OPERATION MANUAL

TH8300/TH8310

Programmable DC Electronic Load

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Chapter 1 Introduction to the instrument

Thank you for purchasing and using our products. Before you use this instrument, please first confirm the matters in the last chapter of the manual "Set and Warranty". If there is any non-conformity, please contact us as soon as possible to protect your rights and interests.

1.1   Introduction

TH8300/TH8310 series programmable DC electronic load, the main functions and advantages are as follows:

- The maximum power of TH8300 whole machine is 2500W, and the maximum current of inline machine is 400A.

- The maximum power of TH8310 whole machine is 1000W, and the maximum current of inline machine is 160A.

- Module maximum power is 500W, maximum current is 80A, maximum voltage is 600V.

- A single whole machine supports up to five modules in parallel and up to ten channels.

- Connect via CAN interface and support up to four whole machines online.

- 500kHz ADC sampling rate.

- Dynamic pull mode up to 50 kHz.

- 24-bit color 2.8-inch color LCD display.

- English and Chinese operation interface.

- Smart Fan System.

- Support power-on hold function.

- Support timer function.

- Support RS232, USB, LAN, GPIB interfaces for easy data communication with PC.

- Support signal output function (SYSTEM I/O).

- Electrically isolated, external inputs and outputs.

- Supports over-current protection (OCP), over-voltage protection (OVP), over-power protection (OPP), over-temperature protection (OTP), reverse polarity protection (REV), and low-voltage protection (LVP).

The TH8300 series programmable DC electronic loads include the following types of modules (TH8301-80-20, TH8301A-80-20 is a dual-channel module):

Frame Model	Maximum number of channels supported
TH8300	5
TH8310	2

Table 1-1 Frame Model

Module Model	Voltage	Current	Power
TH8301-80-20	80V	20A	100W*2
TH8301A-80-20	80V	20A	200W*2
TH8302-80-40	80V	40A	200W
TH8303-80-60	80V	60A	300W
TH8304-80-80	80V	80A	400W
TH8305-80-80	80V	80A	500W
TH8302-600-10	600V	10A	200W
TH8303-600-15	600V	15A	300W
TH8305-600-30	600V	30A	500W

Table 1-2 Main specifications of each model module

1.2 Conditions of use

1.2.1 Power connection

1) Supply voltage range: TH8300 90~130VAC or 175~253VAC.

   TH8310 100VAC or 220VAC, switchable via rear panel switch.
2) Power supply frequency range: 47~63Hz.

3) Power supply range: 300VA max.

4) The power input phase L, zero N and ground E should be the same as the power plug of this instrument.

1.2.2 Environmental conditions

The TH8300 series programmable DC electronic load is only allowed to be used indoors and in low condensation areas, and the general environmental requirements of this instrument are shown in Table 1-3. The fan speed of TH8300 series programmable DC electronic load changes intelligently with the pulling power, and the instrument stops the pulling current when the temperature reaches the over-temperature protection trigger value.

Environmental conditions	Requirements
Operating temperature	0℃~40℃
Operating humidity	10%~90% (non-condensing)
Storage temperature	-20°C~70°C
Altitude	Operating at altitudes up to 2000 m
Pollution degree	Pollution degree 2
Security Level	Safety Category II

1.2.3 Cautions

Table 1-3 Instrument environmental requirements

1) Please do not use it in adverse environment such as dusty, vibration, direct sunlight, corrosive gas, explosive gas, steam, etc.

2) Do not use the equipment that has been damaged. Before using the equipment, check its housing for cracks. Please use the cable provided to connect the equipment. Before operating the instrument, you should make sure that the AC power supply is well grounded.

3) Before connecting the device, check all security markings on the device.

4) Use wires with proper load ratings. All load wires must have the capacity to carry the maximum short-circuit output current of the power supply without overheating. If there are multiple loads, each pair of load wires must be able to safely carry the full rated short-circuit output current of the power supply.

5) Do not install replacement parts on the instrument yourself or perform any unauthorized modifications.

6) Do not use this equipment with the cover removed or loose.

7) The use of this instrument on life support systems or any other equipment with safety requirements is strictly prohibited.

8) Please keep a good ventilation around the four sides of this instrument to avoid overheating of the instrument. Do not block the ventilation holes of the equipment to avoid the internal temperature rising and affecting the accuracy.

9) Please use a dry cloth to clean the device housing, do not clean the inside of the instrument.

10) Do not switch the instrument on and off frequently to avoid loss of stored data.

11) This instrument has been carefully designed to reduce noise interference due to the input from the AC power supply terminal, however, it should still be used in a low noise environment as much as possible. If this cannot be avoided, please install a power supply filter.

12) If the instrument is not used for a long time, please put it in the original packing box or similar case. Store in a ventilated room at a temperature of 5°C to 40°C and a relative humidity of not more than 85% RH. The air should not contain harmful impurities that corrode the meter and should be protected from direct sunlight.

1.2.4 Warm-up

To ensure accurate measurement, the warm-up time should be at least 30 minutes.

1.3   Safety and Signs

1.3.1   Symbols and Signs

I	ON (power closed)	⏚	Protective earth terminal

○	OFF (power off)	⏚	Grounding terminal
⚠	Warning Sign	⏚	Ground connection end identification
⚡	Electric shock hazard sign		

Table 1-4 Basic Conformity and Marking

CE The CE mark indicates that the product complies with all relevant European legislation (if it carries the year, it indicates the year in which this design was approved).

This apparatus complies with the labelling requirements of the WEEE Directive (2002/96/EC) and this additional product label indicates that this appliance/electronic product must not be disposed of in household waste. According to the classification of equipment in Annex I of the WEEE Directive, this apparatus belongs to the "monitoring category".

Chapter 2 Overview

2.1 Front Panel Description

The front panel of TH8300 series programmable DC electronic load is shown in Figure 2-1.
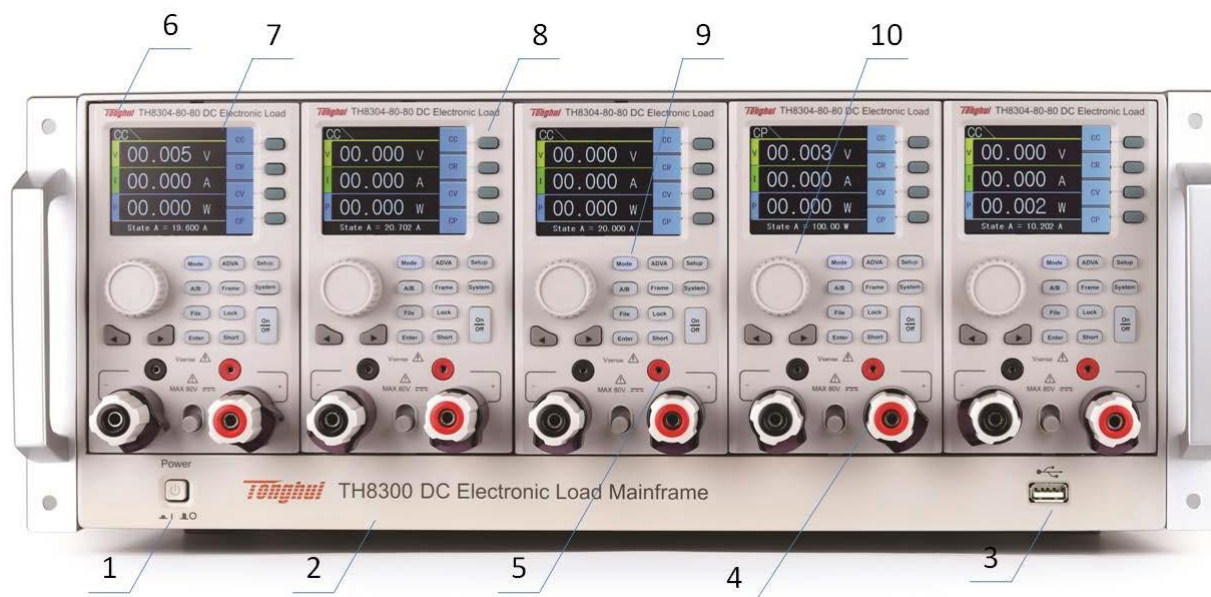
Figure 2-1 Front Panel

Marking	Name	Function
1	Power Switch	Instrument power on
2	Trademark and model	Introduction of instrument models
3	USB flash drive interface	Upgrade firmware version
4	Current terminal	Power connection via current terminal
5	Vsense Terminals	Remote voltage measurement terminal
6	Module Model	Introduction of module models
7	LCD Display	Display settings and output
8	Menu key	Response menu function
9	Module function key	Switch each function module and pull the load current
10	Knob	Adjust the set value or move the cursor

Table 2-1 Front Panel Description

2.2 Rear Panel Description

The rear panel of TH8300 series programmable DC electronic load is shown in Figure 2-2.

Figure 2-2 Rear Panel

Marking	Name	Function
1	RS232 serial interface	RS232 serial communication interface for on-line communication with PC.
2	LAN port	LAN port communication for online communication with computers.
3	System Bus Interface	CAN interface for on-line connection between whole machines.
4	USB Interface	USB Device interface for online communication with PC.
5	System I/O Interface	Signal input and output
6	GPIB Interface	GPIB interface for on-line communication with PC.
7	Fuse	Protecting the machine
8	Power outlets	Connecting power
9	Fans	Heat Dissipation

Table 2-2 Rear Panel Description

2.3   TH8310 appearance

Figure 2-3 TH8310 Front Panel

Figure 2-4 TH8310 Rear Panel

2.4　Display area definition

The TH8300 series programmable DC electronic load adopts a 24-bit color 2.8-inch color LCD screen with a resolution of 320×240. The display is divided into the following display areas, as shown in Figure 2-5.
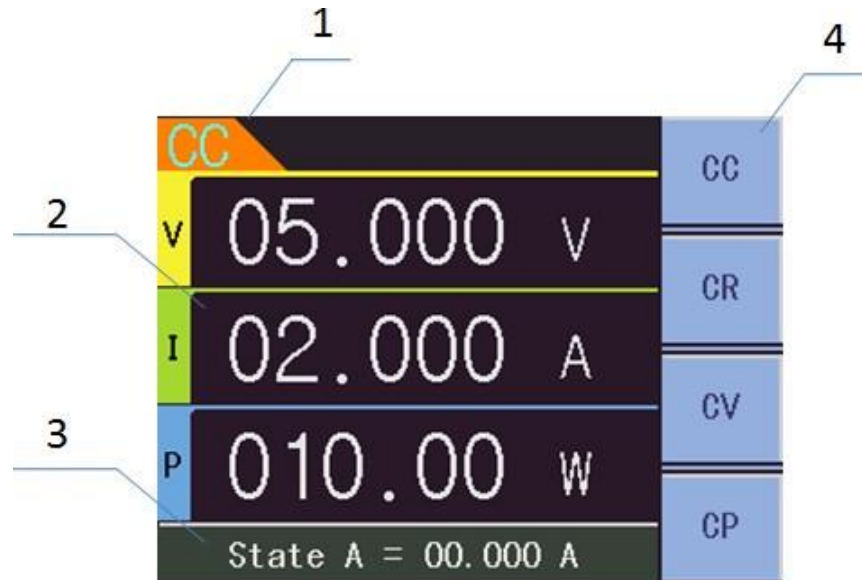
Figure 2-5 Description of the display area

1) Title area

   This area indicates the current mode.

2) Measurement results display area

   This area displays the results of the tested parameters.

3) Shortcut setting area

   This area is used for quick settings in general mode.

4) Menu display area

   This area displays the function menu, quick setup mode.

2.5　Basic operation

2.5.1　General mode

1) Set the general mode: Press Mode to select the mode.
2) Pull load current: Press Load.

2.5.2　Advanced Mode

1) Set advanced mode: Press ADVA to select the mode.

2) Pull load current: Press Load.

2.6　Power on instructions

Press the power switch at the lower left corner of the front panel of the instrument, the instrument turns on and displays the power-on screen. Figure 2-6 shows the power-on screen of TH8300 series programmable DC electronic load.

The power-on screen includes some product information such as trademark, instrument model and version number of Tonghui Company. The instrument will self-test when it is turned on and will stay in the power-on screen if there is any abnormality.

Figure 2-6 Power-on Screen

Chapter 3 Overview of Instrument Functions

3.1   Introduction

The TH8300 series programmable DC electronic loads contain slots for five modules and can reach a maximum power of 2500W and supports up to ten channels.

Each module has an independent intelligent fan, and the fan speed varies with power. When the module temperature exceeds the over-temperature protection value, the module stops pulling the load current.

The general mode contains CC, CR, CV, and CP.

The advanced modes include DYN, SWP, CR-LED, BATT, TIME, MPPT,

OCPT, OVPT, OPPT, SIN, LIST, AUTO.

CC --- Constant current mode
CR --- Constant resistance mode
CV --- Constant voltage mode
CP --- Constant power mode
DYN --- Dynamic load mode
SWP --- Dynamic Frequency Scan Mode
CR-LED --- Analog LED Test Mode
BATT --- Battery Test Mode
TIME --- Timing test mode
MPPT --- Maximum Power Point Tracking Test Mode
OCPT --- Over Current Protection Test Mode
OVPT --- Over Voltage Protection Test Mode
OPPT --- Over Power Protection Test Mode
SINE --- Sine Wave Test Mode
LIST --- List test mode
AUTO --- Auto test mode

3.2   Model Introduction

3.2.1   CC Constant Current Mode

In constant current mode, the electronic load always consumes a constant current regardless of whether the input voltage changes or not. As shown in Figure 3-1. The starting pull current is 0.1% of full scale.
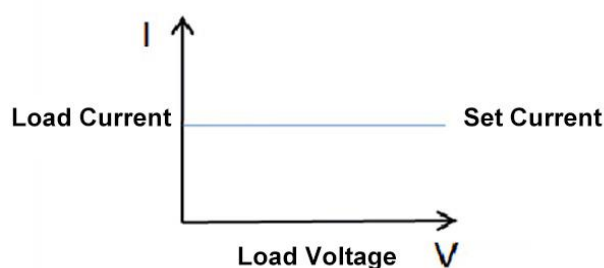
Figure 3-1 CC Mode

3.2.2 CR Constant resistance mode

In constant resistance mode, the electronic load is equivalent to a constant resistance, and the electronic load will change the current linearly with the change of voltage. As shown in Figure 3-2.
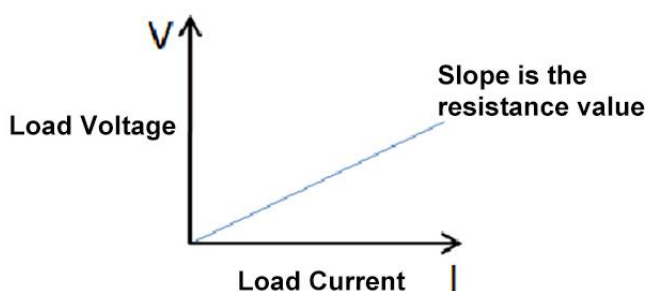
Figure 3-2 CR mode

3.2.3 CV Constant Voltage Mode

In constant voltage mode, the electronic load controls the power supply output voltage by adjusting the pull load current according to the set voltage value. As shown in Figure 3-3.
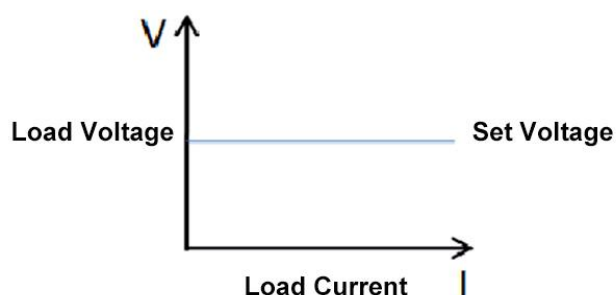
Figure 3-3 CV Mode

3.2.4 CP Fixed Power Mode

In the constant power mode, the electronic load always consumes a constant power. According to the formula: $P = V \times I$, if the input voltage V increases, the current I will be forced to decrease to keep the power constant. This is shown in Figure 3-4.
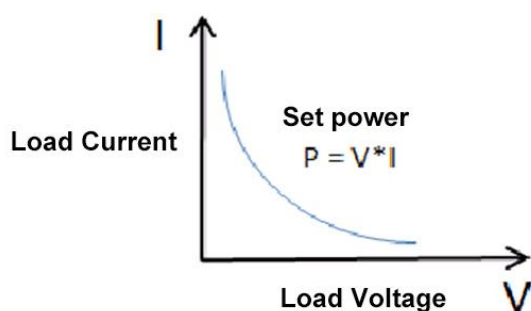
Figure 3-4 CP Mode

3.2.5 DYN Dynamic Load Mode

Dynamic load mode allows the load to switch between two current levels repeatedly. Dynamic load mode requires setting two current levels, the duration of each current level, the ramp up, the ramp down, and the number of repetitions. The number of repetitions determines the number of cycles of the entire high and low current pull load, ranging from 0 to 65535, with 0 indicating infinite cycles. As shown in Figure 3-5.
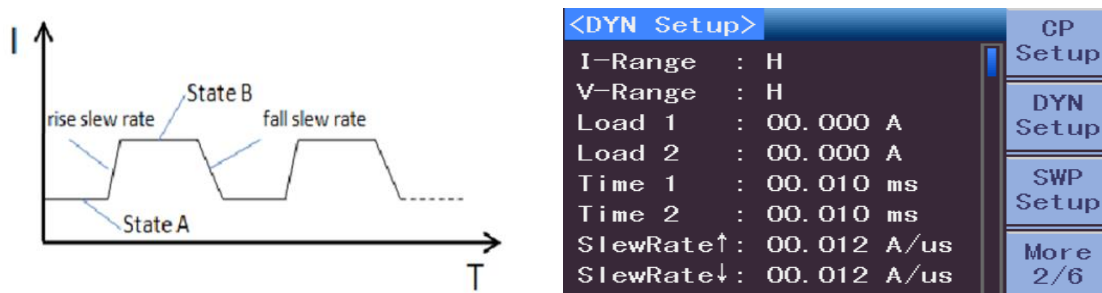
Figure 3-5 DYN Mode

3.2.6 SWP Dynamic Frequency Scan Mode

The electronic load provides a unique dynamic frequency sweep to find the worst-case voltage to be measured with frequency conversion. The dynamic frequency sweep requires setting two current levels, start frequency, end frequency, step frequency, duration, rise slope, and fall slope. When operated, the electronic load will pull the current at the set frequency for the set duration.
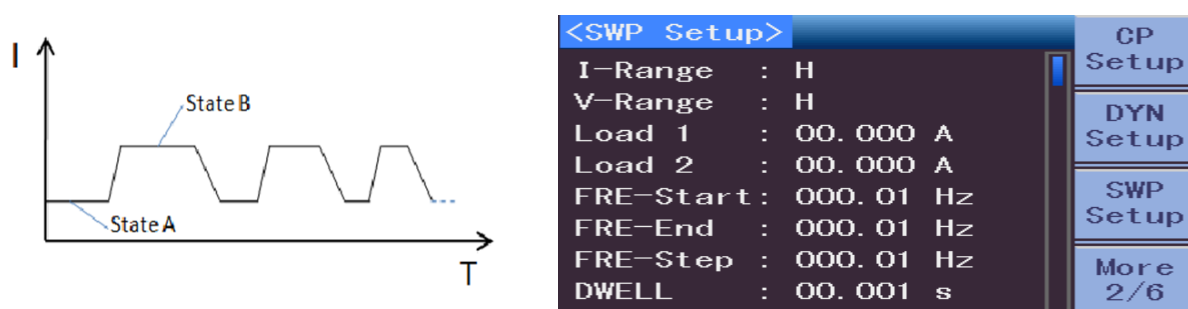
Figure 3-6 SWP mode

3.2.7 CR-LED test mode

Under the traditional CR mode, the electronic load increases the setting of diode conduction voltage, so that the electronic load will work only when the voltage added to both ends of the electronic load is greater than the conduction voltage of the diode, which completely and truly simulates the working principle of the diode, so the electronic load can simulate the ripple current during the real LED test.

```
<LED Setup>                    LED
                               Setup
R-Range   : H
R-Set     : 0002.9 Ω           BATT
V-Set     : 00.700 V           Setup

                               TIME
                               Setup

                               More
                               3/6
```

3.2.8   BATT Battery Test Mode

The electronic load can perform battery discharge test based on CC, CR or CP mode, and the termination conditions include voltage, timing, capacity, and energy. When the trigger condition of trigger termination is reached, the battery stops discharging and the load stops pulling the load current.

```
<BATT Setup>                   LED
                               Setup
Mode      : CC
I-Range   : H
V-Range   : H                  BATT
                               Setup
I-Set     : 00.000 A
Condition : VOLT               TIME
Level     : 00.000 V           Setup
SlewRate↑ : 00.012 A/us
SlewRate↓ : 00.012 A/us        More
                               3/6
```

3.2.9   TIMING Time measurement mode

The electronic load has a unique time measurement function, which can perform accurate time measurement in the range of 0s to 100000s. The user can set CC, CR or CP mode to start timing when the voltage reaches the starting voltage and stop timing when the voltage reaches the end voltage, which can measure the time that the object under test is pulling load in the target voltage interval. This feature allows for application in battery discharge testing and other similar applications.

```
<TIME Setup>                    LED
                               Setup
Mode      : CC
I-Range   : H                  BATT
V-Range   : H                  Setup
I-Set     : 00.000 A
TRG-Mode  : Rise               TIME
TRG-Start : 00.000 V           Setup
TRG-End   : 00.000 V
Time-Out  : 000120 s           More
                               3/6
```

3.2.10 MPPT Maximum Power Point Tracking test mode

The electronic load provides a maximum power point tracking function with DSP-based algorithms that can find out the maximum power provided by the power supply and at the same time can provide the voltage and current corresponding to the maximum power.
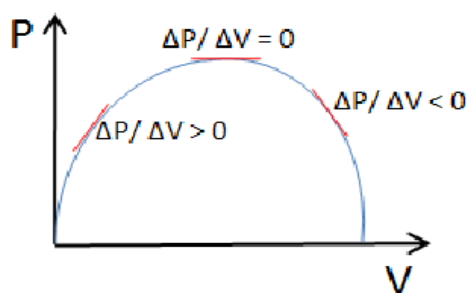

```
<MPPT Setup>                    MPPT
                               Setup
V-Range   : H
Speed     : Fast                OCPT
                               Setup

                                OVPT
                               Setup

                                More
                               4/6
```

Figure 3-7 MPPT mode

3.2.11 OCPT Overcurrent Protection Test Mode

The electronic load has an over-current protection test (OCPT) function. In the OCPT test mode, the electronic load pulls a step-up current to test whether the output voltage of the power supply is lower than the trigger voltage in the overload condition, and then judge whether the output protection function of the power supply is normal.
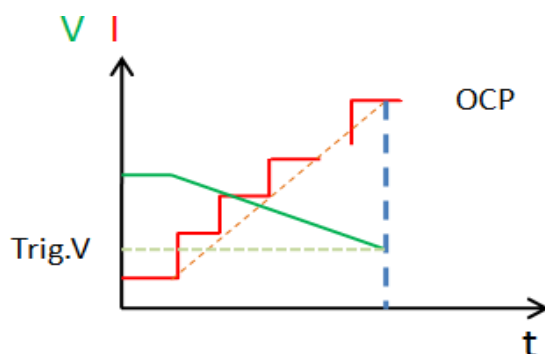

```
<OCPT Setup>                    MPPT
                               Setup
I-Range  : H
V-Range  : H                    OCPT
Start-I  : 00.000 A            Setup
End-I    : 00.000 A
I-Step   : 000001               OVPT
DWELL    : 000.01  ms          Setup
TRG-V    : 00.000 V
SPEC-L   : 00.000 A             More
                               4/6
```

Figure 3-8 OCPT mode

3.2.12 OVPT Overvoltage Protection Test Mode

The load provides over-voltage protection test (OVPT) function, the load

captures the input voltage peak point and falling edge, and triggers at the preset level (Vtrig) at the falling edge moment, then the voltage peak is the over-voltage protection point of the power supply under test, and the time interval from the peak moment to the trigger moment is the OVP response time (Tovp) of the power supply under test, Tovp measurement accuracy is 10us.
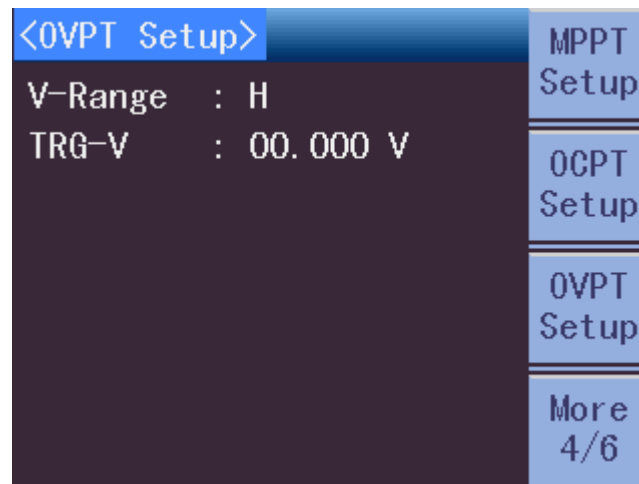
3.2.13 OPPT over-power protection test mode

The electronic load has the function of overpower protection test (OPPT). In the OPPT test mode, the electronic load pulls the power of the load step up to test whether the output voltage of the power supply is lower than the trigger voltage under the overload condition, and then judge whether the output protection function of the power supply is normal.
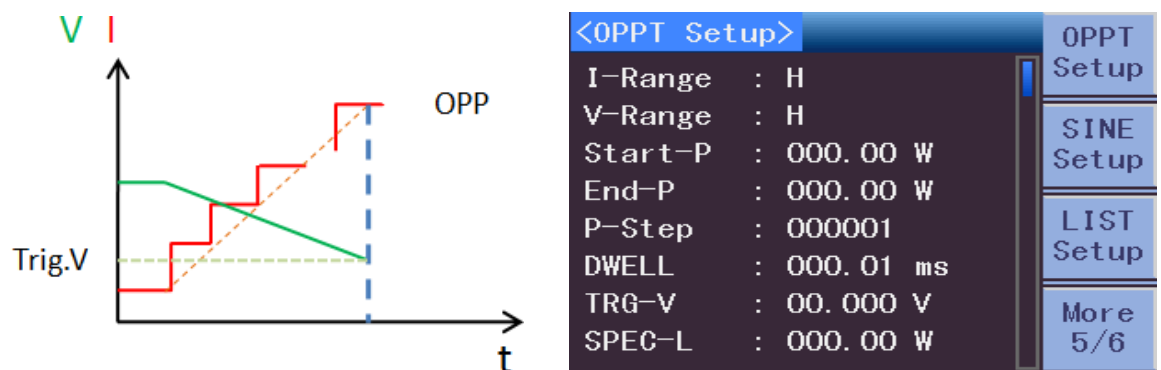
Figure 3-9 OPPT Mode

3.2.14 SINE Sine wave test mode

The electronic load has a unique sine wave pull load current mode, which can set the pull load current deviation value (I_DC), pull load sine wave value (I_AC) and sine wave frequency value, and the lowest point of this sine wave pull load cannot be less than zero. The sine wave test can be used to simulate the ripple function.

```
<SINE Setup>                OPPT
                            Setup
I-Range   : H
V-Range   : H               SINE
I-DC      : 00.000 A        Setup
I-AC      : 00.000 A
Frequency: 000.01 Hz        LIST
                            Setup

                            More
                            5/6
```

3.2.15 LIST list test mode

LIST mode can accurately and quickly complete complex arbitrary current change patterns, and complete multi-alignment with load of precision testing. It can help customers to save cost greatly. By editing the pull load value, duration, slope and repetition number of each step, LIST function generates a variety of complex sequences to meet complex test requirements.

```
<LIST Setup>                OPPT
                            Setup
I-Range   : H
V-Range   : H               SINE
Repeat    : 000001          Setup
Total-SEQ: 000001
Sequence  : 000001          LIST
Level     : 00.000 A        Setup
DWELL     : 00.000 s
SlewRate : 00.000 A/us       More
                            5/6
```

3.2.16 AUTO automatic test mode

AUTO mode can accurately simulate the automatic testing process of production line and complete multi-step precision testing, which can help customers save cost greatly. Different modes can be set for each step, and by editing the pull load value, duration, rising slope, falling slope, number of repetitions and upper and lower limits of current, voltage and power for each step, you can judge whether each step is qualified or not.

```
<AUTO Setup>                     AUTO
                                 Setup
Program  : 01
PROG-Type: List
Chain    : 02
Repeat   : 000001
Clear SEQ: Off
Total SEQ: 002
Set-SEQ  : Off               More
                             6/6
```
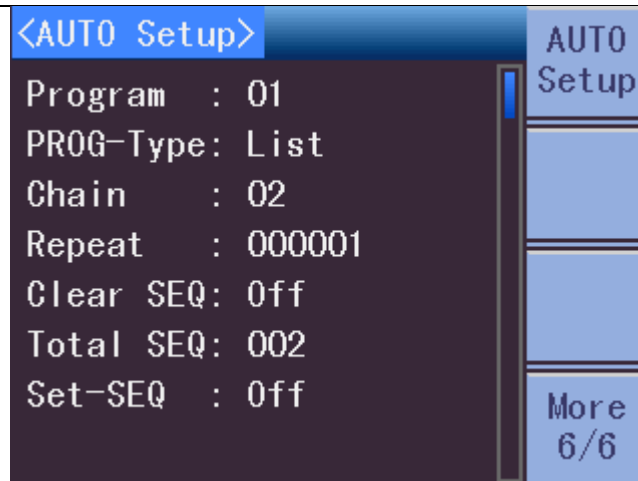
3.3　Protection function

3.3.1　Overvoltage protection (OVP)

The trigger value of overvoltage protection is 110% of the current range. If the overvoltage circuit is triggered, the load will be immediately OFF, the buzzer will sound, and the load screen will display a pop-up window (OVP).

Operation to clear the overvoltage protection status: Check whether the voltage of the DUT is within the protection trigger value, if it is beyond, please disconnect the DUT. When the Enter key on the front panel of the load is pressed, the word of load screen (OVP) is eliminated, and the load exits the OVP protection status.

3.3.2　Overcurrent Protection (OCP)

The maximum load current will be limited by hardware to about 110% of the present current range. Once the over-current protection is triggered, the load will immediately turn off, the buzzer will sound, and the load screen will display a pop-up window (OCP).

Operation to clear the over-current protection status: Check whether the current of the DUT is within the rated current of the load or the set protection current, if it is exceeded, please disconnect the DUT. When the Enter key on the front panel of the load is pressed, the word of load screen (OCP) is eliminated, and the load exits the OCP protection status.

3.3.3　Overpower Protection (OPP)

The maximum load power will be limited by hardware to about 110% of the present current power range. Once the over-power protection is triggered, the load will immediately turn off, the buzzer will sound, and the load screen will display a pop-up window (OPP).

Operation to clear the overpower protection status: After pressing the Enter key on the front panel of the load, the word "OPP" will be removed from the load screen and the load will exit the OPP protection status.

3.3.4   Over Temperature Protection (OTP)

When the internal power device of the load exceeds about 85°C, the load temperature is protected, at which time the load will be automatically OFF, the buzzer will sound, and the load screen will display a pop-up window (OTP).

Operation to clear the over temperature protection: When the load temperature drops to the protection point, press the Enter key on the front panel of the load, the word "OTP" will be eliminated, and the load will exit the OTP state.

3.3.5   Input polarity reversal protection (REV)

When the input voltage polarity is reversed, the load will be immediately OFF, the buzzer will sound, and the load screen will display a pop-up window (REV). As long as the input voltage with opposite polarity is always present, it will always be in the alarm state.

Operation to clear the reverse polarity protection status: Check whether the polarity is reversed, and if so, disconnect the connector.

3.4   ALLRUN Function

You can turn on the ALLRUN function of the module that needs to pull the current together and press the LOAD key of any ALLRUN function to turn on the module to pull the current synchronously or stop pulling the current. The following is an example analysis:

Module 1 and 2 ALLRUN function is turned on, module 3, 4 and 5 ALLRUN function is turned off.

Module 1 LOAD ON, module 2 synchronous LOAD ON, modules 3, 4 and 5 do not respond.

Module 2 LOAD ON, module 1 synchronous LOAD ON, modules 3, 4 and 5 do not respond.

Module 3 LOAD ON, Modules 1, 2, 4 and 5 do not respond.

Module 4 LOAD ON, Modules 1, 2, 3 and 5 do not respond.

Module 5 LOAD ON, Modules 1, 2, 3 and 4 do not respond.

3.5   Module Online

3.5.1   Module Online Setup

You can set any module as host mode, other modules involved in online as slave mode, and modules not involved as standalone mode. If there is already a host module, and then set the current module as host module, the module will prompt that the number of hosts is greater than 1, and you need to change it manually. After the successful connection, you can choose the connection type, which is divided into power and copy mode. The power mode is for the modules participating in the online to allocate the current of pulling load proportionally according to the maximum current. The power mode should be set to CC mode. Copy mode is for all participating modules to pull the current value set by the host module. Copy mode supports CC mode and DYN mode. Only the host module can LOAD ON or LOAD OFF, the slave module keys do not respond (only the L/R keys

respond for the dual channel module).

```
<Parallel Setup>              PARAL
Mode     : Master
Status   : Off               INFO

                             DIGIT

                             More
                             2/2
```
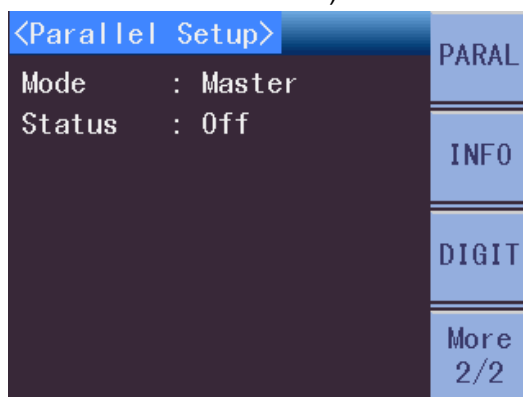
3.5.2 Cautions

Description of module online and ALLRUN function: If no module is online, all modules with ALLRUN function on are LOAD ON or LOAD OFF synchronously.

If some of the modules are online and some of them are not involved in online, they do not affect each other. The following is an example analysis:

Modules 1 and 2 are online, module 1 is the host module. Modules 3, 4 and 5 are not involved in online, modules 3 and 4 ALLRUN function is ON and module 5 ALLRUN function is OFF.

Module 1 LOAD ON, module 2 synchronous LOAD ON, modules 3, 4 and 5 do not respond.

Module 3 LOAD ON, module 4 synchronous LOAD ON, modules 1, 2 and 5 do not respond.

Module 4 LOAD ON, module 3 synchronous LOAD ON, modules 1, 2 and 5 do not respond.

Module 5 LOAD ON, Modules 1, 2, 3 and 4 do not respond.

Whether the ALLRUN function of module 1 and 2 is turned on or, it does not affect the operating status.

3.6   CAN Online

Support up to 4 whole machines to be connected online through CAN interface. First set a master frame, enter the backplane setting, set CAN mode as master, CAN address as 1, and CAN status as on. Set the slave frame, set CAN mode as slave, CAN address as 2~4, and CAN status as on. Then set a host module in the host, the other modules are set to slave mode, enter the module online, and the online mode is set to copy mode. After it succeeds, the host module can set the pull load value, and the other machines in the online can pull load the same current value at the same time, supporting CC and DYN mode.

Chapter 4 Basic Operations and Instructions

This chapter introduces the operation and parameter descriptions of modules such as General Mode, Advanced Mode, System Setting, Function Setting, Limit Setting, Online Setting, Machine Information, Digitizing, Base Board Setting, and Base Board Communication.

4.1 Measurement display

4.1.1 General mode description

Press the Mode module key to enter General mode, the page is shown in Figure 4-1:
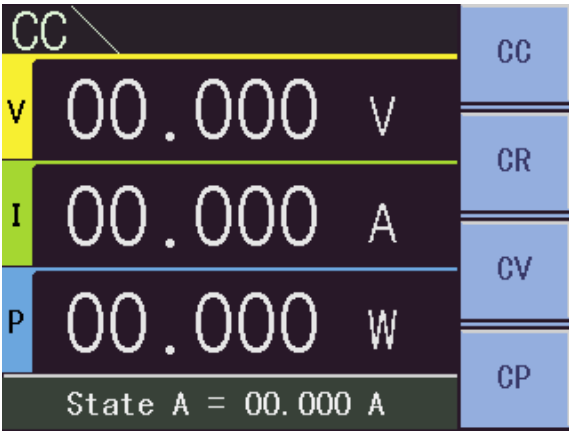
Figure 4-1 General Mode Page

Press Menu Key 1 in the measurement screen to enter CC mode. Press Menu Key 2 to enter CR mode.

Press Menu Key 3 to enter CV mode. Press Menu Key 4 to enter CP mode.

4.1.2 Advanced mode description

Press the ADVA module key to enter advanced mode, and the page is shown in Figure 4-2:

Press menu key 1 in the measurement interface to enter DYN mode. Press menu key 2 to enter SWP mode.

Press Menu Key 3 to enter CR-LED mode. Press Menu Key 4, the menu area displays more advanced modes.

Figure 4-2 Advanced Mode Page
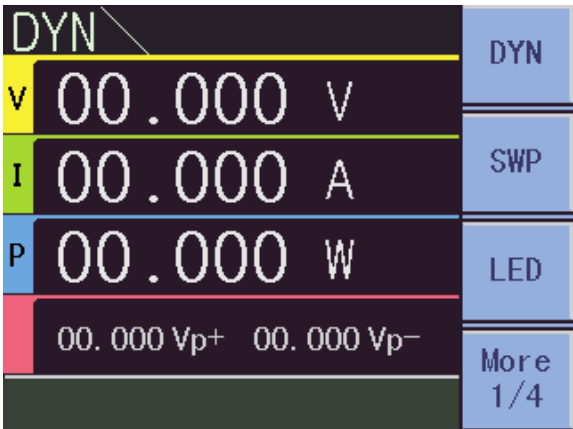
4.2 General mode setup

4.2.1 CC Mode Setup

4.2.1.1 Instructions and operation

1) Description

The CC setting contains current range setting, voltage range setting, current value A setting, current value B setting, rising slope setting, and falling slope setting. As shown in Figure 4-3.

Figure 4-3 CC Setup Page

2) Operation

Press the SETUP key, if the current mode is CC mode, it will automatically jump to the CC setting interface. If the current mode is not CC mode, you can switch to the CC setting interface by toggling menu key 4 (More).

4.2.1.2 Setting parameter description and operation

■ Current range

1) Description
The current range is divided into high range, medium range, and low range. Take TH8302 as an example, it is 40A, 4A, 400mA respectively.

2) Operation

Use the knob to turn the cursor to the current range setting and press the different menu keys to change the current range accordingly.

■ Voltage range

1) Description

The voltage range is divided into high range, medium range and low range. They are 80V, 16V and 6V respectively.

2) Operation

Use the knob to turn the cursor to the voltage range setting and press the different menu keys to change the voltage range accordingly.

■ Current setting value A

1) Description

This parameter represents the pull-load current level A.

2) Operation

Turn the cursor to the current setting value A setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Current setting value B

1) Description

This parameter represents the pull-load current level B.

2) Operation

Turn the cursor to the current setting value B setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Rising slope

1) Description

This parameter represents the rising slope of the pull-load current in A/us or mA/us.

2) Operation

Turn the cursor to the rising slope setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Falling slope

1) Description

This parameter represents the slope of the pull-load current drop in A/us or mA/us.

2) Operation

Turn the cursor to the falling slope setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

4.2.2　CR mode setting

4.2.2.1　Instructions and operation

1) Description

The CR setting contains current range setting, resistance range setting,

resistance value A setting, and resistance value B setting. As shown in Figure 4-4.

```
<CR Setup>                        CC
                                Setup
R-Range  : H
I-Range  : H                      CR
State A  : 0002.9 Ω             Setup
State B  : 0002.9 Ω
                                  CV
                                Setup

                                 More
                                  1/6
```

Figure 4-4 CR Setup Page

2)　Operation

　　Press SETUP key, if the current mode is CR mode, it will automatically jump to the CR setting interface. If the current mode is not CR mode, you can switch to the CR setting interface by toggling menu key 4 (More).

4.2.2.2　Setting parameter description and operation

■　Resistance range

1)　Description

　　The current range is divided into high range, medium range, and low range. Take TH8302 as an example, it is 9000Ω, 2160Ω and 60Ω respectively.

2)　Operation

　　Use the knob to turn the cursor to the resistance range setting and press different menu keys to change the resistance range accordingly.

■　Current range

1)　Description

The current range is divided into high range, medium range, and low range.

2)　Operation

　　Use the knob to turn the cursor to the current range setting and press different menu keys to change the current range accordingly.

■　Resistance setting value A

1)　Description

This parameter represents the pull-load resistance level A.

2)　Operation

　　Turn the cursor to the resistance setting value A setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned

down. Press the Enter key to exit the editing state.

■ Resistance setting value B

1) Description

This parameter represents the pull-load resistance level B.

2) Operation

Turn the cursor to the resistance setting value B setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

4.2.3 CV mode setting

4.2.3.1 Instructions and operation

1) Description

The CV setting contains voltage range setting, voltage value A setting, and voltage value B setting. As shown in Figure 4-5.

Figure 4-5 CV Setup Page

2) Operation

Press the SETUP key, if the current mode is CV mode, it will automatically jump to the CV setting interface. If the current mode is not CV mode, you can switch to the CV setting interface by toggling menu key 4 (More).

4.2.3.2 Setting parameter description and operation

■ Voltage range

1) Description

The voltage range is divided into high range, medium range, and low range. They are 80V, 16V and 6V respectively.

2) Operation

Use the knob to turn the cursor to the voltage range setting and press the

different menu keys to change the voltage range accordingly.

- ◼ Current range
  The CV mode current range is always high range.

- ◼ Voltage setting value A

  1) Description

  This parameter represents the pull-load voltage level A.

  2) Operation

  Turn the cursor to the voltage setting value A setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

- ◼ Voltage setting value B

  1) Description

  This parameter represents the pull-load voltage level B.

  2) Operation

  Turn the cursor to the voltage setting value B setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

4.2.4 CP mode setting

4.2.4.1 Description and operation

1) Description

The CP settings include power range setting, voltage range setting, power value A setting, power value B setting, rising slope setting, and falling slope setting. As shown in Figure 4-6.

30
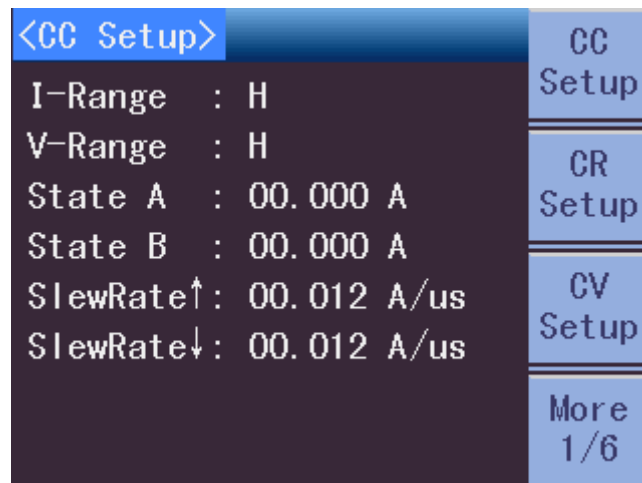
Figure 4-6 CP Setup Page

2) Operation

Press SETUP key, if the current mode is CP mode, it will automatically jump to the CP setting interface. If the current mode is not CP mode, you can switch to the CP setting interface by toggling menu key 4 (More).

4.2.4.2　Setting parameter description and operation

■ Power range

1) Description

The power range is divided into high range, medium range, and low range. Take TH8302 as an example, it is 200W, 20W and 4W respectively.

2) Operation

Use the knob to turn the cursor to the current range setting and press the different menu keys to change the power range accordingly.

■ Voltage range

1) Description

The voltage range is divided into high range, medium range, and low range. They are 80V, 16V and 6V respectively.

2) Operation

Use the knob to turn the cursor to the voltage range setting and press the different menu keys to change the voltage range accordingly.

■ Power setting value A

1) Description

This parameter represents the pull-load power level A.

2) Operation

Turn the cursor to the power setting value A setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Power setting value B

1) Description

This parameter represents the pull-load power level B.

2) Operation

Turn the cursor to the power setting value B setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the

Enter key to exit the editing state.

■ Rising slope

1) Description

This parameter represents the rising slope of the pull-load current in A/us or mA/us.

2) Operation

Turn the cursor to the rising slope setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Falling slope

1) Description

This parameter represents the falling slope of the pull-load current in A/us or mA/us.

2) Operation

Turn the cursor to the rising slope setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

4.3   Advanced Mode Settings

4.3.1   DYN Mode Settings

4.3.1.1   Instructions and operation

1) Description

DYN mode is a dynamic load mode, based on CC mode. It contains current range setting, voltage range setting, current value 1 setting, current value 2 setting, time value 1 setting, time value 2 setting, rising slope setting, falling slope setting, and repetition number setting. As shown in Figure 4-7.
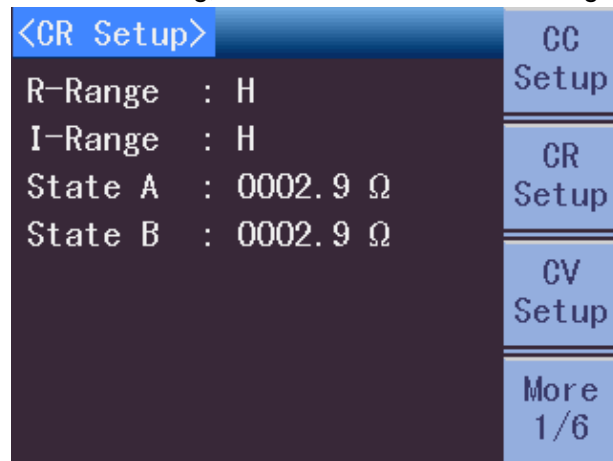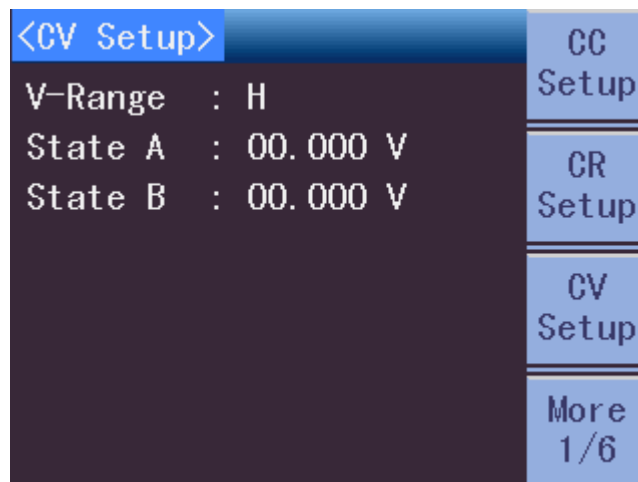
Figure 4-7 DYN Setup Page
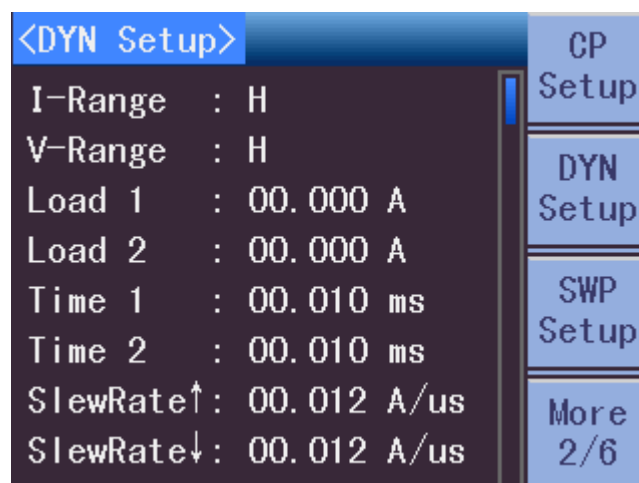
2) Operation

Press SETUP key, if the current mode is DYN mode, it will automatically jump to the DYN setting interface. If the current mode is not DYN mode, you can switch to the DYN settings screen by toggling menu key 4 (More).

4.3.1.2 Setting parameter description and operation

■ Current range

1) Description

The current range is divided into high range, medium range, and low range. Take TH8302 as an example, it is 40A, 4A, 400mA respectively.

2) Operation

Use the knob to turn the cursor to the current range setting and press the different menu keys to change the current range accordingly.

■ Voltage range

1) Description

The voltage range is divided into high range, medium range and low range. They are 80V, 16V and 6V respectively.

2) Operation

Turn the cursor to the voltage range setting with the knob and press the different menu keys to change the voltage range accordingly.

■ Current setting value 1

1) Description

This parameter represents the dynamic pull-load current level 1.

2) Operation

Turn the cursor to the current setting value 1 setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Current setting value 2

1) Description

This parameter represents the dynamic pull-load current level 2.

2) Operation

Turn the cursor to the current setting value 2 setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Time setting value 1

1) Description

This parameter represents the duration of the dynamic pull-load current level 1.

2) Operation

Turn the cursor to the time setting value 1 setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Time setting value 2

1) Description

This parameter represents the duration of the dynamic pull-load current level 2.

2) Operation

Turn the cursor to the time setting value 1 setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Rising slope

1) Description

This parameter represents the rising slope of the pull-load current in A/us or mA/us.

2) Operation

Turn the cursor to the rising slope setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Falling slope

1) Description

This parameter represents the falling slope of the pull-load current in A/us or mA/us.

2) Operation

Turn the cursor to the falling slope setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the

Enter key to exit the editing state.

- Number of repetitions

    1) Description

    This parameter represents the number of repetitions of the dynamic pull-load process.

    2) Operation

    Turn the cursor to the repeat count setting by the knob and press the knob change key to enter the editing state. You can change the value position to be changed by the left and right keys or press the knob change key continuously to change the value position. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

4.3.2 SWP mode setting

4.3.2.1   Instructions and operation

1) Description

SWP mode is dynamic load frequency sweep mode, based on CC mode. It contains current range setting, voltage range setting, current value 1 setting, current value 2 setting, start frequency setting, termination frequency setting, step frequency setting, duration setting, rise slope setting, and fall slope setting. As shown in Figure 4-8.
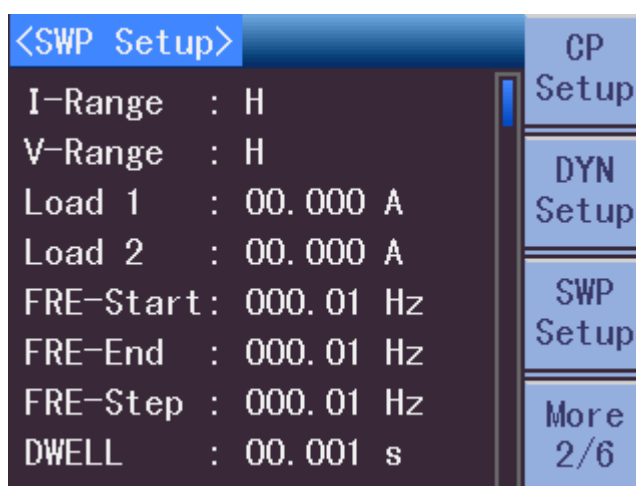
Figure 4-8 SWP Setting Page

2) Operation

Press SETUP key, if the current mode is SWP mode, it will automatically jump to the SWP setting interface. If the current mode is not SWP mode, you can switch to the SWP setting interface by toggling menu key 4 (More).

4.3.2.2   Setting parameter description and operation

- Current range

    1) Description

    The current range is divided into high range, medium range, and low range. Take TH8302 as an example, it is 40A, 4A, 400mA respectively.

2) Operation

Use the knob to turn the cursor to the current range setting and press the different menu keys to change the current range accordingly.

∎ Voltage range

1) Description

The voltage range is divided into high range, medium range, and low range. They are 80V, 16V and 6V respectively.

2) Operation

Use the knob to turn the cursor to the voltage range setting and press the different menu keys to change the voltage range accordingly.

∎ Current setting value 1

1) Description

This parameter represents the dynamic pull-load current level 1.

2) Operation

Turn the cursor to the current setting value 1 setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

∎ Current setting value 2

1) Description

This parameter represents the dynamic pull-load current level 2.

2) Operation

Turn the cursor to the current setting value 2 setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

∎ Starting frequency

1) Description

This parameter represents the frequency at which the dynamic pull current starts.

2) Operation

Turn the cursor to the starting frequency setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press Enter

to exit the editing state.

■ Termination frequency

1) Description

This parameter represents the frequency at which the dynamic pull current is terminated.

2) Operation

Turn the cursor to the termination frequency setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Step frequency

1) Description

This parameter represents the value of the change in frequency at each step of the dynamic pulling current.

2) Operation

Turn the cursor to the step frequency setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Duration

1) Description

This parameter represents the duration of each step of the dynamic pull current from the start frequency to the termination frequency.

2) Operation

Turn the cursor to the duration setting with the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Rising slope

1) Description

This parameter represents the rising slope of the pull-load current in A/us or mA/us.

2) Operation

Turn the cursor to the rising slope setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by

pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Falling slope

1) Description

This parameter represents the falling slope of the pull-load current in A/us or mA/us.

2) Operation

Turn the cursor to the falling slope setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

4.3.3 CR-LED mode setting

4.3.3.1 Instructions and operation

1) Description

The CR-LED setting contains resistance range setting, resistance value setting, and voltage value setting. As shown in Figure 4-9.

Figure 4-9 CR-LED Setup Page

2) Operation

Press SETUP key, if the current mode is CR-LED mode, it will automatically jump to the CR-LED setting interface. If the current mode is not CR-LED mode, you can switch to the CR-LED setting interface by toggling menu key 4 (More).

4.3.3.2 Setting parameter description and operation

■ Resistance range

1) Description

The resistance range is divided into high range, medium range, and low range. Take TH8302 as an example, it is 9000Ω, 2160Ω and 60Ω respectively.

2) Operation

Use the knob to turn the cursor to the resistance range setting and press different menu keys to change the resistance range accordingly.

■ Resistance setting value

1) Description

This parameter represents the simulated LED resistance value.

2) Operation

Turn the cursor to the resistance setting value by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Voltage setting value

1) Description

This parameter represents the simulated LED starting voltage.

2) Operation

Turn the cursor to the voltage setting value with the knob and press the knob change key to enter the editing state. You can change the value position to be changed by the left and right keys or keep pressing the knob change key to change the value position. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

4.3.4 BATT mode setting

4.3.4.1 Instructions and operation

1) Description

BAT is the battery measurement mode, and the settings include discharge mode setting, current range setting, voltage range setting, setting value, termination mode setting, termination threshold setting, rising slope setting, and falling slope setting. As shown in Figure 4-10.

| <BATT Setup>	LED Setup
Mode : CC	
I-Range : H	BATT Setup
V-Range : H	
I-Set : 00.000 A	
Condition : VOLT	TIME Setup
Level : 00.000 V	
SlewRate↑: 00.012 A/us	More 3/6
SlewRate↓: 00.012 A/us	

Figure 4-10 BATT Setup Page

2) Operation

Press the SETUP key, if the current mode is BATT mode, it will automatically jump to the BATT setting interface. If the current mode is not BATT mode, you can switch to the BATT setting interface by toggling menu key 4 (More).

4.3.4.2 Setting parameter description and operation

■ Discharge mode

1) Description

The discharge modes include CC, CR, and CP.

2) Operation

Use the knob to turn the cursor to the discharge mode setting and press the different menu keys to change the current range accordingly.

■ Current range

1) Description

The current range is divided into high range, medium range, and low range. Take TH8302 as an example, it is 40A, 4A, 400mA respectively.

2) Operation

Use the knob to turn the cursor to the current range setting and press the different menu keys to change the current range accordingly.

■ Voltage range

1) Description

The voltage range is divided into high range, medium range, and low range. They are 80V, 16V and 6V respectively.

2) Operation

Use the knob to turn the cursor to the voltage range setting and press the different menu keys to change the voltage range accordingly.

■ Set value

1) Description

This parameter represents the pull-load value corresponding to different discharge modes. For example, if the discharge mode is CC, it is the current value of the pull load.

2) Operation

Turn the cursor to the setting value by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the

Enter key to exit the editing state.

■ Termination Mode

1) Description

This parameter represents the mode in which the battery test is terminated, including voltage, timing, capacity, and energy.

2) Operation

Use the knob to turn the cursor to the termination mode setting and press different menu keys to change the termination mode accordingly.

■ Termination Threshold

1) Description

This parameter represents the trigger value corresponding to the battery test termination mode.

2) Operation

Turn the cursor to the termination threshold setting value by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Rising slope

1) Description

This parameter represents the rising slope of the pull-load current in A/us or mA/us.

2) Operation

Turn the cursor to the rising slope setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Falling slope

1) Description

This parameter represents the falling slope of the pull-load current in A/us or mA/us.

2) Operation

Turn the cursor to the falling slope setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

4.3.5 TIMING mode setting

4.3.5.1 Description and operation

1) Description

TIME is the timing measurement mode, and the settings include measurement mode setting, current range setting, voltage range setting, setting value, trigger mode setting, starting voltage setting, terminating voltage setting, stop time setting, rising slope setting, and falling slope setting. As shown in   Figure 4-11.
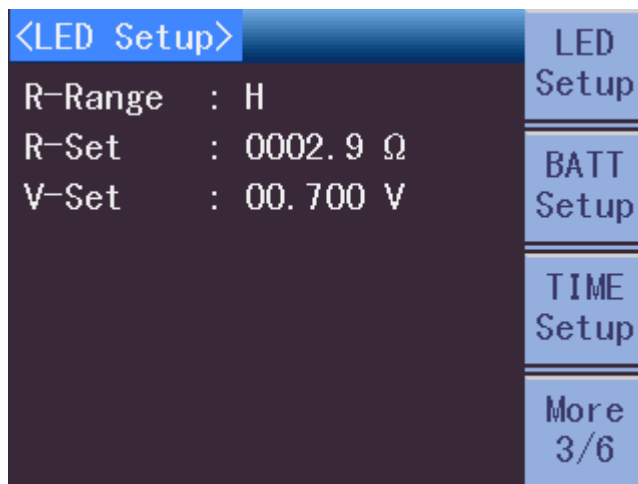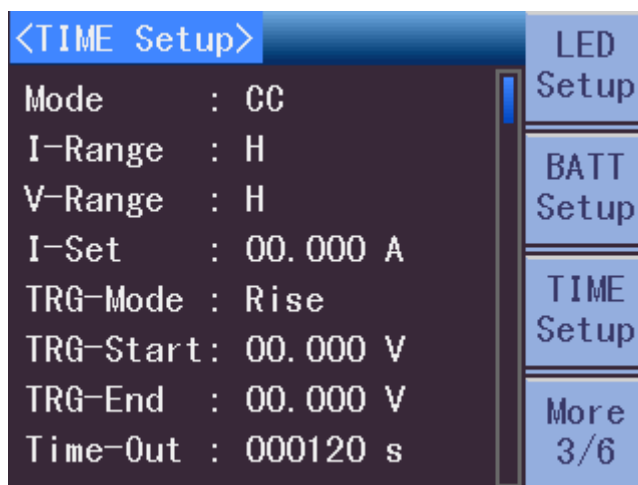

Figure 4-11 TIME Setup Page

2) Operation

Press SETUP key, if the current mode is TIME mode, it will automatically jump to the TIME setting interface. If the current mode is not TIME mode, you can switch to the TIME setting interface by toggling menu key 4 (More).

4.3.5.2 Setting parameter description and operation

■ Test Mode

1) Description

The test modes include CC, CR, and CP.

2) Operation

Use the knob to turn the cursor to the test mode setting and press the different menu keys to change the current range accordingly.

■ Current range

1) Description

The current range is divided into high range, medium range, and low range. Take TH8302 as an example, it is 40A, 4A, 400mA respectively.

2) Operation

Use the knob to turn the cursor to the current range setting and press the different menu keys to change the current range accordingly.

■ Voltage range

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1) Description

The voltage range is divided into high range, medium range, and low range. They are 80V, 16V and 6V respectively.

2) Operation

Use the knob to turn the cursor to the voltage range setting and press the different menu keys to change the voltage range accordingly.

■ Set value

1) Description

This parameter represents the pull-load value corresponding to different test modes. For example, if the test mode is CC, it is the current value of the pull load.

2) Operation

Turn the cursor to the setting value by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Trigger mode

1) Description

This parameter represents the mode of the timing test, including rise, fall, and hold.

2) Operation

Turn the cursor to the test mode setting through the knob and press different menu keys to change the trigger mode accordingly.

■ Starting voltage

1) Description

This parameter represents the starting voltage of the timing test.

2) Operation

Turn the cursor to the starting voltage setting value with the knob and press the knob change key to enter the editing state. You can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Termination voltage

1) Description

This parameter represents the timing test termination voltage.

2) Operation

Turn the cursor to the end voltage setting value with the knob, press the

knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Stop time

1) Description

This parameter represents the maximum duration of the timing test, even if the whole test process is not completed at this time, the electronic load is forced to stop pulling the load current.

2) Operation

Turn the cursor to the stop time setting value by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Rising slope

1) Description

This parameter represents the rising slope of the pull-load current in A/us or mA/us.

2) Operation

Turn the cursor to the rising slope setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Falling slope

1) Description

This parameter represents the falling slope of the pull-load current in A/us or mA/us.

2) Operation

Turn the cursor to the falling slope setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

4.3.6 MPPT mode setting

4.3.6.1 Instructions and operation

1) Description

The MPPT test function is maximum power point tracking. The settings

include voltage range setting, test speed setting. As shown in Figure 4-12.

Figure 4-12 MPPT Setup Page

2) Operation

Press SETUP key, if the current mode is MPPT mode, it will automatically jump to the MPPT setting interface. If the current mode is not MPPT mode, you can switch to the MPPT setting interface by toggling menu key 4 (More).

4.3.6.2   Setting parameter description and operation

■ Voltage range

1) Description

The voltage range is divided into high range, medium range, and low range. They are 80V, 16V and 6V respectively.

2) Operation

Use the knob to turn the cursor to the voltage range setting and press the different menu keys to change the voltage range accordingly.

■ Test Speed

1) Description

The test speed is divided into fast, medium, and slow speed.

2) Operation

Use the knob to turn the cursor to the test speed setting and press different menu keys to change the test speed accordingly.

4.3.7 OCPT mode setting

4.3.7.1   Instructions and operation

1) Description

OCPT mode is over current protection test, based on CC mode. It contains current range setting, voltage range setting, start current setting, termination current setting, step number setting, duration setting, trigger voltage setting, lower current limit setting, upper current limit setting, and pull-load lock setting. As shown in Figure 4-13.

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<OCPT Setup>

|	
I-Range	: H
V-Range	: H
Start-I	: 00.000 A
End-I	: 00.000 A
I-Step	: 000001
DWELL	: 000.01 ms
TRG-V	: 00.000 V
SPEC-L	: 00.000 A

MPPT Setup

OCPT Setup

OVPT Setup

More 4/6

Figure 4-13 OCPT Setup Page

2) Operation

Press SETUP key, if the current mode is OCPT mode, it will automatically jump to the OCPT setting interface. If the current mode is not OCPT mode, you can switch to the OCPT setting interface by toggling menu key 4 (More).

4.3.7.2 Setting parameter description and operation

■ Current range

1) Description

The current range is divided into high range, medium range, and low range. Take TH8302 as an example, it is 40A, 4A, 400mA respectively.

2) Operation

Use the knob to turn the cursor to the current range setting and press the different menu keys to change the current range accordingly.

■ Voltage range

1) Description

The voltage range is divided into high range, medium range, and low range. They are 80V, 16V and 6V respectively.

2) Operation

Use the knob to turn the cursor to the voltage range setting and press the different menu keys to change the voltage range accordingly.

■ Starting current

1) Description

This parameter represents the current at which the overcurrent protection test starts.

2) Operation

Turn the cursor to the starting current setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by

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pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press Enter to exit the editing state.

■ Termination current

3) Description

This parameter represents the current at which the overcurrent protection test is terminated.

4) Operation

Turn the cursor to the end current setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Steps Number

1) Description

This parameter represents the step of change between the starting current and the ending current.

2) Operation

Turn the cursor to the step number setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Duration

1) Description

This parameter represents the duration of each step of the current pull load.

2) Operation

Turn the cursor to the duration setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Trigger voltage

1) Description

This parameter represents the voltage at which the overcurrent protection test is triggered.

2) Operation

Turn the cursor to the trigger voltage setting by the knob, press the knob change key to enter the editing state, you can change the value position to be

changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the $\boxed{\text{Enter}}$ key to exit the editing state.

■ Lower current limit

1) Description

This parameter represents the lower limit value of the trigger voltage corresponding to the test current.

2) Operation

Turn the cursor to the lower current limit setting with the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the $\boxed{\text{Enter}}$ key to exit the editing state.

■ Current limit

1) Description

This parameter represents the upper limit of the trigger voltage corresponding to the test current.

2) Operation

Turn the cursor to the current limit setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the $\boxed{\text{Enter}}$ key to exit the editing state.

■ Pull-Load Lock

1) Description

This parameter represents whether the load continues to pull current after the trigger voltage is reached. If the load lock is on, the load will continue to pull current, and if the load lock is off, the load will stop pulling current.

2) Operation

Use the knob to turn the cursor to the pull load lock setting and press the different menu keys to change the voltage range accordingly.

4.3.8 OVPT mode setting

4.3.8.1 Instructions and operation

1) Description

OVPT test function is over voltage protection test. The settings include voltage range setting, trigger voltage setting. As shown in Figure 4-14.
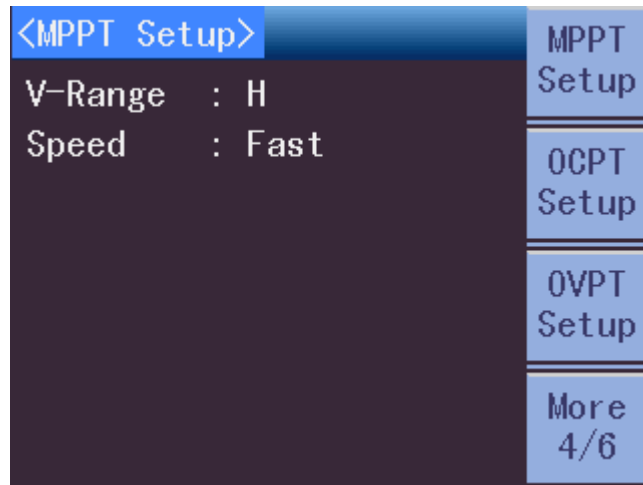
Figure 4-14 OVPT Setup Page

    2) Operation

Press SETUP key, if the current mode is OVPT mode, it will automatically jump to the OVPT setting interface. If the current mode is not OVPT mode, you can switch to the OVPT setting interface by toggling menu key 4 (More).

4.3.8.2 Setting parameter description and operation

■ Voltage range

    1) Description

The voltage range is divided into high range, medium range, and low range. They are 80V, 16V and 6V respectively.

    2) Operation

Use the knob to turn the cursor to the voltage range setting and press the different menu keys to change the voltage range accordingly.

■ Trigger voltage

    1) Description

This parameter represents the trigger voltage for reaching the voltage protection test.

    2) Operation

Turn the cursor to the trigger voltage setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

4.3.9 OPPT mode setting

4.3.9.1 Instructions and operation

    1) Description

OPPT mode is over power protection test, based on CC mode. It contains current range setting, voltage range setting, starting power setting, termination power setting, step number setting, duration setting, trigger voltage setting,

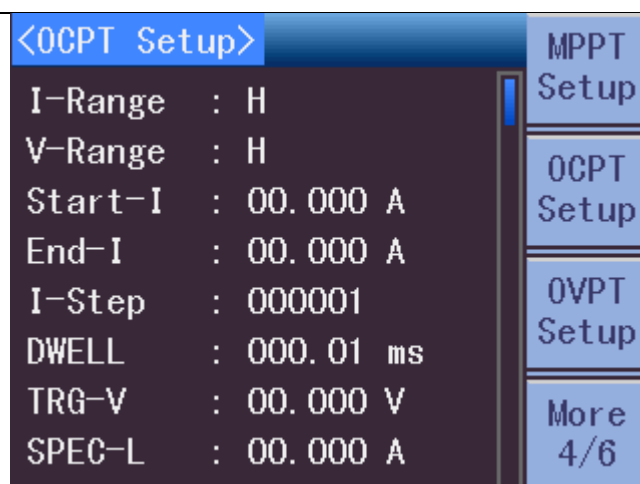lower power limit setting, upper power limit setting, and pull-load lock setting. As shown in Figure 4-15.

Figure 4-15 OPPT Setting Page

2) Operation

Press the SETUP key, if the current mode is OPPT mode, it will automatically jump to the OPPT setting interface. If the current mode is not OPPT mode, you can switch to the OPPT setting interface by toggling menu key 4 (More).

4.3.9.2   Setting parameter description and operation

■ Current range

1) Description

The current range is divided into high range, medium range, and low range.

2) Operation

Use the knob to turn the cursor to the current range setting and press the different menu keys to change the current range accordingly.

■ Voltage range

1) Description

The voltage range is divided into high range, medium range, and low range. They are 80V, 16V and 6V respectively.

2) Operation

Use the knob to turn the cursor to the voltage range setting and press the different menu keys to change the voltage range accordingly.

■ Starting power

1) Description

This parameter represents the power at the start of the overpower protection test.

2) Operation

Turn the cursor to the starting power setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press Enter to exit the editing state.

■ Termination power

1) Description

This parameter represents the power at which the overpower protection test is terminated.

2) Operation

Turn the cursor to the end power setting by the knob and press the knob change key to enter the editing state. You can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Step Number

1) Description

This parameter represents the step of change between the starting power and the ending power.

2) Operation

Turn the cursor to the step number setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Duration

1) Description

This parameter represents the duration of each step of the power pull.

2) Operation

Turn the cursor to the duration setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Trigger voltage

1) Description

This parameter represents the voltage at which the over-power protection test is triggered.

2) Operation

Turn the cursor to the trigger voltage setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

- Lower power limit

   1) Description

   This parameter represents the lower limit value of the trigger voltage corresponding to the test power.

   2) Operation

   Turn the cursor to the lower power limit setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

- Power limit

   1) Description

   This parameter represents the upper limit of the trigger voltage corresponding to the test power.

   2) Operation

   Turn the cursor to the power limit setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

- Pull Load Lock

   1) Description

   This parameter represents whether the load continues to pull current after the trigger voltage is reached. If the load lock is on, the load will continue to pull current, and if the load lock is off, the load will stop pulling current.

   2) Operation

   Use the knob to turn the cursor to the pull load lock setting and press the different menu keys to change the voltage range accordingly.

4.3.10 SINE mode setting

4.3.10.1   Instructions and operation

   1) Description

   The SINE test function is a sine wave test. The settings include current range setting, voltage range setting, DC current setting, AC current setting, and frequency setting. As shown in Figure 4-16.
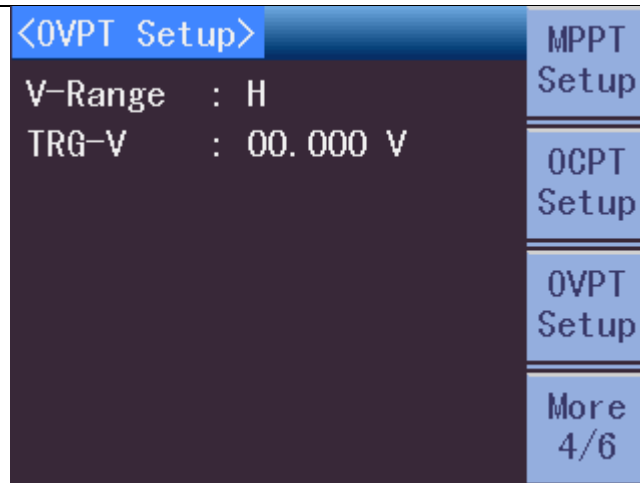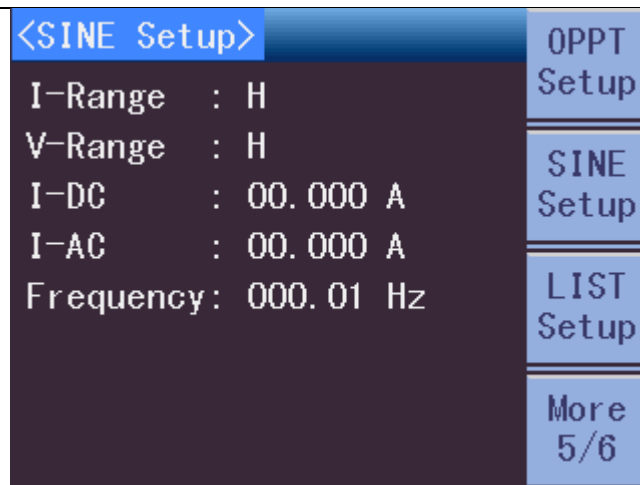
Figure 4-16 SINE Setup Page

2) Operation

Press SETUP key, if the current mode is SINE mode, it will automatically jump to the SINE setting interface. If the current mode is not SINE mode, you can switch to the SINE setting interface by toggling menu key 4 (More).

4.3.10.2 Setting parameter description and operation

■ Current range

1) Description

The current range is divided into high range, medium range, and low range.

2) Operation

Use the knob to turn the cursor to the current range setting and press the different menu keys to change the current range accordingly.

■ Voltage range

1) Description

The voltage range is divided into high range, medium range, and low range. They are 80V, 16V and 6V respectively.

2) Operation

Use the knob to turn the cursor to the voltage range setting, and press the different menu keys to change the voltage range accordingly.

■ DC Current

1) Description

This parameter represents the DC current in a sine wave test.

2) Operation

Turn the cursor to the DC current setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

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■ AC Current

1) Description

This parameter represents the AC current in a sine wave test.

2) Operation

Turn the cursor to the AC current setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Frequency settings

1) Description

This parameter represents the frequency in the sine wave test.

2) Operation

Turn the cursor to the frequency setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

4.3.11 LIST mode setting

4.3.11.1   Instructions and operation

1) Description

LIST test function is list test. The settings include current range setting, voltage range setting, repetition number setting, total sequence setting, current sequence setting, current setting, duration setting, and slope setting. As shown in Figure 4-17.
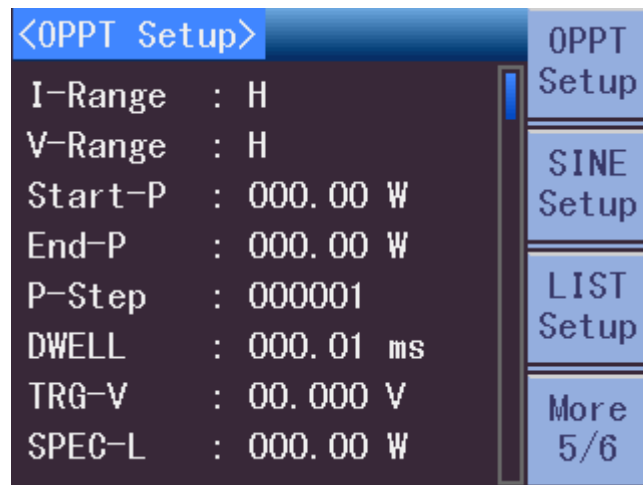

Figure 4-17 LIST Setup Page

2) Operation

Press SETUP key, if the current mode is LIST mode, it will automatically jump to the LIST setting interface. If the current mode is not LIST mode, you can switch to the LIST setting interface by toggling menu key 4 (More).

4.3.11.2   Setting parameter description and operation

■ Current range

1)   Description

The current range is divided into high range, medium range, and low range.

2)   Operation

Use the knob to turn the cursor to the current range setting and press the different menu keys to change the current range accordingly.

■ Voltage range

1)   Description

The voltage range is divided into high range, medium range, and low range. They are 80V, 16V and 6V respectively.

2)   Operation

Use the knob to turn the cursor to the voltage range setting and press the different menu keys to change the voltage range accordingly.

■ Number of repetitions

1)   Description

This parameter represents the number of iterations of the list test.

2)   Operation

Turn the cursor to the repeat count setting with the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Total number of sequences

1)   Description

This parameter represents the total number of sequences tested by the list.

2)   Operation

Turn the cursor to the sequence total setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Current Sequence

1)   Description

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This parameter represents the current sequence of the list test.

2) Operation

Turn the cursor to the current sequence setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Current setting

1) Description

This parameter represents the current pull-load value of the current sequence.

2) Operation

Turn the cursor to the current setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Duration

1) Description

This parameter represents the duration of the current sequence current pull.

2) Operation

Turn the cursor to the duration by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Slope setting

1) Description

This parameter represents the slope of the current change in the current sequence.

2) Operation

Turn the cursor to the slope setting with the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

4.3.12 AUTO mode setting

4.3.12.1   Instructions and operation

1) Description

AUTO mode is the automatic test function. The settings include current

program, program type, linked program, repeat count, clear sequence, total number of sequences, and edit sequence. When the program type is LIST, each sequence will be set after entering the edit sequence. When the program type is STEP, the step will be set after entering the edit sequence. AUTO mode contains 10 programs, each program can edit up to 100 sequences. Users can freely chain programs together to form combinations and complete the automatic test process. As shown in Figure 4-18, 4-19, 4-20.
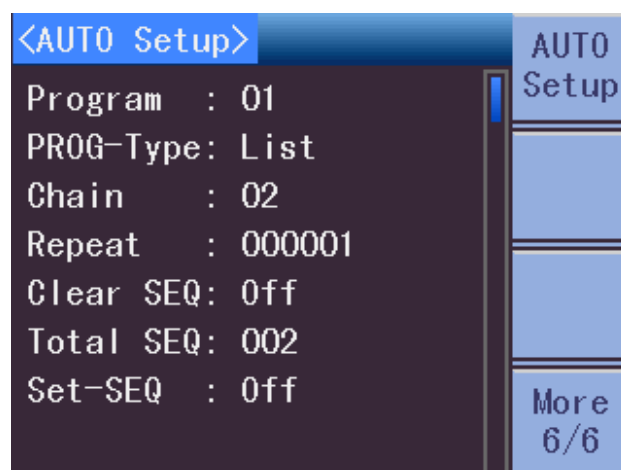
Figure 4-18 AUTO setting page
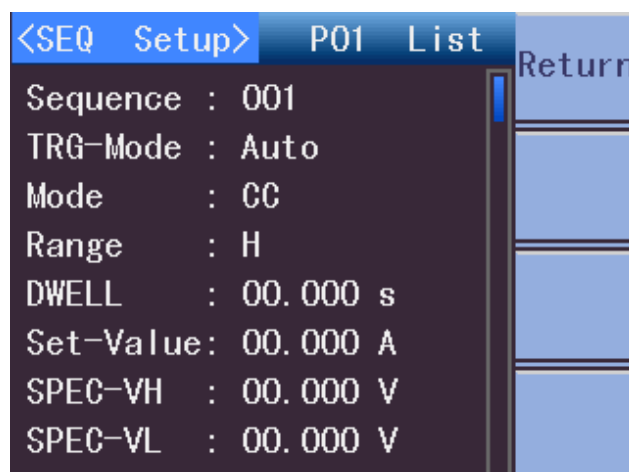
Figure 4-19 Timing Setting Page
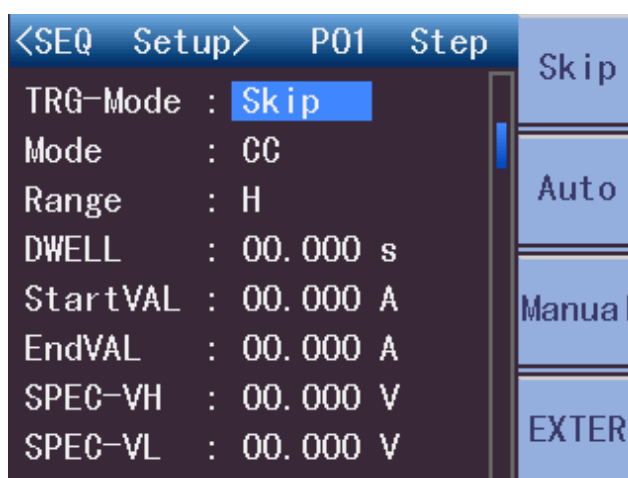
Figure 4-20 Step Setting Page

2) Operation

Press SETUP key, if the current mode is AUTO mode, it will automatically jump to AUTO setting interface. If the current mode is not AUTO mode, you can switch to the AUTO setting screen by toggling menu key 4 (More). When the program type is set to LIST, it will enter the timing setting screen after editing sequence is selected. When the program type is set to STEP, it will enter the step setting screen after editing sequence is selected.

4.3.12.2 Setting parameter description and operation

A. Program type set to LIST

■ Current Program

1) Description

The first program executed in automatic mode.

2) Operation

Turn the cursor to the current program setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Program Type

1) Description

There are two types of programs: List (list) and Step (step).

2) Operation

Use the knob to rotate the cursor to the program type setting and press different menu keys to change the program type accordingly.

■ Chain Knot

1) Description

This parameter represents the next program to be executed.

2) Operation

Turn the cursor to the link setting by the knob and press the knob change key to enter the editing state. You can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Number of repetitions

1) Description

This parameter represents the number of repetitions of the current program.

2) Operation

Turn the cursor to the sequence repetition number setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Clear Sequence

1) Description

This parameter clears the sequence of the current program.

2) Operation

Turn the cursor to the Program Clear Sequence setting by the knob, and press Menu Key 1 to clear the sequence.

■ Edit Sequence

1) Description

This parameter represents entering sequence editing. When the program type is set to LIST, the selected editing sequence will enter the Timing setting page. When the program type is set to STEP, the selected editing sequence will enter the step setting page.

2) Operation

Use the knob to turn the cursor to the program edit sequence setting, and press menu key 1 to enter the sequence edit.

■ Current Sequence

1) Description

This parameter represents the currently edited sequence.

2) Operation

Turn the cursor to the current sequence by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Trigger mode

1) Description

This parameter represents the trigger mode of the current sequence. Skip means the current sequence is not executed, Auto means the current sequence is executed automatically, Manual means waiting for a manual trigger signal, and External means waiting for an external trigger signal.

2) Operation

Use the knob to turn the cursor to the trigger mode setting and press different menu keys to change the trigger mode accordingly.

■ Test Mode

1) Description

This parameter represents the test mode of the current sequence. It includes CC, CR, CV, and CP.

2) Operation

Use the knob to turn the cursor to the test mode setting and press different menu keys to change the test mode accordingly.

■ Measurement range

1) Description

This parameter represents the range of the current sequence; CC, CP mode indicates current range, CR, CV mode indicates voltage range.

2) Operation

Use the knob to turn the cursor to the range setting and press the different menu keys to change the range accordingly.

■ Duration

1) Description

This parameter represents the duration of the current sequence test.

2) Operation

Turn the cursor to the duration by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Set value

1) Description

This parameter represents the pull-load value of the current mode.

2) Operation

Turn the cursor to the setting value by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Upper Voltage limit

1) Description

This parameter represents the upper voltage limit of the current sequence.

2) Operation

Turn the cursor to the upper voltage limit setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Lower voltage limit

1) Description

This parameter represents the lower voltage limit of the current sequence.

2) Operation

Turn the cursor to the lower voltage limit setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Upper Current limit

1) Description

This parameter represents the upper current limit of the current sequence.

2) Operation

Turn the cursor to the upper voltage limit setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Lower current limit

1) Description

This parameter represents the lower current limit of the current sequence.

2) Operation

Turn the cursor to the lower voltage limit setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Upper Power limit

1) Description

This parameter represents the upper power limit of the current sequence.

2) Operation

Turn the cursor to the upper voltage limit setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by

pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Lower power limit

1) Description

This parameter represents the lower power limit of the current sequence.

2) Operation

Turn the cursor to the lower voltage limit setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Rising slope

1) Description

When the test mode of the current sequence is set to CC or CP, the rising slope needs to be set.

2) Operation

Turn the cursor to the rising slope setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Falling slope

1) Description

When the test mode of the current sequence is set to CC or CP, the falling slope needs to be set.

2) Operation

Turn the cursor to the rising slope setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

B. Program type is set to Step

■ Trigger mode

1) Description

This parameter represents the trigger mode of the current sequence. Skip means the current sequence is not executed, Auto means the current sequence is executed automatically, Manual means waiting for a manual trigger signal, and External means waiting for an external trigger signal.

2) Operation

Use the knob to turn the cursor to the trigger mode setting and press different menu keys to change the trigger mode accordingly.

■ Test Mode

1) Description

This parameter represents the test mode of the current sequence. It includes CC, CR, CV, and CP.

2) Operation

Use the knob to turn the cursor to the test mode setting and press different menu keys to change the test mode accordingly.

■ Measurement range

1) Description

This parameter represents the range of the current sequence; CC, CP mode indicates current range, CR, CV mode indicates voltage range.

2) Operation

Use the knob to turn the cursor to the range setting and press the different menu keys to change the range accordingly.

■ Duration

1) Description

This parameter represents the duration of the current sequence test.

2) Operation

Turn the cursor to the duration by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Starting value

1) Description

This parameter represents the starting pull-load value for the current mode.

2) Operation

Turn the cursor to the starting value setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the

knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

- **Termination value**

  1) Description

  This parameter represents the termination pull value for the current mode.

  2) Operation

  Turn the cursor to the end value setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

- **Upper Voltage limit**

  1) Description

  This parameter represents the upper voltage limit of the current sequence.

  2) Operation

  Turn the cursor to the upper voltage limit setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

- **Lower voltage limit**

  1) Description

  This parameter represents the lower voltage limit of the current sequence.

  2) Operation

  Turn the cursor to the lower voltage limit setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

- **Upper Current limit**

  1) Description

  This parameter represents the upper current limit of the current sequence.

  2) Operation

  Turn the cursor to the upper voltage limit setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to

exit the editing state.

- **Lower current limit**

    1) Description

    This parameter represents the lower current limit of the current sequence.

    2) Operation

    Turn the cursor to the lower voltage limit setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

- **Upper Power limit**

    1) Description

    This parameter represents the upper power limit of the current sequence.

    2) Operation

    Turn the cursor to the upper voltage limit setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

- **Lower power limit**

    1) Description

    This parameter represents the lower power limit of the current sequence.

    2) Operation

    Turn the cursor to the lower voltage limit setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

- **Rising slope**

    1) Description

    When the test mode of the current sequence is set to CC or CP, the rising slope needs to be set.

    2) Operation

    Turn the cursor to the rising slope setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

- **Falling slope**

1) Description

When the test mode of the current sequence is set to CC or CP, the falling slope needs to be set.

2) Operation

Turn the cursor to the rising slope setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

4.4   System Setup

4.4.1   Instructions and operation

1) Description

The system settings include power-on parameter settings, backlight settings, language settings, key sound settings, system reset settings, and factory settings. As shown in Figure 4-21.
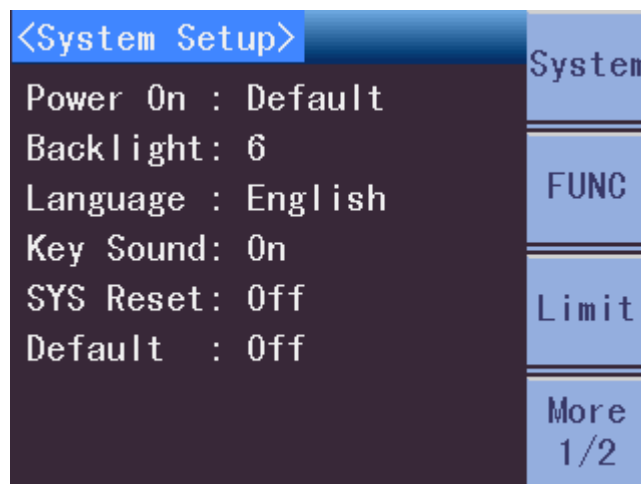
Figure 4-21 System Setup Page

2) Operation

Pressing the System key will switch to the System settings screen.

4.4.2   Setting parameter description and operation

■   Boot parameters

1) Description

The boot parameters are divided into default parameters and user parameters.

2) Operation

Use the knob to turn the cursor to the power-on parameter setting and press different menu keys to change the power-on parameters accordingly.

■   Backlight settings

1) Description

The backlight setting is divided into a total of ten grades, which are 1~10.

2) Operation

Use the knob to turn the cursor to the backlight setting, and press the "+" or "-" button to change the backlight brightness.

■ Language Settings

1) Description

The language settings are divided into Chinese and English.

2) Operation

Use the knob to turn the cursor to the language setting and press different menu keys to change the language setting accordingly.

■ Key Sound

1) Description

The key sound can be turned on or off.

2) Operation

Use the knob to turn the cursor to the key sound setting and press different menu keys to change the key sound accordingly.

■ System Reset

1) Description

The system reboots after a system reset.

2) Operation

Use the knob to turn the cursor to the system setting and press the corresponding menu key to reset the system.

■ Factory Settings

1) Description

Restore Factory Settings sets all settings to factory defaults.

2) Operation

Use the knob to turn the cursor to the factory setting and press the corresponding menu key to restore the factory setting.

4.5 Function Setting

4.5.1 Description and operation

1) Description

Function settings include start voltage setting, voltage threshold setting, shutdown voltage setting, soft start setting, start time setting, positive timing setting, countdown timing setting, countdown time setting, low voltage

protection setting, all pull-load setting, voltage response setting, CV type setting, external waveform setting, V-Sense setting, and lock mode setting. As shown in Figure 4-22, 4-23.
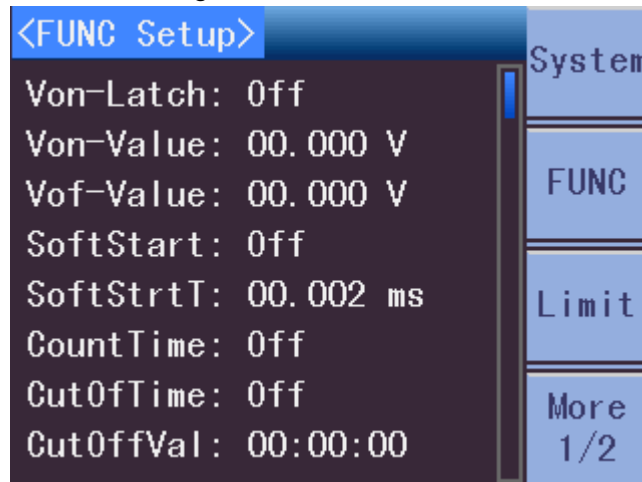
Figure 4-22 Function Setting Page
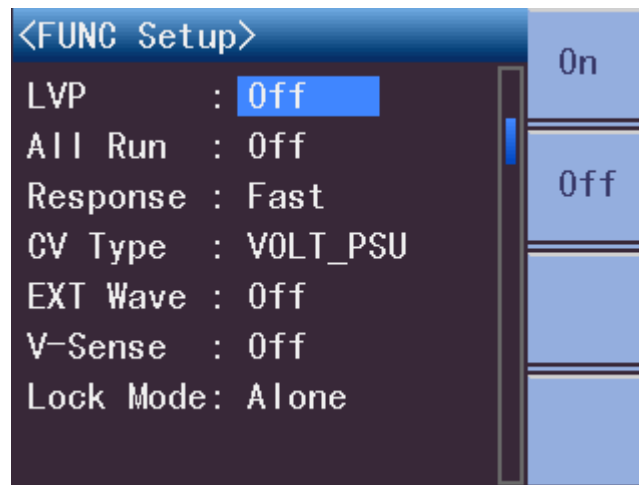
Figure 4-23 Function Setting Page

2) Operation

Press the System key, it will switch to the system setting page, and then press the menu key corresponding to the function setting to switch to the function setting interface.

4.5.2 Setting parameter description and operation

■ Starting voltage

1) Description

The starting voltage is with two states of on/off. In the on state, if the voltage reaches Von, the load continues to pull current. In the off state, if the voltage is below Von, the load stops pulling load current.

2) Operation

Use the knob to turn the cursor to the start voltage setting and press the different menu keys to change the start voltage setting accordingly.

■ Voltage Threshold

1) Description

This parameter represents the minimum starting voltage value for electronic load pulling current.

2) Operation

Turn the cursor to the voltage threshold setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the $\boxed{\text{Enter}}$ key to exit the editing state.

■ Shutdown voltage

1) Description

The electronic load will stop pulling the load current when the voltage of the object to be measured is lower than Voff. To avoid logic errors, generally Voff should be less than or equal to Von.

2) Operation

Turn the cursor to the off voltage setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the $\boxed{\text{Enter}}$ key to exit the editing state.

■ Soft Start

1) Description

This parameter represents the switch for soft start of the electronic load.

2) Operation

Use the knob to turn the cursor to the soft start setting and press different menu keys to change the soft start setting accordingly.

■ Start-up time

1) Description

This parameter represents the soft start time of the electronic load.

2) Operation

Turn the cursor to the start time setting by the knob and press the knob change key to enter the editing state. You can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the $\boxed{\text{Enter}}$ key to exit the editing state.

■ Positive Timing

1) Description

This parameter represents the timing of the start time of the electronic load.

2) Operation

Use the knob to turn the cursor to the soft start setting and press the different menu keys to change the timing settings accordingly.

■ Countdown

1) Description

This parameter represents the switch for the countdown operation of the electronic load.

2) Operation

Use the knob to turn the cursor to the countdown setting and press different menu keys to change the countdown setting accordingly.

■ Countdown Time

1) Description

This parameter represents the time setting of electronic load countdown operation.

2) Operation

Turn the cursor to the countdown time setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Low voltage protection

1) Description

This parameter represents the electronic load low voltage protection switch.

2) Operation

Use the knob to turn the cursor to the low voltage protection setting and press different menu keys to change the low voltage protection setting accordingly.

■ All pull load

1) Description

When all pull load is on, press the "LOAD" key for any module with all pull load on, and all modules with all pull load on will pull current at the same time.

2) Operation

Use the knob to turn the cursor to the All Pull Settings and press different menu keys to change the All Pull Settings accordingly.

■ Voltage response

1) Description

This parameter represents the speed of the electronic load voltage response.

2) Operation

Use the knob to turn the cursor to the voltage response setting and press the different menu keys to change the voltage response setting accordingly.

- CV Type

    1) Description

    This parameter is used to distinguish the voltage types corresponding to different power supplies, including Current PSU and Voltage PSU.

    2) Operation

    Use the knob to turn the cursor to the CV type setting and press different menu keys to change the CV type setting accordingly.

- External Waveforms

    1) Description

    This parameter represents the CC mode when the electronic load can use external drive current for the waveform generator.

    2) Operation

    Use the knob to turn the cursor to the external waveform setting and press different menu keys to change the external waveform setting accordingly.

- V-Sense

    1) Description

    This parameter represents the control switch on the voltage Sense terminal, which when turned on avoids errors caused by voltage drops on the test line and is particularly useful when precise voltages are required for CR or CV testing.

    2) Operation

    Use the knob to turn the cursor to the V-Sense setting and press different menu keys to change the V-Sense type setting accordingly.

- Lock Mode

    1) Description

    This parameter represents whether a single module is locked, or all modules are locked when the "Lock" key is pressed.

    2) Operation

    Use the knob to turn the cursor to the lock mode setting and press different menu keys to change the lock mode setting accordingly.

4.6   Limit settings

4.6.1   Instructions and operation

1) Description

The limit setting contains limit state setting, limit mode setting, reference current setting, current upper limit setting, current lower limit setting, reference voltage setting, voltage upper limit setting, voltage lower limit setting, reference power setting, power upper limit setting, power lower limit setting. As shown in Figure 4-24, 4-25.
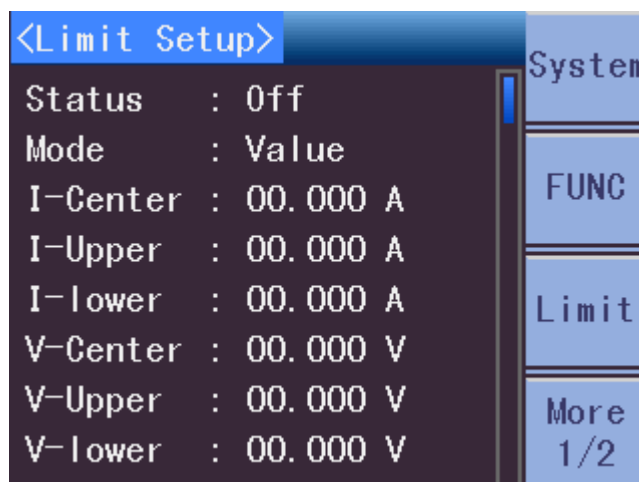
Figure 4-24 Limit settings page
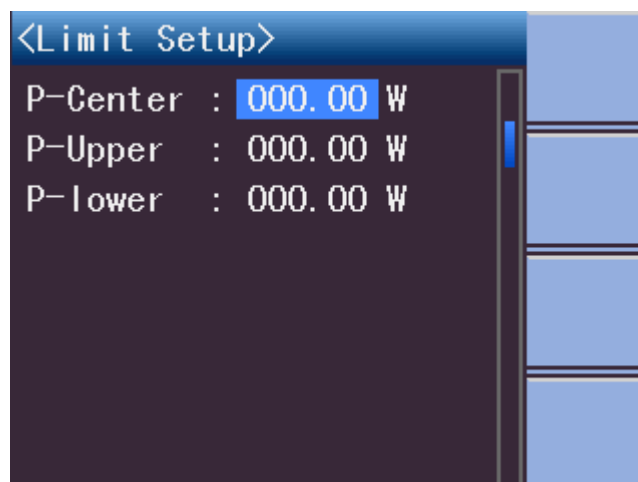
Figure 4-25 Limit settings page

2) Operation

Press System key, it will switch to the system setting page, and then press the menu key corresponding to the limit setting, it will switch to the limit setting interface.

4.6.2 Setting parameter description and operation

■ Limit state

1) Description

This parameter represents whether limit judgment is turned on or not.

2) Operation

Use the knob to turn the cursor to the limit state setting and press

different menu keys to change the limit state setting accordingly.

■ Limit Mode

1) Description

This parameter represents the setting of the limit mode, both numeric and percentage mode.

■ Reference current

1) Description

This parameter represents the reference current of the limit setting.

2) Operation

Turn the cursor to the reference current setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the $\boxed{\text{Enter}}$ key to exit the editing state.

■ Upper Current limit

1) Description

This parameter represents the upper current limit of the limit setting.

2) Operation

Turn the cursor to the current limit setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the $\boxed{\text{Enter}}$ key to exit the editing state.

■ Lower current limit

1) Description

This parameter represents the lower current limit for the limit setting.

2) Operation

Turn the cursor to the lower current limit setting with the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the $\boxed{\text{Enter}}$ key to exit the editing state.

■ Reference voltage

1) Description

This parameter represents the reference voltage for the limit setting.

2) Operation

Turn the cursor to the reference voltage setting by the knob, press the knob

change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the $\boxed{\text{Enter}}$ key to exit the editing state.

■ Upper Voltage limit

3) Description

This parameter represents the upper voltage limit of the limit setting.

4) Operation

Turn the cursor to the upper voltage limit setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the $\boxed{\text{Enter}}$ key to exit the editing state.

■ Lower voltage limit

3) Description

This parameter represents the lower voltage limit of the limit setting.

4) Operation

Turn the cursor to the lower voltage limit setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the $\boxed{\text{Enter}}$ key to exit the editing state.

■ Reference power

1) Description

This parameter represents the reference power of the limit setting.

2) Operation

Turn the cursor to the reference power setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the $\boxed{\text{Enter}}$ key to exit the editing state.

■ Upper Power limit

1) Description

This parameter represents the upper power limit of the limit setting.

2) Operation

Turn the cursor to the power limit setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up

and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ Lower power limit

1) Description

This parameter represents the lower limit of power for the limit setting.

2) Operation

Turn the cursor to the lower power limit setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

4.7　Online Settings

4.7.1　Instructions and operation

1) Description

Online settings include online mode setting, online status setting, and online type setting. As shown in Figure 4-26.
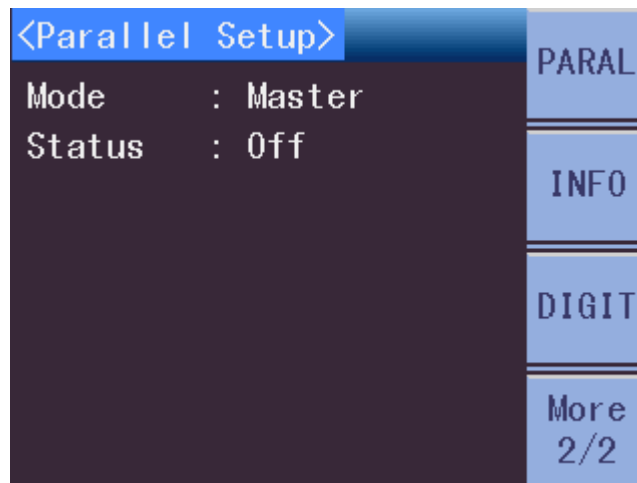
Figure 4-26 Online Setup Page

2) Operation

Press System key, it will switch to the system setting page. You can switch to the online setting interface by toggling menu key 4 (More) and then pressing the menu key corresponding to online setting.

4.7.2　Setting parameter description and operation

■ Online mode

1) Description

The online mode is divided into standalone, slave and host.

2) Operation

Use the knob to turn the cursor to the online mode setting and press

different menu keys to change the online mode setting accordingly.

■ Online Status

1) Description

This parameter represents the switch of online status. It can only be turned on when the module is set to host module. If the number of host modules is greater than 1, it will indicate online failure.

2) Operation

Use the knob to turn the cursor to the online status setting and press different menu keys to change the online status setting accordingly.

■ Online Type

1) Description

After the system is successfully connected, the host module will display the connection type. There are two types: power and copy. When the connection type is power, each module is assigned current according to its own power level. When the connection type is copy, each module pulls the same current and is controlled by the host module.

2) Operation

Use the knob to turn the cursor to the online type setting and press different menu keys to change the online type setting accordingly.

4.8   Digital setup

4.8.1   Instructions and operation

1) Description

The digitization setting contains sample time setting, sample point setting, trigger source setting, and trigger point setting. As shown in Figure 4-27.
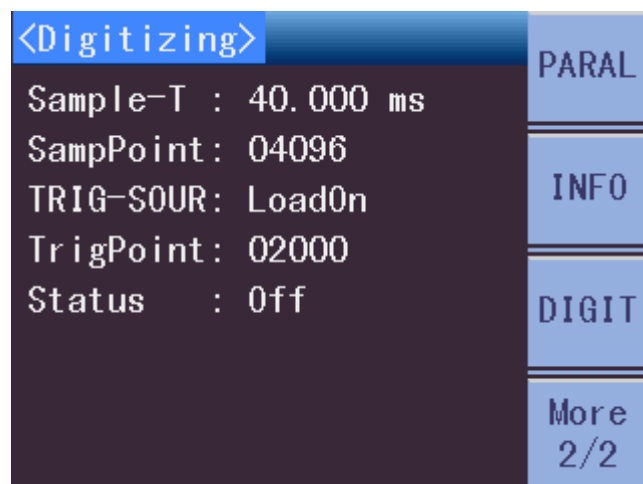
Figure 4-27 Digitization setup page

2) Operation

Press the System key, it will switch to the system settings page. You can

switch to the digital settings screen by toggling menu key 4 (More) and then pressing the menu key corresponding to digital settings.

4.8.2   Setting parameter description and operation

■   Sampling time

1)   Description

This parameter represents the sampling time interval in the range of 10us to 40ms.

2)   Operation

Turn the cursor to the sampling time setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■   Sampling Points

1)   Description

This parameter represents the number of sampling points, in the range 1 to 4096.

2)   Operation

Turn the cursor to the sampling point setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■   Trigger source

1)   Description

This parameter represents the trigger source.

2)   Operation

Use the knob to turn the cursor to the trigger source setting and press different menu keys to change the trigger source setting accordingly.

■   Trigger Points

1)   Description

This parameter represents the trigger point of the digitization function.

2)   Operation

Turn the cursor to the trigger point setting by the knob, press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

■ State

1) Description

This parameter represents whether the digitization function is enabled or disabled.

2) Operation

Use the knob to turn the cursor to the status setting and press different menu keys to change the status setting accordingly.

4.9 Machine information and upgrades

4.9.1 Instructions and operation

1) Description

The machine information page can display the baseboard software version, module software version, and DSP software version. It provides the option of baseboard upgrade, module upgrade, and DSP upgrade. As shown in Figure 4-28.
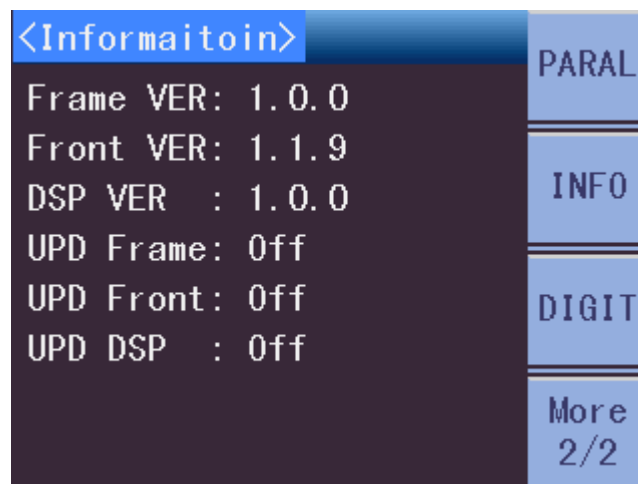
Figure 4-28 Machine Information Page

2) Operation

Press the System key, it will switch to the system settings page. You can switch to the digital settings screen by toggling menu key 4 (More) and then pressing the menu key corresponding to digital settings.

4.9.2 Setting parameter description and operation

■ Upgrade Baseboard

1) Description

Upgrade the software version of the baseboard.

2) Operation

Use the knob to turn the cursor to the upgrade baseboard setting, and press menu key 1 to upgrade the baseboard program.

■ Upgrade Module

1) Description

Upgrade module front panel software version.

2) Operation

Use the knob to turn the cursor to the upgrade module setting and press menu key 1 to upgrade the baseboard program.

■ Upgrade DSP

1) Description

Upgrade the module DSP software version.

2) Operation

Use the knob to turn the cursor to upgrade the DSP setting, and press menu key 1 to upgrade the baseboard program.

4.10 Baseboard setup

4.10.1 Instructions and operation

1) Description

The baseboard setup mainly refers to the communication between the baseboard and external devices, including the configuration of the System I/O interface and the configuration of the Can address. As shown in Figure 4-29.
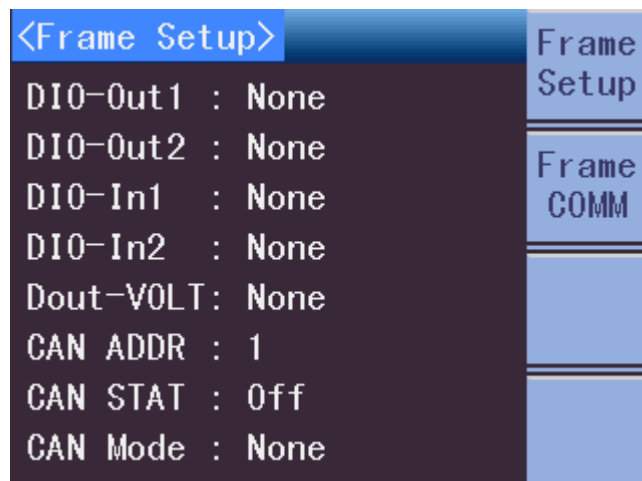
Figure 4-29 Baseboard Settings Page

2) Operation

Press the Frame key and it will switch to the baseboard settings page.

4.10.2 Setting parameter description and operation

■ DIO-Out1

1) Description

This parameter represents the functional configuration of the digitized output port 1.

2)   Operation

Use the knob to turn the cursor to the DIO-Out1 setting and press different menu keys to change the DIO-Out1 setting accordingly.

■   DIO-Out2

1)   Description

This parameter represents the functional configuration of the digitized output port 2.

2)   Operation

Use the knob to turn the cursor to the DIO-Out2 setting and press different menu keys to change the DIO-Out2 setting accordingly.

■   DIO-In1

1)   Description

This parameter represents the functional configuration of digitized input port 1.

2)   Operation

Use the knob to turn the cursor to the DIO-In1 setting and press different menu keys to change the DIO-In1 setting accordingly.

■   DIO-In2

1)   Description

This parameter represents the functional configuration of digitized input port 2.

2)   Operation

Use the knob to turn the cursor to the DIO-In2 setting and press different menu keys to change the DIO-In2 setting accordingly.

■   Dout-VOLT

1)   Description

This parameter represents the voltage configuration of the digitized output port.

2)   Operation

Use the knob to turn the cursor to the Dout-VOLT setting and press different menu keys to change the Dout-VOLT setting accordingly.

■   CAN Address

1)   Description

The Can address is set in the range 1 to 10.

2)   Operation

Use the knob to turn the cursor to the Can address setting and press the "+" or "-" key to change the Can address.

■   CAN State

1) Description

This parameter represents the switching state of the Can interface.

2) Operation

Use the knob to turn the cursor to the Can state setting and press different menu keys to change the Can state setting accordingly.

- CAN mode

1) Description

This parameter is used to set the online mode of the current frame.

2) Operation

Use the knob to turn the cursor to the Can mode setting and press the different menu keys to change the Can mode setting accordingly.

4.11 Baseboard communication

4.11.1 Description and operation

1) Description

The baseboard communication mainly refers to the communication between the baseboard and the upper computer, and the baseboard communication methods include RS232, LAN, USBTMC, USBCDC, GPIB. as shown in Figure 4-30.
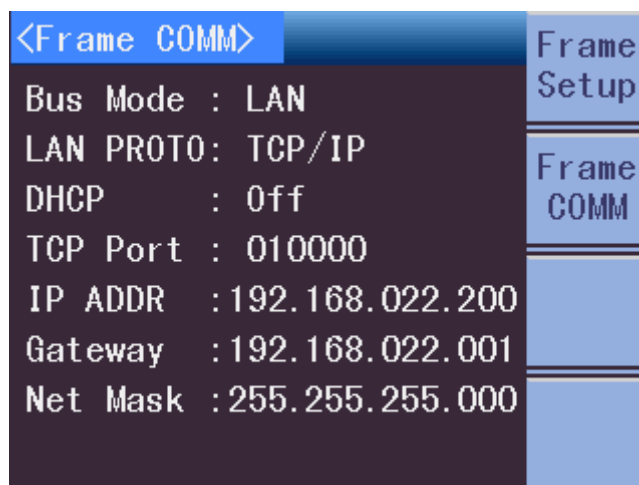
Figure 4-30 Baseboard Communication Page

2) Operation

Press the Frame key, it will switch to the baseboard setting page, and press the menu key corresponding to the baseboard communication to switch to the baseboard communication setting interface.

4.11.2 Setting parameter description and operation

1) Description

The communication mode of the base board includes RS232, LAN, USBTMC, USBCDC, GPIB. When the communication mode is RS232, you need to set the communication protocol and baud rate. When the communication mode is LAN, you need to set the communication mode, communication protocol, dynamic configuration, TCP port, IP address, default gateway, subnet mask. When the communication mode is USBTMC or USBCDC, no special settings are required. When the communication method is GPIB, GPIB address should be set.

2) Operation

Use the knob to turn the cursor to the setting and press different menu keys to change the corresponding settings accordingly. If you need to change the value, use the knob to turn the cursor to the setting, and press the knob change key to enter the editing state, you can change the value position to be changed by the left and right keys, or you can change the value position by pressing the knob change key continuously. The value increases when the knob is turned up and decreases when the knob is turned down. Press the Enter key to exit the editing state.

Chapter 5 File Management

5.1　Module file

5.1.1　Description

TH8300 series programmable DC electronic load can store all the parameters set by the user in the form of files in the internal non-volatile memory of the instrument. When the same settings are to be used next time, users do not need to reset these parameters, just load the corresponding files, and get the same settings as last time. As shown in Figure 5-1, 5-2.
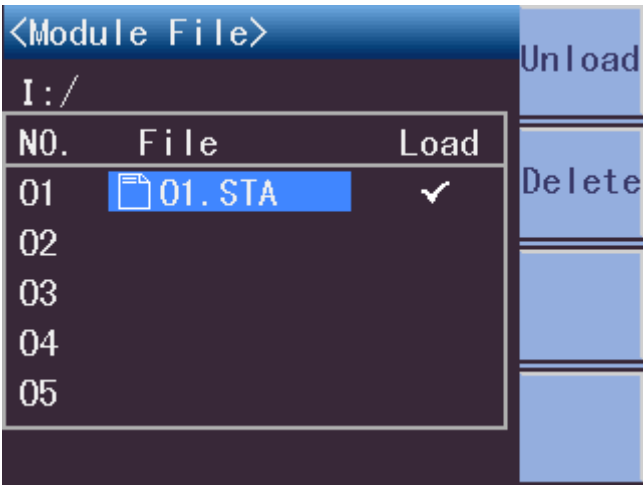
Figure 5-1 Module file page
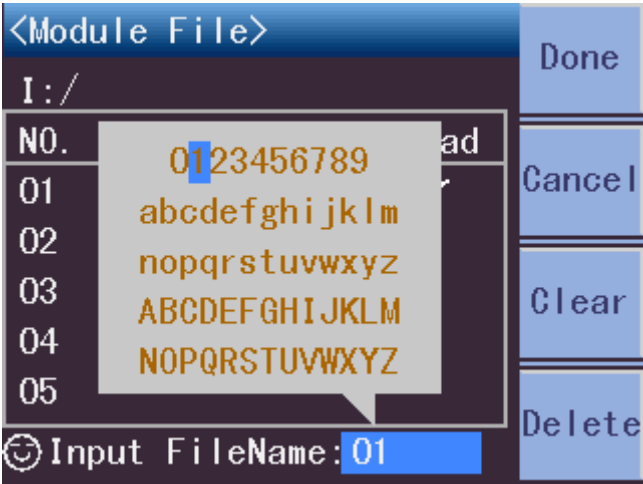
Figure 5-2 File Save Page

5.1.2　Operation

Press the File module key to enter the <module file> page. This instrument can operate on 40 internal files. When the cursor is not in the title bar, press the ← key or → key to quickly switch file pages.

- ■　Save

1) Turn the knob down to move to the serial number of the empty file and press the menu key corresponding to Save. The prompt box at the bottom of the page will ask if you want to save. Press the menu key that corresponds to "Yes".

2) The character selection panel will pop up in the center of the screen, select the corresponding character by turning the knob, and add the character to the file name in the prompt bar at the bottom of the screen by pressing the knob change key. If you enter the wrong character, press the menu key corresponding to "Delete". If you want to re-enter, you can press the menu key corresponding to "Clear". If you do not need to save the file at this time, press the menu key corresponding to "Cancel".

3) Once the file name is entered, press the menu key corresponding to "OK" to save the file.

■ Load

1) Move to the serial number of the file to be loaded by turning the knob up or down.

2) Press the menu key corresponding to "Load" to load the file where the cursor is located.

■ Unload

1) Move to the loaded file serial number by turning the knob up or down.

2) Press the menu key corresponding to "Unload" to unload the file where the cursor is located.

■ Delete

1) Move to the serial number of the file to be deleted by turning the knob up or down.

2) Press the menu key corresponding to "Delete" to delete the file where the cursor is located.

Chapter 6 Communication Interface

6.1 RS232 interface

6.1.1 Description

The widely used serial communication standard is the RS-232 standard, which can also be called the asynchronous serial communication standard for data communication between computers and computers, and between computers and peripherals. RS stands for "Recommmended Standard" and 232 is the standard number. The standard was officially published by the Electronic Industries Association of America (EIA) in 1969 and specifies that data is transmitted one data line at a time. Most serial port configurations are usually not strictly based on the RS-232 standard; 25-pole connectors are used at each port (IMB AT uses a 9-pole connector). The most commonly used RS-232 signals are shown in the table below.

Signal	Symbols	25-pin connector pin number	9-pin connector pin number
Request to send	RTS	4	7
Clear send	CTS	5	8
Data setup preparation	DSR	6	6
Data carrier detection	DCD	8	1
Data terminal preparation	DTR	20	4
Sending data	TXD	2	3
Receiving data	RXD	3	2
Grounding	GND	7	5

Table 6-1 RS-232 Signal Table

The serial interface of this instrument is not strictly based on the RS-232 standard, but only a minimal subset is provided. This is shown in the table below.

Signal	Symbols	Connector Pin Number
Sending data	TXD	3
Receiving data	RXD	2
Grounding	GND	5

Table 6-2 RS-232 Signal Subset Table

This is the easiest and cheapest way to communicate using the serial port. The RS-232 connector of this instrument uses a 9-pin DB type socket with the pin sequence shown in Figure 6-1.
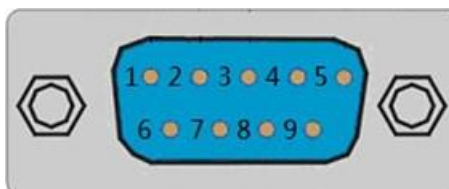
Figure 6-1 RS-232 Interface

Note: The serial port pin definition of this instrument is the same as the pin definition of the standard 9-pole RS232 connector. To avoid electrical shock,

when plugging or unplugging the connector, turn off the power first; please do not short the output terminal or short it to the case at will to avoid damaging the device.

6.1.2 Operation

6.1.2.1 RS232 connection to computer
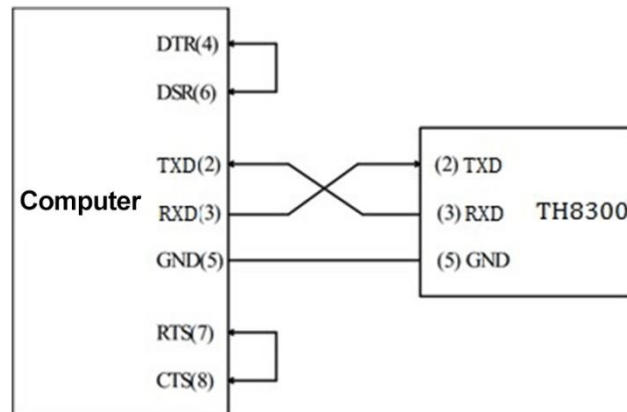
The pin definition of this instrument is the same as the serial interface pin definition of 9-core connector used in IMBAT compatible machine. Users can make their own three-wire connection cable (length should be less than 1.5m) using a two-core shielded wire as shown in the diagram or purchase the serial interface cable line between the computer and the instrument from our company. When making your own connection cable, note that pins 4 and 6 should be shorted on the computer connector, and pins 7 and 8 should be shorted. The connection schematic is shown in Figure 6-2.

Figure 6-2 RS-232 Wiring Diagram

6.1.2.2 Format of data sent and received

TH8300 series programmable DC electronic load uses full-duplex asynchronous communication transmission method containing start and stop bits. The data transmission format of RS-232 is: 8 bits (bit) data bit, 1 bit (bit) stop bit, no parity bit (bit), and the ending character is <LF> (line feed character, ASCII code is 10).

6.1.2.3 Select Baud Rate

The baud rate is the rate at which the TH8300 communicates with the computer. There are 8 sets of baud rates to choose from: 9600, 19200, 28800, 38400, 57600, 115200. The default baud rate for TH8300 series instruments is 9600.

6.2   USBTMC Remote Control System

The USB (Universal Serial Bus) remote control system controls devices via the USB interface. The connection is compliant with the USBTMC-USB488 and USB2.0 protocols.

6.2.1 System Configuration

Connect the USB port on the rear panel of the TH8300 series instrument to the USB port on the host computer via the USB cable.

6.2.2 Install the driver

The first time you connect the TH8300 to the computer with the USB cable, the computer will prompt in the lower right corner of the desktop, "New Hardware", followed by a pop-up dialog box asking for driver installation. As shown in Figure 6-3 below:

Figure 6-3: Installing the USB driver Step 1

Click "Next", the dialog box shown in Figure 6-4 will pop up, select "Automatically install software (recommended)".
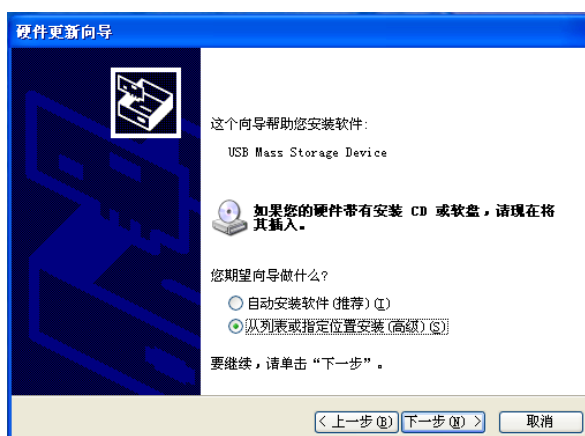
Figure 6-4 Installing the USB Driver Step 2

After the driver is installed, the user can see the "usb test and measurement device" in the device manager of the computer. As shown in Figure 6-5 below:
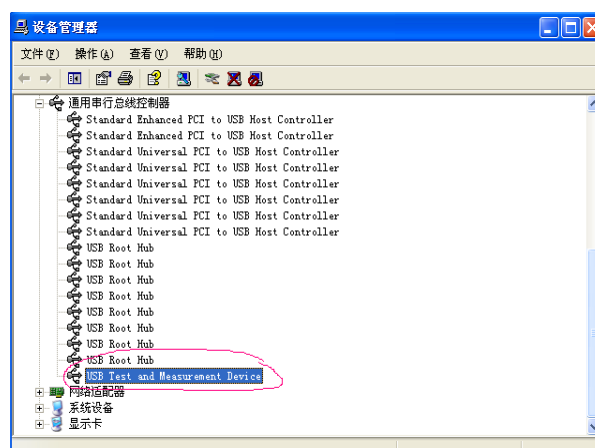
Figure 6-5 Computer Device Manager showing USBTMC

When using the USBTMC interface, the user can access the instrument through the labview software programming.

6.3   USBCDC

6.3.1   Description

With the rapid changes in PC technology, RS232 interface is no longer the standard configuration of PC, and USB interface is gradually being more and more widely used. The USB interface of the TH8300 series programmable DC electronic load caters to this trend, providing us with great convenience and speed while having good flexibility for our use. By installing the USB driver provided by our company, it is easy to turn the USB virtual serial port into the RS232 interface we are familiar with every day. It is as easy and convenient to operate the USB interface as it is to operate the RS232 serial port, and all RS232 interface settings are suitable for the USB virtual serial interface.

6.3.2   Install the driver

The driver is downloaded from the official website of Tonghui Electronics > Service & Support > Download Center > Software for the TH8300 USBCDC driver (32&64 bit).

To install the driver for the USBCDC, the same method is used as for the USBTMC. After the driver is installed, users can see "TH8300 USB Vcom Port" in the device manager of the computer.

6.4   GPIB Interface

6.4.1   CPIB Bus

IEEE488 (GPIB) General Purpose Parallel Bus Interface is the international standard for intelligent instrument bus interfaces. IEEE is the acronym for the Institute of Electrical and Electronics Engineers and 488 is the standard number. The interface can be connected and communicated with computers or other intelligent devices and can easily form an automatic test system together with other test instruments. Multiple test instruments can be connected simultaneously on the same bus. In this instrument, the instrument adopts IEEE488.2 standard, and the interface board is optional by the user. The control instruction system is open, and the user can use the computer interface provided with the product, or program itself according to this control instruction system for the purpose. The control command system supports most of the functions of the instrument, which means that the operation of almost all functions of the instrument can be reached from the control computer in order to realize remote control of the instrument.

When using the GPIB system of this instrument, the following points should be noted:
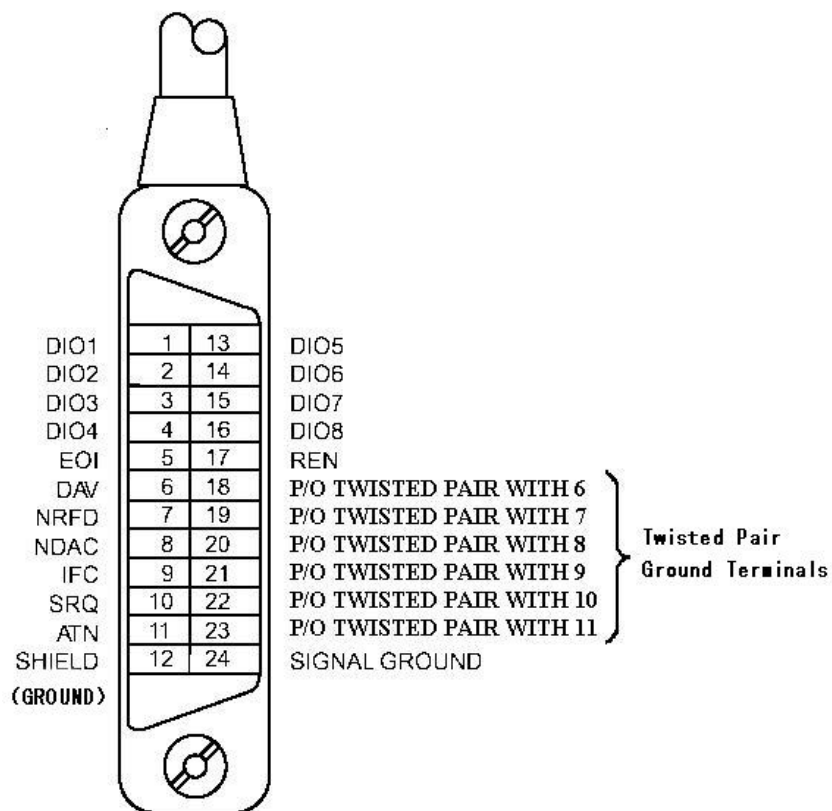
Figure 6-6

The total cable length of a bus system should not exceed the product of 2 meters and the total number of connected test instruments, and the total cable length should not exceed 20 meters. A maximum of 15 test instruments can be connected simultaneously on the same bus. There is no limit to how the cables can be connected together, but it is recommended that only four back connectors be stacked on any one test instrument.
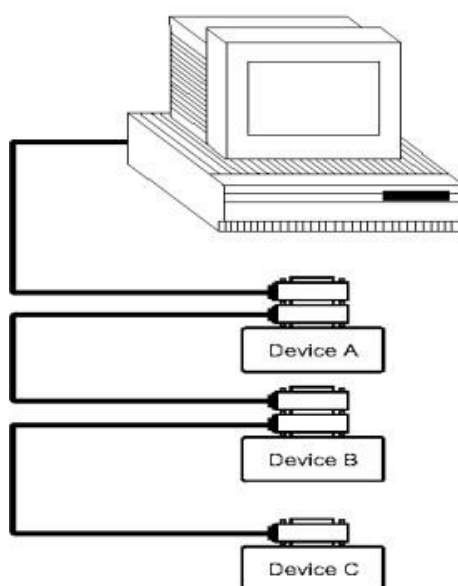
Figure 6-7 GPIB cable connection method Ⅰ
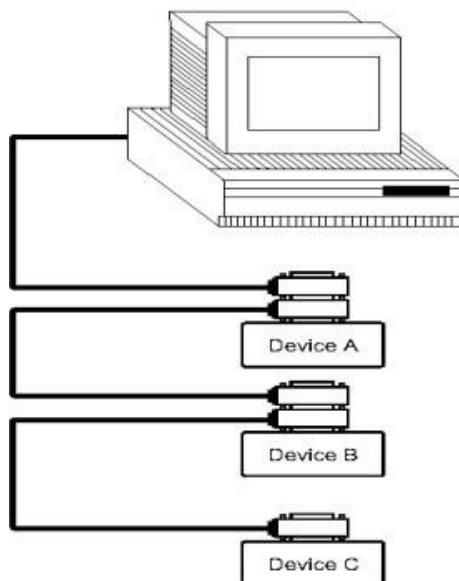
Figure 6-8 GPIB cable connection method Ⅱ

6.4.2　GPIB interface function

This instrument provides most of the GPIB general functions except for the controller, see Table 6-3 below:

Code Name	Function
SH1	Support all data source contact functions
AH1	Support all fiduciary contact functions
T5	Basic speak function; speak only function; speak cancel when MLA; serial roll call not supported
L4	Basic listen function; listen cancel when MTA; no listen-only function
RL1	Remote control / local function
DC1	Device Clear Function
DT1	Device trigger function
C0	No controller function
E1	Open collector drive

Table 6-3

6.4.3　GPIB Address

The GPIB of this instrument is addressed by single address, there is no secondary address, you can use 1-31 as GPIB address, the default address is 1 at the factory.

Chapter 7 Communication Command Reference

The communication commands of TH8300 series instruments comply with the SCPI command standard.

7.1   SCPI command

Available on our website www.tonghui.com.cn

SCPI (Standard Commands for Programmable Instruments) is an ASCII-based instrument command language for test and measurement instruments. SCPI commands are based on a hierarchical structure (also called a tree system). In this system, related commands are grouped under a common node or root so that subsystems are formed.

According to the command syntax, most commands (and some parameters) are represented by a mixture of upper- and lower-case letters. Capital letters indicate the abbreviation of a command. For shorter program lines, abbreviated format commands can be sent. For better program readability, long format commands can be sent.

Data conventions in this manual:

NR1: Integer, e.g., 123

CRD: Character, e.g., H, M, L

space: Space

Syntax conventions:

[SOURce[1|2]:]VOLTage:UNIT {VPP|VRMS|DBM}

[SOURce[1|2]:]FREQuency:CENTer {<frequency>|MINimum|MAXimum| DEFault}

Note: Command syntax conventions:

◆   The curly brackets ({ }) contain the parameter options for the given command string. The curly brackets are not sent with the command string.

◆   The vertical bar (|) separates multiple parameter selections for a given command string. For example, in the above command, the {VPP|VRMS|DBM} means you can specify "VPP", "VRMS" or "DBM". The vertical bar is not sent with the command string.

◆   The pointed brackets (<>) in the second example indicate that a value must be specified for the parameter inside the brackets. For example, in the syntax statement above, the parameter inside the pointed brackets is <frequency>. The pointed brackets are not sent with the command string. You must specify a value for the parameter (e.g., "FREQ:CENT 1000"), unless you select one of the other options shown in the syntax (e.g., "FREQ:CENT MIN").

◆   Some syntax elements (e.g., nodes and parameters) are enclosed in square brackets ([ ]). This means that the element is optional and can be omitted. The pointed brackets are not sent with the command string. If no value is specified for an optional parameter, the

instrument will select the default value. In the above example, "SOURce[1|2]" means you can pass "SOURce" or "SOURce1", or "SOUR1" or "SOUR" to refer to source channel 1. In addition, since the entire SOURce node is optional (in square brackets), you can also refer to channel 1 by omitting the SOURce node altogether. This is because channel 1 is the default channel for the SOURce language node. On the other hand, to refer to channel 2, you must use "SOURce2" or "SOUR2" in the program line.

◆ ^END: EOI (end of line) signal for IEEE-488 bus.

7.1.1 IEEE488.2 Common Commands

Standard SCPI commands:

● *IDN ●*RST

Note: This machine mainly uses 2 common commands.

7.1.1.1 *IDN?

◆ Description: Read out the product information.

Syntax: *IDN?
Return result: {string1},{string2},{string3}<^END>
The return data information is as follows:
    {string1}   Company name (Tonghui);
    {string2}   Model number (TH8300);
    {string3}   Software version number (Version1.0.0);
Example:
    *IDN?------------- Return: e.g., Tonghui, TH8300, Version:1.0.0

7.1.1.2 *RST

◆ Description: Reset the machine to the factory initial state, including the values set by the parameters. Automatic restart after the reset is completed.

Syntax: *RST
Example:
    *RST

7.1.2 ABORt subsystem command set

◆ Description: All modules are "OFF".

Syntax: :ABORt
Parameter: None
Example: :ABORt

7.1.3 ADVance subsystem command set

Set advanced mode settings.

7.1.3.1 CR-LED settings

◆ Description: Set voltage
Syntax: :ADVance:LED:V<space><value>
    :ADVance:LED:V?
Parameter: value --------- Value size
Example:

:ADV:LED:V 1 ---------- Set the threshold voltage to 1V

:ADV:LED:V?------------ Return the threshold voltage setting value

◆ Description: Set the resistance

Syntax: :ADVance:LED:R<space><value>

:ADVance:LED:R?

Parameter: value ----------- Value size

Example:

:ADV:LED:R 1 ---------- Set the resistance value to 1V

:ADV:LED:R? ----------- Return the resistance value

◆ Description: Set the current

Syntax: :ADVance:LED:CURRent:RANGe<space><CRD|NR1>

:ADVance:LED:CURRent:RANGe?

Parameter: <CRD|NR1> ------ LOW|L|0,MIDDLE|M|1,HIGH|H|2

Example:

:ADV:LED:CURR:RANG 1 ------ Set the current range to mid-range

:ADV:LED:CURR:RANG? ------- Return the current range

7.1.3.2　　BAT Battery Test Setup

◆ Description: Set the discharge mode

Syntax: :ADVance:BAT:MODE<space><CRD|NR1>

:ADVance:BAT:MODE?

Parameter: <CRD|NR1> ------ CC|0,CR|1,CP|2

Example:

:ADV:BAT:MODE 0 --------- Set the discharge mode to CC

:ADV:BAT:MODE?----------- Return the discharge mode

◆ Description: Set the pull-load value

Syntax: :ADVance:BAT:VALue<space><value>

:ADVance:BAT:VALue?

Parameter: value -------- Value size

Example:

:ADV:BAT:VAL 1------------- Set the pull-load value to 1

:ADV:BAT:VAL? -------------- Return the pull-load value

◆ Description: Set the termination mode

Syntax: :ADVance:BAT:CONDition<space><CRD|NR1>

:ADVance:BAT:CONDition?

Parameter: <CRD|NR1> ------ OLTage|0,TIME|1,CAPACITY|2,ENERGY|3

Example:

:ADV:BAT:COND 1---- Set the termination mode to TIME

:ADV:BAT:COND?----- Return the termination mode

◆ Description: Set the termination threshold

Syntax: :ADVance:BAT:LEVEL<space><value>

:ADVance:BAT:LEVEL?

Parameter: value -------- Value size

Example:

:ADV:BAT:LEVEL 1 --------- Set the termination threshold to 1

:ADV:BAT:LEVEL? ---------- Return the termination threshold

◆ Description: Set the rising slope

Syntax: :ADVance:BAT:RISE<space><value>

:ADVance:BAT:RISE?

Parameter: value -------- Value size

Example:
  :ADV:BAT:RISE 1 ----------- Set the rising slope to 1A/us
  :ADV:BAT:RISE?------------- Return the rising slope

◆ Description: Sets the falling slope
 Syntax: :ADVance:BAT:FALL<space><value>
   :ADVance:BAT:FALL?
 Parameter: value ------ Value size
 Example:
  :ADV:BAT:FALL 1 ----------- Set the falling slope to 1A/us
  :ADV:BAT:FALL? ------------ Returns the falling slope

◆ Description: Set the voltage range
 Syntax: :ADVance:BAT:VOLTage:RANGe<space><CRD|NR1>
   :ADVance:BAT:VOLTage:RANGe?
 Parameter: <CRD|NR1> ------ LOW|L|0,MIDDLE|M|1,HIGH|H|2
 Example:
  :ADV:BAT:VOLT:RANG 1 - Set the voltage range to medium range
  :ADV:BAT:VOLT:RANG? -------- Return to voltage range

7.1.3.3   TIMING Time test settings

◆ Description: Set the test mode
 Syntax: :ADVance:TIMing:MODE<space><CRD|NR1>
   :ADVance:TIMing:MODE?
 Parameter: <CRD|NR1> ------ CC|0,CR|1,CP|2
 Example:
  :ADV:TIM:MODE 0 ---------- Set the test mode to CC
  :ADV:TIM:MODE? ----------- Return the test mode

◆ Description: Set the pull-load value
 Syntax: :ADVance:TIMing:VALue<space><value>
   :ADVance:TIMing:VALue?
 Parameter: value ------ Value size
 Example:
  :ADV:TIM:VAL 1 ------------- Set the test value to 1
  :ADV:TIM:VAL?-------------- Return the test value

◆ Description: Set the trigger mode
 Syntax: :ADVance:TIMing:TRIGger:MODE<space><CRD|NR1>
   :ADVance:TIMing:TRIGger:MODE?
 Parameter: <CRD|NR1> ------ FALL|0,RISE|1,HOLDUP|2
 Example:
  :ADV:TIM:TRIG:MODE 0 -------- Set the trigger mode to FALL
  :ADV:TIM:TRIG:MODE? --------- Return the trigger mode

◆ Description: Set the starting voltage
 Syntax: :ADVance:TIMing:TRIGger:VSTArt<space><value>
   :ADVance:TIMing:TRIGger:VSTArt?
 Parameter: value ------ Value size
 Example:
  :ADV:TIM:TRIG:VSTA 1 --------- Set the starting voltage to 1V

  :ADV:TIM:TRIG:VSTA ?---------- Return the starting voltage

◆ Description: Set the termination voltage
 Syntax: :ADVance:TIMing:TRIGger:VEND<space><value>
   :ADVance:TIMing:TRIGger:VEND?

Parameter: value ------ Numeric size

Example:

:ADV:TIM:TRIG:VEND 2--------- Set the termination voltage to 2V

:ADV:TIM:TRIG:VEND?---------- Return the termination voltage

◆ Description: Set the hold mode termination voltage

Syntax: :ADVance:TIMing:ENDVoltage<space><value>

:ADVance:TIMing:ENDVoltage?

Parameter: value ------ Value size

Example:

:ADV:TIM:ENDV 2-------- Set the hold mode termination voltage to 2V

:ADV:TIM:ENDV?--------- Return the hold mode termination voltage

◆ Description: Set the duration

Syntax: :ADVance:TIMing:TOUT<space><value>

:ADVance:TIMing:TOUT?

Parameter: value ------ Value size

Example:

:ADV:TIM:TOUT 1----------- Set the duration to 1s

:ADV:TIM:TOUT? ------------ Return the duration

◆ Description: Set the rising slope

Syntax: :ADVance:TIMing:RISE<space><value>

:ADVance:TIMing:RISE?

Parameter: value ------ Value size

Example:

:ADV:TIM:RISE 1 ------------ Set the rising slope to 1A/us

:ADV:TIM:RISE? ------------- Return the rising slope

◆ Description: Set the falling slope

Syntax: :ADVance:TIMing:FALL<space><value>

:ADVance:TIMing:FALL?

Parameter: value ------ Value size

Example:

:ADV:TIM:FALL 1------------ Set the falling slope to 1A/us

:ADV:TIM:FALL? ------------- Returns the falling slope

◆ Description: Set the voltage range

Syntax: :ADVance:TIMing:VOLTage:RANGe<space><CRD|NR1>

:ADVance:TIMing:VOLTage:RANGe?

Parameter: <CRD|NR1> ------ LOW|L|0,MIDDLE|M|1,HIGH|H|2

Example:

:ADV:TIM:VOLT:RANG 1 ------ Set the voltage range to medium range

:ADV:TIM:VOLT:RANG? ------ Return the voltage range

7.1.3.4   OCP Overcurrent Protection Test Setup

◆ Description: Set the starting current

Syntax: :ADVance:OCP:ISTArt<space><value>

:ADVance:OCP:ISTArt?

Parameter: value ------ Value size

Example:

:ADV:OCP:ISTA 1 ----------- Set the starting current 1A

:ADV:OCP:ISTA? ------------ Return the starting current

◆ Description: Set the termination current

Syntax: :ADVance:OCP:IEND<space><value>

:ADVance:OCP:IEND?
Parameter: value ------ Value size
Example:
    :ADV:OCP:IEND 2----------- Set the termination current to 2A
    :ADV:OCP:IEND?------------ Return the termination current

◆ Description: Set the step number
  Syntax: :ADVance:OCP:STEP<space><value>
      :ADVance:OCP:STEP?
  Parameter: value ------ Value size
  Example:
    :ADV:OCP:STEP 100------- Set the number of steps to 100
    :ADV:OCP:STEP? ----------- Return the number of steps

◆ Description: Set the duration
  Syntax: :ADVance:OCP:DWELl<space><value>
      :ADVance:OCP:DWELl?
  Parameter: value ------ Value size
  Example:
    :adv:ocp:dwel 1--------------- Set the duration to 1s
    :ADV:OCP:DWEL? ---------- Return the duration

◆ Description: Set the upper current limit
  Syntax: :ADVance:OCP:SPECification:H<space><value>
      :ADVance:OCP:SPECification:H?
  Parameter: value ------ Value size
  Example:
    :ADV:OCP:SPEC:H 2------- Set the upper current limit to 2A
    :ADV:OCP:SPEC:H?-------- Return the upper current limit

◆ Description: Set the lower current limit
  Syntax: :ADVance:OCP:SPECification:L<space><value>
      :ADVance:OCP:SPECification:L?
  Parameter: value ------ Value size
  Example:
    :ADV:OCP:SPEC:L 1 ------- Set the lower current limit to 1A
    :ADV:OCP:SPEC:L? -------- Return the lower current limit

◆ Description: Set the trigger voltage
  Syntax: :ADVance:OCP:TRIGger:VOLTage<space><value>
      :ADVance:OCP:TRIGger:VOLTage?
  Parameter: value ------ Value size
  Example:

    :ADV:OCP:TRIG:VOLT 1 -------- Set the trigger voltage to 1V
    :ADV:OCP:TRIG:VOLT? --------- Return the trigger voltage

◆ Description: Set the pull-load lock
  Syntax: :ADVance:OCP:LATCh<space><CRD|NR1>
      :ADVance:OCP:LATCh?
  Parameter: <CRD|NR1> ------ OFF|0,ON|1
  Example:
    :ADV:OCP:LATC 1 ---------- Set the pull-load lock to ON
    :ADV:OCP:LATC? ----------- Return the pull-load lock

◆ Description: Return the test result
  Syntax: :ADVance:OCP:RESult?

Parameter: None

Example:

  :ADV:OCP:RES? ------------ Return the test result

◆ Description: Set the voltage range

 Syntax: :ADVance:OCP:VOLTage:RANGe<space><CRD|NR1>

    :ADVance:OCP:VOLTage:RANGe?

 Parameter: <CRD|NR1> ------ LOW|L|0,MIDDLE|M|1,HIGH|H|2

 Example:

  :ADV:OCP:VOLT:RANG 1 ------ Set the voltage range to medium range

  :ADV:OCP:VOLT:RANG? ------ Return the voltage range

7.1.3.5 OVP overvoltage protection test setup

◆ Description: Set the trigger voltage

 Syntax: :ADVance:OVP:VOLTage<space><value>

    :ADVance:OVP:VOLTage?

 Parameter: value ------ Value size

 Example:

  :ADV:OVP:VOLT 1 ---------- Set the trigger voltage to 1V

  :ADV:OVP:VOLT? ----------- Return the trigger voltage

◆ Description: Return the test result

 Syntax: :ADVance:OVP:RESult?

 Parameter: None

 Example:

  :ADV:OVP:RES?------------- Return the test result

7.1.3.6 OPP Over Power Protection Test Setup

◆ Description: Set the starting power

 Syntax: :ADVance:OPP:PSTArt<space><value>

    :ADVance:OPP:PSTArt?

 Parameter: value ------ Value size

 Example:

  :ADV:OPP:PSTA 1 ---------- Set the starting power to 1W

  :ADV:OPP:PSTA? ----------- Return the starting power

◆ Description: Set the termination power

 Syntax: :ADVance:OPP:PEND<space><value>

  :ADVance:OPP:PEND?

 Parameter: value ------ Value size

 Example:

  :ADV:OPP:PEND 2---------- Set the termination power to 2W

  :ADV:OPP:PEND?----------- Return the termination power

◆ Description: Set the number of steps

 Syntax: :ADVance:OPP:STEP<space><value>

    :ADVance:OPP:STEP?

 Parameter: value ------ Value size

 Example:

  :ADV:OPP:STEP 100------- Set the number of steps to 100

  :ADV:OPP:STEP? ----------- Return the number of steps

◆ Description: Set the duration

 Syntax: :ADVance:OPP:DWELl<space><value>

    :ADVance:OPP:DWELl?

Parameter: value ------ Value size

Example:

:ADV:OPP:DWEL 1 --------- Set the duration to 1s

:ADV:OPP:DWEL? ---------- Return the duration

◆ Description: Set the upper power limit

Syntax: :ADVance:OPP:SPECification:H<space><value>

:ADVance:OPP:SPECification:H?

Parameter: value ------ Value size

Example:

:ADV:OPP:SPEC:H 2------- Set the upper power limit to 2W

:ADV:OPP:SPEC:H?-------- Return the upper power limit

◆ Description: Set the lower power limit

Syntax: :ADVance:OPP:SPECification:L<space><value>

:ADVance:OPP:SPECification:L?

Parameter: value ------ Value size

Example:

:ADV:OPP:SPEC:L 1 ------- Set the lower power limit to 1W

:ADV:OPP:SPEC:L? -------- Return the lower power limit

◆ Description: Set the trigger voltage

Syntax::ADVance:OPP:TRIGger:VOLTage<space><value>

:ADVance:OPP:TRIGger:VOLTage?

Parameter: value ------ Value size

Example:

:ADV:OPP:TRIG:VOLT 1 -------- Set the trigger voltage to 1V

:ADV:OPP:TRIG:VOLT? --------- Return the trigger voltage

◆ Description: Set the pull-load lock

Syntax: :ADVance:OPP:LATCh<space><CRD|NR1>

:ADVance:OPP:LATCh?

Parameter: <CRD|NR1> ------ OFF|0,ON|1

Example:

:ADV:OPP:LATC 1 ------------ Set the pull-load lock to ON

:ADV:OPP:LATC? ----------- Return the pull-load lock

◆ Description: Return the test result

Syntax: :ADVance:OPP:RESult?

Parameter: None

Example:

:ADV:OPP:RES?------------- Return the test result

◆ Description: Set the voltage range

Syntax: :ADVance:OPP:VOLTage:RANGe<space><CRD|NR1>

:ADVance:OPP:VOLTage:RANGe?

Parameter: <CRD|NR1> ------ LOW|L|0,MIDDLE|M|1,HIGH|H|2

Example:

:ADV:OPP:VOLT:RANG 1 ------ Set the voltage range to medium range

:ADV:OPP:VOLT:RANG? ------ Return the voltage range

7.1.3.7   SINE Sine wave test setup

◆ Description: Set the frequency

Syntax: :ADVance:SINE:FREQuency<space><value>

:ADVance:SINE:FREQuency?

Parameter: value   ------   Value   size

Example:

    :ADV:SINE:FREQ 1 --------- Set the frequency to 1Hz

    :ADV:SINE:FREQ? ---------- Return the frequency

◆ Description: Set the DC current

Syntax: :ADVance:SINE:IDC<space><value>

    :ADVance:SINE:IDC?

Parameter: value ------ Value size

Example:

    :ADV:SINE:IDC 1 ------------ Set the DC current to 1A

    :ADV:SINE:IDC? ------------- Return the DC Current

◆ Description: Set the AC current

Syntax: :ADVance:SINE:IAC<space><value>

    :ADVance:SINE:IAC?

Parameter: value ------ Value size

Example:

    :ADV:SINE:IAC 2 ------------ Set the AC current to 2A

    :ADV:SINE:IAC? ------------- Return the AC current

◆ Description: Set the voltage range

Syntax: :ADVance:SINE:VOLTage:RANGe<space><CRD|NR1>

    :ADVance:SINE:VOLTage:RANGe?

Parameter: <CRD|NR1> ------ LOW|L|0,MIDDLE|M|1,HIGH|H|2

Example:

    :ADV:SINE:VOLT:RANG 1 ----- Set the voltage range to medium range

    :ADV:SINE:VOLT:RANG? ------ Return the voltage range

7.1.3.8 LIST list test setup

◆ Description: Set the number of repetitions

Syntax: :ADVance:LIST:REPeat<space><value>

    :ADVance:LIST:REPeat?

Parameter: value ------ Value size

Example:

    :ADV:LIST:REP 1------------ Set the number of repetitions to 1

    :ADV:LIST:REP? ------------- Return the number of repetitions

◆ Description: Set the total number of sequences

Syntax: :ADVance:LIST:SEQuence:ALL<space><value>

    :ADVance:LIST:SEQuence:ALL?

Parameter: value ------ Value size

Example:

    :ADV:LIST:SEQ:ALL 10 ------ Set the total number of sequences to 10

    :ADV:LIST:SEQ:ALL? ------ Return the total number of sequences

◆ Description: Set the parameters of the current sequence

Syntax: :ADVance:LIST:DATA<space><Arg1>,<Arg2>,<Arg3>,<Arg4>

    :ADVance:LIST:DATA?<space><Arg1>

Parameter: Arg1 --- Current sequence

    Arg2 --- Current setting value of the current sequence

    Arg3 --- Current duration of the current sequence

    Arg4 --- Slope of the current sequence

Example:

    :ADV:LIST:DATA 1,1,1,1 ------ Set the current value of sequence 1 to 1, the duration to 1s, the slope 1A/us

    :ADV:LIST:DATA? 1--------- Return the sequence 1 setting parameters

◆ Description: Set the voltage range

Syntax: :ADVance:LIST:VOLTage:RANGe<space><CRD|NR1>

:ADVance:LIST:VOLTage:RANGe?

Parameter: <CRD|NR1> ------ LOW|L|0,MIDDLE|M|1,HIGH|H|2

Example:

:ADV:LIST:VOLT:RANG 1---- Set the voltage range to medium range

:ADV:LIST:VOLT:RANG?----- Return the voltage range

7.1.3.9   AUTO automatic test setup

◆ Description: Set the current program

Syntax: :PROG:NSELect<space><value>

:PROG:NSELect?

Parameter: value ----- Value size

Example:

:PROG:NSELect 1----------- Set the current program to 1

:PROG:NSELect?------------ Return the current program

◆ Description: Set the program parameters

Syntax: :PROG:DATA<space><Arg1>,<Arg2>,<Arg3>,<Arg4>,<Arg5>

:PROG:DATA ? <space> < Arg1>

Parameters: <Arg1> ------ Program

<Arg2> ------ Program type 0|LIST 1|STEP

<Arg3> ------ Link knot

<Arg4> ------ Number of repetitions

<Arg5> ------ Total number of sequences

Example:

:PROG:DATA 1,1,2,1,1 ---- Set program 1 type to STEP, link program 2, repeat count to 1, total number of sequences to 1

:PROG:DATA? 1 ------------- Return to Program 1 settings

◆ Description: Set the sequence parameters

Syntax: :PROG:DATA:LIST<space><Arg1>,<Arg2>,<Arg3>,<Arg4>.

<Arg5>,<Arg6>,<Arg7>,<Arg8>,<Arg9>,<Arg10>,<Arg11>,<Arg12>.

<Arg13>,<Arg14>,<Arg15>,<Arg16>

:PROG:DATA:LIST? <space> < Arg1>,<Arg2>

Parameters: <Arg1> Program

<Arg2> ----- Sequence

<Arg3> ---- Trigger mode 0|jump 1|automatic 2|manual 3|external

<Arg4> ---- Test mode 0|CC 1|CR 2|CV 4|CP

<Arg5> ---- Range   0|Low 1|Medium 2|High

<Arg6> ---- Duration   Unit s

<Arg7> ----- Pull-load values

<Arg8> ----- Upper voltage limit

<Arg9> ----- Lower voltage limit

<Arg10> --- Upper current limit

<Arg11> --- Lower current limit

<Arg12> --- Upper power limit

<Arg13> --- Lower power limit

<Arg14> ---- Delay time   Unit s

<Arg15> --- Rising slope

<Arg16> --- Falling slope

Example:

:PROG:DATA:LIST 1,1,1,0,0,1,1,2,0, 2,0, 2,0,2,0,1,1,1 -- Set program

1 sequence 1 trigger mode to auto, test mode CC, range high, duration 1s, pull load value 1A, voltage upper limit 2V, voltage lower limit 0V, current upper limit 2A, current lower limit 0A, power upper limit 2W, power lower limit 0W, delay time 1s, rising slope 1A/us, falling slope 1A/us

:PROG:DATA:LIST? 1,1 ------ Return to program 1 sequence 1 settings

◆ Description: Set the step parameters

Syntax: :PROG:DATA:STEP<space><Arg1>,<Arg2>,<Arg3>,<Arg4>.

<Arg5>,<Arg6>,<Arg7>,<Arg8>,<Arg9>,<Arg10>,<Arg11>,<Arg12>.

<Arg13>,<Arg14>,<Arg15>,<Arg16>

:PROG:DATA:STEP? <space> < Arg1>

Parameters: <Arg1> Program

<Arg2> ---- Trigger mode 0|jump 1|automatic 2|manual 3|external

<Arg3> ---- Test mode 0|CC 1|CR 2|CV 4|CP

<Arg4> ---- Range   0|Low 1|Medium 2|High

<Arg5> ---- Duration   Unit s

<Arg6> ----- Starting pull-load value

<Arg7> ----- Termination pull-load value

<Arg8> ----- Upper voltage limit

<Arg9> ----- Lower voltage limit

<Arg10> --- Upper current limit

<Arg11> --- Lower current limit

<Arg12> --- Upper power limit

<Arg13> --- Lower power limit

<Arg14> ---- Delay time   Unit s

<Arg15> --- Rising slope

<Arg16> --- Falling slope

Example:

:PROG:DATA:LIST 1,1,0,0,1,1,2,2,0, 2,0, 2,0,2,0,1,1 -- Set program 1 trigger mode to auto, test mode CC, range high, duration 1s, starting pull-load value 1A, termination pull-load value 2A, voltage upper limit 2V, voltage lower limit 0V, current upper limit 2A, current lower limit 0A, power upper limit 2W, power lower limit 0W, delay time 1s, rising slope 1A/us, falling slope 1A/us

:PROG:DATA:STEP? 1 ---------- Return to program 1 step setting

◆ Description: Query the test results

Syntax: :PROG:SPEC:LIST?<space><Arg1>,<Arg2>

:PROG:SPEC:STEP?<space><Arg1>

Parameter: <Arg1> - Program

<Arg2> -------- Sequence

Example:

:PROG:SPEC:LIST? 1,1 ------ Query the test results of Program 1 Sequence 1

:PROG:SPEC:STEP? 1 ------ Query the test results of program 1 step

7.1.4 CHANnel subsystem command set

There are two types of TH8300 series modules, single channel and dual channel, and each channel corresponds to a number. For dual channel modules, each module has two channels, and the channel numbers are 1, 2, 3, 4 --- in order, and for single channel modules, each module has only one channel, and the channel numbers are 1, 3, 5, 7 --- in order.

◆ Description: Set the channel to receive commands

Syntax: :CHANnel[:LOAD]<space><value>
       :CHANnel[:LOAD]?
Parameters: value ------ Value size
Example:
       :CHAN:LOAD 1--------- Set channel 1
       :CHAN 2------------------ Set channel 2
       :Chan ALL ------------- Set to all channels
       :CHAN?------------------ Return to current channel
◆ Description: Turn the module on or off
   Syntax: :CHANnel:ACTive<space><CRD|NR1>
       :CHANnel:ACTive?
   Parameters: <CRD|NR1>   OFF|0,ON|1
   Example:
       :CHAN:ACT 1----- Turn on the load module
       :CHAN:ACT?------------ Returns the current load status
◆ Description: Ask the module to indicate the identity
   Syntax: :CHANnel:ID?
   Parameters: None

   Example:
       :CHAN:ID?--------- Return module information

7.1.5   CONFigure subsystem command set

◆ Description: Turn the module on or off
   Syntax: :CONFigure:VOLTage:LATCh<space><CRD|NR1>
       :CONFigure:VOLTage:LATCh?
   Parameters: <CRD|NR1>   ------   OFF|0,ON|1
   Example:
       : CONF:VOLT:LATC 1-------- Open the action category of Von
       : CONF:VOLT:LATC? -------- Return the action category of Von
◆ Description: Set the starting voltage
   Syntax: :CONFigure:VOLTage:ON<space><value>
       :CONFigure:VOLTage:ON?
   Parameters: value ------ Value size
   Example:
       : CONF:VOLT:ON 0.2 ---- Turn on Von to 0.2V
       : CONF:VOLT:ON?------ Returns the Von value
◆ Description: Set the shutdown voltage
   Syntax: :CONFigure:VOLTage:OFF<space><value>
       :CONFigure:VOLTage:OFF?
   Parameters: value   Value size
   Example:
       : CONF:VOLT:OFF 0.2------ Turn on Voff to 0.2V
       : CONF:VOLT:OFF? -------- Returns the Voff value
◆ Description: Set the remote voltage
   Syntax: :CONFigure:VOLTage:SENse<space><CRD|NR1>
       :CONFigure:VOLTage:SENse?
   Parameters: <CRD|NR1>   OFF|0,ON|1
   Example:
       : CONF:VOLT:SEN 1 --------- Turn on the remote voltage
       : CONF:VOLT:SEN?---------- Returns the remote voltage setting

◆ Description: Set the soft start
　 Syntax: :CONFigure:SOFTstart<space><CRD|NR1>
　　　　 :CONFigure:SOFTstart?
　 Parameters: <CRD|NR1>　　　　OFF|0,ON|1
　 Example:
　　　　: CONF:SOFT 1-------- Turn on soft start
　　　　: CONF:SOFT?--------- Return to soft start settings
◆ Description: Set the soft start time
　 Syntax: :CONFigure:SOFTstart:VALue <space><value>
　　　　 :CONFigure:SOFTstart:VALue?
　 Parameter: value　　　　Value　　　　size
　 Example:
　　　　: CONF:SOFT:VAL 0.001-------- Turn on the soft start to 1ms
　　　　: CONF:SOFT:VAL? -------- Return the soft start time

◆ Description: Set positive timing
　 Syntax: :CONFigure:COUNttime<space><CRD|NR1>
　　　　 :CONFigure:COUNttime?
　 Parameters: <CRD|NR1>　　　　OFF|0,ON|1
　 Example:
　　　　: CONF:COUN 1 ------- Start positive timing
　　　　: CONF:COUN? -------- Return to positive timing settings
◆ Description: Set the countdown timer
　 Syntax: :CONFigure:CUTOFFtime<space><CRD|NR1>
　　　　 :CONFigure:CUTOFFtime?
　 Parameters: <CRD|NR1>　　　　OFF|0,ON|1
　 Example:
　　　　: CONF:CUTOFF 1---- Turn on the countdown timer
　　　　: CONF:CUTOFF?----- Return to countdown settings
◆ Description: Set the countdown time
　 Syntax: :CONFigure:CUTOFFtime:VALue<space><value>
　　　　 :CONFigure:CUTOFFtime:VALue?
　 Parameters: value　　　　Value　　　size
　 Example:
　　　　: CONF:CUTOFF:VAL 2 --- Turn on countdown 2s
　　　　: CONF:CUTOFF:VAL? ---- Return the countdown setting
◆ Description: Set low voltage protection
　 Syntax: :CONFigure:LVP<space><CRD|NR1>
　　　　 :CONFigure:LVP?
　 Parameters: <CRD|NR1>　　　　OFF|0,ON|1
　 Example:
　　　　: CONF:LVP 1 ---- Turn on low voltage protection
　　　　: CONF:LVP? ----- Return to low voltage protection setting
◆ Description: Set all pull-load
　 Syntax: :CONFigure:ALLRun<space><CRD|NR1>
　　　　 :CONFigure:ALLRun?
　 Parameters: <CRD|NR1>　　　　OFF|0,ON|1
　 Example:
　　　　: CONF:ALLR 1 --------- Turn on all pull-load
　　　　: CONF:ALLR? ---------- Return to all pull-load settings
◆ Description: Set the external waveform function

Syntax: :CONFigure:EXTernal:WAVeform<space><CRD|NR1>

:CONFigure:EXTernal:WAVeform?

Parameters: <CRD|NR1>   OFF|0,ON|1

Example:

    : CONF:EXT:WAV 1 -- Turn on the external waveform function

    : CONF:EXT:WAV? --- Return to external waveform function settings

◆ Description: Set key sounds

Syntax: :CONFigure:SOUNd<space><CRD|NR1>

:CONFigure:SOUNd?

Parameters: <CRD|NR1>   OFF|0,ON|1

Example:

    : CONF:SOUN 1 ------- Turn on the key tone

    : CONF:SOUN? -------- Return to key tone setting

◆ Description: Set the online status

Syntax: :CONFigure:PARALLel:INITial<space><CRD|NR1>

:CONFigure:PARALLel:INITial?

Parameters: <CRD|NR1>   OFF|0,ON|1

Example:

    : CONF:PARALL:INIT 1 ---- Turn on online

    : CONF:PARALL:INIT? ----- Return to online status

◆ Description: Set online mode

Syntax: :CONFigure:PARALLel:MODE<space><CRD|NR1>

:CONFigure:PARALLel:MODE?

Parameters: <CRD|NR1>   NONE|0, SLAVE |1, MASTER |2

Example:

    : CONF:PARALL:MODE 1------- Set the slave

    : CONF:PARALL:MODE? ------- Return to online mode

◆ Description: Set the connection type

Syntax: :CONFigure:PARALLel:TYPE<space><CRD|NR1>

:CONFigure:PARALLel:TYPE?

Parameters: <CRD|NR1>   POW|0,_COPY|1

Example:

    : CONF:PARALL:TYPE 0--------- Set the connection type to power

    : CONF:PARALL:TYPE? --------- Return to online mode

◆ Description: Set the DIO IN1 type

Syntax: :CONFigure:DIO:IN1<space><NR1>

:CONFigure:DIO:IN1?

Parameters: <NR1>   0|NONE,1|EXTERNAL LOAD ON/OFF.

        2|REMOTE INHIBIT

Example:

    : CONF:DIO:IN1 0 ------ Set DIO IN1 type to NONE

    : CONF:DIO:IN1? ------- Returns the DIO IN1 type

◆ Description: Set the DIO IN2 type

Syntax: :CONFigure:DIO:IN2<space><NR1>

:CONFigure:DIO:IN2?

Parameters: <NR1>   0|NONE, 1|OCP TEST PASS-H.

        2|REMOTE INHIBIT

Example:

    : CONF:DIO:IN2 0 ----- Set DIO IN2 type to NONE

: CONF:DIO:IN2? ------ Returns the DIO IN2 type

◆ Description: Set DIO OUT1 type
   Syntax: :CONFigure:DIO:OUT1<space><NR1>
        :CONFigure:DIO:OUT1?
   Parameters: <NR1>   0|NONE,1|EXTERNAL LOAD ON/OFF.

                    2|OCP TEST FAIL-L, 3|GONG TOTAL PASS-H.

                    4|GONG TOTAL FAIL-L, 5|OTP OVP OCP OPP REV-H.

                    6|BUS CTRL.ACT-H, 7|BUS CTRL.ACT-L
   Example:
        : CONF:DIO:OUT1 0-------- Set DIO OUT1 type to NONE
        : CONF:DIO:OUT1?--------- Return DIO OUT1 type
◆ Description: Set DIO OUT2 type
   Syntax: :CONFigure:DIO:OUT2<space><NR1>
        :CONFigure:DIO:OUT2?
   Parameters: <NR1>   0|NONE,1|EXTERNAL LOAD ON/OFF.

                    2|OCP TEST FAIL-L, 3|GONG TOTAL PASS-H.

                    4|GONG TOTAL FAIL-L, 5|OTP OVP OCP OPP REV-H.

                    6|BUS CTRL.ACT-H, 7|BUS CTRL.ACT-L

   Example:
        : CONF:DIO:OUT2 0--------- Set DIO OUT2 type to NONE
        : CONF:DIO:OUT2?--------- Return DIO OUT2 type
◆ Description: Set the DIO output voltage level
   Syntax: :CONFigure:DIO:VOLTage<space><NR1>
        :CONFigure:DIO:VOLTage?
   Parameters: <NR1>-- |NONE,1|1.8V,2|3.3V,3|5V
   Example:
        : CONF:DIO:VOLT 1--------- Set the voltage level to 1.8V
        : CONF:DIO:VOLT?---------- Return voltage level
◆ Description: Set CAN address
   Syntax: :CONFigure:CAN:ADDR<space><value>
        :CONFigure:CAN:ADDR?
   Parameters: value   Value size
   Example:
        : CONF:CAN:ADDR 1 ------ Set the CAN address to 1
        : CONF:CAN:ADDR? ------- Return the CAN address?

7.1.6   CURRent Subsystem Command Set

7.1.6.1   STATic General Mode CC Settings

◆ Description: Set the current level 1
   Syntax: :CURRent:STATic:L1<space><value>
        :CURRent:STATic:L1?
   Parameters: value   Value size
   Example:
        :CURR:STAT:L1 1----------- Set current level 1 to 1A
        :CURR:STAT:L1? ------------ Return current level 1 set value

◆ Description: Set the current level 2

Syntax: :CURRent:STATic:L2<space><value>

:CURRent:STATic:L2?

Parameters: value   Value size

Example:

:CURR:STAT:L2 2----------- Set current level 2 to 2A

:CURR:STAT:L2? ------------ Return current level 2 setting value

◆ Description: Set the rising slope

Syntax: :CURRent:STATic:RISE<space><value>

:CURRent:STATic:RISE?

Parameters: value   Value size

Example:

:CURR:STAT:RISE 1 ------------- Set the rising slope to 1A/us

: CURR:STAT:RISE? ------------- Return the rising slope

◆ Description: Sets the falling slope

Syntax: :CURRent:STATic:FALL<space><value>

:CURRent:STATic:FALL?

Parameters: value   Value size

Example:

:CURR:STAT:FALL 1 ------------- Set the falling slope to 1A/us

:CURR:STAT:FALL? -------------- Returns the falling slope

◆ Description: Set the voltage range

Syntax: :CURRent:STATic:VOLTage:RANGe<space><CRD|NR1>

:CURRent:STATic:VOLTage:RANGe?

Parameters: <CRD|NR1>   LOW|L|0,MIDDLE|M|1,HIGH|H|2

Example:

:CURR:STAT:VOLT:RANG 1 - Set the voltage range to medium range

:CURR:STAT:VOLT:RANG? - Return to voltage range

7.1.6.2   DYNamic Dynamic Pull-load Mode Settings

◆ Description: Set the current level 1

Syntax: :CURRent:DYNamic:L1<space><value>

:CURRent:DYNamic:L1?

Parameters: value   Value   size

Example:

:CURR:DYN:L1 1 ------------ Set current level 1 to 1A

:CURR:DYN:L1? ------------- Return current level 1 set value

◆ Description: Set the current level 2

Syntax: :CURRent:DYNamic:L2<space><value>

:CURRent:DYNamic:L2?

Parameters: value   Value   size

Example:

:CURR:DYN:L2 2 ------------ Set current level 2 to 2A

:CURR:DYN:L2? ------------- Return current level 2 setting value

◆ Description: Set the rising slope

Syntax: :CURRent:DYNamic:RISE<space><value>

:CURRent:DYNamic:RISE?

Parameters: value   Value size

Example:

:CURR:DYN:RISE 1 ------- Set the rising slope to 1A/us

: CURR:DYN:RISE? --------- Return the rising slope

◆ Description: Sets the falling slope
Syntax: :CURRent:DYNamic:FALL<space><value>
:CURRent:DYNamic:FALL?
Parameters: value   Value size
Example:
:CURR:DYN:FALL 1 -------- Set the falling slope to 1A/us
:CURR:DYN:FALL? --------- Returns the falling slope

◆ Description: Set the duration 1
Syntax: :CURRent:DYNamic:T1<space><value>
:CURRent:DYNamic:T1?
Parameters: value   Value   size
Example:
:CURR:DYN:T1 1 ------------ Set duration 1 to 1s
:CURR:DYN:T1? ------------- Returns the duration 1 set value

◆ Description: Set the duration 2
Syntax: :CURRent:DYNamic:T2<space><value>
:CURRent:DYNamic:T2?
Parameters: value   Value   size
Example:
:CURR:DYN:T2 1 ------------ Set duration 2 to 1s
:CURR:DYN:T2? ------------- Returns the duration 2 set value

◆ Description: Set the number of repetitions
Syntax: :CURRent:DYNamic:REPeat<space><value>
:CURRent:DYNamic:REPeat?
Parameters: value   Value   size
Example:
:CURR:DYN:REP 1 --------- Set the number of repetitions to 1
:CURR:DYN:REP? ---------- Returns the number of repetitions

◆ Description: Set the voltage range
Syntax: :CURRent:DYNamic:VOLTage:RANGe<space><CRD|NR1>
:CURRent:DYNamic:VOLTage:RANGe?
Parameters: <CRD|NR1>   LOW|L|0,MIDDLE|M|1,HIGH|H|2
Example:
:CURR:DYN:VOLT:RANG 1 - Set the voltage range to medium range
:CURR:DYN:VOLT:RANG? - Return to voltage range

7.1.6.3   SWEep dynamic pull-load mode setting

◆ Description: Set the current level 1
Syntax: :CURRent:SWEep:L1<space><value>
:CURRent:SWEep:L1?
Parameters: value   Value size
Example:

:CURR:SWE:L1 1 ------------ Set current level 1 to 1A
:CURR:SWE:L1? ------------- Return current level 1 set value

◆ Description: Set the current level 2
Syntax: :CURRent:SWEep:L2<space><value>
:CURRent:SWEep:L2?
Parameters: value   Value size
Example:

                    :CURR:SWE:L2 2------------ Set current level 2 to 2A

                    :CURR:SWE:L2?------------- Return current level 2 setting value

◆   Description: Set the rising slope

     Syntax: :CURRent:SWEep:RISE\<space>\<value>

           :CURRent:SWEep:RISE?

     Parameters: value   Value size

     Example:

           :CURR:SWE:RISE 1-------- Set the rising slope to 1A/us

           : CURR:SWE:RISE? -------- Return the rising slope

◆   Description: Sets the falling slope

     Syntax: :CURRent:SWEep:FALL\<space>\<value>

           :CURRent:SWEep:FALL?

     Parameters: value   Value size

     Example:

           :CURR:SWE:FALL 1-------- Set the falling slope to 1A/us

           :CURR:SWE:FALL?--------- Returns the falling slope

◆   Description: Set the starting frequency

     Syntax: :CURRent:SWEep:FSTArt\<space>\<value>

           :CURRent:SWEep:FSTArt?

     Parameters: value   Value   size

     Example:

           :CURR:SWE:FSTA 100---- Set the starting frequency to 100Hz

           :CURR:SWE:FSTA? -------- Return the starting frequency

◆   Description: Set the termination frequency

     Syntax: :CURRent:SWEep:FEND\<space>\<value>

           :CURRent:SWEep:FEND?

     Parameters: value   Value size

     Example:

           :CURR:SWE:FEND 1000-------- Set the starting frequency to 1000Hz

           :CURR:SWE: FEND? ------------- Return to starting frequency

◆   Description: Set the step frequency

     Syntax: :CURRent:SWEep:FSTEp\<space>\<value>

           :CURRent:SWEep:FSTEp?

     Parameters: value   Value size

     Example:

           :CURR:SWE:FSTE 100---- Set the step frequency to 100Hz

           :CURR:SWE:FSTE? -------- Return step frequency

◆   Description: Set the duration

     Syntax: :CURRent:SWEep:DWELl\<space>\<value>

           :CURRent:SWEep:DWELl?

     Parameters: value   Value size

     Example:

           :CURR:SWE:DWEL 1 ------------ Set the duration to 1s

           :CURR:SWE:DWEL ?------------- Return the duration

◆   Description: Set duty cycle

     Syntax: :CURRent:SWEep:DUTY\<space>\<value>

           :CURRent:SWEep:DUTY?

     Parameters: value   Value size

     Example:

           :CURR:SWE:DUTY 0.5 ---------- Set duty cycle to 50%

:CURR:SWE:DUTY?------------- Return Duty Cycle

◆ Description: Set the voltage range
Syntax: :CURRent:SWEep:VOLTage:RANGe<space><CRD|NR1>
    :CURRent:SWEep:VOLTage:RANGe?
Parameters: <CRD|NR1>   LOW|L|0,MIDDLE|M|1,HIGH|H|2
Example:
    :CURR:SWE:VOLT:RANG 1   Set the voltage range to medium range
    :CURR:SWE:VOLT:RANG?-- Return to voltage range

7.1.7 DIGitizing subsystem command set

◆ Description: Disables digitizing
Syntax: :DIGitizing:ABORt

Parameters: None
Example:
    :DIG:ABOR   Turn off digitization function

◆ Description: Initializes the digitization function
Syntax: :DIGitizing:INITiate
Parameters: None
Example:
    :DIG:INIT----- Initialize digitization function

◆ Description: Set status
Syntax: :DIGitizing:STATe<space><CRD|NR1>
    :DIGitizing:STATe?
Parameters: <CRD|NR1>   OFF|0,ON|1
Example:
    :DIG:STAT 1   Enable digitization function
    :DIG:STAT?   Query digitization function

◆ Description: Set the sampling point
Syntax: :DIGitizing:SAMPling:POINt<space><value>
    :DIGitizing:SAMPling:POINt?
Parameters: value   Value size
Example:
    :DIG:SAMP:POIN 100 ------ Set the sampling point to 100
    :DIG:SAMP:POIN? ---------- Return the sampling point

◆ Description: Set the sampling time

Syntax: :DIGitizing:SAMPling:TIME<space><value>
    :DIGitizing:SAMPling:TIME?
Parameters: value   Value   size
Example:
    :DIG:SAMP:TIME 0.02 ----- Set the sampling time to 0.02s
    :DIG:SAMP:TIME?----------- Return the sampling time

◆ Description: Set the trigger point
Syntax: :DIGitizing:TRIGger:POINt<space><value>
    :DIGitizing:TRIGger:POINt?
Parameters: value   Value   size
Example:
    :DIG:TRIG:POIN 100 ------- Set the trigger point to 100
    :DIG:TRIG:POIN?----------- Return the trigger point

◆ Description: Set the trigger source
Syntax: :DIGitizing:TRIGger:SOURce<space><CRD|NR1>

:DIGitizing:TRIGger:SOURce?
Parameters: <CRD|NR1>   LOADON|0,LOADOFF|1
           TTL|2,BUS|3,MANUAL|4

Example:
    :DIG:TRIG:SOUR 1 --------- Set the trigger source to LOADOFF
    :DIG:TRIG:SOUR? ---------- Return the trigger source setting

◆ Description: Waveform data transfer from module to frame
Syntax: :DIGitizing:WAVeform:CAPture?

Parameters: None
Example:
    :DIG:WAV:CAP? - Waveform data transfer from module to frame

◆ Description: The electronic load sends voltage or current waveform information in binary format
Syntax: :DIGitizing:WAVeform:DATA:<V|I>?

Parameters: None
Example:
    :DIG:WAV:DATA:V?   Send voltage waveform information in binary format

7.1.8 FETCh subsystem command set

◆ Description: Returns the current measurement of all modules
Syntax: :FETCh:ALLCurrent?
Parameters: None
Example:
    :FETC:ALLC? ----- Returns the current measurement of all modules

◆ Description: Returns the power measurement of all modules
Syntax: :FETCh:ALLPower?
Parameters: None
Example:
    :FETC:ALLP? ----- Returns the power measurement of all modules

◆ Description: Returns the voltage measurement of all modules
Syntax: :FETCh:ALLVoltage?
Parameters: None

Example:
    :FETC:ALLV? ----- Returns the voltage measurement of all modules

◆ Description: Returns the maximum voltage measurement of all modules
Syntax: :FETCh:ALLVoltage:MAX?
Parameters: None
Example:
    :FETC:ALLV:MAX?---- Returns the maximum voltage measurement for all modules

◆ Description: Returns the minimum voltage measurement for all modules
Syntax: :FETCh:ALLVoltage:MIN?
Parameters: None
Example:
    :FETC:ALLV:MIN?----- Returns the minimum voltage measurement for all modules

◆ Description: Returns the current module current measurement
syntax: :FETCh:CURRent?
Parameters: None
Example:

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:FETC:CURR?---- Returns the current module current measurement value

◆ Description: Returns the power measurement of the current module
Syntax: :FETCh:POWer?
Parameters: None
Example:
:FETC:POW?----- Returns the power measurement of the current module

◆ Description: Returns the voltage measurement of the current module
Syntax: :FETCh:VOLTage?
Parameters: None
Example:
:FETC:VOLT? ---- Returns the voltage measurement of the current module

◆ Description: Returns the peak voltage of the current module
Syntax: :FETCh:VOLTage:PEAK+?
Parameters: None
Example:
:FETC:VOLT:PEAK+?------ Return the peak voltage of the current module

◆ Description: Returns the valley voltage of the current module
Syntax: :FETCh:VOLTage:PEAK-?
Parameter: None
Example:
:FETC:VOLT:PEAK-?------- Returns the valley voltage of the current module

◆ Description: Returns the AH of the current module in timing measurement mode.
Syntax: :FETCh:AH?
Parameters: None
Example:
:FETC:AH? -------- Returns the AH of the current module

◆ Description: Returns the WH of the current module in timing measurement mode.
Syntax: :FETCh:WH?
:FETC:WH? ------- Returns the WH of the current module in timing measurement mode

◆ Description: Returns the time of the current module in timing measurement mode
Syntax: :FETCh:TIME?
Parameters: None
Example:
:FETC:TIME? ----- Returns the time of the current module

◆ Description: Returns the frequency of the current module in frequency sweep mode or sine wave test mode
Syntax::FETCh:FREQuency?
Parameters: None
Example:
:FETC:FREQ?---- Current frequency of the module in frequency sweep mode or sine wave test mode

7.1.9 LOAD subsystem command set

◆ Description: Load pull or unload current
   Syntax: :LOAD[:STATe]<space><CRD|NR1>
         :LOAD[:STATe]?
   Parameters: <CRD|NR1>   OFF|0,ON|1
   Example:
         :LOAD ON --------- Pulling current
         :LOAD 0 ------------ Unload current
         :LOAD? ------------- Return to pull status
◆ Description: Query the protection status of the load
   Syntax: :LOAD:PROTection?
   Parameters: None
   Example:
         :LOAD:PROT? ---------- Query the status of the load
◆ Description: Reset the state of the load
   Syntax: :LOAD:PROTection:CLEAr
   Parameters: None
   Example:
         :LOAD:PROT:CLEA--------------- Reset the state of the load
◆ Description: Set up short circuit simulation
   Syntax: :LOAD:SHORt[:STATe]<space><CRD|NR1>
         :LOAD:SHORt[:STATe]?
   Parameters: <CRD|NR1>   OFF|0,ON|1
   Example:
         :LOAD:SHOR ON------------ Turn on short-circuit simulation
         :LOAD:SHOR 0 -------------- Turn off short-circuit simulation
         :LOAD:SHOR? -------------- Return to short-circuit simulation state

7.1.10 MEASure subsystem command set

◆ Description: Returns the current measurement of all modules
   Syntax: :MEASure:ALLCurrent?

         :MEAS:ALLC? ---- Returns the current measurement value of all modules
◆ Description: Returns the power measurement of all modules
   Syntax: :MEASure:ALLPower?
   Parameters: None
   Example:
         :MEAS:ALLP? ---- Returns the power measurement value of all modules
◆ Description: Returns the voltage measurement of all modules
   Syntax: :MEASure:ALLVoltage?
   Parameters: None
   Example:
         :MEAS:ALLV? ---- Returns the voltage measurement value of all modules
◆ Description: Returns the current current measurement of the module
   Syntax: :MEASure:CURRent?
   Parameters: None
   Example:
         :MEAS:CURR? --- Returns the current current measurement value of the module
◆ Description: Returns the power measurement of the current module

Syntax: :MEASure:POWer?
Parameters: None
Example:
:MEAS:POW? ---- Returns the power measurement value of the current module
◆ Description: Returns the voltage measurement of the current module
Syntax: :MEASure:VOLTage?
Parameters: None
Example:
:MEAS:VOLT? ---- Returns the voltage measurement of the current module

7.1.11 MODE subsystem command set

◆ Description: Set the operation mode of electronic load
Syntax: :MODE<space><NRf>
         MODE?
Parameters:
<CRD>,CCL,CCM,CCH,CRL,CRM,CRH,CVL,CVM,CVH,CPL,CPM,
CPH,CCDL,CCDM,CCDH,CCFSL,CCFSM,CCFSH,LEDL,LEDM,LEDH,
BATL,BATM,BATH,TIML TIMM, TIMH, MPPTL, MPPTM, MPPTH, OCPL,
OCPM, OCPH, OVPL, OVPM, OVPH, OPPL, OPPM, OPPH, SWDL, SWDM,
SWDH, LISTL, LISTM, LISTH, PROG
Example:
:MODE CCL------- Set to CC mode low range
:MODE CCH ------ Set to CC mode high range
:MODE CCDL----- Set to dynamic mode low range
:MODE CCDH ---- Set to dynamic mode high range
:MODE CRL------- Set to CR mode low range
:MODE CRH ------ Set to CR mode high range
MODE?------------ Query the current mode

7.1.12 POWer subsystem command set

◆ Description: Set the power level 1
Syntax: :POWer:STATic:L1<space><value>
        :POWer:STATic:L1?
Parameters: value   Value size
Example:
:POW:STAT:L1 1 ------------ Set the power level 1 to 1W
:POW:STAT:L1? ------------- Return power level 1 set value
◆ Description: Set the power level 2
Syntax: :POWer:STATic:L2<space><value>
        :POWer:STATic:L2?
Parameters: value   Value size
Example:
:POW:STAT:L2 2 ------------ Set the power level 2 to 22
:POW:STAT:L2? ------------- Returns the power level 2 setting value
◆ Description: Set the rising slope
Syntax: :POWer:STATic:RISE<space><value>
        :POWer:STATic:RISE?
Parameters: value   Value size

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Example:
    :POW:STAT:RISE 1--------- Set the rising slope to 1A/us
    :POW:STAT:RISE?---------- Return the rising slope

◆ Description: Set the falling slope
  Syntax: :POWer:STATic:FALL<space><value>
    :POWer:STATic:FALL?
  Parameters: value   Value size
  Example:
    :POW:STAT:FALL 1 -------------- Set the falling slope to 1A/us
    :POW:STAT:FALL?---------------- Returns the falling slope

◆ Description: Set the voltage range
  Syntax: :POWer:STATic:VOLTage:RANGe<space><CRD|NR1>
    :POWer:STATic:VOLTage:RANGe?
Parameters: <CRD|NR1>   LOW|L|0,MIDDLE|M|1,HIGH|H|2
  Example:
    :POW:STAT:VOLT:RANG 1 ---- Set the voltage range to medium range
    :POW:STAT:VOLT:RANG? ----- Return to voltage range

7.1.13 RESistance Subsystem Command Set

◆ Description: Set the resistance level 1
  Syntax: :RESistance:STATic:L1<space><value>
    :RESistance:STATic:L1?
  Parameters: value   Value   size
  Example:
    :RES:STAT:L1 1   Set the resistance level 1 to 1Ω
    :RES:STAT:L1? ----------- Return resistance level 1 setting value

◆ Description: Set the resistance level 2
  Syntax: :RESistance:STATic:L2<space><value>
    :RESistance:STATic:L2?
  Parameters: value   Value   size
  Example:
    :RES:STAT:L2 2 ------------- Set the resistance level 2 to 2Ω
    :RES:STAT:L2? -------------- Returns the resistance level 2 setting value

◆ Description: Set the current range
  Syntax: :RESistance:STATic:CURRent:RANGe<space><CRD|NR1>
    :RESistance:STATic:CURRent:RANGe?
  Parameters: <CRD|NR1>   LOW|L|0,MIDDLE|M|1,HIGH|H|2
  Example:
    :RES:STAT:CURR:RANG 1 ---- Set the voltage range to medium range
    :RES:STAT:CURR:RANG? ----- Return to voltage range

7.1.14 RUN subsystem command set

◆ Description: All module pull-load current

  syntax: :RUN
  Parameters: None

Example:
        :RUN ---------- All module pull load current

7.1.15 SHOW subsystem command set

◆ Description: Switch channel display
  Syntax: :SHOW[:DISPlay]<space><CRD>
  Parameters: <CRD>,L|R, A|B
  Example:
        :SHOW:DISP L --------- Display the measured value of the left channel
        :SHOW:DISP R -------- Display the measured value of the right
        channel
        :SHOW:DISP A--------- Display the A value of a single channel module
        :SHOW:DISP B--------- Display the B value of a single channel module

7.1.16 SPECification subsystem command set

◆ Description: Return the limit judgment result of all modules
  Syntax: :SPECification[:PASS]?
  Parameters: None
  Example:
        :SPEC? ------- Return the limit judgment result of all modules
◆ Description: Return the power limit judgment result of all modules
  Syntax: :SPECification[:PASS]:POWer?
  Parameters: None
  Example:
        :SPEC:POW? ----- Return the power limit judgment result of all
        modules
◆ Description: Return the current limit judgment result of all modules
  Syntax: :SPECification[:PASS]:CURRent?

  Parameters: None

  Example:
        :SPEC:CURR? --- Return the current limit judgment result of all
        modules
◆ Description: Returns the voltage limit judgment result of all modules
  Syntax: :SPECification[:PASS]:VOLTage?
  Parameters: None
  Example:
        :SPEC:VOLT? ---- Return the voltage limit judgment result of all
        modules
◆ Description: Turn on or off the limit judgment
  Syntax: :SPECification:TEST<space><CRD|NR1>
          :SPECification:TEST?
  Parameters: <CRD|NR1>   OFF|0,ON|1
  Example:
        :SPEC:TEST 1 --- Turn on limit judgment
        :SPEC:TEST? ---- Return the limit judgment setting
◆ Description: Set the input mode
  Syntax: :SPECification:UNIT<space><CRD|NR1>
          :SPECification:UNIT?
  Parameters: <CRD|NR1>   VALUE |0, PERCENT |1
  Example:

      :SPEC:UNIT 0 ---- Set the input mode to numeric mode

      :SPEC:UNIT? ----- Return to input mode

◆ Description: Set the reference current

  Syntax: :SPECification:CURRent:C<space><value>

    :SPECification:CURRent:C?

  Parameters: <value> Value   size

  Example:

    :SPEC:CURR:C 1 Set reference current

    :SPEC:CURR:C? Return to reference current

◆ Description: Set current limit

  Syntax: :SPECification:CURRent:H<space><value>

    :SPECification:CURRent:H?

  Parameters: <value> Value   size

  Example:

    :SPEC:CURR:H 2 Set current upper limit

    :SPEC:CURR:H? Return current limit

◆ Description: Set lower current limit

  Syntax: :SPECification:CURRent:L<space><value>

    :SPECification:CURRent:L?

  Parameters: <value> Value   size

  Example:

    :SPEC:CURR:L 0 Set lower current limit

    :SPEC:CURR:L? Return current lower limit

◆ Description: Set the reference voltage

  Syntax: :SPECification:VOLTage:C<space><value>

    :SPECification:VOLTage:C?

  Parameters: <value> Value size

  Example:

    :SPEC:VOLT:C 1 ------ Set reference voltage

    :SPEC:VOLT:C? ------- Return to reference voltage

◆ Description: Set the upper voltage limit

  Syntax: :SPECification:VOLTage:H<space><value>

    :SPECification:VOLTage:H?

  Parameters: <value> Value   size

  Example:

    :SPEC:VOLT:H 2 ------ Set the upper voltage limit

    :SPEC:VOLT:H? ------- Return voltage upper limit

◆ Description: Set the lower voltage limit

  Syntax: :SPECification:VOLTage:L<space><value>

    :SPECification:VOLTage:L?

  Parameters: <value> Value   size

  Example:

    :SPEC:VOLT:L 0------- Set lower voltage limit

    :SPEC:VOLT:L?-------- Return voltage lower limit

◆ Description: Set the reference power

  Syntax: :SPECification:POWer:C<space><value>

    :SPECification:POWer:C?

  Parameters: <value> Value   size

  Example:

    :SPEC:POW:C 1------- Set the reference power

:SPEC:POW:C? -------- Return to base power

◆ Description: Set power limit
   Syntax: :SPECification:POWer:H<space><value>
            :SPECification:POWer:H?
   Parameters: <value>   Value   size
   Example:
            :SPEC:POW:H 2 ------- Set power limit
            :SPEC:POW:H? -------- Return power limit
◆ Description: Set the lower power limit
   Syntax: :SPECification:POWer:L<space><value>
            :SPECification:POWer:L?
   Parameters: <value>   Value   size
   Example:
            :SPEC:POW:L 0 ------- Set the lower limit of power
            :SPEC:POW:L? -------- Return power lower limit

7.1.17 VOLTage Subsystem Command Set

◆ Description: Set the voltage level 1
   Syntax: :VOLTage:STATic:L1<space><value>
            :VOLTage:STATic:L1?
   Parameters: value   Value size
   Example:

            :VOLT:STAT:L1 1 ------------ Set voltage level 1 to 1V
            :VOLT:STAT:L1? ------------ Return voltage level 1 set value
◆ Description: Set the voltage level 2
   Syntax: :VOLTage:STATic:L2<space><value>
            :VOLTage:STATic:L2?
   Parameters: value   Value size
   Example:
            :VOLT:STAT:L2 2 ------------ Set voltage level 2 to 2V
            :VOLT:STAT:L2? ------------ Return voltage level 2 set value
◆ Description: Set the execution category in constant voltage mode
   Syntax: :VOLTage:STATic:TYPE<space><CRD|NR1>
            :VOLTage:STATic:TYPE?
   Parameters: <CRD|NR1>   CURR/PSU|0,VOLT/PSU|1
   Example:
            :VOLT:STAT:TYPE 0 ------------- Set the execution category to current
            type
            :VOLT:STAT:TYPE? -------------- Return the execution category
◆ Description: Set the response speed in constant voltage mode
   Syntax: :VOLTage:STATic:RESponse<space><CRD|NR1>
            :VOLTage:STATic:RESponse?
   Parameters: <CRD|NR1>   FAST|0,NORMAL|1,SLOW|2
   Example:
            :VOLT:STAT:RES 0 --------- Set the response speed to fast
            :VOLT:STAT:RES? ---------- Return the response speed

7.2   Command example

Query machine model	*IDN?
Set pass module	CHAN 1CHAN:LOAD 1CHAN ALL CHAN?

Query module model	CHAN:ID?
Open Module	CHAN:ACT 1
All pull load	RUN
Uninstall all	ABORT
Module pull load current	LOAD 1 LOAD?
Module short circuit	LOAD:SHOR 1 LOAD:SHOR?
Query module protection status	LOAD:PROT?
Reset module protection status	LOAD:PROT:CLEA
Change Mode	MODE CCH MODE? Mode: CCL, CCM, CCH, CRL, CRM, CRH, CVL, CVM, CVH, CPL, CPM, CPH, CCDL, CCDM, CCDH, CCFSL, CCFSM, CCFSH, LEDL, LEDM, LEDH, BA TL, BATM, BATH, TIML, TIMM, TIMH. MPPTL, MPPTM, MPPTH, OCPL, OCPM, OCPH, OVP L, OVPM. OVPH, OPPL, OPPM, OPPH, SWDL, SWDM, SWDH, LISTL, LISTM. LISTH, PROG

CC Settings	CURR:STAT:L1 10;CURR:STAT:L2 20;CURR:STAT:RISE 1;CURR:STAT:FALL 1. CURR:STAT:VOLT:RANG 1
DYN Settings	CURR:DYN:L1 10;CURR:DYN:L2 20;CURR:DYN:RISE 1;CURR:DYN:FALL 1. CURR:DYN:T1 1;CURR:DYN:T2 2;CURR:DYN:REP 10;CURR:DYN:VOLT:RANG 1
SWP Settings	CURR:SWE:L1 10;CURR: SWE:L2 20;CURR:SWE:RISE 1;CURR:SWE:FALL 1. CURR:SWE:FSTA 100;CURR:SWE:FEND 1000;CURR:SWE:FSTE 100. CURR:SWE:DWEL 1;CURR:SWE:DUTY 0.5;CURR:SWE:VOLT:RANG 1
CR Settings	RES:STAT:L1 10;RES:STAT:L2 20;RES:STAT:CURR:RANG 1
CV Settings	volt:stat:l1 10;volt:stat:l2 20;volt:stat:type 0;VOLT:STAT:RES 0
CP Settings	POW:STAT:L1 10;POW:STAT:L2 20;POW:STAT:RISE 1;POW:STAT:FALL 1. POW:STAT:VOLT:RANG 1
CR-LED settings	ADV:LED:V 1; ADV:LED:R 1; ADV:LED:CURR:RANG 1
BATT Settings	ADV:BAT:MODE 2; ADV:BAT:VAL 1; ADV:BAT:COND 1; ADV:BAT:LEVEL 1. ADV:BAT:RISE 1;ADV:BAT:FALL 1;ADV:BAT:VOLT:RANG 1
TIME Setting	ADV:TIM:MODE 2; ADV:TIM:VAL 10; ADV:TIM:TRIG:MODE 1. ADV:TIM:TRIG:VSTA 5; ADV:TIM:TRIG:VEND 10; ADV:TIM:TOUT 2; ADV:TIM:RISE 1; ADV:TIM:FALL 1; ADV: TIM:VOLT:RANG 1

OCPT Settings	ADV:OCP:VOLT:RANG 1. ADV:OCP:ISTA 10; ADV:OCP:IEND 20; ADV:OCP:STEP 100; ADV:OCP:DWEL 1. ADV:OCP:SPEC:H 25; ADV:OCP:SPEC:L 15; ADV:OCP:TRIG:VOLT 5. ADV:OCP:LATC 1.
OVPT Settings	ADV:OVP:VOLT 10
OPPT Settings	ADV:OPP:VOLT:RANG 1. ADV:OPP:PSTA 10; ADV:OPP:PEND 20; ADV:OPP:STEP 100; ADV:OPP:DWEL 1. ADV:OPP:SPEC:H 25; ADV:OPP:SPEC:L 15; ADV:OPP:TRIG:VOLT 5. ADV:OPP:LATC 1.
SINE Settings	ADV:SINE:FREQ 100; ADV:SINE:IDC 1; ADV:SINE:IAC 2. ADV:SINE:VOLT:RANG 1
LIST Settings	ADV:LIST:REP 10; ADV:LIST:SEQ:ALL 20; ADV:LIST:VOLT:RANG 1. ADV:LIST:DATA 1,1,1,1; ADV:LIST:DATA?1
PROG Settings	PROG:NSEL 1. PROG:NSEL? PROG:DATA 1,1,1,1,1 PROG:DATA?1
	PROG:DATA:LIST 1,1,1,0,1,1,1,1,1,1,1,1,1,1,1,1,1 PROG:DATA:LIST?1,1 PROG:DATA:STEP 1,1,0,1,1,1,1,1,1,1,1,1,1,1,1,1 PROG:DATA:STEP?1
CONF Settings	CONF:SOUN 1. CONF:VOLT:LATC 1; CONF:VOLT:ON 0.2; CONF:VOLT:OFF 0.1. CONF:SOFT 1;CONF:SOFT:VAL 0.001. CONF:COUN 1; CONF:CUTOFF 1; CONF:CUTOFF:VAL 200; CONF:LVP 1; CONF:ALLR 1; CONF:EXT:WAV 1; CONF:VOLT:SEN 1; CONF:PARALL:MODE 2; CONF:PARALL:INIT 1. CONF:PARALL:TYPE 0. conf:dio:in1 1;conf:dio:in2 1;conf:dio:out1 1;conf:dio:out2 1. conf:dio:volt 1 CONF:CAN:ADDR 1; CONF:CAN:MODE 1; CONF:CAN:STAT 1.
DIGIT Settings	DIG:ABOR;DIG:INIT;DIG:STAT 1. DIG:SAMP:POIN 100;DIG:SAMP:TIME 0.02. DIG:TRIG:POIN 100;DIG:TRIG:SOUR 1; DIG:WAV:CAP? DIG:WAV:DATA? DIG:WAV:DATA:V? DIG:WAV:DATA:I?
SHOW Settings	SHOW:DISP L; SHOW:DISP A.
SPEC Settings	SPEC:POW? SPEC:CURR? SPEC:VOLT? SPEC:TEST 1; SPEC:UNIT 1. SPEC:CURR:C 1;SPEC:CURR:H 2;SPEC:CURR:L 0; SPEC:VOLT:C 1; SPEC:VOLT:H 2;SPEC:VOLT:L 0. SPEC:POW:C 1;SPEC:POW:H 2;SPEC:POW:L 0.

FETC	FETC:ALLC? FETC:ALLV? FETC:ALLP?
	FETC:ALLV:MAX? FETC:ALLV:MIN?
	FETC:CURR? FETC:VOLT? FETC:POW?
	FETC:VOLT:PEAK+? FETC:VOLT:PEAK-? FETC:AH?
	FETC:WH?
	FETC:TIME?
	FETC:FREQ?
MEAS	MEAS:ALLC? MEAS:ALLV? MEAS:ALLP?
	MEAS:CURR? MEAS:VOLT? MEAS:POW?

Chapter 8　Technical indicators

8.1　Product Specifications

Specification				
Rating (0-40℃)	Module	TH8301-80-20		
	Input power	100W ×2		
	Input Voltage	0~80V		
	Input Current	0~20A		
	Minimum operating voltage	0.5V@0.2A	0.5V@2A	0.5V@20A
General mode				
Constant voltage mode	Measurement range	6V	16V	80V
	Resolution	0. 1mV	1mV	1mV
	Precision	0.05%+0.1%FS		
Constant current mode	Measurement range	0~0.2A	0~2A	0~20A
	Resolution	0.01mA	0.1mA	1mA
	Precision	0.2%+0.2%FS		
Constant resistance mode	Measurement range	0.04~80Ω (100W/6V)	1.4~2.9kΩ (100W/16V)	6~12kΩ (100W/80V)
	Resolution	0.01Ω	0.1Ω	1Ω
	Precision	1%	1%	1%
Constant power mode	Measurement range	0~2W	0~10w	0~100w
	Resolution	1mW	10mW	100mW
	Precision	1%		
Dynamic mode - constant current mode				
	Minimum working voltage	1.5V		
	Frequency	100Hz~50kHz/0.01Hz~1kHz		
	Duty Cycle	1~99% (minimum rise time controlled)		
	Precision	1us/1ms+100ppm		
	Slope	0.04A/ms~0.02A/μs	0. 4A/ms~0. 2A/μs	4A/ms~2A/μs
	Resolution	0.01mA/μs	0.1mA/μs	1mA/μs
	Precision	10%±20μs		
	Minimum rise time	10μs		
Measurement				
Voltage readback	Measurement range	0~6V	0~16V	0~80V
	Resolution	0. 2mV	0.3mV	1.4mV
	Precision	0.025%+0.01%FS		0.01%+0.025%FS
Current Readback	Measurement range	0~0.2A	0~2A	0~20A
	Resolution	0.004mA	0.04mA	0.4mA
	Precision	0.2%+0.2%FS		
Power Readback	Measurement range	16W	30W	100W

	Precision	0.2%+0.2%FS		
Scope of protection				
Overpower protection	yes			
Overcurrent protection	yes			
Overvoltage protection	yes			
Over temperature protection	yes			
Operating temperature	0-40°C			
Size(mm)	142*85*550			
Weight	4.2kg			

Specification				
Rating (0-40℃)	Module	TH8301A-80-20		
	Input power	200W ×2		
	Input Voltage	0~80V		
	Input Current	20A		
	Minimum operating voltage	0.5V@0.2A	0.5V@2A	0.5V@20A
General mode				
Constant voltage mode	Measurement range	6V	16V	80V
	Resolution	0. 1mV	1mV	1mV
	Precision	0.05%+0.1%FS		
Constant current mode	Measurement range	0~0.2A	0~2A	0~20A
	Resolution	0.01mA	0.1mA	1mA
	Precision	0.2%+0.2%FS		
Constant resistance mode	Measurement range	0.04~80Ω (100W/6V)	1.4~2.9kΩ (100W/16V)	6~12kΩ (100W/80V)
	Resolution	0. 01Ω	0. 1Ω	1Ω
	Precision	1%	1%	1%
Constant power mode	Measurement range	0~4W	0~20w	0~200w
	Resolution	2mW	20mW	200mW
	Precision	1%		
Dynamic mode - constant current mode				
	Minimum working voltage	1.5V		
	Frequency	100Hz~50kHz/0.01Hz~1kHz		
	Duty Cycle	1~99% (minimum rise time controlled)		
	Precision	1us/1ms+100ppm		
	Slope	0.04A/ms~0.02A/µs	0. 4A/ms~0. 2A/µs	4A/ms~2A/µs
	Resolution	0.01mA/µs	0.1mA/µs	1mA/µs
	Precision	10%±20µs		

	Minimum rise time	10μs		
Measurement				
Voltage readback	Measurement range	0~6V	0~16V	0~80V
	Resolution	0. 2mV	0.3mV	1.4mV
	Precision	0.025%+0.01%FS		0.01%+0.025%FS
Current Readback	Measurement range	0~0.2A	0~2A	0~20A
	Resolution	0.004mA	0.04mA	0.4mA
	Precision	0.2%+0.2%FS		
Power Readback	Measurement range	30W	60W	200W
	Precision	0. 2%+0.2%FS		
Scope of protection				
Overpower protection	yes			
Overcurrent protection	yes			
Overvoltage protection	yes			
Over temperature protection	yes			
Operating temperature	0-40°C			
Size(mm)	142*85*550			
Weight	4.2kg			

Specification				
Rating (0-40℃)	Module	TH8302-80-40		
	Input power	200W ×1		
	Input Voltage	0~80V		
	Input Current	0~40A		
	Minimum operating power Pressure	0.5V@0.4A	0.5V@4A	0.5V@40A
General mode				
Constant voltage mode	Measurement range	6V	16V	80V
	Resolution	0. 1mV	1mV	1mV
	Precision	0.05%+0.1%FS		
Constant current mode	Measurement range	0~0.4A	0~4A	0~40A
	Resolution	0.01mA	0.1mA	1mA
	Precision	0.2%+0.2%FS		
Constant resistance mode	Measurement range	0.03~60Ω (200W/6V)	1.0~2.16kΩ (200W/16V)	4.3~9kΩ (200W/80V)
	Resolution	0. 01Ω	0. 1Ω	0. 1Ω
	Precision	1%	1%	1%
Constant power mode	Measurement range	0~4W	0~20w	0~200w

	Resolution	2mW	20mW	200mW
	Precision	1%		

Dynamic mode - constant current mode

	Minimum working voltage	1.5V		
	Frequency	100Hz~50kHz/0.01Hz~1kHz		
	Duty Cycle	1~99% (minimum rise time controlled)		
	Precision	1us/1ms+100ppm		
	Slope	0.08A/ms~0.04A/μs	0. 8A/ms~0. 4A/μs	8A/ms~4A/μs
	Resolution	0.01mA/μs	0.1mA/μs	1mA/μs
	Precision	10%±20μs		
	Minimum rise time	10μs		

Measurement

Voltage readback	Measurement range	0~6V	0~16V	0~80V
	Resolution	0. 2mV	0.3mV	1.4mV
	Precision	0.025%+0.01%FS		0.01%+0.025%FS
Current Readback	Measurement range	0~0.4A	0~4A	0~40A
	Resolution	0.008mA	0.08mA	0.8mA
	Precision	0.2%+0.2%FS		
Power Readback	Measurement range	30W	60W	200W
	Precision	0. 2%+0.2%FS		

Scope of protection

Overpower protection	yes			
Overcurrent protection	yes			
Overvoltage protection	yes			
Over temperature protection	yes			
Operating temperature	0-40°C			
Size(mm)	142*85*550			
Weight	4.2kg			

Specification				
Rating (0-40℃)	Module	TH8303-80-60		
	Input power	300W ×1		
	Input Voltage	0~80V		
	Input Current	0~60A		
	Minimum operating voltage	0.5V@0.6A	0.5V@6A	0.5V@60A
General mode				
Constant voltage mode	Measurement range	6V	16V	80V
	Resolution	0. 1mV	1mV	1mV

	Precision	0.05%+0.1%FS		
Constant current mode	Measurement range	0~0.6A	0~6A	0~60A
	Resolution	0.01mA	0.1mA	1mA
	Precision	0.2%+0.2%FS		
Constant resistance mode	Measurement range	0.015~30Ω (300W/6V)	0.3~600Ω (300W/16V)	1.5~3kΩ (300W/80V)
	Resolution	0.001Ω	0.1Ω	0.1Ω
	Precision	1%	1%	1%
Constant power mode	Measurement range	0~6W	0~30w	0~300w
	Resolution	3mW	30mW	300mW
	Precision	1%		

Dynamic mode - constant current mode

	Minimum working voltage	1.5V		
	Frequency	100Hz~50kHz/0.01Hz~1kHz		
	Duty Cycle	1~99% (minimum rise time controlled)		
	Precision	1us/1ms+100ppm		
	Slope	0.12A/ms~0.06A/μs	1.2A/ms~0.6A/μs	12A/ms~6A/μs
	Resolution	0.01mA/μs	0.1mA/μs	1mA/μs
	Precision	10%±20μs		
	Minimum rise time	10μs		

Measurement

Voltage readback	Measurement range	0~6V	0~16V	0~80V
	Resolution	0.2mV	0.3mV	1.4mV
	Precision	0.025%+0.01%FS		0.01%+0.025%FS
Current Readback	Measurement range	0~0.6A	0~6A	0~60A
	Resolution	0.012mA	0.12mA	1.2mA
	Precision	0.2%+0.2%FS		
Power Readback	Measurement range	30W	60W	300W
	Precision	0.2%+0.2%FS		

Scope of protection

Overpower protection	yes			
Overcurrent protection	yes			
Overvoltage protection	yes			
Over temperature protection	yes			
Operating temperature	0-40°C			
Size(mm)	142*85*550			
Weight	4.2kg			

Specification

Rating (0-40℃)	Module	TH8304-80-80		
	Input power	400W ×1		
	Input Voltage	0~80V		
	Input Current	0~80A		
	Minimum operating power Pressure	0.4V@0.8A	0.4V@8A	0.4V@80A

General mode

Constant voltage mode	Measurement range	6V	16V	80V
	Resolution	0. 1mV	1mV	1mV
	Precision	0.05%+0.1%FS		
Constant current mode	Measurement range	0~0.8A	0~8A	0~80A
	Resolution	0.01mA	0.1mA	1mA
	Precision	0.2%+0.2%FS		
Constant resistance mode	Measurement range	0.01~20Ω (400W/6V)	0.3~720Ω (400W/16V)	1.5~2.9kΩ (400W/80V)
	Resolution	0. 01Ω	0. 1Ω	0. 1Ω
	Precision	1%	1%	1%
Constant power mode	Measurement range	0~8W	0~40w	0~400w
	Resolution	4mW	40mW	400mW
	Precision	1%		

Dynamic mode - constant current mode

	Minimum working voltage	1.5V		
	Frequency	100Hz~50kHz/0.01Hz~1kHz		
	Duty Cycle	1~99% (minimum rise time controlled)		
	Precision	1us/1ms+100ppm		
	Slope	0.16A/ms~0.08A/μs	1.6A/ms~0. 8A/μs	16A/ms~8A/μs
	Resolution	0.01mA/μs	0.1mA/μs	1mA/μs
	Precision	10%±20μs		
	Minimum rise time	10μs		

Measurement

Voltage readback	Measurement range	0~6V	0~16V	0~80V
	Resolution	0. 2mV	0.3mV	1.4mV
	Precision	0.025%+0.01%FS		0.01%+0.025%FS
Current Readback	Measurement range	0~0.8A	0~8A	0~80A
	Resolution	0.016mA	0.16mA	1.6mA
	Precision	0.2%+0.2%FS		
Power Readback	Measurement range	60W	60W	400W
	Precision	0. 2%+0.2%FS		

Scope of protection

Overpower	yes			

protection				
Overcurrent protection	yes			
Overvoltage protection	yes			
Over temperature protection	yes			
Operating temperature	0-40°C			
Size(mm)	142*85*550			
Weight	4.2kg			

Specification				
Rating (0-40℃)	Module	TH8305-80-80		
	Input power	500W ×1		
	Input Voltage	0~80V		
	Input Current	0~80A		
	Minimum operating power Pressure	0.4V@0.8A	0.4V@8A	0.4V@80A
General mode				
Constant voltage mode	Measurement range	6V	16V	80V
	Resolution	0. 1mV	1mV	1mV
	Precision	0.05%+0.1%FS		
Constant current mode	Measurement range	0~0.8A	0~8A	0~80A
	Resolution	0.01mA	0.1mA	1mA
	Precision	0.2%+0.2%FS		
Constant resistance mode	Measurement range	0.01~20Ω (400W/6V)	0.3~720Ω (400W/16V)	1.5~2.9kΩ (400W/80V)
	Resolution	0. 01Ω	0. 1Ω	0. 1Ω
	Precision	1%	1%	1%
Constant power mode	Measurement range	0~8W	0~50w	0~500w
	Resolution	5mW	50mW	500mW
	Precision	1%		
Dynamic mode - constant current mode				
	Minimum working voltage	1.5V		
	Frequency	100Hz~50kHz/0.01Hz~1kHz		
	Duty Cycle	1~99% (minimum rise time controlled)		
	Precision	1us/1ms+100ppm		
	Slope	0.16A/ms~0.08A/μs	1.6A/ms~0. 8A/μs	16A/ms~8A/μs
	Resolution	0.01mA/μs	0.1mA/μs	1mA/μs
	Precision	10%±20μs		
	Minimum rise time	10μs		
Measurement				

Voltage readback	Measurement range	0~6V	0~16V	0~80V
	Resolution	0. 2mV	0.3mV	1.4mV
	Precision	0.025%+0.01%FS		0.01%+0.025%FS
Current Readback	Measurement range	0~0.8A	0~8A	0~80A
	Resolution	0.016mA	0.16mA	1.6mA
	Precision	0.2%+0.2%FS		
Power Readback	Measurement range	60W	60W	500W
	Precision	0. 2%+0.2%FS		
Scope of protection				
Overpower protection	yes			
Overcurrent protection	yes			
Overvoltage protection	yes			
Over temperature protection	yes			
Operating temperature	0-40°C			
Size(mm)	142*85*550			
Weight	4.2kg			

Specification				
Rating (0-40℃)	Module	TH8302-600-10		
	Input power	200W		
	Input Voltage	0~600V		
	Input Current	10A		
	Minimum operating voltage	2V@0.1A	2V@1A	2V@10A
General mode				
Constant voltage mode	Measurement range	80V	150V	600V
	Resolution	1mV	10mV	10mV
	Precision	0.05%+0.1%FS		
Constant current mode	Measurement range	0~0.1A	0~1A	0~10A
	Resolution	0.005mA	0.05mA	0.5mA
	Precision	0.2%+0.2%FS		
Constant resistance mode	Measurement range	0.2~400Ω (200W/80V)	3~6kΩ (200W/150V)	300~300kΩ (200W/600V)
	Resolution	0. 1Ω	1Ω	1Ω
	Precision	1%	1%	1%
Constant power mode	Measurement range	0~2W	0~20w	0~200w
	Resolution	2mW	20mW	200mW
	Precision	1%		
Dynamic mode - constant current mode				

	Minimum working voltage	3V		
	Frequency	100Hz~50kHz/0.01Hz~1kHz		
	Duty Cycle	1~99% (minimum rise time controlled)		
	Precision	1us/1ms+100ppm		
	Slope	0.02A/ms~0.01A/µs	0. 2A/ms~0. 1A/µs	2A/ms~1A/µs
	Resolution	0.005mA/µs	0.05mA/µs	0.5mA/µs
	Precision	10%±20µs		
	Minimum rise time	10µs		
Measurement				
Voltage readback	Measurement range	0~80V	0~150V	0~600V
	Resolution	1.5mV	2.7mV	10.7mV
	Precision	0.025%+0.01%FS		0.01%+0.025%FS
Current Readback	Measurement range	0~0.1A	0~1A	0~10A
	Resolution	0.002mA	0.02mA	0.2mA
	Precision	0.2%+0.2%FS		
Power Readback	Measurement range	0~30W	0~60W	0~200W
	Precision	0. 2%+0.2%FS		
Scope of protection				
Overpower protection	yes			
Overcurrent protection	yes			
Overvoltage protection	yes			
Over temperature protection	yes			
Operating temperature	0-40°C			
Size(mm)	142*85*550			
Weight	4.2kg			

Specification				
Rating (0-40℃)	Module	TH8303-600-15		
	Input power	300W		
	Input Voltage	0~600V		
	Input Current	15A		
	Minimum operating voltage	2V@0.15A	2V@1.5A	2V@15A
General mode				
Constant voltage mode	Measurement range	80V	150V	600V
	Resolution	1mV	10mV	10mV
	Precision	0.05%+0.1%FS		
Constant current mode	Measurement range	0~0.15A	0~1.5A	0~15A
	Resolution	0.005mA	0.05mA	0.5mA

	Precision	0.2%+0.2%FS		
Constant resistance mode	Measurement range	0.13~270Ω (300W/80V)	1.9~4kΩ (300W/150V)	208~200kΩ (300W/600V)
	Resolution	0.01Ω	0.1Ω	1Ω
	Precision	1%	1%	1%
Constant power mode	Measurement range	0~6W	0~30w	0~300w
	Resolution	3mW	30mW	300mW
	Precision	1%		

Dynamic mode - constant current mode				
	Minimum working voltage	3V		
	Frequency	100Hz~50kHz/0.01Hz~1kHz		
	Duty Cycle	1~99% (minimum rise time controlled)		
	Precision	1us/1ms+100ppm		
	Slope	0.03A/ms~0.015A/µs	0.3A/ms~0.15A/µs	3A/ms~1.5A/µs
	Resolution	0.005mA/µs	0.05mA/µs	0.5mA/µs
	Precision	10%±20µs		
	Minimum rise time	10µs		

Measurement				
Voltage readback	Measurement range	0~80V	0~150V	0~600V
	Resolution	1.5mV	2.7mV	10.7mV
	Precision	0.025%+0.01%FS		0.01%+0.025%FS
Current Readback	Measurement range	0~0.15A	0~1.5A	0~15A
	Resolution	0.003mA	0.03mA	0.3mA
	Precision	0.2%+0.2%FS		
Power Readback	Measurement range	0~90W	0~300W	0~300W
	Precision	0.2%+0.2%FS		

Scope of protection				
Overpower protection	yes			
Overcurrent protection	yes			
Overvoltage protection	yes			
Over temperature protection	yes			
Operating temperature	0-40°C			
Size(mm)	142*85*550			
Weight	4.2kg			

Specification		
Rating (0-40℃)	Module	TH8305-600-30
	Input power	500W
	Input Voltage	0~600V

	Input Current	30A		
	Minimum operating voltage	2V@0.3A	2V@3A	2V@30A
General mode				
Constant voltage mode	Measurement range	80V	150V	600V
	Resolution	1mV	10mV	10mV
	Precision	0.05%+0.1%FS		
Constant current mode	Measurement range	0~0.3A	0~3A	0~30A
	Resolution	0.005mA	0.05mA	0.5mA
	Precision	0.2%+0.2%FS		
Constant resistance mode	Measurement range	0.1~200Ω (500W/80V)	1.5~3kΩ (500W/150V)	150~150kΩ (500W/600V)
	Resolution	0.1Ω	0.1Ω	1Ω
	Precision	1%	1%	1%
Constant power mode	Measurement range	0~8W	0~50w	0~500w
	Resolution	5mW	50mW	500mW
	Precision	1%		
Dynamic mode - constant current mode				
	Minimum working voltage	3V		
	Frequency	100Hz~50kHz/0.01Hz~1kHz		
	Duty Cycle	1~99% (minimum rise time controlled)		
	Precision	1us/1ms+100ppm		
	Slope	0.06A/ms~0.03A/μs	0.6A/ms~0.3A/μs	6A/ms~3A/μs
	Resolution	0.005mA/μs	0.05mA/μs	0.5mA/μs
	Precision	10%±20μs		
	Minimum rise time	10μs		
Measurement				
Voltage readback	Measurement range	0~80V	0~150V	0~600V
	Resolution	1.5mV	2.7mV	10.7mV
	Precision	0.025%+0.01%FS		0.01%+0.025%FS
Current Readback	Measurement range	0~0.15A	0~1.5A	0~15A
	Resolution	0.003mA	0.03mA	0.3mA
	Precision	0.2%+0.2%FS		
Power Readback	Measurement range	0~180W	0~500W	0~500W
	Precision	0.2%+0.2%FS		
Scope of protection				
Overpower protection	There are			
Overcurrent protection	There are			
Overvoltage protection	There are			
Over temperature protection	There are			

Operating temperature	0-40°C
Size(mm)	142*85*550
Weight	4.2kg

Frame size (mm):
480*177*590
Machine weight:
15kg

8.2 Additional Features

- Status memory capacity: 40 groups

- Recommended calibration frequency for operational status: 1 time/year

- Heat dissipation method: fan

Chapter 9 Warranty

Warranty period: The warranty period is two years for those who use the instrument purchased from the Company since the date of shipment from the Company, and for those who purchase from the business sector since the date of shipment from the business sector. The warranty should be issued to the instrument warranty card. During the warranty period, if the instrument is damaged due to improper operation by the user, the repair cost shall be borne by the user. The instrument is responsible for the lifetime maintenance by the company.

The repair of this instrument requires professional and technical personnel for maintenance; please do not replace the internal components of the instrument without permission during the repair; after the repair of the instrument, it needs to be remeasured and calibrated to avoid affecting the test accuracy. Due to the user's blind repair, replacement of instrument parts caused by damage to the instrument is not covered by the warranty, the user should bear the maintenance costs.

The instrument should be protected from sunlight and moisture and should be used properly in the environment described in 1.2.2.

If the instrument is not used for a long time, it should be packed and sealed in the factory box.