Operation Manual

TH6700A

Programmable DC Power Supply

V1.0.1@2023.10

CONTENTS

Chapter 1 Overview

Thank you for purchasing and using our products, before you use this instrument, please first confirm the matters according to the manual chapter 7 "set and warranty", if there is any discrepancy, please contact us as soon as possible in order to protect your rights and interests.

1.1 Introduction

TH6700A series is a programmable switching DC power supply. This series of instrument is powerful, superior performance, and the use of digital tube display, display clear, quick and easy to operate, can be well adapted to the production site rapid operation needs and laboratory needs of high precision and high stability, at the same time, the instrument provides a USB interface and LAN port for the instrument to be used in the remote operation of the computer to provide the conditions.

The special features and advantages of the instrument are listed below:

- Adopt digital tube display, reduce power consumption, display simple and clear
- High accuracy and resolution
- Low ripple and low noise
- Intelligent fan control saves energy and reduces noise
- Software control and detection via computer
- Precise fine-tuning of values by knob and cursor
- High current power and high stability

1.2 Conditions of use

1.2.1 Power supply

Supply Voltage: 88~265V

Power frequency: 50Hz/60Hz (1±5%)

Power consumption: <50VA

1.2.2 Ambient temperature and humidity

Normal operating temperature: 0℃～40℃, Humidity: < 90%RH

Reference operating temperature: 20℃±8℃, humidity: < 80%RH

Transportation ambient temperature: 0℃～55℃, humidity:≤ 93%RH

1.2.3 Preheating

Warm-up time after power on: >30 minutes

1.3 Safety Requirement

This instrument is a Class I safety instrument

1.3.1 Electrical Insulation Resistance

The insulation resistance between the power supply terminals and the housing is not less than 50MΩ under reference operating conditions;

Insulation resistance between the power supply terminals and the housing under hot and humid transportation conditions is not less than 2MΩ ;

1.3.2 Dielectric strength

Under the reference working conditions, the power terminals and the shell can withstand the rated voltage of 2.1kV DC voltage for 1 minute without breakdown and flying arc phenomenon.

1.3.3 Leakage Current

Leakage current is not more than 3.5mA.

1.4 Electromagnetic Compatibility

Power transient sensitivity according to GB6833.4.

Conductivity sensitivity is according to the requirements of GB6833.6.

Radiation interference according to the requirements of GB6833.10.

1.5 Notes

Please do not use in dusty, vibration, direct sunlight, corrosive gases and other adverse environments.

If the instrument is not used for a long time, please store it in the original packing box or similar box in a ventilated room with the temperature of 5℃～40℃ and relative humidity not more than 85%RH. The air should not contain harmful impurities that corrode the measuring instrument, and it should be avoided from direct sunlight.

This instrument has been carefully designed to minimize spurious interference due to inputs from the AC power supply side, however, it should still be used in as low a spurious environment as possible, and if this cannot be avoided, a power supply filter should be installed.

There is a cooling fan at the back of the instrument and cooling vents on the left and right to avoid the internal temperature from rising and affecting the accuracy, please make sure the instrument is in a well ventilated condition.

Do not switch the instrument on and off frequently as this may cause loss of stored data.

Chapter 2 Panel Description

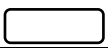
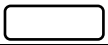
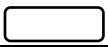
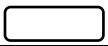
The content of this chapter is only a general description; the specific operation and detailed explanation refer to the corresponding content of Chapter 4.

2.1 Front Panel Description

The front panel schematic is shown in Figure 2-1.

Figure 2-1

See Table 2-1 for an introduction:

1	Trademarks & Models	Show logo, model number and power supply parameters
2	Power switch 	Turn on or cut off the 220V mains power, when it is in O position, cut off the power; when it is in one position, turn on the power.
3	Digital display screen	Display all measurement parameters, status, measurement results, and more.
4	Function 	The function keys are used to configure the various parameters of the power supply
5	OVP/OCP 	Setting the overvoltage or overcurrent protection level
6	Set 	Setting the output voltage and output current
7	Utility 	For customizing test sequences for testing

8	Lock/Local	Lock or unlock panel keys to prevent changes to panel settings
9	PWR DSPL	To change the display data from V/A to V/W or W/A, press the Voltage knob to change to V/W and the Current knob to change to W/A.
10	Voltage Current	Knobs for adjusting value size and moving the cursor
11	USB port	HOST port on USB for updating firmware or loading list files

Table 2-1

2.2 Rear Panel Description

The rear panel schematic of the TH67X1A, TH67X2A series is shown in Figure 2-2.

TH6731/TH6741 TH6711/TH6721

TH6712/TH6722 TH6732/TH6742

Figure 2-2

See Table 2-2 for an introduction:

1	External port	For external input control, on-line, etc.
2	Output side	For output voltage, current
3	Fan (loanword)	For heat dissipation
4	USB	USB DEVICE interface for remote control
5	LAN	LAN port for remote control
6	Three-wire power socket	Access to power supply
7	Nameplate	Record model number, lot number, etc.

Table 2-2

The rear panel schematic of the TH67X3A series is shown in Figure 2-2-1.

TH6713/TH6723 TH6733/TH6743

Figure 2-2-1

See Table 2-2-1 for introduction

1	external port	For external input control, on-line, etc.
2	output side	For output voltage, current
3	fan (loanword)	For heat dissipation
4	USB	USB DEVICE interface for remote control
5	LAN	LAN port for remote control
6	wiring outlet	Access to power supply
7	nameplate	Record model number, lot number, etc.

Table 2-2-1

2.3 Display Overview

2.3.1 Display Indicators

A schematic diagram of the display indicators is shown in Figure 2-3-1

Figure 2-3-1

(1) **VSR:** Voltage Switching Rate

(2) **CV:** Constant Voltage Mode

(3) **RMT:** Remote Control Mode

(4) **ALM:** Alarm on status

(5) **DLY:** Delayed Output

(6) **CC:** Constant current mode

(7) **ISR:** Current conversion speed

(8) **20 40 60 80 100 %W:** Power column indicating current power output as a percentage

2.3.2 Show page

- Output Display

  This page is the power-up default page and shows the basic measurement display values.

- Function Setting

  This page displays generalized setup parameters, such as delay time, voltage rise rate, and so on.

- OVP/OCP Settings

  This page displays the overvoltage protection and overcurrent protection setting parameters.

- Set Settings

  This page displays the output voltage and output current setting parameters.

- Utility Settings

  This screen displays the operational settings for the test sequence.

- PWR DSPL

  This page displays the measurement parameters V/W or W/A.

- POW DSPL

  This page displays power failure setup parameters such as on-line mode, external control, etc.

Chapter 3 Operating Instructions

3.1 Output Display Page

Power on to enter the output display interface when the current, voltage and a series of measurement parameters are set, press the Output key output, output, the key shows red. The interface displays the output voltage, current and power display value.

If the output is turned off, the **Output** key red light goes out.

3.2 Function Setting Page

Press the **Function** key to enter the function page, as shown in Figure 3-1, and the main configurations are shown in Table 3-1.

Figure 3-2

Operation procedure: first rotate the **Voltage** knob to select the function sequence,

then rotate and press the **Current** knob to set, and finally press the **Voltage** knob to confirm the setting.

Functional sequence	Function	Setting instructions
F-00	Enter your password and upgrade	Enter the password 6700 to enter the upgrade interface, which can upgrade the instrument software.
F-01	Start-up delay	0--99.99 (s)
F-02	Off Delay	0--99.99 (s)
F-03	Conversion speed	0-CV high speed, 1-CC high speed, 2-CV programmable, 3-CC programmable
F-04	Voltage Rise Rate	>0
F-05	Voltage drop rate	>0
F-06	Current Rise Rate	>0
F-07	Current drop rate	>0
F-08	Analog internal resistance	0--Max
F-09	Drain Resistor	0-Close, 1-Open
F-10	Buzzer Switch	0-Close, 1-Open
F-17	Measured average	0-slow, 1-medium, 2-fast
F-19	Lockout mode	0-OFF, 1-ON/OFF
F-24	Bus Mode	0-USBCDC, 1-USBTMC, 2-LAN
F-30	MACaddr	
F-31	MACaddr	
F-32	MACaddr	
F-33	MACaddr	
F-34	MACaddr	
F-35	MACaddr	
F-39	Ipaddr	
F-40	Ipaddr	
F-41	Ipaddr	
F-42	Ipaddr	
F-43	NETMASK	

F-44	NETMASK	
F-45	NETMASK	
F-46	NETMASK	
F-47	GATEWAY	
F-48	GATEWAY	
F-49	GATEWAY	
F-50	GATEWAY	
F-88	Initialization	
F-89	Releases	
F-90	CV control mode	0-panel, 1-voltage, 2-resistance rise, 3-resistance fall
F-91	CC control mode	0-panel, 1-voltage, 2-resistance rise, 3-resistance fall
F-92	Power-on output (of an electrical device etc)	0-Close, 1-Open
F-93	Online mode	0-master, 1-master one-parallel, 2-master two-parallel, 3-slave parallel, 4-slave serial
F-94	External logic	0-open high, 1-open low

Table 3-1

3.2.1 Startup/shutdown delay

F-01: Add a delay when the instrument turns on the output, when the Output key is pressed to turn on the output, the delay is then output in seconds (s).

F-02: Adds a delay when the instrument turns off the output, when the Output key is pressed to turn off the output, the delay is then turned off in seconds (s).

3.2.2 Conversion speed

F-03: The rising speed of setting value is divided into four modes: 0-constant voltage (CV) high speed, 1-constant current (CC) high speed, 2-constant voltage (CV) can be set, and 3-constant current (CC) can be set, and different modes can be selected through the panel.

Constant voltage high speed: set voltage value immediately sent to DA conversion, output

Constant current high speed: set current value immediately sent to DA conversion,

output

Constant voltage can be set: set the voltage value according to the rate set to send to the DA conversion, output. For example: voltage set 20V, voltage rise rate set 5V/s, open the output, 4s later, the voltage rises to 20V.

Constant current can be set: set the current value according to the set rate sent to the DA conversion, output. For example: the current is set to 20A, the current rise rate is set to 5A/s, open the output, and after 4s, the current rises to 20A.

3.2.3 Voltage, current rise/fall rate

F-04: The rate of rise of the voltage when the instrument sets the output.

F-05: The rate of voltage drop when the instrument sets the output.

The above two function settings are valid only when the conversion speed is **CV-settable (F-03 is set to 2).**

F-06: The rate of rise of the current when the instrument sets the output.

F-07: The rate at which the current falls when the instrument sets the output.

The above two function settings are valid only when the conversion speed is **CC settable (F-03 set to 3)**.

3.2.4 Analog Internal Resistance

F-08: Used as the internal resistance of the voltage source, set in Ω.

3.2.5 Drain Resistor

F-09: Dummy load of the instrument, can be selected to open or close, when the drain resistor is open, constant voltage mode no-load shutdown output can be quickly discharged, 0-closed, 1-open.

3.2.6 Buzzer Switch

F-10: Used as an instrument signal, 0-closed, 1-open.

3.2.7 Measured Average

F-17: Sampling speed, there are 0-slow (low speed), 1-medium (medium speed), 2-fast (high speed), which can be selected according to the page display.

1. Low speed: slow sampling, high accuracy
2. Medium speed: between low and high speed
3. High speed: fast sampling speed, slightly less accurate

3.2.8 Lockout Mode

F-19: Function of pressing the Output button when the panel is locked.

0-OFF: When the panel is locked, pressing the Output button will only turn off the output;

1-ON/OFF: When the panel is locked, press the Output button to turn the output on and off.

3.2.9 Bus Mode

F-24: Interface settings for connection to external devices, 0-USBCDC, 1-USBTMC, 2-LAN.

LAN: Local Area Network settings:

- **F-30~F-35:** MAC address, 6 bytes, hexadecimal number **, (not settable).**
- **F-39~F-42:** IP address, 0~255 decimal integer
- **F-43~F-46:** subnet mask, 0~255 decimal integer
- **F-47~F-50:** gateway, 0~255 decimal integer

3.2.10 System Settings

F88: System initialization, restore factory settings, 0-disable, 1-initialize.

F-89: Version lookup, 0-year, 1-month, 2-day, 3-5 version numbers

3.2.11 Power Failure Setting

F-90: Output voltage control mode in constant voltage mode, 0-panel control output, 1-external voltage control output, 2-external resistor rising control output, 3-external resistor falling control output.

F-91: Output current control mode in constant current mode, 0-panel control output, 1-external voltage control output, 2-external resistance rise control output, 3-external resistance fall control output.

F-92: Whether or not to output directly at power on, 0-off, 1-on.

F-93: This series of instruments can be more than one on-line, for stacking power, according to the need to choose series or parallel connection, 0-master, 1-master a parallel, 2-master two parallel, 3-slave parallel, 4-slave series.

F-94: 0-high open, 1-low open.

Under this page, F-90~F-94 cannot be changed, see section 3.6 for details.

3.3 OVP/OCP Setup Page

Press the **OVP/OCP** key to enter the overvoltage/overcurrent setting page, as shown in Figure 3-3.

Figure 3-2

Operation Procedure: Press or rotate the **Voltage** knob to set the OVP value size, and press or rotate the **Current** knob to set the OCP value size**.**

3.4 Set Settings Page

Press **Set** to enter the output voltage and current setting page, as shown in Figure 3-4.

Figure 3-3

Operation procedure: Press or rotate the **Voltage** knob to set the output voltage size, press or rotate the **Current** knob to set the output current size**.**

3.4.1 CC and CV modes

When the power supply operates in constant current mode (CC), a constant current is supplied to the load. In constant current mode, the voltage output can vary while the current remains constant. When the load resistance increases to the point where the current limit (ISET) can no longer be maintained, the power supply switches to CV mode. The point at which the power supply switches modes is the crossover point, as shown in Figure 3-4.

When the power supply is operating in constant voltage mode, it will provide a constant voltage to the load and the current will vary with the load. In the event that the load resistance is too low to maintain a constant voltage, the power supply will switch to CC

mode and maintain the set current limit.

The conditions that determine whether the power supply operates in CC mode or CV mode depend on the set current (ISET), set voltage (VSET), load resistance (RL), and critical resistance (RC). The critical resistance is determined by VSET/ISET. When the load resistance is greater than the critical resistance, the power supply will operate in CV mode. This means that the voltage output will be equal to the VSET voltage, but the current will be less than the ISET. If the load resistance decreases to the point where the current output reaches the ISET level, the power supply switches to CC mode.

Conversely, when the load resistance is less than the critical resistance, the power supply will operate in CC mode. In CC mode, the current output is equal to ISET and the voltage output is less than VSET.

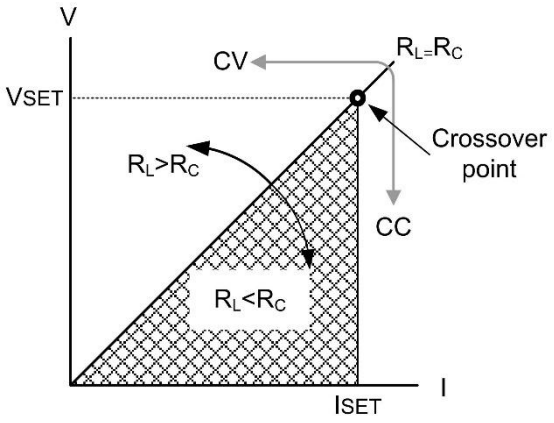


Figure 3-4

3.5 Utility Setup Page

Press the **Utility** key to enter the Test Sequence Setup page, insert the USB flash disk, you can load the list file for list output, as shown in Figure 3-5.

Figure 3-5

3.5.1 File Copy to Memory

Steps: First rotate the **Current** knob to select the test file (1~10), then rotate the **Voltage** knob to select to 2, and finally press the **Voltage** knob to confirm the copy.

Example: After copying file No. 4 successfully, it will display (L 04) as Figure 3-5-1.

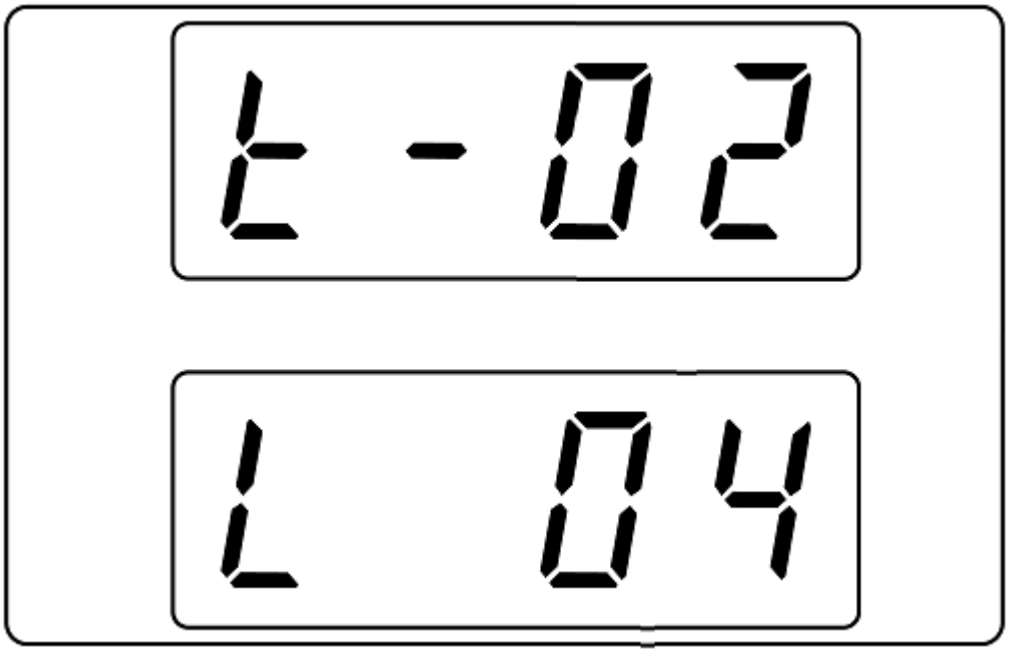


Figure 3-5-1

3.5.2 File Loading

Procedure: After copying the file to memory, rotate the **Voltage** knob to select to 1, then press the **Voltage** knob to confirm loading. Example: After loading file No. 4 successfully, it will display (y 04) as Figure 3-5-2.

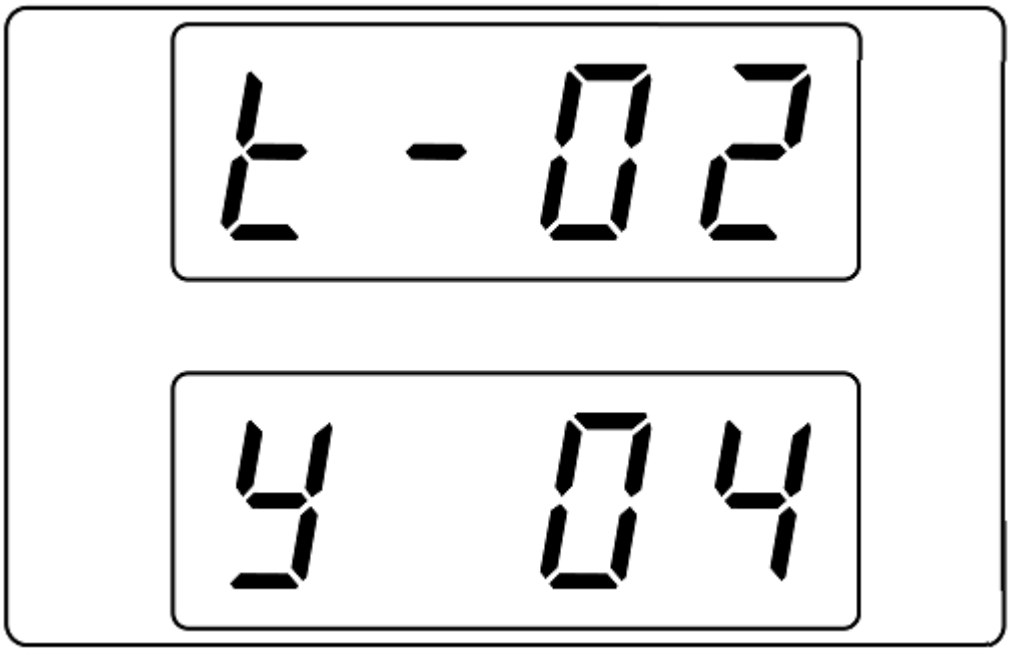


Figure 3-5-2

3.5.3 File Deletion

Steps: First rotate the **Current** knob to select the test file (1~10) to be deleted, and then rotate the **Voltage** knob to select 3, and finally press the **Voltage** knob to confirm the

deletion. Example: After deleting file No. 4 successfully, it will display (n 04) as Figure 3-5-3.

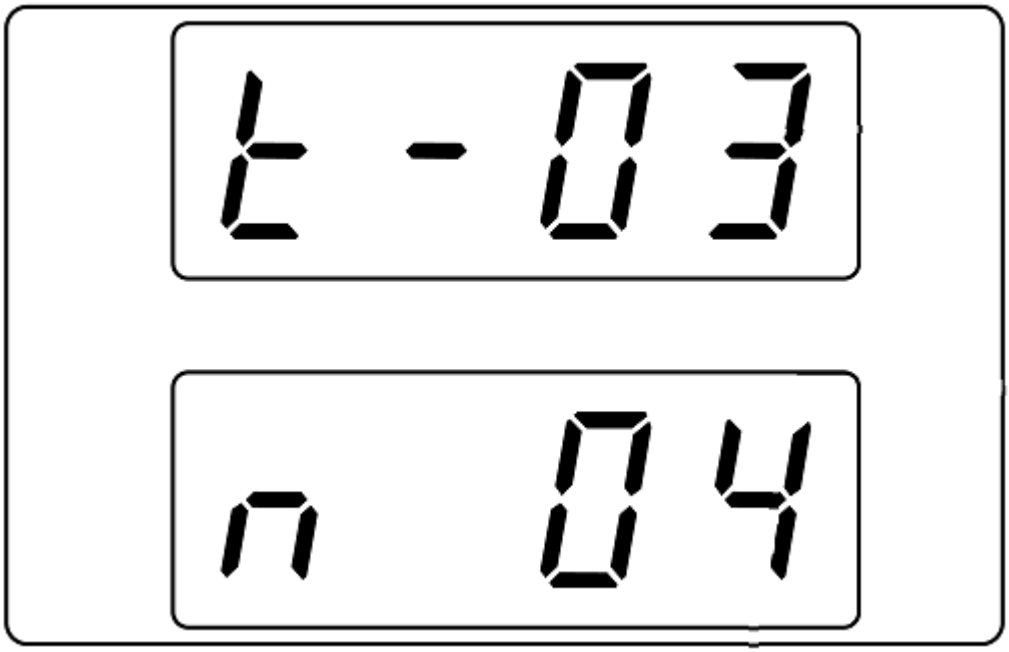


Figure 3-5-3

3.5.4 File Format

The file name must be one of the ten of t001~t010, and the file format is .csv format, otherwise the instrument will not recognize it. The contents of the file are shown in Figure 3-5-4.

	A	B	C	D
1	Cycle	3	1	10
2	step	time(sec)	voltage(V)	current(A)
3	1	2	1	1
4	2	2	2	1
5	3	2	3	1
6	4	2	4	1
7	5	2	5	1
8	6	2	6	1
9	7	2	7	1
10	8	2	8	1
11	9	2	9	1
12	10	2	10	1

Figure 3-5-4

As shown in the figure A1 is for the header of the file, can not be changed;

B1 is the number of times the list is repeated, 1~999;

C1 is the list start number;

D1 is the ending serial number of the list;

A2 is the header of the file, the list step number, and cannot be changed;

Column A3 starts with the setup list serial number;

B2 is the header of the file, the list serial number duration, and cannot be changed;

Column B3 starts with the set duration in seconds;

C2 is a file header that sets the output voltage and cannot be changed;

Column C3 starts with the set output voltage in V;

D2 is a file header that sets the output current and cannot be changed;

Column D3 starts with the set output current in A;

3.5.5 Error Code

Msg 4: Please close the output;

Err 1: No file, could not be loaded;

Err 2: File error;

Err 3: File data out of range error;

Err 4: File data overpower error;

Err 5: File not found;

Err 6: The USB flash drive is not inserted;

3.6 POWER Setup Page

After powering down, press and hold the **Function** key to turn on the power and enter the power-down settings, as shown in Figure 4-4.

Figure 4-4

Note: Changing parameters within the power failure setting will be selected immediately after power failure again in case the setting is determined, and the parameters will have been changed after the next power up and power on.

3.6.1 Constant Pressure Control

F-90: Output voltage control mode in constant voltage mode, 0-panel control output, 1-external voltage control output, 2-external resistor rising control output, 3-external resistor falling control output.

0-Panel control output: internal control, voltage setting can be set with native numeric keys.

1-External voltage control output: the instrument panel control failure, the external port access to the voltage source input, the size of the voltage source as the input of the

machine, the input range of 0 ~ 10V, corresponding to the output of the machine 0 ~ maximum value.

2-External resistance rise control output: the instrument panel control failure, from the external port access resistor, resistance size as the input of the machine, resistance range 0 ~ 10KΩ, corresponding to the input of the machine 0 ~ maximum value.

3-External resistor down control output: the instrument panel control failure, by the external port access resistor, resistor size as the input of the machine, resistor range 0 ~ 10KΩ, corresponding to the maximum value of the input of the machine ~ 0V.

3.6.2 Constant current control

F-91: Output current control mode in constant current mode, 0-panel control output, 1-external voltage control output, 2-external resistance rise control output, 3-external resistance fall control output.

0-Panel control output: internal control, current setting can be set with native numeric keys.

1-External voltage control output: the instrument panel control failure, the external port access to the voltage source input, the size of the voltage source as the input of the machine, the input range of 0 ~ 10V, corresponding to the output of the machine 0 ~ maximum value.

2-External resistance rise control output: the instrument panel control failure, from the external port access resistor, resistance size as the input of the machine, resistance range 0 ~ 10KΩ, corresponding to the input of the machine 0 ~ maximum value.

3-External resistor down control output: the instrument panel control failure, by the external port access resistor, resistor size as the input of the machine, resistor range 0 ~ 10KΩ, corresponding to the maximum value of the input of the machine ~ 0V.

3.6.3 Power-on Output

F-92: Whether or not to output directly at power on, 0-off, 1-on.

3.6.4 Online Mode

F-93: This series of instruments can be more than one on-line, for stacking power, according to the need to choose series or parallel connection, 0-master, 1-master a parallel, 2-master two parallel, 3-slave parallel, 4-slave series.

0 - Host Standalone: only one machine or two instruments in series as the master unit.

1-Host in one-parallel: two instruments are connected in parallel as the master unit.

2-Host in two- parallel: three instruments in parallel as the master unit.

3-Slave in parallel: two or three instruments are connected in parallel as slave unit. (Up to three in parallel, including the master)

4-Slave in series: as a slave when connected in series. (TH671XA, TH672XA only, tandem connection can only be two units, including tandem host)

Note: Only instruments of the same model can be connected when on-line! The instrument does not accept commands when acting as a slave!

3.6.5 External Logic

F-94: 0-high ON, 1-low ON (instrument factory default high)

0-High level ON: panel controllable output, when the external is high, the output is open, when it is low, the output is closed and the panel cannot open the output.

1-Low Level ON: The panel is not controllable output, when the external is low, the output turns on, when it is high, and the output turns off.

Chapter 4 Correct output of the instrument

(1) Connect the power supply and press the power switch.

(2) The instrument is switched on and warmed up for 30 minutes.

(3) Select the appropriate connecting cable according to the actual needs, and connect the load to the [+,-] port on the rear panel of the instrument with the connecting cable.

(4) Set the working mode and output parameters of the instrument, and press the Output button to output.

4.1 Output Side

Since the rear panels of the TH671XA and TH672XA series are identical, it is sufficient to connect the outputs directly.

And TH673XA, TH674XA series rear panel is the same, the following to do the introduction, such as Figure 4-1-1 for the instrument socket, to output to Figure 4-1-2 output terminals to be inserted.

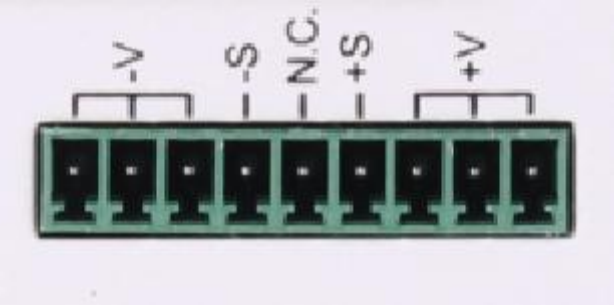


Figure 4-1-1

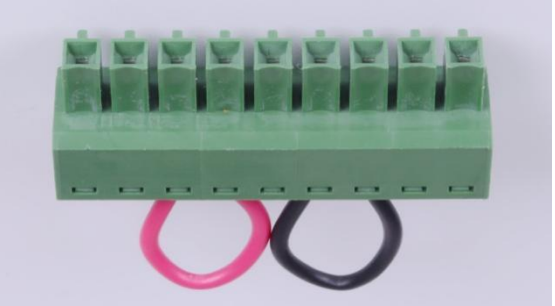


Figure 4-1-2

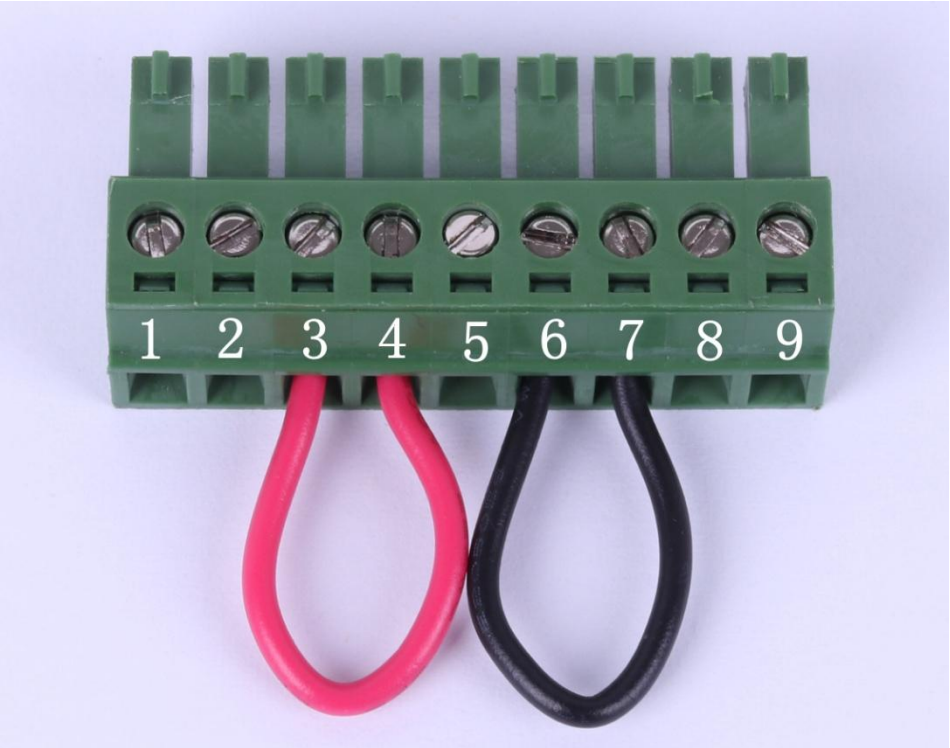


Figure 4-1-3

From Figure 4-1-3 the output interface has 9 output ports, which are described in Table 4-1-3:

Pin	Functionality	Instruction
1	+V	U, I input + terminal
2	+V	
3	+V	
4	+S	SENSE+
5	N.C.	Empty pin
6	-S	SENSE-
7	-V	U, I Output-Terminals
8	-V	
9	-V	

Table 4-1-3

4.2 Interface Schematic

The interface pins on the rear panel of the instrument are shown in Figure 4-2.

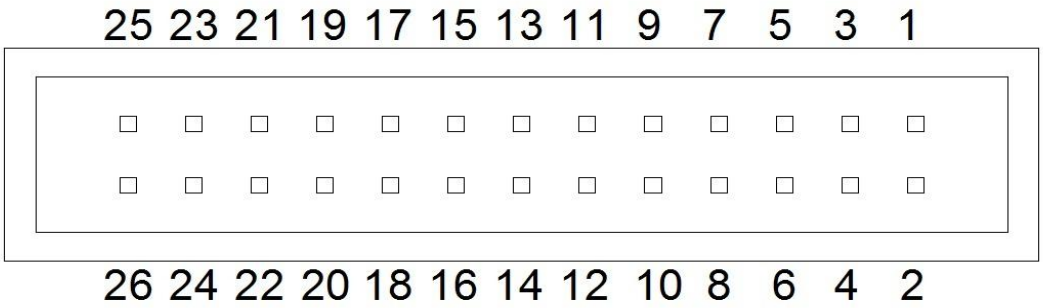


Figure 4-2

Pin Name	Pin number	Description
CURRENT SHARE	1	Used when operating 2 or more power supplies in parallel
D COM	2	Connected to the (-S) sense- terminal for remote sampling, or to the negative output terminal for non-remote sampling
CURRENT SUM OUT	3	Current total output signal in parallel mode
EXT-V CV CONT	4	External Voltage Control Voltage Output. 0~10V is used to control the full scale voltage output (0%~100%) of the instrument.
EXT-V CC CONT	5	External voltage controlled current output. 0~10V is used to control the full scale current output (0%~100%) of the instrument.
EXT-R CV CONT Pin1	6	External resistor controlled voltage output. 0~10kΩ voltage is used to control the full scale voltage output of the instrument (0%~100%)
EXT-R CV CONT Pin2	7	External resistor controlled voltage output. 0~10kΩ voltage is used to control the full scale voltage output of the instrument (0%~100%)
EXT-R CC CONT Pin1	8	External resistor to control current output. 0~10kΩ voltage is used to control the full scale current output of the instrument (0%~100%)
EXT-R CC CONT Pin2	9	External resistor to control current output. 0~10kΩ voltage is used to control the full scale current output of the instrument (0%~100%)
V MON	10	Voltage detection output, voltage 0~10V corresponds to the full-scale output 0%~100%
I MON	11	Current detection output, voltage 0~10V corresponds to the full scale output 0%~100%
SHUTDOWN	12	The shutdown signal turns off the output or power supply when using a TTL low level signal. Shutdown signal boosted to 5V, 10kΩ pull-up resistor
CURRENT_SUM_1	13	The current total input signal of the host from the first slave CURRENT SUM OUTPUT. Used only in parallel mode

CURRENT_SUM_2	14	The current total input signal of the host from the second slave CURRENT SUM OUTPUT. Used in parallel mode only
FEEDBACK	15	Parallel control signals in master-slave parallel operation
A COM	16	Analog signal common terminal. For remote sampling, connect to the sense- terminal. For non-remote sampling, connected to negative output terminal.
STSTUS COM	17	Common status signals 18,19,20,21 and 22
CV STATUS	18	On in CV mode (opto-coupled open collector output)
CC STATUS	19	On in CC mode (opto-coupled open collector output)
ALM STATUS	20	Turns on when any of the protection modes (OVP, OCP) are tripped or when a shutdown signal is input.
OUTPUT ON STATUS	21	Open when output is on (optically coupled open collector output)
POWER OFF STATUS	22	Turns on when power is off
N.C.	23	connectionless
OUT ON/OFF CONT	24	(Default setting) Turns the output on/off when a TTL low signal is used. Internal circuitry boosted to 5V, 10kΩ pull-up resistor
SER SLV IN	25	Serial Slave Input for Master-Slave Serial Operation
N.C.	26	connectionless

4.3 Instrument Series Output

This series of instruments can output two instruments of the same type in series, the instrument as the master unit will change the on-line mode to the host stand-alone in the power-off setting page, and the instrument as the slave will change the on-line mode to the slave series in the power-off setting page, and then the actual voltage *2 will be turned on after the output is turned on and the current will remain unchanged, and the host will show the voltage to be the stand-alone voltage of this instrument, and the power to be the stand-alone power of this instrument.

Note: Only TH671XA, TH672XA series have series output function.

The online schematic is shown in Figure 4-3.

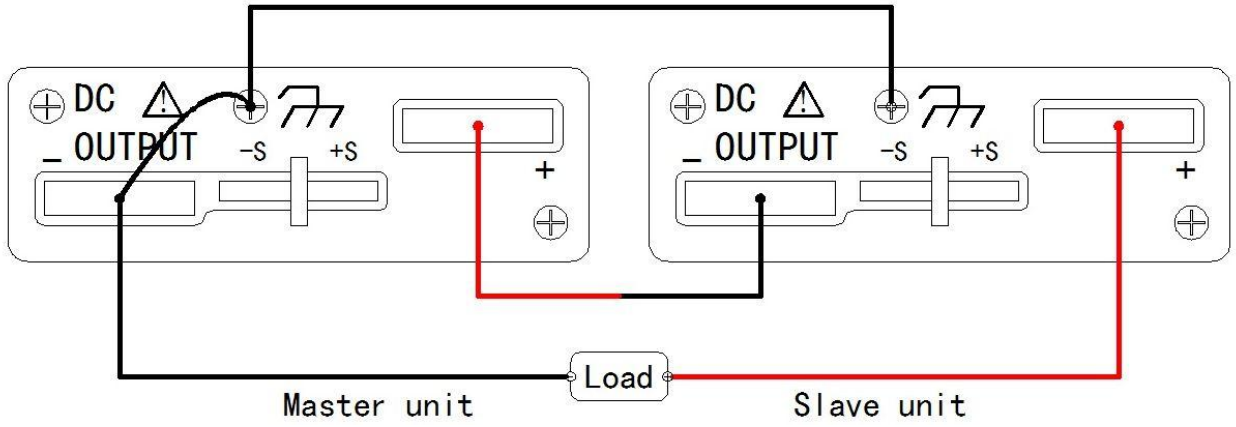


Figure 4-3

A diagram of the series connection legs is shown in Figure 4-3-1

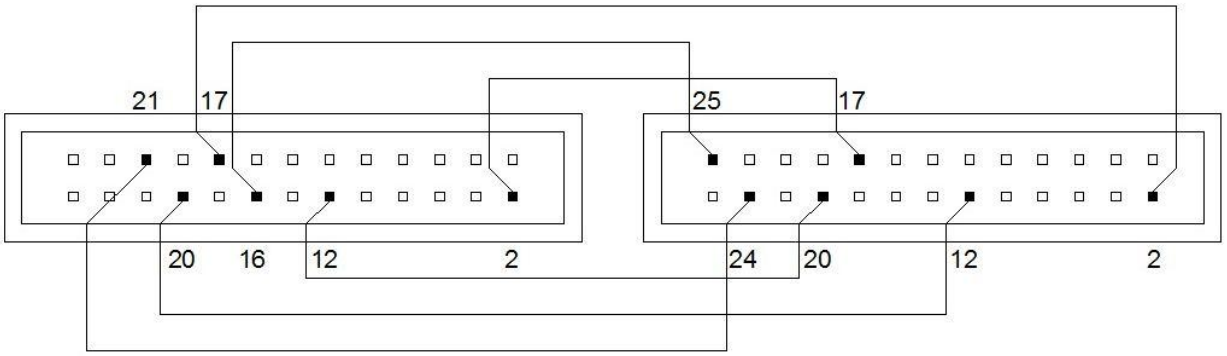


Figure 4-3-1

Host Pins		Tandem Slave Pins
16 - A COM	----------	25 -- SER SLV IN
21 --OUTPUT ON STATUS	----------	24 --OUT OFF/ON CONT
20 --ALM STATUS	----------	12 --SHUTDOWN
17 -- STATUS COM	----------	2 -- D COM
12 -- SHUTDOWN	----------	20 --ALM STATUS
2 - D COM	----------	17 -- STATUS COM

4.4 Instrument Parallel Output

4.4.1 Host in one - parallel

Output two instruments of the same model in parallel, the instrument as the host will change the on-line mode to host one and the instrument as the slave will change the on-line mode to slave parallel in the power-off setting page, the actual voltage will be unchanged after the output is turned on and the current *2, the host will display the current as the total current of the two instruments, and the power will be the total power of the two instruments.

The online schematic is shown in Figure 4-4.

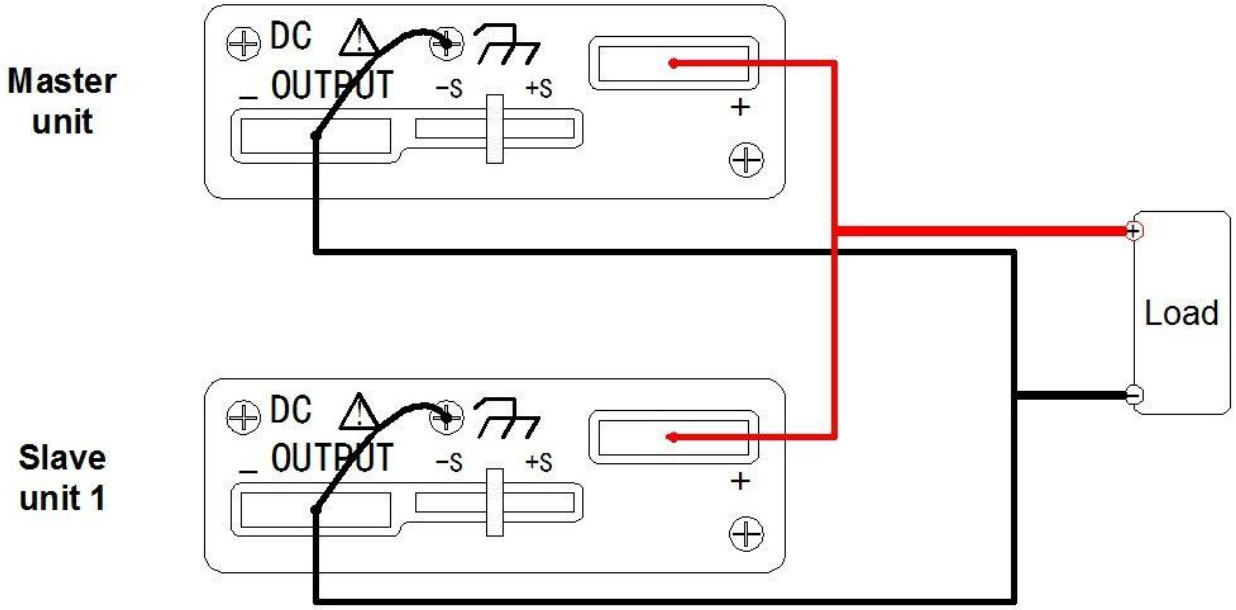


Figure 4-4

The parallel connection footage schematic is shown in Figure 4-4-1

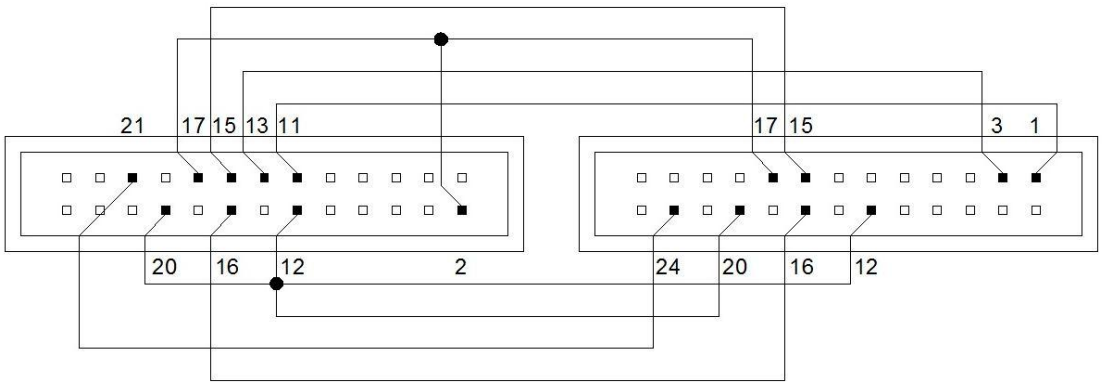


Figure 4-4-1

Host Pins		Slave Pins
11 -- I MON	----------	1 -- CURRENT SHARE
21 --OUTPUT ON STATUS	----------	24 --OUT OFF/ON CONT
20 --ALM STATUS	----------	12 --SHUTDOWN
12 -- SHUTDOWN	----------	20 --ALM STATUS
17 -- STATUS COM	----------	17 --STATUS COM
2 - D COM		
15 -- FEE DBACK	----------	15 -- FEE DBACK
13 --CURRENT_SUM_1	----------	3 --CURRENT SUM OUT
16 - A COM	----------	16-A COM

4.4.2 Host in Two-Parallel

Three instruments of the same model will be output in parallel, the instrument as the host will change the on-line mode to two parallels of the host in the power-off setting page, and the two instruments as the slaves will change the on-line mode to parallel connection of the slaves in the power-off setting page, the actual voltage will be unchanged after the output is turned on, and the current will be *3, and the host will display the current as the total current of the three instruments, and the power will be the total power of the three instruments.

The online schematic is shown in Figure 4-4-2.

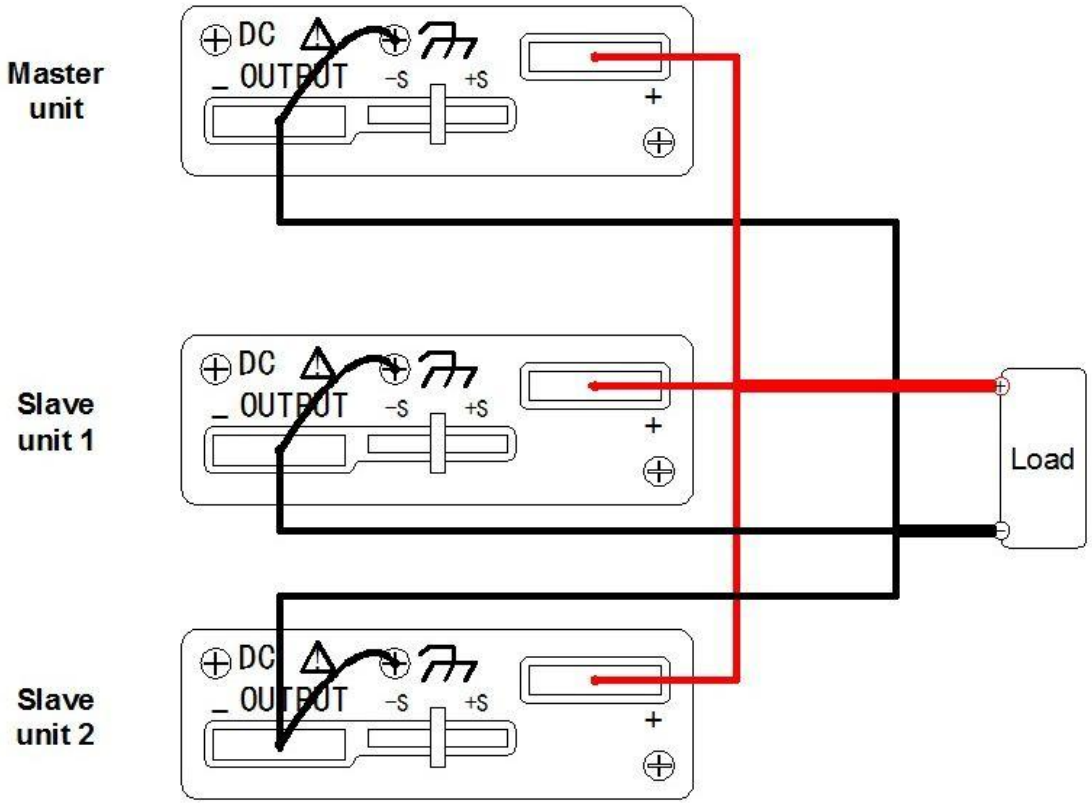


Figure 4-4-2

The parallel connection footage schematic is shown in Figure 4-4-2-1

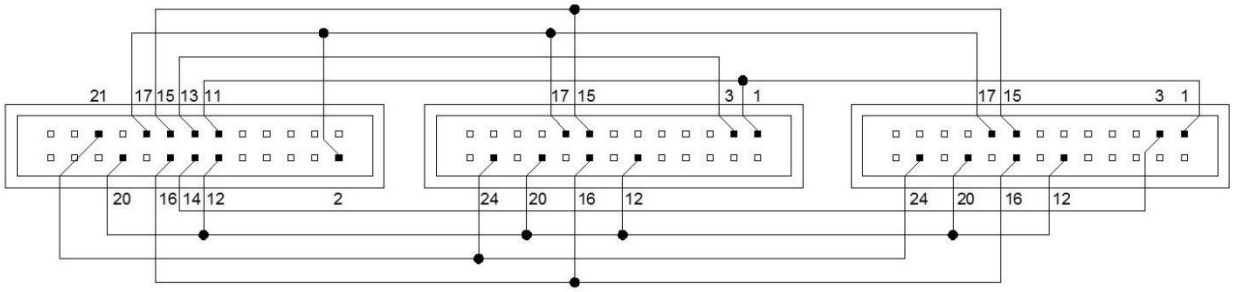


Figure 4-4-2-1

Host Footprints	Slave 1 Pin	Slave 2
11 -- I MON	------- 1 -- CURRENT SHARE	------- 1 -- CURRENT SHARE
21 --OUTPUT ON STATUS	------- 24 --OUT OFF/ON CONT	------- 24 --OUT OFF/ON CONT
20 --ALM STATUS	------- 12 --SHUTDOWN	------- 12 --SHUTDOWN
12 --SHUTDOWN	------- 20 --ALM STATUS	------- 20 --ALM STATUS

17 -- STATUS COM ------- 17 --STATUS COM ------- 17 --STATUS COM

2 - D COM

15 -- FEE DBACK ------- 15 --FEE DBACK ------- 15 --FEE DBACK

14 --CURRENT_SUM_2 ---------- 3 --CURRENT SUM OUT

13 --CURRENT_SUM_1 ------- 3 --CURRENT SUM OUT

16 --A COM ------- 16 --A COM ------- 16 --A COM

4.5 External Control Outputs

This series of instruments can not only set the parameters through the panel, but also through the instrument rear panel socket access to the voltage source and resistance, direct control of the output voltage or current.

The instrument voltage and current settings can be changed by adjusting the size of the external access voltage source or the size of the resistor.

4.5.1 CV External Voltage

The constant voltage control is changed to external voltage within the power failure setting, when the external voltage input is 0~10V, the corresponding instrument voltage is set to 0~30V.

The rear panel voltage source wiring is shown in Figure 4-5-1.

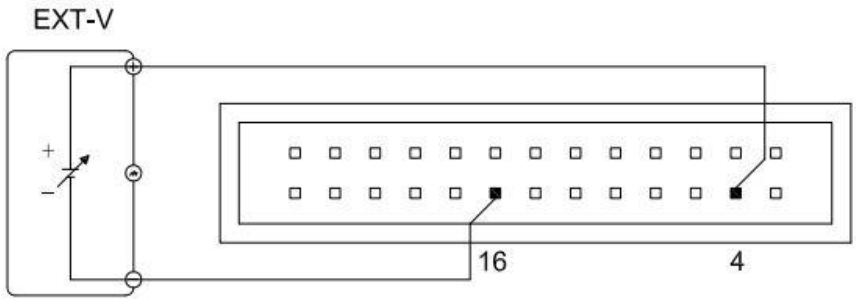


Figure 4-5-1

4.5.2 CV External Resistor Rise

The constant voltage control is changed to an external resistor rise within the power-down setting, which corresponds to the instrument voltage setting of 0~30V when the external resistor is 0~10kΩ.

The rear panel resistor wiring is shown in Figure 4-5-2.

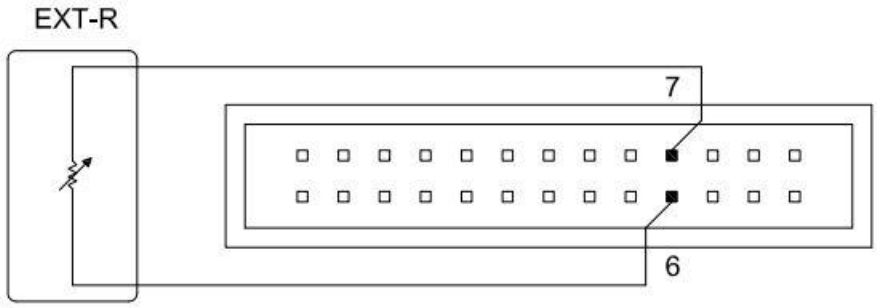


Figure 4-5-2

4.5.3 CV External Resistance Drop

The constant voltage control is changed to an external resistor drop within the power-down setting, which corresponds to the instrument voltage setting of 30~0V when the external resistor is 0~10kΩ.

The rear panel resistor wiring is shown in Figure 4-5-3.

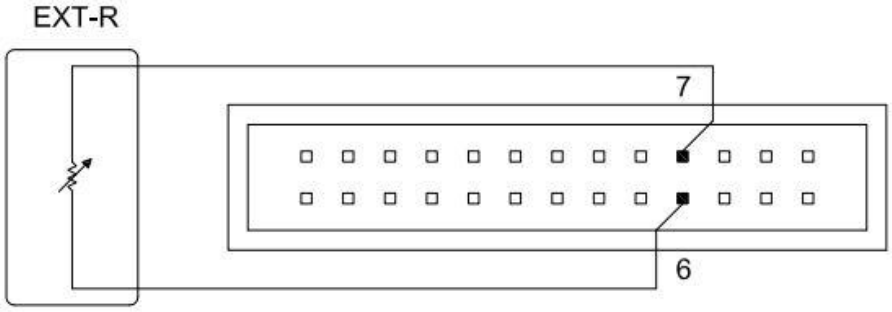


Figure 4-5-3

4.5.4 CC External Voltage

The constant current control is changed to external voltage within the power-down setting, at which time the external voltage input of 0~10V corresponds to the instrument voltage settings of 0~36A (TH6711A), 0~72A (TH6712A), and 0~108A (TH6713A).

The rear panel voltage source wiring is shown in Figure 4-5-4.

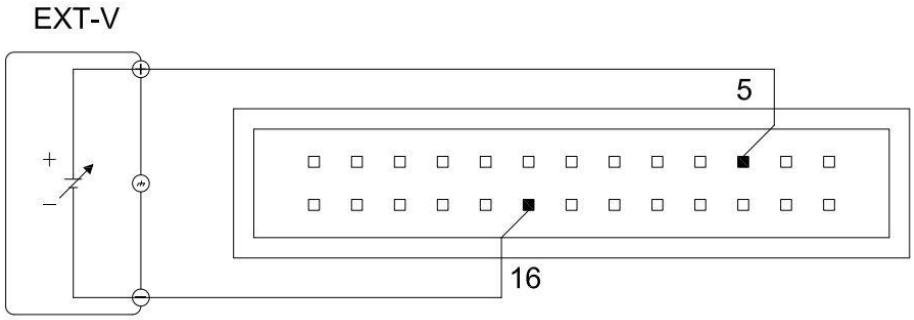


Figure 4-5-4

4.5.5 CC external resistor rising

The constant current control is changed to an external resistor rise within the power-down setting, when the external resistor 0~10kΩ corresponds to the instrument voltage settings 0~36A (TH6711A), 0~72A (TH6712A), and 0~108A (TH6713A).

The rear panel voltage source wiring is shown in Figure 4-5-5.

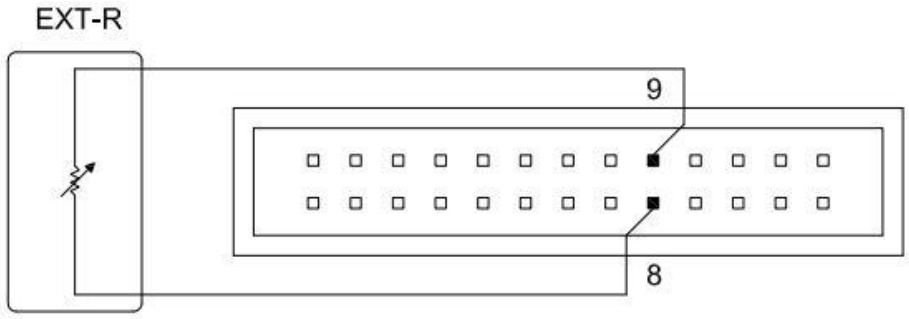


Figure 4-5-5

4.5.6 CC External Resistance Drop

The constant current control is changed to an external resistor drop within the power-down setting, when the external resistor 0~10kΩ corresponds to the instrument voltage settings 36~0A (TH6711A), 72~0A (TH6712A), 108~0A (TH6713A).

The rear panel voltage source wiring is shown in Figure 4-5-6.

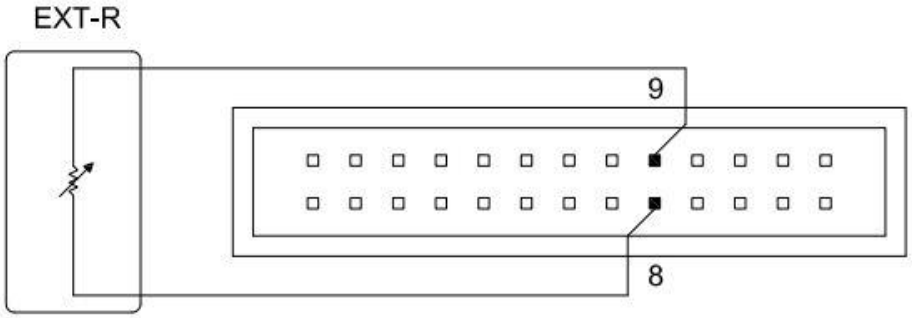


Figure 4-5-6

Chapter 5 Interfaces and Communication

The instrument can be used with LAN port and USB port for data communication and remote control without instrument panel, but they cannot be used at the same time; they have the same programmed commands but use different hardware configuration and communication protocols.

5.1 LAN

5.1.1 LAN remote control system

The LAN (Local Area Network) remote control system controls the unit via the LAN interface. Compatible with this instrument SCPI commands.

5.1.2 System Configuration

Connect the LAN port on the rear panel of the TH6700A series instrument to the network port of your computer via a network cable. Set the IP and port to be used. The instrument port number (PORT) is 8000 and cannot be changed.

5.2 USBTMC

5.2.1 USBTMC Remote Control System

The USB (Universal Serial Bus) remote control system controls the device via the USB interface and is compatible with the SCPI commands of this instrument.

5.2.2 System Configuration

Connect the USB port on the rear panel of the TH6700A to the USB port on the host computer via the USB cable, and the Device Manager appears USB Test and Measurement Devices.

5.3 USBCDC

5.3.1 USBCDC Virtual Serial Port

The USB interface can be configured as a virtual serial port (VCom) by selecting the bus method "USBCDC". Compatible with SCPI commands.

5.3.2 System Configuration

Connect the USB port on the rear panel of the TH6700A series instrument to the USB port on the host computer via the USB cable.

5.4 Communication Instruction

This instrument references the SCPI (Standard Command for Programmable Instruments) instructions. The SCPI instructions are tree-structured, where the highest level is called a subsystem instruction. The layers under the instruction are valid only if a subsystem instruction is selected, using colons to separate the hierarchy of instructions.

5.4.1 Basic rules of instruction structure

(1) Ignore case.

(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.

(3) Some instructions have no parameters.

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

(5) Instructions may be abbreviated or spelled out in their entirety (lower case letters may be omitted in subsequent instruction narratives).

(6) The instruction is immediately followed by a question mark (?) Execute a query corresponding to the instruction.

(7) Those within [ ] may be omitted.

(8) Two commands are separated by a semicolon.

5.4.2 Subsystem commands for the instrument

- Public Instruction
- APPLY Voltage-current complex setting
- DISPLAY Page display

- MEASURE Show Query
- OUTPUT Output Settings
- SENSE Measurement speed
- SOURCE set up
- SYSTEM System Setup

5.4.3 Public Commands

5.4.3.1 Search for Instruments

◆ Description：For querying instrument model, version, etc.

Syntax: *IDN?

5.4.3.2 Instrument Reset

◆ Description: Used to reset the instrument, the instrument parameter settings are restored to the initial values

Syntax: *RST

5.4.3.3 Restore the factory

◆ Description：Used to restore the instrument to the factory, set parameters, system parameters to restore initial value

Syntax: *FACT

5.4.4 APPLY subsystem command set

◆ Description: Simultaneously set/query output voltage and output current

Syntax: APPLy {<voltage>|MIN|MAX},{<current>|MIN|MAX}

APPLy?

Parameter: <voltage>: set voltage value in V

<current>: set current value in A

MIN: Minimum value of set voltage or current for current model

MAX: Maximum value of set voltage or current for current model

Example: APPL:1.1,2.2 ---- Set the output voltage 1.1V and current 1.2A.

APPL? ---- Query the current set voltage current.

5.4.5 DISPLAY subsystem command set

- Description: control page switching

Syntax: DISPlay:MENU[:NAME] <pagenum>

DISPlay:MENU[:NAME]?

The meaning of the parameter: <pagenum> is described in the following table:

The value of pagenum	Meaning	Query return content
0	Measuring and displaying voltage and current	0
1	Measuring and displaying voltage and power	1
2	Measurement display power current	2
3	Voltage and current setting page	3
4	OVP,OCP Setting Page	4
5~~99	null	5~~99
100~~199	Corresponding setting F00~~F99	100~~199

Example: DISP:MENU 3 ---- Access the Voltage and Current Setting page.

DISP:MENU? ---- Query the current page, refer to the above table for contents.

5.4.6 MEASURE subsystem command set

5.4.6.1 Query output current

- Description：Used to query the current output and displayed on the screen current value, unit A

Syntax: MEASure[:SCALar]:CURRent[:DC]?

Example: MEAS:CURR?---- Query current current value

5.4.6.2 Query Output Voltage

- Description：Used to query the current output and display the voltage value on the screen, unit V

  Syntax: MEASure[:SCALar]:VOLTage[:DC]?

  Example: MEAS:VOLT?---- Query current voltage value

5.4.6.3 Query Output Power

- Description：Used to query the current output and display the power value on the screen, unit W

  Syntax: MEASure[:SCALar]:POWer[:DC]?

  Example: MEAS:POW ?---- Query current power value

5.4.7 OUTPUT subsystem command set

5.4.7.1 start-up delay

- Description：Used to set the query instrument startup delay time, unit s

  Syntax: OUTPut:DELay:ON <NRf>

  OUTPut:DELay:ON?

  Parameter: <NRf>---- startup delay time, 0~~99.99s, 0 for no delay

  Example: OUTP:DEL:ON 5 ---- Setting the startup delay to 5 seconds

  OUTP:DEL:ON? ---- Query startup delay time

5.4.7.2 Off Delay

- Description：Used to set the query instrument shutdown delay time, unit s

  Syntax: OUTPut:DELay:OFF <NRf>

  OUTPut:DELay:OFF?

  Parameter: <NRf>---- off delay time, 0~~99.99s, 0 is no delay

  Example: OUTP:DEL:OFF 10 ---- Setting the off delay to 10 seconds

OUTP:DEL:OFF? ---- Queries the startup delay time.

5.4.7.3 Conversion speed

- Description: Used to set the conversion speed of the query instrument

Syntax: OUTPut:MODE {0|1|2|3|CVHS|CCHS|CVLS|CCLS}

OUTPut:MODE?

Parameters: 0/ CVHS ---- Constant Voltage High Speed

1/ CCHS ---- Constant Current High Speed

2/ CVLS ---- Constant pressure can be set

3/ CCLS ---- Constant current settable

Example: OUTP:MODE 0---- Setting the Instrument to Constant Voltage High Speed Mode

OUTP:MODE ?---- Queries the current conversion speed (returns a number)

5.4.7.4 Output Switch

- Description: Used to set the output state of the query instrument

Syntax: OUTPut[:STATe][:IMMediate] {OFF|ON|0|1}

OUTPut[:STATe][:IMMediate]?

Parameters: 0/ OFF ---- Turns off the output

1/ ON ---- Turn on the output

Instance: OUTP 0 ---- Setting the instrument output off

OUTP? ---- Queries the current output status (returns a number)

5.4.7.5 Protection Inquiry

- Description：Used to query the protection status of the instrument, which will be eliminated after querying

Syntax: OUTPut: PROTection?

Parameters: OK ---- No alarm

OVP ---- Overvoltage Protection

OCP ---- Overcurrent Protection

OTP ---- Over Temperature Protection

ALM ---- Limit voltage protection

Example: OUTP: PROT? ---- Query protection status

5.4.8 SEHSE Subsystem Command Set

5.4.8.1 Measurement speed

- Description: Used to set the measurement speed of the query instrument

Syntax: SENSe:AVERage:COUNt {0|1|2|LOW|MIDDle|HIGH}

SENSe:AVERage:COUNt?

Parameters: 0/ LOW ---- LOW

1/ MIDDle ---- Medium speed

2/ HIGH ---- High Speed

Example: SENSe:AVERage:COUNt 0---- Setting the Instrument Measurement Speed Low

SENSe:AVERage:COUNt ?---- Query current measured speed (return number)

5.4.9 SOURce subsystem command set

5.4.9.1 Current Setting Value

- Description: Used to set the current setting of the query instrument

Syntax: [SOURce:]CURRent[:LEVel][:IMMediate][:AMPLitude] {<NRf>|MIN|MAX}

[SOURce:]CURRent[:LEVel][:IMMediate][:AMPLitude]?

Parameters: <NRf> ---- Allowable current setting value for current model

MIN ---- Minimum value of current setting for current model

MAX ---- Maximum value of current setting for current model

Example: CURR 2 ---- Setting the current setpoint to 2A

CURR? ---- Queries the current current setting value (returns a number)

5.4.9.2 OCP

- Description: Used to set the overcurrent protection of the query instrument

Syntax: [SOURce:]CURRent:PROTection[:LEVel] {<NRf>|MIN|MAX}

[SOURce:]CURRent:PROTection[:LEVel]?

Parameters: <NRf> ---- Allowable overcurrent protection value for the current model

MIN ---- Minimum value for overcurrent protection for current models

MAX ---- Maximum overcurrent protection for current models

Example: CURR:PROT 5 ---- Set the overcurrent protection value to 5A

CURR:PROT? ---- Query current overcurrent protection value (return number)

5.4.9.3 Current Rise Rate

- Description: Used to set the current rise rate of the query instrument

Syntax: [SOURce:]CURRent:SLEW:RISing {<NRf>|MIN|MAX}

[SOURce:]CURRent:SLEW:RISing?

Parameters: <NRf> ---- Current Model Allowable Current Rise Rate Value

MIN ---- Current Model Current Rise Rate Min.

MAX ---- Maximum current rate of rise for current models

Example: CURR:SLEW:RIS 5 ---- Set the current rise rate value to 5A/s

CURR:SLEW:RIS? ---- Queries the current rate of rise value (return number)

5.4.9.4 Current Drop Rate

- Description: Used to set the current drop rate of the query instrument

Syntax: [SOURce:]CURRent:SLEW:FALLing {<NRf>|MIN|MAX}

[SOURce:]CURRent:SLEW:FALLing?

Parameters: <NRf> ---- Current model allowable current drop rate value

MIN ---- Current Model Current Drop Rate Min.

MAX ---- Maximum Current Drop Rate for Current Models

Example: CURR:SLEW:FALL 5 ---- Sets the current fall rate value to 5A/s

CURR:SLEW:FALL? ---- Queries the current drop rate value (return number)

5.4.9.5 analog internal resistance

- Description: Used to set the analog internal resistance of the query instrument

Syntax: [SOURce:]RESistance[:LEVel][:IMMediate][:AMPLitude] {<NRf>|MIN|MAX}

[SOURce:]RESistance[:LEVel][:IMMediate][:AMPLitude]?

Parameters: <NRf> ---- Analog internal resistance value allowed for the current model number

MIN ---- Analog Internal Resistance Minimum for current models

MAX ---- Maximum Analog Internal Resistance for Current Models

Example: RES 5 ---- Setting the analog internal resistance to 5Ω

RES? ---- Queries the current analog internal resistance value (return number)

5.4.9.6 Voltage Setting

- Description: Used to set the voltage setting value of the query instrument

Syntax: [SOURce:]VOLTage[:LEVel][:IMMediate][:AMPLitude] {<NRf>|MIN|MAX}

[SOURce:]VOLTage[:LEVel][:IMMediate][:AMPLitude]?

Parameters: <NRf> ---- Allowable voltage setting for current model

MIN ---- Voltage setting minimum for current model

MAX ---- Voltage Setting Maximum for Current Models

Example: VOLT 2 ---- Setting the voltage setting value to 2V

VOLT? ---- Queries the current voltage setting (returns a number)

5.4.9.7 OVP

- Description: Used to set the overvoltage protection of the query instrument

Syntax: [SOURce:]VOLTage:PROTection[:LEVel] {<NRf>|MIN|MAX}

[SOURce:]VOLTage:PROTection[:LEVel]?

Parameters: <NRf> ---- Allowable overvoltage protection value for current model

MIN ---- Minimum overvoltage protection for current models

MAX ---- Overvoltage Protection Maximum for Current Models

Example: VOLT:PROT 5 ---- Setting the overvoltage protection value to 5V

VOLT:PROT? ---- Queries the current overvoltage protection value (return number)

5.4.9.8 Voltage Rise Rate

- Description: Used to set the voltage rise rate of the query instrument

Syntax: [SOURce:]VOLTage:SLEW:RISing {<NRf>|MIN|MAX}

[SOURce:]VOLTage:SLEW:RISing?

Parameters: <NRf> ---- Voltage Rise Rate value allowed for current models

MIN ---- Voltage Rise Rate Minimum for current models

MAX ---- Voltage Rise Rate Maximum for Current Models

Example: VOLT:SLEW:RIS 5 ---- Sets the voltage rise rate value to 5V/s

VOLT:SLEW:RIS? ---- Queries the current voltage rise rate value (return number)

5.4.9.9 Voltage drop rate

- Description: Used to set the voltage drop rate of the query instrument

Syntax: [SOURce:]VOLTage:SLEW:FALLing {<NRf>|MIN|MAX}

[SOURce:]VOLTage:SLEW:FALLing?

Parameters: <NRf> ---- Voltage drop rate value allowed for current model

MIN ---- Voltage Drop Rate Minimum for Current Models

MAX ---- Voltage Drop Rate Maximum for Current Models

Example: VOLT:SLEW:FALL 5 ---- Sets the voltage drop rate value to 5V/s

VOLT:SLEW:FALL? ---- Queries the current voltage drop rate value (return number)

5.4.10 SYSTEM subsystem command set

5.4.10.1 Audible Switch

- Description: Used to set the alarm switch of the query instrument.

Syntax: SYSTem:CONFigure:BEEPer[:STATe] {OFF|ON|0|1}

SYSTem:CONFigure:BEEPer[:STATe]?

Parameters: 0/ OFF ---- Turning off the signaling

1/ ON ---- Turning on the audible signal

Example: SYST:CONF:BEEP 0 ---- Setting the instrument alarm off

SYST:CONF:BEEP? ---- Query current alarm status (return number)

5.4.10.2 Drain Resistor

- Description: Used to set the query instrument's bleeder resistance

Syntax: SYSTem:CONFigure:BLEeder[:STATe] {OFF|ON|0|1}

SYSTem:CONFigure:BLEeder[:STATe]?

Parameters: 0/ OFF ---- Off Drain Resistor

1/ ON ---- Open Drain Resistor

Example: SYST:CONF:BLE 0 ---- Setting Instrument Drain Resistor Off

SYST:CONF:BLE? ---- Query current bleeder resistance status (return number)

5.4.10.3 CC Control Mode

- Description: Used to set the CC control mode of the query instrument

Syntax: SYSTem:CONFigure:CURRent:CONTrol {0|1|2|3}

SYSTem:CONFigure:CURRent:CONTrol?

Parameters: 0 ---- Panel control

1 ---- External Voltage Control

2 ---- External resistor control (rising)

3 ---- External resistor control (falling)

Example: SYST:CONF:CURR:CONT 0---- Setting CC Panel Controls

SYST:CONF:CURR:CONT?---- Query CC control mode (return number)

5.4.10.4 CV control mode

- Description: Used to set the CV control mode of the query instrument

Syntax: SYSTem:CONFigure:VOLTage:CONTrol {0|1|2|3}

SYSTem:CONFigure:VOLTage:CONTrol?

Parameters: 0 ---- Panel control

2 ---- External Voltage Control

2 ---- External resistor control (rising)

3 ---- External resistor control (falling)

Example: SYST:CONF:VOLT:CONT 0---- Setting up CV panel control

SYST:CONF:VOLT:CONT?---- Query CV control mode (return number)

5.4.10.5 Online

- Description: Used to set the online status of the query instrument

Syntax: SYSTem:CONFigure:MSLave {0|1|2|3|4}

SYSTem:CONFigure:MSLave?

Parameters: 0 ---- Host Standalone

1 ---- Host in one- parallel

2 ---- Host in two- parallel

3 ---- Slave in Parallel

4 ---- Slave in Series

Example: SYST:CONF:MSL 0 ---- Setting the instrument as a host standalone

SYST:CONF:MSL? ---- Query instrument online mode (return number)

5.4.10.6 External Logic

- Description: External logic used to set up the query instrument

Syntax: SYSTem:CONFigure:OUTPut:EXTernal[:MODE] {0|1|HIGH|LOW}

SYSTem:CONFigure:OUTPut:EXTernal[:MODE]?

Parameters: 0 ---- High level ON

1 ---- Low Level ON

HIGH ---- High level ON

LOW ---- Low ON

Example: SYST:CONF:OUTP:EXT 0 ---- Setting the instrument to high level on

SYST:CONF:OUTP:EXT? ---- Query instrument external logic (return number)

5.4.10.7 Power-on Output

- Description: Used to set the power-up output of the query instrument

Syntax: SYSTem:CONFigure:OUTPut:PON[:STATe] {OFF|ON|0|1}

SYSTem:CONFigure:OUTPut:PON[:STATe]?

Parameters: 0 ---- Power-up output off

1 ---- Power-up output on

OFF ---- Power-up output off

ON ---- Power-up output on

Example: SYST:CONF:OUTP:PON 0---- Setting Instrument Power-Up Output Off

SYST:CONF:OUTP:PON? ---- Query instrument power-up output (return number)

5.4.10.8 Communication Interface

- Description：Used to set the communication interface for querying the use of the instrument.

Syntax: SYSTem:COMMunicate:ENABle {0|1|2|LAN|USBCDC|USBTMC}

SYSTem:COMMunicate:ENABle?

Parameters: 0 ---- LAN

1 ---- USB-CDC

2 ---- USB-TMC

LAN ---- LAN

USBCDC ---- USB-CDC

USBTMC ---- USB-TMC

Example: SYST:COMM:ENAB 0 ---- Sets the instrument communication interface to LAN

SYST:COMM:ENAB? ---- Query instrument communication interface (return number)

5.4.10.9 IP Address

- Description: Used to set the IP address of the query instrument

Syntax: SYSTem:COMMunicate:LAN:IPADdress <address>

SYSTem:COMMunicate:LAN:IPADdress?

Parameter: address---- Set IP address

Example: SYST:COMM:LAN:IPAD 192.168.1. 1---- Setting the IP address

SYST:COMM:LAN:IPAD? ---- Query IP

5.4.10.10 Gateway

- Description: Used to set the gateway for querying the instrument

Syntax: SYSTem:COMMunicate:LAN:GATEway <gateway>

SYSTem:COMMunicate:LAN:GATEway?

Parameters: gateway---- set gateway

Example: SYST:COMM:LAN:GATE 192.168.1.1---- Setting the Gateway

SYST:COMM:LAN:GATE? ---- Query Gateway

5.4.10.11 Subnet Mask

- Description: Used to set the subnet mask of the query instrument

Syntax: SYSTem:COMMunicate:LAN:SMASk <mask>

SYSTem:COMMunicate:LAN:SMASk?

Parameters: mask---- Subnet mask to set

Example: SYST:COMM:LAN:SMAS 255.255.255.0---- Setting the subnet mask

SYST:COMM:LAN:SMAS? ---- Query Subnet Mask

5.4.10.12 Host Address

- Description: Used to query the host address of the instrument

Syntax: SYSTem:COMMunicate:LAN:MAC?

Parameters: mask---- Subnet mask to set

Example: SYST:COMM:LAN:MAC? ---- Query host address

5.4.10.13 Output Lockout

- Description: Used to set the output lock of the query instrument

Syntax: SYSTem:KEYLock:MODE {0|1}

SYSTem:KEYLock:MODE?

Parameters: 0 ---- Locked status only outputs can be turned off

1 ---- Outputs can be turned on and off in a locked state

Example: SYST:KEYL:MODE 0 ---- Setting the instrument lock state can only turn off the output

SYST:KEYL:MODE? ---- Query Instrument Output Lockout (return number)

5.4.10.14 Panel Lock

- Description: Used to set the panel lock status of the query instrument

Syntax: SYSTem:KLOCk {OFF|ON|0|1}

SYSTem:KLOCk?

Parameters: 0 ---- panel unlock

1 ---- Panel Lock

OFF ---- Panel Unlock

ON ---- Panel Lock

Example: SYST:KLOC 0 ---- Setting the instrument panel to unlock

SYST:KLOC? ---- Query panel lock status (return digit)

Chapter 6 Technical Parameter Indicators

TH671XA

Parameters	TH6711A	TH6712A	TH6713A
Rated voltage	30V		
Rated current	33A	66A	100A
Rating	360W	720W	1080W
Maximum voltage	31.5V		
Maximum current	36A	72A	108A
Power limit	Approx. 105% of rated power		
Voltage setting range	0~31.5V		
Current setting range	0~36A	0~72A	0~108A
Startup delay setting range	0~99.99s		
Stop delay setting range	0~99.99s		
Voltage rise setting range	0.01~60V/s		
Voltage drop setting range	0.01~60V/s		
Current rise setting range	0.01~72A/s	0.1~144A/s	0.1~216A/s
Current drop setting range	0.01~72A/s	0.1~144A/s	0.1~216A/s
Analog internal resistance setting range	0~0.833Ω	0~0.417Ω	0~0.278Ω
CV power conditioning rate	≤18mV		
CC Power Regulation Rate	≤41mA	≤77mA	≤113mA
CV load regulation rate	≤20mV		
CC load regulation rate	≤41mA	≤77mA	≤113mA
CV Ripple and Noise (20Hz-2MHz)	≤60mVp-p and 7mVrms	≤80mVp-p and 11mVrms	≤100mVp-p and 14mVrms
CC Ripple and Noise (20Hz-2MHz)	≤72mArms	≤144mArms	≤216mArms
Rise time (full load)	≤50ms		
Rise time (no load)	≤50ms		
Descent time (full load)	≤50ms		
Descent time (no load)	≤500ms		
Dynamic recovery time (recovery to 0.1% + 10mV)	≤2ms		
Overvoltage protection setting range	3~33V		
Overvoltage protection accuracy	Rated voltage* ±2%		
Overcurrent protection setting range	3.6~37.8A	5~75.6A	5~113.4A
Overcurrent protection accuracy	Rated current* ±2%		
Over-temperature protection (shutdown output)	Internal temperature rise decision		
Voltage Setting Value Resolution	10mV		
Current Setting Value Resolution	10mA	10mA	100mA
Voltage setpoint accuracy 25 ℃±5 ℃ (>0.1V)	≤0.1%+10mV		
Current setpoint accuracy 25 ℃±5 ℃ (>0.1A)	≤0.1%+30mA	≤0.1%+60mA	≤0.1%+100mA
Voltage Readback Resolution	10mV		
Current readback resolution	10mA	10mA	100mA
Voltage readback value accuracy 25℃ ±5℃ (>0.1V)	≤0.1%+20mV		
Current readback value accuracy 25℃ ±5℃ (>0.1A)	≤0.1%+40mA	≤0.1%+70mA	≤0.1%+100mA
External voltage control CV accuracy 25℃ ±5℃	Rated Output Voltage ±0.5%		

External Voltage Control CC Accuracy 25℃±5℃	Rated output current ±1%
External Resistance Control CV Accuracy 25℃±5℃	Rated Output Voltage ±1.5%
External resistance control CC accuracy 25℃±5℃	Rated Output Current ±1.5%
Parallel unit	Includes up to three mainframes (same model)
Tandem unit	Includes up to two mainframes (same model)
Power factor 100VAC (full load)	0.99
Power factor 200VAC (full load)	0.97
Efficiency 100VAC (full load)	75%
Efficiency 200VAC (full load)	77%

TH672XA

Parameters	TH6721A	TH6722A	TH6723A
Rated voltage	80V		
Rated current	12.5A	25A	37.5A
Rating	360W	720W	1080W
Maximum voltage	84V		
Maximum current	13.5A	27A	40.5A
Power limit	Approx. 105% of rated power		
Voltage setting range	0~84V		
Current setting range	0~13.5A	0~27A	0~40.5A
Startup delay setting range	0~99.99s		
Stop delay setting range	0~99.99s		
Voltage rise setting range	0.1~160V/s		
Voltage drop setting range	0.1~160V/s		
Current rise setting range	0.01~27A/s	0.01~54A/s	0.01~81A/s
Current drop setting range	0.01~27A/s	0.01~54A/s	0.01~81A/s
Analog internal resistance setting range	0~5.926Ω	0~2.963Ω	0~1.975Ω
CV power conditioning rate	≤43mV		
Cc power regulation rate	≤18.5mA	≤32mA	≤45.5mA
CV load regulation rate	≤45mV		
CC load regulation rate	≤18.5mA	≤32mA	≤45.5mA
CV Ripple and Noise (20Hz-2mhz)	≤60mVp-p and 7mVrms	≤80mVp-p and 11mVrms	≤100mVp-p and 14mVrms
CC Ripple and Noise (20Hz-2mhz)	≤27mArms	≤54mArms	≤81mArms
Rise time (full load)	≤50ms		
Rise time (no load)	≤50ms		
Descent time (full load)	≤50ms		
Descent time (no load)	≤500ms		
Dynamic recovery time (recovery to 0.1% + 10mv)	≤2ms		
Overvoltage protection setting range	8~88V		
Overvoltage protection accuracy	Rated voltage* ±2%		
Overcurrent protection setting range	1.35~14.18A	2.7~28.35A	4.05~42.53A
Overcurrent protection accuracy	Rated current* ±2%		
Over-temperature protection (shutdown output)	Internal temperature rise decision		
Voltage setting value resolution	10mV		

Current setting value resolution	10mA	10mA	100mA
Voltage setpoint accuracy 25℃±5℃ (>0.1V)	≤0.1%+10mV		
Current setpoint accuracy 25℃±5℃ (>0.1A)	≤0.1%+10mA	≤0.1%+30mA	≤0.1%+40mA
Voltage readback resolution	10mV		
Current readback resolution	10mA	10mA	100mA
Voltage readback value accuracy 25℃±5℃ (>0.1V)	≤0.1%+20mV		
Current readback value accuracy 25℃±5℃ (>0.1A)	≤0.1%+20mA	≤0.1%+40mA	≤0.1%+50mA
External voltage control CV accuracy 25℃±5℃	Rated Output Voltage ±0.5%		
External voltage control cc accuracy 25℃±5℃	Rated output current ± 1%		
External resistance control cv accuracy 25℃±5℃	Rated Output Voltage ±1.5%		
External resistance control cc accuracy 25℃±5℃	Rated Output Current ±1.5%		
Parallel unit	Includes up to three mainframes (same model)		
Tandem unit	Includes up to two mainframes (same model)		
Power factor 100VAC (full load)	0.99		
Power factor 200VAC (full load)	0.97		
Efficiency 100VAC (full load)	76%		
Efficiency 200VAC (full load)	78%		

TH673XA

Parameters	TH6731A	TH6732A	TH6733A
Rated voltage	250V		
Rated current	4.2A	8.4A	12.6A
Rating	360W	720W	1080W
Maximum voltage	262.5V		
Maximum current	4.5A	9A	13.5A
Power limit	Approx. 105% of rated power		
Voltage setting range	0~262.5V		
Current setting range	0~4.5A	0~9A	0~13.5A
Startup delay setting range	0~99.99s		
Stop delay setting range	0~99.99s		
Voltage rise setting range	0.1~500V/s		
Voltage drop setting range	0.1~500V/s		
Current rise setting range	0.001~9A/s	0.01~18A/s	0.01~27A/s
Current drop setting range	0.001~9A/s	0.01~18A/s	0.01~27A/s
Analog internal resistance setting range	0~55.55Ω	0~27.77Ω	0~18.51Ω
CV power conditioning rate	≤128mV		
Cc power regulation rate	≤9.5mA	≤14mA	≤18.5mA
CV load regulation rate	≤130mV		
CC load regulation rate	≤9.5mA	≤14mA	≤18.5mA
CV Ripple and Noise (20Hz-2mhz)	≤80mVp-p and 15mVrms	≤100mVp-p and 15mVrms	≤125mVp-p and 15mVrms
CC Ripple and Noise (20Hz-2mhz)	≤10mArms	≤20mArms	≤30mArms
Rise time (full load)	≤100ms		
Rise time (no load)	≤100ms		
Descent time (full load)	≤150ms		

Descent time (no load)	≤1200ms		
Dynamic recovery time (recovery to 0.1% + 10mv)	≤2ms		
Overvoltage protection setting range	20~275V		
Overvoltage protection accuracy	Rated voltage* ±2%		
Overcurrent protection setting range	0.45~4.72A	0.9~9.45A	1.35~14.17A
Overcurrent protection accuracy	Rated current* ±2%		
Over-temperature protection (shutdown output)	Internal temperature rise decision		
Voltage setting value resolution	100mV		
Current setting value resolution	1mA	1mA	10mA
Voltage setpoint accuracy 25℃±5℃ (>0.1V)	≤0.1%+200mV		
Current setpoint accuracy 25℃±5℃ (>0.1A)	≤0.1%+5mA	≤0.1%+10mA	≤0.1%+15mA
Voltage readback resolution	100mV		
Current readback resolution	1mA	1mA	10mA
Voltage readback value accuracy 25℃±5℃ (>0.1V)	≤0.1%+200mV		
Current readback value accuracy 25℃±5℃ (>0.1A)	≤0.1%+5mA	≤0.1%+10mA	≤0.1%+20mA
External voltage control cv accuracy 25℃±5℃	Rated Output Voltage ±0.5%		
External voltage control cc accuracy 25℃±5℃	Rated output current ±1%		
External resistance control cv accuracy 25℃±5℃	Rated Output Voltage ±1.5%		
External resistance control cc accuracy 25℃±5℃	Rated Output Current ±1.5%		
Parallel unit	Includes up to three mainframes (same model)		
Tandem unit	not have		
Power factor 100VAC (full load)	0.99		
Power factor 200VAC (full load)	0.97		
Efficiency 100VAC (full load)	77%		
Efficiency 200VAC (full load)	79%		

TH674XA

Parameters	TH6741A	TH6742A	TH6743A
Rated voltage	800V		
Rated current	1.32A	2.64A	3.96A
Rating	360W	720W	1080W
Maximum voltage	840V		
Maximum current	1.44A	2.88A	4.32A
Power limit	Approx. 105% of rated power		
Voltage setting range	0~840V		
Current setting range	0~1.44A	0~2.88A	0~4.32A
Startup delay setting range	0~99.99s		
Stop delay setting range	0~99.99s		
Voltage rise setting range	1~1600V/s		
Voltage drop setting range	1~1600V/s		
Current rise setting range	0.001~2.88A/s	0.001~5.76A/s	0.001~8.64A/s
Current drop setting range	0.001~2.88A/s	0.001~5.76A/s	0.001~8.64A/s
Analog internal resistance setting range	0~555.5Ω	0~277.8Ω	0~185.1Ω
CV power conditioning rate	≤403mV		
CC Power Regulation Rate	≤6.44mA	≤7.88mA	≤9.32mA

CV load regulation rate	≤405mV		
CC load regulation rate	≤6.44mA	≤7.88mA	≤9.32mA
CV Ripple and Noise (20Hz-2MHz)	≤150mVp-p and 30mVrms	≤200mVp-p and 30mVrms	≤200mVp-p and 30mVrms
CC Ripple and Noise (20Hz-2MHz)	≤5mArms	≤10mArms	≤15mArms
Rise time (full load)	≤150ms		
Rise time (no load)	≤150ms		
Descent time (full load)	≤300ms		
Descent time (no load)	≤2000ms		
Dynamic recovery time (recovery to 0.1% + 10mV)	≤2ms		
Overvoltage protection setting range	20~880V		
Overvoltage protection accuracy	Rated voltage* ±2%		
Overcurrent protection setting range	0.144~1.512A	0.288~3.024A	0.432~4.536A
Overcurrent protection accuracy	Rated current* ±2%		
Over-temperature protection (shutdown output)	Internal temperature rise decision		
Voltage Setting Value Resolution	100mV		
Current Setting Value Resolution	1mA	1mA	1mA
Voltage setpoint accuracy 25℃±5℃ (>0.1V)	≤0.1%+400mV		
Current setpoint accuracy 25℃±5℃ (>0.1A)	≤0.1%+2mA	≤0.1%+4mA	≤0.1%+6mA
Voltage Readback Resolution	100mV		
Current readback resolution	1mA	1mA	1mA
Voltage readback value accuracy 25℃±5℃ (>0.1V)	≤0.1%+20mV		
Current readback value accuracy 25℃±5℃ (>0.1A)	≤0.1%+2mA	≤0.1%+4mA	≤0.1%+6mA
External voltage control CV accuracy 25℃±5℃	Rated Output Voltage ±0.5%		
External Voltage Control CC Accuracy 25℃±5℃	Rated output current ±1%		
External Resistance Control CV Accuracy 25℃±5℃	Rated Output Voltage ±1.5%		
External Resistance Control CC Accuracy 25℃±5℃	Rated Output Current ±1.5%		
Parallel unit	Includes up to three mainframes (same model)		
Tandem unit	not have		
Power factor 100VAC (full load)	0.99		
Power factor 200VAC (full load)	0.97		
Efficiency 100VAC (full load)	78%		
Efficiency 200VAC (full load)	80%		

- Power conditioning rate (88-132 VAC and 170-265 VAC, constant load)
- Load regulation ratio (no load - full load, constant input voltage)
- Rise time (10%-90% of rated output voltage with rated resistive load)
- Dropout time (90%-10% of rated output voltage with rated resistive load)
- Dynamic recovery time (time for the output voltage to recover within 0.1% + 10mV of the rated output when the load varies from 50% to 100% of the rated output current)

Chapter 7 Warranty and Changes

7.1 Warranty

Warranty period: The warranty period of two years 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.

Instruments should be protected from sunlight and moisture and should be used properly in the environment described in 1.2.2.

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

7.2 Instruction Manual Change Record

1. Instruction manual version V1.0.0----------2023-02
2. Instruction manual version V1.0.1----------2023-10

Contents: Modification of instrument panel diagrams, addition of appendices

Company Statement:

What are 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 product's performance, functions, internal structure, appearance, accessories, packaging, etc. without further 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.

Chapter 8 Appendices

8.1 Instrument Warning Code

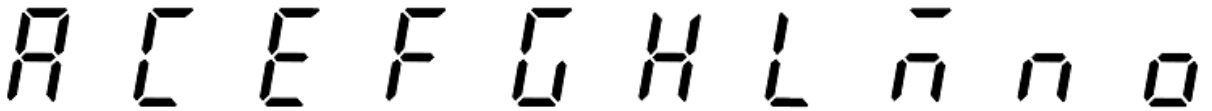
Warning Code	Instrument Display	Meaning
1	MS on	USB flash drive insertion
2	MS oFF	USB flash drive removal
4	out on	Instrument is outputting, turn off first
5	MSG 5	External Level Conflict
6	MSG 6	Output overpower
7	MSG oVP	Over Pressure Alarm
8	MSG oCP	Overcurrent Alarm
9	MSG otP	Over Temperature Alarm
10	MSG ALM	ALM Alarm
11	MSG 11	External logic low, panel not available

8.2 Instrument Error Code

Warning Code	Instrument Display	Meaning
1	Err 1	No documents, can't load
2	Err 2	documentation error
3	Err 3	File data out of range
4	Err 4	File data overpower
5	Err 5	Can't find the file.
6	Err 6	USB flash drive not inserted
7	Err 7	Failed to read upgrade file

8.3 Digital Display Comparison Table

0	1	2	3	4	5	6	7	8	9
									

A	C	E	F	G	H	L	M	n	o
									

P	r	S	t	u	V	y