Operation Manual

TH6434

DC Power Supply/Load

V1.0@2023.04

Catalog

Chapter 1 Overview

This chapter describes some of the checks you must make when you receive the instrument and what you must know and have before you can install and use the instrument.

1.1 Unpacking and Inspection

Thank you for purchasing and using our products, after opening the box, you should first check whether the instrument is damaged because of transportation, we do not recommend you to power up the instrument in the case of damaged appearance.

Then confirm according to the packing list, if there is any discrepancy you can contact our company or distributor as soon as possible to maintain your rights and interests.

1.2 Performance Characteristics

TH6434 DC Power Supply/Load: The programmable DC power supply has extremely fast voltage rise speed and super high accuracy and resolution, supporting panel programming; DC electronic load has high accuracy and multiple testing functions with superior performance. This series of instruments adopts LCD screen display, clear display, operation menuization, fast and convenient, also equipped with a variety of communication interfaces, both desktop and system type characteristics, can be well adapted to the production site rapid operation needs and the laboratory high accuracy and high stability needs.

- 480X272 dot matrix graphic LCD display
- User-friendly interface, easy to operate
- DC power output: CH1, CH2, CH3, CH4
- DC power supply pull-load: CH1, CH2 can realize the load pull-load function
- Series-parallel connection: CH1+CH2 can realize series-parallel outputs
- Communication: RS232, GPIB, USB-CDC, USB-TMC, LAN
- I/O: 5 groups of Control I/O ports on the rear panel can realize various function control.
- Programmable Sequence: CH1 and CH2 are capable of 100 programmable sequence outputs and pull-downs.
- Delay control: can realize delay and timing control of multiple outputs or pull loads
- Recording: U disk to realize real-time sampling data recording and uploading

1.3 Power Connection

Supply voltage: 220V(1±10%)

Power supply frequency: 50Hz/60Hz (1±5%)

This instrument has been designed to reduce a certain amount of spurious interference due to inputs from the AC power supply side, but it should still be used in as low a noise environment as possible, and if this cannot be avoided, install a power supply filter.

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WARNING: To prevent electrical leakage, the user must ensure that the ground wire of the power supply is reliable and connected to earth.

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1.4 Fuse

The instrument is equipped with fuses from the factory, and the user should use the fuses provided by our company.

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WARNING: Before powering up the unit, note that your fuse location matches the supply voltage range.

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1.5 Environment Requirements

Please do not use it under dusty, vibration, direct sunlight or corrosive gas.

Normal working conditions of the instrument: temperature of 0℃ ~ 40℃, relative humidity ≤ 75% of the environment to ensure the accuracy of the measurement.

To ensure that the instrument is well ventilated for heat dissipation, do not block the left and right ventilation holes so that measurement accuracy can be maintained.

If the instrument is not used for a long time, please put it in the original packing box or similar box, storage conditions: temperature of 5℃ ~ 40℃, relative humidity is not greater than 85% RH ventilated room, the air should not contain corrosion of the measuring instrument of the harmful impurities, and should avoid direct sunlight.

The test leads connected to the DUT should be kept away from strong electromagnetic fields to avoid interference with the measurement.

1.6 Test Fixture

Please use the test fixtures or test cables equipped by our company, user-made or other companies' test fixtures or test cables may lead to incorrect measurement

results. Instrument test fixtures or test cables and the pins of the device under test should be kept clean to ensure that the device under test has good contact with the fixture.

Connect the test fixture or test cable to the four test terminals on the front panel of the instrument. For DUTs with shielded enclosures, the shielding can be connected to the instrument ground "⊥".

Note: When no test fixture or test cable is installed, the instrument will display an unstable measurement.

1.7 Preheating

To ensure Accuracy measurement of the instrument, the power-on warm-up time should be not less than 30 minutes.

Do not switch the instrument on and off frequently as this may cause internal data confusion.

1.8 Safety Requirement

The measuring instrument is a Class I safety instrument.

1.8.1 Insulation Resistance

Under the reference working conditions, the insulation resistance between the power supply terminals and the shell shall be not less than 50MΩ.

The insulation resistance between the voltage terminals and the enclosure shall be not less than 2MΩ under hot and humid conditions of transportation.

1.8.2 Dielectric Strength

Under the reference working conditions, the power supply terminals and the shell should be able to withstand the frequency of 50Hz, rated voltage of 1.5kV AC voltage, timing 1 minute. There should be no breakdown and flying arc phenomenon.

1.8.3 Leakage Current

Leakage current should be no more than 3.5mA (AC RMS).

1.9 Electromagnetic Compatibility Requirements

Complies with Directive 2004/108/EC on electromagnetic compatibility.

EN 61326-1:2021 Electromagnetic compatibility requirements for electrical equipment for measurement, control and laboratory use

- CISRP 11:2015+A1:2016+A2:2019 Levels of emitted and conducted radiation, group 1, category A

- EN 61000-4-2:2009 Electrostatic discharge immunity
- EN 61000-4-3:2020 Radiated immunity to RF electromagnetic fields
- EN 61000-4-4:2012 Electrical fast transient impulse group immunity
- EN 61000-4-5:2014+A1:2017 Power line surge impulse immunity
- EN 61000-4-6:2014 Conducted radio frequency immunity
- EN 61000-4-11:2020 Voltage dips and interruptions immunity

EN 61000-3-2:2019+A1:2021 Harmonic radiation from AC power lines

EN 61000-3-3:2013+A1:2019+A2:2021 Voltage changes, fluctuations and flicker

1.10 Other Features

Power consumption: Power consumption ≤130VA.

Overall dimensions (W*H*D): 215mm*125mm*290mm

Weight : About 8kg;

Chapter 2 Panel Description

This chapter describes the distribution and functions of the keys and interfaces on the front and rear panels of the TH6434 series instruments.

2.1 Front Panel Description

Figure 2-1 provides a brief description of the TH6434 series front panel.

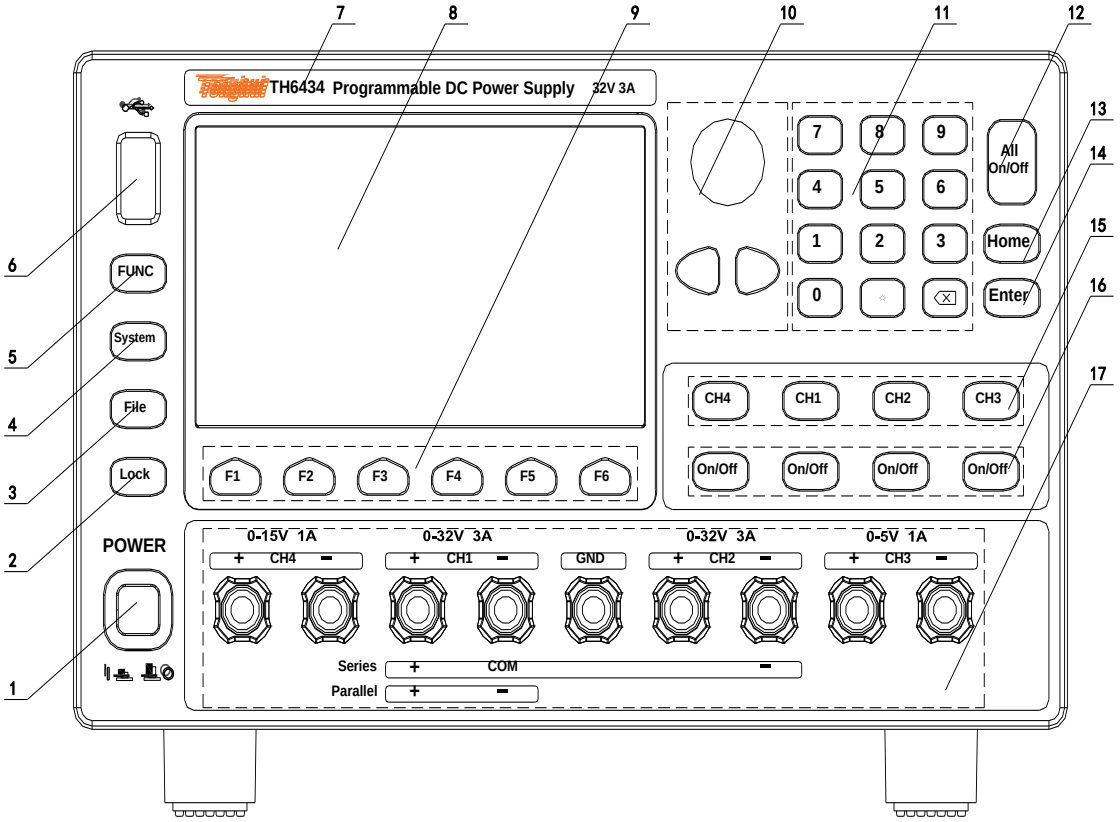

Figure 2-1

1. **Power switch (POWER)**

   Turn the main power line switch on or off.

2. **LOCK key**

   Used to lock the keys to prevent misuse;

   When the instrument is communicating with an external source, the instrument likewise enters a key-locked state.

3. **File key**

   Used to access the document management interface.

4. **System menu key**

   Used to access the system setup page.

5. **FUNC menu key**

Used with the operation of some higher-order functions, such as sequences, time delays, recording, and so on.

6. USB HOST interface

The interface is used to connect to the USB flash disk memory for file storage and recall, picture interception and data upload.

7. Trademarks & Models

Instrument trademark and model number.

8. LCD liquid crystal display

480X272 dot matrix graphic LCD to display measurement results, measurement conditions, etc.

9. Function keys F1~F6

Function keys F1~F6 will show different functions under different operations.

10. Knob and Arrow keys

Used for cursor movement and parameter setting.

11. Numeric keypad

Used to enter specific values.

12. ALL ON/OFF key

For simultaneous startup or shutdown of all channels

13. Home button

Go back to the main boot page.

14. Enter key

Confirmation key for terminating data entry.

15. Channel selector key

The 4 channels have independent keys to switch the setting environment between CH1-CH4.

16. Independent On/Off key

Starts or shuts down the corresponding channel.

17. Ports

Four independent output terminals CH1-CH4, GND ground terminal.

2.2 Rear Panel Description

Figure 2-2 provides a brief description of the TH6434 rear panel.

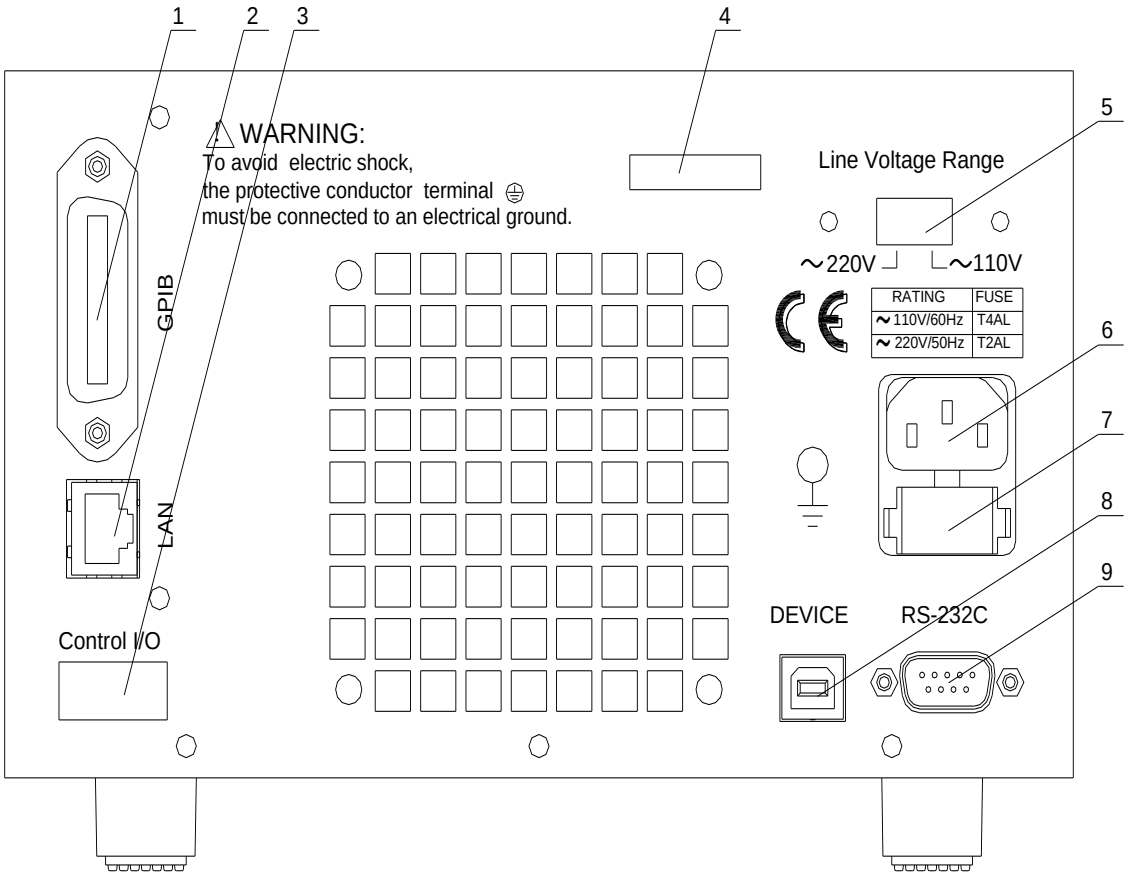

Figure 2-6

1、 GPIB interface

It is used to realize parallel communication with computers and form GPIB test systems.

2、 LAN interface

Network interface to realize the control and communication of the network system.

3、 Control I/O

A total of 5 ports that can be used as input/output control

4、 Nameplate

Indicates date of manufacture, instrument number, and manufacturer.

5、 AC input diverter switch

The direction of replacing the inner core switches the AC input 110V60Hz and 220V50Hz.

6、 Electric socket

For input of AC power.

7、 Fuse holder

Used to install a power fuse to protect the instrument.

8、 USB Device interface

USB communication interface to realize on-line communication with computer.

9、 RS232C serial interface

Serial communication interface for on-line communication with PC.

Chapter 3 Instructions for Use

This chapter describes in detail the functions and use of the instrument.

3.1 Output Display

The <Output Display> page is the main display page, which displays the test values of several groups of channels at the same time, and also allows you to set basic parameters.

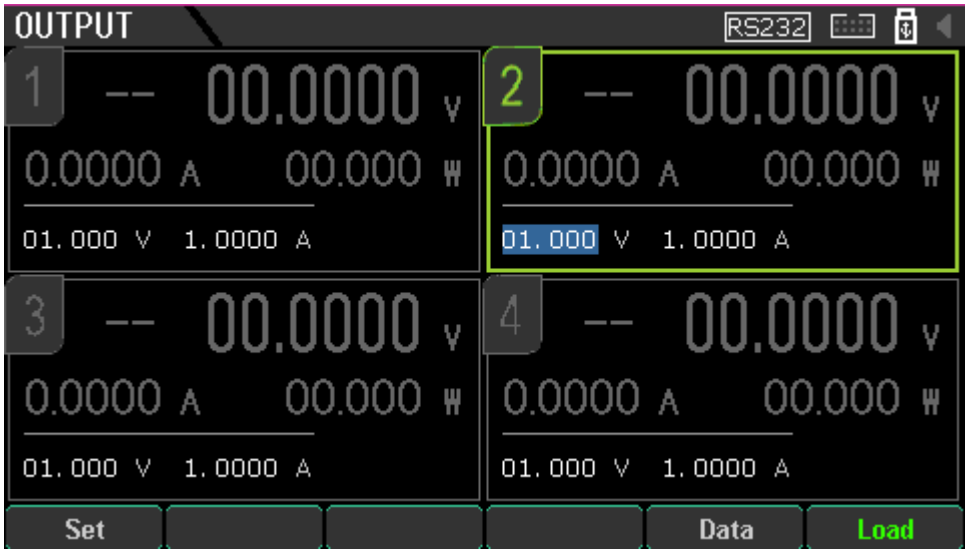

Figure 3-1

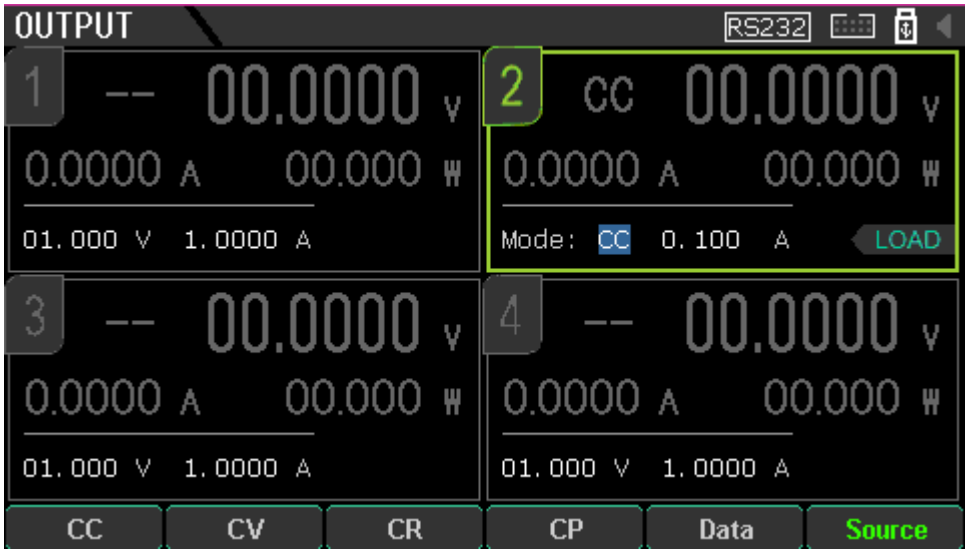

Figure 3-2

1、 Parameter Setting

Select the corresponding channel with the **channel selector keys**, and then use **the arrow keys** to move the cursor to select the setting item.

- Numeric input: Numeric keypad for direct numeric input
- Knob adjustment: Press the **function key F1** [Setting] or press **the**

knob to enter the fine adjustment state, and adjust the value of the corresponding bit through the **direction keys** and **knob**.

2、 Power load switching

CH1 and CH2 support the load function, select the corresponding channel and switch the power/load mode by **function key F6**.

3.2 Channel Settings

The **<Channel Setup>** page is the setup and display page for a particular channel, where the specific parameters for that channel can be set.

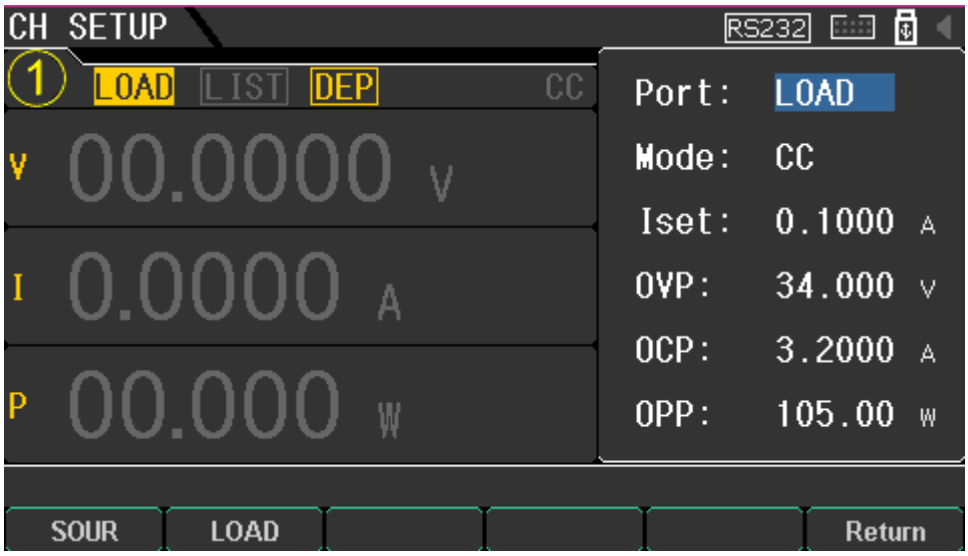

Figure 3-3

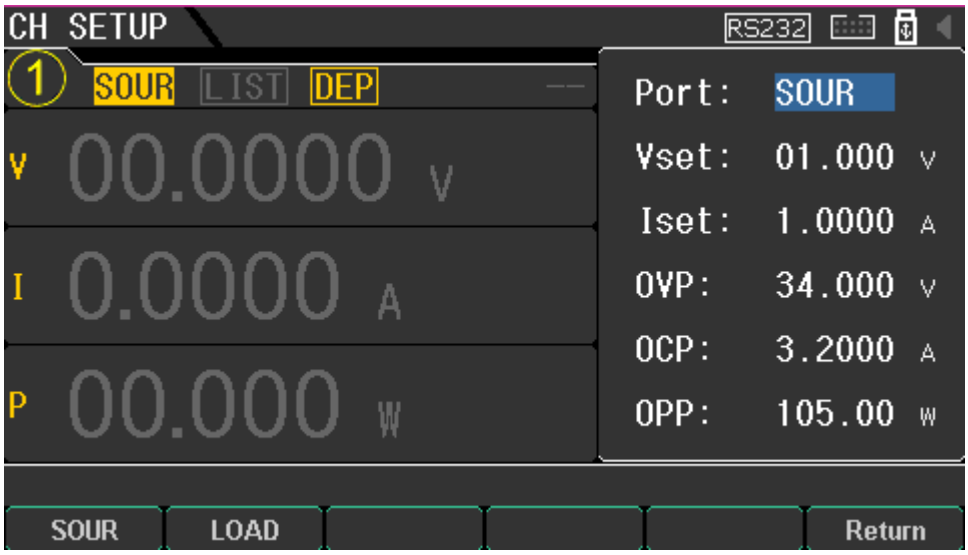

Figure 3-4

1、 Port: allows you to set the channel to power or load mode

- Source

2、Voltage:Set the output voltage value

3、Current:Set the output current value

- Load

2、Mode:Setting to pull load in CC, CV, CR or CP mode

3、Voltage/current/resistance/power:corresponding to the pull-load mode of the pull-in value

4、 OVP: Over-voltage protection value, if the sampling voltage exceeds the value will close the channel

5、 OCP: Overcurrent protection value, if the sampling current exceeds the value will be closed to the channel

6、OPP: Over power protection value, if the sampling power exceeds the value will close the channel.

3.3 List Function

This function satisfies the user's need for continuously changing parameters for output or pull load. Users can edit specific waveforms according to their needs.

Note: This function is only available for CH1/CH2.

As in Figure 3-6, press the front panel shortcut key **FUNC** and then LIST through the **function key F1** to access the page.

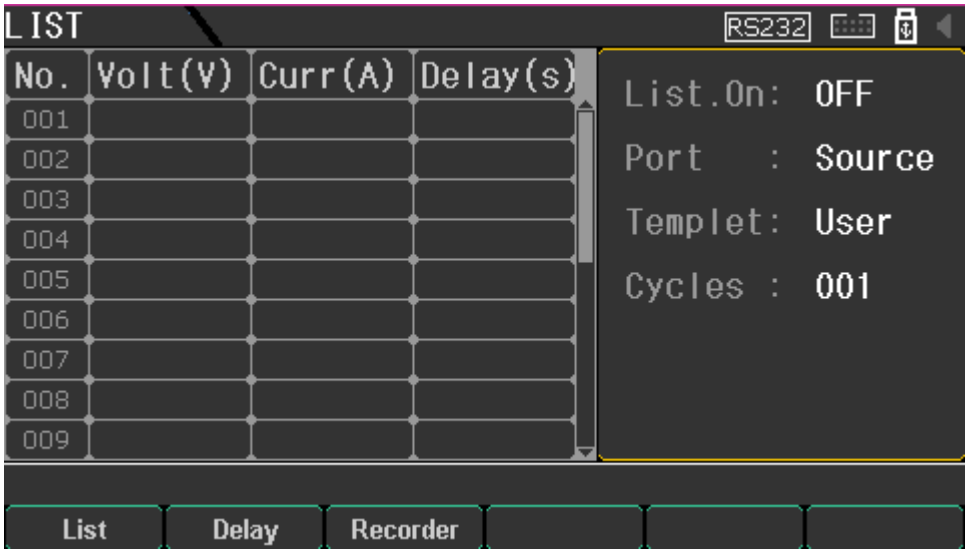

Figure 3-6

1、 Function switches: For turning list functions on or off

2、 Port mode: Sourse/Load mode selection

- Source: Output in list
- Load: Pull load in list

3、 Template:Waveforms for quick setup lists

- User: Freely set every parameter in the list
- Waveforms: Quickly set the list parameters by specific waveforms.

4、 Cycles:number of loops in the list

- Infinite: Loop through the list of parameters without stopping
- User: Close the channel after executing the list a specific number of times

3.3.1 List Templates

1、User

1) Select "User" in the Template Options to go to the list.

2) The total number of steps is set by increasing with **function key F1** or inserting with **function key F2**.

3) Move the cursor to the corresponding parameter voltage, current or delay to directly enter the parameter value.

4) After setting all parameters, press **the function key F6** to finish, generate a list and end the setup.

2、 Waveform templates

This feature has several built-in waveform scenarios for quick setups

(1) Sine Wave

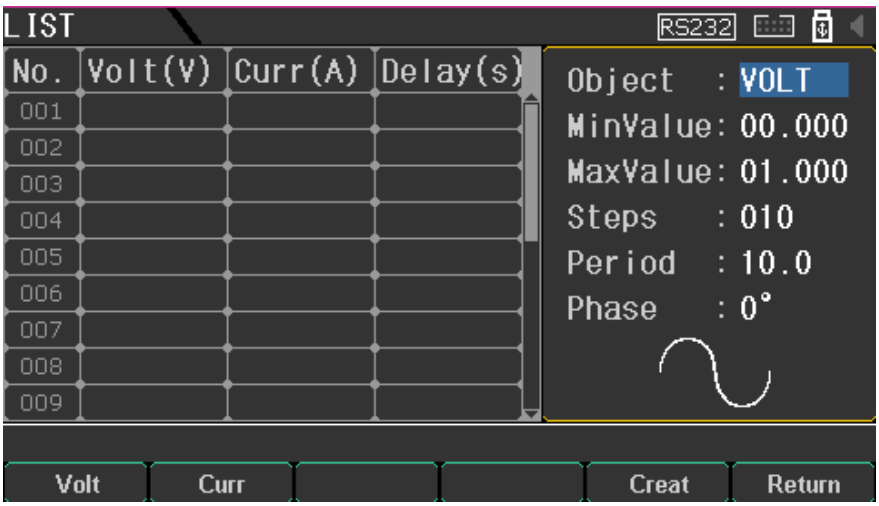

Figure 3-7

- Object: Current parameter to be set
- MinValue, maxValue: Peaks and valleys in a waveform cycle
- Steps:Total number of steps in a waveform cycle
- Period: Total time to execute a waveform (s)
- Phase: The start of the waveform

(2) Triangle wave

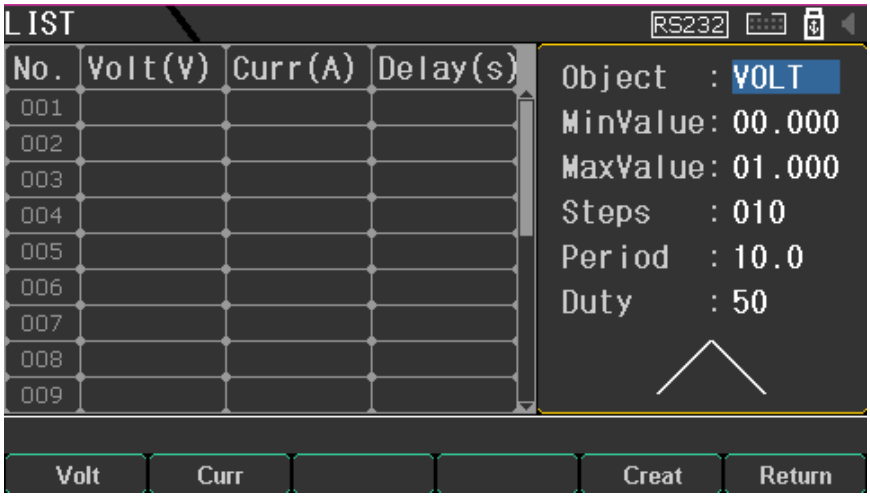

Figure 3-8

- Object: Current parameter to be set
- MinValue, maxValue: Peaks and valleys in a waveform cycle
- Steps:Total number of steps in a waveform cycle
- Period: Total time to execute a waveform (s)
- Duty cycle: The proportion of the rising edge in the waveform (%)

(3) Steps

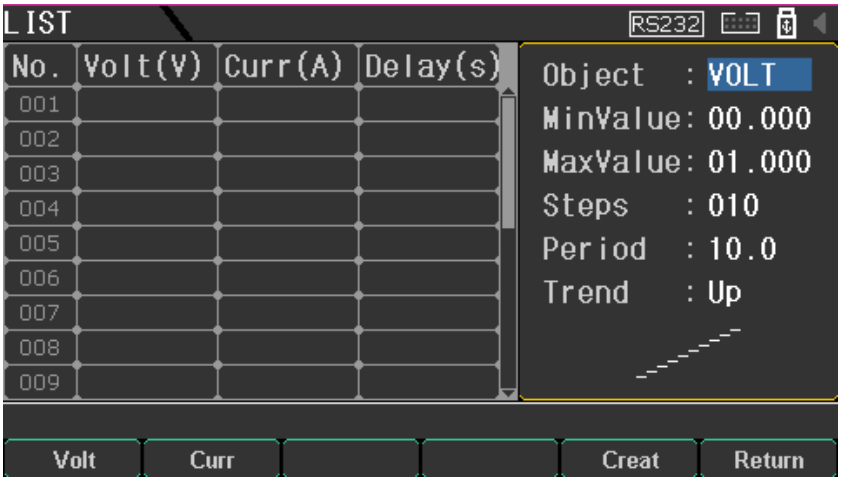

Figure 3-9

- Object: Current parameter to be set
- MinValue, maxValue: Peaks and valleys in a waveform cycle
- Steps:Total number of steps in a waveform cycle
- Period: Total time to execute a waveform (s)
- Trend: The direction of change of the ladder, up or down.

(4) Exponents

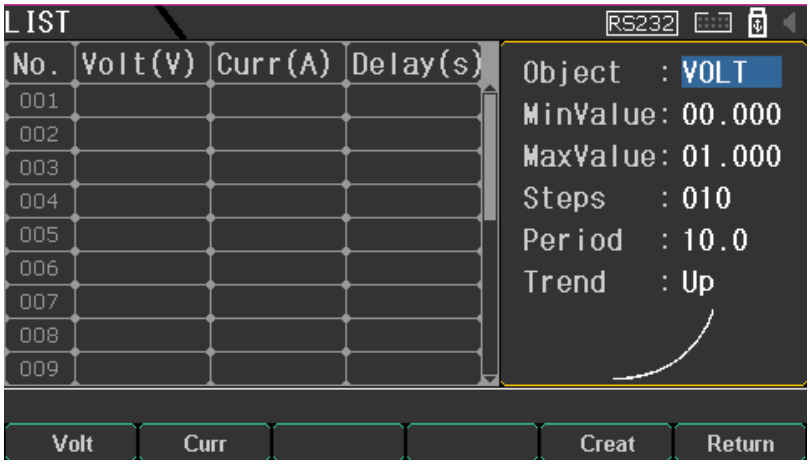

Figure 3-10

- Object: Current parameter to be set
- MinValue, maxValue: Peaks and valleys in a waveform cycle
- Steps:Total number of steps in a waveform cycle
- Period: Total time to execute a waveform (s)
- Trend: The direction of change of the index, up or down.

(5) Logarithms

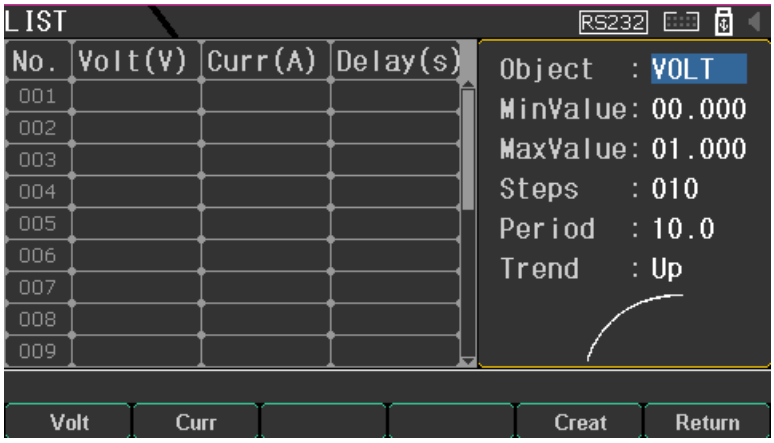

Figure 3-11

- Object: Current parameter to be set
- MinValue, maxValue: Peaks and valleys in a waveform cycle
- Steps:Total number of steps in a waveform cycle
- Period: Total time to execute a waveform (s)
- Trend: The direction of change of the logarithm, up or down

When the parameter setting of the waveform is completed, press **the function key F5** Create to automatically generate the list according to the current parameters.

3.3.2 List Storage and Recall

For a list that has already been set up, the user can store the list for the next time it is needed and call it up without having to reset it.

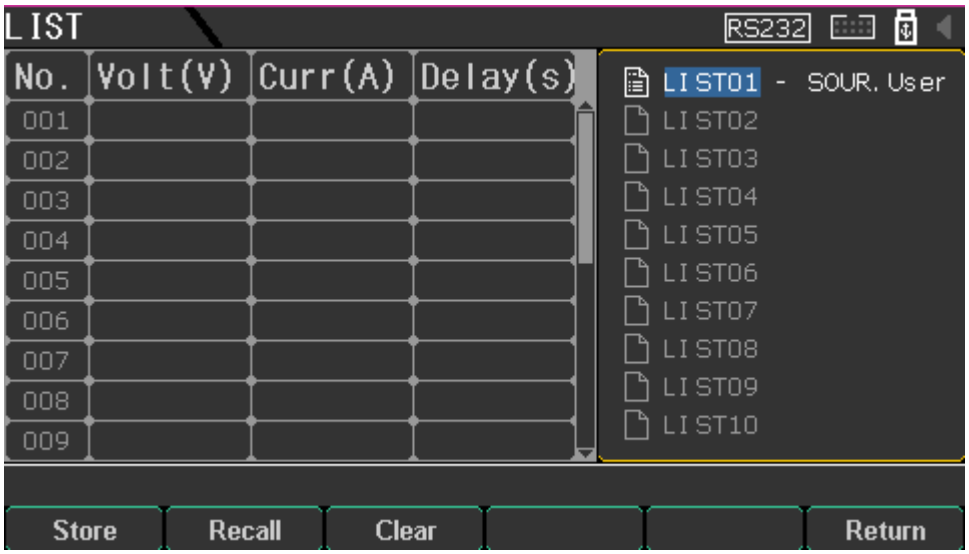

Figure 3-12

3.4 Delay Output Function

As shown in Figure 3-12, users can set a certain channel delay switch or work timing according to their needs.

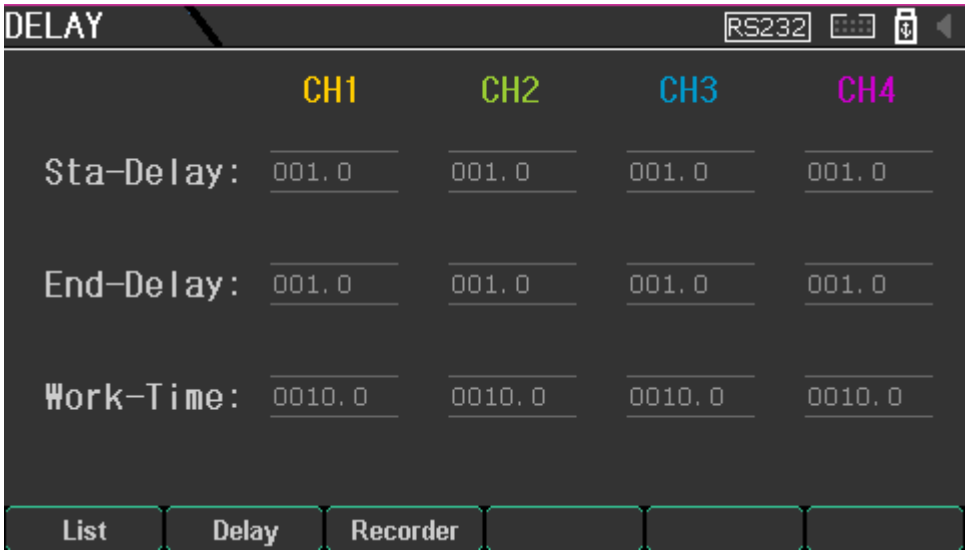

Figure 3-13

For different channel delay settings:

Sta-Delay: output the delay time before start, range 0~100s

End-Delay: delay before outputting off, range 0~100s

Work-Time: output working hours, range 0.1s~360,000s

3.5 Output Recording Function

In order to have a detailed view of the sampling values of each port, the TH6434 incorporates a function to record data in real time and upload the saved data in CSV format to U for further analysis.

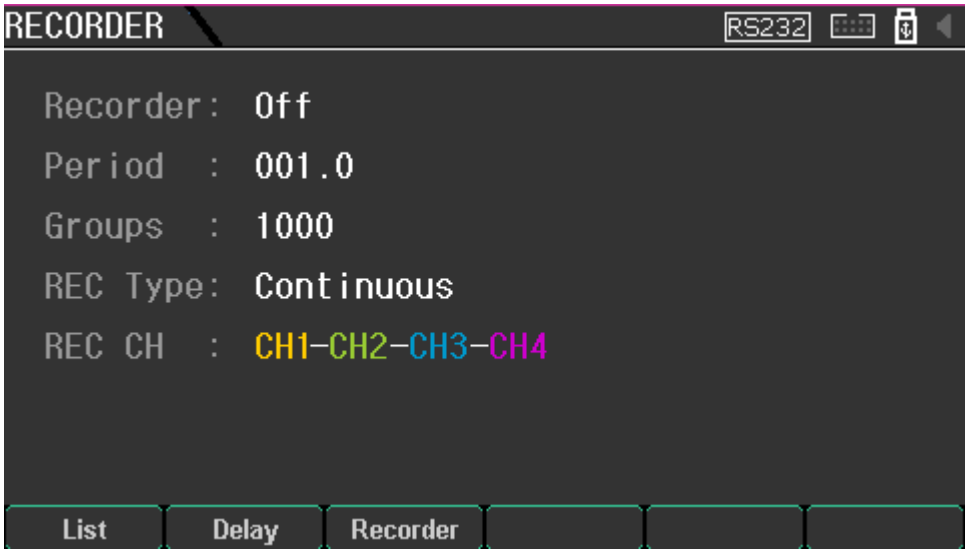

Figure 3-14

3.5.1 Parameter Description

Recorder: Used to turn the data logging function on or off.

REC CH: Selects the channel on which you want to record data.

Period: The frequency of recording data, i.e. how often a set of data is recorded.

Groups: The total number of groups of data recorded in a single recording.

REC Type: Single or continuous, i.e., after recording the "number of recording groups", stop recording or continue to perform the recording function.

3.5.2 Implementation Process

1、 Insert the USB flash drive into the front panel Host port.

2、 Set the above parameters and "turn on" the logging function.

3、 The instrument will record a set of voltage, current and power sampling values according to the set intervals.

4、 When the total number of recorded groups reaches the set "Number of Recorded Groups", the instrument will upload the data in CSV format to a USB flash drive.

5、 If the recording mode is "Single", the instrument will stop the recording function; if the recording mode is "Continuous", the instrument will start a new round of recording.

3.6 System Settings

Press the System button on the front panel to enter the System Setup page. The following is shown in Figure 3-15:

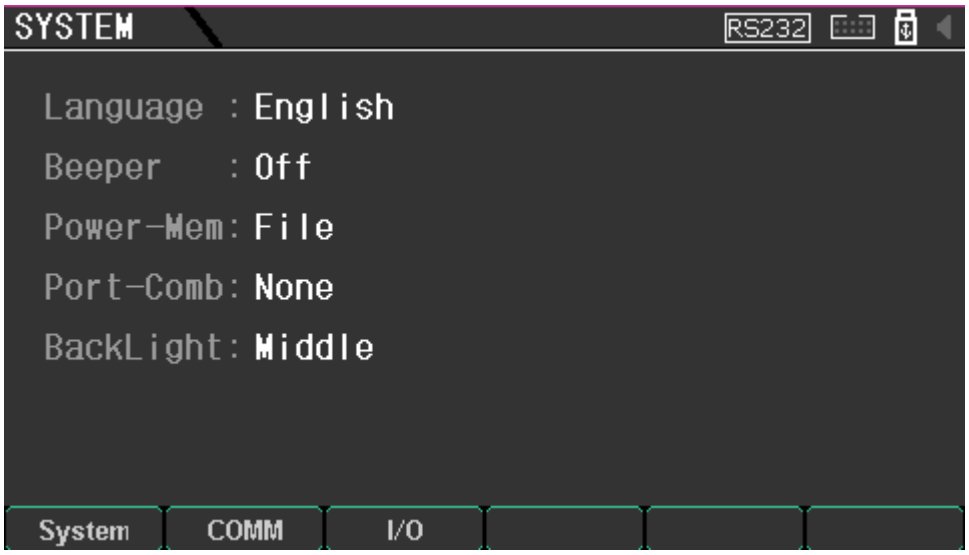

Figure 3-15

- Language: The language of the menu displayed by the instrument, Chinese or English.
- Beeper: Instrument buzzer status, on or off
- Power-Mem: Parameters loaded by the system after booting up
  - Factory parameters: System default parameters
  - File parameters: User-stored setup parameters or configurations, see <File Storage> page for details
- Port-Comb: Combined state of CH1 and CH2, independent, series and parallel connections
- BackLight: Adjustable LCD screen brightness
- Date: Set the instrument to display the date and time, year-month-day-hour-minute-second

3.7 Communication

The instrument supports multiple communication methods, i.e., RS232, USB-CDC, USB-TMC, GPIB, and LAN, which can be selected on the <Communication Settings> page.

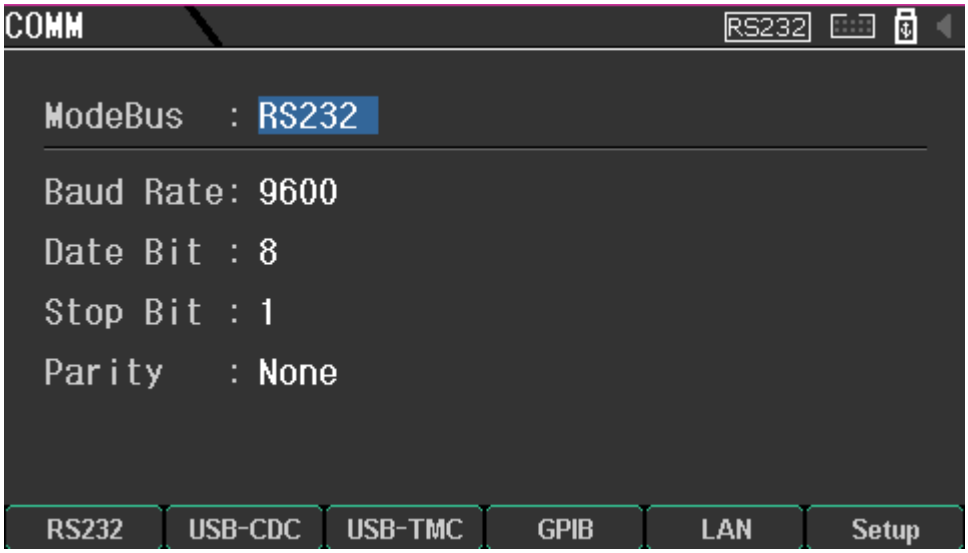

Figure 3-16

- RS232
- USB-CDC
- USB-TMC
- GPIB
- LAN

Select one of the communication methods to use, the specific parameters can be configured by **function key F6** configuration for more detailed parameter settings.

3.8 I/O Settings

The instrument port panel has 5 groups of independent **I/O** interfaces, which support external signal control of the instrument, and also can send signals to the outside according to the current status of the instrument.

3.8.1 Input Settings

Set one of the I/O ports as an input and set a specific function to control the instrument to perform the set function when an external signal is received from that I/O port.

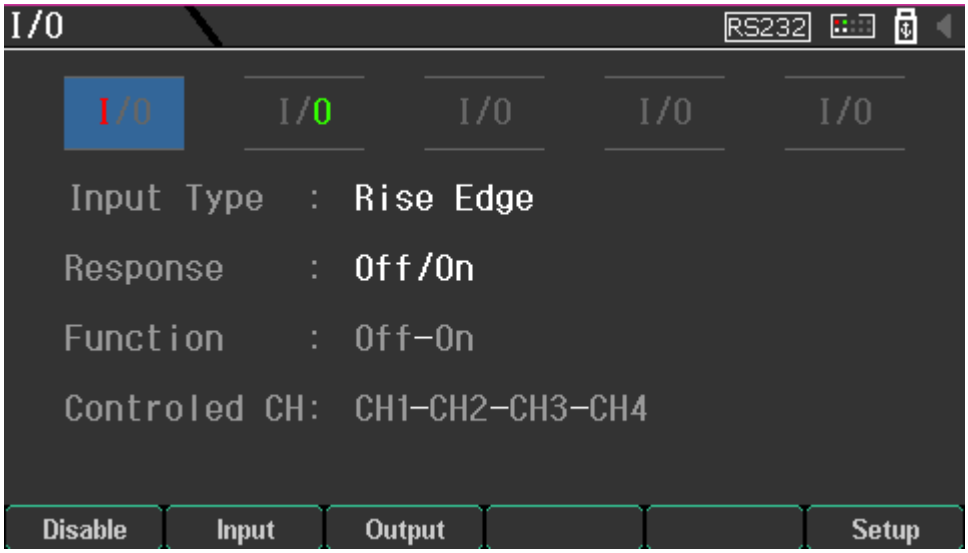

Figure 3-17

1、Input Type: Select the type of external signal to be responded to.

- Rising edge
- Falling edge
- High level
- Low level
- Level state

2、Response: The type of function to which the controlled channel responds.

- Off/On: Control channel port on or off
- Port: Control channel switching mode

3、Function: Select specific functions based on function type

- Off-On: Multi-selectable, when the instrument receives an external signal, the selected channel will be output or turned off
- Power - CC-CV-CR-CP: Multiple selections are available, the selected channel will switch to this mode or switch among several modes sequentially when the instrument receives an external signal.

4、Controled CH: Can be multi-selected, select the implementation of the above functions of the channel

3.8.2 Output Settings

Set one group of I/O ports as output and set the specific function, when the instrument is in operation and triggers a certain state, an electrical signal will be output to the outside through this I/O port.

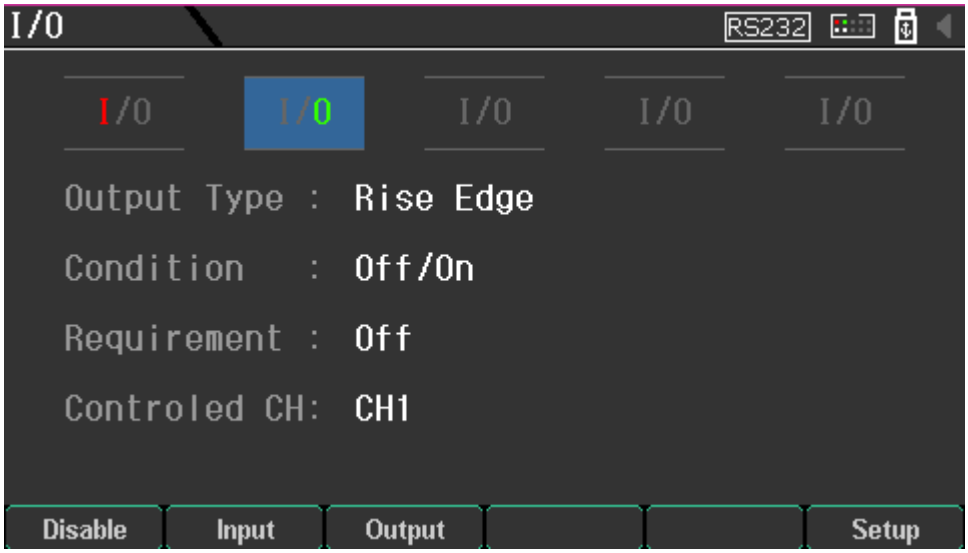

Figure 3-18

1、Output Type: Select the type of electrical signal to be output.

- Rising edge
- Falling edge

2、Condition: Trigger the I/O port to output the required instrument state type

- Off/On: Trigger I/O port output when the selected channel is On or Off
- Sampling voltage: Trigger the I/O port output when the selected channel voltage is at this value.
- Sampling current: Trigger I/O output when selected channel current is at this value
- Sampling power: Trigger I/O output when selected channel power is at this value

3、Requirement: Specific trigger requirements

- Off/On: According to this selection, the instrument will detect the On/Off status of the selected channel in real time and judge whether to output the relevant signal or not
- > <: Depending on this option, it is decided to output the relevant signal when greater or less than the triggered sample value

4、Controled CH: Select the channel to be used for detection

3.9 Memory

Press the front panel **File** key to enter the **<Memory>** page. This function is used for storing, recalling and loading the instrument setup parameters or configurations. Users can store the currently set parameters or configurations during

the use of the instrument and load them directly when the instrument is turned on next time to avoid repeating the settings; or upload the saved files to a USB flash disk and then download them to the instrument from the USB flash disk when needed.

3.9.1 Memory

1、Select "Internal Documents"

2、Rotate **the knob** to move the cursor to any file number

3、Press **the function key F1** Store, the current instrument configuration and parameters are stored in the file

4、Press **the function key F2** to invoke and select "File" for "Power On Parameter" in the **<System Settings>** page, then the file parameter can be loaded at power on.

Figure 3-19

3.9.2 Import in USB Flash Drive

1、Insert the USB flash drive into the **Host** port on the front panel.

2、Rotate **the knob** to center the cursor on a file that already contains data.

3、Press **function key F6** to import to USB flash drive and the file data will be stored in STA format in the STA folder on the USB flash drive.

3.9.3 Import from USB flash drive

1、Select "External Files" and the instrument loads the list of STA files in the STA folder on the USB flash drive.

2、Rotate **the knob** to select the desired file

3、Press **the function key F1** [Recall], the instrument loads the data of the file and replaces the current parameters and configuration of the instrument

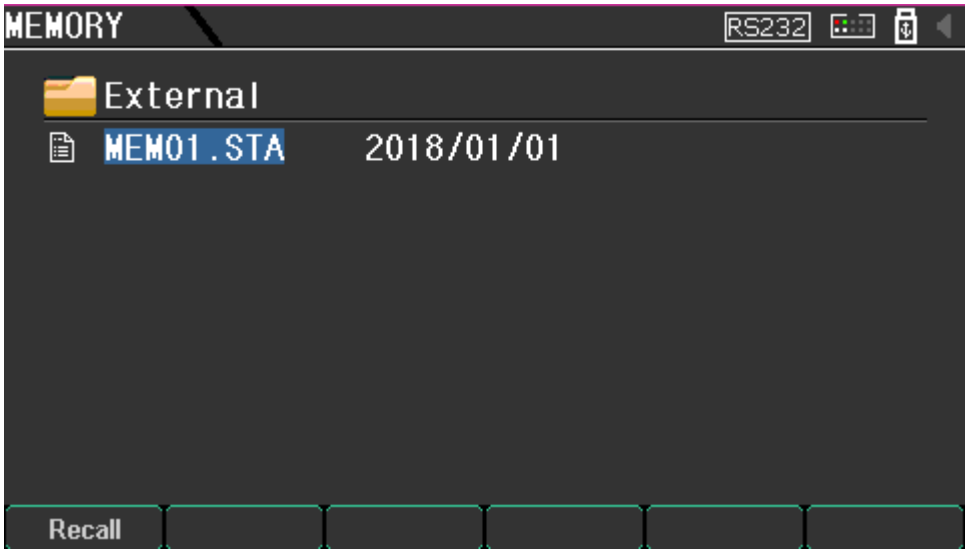

Figure 3-20

Chapter 4 Interface and Communication

The instrument can use RS232C, GPIB, USB and LAN interfaces for data communication, but all four cannot be used at the same time; they have the same programmed commands but use different hardware configurations and communication protocols.

4.1 RCI Remote Control Interface

4.1.1 RS232 Interface Description

The RS232 interface provided by the instrument can be used to communicate with the computer, providing a wealth of program control commands, through the RS232 interface, the computer can implement the instrument panel almost all the functions of the operation.

4.1.1.1 RS232 Interface Introduction

The widely used serial communication standard is the RS-232 standard, which can also be called the asynchronous serial communication standard, and is used to enable data communication between computers and computers, and between computers and peripherals. The configuration of most serial ports is usually not strictly based on the RS-232 standard: a 25-pole connector is used at each port (IMB AT uses a 9-pole connector). The most commonly used RS-232 signals are shown in Table 4-1:

Code	Notation	25 pole connector pin number	9 pole connector pin number
Request To Sent	RTS	4	7
Clear To Send	CTS	5	8
Data Set Ready	DSR	6	6
Data Carrier Detection	DCD	8	1
Data Terminal Ready	DTR	20	4
Transmitted Data	TXD	2	3
Received Data	RXD	3	2
Ground	GND	7	5

Table 4-1

As with most serial ports in the world, the instrument's serial interface is not strictly based on the RS-232 standard, but only a minimal subset is provided. Table 4-2 below:

Code	Notation	Connector pin number
Transmitted Data	TXD	3
Received Data	RXD	2
Ground	GND	5

Table 4-2

This is the easiest and cheapest way to communicate using the serial port.

Note: The serial port pin definitions of this instrument are essentially the same as those of the connector for a standard 9-cell RS232C.

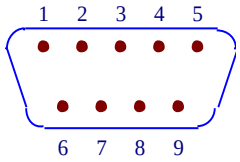

Figure 4-1

The RS232C connector on this instrument uses a 9-pin pin DB type socket with the pinout sequence shown in Figure 6-1 below:

It can be directly connected to it using a standard DB type 9-pole hole plug.

⚠**WARNING:** To avoid electrical shock, turn off power when plugging or unplugging connectors;

⚠**WARNING:** Do not arbitrarily short the output terminals, or short to the chassis to avoid damage to the device.

The instrument is connected to the computer as shown in Figure 4-2:

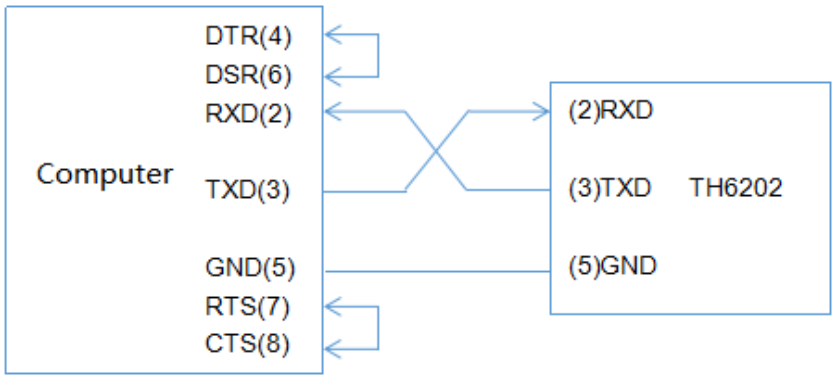

Figure 4-2

As can be seen from the above figure, the pin definition of this instrument is the same as that of the 9-pole connector serial interface pin definition used by IMB AT-compatible machines. Users can use two-core shielded cable as shown in the diagram to make their own three-wire connection cable (the length should be less than 1.5m) or from the same benefit of the Electronic Co., Ltd. purchased to the serial interface between the computer and the instrument cable or directly buy a standard DB9 core cable (crossover cable).

When making your own connecting cable, note that you should short pins 4 and

6 and pins 7 and 8 on the computer connector.

4.1.2 GPIB Interface Description

4.1.2.1 GPIB Bus

IEEE488 (GPIB) General Parallel Bus Interface is an international standard for intelligent instrument bus interfaces, IEEE is the acronym of the Institute of Electrical and Electronics Engineers, and 488 is the standard number. Through the interface can be connected to the computer or other intelligent equipment to communicate with other test instruments can be easily composed of automatic test systems. Multiple test instruments can be connected to the same bus at the same time. In this instrument, the instrument adopts IEEE488.2 standard, and the interface board is optional by the user. The control command system is open, the user can use the computer operation interface provided by the product, or can be programmed according to the control command system to achieve the purpose. The control command system supports most of the functions of the instrument, that is to say, almost all functions of the instrument can be operated on the control computer to realize the remote control of the instrument.

The following points should be noted when using the GPIB system of this instrument:

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.

Up to 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 4 back connectors be stacked on any one test instrument.

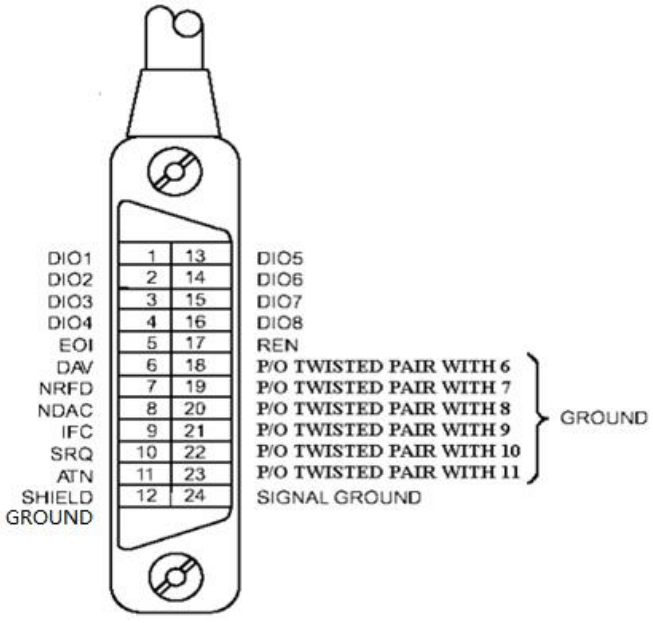

Figure 4-3

GPIB cable connection method 1:

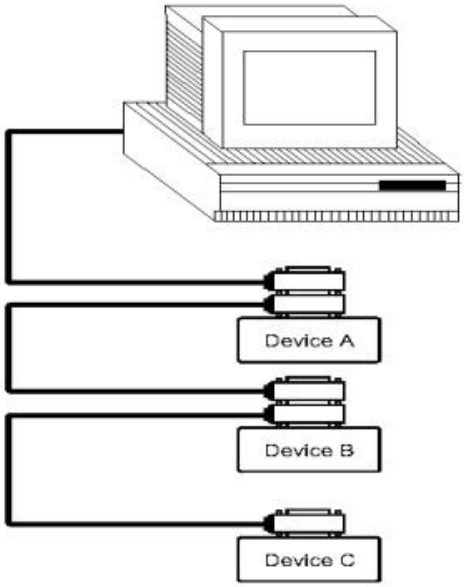

Figure 4-4

GPIB cable connection method 2:

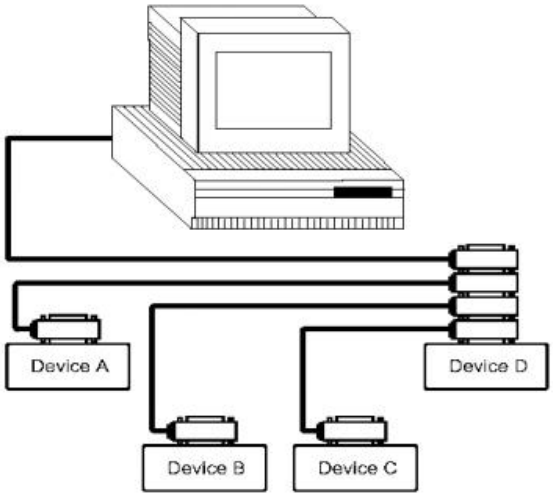

Figure 4-5

4.1.2.2 GPIB Interface Function

The instrument provides most of the general GPIB functions except for the controller, see Table 4-3 below:

Nicknames	Function
SH1	Support all data source contact functions
AH1	Support all fiducial contact functions
T5	Basic speak function; Speak function only; Speak cancel at MLA;

	Serial roll call not supported
L4	Basic listening function; MTA when listening canceled; 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 4-3

4.2 Communication Command

This instrument references the GPIB Common Instructions and the SCPI (Standard Commands for Programmable Instruments) instructions.The GPIB Common Instructions are defined by the IEEE488.2-1987 standard.These instructions are applicable to all instrument units, but this instrument does not support all of the Common Instructions.The SCPI instructions are tree structured, with a maximum of three layers, where the highest layer is referred to as a subsystem instruction. Layers under a subsystem instruction are only valid if that instruction is selected, using colons to separate the hierarchy of instructions.

4.2.1 Basic Rules of Command Structure

(1) Ignore case

Example: SYSTEM:LOCAL= system:local=SYSTem:LOCAL

(2) The space is used to separate the instruction and the parameter of the instruction, before the space is the instruction, after the space is the corresponding parameter of the instruction.

Example: SYST:LANG CN, SYST:LAN is the command and CN is its parameter.

(3) Some commands have no parameters

For example, SYSTem:LOCAL.

(4) Spaces (_ indicates spaces) cannot be placed before or after a colon

Example:☒ SYST : LANG CN→☑ SYST:LANG CN

(5) Directives can be abbreviated or spelled out in their entirety, and lowercase parts can be omitted

Example: SYSTEM:LOCAL=SYST:LOCAL

4.2.2 SCPI Command

The command syntax conventions are as follows:

- Specific symbols in the instruction syntax such as "{}", "<>", "|", etc. do not need to be written to the instruction
- The pointed brackets "<>" indicate that a value must be specified for the bracketed parameter.
- The vertical bar "|" separates multiple parameter selections for a given command string, only one of which needs to be written.
- The "?" at the end of the command indicates a query command. denotes the query command, the instrument will return the corresponding parameters after receiving this kind of command.

4.2.2.1 SYSTem Command Set

a) SYSTem:LOCAL

Description: Set instrument operation to local

Syntax: SYSTem:LOCAL

b) SYSTem:LANG

Description: Set the instrument display language.

Syntax: SYSTem:LANG <CN|EN>

SYSTem:LANG ?

Example:

SYST:LANG CN Set the instrument language to Chinese

SYST:LANG ? Query the currently set instrument language

c) SYSTem:BEEPer

DESCRIPTION: Set the state of the instrument's buzzer.

Syntax:

SYSTem:BEEPer <0|1|OFF|ON>

SYSTem:BEEPer ?

Example:

SYST:BEEP 0 Set the buzzer off

SYST:BEEP ? Query the current status of the buzzer

d) SYSTem:PMEM

Description: Set the type of parameter that the instrument turns on loading.

Syntax:

SYSTem:PMEM <DEFault|FILE>

SYSTem:PMEM ?

Example:

SYST:PMEM DEF Set the type of default parameter to be loaded when the instrument is turned on

SYST:PMEM ? Query the type of on-load parameter currently set

e) SYSTem:COMBine

Description: Set the combination mode of the instrument.

Syntax:

SYSTem:COMBine <0|1|2|OFF|SERial|PARallel>

SYSTem:COMBine ?

Example:

SYST:COMB 0 Set off combination mode

SYST:COMB ? Query the current combination mode

f) SYSTem:BRIGHT

DESCRIPTION: Set the brightness of the instrument display backlight.

Syntax:

SYSTem:BRIGHT <0|1|2|LOW|MIDdle|High>

SYSTem:BRIGHT ?

Example:

SYST:BRIGHT LOW Sets the backlight brightness to low.

SYST:BRIGHT ? Queries the current backlight brightness

g) SYSTem:<YEAR|MONth|DATe|HOUR|MINute|SECond>

Description: Sets the date the instrument displays.

Syntax:

SYSTem:<YEAR|MONth|DATe|HOUR|MINute|SECond> <NR1>

SYSTem:<YEAR|MONth|DATe|HOUR|MINute|SECond> ?

Example:

SYST:YEAR 2022 Sets the year displayed by the instrument to 2022

SYST:MON ? Queries the current month displayed by the instrument

4.2.2.2 CHSELect Command Set

DESCRIPTION: Selects the current channel to be controlled.

Syntax:

CHSELect <CH1|CH2|CH3|CH4|1|2|3|4>

Example:

CHSEL CH1 Selects the current channel 1 to be controlled

4.2.2.3 DISPlay Command Set

Description：Switch the instrument display interface.

Syntax:

DISPlay:page <outp|ch|list|outp|delay|rec|syst|comm|io|mem>

Example:

DISP:page outp Switches the current display to the output page.

4.2.2.4 MEASure Command Set

a) MEASure <1|2|3|4>:<VOLTage|CURRent|POWer|ALL> ?

Description: Reads the measured value of the selected channel.

Syntax:

MEASure <1|2|3|4>:<VOLTage|CURRent|POWer|ALL> ?

Example:

MEAS 1:ALL Reads all measured values of channel 1

b) MEASure:<VOLTage|CURRent|POWer]>?

Description: Reads the selected measurements for all channels.

Syntax:

MEASure:<VOLTage|CURRent|POWer]>?

Example:

MEAS:VOLT Reads the measured voltage of all channels

4.2.2.5 OUTPut Command Set

a) OUTPut <1|2|3|4>:STATe

DESCRIPTION: Controls the output or shutdown of the selected channel.

Syntax:

OUTPut <1|2|3|4>:STATe <0|1|OFF|ON>

OUTPut <1 | 2 | 3 | 4>:STATe ?

Example:

OUTP 1:STAT 0	Control 1 channel state off
OUTP 2:STAT ?	Queries the current 2-channel output status

b) OUTPut:STATe

DESCRIPTION: Controls the output or shutdown of all channels.

Syntax:

OUTPut:STATe <0|1|OFF|ON>

OUTPut:STATe ?

Note: 0 is the same as OFF, 1 is the same as ON.

Example:

OUTP:STAT 0	Controls all channel states off
OUTP:STAT ?	Queries the current status of all channel outputs

4.2.2.6 MODe Command Set

Description: Sets the mode of the selected channel.

Syntax:

MODe <1|2>:SOURce

MODe <1|2>:LOAD <CC|CV|CR|CP>

MODe <1|2> ?

Example:

MOD 1:SOUR	Sets channel 1 to source mode
MOD 2:LOAD CC	Set 2 channels to load CC mode
MOD 1 ?	Queries the current mode of channel 1

4.2.2.7 SOURce Command Set

a) SOURce <1|2|3|4>:VOLTage

Description: Sets the source voltage of the selected channel.

Syntax:

SOURce <1|2|3|4>:VOLTage <NRf|MINimum|MAXimum>

SOURce <1|2|3|4>:VOLTage ?

Example:

SOUR 1:VOLT 1 Set channel 1 source voltage to 1v

SOUR 2:VOLT ? Queries the current 2-channel source voltage

b) SOURce <1|2|3|4>:CURRent

Description: Sets the source current of the selected channel.

Syntax:

SOURce <1|2|3|4>:CURRent <NRf|MINimum|MAXimum>

SOURce <1|2|3|4>:CURRent ?

Example:

SOUR 1:CURR 1 Sets channel 1 source current to 1A

SOUR 2:CURR ? Queries the current 2-channel source current

4.2.2.8 LOAD Command Set

a) LOAD <1|2|3|4>:VOLTage

Description: Sets the load voltage for the selected channel.

Syntax:

LOAD <1|2|3|4>:VOLTage <NRf|MINimum|MAXimum>

LOAD <1|2|3|4>:VOLTage ?

Example:

LOAD 1:VOLT 1 Set 1 channel load voltage to 1v

LOAD 2:VOLT ? Queries the current 2-channel load voltage

b) LOAD <1|2|3|4>:CURRent

Description: Sets the load current for the selected channel.

Syntax:

LOAD <1|2|3|4>:CURRent <NRf|MINimum|MAXimum>

LOAD <1|2|3|4>:CURRent ?

Example:

LOAD 1:CURR 1 Set 1 channel load current to 1A

LOAD 2:CURR ? Queries the current 2-channel load current

c) LOAD <1|2|3|4>:RESistance

Description: Sets the load resistance of the selected channel.

Syntax:

LOAD <1|2|3|4>:RESistance <NRf|MINimum|MAXimum>

LOAD <1|2|3|4>:RESistance ?

Example:

LOAD 1:RES 5 Set 1 channel load current to 5Ω

LOAD 2:RES ? Queries the current 2-channel load resistance

d) LOAD <1|2|3|4>:POWer

Description: Sets the load power for the selected channel.

Syntax:

LOAD <1|2|3|4>:POWer <NRf|MINimum|MAXimum>

LOAD <1|2|3|4>:POWer ?

Example:

LOAD 1:POW 5 Set the load power of channel 1 to 5W

LOAD 2:POW ? Queries the current 2-channel load power

4.2.2.9 PROTect Command Set

a) PROTect <1|2|3|4>:VOLTage

DESCRIPTION: Sets the OVP for the selected channel.

Syntax:

PROTect <1|2|3|4>:VOLTage <NRf|MINimum|MAXimum>

PROTect <1|2|3|4>:VOLTage ?

Example:

PROTect 1:VOLT 1 Sets channel 1 overvoltage protection to 1v

PROTect 2:VOLT ? Queries the current 2-channel overload voltage

b) PROTect <1|2|3|4>:CURRent

Description: Sets the OCP for the selected channel.

Syntax:

PROTect <1|2|3|4>:CURRent <NRf|MINimum|MAXimum>

PROTect <1|2|3|4>:CURRent ?

Example:

PROTect 1:CURR 1 Set 1 channel overcurrent protection to 1A

PROTect 2:CURR ? Queries the current 2-channel overload current

c) PROTect <1|2|3|4>:POWer

DESCRIPTION: Sets the OPP for the selected channel.

Syntax:

PROTect <1|2|3|4>:POWer <NRf|MINimum|MAXimum>

PROTect <1|2|3|4>:POWer ?

Example:

PROTect 1:POW 5 Sets channel 1 overpower protection to 5W

PROTect 2:POW ? Queries the current 2-channel overload power

4.2.2.10 LIST Command Set

a) LIST <1|2>:MODe

Description：Set the working mode of the selected channel list.

Syntax:

LIST <1|2>:MODe <SOURce|CC|CV>

Example:

LIST 2:MOD CC Sets the 2-channel list operating mode to Load CC mode.

b) LIST <1|2>:CYCles

Description: Set the number of times the selected channel list will cycle.

Syntax:

LIST <1|2>:CYCles <NRf|MINimum|MAXimum|UNLimit>

Example:

LIST 1:CYC 5 Sets the 1-channel list to cycle 5 times

c) LIST <1|2>:STEPs

Description: Sets the number of selected channel list steps.

Syntax:

LIST <1|2>:STEPs <NRf|MINimum|MAXimum>

Example:

LIST 1:STEP 5 Sets the number of steps in the 1-channel list to 5

d) LIST <1|2>:LEVel

DESCRIPTION: Sets the voltage, current and delay for a step in the selected

channel list.

Syntax:

LIST <1|2>:LEVel <number>, <voltage>, <current>, <delay>

Example:

list 1:lev 5,1,1,0.01 Set the voltage at step 5 of the 1-channel list to 1V, the current to 1A, and the delay time to 0.01s.

e) LIST <1|2>:TYPe

Description：Set the selected channel list waveform template and its parameters.

Syntax:

LIST <1|2>:TYPe <1-5>,<MIN voltage>,<MAX voltage>,<MIN current>,<MAX current>,<step>,<cycle >,<initial phase|duty ratio|direction

Example:

List 1:ttyp 1,0,1,0,0,0,8,10,90 Set the sequence waveform of channel 1 as sinusoidal waveform, the change parameter is voltage, the minimum voltage value is 0V, the maximum voltage value is 1V, the number of steps is 8, the period is 10, and the initial phase is 90°.

f) LIST <1|2>:STATe

Description：Enable or disable the selected channel list function

Syntax:

LIST <1|2>:STATe <0|1|OFF|ON>

Example:

LIST 1:STATe 0 Disables the 1-channel list function

4.2.2.11 DELAY Command Set

DESCRIPTION: Sets the time for the selected channel to turn on, end or work delay.

Syntax:

DELAY <1|2|3|4>:<STArt|END|WORK> <NRf|MINimum|MAXimum>

Example:

DELAY 1:STA 0.01 Set channel 1 turn-on delay to 0.01s

Description：Set the delay state of this channel

Syntax:

DELAY <1|2|3|4>:<STArt|END|WORK> <OFF|ON

Example:

DELAY 1:STA ON Set channel 1 on delayed start

4.2.2.12 TRIGER Command Set

Description：Set the input/output mode of the rear panel I/O port

a) TRIGer:SELect

Description: Selects the I/O port to be controlled.

Syntax:

TRIGer:SELect <1 | 2 | 3 | 4 | 5>

Example:

TRIG:SEL 1 Select port 1

b) TRIGer:ENABle

Description: Enable the selected I/O port type.

Syntax:

TRIGer:ENABle <IN | OUT>

Example:

TRIG:ENAB IN Enables the selected I/O port to be an input

c) TRIGer:DISABle

Description: Disable the selected I/O port.

Syntax:

TRIGer:DISABle

Example:

TRIG:DISAB Disable the selected I/O port

d) TRIGer:IN:TYPe

Description: Sets the type of detection input signal.

Syntax:

TRIGer:IN:TYPe < RISe | FALL | HIGH | LOW | STATe>

Example:

TRIG:IN:TYP RIS Setting Detect Rising Edge Inputs

e) TRIGer:IN:FUNCtion

Description：Set the function of this I/O port response.

Syntax:

TRIGer:IN:FUNCtion < OFF | ON | SOURce | CC | CV | CR | CP>

Example:

TRIG:IN:FUNC OFF The selected channel is turned off when the I/O port detects a signal.

f) TRIGer:IN:CHannel

Description: Sets the channel controlled by this I/O port.

Syntax:

TRIGer:IN:CHannel < 1 | 2 | 3 | 4 | ch1 | ch2 | ch3 | ch4>

Example:

TRIG:IN:CH 1 Sets this I/O port to control CH1.

g) TRIGer:OUT:TYPe

Description: Set the output signal type of this I/O port.

Syntax:

TRIGer:OUT:TYPe <Rise | FALL>

Example:

TRIG:OUT:FALL Sets the output signal of this I/O port to falling edge.

h) TRIger:OUT:CONDition

Description: Set the output condition of this I/O port.

Syntax:

TRIger:OUT:CONDition <OFF | ON | >V | <V | >I | <I | >P | <P | val>

Example:

TRIG:OUT:COND >V

TRIG:OUT:COND 32

When the sampling voltage of the selected channel is >32V, this I/O port outputs the signal

i) TRIGer:OUT: Channel

Description: Sets the channel for this I/O match.

Syntax:

TRIGer:OUT:CHannel < 1 | 2 | 3 | 4 | ch1 | ch2 | ch3 | ch4>

Example:

TRIG:OUT:CH 1 Sets this I/O port to match CH1.

Chapter 5 Appendix

5.1 technical Indicator

TH6434					
		CH1	CH2	CH3	CH4
Power Mode	Voltage	0-32V	0-32V	0-5V	0-15V
	Current	0-3A	0-3A	0-1A	0-1A
	Series Connection	0-64V,0-3A		-	
	Parallel Connection	0-32V,0-6A			
Resolution	Setting:1mV/0.1mA Readback:0.1mV/0.1mA				
Accuracy	Voltage:0.03%+10mV Current:0.3%+10mA				
Load Mode	CC	0-3.2A	0-3.2A	-	
	CV	1-33V	1-33V		
	CR	1-1000Ω	1-1000Ω		
	CP	0-50W	0-50W		
Resolution	10mV/1mA/1Ω/0.01W				
Accuracy	CV:0.1%+30mV CC:0.3%+10mA CR:3%+1Ω CP:0.3%+1W				
Ripple	Constant Voltage	1mVrms			
	Constant Current	2mArms			
Power Adjustment Ratio	Constant Voltage	0.006% + 3mV			
	Constant Current	0.01%+3mA			
Load Adjustment Ratio	Constant Voltage	0.01%++3mV			
	Constant Current	0.01%+3mA			
Series Adjustment Ratio	Linear	0.01%+5mV			
	Load	100mV			

Parallel Adjustment Ratio	Linear	0.01% + 3mV
	Load	0.01% + 3mV
Recovery Time	50μs	

TH6433				
		CH1	CH2	CH3 (USB port)
Power Mode	Voltage	0-32V	0-32V	1.8V/2.5V/3.3V/5.0V
	Current	0-3A	0-3A	0-3A
	Series Connection	0-64V,0-3A		-
	Parallel Connection	0-32V,0-6A		
Resolution	Setting:1mV/0.1mA Readback:0.1mV/0.1mA			-
Accuracy	Voltage:0.03%+10mV Current:0.3%+10mA			Voltage:5%
Load Mode	CC	0-3.2A	0-3.2A	-
	CV	1-33V	1-33V	
	CR	1-1000Ω	1-1000Ω	
	CP	0-50W	0-50W	
Resolution	10mV/1mA/1Ω/0.01W			
Accuracy	CV:0.1%+30mV CC:0.3%+10mA CR:3%+1Ω CP:0.3%+1W			
Ripple	Constant Voltage	1mVrms		
	Constant Current	2mArms		
Power Adjustment Ratio	Constant Voltage	0.006% + 3mV		
	Constant Current	0.01%+3mA		
Load Adjustment Ratio	Constant Voltage	0.01%++3mV		
	Constant Current	0.01%+3mA		

Series Adjustment Ratio	Linear	0.01%+5mV
	Load	100mV
Parallel Adjustment Ratio	Linear	0.01% + 3mV
	Load	0.01% + 3mV
Recovery Time	50μs	

TH6432			
		CH1	CH2
Power Mode	Voltage	0-32V	0-32V
	Current	0-3A	0-3A
	Series Connection	0-64V,0-3A	
	Parallel Connection	0-32V,0-6A	
Resolution	Setting:1mV/0.1mA Readback:0.1mV/0.1mA		
Accuracy	Voltage:0.03%+10mV Current:0.3%+10mA		
Load Mode	CC	0-3.2A	0-3.2A
	CV	1-33V	1-33V
	CR	1-1000Ω	1-1000Ω
	CP	0-50W	0-50W
Resolution	10mV/1mA/1Ω/0.01W		
Accuracy	CV:0.1%+30mV CC:0.3%+10mA CR:3%+1Ω CP:0.35%+10W		
Ripple	Constant Voltage	1mVrms	
	Constant Current	2mArms	
Power Adjustment Ratio	Constant Voltage	0.006% + 3mV	
	Constant Current	0.01%+3mA	
Load Adjustment	Constant Voltage	0.01%++3mV	

Ratio	Constant Current	0.01%+3mA
Series Adjustment Ratio	Linear	0.01%+5mV
	Load	100mV
Parallel Adjustment Ratio	Linear	0.01% + 3mV
	Load	0.01% + 3mV
Recovery Time	50μs	

TH6431		
		CH1
Power Mode	Voltage	0-32V
	Current	0-6A
Resolution	Setting:1mV/0.1mA Readback:0.1mV/0.1mA	
Accuracy	Voltage:0.03%+10mV Current:0.3%+10mA	
Resolution Accuracy Load Mode	CC	0-6A
	CV	1-33V
	CR	1-1000Ω
	CP	0-100W
Resolution	10mV/1mA/1Ω/0.01W	
Accuracy	CV:0.1%+30mV CC:0.3%+10mA CR:3%+1Ω CP:0.3%+1W	
Resolution Accuracy	Constant Voltage	1mVrms
	Constant Current	2mArms
Ripple	Constant Voltage	0.006% + 3mV
	Constant Current	0.01%+3mA
Power Adjustment Ratio	Constant Voltage	0.01%++3mV
	Constant Current	0.01%+3mA

Load Adjustment Ratio	Linear	0.01%+5mV
	Load	100mV
Series Adjustment Ratio	Linear	0.01% + 3mV
	Load	0.01% + 3mV
Parallel Adjustment Ratio	50μs	

5.2 Warranty

Warranty period: The warranty period of one year shall be calculated from the date of shipment of the instrument purchased from the Company by the user unit, and from the date of shipment of the instrument purchased from the operating department. Warranty should be issued by the instrument warranty card. During the warranty period, if the instrument is damaged due to improper operation by the user, the maintenance cost shall be borne by the user. The company is responsible for the lifetime maintenance of the instrument.

The maintenance of this instrument requires professional and technical personnel to carry out maintenance; maintenance, please do not replace the internal components of the instrument without authorization; maintenance of the instrument, the need to re-measure the calibration, so as not to affect the accuracy of the test. Due to the user blind maintenance, replacement of instrument components 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 humidity and should be used properly in the environment described in 1.2.

When the instrument is not used for a long period of time, it should be sealed in the factory box.

Company Statement

What is described in this manual may not be all the contents of the instrument, and Tonghui reserves the right to make improvements and enhancements to the performance, functions, internal structure, appearance, accessories, packaging, etc. of this product without separate explanation! For any confusion caused by the inconsistency between the manual and the instrument, you may contact our company through the address on the cover.