High Power DC Electronic Load

User Manual

MATRIX TECHNOLOGY INC.

Version 2.0

Catalog

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Safety summary

The following general safety precautions must be observed when operating and maintaining this series of equipment. Failure to comply with these precautions or any explicit warnings in this manual will be a violation of design, manufacture and instrument use safety standards.
The Company shall not be liable for any breach of these requirements by the user.

Before connecting to the power supply

Check that the product setting is in line with the line voltage.

protective ground

Before turning on the power, make sure that the protective grounding of the equipment is good to prevent electric shock.

The necessity of protecting the ground

Do not cut off the internal or external protective ground wire or interrupt the connection of the protective ground terminal. This will cause potential electric shock danger and may cause harm to the human body.

Fuse

Only the required rated current, voltage and specific form of fuse (normal fuse, time delay, etc.) can be used. Do not use different fuses or short circuit fuse sockets. Otherwise, there may be a risk of electric shock or fire. Warning: Before replacing the fuse, be sure to unplug the power cord.

Do not operate in explosive air

Do not operate the instrument under flammable gas or gas.

Do not remove the instrument housing

The operator shall not remove the instrument shell. Parts replacement and internal adjustment can only be performed by qualified maintenance personnel.

Safety symbols

	Danger-High pressure.
	Note: In order to avoid injury, death of personnel or damage to the instrument, the operator must refer to the notes in the instructions.
	Protective grounding terminal: This symbol indicates that the grounding terminal must be connected to the earth before instrument operation.
Note	Note: The mark indicates danger and is used to alert the user that failure to follow the correct operating procedures may result in injury. Do not ignore the mark and continue to operate until you fully understand and follow the precautions.
Warn	Warning marks indicate danger. If not detected in time, it may cause injury or death to personnel. This mark reminds you to pay attention to procedures, actual operations and environment.

1. Outlin

1.1 Introduction

This manual contains the specifications, installation, operation steps and program design of high power DC electronic load respectively.

1.2 Product description

High-power electronic loads come in various models depending on the load operating voltage, loading current, and rated power. Each model has the same basic functions. All models can operate under constant current mode (CC), constant resistance mode (CR), constant voltage mode (CV), constant power mode (CP), or dynamic mode (CCD).

1.3 Main features

- TFT LCD screen, the display content is more rich and comprehensive;
- RS-232C standard communication port; GPIB/LAN (optional)
- Four basic operation modes: CC, CR, CV and CP;
- High speed dynamic loading mode (CCD), up to 20KHz;
- Programmable loading slope and starting loading voltage point (Von);
- Good low voltage load carrying capacity;
- Voltage: 0-1200V; current: 0-9000A; power 1.2KW-60KW; multiple models;
- 100 sets of memory can be stored/called by the user to set;
- Can set 100 sets of programs to meet more testing requirements;
- Multiple advanced functions: battery discharge test, OCP test, OPP test, LIST mode, etc
- The test program (PROGRAM function) can be automatically run on a single machine
- 16 A/D, high measurement accuracy;
- Simulate load short circuit;
- Automatically determine whether the index of the object under test meets the set specifications;

1.4 Input specification

AC input voltage: 220V single phase
Fuse: 3A, 250Vac
Amplitude: +-10%
Frequency: 47 to 63 Hz
Maximum VA: 300VA

Note:

1. This device is for indoor use only.
2. The device can be used up to an altitude of 2,000 meters.
3. All specifications, unless otherwise indicated, are tested at 20 (C (30 (C.
4. The operating temperature range is 0 (C (40 (C.
5. Relative humidity is 10% to 90%.
6. The specification for DC current accuracy is only started after 30 seconds of input.
7. The normal temperature coefficient is 100ppm.

Warn

This equipment cannot be used for CAT I, II, III or IV measurements.

CAT IV-A measurement of a low-voltage installation.

CAT III-Measurement of instruments installed in a building.

CAT II-A measurement of the direct connection between a circuit board and a low-voltage installation.

CAT I--A measurement of the direct connection between a circuit board and mains power.

1.5 Electronic load series selection table

Power	Voltage	Current
150V series		
1200W	0-150V	0-120A
1800W	0-150V	0-180A
2400W	0-150V	0-240A
3000W	0-150V	0-300A
6000W	0-150V	0-600A
9000W	0-150V	0-900A
12000W	0-150V	0-1200A
15000W	0-150V	0-1200A
18000W	0-150V	0-1200A
21000W	0-150V	0-1200A
24000W	0-150V	0-1200A
30000W	0-150V	0-1200A
800V series		
1200W	0-800V	0-48A
1800W	0-800V	0-72A
2400W	0-800V	0-96A
3000W	0-800V	0-120A
6000W	0-800V	0-240A
9000W	0-800V	0-360A
12000W	0-800V	0-480A
15000W	0-800V	0-600A
18000W	0-800V	0-720A
21000W	0-800V	0-840A
24000W	0-800V	0-960A
30000W	0-800V	0-1200A

Power	Voltage	Current
600V series		
1200W	0-600V	0-48A
1800W	0-600V	0-72A
2400W	0-600V	0-96A
3000W	0-600V	0-120A
6000W	0-600V	0-240A
9000W	0-600V	0-360A
12000W	0-600V	0-480A
15000W	0-600V	0-600A
18000W	0-600V	0-720A
21000W	0-600V	0-840A
24000W	0-600V	0-960A
30000W	0-600V	0-1200A
1200V series		
3000W	0-1200V	0-120A
6000W	0-1200V	0-240A
9000W	0-1200V	0-360A
12000W	0-1200V	0-480A
15000W	0-1200V	0-600A
18000W	0-1200V	0-720A
21000W	0-1200V	0-840A
24000W	0-1200V	0-960A
30000W	0-1200V	0-1200A

2. Install

2.1 Introduction

This chapter describes how to install the programmable DC electronic load and startup program, as well as precautions when applying it.

2.2 View

After unpacking the instrument, check for any damage caused by transportation. Please keep all packaging materials for use when returning the instrument if necessary. If you find any damage to the instrument, please immediately make a claim against the delivery person. Do not return the instrument directly to our company without our consent.
In addition to this manual, please make sure that the following items are received in good condition: one power cord, one operation manual (electronic version), one warranty card, and a set of screws for the output end.

2.3 Erection sequence

The DC electronic load can operate normally in the temperature of 0 to 40 ° C, but this instrument must be installed in a place with enough space so that air can flow fully and facilitate machine cooling.

2.3.1 Power on self-test

Before starting the electronic load, please check the following items:

1. The instrument has been selected to meet the specifications of alternating current.
2. The AC power cable has been connected to the AC input socket.

Note

The working power supply is grounded through the third connector, so please confirm that the selected socket is a national standard socket and the grounding is good.
Open the power switch on the front panel of the electronic load. After starting, the electronic load will immediately automatically execute the self-test program to check whether all components of the system are normal. The self-test screen is as follows:

Figure 2-1 Self-test screen

After the self-inspection procedure is completed, the instrument will work normally and enter the main screen as follows:

Figure 2-2, working picture

If a fault is found in a certain part of the instrument during the self-test process, the corresponding alarm information will be prompted, and the operation interface will stop at the self-test screen and cannot enter the working screen.

If the self-test fails, please contact the after-sales technical personnel of our company first to troubleshoot the cause of the fault. If the problem cannot be eliminated after guidance from our technical personnel, the electronic load should be sent back to our dealer or maintenance department for repair.

2.4 Load wiring

2.4.1 LOAD wire joint

Note

According to the safety requirements, when users choose the load wiring of the electronic load, they must be able to withstand the short circuit output current connected at the load end and not produce overheating phenomenon.

The input of external products can be connected via the terminals labeled "(" and "(" on the electronic load backplane. When making input connections, pay attention to the size, length, and polarity of the wiring. The load lines must avoid overheating; otherwise, the instrument may not maintain good performance. Additionally, the wiring must be thick enough to limit voltage drops to less than 0.5V per lead, and it should also be as short as possible and bundled with wire ties to reduce inductance and noise. Connect the high (HIGH) potential output terminal from PLUS (() terminals to the power supply (test object), and connect MINUS (() to the low (LOW) potential output terminal. Figure 2-3 shows a typical setup from the electronic load to the test object. When using an electronic load, there should be no obstructions more than 1 meter in front of the machine and more than 2.5 meters behind it that could block the inlet and outlet air ducts, as this can easily cause the machine to overheat and trigger OTP protection.

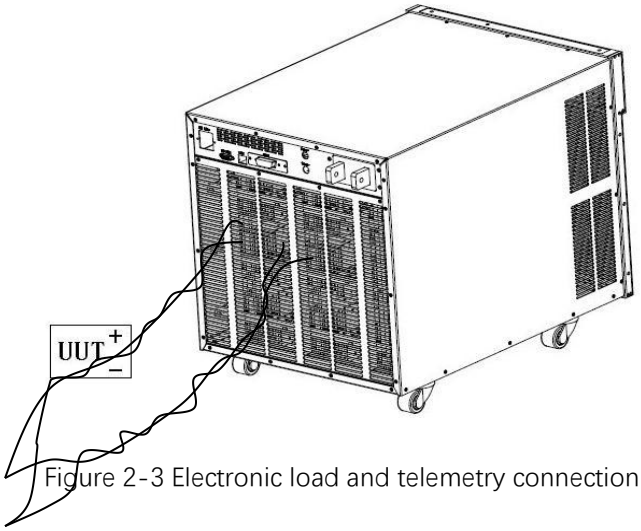


Figure 2-3 Electronic load and telemetry connection

2.4.2 SENSE wire joint

This series of electronic loads has two voltage sampling endpoints. One is the load LOAD terminal for measuring voltage, and the other is the load Sense terminal for measurement. Users can set the voltage sampling method in the software to UUT (Sense sampling) or LOAD for voltage measurement. The UUT sampling method is mainly used during power supply testing to avoid voltage loss caused by impedance in the wiring. This method is particularly effective when the electronic load operates in CV or CR mode, or when users need to accurately measure the output voltage in CC mode. Figure 2-3 illustrates the wiring configuration.

Note

The potential of the V-sense red connector must be higher than that of the V-sense black connector.

3. Operate

3.1 Resume

High-power DC electronic loads are suitable for the design, manufacturing, testing, and quality management of switch-mode power supply products. This series of instruments includes MCU, GPIB, and RS-232C communication ports, front panel button groups, TFT color displays, and power modules. The built-in remote control function allows users to monitor, read back current, voltage, and load operating status. Additionally, the storage/call function can store 100 files, 100 programs, and a set of default values. All data can be saved in the EEPROM of the electronic load for subsequent use.

This series of electronic load has temperature controlled cooling fan. When the power of the electronic load rises or falls, the fan speed will be automatically enhanced and weakened. The fan will only run at full speed when the output power of the load reaches a certain size, so as to reduce the overall noise level.

Each electronic load can operate in constant current (CC), constant resistance (CR), constant voltage (CV) and constant power (CP) modes.

3.2 Front panel description

The front panel of this series of electronic load is shown in Figure 3-1. The description of each functional component is as follows:

1. LCD PANEL: TFT LCD screen
2. Shortcuts: four shortcuts to quickly select the operation mode;
3. Function keys: select the functions to be performed.
4. Input key: input the set parameters, including 0-9 keys and confirm key, delete key
5. Knob: Change the setting parameters and select the position cursor to change the number
6. Switch: Power switch of the equipment

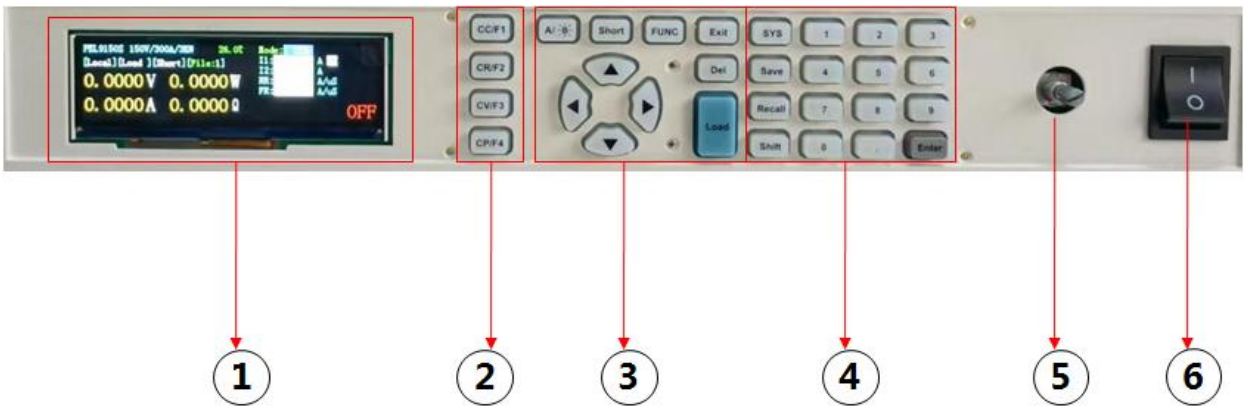


Figure 3-1 Front panel

3.3 Back panel description

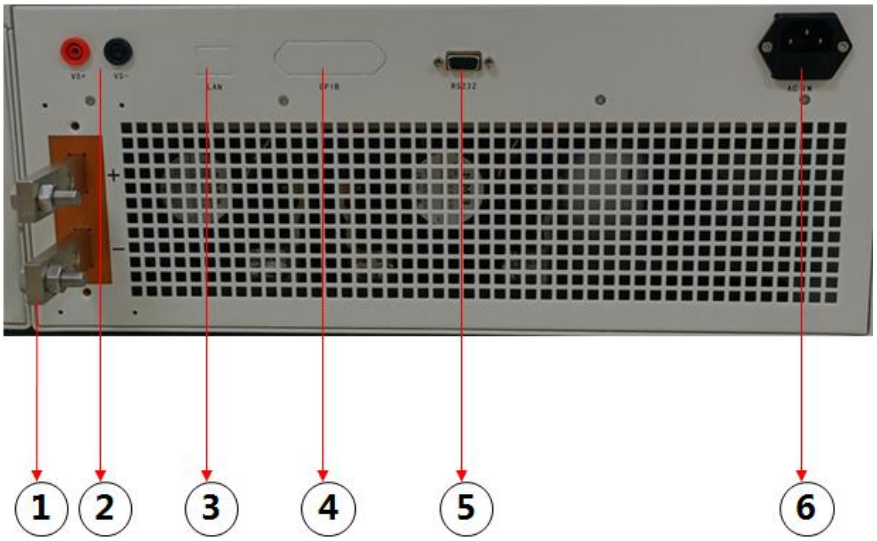


Figure 3-2 Rear panel

The back panel of this series of electronic loads is shown in Figure 3-2. The definition of each interface is as follows:

1. LOAD CONNECTOR: Load terminal port
2. Sense PORT: Remote voltage measurement port
3. LAN: Network communication port (optional)
4. GPIB PORT: GPIB communication port (optional)
5. RS232 PORT: RS232 communication port
6. AC INPUT: AC input port

3.4 Local/RMT control

The local control mode takes effect after the load power is connected and the self-check program is completed. The front panel buttons and display can be manually controlled when the electronic load is used for basic operations. Remote control can be achieved through RS-232C/GPIB/LAN communication ports. When remote control is active, only the PC can control the operation of the electronic load. Switching between local and remote control can be completed using the "EXIT" button on the front panel.

Most of the functions that can be operated remotely can also be operated on this end. Detailed operations on this end are described in Chapter 4. Basic remote programming instructions are described in the following chapters of this specification.

3.5 Operator schema

There are four static loading modes for DC electronic loads: constant current (CC), constant resistance (CR), constant voltage (CV) and constant power (CP); and one dynamic loading mode

CCD.

The different working modes can be selected by pressing the mode shortcut key. After the load completes the self-test, it will be defaulted to CCH mode. At this time, the user can select the required mode by pressing the [left and right direction keys]. After the mode is selected, press [ENTER] to confirm. Then, various parameters can be set in this mode.

All data set under the CC/CR/CV/CP mode can be reset at any time to meet the required current, voltage, or slope for testing. In local mode, any loading value and specification upper/lower limits can be set using the keyboard on the electronic load front panel. Edited parameters can be saved for easy recall. When programming data exceeds the limits, the load will automatically set to the maximum or minimum value. In remote mode, the parameters must not exceed their specifications; if data exceeds these limits, an "alarm message" will be displayed.

The working mode of the shortcut key corresponding to the load setting is as follows:

CC/F1: Constant current loading mode

CR/F2: Fixed resistance loading mode

CV/F3: Constant voltage loading mode

CP/F4: Fixed power loading mode

3.5.1 Fixed current mode

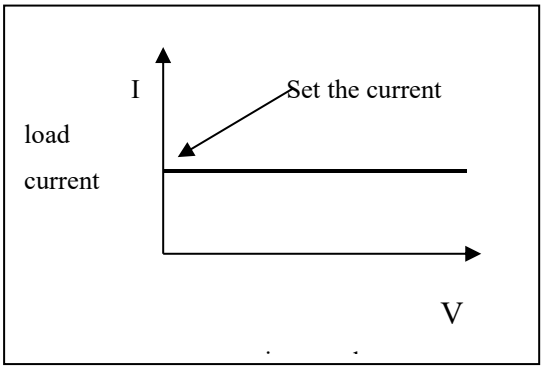


Figure 3-3 Fixed current mode

In the constant current loading mode, the electronic load controls the current change based on the set current value and current slope, independent of input voltage variations. Users can select the CCL or CCH mode by pressing the shortcut keys CC/F1 or using the [left/right reverse key] in the mode field, and confirm by pressing the [ENTER] key after selecting the mode.

The function key [A/B] can quickly switch between two different current loading values in the current mode. The fixed current mode is mainly used to check the stability of the output voltage of the switch power supply under test.

In all static modes: CC, CR, CV, and CP can set two different loading values for A and B. The A and B states require selecting the same gear, which can be switched using the [A/B] key. The slope determines the rate at which the load setpoint changes from the initial state to the setpoint. Figure 3-4 shows the change in load current after pressing the [A/B] key.

I1：4A，I2：2A，RR：200mA/(S，FR：80mA/(S

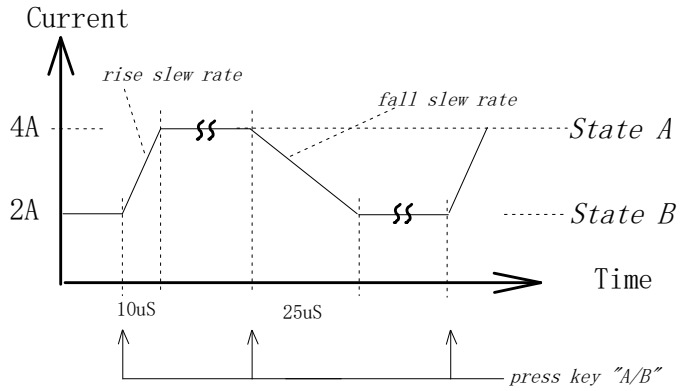


Figure 3-4 Load changes after pressing the A/B key

The constant current mode can also simulate dynamic load variations in the CCD mode. Users can program six parameters: two load setpoints (I1 and I2), load periods (T1 and T2), and slopes (RR and FR). After LOAD ON, the load will vary according to these setpoints. Dynamic loads are typically used under instantaneous pull-up conditions to test the output voltage performance of the device under test. Figure 3-5 shows the current waveform for dynamic functionality.

I1：4A，I2：2A，RR：10mA/(S，FR ：10mA/(S，T1：10mS，T2：10mS

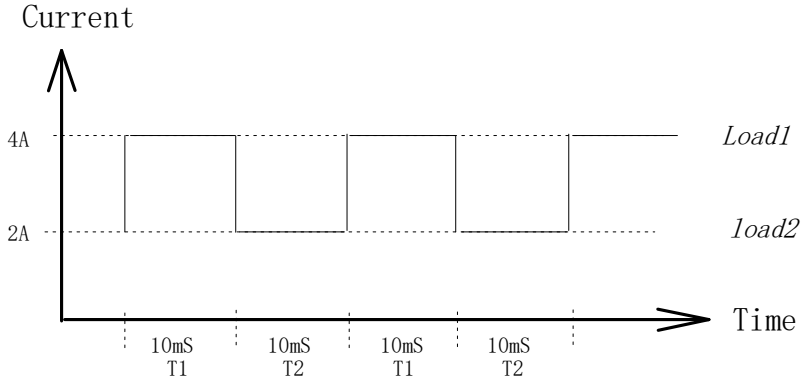


Figure 3-5 Dynamic current waveform

The slope determines the rate of change of the current loaded by the load. The slope value includes both the rate of rise and the rate of fall.

3.5.2 Fixed resistance mode

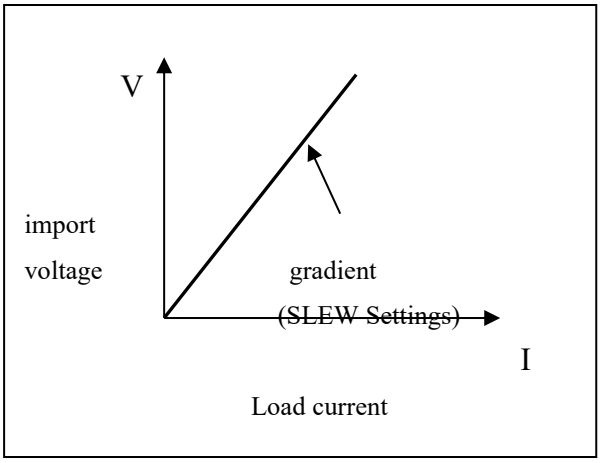


Figure 3-6 Fixed resistance mode

In fixed resistor mode, the electronic load suppresses current to the input voltage in a linear proportion according to the pre-programmed resistance. The input voltage has a bipolar resistor-capacitor (RC) filter, so the high-frequency portion is removed. In fixed resistor mode, the load proportionally suppresses current to the input voltage through a bipolar resistor-capacitor (RC) filter. To avoid changes in load current due to variations in input voltage, the power supply impedance should be minimized as much as possible. When high suppression current (low set resistance) is programmed, a Sense line must be connected to sense the load input voltage.

The fixed resistance mode can be selected in two positions: CRL (low) and CRH (high). In the low position, the DC voltage of the input load cannot exceed the requirements of the low voltage load; in the high position, the DC voltage of the input load can be full voltage input. The fixed resistance mode is default CRH.

The fixed resistance mode function is the same as the fixed current mode. Users can set two resistance values (R1 or R2). Both use the same gear. The [A/B] key can be used to select R1 or R2. The slope determines the rate at which the load setting changes from one state to another.

3.5.3 Fixed voltage mode

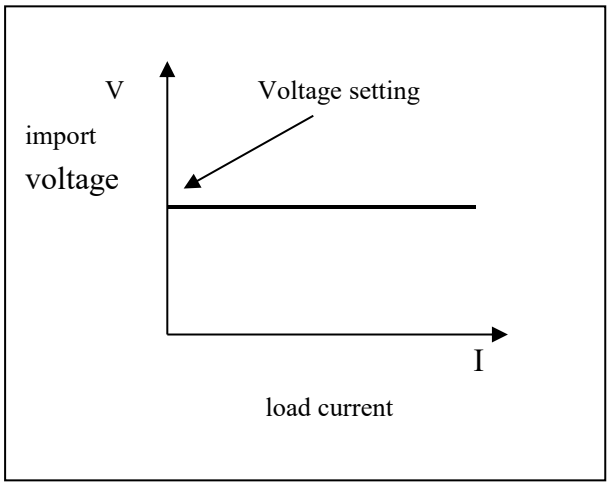


Figure 3-7 Fixed voltage mode

In the fixed voltage mode, the electronic load will control the loading current according to the set value to control the output voltage to be stable at the set value. In the fixed voltage mode, users need to select the loading speed according to the loop characteristics of different test power supplies. There are three loading speeds

0: S Slow, mainly used for testing products with slow current loop changes such as charging power supplies

1: Medium speed, mainly used for conventional switch power supply testing

2: F Fast, mainly used for high-speed power supply testing.

The response speed of the loop can be selected according to the characteristics of the user's actual product. If the loop response is not configured well, the measured power supply will not enter the constant current mode. The response speed should match the loop speed of the measured power supply.

The fixed voltage mode can also set two voltage values (V1 or V2). The [A/B] key can be used to select V1 or V2.

3.5.4 Fixed power mode

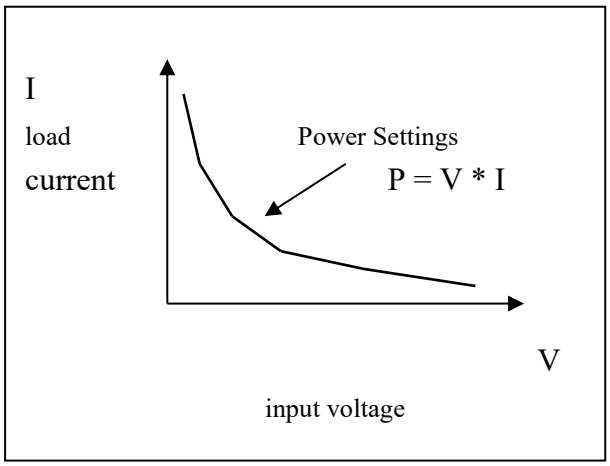


Figure 3-8 Fixed power mode

In the constant power mode, the electronic load adjusts the loading current according to the set power value. This mode controls the loading current size through high-speed software calculations. That is, based on the currently measured voltage value, it quickly calculates the required current value and then loads to achieve the desired power.

As with other modes, users can set two power values (P1 or P2). Both P1 and P2 use the same gear. The [A/B] key can be used to select P1 or P2.

3.6 measuration

The electronic load can measure the current, voltage, resistance and power of the tested power supply at a sampling rate of about 10 ms. Voltage and current measurements are performed at full scale ratings with 16-bit resolution. The voltage, current, power and resistance display bits on the TFT screen are 5 significant digits.

3.7 Slope and fastest load time

The slope is defined as the rate of change of current with respect to time. A programmable slope allows for a transition from one setpoint to another controlled setting, reducing the induced voltage drop in inductive power connections or controlling the instantaneous induction of test equipment. If the transition time between a setpoint and another is large, the actual transition time can be calculated from the current conversion divided by the slope. The actual transition time is defined as the time required for the program to cycle through input changes from 10% to 90% or from 90% to 10%. If the transition between a setpoint and another is small, the bandwidth of the electronic load's small signal will limit the minimum transition time for all programmable slopes. Due to this limitation, the actual transition time will be longer than expected by the slope. Therefore, when determining the actual transition time, both the minimum transition time and the slope should be considered. The minimum transition time is 24 (S to 6 ms depending on the slope setting.

3.8 Start/stop loading (VON point) Settings

To simulate the instantaneous state of an electronic load on the test object, the main issue lies in when and how to start the electronic load to suppress current to the test object. These issues can be addressed by setting the start loading voltage Von. When the electronic load is LOAD ON and the input voltage exceeds Von, the loading current begins; however, if the electronic load is LOAD OFF or the input voltage is below Von, the loading stops. Refer to Figures 3-9 and 3-10 for the start and stop of the loading current.

Von Latch has two operating modes: locked and unlocked. Locked means that when the voltage exceeds Von, the electronic load will start to draw current and continue regardless of whether the input voltage drop is below Von. Unlocked means that when the voltage is below Von, the electronic load will stop drawing current. The Von voltage and operating mode can be set in SYS.

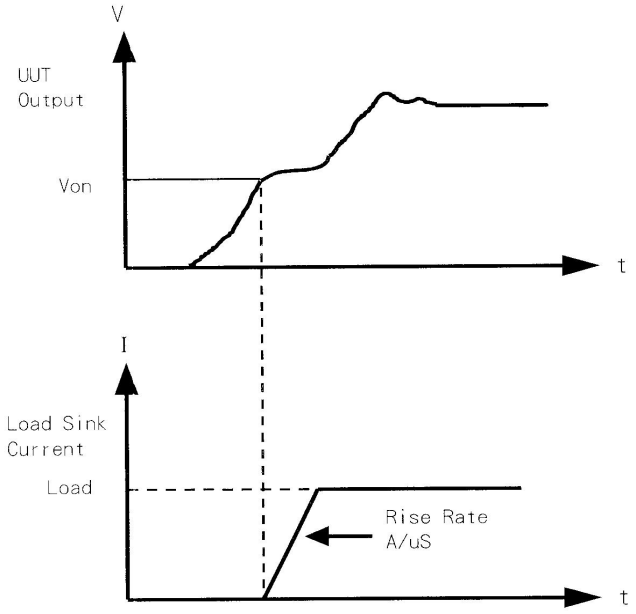


Figure 3-9 Start suppression current (Von Latch off)

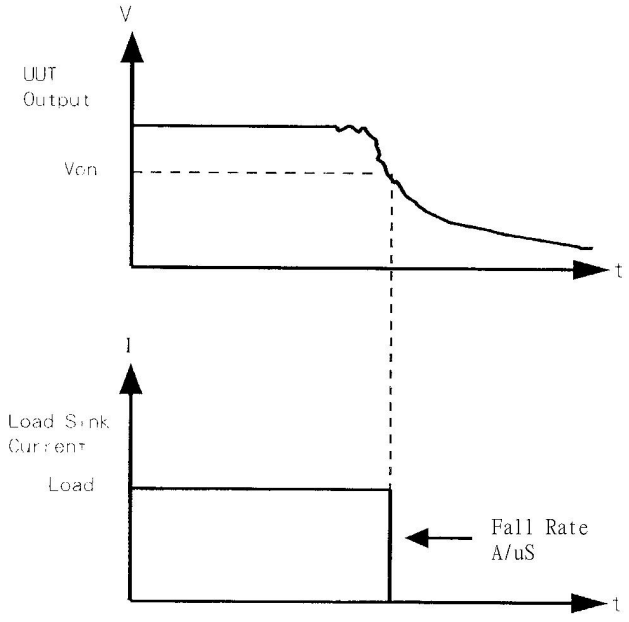


Figure 3-10 Stop inhibiting current (Von Latch off)

3.9 Simulate a short circuit

The electronic load can be set to the maximum current value during input to simulate a short-circuit state. The short circuit can be performed via the front panel or remotely. When the electronic load is LOAD ON, pressing the [Short] key activates the short-circuit function; another press cancels the short-circuit simulation. The actual value of the electronic load's short-circuit depends on the mode and setting used when the short circuit is activated. It is essentially limited

to the maximum power setting that the electronic load can supply. In constant current mode, it equals the maximum current. In constant resistance mode, it matches the minimum resistance of the existing resistance setting. In constant voltage mode, it is zero voltage. In constant power mode, it matches the maximum power of the existing power setting. Activating the short circuit does not affect the programmed settings, and after the short circuit is turned off, the input to the electronic load will return to the previously programmed value.

Please note that opening the short circuit may cause the electronic load to be overloaded with excessive current and trigger circuit protection, which will turn off the electronic load.

3.10 Load (LOAD ON/OFF)

The load can be switched on/off via the [Load] button on the front panel or remotely controlled. Turning off the electronic load does not affect the programmed Settings. When the electronic load is turned on again, it will return to the previous programmed value.

3.11 protect

The electronic load has a perfect protection mechanism, including: overvoltage protection, overcurrent protection, overpower protection, overheating protection and reverse voltage abnormal alarm.

When the aforementioned protection features or alarms occur, the appropriate bits in the electronic load status buffer will change. At this point, the buzzer of the electronic load will sound to inform of the protection or alarm status. When one or more protections or alarms are triggered, the electronic load will stop loading, and at this time, protection information will appear on the TFT screen.

- Overvoltage protection (OVP)
  The set value of the overvoltage alarm circuit is set slightly higher than the voltage file position of the electronic load specification. When the overvoltage state is generated, the electronic load will display OVP information and stop working.
- Overcurrent protection (OCP)
  When the electronic load operates in fixed resistance and fixed voltage mode, it may load beyond its rated current. The current setting is set slightly above the current of the electronic load. When an overcurrent state occurs, the electronic load displays OCP information and stops working.
- Overpower protection (OPP)
  The set value of the overpower protection circuit is set slightly higher than the power file position of the electronic load specification. When the overpower state is generated, the electronic load will display OPP information.
- Overtemperature protection (OTP)
  The electronic load has an overtemperature protection circuit that shuts down the load if the internal temperature of the electronic load exceeds its safety limit. When the overtemperature state is generated, the electronic load displays OTP.
- Reverse voltage (REV)

When the polarity connection of the device under test is incorrect, the electronic load will execute a reverse current. The maximum safe reverse current is equal to the rated current of the electronic load. If the reverse current of the device under test exceeds the rated current of the electronic load, it may be damaged. Once a reverse current is detected, the power supply to the device must be immediately turned off and its connection corrected. When a reverse voltage occurs, the electronic load will display REV.

All protection or alarm triggers are locked. When any protection or alarm occurs, the electronic load will turn off the input and emit an alarm until the situation is relieved. When a protection occurs, the user can cancel the alarm by pressing the EXIT key after determining that the conditions causing the protection alarm have changed.

Warn

To protect the electronic load from possible damage, the input voltage must not exceed the specification of the maximum rated input voltage. In addition, the (terminal potential of the electronic load must be greater than the (terminal potential.

3.12 Store/call setup files

The settings of the electronic load can be stored or recalled for different test setups. This simplifies the repetitive programming work for various tests. On the main interface, existing mode parameters (CC, CR, CV, and CP), programs, and startup status (default) can be saved in EEPROM by pressing the [SAVE] button. Settings can also be recalled from a specified file using the [RECALL] button.

3.13 programming

The programming function is very useful, capable of simulating various test requirements. The electronic load can store 100 programs, each with 10 test steps. Each step corresponds to a parameter file, and the IVS electronic load can store up to 100 sets of parameter files. For detailed specifications of program functions, please refer to subsequent sections.

4. This is an end operation

4.1 brief introduction

This chapter details how to operate the electronic load from this panel.

4.2 This is an end operation

To use the local button group to control the electronic load, first switch to the local operation mode. The electronic load defaults to entering the local operation mode after startup. When using local operation, you can control the load through the front panel display and various button groups. The display shows preset parameters, including input voltage, current, power, or resistance.

Note

When the editor sets, a cursor is displayed on the screen to indicate which parameter is currently set.

In remote control mode, the front panel button group is not functional. Only the remote controller can set the parameters of the electronic load. The TFT screen will display the current input voltage and current readings and REMOTE messages.

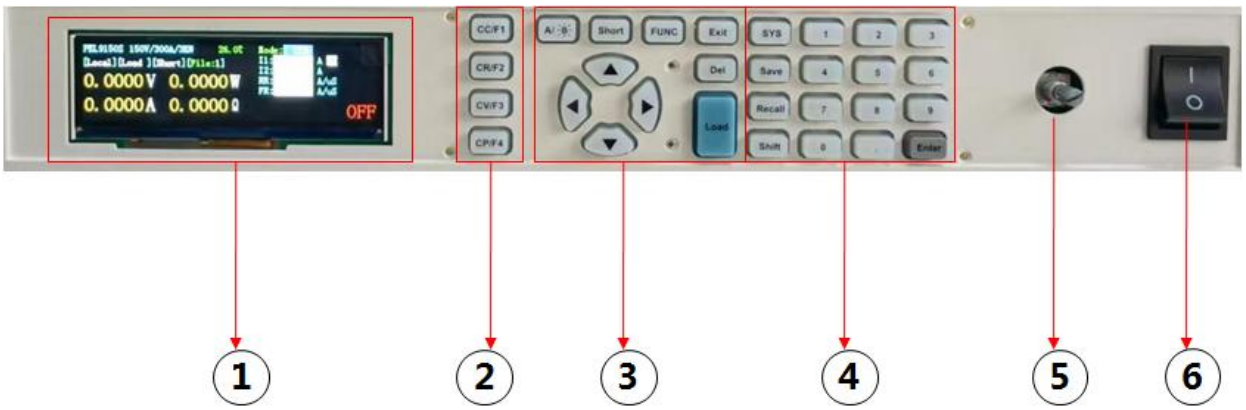


Figure 4-1 Electronic load front panel

1. TFT display: Display Settings information and measurement data. The detailed description of the display area is shown in Figure 4-2 below

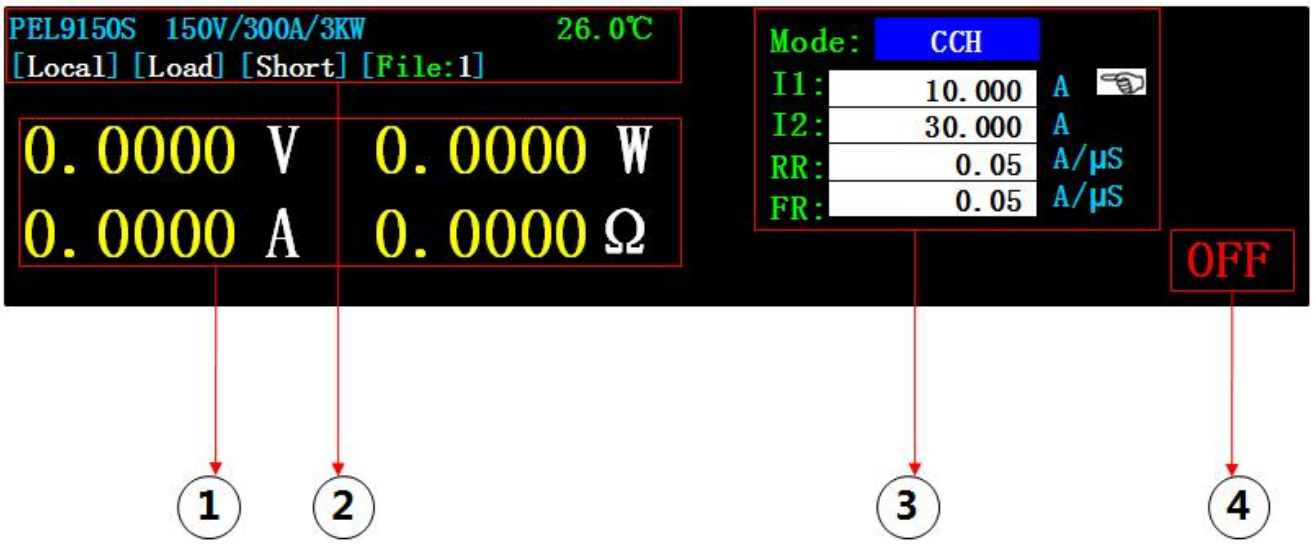


Figure 4-2 shows the legend

(1) Real-time data display area
The real-time data displayed by the load currently measured include voltage (V), current (A), power (W) and resistance (Ω).

(2) Status information display area
The data displayed in this region include: device model, device specification, control mode (local/remote), voltage sampling port (U: UUT/L: LOAD), short circuit function (start/stop), storage location (File 1-100), and device information (temperature/time)

(3) Edit the information display area

(4) Load status display area

2. Quick key area. The functions of each key are described as follows:

[CC/F1]: Enter the setting mode of constant current loading
[CR/F2]: Enter the fixed resistance loading mode setting
[CV/F3]: Enter the setting mode of constant voltage loading
[CP/F4]: Enter the setting of fixed power loading mode

3. Function key area. The functions of each key are described as follows:

[A/B] Switch key. In LOAD ON state, this function key can be used to switch between two different loading amounts. When switched to B state, the button will light up and default to A loading

[SHORT] Short circuit key. In LOAD ON state, pressing this key can start the short circuit. After the simulated short circuit function is started, this button will light up with a red light and TFT screen will display SHORT. The default value is SHORT OFF

[Direction keys] can be used to move the cursor up and down when editing parameters; or to

select different options by using left and right direction keys when setting a parameter.
[EXIT] Exit key. You can exit a screen and return to the previous screen; in remote control mode, you can also press this key to return to local control mode.
[DEL] Delete key. Delete the value currently entered.
[LOAD] Load key. This function key is used to load and unload the electronic load. When this key is pressed, the TFT screen will display whether the current load is ON or OFF. The default value is OFF
[SAVE] Storage key. Stores the edited parameters to the current file. The file is named (1 to 100). The default value is FILE 1
[RECALL] Call key. You can call the stored parameter files again.
[FUNC] Advanced function key. You can enter and select different advanced functions.
[SYS] System Settings Key. Press this key to enter the system settings of the load.
[SHIFT] is a reserved key that, when combined with another key, enables new functions

4. Enter the key area.
The functions of each key are described as follows:
[Number keys] Number keys. Enter 0-9 values.
[Period] Key. Enter the period.
[ENTER] Confirm key. Confirm the parameters input and selected.
5 Load knob. In LOAD ON mode, press this knob inward. A cursor will appear on the current loaded value in the editing area. Use the left and right keys to move the cursor to a specific number. Then rotate the knob to fine-tune the load amount. After selecting, press [ENTER] to confirm.
5. Power switch, open or close the working power supply of the load.

4.1 Set the operation mode

After the self-test program is completed, the user can select different loading modes: CC, CR, CV and CP through 4 shortcut keys on the main interface.

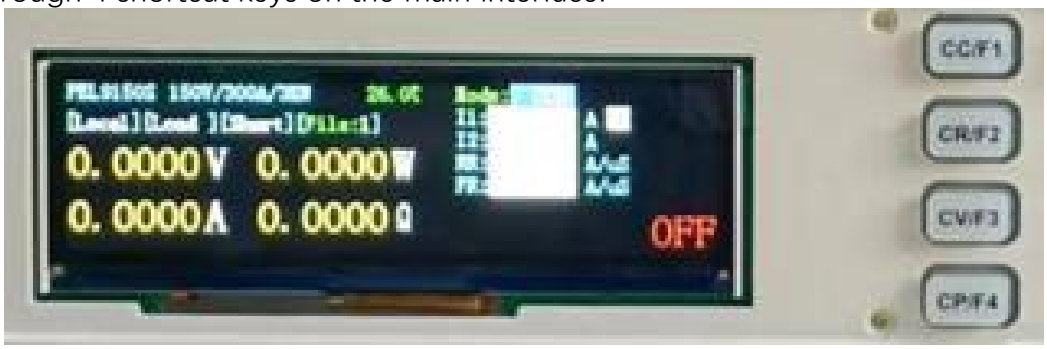


Figure 4-3 Operation mode selection

4.1.1 Set the constant current mode

The CC (fixed current) operation mode can select two working positions: CCL and CCH. The loading current and loading slope can be set, the unit of current is Amps; the unit of slope is

Amps/ (S. The setting method of CCL and CCH is exactly the same, and the following is an example of CCH.

Step1 Choose CCH mode

First, press the shortcut key [CC/F1] to select and enter CC mode, then press the [direction key] to select CCH mode, and finally press [ENTER] to confirm that the current mode is CCH mode.

Step2 Set the loading current value

Press the [direction key] to stop the cursor in the I1 setting column, press the number key to input "50" and press [ENTER] to set the loading A value to 50A. Move the cursor to the I2 setting column, press the number key to input "10" and press [ENTER] to set the loading B value to 10A.

Step3 Set the rise and fall slopes

Move the cursor to RR Settings bar by pressing [direction key]. Enter "1.2" by pressing the number key and press [ENTER] to set the rising slope to 1.2A/uS. Move the cursor to FR Settings bar, enter "0.5" by pressing the number key and press [ENTER] to set the falling slope to 0.5A/uS.

Step4 Load

Complete Step 1-Step 3, then press [LOAD]. At this time, the load starts to carry a load of 50A. The cursor stays in the I1 setting bar as shown in Figure 4-4 below

Figure 4-4 Fixed current mode operation

Step5 Fine-tune the loading current

When the load is ON, the user can press the knob inward to turn on the position cursor, then use the [direction key] to move the cursor to the number position that needs adjustment, and then rotate the knob. At this time, the loaded load will change with the rotation of the knob. After pressing [ENTER] to confirm, the value will be saved.

4.1.2 Dynamic CCD mode setting

Dynamic constant current mode also offers two settings: CCDL and CCDH. Users can set six parameters: loading current I1 and loading time T1, loading current I2 and loading time T2, current rise slope RR, and current fall slope FR. The unit for current is A, the unit for slope is A/(S, and the unit for period is mS. The setup methods for CCDL and CCDH are identical; the following explanation will focus on CCDH.

Step1 Select CCDH mode

First, press the shortcut key [CC/F1] to enter CC mode, then use the [direction key] to select CCDH mode, and finally press [ENTER] to confirm that the current mode is CCDH mode.

Step2 Set loading parameters

Move the cursor to the I1 Settings bar, press the number key to enter "5" and press [ENTER] to set the I1 value to 5A,

Stop the cursor in I2 Settings, press the number key to enter "10" and press [ENTER] to set the I2 value to 10A.

Move the cursor to the T1 Settings bar, press the number key to enter "1000" and press [ENTER] to set the T1 value to 1S,

Stop the cursor in T2 Settings, press the number key to enter "1000" and press [ENTER] to set the T2 value to 1S.

Move the cursor to the RR Settings bar, press the number key to enter "0.1" and press [ENTER] to set the rising slope to 0.1A/uS,

Stop the cursor in the FR setting column, press the number key to input "0.1", and then press [ENTER] to set the slope of decrease to 0.1A/uS.

Step3 Load

After completing Step1-Step2, press [LOAD]. At this time, the load starts to perform periodic dynamic load carrying under two load conditions of 5A/10A, as shown in Figure 4-5

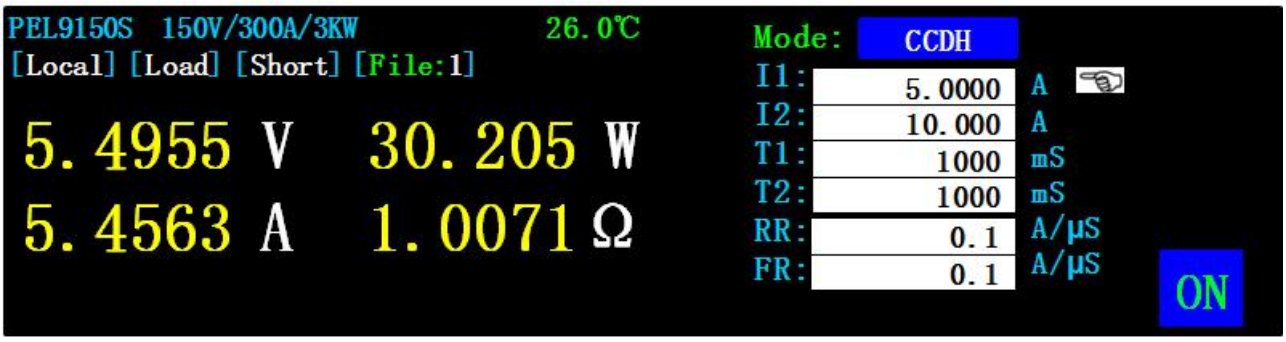


Figure 4-5 Setting of dynamic mode of fixed electric flow

4.1.3 Set the resistance mode

CR (Constant Resistance) operation mode offers two working modes: CRL and CRH. When selecting the CRL mode, the load operates at a low voltage level, so the voltage applied to the load must be less than the low-range limit. In CRH mode, the load operates at a high voltage level, allowing for full-range voltage input. Under constant resistance mode, users can set parameters such as the loading resistance value and the loading slope. The unit of resistance is ohms; the unit of slope is A/(S). The setup methods for CRL and CRH are identical; the following explanation will use CRL as an example.

Step1 Select the CRL mode

First, press the shortcut key [CR/F2] to select CR mode, then press the [direction key] to select CRL mode, and finally press [ENTER] to confirm that the current mode is CRL mode.

Step2 Set the loading resistance value

Move the cursor to the R1 Settings bar, press the number key to enter "1" and press [ENTER] to set the loaded A value to 1Ω,

Stop the cursor in the R2 setting column, press the number key to enter "10" and press [ENTER] to set the loaded B value to 10Ω.

Step3 Set the upward and downward slopes

Stop the cursor in RR Settings, press the number key to enter "2" and press [ENTER] to set the rising slope rate of 2A/(S. Stop the cursor in FR Settings, press the number key to enter "1" and press [ENTER] to set the falling slope rate of 1A/(S.

Step4 Load

Complete Step 1-Step 3, then press [LOAD]. At this time, the load starts to carry 1Ω. The cursor stays in the R1 setting bar as shown in Figure 4-6 below

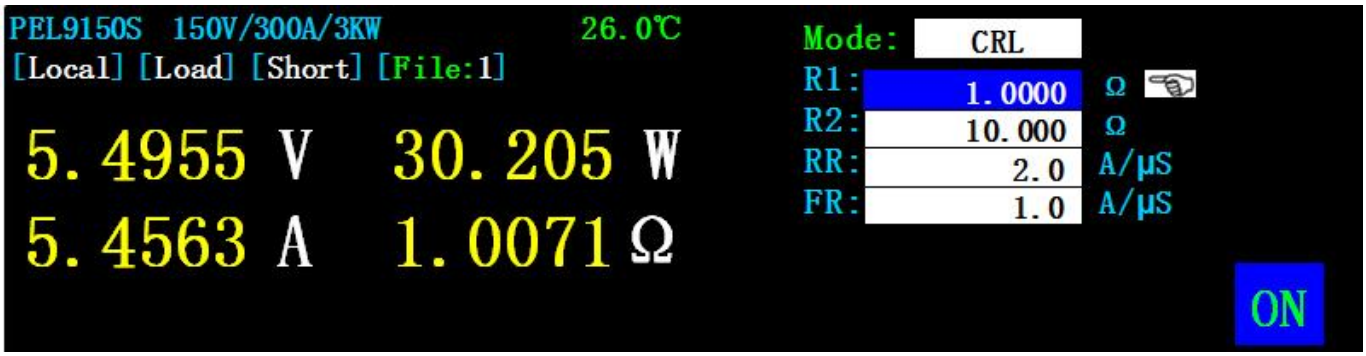


Figure 4-6 Setting of fixed resistance mode

Step5 Fine-tune the loading current

When the load is LOAD ON, the user can press the knob inward to turn on the position cursor, then use the [direction key] to move the cursor to the number position that needs to be adjusted, and then rotate the knob. At this time, the load will change along with the rotation of the knob.

4.1.4 Set the fixed voltage mode

There is only one working mode of CV (fixed voltage) operation mode: CVH. In the fixed voltage mode, the parameters that users can set are constant voltage value and current limiting point. The unit of voltage is V; the unit of current is A. The following is an example of CVH.

Step1 Choose CVH mode

First, press the shortcut key [CV/F3] to select CV mode, and then press [ENTER] to confirm that the current mode is CVH mode.

Step2 Set the loading voltage value

Move the cursor to the V1 Settings bar, press the number key to enter "10" and press [ENTER] to set the load A value to 10V,

Stop the cursor in the V2 setting bar, press the number key to enter "5" and press [ENTER] to set the loaded B value to 5V.

Step3 Set the current limiting point

Move the cursor to the LM Settings bar, press the number key to enter "20", and press [ENTER] to set the current limit point to 20A,

Step4 Select load response speed

Move the cursor to the RESPONE settings bar, press the number keys to enter "0", then press

[ENTER] to set the load loading mode to slow load. The constant voltage mode has three loading speeds: S (slow), M (medium), F (fast), for testing different characteristics of the sample. For current change curves, please refer to Figures 4-7 and 4-8.

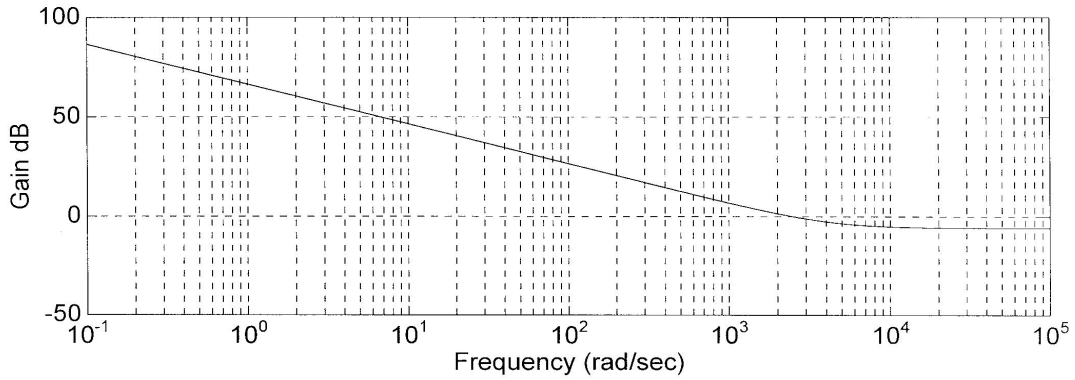


Figure 4-7 CV mode response transmission function (FAST)

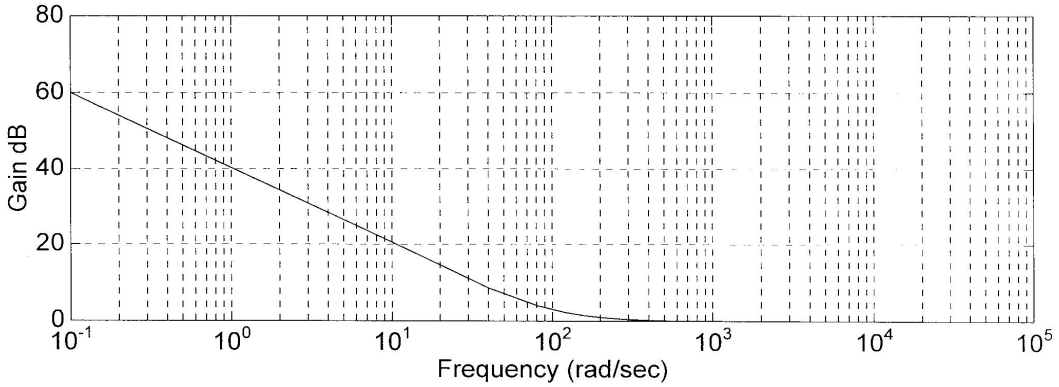


Figure 4-8 CV mode response transmission function (SLOW)

Step5 Load

Complete Step 1-Step 4, then press [LOAD]. At this time, the load starts to carry a constant voltage of 10V. The cursor stays in the V1 setting bar, as shown in Figure 4-9 below

Figure 4-9 Setting of fixed voltage mode

Step5 Fine-tune to change the voltage regulator value

When the load is in LOAD ON state, the user can press the knob inward to open the position cursor, then use the [direction key] to move the cursor to the number position that needs to be adjusted, and then rotate the knob. At this time, the load will change with the rotation of the knob.

4.1.5 Set the fixed power mode

The CP (fixed power) operation mode can select two working positions: CPL and CPH. The loading power and loading slope can be set, the power unit is Watt; the slope unit is A/ (S. The setting method of CPL and CPH is exactly the same, and the following is an example of CPH.

Step1 Select CPH mode

First, press the shortcut key [CP/F4] to select CP mode, then press the [direction key] to select CPH mode, and finally press [ENTER] to confirm that the current mode is CPH mode.

Step2 Set the loading power value

Move the cursor to the P1 Settings bar, press the number key to enter "5000" and press [ENTER] to set the load A value to 5000W,

Stop the cursor in the P2 setting bar, press the number key to input "500" and press [ENTER] to set the loaded B value to 500W.

Step3 Set the upward and downward slopes

Move the cursor to RR Settings, press the number key to enter "5", and press [ENTER] to set the rising slope to 5A/uS,

Stop the cursor in the FR setting bar, press the number key to enter "5" and press [ENTER] to set the slope of decrease to 5A/uS.

Step4 Load

Complete Step1-Step3, and then press [LOAD]. At this time, the load starts to carry a load of 5000W. The cursor stays in the P1 setting bar, as shown in Figure 4-10 below

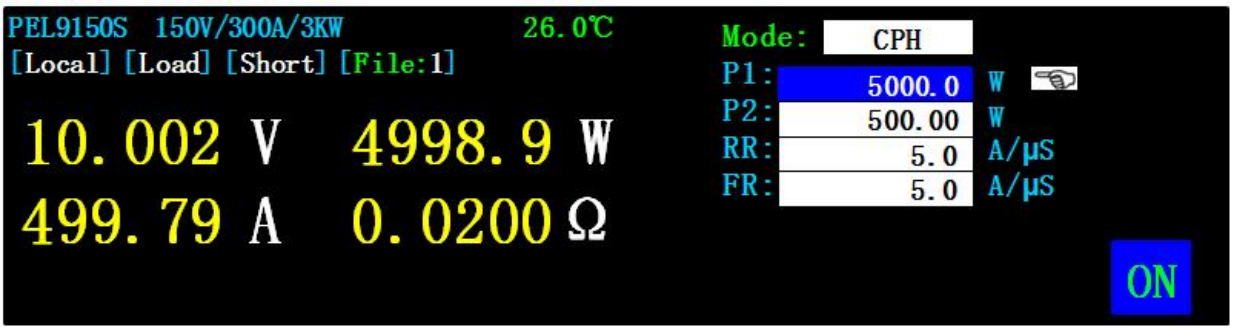


Figure 4-10 Power mode setting

Step5 Fine-tune the loading current

When the load is in LOAD ON state, the user can press the knob inward to open the position cursor, then use the [direction key] to move the cursor to the number of digits that need to be

adjusted, and then rotate the knob. At this time, the loaded load will change with the rotation of the knob.

4.1.6 Set system configuration

The DC electronic load offers many practical functions, such as Von point, Current limit, and Auto Load On. To utilize these powerful features, you can set the relevant parameters in the system configuration according to your application needs. Under the main screen, press [SYS] to enter the system settings interface, as shown in Figure 4-11, and use the [Direction Keys] to move the cursor up or down.

Figure 4-11 Main interface of SYS system Settings

The main interface of the system Settings contains seven function groups, each group is described as follows:

Panel Setup：Set the conventional system parameters of the electronic load
Load Setup：Set the operating parameters of the electronic load
Communication：Set the electronic load communication parameters
Program Setup：Electronic load program function setting
LIST Setup：Electronic load list mode parameter setting
Restore Factory：Restore factory Settings
Version Message：View the electronic load information

The following details the definition and setting methods of each function group parameters.
In the system Settings main interface of Figure 4-11, move the cursor up and down to select the next level directory to enter. After determining it, press the [ENTER] key to enter the selected function group for parameter setting. The background color of the selected column will turn blue.

4.1.6.1 Pannel Setup Parameter Settings

After entering this function group, the interface of this function group is shown in Figure 4-12. The parameters in this function group are mainly the conventional system item settings of the

electronic load. The detailed explanations of each setting are as follows. The options with blue font indicate the default system options.

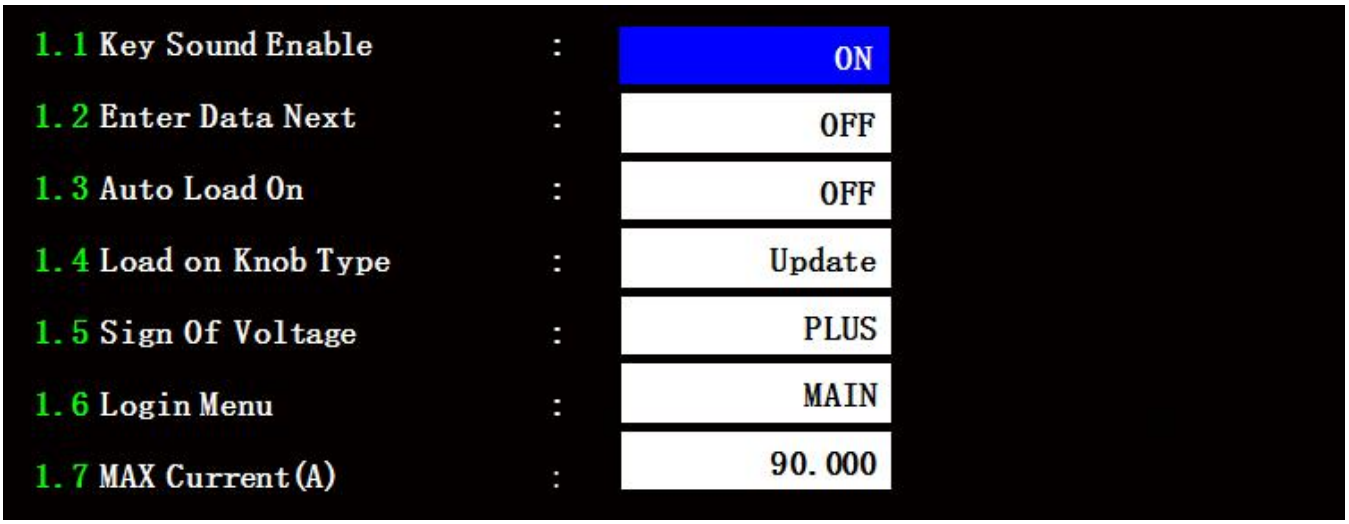


Figure 4-12 Panel Setup Settings interface

Key Sound Enable : ON button sound on; OFF button sound off.

Enter Data Next: ON Press the Enter key to move the cursor to the next Settings bar;

The cursor does not move after the OFF carriage return key is pressed.

Auto Load ON: After the ON load is turned on, the parameters before the previous shutdown are automatically called;

The OFF load is not loaded after startup.

Load ON Knob Type: **Update indicates that after LOAD ON, the rotation knob can change the current loading value;**

When the load is ON, the knob cannot change the loading value, according to Old.

Sign Of Voltage: Plus uses absolute value to display data;

Minus The minus sign occupies the first display position.

Login Menu: Select the mode to enter after startup. MAIN, enter the normal mode after startup;

Prog, enter the program running mode after startup. (Production line use)

MAX Current: Set the maximum current value loaded in CC mode.

4.1.6.2 Load Setup Parameter Settings

After entering this function group, the interface of this function group is shown in Figure 4-13. The parameters in this function group are mainly electronic negative
Load project Settings. The detailed description of each setting is as follows. The options in blue font are the default system options.

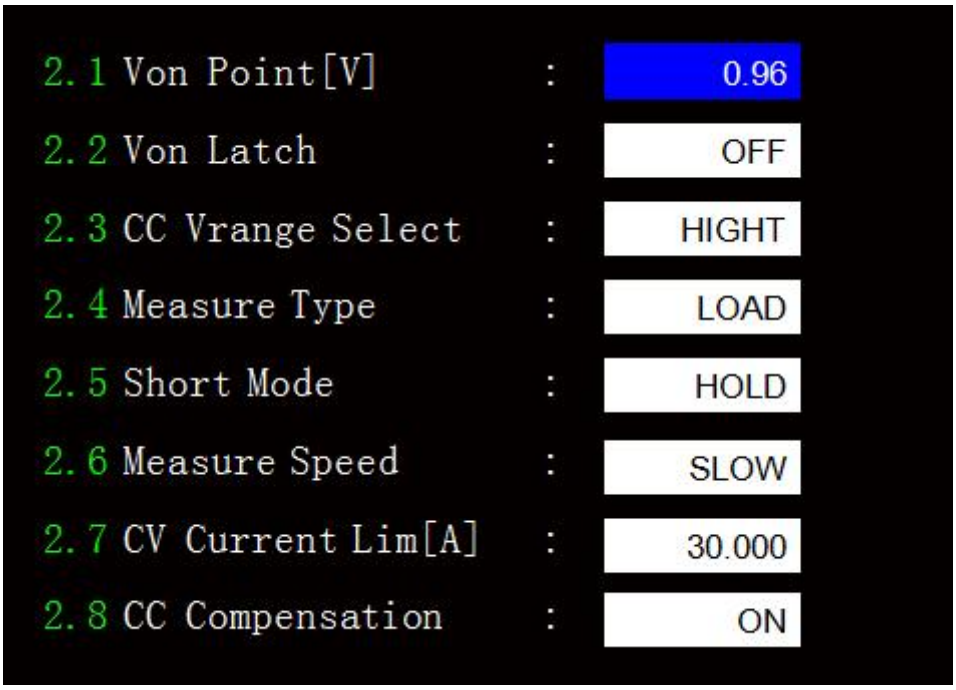


Figure 4-13 Load Setup Settings interface

Von Point[V]: Set the starting load voltage point. **The default value is 0.96V.**

Von Latch: Von lock switch. ON Von switch locked. When the input voltage of the load reaches the Von voltage, the load will be pulled, and even if the subsequent input voltage of the load is lower than the Von voltage, the load will still be loaded;

OFF Von The switch is not locked. When the load input voltage is lower than the Von voltage, the load stop pulling, and load when the Von voltage is higher.

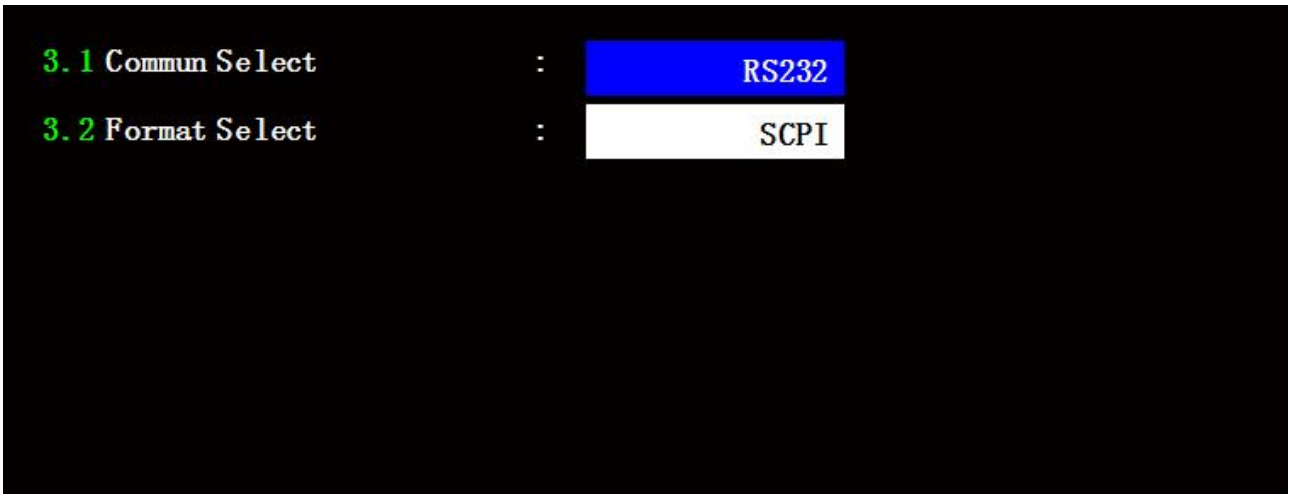
CC Vrange Select: CC mode voltage level selection. **The default is HIGH high.**

Measure Type: The UUT indicates that the voltage measurement is performed using the UUT port;

LOAD indicates that the measured voltage passes through the load.

Short Mode: **Hold indicates that the load is short-circuited after pressing the short circuit key, and the load is restored after releasing the short circuit key;**

Toggle indicates that the load short circuit mode is triggered after



pressing the short circuit button, and the short circuit is still executed when the short circuit button is released mode until you press the short circuit button again;

Measure Speed: **SLOW low-speed sampling, collect multiple data and take the average value to display more stable;**

MID for medium speed sampling, FAST for high speed sampling, real-time data display.

CV Current Lim[A]: Set the current limiting point of the electronic load in CV mode. **The default value is the maximum load current value. The same as the LM value in CV edit mode.**

CC Compensation: Software compensation switch. **ON, software compensation is on;**

OFF compensation is not used. It is mainly used for long-term load and loading value compensation when the temperature changes.

4.1.6.3 Communication Parameter Settings

After entering this function group, the interface of this function group is shown in Figure 4-14. The parameters in this function group are mainly electronic negative

Communication control parameter Settings are described in detail below. The options in blue font indicate the default system options.

Figure 4-14 Communication Settings screen

Commun Select: Select the communication port mode of the device (RS232/GPIB/LAN).

Format Select: The communication protocol (SCPI/Other) for selecting the device is set to SCSI by default.

Different communication modes require different parameters to be configured. After the user selects the communication mode, press the [ENTER] key to enter the parameter configuration of the relevant port.

RS232 communication parameter setting

Baud Rate: Port rate Settings. Default is 9600

Data Bit: Number of data bits. The load is preset to 8.

Parity: Odd-even parity Settings. None No parity; ODD Odd parity; EVEN Even parity.

Stop Bit: Stop the number of bits, and set the load preset to 1 bit

GPIB communication parameter Settings

GPIB Address : Set the GPIB address of the machine

LAN communication parameter setting

IP Address: Set the IP address of the device

Sub Mask: Set the SUB domain address

Gateway IP: Set the door address

Socket Port: Set the communication port number

4.1.6.4 Program Setup Settings

After selecting this function group, the interface of this function group is shown in Figure 4-16. The parameters in this function group are mainly electronic negative

Advanced features: Basic parameter Settings for programming mode. Detailed descriptions of each setting are as follows. The options in blue font indicate the default system options.

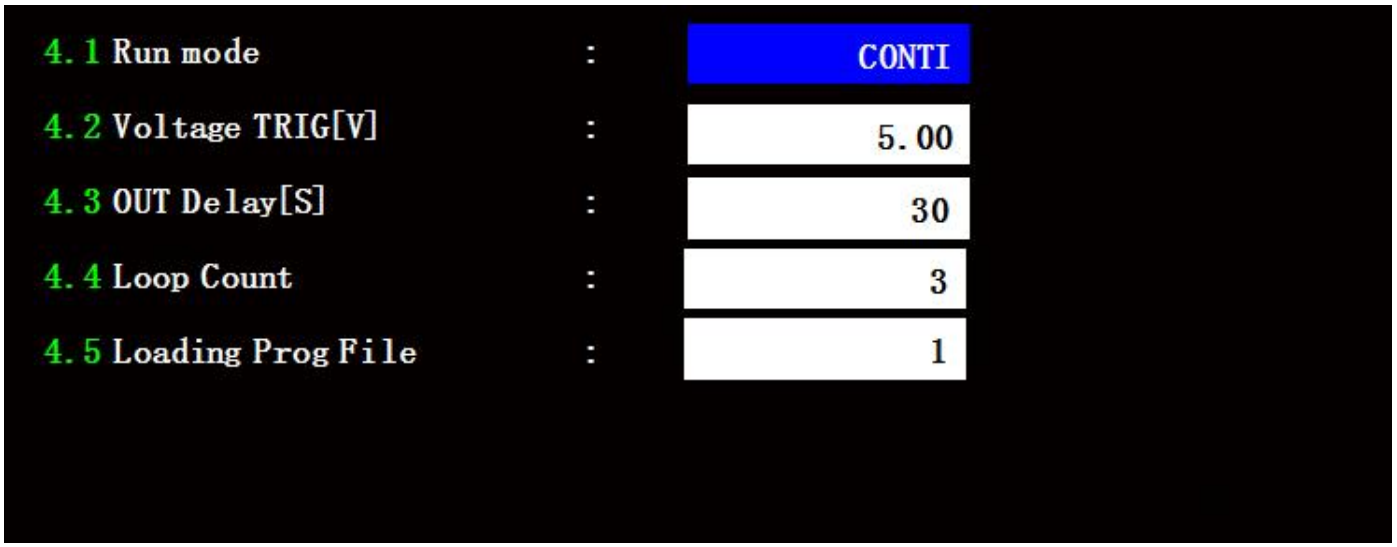


Figure 4-16 Electronic load programming Settings interface

Run mode : Sets the way a program runs.

ABORT: When the specification exceeds during the process of running the program, stop executing the remaining steps and jump out of the program;

CONT： When a program runs out of specifications, the program does not stop and continues to execute the remaining steps;

LOOP: The current program is not stopped after execution, and the program is repeated until the set number of cycles is reached.

During the operation of the program, the user can manually stop by pressing the LOAD key.

Voltage TRIG: Conditions for automatic testing. When the voltage sampled by the load exceeds the set value,

The load starts to automatically run the current program. (Valid in PROG mode)

OUT Delay[s] : After the program runs once, it will automatically start executing at the next time by default

It is 5S. Users set it according to their actual needs.

Out Delay[S]: Set the interval time of the program, in S

Loop Count: Set the number of times the program runs in a loop. The default is 1.

Loading Prog File : The name of the file currently being executed.

4.1.6.5 LIST Setup Settings

After selecting this function group, the interface of this function group is shown in Figure 4-17. The parameters in this function group are mainly electronic negative

Advanced features: Basic parameter Settings for LIST mode. Detailed descriptions of each setting are as follows. Options in blue font indicate the default system options.

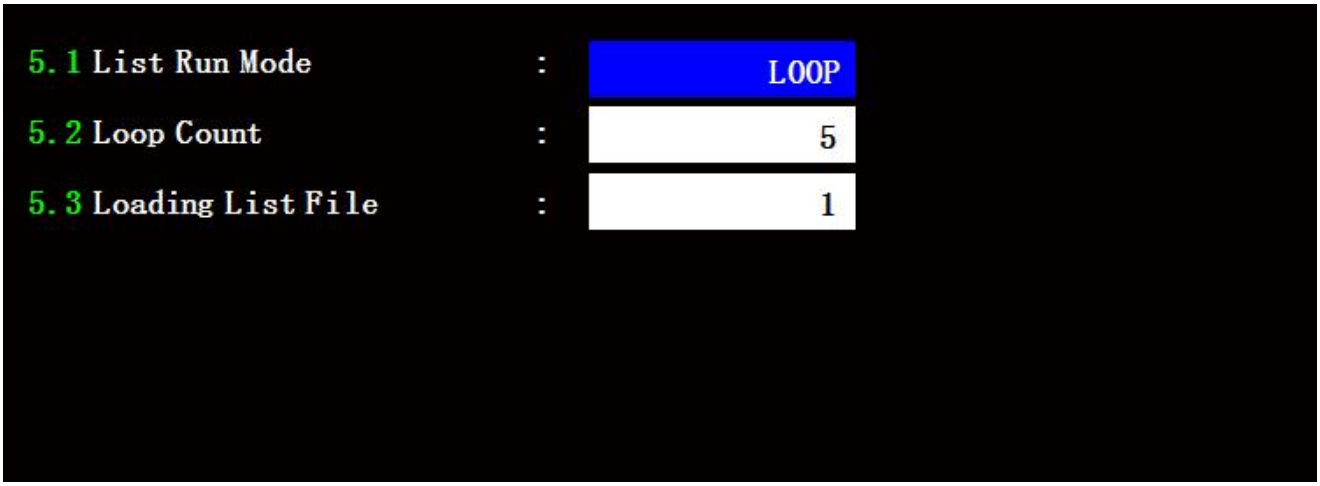


Figure 4-17 Electronic load programming Settings interface

List Run mode: Set the way a program runs. ONCE: Run the current program once; LOOP: Do not stop after the current program is executed, repeat until the set number of cycles is reached. During the running of the program, users can manually stop by pressing the LOAD key.

Loop Count: Set the number of times the program runs in a loop. The default is 1.

Loading Prog File: The name of the file currently being executed.

4.1.6.6 factory data reset

When the user's electronic load parameters are set in a chaotic manner, they can choose this function to restore all settings of the load to their factory default state. This function should not be operated lightly unless it is an emergency, as it may result in the loss of saved data. As shown in Figure 4-17, if YES is selected at this point, the factory settings will be restored; otherwise, no action will be taken.

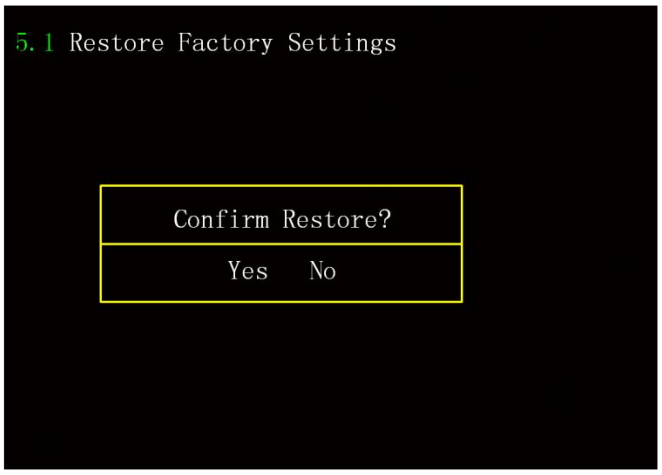


Figure 4-17 Electronic load recovery factory interface

4.1.6.7 Version information

The version information of this device can be queried through this function group. See Figure 4-18

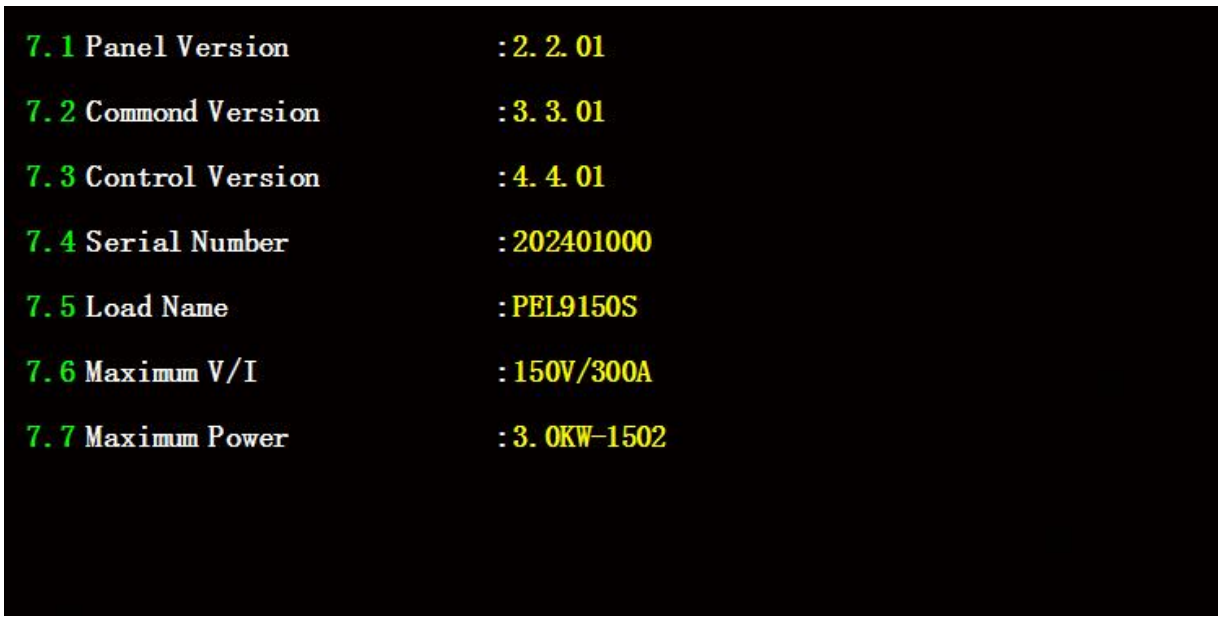


Figure 4-18 Electronic load version information

Panel Version : Display screen program version
Commond Version: Communication board program version
Control Version: Main control board program version.
Serial Number: Instrument serial number
Load Name: Instrument model
Maximum V/I : Maximum instrument voltage/current
Maximum Power: Maximum instrument power

5. Advanced operations

5.1 brief introduction

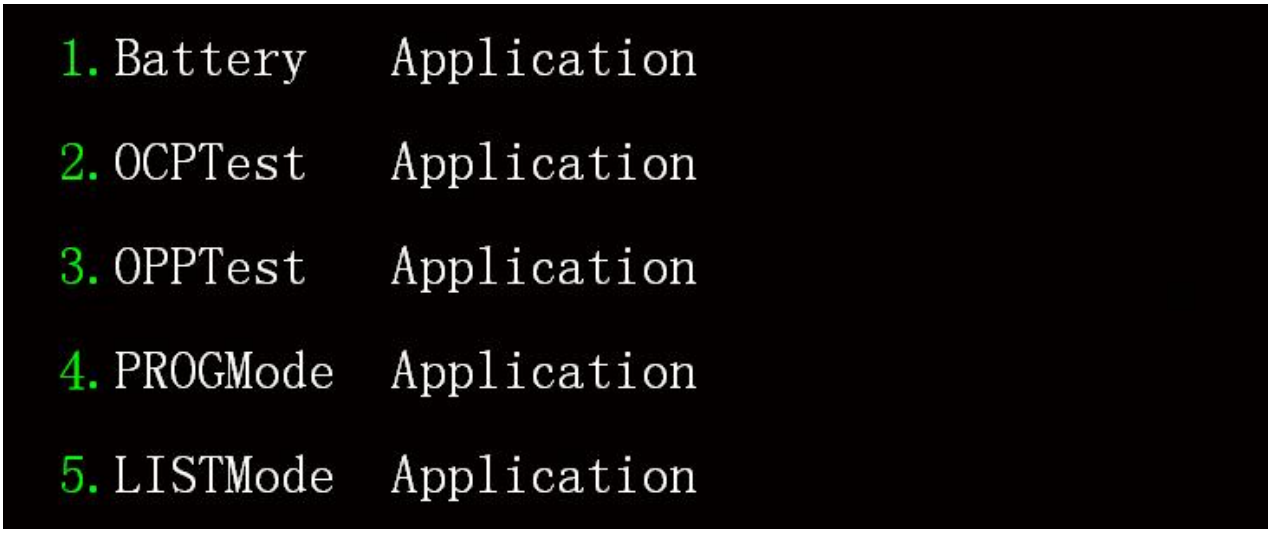
This chapter describes in detail how to operate the advanced functions of the electronic load from this panel and complete the test of specific functions.

5.2 Enter advanced mode

When using this series of programmable DC electronic loads, in addition to the routine operations introduced in Chapter Four, users can utilize some advanced features of the load to quickly and automatically complete specific functional tests. These advanced features include: simulated battery discharge testing, OCP fast testing, OPP maximum power point, and programming mode testing. More advanced features can be developed according to user requirements.

In the standby state of the electronic load, after the user selects the [FUNC] key on the keyboard, they can enter the advanced function options of the load. As shown in the figure below, customers can press the [ENTER] key according to the cursor position to enter each advanced function test screen. The test contents that each advanced function can complete are:

1. Battery Application : Simulated battery discharge test.
2. OCPTest Application : Test the overcurrent protection point function of power supply products.
3. OPPTest Application : Test the maximum power point function of the power supply product.
4. PROGMode Application: Programming patterns
5. LISTMode Application: List mode



5.3 Simulate battery discharge test

Select the Battery Application function, press the [ENTER] key to enter the setting interface of this function, as shown in the figure below:

Setting parameters description:

Mode: Load loading mode selection

ISET: load loading value

VEND: End discharge voltage point (discharge end condition is when the battery voltage is lower than the set value)

TOUT: Discharge time (S)

RR: load loading rise slope

FR: load unloading slope

For example, the battery to be tested is discharged at 3A, and the discharge cutoff condition is that the battery voltage is lower than 3.2V, and the total running time is 3600S.

Step1 Select the battery discharge mode

First, in the MODE column, press the [direction key] to select the loading mode. Users can choose different loading modes according to the required parameters. After selecting the loading mode, press the [ENTER] key to confirm that the current mode is CCL mode.

Step2 Set the discharge current value and cut-off discharge voltage

Stop the cursor in ISET setting column, press the number key to input "3", press [ENTER] to set the loading current value to 3A, stop the cursor in VEND setting column, press the number key to input "3.2", and press [ENTER] to set the stopping discharge loading voltage value to 3.2V.

Step3 Set the function jump time

Place the cursor on the TOUT settings bar, press the number keys to enter "3600" and then press [ENTER]. Set this function to have a maximum completion time of 3600S. If the product is loaded according to the 3A standard and the battery voltage remains above 3.2V after exceeding this time of 3600S, the test for this function will fail, and the system will pop up a message indicating that this function has failed. During this period, if the voltage drops below 3.2V, the program will automatically stop running and display the battery capacity value.

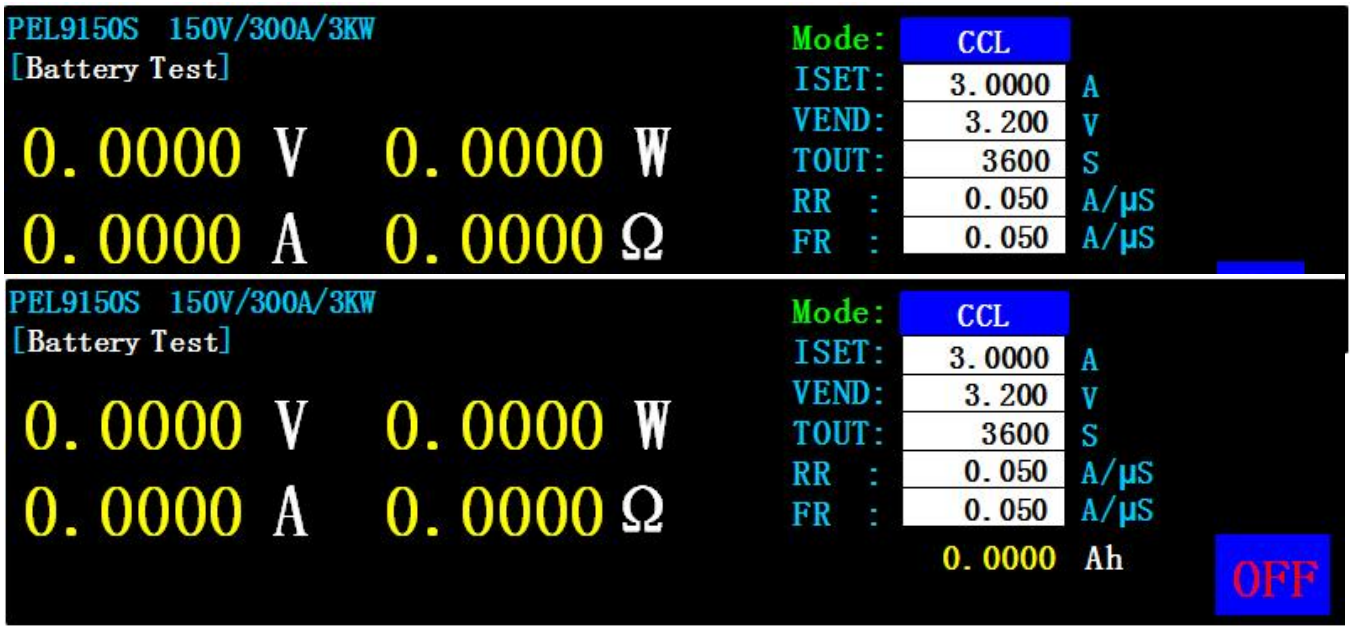
Step4 Set the rise and fall slope

Stop the cursor in RR Settings, press the number key to enter "0.05" and press [ENTER] to set the

rising slope to 0.05A/uS, stop the cursor in FR Settings, press the number key to enter "0.05" and press [ENTER] to set the falling slope to 0.05A/uS.

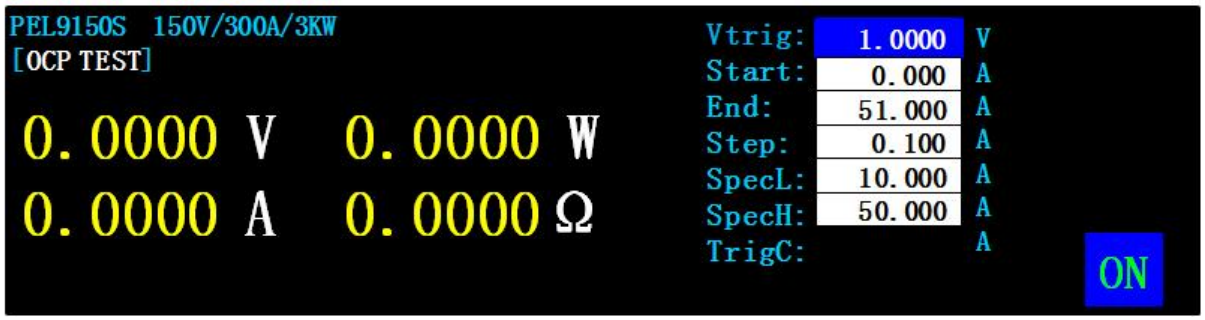
Step5 Start the test

After completing Step 1-Step 4, press the [Load] key. At this time, the load begins to test according to the parameters set above. After the test is completed, the test results and the specific discharge time of the battery are displayed as shown in the figure below



5.4 Overcurrent protection function test

Select the OCPTest Application function, press the [ENTER] key to enter the setting interface of this function, as shown in the figure below:



Setting parameters description:

Vtrig: Overcurrent protection judgment condition setting, the power supply voltage is lower than the set value to be regarded as the occurrence of protection function

Start: Overcurrent protection initial load current value

End: Overcurrent protection final load current value

Step: The value of the current change at each step

Specl: Lower limit of overcurrent protection point

SpecH: Upper limit of overcurrent protection point

TrigC: specific overcurrent protection point value

For example, the overcurrent protection function test of the power supply to be tested is carried out from 10A to 20A, with each step of current changing by 1A. The upper limit of the overcurrent protection point is 21A and the lower limit is 19A. The condition for judging the occurrence of overcurrent protection is that the voltage drops to 0.5V.

Step1 Set the conditions for determining the occurrence of overcurrent protection:

First, press the [direction key] to stop the cursor in the Vtrig column, and then press the numeric key to input "0.5" and press [ENTER] to set the OCP protection occurrence determination condition as the power supply voltage drops to 0.5V.

Step2 Set the start/end load current value

Stop the cursor in Strat Settings, press the number key to enter "10" and press [ENTER] to set the starting loading current value to 10A. Stop the cursor in End Settings, press the number key to enter "20" and press [ENTER] to set the ending loading current value to 20A.

Step3 Set the value of the changing current at each step

Stop the cursor in the Step Settings bar, press the number key to enter "1" and press [ENTER] to set the current change value of each step to 1A.

Step4 Set the upper/lower limit of OCP protection point specification

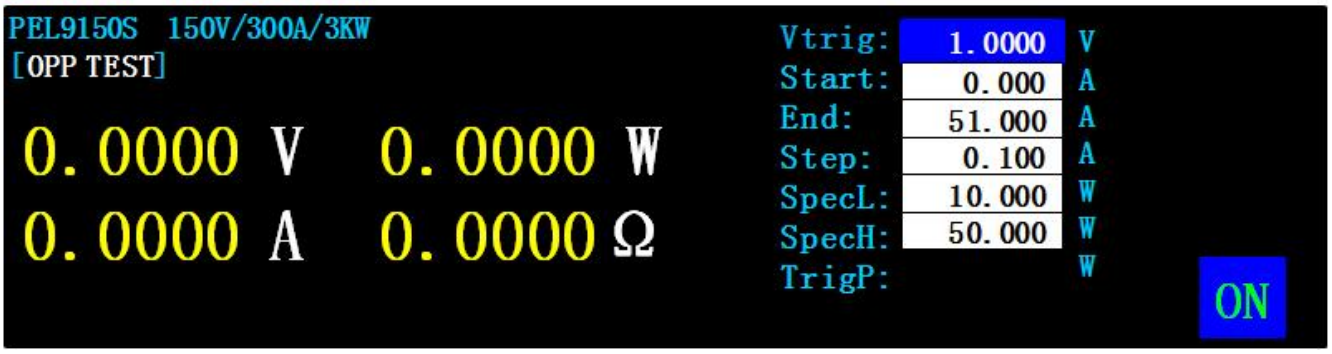
Stop the cursor in SpecL Settings, press the number key to enter "19" and press [ENTER] to set the lower limit of OCP protection point to 19A, and stop the cursor in SpecH Settings, press the number key to enter "21" and press [ENTER] to set the upper limit of OCP protection point to 21A.

Step5 Start the test

After completing Step 1-Step 4, press [Load]. At this time, the load begins to test according to the parameters set above, and the test results are displayed after the test is completed. The current point where the product occurs OCP is shown in the following figure

5.5 Overpower protection function test

Select the OPPTest Application function, press the [ENTER] key to enter the setting interface of this function, as shown in the figure below:



Setting parameters description:

Vtrig: Overpower protection judgment condition setting, the power supply voltage below the set value is regarded as the occurrence of protection function

Start: Start loading the current value

End: Final loading current value

Step: The value of the current change at each step

SpecL: lower limit of overpower protection point

SpecH: Upper limit of overpower protection point

TrigP: Power protection point

For example, the power supply under test performs the maximum power point function test, starting from 10A and ending at 200A. The current changes by 1A at each step. The upper limit of the maximum power point is 1900W and the lower limit is 2100W. The condition that causes overcurrent protection is that the voltage drops to 0.6V

Step1 Set the conditions for determining the occurrence of overpower protection:

First, press the [direction key] to stop the cursor in the Vtrig column, and then press the value key to input "0.6" and press the [ENTER] to set the determination condition of OPP protection as the power supply voltage drops to 0.6V.

Step2 Set the start/end load current value

Stop the cursor in Strat Settings, press the number key to enter "1" and press [ENTER] to set the starting load current value to 1A,

Stop the cursor in the End Settings column, press the number key to enter "20" and press [ENTER] to set the end load current value to 20A.

Step3 Set the value of the changing current at each step

Stop the cursor in the Step Settings bar, press the number key to enter "0.5" and press [ENTER] to set the step current change value to 0.5A.

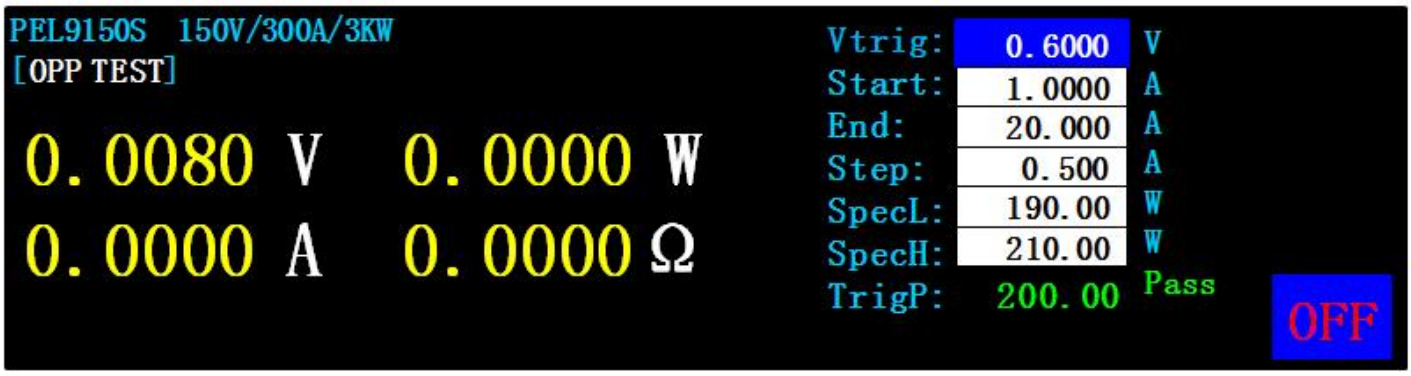
Step4 Set the upper/lower limit of maximum power point specification

Make the cursor stop in SpecL Settings, press the number key to enter "190", and press [ENTER] to set the lower limit of the maximum power protection point to 190W. Make the cursor stop in SpecH Settings, press the number key to enter "210", and press [ENTER] to set the upper limit of the maximum power protection point to 210W.

Step5 Start the test

After completing Step 1-Step 4, press [LOAD]. At this time, the load begins to test according to

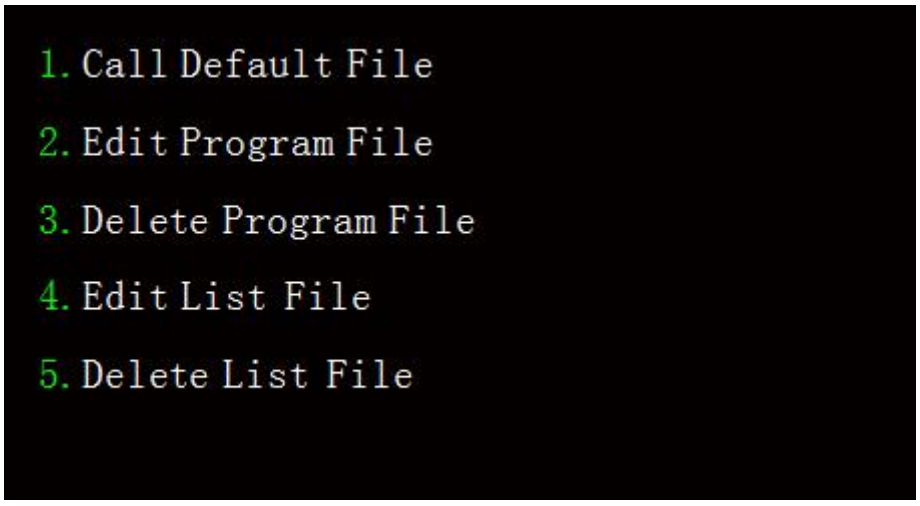
the parameters set above. After the test is completed, the test result is displayed: product overpower protection point. As shown in the figure below



The PROGRAM mode primarily provides an automatic operation for various load conditions, automatically collecting voltage and current parameters at each step. It then compares these values with pre-set standard values to automatically determine whether the test results meet the specifications. This function is mainly used for production testing, R&D testing, etc. Below, we will provide a detailed introduction to the PROGRAM function of this load.

5.6.1 edit routine

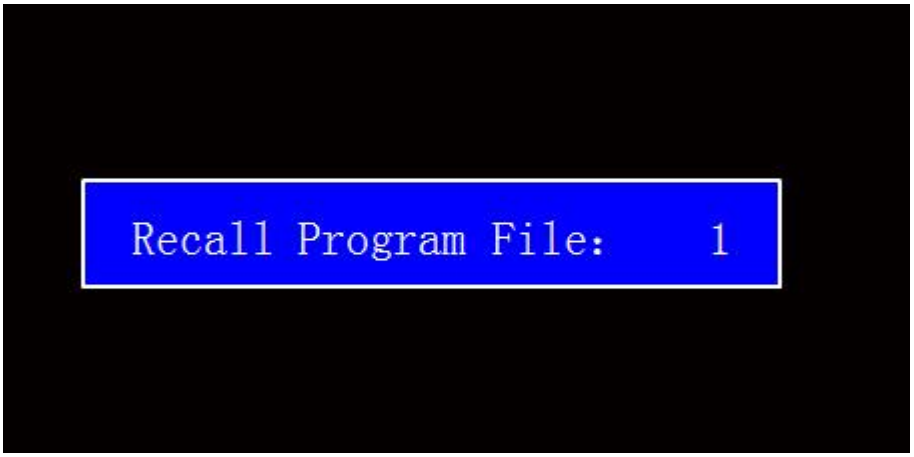
STEP1: The user presses the [RECALL] on the front panel of the electronic load while the load is in standby mode Key, and the following window is displayed:



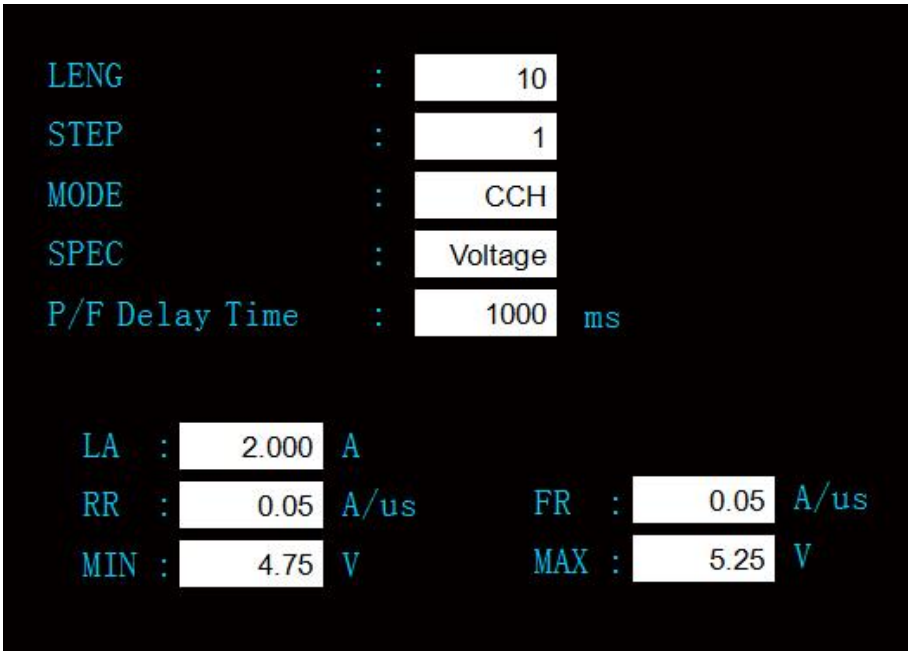
parameter declaration:

1. Call Default File : Call the default parameter configuration file.
2. Edit Program File : Edit the test program file
3. Delete Program File : Delete the test program file
4. Edit List File : Edit the program file in LIST mode
5. Delete List File : Delete program files in LIST mode

STEP2: After selecting the Edit Program File menu, press the [ENTER] key to confirm and enter the next window:



STEP3: The user enters the program file (1-20) to be called, and enters the program editing window after pressing the [ENTER] key, as follows:



Programming window parameter description:

LENG: Set the number of steps included in the current program. Enter a number between 1 and 50, with a maximum of 50 steps per program

STEP: The current editing step. (The value entered can only be less than or equal to LENG)

Note: The parameter setting content below the STEP column corresponds to the number of steps in the STEP

MODE: In the current step, the load loading mode is selected by pressing the [direction key] and confirmed by pressing the [ENTER] key. There are the following Several options.

CCL: fixed current low mode; CCH: fixed current high mode; CCDL: dynamic fixed current low mode;

CCDH: dynamic fixed current high mode; CRL: fixed resistance low mode; CRH: fixed resistance high mode;

CVL: fixed voltage low mode; CVH: fixed voltage high mode; CPL: fixed power low mode;

CPH: set power high mode; SHORT: short circuit mode; LOAD OFF: no load mode;

SPEC: Parameters for determining the upper and lower limits of specifications. Select with left and right cursor keys, and press Enter to confirm. There are several options.

Voltage: voltage specification; Current: current specification; Reis: resistance specification; Power: power specification; NA: no judgment

P/F Delay Time: Sampling delay time. That is, after running the set delay time, the load performs the corresponding specification judgment.

LA: Load value. Different units are used for different modes

RR: The rising slope is set

FR: Set the slope of decline

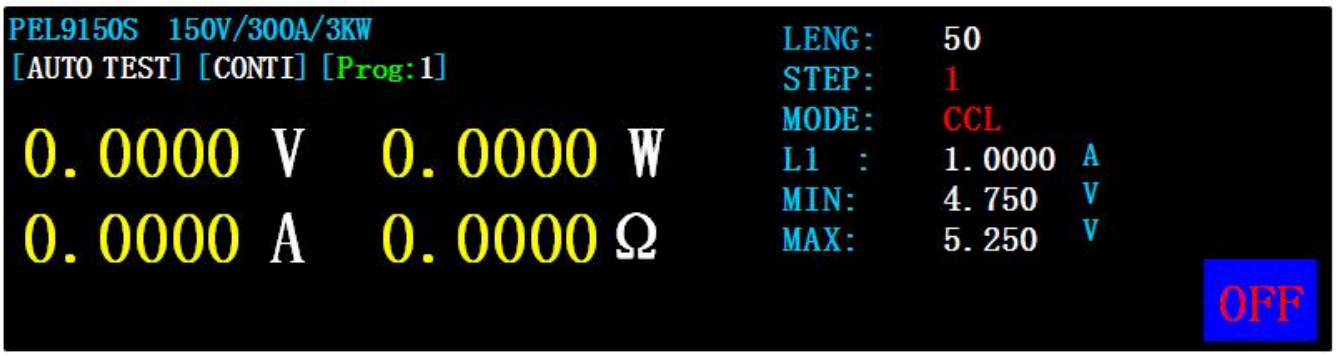
MIN: Lower limit of specification

MAX: Specification upper limit setting

After editing a step, the user can use the up and down cursor to move to the STEP column, change the step value, complete the current step setting, repeat this action, and complete the current program editing work.

STEP4: Save the program. After editing all the contents of the program, press the [SAVE] key to save the edited program.

STEP5: Call the program. Under the standby window, the user presses the [FUNC] key to enter the menu selection and selects the fourth item: PROGMode Application, that is, enter the program running window as follows:



STEP5: Run the program. After the program is called, the user can press the [LOAD] key to start the automatic program test. After the test, the left display area will show the test result as PASS or FAIL, accompanied by an audio prompt. A beep indicates PASS, while a long beep indicates FAIL. The user can press the [EXIT] key to eliminate the alarm.

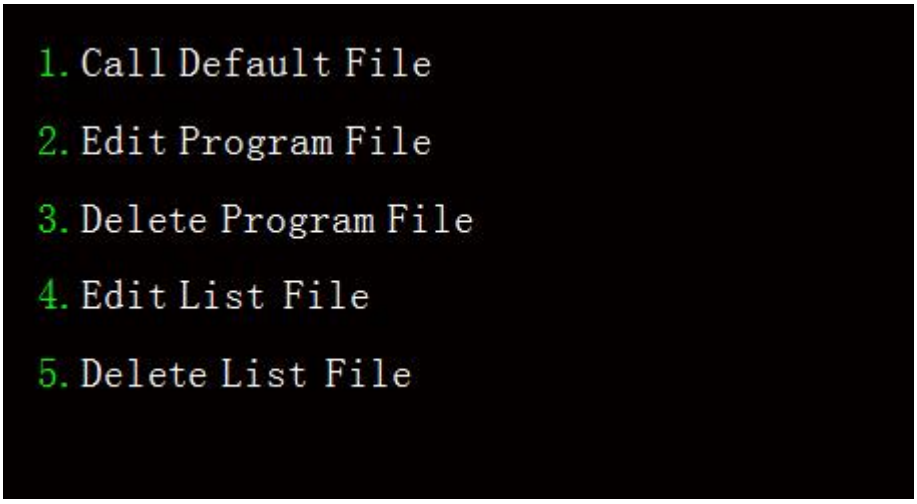
5.7 LIST pattern

The LIST mode is designed to provide users with the ability to continuously run multiple load conditions automatically. This feature is primarily used for durability testing in development. The

following describes the LOAD LIST function.

5.7.1 Edit the LIST program

STEP1: The user presses the [RECALL] on the front panel of the electronic load while the load is in standby mode Key, and the following window is displayed:

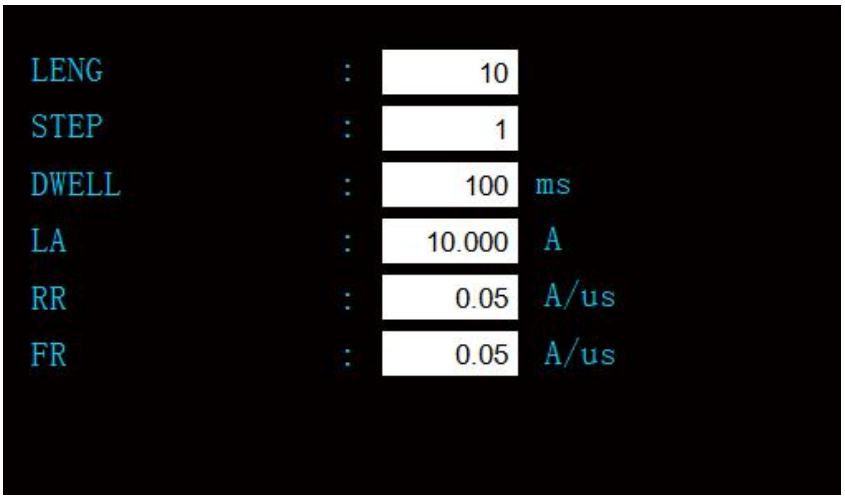


parameter declaration:

1. Call Default File : Call the default parameter configuration file.
2. Edit Program File : Edit the test program file
3. Delete Program File : Delete the test program file
4. Edit List File : Edit program files in LIST mode
5. Delete List File : Delete program files in LIST mode

STEP2: After selecting the EDIT List File menu, press the [ENTER] key to confirm and enter the next window:

STEP3: The user enters the LIST program file (1-20) to be called, and enters the LIST program editing window after pressing the [ENTER] key, as follows:



Programming window parameter description:

LENG: Set the number of steps included in the current program. Enter a number between 1 and 50, with a maximum of 50 steps per program

STEP: The current editing step. (Enter values that are less than or equal to LENG)

Note: The parameter setting content below the STEP column corresponds to the number of steps in the STEP

DWELL: Load time.

LA: Load value. Different units are used for different modes

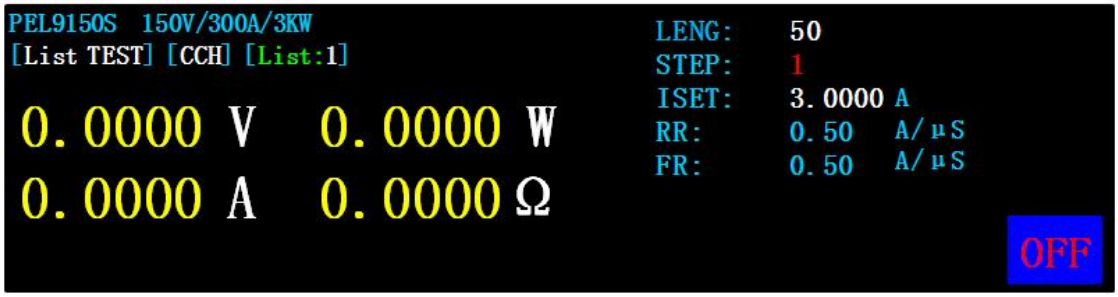
RR: The rising slope is set

FR: Set the slope of decline

After editing a step, the user can use the up and down cursor to move to the STEP column, change the step value, complete the current step setting, repeat this action, and complete the current program editing work.

STEP4: Save the program. After editing all the contents of the program, press the [SAVE] key to save the current edited LIST file.

STEP5: Call the program. Under the standby window, the user presses the [FUNC] key to enter the menu selection and selects the fifth item: LISTMode Application, that is, enter the program running window as follows:



STEP5: Run the program. After the program is called, the user can press the [LOAD] key to start the automatic LIST test program.

Warranty Card

What the warranty covered:

If the machine break down due to its defectiveness, MATRIX will provide free maintenance during warranty period. If the machine break down due to wrong operation or carelessness, then Matrix provide paid service within warranty period.

How long does this warranty last:

This warranty lasts for 1 year from the date of original purchase of all MATRIX branded products.

Who is covered:

This warranty covers only the original purchaser of this product. This warranty is not transferable to subsequent owners or purchasers of this product.

What do customers need to do to get repairs/service under the warranty policy?

If the machine get problem, please contact our local distributor. If you cannot find the local distributor, you can contact us directly, our email is service@szmatrix.com, our telephone No. is 0086 755 2836 4276.

What information do customers need to supply?

Model No.	
Serial No.	
Problem description	
Picture	
Video if necessary	