East Tester®

ET5420 double channel Programmable DC power load User manual

Hangzhou Zhongchuang Electron Co.,Ltd

Basic Information

ET54 series single/double channel programmable dc electronic load, USES the high performance chip, high speed, high precision design, provide 1mV、1mA resolution, superior performance, can be widely applied to the charger, switching power supply, linear power supply, production test of all kinds of batteries and other industries, scientific research institutions such asthe test research and development.

Product features:

humanized design.

2.8-inch TFT LCD display, rich display content, support Chinese and English display;
Simple and convenient operation process, with intuitive interface display system, easy to use;
It has the function of key lock to prevent misoperation.

high-performance load:

The basic measurement modes of CC, CV, CR, CP, CC+CV, CR+CV are provided.

Provide professional battery test and LED test;

Dynamic test mode, can test the dynamic power output performance;

Scanning test mode can test the continuity of power output within a certain range.

List mode, which can simulate various loaded state changes;

Short circuit test for simulating load short circuit;

The measurement model of the far end can improve the measurement accuracy when the current is high.

Support external trigger input;

Built-in buzzer alarm;

Power off to maintain data storage function;

Remote operation can be carried out through RS-232 interface and USB Device interface.

With PS2 interface, support external keypad to set data values;

safety protection:

With over voltage, over current and overpower protection functions, over voltage and over current parameters can be set flexibly to effectively protect the load.
It has the function of secondary over-temperature protection to realize the double over-temperature protection of software and hardware.

It has the function of intelligent fan speed control, which can effectively reduce the working fan noise.
With output polarity reverse protection;

General technical specifications:

Power voltage: 220Vac±10%, optional 110Vac±10%, 45-65hz
Display: 2.8-inch TFT LCD, resolution 320 x 240
Operating temperature: 0 ℃ to 40 ℃
Storage temperature: - 10 ℃ to 70 ℃
Relative humidity: < 80%
Interface: standard USB Device, RS232(or 485)
Size: 90mm * 190mm * 300mm (width * height * depth)

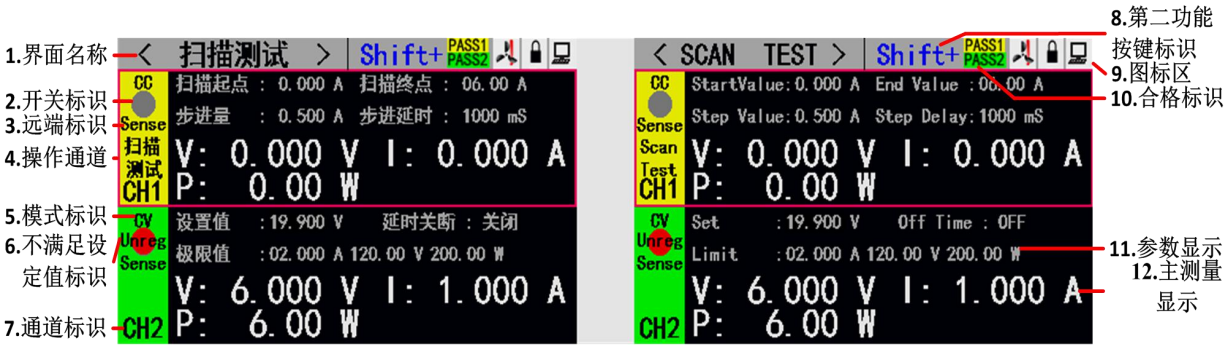
Standard accessories:

One three-core power cord
Two power fuses
1 user manual

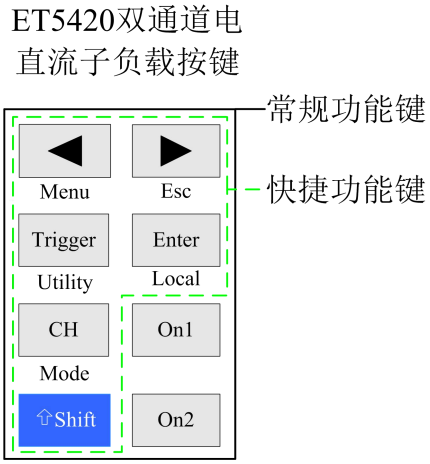
Catalog

一、Quick Reference

1.1 Front Panel



1.2Front Panel Press



1.3 Key Manual

General function key		Shortcut function key	
CH	CH1/CH2 switching	Shift+Menu	Non-basic mode parameter settings
On1、On2	CH1/CH2 switch key	Shift+Esc	return
Trigger	Trigger key	Shift+Mode	Mode selection
Enter	Enter	Shift+Utility	System common settings
◄ ►	Cursor left and right keys	Shift+Local	Remote local switching
Shift	Shift overlay		

二、Function Operation

Before testing the pending test source by load, In order to ensure the stable and safe operation of the load, please be sure that after connecting the load and pending testing source by the way of red positive and black negative, turn on power output firstly , then turn on the load.

2.1 Remote/ Local Switch Operation

When the load is working under remote control operation mode, there will be a corresponding icon showing in the top line of the interface, then interface is locked. This action could be controlled and operated by the PC instruction . Also users can press the button 【Shift】 + 【 Enter 】 simultaneously to switch to the Local operating mode.

2.2 System Setting Operation

Press [Shift] + [Trigger] (Utility) to enter the system menu interface as shown in Figure 2.2.1. Rotate the knob to select and enter the corresponding submenu. In the system setting interface, you can complete operations such as language, factory reset, power-on settings, etc. The system interface is shown in Figure 2.2.2.

Operation instructions: 1. Select the operation item by turning the knob. 2. Press [Enter] to enter the submenu interface or switch the contents of the operation item. 3. Press [Shift] + [▶] (Esc) to return to the previous interface.

Fig-2.2.1 Interface of System Setting

Fig 2.2.2 Interface of System Setting

2.3 Load Setting Operation

Through the system menu, you can enter the load setting interface, as shown in Figure 2.3. In this interface, the relevant settings for the load range, limit value, delay off, etc. can be completed.

Operation instructions: 1. Select the operation item by turning the knob. 2. Non-numeric parameters Press [Enter] to switch the setting options. 3. Digital parameter, press [Enter] to enter the edit mode, use the arrow keys to select the corresponding number of digits, then rotate the knob to adjust the value, [Enter] to confirm the input. 4. Press [Shift] + [▶] (Esc) to return to the previous interface.

Fig - 2.3 Interface of Load Setting

2.4 Basic Operation

Programmable electronic Load can work under these basic measurement mode: Constant current mode (CC), constant voltage mode (CV), constant resistance mode (CR), constant power mode (CP), constant voltage mode (CC+CV), constant resistance mode (CC+CR). All these mode could be set through button of 【Mode】【Enter】【Esc】 on the testing display.

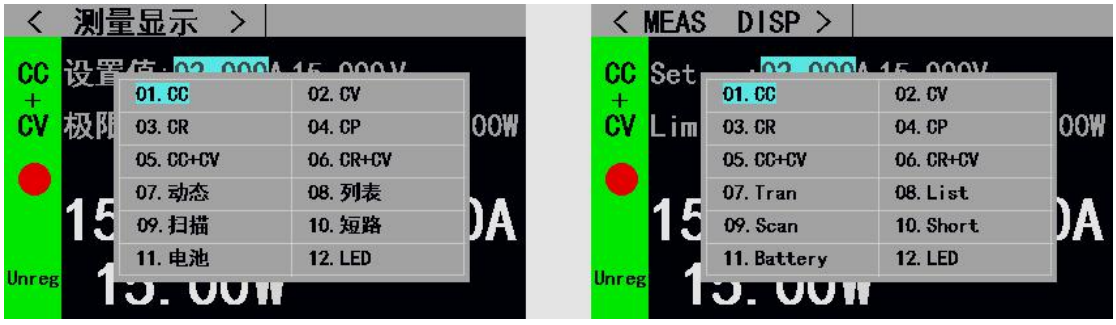


Fig -2.4 Interface of Mode Selection

2.4.1 Constant Current Measurement Mode

In constant current mode, the electronic load consumes a constant current regardless of whether the input voltage changes.

Operation instructions: 1. Press the [CH] key to select the operation channel; 2. Select the operation item by rotating the knob; 3. Set the parameters. Press [Enter] to enter the edit mode, use the arrow keys to select the corresponding number of digits, then adjust the value by turning the knob, [Enter] or [Shift] + [▶] (Esc) to exit editing; 4. Press the corresponding [On1], [On2] startup mode.

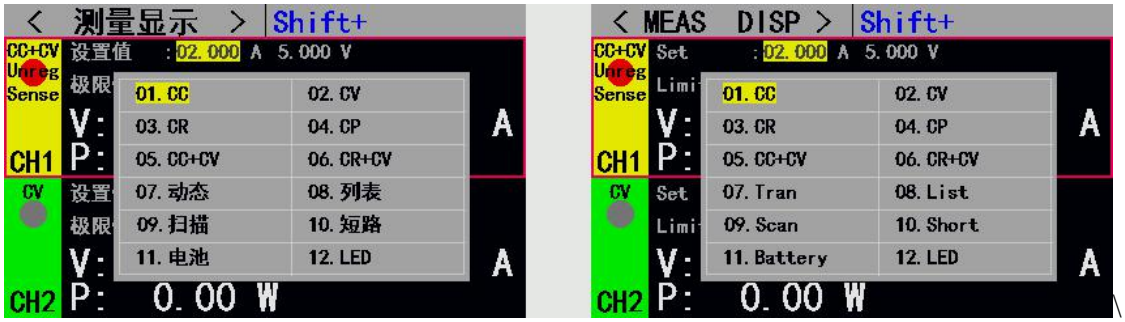


Fig-2.4.1 Constant Current Test Mode

2.4.2 Constant Voltage Measurement Mode

In constant voltage mode, the electronic load will consume enough current to maintain the input voltage at the set voltage.

Operation instructions: 1. Press the [CH] key to select the operation channel; 2. Select the operation item by rotating the knob; 3. Set the parameters. Press [Enter] to enter the edit mode, use the arrow keys to select the corresponding number of digits, then adjust the value by turning the knob, [Enter], [Shift] + [▶] (Esc) to exit editing; 4. Press the corresponding [On1], [On2] startup mode.

Fig- 2.4.2 Constant Voltage Measurement Mode

2.4.3 Constant Resistance Measurement Mode

In constant resistance mode, the load is equivalent to a constant resistance, and the load will consume a correspondingly varying current as the input voltage changes.
Operation instructions: 1. Press the [CH] key to select the operation channel; 2. Select the operation item by rotating the knob; 3. Set the parameters. Press [Enter] to enter the edit mode, use the arrow keys to select the corresponding number of digits, then adjust the value by turning the knob, [Enter] or [Shift] + [▶] (Esc) to exit editing; 4. Press the corresponding [On1], [On2] startup mode.

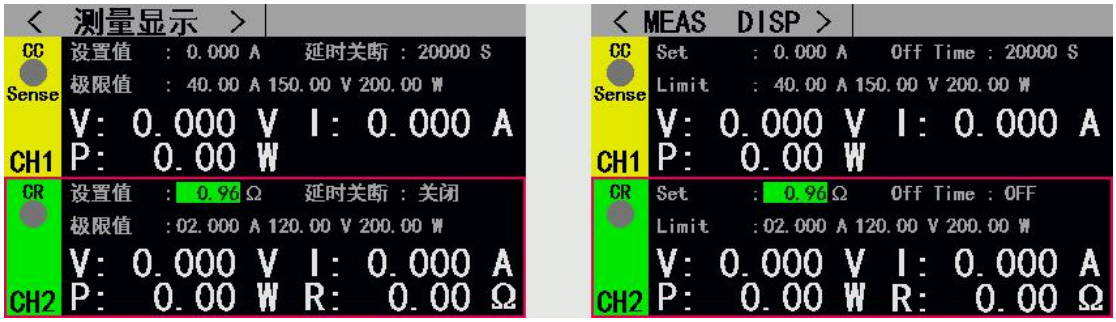


Fig - 2.4.3 Constant Resistance Measurement Mode

2.4.4 Constant Power Measurement Mode

In constant power mode, the load consumes a constant amount of power. When the input voltage changes, the load will adjust the current to maintain the power consumption at the set power value.
Operation instructions: 1. Press the [CH] key to select the operation channel; 2. Select the operation item by rotating the knob; 3. Set the parameters. Press [Enter] to enter the edit mode, use the arrow keys to select the corresponding number of digits, then adjust the value by turning the knob, [Enter] or [Shift] + [▶] (Esc) to exit editing; 4. Press the corresponding [On], [On2] startup mode.

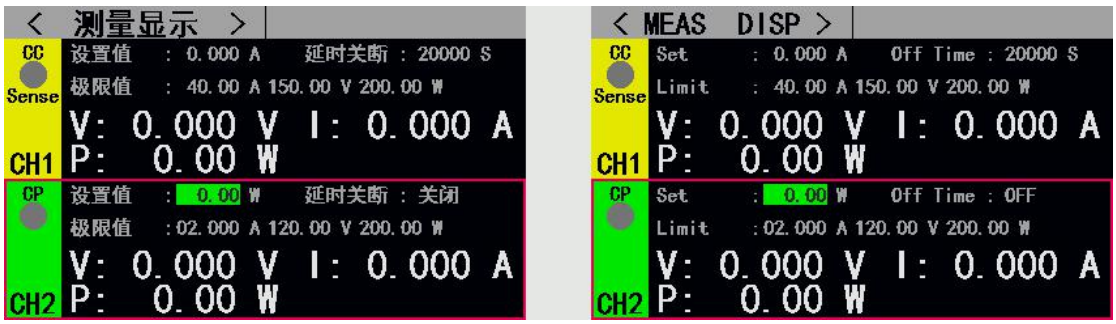


Fig 2.4.4 Constant Power Measurement Mode

2.4.5 Constant Current Switch to Constant Voltage Measurement Mode

The constant current voltage measurement mode is to prevent damage to the source under test due to overcurrent discharge. In this mode, when the source to be tested cannot output the current value set by the load, it will automatically switch from the constant current mode to the constant voltage mode.
Operation instructions: 1. Press the [CH] key to select the operation channel; 2. Select the operation item by rotating the knob; 3. Set the parameters. Press [Enter] to enter the edit mode, use the arrow keys to select the corresponding number of digits, then adjust the value by turning the knob, [Enter], [Shift] + [▶] (Esc) to exit editing; 4. Press the corresponding [On1], [On2] startup mode.

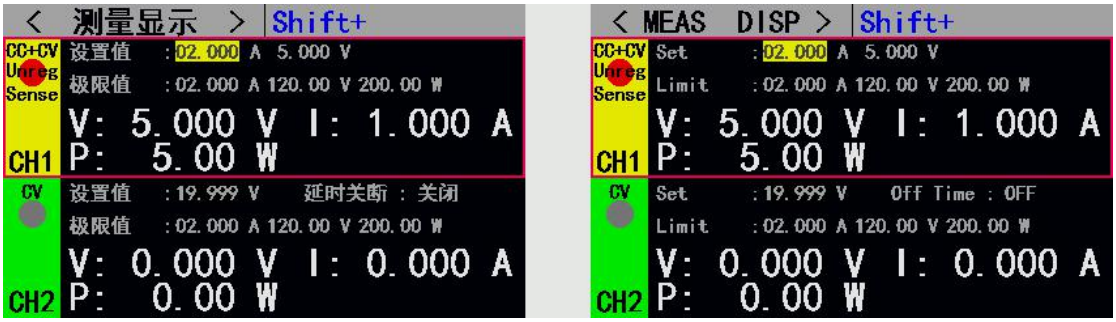


Fig 2.4.5 Constant Current Switch to Constant Voltage Measurement Mode

2.4.6 Constant Resistance Switch to Constant Voltage Measurement Mode

The constant resistance voltage measurement mode is to prevent damage to the source to be tested due to overcurrent discharge. In this mode, when the source to be tested cannot output enough current to maintain the set resistance, the load will change from constant resistance mode to constant voltage mode.
Operation instructions: 1. Press the [CH] key to select the operation channel; 2. Select the operation item by rotating the knob; 3. Set the parameters. Press [Enter] to enter the edit mode, use the arrow keys to select the corresponding number of digits, then adjust the value by turning the knob, [Enter], [Shift] + [▶] (Esc) to exit editing; 4. Press the corresponding [On1], [On2] startup mode.

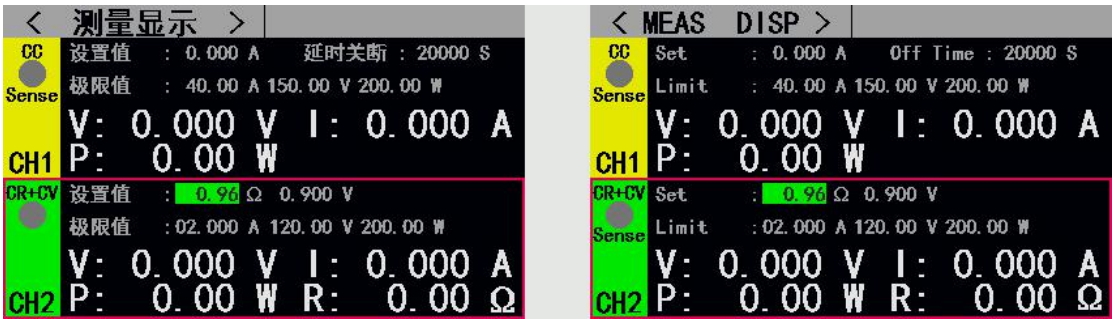


Fig 2.4.5 Constant Resistance Switch to Constant Voltage Measurement Mode

2.5 Dynamic Test Operation

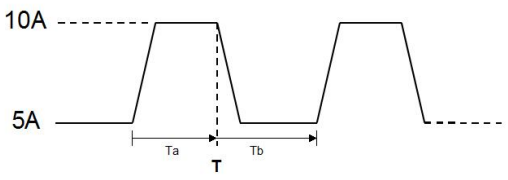
The dynamic test operation can be repeatedly switched between two load setting currents or voltages. This function can be used to test the dynamic characteristics of the power supply. Before starting the dynamic test operation, the dynamic test related parameters need to be set. The specific setting parameters include: dynamic load state, A value, A value pulse width time, B value, B value pulse width time, dynamic test mode, setting interface and test interface. See Figures 2.5.1 and 2.5.2, respectively.

Parameter setting interface operation instructions: 1. After entering the dynamic test main interface through the [Mode] key, press [Shift] + [◀] (Menu) to enter the parameter setting interface of the dynamic test. 2. Rotate the knob to select the operation item; 3. Press the [Enter] key to switch the setting option; 4. For the numeric parameter, press the [Enter] key to enter the editing mode, select the corresponding digit by the direction key, and then rotate Knob adjust the value, [Enter] or [Shift] + [▶] (Esc) to exit editing; 5. Press [Shift] + [▶] (Esc) to return to the previous interface.

Test interface operation instructions: Press the corresponding [On1], [On2] to start or close the mode.

Among them, the dynamic test mode can be divided into three types: continuous mode, pulse mode and trigger mode, as follows:

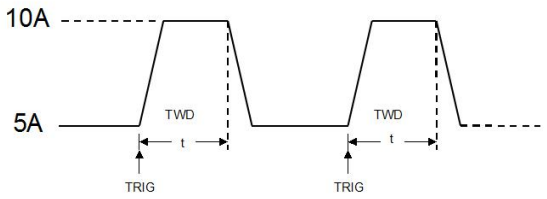
Continuous mode: In this mode, after the test is started, the load can continuously switch between the A value and the B value.



连续操作模式

Continuous operation mode

Pulse mode: In this mode, after the test is started, the load will switch from the A value to the B value every time a trigger signal is received, and then switch to the A value after maintaining the B value pulse width time.



脉冲操作模式

Pulse mode

Trigger mode: In this mode, after the test is started, the load switches between the A value and the B value every time a trigger signal is received. In this mode, setting the pulse width will not work.

触发操作模式

Trigger mode of operation

Fig 2.5.1 Dynamic Setting Interface

Fig 2.5.2 Dynamic Test Interface

2.6 List Testing Mode

The list test function can conveniently test the working condition of the source to be tested under different load conditions, which is beneficial to the automatic test of the production line. By pre-setting the steps of the list test, the test steps and test parameters of the source to be tested can be edited into a list and a series of tests can be completed in order. Specific setting parameters include: setting the number of steps, stepping mode, cycle switch, load mode of each step, load size, delay time, comparison switch, upper limit value, lower limit value.

In the list test interface, press [Shift] + [◀] (Menu) to enter the list menu interface, adjust the knob to select the corresponding option, press [Enter] to enter the corresponding submenu.

Fig 2.6 List Menu Interface

The setup interface and test interface are shown in Figure 2.6.1 and 2.6.2 respectively, and the test end test result interface is shown in 2.6.3.

List test setting interface operation instructions: 1. Select the operation item by rotating the knob; 2. Edit the parameter by switching the direction key to the editing state, select the previous page or the next page with the direction key and press [Enter] to proceed. Page turning operation, press the arrow key to save and press [Enter] to enter the list test parameter saving interface; 3. In the editing state, press the [Enter] key to switch the setting option; 4. Edit the digital parameter in the state, press [Enter] 】Enter the edit mode, use the arrow keys to select the corresponding number of digits, then rotate the knob to adjust the value, [Enter] or [Shift] + [▶] (Esc) to exit editing; 5. Press [Shift] + [▶] (Esc) returns to the previous interface;

Test interface operation instructions: Press the corresponding [On1], [On2] to start or close the mode.

Fig 2.6.1 List Set Interface

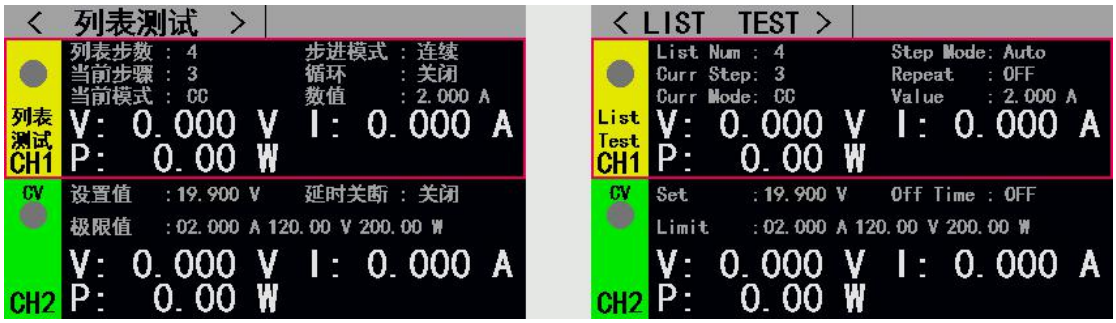


Fig 2.6.2 List Test Interface

Fig 2.6.3 List Result Interface

List test result save interface operation instructions: 1. Select the file by rotating the knob; 2. Use the arrow keys to switch to the edit state to edit the file. Select the previous or next page with the arrow keys and press [Enter] to proceed. Page turning operation; 3. In the editing state, select the operation of storing, reading and deleting files by rotating the knob, press [Enter] to enter the file naming interface, call the file, delete the file; 4. Press [Shift] + [▶] (Esc) returns to the previous interface;

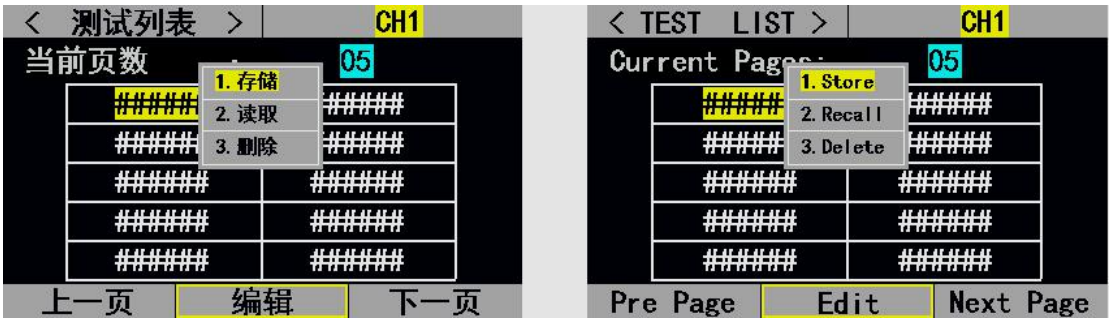


Fig 2.6.4 File List Setting Parameter Storage Interface

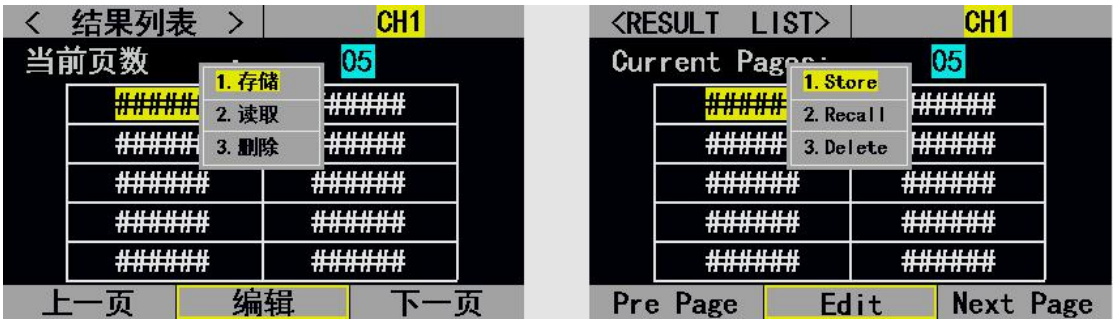


Fig 2.6.5 File List Result Storage Interface

File naming interface operation instructions: 1. Use the arrow keys to switch to the editing state to edit the file file, switch to save and press [Enter] to save the file, if it is a null character, report an error; 2. Edit the character by rotating the knob Press [Enter] to type the character; 3. Press [Esc] to return to the previous interface;

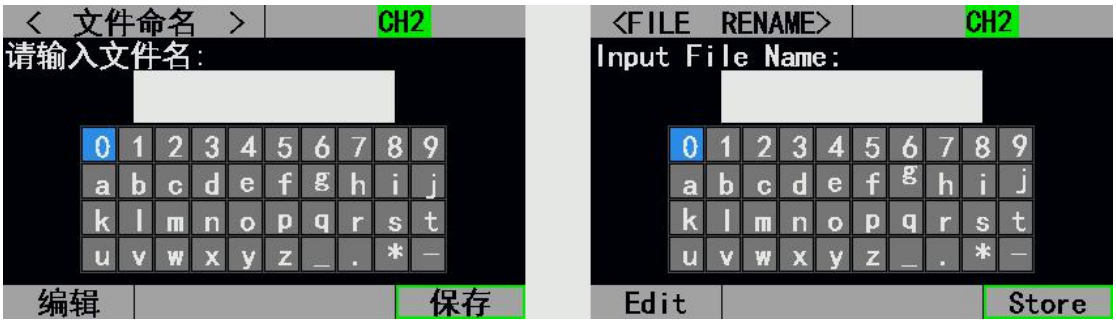


Fig 2.6.7 File Name Interface

2.7 Scanning Test Operation

The scanning test can be used to detect the continuous working condition of the source to be tested within a certain range, and can conveniently capture various critical parameters such as protection current and turning voltage. Users can set the scan start point, end point, step size, step delay, threshold type, comparison type and other related parameters. The scan test ends and the test result is qualified or not.

Parameter setting interface operation instructions: 1. Press [Shift] + [◀] (Menu) in the main interface of the scan test to enter the scan setting interface; 2. Select the operation item by rotating the knob; 3. Press the [Enter] key for non-numeric parameters. Switch the setting options; 4. For numeric parameters, press [Enter] to enter the editing mode, use the arrow keys to select the corresponding number of digits, then rotate the knob to adjust the value, [Enter] or [Shift] + [▶] (Esc) Exit editing; 5. Press [Shift] + [▶] (Esc) to return to the previous interface.

Test interface operation instructions: Press the corresponding [On1], [On2] to start or close the mode.

Fig 2.7.1 Scan Test Set Interface

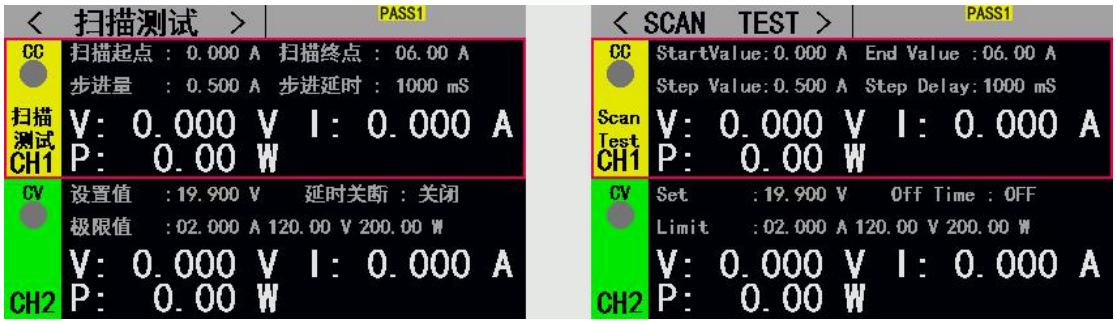


Fig 2.7.2 Scan Test Interface

2.8 Battery Test Operation

The battery test function is commonly used to detect the discharge performance of the battery. The electronic load can be operated in a constant current or a constant resistance mode, which can conveniently determine the discharge capacity of the battery.

Parameter setting interface operation instructions: 1. Press [Shift] + [◀] (Menu) in the battery test main interface to enter the battery setting interface; 2. Select the operation item by rotating the knob; 3. Press the [Enter] key for non-numeric parameters. Switch the setting options; 4. For numeric parameters, press [Enter] to enter the editing mode, use the arrow

keys to select the corresponding number of digits, then rotate the knob to adjust the value, [Enter], [Shift] + [▶] (Esc) Exit editing; 5. Press [Shift] + [▶] (Esc) to return to the previous interface.

Test interface operation instructions: Press the corresponding [On1], [On2] to start or close the mode.

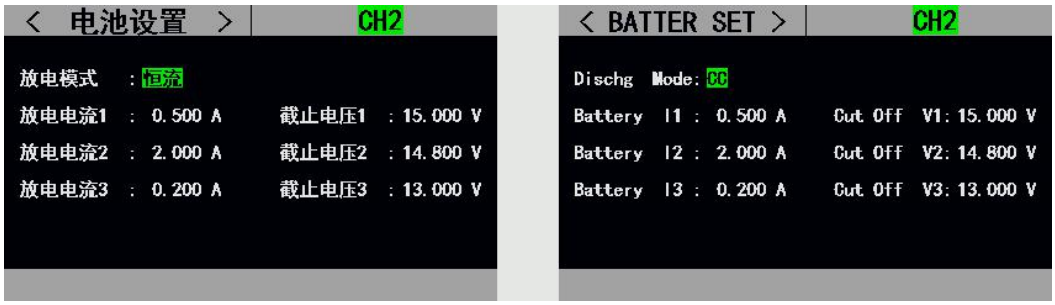


Fig 2.8.1 Battery Test Set Interface

Fig 2.8.2.1 Battery Test CC Interface

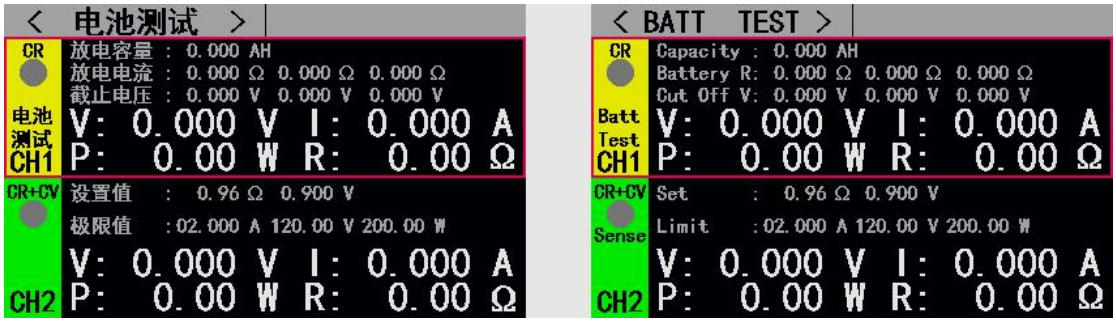
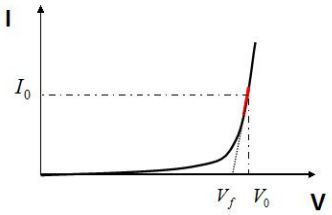


Fig 2.8.2.2 Battery Test CR Interface

2.9 LED Test Operation

The CR-LED test can simulate the characteristics of a real LED lamp. By increasing the turn-on voltage setting of the diode in the conventional CR mode, when the load input

voltage exceeds the turn-on voltage of the diode, the load starts to work, and the LED drive power can be truly reflected. With load capacity.



LED特性曲线

Operation instructions: 1. Press the [CH] key to select the operation channel; 2. Select the operation item by rotating the knob; 3. Set the parameters. Press [Enter to enter the edit mode, use the arrow keys to select the corresponding number of digits, then adjust the value by turning the knob, [Enter] or [Shift] + [▶] (Esc) to exit editing; 4. Press the corresponding [On1], [On2] Start or disable mode.

Options：

Option Name	Option Content	Option Remark
LED Vo：	0---Vmax	Stable Working Voltage of LED Constant Current Source with led light
LED Io：	0---Imax	Input current of LED Constant Current Source
LED Coeff：	0.01—1	Ratio of voltage across Rd to total voltage in the loop

Vf: :on-off voltage of the diode

Rd: LED resistance Value

$$Rd = (Vo / Io) * Coeff \quad (1)$$

$$Vf = Vo * (1 - Coeff) \quad (2)$$

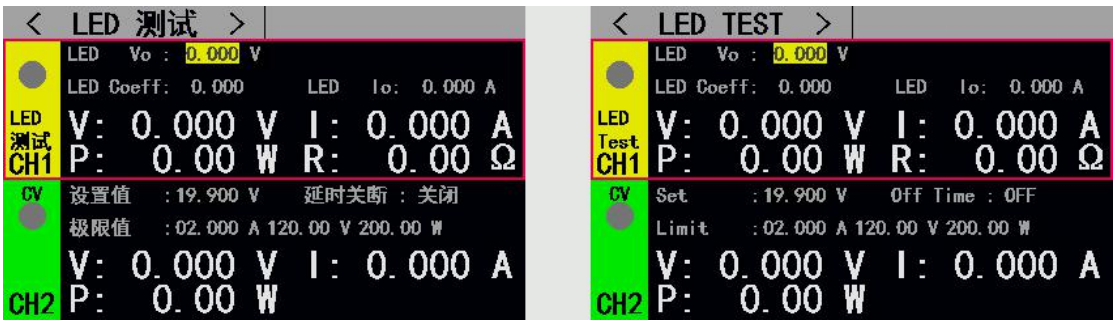


Fig 2.9 LED Test Interface

2.10 Short Circuit Test Operation

The load can simulate a short circuit at the input. In the short-circuit test, the actual current value consumed by the load short-circuit depends on the maximum output of the power supply.

Operation instructions: 1. Press the [CH] key to select the operation channel; 2. Select the operation item by rotating the knob; 3. Set the parameters. Press [Enter] to enter the edit mode, use the arrow keys to select the corresponding number of digits, then adjust the value by turning the knob, [Enter] or [Shift] + [▶] (Esc) to exit editing; 4. Press the corresponding [On1], [On2] Start or disable mode.

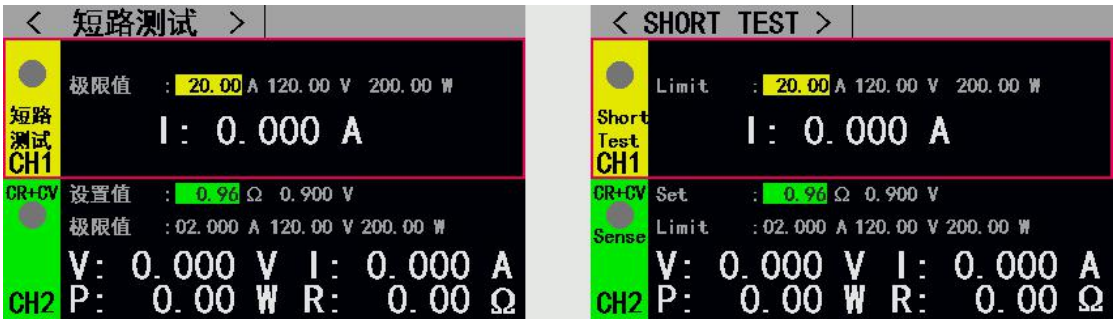


Fig 2.10 Short Circuit Test Interface

2.11 Protection Function

The load provides overcurrent, overvoltage, overpower, overtemperature, and polarity reverse protection (the message is based on the physical map).

2.12 Trigger Function

The load has a trigger function, which is mainly used in dynamic and list tests to initiate the next conversion. The load supports three trigger modes: 1. Manual (triggered by the [Trigger]

key on the front panel). 2. External (trigger by triggering the port on the rear panel). 3. Bus (triggered by program control instructions of the RS-232 or 485 bus interface).

2.13 Qualified Test Operation

The qualification test is an additional function of the basic measurement mode CC/CV/CR/CP. After the qualified test function is enabled, the main interface of the basic measurement mode can detect in real time whether the current test is within the set limit range and display Pass/Fail.

Parameter setting interface operation instructions: 1. Select the operation item by rotating the knob; 2. Press the [Enter] key to switch the setting option; 3. For the numeric parameter, press the [Enter] key to enter the editing mode, and select the corresponding direction by the direction key. The number of digits, then rotate the knob to adjust the value, [Enter] or [Shift] + [▶] (Esc) to exit editing; 4. Press [Shift] + [▶] (Esc) to return to the previous interface.

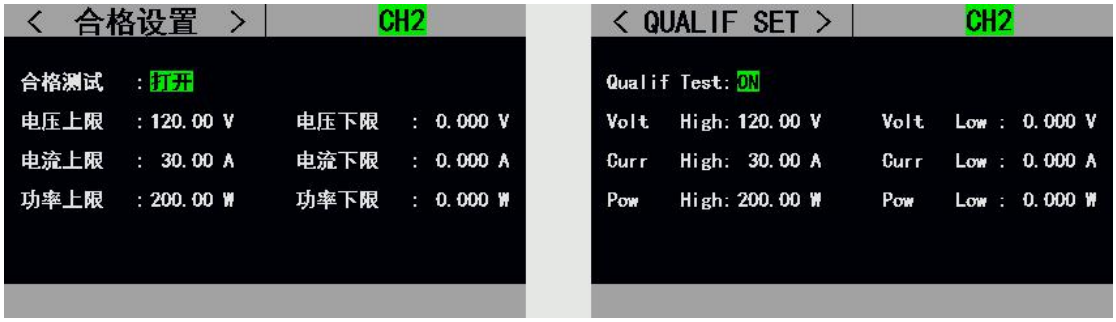


Fig 2.14.1 Qualified Test Set Interface

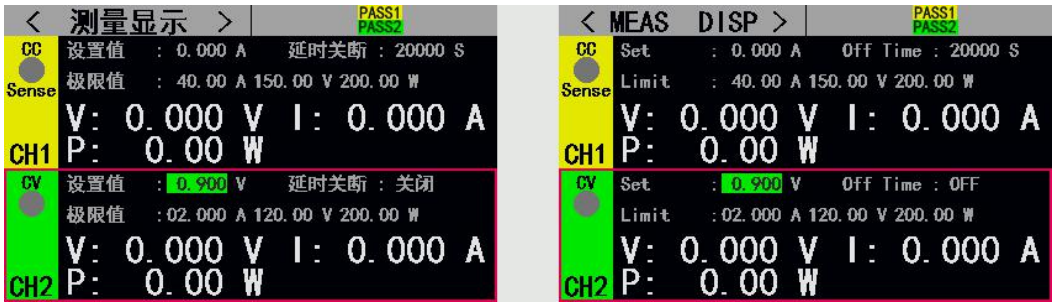


Fig 2.14.2 Interface after Starting Qualified Test

2.14 Other System Set

2.14.1 Key Lock Function

The load also adds locking Function to prevent users' error.The title bar displays the lock id.In locked state except [On/Off], [Enter], [Shift] + [▶] button, the rest of the buttons including knobs are locked.In addition, in the lock state, the icon bar will appear lock icon, icon disappear when unlocked.Long press [Enter] key with 3s can switch between lock and unlock state.

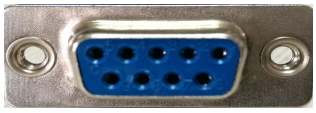
2.14.2 External Interface Function

ET54 series is equipped with RS232 (optional) or 485 (optional) as well as two USB communication interfaces, users can choose either interface to complete the communication with the computer.

USB Interface:

After connecting the load and PC through USB public to public connection line, the serial port software or upper computer can be used to communicate with the load at the PC end. The configuration and communication mode are the same as RS232 interface mode

- **RS232/485 Interface:**



Interface	PIN	PIN definition	Instruction
RS232	2	RXD	RS232 Interface
	3	TXD	RS232 Interface
RS485	1	A	RS485 Interface
	2	B	RS485 Interface
Public	5/6	GND	
Instruction Interface	4	PASS	Teat Result Level Input
	7	NTRI	External Trigger Input
	8	FAIL	Teat Result Level Input
	9	RUN	Working Condition Level Input

Communication Interface Instruction: Rs-232 or 485 interface support SCPI protocol, SCPI command can be used for programming.When using RS232 or 485 interface for data communication, relevant communication parameters should be well configured on PC and load side. For example, the communication parameters of load can be configured on the communication setting interface, as shown in figure 2.15.2.

Indicating interface Instruction: test result output and running state indication, low level output means effective, default output is high level 3.3v.For externally triggered input

pins, the drop edge is valid, and the interval between the two drops should be greater than 10mS.

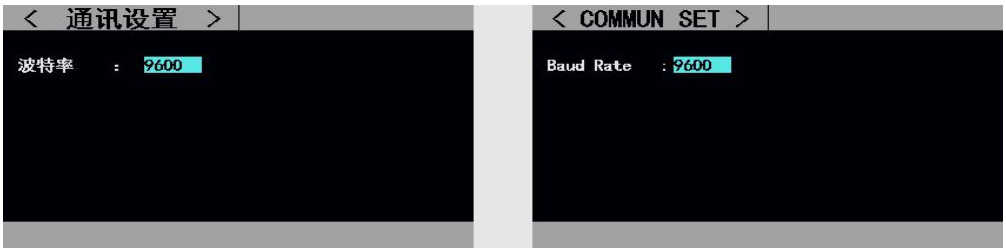


Fig 2.15.2 Communication Set Interface

Technical Specification

Model		ET5420
Rated Input	Power	400W （Double channel 200W*2)
	Input Voltage	0-150V
	Input Current	0-40A(20A per channel)
Constant Voltage Mode	Measurement Range	0.1~19.999V,0.1~150.00V
	Resolution Rate	1mV,10mV
	Accuracy	±(0.05%+0.02%FS)
Constant Current Mode	Measurement Range	0~3.000A,0~20.00A
	Resolution Rate	1mA,10mA
	Accuracy	±(0.05%+0.05%FS)
Constant Resistance Mode	Measurement Range	0.05Ω~1 kΩ，1 kΩ~4.5kΩ
	Resolution Rate	10mR，100mR
	Accuracy	±(0.1%+0.5%FS)
Constant Power Mode	Measurement Range	0~200W
	Resolution Rate	10mW
	Accuracy	±(0.1%+0.5%FS)
Dynamic Test Function	Mode	CC，CV
	T1&T2	1ms~60s；resolution rate ： 1ms
	Accuracy	0.1%+1mS
Battery Test Mode	Discharge Mode	CC，CR
	Discharge Capacity	9999Ah
	Resolution Rate	1mA，10mA，10mR，100mR
Test Range		
Voltage	Range	0~19.999V,0 ~150.00V

Read back	Resolution Rate	1mV,10mV
	Accuracy	±(0.05%+0.1%FS)
Current Read back	Range	0~3.000A,0~20.00A
	Resolution Rate	1mA,10mA
	Accuracy	±(0.05%+0.1%FS)
Power Read back	Range	200W
	Resolution Rate	10mW
	Accuracy	±(0.1%+0.5%FS)
Scope of Protection		
Over Voltage Protection		>155V over voltage protection
Over Current Protection		> 22A Cut off
Over Power Protection		220W
Over Temperature Protection		85℃