

# ET5420 double channel Programmable DC power load User manual



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## **Basic Information**

ET54 series single/double channel programmable dc electronic load, USES the hi gh 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, sci entific 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 curr ent 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 °C to 40 °C Storage temperature: - 10 °C to 70 °C 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

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# Catalog

## -, Quick Reference

## **1.1 Front Panel**



## **1.2Front Panel Press**

ET5420双通道电 直流子负载按键



## 1.3 Key Manual

| Gene    | ral function key      | Shortcut function key |                          |  |  |
|---------|-----------------------|-----------------------|--------------------------|--|--|
| СН      | CH1/CH2 switching     | Shift+Menu            | Non-basic mode parameter |  |  |
|         |                       |                       | settings                 |  |  |
| On1、On2 | CH1/CH2 switch        | Shift+Esc             | return                   |  |  |
|         | key                   |                       |                          |  |  |
| Trigger | Trigger key           | Shift+Mode            | Mode selection           |  |  |
| Enter   | Enter                 | Shift+Utility         | System common settings   |  |  |
| < ►     | Cursor left and right | Shift+Local           | Remote local switching   |  |  |
|         | keys                  |                       |                          |  |  |
| 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] +

 $[\blacktriangleright]$  (Esc) to return to the previous interface.

| く 系统菜单  | >         |
|---------|-----------|
| 1. 负载设置 | 2. 系统设置   |
| 3. 通讯设置 | 4. 合格测试设置 |
| 5. 系统信息 |           |
|         |           |
|         |           |
|         |           |
|         |           |

Fig-2.2.1 Interface of System Setting

| く 系织 | 设置 >  |      |     |
|------|-------|------|-----|
| 开机设置 | : 上次值 | 语言设置 | :中文 |
| 还原设置 | :恢复   |      |     |
|      |       |      |     |
|      |       |      |     |
|      |       |      |     |
|      |       |      |     |

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)

| onl:High | OFF Delay                              | : <b>0</b> FF   |
|----------|--|---|
| onV:High | lmax                                   | : 30.00 A   |
| V : OFF  | Vmax                                   | : 150. 00 V   |
| V : OFF  | Pmax                                   | : 200.00 W  |
|          |  |   |
|          | onl:High<br>onV:High<br>V:OFF<br>V:OFF | onl:High OFF Delay<br>onV:High Imax<br>V:OFF Vmax<br>V:OFF Pmax |

to return to the previous interface.



## 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.

| <     | 测量  | ■显示 >         |            |     | <    | MEAS | DISP >         |           |     |
|-------|-----|---------------|------------|-----|------|------|----------------|-----------|-----|
| CC    | 设置  | 14 NO 000     | A 15 000 V |     | CC   | Set  | 02 000         | A 15 000V |     |
| +     | W.E | 01.00         | 02. CV     |     | +    | 000  | 01.00          | 02. CV    |     |
| CV    | 极阻  | 03. CR        | 04. CP     | OOW | CV   | Lim  | 03. CR         | 04. CP    | 00W |
|       |     | 05. CC+CV     | 06. CR+CV  |     |      |      | 05. CC+CV      | 06. CR+CV |     |
| •     | 4.5 | 07. 动态        | 08. 列表     |     |      | 2.0  | 07. Tran       | 08. List  |     |
|       | 15  | 09. 扫描        | 10. 短路     | JA  |      | 15   | 09. Scan       | 10. Short | JA  |
|       |     | 11. 电池        | 12. LED    |     |      |      | 11. Battery    | 12. LED   |     |
| Unreg | 1   | <b>D. UUT</b> | Y          |     | Unre |      | <b>ט. טע</b> ז | ť         |     |

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] + [ $\blacktriangleright$ ] (Esc) to exit editing; 4. Press the corresponding [On1], [On2] startup mode.

|       | 测量         | 量显示 >                     | Shift+    |   | < MEA     | S DISP >               | Shift+    |   |
|-------|------------|---------------------------|-----------|---|-----------|------------------------|-----------|---|
| CC+CV | 设置         | 直 : <mark>02.000</mark> A | 5. 000 V  |   | CC+CV Set | : 02.000 A             | 5.000 V   |   |
| Sense | 极限         | 01. CC                    | 02. CV    |   | Sense Lin | 1 <sup>11</sup> 01. CC | 02. CV    |   |
|       | V:         | 03. CR                    | 04. CP    | A | V         | 03. CR                 | 04. CP    | A |
| CH1   | <b>P</b> : | 05. CC+CV                 | 06. CR+CV |   | CH1 P     | 05. CC+CV              | 06. CR+CV |   |
| CV    | 设置         | 07. 动态                    | 08. 列表    |   | CV Set    | 07. Tran               | 08. List  |   |
|       | 极限         | 09. 扫描                    | 10. 短路    |   | Lin       | ii: 09. Scan           | 10. Short |   |
|       | <b>V</b> : | 11. 电池                    | 12. LED   | A | V         | 11. Battery            | 12. LED   | A |
| CH2   | P:         | 0.00                      | N         |   | CH2 P     | 0.00 0                 |           |   |

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.



#### 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

| く 动态设置 >               | CH1             | < TRAN SET >      | CH1                |
|------------------------|-----------------|-------------------|--------------------|
| 动态载态 : <mark>恒流</mark> | 动态模式 : 连续       | Tran State: 00    | Tran Mode : Auto   |
| 值 A : 0.000 A          | 脉宽 A : 00000 mS | Level A : 0.000 A | Width A : 00000 mS |
| 值 B : 0.000 A          | 脉宽 B : 00000 mS | Level B : 0.000 A | Width B : 00000 mS |

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] + [ $\blacktriangleleft$ ] (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] + [ $\blacktriangleright$ ] (Esc) to exit editing; 5. Press [Shift] + [ $\blacktriangleright$ ] (Esc) returns to the previous interface;

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

| <  | 列表  | 設置    | >    |    | CH1   |       | <    | LIST  | SET                  | >     |             | CH1     |                |
|----|-----|-------|------|----|-------|-------|------|-------|----------------------|-------|-------------|---------|----------------|
| 列表 | 步数: | 05 步  | 进模式: | 连续 | 循环:   | 关闭    | List | Step: | <mark>05</mark> Step | Mode: | Auto        | Repea   | t: <b>O</b> FF |
| 序号 | 模式  | 大小    | 延时   | 比较 | 上限    | 下限    | Num  | Node  | Value                | Delay | Comp        | Max     | Nin            |
| 01 | 开路  |       | 0000 | 关闭 | 0.000 | 0.000 | -01  | Open  | <u> </u>             | 0000  | OFF         | 0.000   | 0.000          |
| 02 | 短路  |       | 0000 | 关闭 | 0.000 | 0.000 | 02   | Short | i                    | 0000  | OFF         | 0.000   | 0.000          |
| 03 | CC  | 0.000 | 0000 | 关闭 | 0.000 | 0.000 | 03   | CC    | 0.000                | 0000  | OFF         | 0.000   | 0.000          |
| 04 | CV  | 0.000 | 0000 | 关闭 | 0.000 | 0.000 | 04   | CV    | 0.000                | 0000  | OFF         | 0.000   | 0.000          |
| 05 | CR  | 0.000 | 0000 | 关闭 | 0.000 | 0.000 | 05   | CR    | 0.000                | 0000  | OFF         | 0.000   | 0.000          |
|    |     |       |      |    |       |       |      |       |                      |       | - 2).<br>21 | 40) - A |                |
|    |     | ī     | 编辑   |    | ホー    | ·贡    | Pre  | Pag   | e                    | Edit  | t I         | Next    | Page           |

Fig 2.6.1 List Set Interface

| <               | 列表测试 >   | < LIST TEST >   |
|-----------------|--|---|
|                 | 列表步数 : 4 步进模式 : 连续<br>当前步骤 : 3 循环 : 关闭<br>当前模式 : CC 数值 : 2,000 A | List Num: 4 Step Mode: Auto<br>Curr Step: 3 Repeat : OFF<br>Curr Mode: CC Value : 2.000 A |
| 列表<br>测试<br>CH1 | V: 0.000 V I: 0.000 A<br>P: 0.00 W                               | List V: 0.000 V I: 0.000 A<br>CH1 P: 0.00 W   |
| CV              | 设置值 : 19.900 V 延时关断 : 关闭   | CV Set : 19.900 V Off Time : OFF  |
|                 | 极限值 :02.000 A 120.00 V 200.00 ₩                                  | Limit. : 02.000 A 120.00 V 200.00 W   |
|                 | V: 0.000 V I: 0.000 A  | V: 0.000 V I: 0.000 A   |
| CH2             | P: 0.00 W  | CH2 P: 0.00 W   |

Fig 2.6.2 List Test Interface

| <  | 列表  | 结果        | >  |       | CH1   |      | <   | LIST  | OUT   | >     |       | CH1   |        |
|----|-----|-----------|----|-------|-------|------|-----|-------|-------|-------|-------|-------|--------|
|    |     |           |    |       |       |      |     |       |       |       |       |       |        |
| 序号 | 模式  | 大小        | 比较 | 上限    | 下限    | 结果   | Num | Node  | Value | Comp  | Max   | Min   | Result |
| 01 | 开路  | ÷         | 关闭 | 0.000 | 0.000 |      | 01  | Open  |       | OFF   | 0.000 | 0.000 |        |
| 02 | 短路  | - <u></u> | 关闭 | 0.000 | 0.000 |      | 02  | Short |       | OFF   | 0.000 | 0.000 |        |
| 03 | CC  | 3.000     | 打开 | 3.000 | 0.000 | FAIL | 03  | CC    | 0.000 | OFF   | 0.000 | 0.000 | FAIL   |
| 04 | CV  | 5.000     | 打开 | 5.000 | 0.000 | PASS | 04  | CV    | 0.000 | OFF   | 0.000 | 0.000 | PASS   |
| 05 | CR  | 7.000     | 打开 | 7.000 | 0.000 | FAIL | 05  | CR    | 0.000 | OFF   | 0.000 | 0.000 | FAIL   |
|    |     |           |    |       |       |      |     |       |       |       |       |       |        |
| L  | 二一页 |           | 保存 |       | ーイ    | ·页   | Pr  | e Pag | e     | Store | ;     | Next  | Page   |

#### 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] + [ $\blacktriangleright$ ] (Esc) returns to the previous interface;

| < 測试列表 >              | CH1               | < 7  | IEST LI               | ST >           |          | CH1                   |     |
|-----------------------|-------------------|------|-----------------------|----------------|----------|-----------------------|-----|
| 当前页数 🙀                | 05                | Cu   | rrent Pa              | agon :         |          | )5                    |     |
|                       |                   |      | <del>          </del> | 1. 50<br>1. 50 | call III | +###                  |     |
| <del>          </del> | ]除 #####          |      | <del>####</del>       | # 3. De        | lete 👭   | <del>      </del>     |     |
| <del>######</del>     | <del>######</del> |      | ####                  |                | ####     | <del>          </del> |     |
| <del>######</del>     | <del>######</del> |      | ####                  | +##            | ###      | <del>      </del>     |     |
| <del>######</del>     | <del>######</del> |      | ####                  | ###            | ####     | <del>          </del> |     |
| 上一页 纠                 | 扁辑 下一             | 页 Pr | e Page                | Ed             | lit      | Next P                | age |

|                |                 |                 | -         |
|----------------|-----------------|-----------------|-----------|
| Eig 2 6 4 Eila | List Satting Do | romator Storago | Interface |
| FIE 2.0.4 FIIE | List Setting Pa | lameter Storage | Interface |
| 0              |                 |                 |           |

| < | 结果列表 >               | CH1                 | < <u>R</u> | ESULT L                | IST>     |                 | CH1     |    |
|---|----------------------|---------------------|------------|------------------------|----------|-----------------|---------|----|
| 当 | 前页数 🔒                | 05                  | Cu         | rrent Pa               | g        | 05              | 5       |    |
|   | <del>#####</del> 2.读 |                     |            | <del>           </del> | # 2. Rea | all IIII        | +##     |    |
|   | <b></b>              | £ <mark>₩₩₩₩</mark> |            | ####                   | # 3. De  | ete             | +##     |    |
|   | <del>######</del>    | <del>######</del>   |            | ####                   | ##       | ####            | +##     |    |
|   | <del>######</del>    | <del>######</del>   |            | ####                   | ##       | #####           | +##     |    |
|   | <del>######</del>    | <del>######</del>   |            | ####                   | ##       | <del>####</del> | +##     |    |
| F | 一页 编                 | 辑 下一                | 页 Pr       | e Page                 | Ed       | lit I           | Next Pa | ge |

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;

| く文   | 件看 | <b>户</b> 名 | 1 | > |   |   |   | CH | 2 |           | <f il<="" th=""><th>E</th><th>R</th><th>EN/</th><th>ME</th><th>&gt;</th><th></th><th></th><th></th><th>CH</th><th>2</th><th></th></f> | E | R   | EN/ | ME | >  |   |   |   | CH | 2   |     |
|------|----|------------|---|---|---|---|---|----|---|-----------|---|---|-----|-----|----|----|---|---|---|----|-----|-----|
| 请输入了 | 文件 | -名         | : |   |   |   |   |    |   |           | Input   | F | ile | e N | ал | e: |   |   |   |    |     |     |
|      |    |            |   |   |   |   |   |    |   |           |   |   |     |     |    |    |   |   |   |    |     |     |
| 0    | 1  | 2          | 3 | 4 | 5 | 6 | 7 | 8  | 9 |           |   | 0 | 1   | 2   | 3  | 4  | 5 | 6 | 7 | 8  | 9   |     |
| a    | b  | С          | d | е | f | g | h | i  | j |           |   | a | b   | С   | d  | е  | f | g | h |    | j   |     |
| k    | 1  | m          | n | 0 | р | q | r | s  | t |           |   | k |     | Π   | n  | 0  | р | q | r | S  | t   |     |
| u    | V  | W          | x | у | z |   |   | *  |   |           |   | u | ۷   | W   | x  | у  | Z |   |   | *  |     |     |
| 编辑   |    |            |   |   |   |   |   |    | ł | <b>呆存</b> | Edi   | t |     |     |    |    |   |   |   |    | Sto | ore |

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.

| く扫   | ましん おうしょう はんしょう しんしょう しんしょう しんしん しんしん しんしん しんしん しんし | CH2            | < SCAN SET >         | CH2                  |
|------|---|----------------|----------------------|----------------------|
| 扫描类型 | : 10.000 A  | 阈值类型 :电压转折     | Scan Type : 00       | TH Type:∆V           |
| 扫描起点 | : 0.000 A   | 阈值设置 : 0.000 V | Start Vlaue: 0,000 A | TH Value: 0.500 V    |
| 扫描终点 | : 0.000 A   | 比较类型 :按电压      | End Vlaue : 0,000 A  | Comp Type:InVolt.    |
| 步进量  | : 0.000 A   | 上限 : 0.000 V   | Step Value : 0.500 A | Limit Low : 0.000 V  |
| 步进延时 | :00000 mS   | 下限 : 0.000 V   | Step Delay :00000 mS | Limit High : 0.000 V |
|      |   |                |                      |                      |

Fig 2.7.1 Scan Test Set Interface

|          | 扫描测试 >                  | PASS1           | <                     | SCAN       | TEST >      | 8           | PASS1       |   |
|----------|-------------------------|-----------------|-----------------------|------------|-------------|-------------|-------------|---|
| CC       | 扫描起点 : 0.000 A 扌        | 日描终点 : 06.00 A  | CC                    | StartV     | alue:0.000  | A End Val   | ue :06.00 A |   |
|          | 步进量 : 0.500 A 🛃         | 步进延时 : 1000 mS  |                       | Step V     | alue: 0.500 | A Step De   | lay:1000 mS |   |
| 扫描<br>测试 | V: 0.000 V<br>P: 0.00 W | I: 0.000 #      | A Scan<br>Test<br>CH1 | V:<br>p·   | 0.000       | VI:         | 0. 000      | A |
| CV       | ひ. 00 ₩                 | 延时关款 : 关闭       |                       | Set        | : 19, 900   | V 0FF 1     | ime : OFF   |   |
| ۲        | 极限值 : 02. 000 A 12      | 0.00 V 200.00 W | 0                     | Limit      | : 02. 000   | A 120.00 V  | 200. 00 W   |   |
|          | V: 0.000 V              | I: 0.000 A      | A                     | V:         | 0.000       | <b>V</b> I: | 0.000       | Α |
| CH2      | P: 0.00 W               |                 | CH2                   | <b>P</b> : | 0.00        | W           |             |   |

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.

| く 电池设置 >        | CH2             | < BATTER SET >       | CH2                   |
|-----------------|-----------------|----------------------|-----------------------|
| 放电模式 : 恒流       |                 | Dischg Mode: CC      |                       |
| 放电电流1 : 0.500 A | 截止电压1 :15.000 V | Battery 11 : 0.500 A | Cut Off V1: 15.000 V  |
| 放电电流2 : 2.000 A | 截止电压2 :14.800 V | Battery 12 : 2.000 A | Cut Off V2: 14.800 V  |
| 放电电流3 : 0.200 A | 截止电压3 :13.000 V | Battery 13 : 0.200 A | Cut. Off V3: 13.000 V |
|                 |                 |                      |                       |
|                 |                 |                      |                       |
|                 |                 |                      |                       |

Fig 2.8.1 Battery Test Set Interface





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 starts to work, and the LED drive power can be truly reflected. With load capacity. Operation instructions: 1. Press the [CH] key to

the operation channel; 2. Select the operation item rotating the knob; 3. Set the parameters. Press [Enter 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]

+ [**b**] (Esc) to exit editing; 4. Press the corresponding [On1], [On2] Start or disable mode.

| Options | : |
|---------|---|
|---------|---|

| Option Name | Option Content | Option Remark   |
|-------------|----------------|---|
| LED Vo:     | 0Vmax          | Stable Working Voltage of LED Constant Current          |
|             |                | Source with led light                                   |
| LED Io:     | 0Imax          | 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 | (1) |
|------------------------|-----|
| Vf = Vo * (1 - Coeff)  | (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] + [ $\blacktriangleright$ ] (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).

| < 扫描设置 > C          | H <mark>2</mark> < | SCAN SET        | >        | CH2              |
|---------------------|--------------------|-----------------|----------|------------------|
| <sup>扫描</sup> 极性反接! | Sc.                | n               | RVP!     |                  |
| 扫描终点 : 0.000 A 比较类型 | :按电压 End           | Vlaue : 0.000   | A Comp   | Type : InVolt    |
| 步进量 : 0.000 A 上限    | : 0.000 V Sta      | p Value : 0.500 | )A Limit | t. Low : 0.000 V |
| 步进 极性反接!            | Ste                | P               | RVP!     |                  |

# 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.

| く合格  | 路设置 >       | CH2            | < QUALIF SET >               | CH2                 |
|------|-------------|----------------|------------------------------|---------------------|
| 合格测试 |             |                | Qualif Test: <mark>ON</mark> |                     |
| 电压上限 | : 120. 00 V | 电压下限 : 0.000 V | Volt. High: 120.00 V         | Volt. Low : 0.000 V |
| 电流上限 | : 30.00 A   | 电流下限 : 0.000 A | Curr High: 30.00 A           | Curr Low : 0.000 A  |
| 功率上限 | : 200.00 W  | 功率下限 : 0.000 W | Pow High: 200.00 W           | Pow Low : 0.000 W   |
|      |             |                |                              |                     |
|      |             |                |                              |                     |
|      |             |                |                              |                     |

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] + [ $\blacktriangleright$ ] 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                   |
|-------------|-----|----------------|-------------------------------|
| DS222       | 2   | RXD            | RS232 Interface               |
| K5252       | 3   | TXD            | RS232 Interface               |
| DC495       | 1   | А              | RS485 Interface               |
| K3463       | 2   | В              | RS485 Interface               |
| Public      | 5/6 | GND            |                               |
|             | 4   | PASS           | Teat Result Level Input       |
| Instruction | 7   | NTRI           | External Trigger Input        |
| Interface   | 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<br>Voltage<br>Mode | Measurement     | 0.1~19.999V,0.1~150.00V  |  |
|                             | Range           |  |  |
|                             | Resolution Rate | 1mV,10mV   |  |
|                             | Accuracy        | ±(0.05%+0.02%FS)   |  |
| Constant<br>Current<br>Mode | Measurement     | 0~3.000A,0~20.00A  |  |
|                             | Range           |  |  |
|                             | Resolution Rate | 1mA,10mA   |  |
|                             | Accuracy        | $\pm (0.05\% + 0.05\% FS)$   |  |
| Constant                    | Measurement     | $0.05\Omega \sim 1 \text{ k}\Omega$ , $1 \text{ k}\Omega \sim 4.5 \text{ k}\Omega$ |  |
| Registence                  | Range           |  |  |
| Mode                        | Resolution Rate | 10mR, 100mR  |  |
|                             | Accuracy        | $\pm (0.1\% + 0.5\% FS)$   |  |
| Constant<br>Power<br>Mode   | Measurement     | 0~200W   |  |
|                             | Range           |  |  |
|                             | Resolution Rate | 10mW   |  |
|                             | Accuracy        | $\pm (0.1\% + 0.5\% FS)$   |  |
| Dynamic                     | Mode            | CC, CV   |  |
| Test                        | T1&T2           | 1ms~60s; resolution rate : 1ms   |  |
| Function                    | Accuracy        | 0.1%+1mS   |  |
| Battery<br>Test Mode        | Discharge Mode  | CC, CR   |  |
|                             | Discharge       | 9999Ah   |  |
|                             | Capacity        |  |  |
|                             | 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<br>Read back        | Range                  | 0~3.000A,0~20.00A             |  |
|                             | <b>Resolution Rate</b> | 1mA,10mA                      |  |
|                             | Accuracy               | ±(0.05%+0.1%FS)               |  |
| Power<br>Read back          | Range                  | 200W                          |  |
|                             | Resolution Rate        | 10mW                          |  |
|                             | Accuracy               | $\pm (0.1\% + 0.5\% FS)$      |  |
| Scope of Protection         |                        |                               |  |
| Over Voltage Protection     |                        | >155V over voltage protection |  |
| Over Current Protection     |                        | > 22A Cut off                 |  |
| Over Power Protection       |                        | 220W                          |  |
| Over Temperature Protection |                        | 85°C                          |  |