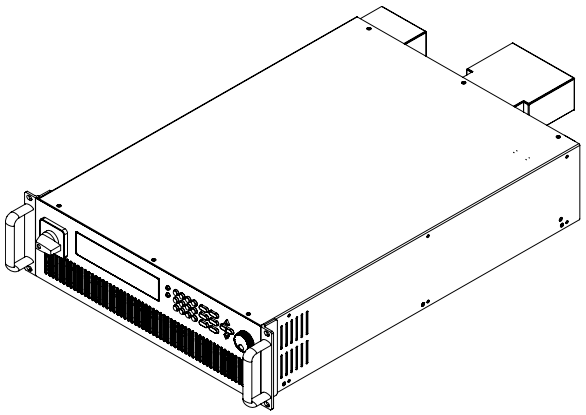
Regenerative DC Electronic Load

Series IT8300 User's Manual



Model: IT8311/IT8312/IT8321/IT8322/IT8331/IT8332/
IT8341/IT8342/IT8351/IT8352/IT8361/IT8362/IT8371
/IT8372/IT8381/IT8382/IT8391/IT8392
Revision: V1.0

Notices

Manual Part Number

IT8300-402227

Revision

1st Edition: APR 17, 2017

Itech Electronic, Co., Ltd.

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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.

Certification and Quality Assurance

IT8300 series electronic load completely reaches nominal technical indicators in the manual.

Warranty service

ITECH Company will provide one-year warranty services for the product materials and manufacturing (excluding the following limitations).

- When warranty service or repair is needed, please send the product to the service unit specified by ITECH Company.
- When the product is sent to ITECH Company for warranty service, the customer must pay the one-way freight to the maintenance department of ITECH, and ITECH will be responsible for return freight.
- If the product is sent to ITECH for warranty service from other countries, the customer will be responsible for all the freight, duties and other taxes.

Limitation of Warranty

Warranty service does not apply to the damage caused in the following circumstances:

- Damage resulting from customer-wired circuits or customer-supplied parts or accessories;
- Product which has been modified or repaired by the customer;
- Damage caused by the circuit installed by the customer or damage caused by operation of the product in non-specified environment;
- The product model or serial number is altered, deleted, removed or made illegible by customer;
- Damage caused by accidents, including but not limited to lightning, water, fire, abuse or negligence.

Safety signs

	Direct current		ON (power)
	Alternating current		OFF (power)
	Both direct and alternating current		Power-on state
	Chassis (earth ground) symbol.		Power-off state
	Earth (ground) terminal		Reference terminal
	Caution		Positive terminal
	Warning (refer to this manual for specific Warning or Caution information)		Negative terminal
	A chassis terminal	-	-

Safety Precautions

General safety precautions below must be followed in each phase of instrument operation. In case of failure to follow these precautions or specific warnings in other parts of the manual, violation against the safety standards related to the design, manufacture and purpose of the instrument will occur. If the user does not follow these precautions, ITECH will bear no responsibility arising there from.

WARNING

- **Do not use the instrument if it is damaged. Before operation, check the casing to see whether it cracks. Do not operate the instrument in the presence of inflammable gasses, vapors or dusts.**
- **The electronic load is provided with a power cable during delivery and should be connected to a junction box. Before operation, be sure that the electronic load is well grounded.**
- **Use electric wires of appropriate load. All loading wires should be capable of bearing maximum short-circuit of electronic load without overheating.**
- **Check all marks on the instrument before connecting the instrument to electronic load.**
- **Ensure the voltage fluctuation of mains supply is less than 10% of the working voltage range in order to reduce risks of fire and electric shock.**
- **Do not install alternative parts on the instrument or perform any unauthorized modification.**
- **Do not use the equipment when the removable cover is dismantled or loose.**
- **Please use the power adapter supplied by the manufacturer to avoid accidental injury.**
- **We do not accept responsibility for any direct or indirect financial damage or loss of profit that might occur when using the instrument.**
- **This instrument is used for industrial purposes, do not apply this product to IT power supply system.**
- **Do not use the equipment on the life support system or other equipment with safety requirements.**

CAUTION

- **If the equipment is not used in the manner specified by the manufacturer, its protection may be damaged.**
- **Always use dry cloth to clean the equipment housing. Do not clean the inside of the instrument.**
- **Do not block the air vent of the equipment.**

Environmental conditions

The instrument can only be used indoors or in low condensation areas. The following table shows general environmental requirements for this instrument.

Environmental conditions	Requirement
Operating temperature	0°C - 40°C
Operating humidity	20% - 80% (non condensing)
Storage temperature	-20°C - 70 °C
Altitude	Operating up to 2,000 meters
Installation category	II
Pollution degree	Pollution degree 2

Note

In order to ensure the accuracy of measurement, it is recommended to operate the instrument half an hour after start-up.

Regulation tag

CE	The CE tag shows that the product complies with the provisions of all relevant European laws (if the year is shown, it indicates that the year when the design is approved).
	This instrument complies with the WEEE directive (2002/96/EC) tag requirements. This attached product tag shows that the electrical/electronic product cannot be discarded in household waste.
	This symbol indicates that no danger will happen or toxic substances will not leak or cause damage in normal use within the specified period. The service life of the product is 10 years. The product can be used safely within the environmental protection period; otherwise, the product should be put into the recycling system.

Waste electrical and electronic equipment (WEEE) directive

Waste electrical and electronic equipment (WEEE) directive, 2002/96/EC

The product complies with tag requirements of the WEEE directive (2002/96/EC). This tag indicates that the electronic equipment cannot be disposed of as ordinary household waste.

Product Category

According to the equipment classification in Annex I of the WEEE directive, this instrument belongs to the “Monitoring” product.

If you want to return the unnecessary instrument, please contact the nearest sales office of ITECH.

Compliance Information

Complies with the essential requirements of the following applicable European Directives, and carries the CE marking accordingly:

- Electromagnetic Compatibility (EMC) Directive 2014/30/EU
- Low-Voltage Directive (Safety) 2014/35/EU

Conforms with the following product standards:

EMC Standard

IEC 61326-1:2012/ EN 61326-1:2013 [1][2][3]

Reference Standards

CISPR 11:2009+A1:2010/ EN 55011:2009+A1:2010 (Group 1, Class A)
IEC 61000-4-2:2008/ EN 61000-4-2:2009
IEC 61000-4-3:2006+A1:2007+A2:2010/ EN 61000-4-3:2006+A1:2008+A2:2010
IEC 61000-4-4:2004+A1:2010/ EN 61000-4-4:2004+A1:2010
IEC 61000-4-5:2005/ EN 61000-4-5:2006
IEC 61000-4-6:2008/ EN 61000-4-6:2009
IEC 61000-4-11:2004/ EN 61000-4-11:2004

1. The product is intended for use in non-residential/non-domestic environments. Use of the product in residential/domestic environments may cause electromagnetic interference.
2. Connection of the instrument to a test object may produce radiations beyond the specified limit.
3. Use high-performance shielded interface cable to ensure conformity with the EMC standards listed above.

Safety Standard

IEC 61010-1:2010/ EN 61010-1:2010

Content

Chapter1 Inspection and Installation

1.1 Verifying the Shipment

Open the package and check the articles within package box before operation. In case of any non-conformity, missing or appearance wearing, please contact ITECH immediately.

The package box should comprise:

Device name	Quantity	Model	Remarks
Electronic load	1	IT8300 series	IT8300 series include: IT8311/IT8312/IT8321/IT8322/ IT8331/IT8332/IT8341/IT8342/ IT8351/IT8352/IT8361/IT8362/ IT8371/IT8372/IT8381/IT8382/ IT8391/IT8392/
Power cord	1	-	-
USB communication cable	1	-	This accessory is selected when the USB interface is used for starting up remote operation.
CD	1	-	Comprising user manual and documents related to programming and grammatical guidelines.
Factory alignment report	1	-	Test report before delivery.

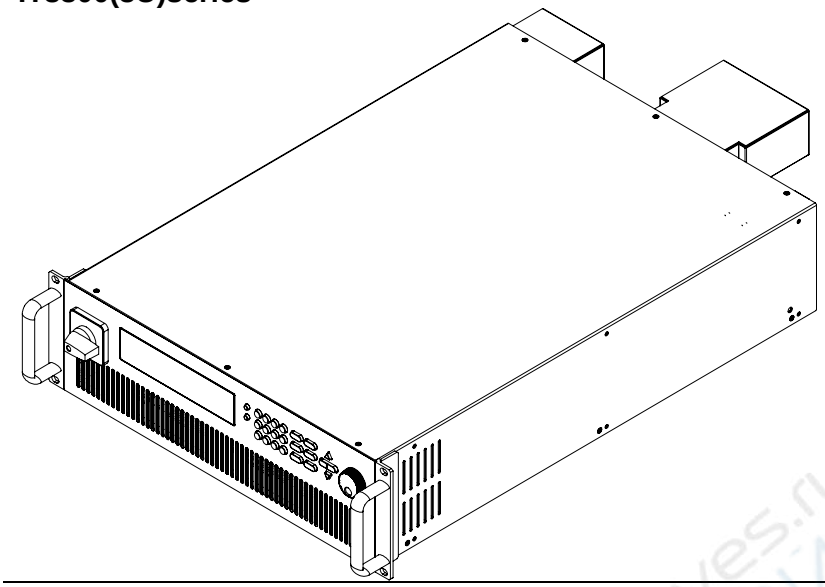
Note

After confirming that package contents are consistent and correct, please appropriately keep package box and related contents. The package requirements should be met when the instrument is returned to factory for repair.

1.2 Instrument Size Introduction

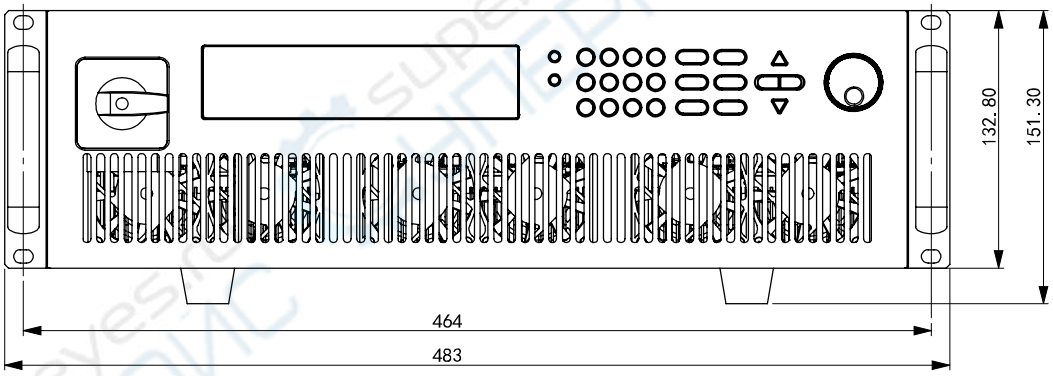
The instrument should be installed at well-ventilated and rational-sized space. Please select appropriate space for installation based on the electronic load size.

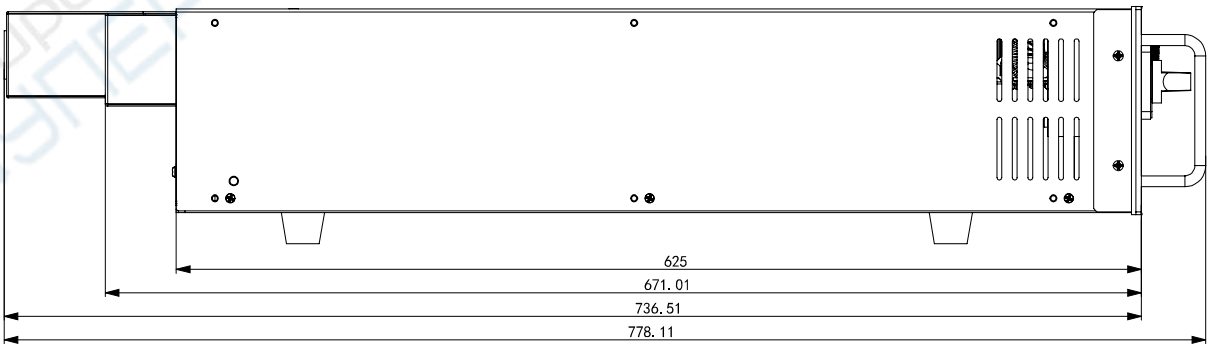
IT8300(3U)series



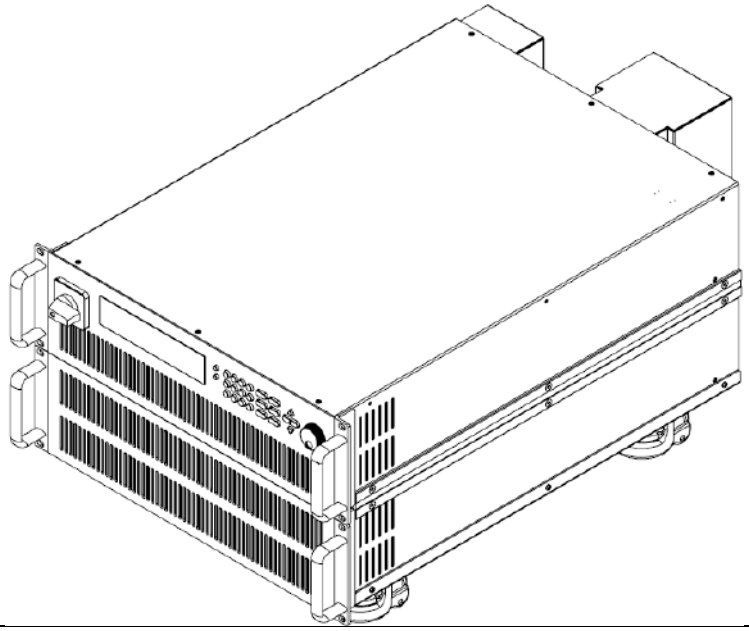
Overall dimensions:
Width: 483 mm
Height: 151.3 mm
Depth: 778.11 mm

Detailed dimensional drawings



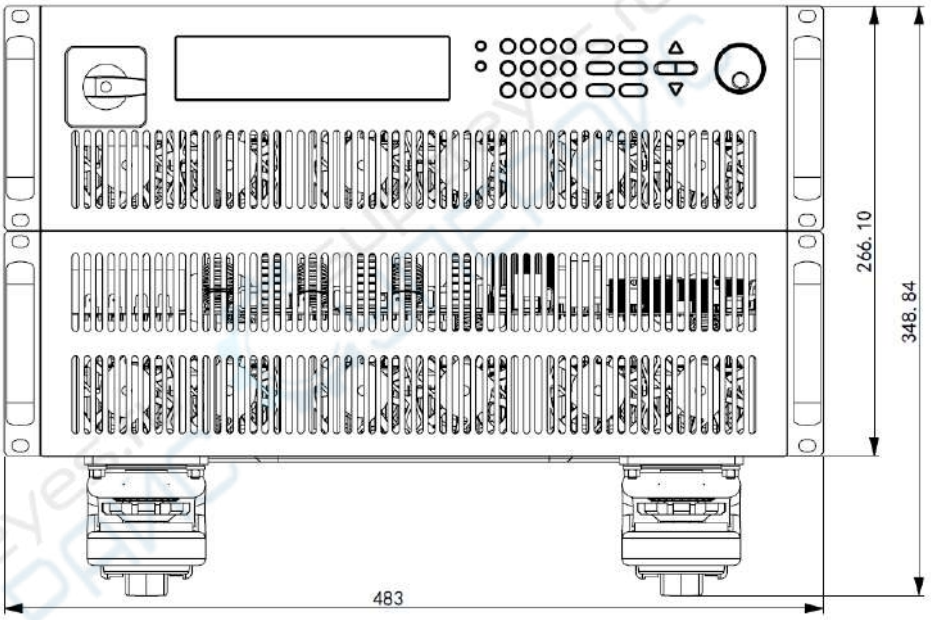


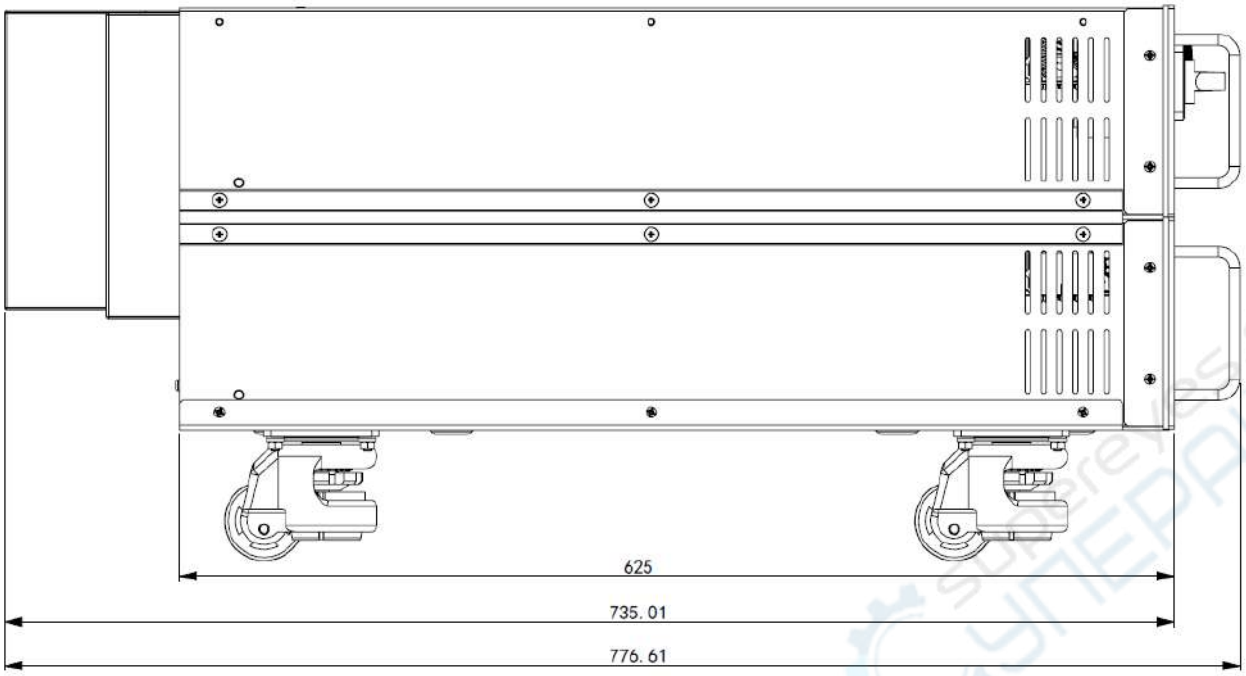
IT8300(6U)series



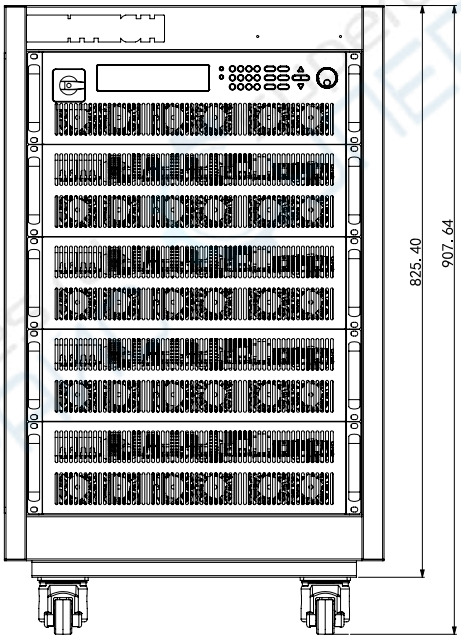
Overall dimensions:
Width: 483 mm
Height: 348.84 mm
Depth: 776.61 mm

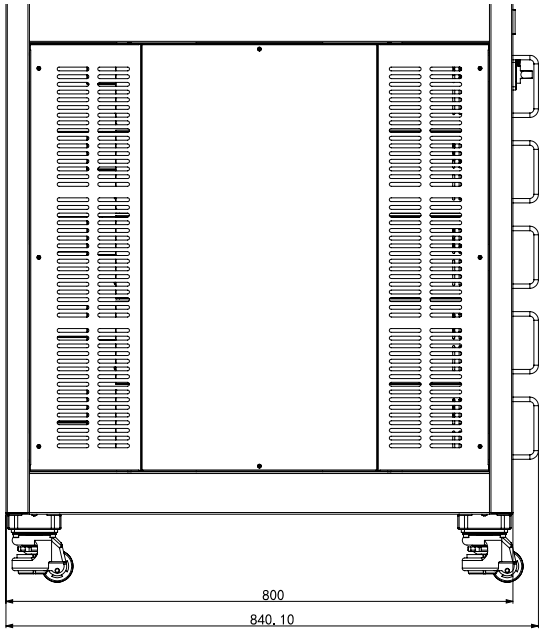
Detailed dimensional drawings





IT8300 (15U) series, Overall dimensions: 550 mmW x 800mmD x 908mmH, Refer to the following dimension drawing:





IT8300 (24U) series, Overall dimensions: 550 mmW x 900.1mmD x 1291.24mmH, Refer to the following dimension drawing:

1.3 Connecting the Power Cord

Before connect

To avoid buring out and electric shock, The safety precautions must be observed.

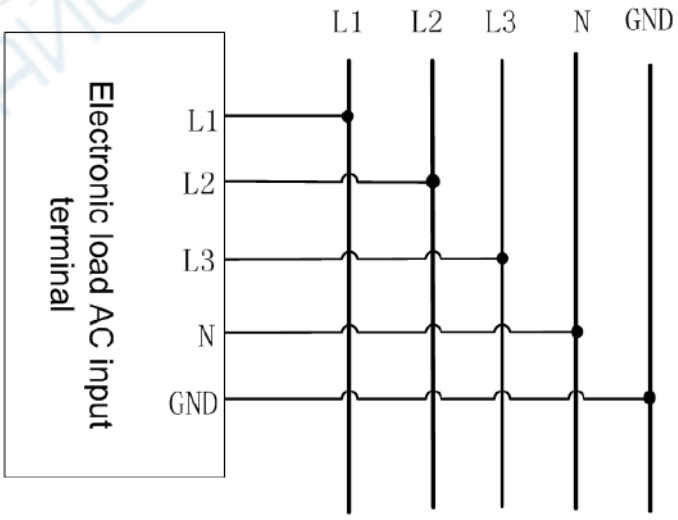
WARNING

- To avoid burning out, be sure to confirm that the power voltage matches with the supply voltage.
- please ensure the power switch of the instrument is turned OFF.
- To avoid burning out and electric shock, please only use the power cord supplied as a standard accessory.
- Be sure to connect the main power socket to the power outlet with protective grounding. Do not use terminal board without protective grounding.
- Do not use an extended power cord without protective grounding, otherwise the protection function will fail.
- Be sure to perform related operations and connections to feed energy back to grid in accordance with related regulations, and meet all necessary conditions.

Connecting the Power Cord

The IT8300 series electronic load AC input needs to connect to the three-phase power supply with protective grounding.

1. Please ensure the power switch of the instrument is turned OFF.
2. Remove the protective covers.
3. Connect one end of the AC power cord to the AC input terminals in the rear panel of the electronic load.
4. Connect the other end of the power cord to the AC distribution panel that meets the requirements in the “Output parameter” column of the specifications.



1.4 Connecting Test Cables (Optional)

Test cables are not standard accessories of the instrument. Please select optional red and black test cables for individual sales based on the maximum current value. For specifications of test cables and maximum current values, refer to "**Specifications of Red and Black Test cables**" in "**Appendix**".

WARNING

- **Before connecting test cables, be sure to switch off the instrument. Power switch is in Off position. Otherwise, contact with input terminals in rear panel may cause electrical shock.**
- **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.**
- **Always use test cables provided by ITECH to connect the equipment. If test cables from other factories are used, please check that the test cable can withstand maximum current.**

Test cable connection is given below taking local measurement as example. For details of local and remote measurements, refer to "**Functions of Rear Panel Terminal**".

1. Before connecting the test cables, be sure that the instrument Power is in Off position.
2. Unscrew the screws of the input terminals and connect the red and black test cables to the input terminals. Re-tighten the screws.

   When maximum current that one test cable can withstand fails to meet the current rated current, use several pieces of red and black test cables. For example, the maximum current is 1,200A, then 4 pieces of 360A red and black cables are required.
3. Directly connect the other end of the red and black cables to the DUT terminal.

Chapter2 Quick Start

This Chapter will introduce power-on check steps of IT8300 Series to ensure normal start-up and usage under initialization status of the load. Besides, to facilitate usage, this part also displays the functions of front board, rear board and keyboard keys as well as display functions of VFD (Vacuum Fluorescent Display) to a quick view of load appearance, structure and key usage functions before operation.

2.1 Brief Introduction

IT8300 series provides unique regenerative function. It can convert the absorbed DC power into AC power and feed it back to grid. That greatly saves energy and reduces heat dissipation cost for users. IT8300 adopts high power density design, e.g. for 3 U size, it can absorb power up to 10.5 kW. For high power test requirements, IT8300 supports master-slave paralleling and current equalized distribution, the functions expand the power without degrading the performance specifications. Moreover IT8300 has multiple functions such as the automatic grid-state detection, on-grid electricity accumulation, islanding protection, battery-test function, dynamic mode, LIST function, etc. The built-in interfaces include LAN, USB, RS232, RS485, CAN and analog interface, which are very convenient for PC and PLC remote control and user calibration. The various functions make IT8300 series suitable for high-capacity battery test, high-power power supply life-circle test etc.

IT8300 Series electronic load is featured with:

- Regenerative DC Electronic Load
- Four operation modes: constant voltage, constant current, constant resistance and constant power.
- Multiple parameters measurement & display Vdc, Idc, Pdc, Vac, Pac, Fac, Wac
- High resolution, high precision and high stability
- Dynamic test function
- Electricity-accumulation function
- With pre-charging function, prevent dc loading current overshoot
- Automatic grid-state detection, achieve reliable on-grid function, anti-islanding protection
- With module parallel function, increase load capacity.
- Over current protection, Over voltage protection, Over temperature, Over power protection and power grid fault protection.
- External analog control, current analog monitoring, isolating and output
- Battery test function
- Auto test function
- Short-circuit function
- Intelligent fan control
- Built-in USB, RS485, LAN, CAN and RS232 communication interfaces

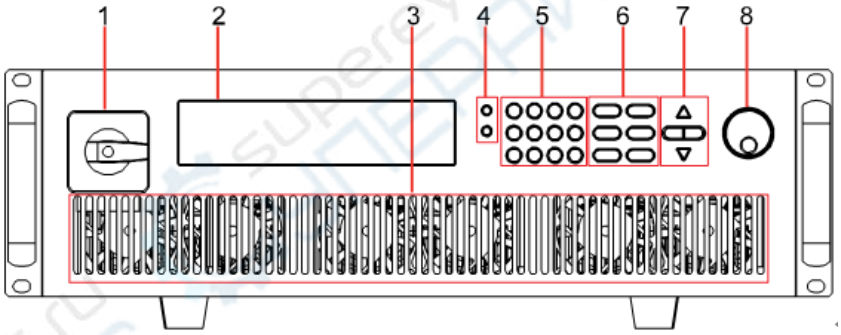
Model Selection Table for IT8300 Series:

80V	800V	Dimension
IT8311 80V/170A/3.5KW	**IT8312** 800V/20A/3.5KW	**3U**
IT8321 80V/340A/7KW	**IT8322** 800V/40A/7KW	**3U**

80V	800V	Dimension
IT8331 80V/510A/10.5KW	**IT8332** 800V/60A/10.5KW	**3U**
IT8341 80V/1020A/21KW	**IT8342** 800V/120A/21KW	**6U**
IT8351 80V/1530A/31.5KW	**IT8352** 800V/180A/31.5KW	**15U**
IT8361 80V/2040A/42KW	**IT8362** 800V/240A/42KW	**24U**
IT8371 80V/2550A/52.5KW	**IT8372** 800V/300A/52.5KW	**24U**
IT8381 80V/3060A/63KW	**IT8382** 800V/360A/63KW	**24U**
IT8391 80V/3570A/73.5KW	**IT8392** 800V/420A/73.5KW	**24U**

2.2 Front Panel Introduction

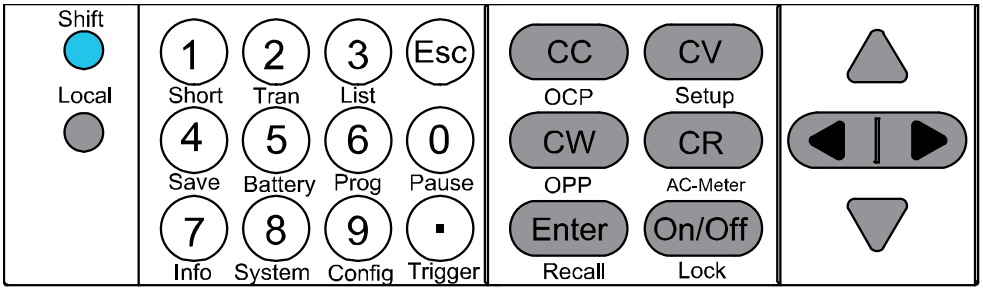
The 3U models of IT8300 Series electronic load have same front panels. Other models, have same panels as 3U Model. The front panel diagram and function key diagram of 3U Model are as follows.



1. Power Switch
2. VFD Screen
3. Vent hole
4. Shift and Local keys
5. Number key
6. Function keys
7. Up, Down, Left and Right key, to move cursor
8. Adjusting knob

2.3 Keyboard Introduction

Keys at IT8300 key area are shown below.



Detailed description of keys:

Keys	Name and functions
Shift	Composite key.
Local	Local key, to shift local and remote operation.
0~9	0 -9 are numeric keys.
.	Dot.
Esc	Esc key, to exit at any working status.
CC	To select constant current mode and set current input value.
CV	To select constant voltage mode and set voltage input value.
CR	To select constant resistance mode and set resistance input value.
CW	To select constant power mode and set constant power input value.
Enter	Enter key.
On/Off	To control input status of load: on/off.
	Up/Down key, to select menu items during menu operation.
	Left/Right key, to adjust the cursor to the specified location to set the value.

2.4 Fast function key

A combination of front panel keys and **[Shift]** composition keys in IT8300 Series can realize functions marked at key bottom. For details, see table below.

Keys	Function introduction
Shift +1 (Short)	To start or end short circuit test.
Shift +2 (Tran)	To set dynamic operation parameters.
Shift +3 (List)	To set list operation function.
Shift +4 (Save)	To save existing setting load parameter values, e.g., voltage, current and power.
Shift +5 (Battery)	To operate battery test function.
Shift +6 (Prog)	To operate auto test function.
Shift +7 (Info)	To display model, version number and serial number of electronic load.
Shift +8 (System)	To set system menu.
Shift +9 (Config)	To configure system menu.
Shift +0 (Pause)	To pause operation during automatic test.
Shift + **.** (Trigger)	Trigger key, to start up triggering functions.
Shift + CC (OCP)	To operate OCP test function.
Shift + CV (Setup)	To set specific parameters of constant voltage, constant current, constant resistance and constant power.

Shift + CW (OPP)	To operate OPP test function.
Shift + CR(AC-Meter)	To observe the regenerative power value, including voltage, frequency and power of each phase, as well as total power, total current regenerative and total historical regenerative power.
Shift + Enter (Recall)	To select stored load parameter values, e.g., voltage, current and power setting values.
Shift + On/Off (Lock)	To operate Keyboard locking function.

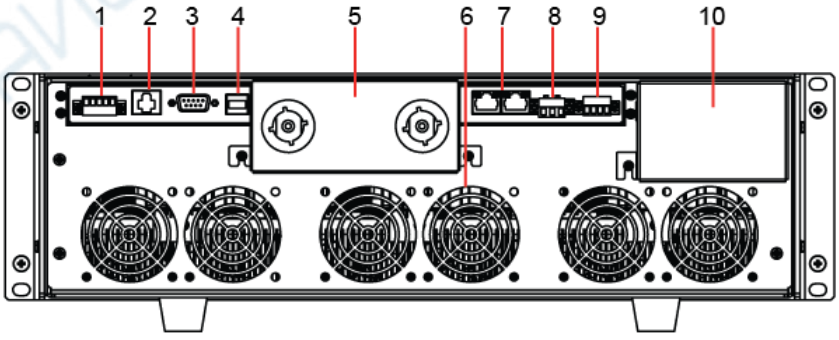
2.5 Function description of VFD status indicators

IT8300 series VFD indicator lamps description as follows:

Flag	Function introduction	Flag	Function introduction
OFF	The load is off.	**Error**	The load has error.
CC	The load is under constant current mode.	**Trig**	The load is waiting for triggering signal.
CV	The load is under constant voltage mode.	**Sense**	The load is under remote sense input mode.
CR	The load is under constant resistance mode.	**Prot**	The load is under software overcurrent protection status.
CW	The load is under constant power mode.	**Rear**	Start external analog quantity function.
Rmt	The load is under remote operation mode.	**Auto**	Start automatic voltage range.
Addr	Send command under remote operation.	*	Start keyboard locking function.
SRQ	Serial request query.	**Shift**	Shift key is pressed.

2.6 Rear Panel Introduction

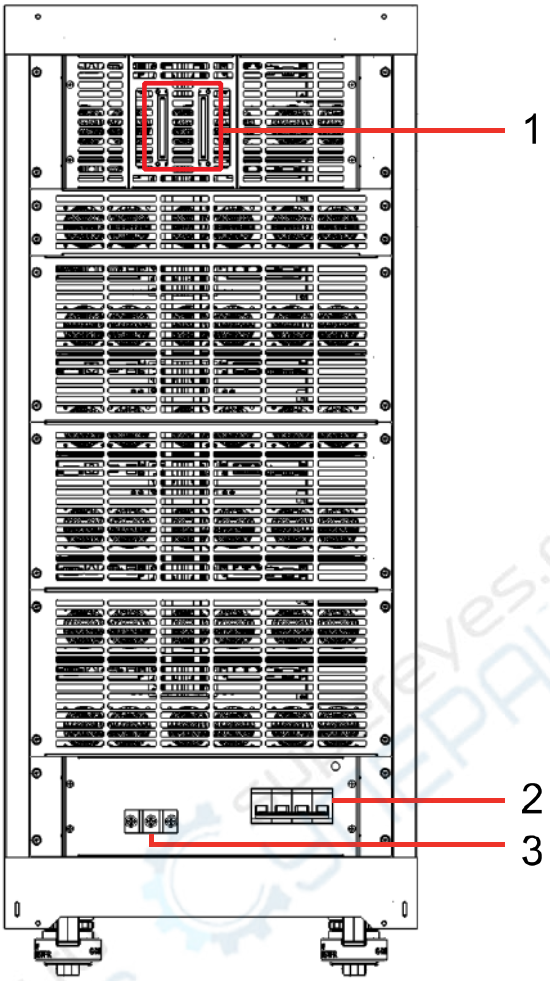
Schematic Diagram of Rear Panel of IT8300 series (3U) electronic load.



1. RS485 communication interface and CAN communication interface
2. LAN communication interface
3. RS232 communication interface
4. USB communication interface
5. Electronic load input terminal
6. Vent hole
7. System bus interface
8. Sense terminal

9. Current monitor interface and Analog interface
10. AC input terminal

Schematic Diagram of Rear Panel of IT8300 series (24U) electronic load is shown as below, and model 15U has same rear panels as 24U Model except size.



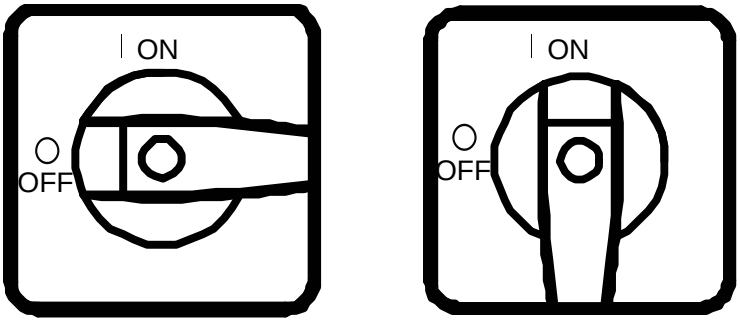
1. Input terminal
2. AC power switch
3. AC power input terminal

2.7 Power-on Selftest

A successful selftest indicates that this purchased load meets factory standards and meets the use requirements. Before operation, please confirm that you have fully understood the safety instructions.

Power Switch Introduction

User can rotate the power switch of IT8300 series electronic load directly to turn on or turn off the instrument. The sketch of Powe switch is as follows.



Off state On state

Selftest steps

Normal selftest procedures:

1. Correctly connect the power cable. Rotate Power key to start up.
2. After approximately 1s, the system is under selftest and the VFD display shows “System Selftest….”
3. After selftest, the VFD display information below.
   0.00V 0.0A
   0W CC=0.0A

   Information description:
   - The first cable displays actual input voltage and current values.
   - The second cable displays setting values of actual power value and current (voltage, power and resistance).
4. Press **[Shift]** + 7(Info), the electronic load VFD screen displays related information of the product. Press key to switch display of product model, product serial number and software version number.
   Model:IT83XX
   Ver:1.XX-1.XX
   SN:XXXXXXXXXXXXXXXXX

Exception handling

If the electronic load cannot start normally, please check and take measures by reference to steps below.

1. Check whether the power cable is correctly connected and confirm whether the electronic load is powered.

   Correct connection of power cable => 2

   Incorrect connection of power cable => Re-connect the power cable and check whether the exception is removed.

2. Check whether the power in On. **Power** key is under “|” On status.

   Yes => 3

   No => Please check the **Power** key to start power and check whether the exception is removed.

3. Check whether set power voltage of electronic load is matched with the power supply voltage.

Chapter3 Function and Features

This Chapter will give a detailed description of functions and features of the electronic load. The operation step data in this chapter are only for reference. For actual data, refer to specific models and specifications.

3.1 Switching of local/remote operation modes

The electronic load is provided with local and remote operation modes. These two modes can be switched through communication commands. At initialization, the electronic load is defaulted under local operation mode.

- Local operation mode: for operating related functions through keys on the electronic load machine.
- Remote operation mode: for operating related functions of the electronic load on PC through a connection between the electronic load and PC. Under remote operation mode, except **[Local]** key, other keys on the board are disabled. The **[Local]** key can be used for switching to local operation mode.

3.2 Constant-status operation mode

The electronic mode can work under the 4 constant-state operation modes:

- Constant current operation mode (CC)
- Constant voltage operation mode (CV)
- Constant resistance operation mode (CR)
- Constant power operation mode (CW)

3.2.1 Constant current operation mode (CC)

Under CC mode, the electronic load will consume constant current in regardless of whether the input voltage changes or not, as shown in Fig. 3-1.

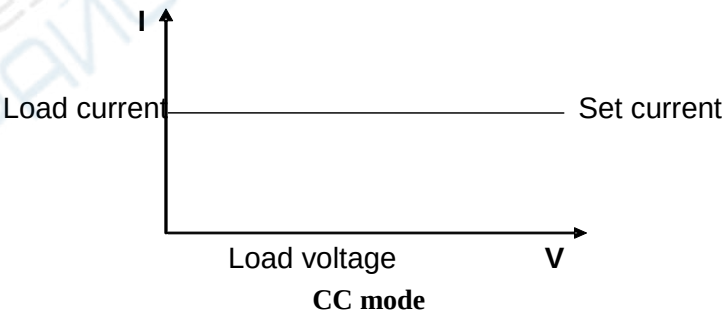


Fig. 3-1 Voltage-Current Relation Schema under CC Mode

Under CC mode, the electronic load provides three ways to set constant current.

- Rotate adjusting knob to set constant current value.
- Use numeric keys to input current value and press **[Enter]** key to confirm set constant current value.
- Use  moving cursor and press  to adjust values at corresponding positions.

Operation steps

1. Press **[CC]** key and **[Shift]** + **[CV]** to enter parameter setting screen.
   Constant Current
   Range=0.0A
2. Set maximum working current value and press **[Enter]** for confirmation.
   Constant Current
   Range =1.0A
3. Set maximum voltage value and press **[Enter]** key.
   Constant Current
   High=0.00V
4. Set minimum voltage value and press **[Enter]** key.
   Constant Current
   Low=0.00V
5. Set high and low rate and press **[Enter]** key.
   Constant Current
   High-Rate Low-Rate
6. Set ascending slope and press **[Enter]** key.
   Constant Current
   Rise up=0.0A/mS
7. Set descending slope and press **[Enter]** key.
   Constant Current
   Fall down=0.0A/mS
8. Complete parameter setting.
   10.00V 0.0A
   0W CC=1.0A

Note

If the above method is for editing auto test step (as mentioned below), constant current range can also be set.

3.2.2 Constant voltage operation mode (CV)

Under CV mode, the electronic load will consume sufficient current to maintain the input voltage at setting voltage. As shown in Fig. 3-2.

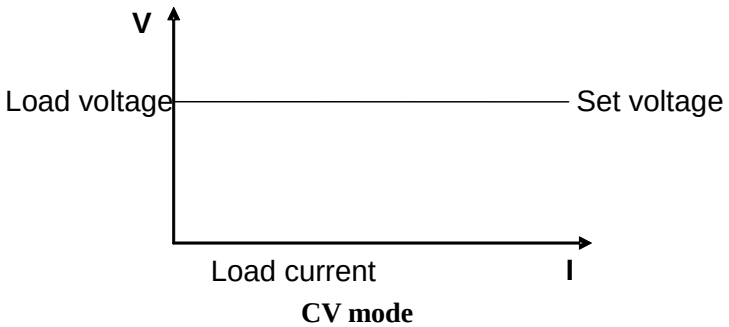


Fig. 3-2 Voltage-Current Relation Schema under CV Mode

Under CV mode, the electronic load provides three ways to modify constant voltage.

- Rotate adjusting knob to set constant voltage value.
- Use numeric keys to input voltage value and press **[Enter]** key to confirm set constant voltage value.
- Use  moving cursor and press  to adjust values at corresponding positions.

Operation steps

1. Press **[CV]** key and **[Shift]** + **[CV]** to enter parameter setting screen.

   Constant Voltage

   Range=80.00V

2. Set maximum working voltage value and press **[Enter]** for confirmation.

   Constant Voltage

   Range=2.33V

3. Set maximum current value and press **[Enter]** key.

   Constant Voltage

   High=66.0A

4. Set minimum current value and press **[Enter]** key.

   Constant Voltage

   Low=0.0A

5. Complete parameter setting.

   10.00V 0.0A

   0W CV=2.33V

Note

If the above method is for editing auto test step (as mentioned below), constant voltage range can also be set.

3.2.3 Constant resistance operation mode (CR)

Under CR mode, the electronic load is equivalent to a constant resistance (as shown below) and will give linear change of current with input voltage change. As shown in Fig. 3-3.

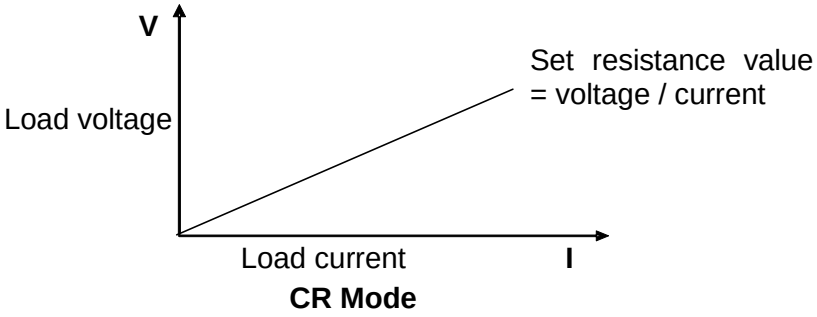


Fig. 3-3 Voltage-Current Relation Schema under CR Mode

Under CR mode, the electronic load provides three ways to modify constant resistance.

Rotate adjusting knob to set constant resistance value.

Use numeric keys to input resistance value and press **[Enter]** key to confirm set constant resistance value.

Use  moving cursor and press  to adjust values at corresponding positions.

Operation steps

1. Press **[CR]** key and **[Shift]** + **[CV]** to enter parameter setting screen.

   Constant Resistance

   Range=1200.000Ω
2. Set maximum working resistance value and press **[Enter]** for confirmation.

   Constant Resistance

   Range=1000.000Ω
3. Set maximum voltage value and press **[Enter]** key.

   Constant Resistance

   High=80.00V
4. Set minimum voltage value and press **[Enter]** key.

   Constant Resistance

   Low=0.00V
5. Complete parameter setting.

   10.00V 0.0A

   0W CR=2.000Ω

Note

If the above method is for editing auto test step (as mentioned below), constant resistance range can also be set.

3.2.4 Constant power operation mode (CW)

Under CW mode, the electronic load will consume a constant power, as shown below. If input voltage rises, the input current decreases and power P (= V * I) will maintain at setting power. As shown in Fig. 3-4.

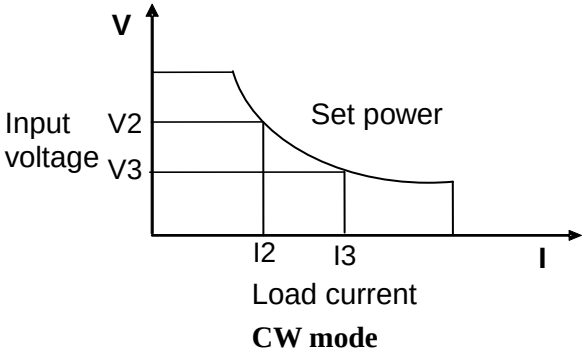


Fig. 3-4 Voltage-Current Relation Schema under CW Mode

Under CW mode, the electronic load provides three ways to modify constant power.

Rotate adjusting knob to set constant power value.

Use numeric keys to input power value and press **[Enter]** key to confirm set constant power value.

Use  moving cursor and press  to adjust values at corresponding positions.

Operation steps

1. Press **[CW]** key and **[Shift]** + **[CV]** to enter parameter setting screen.

   Constant Power

   Range=400W

2. Set maximum working power value and press **[Enter]** for confirmation.

   Constant Power

   Range =300W

3. Set maximum voltage value and press **[Enter]** key.

   Constant Power

   High=130.00V

4. Set minimum voltage value and press **[Enter]** key.

   Constant Power

   Low=0.00V

5. Complete parameter setting.

   10.00V 0.0A

   0W CW=1W

Note

If the above method is for editing auto test step (as mentioned below), constant power range can also be set.

3.3 Input control function

Control input switch of the electronic load by pressing **[On/Off]** key on the front board. If **[On/Off]** lamp is on, the input is on; and if **[On/Off]** lamp is off, the VFD Off is on and the input is off. When the electronic load is on, the VFD working status indicator is OFF.

3.4 Keyboard locking function

Press the composite key **[Shift]** + **[On/Off]** (Lock) to lock the instrument board key, and the VFD displays *. Under other function statuses, except **[On/Off]** key and **[Shift]** + 7 (Info), other keys are disabled. Press this composite key to cancel locking.

3.5 Short-circuit analog function

The load can analog a short circuited circuit at input terminal. Under board operation, press the **[Shift]** + 1(Short) key to switch short circuit status. The short circuit status does not influence existing setting value. When the short circuit operation is switched back to OFF status, the load returns back to original setting status.

Actual current value consumed by load at short circuit depends on the existing working mode of load and current range. Under CC, CP and CR modes, maximum short-circuit current is 100% of current range. Under CV mode, short circuit current is equivalent to that constant voltage value of load is 0 V.

3.6 System menu function (System)

Press **[Shift]** + 8(System) to enter system menu setting.

Reset	Recover all configurations to factory set values.	
Power-On	POWER-ON SET	Set the power-on state of the instrument.
	Rst(Def)	Set the input status of load at powering on as default setting.
	Sav0	Set the input status of load at powering on as SAVE 0 value.
Buzzer	BUZZER STATE	Set the buzzer status.
	Off	Set the buzzer as OFF status.
	On(Def)	Set the buzzer as ON status.
Trigger	TRIGGER SOURCE	Set triggering mode.
	Manual(Def)	Manual trigger.
	Hold	Trig: IMM valid.
	Bus	Bus trigger mode.
	Timer	Timer trigger mode.
Memory	MEMORY	Work with Recall button to recall 100 sets saved parameters
	Group = 0	0: represents 1-10 groups; 1: represents: 11-20 groups, by parity of reasoning.
Displ	DISPLAY ON TIMER	Screen displays loading time.
	Off(Def)	Start function.
	On	Stop function.
Communication	COMMUNICATION	Select the interface for communication with a computer.
	RS232(Def)	Select the RS232 communication interface.
		4800, 8, N non parity check, 1, NONE
		9600 O even parity check, 2, CTS/RTS
		19200 E odd parity check XON/XOFF
		38400
		57600
		115200
	USB	Select the USB communication interface.
	LAN	Select the LAN communication interface.
		Gateway= 192.168.0.1 Gate way setting.
		IP= 192.168.0.125 IP address
		Mask= 255.255.255.0 Mask setting
		Socket Port= 30000 Socket Port setting
	RS485	Select the RS485 communication interface.
		4800, 8, N non parity check, 1
		9600 O even parity check, 2
		19200 E odd parity check
		38400
		57600
		115200
	CAN	Select the CAN communication interface.

		20K: Baud rate
		Addr: Address of load
		Prescaler: Prescaler
		BS1 Value: Not settable
		BS2 Value: Not settable
Protocol	PROTOCOL	Communication protocol selection
	SCPI(Def)	SCPI protocol.
	Extend-Table	Expand SCPI protocol for compatibility of other machines.
Parallel	PARALLEL SETUP	Parallel mode set up
	Single	Single mode
	Slave	Act as a slave mode
	Master	Act as a master mode
	Total = 3	Set total number of instruments in parallel.

Restored to Factory Setting (>Reset)

This option is used to restore all settings in the system menu to factory setting values. Select “YES” and Press **[Enter]** to restore to factory setting values. In this case, all set values in the system will be restored to factory setting values, i.e., the (Def) mark values.

Power on (>Power-on)

This parameter determines the state of electronic load after power up. If you select “Rst”, the default input parameter settings will be active after power up. The default setup is 0V and 0A. If you select “Sav0”, then the electronic load will automatically recall the input parameters setting saved in 0 register.

Key Sound Set (>Buzzer)

This item can set the key sound state. If in On mode, the electronic load will issue beeper sound when you press any button. If in Off mode, the beeper will not make a sound. The default set is in On mode.

3.7 Configuration menu function (Config)

Press **[Shift]** + 9(Config) to enter menu configuration (CONFIG MENU).

Von	Living	Von point living state, ON /OFF
	Point= 2V	Set the Von value
	Hysteresis=0.5V	Indicates the hysteresis voltage, when the voltage falls below that value, the Von function is maintained.
	Latch	Von point latch state, ON /OFF
	Point= 2V	Set the Von value
Protect	P-Limit	Set hardware protective power value.
	Point=150W	Set the maximum power.
	I-Protect	Set software current protection.
	On	Start function.
	Point=30A	Set software current protective value.

	Delay= 3S	Set software current protective delay.
	Off	Stop function.
	P-Protect	Set software power protection.
	Point=100W	Set software power protective value.
	Delay= 3S	Set software power protective delay.
	Time	Set LOAD ON timer.
	On	Start function.
	Delay=10S	Set LOAD ON timer value.
	Off	Stop function.
Remote-Sense	On	Start remote sense compensation function
	Off	Stop remote sense compensation function
Ext-Program	On	Start external 0-10 V analog quantity control function.
	Off	Stop external 0-10 V analog quantity control function.

3.8 Observe power grid information

The regenerative power value can be observed on the front panel of IT8300 series, including voltage, frequency and power of each phase, as well as total power, total current regenerative and total historical regenerative power.

1. Press **[Shift]**+ **[CR]** (AC-Meter) to enter the power grid information interface.

   “Display” and “Clear” are displayed on the interface.

2. Select “Display”, then the current regenerative power value will display.

   L1:234.8Vac 49.95Hz 0.0kw

3. Press down arrow key to display the regenerative power value of L2 and L3, total power, total current regenerative and total historical regenerative power.

   P=0.00kw total power

   E=125.1kwh total current regenerative power

   E_total=215.7kwh total historical regenerative power

You can zero the total current regenerative power value by selecting “Clear”, but the total historical regenerative power value can’t be cleared.

3.9 Triggering function

Triggering function is necessary to operate dynamic pulse output and list output. There are three triggering methods to trigger the tested instrument. Optional triggering sources of triggering function of electronic load comprise:

- **Manual trigger:** when key trigger is valid, press **[Shift]** + **.**(Trigger) key and

the load will trigger an operation.

- **Timing trigger:** when the timing trigger is valid, the load will automatically trigger an operation at intervals.
- **Trigger holding:** when trigger holding is valid, only when the load receives trigger command (TRIG:IMM), the load will trigger an operation.
- **Bus trigger:** when the bus trigger is valid, after the load receives a trigger command (GET or * TRG) from GPIB port, the load will trigger an operation.

Select the triggering sources as follows:

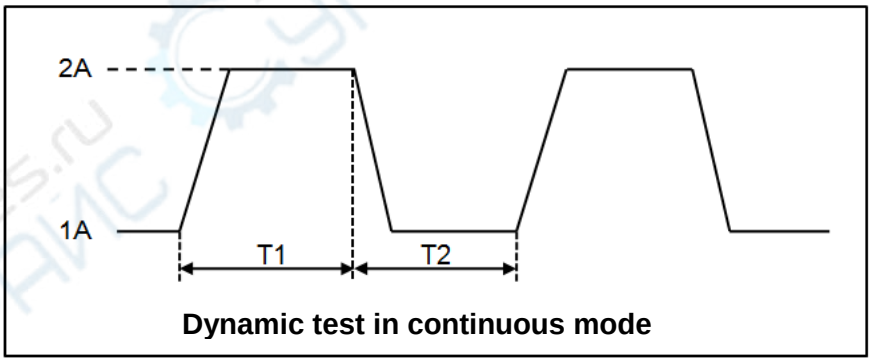
3.10 Dynamic test function

Through dynamic test operation, the electronic load can be switched between two setting parameters based on setting rules. This function can be used to test dynamic performances of power supply. For dynamic test operation, press **[Shift]** + 2 (Tran) key on the front board to enter the dynamic test menu. Before test, firstly, set parameters related to dynamic test operation, including dynamic test mode, A value, B value, pulse width time, frequency, duty ratio, etc. Under CC mode, current ascending and descending slopes should be set for dynamic test.

The dynamic test mode can be divided into continuous mode, pulse mode and toggle mode.

3.10.1 Continuous mode

Under continuous mode, after enabling dynamic test operation, the load will be switched continuously between A value and B value.



Dynamic test in continuous mode

When output voltage and current of the tested instrument are 10 V and 3 A respectively, the load current will switch between 1 A and 2 A. Set the dynamic test parameters and perform the test as follows:

1. Press **[Shift]** + 2 (Tran) keys.

   TRANSITION

   On Off

2. Operate  key and move to Off. Press **[Enter]** key and select Continuous. Press **[Enter]** key.

   TRANSITION

   Continuous Pulse Toggle

3. Operate  key and select high range and low range. Move to the High-Rate and press **[Enter]** key.

   TRANSITION

   High-Rate Low-Rate

4. Set ascending slope and press **[Enter]** key.

   TRANSITION

   Rise up=2.0A/mS

5. Set descending slope and press **[Enter]** key.

   TRANSITION

   Fall down=2.0A/mS

6. Set A value and press **[Enter]** key.

   TRANSITION

   Level A=1.0A

7. Set B value and press **[Enter]** key.

   TRANSITION

   Level B=2.0A

8. Set frequency value and press **[Enter]** key.

   TRANSITION

   Frequnce=50.00Hz(0.01-500Hz)

9. Set duty ratio and press **[Enter]** key.

   TRANSITION

   Duty=50.00%

10. Start dynamic test and operate  key. Move to On and press **[Enter]** key.

    TRANSITION

    On Off

11. Enter the dynamic test mode.

    10.00V 0.0A

    0W 0 TRAN

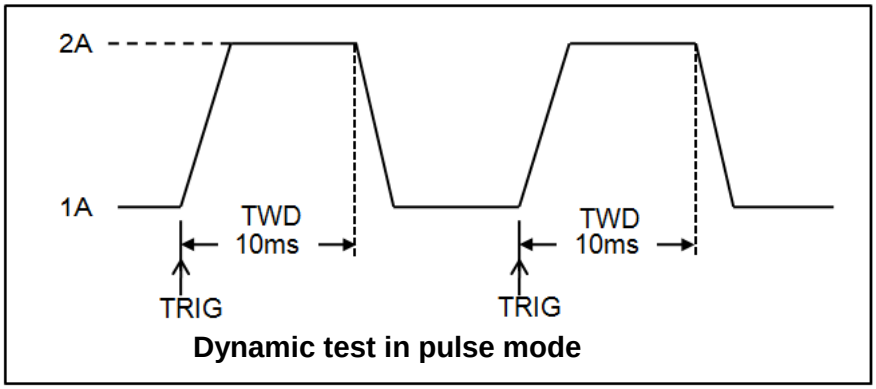
12. Press **[On/Off]** key to open input and press **[Shift]** + **.** (Trigger).

    The load will continuously switch between A and B value. Time of operations is shown at bottom right.

13. Press **[CC]/ [CV]/ [CR]/ [CW]** key or any composite function key to exit dynamic test function. Repeat Steps 1-12 to continue parameter setting and operation of dynamic test.

3.10.2 Pulse mode

Under pulse mode, after enabling dynamic test operation, the load will switch to B value after receipt of a trigger signal and switch back to A value after maintaining B for pulse width time.



Dynamic test in pulse mode

When output voltage and current of the tested instrument are 10 V and 3 A respectively, the load current will switch between 1 A and 2 A. Set the dynamic test parameters and perform the test as follows:

1. Press **[Shift]** + 2 (Tran) keys.
   TRANSITION
   On Off
2. Operate ◀ ▶ key and move to On. Press **[Enter]** key and select Pulse. Press **[Enter]** key (The Trig lamp that indicates VFD screen status is on).
   TRANSITION
   Continuous Pulse Toggle
3. Operate ◀ ▶ key and select high range and low range. Move to the High-Rate and press **[Enter]** key.
   TRANSITION
   High-Rate Low-Rate
4. Set ascending slope and press **[Enter]** key.
   TRANSITION
   Rise up=2.0A/mS
5. Set descending slope and press **[Enter]** key.
   TRANSITION
   Fall down=2.0A/mS
6. Set A value and press **[Enter]** key.
   TRANSITION
   Level A=1.0A
7. Set B value and press **[Enter]** key.
   TRANSITION
   Level B=2.0A
8. Set time width and press **[Enter]** key.
   TRANSITION
   Pulse Width=5.00000S (0.001-3600S)

   Note
   The digit numbers after the decimal point varies with the set value.

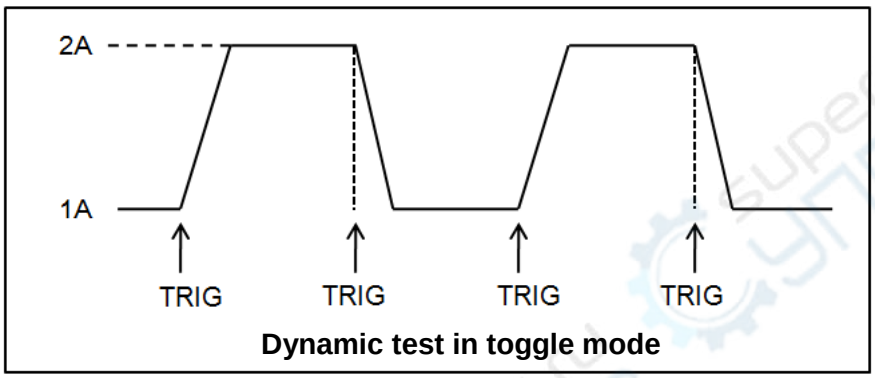
9. Start dynamic test and operate ◀ ▶ key. Move to On and press **[Enter]** key.
   TRANSITION
   On Off
10. Enter the dynamic test mode.
    10.00V 0.0A
    0W 0 TRAN
11. Press **[On/Off]** key to open input and press **[Shift]** + **.** (Trigger) key.
    The load will switch after receipt of every trigger signal. The load will

continuously switch between A and B value. Time of operations is shown at bottom right.

12. Press **[CC]/ [CV]/ [CR]/ [CW]** key or any composite function key to exit dynamic test function. Repeat Steps 1-11 to continue parameter setting and operation of dynamic test.

3.10.3 Toggle mode

Under toggle mode, after enabling dynamic test operation, the load will be switched continuously between A value and B value after receipt of every trigger signal.



Dynamic test in toggle mode

When output voltage and current of the tested instrument are 10 V and 3 A respectively, the load current will switch between 1 A and 2 A. Set the dynamic test parameters and perform the test as follows:

1. Press **[Shift]** + 2 (Tran) eys.

   TRANSITION

   On Off

2. Operate  key and move it to on. Press **[Enter]** key and move the cursor to Toggle. And press **[Enter]** key (The Trig lamp that indicates VFD screen status is on)

   TRANSITION

   Continuous Pulse Toggle

3. Operate  key and select high range and low range. Move to the High-Rate and press **[Enter]** key.

   TRANSITION

   High-Rate Low-Rate

4. Set ascending slope and press **[Enter]** key.

   TRANSITION

   Rise up=2.0A/mS

5. Set descending slope and press **[Enter]** key.

   TRANSITION

   Fall down=2.0A/mS

6. Set A value and press **[Enter]** key.

   TRANSITION

   Level A=1.0A

7. Set B value and press **[Enter]** key.

   TRANSITION

   Level B=2.0A

8. Start dynamic test and operate  key. Move to on and press **[Enter]** key.

   TRANSITION

   On Off

9. Enter the dynamic test mode.

   10.00V 0.0A

   0W 0 TRAN

10. Press **[On/Off]** key to open input and press **[Shift]** + **.** (Trigger) key.

    The load will switch after receipt of every trigger signal. The load will switch between A and B value for one time. Time of operations is shown at bottom right.

11. Press **[CC]/ [CV]/ [CR]/ [CW]** key or any composite function key to exit dynamic test function. Repeat Steps 1-10 to continue parameter setting and operation of dynamic test.

3.11 OCP test function

The IT8300 series electronic load is provided with overcurrent protection test function (OCP). Under OCP test mode, when input voltage reached Von value, delay for a while for the electronic load to latch. Ascend value by step value at regular interval. At the same time, check the load input voltage and judge whether it is higher than standard voltage value. If higher, it indicates that OCP does not occur. Repeat current stepping operation till the load operates to the cutoff current. At the same time, check whether the cutoff current value is within target scope. If yes, PASS the test, otherwise FAULT. If lower, it indicates that OCP has occurred. Check whether the existing current value is within target scope again. If yes, PASS the test, otherwise FAULT.

Operating steps:

1. Press **[Shift]** + **[CC]** (OCP) keys to enter OCP test function setting screen.

OCP TEST	Run	OCP TEST	
			Run OCP test documents.
	Recall	OCP TEST	
		Recall OCP File=1	Recall OCP test documents (1-5).
	Edit	OCP TEST	
		1:Voltage on level=0.00V	Set Von voltage value.
		2:Voltage on Delay=0.00S	Set Von voltage delay time.
		3:Current Range=0.0A	Set working current range.
		4:Start Current=0.0A	Set initial current value.
		5:Step Current=0.0A	Set step current value.
		6:Step Delay=0.00S	Set step delay time.
		7:End Current=0.0A	Set cutoff current value.
		8:OCP Voltage=0.00V	Set OCP value.
		9:Max Trip Current=0.0A	Set overcurrent range (maximum value).
		10:Min Trip Current=0.0A	Set overcurrent range (minimum

			value).
		Save OCP File=1 (1-5)	Save OCP test documents.

2. Press **[Shift]** + **.** (Trigger) key to start OCP test. If within range, PASS the test and the board will display as follows:

```
9.99V          0.5A
1W      5.1A     PASS          STOP
```

If not, there is FAULT and the board will display as follows:

```
9.99V          0.5A
1W      5.1A     FAULT      STOP
```

3. End test. Press **[Esc]** to return to setting screen.

Note

If the set OCP voltage value is higher than the power voltage value, the OCP will fail to operate and the board will display as follows:

```
9.99V          0.9A
1W      0.1A      FAULT      STOP
```

3.12 OPP test function

The IT8300 series electronic load is provided with overpower protection test function (OPP). Under OPP test mode, when input voltage reached Von value, delay for a while for the electronic load to latch. Ascend value by step value at regular interval. At the same time, check the load input voltage and judge whether it is higher than standard voltage value. If higher, it indicates that OPP does not occur. Repeat power stepping operation till the load operates to the cutoff power. At the same time, check whether the cutoff power value is within target scope. If yes, PASS the test, otherwise FAULT. If lower, it indicates that OPP does occur. Check whether the existing power value is within target scope again. If yes, PASS the test, otherwise FAULT.

Operating steps:

1. Press **[Shift]** + **[CW]** (OPP) keys to enter OPP test function setting screen:

OPP TEST	Run	OPP TEST	
			Operate OPP test documents.
	Recall	OPP TEST	
		Recall OPP File=1	Recall OPP test documents (1-5).
	Edit	OPP TEST	
		1:Voltage on level=0.00V	Set Von voltage value.
		2:Voltage on Delay=0.00S	Set Von voltage delay time.
		3:Current Range=0.0A	Set current range.
		4:Start Power=0W	Set initial power value.
		5:Step Power=0W	Set step power value.
		6:Step Delay=0.00S	Set step delay time.
		7:End Power=0.0A	Set cutoff power value.
		8:OPP Voltage=0.00V	Set OPP value.
		9:Max Trip Power =0W	Set overpower range (maximum

			value).
		10:Min Trip Power =0W	Set overpower range (minimum value).
		Save OPP File=1 (1-5)	Save OPP test documents.

2. Press **[Shift]** + **.** (Trigger) key to start OPP test. If within range, PASS the test and the board will display as follows:

```
9.99V              0.7A
1W      49W     PASS     STOP
```

If not, there is FAULT and the board will display as follows:

```
9.99V              0.7A
1W      48W     FAULT     STOP
```

3. End test. Press **[ESC]** to return to setting screen. Press **[ESC]** again to exit.

Note

If the set OPP voltage value is higher than the power voltage value, the OPP will fail to operate and the board will display as follows:

```
9.99V              0.7A
1W      1W      FAULT     STOP
```

3.13 Battery discharge test function

In the IT8300 series electronic load, constant current mode is applied for discharge test with programmatic setting of stop voltage/capacity/discharging time If stop voltage is set as the stop condition, the system determines whether the battery is about to reach the set threshold value or unsafe status when the battery voltage is low, and if yes, an automatic stop will be activated. During test, the operator can observe voltage, discharging time and discharged capacity of battery. Battery discharge test is a necessary step before battery replacement as it can reflect reliability and remaining life of battery.

Press **[Shift]** + 5(Battery) keys to enter function testing screen of battery discharge test.

STOP CONDITION	Stop Voltage=0.00V	Set stop voltage.
	Stop Capability=0.0Ah	Set battery stop capacity.
	Stop Timer=0S	Set discharge time.

Operation method:

1. Press **[On/Off]** key to cut off load input status. Connect the battery to be tested. Under CC mode, press **[Shift]** + 5(Battery) keys to enter battery discharge function menu and perform tests based on stop conditions. Whichever stop condition is satisfied, the test will stop.
2. Set discharge stopping conditions:
   - Type I: Press **[Shift]** + 5(Battery) keys and select Capability. Press **[Enter]** key and the VFD displays Stop Capability =Ah. Set battery stop

capacity. Press **[Enter]** key. When set battery capacity is reached, the load input status will automatically be OFF.

- Type II: Press **[Shift]** + 5(Battery) keys and select Voltage. Press **[Enter]** key and the VFD displays Stop Voltage=V. Set stop voltage and press **[Enter]** key to start discharge test. When the battery voltage drops to stop voltage, the load input status will automatically be OFF.
- Type III: Press **[Shift]** + 5(Battery) key and select Timer. Press **[Enter]** key and the VFD displays Stop Timer=S (Max. 99999S). Set discharge time. When the set stop time is reached, the load input status will automatically be OFF.

3. Press **[Shift]** + **.** (Trigger) key to start test. The board will display discharge voltage, current discharge time and discharged capacity (AH).
4. Press **[Esc]** key to exit battery capacity test mode in any three methods.

3.14 Configuration save function

The electronic load can save some commonly-used parameters in 100-group NVM for convenient and fast usage. The parameters to be saved includes working mode, voltage, current, etc. The **[Shift]** + 4 (Save) keys can be used for saving parameters. The **[Shift]** + **[Enter]** (Recall) key is for quick invoking.

Operation steps

If the operator needs to save configured parameter values for direct recall in follow-up operation, refer to the steps below:

E.g., power supply 6V and 3A. The electronic load works under constant current (CC) 1A. Save "CC 1A" in register 9 for recall.

- **SAVE**

1. Set parameters and press **[Shift]** + 4 (Save) keys to save data. Press 9 key (to select in which group the data is to be saved).

   5.89V 0.9A

   5W Save 9
2. Press **[Enter]** key.

   5.89V 0.9A

   5W CC=1.0A

- **RECALL**

1. Press **[Shift]** + **[Enter]** (Recall) key and press **9** (to select from which group the data is recalled).

   5.89V 0.9A

   5W Recall 9

Memory function

When you want to recall the data saved in the memory, you should set memory group in the system menu first.

Group 0 means you can recall data saved in 1-10 groups. Group 1 means you can recall data saved in 11-20 groups. Group2-Group 9 can be concluded in the same manner.

3.15 VON Function

When testing some power products with slow voltage rise speed, if the electronic load input is opened before power, the power may latch protection. In this way, the user may set VON value. The electronic load only latches when power voltage is higher than this value.

Press **[Shift]** + 9(Config) keys to enter configuration menu. Set voltage value in Voltage on under configuration menu to control on/off status of electronic load. Based on Von value load and unload, the load has two modes: Living and Latch. When Living is selected, it indicates that the work load point is in living status; when Latch is selected, it indicates that the work load point is in latch load status.

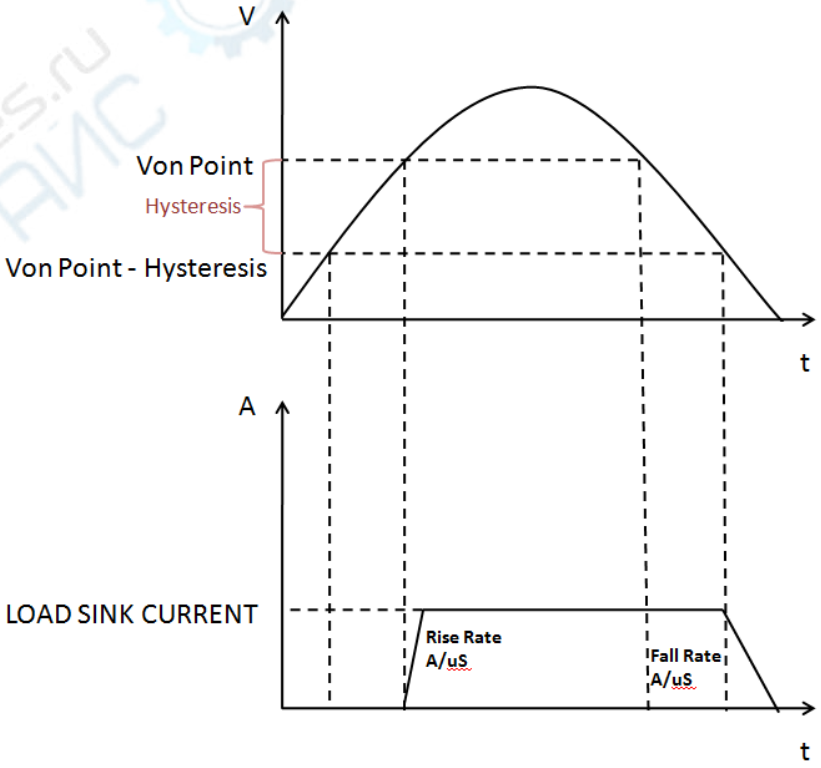
Note

Please confirm whether it is necessary to set loading voltage, a step that provides convenience for limiting working voltage value. If not necessary, do not set the loading voltage to prevent unnecessary trouble from failure of loading.

If the instrument cannot load, please firstly check whether the VON function is set. If yes, reset the Von value to minimum value (which may be directly set as 0. If minimum voltage value of instrument is not 0, press 0 for confirmation and the menu will automatically set the value as minimum value).

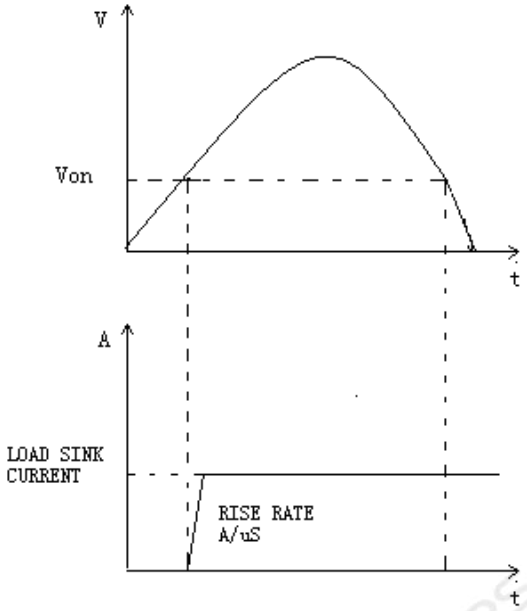
- When VON LIVING function is enabled, the tested power voltage starts rising. When the voltage is higher than the difference between Von Point and Hysteresis, and is lower than Von Point loading voltage, the load will not be loaded; and the load test starts only when the power voltage rises and is higher than Von Point loading voltage.

  After load test, judge whether to continue loading based on the difference between Von Point and Hysteresis; when the power voltage drops but is still higher than the difference between Von Point and Hysteresis, the load is still loaded; only when the power voltage is lower than the difference between Von Point and Hysteresis, the load will unload.



Load working range when VON LIVING is started

- When VON LATCH function is started, the load starts load test only when the power voltage rises and is higher than Von Point loading voltage. When the power voltage drops and is lower than Von Point unloading voltage, the load will not unload.



Load working range when VON LATCH is started

3.16 Protective Function

The load is provided with following protective functions: overvoltage protection (OVP), overcurrent protection (OCP), overpower protection (OPP), overtemperature protection (OTP) and AC protection (ACP).

Overvoltage protection (OVP)

The load will be immediately OFF and the buzzer will sound if the overvoltage circuit is triggered. OV and VF bits of the status register will be set and OVP will be displayed on the screen of the load till resetting.

Clear overvoltage protection status:

Inspect whether voltage of object under test is within load rated voltage or set protection voltage range. If not, disconnect the object. Press the [Esc] key on load front board (or send command PROTection:CLEar), the load front board (OVP) word will get cleared and the load will exit OVP protection status.

Overcurrent protection (OCP)

When software overcurrent protection function is on, if the loading current value exceeds delay of such overcurrent protection set value, the load will automatically be OFF and the VFD will display OCP. At the same time, OC and PS bits of the status register will be set and keep till reset.

The setting method as follows:

1. Press **[Shift]** + 9(Config) to enter configuration menu setting screen.
2. Press  to move to the **Protect** and press [**Enter**].

3. Press  to select **A-Limit** and press [**Enter**].
4. Press  to select **On** and press [**Enter**].
5. Press numeric keys and set the OCP Point, press [**Enter**] to confirm.
6. Press numeric keys and set the Delay time, press [**Enter**] to confirm.
7. Press [Esc] to exit setting.

Clear overcurrent protection status:

Inspect whether current of object under test is within load rated current or set protection current range. If not, disconnect the object. Press the [Esc] key on load front board (or send command PROTection:CLEar), the load front board (OCP) word will get cleared and the load will exit OCP protection status.

Overpower protection (OPP)

The electronic load is provided with two kinds of overpower protections: hardware overpower protection and software overpower protection.

- **Hardware overpower protection:**

  the user can set load hardware overpower protection. Load overpower will be limited to existing power value. The On/Off status of load will not be changed by the hardware overpower protection.
- **Software overpower protection:**

  If the loading power value exceeds delay of such overpower protection set value, the load will automatically be OFF and the VFD will display OPP. At the same time, OP and PS bits of the status register will be set and keep till reset.
  The setting method as follows:

1. Press **[Shift]** + 9(Config) to enter configuration menu setting screen.
2. Press  to move to the **Protect** and press [**Enter**].
3. Press  to select **P-Limit** and press [**Enter**].
4. Press numeric keys and set the OPP Point, press [**Enter**] to confirm.
5. Press numeric keys and set the Delay time, press [**Enter**] to confirm.
6. Press [Esc] to exit setting.

Clear overpower protection status:

Inspect whether power of object under test is within load rated power or set protection power range. If not, disconnect the object. Press the [Esc] key on load front board (or send command PROTection:CLEar), the load front board (OPP) word will get cleared and the load will exit OPP protection status.

Overtemperature protection (OTP)

When internal power device of load is higher than about 80 °C, the load is under temperature protection. At this time, the load will automatically be OFF and VFD will display OTP. At the same time, OT and PS bits of the status register will be set and keep till reset.

When load temperature is decreased to protection point (75 °C), the load automatically restored from the protection state, and OTP need to be manually cleared, the load into the standby state.

Clear overtemperature protection:

Press the [Esc] key on load front board (or send command PROTection:CLEar), the load front board (OTP) word will get cleared and the load will exit OTP protection status.

AC protection(ACP)

AC protection includes overvoltage protection, undervoltage protection, overfrequency protection, underfrequency protection and overcurrent protection. The load will be immediately OFF and the buzzer will sound if the voltage, current and frequency at the inverse AC terminal are not within rated range. ACP related error information will be displayed on the screen of the load till resetting.

- VacH: Grid voltage is too high
- VacL: Grid voltage is too low
- FacH: Grid frequency is too high
- FacL: Grid frequency is too low
- Iac_OC: Grid current is too high, OCP

The error information can be cleared manually, but can not be cleared within 5 seconds of the instrument's self-test, and the instrument is in standby state. If there is still error information after manual removal, the instrument will cycle the self-test again.

Clear AC protection:

Except Iac_OC protection, when the grid is recovered, press the [Esc] key on load front panel (or send command to PROTection:CLEar), the load front panel (OVP) word will get cleared and the load will exit ACP protection status. Under Iac_OC protection, the instrument needs restarting to exit protection status. Under ACP status, the user can press **[Shift]**+**[CR]** (AC-Meter) key to enter the power grid information interface to check grid voltage and frequency.

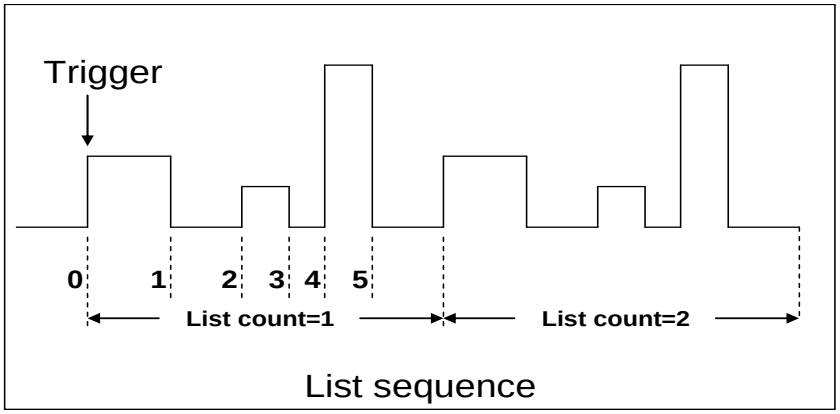
3.17 List Operation

LIST mode provides an accurate, fast and low-cost way to complete any complicated current change mode, which enables synchronization of internal or external signals in multiple quasi-bit load precision tests.

When different trigger sources are selected, the LIST function will form a variety of complex sequences by editing step value, pulse width and slope of each step to meet complicated test requirements. LIST parameters comprise designation of input list file, input step count (2-84 steps), step time (0.01s – 3600s) as well as setting value and slope of each step. The list file can be stored in non-volatile RAM available for a quick output in case of usage. The user can edit 7 groups of list files at maximum.

If the load operation mode is at List operation, the load will start List operation when it receives a trigger signal till completion or receipt of another trigger signal.

Before List operation, be sure to edit List operation files and save them in load non-volatile RAM. Refer to examples below to know how to execute List operation through board. It is assumed that output voltage and current of the tested instrument are 10V and 3A respectively and the load is under CC mode.



Edit the LIST file and trigger to operate this file. Operation steps:

Operation steps

1. Press **[Shift]** + 3(List) keys.
   LIST
   On Recall Edit
2. Operate  key and move to Edit. Press **[Enter]** key.
   EDIT LIST
   High-Rate Low-Rate
3. Operate  key and move to the High-Rate and press **[Enter]** key.
   EDIT LIST
   Current Range=3.0A
4. Edit number of steps. Press 2 key to edit two steps. Press **[Enter]** key.
   EDIT LIST
   File Step=2(2-84)
5. Edit current value in step 1 and press **[Enter]** key.
   EDIT LIST
   Step 01 Level=1.0A
6. Edit slope in step 1 and press **[Enter]** key.
   EDIT LIST
   Step 01 Rate=0.1A/mS
7. Edit time in step 1 and press **[Enter]** key.
   EDIT LIST
   Step 01 Width=5.00S
8. Edit current value in step 2 and press **[Enter]** key.
   EDIT LIST
   Step 02 Level=2.0A
9. Edit slope in step 2 and press **[Enter]** key.
   EDIT LIST
   Step 02 Rate=0.1A/mS

10. Edit time in step 2 and press **[Enter]** key.

    EDIT LIST

    Step 02 Width=5.00S

11. Edit repeat count and press **[Enter]** key.

    EDIT LIST

    Repeat Count=3

12. Save all edited files and press **[Enter]** key.

    EDIT LIST

    Save List File=1 (1-7)

13. Operate  key and move to on. Press **[Enter]** key (The Trig lamp that indicates VFD screen status is on). Press **[Esc]** key to exit setting.

    LIST

    On Recall Edit

14. Press **[On/Off]** key to open input and press **[Shift]** + **.**(Trigger) key (Triggering key).

    List operation running

15. Press **[CC]/ [CV]/ [CR]/ [CW]** key or any composite function key to exit List test function.

For direct recall of existing List files and triggering of List operation, refer to steps below:

Operation steps

1. Press **[Shift]** +3 (List) keys. Press  key to select Recall. And press **[Enter]** for confirmation.

   LIST

   On Recall Edit

2. Select edited files and press **[Enter]** for confirmation.

   Recall List File=1

3. Operate  key and move to on. Press **[Enter]** key (The Trig lamp that indicates VFD screen status is on). Press **[Esc]** key to exit setting.

   LIST

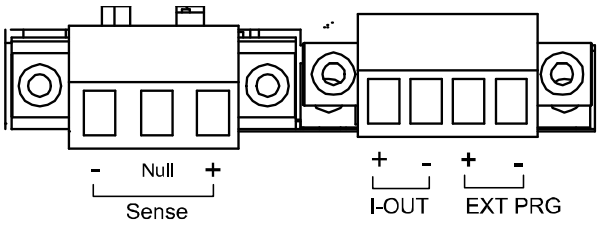
   On Recall Edit

4. Press **[On/Off]** key to open input and press **[Shift]** + **.**(Trigger) key (Triggering key)

   List operation.

3.18 Terminal function of rear panel

Terminals on IT8300 rear panel comprise remote sensor terminal, external analog control terminal and current monitoring terminal. Terminal schematic (as shown below):



Pin	Pin function
Sense+, Sense-	Remote sense terminal
Null	Null
I-OUT+, I-OUT-	current monitoring terminal
EXT PRG+, EXT PRG-	External analog control terminal

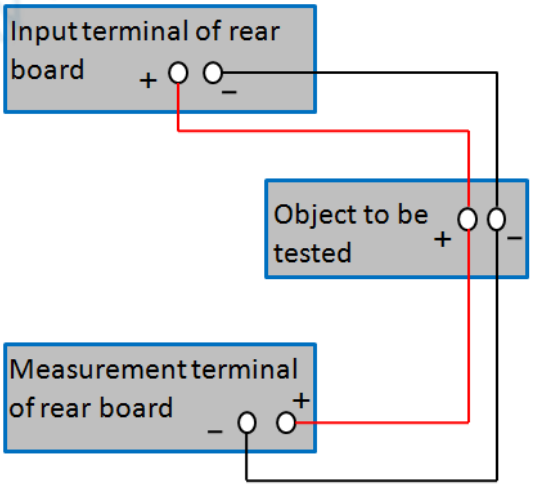
3.18.1 Remote sense compensation functions

Under CC, CV, CR or CW mode, if the load consumes large current, a large voltage drop will be detected in connection cable between tested instrument and load terminal. To ensure measurement accuracy, a remote sense measurement terminal is provided at load rear board to compensate voltage drop lost in wire.

Remote sense operation: Sense (+) and Sense (-) are remote input terminals. To avoid voltage drop caused by long input wire of load, the remote sense test allows direct measurement at input terminal source so as to improve measurement accuracy.

Operation steps

1. Press **[Shift]** + 9(Config) keys to enter menu.
2. Operate  key and select Remote-Sense. Press **[Enter]** key.
3. Select ON and start Sense function. Set load in remote sense measurement mode.
4. Remote sense measurement is connected. Refer to figure below for detailed wiring.



3.18.2 Current monitoring (I-OUT)

The 0-10V analog quantity output signal of current monitoring output terminal represents input current to which the terminal belongs from 0 to full range. An external voltmeter or oscilloscope can be connected to display input current change.

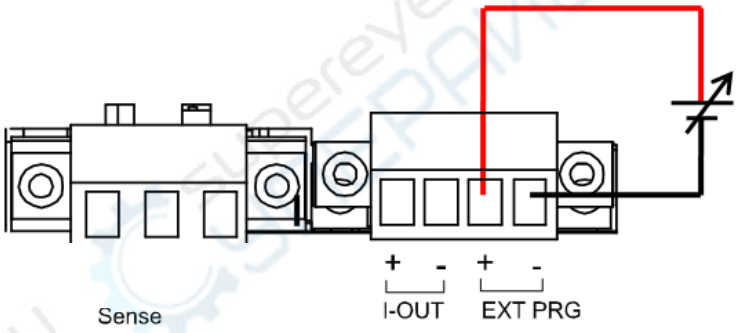
3.18.3 External analog quantity test

Loading current of the electronic load can be controlled by EXT PRG (positive and negative) analog quantity terminals on rear board. Connect 0-10V adjustable voltage at the EXT PRG terminal to analog input from 0- full range so as to adjust input current of load (10V corresponds to current of load at full range).

Operation

1. Press **[Shift]** + 9(Config) keys to enter menu.
2. Operate  key and select Ext-Program. Press **[Enter]** key.
3. Select ON and start external analog function.
4. Press **[Esc]** exit the menu and the screen displays Rear.

   Connecting the terminal as follow.



3.19 Auto Test Function

The IT8300 series electronic load delivers strong auto test functions, which can analog several tests. A total of 10 groups of test files can be edited, and each group test file has 10 steps. Therefore, a maximum of 100 steps can be edited and saved in EEPROM.

The edited test file can be recalled and tested at any time. The test operation is simple. In addition, all keys can be locked (press **[Shift] + [On/Off]** (Lock)) to avoid affecting normal test due to accidental touch of the keyboard.

All test files can be linked to each other (for example, link File1 to File2). Each group of test file includes parameters below: loading mode (CC/CV/CR/CW, in CC dynamic mode, user can set current rising and falling slope.), loading value (Value), loading time (Ton), unloading time (Toff), delay time (Tpf), low and high limit range (Low & High) of judgment values, and test stop conditions.

They are useful for executing a set of tests on a device, then displaying whether the tests passed or failed. Automatic test operation includes four steps: Edit, save, recall and run.

Edit test files

1. Press **[Shift]** + 6(Prog) keys.

   PROGRAM

   Run Recall Edit

2. Operate  key and move to Edit. Press **[Enter]** key to enter editing test files.

   EDIT PROGRAM

   Active Sequence=0987654321

3. Press numeric key to select test step and press **[Enter]** key. Active Sequence= 09876543YY (indicating that 1/2 step has been selected).

   EDIT PROGRAM

   Active Sequence=09876543YY

4. Select whether pause is necessary for these two steps. If step 2 is to be paused, press 2 key. If not, directly press **[Enter]** key.

   EDIT PROGRAM

   Pause Sequence=□□□□□□□□Y1

5. Select whether short-circuit test is necessary for these two steps. If step 1 is to be tested, press 1 key. If not, directly press **[Enter]** key.

   EDIT PROGRAM

   Short Sequence=□□□□□□□□2Y

6. Set loading time of step 1. If 2S is required, directly press 2 key on the board. Press **[Enter]** key.

   EDIT PROGRAM

   SEQ01 On Time=2.0S

7. Set unloading time of step 1. If 2S is required, directly press 2 key. Press **[Enter]** key.

   EDIT PROGRAM

   SEQ01 Off Time=2.0S

8. Set test delay time of step 1. If 1S is required, directly press 1 key. Press **[Enter]** key. Tpf is delay time before measurement.

   EDIT PROGRAM

   SEQ01 P/F Delay Time=1.0S

9. Set loading time of step 2. If 2S is required, directly press 2 key. Press **[Enter]** key.

   EDIT PROGRAM

   SEQ02 On Time=2.0S

10. Set unloading time of step 2. If 2S is required, directly press 2 key. Press **[Enter]** key.

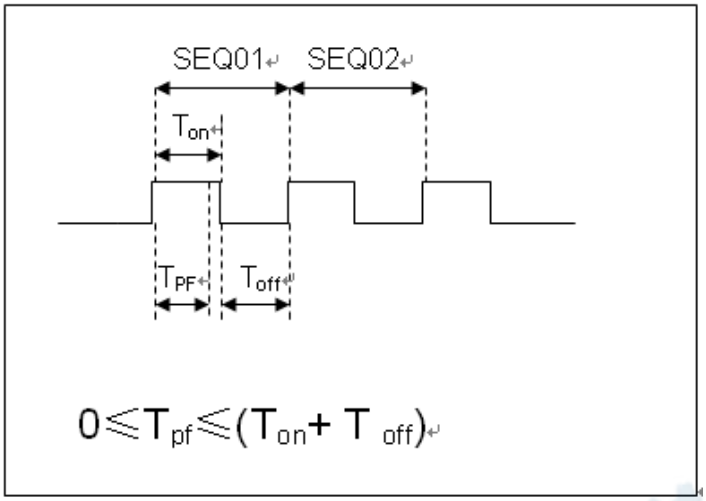
    EDIT PROGRAM

    SEQ02 Off Time=2.0S

11. Set test delay time of step 2. If 1S is required, directly press 1 key. Press **[Enter]** key. Tpf is delay time before measurement.

EDIT PROGRAM

SEQ02 P/F Delay Time=1.0S



Tpf is delay time before measurement.

12. Set conditions for stop test. COMPLETE means to stop after all tests are completed and FAILURE means to stop in case of test error. Press **[Enter]** key.

    PROGRAM

    Complete-Stop Failure-Stop

13. Determine whether to link to next group of test file. If it is to link to second group, press 2 key. 0 means not to link to other test files. Press **[Enter]** key.

    PROGRAM

    Chain Program File=0 (0-10)

14. Save the programmed files in EEPROM. A total of 10 groups of files can be saved. If it is to save edited files in group 1, press 1 key. Press **[Enter]** key.

    PROGRAM

    Save Program File=1 (1-10)

15. Press **[ESC]** key to exit editing menu.

Note

The above steps only set entire framework of auto tests. Additional setting is required for specific parameters in each step. This design will facilitate modification of parameters in a single step. In the following editing procedures, "Y indicates selected status. To cancel selected status, press numeric key of corresponding step again.

Edit Auto Test Step Parameter

After setting of entire structure of auto test, settings at each step should be independently saved. Take CC and CV mode as an example to describe how to edit auto test step parameters as below. The step editing methods of CR and CW modes are similar.

It is assumed that step 1 edits CC mode as follows: current: 2A, maximum voltage value: 10V, and minimum voltage value: 2V.

1. Press the **[CC]** key to set the current value as 2A.

   Press the **[Shift]**+**[CV]**(Setup) keys to enter the parameter setting page.

Constant Current
Range=10.0A

2. Set the maximum working current value, and enter the **[Enter]** key.

   Constant Current
   Range =2.0A

3. Set the maximum voltage value, and enter the **[Enter]** key.

   Constant Current
   High=10.00V

4. Set the minimum voltage value, and enter the **[Enter]** key.

   Constant Current
   Low=2.00V

5. Select the high or low rate, and enter the **[Enter]** key.

   Constant Current
   High-Rate Low-Rate

6. Set the current rising slope, and enter the **[Enter]** key.

   Constant Current
   Rise up=1.0A/mS

7. Set the current falling slope, and enter the **[Enter]** key.

   Constant Current
   Fall down=1.0A/mS
   After the parameter settings are complete, the page is shown as follows.

   0.00V 0.0A
   0W CC=2.0A

8. Press **[Shift]** + 4(Save) keys for saving. Press **[11]** to save as the first step of the Program 2.

   0.00V 0.0A
   0W Save 11

It is assumed that step 2 edits CV mode as follows: voltage: 3V, maximum current value: 5A, and minimum current value: 0A

1. Press the **[CV]** key to set the voltage value as 3V.

   Press the **[Shift]**+**[CV]**(Setup) keys to enter the parameter setting page.

   Constant Voltage

   Range=50.00V

2. Set the maximum working voltage value, and enter the **[Enter]** key.

   Constant Voltage

   Range=3.00V

3. Set the maximum current value, and enter the **[Enter]** key.

   Constant Voltage
   High=5.0A

4. Set the minimum current value, and enter the **[Enter]** key.

   Constant Voltage

   Low=0.0A

   After the parameter settings are complete, the page is shown as follows.

   10.00V 0.0A

   0W CV=3.00V

5. Press **[Shift]** + 4(Save) keys for saving. Press **[12]** to save as the second step of the Program 2.

   0.00V 0.0A

   0W Save 12

Note

Settings at each step should be independently saved. Saving positions of step parameters are related to save group and step number of auto test files. If the auto test file is saved in group 1, the saving position of step parameter is consistent with the step number; if the auto test file is saved in group 2, the saving position is 1+ step number, for example, steps 1, 2 and 3 are saved in 11, 12 and 13 respectively; if the auto test file is saved in group 3, the saving position is 2+ step number, for example, steps 1, 2 and 3 are saved in 21, 22 and 23 respectively, and so on. Refer to the following table for saving position.

Correspondence Table of Auto test files and step parameter saving.

Program 1Sequence	1	2	3	4	5	6	7	8	9	10
Save Group	1	2	3	4	5	6	7	8	9	10
Program 2Sequence	1	2	3	4	5	6	7	8	9	10
Save Group	11	12	13	14	15	16	17	18	19	20
:	:	:	:	:	:	:	:	:	:	:
:	:	:	:	:	:	:	:	:	:	:
Program 10Sequence	1	2	3	4	5	6	7	8	9	10
Save Group	91	92	93	94	95	96	97	98	99	100

Recall test file for running

To recall edited test files from EEPROM quickly after re-energizing instrument, refer to the method below.

1. Press **[Shift]** + 6(Prog) keys.

   PROGRAM

   Run Recall Edit

2. Operate  key, select Recall and press **[Enter]** key.

   RECALL PROGRAM

   Recall Program File=1

3. Operate  key, select Run and press **[Enter]** key.

   PROGRAM

   Run Recall Edit

4. Display auto test file 1.

   PRG01 STOP

5. Press **[Shift]** + **.** (Trigger) key. Operate auto test file 1.

6. Press **[Shift]** + 0 (Pause) key to pause auto test. Press  key for next step.

3.20 Parallel Function

Maximum power of the IT8300 series load is 73.5KW. In IT8300 series load,

several loads (8 at maximum) can be connected in parallel to expand load current and power. The operation steps of parallel function are described below taking 3 instruments (1 Master and 2 Slave) in parallel as an example.

CAUTION

Before connect the system bus, the parallel mode must be single. When connecting the system bus, please note the built-in terminal matching resistance at the rear panel. If the resistance is removed, the instrument may not work properly. The user can install the terminal matching resistance on the Input end of the first system bus and the Output end of the last system bus.

1. Connect 3 loads in parallel under Single mode, and connect them to the distribution box.
2. Turn on the three instruments.
3. Press the composite key **[Shift]** + 8(System) to enter the System Menu on the first instrument.
4. Press the Right key to select "**Parallel**" and press **[Enter]** for parallel setting.
   - Single: Single mode.
   - Slave: Salve mode.
   - Master: Master mode. If Master mode is selected, you need to set the number of Salves for the Master.

   Total: total number of instruments in parallel. For example, Total = 3.
5. Select the Master and press **[Enter]**.
6. Set the total number of instruments in parallel as **3** and press **[Enter]**. The panel displays as follows:

   SWITCH TO MASTER ?

   No Yes
7. Select the Yes and the panel displays as follows. All keys and buttons are deactivated. Except shutdown and restart, no operations are permitted.

   ON MASTER MODE

   Please Power Off !

   Select No to jump to previous menu, and the existing mode remains unchanged.
8. On the front panel of second single instrument, press the composite key **[Shift]** + 8(System) to enter the System Menu.
9. Press the Right key to select "**Parallel**" and press **[Enter]** for parallel setting.
10. Select the Slave and press **[Enter]**, the panel displays as follows:

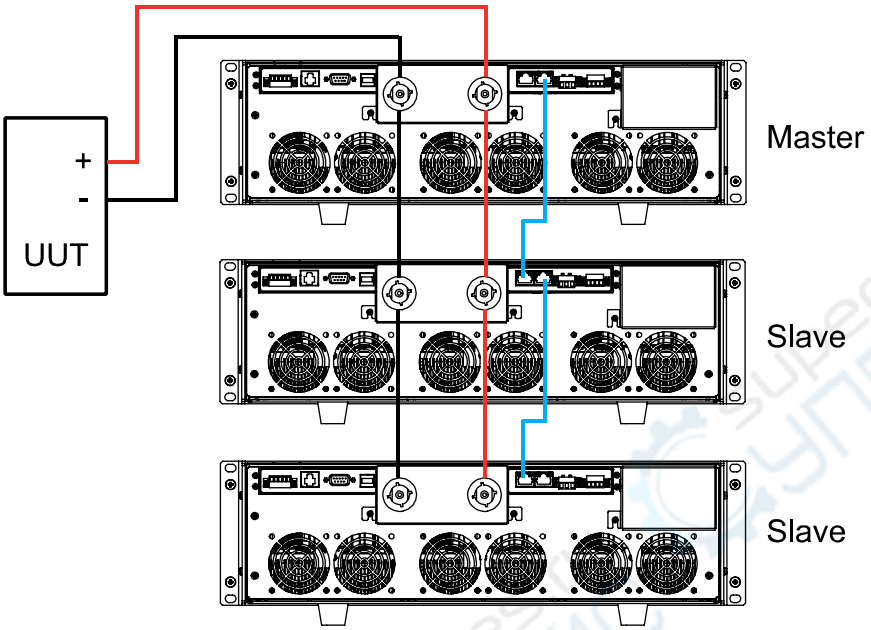
    SWITCH TO SLAVE ?

    No Yes
11. Select the Yes and the panel displays as follows:

    ON SLAVE MODE

    Please Power Off !

12. Repeat steps 7-10, and set the third single instrument to Slave mode.
13. Power off 3 single instruments respectively.
14. Refer to the diagram below for wiring. The system bus is used for master-slave connection.



15. After wiring, power on 3 single instruments respectively.

    The 3 instruments are now connected in parallel.

To change Parallel Mode to Single Mode, follow the steps below:

1. Power off 3 instruments respectively.
2. Remove System BUS connecting 3 instruments.
3. Power on 3 instruments respectively.
4. Press the composite key (Shift+Local+Esc) on the front panel of 3 single instruments, and the single instrument will automatically switch to Single Mode.

Chapter4 References of Load Communication Interfaces

IT8300 series electronic load is provided with five communication interfaces to communicate with a computer for selection, including RS232, USB, LAN, CAN and RS485.

4.1 RS232 Interface

Cable connection load with both ends of COM interface (DB9) and computer. Composite key **[Shift]** + 8(System) on front board can be used to enter system menu for activation.

In RS-232 interface, all SCPI commands can be used for programming. If RS-232 interface is selected, in accordance with internal connection of data terminal equipment (DTE) and data communication equipment (DCE) as defined in EIA RS-232, the load is connected to another DTE (e.g., PC COM interface) with direct-connected Modem cable.

RS-232 data format

RS-232 data comprises start bit, odd and even parity check bit, stop bit and 8-bit data bit. Start bit and stop bit are not editable. However, next odd or even item can be selected by front board **[Shift]** + 8(System). The odd and even items are saved in NVM.

Baud rate

Through front board **[Shift]** + 8(System), the user may select one Baud rate saved in NVM: 4800 /9600 /19200 /38400 /57600 /115200

RS-232 Connection

Use RS-232 cable with DB-9 interface because the RS-232 serial port can be connected controller (e.g. PC) serial port. Do not use modulating cable of air-conditioner.

If your computer is provided with a RS-232 interface with DB-25 plug, a cable and a adapter with DB-25 plug (one end) and DB-9 plug (the other end) are required (not the modulating cable of the air-conditioner).

RS232 Pins of Plug

Base pin number	Description
1	No conjunction
2	TXD, data transmission
3	RXD, data receiving
4	No conjunction
5	GND, grounding
6	No conjunction
7	CTS, clear to send

8	RTS, request to send
9	No conjunction

RS-232 troubleshooting:

In case of connection failure of RS-232, perform following check:

- Check if the computer and load are provided with same Baud rate, parity check bit, data bit and flow control. The power shall be configured with one start bit (fixed) and one stop bit (fixed).
- Just as described in the RS-232 connector, correct interface cable or adapter shall be adopted. Note: even if the cable is equipped with right plug, internal wiring may be incorrect.
- The interface cable must be connected to the correct serial port (COM1, COM2, etc.) of the computer.

Setting of communication

Before communication operation, be sure to match load and PC parameters (as follows).

Baud rate: 9600 (4800/9600/19200/38400/57600/15200). You may enter system menu through the board to set communication Baud rate.

Data bit: 8 bits

Stop bit: 1 bit

Check: (none, even, odd)

EVEN 8 data bits have even-parity check

ODD 8 data bits have odd-parity check

NONE 8 data bits have no check

Local address: (0-31, factory set value: 0)

Start Bit	Parity=None	8 Data Bits	Stop Bit

4.2 USB Interface

Connect the load and the computer using a cable with two USB interfaces (each end). All functions of the load can be programmed via USB.

The functions of load USB488 interface are as follows:

- The interface is 488.2 USB488 Interface.
- The interface receives requests of REN_CONTROL, GO_TO_LOCAL and LOCAL_LOCKOUT.
- The interface receives the command MsgID=TRIGGER USBTMC and conveys the TRIGGER command to the functional layer.

The functions of load USB488 device are as follows:

- Capable to read all common SCPI commands.
- SR1 enabled.
- RL1 enabled.

- DT1 enabled.

4.3 LAN Interface

Connect the LAN interface of load to the computer with a reticle (crossed).

1. Press **[Shift]** + 8(System) button to enter the system set.
2. Press the Right key to select Communication and press **[Enter]** for setting.
3. Press the Right key to select LAN and press **[Enter]** for setting.
4. Set the Gateway, IP, Mask and Socket Port in the LAN option.

   The gateway address should be consistent with that of the PC, and the IP address should be at the same network segment with the PC's IP address.

4.4 CAN Interface

There is one CAN interface at the rear panel. The user can use this terminal for PC connection; to activate connection, be sure that the values set in the System menu are same as the corresponding values set in PC.

Note

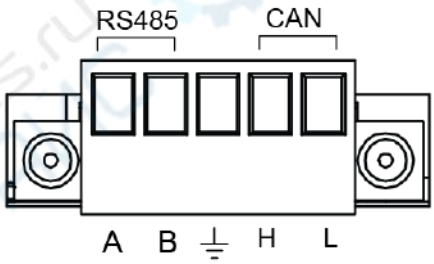
CAN setting in the program shall be consistent with the one set in the System menu of front panel. To query and change, press the composite key **[Shift]** + 8(System) to enter the setting screen in System menu for query and change. For details, refer to 3.6 System Menu.

Baud Rate

In the front panel **[Shift]** + 8(System), under the System menu, the user can select one Baud rate stored in NVM:
20K|40K|50k|80k|100k|125k|150K|200k|250k|400K|500K|1000K

CAN Pin Definition

CAN interface pin is as follows.



CAN interface pin

Pin	Description
H	CAN_H
L	CAN_L

CAN Troubleshooting:

If CAN connection fails, check that:

1. The PC and load have same Baud rate.
2. Appropriate interface pin or adapter is used, as described in CAN connector.
3. The interface cable is correctly connected (CAN_H to CAN_H, CAN_L to CAN_L).
4. Check whether 120 Ω terminal resistance is connected.

Setting Communication

Before running communication, please match the load parameters with the PC parameters as shown below.

Baud rate: 20K(40K, 50K, 80K, 100K, 125K, 150K, 200K, 250K, 400K, 500K, 1000K). You can enter the System menu through panel and set the communication Baud rate

Addr.: 1-99

Prescale (Pres): Not settable. Change with Baud rate setting.

PTS (BS1): Not settable. Change with Baud rate setting.

PBS (BS2): Not settable. Change with Baud rate setting.

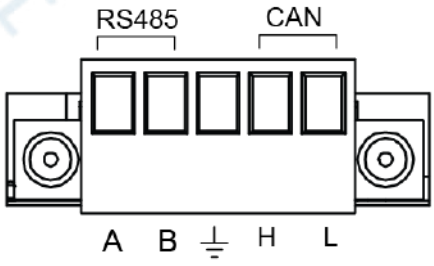
Baud rate	(Prescale)	PTS	PBS
20K	150	10	1
40K	75	10	1
50K	60	10	1
80K	75	4	0
100K	30	10	1
125K	24	10	1
150K	20	10	1
200K	15	10	1
250K	12	10	1
400K	15	4	0
500K	6	10	1
1000K	3	10	1

4.5 RS485 Interface

There is one RS485 interface at the rear panel. The user can use this terminal for PC connection; to activate connection, be sure that the values set in the System menu are same as the corresponding values set in PC.

Through front board **[Shift]** + 8(System), the user can set the Baud rate, Data bit, Stop bit and check. And the operation method is same as RS232.

RS485 interface pin is as follows.



RS485 interface pin

pin	description
a	A cable of RS485 interface
B	B cable of RS485 interface

Chapter5 Technical Specifications

This chapter will introduce the rated voltage, current, power and many other main parameters of IT8300 series.

Parameter		IT8311 V1.3
Input parameter		
Rated value (0~40 ℃)	**Input voltage**	0~80V
	Input current	0~170A
	Input power	0~3.5kW
	Min. operating voltage	1V at 170A
CC mode	**Range**	0~170A
	Resolution	100mA
	Accuracy	<0.4% Imax
CV mode	**Range**	0~80V
	Resolution	10mV
	Accuracy	<0.3% Umax
CR mode	**Range**	0.01~1200Ω
	Resolution	0.001Ω
	Accuracy	(1/Rmin)*2%:(0.01~80Ω);(1/Rmin)*5%:(80~1200Ω)
CP mode	**Range**	0~3.5kW
	Resolution	1W
	Accuracy	<1.3% Pmax
Dynamic	**Rising slope**	500A/ms
	Falling slope	500A/ms
	Dynamic Frequency	500Hz
	Minimum rise time	1ms
Input read-back value		
Readback current	**Range**	0~170A
	Resolution	100mA
	Accuracy	<0.4% Imax
Readback voltage	**Range**	0~80V
	Resolution	10mV
	Accuracy	<0.3% Umax
Readback power	**Range**	0~3.5kW
	Resolution	1W
	Accuracy	<1.3% Pmax
Protection range		
OCP Protection		172A
OVP Protection		81V
OPP Protection		3.6kW
Short circuit testing		
Current		175A
External analog		
Current Programming		External programming voltage 0-10V corresponds to current 0-170A
Current Monitoring		Current 0-170A corresponds to external monitoring voltage 0-10V
Output parameter		
Output voltage range		190VAC~260VAC
OVP Protection		260VAC
UVP Protection		190VAC

Output frequency range	45Hz~65Hz
Maximum output current (rms)	17Aac
Power factor	> 0.99 (lead or lag)
DC component	-0.5A~+0.5A
Harmonic THDI	<3%
Islanding protection	Active islanding protection
Environment parameter	
Working temperature	0~40℃
Storage temperature	-20~70℃
Noise	60dB
Efficiency	
Maximum efficiency (Fully loaded power of maximum input voltage)	92.5%
Communication	
Interface	RS232/USB/RS485/CAN/LAN
Protocol	SCPI
Machinery parameter	
Dimension (mm)	766.6mm*483mm*132.8mm
Weight(net)	26kg
Input terminal impedance	300kΩ

Remarks:
The scope of read-back resistance is described as follows:

- **0.01~80Ω**
  Lower limit value: 1/(1/R+(1/R)*0.02+0.002)
  Upper limit value: 1/(1/R-(1/R)*0.02-0.002)
- **80~1200Ω**
  Lower limit value: 1/(1/R+(1/R)*0.05+0.002)
  Upper limit value: 1/(1/R-(1/R)*0.05-0.002)

Parameter		**IT8312 V1.3**
Input parameter		
Rated value (0~40 ℃)	**Input voltage**	0~800V
	Input current	0~20A
	Input power	0~3.5kW
	Min. operating voltage	15V at 20A
CC mode	**Range**	0~20A
	Resolution	10mA
	Accuracy	<0.4% I_{max}
CV mode	**Range**	0~800V
	Resolution	100mV
	Accuracy	<0.3% U_{max}
CR mode	**Range**	0.9~3000Ω
	Resolution	0.001Ω(R<10Ω);0.01Ω(10Ω≤R<100Ω);0.1Ω(100Ω≥R<1000Ω);1Ω(R≥1000Ω)
	Accuracy	R_{max} *2%:(0.9~1000Ω); R_{max} *5%:(1000~3000Ω);
CP mode	**Range**	0~3.5kW
	Resolution	1W

	Accuracy	<1.3% P_{max}
Dynamic	**Rising slope**	50A/ms
	Falling slope	50A/ms
	Dynamic Frequency	500Hz
Readback current	**Range**	0~20A
	Resolution	10mA
	Accuracy	<0.4% I_{max}
Readback voltage	**Range**	0~800V
	Resolution	100mV
	Accuracy	<0.3% U_{max}
Readback power	**Range**	0~3.5kW
	Resolution	1W
	Accuracy	<1.3% P_{max}
Protection range		
OCP Protection		21A
OVP Protection		810V
OPP Protection		3.6kW
Short circuit testing		
Current		21A
External analog		
Current Programming		External programming voltage 0-10V corresponds to current 0-20A
Current Monitoring		Current 0-20A corresponds to external monitoring voltage 0-10V
Output parameter (L, N)		
Output voltage range		190VAC~260VAC
OVP Protection		260VAC
UVP Protection		190VAC
Output frequency range		45Hz~65Hz
Maximum output current (rms)		17Aac
Power factor		> 0.99 (lead or lag)
DC component		-0.5A~+0.5A
Harmonic THDI		<5%
Three-phase power unbalance factor		-
Islanding protection		Active islanding protection
Environment parameter		
Working temperature		0~40℃
Storage temperature		-20~70℃
Efficiency		
Maximum efficiency (Fully loaded power of maximum input voltage)		94.5%
Communication		
Interface		**RS232/USB/RS485/CAN/LAN**
Protocol		SCPI
Machinery parameter		
Dimension (mm)		766.6mm*483mm*132.8mm
Weight(net)		26kg

Remarks:
Current and voltage is not less than 10% of full scale in resistance test.
The scope of read-back resistance is described as follows:

- **0.9~1000Ω**

Lower limit value: 1/(1/R+(1/R)*0.02+0.002)

Upper limit value: 1/(1/R-(1/R)*0.02-0.002)

- **1000~3000Ω**
  Lower limit value: 1/(1/R+(1/R)*0.05+0.002)
  Upper limit value: 1/(1/R-(1/R)*0.05-0.002)

Parameter		IT8321 V1.3
Input parameter		
Rated value (0~40 ℃)	**Input voltage**	0~80V
	Input current	0~340A
	Input power	0~7kW
	Min. operating voltage	1V at 340A
CC mode	**Range**	0~340A
	Resolution	100mA
	Accuracy	<0.4% Imax
CV mode	**Range**	0~80V
	Resolution	10mV
	Accuracy	<0.3% Umax
CR mode	**Range**	0.005~600Ω
	Resolution	0.001Ω
	Accuracy	(1/Rmin)*2%:(0.005~60Ω);(1/Rmin)*5%:(60~600Ω)
CP mode	**Range**	0~7kW
	Resolution	1W
	Accuracy	<1.3% Pmax
Dynamic	**Rising slope**	500A/ms
	Falling slope	500A/ms
	Dynamic Frequency	500Hz
	Minimum rise time	1ms
Input read-back value		
Readback current	**Range**	0~340A
	Resolution	100mA
	Accuracy	<0.4% Imax
Readback voltage	**Range**	0~80V
	Resolution	10mV
	Accuracy	<0.3% Umax
Readback power	**Range**	0~7kW
	Resolution	1W
	Accuracy	<1.3% Pmax
Protection range		
OCP Protection		342A
OVP Protection		81V
OPP Protection		7.1kW
Short circuit testing		
Current		345A
External analog		
Current Programming		External programming voltage 0-10V corresponds to current 0-340A
Current Monitoring		Current 0-340A corresponds to external monitoring voltage 0-10V
Output parameter		
Output voltage range		190VAC~260VAC
OVP Protection		260VAC
UVP Protection		190VAC
Output frequency range		45Hz~65Hz

Maximum output current (rms)	17Aac
Power factor	>0.99 (lead or lag)
DC component	-0.5A~+0.5A
Harmonic THDI	<3%
Islanding protection	Active islanding protection
Environment parameter	
Working temperature	0~40℃
Storage temperature	-20~70℃
Noise	60dB
Efficiency	
Maximum efficiency (Fully loaded power of maximum input voltage)	92.5%
Communication	
Interface	RS232/USB/RS485/CAN/LAN
Protocol	SCPI
Machinery parameter	
Dimension (mm)	766.6mm*483mm*132.8mm
Weight(net)	33kg
Input terminal impedance	300kΩ

Remarks:
The scope of read-back resistance is described as follows:

- **0.005~60Ω**
  Lower limit value: 1/(1/R+(1/R)*0.02+0.002)
  Upper limit value: 1/(1/R-(1/R)*0.02-0.002)
- **60~600Ω**
  Lower limit value: 1/(1/R+(1/R)*0.05+0.002)
  Upper limit value: 1/(1/R-(1/R)*0.05-0.002)

Parameter		**IT8322 V1.3**
Input parameter		
Rated value (0~40 ℃)	**Input voltage**	0~800V
	Input current	0~40A
	Input power	0~7kW
	Min. operating voltage	15V at 40A
CC mode	**Range**	0~40A
	Resolution	10mA
	Accuracy	<0.4% I_{max}
CV mode	**Range**	0~800V
	Resolution	100mV
	Accuracy	<0.3% U_{max}
CR mode	**Range**	0.6~2000Ω
	Resolution	0.001Ω(R<10Ω);0.01Ω(10Ω≤R<100Ω);0.1Ω(100Ω≥R<1000Ω);1Ω(R≥1000Ω)
	Accuracy	R_{max} *2%:(0.6~600Ω); R_{max} *5%:(600~2000Ω);
CP mode	**Range**	0~7kW
	Resolution	1W
	Accuracy	<1.3% P_{max}
Dynamic	**Rising slope**	50A/ms

	Falling slope	50A/ms
	Dynamic Frequency	500Hz
Readback current	**Range**	0~40A
	Resolution	10mA
	Accuracy	<0.4% I_{max}
Readback voltage	**Range**	0~800V
	Resolution	100mV
	Accuracy	<0.3% U_{max}
Readback power	**Range**	0~7kW
	Resolution	1W
	Accuracy	<1.3% P_{max}
Protection range		
OCP Protection		42A
OVP Protection		810V
OPP Protection		7.1kW
Short circuit testing		
Current		42A
External analog		
Current Programming		External programming voltage 0-10V corresponds to current 0-40A
Current Monitoring		Current 0-40A corresponds to external monitoring voltage 0-10V
Output parameter		
Output voltage range		190VAC~260VAC
OVP Protection		260VAC
UVP Protection		190VAC
Output frequency range		45Hz~65Hz
Maximum output current (rms)		17Aac
Power factor		> 0.99 (lead or lag)
DC component		-0.5A~+0.5A
Harmonic THDI		<5%
Three-phase power unbalance factor		-
Islanding protection		Active islanding protection
Environment parameter		
Working temperature		0~40℃
Storage temperature		-20~70℃
Efficiency		
Maximum efficiency (Fully loaded power of maximum input voltage)		94.5%
Communication		
Interface		**RS232/USB/RS485/CAN/LAN**
Protocol		SCPI
Machinery parameter		
Dimension (mm)		766.6mm*483mm*132.8mm
Weight(net)		33kg

Remarks:
Current and voltage is not less than 10% of full scale in resistance test.
The scope of read-back resistance is described as follows:

- **0.6~600Ω**
  Lower limit value: 1/(1/R+(1/R)*0.02+0.002)
  Upper limit value: 1/(1/R-(1/R)*0.02-0.002)
- **600~2000Ω**

Lower limit value: 1/(1/R+(1/R)*0.05+0.002)
Upper limit value: 1/(1/R-(1/R)*0.05-0.002)

Parameter		IT8331 V1.3
Input parameter		
Rated value (0~40 ℃)	**Input voltage**	0~80V
	Input current	0~510A
	Input power	0~10.5kW
	Min. operating voltage	1V at 510A
CC mode	**Range**	0~510A
	Resolution	100mA
	Accuracy	<0.4% Imax
CV mode	**Range**	0~80V
	Resolution	10mV
	Accuracy	<0.3% Umax
CR mode	**Range**	0.003~400Ω
	Resolution	0.001Ω
	Accuracy	(1/Rmin)*2%:(0.003~40Ω);(1/Rmin)*5%:(40~400Ω)
CP mode	**Range**	0~10.5kW
	Resolution	1W
	Accuracy	<1.3% Pmax
Dynamic	**Rising slope**	500A/ms
	Falling slope	500A/ms
	Dynamic Frequency	500Hz
	Minimum rise time	1ms
Input read-back value		
Readback current	**Range**	0~510A
	Resolution	100mA
	Accuracy	**<0.4% Imax**
Readback voltage	**Range**	0~80V
	Resolution	10mV
	Accuracy	**<0.4% Imax**
Readback power	**Range**	0~10.5kW
	Resolution	1W
	Accuracy	**<0.4% Imax**
Protection range		
OCP Protection		512A
OVP Protection		81V
OPP Protection		10.6kW
Short circuit testing		
Current		515A
External analog		
Current Programming		External programming voltage 0-10V corresponds to current 0-510A
Current Monitoring		Current 0-510A corresponds to external monitoring voltage 0-10V
Output parameter		
Output voltage range		190VAC~260VAC
OVP Protection		260VAC
UVP Protection		190VAC
Output frequency range		45Hz~65Hz
Maximum output current (rms)		17Aac

Power factor	>0.99 (lead or lag)
DC component	-0.5A~+0.5A
Harmonic THDI	<3%
Islanding protection	Active islanding protection
Environment parameter	
Working temperature	0~40℃
Storage temperature	-20~70℃
Noise	60dB
Efficiency	
Maximum efficiency (Fully loaded power of maximum input voltage)	92.5%
Communication	
Interface	RS232/USB/RS485/CAN/LAN
Protocol	SCPI
Machinery parameter	
Dimension (mm)	766.6mm*483mm*132.8mm
Weight(net)	40kg
Input terminal impedance	300kΩ

Remarks:
The scope of read-back resistance is described as follows:

- **0.003~40Ω**
  Lower limit value: 1/(1/R+(1/R)*0.02+0.002)
  Upper limit value: 1/(1/R-(1/R)*0.02-0.002)
- **40~400Ω**
  Lower limit value: 1/(1/R+(1/R)*0.05+0.002)
  Upper limit value: 1/(1/R-(1/R)*0.05-0.002)

Parameter		**IT8332 V1.3**
Input parameter		
Rated value (0~40 ℃)	**Input voltage**	0~800V
	Input current	0~60A
	Input power	0~10.5kW
	Min. operating voltage	15V at 60A
CC mode	**Range**	0~60A
	Resolution	10mA
	Accuracy	<0.4% I_{max}
CV mode	**Range**	0~800V
	Resolution	100mV
	Accuracy	<0.3% U_{max}
CR mode	**Range**	0.3~1000Ω
	Resolution	0.001Ω(R<10Ω);0.01Ω(10Ω≤R<100Ω);0.1Ω(100Ω≥R<1000Ω);1Ω(R≥1000Ω)
	Accuracy	R_{max} *2%:(0.3~300Ω); R_{max} *5%:(300~1000Ω);
CP mode	**Range**	0~10.5kW
	Resolution	1W
	Accuracy	<1.3% P_{max}
Dynamic	**Rising slope**	50A/ms
	Falling slope	50A/ms
	Dynamic	500Hz

	Frequency	
Input read-back value		
Readback current	**Range**	0~60A
	Resolution	10mA
	Accuracy	<0.4% I_{max}
Readback voltage	**Range**	0~800V
	Resolution	100mV
	Accuracy	<0.3% U_{max}
Readback power	**Range**	0~10.5kW
	Resolution	1W
	Accuracy	<1.3% P_{max}
Protection range		
OCP Protection		63A
OVP Protection		810V
OPP Protection		10.6kW
Short circuit testing		
Current		63A
External analog		
Current Programming		External programming voltage 0-10V corresponds to current 0-60A
Current Monitoring		Current 0-60A corresponds to external monitoring voltage 0-10V
Output parameter (L1, L2, L3 correspond to N respectively)		
Output voltage range		190VAC~260VAC
OVP Protection		260VAC
UVP Protection		190VAC
Output frequency range		45Hz~65Hz
Maximum output current (rms)		17Aac
Power factor		> 0.99 (lead or lag)
DC component		-0.5A~+0.5A
Harmonic THDI		<5%
Three-phase power unbalance factor		<5%
Islanding protection		Active islanding protection
Environment parameter		
Working temperature		0~40℃
Storage temperature		-20~70℃
Efficiency		
Maximum efficiency (Fully loaded power of maximum input voltage)		94.5%
Communication		
Interface		**RS232/USB/RS485/CAN/LAN**
Protocol		SCPI
Machinery parameter		
Dimension (mm)		766.6mm*483mm*132.8mm
Weight(net)		40kg

Remarks:
Current and voltage is not less than 10% of full scale in resistance test.
The scope of read-back resistance is described as follows:

- **0.3~300Ω**
  Lower limit value: 1/(1/R+(1/R)*0.02+0.002)
  Upper limit value: 1/(1/R-(1/R)*0.02-0.002)
- **300~1000Ω**
  Lower limit value: 1/(1/R+(1/R)*0.05+0.002)

Upper limit value: 1/(1/R-(1/R)*0.05-0.002)

Parameter		IT8341 V1.3
Input parameter		
Rated value (0~40 ℃)	**Input voltage**	0~80V
	Input current	0~1020A
	Input power	0~21kW
	Min. operating voltage	1V at 1020A
CC mode	**Range**	0~1020A
	Resolution	100mA
	Accuracy	<0.4% Imax
CV mode	**Range**	0~80V
	Resolution	10mV
	Accuracy	<0.3% Umax
CR mode	**Range**	0.002~200Ω
	Resolution	0.001Ω
	Accuracy	(1/Rmin)*2%:(0.002~2Ω);(1/Rmin)*5%:(2~200Ω)
CP mode	**Range**	0~21kW
	Resolution	1W
	Accuracy	<1.3% Pmax
Dynamic	**Rising slope**	1000A/ms
	Falling slope	1000A/ms
	Dynamic Frequency	500Hz
	Minimum rise time	1ms
Input read-back value		
Readback current	**Range**	0~1020A
	Resolution	100mA
	Accuracy	**<0.4% Imax**
Readback voltage	**Range**	0~80V
	Resolution	10mV
	Accuracy	**<0.3% Umax**
Readback power	**Range**	0~21kW
	Resolution	1W
	Accuracy	**<1.3% Pmax**
Protection range		
OCP Protection		1022A
OVP Protection		82V
OPP Protection		21.1kW
Short circuit testing		
Current		1025A
External analog		
Current Programming		External programming voltage 0-10V corresponds to current 0-1020A
Current Monitoring		Current 0-1020A corresponds to external monitoring voltage 0-10V
Output parameter		
Output voltage range		190VAC~260VAC
OVP Protection		260VAC
UVP Protection		190VAC
Output frequency range		45Hz~65Hz
Maximum output current (rms)		34Aac
Power factor		>0.99 (lead or lag)

DC component	-0.5A~+0.5A
Harmonic THDI	<3%
Islanding protection	Active islanding protection
Environment parameter	
Working temperature	0~40℃
Storage temperature	-20~70℃
Noise	60dB
Efficiency	
Maximum efficiency (Fully loaded power of maximum input voltage)	92.5%
Communication	
Interface	RS232/USB/RS485/CAN/LAN
Protocol	SCPI
Machinery parameter	
Dimension (mm)	766.6mm*483mm*265.6mm
Weight(net)	80kg
Input terminal impedance	300kΩ

Remarks:
The scope of read-back resistance is described as follows:

- **0.002~2Ω**
  Lower limit value: 1/(1/R+(1/R)*0.02+0.002)
  Upper limit value: 1/(1/R-(1/R)*0.02-0.002)
- **2~200Ω**
  Lower limit value: 1/(1/R+(1/R)*0.05+0.002)
  Upper limit value: 1/(1/R-(1/R)*0.05-0.002)

Parameter		**IT8342 V1.3**
Input parameter		
Rated value (0~40 ℃)	**Input voltage**	0~800V
	Input current	0~120A
	Input power	0~21kW
	Min. operating voltage	15V at 120A
CC mode	**Range**	0~120A
	Resolution	10mA
	Accuracy	<0.4% I_{max}
CV mode	**Range**	0~800V
	Resolution	100mV
	Accuracy	<0.3% U_{max}
CR mode	**Range**	0.15~500Ω
	Resolution	0.001Ω(R<10Ω);0.01Ω(10Ω≤R<100Ω);0.1Ω(100Ω≥R<1000Ω);1Ω(R≥1000Ω)
	Accuracy	R_{max} *2%:(0.15~100Ω); R_{max} *5%:(100~500Ω);
CP mode	**Range**	0~21kW
	Resolution	1W
	Accuracy	<1.3% P_{max}
Dynamic	**Rising slope**	100A/ms
	Falling slope	100A/ms
	Dynamic Frequency	500Hz

Input read-back value		
Readback current	Range	0~120A
	Resolution	10mA
	Accuracy	<0.4% I_{max}
Readback voltage	Range	0~800V
	Resolution	100mV
	Accuracy	<0.3% U_{max}
Readback power	Range	0~21kW
	Resolution	1W
	Accuracy	<1.3% P_{max}
Protection range		
OCP Protection		126A
OVP Protection		810V
OPP Protection		21.2kW
Short circuit testing		
Current		126A
External analog		
Current Programming		External programming voltage 0-10V corresponds to current 0-120A
Current Monitoring		Current 0-120A corresponds to external monitoring voltage 0-10V
Output parameter (L1, L2, L3 correspond to N respectively)		
Output voltage range		190VAC~260VAC
OVP Protection		260VAC
UVP Protection		190VAC
Output frequency range		45Hz~65Hz
Maximum output current (rms)		34Aac
Power factor		> 0.99 (lead or lag)
DC component		-0.5A~+0.5A
Harmonic THDI		<5%
Three-phase power unbalance factor		<5%
Islanding protection		Active islanding protection
Environment parameter		
Working temperature		0~40℃
Storage temperature		-20~70℃
Efficiency		
Maximum efficiency (Fully loaded power of maximum input voltage)		94.5%
Communication		
Interface		**RS232/USB/RS485/CAN/LAN**
Protocol		SCPI
Machinery parameter		
Dimension (mm)		766.6mm*483mm*265.6mm
Weight(net)		80kg

Remarks:
Current and voltage is not less than 10% of full scale in resistance test.
The scope of read-back resistance is described as follows:

- **0.15~100Ω**
  Lower limit value: 1/(1/R+(1/R)*0.02+0.002)
  Upper limit value: 1/(1/R-(1/R)*0.02-0.002)
- **100~500Ω**
  Lower limit value: 1/(1/R+(1/R)*0.05+0.002)
  Upper limit value: 1/(1/R-(1/R)*0.05-0.002)

Parameter		IT8351 V1.3
Input parameter		
Rated value (0~40 ℃)	**Input voltage**	0~80V
	Input current	0~1530A
	Input power	0~31.5kW
	Min. operating voltage	1V at 1530A
CC mode	**Range**	0~1530A
	Resolution	100mA
	Accuracy	<0.4% Imax
CV mode	**Range**	0~80V
	Resolution	10mV
	Accuracy	<0.3% Umax
CR mode	**Range**	0.002~133Ω
	Resolution	0.001Ω
	Accuracy	(1/Rmin)*2%:(0.002~2Ω);(1/Rmin)*5%:(2~133Ω)
CP mode	**Range**	0~31.5kW
	Resolution	1W
	Accuracy	<1.3% Pmax
Input read-back value		
Readback current	**Range**	0~1530A
	Resolution	100mA
	Accuracy	**<0.4% Imax**
Readback voltage	**Range**	0~80V
	Resolution	10mV
	Accuracy	**<0.3% Umax**
Readback power	**Range**	0~31.5kW
	Resolution	1W
	Accuracy	**<1.3% Pmax**
Protection range		
OCP Protection		1532A
OVP Protection		82V
OPP Protection		31.6kW
Short circuit testing		
Current		1535A
External analog		
Current Programming		External programming voltage 0-10V corresponds to current 0-1530A
Current Monitoring		Current 0-1530A corresponds to external monitoring voltage 0-10V
Output parameter		
Output voltage range		190VAC~260VAC
OVP Protection		260VAC
UVP Protection		190VAC
Output frequency range		45Hz~65Hz
Maximum output current (rms)		51Aac
Power factor		>0.99 (lead or lag)
DC component		-0.5A~+0.5A
Harmonic THDI		<3%
Islanding protection		Active islanding protection
Environment parameter		
Working temperature		0~40℃
Storage temperature		-20~70℃

Noise	60dB
Efficiency	
Maximum efficiency (Fully loaded power of maximum input voltage)	92.5%
Communication	
Interface	RS232/USB/RS485/CAN/LAN
Protocol	SCPI
Machinery parameter	
Dimension (mm)	800mm*550mm*907.64mm
Weight(net)	175kg
Input terminal impedance	300kΩ

Remarks:
The scope of read-back resistance is described as follows:

- **0.001~2Ω**
  Lower limit value: 1/(1/R+(1/R)*0.02+0.002)
  Upper limit value: 1/(1/R-(1/R)*0.02-0.002)
- **2~133Ω**
  Lower limit value: 1/(1/R+(1/R)*0.05+0.002)
  Upper limit value: 1/(1/R-(1/R)*0.05-0.002)

Parameter		**IT8352 V1.3**
Input parameter		
Rated value (0~40 ℃)	**Input voltage**	0~800V
	Input current	0~180A
	Input power	0~31.5kW
	Min. operating voltage	15V at 180A
CC mode	**Range**	0~180A
	Resolution	10mA
	Accuracy	<0.4% I_{max}
CV mode	**Range**	0~800V
	Resolution	100mV
	Accuracy	<0.3% U_{max}
CR mode	**Range**	0.1~333Ω
	Resolution	0.001Ω(R<10Ω);0.01Ω(10Ω≤R<100Ω);0.1Ω(100Ω≥R<1000Ω);1Ω(R≥1000Ω)
	Accuracy	R_{max} *2%:(0.1~80Ω); R_{max} *5%:(80~333Ω);
CP mode	**Range**	0~31.5kW
	Resolution	1W
	Accuracy	<1.3% P_{max}
Dynamic	**Rising slope**	100A/ms
	Falling slope	100A/ms
	Dynamic Frequency	-
Input read-back value		
Readback current	**Range**	0~180A
	Resolution	10mA
	Accuracy	<0.4% I_{max}
Readback voltage	**Range**	0~800V
	Resolution	100mV
	Accuracy	<0.3% U_{max}

Readback power	**Range**	0~31.5kW
	Resolution	1W
	Accuracy	<1.3% P_{max}
Protection range		
OCP Protection		189A
OVP Protection		810V
OPP Protection		31.8kW
Short circuit testing		
Current		189A
External analog		
Current Programming		External programming voltage 0-10V corresponds to current 0-180A
Current Monitoring		Current 0-180A corresponds to external monitoring voltage 0-10V
Output parameter (L1, L2, L3 correspond to N respectively)		
Output voltage range		190VAC~260VAC
OVP Protection		260VAC
UVP Protection		190VAC
Output frequency range		45Hz~65Hz
Maximum output current (rms)		51Aac
Power factor		> 0.99 (lead or lag)
DC component		-0.5A~+0.5A
Harmonic THDI		<5%
Three-phase power unbalance factor		<5%
Islanding protection		Active islanding protection
Environment parameter		
Working temperature		0~40℃
Storage temperature		-20~70℃
Efficiency		
Maximum efficiency (Fully loaded power of maximum input voltage)		94.5%
Communication		
Interface		**RS232/USB/RS485/CAN/LAN**
Protocol		SCPI
Machinery parameter		
Dimension (mm)		800mm*550mm*907.64mm
Weight(net)		175kg

Remarks:
Current and voltage is not less than 10% of full scale in resistance test.
The scope of read-back resistance is described as follows:

- **0.1~80Ω**
  Lower limit value: 1/(1/R+(1/R)*0.02+0.002)
  Upper limit value: 1/(1/R-(1/R)*0.02-0.002)
- **80~333Ω**
  Lower limit value: 1/(1/R+(1/R)*0.05+0.002)
  Upper limit value: 1/(1/R-(1/R)*0.05-0.002)

Parameter		**IT8361 V1.3**
Input parameter		
Rated value (0~40 ℃)	**Input voltage**	0~80V
	Input current	0~2040A
	Input power	0~42kW

	Min. operating voltage	1V at 2040A
CC mode	**Range**	0~2040A
	Resolution	100mA
	Accuracy	<0.4% Imax
CV mode	**Range**	0~80V
	Resolution	10mV
	Accuracy	<0.3% Umax
CR mode	**Range**	0.001~0.1kΩ
	Resolution	0.001Ω
	Accuracy	(1/Rmin)*2%:(0.001~2Ω);(1/Rmin)*5%:(2~100Ω)
CP mode	**Range**	0~42kW
	Resolution	1W
	Accuracy	<1.3% Pmax
Input read-back value		
Readback current	**Range**	0~2040A
	Resolution	100mA
	Accuracy	**<0.4% Imax**
Readback voltage	**Range**	0~80V
	Resolution	10mV
	Accuracy	**<0.3% Umax**
Readback power	**Range**	0~42kW
	Resolution	1W
	Accuracy	**<1.3% Pmax**
Protection range		
OCP Protection		2042A
OVP Protection		82V
OPP Protection		42.1kW
Short circuit testing		
Current		2045A
External analog		
Current Programming		External programming voltage 0-10V corresponds to current 0-2040A
Current Monitoring		Current 0-2040A corresponds to external monitoring voltage 0-10V
Output parameter		
Output voltage range		190VAC~260VAC
OVP Protection		260VAC
UVP Protection		190VAC
Output frequency range		45Hz~65Hz
Maximum output current (rms)		68Aac
Power factor		>0.99 (lead or lag)
DC component		-0.5A~+0.5A
Harmonic THDI		<3%
Islanding protection		Active islanding protection
Environment parameter		
Working temperature		0~40℃
Storage temperature		-20~70℃
Noise		60dB
Efficiency		
Maximum efficiency (Fully loaded power of maximum input voltage)		92.5%
Communication		

Interface	RS232/USB/RS485/CAN/LAN
Protocol	SCPI
Machinery parameter	
Dimension (mm)	800mm*550mm*1291.24mm
Weight(net)	284kg
Input terminal impedance	300kΩ

Remarks:
The scope of read-back resistance is described as follows:

- **0.001~2Ω**
  Lower limit value: 1/(1/R+(1/R)*0.02+0.002)
  Upper limit value: 1/(1/R-(1/R)*0.02-0.002)
- **2~100Ω**
  Lower limit value: 1/(1/R+(1/R)*0.05+0.002)
  Upper limit value: 1/(1/R-(1/R)*0.05-0.002)

Parameter		**IT8362 V1.3**
Input parameter		
Rated value (0~40 ℃)	**Input voltage**	0~800V
	Input current	0~240A
	Input power	0~42kW
	Min. operating voltage	15V at 240A
CC mode	**Range**	0~240A
	Resolution	10mA
	Accuracy	<0.4% I_{max}
CV mode	**Range**	0~800V
	Resolution	100mV
	Accuracy	<0.3% U_{max}
CR mode	**Range**	0.08~250Ω
	Resolution	0.001Ω(R<10Ω);0.01Ω(10Ω≤R<100Ω);0.1Ω(100Ω≥R<1000Ω);1Ω(R≥1000Ω)
	Accuracy	R_{max} *2%:(0.08~60Ω); R_{max} *5%:(60~250Ω);
CP mode	**Range**	0~42kW
	Resolution	1W
	Accuracy	<1.3% P_{max}
Dynamic	**Rising slope**	100A/ms
	Falling slope	100A/ms
	Dynamic Frequency	-
Input read-back value		
Readback current	**Range**	0~240A
	Resolution	10mA
	Accuracy	<0.4% I_{max}
Readback voltage	**Range**	0~800V
	Resolution	100mV
	Accuracy	<0.3% U_{max}
Readback power	**Range**	0~42kW
	Resolution	1W
	Accuracy	<1.3% P_{max}
Protection range		
OCP Protection		252A
OVP Protection		810V

OPP Protection	42.4kW
Short circuit testing	
Current	252A
External analog	
Current Programming	External programming voltage 0-10V corresponds to current 0-240A
Current Monitoring	Current 0-240A corresponds to external monitoring voltage 0-10V
Output parameter (L1, L2, L3 correspond to N respectively)	
Output voltage range	190VAC~260VAC
OVP Protection	260VAC
UVP Protection	190VAC
Output frequency range	45Hz~65Hz
Maximum output current (rms)	68Aac
Power factor	> 0.99 (lead or lag)
DC component	-1A~+1A
Harmonic THDI	<5%
Three-phase power unbalance factor	<5%
Islanding protection	Active islanding protection
Environment parameter	
Working temperature	0~40℃
Storage temperature	-20~70℃
Efficiency	
Maximum efficiency (Fully loaded power of maximum input voltage)	94.5%
Communication	
Interface	**RS232/USB/RS485/CAN/LAN**
Protocol	SCPI
Machinery parameter	
Dimension (mm)	800mm*550mm*1291.24mm
Weight(net)	284kg

Remarks:
Current and voltage is not less than 10% of full scale in resistance test.
The scope of read-back resistance is described as follows:

- **0.08~60Ω**
  Lower limit value: 1/(1/R+(1/R)*0.02+0.002)
  Upper limit value: 1/(1/R-(1/R)*0.02-0.002)
- **60~250Ω**
  Lower limit value: 1/(1/R+(1/R)*0.05+0.002)
  Upper limit value: 1/(1/R-(1/R)*0.05-0.002)

Parameter		**IT8371 V1.2**
Input parameter		
Rated value (0~40 ℃)	**Input voltage**	0~80V
	Input current	0~2550A
	Input power	0~52.5kW
	Min. operating voltage	1V at 2550A
CC mode	**Range**	0~2550A
	Resolution	100mA
	Accuracy	<0.4% Imax

CV mode	**Range**	0~80V
	Resolution	10mV
	Accuracy	<0.3% Umax
CR mode	**Range**	0.001~80Ω
	Resolution	0.001Ω
	Accuracy	(1/Rmin)*2%:(0.001~1Ω);(1/Rmin)*5%:(1~80Ω)
CP mode	**Range**	0~52.5kW
	Resolution	10W
	Accuracy	<1.3% Pmax
Dynamic	**Rising slope**	1000A/ms
	Falling slope	1000A/ms
	Dynamic Frequency	500Hz
	Minimum rise time	1ms
Input read-back value		
Readback current	**Range**	0~2550A
	Resolution	100mA
	Accuracy	**<0.4% Imax**
Readback voltage	**Range**	0~80V
	Resolution	10mV
	Accuracy	**<0.3% Umax**
Readback power	**Range**	0~52.5kW
	Resolution	10W
	Accuracy	**<1.3% Pmax**
Protection range		
OCP Protection		2552A
OVP Protection		82V
OPP Protection		52.6kW
Short circuit testing		
Current		2555A
Voltage		0V
Resistance		1mΩ
External analog		
Current Programming		External programming voltage 0-10V corresponds to current 0-2550A
Current Monitoring		Current 0-2550A corresponds to external monitoring voltage 0-10V
Output parameter		
Output voltage range		190VAC~260VAC
OVP Protection		260VAC
UVP Protection		190VAC
Output frequency range		45Hz~65Hz
Maximum output current (rms)		85Aac
Power factor		>0.99 (lead or lag)
DC component		-0.5A~+0.5A
Harmonic THDI		<3%
Islanding protection		Active islanding protection
Environment parameter		
Working temperature		0~40℃
Storage temperature		-20~70℃
Noise		60dB
Efficiency		
Maximum efficiency (Fully loaded power of maximum input voltage)		92.5%

Communication	
Interface	RS232/USB/RS485/CAN/LAN
Protocol	SCPI
Machinery parameter	
Dimension (mm)	800mm*550mm*907.64mm
Weight(net)	255kg
Input terminal impedance	**300kΩ**

Remarks:
The scope of read-back resistance is described as follows:

- **0.001~1Ω**
  Lower limit value: 1/(1/R+(1/R)*0.02+0.002)
  Upper limit value: 1/(1/R-(1/R)*0.02-0.002)
- **1~80Ω**
  Lower limit value: 1/(1/R+(1/R)*0.05+0.002)
  Upper limit value: 1/(1/R-(1/R)*0.05-0.002)

Parameter		IT8372 V1.3
Input parameter		
Rated value (0~40 ℃)	**Input voltage**	0~800V
	Input current	0~300A
	Input power	0~52.5kW
	Min. operating voltage	15V at 300A
CC mode	**Range**	0~300A
	Resolution	10mA
	Accuracy	<0.4% I_{max}
CV mode	**Range**	0~800V
	Resolution	100mV
	Accuracy	<0.3% U_{max}
CR mode	**Range**	0.06~200Ω
	Resolution	0.001Ω(R<10Ω);0.01Ω(10Ω≤R<100Ω);0.1Ω(100Ω≥R<1000Ω);1Ω(R≥1000Ω)
	Accuracy	R_{max} *2%:(0.06~40Ω); R_{max} *5%:(40~200Ω);
CP mode	**Range**	0~52.5kW
	Resolution	1W
	Accuracy	<1.3% P_{max}
Dynamic	**Rising slope**	100A/ms
	Falling slope	100A/ms
	Dynamic Frequency	-
Input read-back value		
Readback current	**Range**	0~300A
	Resolution	10mA
	Accuracy	<0.4% I_{max}
Readback voltage	**Range**	0~800V
	Resolution	100mV
	Accuracy	<0.3% U_{max}
Readback power	**Range**	0~52.5kW
	Resolution	1W
	Accuracy	<1.3% P_{max}
Protection range		
OCP Protection		315A

OVP Protection	810V
OPP Protection	53kW
Short circuit testing	
Current	315A
External analog	
Current Programming	External programming voltage 0-10V corresponds to current 0-300A
Current Monitoring	Current 0-300A corresponds to external monitoring voltage 0-10V
Output parameter (L1, L2, L3 correspond to N respectively)	
Output voltage range	190VAC~260VAC
OVP Protection	260VAC
UVP Protection	190VAC
Output frequency range	45Hz~65Hz
Maximum output current (rms)	85Aac
Power factor	> 0.99 (lead or lag)
DC component	-1A~+1A
Harmonic THDI	<5%
Three-phase power unbalance factor	<5%
Islanding protection	Active islanding protection
Environment parameter	
Working temperature	0~40℃
Storage temperature	-20~70℃
Efficiency	
Maximum efficiency (Fully loaded power of maximum input voltage)	94.5%
Communication	
Interface	**RS232/USB/RS485/CAN/LAN**
Protocol	SCPI
Machinery parameter	
Dimension (mm)	800mm*550mm*1291.24mm
Weight(net)	324kg

Remarks:
Current and voltage is not less than 10% of full scale in resistance test.
The scope of read-back resistance is described as follows:

- **0.06~40Ω**
  Lower limit value: 1/(1/R+(1/R)*0.02+0.002)
  Upper limit value: 1/(1/R-(1/R)*0.02-0.002)
- **40~200Ω**
  Lower limit value: 1/(1/R+(1/R)*0.05+0.002)
  Upper limit value: 1/(1/R-(1/R)*0.05-0.002)

Parameter		**IT8381 V1.2**
Input parameter		
Rated value (0~40 ℃)	**Input voltage**	0~80V
	Input current	0~3060A
	Input power	0~63kW
	Min. operating voltage	1V at 3060A
CC mode	**Range**	0~3060A
	Resolution	100mA

	Accuracy	<0.4% Imax
CV mode	**Range**	0~80V
	Resolution	10mV
	Accuracy	<0.3% Umax
CR mode	**Range**	0.001~50Ω
	Resolution	0.001Ω
	Accuracy	(1/Rmin)*2%:(0.001~1Ω);(1/Rmin)*5%:(1~50Ω)
CP mode	**Range**	0~63kW
	Resolution	10W
	Accuracy	<1.3% Pmax
Dynamic	**Rising slope**	1000A/ms
	Falling slope	1000A/ms
	Dynamic Frequency	500Hz
	Minimum rise time	1ms
Input read-back value		
Readback current	**Range**	0~3060A
	Resolution	100mA
	Accuracy	**<0.4% Imax**
Readback voltage	**Range**	0~80V
	Resolution	10mV
	Accuracy	**<0.3% Umax**
Readback power	**Range**	0~63kW
	Resolution	10W
	Accuracy	**<1.3% Pmax**
Protection range		
OCP Protection		3062A
OVP Protection		82V
OPP Protection		63.1kW
Short circuit testing		
Current		3065A
Voltage		0V
Resistance		1mΩ
External analog		
Current Programming		External programming voltage 0-10V corresponds to current 0-3060A
Current Monitoring		Current 0-3060A corresponds to external monitoring voltage 0-10V
Output parameter		
Output voltage range		190VAC~260VAC
OVP Protection		260VAC
UVP Protection		190VAC
Output frequency range		45Hz~65Hz
Maximum output current (rms)		102Aac
Power factor		>0.99 (lead or lag)
DC component		-0.5A~+0.5A
Harmonic THDI		<3%
Islanding protection		Active islanding protection
Environment parameter		
Working temperature		0~40℃
Storage temperature		-20~70℃
Noise		60dB
Efficiency		
Maximum efficiency		92.5%

(Fully loaded power of maximum input voltage)	
Communication	
Interface	RS232/USB/RS485/CAN/LAN
Protocol	SCPI
Machinery parameter	
Dimension (mm)	800mm*550mm*1291.24mm
Weight(net)	364kg
Input terminal impedance	300kΩ

Remarks:
The scope of read-back resistance is described as follows:

- **0.001~1Ω**
  Lower limit value: 1/(1/R+(1/R)*0.02+0.002)
  Upper limit value: 1/(1/R-(1/R)*0.02-0.002)
- **1~50Ω**
  Lower limit value: 1/(1/R+(1/R)*0.05+0.002)
  Upper limit value: 1/(1/R-(1/R)*0.05-0.002)

Parameter		**IT8382 V1.3**
Input parameter		
Rated value (0~40 ℃)	**Input voltage**	0~800V
	Input current	0~360A
	Input power	0~63kW
	Min. operating voltage	15V at 360A
CC mode	**Range**	0~360A
	Resolution	10mA
	Accuracy	<0.4% I_{max}
CV mode	**Range**	0~800V
	Resolution	100mV
	Accuracy	<0.3% U_{max}
CR mode	**Range**	0.05~160Ω
	Resolution	0.001Ω(R<10Ω);0.01Ω(10Ω≤R<100Ω);0.1Ω(100Ω≥R<1000Ω);1Ω(R≥1000Ω)
	Accuracy	R_{max} *2%:(0.05~20Ω); R_{max} *5%:(20~160Ω);
CP mode	**Range**	0~63kW
	Resolution	1W
	Accuracy	<1.3% P_{max}
Dynamic	**Rising slope**	100A/ms
	Falling slope	100A/ms
	Dynamic Frequency	-
Input read-back value		
Readback current	**Range**	0~360A
	Resolution	10mA
	Accuracy	<0.4% I_{max}
Readback voltage	**Range**	0~800V
	Resolution	100mV
	Accuracy	<0.3% U_{max}
Readback power	**Range**	0~63kW
	Resolution	1W
	Accuracy	<1.3% P_{max}

Protection range	
OCP Protection	378A
OVP Protection	810V
OPP Protection	63.6kW
Short circuit testing	
Current	378A
External analog	
Current Programming	External programming voltage 0-10V corresponds to current 0-360A
Current Monitoring	Current 0-360A corresponds to external monitoring voltage 0-10V
Output parameter (L1, L2, L3 correspond to N respectively)	
Output voltage range	190VAC~260VAC
OVP Protection	260VAC
UVP Protection	190VAC
Output frequency range	45Hz~65Hz
Maximum output current (rms)	102Aac
Power factor	> 0.99 (lead or lag)
DC component	-1A~+1A
Harmonic THDI	<5%
Three-phase power unbalance factor	<5%
Islanding protection	Active islanding protection
Environment parameter	
Working temperature	0~40℃
Storage temperature	-20~70℃
Efficiency	
Maximum efficiency (Fully loaded power of maximum input voltage)	94.5%
Communication	
Interface	**RS232/USB/RS485/CAN/LAN**
Protocol	SCPI
Machinery parameter	
Dimension (mm)	800mm*550mm*1291.24mm
Weight(net)	364kg

Remarks:
Current and voltage is not less than 10% of full scale in resistance test.
The scope of read-back resistance is described as follows:

- **0.06~20Ω**
  Lower limit value: 1/(1/R+(1/R)*0.02+0.002)
  Upper limit value: 1/(1/R-(1/R)*0.02-0.002)
- **20~160Ω**
  Lower limit value: 1/(1/R+(1/R)*0.05+0.002)
  Upper limit value: 1/(1/R-(1/R)*0.05-0.002)

Parameter		IT8391 V1.2
Input parameter		
Rated value (0~40 ℃)	**Input voltage**	0~80V
	Input current	0~3570A
	Input power	0~73.5kW
	Min. operating voltage	1V at 3570A

CC mode	**Range**	0~3570A
	Resolution	100mA
	Accuracy	<0.4% Imax
CV mode	**Range**	0~80V
	Resolution	10mV
	Accuracy	<0.3% Umax
CR mode	**Range**	0.001~50Ω
	Resolution	0.001Ω
	Accuracy	(1/Rmin)*2%:(0.001~1Ω);(1/Rmin)*5%:(1~50Ω)
CP mode	**Range**	0~73.5kW
	Resolution	10W
	Accuracy	<1.3% Pmax
Dynamic	**Rising slope**	1000A/ms
	Falling slope	1000A/ms
	Dynamic Frequency	500Hz
	Minimum rise time	1ms
Input read-back value		
Readback current	**Range**	0~3570A
	Resolution	100mA
	Accuracy	**<0.4% Imax**
Readback voltage	**Range**	0~80V
	Resolution	10mV
	Accuracy	**<0.3% Umax**
Readback power	**Range**	0~73.5kW
	Resolution	10W
	Accuracy	**<1.3% Pmax**
Protection range		
OCP Protection		3572A
OVP Protection		82V
OPP Protection		73.6kW
Short circuit testing		
Current		3575A
Voltage		0V
Resistance		1mΩ
External analog		
Current Programming		External programming voltage 0-10V corresponds to current 0-3570A
Current Monitoring		Current 0-3570A corresponds to external monitoring voltage 0-10V
Output parameter		
Output voltage range		190VAC~260VAC
OVP Protection		260VAC
UVP Protection		190VAC
Output frequency range		45Hz~65Hz
Maximum output current (rms)		119Aac
Power factor		>0.99 (lead or lag)
DC component		-0.5A~+0.5A
Harmonic THDI		<3%
Islanding protection		Active islanding protection
Environment parameter		
Working temperature		0~40℃
Storage temperature		-20~70℃
Noise		60dB

Efficiency	
Maximum efficiency (Fully loaded power of maximum input voltage)	92.5%
Communication	
Interface	RS232/USB/RS485/CAN/LAN
Protocol	SCPI
Machinery parameter	
Dimension (mm)	800mm*550mm*1291.24mm
Weight(net)	404kg
Input terminal impedance	300kΩ

Remarks:
The scope of read-back resistance is described as follows:

- **0.001~1Ω**
  Lower limit value: 1/(1/R+(1/R)*0.02+0.002)
  Upper limit value: 1/(1/R-(1/R)*0.02-0.002)
- **1~50Ω**
  Lower limit value: 1/(1/R+(1/R)*0.05+0.002)
  Upper limit value: 1/(1/R-(1/R)*0.05-0.002)

Parameter		IT8392 V1.3
Input parameter		
Rated value (0~40 ℃)	**Input voltage**	0~800V
	Input current	0~420A
	Input power	0~73.5kW
	Min. operating voltage	15V at 420A
CC mode	**Range**	0~420A
	Resolution	10mA
	Accuracy	<0.4% I_{max}
CV mode	**Range**	0~800V
	Resolution	100mV
	Accuracy	<0.3% U_{max}
CR mode	**Range**	0.045~140Ω
	Resolution	0.001Ω(R<10Ω);0.01Ω(10Ω≤R<100Ω);0.1Ω(100Ω≥R<1000Ω);1Ω(R≥1000Ω)
	Accuracy	R_{max} *2%:(0.045~10Ω); R_{max} *5%:(10~140Ω);
CP mode	**Range**	0~73.5kW
	Resolution	1W
	Accuracy	<1.3% P_{max}
Dynamic	**Rising slope**	100A/ms
	Falling slope	100A/ms
	Dynamic Frequency	-
Input read-back value		
Readback current	**Range**	0~420A
	Resolution	10mA
	Accuracy	<0.4% I_{max}
Readback voltage	**Range**	0~800V
	Resolution	100mV
	Accuracy	<0.3% U_{max}
Readback	**Range**	0~73.5kW

power	**Resolution**	1W
	Accuracy	<1.3% P_{max}
Protection range		
OCP Protection		441A
OVP Protection		810V
OPP Protection		74.2kW
Short circuit testing		
Current		441A
External analog		
Current Programming		External programming voltage 0-10V corresponds to current 0-420A
Current Monitoring		Current 0-420A corresponds to external monitoring voltage 0-10V
Output parameter (L1, L2, L3 correspond to N respectively)		
Output voltage range		190VAC~260VAC
OVP Protection		260VAC
UVP Protection		190VAC
Output frequency range		45Hz~65Hz
Maximum output current (rms)		119Aac
Power factor		> 0.99 (lead or lag)
DC component		-1A~+1A
Harmonic THDI		<5%
Three-phase power unbalance factor		<5%
Islanding protection		Active islanding protection
Environment parameter		
Working temperature		0~40℃
Storage temperature		-20~70℃
Efficiency		
Maximum efficiency (Fully loaded power of maximum input voltage)		94.5%
Communication		
Interface		**RS232/USB/RS485/CAN/LAN**
Protocol		SCPI
Machinery parameter		
Dimension (mm)		800mm*550mm*1291.24mm
Weight(net)		404kg

Remarks:
Current and voltage is not less than 10% of full scale in resistance test.
The scope of read-back resistance is described as follows:

- **0.045~10Ω**
  Lower limit value: 1/(1/R+(1/R)*0.02+0.002)
  Upper limit value: 1/(1/R-(1/R)*0.02-0.002)
- **10~140Ω**
  Lower limit value: 1/(1/R+(1/R)*0.05+0.002)
  Upper limit value: 1/(1/R-(1/R)*0.05-0.002)

*The above specifications may be subject to change without prior notice.

Chapter6 Routine Maintenance

This chapter describes the general maintenance items and methods for IT8300.

6.1 Self-test

IT8300 load has the self-test function. For self-test details, refer to Chapter II “Power-on Self-test”.

6.2 Routine Maintenance

This section introduces the basic maintenance involved in routine operation of the instrument, such as cleaning, self-repair, etc.

Cleaning

Wipe the machine with dry or slightly wet cloth. Do not wipe the inside of the machine without permission. Cut off the power supply before cleaning.

Initialization

Factory settings of the system will be restored by implementing this operation:

1. Select [**Shift**] + **8**(**System**) to enter the system menu interface.
2. Press directiion key to select the **Reset** and press [**Enter**].
3. The system will be initialized.

6.3 Contact ITECH Engineer

This section introduces the procedures for troubleshooting.

Preparations before contact

In case of instrument failure, make the following preparations before returning the instrument to ITECH for repair or contacting the engineer.

1. Complete all inspections specified in “Self-check of Instrument Fault” and check whether the fault still occurs.
2. If the fault still occurs, carefully read the warranty service and restriction requirements in the foreword of the manual and confirm that your instrument meets the warranty service requirements.
3. To send the instrument back to the manufacturer for repair, see the requirements in 7.5 “Return for Repair”.

Self-check of Instrument Fault

In case of instrument failure, please perform the following self-checks. If the instrument can be recovered by simple check, the cost and time can be saved. Before contacting the engineer of ITECH, please check the following items.

- Check whether the instrument is powered on.

- Check whether the instrument is started up normally.
- Check whether the fuse is in good condition.
- Check whether other connectors are in good condition, including cables, plugs, etc.
- Check whether the system configuration is correct in operation.
- Check whether the self-test is successfully and whether all specifications and performance meet the specified requirements.
- Check whether the instrument displays error information.
- Use other instruments instead of this instrument for confirmation.

SN collection

ITECH will improve the product performance, availability and reliability from time to time. The service personnel of ITECH will record the changes of each instrument, and all the relevant information will be identified according to the SN. The SN will be used as the tracking ID of the instrument returned for repair.

To contact the engineer, the valid SN will be an effective guarantee for effective service and complete information. You can obtain the instrument SN in the following methods:

1. Press **[Shift]** + 7(Info), the instrument displays information of system.
2. Press left and right direction keys to select the SN.
3. Please record the SN.

Calibration interval

The calibration frequency recommended by ITECH for IT8300 electronic load is once a year.

6.4 Return for Repair

Before returning the instrument for repair, please read the following requirements.

Packaging

Refer to the following steps to package the instrument to be returned for repair.

1. Pack the instrument to be repaired into the package used in delivery, including relevant accessories.
2. Provide the detailed problem description, such as copy of error information and any related problem information.

CAUTION

- The instrument may be damaged if the unspecified package is used for delivery. Use the special package for delivery, and pack the instrument according to the packaging standards of delivery.
- Do not use the styrene particle material of any shape as the package material, as the instrument cannot be well fixed in the package or prevented from shaking. In addition, the instrument may be damaged by static electricity

generated by styrene particles or penetration of styrene particles into holes of the rear panel.

3. Read the requirements of transportation costs of warranty services in the foreword before delivery.

Appendix

Specifications of Red and Black Test Cables

ITECH provides you with optional red and black test cables, which individual sales and you can select for test. For specifications of ITECH test cables and maximum current values, refer to the table below.

Model	Specification	Cross section	Length
IT-E301/10A	10A	-	1m
IT-E301/30A	30A	6mm2	1.2m
IT-E301/30A	30A	6mm2	2m
IT-E301/60A	60A	20mm2	1.5m
IT-E301/120A	120A	50mm2	2m
IT-E301/240A	240A	70mm2	1m
IT-E301/240A	240A	70mm2	2m
IT-E301/360A	360A	95mm2	2m

For maximum current of AWG copper wire, refer to table blow.

AWG	10	12	14	16	18	20	22	24	26	28
The Maximum current value(A)	40	25	20	13	10	7	5	3.5	2.5	1.7

Note: AWG (American Wire Gage), it means X wire (marked on the wire). The table above lists current capacity of single wire at working temperature of 30°C. For reference only.

Contact US

Thank you for purchasing ITECH products. If you have any doubt about this product, please contact us as follows.

1. Please refer to the CD-ROM of related user's manual in package.
2. Visit ITECH website www.itechate.com.
3. Select the most convenient contact for further consultation.