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## **Operation Manual**

### **TH6400 Series**

### **Programmable DC Power Supply**

**TECHMIZE**

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## **Declaration**

The descriptions contained in this manual may not cover all information about this instrument. Introductions to the improvements of the instrument in performance, function, internal structure, outer appearance, accessories, packing material, etc. are subject to change without notice. If you find any inconformity of this manual with our instruments, please contact us for further consultation by the address listed on the cover.

# Chapter 1 Introduction

Thank you for your purchase and use of our products. This chapter will introduce the basic instrument performance, which is followed by notes of unpacking and installing.

## 1.1 Introduction to Instrument

TH6400 series is a programmable linear DC power supply with double range. The series of instruments have powerful functions and superior performance. The use of LCD screen display makes the display clear and menu operation easy, which adapt to the needs of rapid operation on the production site and high precision and stability of high-precision laboratory. Also, being equipped with RS232 interface, USB interface and GPIB interface, they are convenient for the instrument used in remote operation of the computer.

Special features and benefits of the instrument are as follows:

- 480\*272 pixels, 24-bit color, 4.3-inch color TFT LCD screen, used to set the test conditions and measurement results display
- Numeric keyboard operation
- High accuracy and high resolution
- Low ripple and low noise
- Intelligent fan control to save energy and reduce noise
- Software control and testing through the computer
- 3 channel programmable voltage and current output
- Fine-tune the value with knobs and cursors
- The maximum timer setting time is 99999.9 seconds

## 1.2 Working Condition

### ● Power Connection

Power supply: 220V (1±10%)

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

Power range: <50VA

### ● Environment Temperature and humidity

Normal working temperature: 0°C to 40°C      Humidity: < 90%RH

Reference working temperature: 20°C±8°C      Humidity: < 80%RH

Transport working temperature: 0°C~55°C      Humidity: ≤93%RH

### ● Warm-up

For accurate measurement, the warm-up time should not be less than 20 minutes.

# Chapter 2 Precautions for Usage

- Please do not use the tester in dusty, vibrative, direct sunlight and corrosive gases and other adverse environments.
- When the instrument is not used for a long time, please put it in the original box or similar box and stored in a ventilated room with temperature of 5°C~40°C and relative humidity less than 85% RH. Do not store the tester in a corrosive atmosphere containing harmful impurities and should avoid direct sunlight.
- The instrument has been carefully designed to reduce clutter due to AC power input. However, it should still be used under low noise conditions. If that is inevitable, please install the power filter.
- There is cooling fan on the rear panel and cooling vents in the left and right case to avoid influencing the accuracy due to internal temperature rise. Please make sure the instrument is in good ventilation.
- Do not switch the instrument frequently to avoid loss of stored data.

## 2.1 Dimension and Weight

- **Dimension (W\*H\*D):** 218mm\*88.8mm\*473mm
- **Weight:** 12kg

## 2.2 Safety Requirements

This tester is a Class I safe equipment.

- **Insulation resistance**

In the reference working conditions, the insulation resistance between the power terminals and the shell is not less than 50MΩ.

In hot and humid transport conditions, the insulation resistance between the power terminals and the shell is not less than 2MΩ.

- **Dielectric strength**

In the reference working conditions, the power terminal and the shell can withstand for one minute with no breakdown and flashover phenomenon of 1.5kV rated voltage and 50Hz frequency of AC voltage.

- **Leakage current**

The leakage current is not greater than 3.5mA.

## 2.3 Electromagnetic Compatibility

Power Transient Sensitivity, refer to requirements of GB6833.4.

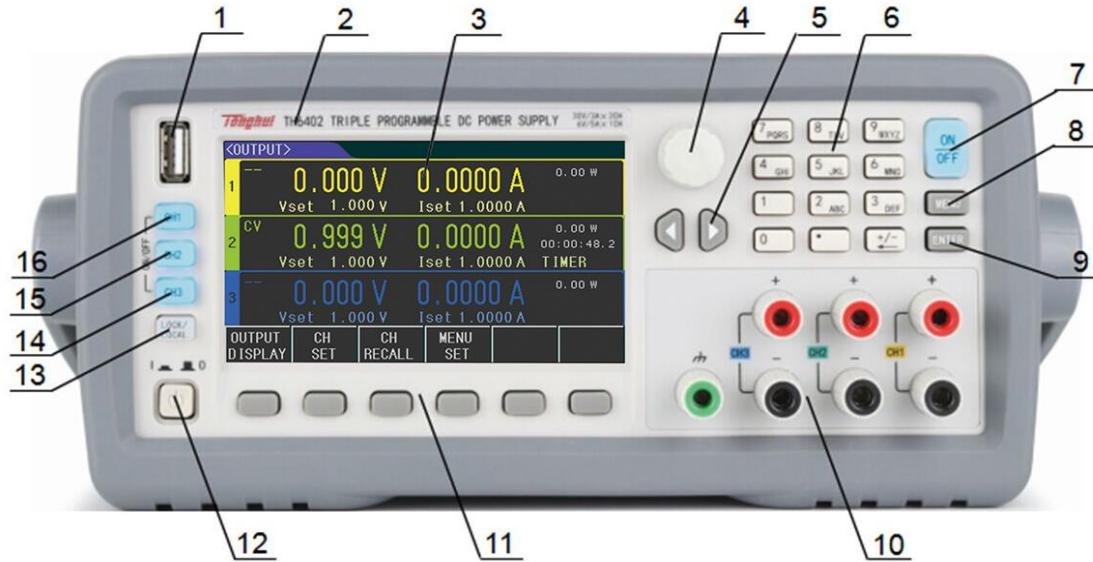
Conducted Susceptibility, refer to requirements of GB6833.6.

Radiated interference, refer to requirements of GB6833.10.

# Chapter 3 Panel

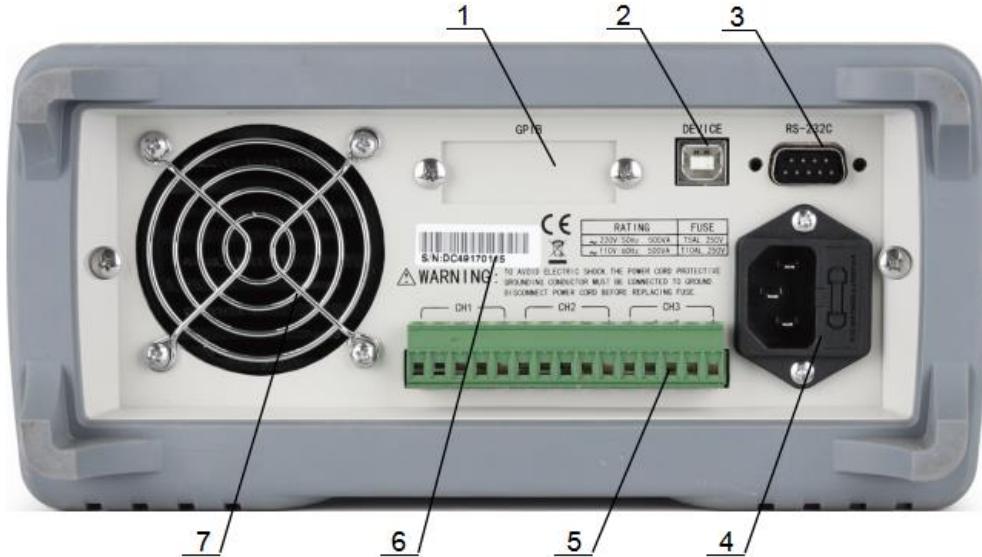
In this chapter, there is only rough description, please refer to more information in chapter 4.

## 3.1 Front panel



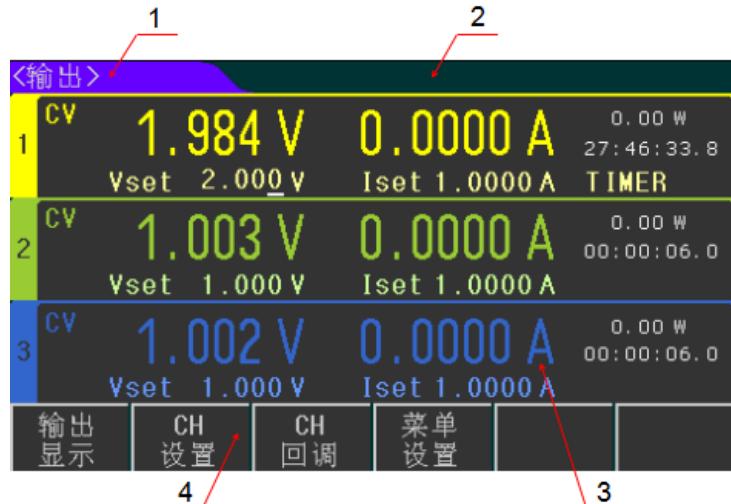
Name	Function
① USB interface	Import or export the data via the USB interface
② Trademark and model	Mark the manufacturer and model of the instrument
③ LCD display	480 × 272 pixels, 24-bit color, 4.3-inch color TFT LCD screen
④ Knob	Adjust the value or move the arrow cursor
⑤ Arrow keys	Left and right arrow keys for moving the cursor
⑥ Numeric keys	Input the specific values
⑦ [ON/OFF] key	Turn on or off the three channel output simultaneously
⑧ [MENU] key	Quick access to menu interface
⑨ [ENTER] key	To input the data and can be used with the [LOCK/LOCAL] key to take screenshots
⑩ Output terminal	Front panel output ports, total three channels
⑪ Software menu key	To set the display content
⑫ Power switch	Power switch
⑬ [LOCK/LOCAL] key	To lock the key or switch the remote control and can be used with the [ENTER] key to take screenshots
⑭ Output key for 3 channels	Corresponding to the output or close button for three channels

### 3.2 Rear panel



1	GPIB	Communicated with PC to build GPIB test system
2	USB	Controlled by PC via USB DEVICE
3	RS232	Function is same as No.2
4	Power socket	Connecting 220V/50HZ AC power supply
5	Remote test terminal	Same function as output in front panel, 4-terminal sampling function is added
6	Nameplate	Record production date, model, manufacturer

### 3.3 Display



(1.) **Display menu zone:** Display the name of current page

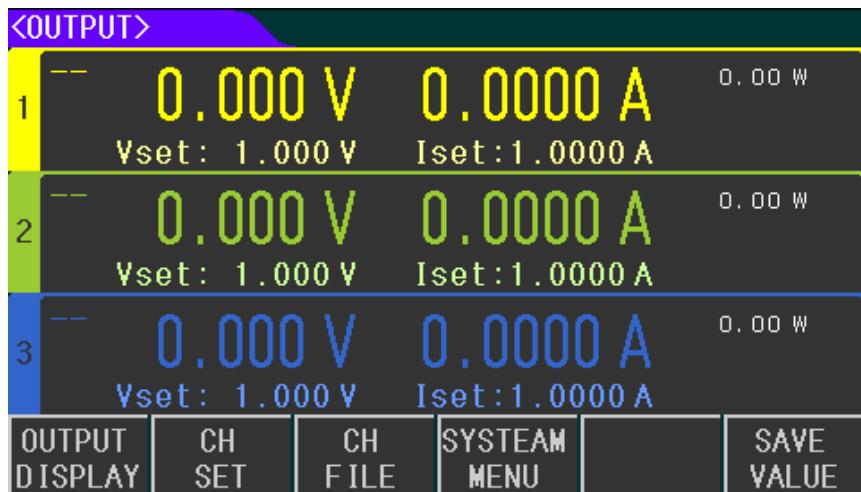
- (2.) **Status and error information zone:** Display the error information or current working status.
- (3.) **Fast setting and display zone:** In this zone, you can set the voltage, current and real time sampling numbers & timing can be displayed .
- (4.) **Softkey menu zone:** The content is flexibly, display the function matched with current softkey

# Chapter 4 Operation

## 4.1 Output display

Press **OUTPUT DISPLAY** to enter <OUTPUT> page

<OUTPUT> is displayed as below



You can set the voltage and current in 3 channels, also the measured voltage, current, power, output time and output status are displayed.

### 4.1.1 Value setting

The setting range of voltage and current in each channel is from 0 to Max.value (The Max. value is decided by different models). Use the direction key to move the cursor to the setting item, and there are 2 ways to set voltage or current:

A: Press Knob to the adjusting position, rotate it to adjust the value

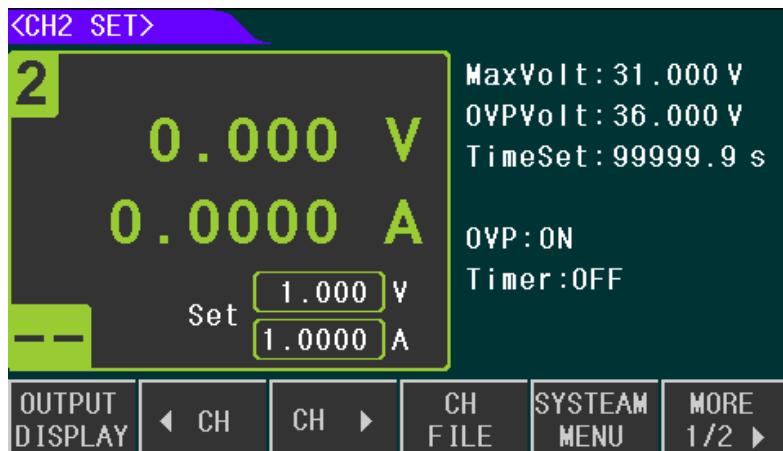
B: Use number key to input the value, select the unit on the bottom zone or use ENTER to input the voltage or current value.

### 4.1.2 Output

The CH1, CH2, CH3 on the left of panel is matched with output or off in 3 channels, When the parameter is set of one channel, then press the output, the indicator is light. When you turn off the channel, press the key once again, then the output is off, indicator is off. The ON/OFF key is used to turn on and off the output of 3 channels together

## 4.2 CH SET

Press **CH SET** to enter CH1 SET, and set another channels by **◀CH** 和 **CH▶** to switch CH2 SET is displayed as below:



On this page, you can set the parameter of one channel, the following parameter and function can be set:

- Voltage, current
- Max Volt
- OVP Volt
- Time Set
- OVP
- Timer
- SAVE VALUE

### 4.2.1 Voltage and current Set

The setting range of voltage and current in each channel is from 0 to Max.value (The Max. value is determined by different models).The voltage or current can be set by moving the Direction key, and the value can set by knob or inputting the number key. Same setting as 4.1.1

### 4.2.2 Max. Voltage Set

The range of Max. voltage is from 0 to Max. value (which is determined by different models) When the Max. voltage is set, the high voltage is limited. If the Max.voltage is less than the set voltage, then set voltage can only be set to Max. Volt.

### 4.2.3 OVP Volt Set

The range of OVP Volt is from 0 to Max. value (which is determined by different models), same as

above setting. OVP function is used to set the protective point. When the voltage is over the point then the power supply cuts the output, meanwhile OVP is displayed.

#### 4.2.4 Time Set

The range of time set is from 0 to 99999.9s, same as above setting. When the Time is on, the timer starts working in the process of outputting also the count down value is displayed. When the count down is over, then the output is closed.

#### 4.2.5 OVP Switch

Press MORE, and enter the second picture below, press OVP to turn on or off the OVP function



#### 4.2.6 Time Switch

Same as above setting, select the TIME to turn on or off the time function. When the Time is on then the above picture is displayed



#### 4.2.7 SAVE VALUE

It is used to save voltage, current, Max. Volt and OVP Volt to the File. Press SAVE VALUE to save all settings.

### 4.3 CH File

Press CH FILE to enter <CH1 FILE>. This page is used to save the voltage, current Max. voltage and OVP voltage value in each channel. 40 groups of data can be saved, use **◀CH** and **CH▶** to switch the channel.

<CH1 FILE>				
No.	Voltage	Current	MaxVolt	OVP
01	-----	-----	-----	-----
02	-----	-----	-----	-----
03	-----	-----	-----	-----
04	-----	-----	-----	-----
05	-----	-----	-----	-----
06	-----	-----	-----	-----
07	-----	-----	-----	-----
08	-----	-----	-----	-----
09	-----	-----	-----	-----
10	-----	-----	-----	-----

OUTPUT DISPLAY    CH SET    < CH    CH >    SYSTEM MENU

### 4.3.1 Recall and delete

There are 4 pages in CH FILE, and 10 groups of data on each page, use the direction key or PAGE UP and PAGE DOWN to check the data.

When you want to recall some data, just use knob to select the item then click RECALL, then the data is this group will cover the current setting. If you want to delete this group, just select DELETE.  
NOTE: The data can only be saved temporary on this page, and all data will be cleared when your turn off the device. If you want to load the saved data, please save the data into FLASH, refer to menu set.

## 4.4 Menu set

Press the MENU key to enter <SYSTEM>, where you can set the working method of the tester.

The system setting is as below and you can use the direction key to select different setting.

<SYSTEM>				
Language	: English	Key Voice	: Off	
P-Mem	: User Data	R-Wait	: Off	
BusMode	: RS232	Baud Rate	: 9600	
GP IB-Addr	: 8	Combine	: Off	
DATE: 19-03-11 15:16:24				

OUTPUT DISPLAY    CH SET    CH FILE    SYSTEM MENU

### 4.4.1 Language

There are 2 options

- 中文
- ENGLISH

## 4.4.2 Key voice

- ON
- OFF

## 4.4.3 P-Mem

The function is used to select the user data or default

- DEFAULT: Factory setting
- User Data: When there are some settings in the tester, and the settings need to be loaded when turning on the tester next time, then you should select it. Save the setting, saved data, system setting into Flash then you can load all data. If there is any change, please press the USER DATA again to rewrite all data to Flash.

## 4.4.4 R-Wait

The tester can be back to the main display automatically after testing is on hold for a while.

- Off: Turn off the function
- 5s, 30s, 60s: when the testing is on hold, and tester will be back to OUTPUT DISPLAY after a while.

## 4.4.5 Bus Mode

There are 4 types of communication port.

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

## 4.4.6 Baud Rate

Baud rate:

- 4800
- 9600
- 19200
- 38400
- 57600
- 115.2k

## 4.4.7 GPIB-Addr

Available for multi-set communication.

## 4.4.8 Combine

Set the combine status of 3 channels, and data save or recall can't be operated in Combine status

- Off: Turn off Combine
- Series: CH1+CH2 in serial mode, when the set current is same
- Para: CH1+CH2 in parallel, CH2+CH3 in parallel, 3 channels in parallel, when the set voltage is same

- Track: CH1+CH2 in synchronous mode, CH2+CH3 in synchronous mode and 3 channels in synchronous mode. In this mode, the set voltage and current are changed based on some ratio. Before selecting this mode, the voltage and current must be set in advance.

E.g. set value in channels:

CH1 V:2V, I: 0.1A

CH2 V:1V, I: 0.3A

Then select CH1+CH2 TRACK

After selecting this mode, if any set value in some channel is changed

Like: CH1 V:3V, I:0.2A, now the set value in another channel is changed to CH2 V:1.5V. I: 0.6A.

If the set voltage/current is 0 before selecting the TRACK, then the track is failed

#### 4.4.9 Date

There is RTC clock, which can realize the real time display, move the cursor to this item and press SET, then you can set the year, month, date, hour, minute, and second

## Chapter 5 Operation

- (1) Connect to power and press power switch
- (2) Warm up 20 min
- (3) According to the actual requirement, select the suitable connection cable, connect the load to the [+, -] terminal in the tester. In Combine mode, the connection cable in the output terminal must be connected in serial or parallel. Same way is used when rear panel is used
- (4) When setting the working mode and output parameter, the output channel must be selected, press the corresponding CH key to output or press ON/OFF for 3 channels output simultaneously

# Chapter 6 Interface and communication

RS232C, GPIB and USB are available in this tester, which can be used for data communication and remote control but not at the same time. The command is same for all ports, but the hardware configuration and communication protocol is different. Please refer to Chapter 6.2 for more details.

## 6.1 Remote Control

### 6.1.1 RS232 description

The provided RS232 interface can be used to communicate with PC, which can provide multiple commands. All operation on the front panel of tester can be realized via RS232

#### 6.1.1.1 Introduction of RS232 interface

RS-232 standard, also called as asynchronous serial communication standard, has already been widely used for data communication between computers, computer and external equipment. RS is the English abbreviation of Recommended Standard; 232, the standard number. This standard is issued by EIA in 1969, which rules to send one bit in a data line every time.

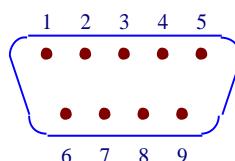
As most serial interfaces, the serial interface of TH64 Series is also not strictly based on RS-232 standard but only uses the smallest subset of this standard. The signals are listed in the following table.

Signal	Code	Connector Pin Number
Transmitted Data	TXD	3
Received Data	RXD	2
Signal Ground Common	GND	5

The reason is that the use of three lines is much more inexpensive and much simpler than that of five lines or six lines, which is the biggest advantage of using serial interface for communication.

Note: The pin definition of this tester is same as the standard 9-core connector

The 9-core DB type socket of RS232C in this tester is as below:

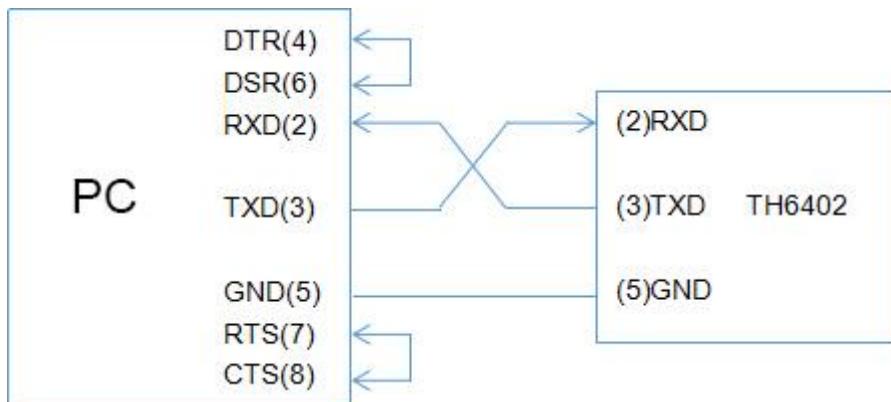


The standard 9-core DB type plug can be used directly

- ⚠ **Warning:** Power supply must be cut when connecting and disconnecting the connector to avoid the electrical shock.
- ⚠ **Warning:** Not short the output terminal, or with body to avoid the components being burnt.

### 6.1.1.2 Communicate with PC

The connection of tester to PC is displayed as below:



Based on the table above, the pin definition of this tester is same as the 9-core connector of IMB AT. User can make 3 wires connection cable (length is less than 1.5m) by using double core shielding wire or buy from us.

When user makes own cable, please note that, Pin4, 6, Pin7 and 8 must be shorted in PC interface. Please set the bus mode, select RS232 in SYSTEM.

Main parameter

Transmission mode	Full duplex asynchronous communication including start and stop bit
Baud rate	9600 bps
Data bit	8 BIT
Stop bit	1 BIT
Verification	None
End symbol	NL (line break, ASCII code 10)
Contact	software
Connector	DB9 core

### 6.1.2 GPIB interface

#### 6.1.2.1 GPIB bus

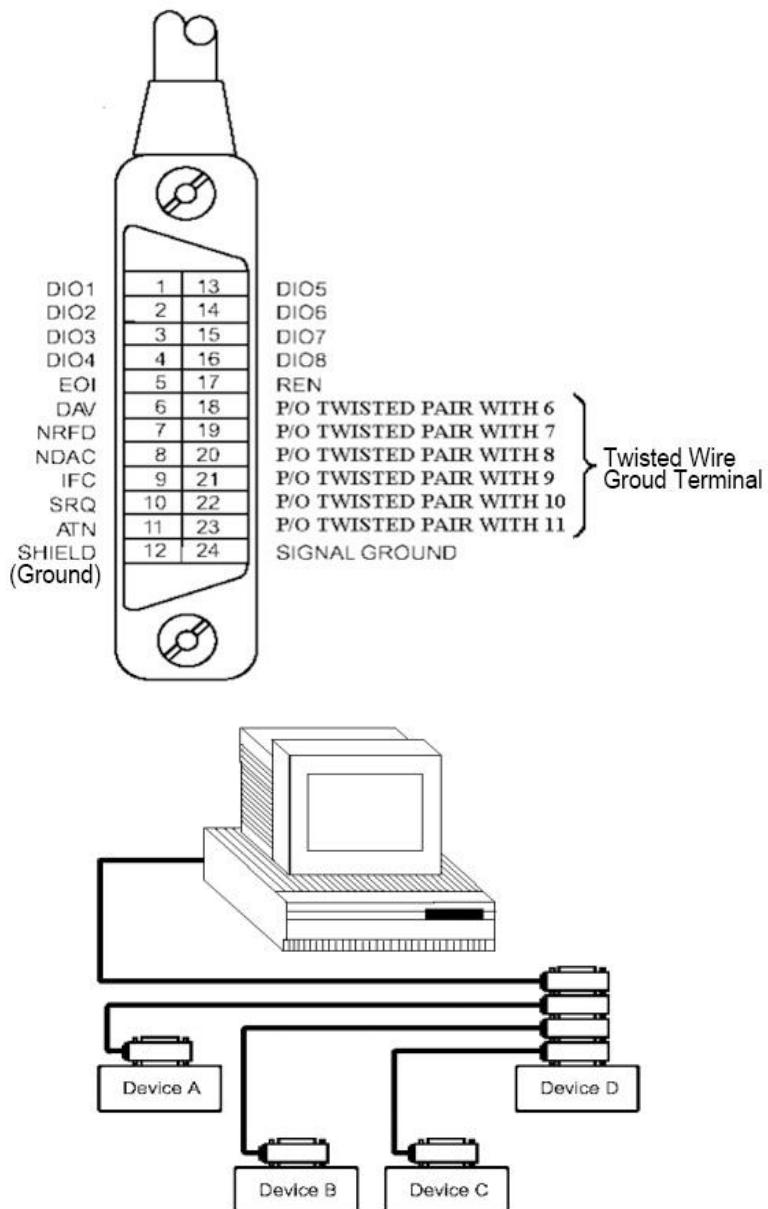
IEEE488 (GPIB) is an international bus interface standard used on intelligent instruments. IEEE is the English abbreviation of Institute of Electrical and Electronics Engineers, and 488 is the standard number. Through this interface, this tester can communicate with PC or others intelligent devices and meanwhile can make up automatic test system with the other devices. Up to 15 devices can be connected on a same bus. This tester applies IEEE488.2 and the interface plate can be inserted in any one of the three expansion slots. Control command system is open so that user can use the PC operation interface provided by this tester or take measurements by the control command system. The control command system supports most functions of the instrument, that is to say, user can execute almost all operations on PC. Thus remote control to the instrument is realized.

When configuring a GPIB system, the following restrictions must be adhered to.

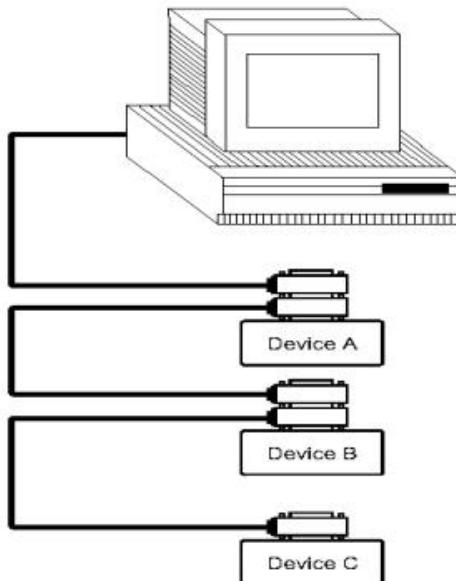
1. The total length of cable in one bus system must be less than or equal to two meters times

the number of devices connected on the bus (the GPIB controller counts as one device) and the total length of cable must not exceed 20 meters.

2. A maximum of 15 devices can be connected on one bus system.
3. There are no restrictions on how the cables are connected together. However, it is recommended that no more than four piggyback connectors be stacked together on any one device.



Way 1



Way 2

### 6.1.2.2 GPIB bus

Code	Function
SH1	Support all data source contact function
AH1	Support all receptor contact function
T5	Basic Talker; Cancel in MLA; Serial call is not supported
L4	Basic Listener; Cancel in MTA; no Listen only function
RL1	Remote/Local function
DC1	Device clear function
DT1	Device trigger function
C0	No controller function
E1	Open Electrode Drive

### 6.1.2.2 GPIB address

The GPIB of this device searches address in single address and there is no deputy address. 1-32 can be used as GPIB address, and the default address is 8

### 6.1.3 USB TMC remote control system

USB remote control system can control the device via USB interface. The communication meet the protocol of USBTMC-USB488 and USB 2.0

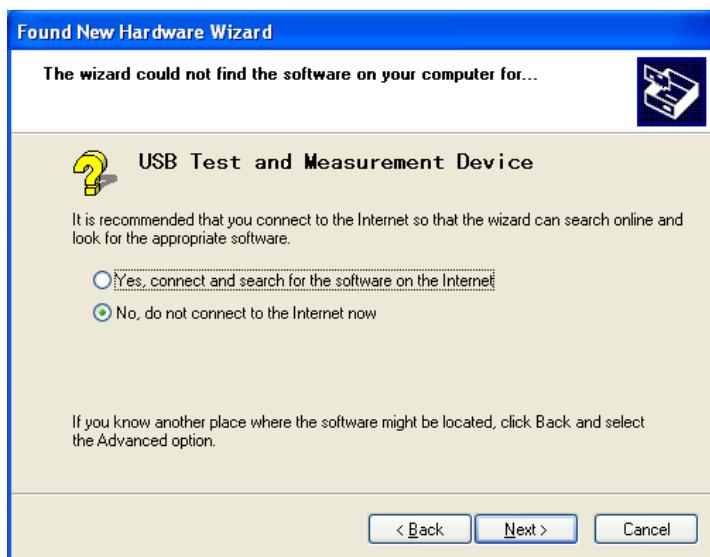
#### 6.1.3.1 Configuration

Connect the USB interface on the rear panel of device to the USB interface in PC via USB cable

#### 6.1.3.2 Install the driver

When the device is first connected to a PC through a USB cable, the prompt information –Found

New Hardware will show on the right bottom of the computer desktop, as is shown below

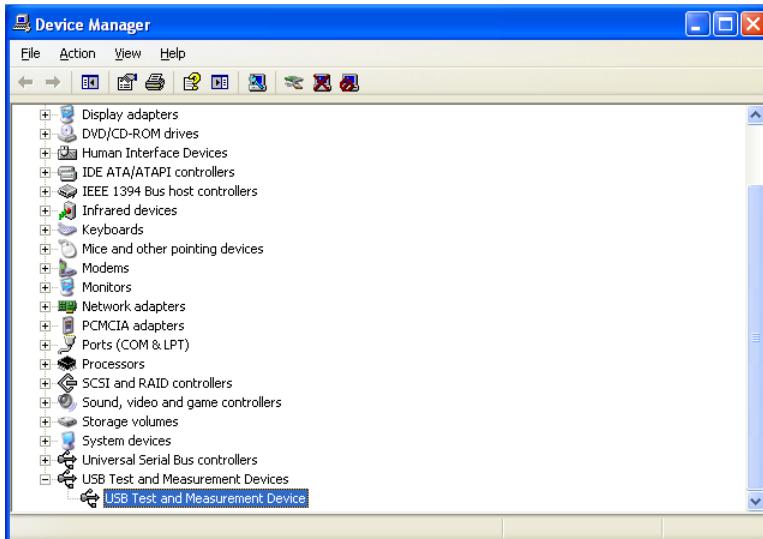


Click Next, the table below is displayed and select Install from a list or specific location



Then click Next, select the routine of the driver provided by us then Next

When the driver is installed, you can see USB Test and Measurement Device in the device manager.



## 6.1.4 USB CDC virtual serial port

Select the bus mode to “USBCDC”, it can make USB interface configure as Vcom

### 6.1.4.1 System configuration

Connect the USB interface on the rear panel of device to the USB interface in PC via USB cable

### 6.1.4.2 Install the driver

Same as USB TMC

Now USB V Com port can be considered as a serial port, when there is no serial port in PC, the communication software based on serial port can also be used as USB virtual serial port in this mode.

## 6.2 Command

In this device, GPIB common command and SCPI command are referred. GPIB common command is defined by IEEE488.2-1987 standard which is suitable for all devices, however, all commands are not supported in this device. SCPI is a tree structure, and there are 3 levels at most, where the top level is called subsystem command. Only subsystem is selected, then the bottom level is valid, use the colon to separate the structure.

### 6.2.1 Basic rule of command structure

(1) Ignore uppercase letter and lowercase letter

E.g. FUNC:IMP CPD = func:imp cpd = Func:Imp CpD

(2) Blank space is used to divide command and parameter; the command is in front and behind blank it is the parameter

E.g. FUNC:IMP CPD, IMP is the command and CPD is its parameter.

(3) There is no parameter in some command

E.g. SYSTem:LOCK

(4) Blank space (\_) can't be put in front or behind colon.

E.g.  FUNC:\_IMP CPD →  FUNC:IMP CPD

(5) Command can be abbreviation or can be full spelling

E.g. FUNCTION:IMPEDANCE CPD = FUNC:IMP CPD

(6) Question mark(?) is behind the command, execute an inquire to the command

E.g. FUNC:IMP?

## 6.2.2 Command for reference

### 6.2.2.1 The following GPIB command is supported

\*RST used for reset the device

\*IDN inquire the model information

### 6.2.2.2 SCPI command

The following commands are supported without distinguishing uppercase or lowercase letter, and the part of lowercase character can be omitted. In <>, there is detailed parameter and no need to input <> “|” is used to divide the parameter

- SYSTem command
  - (1) SYSTm:LOCL
 

Set the remote control, now the keys on front panel are unavailable (Except LOCK/LOCAL key)
  - (2) SYSTem:LOCAL
 

Set the local operation, now keys on front panel are available
  - (3) SYSTem:BEEPer
 

Test if the beeper can work
  - (4) SYSTem:LOCK?
 

Inquire the control status, return lock or local
  - (5) SYSTem:ADDReSS?
 

Inquire the address of this device, return an address value like “8”
- DISPlay page command
  - (1) DISPlay:PAGE <OPD | CHn | SRDn | MEND>

The command is used to switch the display page, in above, the parameter in <>

is the abbreviation of page, which stands for:

- OPD: OutPutDisp <Output display> page
- CHn:CH1~CH3 page, 'n' is the number 1、2 or 3, which matches to 3 channels
- SRDn:SetRecallDisp<CH FILE >, 'n' is the number 1、2 or 3, which matches to 3 channels
- MEND:MenuDisp <SYSTEM>

E.g. disp:page opd switch the page to <OUTPUT DISPLAY>.

(2) DISPlay?

Inquire the current page, and return the parameter, like “op”

- INSTRument channel selection command

(1) INSTRument:NSELect <1|2|3>

Select the channel to operate, which is the base of other commands

(2) INSTRument:NSELect ?

Inquire the current channel

- OUTPut output command

(1) OUTPut <0|1|ON|OFF>

The command is used to control the on or off of output

(2) OUTPut?

Used to inquire the output status of selected channel, return 0 or 1

- VOLTage voltage set command
- VOLTage <set value |MIN|MAX>

The command is used to set the voltage value of selected channel, the parameters in

“<>” shows as:

- Set value: the voltage value
- MIN: Min. value 0
- MAX: Max. voltage value, which can be set
- VOLTage?

Inquire the voltage set value of selected channel

- VOLTage:PROTection <set value |MIN|MAX>

The command is used to set over voltage protective value, and Min. value is 0, and the Max. value is determined by the model.

■ **VOLTage:PROTection ?**

Inquire the over voltage protective value of the selected channel.

■ **VOLTage:MAXvolt <set value |MIN|MAX >**

The command is used to set the Max. value of set voltage, then the set value can't over it.

■ **VOLTage:MAXvolt ?**

Inquire the Max. voltage of the selected channel

● **CURRent current set command**

(1) **CURRent <set value |MIN|MAX >**

The command is used to set the current value of selected channel, the parameters in “< >” shows as:

- Set value: current value
- MIN: Min. value 0
- MAX: Max. value, which is determined by model

(2) **CURRent?**

Inquire the current set value of selected channel

● **TIMer timer set command**

(1) **TIMer <0|1|ON|OFF>**

The command is used to control the switch of timer

(2) **TIMer?**

Inquire the status of timer, return 0 or 1

(3) **TIMer: DATA<0~99999.9>**

The command is used to set the time of selected channel, Min. value is 0 and Max. value is 99999.9s

(4) **TIMer: DATA?**

Inquire the time value of selected channel

- **APPLy Complex control command**

(1) **APPLy: VOLTage <voltage value>,< voltage value >,< voltage value >**

The command is used to set the voltage value of 3 channels

(2) **APPLy: VOLTage?**

Inquire the voltage value of 3 channels

(3) **APPLy: MAXvolt <voltage value>,< voltage value >,< voltage value >**

The command is used to set the Max. voltage value of 3 channels

(4) **APPLy: MAXvolt?**

Inquire the Max. voltage value of 3 channels

(5) **APPLy: PROtection <voltage value>,< voltage value >,< voltage value >**

The command is used to set the over protection voltage value of 3 channels

(6) **APPLy: PROtection?**

Inquire the over protection voltage value of 3 channels

(7) **APPLy: CURRent <current value>,< current value >,< current value >**

The command is used to set the current value of 3 channels

(8) **APPLy: CURRENT?**

Inquire the current value of 3 channels

(9) **APPLy: TIMer:DATA <timer value>,<timer value>,< timer value >**

The command is used to set the time value of 3 channels

(10) **APPLy: TIMer:DATA?**

Inquire the timer value of 3 channels

(11) **APPL:OUT <0|1|ON|OFF>,<0|1|ON|OFF>,<0|1|ON|OFF>**

The command is used to control the output On or off of 3 channels

(12) **APPL:OUT ?**

Inquire the output status of 3 channels

- **MEASure measure command**

(1) **MEASure:VOLTage?**

The command is used to inquire the measured voltage value

(2) **MEASure:CURRent?**

The command is used to inquire the measured voltage value

(3) **MEASure:TIMer?**

The command is used to inquire the current timer value

## (4) MEASure: POWER?

The command is used to inquire the measured power value

## (5) MEASure:VOLTage:ALL ?

The command is used to inquire the voltage value of all channels

## (6) MEASure:CURRent:ALL ?

The command is used to inquire the current value of all channels

## (7) MEASure:TIMER:ALL ?

The command is used to inquire the timer value of all channels

## (8) MEASure: POWER:ALL ?

The command is used to inquire the measured power value of all channels

## ● FUNCtion recall command

## (1) FUNCtion SAV

The command is used to save the set voltage, current, Max. voltage and over protection voltage to the file list

## (2) FUNCtion:RECall &lt;1~40&gt;

The command is used to load any group in CH FILE

## (3) FUNCtion:RECall? &lt;1~40&gt;

The command is used to inquire any group in CH FILE

(4) FUNCtion:DELet  $<1\sim40|ALL>$ 

The command is used to delete one group or clear all list

## ● MENu menu function command

## (1) MENu:LANG &lt;0|1|EN|CN&gt;

The command is used to select the language, 0 and CN is Chinese, 1 and EN is

English

(2) MENu:LANG?

The command is used to inquire the current language,, return cn or en.

(3) MENu:VOICe <0|1|ON|OFF>

The command is used to turn on or off the beeper

(4) MENu:VOICe?

The command is used to inquire the status of beeper

(5) MENu:PMEM <DEFault|USER>

The command is used to set memory status, default and user

(6) MENu:PMEM ?

Inquire the memory status

(7) MENu:RWAIT <0s|5s|10s|20s|30s|60s>

The command is used to set the retest wait time

(8) MENu:RWAIT?

The command is used to inquire the wait time

(9) MENu:COMBine <0~7>

The command is used to set the combine way, 0~7 means different combine ways,  
more details in 4.4.8

(10) MENu:COMBine ?

The command is used to inquire the combine way

- Date clock command

(1) DATe:<YEAR|MONth|DATe|HOUR|MIN|SEC> <set value>

The command is used to set RTC, the parameter in first “<>” is year, month, day,

hour, minute, second, and in second “<>” is the detailed value

(2) DATe?

The command is used to inquire the current date

# Chapter 7 Specification

TH6402				
Parameter		CH1	CH2	CH3
Rated output (0°C~40°C)	Voltage	0~30V	0~30V	0~6V
	Voltage limit	0~36V	0~36V	0~11V
	Current	0~3A	0~3A	0~5A
	Power	210W		
Load regulation	Voltage	$\leq 0.01\% + 3mV$		
	Current	$\leq 0.1\% + 3mA$		
Power supply regulation	Voltage	$\leq 0.01\% + 3mV$		
	Current	$\leq 0.1\% + 3mA$		
Resolution of set value	Voltage	1mV		
	Current	0.1mA		
Resolution of reread value	Voltage	1mV		
	Current	0.1mA		
Resolution of set value (25°C±5°C)	Voltage	$\leq 0.03\% + 10mV$		
	Current	$\leq 0.1\% + 5mA$		
Resolution of reread value (25°C±5°C)	Voltage	$\leq 0.03\% + 10mV$		
	Current	$\leq 0.1\% + 5mA$		
Ripple and noise (20Hz-20MHz)	Voltage(Vp-p)	$\leq 3mV_{p-p}$	$\leq 3mV_{p-p}$	$\leq 4mV_{p-p}$
	Voltage(rms)	$\leq 1mV_{rms}$	$\leq 1mV_{rms}$	$\leq 1mV_{rms}$
	Current	$\leq 3mA_{rms}$	$\leq 3mA_{rms}$	$\leq 5mA_{rms}$
Factor of output temperature (0°C~40°C)	Voltage	$\leq 0.03\% + 10mV$		
	Current	$\leq 0.1\% + 5mA$		
Temperature factor of reread value	Voltage	$\leq 0.03\% + 10mV$		
	Current	$\leq 0.1\% + 5mA$		
Series Synchronization Error		$\leq 0.05\% + 10mA$		
Accuracy of parallel set value	Voltage	$\leq 0.02\% + 5mV$		
	Current	$\leq 0.1\% + 20mA$		
Memory	Save/load	40 group	40 group	40 group
Timer	Function	Turn off output at fixed time 定时关闭输出		
	Time set	0.1s~99999.9s		
	Resolution	0.1s		
Working temperature		0°C~40°C		

TH6402A				
Parameter		CH1	CH2	CH3
Rated output (0°C~40°C)	Voltage	0~30V	0~30V	0~5V
	Voltage limit	0~36V	0~36V	0~11V
	Current	0~3A	0~3A	0~3A
	Power	195W		
Load regulation	Voltage	≤0.01%+3mV		
	Current	≤0.1%+3mA		
Power supply regulation	Voltage	≤0.01%+3mV		
	Current	≤0.1%+3mA		
Resolution of set value	Voltage	10mV		
	Current	1mA		
Resolution of reread value	Voltage	1mV		
	Current	1mA		
Resolution of set value (25°C±5°C)	Voltage	≤0.05%+20mV		
	Current	≤0.2%+5mA		
Resolution of reread value (25°C±5°C)	Voltage	≤0.05%+20mV		
	Current	≤0.2%+5mA		
Ripple and noise (20Hz-20MHz)	Voltage(Vp-p)	≤3mVp-p	≤3mVp-p	≤4mVp-p
	Voltage(rms)	≤1mVrms	≤1mVrms	≤1mVrms
	Current	≤3mA <sub>rms</sub>	≤3mA <sub>rms</sub>	≤5mA <sub>rms</sub>
Factor of output temperature (0°C~40°C)	Voltage	≤0.03%+10mV		
	Current	≤0.1%+5mA		
Temperature factor of reread value	Voltage	≤0.03%+10mV		
	Current	≤0.1%+5mA		
Series Synchronization Error		≤0.05%+10mA		
Accuracy of parallel set value	Voltage	≤0.02%+5mV		
	Current	≤0.1%+20mA		
Memory	Save/load	40 group	40 group	40 group
Timer	Function	Turn off output at fixed time		
	Time set	0.1s~99999.9s		
	Resolution	0.1s		
Working temperature		0°C~40°C		

TH6412				
Parameter		CH1	CH2	CH3
Rated output (0°C~40°C)	Voltage	0~30V	0~30V	0~6V
	Voltage limit	0~36V	0~36V	0~11V
	Current	0~6A	0~6A	0~5A
	Power	390W		
Load regulation	Voltage	$\leq 0.01\% + 3mV$		
	Current	$\leq 0.01\% + 3mA$		
Power supply regulation	Voltage	$\leq 0.01\% + 3mV$		
	Current	$\leq 0.01\% + 3mA$		
Resolution of set value	Voltage	1mV		
	Current	0.1mA		
Resolution of reread value	Voltage	1mV		
	Current	0.1mA		
Resolution of set value (25°C ±5°C)	Voltage	$\leq 0.03\% + 10mV$		$\leq 0.03\% + 10mV$
	Current	$\leq 0.1\% + 8mA$		$\leq 0.1\% + 5mA$
Resolution of reread value (25°C ±5°C)	Voltage	$\leq 0.03\% + 10mV$		$\leq 0.03\% + 10mV$
	Current	$\leq 0.1\% + 8mA$		$\leq 0.1\% + 5mA$
Ripple and noise (20Hz-20MHz)	Voltage(Vp-p)	$\leq 4mVp-p$		
	Voltage(rms)	$\leq 1mVrms$		
	Current	$\leq 5mArms$		
Factor of output temperature (0°C~40°C)	Voltage	$\leq 0.03\% + 10mV$		
	Current	$\leq 0.1\% + 5mA$		
Temperature factor of reread value	Voltage	$\leq 0.03\% + 10mV$		
	Current	$\leq 0.1\% + 5mA$		
Parallel Synchronization Error	Voltage	$\leq 0.02\% + 5mV$		
	Current	$\leq 0.1\% + 30mA$		
Memory	Save/load	40group	40group	40group
Timer	Function	Turn off output at fixed time		
	Time set	0.1s~99999.9s		
	Resolution	0.1s		
Working temperature		0°C~40°C		

TH6413				
Parameter		CH1	CH2	CH3
Rated output (0°C~40°C)	Voltage	0~60V	0~60V	0~6V
	Voltage limit	0~65V	0~65V	0~11V

	Current	0~3A	0~3A	0~5A
	Power	390W		
Load regulation	Voltage	$\leq 0.01\% + 3mV$		
	Current	$\leq 0.01\% + 3mA$		
Power supply regulation	Voltage	$\leq 0.01\% + 3mV$		
	Current	$\leq 0.01\% + 3mA$		
Resolution of set value	Voltage	1mV		
	Current	0.1mA		
Resolution of reread value	Voltage	1mV		
	Current	0.1mA		
Resolution of set value (25°C ± 5°C)	Voltage	$\leq 0.03\% + 10mV$		
	Current	$\leq 0.1\% + 5mA$		
Resolution of reread value (25°C ± 5°C)	Voltage	$\leq 0.03\% + 10mV$		
	Current	$\leq 0.1\% + 5mA$		
Ripple and noise (20Hz-20MHz)	Voltage(Vp-p)	$\leq 4mVp-p$	$\leq 4mVp-p$	$\leq 4mVp-p$
	Voltage(rms)	$\leq 1mVrms$	$\leq 1mVrms$	$\leq 1mVrms$
	Current	$\leq 4mA rms$	$\leq 4mA rms$	$\leq 5mA rms$
Factor of output temperature (0°C ~ 40°C)	Voltage	$\leq 0.03\% + 10mV$		
	Current	$\leq 0.1\% + 5mA$		
Temperature factor of reread value	Voltage	$\leq 0.03\% + 10mV$		
	Current	$\leq 0.1\% + 5mA$		
Parallel Synchronization Error	Voltage	$\leq 0.02\% + 10mV$		
	Current	$\leq 0.1\% + 30mA$		
Memory	Save/load	40group	40group	40group
Timer	Function	Turn off output at fixed time		
	Time set	0.1s ~ 99999.9s		
	Resolution	0.1s		
Working temperature		0°C ~ 40°C		