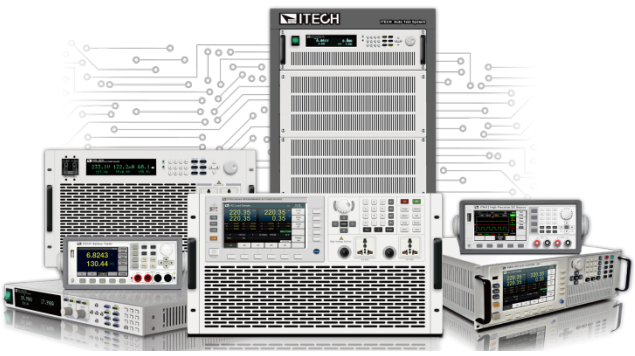
Programmable DC Electronic Load

Series IT8900 User's Manual



Model: Series IT8900
Revision: V1.5

Notices

Manual Part Number

IT8900-402589

Revision

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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

IT8900 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

⎓	DC power	|	ON (with the power switched on)
~	AC power	○	OFF (with the power supply switched off)
⎓ ~	Both DC and AC power supply	⎍	Power supply switching-on status
⏚	Protective grounding terminal	⎎	Power supply switching-off status
⏚	Grounding terminal	⊥	Reference terminal
⚠	Danger sign	+	Positive terminal
⚠	Warning sign (refer to specific “Warning” or “Caution” information in the manual)	−	Negative terminal
⏚	Ground wire connection end sign	-	-

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

- The electronic load is provided with a three-core power line during delivery and should be connected to a three-core 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.
- 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.
- To prevent burnout, please pay special attention to positive and negative polarities of electronic load during connection!
- Do not use damaged equipment. Please check the housing before using the equipment. Check whether the instrument is subject to cracking or is lack of plastic. Do not operate the instrument in the environment with explosive gas, steam or dust.
- Observe all tags on the equipment before connection.
- 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.

WARNING

- SHOCK HAZARD Ground the Instrument. This product is provided with a protective earth terminal. To minimize shock hazard, the instrument must be connected to the AC mains through a grounded power cable, with the ground wire firmly connected to an electrical ground (safety ground) at the power outlet or distribution box. Any interruption of the protective (grounding) conductor or disconnection of the protective earth terminal will cause a potential shock hazard that could result in injury or death.
- Before applying power, verify that all safety precautions are taken. All connections must be made with the instrument turned off, and must be performed by qualified personnel who are aware of the hazards involved. Improper actions can cause fatal injury as well as equipment damage.
- SHOCK HAZARD, LETHAL VOLTAGES This product can input the dangerous voltage that can cause personal injury, and the operator must always be protected from electric shock. Ensure that the input electrodes are either insulated or covered using the safety covers provided, so that no accidental contact with lethal voltages can occur.

- Never touch cables or connections immediately after turning off the instrument. Verify that there is no dangerous voltage on the electrodes or sense terminals before touching them.

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 IT8900 series electronic load 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	IT8900 series	Please refer to 2.1 Brief Introduction for complete models of IT8900 series electronic loads.
Power line	1	IT-E171/ IT-E172/ IT-E173/ IT-E174	The User may select different power lines based on local outlet specification. For detailed specifications, refer to 1.3 Installation of Power Line.
USB communication line	1	-	-
Red and black test lines	x	-	Number of the power cords vary depending on the model.
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.

The IT8900 series load output test lines is shown in the following table.

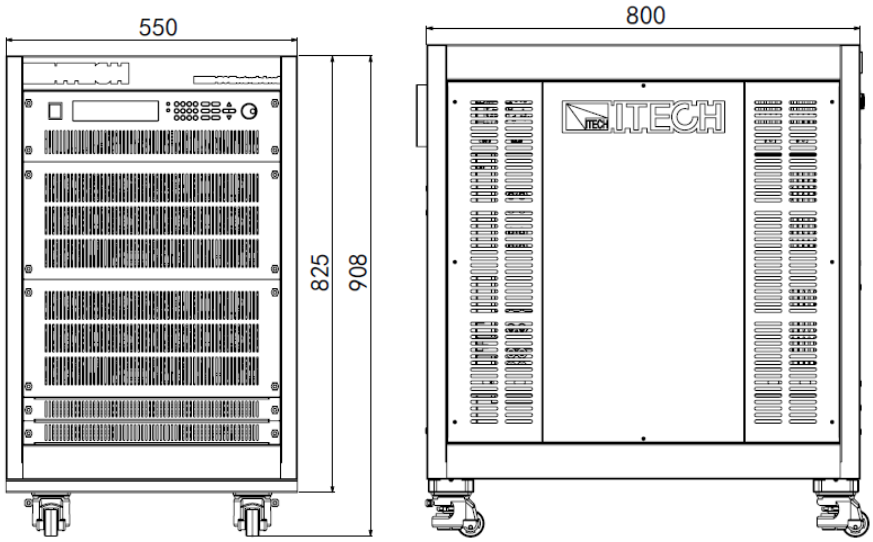
Colour	Specification (Length: 2 meters)
Red	120A
Black	
Red	240A
Black	
Red	360A
Black	
Red	350-500A
Black	
Note: The number of test cables shipped with different models are different, subject to the actual product.	

1.2 Instrument Size Introduction

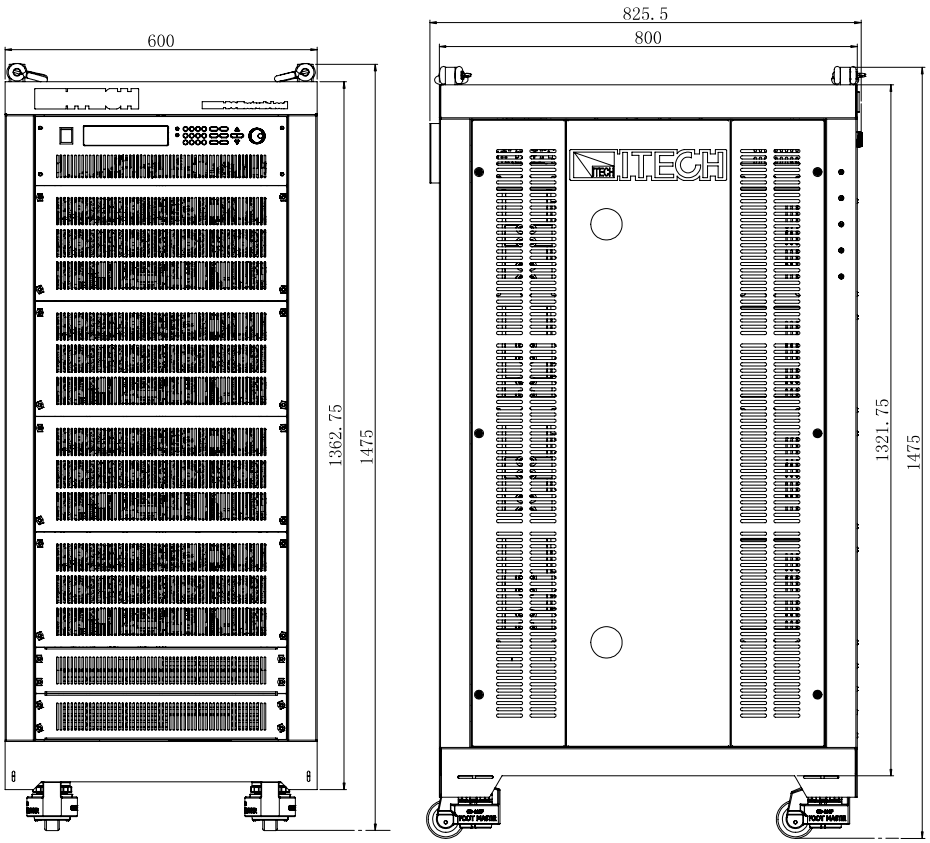
The instrument should be installed at well-ventilated and rational-sized space. Please select appropriate space for installation based on the electronic load

size.

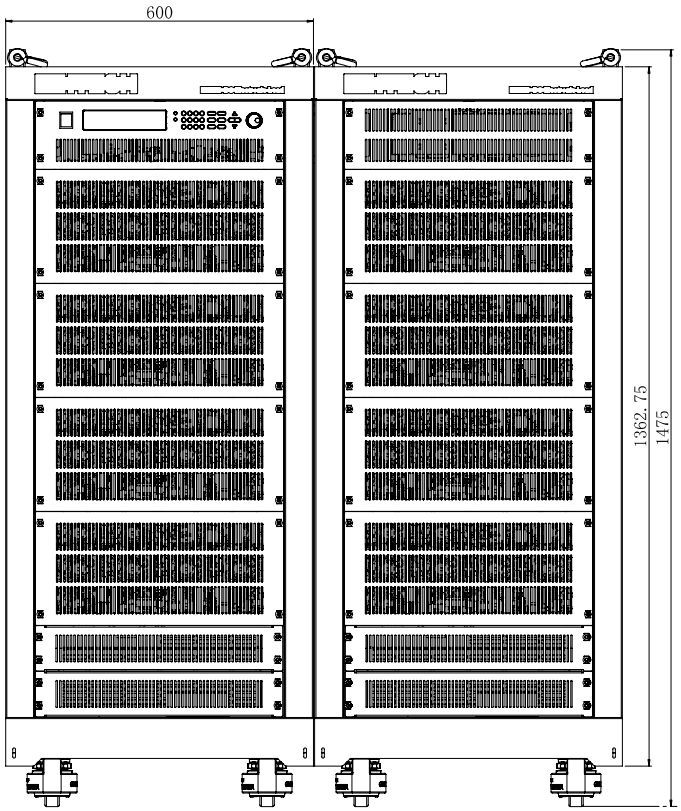
- IT8915-150-960/ IT8912-600-480/ IT8912-1200-240 load, refer to the following dimension drawing:

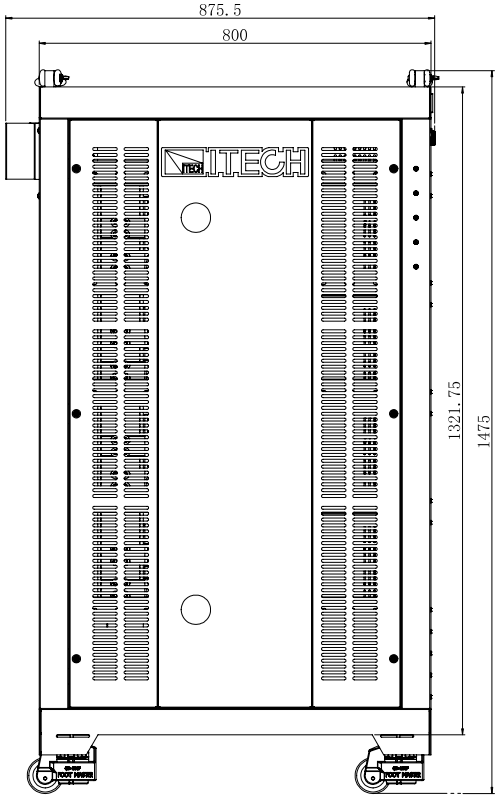


- IT8915-150-1200/IT8918-600-720/ IT8918-1200-360/ IT8922-150-1440/ IT8924-600-960/ IT8924-1200-480/ IT8930-150-1920 load, refer to the following dimension drawing:

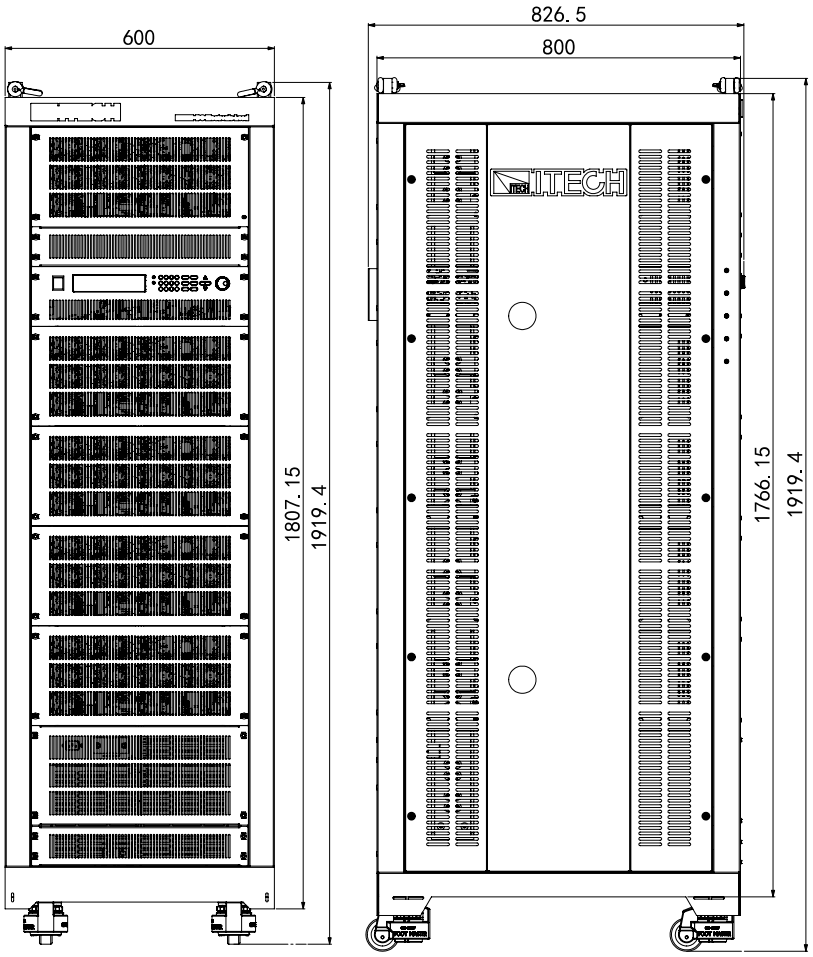


- IT8948-600-1920/ IT8948-1200-960 load, refer to the following dimension drawing:

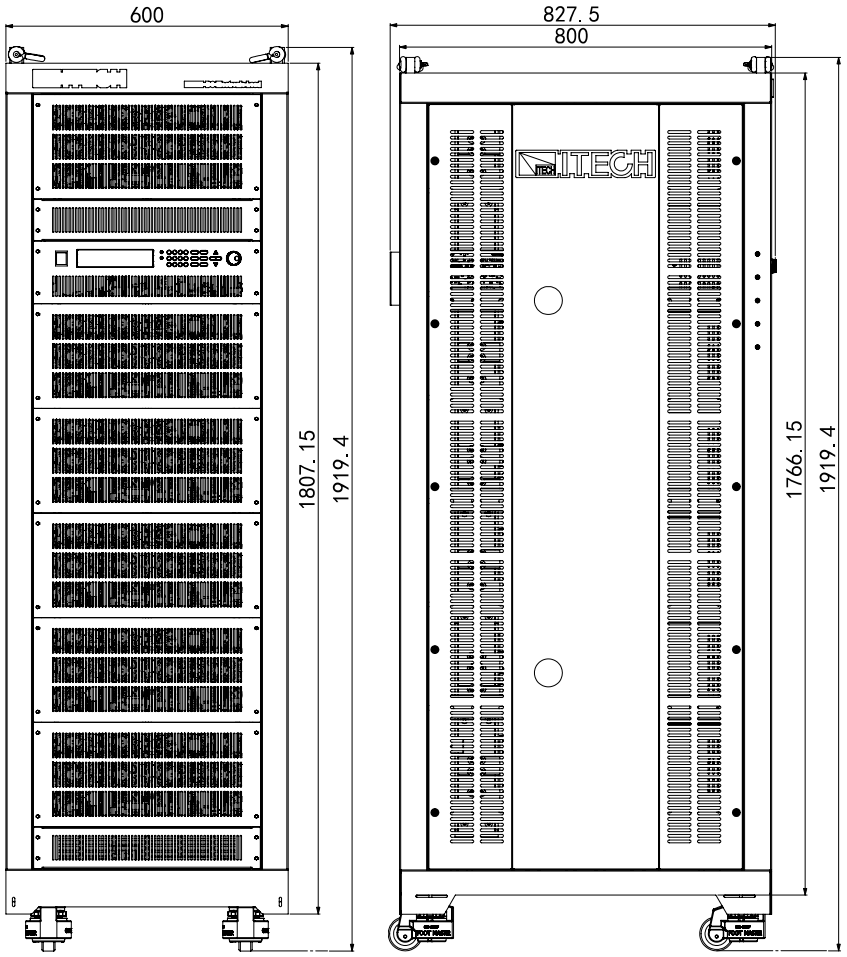




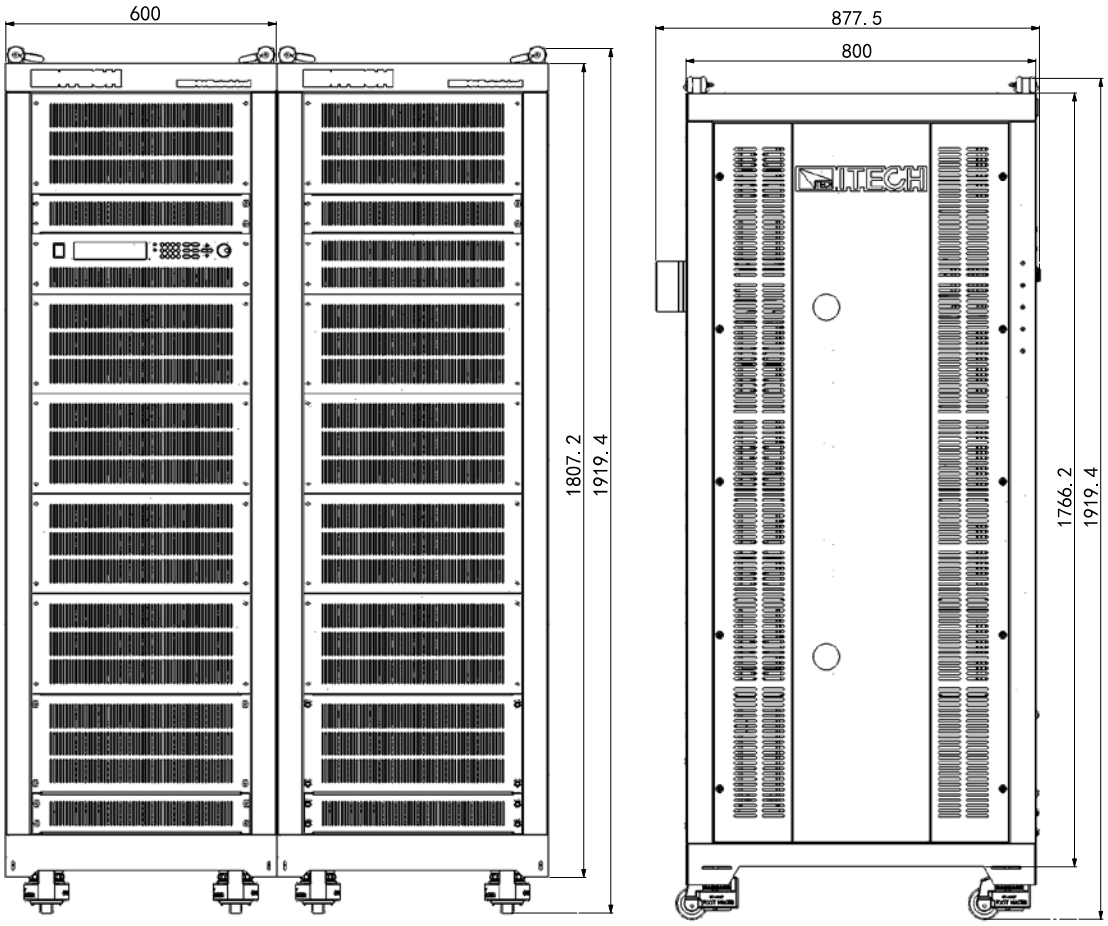
- IT8930-600-1200/ IT8930-1200-600/ IT8937-150-2400 load, refer to the following dimension drawing:



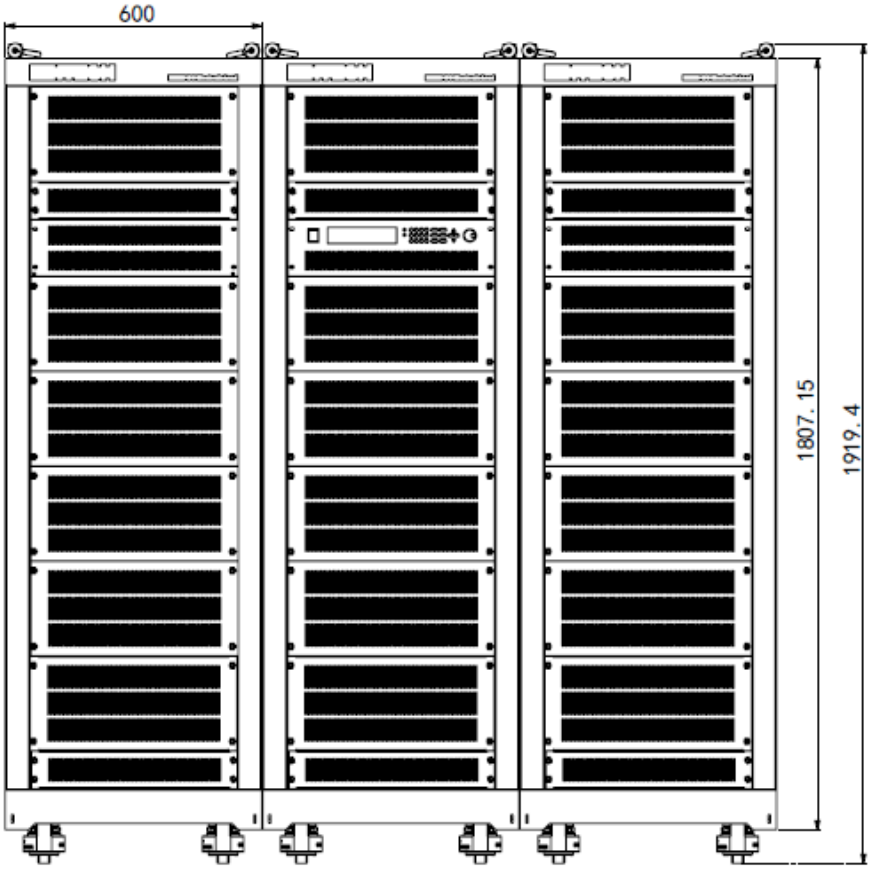
- IT8936-600-1440/ IT8936-1200-720/ IT8945-150-2500 load, refer to the following dimension drawing:

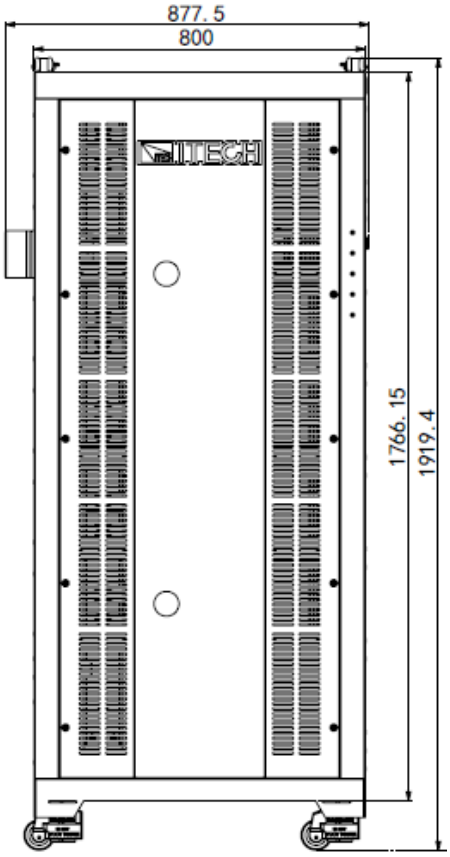


- IT8960-600-2400/IT8960-1200-1200/IT8972-600-2500/ IT8972-1200-1440/ IT8990-150-2500 load, refer to the following dimension drawing:

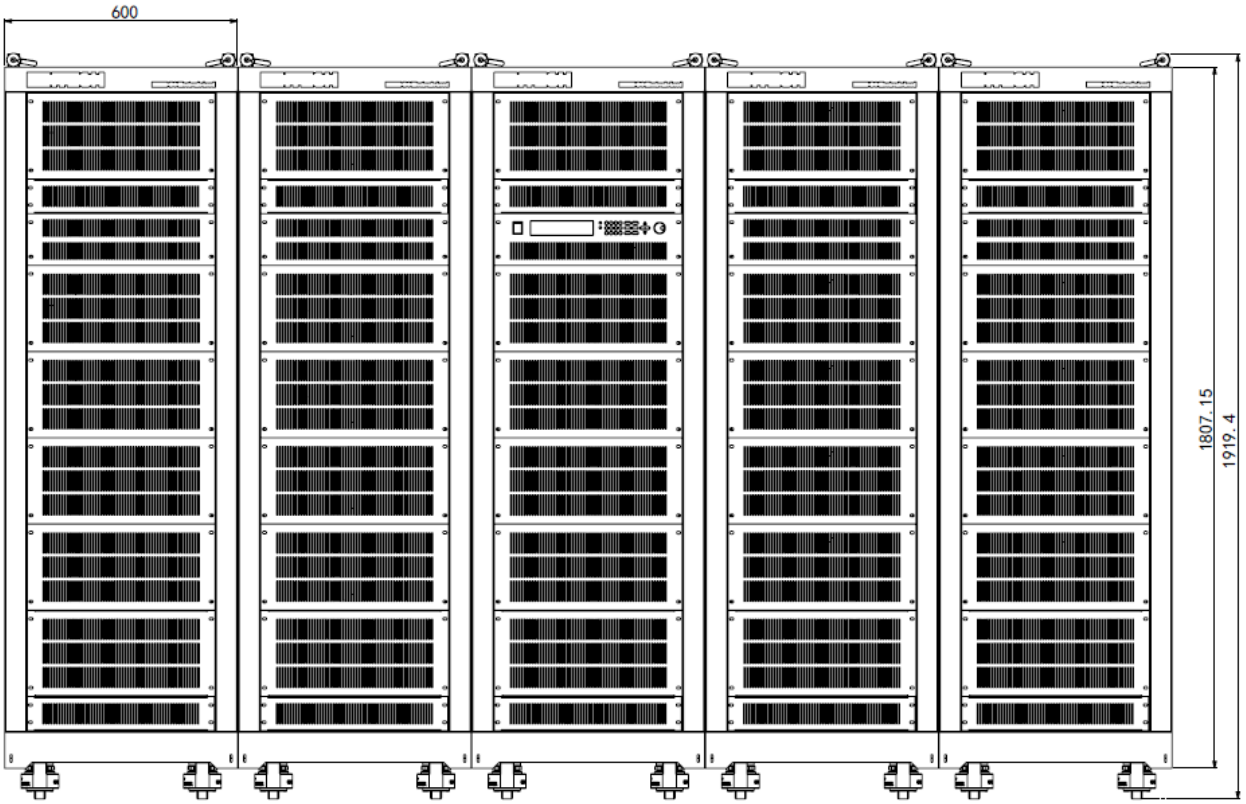


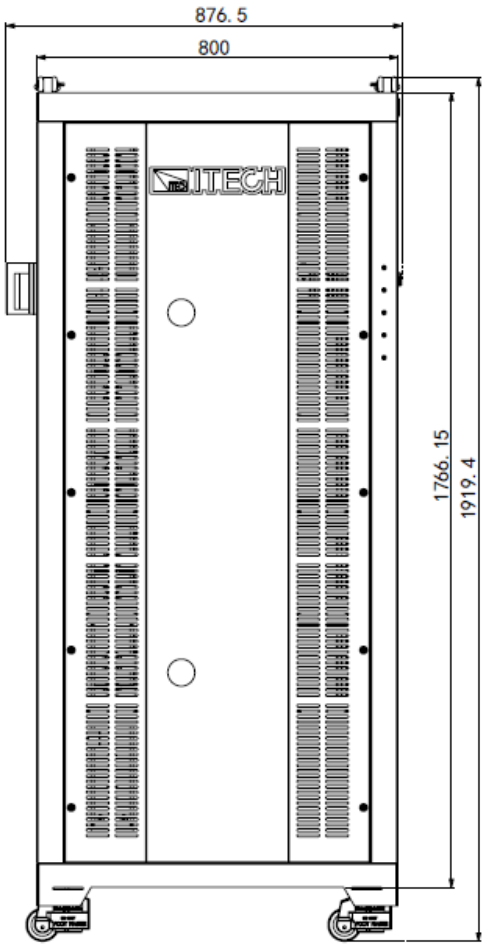
- IT8990-600-2400/IT89135-150-2500/IT89108-600-2500/ IT89108-1200-720 load, refer to the following dimension drawing:





- IT89150-600-2400 load, refer to the following dimension drawing:

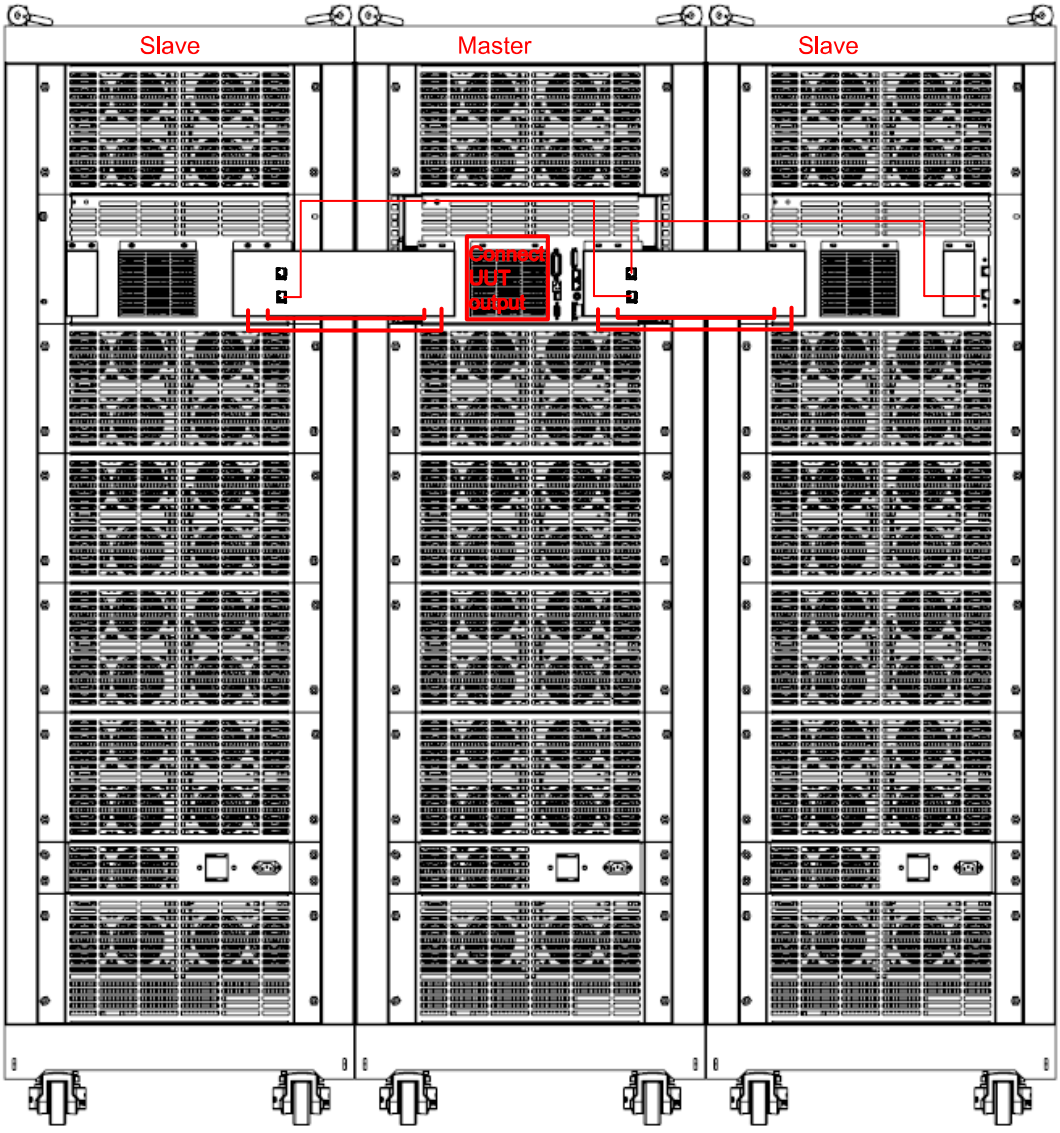




1.3 Connecting the cabinet

Over 48KW models of IT8900 series consist of two or three cabinets. The cabinet with front panel is the system master and others are slaves.

The user needs to connect system bus and load input terminals among cabinets. Before connecting, the user needs to take apart the rear panel which covers the terminals by using a screwdriver. Take example of three cabinets, the wiring diagram is shown as follows. Please refer to 2.6 Rear Panel Introduction for the detailed rear panel introduction.



1.4 Connecting the Power Cord

Connect power line of standard accessories and ensure that the electronic load is under normal power supply.

CAUTION

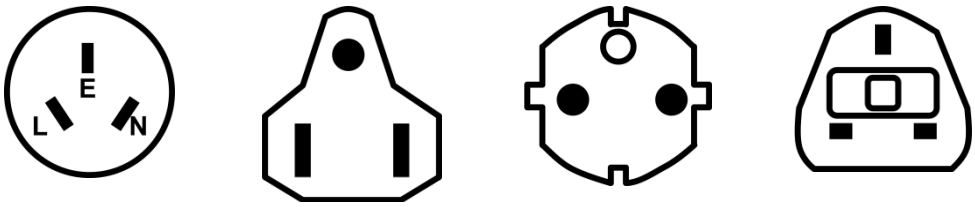
The power cords supplied with this product is certified for safety. In case the supplied lines assembly needs to be replaced, or an extension lines must be added, be sure that it can meet the required power ratings of this product. Any misuse voids the warranty of this product.

AC power input level

Working voltage for IT8900 series electronic load is 100V~240V, AC power input level: 100V~240V 50Hz/60Hz

Categories of power lines

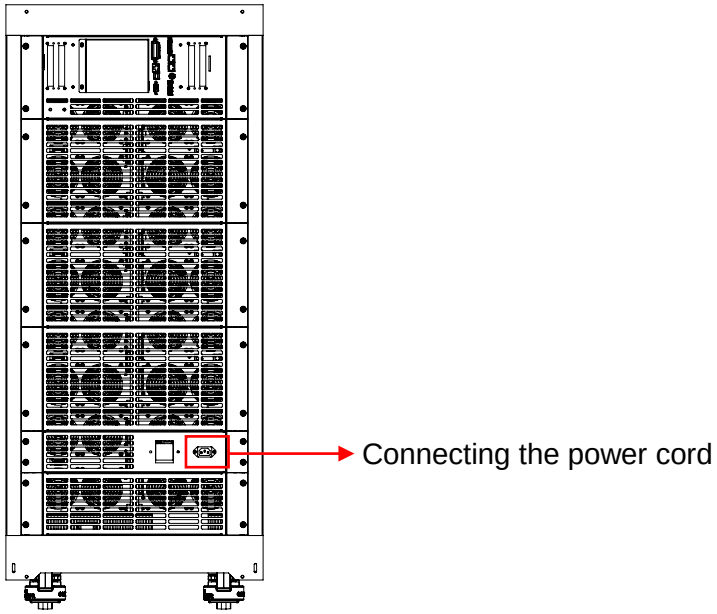
Please select appropriate power lines appropriate to local voltage based on the specifications of power lines below. If purchased model fails to meet local voltage requirements, please contact distributor or factory for change.



China	America, Canada, Japan	Europe	Britain
IT-171	IT-E172	IT-E173	IT-E174

Connecting the power cord

Before connecting the power cord, please ensure the power switch of the instrument is turned OFF. Only use the power cord supplied as a standard accessory. A summary of connection procedures is given below.



1.5 Connecting Test Lines

The test cables of IT8900 series are the standard accessories shipped with the package box. Please refer to **1.1 Verifying the Shipment** for the specification of test cables.

WARNING

- **Before connecting test lines, be sure to switch off the power supply of the test loop in order to avoid electric shock.**

- **To avoid electrical shock, before testing, please make sure the rating values of the testing lines, and do not measure the current that higher than the rating value.**
- **Always use test lines provided by ITECH to connect the equipment. If test lines from other factories are used, please check that the test line can withstand maximum current.**

Test line 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 lines, 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 lines to the input terminals. Re-tighten the screws.

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

Chapter2 Quick Start

This Chapter will introduce power-on check steps of IT8900 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

IT8900 Series is a single-input programmable DC electronic load. Built in with RS232, USB, LAN, CAN and GPIB communication interfaces, this series of programmable DC electronic load provides a multi-purpose solution to meet different design and test requirements.

This Series delivers special functions and advantages at international level, including:

- High-visibility vacuum fluorescent display (VFD)
- Voltage measurement dissolution rate: up to 1 mV Current 1 mA
- Voltage and current measurement speed: up to 500 KHz
- Support the master-slave connection, and all the single machine function is reserved.
- Six operation modes: CC/CV/CR/CP/CV+CC/CR-LED.
- Adjustable CV loop speed, well-suited for multiple power supplies
- Transient over-power loading capability
- Measurement of voltage or current rise/fall time
- Overall modular design, convenient for maintenance and service
- Support the general protective function, including overvoltage protection (OVP), overcurrent protection (OCP), overpower protection (OPP), overtemperature protection (OTP) and input reverse polarity protection (LRV/RRV).
- Rotary coding switch for easy and quick operation
- Remote sense test function
- Battery test function
- Auto test function
- OCP/OPP test function
- Memory capacity: 100 groups
- Short-circuit function
- Dynamic test function
- I-monitor function
- External analog quantity function
- Portable and robust enclosure equipped with skid resistant foot stand
- Intelligent fan control
- Built-in Buzzer, for warning
- Outage backup memory
- Provide power module self-inspection function
- Built-in USB, GPIB, LAN, CAN and RS232 communication interfaces
- Support the VISA, USBTMC and SCPI protocol.

Model	Voltage	Current	Power	Height
IT8912-600-480	600V	480A	12KW	15U
IT8912-1200-240	1200V	240A	12KW	15U
IT8915-150-960	150V	960A	15KW	15U

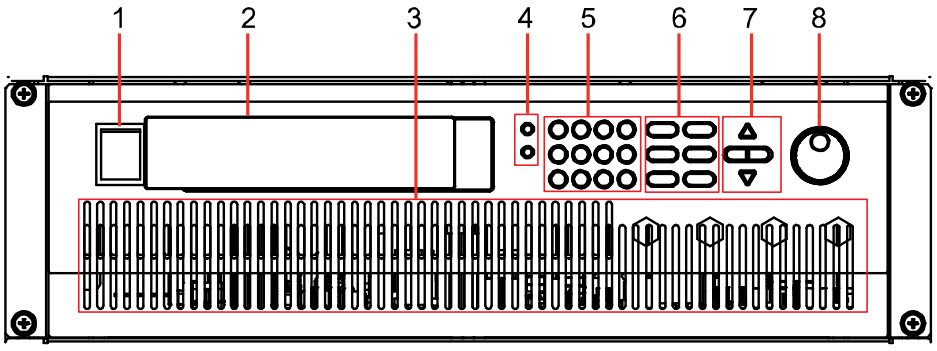
IT8915-150-1200	150V	1200A	15KW	27U
IT8918-600-720	600V	720A	18KW	27U
IT8918-1200-360	1200V	360A	18KW	27U
IT8922-150-1440	150V	1440A	22.5KW	27U
IT8924-600-960	600V	960A	24KW	27U
IT8924-1200-480	1200V	480A	24KW	27U
IT8930-150-1920	150V	1920A	30KW	27U
IT8930-600-1200	600V	1200A	30KW	37U
IT8930-1200-600	1200V	600A	30KW	37U
IT8936-600-1440	600V	1440A	36KW	37U
IT8936-1200-720	1200V	720A	36KW	37U
IT8937-150-2400	150V	2400A	37.5KW	37U
IT8945-150-2500	150V	2500A	45KW	37U
IT8948-600-1920	600V	1920A	48KW	27U*2
IT8948-1200-960	1200V	960A	48KW	27U*2
IT8960-150-2500	150V	2500A	60KW	24U*2
IT8960-600-2400	600V	2400A	60KW	37U*2
IT8960-1200-1200	1200V	1200A	60KW	37U*2
IT8972-600-2500	600V	2500A	72KW	37U*2
IT8972-1200-1440	1200V	1440A	72KW	37U*2
IT8990-150-2500	150V	2500A	90KW	37U*2
IT8990-600-2400	600V	2400A	90KW	37U*3
IT89108-600-2500	600V	2500A	108KW	37U*3
IT89108-1200-2160	1200V	2160A	108KW	37U*3
IT89135-150-2500	150V	2500A	135KW	37U*3
IT89150-600-2400	600V	2400A	150KW	37U*5

Note

- The naming rule of the IT8900 series is IT89XX-YY-ZZ, where XX represents the rated power of the model, YY represents the rated voltage and ZZ represents the rated current.
- Different models of the IT8900 series have the same functions and characteristics. Only the look and the rated voltage/current/power are different. In the table above are included a small part of the models, instead of all models sold or on sale. Please refer to the actual model purchased.

2.2 Front Panel Introduction

Front panel introduction of IT8900 series as below except cooling window.

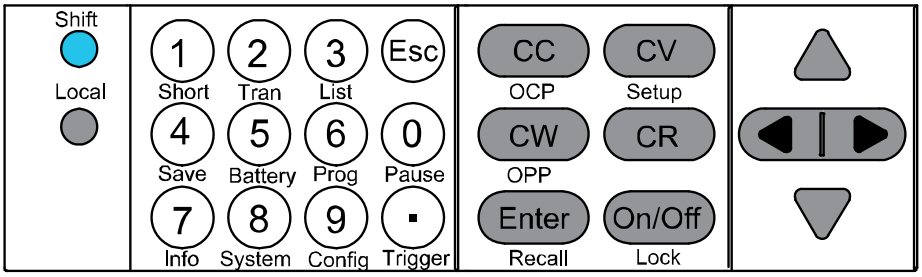


1. Power switch
2. VFD screen
3. Vent hole

4. Shift and Local keys
5. Function keys and composite key
6. Function keys
7. UP, DOWN, LEFT and RIGHT key, to move cursor
8. Adjusting knob

2.3 Keyboard Introduction

Keys at IT8900 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 IT8900 Series can realize functions marked at key bottom. For details, see table below.

Keys	Name and functions
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 + 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.

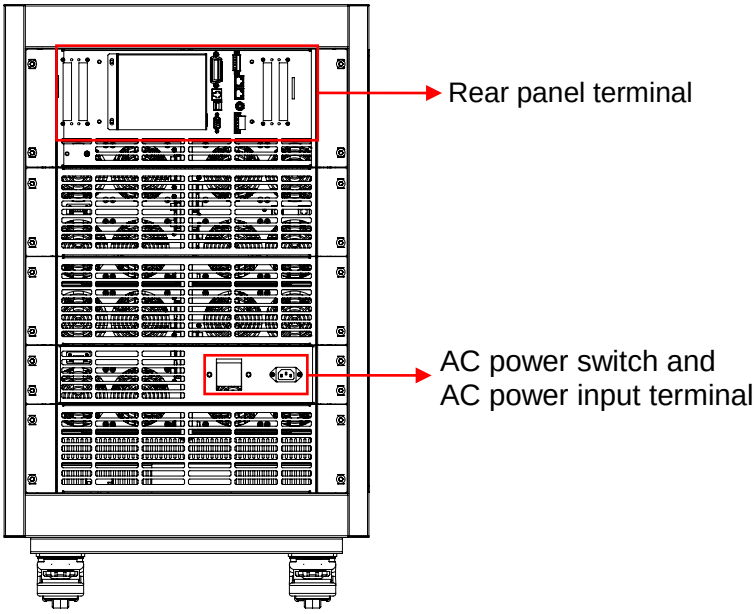
2.5 Function description of VFD status indicators

IT8900 series VFD indicator lamps description as follows:

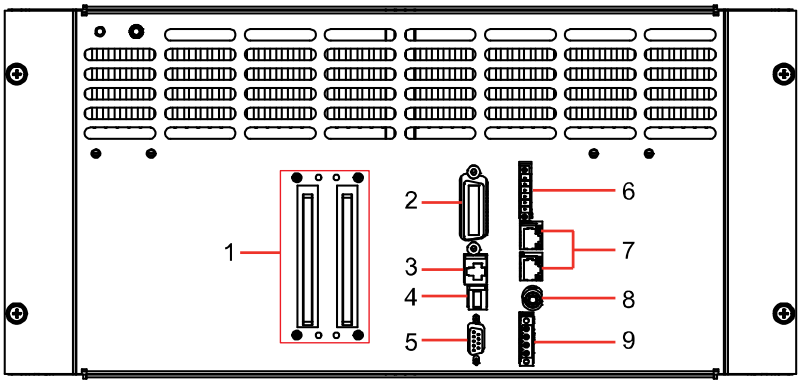
Flag	Function introduction	Flag	Function introduction
OFF	The load is off.	**Error**	The load has error.
CC	The load is under constant current mode.	**Trig**	The load is waiting for triggering signal.
CV	The load is under constant voltage mode.	**Sense**	The load is under remote sense input mode.
CR	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 IT8900 series (15U) electronic load.



The detail of the red box in the figure above is as shown as follows:

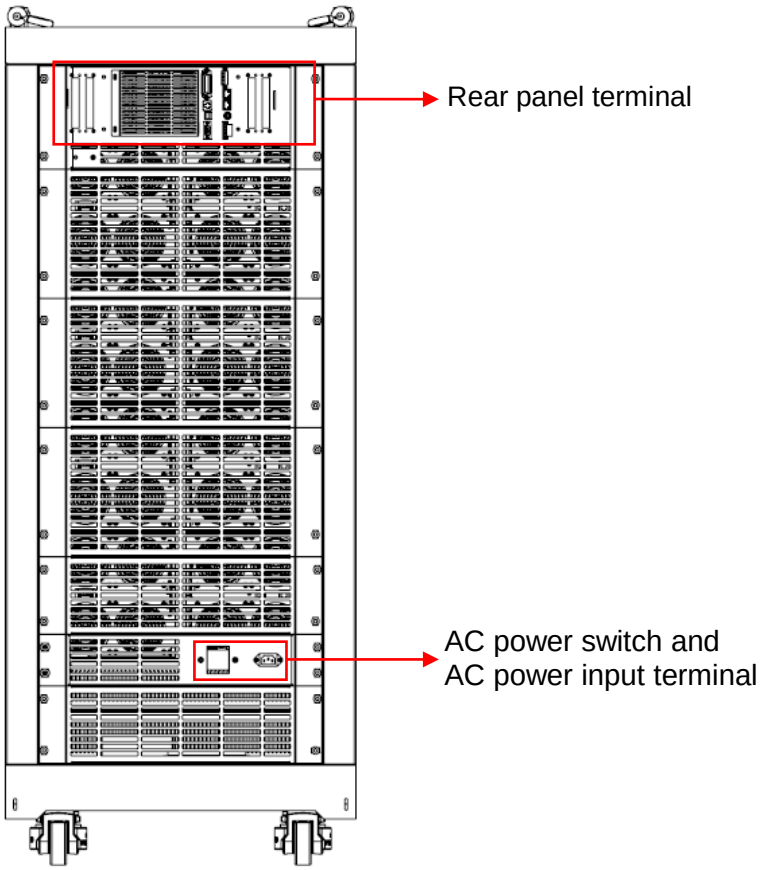


1. Input terminal
2. GPIB interface
3. LAN interface
4. USB interface
5. RS232 interface
6. CAN interface(Optional), external triggering terminal, external On/Off control terminal and voltage fault indication terminal.
7. System bus
8. Current monitoring terminal
9. External analog 0-10 V control terminal and remote sense compensation terminal

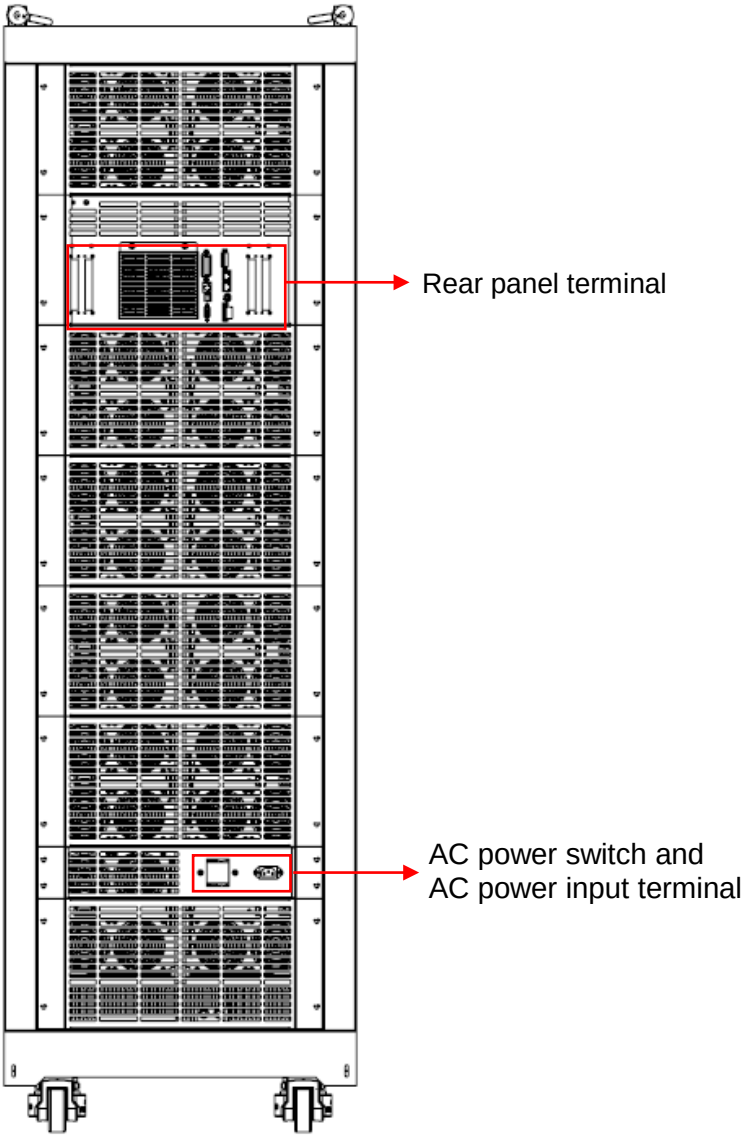
Note

27U and 37U rear panel terminals are exactly the same, please refer to the above description, the following will not be repeated.

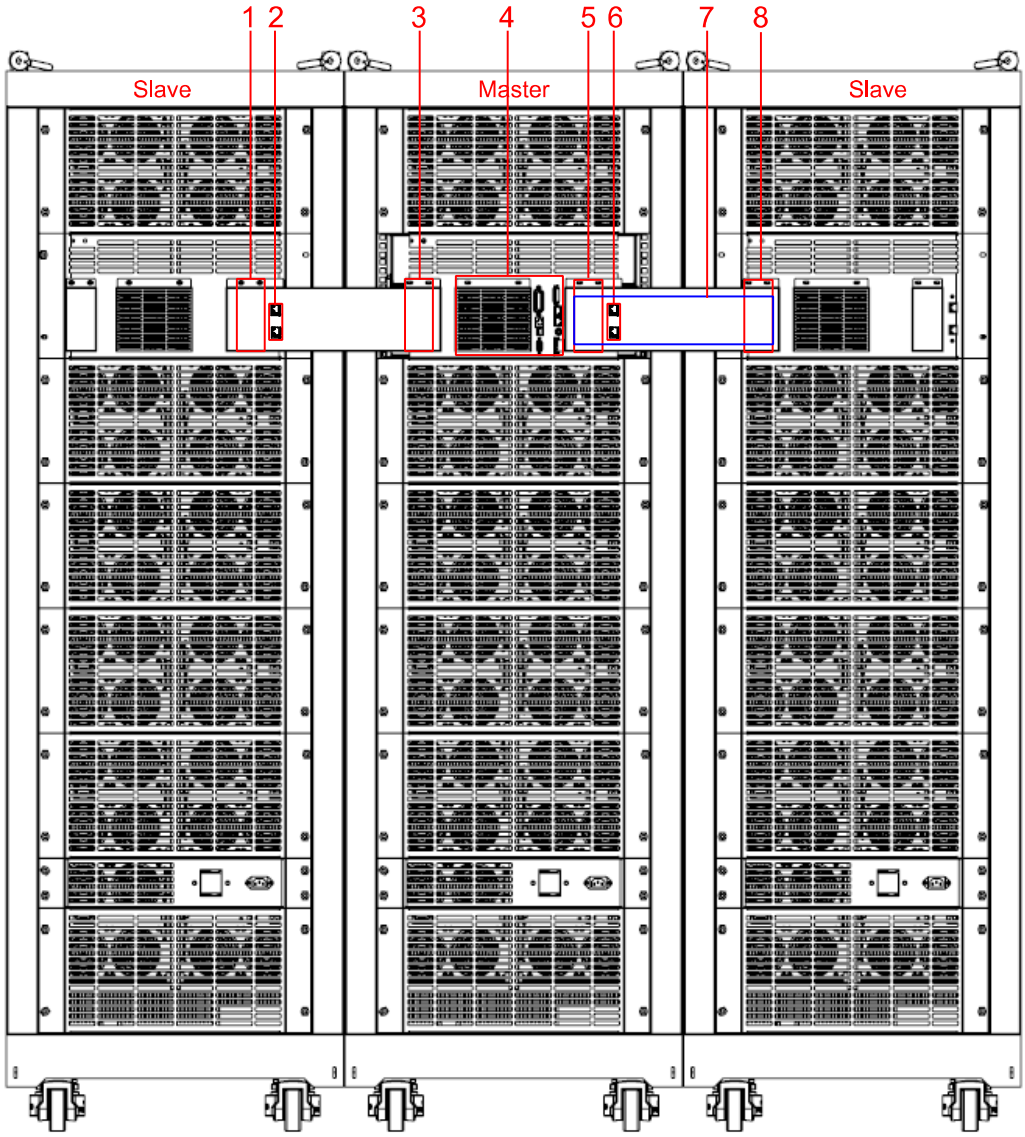
Schematic Diagram of Rear Panel of IT8900 series (27U) electronic load.



Schematic Diagram of Rear Panel of IT8900 series (37U) electronic load.



Schematic Diagram of Rear Panel of IT8900 series (37U*3) electronic load.



1. Slave load input terminals
2. Slave system bus terminals
3. Parallel input terminals, used to connect with slave load input terminals
4. Rear panel terminal
5. Parallel input terminals, used to connect with slave load input terminals
6. Parallel system Bus terminals, used to connect with slave system bus terminals
7. Shield cover
8. Slave load input terminals

2.7 Power-on Selftest

A successful selftest indicates that the purchased load product meets delivery standards and is available for normal usage. Before operation, please confirm that you have fully understood the safety instructions.

WARNING

- To avoid burning out, be sure to confirm that power voltage matches with supply voltage.
- Be sure to connect the main power socket to the power outlet of protective grounding. Do not use terminal board without protective grounding. Before operation, be sure that the electronic load is well grounded.
- To avoid burning out, pay attention to marks of positive and negative polarities before wiring.

Power Switch Introduction

User can press the power switch of IT8900 series electronic load directly to turn on or turn off the instrument. The status of Powe switch are as follows.

OFF ON ON OFF

Selftest steps

Normal selftest procedures:

1. Correctly connect the power line. Press 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.

   0.0000V 0.0000A

   0.00W CC=0.000A

   Information description:

   - The first line displays actual input voltage and current values.
   - The second line 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: IT89XX

   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 line is correctly connected and confirm whether the electronic load is powered.

   Correct wiring of power line => 2

   Incorrect wiring of power line => Re-connect the power line 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 larger than the power supply voltage.

Chapter3 Function and Features

This Chapter will give a detailed description of functions and features of the electronic load. In this chapter, the data involved in operation step just for example, the actual data should be defined in terms of specific models and specifications. It is divided into the following parts:

- Switching of local/remote operation modes
- Constant-status operation mode
- Input control function
- Keyboard locking function
- Dynamic simulation function
- System menu function
- Configuration menu function
- Triggering function
- Dynamic test function
- OCP test function
- OPP test function
- Battery discharge test function
- CR-LED function
- Measurement of voltage or current rise/fall time
- Save function
- VON function
- Protective function
- List function
- Terminal function of rear board
- To operate auto test function
- Parallel function

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.

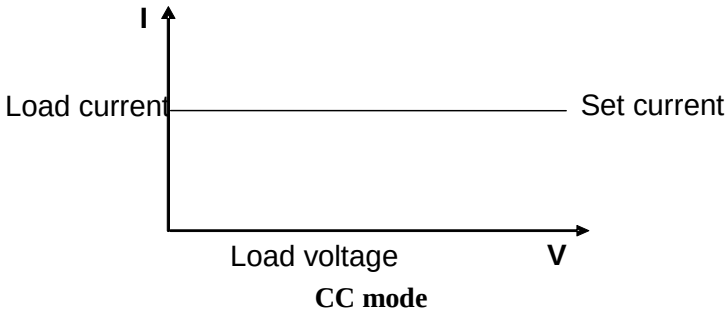


Fig. 3-1 Voltage-Current Relation Schema under CC Mode

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=0.000A

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

   Constant Current
   Range =1.000A

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=0.000V

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=0.000A/uS

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

   Constant Current

Rise down=0.000A/uS

8. Complete parameter setting.

   10.0000V 0.0000A
   0.00W CC=1.000A

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.

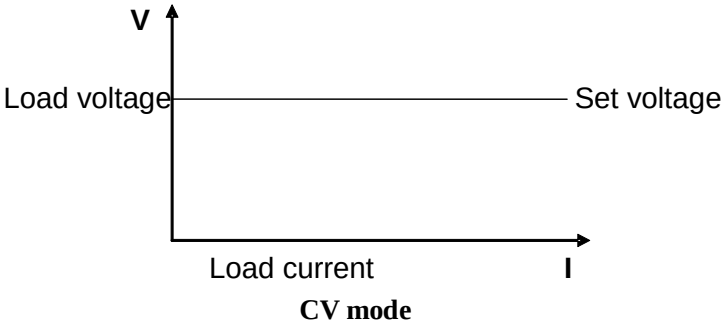


Fig. 3-2 Voltage-Current Relation Schema under CV Mode

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=120.00V

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=66.000A

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

   Constant Voltage
   Low=0.0000A

5. Complete parameter setting.

10.0000V 0.0000A
0.00W 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.

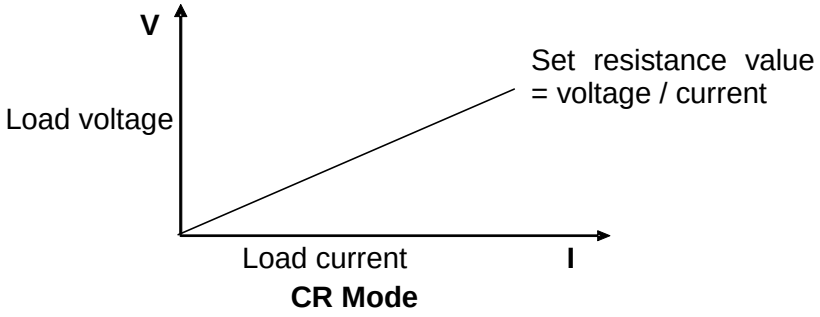


Fig. 3-3 Voltage-Current Relation Schema under CR Mode

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=7500.0Ω

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

   Constant Resistance
   Range=2000.0Ω

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

   Constant Resistance
   High=130.0V

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

   Constant Resistance
   Low=0.000V

5. Complete parameter setting.

   10.0000V 0.0000A
   0.00W 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.

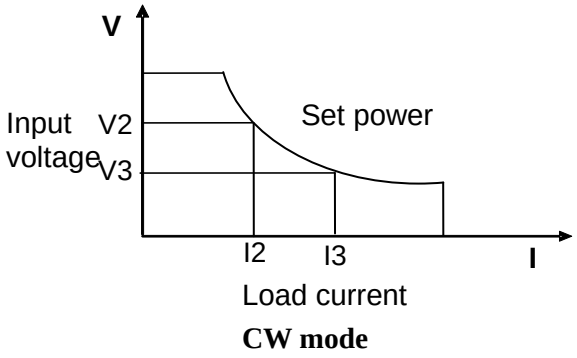


Fig. 3-4 Voltage-Current Relation Schema under CW Mode

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=400.00W

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

   Constant Power
   Range =300.00W

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=0.000V

5. Complete parameter setting.

   10.0000V 0.0000A
   0.00W CW=1.00W

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 110% 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	INITIALIZE SYSTEM?	
	NO	Keep existing configurations.
	YES	Recover all configurations to factory set values.
Power-on	POWER-ON PARAMENT	
	RST(default)	Set the input status of load at powering on as "status as delivered".
	SAV0	Set the input status of load at powering on as SAVE 0 value.
Buzzer	BUZZER STATE	Set the buzzer status.
	On(default)	Set the buzzer as ON status.
	Off	Set the buzzer as OFF status.
Knob	LOAD ON KNOB MODE	Set the pulse knob.
	Update(default)	Real-time update.
	Old	No update (Recover to original value at ON/OFF).
Trigger	TRIGGER SOURCE	Set triggering mode.
	Manual(Def)	Manual trigger.
	External	External signal trigger mode.
	Hold	Trig: IMM valid.
	Bus	GPIB bus trigger mode.
	Timer	Timer trigger mode.

Memory	MEMORY	Work with Recall button to recall 100 sets saved parameters
	Group=(0-9)	0: represents 1-10 sets; 1: represents: 11-20 sets, by parity of reasoning.
Displ	DISPLAY ON TIMER	Screen displays loading time.
	On	Start function.
	Off(default)	Stop function.
Communication	COMMUNICATION	Select the interface for communication with a computer.
	RS232	Select the RS232 communication interface.
		4800, 8, N non parity check, 1, NONE
		9600 O even parity check CTS/RTS
		19200 E odd parity check XON/XOFF
		38400
		57600
		115200
	USBTMC	Select the USB communication interface.
	GPIB	Select the GPIB communication interface, Address(1-30)
	LAN	Select the LAN communication interface.
		Gateway= 192.168.0.1 Gate way setup.
		IP= 192.168.0.125 IP Addr…
		Mask= 255.255.255.0 Mask setup
		Socket Port= 30000 Socket Port setup
	CAN	Select the CAN communication interface. This function is optional.
		10K: Baud rate
		Addr: Address of load
		Prescaler: Prescaler
		BS1 Value: Not settable
		BS2 Value: Not settable
Protocol	PROTOCOL	Communication protocol selection
	SCPI(Default)	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.

Rotary Knob Set (>Knob)

This item is used to set rotary knob state. In Update mode, you can use this rotary knob to set the input value and overturn the menu items. In Old mode, this knob can't be used. The default setting is in **Update** mode.

3.7 Configuration menu function (Config)

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

Von	VOLTAGE ON	Set the load's von point
	Living	Von point living state, ON /OFF
	Point= 2V	Set the Von value
	Latch	Von point latch state, ON /OFF
	Point= 2V	Set the Von value
Protect	PROTECT MENU	
	Max-P	Set hardware power protection.
	MAX POWER	Set hardware protective power value.
	Point= 149.99W	
	A-Limit	Set software current protection.
	CURRENT LIMIT	
	On	Start function.
	Point=30A	Set software current protective value.
	Delay= 3S	Set software current protective delay.
	Off	Stop function.
	P- Limit	Set software power protection.
	POWER LIMIT	
	On	Start function.
	Point=150W	Set software power protective value.
	Delay= 3S	Set software power protective delay.
	Off	Stop function.
	Time	Set LOAD ON timer.
	ON-TIMER	
	On	Start function.
	Delay=10S	Set LOAD ON timer value.
	Off	Stop function.
Measure	MEASURE MENU	
	V-Range	Auto switch function of voltage range.
	VOLTAGE AUTO RANGE	
	On	Start auto voltage range.
	Off	Stop auto voltage range.
	Time V	Measure voltage rise/fall time.

	Low	Set low voltage value.
	Point 1= 0.00V	
	High	Set high voltage value.
	Point 2= 120.00V	
	Time C	Measure current rise/fall time.
	Low	Set low current value.
	Point 1= 0.00A	
	High	Set high current value.
	Point 2= 5.00A	
	FILTER	Smoothing function.
	Average Count=2^(2~16)	Set of average count.
CR-LED	CR LED MODE	Analog LED lamp function (under CR mode).
	On	Start CR-LED function.
	Off	Stop CR-LED function.
Remote-Sense	REMOTE SENSE STATE	Remote sense compensation measurement.
	On	Start remote sense compensation function
	Off	Stop remote sense compensation function
Ext-Program	EXTNAL PROGRAM	External analog quantity function.
	On	Start external 0-10 V analog quantity control function.
	Off	Stop external 0-10 V analog quantity control function.

3.8 Triggering function

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

- **Key ([Trigger]** key) **trigger:** when key trigger is valid, press **[Shift]** + **.**(Trigger) key and the load will trigger an operation.
- **External trigger signal (TTL):** TRIG on the rear board is the triggering input terminal. When external trigger signal method is effective, after applying a low pulse (> 10 us), 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.
- **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.

Select the triggering sources as follows:

Operation steps

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

   Initialize Power-ON Buzzer

2. Press  to move to the Trigger and press **[Enter]** to enter

triggering source selection screen.

SOURCE MANUAL

3. Press ◀ ▶ to select trigger method and press **[Enter]** to complete setting.

   Manual (Def): Manual trigger
   External: external signal trigger
   Hold: special command trigger
   Bus: BUS command trigger
   Timer: timer trigger

4. Press **[Esc]** to exit setting. The system displays original values under different modes.

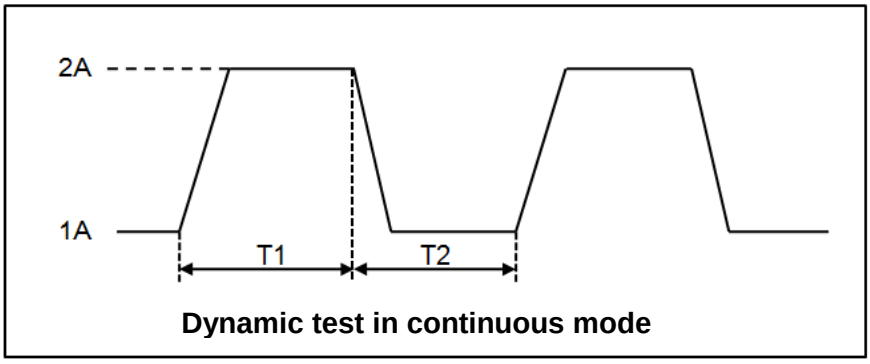
3.9 Dynamic test function

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.

3.9.1 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

Taking CC mode as example (operations under other modes are similar), when output voltage and current of the tested instrument are 10 V and 3 A respectively, the load current will switch from 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 Continuous. Press **[Enter]** key (The Trig lamp that indicates VFD screen status is on).

   TRANSITION
   Continuous Pulse Toggle

3. Operate  key and select high rate and low rate. 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=2.000A/uS

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

   TRANSITION
   Rise down=2.000A/uS

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

   TRANSITION
   Level A=1A

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

   TRANSITION
   Level B=2A

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

   TRANSITION
   Frequency=50Hz(0.01-25000Hz)

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

   TRANSITION
   Duty=98%(0.1%-99.9%)

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

    TRANSITION

    On Off

11. Enter the dynamic test mode.

    10.0000V 0.0000A
    0.00W 0 TRAN

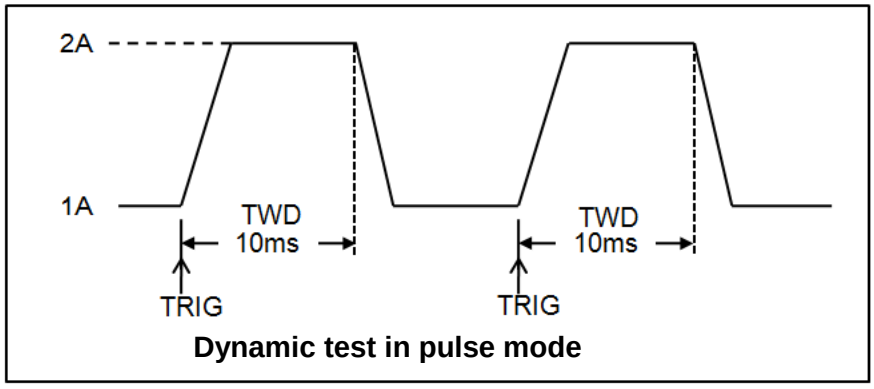
12. Press **[On/Off]** key to open input and press **[Shift]** + **.** (Trigger).

    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.

3.9.2 Pulse mode

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



Dynamic test in pulse mode

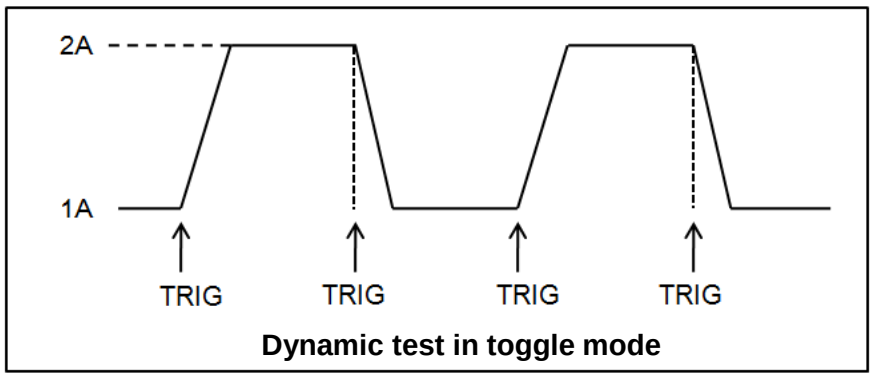
Taking CC mode as example (operations under other modes are similar), when output voltage and current of the tested instrument are 10 V and 3 A respectively, the load current will switch from 1 A and 2 A. Set the dynamic test parameters and perform the test as follows:

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 rate and low rate. 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=2.000A/uS
5. Set descending slope and press **[Enter]** key.
   TRANSITION
   Rise down=2.000A/uS
6. Set A value and press **[Enter]** key.
   TRANSITION
   Level A=1A
7. Set B value and press **[Enter]** key.
   TRANSITION
   Level B=2A
8. Set time width and press **[Enter]** key.
   TRANSITION
   Pulse Width=5S(0.00002-3600S)
9. Start dynamic test and operate ◀ ▶ key. Move to On and press **[Enter]** key.
   TRANSITION
   On Off
10. Enter the dynamic test mode.
    10.0000V 0.0000A
    0.00W 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.

3.9.3 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

Taking CC mode as example (operations under other modes are similar), when output voltage and current of the tested instrument are 10 V and 3 A respectively, the load current will switch from 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 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 rate and low rate. 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=2.000A/uS

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

   TRANSITION
   Rise down=2.000A/uS

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

   TRANSITION
   Level A=1A

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

   TRANSITION
   Level B=2A

8. Start dynamic test and operate ◀ ▶ key. Move to on and press

[Enter] key.

TRANSITION
On Off

9. Enter the dynamic test mode.

   10.0000V 0.0000A
   0.00W 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.

3.10 OCP test function

The IT8900 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; if lower, it indicates that OCP does occur. Check whether the existing current value is within target scope again. If yes, PASS the test.

Operating steps:

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

OCP TEST	Run	OCP TEST	
			Operate OCP test documents.
	Recall	OCP TEST	
		Recall OCP File=1	Recall OCP test documents (1-5).
	Edit	OCP TEST	
		1: Voltage on level=0.000V	Set Von voltage value.
		2: Voltage on Delay=0.00S	Set Von voltage delay time.
		3: Current Range=0.000A	Set working current range.
		4: Start Current=0.000A	Set initial current value.
		5: Step Current=0.000A	Set step current value.
		6: Step Delay=0.00S	Set step delay time.
		7: End Current=0.000A	Set cutoff current value.
		8: OCP Voltage=0.000V	Set OCP value.
		9: Max Trip Current=0.000A	Set overcurrent range (maximum value).
		10: Min Trip Current=0.000A	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:

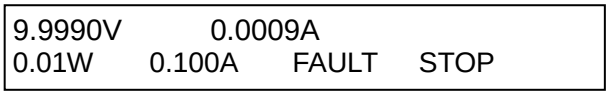
   9.9973V 0.0005A
   0.01W 5.100A PASS STOP

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

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

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:



3.11 OPP test function

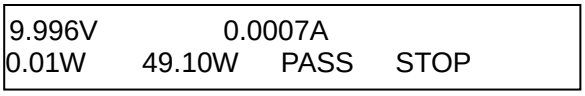
The IT8900 series electronic load is provided with overpower protection test function (OPP). Under OPP test mode, when input voltage reached Von value, delay for a while for the electronic load to latch. Ascend value by step value at regular interval. At the same time, check the load input voltage and 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; if lower, it indicates that OPP does occur. Check whether the existing power value is within target scope again. If yes, PASS the test.

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=0.000V	Set Von voltage value.
		2: Voltage on Delay=0.00S	Set Von voltage delay time.
		3: Current Range=0.000A	Set current range.
		4: Start Power=0.000W	Set initial power value.
		5: Step Power=0.000W	Set step power value.
		6: Step Delay=0.00S	Set step delay time.
		7: End Power=0.000W	Set cutoff power value.
		8: OPP Voltage=0.000V	Set OCP value.
		9: Max Trip Power =0.000W	Set overpower range (maximum value).
		10: Min Trip Power =0.000W	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:



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

```
9.996V              0.0007A
0.01W     48.6W     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:

```
9.996V              0.0007A
0.01W     0.1W      FAULT     STOP
```

3.12 Battery discharge test function

In the IT8900 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 for 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	Voltage	STOP Condition	
		Stop Voltage	Set stop voltage.
	Capability	STOP Condition	
		Stop Capability	Set battery stop capacity.
	Timer	STOP Condition	
		Stop Timer	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 select one of the three methods for test based on actual requirements.
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(0~999.999Ah). 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 (0~99999S). Set discharge time. When the set stop time is reached, the load input status will

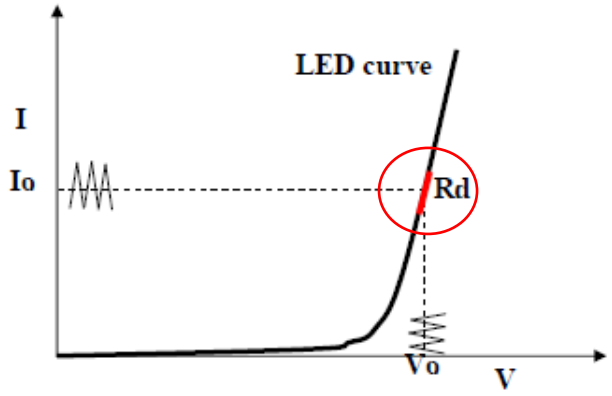
automatically be OFF.

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.

3.13 CR-LED test function

With adding of diode break-over voltage setting in the IT8900 series electronic load under conventional CR mode, the electronic load only works when voltage applied at its both ends is higher than the diode break-over voltage to give a real simulation of diode working principle, i.e., the ripple current at real LED test.

The I-V curve of LED is as shown below. Under conventional CR mode, the electronic load only simulates the static working point of diode as shown in the red circle of the following figure. It is unable to verify the dynamic characteristics of LED under normal working conditions, and the status of accurate ripple current.



Setting CR-LED Mode

Example: LED driver specification

The output current is 200mA and the range of output voltage is from 45V to 62V.

1. **Start CR-LED function.**

   （1） Press **[Shift]** + 9(Config) keys to enter configuration menu.

   （2） Press Right Key and select “CR-LED”. Press **[Enter]** key for entry. Select “on” and press **[Enter]** key.

   （3） Press **[Esc]** key to exit.

2. **Set CR mode and Vd value.**

   For example, the output voltage of LED driver is 50V, verify that whether the output current of LED is rated current 200mA.

   （1） Press **[CR]** key and set corresponding constant resistance. (Set CR=50Ω)

   （2） Press **[Shift]** + **[CV]** (Setup) keys for a series of related setting: range=7500.0, high=130V, low=0V, which may remain the original values. Vd will be set based on the calculation below. (Set Vd=40V)

   （3） Press the **[Enter]** key to save the settings.

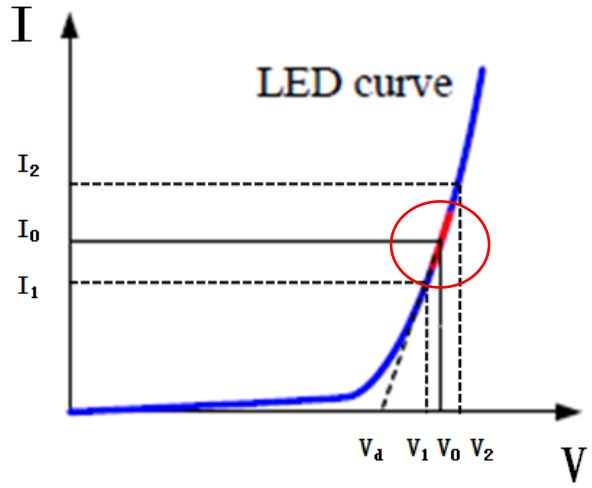
3. **Press [On/Off] key to turn on load input.**

Calculation method of Vd and R:

Definition:

- Vo: constant working voltage of load LED of LED constant current source;
- Io: output current of LED constant current source;
- Vd: break-over voltage of diode (string);
- R: constant resistance.

V-I curve of LED is as shown below.



According to four parameters above and the V-I curve of LED, you can calculate the value of R and Vd.

$$R = \frac{V_2 - V_1}{I_2 - I_1}$$

$$V_d = V_o - (I_0 \times R)$$

Note

The value of V2, V1, I2 and I1 should be close to the static working point of LED as shown in the red circle above.

Or you can calculate the value of R and Vd by the following method.

Vd =V*0.8 R=0.2V/I

Where:

- V: constant working voltage of load LED of LED constant current source;
- I: output current of LED constant current source;
- Vd: break-over voltage of diode (string);
- R: constant resistance.

In the example: Vd=50V*0.8=40V R=(0.2*50V)/0.2A=50Ω.

3.14 Measurement of voltage or current rise/fall time

The IT8900 series electronic load is provided with special voltage or current rise/fall time measurement function. This function gives a simple analog of voltage or current rise/fall speed of oscilloscope test power.

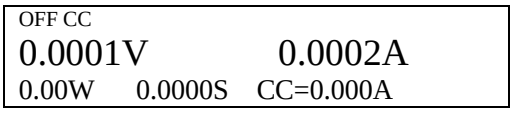
Operation methods:

Set low voltage and high voltage.

1. Press **[Shift]** + 9(Config) keys to enter configuration menu. Press Right key. Select “Measure” and press **[Enter]** key.
2. Press  to select “Time V”. Press **[Enter]** key.
3. Press  to select “Low”. Press **[Enter]** key. Press numeric keys to set low voltage value and press **[Enter]** key.
4. Press  to select “High”. Press **[Enter]** key. Press numeric keys to set high voltage value and press **[Enter]** key.
5. Press **[ESC]** to exit setting.

Start timer function.

1. Press **[Shift]** + 8(System) keys to enter system menu. Press Right key till “Displ” flicks and press **[Enter]** key.
2. Press  key to select “On”. Start timer function and press **[Enter]** key.
3. Press **[ESC]** to exit setting.
4. VFD second line will display time 0.0000S between power value and set value.



Measurement of rise time.

1. Connect DC power to be tested to the input terminal of the electronic load. The power is set with a value that is higher than the set high voltage value. Keep power output in OFF status.
2. Set a constant current value on the load and open the load input.
3. Open power output.
4. The electronic load timer starts timing. After ending, time will keep stable, which is rise time of voltage.
5. Close the power output. The electronic load VFD will display voltage fall time.

3.15 Configuration save function

The electronic load can save some commonly-used parameters in 100-group NVM for convenient and fast usage. Saving parameters comprise 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).

   5.8949V 0.99994A
   5.89W SAVE 9

2. Press **[Enter]** key.

   5.8949V 0.99994A
   5.89W cc=1.000A

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

     5.8949V 0.99994A

     5.89W cc=1.000A

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

3.16 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.

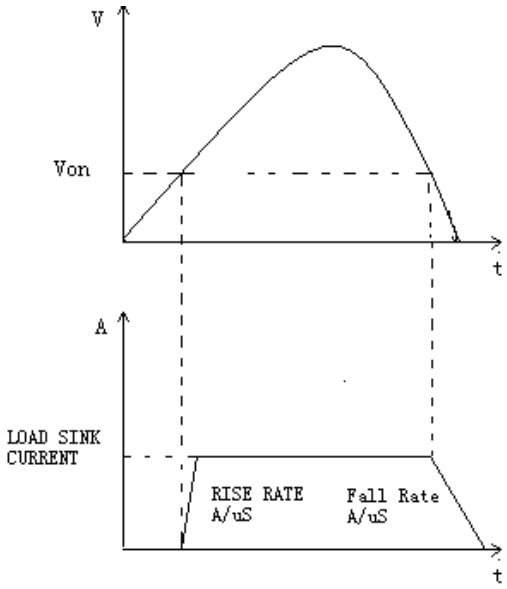
Press **[Shift]** + 9(Config) keys to enter configuration menu. Set voltage value in Voltage on under configuration menu to control on/off status of electronic load. Based on Von value load and unload, the load has two modes: Living and Latch. When Living is selected, it indicates that the work load 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 without authorization to prevent unnecessary trouble from failure of loading.

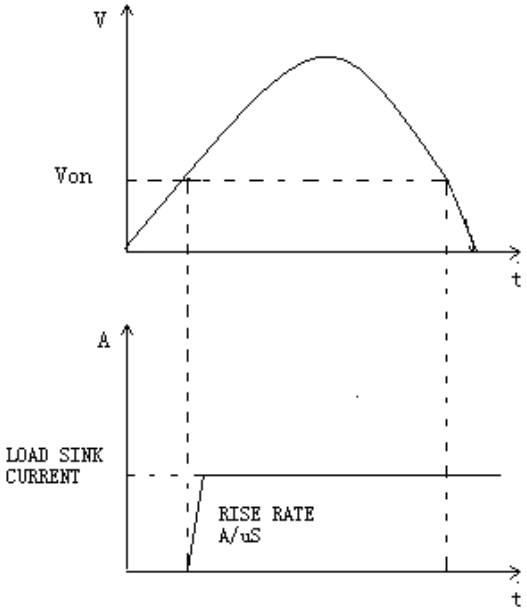
If the instrument cannot load, please firstly check whether the VON function is set. If yes, reset the Von value to minimum value (which may be directly set as 0. If minimum voltage value of instrument is not 0, press 0 for confirmation and the menu will automatically set the value as minimum value).

- When VON LIVING function is 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 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

3.17 Protective Function

The load is provided with following protective functions: overvoltage protection (OVP), overcurrent protection (OCP), overpower protection (OPP), overtemperature protection (OTP) and input reverse polarity protection (LRV/RRV).

Overvoltage protection (OVP)

- **Overvoltage protection:** 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. In case of overvoltage protection, the VF pin of the 8-pin connector on rear board of the load outputs TTL high level and the VF pin can be used for controlling output status of the power to be tested.

- **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 any key on load front board (or send command to PROTection:CLEar), the load front board (OVP) word will get cleared and the load will exit OVP protection status.

Overcurrent protection (OCP)

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

- **Hardware overcurrent protection:** maximum load current of the electronic load is limited within about 110% of the existing current range by hardware. When the hardware triggers overcurrent protection, OC bit of the status register will be set; when such protection is removed, the OC bit will be reset. The On/Off status of load will not be changed by the hardware overcurrent protection.
- **Software overcurrent protection:** the user can set load software overcurrent protection value following steps: press **[Shift]** + 9(Config) key >Protect> A-limit (set as ON). I point is set as OCP current value and A delay set as pre-alarm delay time. 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.
- **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 any key on load front board (or send command to 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:** the user can set load software overpower protection value following steps: press **[Shift]** + 9(Config) key >Protect> Point set OPP power value. P limit is set as pre-alarm delay time. 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.
- **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 any key on load front board (or send command to PROTection:CLEar), the load front board (OPP) word will get cleared and the load will exit OPP protection status.

Overtemperature protection (OTP)

- **Overtemperature protection:** When internal power device of load is higher than about 85 °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.
- **Clear overtemperature protection:** When load temperature is decreased to protection point, press any key on load front board (or send command to PROTection:CLEar), the load front board (OTP) word will get cleared and the load will exit OTP protection status.

Input reverse polarity protection (LRV)

- **Input reverse polarity protection:** The load will be immediately OFF and the buzzer will sound in case of input reverse polarity. The (LRV /RRV) and (VF) bits of status register will be set; and (LRV) will be displayed on the screen. VF will keep till resetting. In case of reverse polarity, VF pin outputs a high level.
- **Clear reverse polarity protection:** Check whether the load has reverse polarity. If yes, disconnect the object.

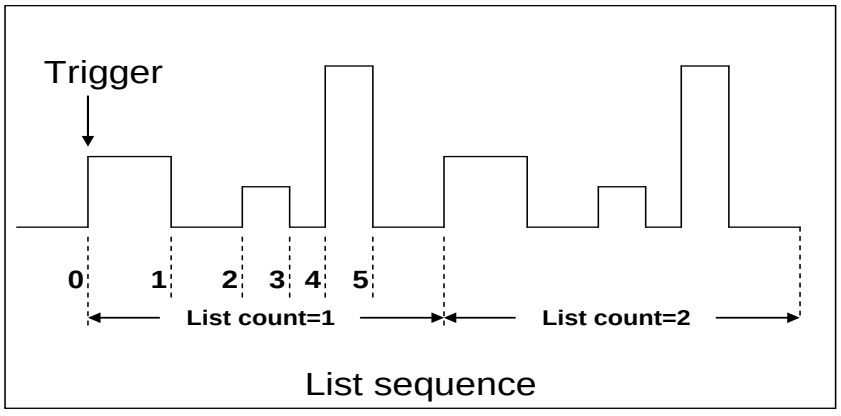
3.18 List Operation

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 at maximum), step time (0.00002s – 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=3A

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 001 Level=1A

6. Edit slope in step 1 and press **[Enter]** key.

   EDIT LIST
   Step 001 Rate=0.1A/uS

7. Edit time in step 1 and press **[Enter]** key.

   EDIT LIST
   Step 001 Width=5S

8. Edit current value in step 2 and press **[Enter]** key.

   EDIT LIST
   Step 002 Level=2A

9. Edit slope in step 2 and press **[Enter]** key.

   EDIT LIST
   Step 002 Rate=0.1A/uS

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

    EDIT LIST
    Step 002 Width=5S

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 and ensure that ON lamp flicks. If not, press **[Enter]** before operation. 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.

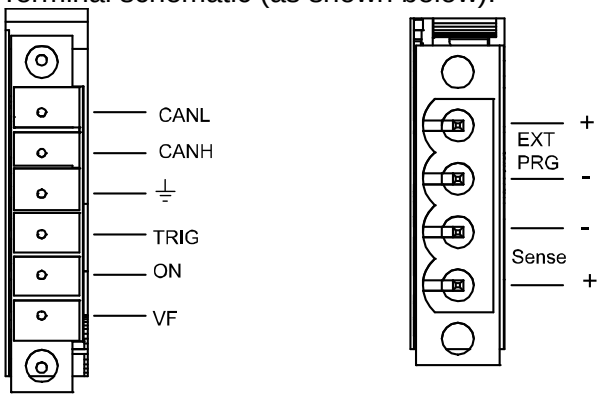
   LIST
   On Recall Edit

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

   List operation.

3.19 Terminal function of rear panel

Terminals on IT8900 rear panel comprise remote sensor terminal, external trigger terminal, external analog control terminal, voltage fault indication terminal, external On/Off control terminal and current monitoring terminal. Terminal schematic (as shown below):



Pin	Pin function
CANH，CANL	CANH and CANL terminal for CAN communication
⏚	Negative input terminal for TRIG, ON and VF
TRIG	Positive input terminal for trigger
ON	Positive input terminal for external On/Off control
VF	Positive input terminal for voltage fault indication
EXT PRG+, EXT PRG-	External analog control terminal
Sense+, Sense-	Remote sense terminal

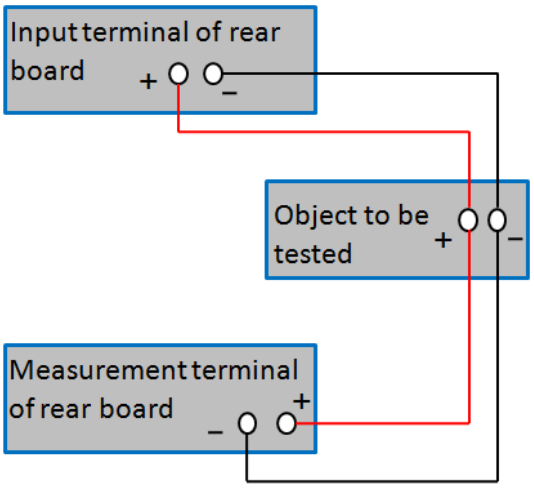
3.19.1 Remote sense compensation functions

Under CC, CV, CR or CW mode, if the load consumes large current, a large voltage drop will be detected in connection line 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.



3.19.2 External trigger function

When rear board triggering mode is selected, firstly, set the trigger source as External and the triggering signal is input from the rear board TRIG terminal.

Set the triggering sources as follows:

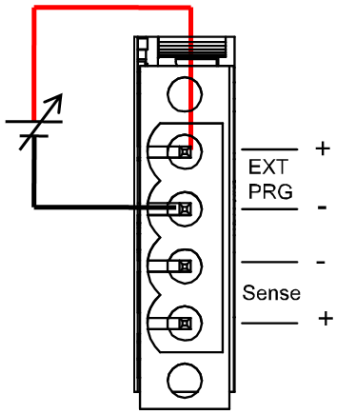
1. Press **[Shift]** + 8(System) keys to enter system menu.
2. Click Right key till Trigger appears and flicks.
3. Press **[Enter]** to entry and press  to select External. Press **[Enter]** for confirmation.
4. Press **[ESC]** to exit the menu.

When external trigger is selected, the positive and negative TRIG terminals will generate trigger signal and the low pulse is valid.

Input corresponding to one trigger can be used for triggering dynamic test, LIST test and auto test.

3.19.3 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).



3.19.4 External On/Off Control

The load input switches can be controlled by the external TTL electrical level. During external input control, the **[On/Off]** key will become invalid and the load input switches can only be controlled by the external TTL electrical level. The load input will be switched on in case of low level external input; and the load input will be switched off in case of high level external input.

3.19.5 Voltage fault indication

When load is under overvoltage protection or terminal reverse polarity protection, VF pin voltage fault indication terminal outputs high level.

3.19.6 Current monitoring (I Monitor)

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.

3.20 Auto Test Function

The IT8900 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.

Edit test files following steps below:

Note

In the following editing procedures, "Y indicates selected status. To cancel selected status, press numeric key of corresponding step again.

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=2S

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

   EDIT PROGRAM
   SEQ01 Off Time=2S

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=1S

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

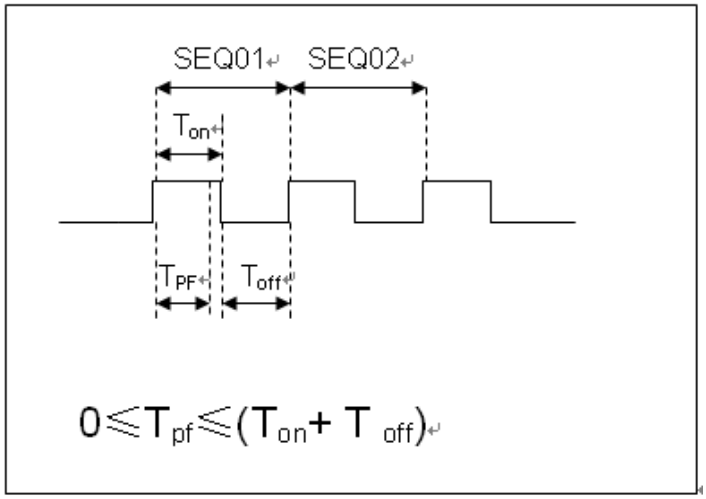
   EDIT PROGRAM
   SEQ02 On Time=2S

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

    EDIT PROGRAM
    SEQ02 Off Time=2S

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=1S



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)

Correspondence Table of Auto test files and step parameter saving.

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

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.

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.

16. Select desired working mode and set working parameters. Press **[Shift]** + **[CV]** (Setup) to enter parameter setting.

    10.0000V 0.0000A
    0.00W CC=1.000A

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

mode as follows: voltage: 3V, maximum current value: 5A, and minimum current value: 0A. After parameter setting in each step, press **[ESC]** to exit setting menu. Press **[Shift]** + 4(Save) key for saving. **Settings at each step should be independently saved. Refer to the Correspondence Table for saving position.**

18. It is necessary to recall test files for running after editing auto test files.

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.

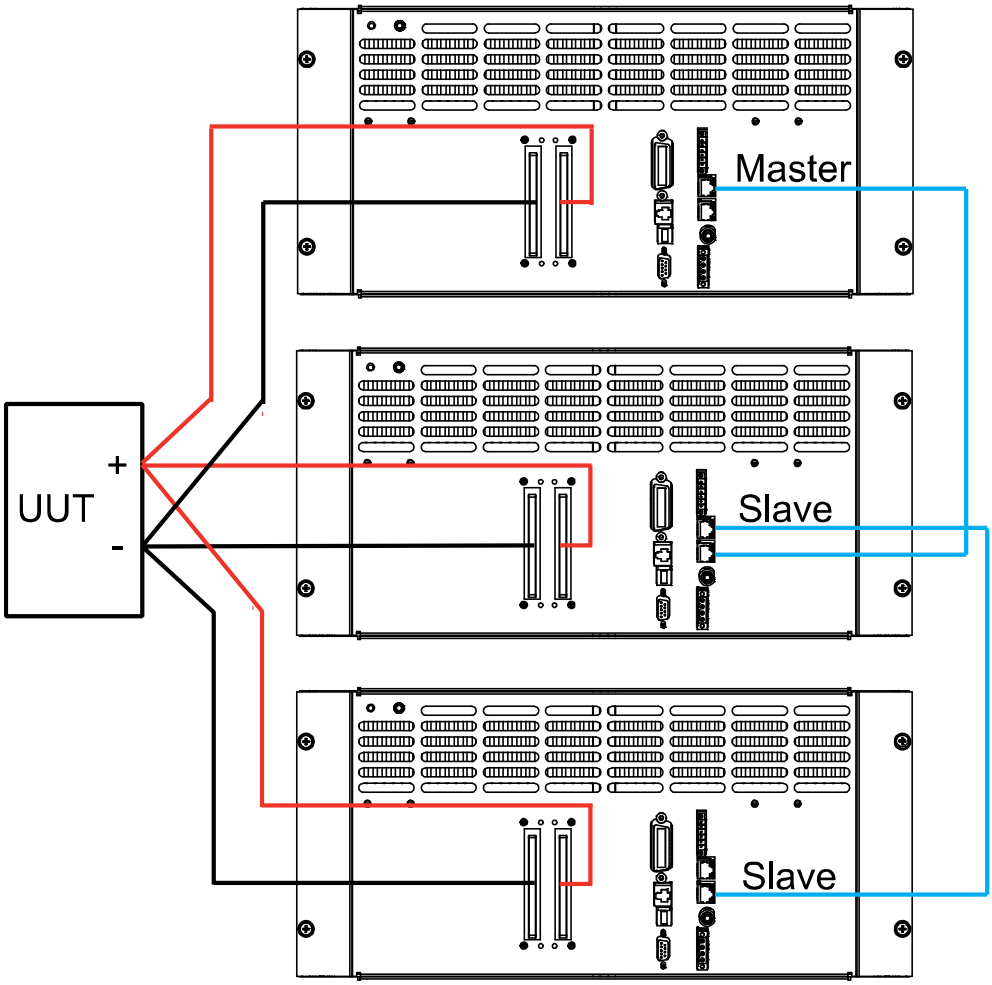
   PRG01 STOP

5. Press **[Shift]** + **.** (Trigger) key.

   Operate auto test file 1. Press **[Shift]** + 0 (Pause) key to pause auto test. Press  key for next step.

3.21 Parallel Function

This series of electronic load supports mutual parallel operation of same models and to increase input power and input current. The figure below shows 3 pcs electronic load in parallel, in which, the system bus is used for master-slave connection.



The master-slave connection for configuring 3 pcs electronic load is as follows:

1. Configure one electronic load as the Master and the other electronic load as Slave.
2. Press the composite key **[Shift]** + 8(System) to enter the System Menu.
3. 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.

CAUTION

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.

Chapter4 Technical Specifications

4.1 Major technical parameters

Model		IT8912-600-480	
Rated value (0～40 ℃)	Input voltage	0~600V	
	Input current	0~48A	0~480A
	Input power	12KW	
	Min. operating voltage	0.39V/48A	3.9V/480A
Constant voltage mode	Range	0.1~60V	0.1~600V
	Resolution	1mV	10mV
	Accuracy	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
Constant current mode	Range	0~48A	0~480A
	Resolution	1mA	10mA
	Accuracy	±(0.05%+0.1%FS)	±(0.05%+0.1%FS)
Constant resistance mode *1	Range	0.01Ω~10Ω	10Ω~7.5KΩ
	Resolution	16bit	
	Accuracy	0.01%+0.08S *2	0.01%+0.0008S
Constant power Mode *3	Range	12KW	
	Resolution	1W	
	Accuracy	0.2%+0.3%FS	
Measuring range			
Read-back voltage	Range	0~60V	0~600V
	Resolution	1mV	10mV
	Accuracy	±(0.025%+0.025%FS)	±(0.025%+0.025%FS)
Read-back current	Range	0~48A	0~480A
	Resolution	1mA	10mA
	Accuracy	±(0.05%+0.1%FS)	±(0.05%+0.1%FS)
Read-back power	Range	12KW	
	Resolution	1W	
	Accuracy	±(0.2%+0.3%FS)	
Protection range			
Overpower protection	≒12.1KW		
Overcurrent protection	≒52A		≒520A
Overvoltage protection	≒630V		
Overtemperature protection	≒85℃		
Specification			
Short circuit	Current (CC)	≒52A	≒520A
	Voltage (CV)	0V	0V
	Resistance (CR)	≒8mΩ	≒8mΩ
Input terminal impedance	≒1MΩ		
Dimension	15U		

*1.The voltage/current input is no less than 10%FS (FS indicates the full

scope).

*2.The scope of read-back resistance is (1/(1/R+(1/R)*0.01%+0.08),1/(1/R-(1/R)*0.01%-0.08)).

*3.The voltage/current input is no less than 10%FS.

Model		IT8912-1200-240	
Rated value (0～40 ℃)	Input voltage	0~1200V	
	Input current	0~24A	0~240A
	Input power	12KW	
	Min. operating voltage	0.5V/24A	5.0V/240A
Constant voltage mode	Range	0.1~120V	0.1~1200V
	Resolution	10mV	100mV
	Accuracy	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
Constant current mode	Range	0~24A	0~240A
	Resolution	1mA	10mA
	Accuracy	±(0.05%+0.1%FS)	±(0.05%+0.1%FS)
Constant resistance mode *1	Range	0.03Ω~10Ω	10Ω~7.5KΩ
	Resolution	16bit	
	Accuracy	0.01%+0.08S *2	0.01%+0.0008S
Constant power Mode *3	Range	12KW	
	Resolution	1W	
	Accuracy	0.2%+0.3%FS	
Measuring range			
Read-back voltage	Range	0~120V	0~1200V
	Resolution	10mV	100mV
	Accuracy	±(0.025%+0.025%FS)	±(0.025%+0.025%FS)
Read-back current	Range	0~24A	0~240A
	Resolution	1mA	10mA
	Accuracy	±(0.05%+0.1%FS)	±(0.05%+0.1%FS)
Read-back power	Range	12KW	
	Resolution	1W	
	Accuracy	±(0.2%+0.3%FS)	
Protection range			
Overpower protection	≒12.1KW		
Overcurrent protection	≒26.4A		≒264A
Overvoltage protection	≒1250V		
Overtemperature protection	≒85℃		
Specification			
Short circuit	Current (CC)	≒26.4A	≒264A
	Voltage (CV)	0V	0V
	Resistance (CR)	≒21mΩ	≒21mΩ
Input terminal impedance	≒2MΩ		
Dimension	15U		

*1.The voltage/current input is no less than 10%FS (FS indicates the full scope).

*2.The scope of read-back resistance is (1/(1/R+(1/R)*0.01%+0.08),1/(1/R-(1/R)*0.01%-0.08)).

*3.The voltage/current input is no less than 10%FS.

Model		IT8915-150-960	
Rated value (0～40 ℃)	Input voltage	0~150V	
	Input current	0~96A	0~960A
	Input power	15KW	
	Min. operating voltage	0.2V/96A	2V/960A
Constant voltage mode	Range	0.1~18V	0.1~150V
	Resolution	1mV	10mV
	Accuracy	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
Constant current mode	Range	0~96A	0~960A
	Resolution	1mA	10mA
	Accuracy	±(0.1%+0.1%FS)	±(0.1%+0.1%FS)
Constant resistance mode *1	Range	0.005Ω~10Ω	10Ω~7.5KΩ
	Resolution	16bit	
	Accuracy	0.01%+0.08S *2	0.01%+0.0008S
Constant power Mode *3	Range	15KW	
	Resolution	1W	
	Accuracy	0.2%+0.3%FS	
Measuring range			
Read-back voltage	Range	0~18V	0~150V
	Resolution	1mV	10mV
	Accuracy	±(0.025%+0.025%FS)	±(0.025%+0.025%FS)
Read-back current	Range	0~96A	0~960A
	Resolution	1mA	10mA
	Accuracy	±(0.1%+0.1%FS)	±(0.1%+0.1%FS)
Read-back power	Range	15KW	
	Resolution	1W	
	Accuracy	±(0.2%+0.3%FS)	
Protection range			
Overpower protection	≒15.1KW		
Overcurrent protection	≒105A		≒1050A
Overvoltage protection	≒157V		
Overtemperature protection	≒85℃		
Specification			
Short circuit	Current (CC)	≒105A	≒1050A
	Voltage (CV)	0V	0V
	Resistance (CR)	≒2mΩ	≒2mΩ
Input terminal impedance	≒300KΩ		
Dimension	15U		

*1.The voltage/current input is no less than 10%FS (FS indicates the full

scope).

*2.The scope of read-back resistance is (1/(1/R+(1/R)*0.01%+0.08),1/(1/R-(1/R)*0.01%-0.08)).

*3.The voltage/current input is no less than 10%FS.

Model		IT8915-150-1200	
Rated value (0～40 ℃)	Input voltage	0~150V	
	Input current	0~120A	0~1200A
	Input power	15KW	
	Min. operating voltage	0.22V/120A	2.2V/1200A
Constant voltage mode	Range	0.1~18V	0.1~150V
	Resolution	1mV	10mV
	Accuracy	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
Constant current mode	Range	0~120A	0~1200A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.1%FS)	±(0.2%+0.1%FS)
Constant resistance mode *1	Range	0.005Ω~10Ω	10Ω~7.5KΩ
	Resolution	16bit	
	Accuracy	0.01%+0.08S *2	0.01%+0.0008S
Constant power Mode *3	Range	15KW	
	Resolution	1W	
	Accuracy	0.2%+0.3%FS	
Measuring range			
Read-back voltage	Range	0~18V	0~150V
	Resolution	1mV	10mV
	Accuracy	±(0.025%+0.025%FS)	±(0.025%+0.025%FS)
Read-back current	Range	0~120A	0~1200A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.1%FS)	±(0.2%+0.1%FS)
Read-back power	Range	15KW	
	Resolution	1W	
	Accuracy	±(0.2%+0.3%FS)	
Protection range			
Overpower protection	≒16.5KW		
Overcurrent protection	≒132A		≒1320A
Overvoltage protection	≒157V		
Overtemperature protection	≒85℃		
Specification			
Short circuit	Current (CC)	≒132A	≒1320A
	Voltage (CV)	0V	0V
	Resistance (CR)	≒1.8mΩ	≒1.8mΩ
Input terminal impedance	≒300KΩ		
Dimension	27U		

*1.The voltage/current input is no less than 10%FS (FS indicates the full scope).

*2.The scope of read-back resistance is (1/(1/R+(1/R)*0.01%+0.08),1/(1/R-(1/R)*0.01%-0.08)).

*3.The voltage/current input is no less than 10%FS.

Model		IT8918-600-720	
Rated value (0～40 ℃)	Input voltage	0~600V	
	Input current	0~72A	0~720A
	Input power	18KW	
	Min. operating voltage	0.43V/72A	4.3V/720A
Constant voltage mode	Range	0.1~60V	0.1~600V
	Resolution	1mV	10mV
	Accuracy	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
Constant current mode	Range	0~72A	0~720A
	Resolution	1mA	10mA
	Accuracy	±(0.1%+0.1%FS)	±(0.1%+0.1%FS)
Constant resistance mode *1	Range	0.01Ω~10Ω	10Ω~7.5KΩ
	Resolution	16bit	
	Accuracy	0.01%+0.08S *2	0.01%+0.0008S
Constant power Mode *3	Range	18KW	
	Resolution	1W	
	Accuracy	0.2%+0.3%FS	
Measuring range			
Read-back voltage	Range	0~60V	0~600V
	Resolution	1mV	10mV
	Accuracy	±(0.025%+0.025%FS)	±(0.025%+0.025%FS)
Read-back current	Range	0~72A	0~720A
	Resolution	1mA	10mA
	Accuracy	±(0.1%+0.1%FS)	±(0.1%+0.1%FS)
Read-back power	Range	18KW	
	Resolution	1W	
	Accuracy	±(0.2%+0.3%FS)	
Protection range			
Overpower protection		≒18.1KW	
Overcurrent protection		≒79.2A	≒792A
Overvoltage protection		≒630V	
Overtemperature protection		≒85℃	
Specification			
Short circuit	Current (CC)	≒79.2A	≒792A
	Voltage (CV)	0V	0V
	Resistance (CR)	≒6mΩ	≒6mΩ
Input terminal impedance		≒1MΩ	
Dimension		27U	

*1.The voltage/current input is no less than 10%FS (FS indicates the full scope).

*2.The scope of read-back resistance is

(1/(1/R+(1/R)*0.01%+0.08),1/(1/R-(1/R)*0.01%-0.08)).

*3.The voltage/current input is no less than 10%FS.

Model		IT8918-1200-360	
Rated value (0～40 ℃)	Input voltage	0~1200V	
	Input current	0~36A	0~360A
	Input power	18KW	
	Min. operating voltage	0.54V/36A	5.4V/360A
Constant voltage mode	Range	0.1~120V	0.1~1200V
	Resolution	10mV	100mV
	Accuracy	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
Constant current mode	Range	0~36A	0~360A
	Resolution	1mA	10mA
	Accuracy	±(0.05%+0.1%FS)	±(0.1%+0.1%FS)
Constant resistance mode *1	Range	0.02Ω~10Ω	10Ω~7.5KΩ
	Resolution	16bit	
	Accuracy	0.01%+0.08S *2	0.01%+0.0008S
Constant power Mode *3	Range	18KW	
	Resolution	1W	
	Accuracy	0.2%+0.3%FS	
Measuring range			
Read-back voltage	Range	0~120V	0~1200V
	Resolution	10mV	100mV
	Accuracy	±(0.025%+0.025%FS)	±(0.025%+0.025%FS)
Read-back current	Range	0~36A	0~360A
	Resolution	1mA	10mA
	Accuracy	±(0.05%+0.1%FS)	±(0.1%+0.1%FS)
Read-back power	Range	18KW	
	Resolution	1W	
	Accuracy	±(0.2%+0.3%FS)	
Protection range			
Overpower protection	≒18.1KW		
Overcurrent protection	≒39.6A		≒396A
Overvoltage protection	≒1250V		
Overtemperature protection	≒85℃		
Specification			
Short circuit	Current (CC)	≒39.6A	≒396A
	Voltage (CV)	0V	0V
	Resistance (CR)	≒15mΩ	≒15mΩ
Input terminal impedance	≒2MΩ		
Dimension	27U		

*1.The voltage/current input is no less than 10%FS (FS indicates the full scope).

*2.The scope of read-back resistance is (1/(1/R+(1/R)*0.01%+0.08),1/(1/R-(1/R)*0.01%-0.08)).

*3.The voltage/current input is no less than 10%FS.

Model		IT8922-150-1440	
Rated value (0～40 ℃)	Input voltage	0~150V	
	Input current	0~144A	0~1440A
	Input power	22.5KW	
	Min. operating voltage	0.26V/144A	2.6V/1440A
Constant voltage mode	Range	0.1~18V	0.1~150V
	Resolution	1mV	10mV
	Accuracy	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
Constant current mode	Range	0~144A	0~1440A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.1%FS)	±(0.2%+0.1%FS)
Constant resistance mode *1	Range	0.005Ω~10Ω	10Ω~7.5KΩ
	Resolution	16bit	
	Accuracy	0.01%+0.08S *2	0.01%+0.0008S
Constant power Mode *3	Range	22.5KW	
	Resolution	1W	
	Accuracy	0.2%+0.3%FS	
Measuring range			
Read-back voltage	Range	0~18V	0~150V
	Resolution	1mV	10mV
	Accuracy	±(0.025%+0.025%FS)	±(0.025%+0.025%FS)
Read-back current	Range	0~144A	0~1440A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.1%FS)	±(0.2%+0.1%FS)
Read-back power	Range	22.5KW	
	Resolution	1W	
	Accuracy	±(0.2%+0.3%FS)	
Protection range			
Overpower protection	≒22.7KW		
Overcurrent protection	≒158A		≒1580A
Overvoltage protection	≒157V		
Overtemperature protection	≒85℃		
Specification			
Short circuit	Current (CC)	≒158A	≒1580A
	Voltage (CV)	0V	0V
	Resistance (CR)	≒1.8mΩ	≒1.8mΩ
Input terminal impedance	≒300KΩ		
Dimension	27U		

*1.The voltage/current input is no less than 10%FS (FS indicates the full scope).

*2.The scope of read-back resistance is (1/(1/R+(1/R)*0.01%+0.08),1/(1/R-(1/R)*0.01%-0.08)).

*3.The voltage/current input is no less than 10%FS.

Model		IT8924-600-960	
Rated value (0～40 ℃)	Input voltage	0~600V	
	Input current	0~96A	0~960A
	Input power	24KW	
	Min. operating voltage	0.48V/96A	4.8V/960A
Constant voltage mode	Range	0.1~60V	0.1~600V
	Resolution	1mV	10mV
	Accuracy	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
Constant current mode	Range	0~96A	0~960A
	Resolution	1mA	10mA
	Accuracy	±(0.1%+0.1%FS)	±(0.1%+0.1%FS)
Constant resistance mode *1	Range	0.01Ω~10Ω	10Ω~7.5KΩ
	Resolution	16bit	
	Accuracy	0.01%+0.08S *2	0.01%+0.0008S
Constant power Mode *3	Range	24KW	
	Resolution	1W	
	Accuracy	0.2%+0.3%FS	
Measuring range			
Read-back voltage	Range	0~60V	0~600V
	Resolution	1mV	10mV
	Accuracy	±(0.025%+0.025%FS)	±(0.025%+0.025%FS)
Read-back current	Range	0~96A	0~960A
	Resolution	1mA	10mA
	Accuracy	±(0.1%+0.1%FS)	±(0.1%+0.1%FS)
Read-back power	Range	24KW	
	Resolution	1W	
	Accuracy	±(0.2%+0.3%FS)	
Protection range			
Overpower protection	≒24.2KW		
Overcurrent protection	≒105A		≒1050A
Overvoltage protection	≒630V		
Overtemperature protection	≒85℃		
Specification			
Short circuit	Current (CC)	≒105A	≒1050A
	Voltage (CV)	0V	0V
	Resistance (CR)	≒5mΩ	≒5mΩ
Input terminal impedance	≒1MΩ		
Dimension	27U		

*1.The voltage/current input is no less than 10%FS (FS indicates the full scope).

*2.The scope of read-back resistance is (1/(1/R+(1/R)*0.01%+0.08),1/(1/R-(1/R)*0.01%-0.08)).

*3.The voltage/current input is no less than 10%FS.

Model		IT8924-1200-480	
Rated value (0～40 ℃)	Input voltage	0~1200V	
	Input current	0~48A	0~480A
	Input power	24KW	
	Min. operating voltage	0.58V/48A	5.8V/480A
Constant voltage mode	Range	0.1~120V	0.1~1200V
	Resolution	10mV	100mV
	Accuracy	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
Constant current mode	Range	0~48A	0~480A
	Resolution	1mA	10mA
	Accuracy	±(0.05%+0.1%FS)	±(0.1%+0.1%FS)
Constant resistance mode *1	Range	0.02Ω~10Ω	10Ω~7.5KΩ
	Resolution	16bit	
	Accuracy	0.01%+0.08S *2	0.01%+0.0008S
Constant power Mode *3	Range	24KW	
	Resolution	1W	
	Accuracy	0.2%+0.3%FS	
Measuring range			
Read-back voltage	Range	0~120V	0~1200V
	Resolution	10mV	100mV
	Accuracy	±(0.025%+0.025%FS)	±(0.025%+0.025%FS)
Read-back current	Range	0~48A	0~480A
	Resolution	1mA	10mA
	Accuracy	±(0.05%+0.1%FS)	±(0.1%+0.1%FS)
Read-back power	Range	24KW	
	Resolution	1W	
	Accuracy	±(0.2%+0.3%FS)	
Protection range			
Overpower protection	≒24.2KW		
Overcurrent protection	≒52.8A		≒528A
Overvoltage protection	≒1250V		
Overtemperature protection	≒85℃		
Specification			
Short circuit	Current (CC)	≒52.8A	≒528A
	Voltage (CV)	0V	0V
	Resistance (CR)	≒12mΩ	≒12mΩ
Input terminal impedance	≒2MΩ		
Dimension	27U		

*1.The voltage/current input is no less than 10%FS (FS indicates the full scope).

*2.The scope of read-back resistance is (1/(1/R+(1/R)*0.01%+0.08),1/(1/R-(1/R)*0.01%-0.08)).

*3.The voltage/current input is no less than 10%FS.

Model		IT8930-150-1920	
Rated value (0～40 ℃)	Input voltage	0~150V	
	Input current	0~192A	0~1920A
	Input power	30KW	
	Min. operating voltage	0.31V/192A	3.1V/1920A
Constant voltage mode	Range	0.1~18V	0.1~150V
	Resolution	1mV	10mV
	Accuracy	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
Constant current mode	Range	0~192A	0~1920A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.1%FS)	±(0.2%+0.1%FS)
Constant resistance mode *1	Range	0.005Ω~10Ω	10Ω~7.5KΩ
	Resolution	16bit	
	Accuracy	0.01%+0.08S *2	0.01%+0.0008S
Constant power Mode *3	Range	30KW	
	Resolution	1W	
	Accuracy	0.2%+0.3%FS	
Measuring range			
Read-back voltage	Range	0~18V	0~150V
	Resolution	1mV	10mV
	Accuracy	±(0.025%+0.025%FS)	±(0.025%+0.025%FS)
Read-back current	Range	0~192A	0~1920A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.1%FS)	±(0.2%+0.1%FS)
Read-back power	Range	30KW	
	Resolution	1W	
	Accuracy	±(0.2%+0.3%FS)	
Protection range			
Overpower protection		≒30.3KW	
Overcurrent protection		≒210A	≒2100A
Overvoltage protection		≒157V	
Overtemperature protection		≒85℃	
Specification			
Short circuit	Current (CC)	≒200A	≒2000A
	Voltage (CV)	0V	0V
	Resistance (CR)	≒1.6mΩ	≒1.6mΩ
Input terminal impedance		≒300KΩ	
Dimension		27U	

*1.The voltage/current input is no less than 10%FS (FS indicates the full scope).

*2.The scope of read-back resistance is (1/(1/R+(1/R)*0.01%+0.08),1/(1/R-(1/R)*0.01%-0.08)).

*3.The voltage/current input is no less than 10%FS.

Model		IT8930-600-1200	
Rated value (0～40 ℃)	Input voltage	0~600V	
	Input current	0~120A	0~1200A
	Input power	30KW	
	Min. operating voltage	0.48V/120A	4.8V/1200A
Constant voltage mode	Range	0.1~60V	0.1~600V
	Resolution	1mV	10mV
	Accuracy	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
Constant current mode	Range	0~120A	0~1200A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.1%FS)	±(0.2%+0.1%FS)
Constant resistance mode *1	Range	0.005Ω~10Ω	10Ω~7.5KΩ
	Resolution	16bit	
	Accuracy	0.01%+0.08S *2	0.01%+0.0008S
Constant power Mode *3	Range	30KW	
	Resolution	1W	
	Accuracy	0.2%+0.3%FS	
Measuring range			
Read-back voltage	Range	0~60V	0~600V
	Resolution	1mV	10mV
	Accuracy	±(0.025%+0.025%FS)	±(0.025%+0.025%FS)
Read-back current	Range	0~120A	0~1200A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.1%FS)	±(0.2%+0.1%FS)
Read-back power	Range	30KW	
	Resolution	1W	
	Accuracy	±(0.2%+0.3%FS)	
Protection range			
Overpower protection	≒30.3KW		
Overcurrent protection	≒132A		≒1320A
Overvoltage protection	≒630V		
Overtemperature protection	≒85℃		
Specification			
Short circuit	Current (CC)	≒132A	≒1320A
	Voltage (CV)	0V	0V
	Resistance (CR)	≒4mΩ	≒4mΩ
Input terminal impedance	≒1MΩ		
Dimension	37U		

*1.The voltage/current input is no less than 10%FS (FS indicates the full scope).

*2.The scope of read-back resistance is (1/(1/R+(1/R)*0.01%+0.08),1/(1/R-(1/R)*0.01%-0.08)).

*3.The voltage/current input is no less than 10%FS.

Model		IT8930-1200-600	
Rated value (0～40 ℃)	Input voltage	0~1200V	
	Input current	0~60A	0~600A
	Input power	30KW	
	Min. operating voltage	0.6V/60A	6V/600A
Constant voltage mode	Range	0.1~120V	0.1~1200V
	Resolution	10mV	100mV
	Accuracy	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
Constant current mode	Range	0~60A	0~600A
	Resolution	1mA	10mA
	Accuracy	±(0.1%+0.1%FS)	±(0.1%+0.1%FS)
Constant resistance mode *1	Range	0.02Ω~10Ω	10Ω~7.5KΩ
	Resolution	16bit	
	Accuracy	0.01%+0.08S *2	0.01%+0.0008S
Constant power Mode *3	Range	30KW	
	Resolution	1W	
	Accuracy	0.2%+0.3%FS	
Measuring range			
Read-back voltage	Range	0~120V	0~1200V
	Resolution	10mV	100mV
	Accuracy	±(0.025%+0.025%FS)	±(0.025%+0.025%FS)
Read-back current	Range	0~60A	0~600A
	Resolution	1mA	10mA
	Accuracy	±(0.1%+0.1%FS)	±(0.1%+0.1%FS)
Read-back power	Range	30KW	
	Resolution	1W	
	Accuracy	±(0.2%+0.3%FS)	
Protection range			
Overpower protection		≒30.3KW	
Overcurrent protection		≒66A	≒660A
Overvoltage protection		≒1250V	
Overtemperature protection		≒85℃	
Specification			
Short circuit	Current (CC)	≒66A	≒660A
	Voltage (CV)	0V	0V
	Resistance (CR)	≒10mΩ	≒10mΩ
Input terminal impedance		≒2MΩ	
Dimension		37U	

*1.The voltage/current input is no less than 10%FS (FS indicates the full scope).

*2.The scope of read-back resistance is (1/(1/R+(1/R)*0.01%+0.08),1/(1/R-(1/R)*0.01%-0.08)).

*3.The voltage/current input is no less than 10%FS.

Model		IT8936-600-1440	
Rated value (0～40 ℃)	Input voltage	0~600V	
	Input current	0~144A	0~1440A
	Input power	36KW	
	Min. operating voltage	0.44V/144A	4.4V/1440A
Constant voltage mode	Range	0.1~60V	0.1~600V
	Resolution	1mV	10mV
	Accuracy	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
Constant current mode	Range	0~144A	0~1440A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.1%FS)	±(0.2%+0.1%FS)
Constant resistance mode *1	Range	0.005Ω~10Ω	10Ω~7.5KΩ
	Resolution	16bit	
	Accuracy	0.01%+0.08S *2	0.01%+0.0008S
Constant power Mode *3	Range	36KW	
	Resolution	1W	
	Accuracy	0.2%+0.3%FS	
Measuring range			
Read-back voltage	Range	0~60V	0~600V
	Resolution	1mV	10mV
	Accuracy	±(0.025%+0.025%FS)	±(0.025%+0.025%FS)
Read-back current	Range	0~144A	0~1440A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.1%FS)	±(0.2%+0.1%FS)
Read-back power	Range	36KW	
	Resolution	1W	
	Accuracy	±(0.2%+0.3%FS)	
Protection range			
Overpower protection		≒36.3KW	
Overcurrent protection		≒158A	≒1580A
Overvoltage protection		≒630V	
Overtemperature protection		≒85℃	
Specification			
Short circuit	Current (CC)	≒158A	≒1580A
	Voltage (CV)	0V	0V
	Resistance (CR)	≒3mΩ	≒3mΩ
Input terminal impedance		≒1MΩ	
Dimension		37U	

*1.The voltage/current input is no less than 10%FS (FS indicates the full scope).

*2.The scope of read-back resistance is (1/(1/R+(1/R)*0.01%+0.08),1/(1/R-(1/R)*0.01%-0.08)).

*3.The voltage/current input is no less than 10%FS.

Model		IT8936-1200-720	
Rated value (0～40 ℃)	Input voltage	0~1200V	
	Input current	0~72A	0~720A
	Input power	36KW	
	Min. operating voltage	0.58V/72A	5.8V/720A
Constant voltage mode	Range	0.1~120V	0.1~1200V
	Resolution	10mV	100mV
	Accuracy	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
Constant current mode	Range	0~72A	0~720A
	Resolution	1mA	10mA
	Accuracy	±(0.05%+0.1%FS)	±(0.1%+0.1%FS)
Constant resistance mode *1	Range	0.01Ω~10Ω	10Ω~7.5KΩ
	Resolution	16bit	
	Accuracy	0.01%+0.08S *2	0.01%+0.0008S
Constant power Mode *3	Range	36KW	
	Resolution	1W	
	Accuracy	0.2%+0.3%FS	
Measuring range			
Read-back voltage	Range	0~120V	0~1200V
	Resolution	10mV	100mV
	Accuracy	±(0.025%+0.025%FS)	±(0.025%+0.025%FS)
Read-back current	Range	0~72A	0~720A
	Resolution	1mA	10mA
	Accuracy	±(0.05%+0.1%FS)	±(0.1%+0.1%FS)
Read-back power	Range	36KW	
	Resolution	1W	
	Accuracy	±(0.2%+0.3%FS)	
Protection range			
Overpower protection		≒36.3KW	
Overcurrent protection		≒75A	≒750A
Overvoltage protection		≒1250V	
Overtemperature protection		≒85℃	
Specification			
Short circuit	Current (CC)	≒75A	≒750A
	Voltage (CV)	0V	0V
	Resistance (CR)	≒8mΩ	≒8mΩ
Input terminal impedance		≒2MΩ	
Dimension		37U	

*1.The voltage/current input is no less than 10%FS (FS indicates the full scope).

*2.The scope of read-back resistance is (1/(1/R+(1/R)*0.01%+0.08),1/(1/R-(1/R)*0.01%-0.08)).

*3.The voltage/current input is no less than 10%FS.

Model		IT8937-150-2400	
Rated value (0～40 ℃)	Input voltage	0~150V	
	Input current	0~240A	0~2400A
	Input power	37.5KW	
	Min. operating voltage	0.36V/240A	3.6V/2400A
Constant voltage mode	Range	0.1~18V	0.1~150V
	Resolution	1mV	10mV
	Accuracy	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
Constant current mode	Range	0~240A	0~2400A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.1%FS)	±(0.2%+0.2%FS)
Constant resistance mode *1	Range	0.005Ω~10Ω	10Ω~7.5KΩ
	Resolution	16bit	
	Accuracy	0.01%+0.08S *2	0.01%+0.0008S
Constant power Mode *3	Range	37.5KW	
	Resolution	1W	
	Accuracy	0.2%+0.3%FS	
Measuring range			
Read-back voltage	Range	0~18V	0~150V
	Resolution	1mV	10mV
	Accuracy	±(0.025%+0.025%FS)	±(0.025%+0.025%FS)
Read-back current	Range	0~240A	0~2400A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.1%FS)	±(0.2%+0.2%FS)
Read-back power	Range	37.5KW	
	Resolution	1W	
	Accuracy	±(0.2%+0.3%FS)	
Protection range			
Overpower protection	≒37.8KW		
Overcurrent protection	≒262A		≒2620A
Overvoltage protection	≒157V		
Overtemperature protection	≒85℃		
Specification			
Short circuit	Current (CC)	≒262A	≒2620A
	Voltage (CV)	0V	0V
	Resistance (CR)	≒1.5mΩ	≒1.5mΩ
Input terminal impedance	≒300KΩ		
Dimension	37U		

*1.The voltage/current input is no less than 10%FS (FS indicates the full scope).

*2.The scope of read-back resistance is (1/(1/R+(1/R)*0.01%+0.08),1/(1/R-(1/R)*0.01%-0.08)).

*3.The voltage/current input is no less than 10%FS.

Model		IT8945-150-2500	
Rated value (0～40 ℃)	Input voltage	0~150V	
	Input current	0~250A	0~2500A
	Input power	45KW	
	Min. operating voltage	0.35V/250A	3.5V/2500A
Constant voltage mode	Range	0.1~18V	0.1~150V
	Resolution	1mV	10mV
	Accuracy	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
Constant current mode	Range	0~250A	0~2500A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.1%FS)	±(0.2%+0.2%FS)
Constant resistance mode *1	Range	0.005Ω~10Ω	10Ω~7.5KΩ
	Resolution	16bit	
	Accuracy	0.01%+0.08S *2	0.01%+0.0008S
Constant power Mode *3	Range	45KW	
	Resolution	1W	
	Accuracy	0.2%+0.3%FS	
Measuring range			
Read-back voltage	Range	0~18V	0~150V
	Resolution	1mV	10mV
	Accuracy	±(0.025%+0.025%FS)	±(0.025%+0.025%FS)
Read-back current	Range	0~250A	0~2500A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.1%FS)	±(0.2%+0.2%FS)
Read-back power *2	Range	45KW	
	Resolution	1W	
	Accuracy	±(0.2%+0.3%FS)	
Protection range			
Overpower protection	≒45.4KW		
Overcurrent protection	≒275A		≒2750A
Overvoltage protection	≒157V		
Overtemperature protection	≒85℃		
Specification			
Short circuit	Current (CC)	≒275A	≒2750A
	Voltage (CV)	0V	0V
	Resistance (CR)	≒1.4mΩ	≒1.4mΩ
Input terminal impedance	≒300KΩ		
Dimension	37U		

*1.The voltage/current input is no less than 10%FS (FS indicates the full scope).

*2.The scope of read-back resistance is (1/(1/R+(1/R)*0.01%+0.08),1/(1/R-(1/R)*0.01%-0.08)).

*3.The voltage/current input is no less than 10%FS.

Model		IT8948-600-1920	
Rated value (0～40 ℃)	Input voltage	0~600V	
	Input current	0~192A	0~1920A
	Input power	48KW	
	Min. operating voltage	0.48V/192A	4.8V/1920A
Constant voltage mode	Range	0.1~60V	0.1~600V
	Resolution	1mV	10mV
	Accuracy	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
Constant current mode	Range	0~192A	0~1920A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.1%FS)	±(0.2%+0.1%FS)
Constant resistance mode *1	Range	0.005Ω~10Ω	10Ω~7.5KΩ
	Resolution	16bit	
	Accuracy	0.01%+0.08S *2	0.01%+0.0008S
Constant power Mode *3	Range	48KW	
	Resolution	1W	
	Accuracy	0.2%+0.3%FS	
Measuring range			
Read-back voltage	Range	0~60V	0~600V
	Resolution	1mV	10mV
	Accuracy	±(0.025%+0.025%FS)	±(0.025%+0.025%FS)
Read-back current	Range	0~192A	0~1920A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.1%FS)	±(0.2%+0.1%FS)
Read-back power *2	Range	48KW	
	Resolution	1W	
	Accuracy	±(0.2%+0.3%FS)	
Protection range			
Overpower protection	≒48.4KW		
Overcurrent protection	≒211A		≒2110A
Overvoltage protection	≒630V		
Overtemperature protection	≒85℃		
Specification			
Short circuit	Current (CC)	≒211A	≒2110A
	Voltage (CV)	0V	0V
	Resistance (CR)	≒2.5mΩ	≒2.5mΩ
Input terminal impedance	≒1MΩ		
Dimension	27U*2		

*1.The voltage/current input is no less than 10%FS (FS indicates the full scope).

*2.The scope of read-back resistance is (1/(1/R+(1/R)*0.01%+0.08),1/(1/R-(1/R)*0.01%-0.08)).

*3.The voltage/current input is no less than 10%FS.

Model		IT8948-1200-960	
Rated value (0～40 ℃)	Input voltage	0~1200V	
	Input current	0~96A	0~960A
	Input power	48KW	
	Min. operating voltage	0.67V/96A	6.7V/960A
Constant voltage mode	Range	0.1~120V	0.1~1200V
	Resolution	10mV	100mV
	Accuracy	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
Constant current mode	Range	0~96A	0~960A
	Resolution	1mA	10mA
	Accuracy	±(0.05%+0.1%FS)	±(0.1%+0.1%FS)
Constant resistance mode *1	Range	0.01Ω~10Ω	10Ω~7.5KΩ
	Resolution	16bit	
	Accuracy	0.01%+0.08S *2	0.01%+0.0008S
Constant power Mode *3	Range	48KW	
	Resolution	1W	
	Accuracy	0.2%+0.3%FS	
Measuring range			
Read-back voltage	Range	0~120V	0~1200V
	Resolution	10mV	100mV
	Accuracy	±(0.025%+0.025%FS)	±(0.025%+0.025%FS)
Read-back current	Range	0~96A	0~960A
	Resolution	1mA	10mA
	Accuracy	±(0.05%+0.1%FS)	±(0.1%+0.1%FS)
Read-back power *2	Range	48KW	
	Resolution	1W	
	Accuracy	±(0.2%+0.3%FS)	
Protection range			
Overpower protection	≒48.4KW		
Overcurrent protection	≒96A	≒960A	
Overvoltage protection	≒1250V		
Overtemperature protection	≒85℃		
Specification			
Short circuit	Current (CC)	≒105A	≒1050A
	Voltage (CV)	0V	0V
	Resistance (CR)	≒7mΩ	≒7mΩ
Input terminal impedance	≒2MΩ		
Dimension	27U*2		

*1.The voltage/current input is no less than 10%FS (FS indicates the full scope).

*2.The scope of read-back resistance is (1/(1/R+(1/R)*0.01%+0.08),1/(1/R-(1/R)*0.01%-0.08)).

*3.The voltage/current input is no less than 10%FS.

Model		IT8960-150-2500	
Rated value (0～40 ℃)	Input voltage	0~150V	
	Input current	0~250A	0~2500A
	Input power	60KW	
	Min. operating voltage	0.3V/250A	3.0V/2500A
Constant voltage mode	Range	0.1~18V	0.1~150V
	Resolution	1mV	10mV
	Accuracy	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
Constant current mode	Range	0~250A	0~2500A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.1%FS)	±(0.2%+0.2%FS)
Constant resistance mode *1	Range	0.005Ω~10Ω	10Ω~7.5KΩ
	Resolution	16bit	
	Accuracy	0.01%+0.08S *2	0.01%+0.0008S
Constant power Mode *3	Range	60KW	
	Resolution	1W	
	Accuracy	0.2%+0.3%FS	
Measuring range			
Read-back voltage	Range	0~18V	0~150V
	Resolution	1mV	10mV
	Accuracy	±(0.025%+0.025%FS)	±(0.025%+0.025%FS)
Read-back current	Range	0~250A	0~2500A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.1%FS)	±(0.2%+0.2%FS)
Read-back power *2	Range	60KW	
	Resolution	1W	
	Accuracy	±(0.2%+0.3%FS)	
Protection range			
Overpower protection		≒60.6KW	
Overcurrent protection		≒275A	≒2750A
Overvoltage protection		≒157V	
Overtemperature protection		≒85℃	
Specification			
Short circuit	Current (CC)	≒275A	≒2750A
	Voltage (CV)	0V	0V
	Resistance (CR)	≒1.2mΩ	≒1.2mΩ
Input terminal impedance		≒300KΩ	
Dimension		24U*2	

*1.The voltage/current input is no less than 10%FS (FS indicates the full scope).

*2.The scope of read-back resistance is (1/(1/R+(1/R)*0.01%+0.08),1/(1/R-(1/R)*0.01%-0.08)).

*3.The voltage/current input is no less than 10%FS.

Model		IT8960-600-2400	
Rated value (0～40 ℃)	Input voltage	0~600V	
	Input current	0~240A	0~2400A
	Input power	60KW	
	Min. operating voltage	0.52V/240A	5.2V/2400A
Constant voltage mode	Range	0.1~60V	0.1~600V
	Resolution	1mV	10mV
	Accuracy	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
Constant current mode	Range	0~240A	0~2400A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.1%FS)	±(0.2%+0.2%FS)
Constant resistance mode *1	Range	0.005Ω~10Ω	10Ω~7.5KΩ
	Resolution	16bit	
	Accuracy	0.01%+0.08S *2	0.01%+0.0008S
Constant power Mode *3	Range	60KW	
	Resolution	1W	
	Accuracy	0.2%+0.4%FS	
Measuring range			
Read-back voltage	Range	0~60V	0~600V
	Resolution	1mV	10mV
	Accuracy	±(0.025%+0.025%FS)	±(0.025%+0.025%FS)
Read-back current	Range	0~240A	0~2400A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.1%FS)	±(0.2%+0.2%FS)
Read-back power *2	Range	60KW	
	Resolution	1W	
	Accuracy	±(0.2%+0.4%FS)	
Protection range			
Overpower protection	≒60.6KW		
Overcurrent protection	≒264A		≒2640A
Overvoltage protection	≒630V		
Overtemperature protection	≒85℃		
Specification			
Short circuit	Current (CC)	≒264A	≒2640A
	Voltage (CV)	0V	0V
	Resistance (CR)	≒2.2mΩ	≒2.2mΩ
Input terminal impedance	≒1MΩ		
Dimension	37U*2		

*1.The voltage/current input is no less than 10%FS (FS indicates the full scope).

*2.The scope of read-back resistance is (1/(1/R+(1/R)*0.01%+0.08),1/(1/R-(1/R)*0.01%-0.08)).

*3.The voltage/current input is no less than 10%FS.

Model		IT8960-1200-1200	
Rated value (0～40 ℃)	Input voltage	0~1200V	
	Input current	0~120A	0~1200A
	Input power	60KW	
	Min. operating voltage	0.72V/120A	7.2V/1200A
Constant voltage mode	Range	0.1~120V	0.1~1200V
	Resolution	10mV	100mV
	Accuracy	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
Constant current mode	Range	0~120A	0~1200A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.1%FS)	±(0.2%+0.1%FS)
Constant resistance mode *1	Range	0.01Ω~10Ω	10Ω~7.5KΩ
	Resolution	16bit	
	Accuracy	0.01%+0.08S *2	0.01%+0.0008S
Constant power Mode *3	Range	60KW	
	Resolution	1W	
	Accuracy	0.2%+0.3%FS	
Measuring range			
Read-back voltage	Range	0~120V	0~1200V
	Resolution	10mV	100mV
	Accuracy	±(0.025%+0.025%FS)	±(0.025%+0.025%FS)
Read-back current	Range	0~120A	0~1200A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.1%FS)	±(0.2%+0.1%FS)
Read-back power *2	Range	60KW	
	Resolution	1W	
	Accuracy	±(0.2%+0.3%FS)	
Protection range			
Overpower protection	≒60.6KW		
Overcurrent protection	≒132A		≒1320A
Overvoltage protection	≒1250V		
Overtemperature protection	≒85℃		
Specification			
Short circuit	Current (CC)	≒132A	≒1320A
	Voltage (CV)	0V	0V
	Resistance (CR)	≒6mΩ	≒6mΩ
Input terminal impedance	≒2MΩ		
Dimension	37U*2		

*1.The voltage/current input is no less than 10%FS (FS indicates the full scope).

*2.The scope of read-back resistance is (1/(1/R+(1/R)*0.01%+0.08),1/(1/R-(1/R)*0.01%-0.08)).

*3.The voltage/current input is no less than 10%FS.

Model		IT8972-600-2500	
Rated value (0～40 ℃)	Input voltage	0~600V	
	Input current	0~250A	0~2500A
	Input power	72KW	
	Min. operating voltage	0.5V/250A	5.0V/2500A
Constant voltage mode	Range	0.1~60V	0.1~600V
	Resolution	1mV	10mV
	Accuracy	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
Constant current mode	Range	0~250A	0~2500A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.1%FS)	±(0.2%+0.2%FS)
Constant resistance mode *1	Range	0.005Ω~10Ω	10Ω~7.5KΩ
	Resolution	16bit	
	Accuracy	0.01%+0.08S *2	0.01%+0.0008S
Constant power Mode *3	Range	72KW	
	Resolution	1W	
	Accuracy	0.2%+0.4%FS	
Measuring range			
Read-back voltage	Range	0~60V	0~600V
	Resolution	1mV	10mV
	Accuracy	±(0.025%+0.025%FS)	±(0.025%+0.025%FS)
Read-back current	Range	0~250A	0~2500A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.1%FS)	±(0.2%+0.2%FS)
Read-back power *2	Range	72KW	
	Resolution	1W	
	Accuracy	±(0.2%+0.4%FS)	
Protection range			
Overpower protection	≒72.7KW		
Overcurrent protection	≒275A		≒2750A
Overvoltage protection	≒630V		
Overtemperature protection	≒85℃		
Specification			
Short circuit	Current (CC)	≒275A	≒2750A
	Voltage (CV)	0V	0V
	Resistance (CR)	≒2mΩ	≒2mΩ
Input terminal impedance	≒1MΩ		
Dimension	37U*2		

*1.The voltage/current input is no less than 10%FS (FS indicates the full scope).

*2.The scope of read-back resistance is (1/(1/R+(1/R)*0.01%+0.08),1/(1/R-(1/R)*0.01%-0.08)).

*3.The voltage/current input is no less than 10%FS.

Model		IT8972-1200-1440	
Rated value (0～40 ℃)	Input voltage	0~1200V	
	Input current	0~144A	0~1440A
	Input power	72KW	
	Min. operating voltage	0.72V/144A	7.2V/1440A
Constant voltage mode	Range	0.1~120V	0.1~1200V
	Resolution	10mV	100mV
	Accuracy	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
Constant current mode	Range	0~144A	0~1440A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.1%FS)	±(0.2%+0.1%FS)
Constant resistance mode *1	Range	0.01Ω~10Ω	10Ω~7.5KΩ
	Resolution	16bit	
	Accuracy	0.01%+0.08S *2	0.01%+0.0008S
Constant power Mode *3	Range	72KW	
	Resolution	1W	
	Accuracy	0.2%+0.3%FS	
Measuring range			
Read-back voltage	Range	0~120V	0~1200V
	Resolution	10mV	100mV
	Accuracy	±(0.025%+0.025%FS)	±(0.025%+0.025%FS)
Read-back current	Range	0~144A	0~1440A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.1%FS)	±(0.2%+0.1%FS)
Read-back power *2	Range	72KW	
	Resolution	1W	
	Accuracy	±(0.2%+0.3%FS)	
Protection range			
Overpower protection	≒72.7KW		
Overcurrent protection	≒158A		≒1580A
Overvoltage protection	≒1250V		
Overtemperature protection	≒85℃		
Specification			
Short circuit	Current (CC)	≒158A	≒1580A
	Voltage (CV)	0V	0V
	Resistance (CR)	≒5mΩ	≒5mΩ
Input terminal impedance	≒2MΩ		
Dimension	37U*2		

*1.The voltage/current input is no less than 10%FS (FS indicates the full scope).

*2.The scope of read-back resistance is (1/(1/R+(1/R)*0.01%+0.08),1/(1/R-(1/R)*0.01%-0.08)).

*3.The voltage/current input is no less than 10%FS.

Model		IT8990-150-2500	
Rated value (0～40 ℃)	Input voltage	0~150V	
	Input current	0~250A	0~2500A
	Input power	90KW	
	Min. operating voltage	0.25V/250A	2.5V/2500A
Constant voltage mode	Range	0.1~18V	0.1~150V
	Resolution	1mV	10mV
	Accuracy	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
Constant current mode	Range	0~250A	0~2500A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.1%FS)	±(0.2%+0.2%FS)
Constant resistance mode *1	Range	0.005Ω~10Ω	10Ω~7.5KΩ
	Resolution	16bit	
	Accuracy	0.01%+0.08S *2	0.01%+0.0008S
Constant power Mode *3	Range	90KW	
	Resolution	1W	
	Accuracy	0.2%+0.3%FS	
Measuring range			
Read-back voltage	Range	0~18V	0~150V
	Resolution	1mV	10mV
	Accuracy	±(0.025%+0.025%FS)	±(0.025%+0.025%FS)
Read-back current	Range	0~250A	0~2500A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.1%FS)	±(0.2%+0.2%FS)
Read-back power *2	Range	90KW	
	Resolution	1W	
	Accuracy	±(0.2%+0.3%FS)	
Protection range			
Overpower protection	≒90.9KW		
Overcurrent protection	≒275A		≒2750A
Overvoltage protection	≒157V		
Overtemperature protection	≒85℃		
Specification			
Short circuit	Current (CC)	≒275A	≒2750A
	Voltage (CV)	0V	0V
	Resistance (CR)	≒1.0mΩ	≒1.0mΩ
Input terminal impedance	≒300KΩ		
Dimension	37U*2		

*1.The voltage/current input is no less than 10%FS (FS indicates the full scope).

*2.The scope of read-back resistance is (1/(1/R+(1/R)*0.01%+0.08),1/(1/R-(1/R)*0.01%-0.08)).

*3.The voltage/current input is no less than 10%FS.

Model		IT8990-600-2400	
Rated value (0～40 ℃)	Input voltage	0~600V	
	Input current	0~240A	0~2400A
	Input power	90KW	
	Min. operating voltage	0.48V/240A	4.8V/2400A
Constant voltage mode	Range	0.1~60V	0.1~600V
	Resolution	1mV	10mV
	Accuracy	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
Constant current mode	Range	0~240A	0~2400A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.2%FS)	±(0.2%+0.2%FS)
Constant resistance mode *1	Range	0.005Ω~10Ω	10Ω~7.5KΩ
	Resolution	16bit	
	Accuracy	0.01%+0.08S *2	0.01%+0.0008S
Constant power Mode *3	Range	90KW	
	Resolution	1W	
	Accuracy	0.2%+0.4%FS	
Measuring range			
Read-back voltage	Range	0~60V	0~600V
	Resolution	1mV	10mV
	Accuracy	±(0.025%+0.025%FS)	±(0.025%+0.025%FS)
Read-back current	Range	0~240A	0~2400A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.2%FS)	±(0.2%+0.2%FS)
Read-back power *2	Range	90KW	
	Resolution	1W	
	Accuracy	±(0.2%+0.4%FS)	
Protection range			
Overpower protection	≒91KW		
Overcurrent protection	≒250A		≒2500A
Overvoltage protection	≒630V		
Overtemperature protection	≒85℃		
Specification			
Short circuit	Current (CC)	≒250A	≒2500A
	Voltage (CV)	0V	0V
	Resistance (CR)	≒2mΩ	≒2mΩ
Input terminal impedance	≒1MΩ		
Dimension	37U*3		

*1.The voltage/current input is no less than 10%FS (FS indicates the full scope).

*2.The scope of read-back resistance is (1/(1/R+(1/R)*0.01%+0.08),1/(1/R-(1/R)*0.01%-0.08)).

*3.The voltage/current input is no less than 10%FS.

Model		IT89108-600-2500	
Rated value (0～40 ℃)	Input voltage	0~600V	
	Input current	0~250A	0~2500A
	Input power	108KW	
	Min. operating voltage	0.45V/250A	4.5V/2500A
Constant voltage mode	Range	0.1~60V	0.1~600V
	Resolution	1mV	10mV
	Accuracy	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
Constant current mode	Range	0~250A	0~2500A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.1%FS)	±(0.2%+0.2%FS)
Constant resistance mode *1	Range	0.005Ω~10Ω	10Ω~7.5KΩ
	Resolution	16bit	
	Accuracy	0.01%+0.08S *2	0.01%+0.0008S
Constant power Mode *3	Range	108KW	
	Resolution	10W	
	Accuracy	0.2%+0.4%FS	
Measuring range			
Read-back voltage	Range	0~60V	0~600V
	Resolution	1mV	10mV
	Accuracy	±(0.025%+0.025%FS)	±(0.025%+0.025%FS)
Read-back current	Range	0~250A	0~2500A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.1%FS)	±(0.2%+0.2%FS)
Read-back power *2	Range	108KW	
	Resolution	10W	
	Accuracy	±(0.2%+0.4%FS)	
Protection range			
Overpower protection	≒109KW		
Overcurrent protection	≒275A		≒2750A
Overvoltage protection	≒630V		
Overtemperature protection	≒85℃		
Specification			
Short circuit	Current (CC)	≒275A	≒2750A
	Voltage (CV)	0V	0V
	Resistance (CR)	≒1.8mΩ	≒1.8mΩ
Input terminal impedance	≒1MΩ		
Dimension	37U*3		

*1.The voltage/current input is no less than 10%FS (FS indicates the full scope).

*2.The scope of read-back resistance is (1/(1/R+(1/R)*0.01%+0.08),1/(1/R-(1/R)*0.01%-0.08)).

*3.The voltage/current input is no less than 10%FS.

Model		IT89108-1200-2160	
Rated value (0～40 ℃)	Input voltage	0~1200V	
	Input current	0~216A	0~2160A
	Input power	108KW	
	Min. operating voltage	0.86V/216A	8.6V/2160A
Constant voltage mode	Range	0.1~120V	0.1~1200V
	Resolution	10mV	100mV
	Accuracy	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
Constant current mode	Range	0~216A	0~2160A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.1%FS)	±(0.2%+0.2%FS)
Constant resistance mode *1	Range	0.005Ω~10Ω	10Ω~7.5KΩ
	Resolution	16bit	
	Accuracy	0.01%+0.08S *2	0.01%+0.0008S
Constant power Mode *3	Range	108KW	
	Resolution	10W	
	Accuracy	0.2%+0.4%FS	
Measuring range			
Read-back voltage	Range	0~120V	0~1200V
	Resolution	10mV	100mV
	Accuracy	±(0.025%+0.025%FS)	±(0.025%+0.025%FS)
Read-back current	Range	0~216A	0~2160A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.1%FS)	±(0.2%+0.2%FS)
Read-back power *2	Range	108KW	
	Resolution	10W	
	Accuracy	±(0.2%+0.4%FS)	
Protection range			
Overpower protection	≒109KW		
Overcurrent protection	≒237A		≒2370A
Overvoltage protection	≒1250V		
Overtemperature protection	≒85℃		
Specification			
Short circuit	Current (CC)	≒237A	≒2370A
	Voltage (CV)	0V	0V
	Resistance (CR)	≒4mΩ	≒4mΩ
Input terminal impedance	≒2MΩ		
Dimension	37U*3		

*1.The voltage/current input is no less than 10%FS (FS indicates the full scope).

*2.The scope of read-back resistance is (1/(1/R+(1/R)*0.01%+0.08),1/(1/R-(1/R)*0.01%-0.08)).

*3.The voltage/current input is no less than 10%FS.

Model		IT89135-150-2500	
Rated value (0～40 ℃)	Input voltage	0~150V	
	Input current	0~250A	0~2500A
	Input power	135KW	
	Min. operating voltage	0.225V/250A	2.25V/2500A
Constant voltage mode	Range	0.1~18V	0.1~150V
	Resolution	1mV	10mV
	Accuracy	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
Constant current mode	Range	0~250A	0~2500A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.1%FS)	±(0.2%+0.2%FS)
Constant resistance mode *1	Range	0.005Ω~10Ω	10Ω~7.5KΩ
	Resolution	16bit	
	Accuracy	0.01%+0.08S *2	0.01%+0.0008S
Constant power Mode *3	Range	135KW	
	Resolution	10W	
	Accuracy	0.2%+0.3%FS	
Measuring range			
Read-back voltage	Range	0~18V	0~150V
	Resolution	1mV	10mV
	Accuracy	±(0.025%+0.025%FS)	±(0.025%+0.025%FS)
Read-back current	Range	0~250A	0~2500A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.1%FS)	±(0.2%+0.2%FS)
Read-back power *2	Range	135KW	
	Resolution	10W	
	Accuracy	±(0.2%+0.3%FS)	
Protection range			
Overpower protection	≒136KW		
Overcurrent protection	≒275A		≒2750A
Overvoltage protection	≒157V		
Overtemperature protection	≒85℃		
Specification			
Short circuit	Current (CC)	≒275A	≒2750A
	Voltage (CV)	0V	0V
	Resistance (CR)	≒0.9mΩ	≒0.9mΩ
Input terminal impedance	≒300KΩ		
Dimension	37U*3		

*1.The voltage/current input is no less than 10%FS (FS indicates the full scope).

*2.The scope of read-back resistance is (1/(1/R+(1/R)*0.01%+0.08),1/(1/R-(1/R)*0.01%-0.08)).

*3.The voltage/current input is no less than 10%FS.

Model		IT89150-600-2400	
Rated value (0～40 ℃)	Input voltage	0~600V	
	Input current	0~240A	0~2400A
	Input power	150KW	
	Min. operating voltage	0.48V/240A	4.8V/2400A
Constant voltage mode	Range	0.1~60V	0.1~600V
	Resolution	1mV	10mV
	Accuracy	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
Constant current mode	Range	0~240A	0~2400A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.2%FS)	±(0.2%+0.2%FS)
Constant resistance mode *1	Range	0.005Ω~10Ω	10Ω~7.5KΩ
	Resolution	16bit	
	Accuracy	0.01%+0.08S *2	0.01%+0.0008S
Constant power Mode *3	Range	150KW	
	Resolution	10W	
	Accuracy	0.2%+0.4%FS	
Measuring range			
Read-back voltage	Range	0~60V	0~600V
	Resolution	1mV	10mV
	Accuracy	±(0.025%+0.025%FS)	±(0.025%+0.025%FS)
Read-back current	Range	0~240A	0~2400A
	Resolution	10mA	100mA
	Accuracy	±(0.1%+0.2%FS)	±(0.2%+0.2%FS)
Read-back power *2	Range	150KW	
	Resolution	10W	
	Accuracy	±(0.2%+0.4%FS)	
Protection range			
Overpower protection	≒152KW		
Overcurrent protection	≒250A		≒2500A
Overvoltage protection	≒630V		
Overtemperature protection	≒85℃		
Specification			
Short circuit	Current (CC)	≒250A	≒2500A
	Voltage (CV)	0V	0V
	Resistance (CR)	≒2mΩ	≒2mΩ
Input terminal impedance	≒1MΩ		
Dimension	37U*5		

*1.The voltage/current input is no less than 10%FS (FS indicates the full scope).

*2.The scope of read-back resistance is (1/(1/R+(1/R)*0.01%+0.08),1/(1/R-(1/R)*0.01%-0.08)).

*3.The voltage/current input is no less than 10%FS.

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

Chapter5 References of Load Communication Interfaces

IT8900 series electronic load is provided with five communication interfaces to communicate with a computer for selection, including S232, USB, GPIB, CAN and LAN.

5.1 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.

Note

RS-232 setting in procedure should be consistent with that in system menu of front board. Press composite key **[Shift]** + 8(System) to change (if necessary). Send a ^C or ^X character string to the load to pause data transmission. It will clear any uncompleted operation and waive any uncompleted output.

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.

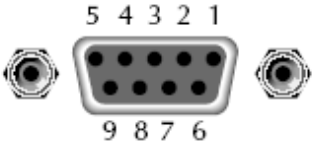
Baud rate

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

5.2 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.

5.3 GPIB Interface

Firstly, connect load GPIB interface and computer GPIB card through IEEE488 bus and ensure sufficient contact. Tighten them with screws. Set address. Load address range: 1-30. Press **[Shift]** + 8(System) to enter system menu functions. Press Left/Right key to find Communication. Select GPIB and set address. Input address and press **[Enter]** for confirmation. The load works by setting GPIB address on front board. GPIB address is saved in NVM.

5.4 LAN Interface

Press **[Shift]** + 8(System) button to enter the system set. Please select “LAN” in the Communication from System and then configure Gateway, IP, Mask and Socket Port in the LAN option.

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

5.5 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:
10K|20K|40K|50k|80k|100k|125k|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).

   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: 10K(20K, 40K, 50K, 80K, 100K, 125K, 200K, 250K, 400K, 500K, 500K). You can enter the System menu through panel and set the communication Baud rate

Addr.: 1-127

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
10k	300	1	6
20k	150	1	6
40K	75	1	6
50K	60	1	6
80K	75	1	1
100K	30	1	6
125K	30	0	5
200K	15	1	6
250K	15	1	5
400K	15	1	1
500K	6	1	6
1000K	3	1	6

Appendix

Specifications of Red and Black Test Lines

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

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

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

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

Thanks for purchasing ITECH products. In case of any doubts, please contact us as follows:

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