

BENCHTOP INSTRUMENT

**Programmable
Switching DC Power Supply
Operation Manual V1.0**

CE

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Use of Operation Manual

Please read through and understand this Operation Manual before operating the product. After reading, always keep the manual nearby so that you may refer to it as needed. When moving the product to another location, be sure to bring the manual as well.

Calibration Notification

We notify that the instruments included in this manual are in compliance with the features and specifications as stated in this manual. Before shipment, the instrument has been calibrated in factory. The calibration procedures and standards are compliant to the national regulations and standards for electronic calibration.

Warranty

We guarantee that the instrument has been passed strict quality check. We warrant our instrument's mainframe and accessories in materials within the warranty period of one year. We guarantee the free spare parts for products which are approved defective in this period. To get repair service, please contact with your nearest sales and service office. We do not provide any other warranty items except the one being provided by this summary and the warranty statement. The warranty items include but not being subjected to the hinted guarantee items related to tradable characteristics and any particular purpose. We will not take any responsibility in cases regarding to indirect, particular and ensuing damage, such as modifications to the circuit and functions by the users, repairing or component replacement by the users, or damage during transportation.

For product improvement, the specifications are subject to change without prior notice.

Safety Instruction

This chapter contains important safety instructions that you must follow when operating the instrument and when keeping it in storage. Read the following before any operation to insure your safety and to keep the best condition for the instrument.

Safety Symbols

The following safety symbols may appear in this manual or on the instrument:



WARNING

Identifies conditions or practices that could result in injury or loss of life.



CAUTION

Identifies conditions or practices that could result in damage to the instrument or to other properties.



DANGER

High voltage



ATTENTION

Refer to the manual



Protective conductor terminal



Earth (ground) terminal

Safety Guidelines



- Before plugging into local AC mains, check and make sure that the output voltage is compatible to the load. (It is suggested to disconnect a load before plugging into local AC mains.)
 - Do not use this instrument near water.
 - Do not operate or touch this instrument with wet hands.
 - Do not open the casing of the instrument when it is connected to AC mains.
 - The max. output voltage of the instrument may be over 60VDC, avoid touch the metal contact part of the output terminals.
 - Do not use the instrument in an atmosphere which contains sulfuric acid mist or other substances which cause corrosion to metal.
 - Do not use the instrument in a dusty place or a highly humid place as such will cause instrument reliability degradation and instrument failures.
 - Install the instrument in a place where is free from vibration.
 - Install the instrument in a place where the ambient temperature is in range of -10~70°C. Note that the instrument operation may become unstable if it is operated in an ambient temperature exceeding the range of 0~40°C
-

Power supply



AC Input voltage: 110V/220V±10%, 50/60Hz

Connect the protective grounding conductor of the AC power cord to an earth ground to avoid electrical shock.

Fuse



- Fuse type: please refer to section 5.2 for details.
 - Make sure the correct type of fuse is installed before power up.
 - Replace the AC fuse with the same type and rating as the original fuse.
 - Disconnect the power cord before fuse replacement.
 - Make sure the cause of fuse blowout is fixed before fuse replacement.
-

Cleaning

- Disconnect the power cord before cleaning.
 - Use a soft cloth dampened in a solution of mild detergent and water. Do not spray any liquid.
 - Do not use chemicals or cleaner containing harsh material such as benzene, toluene, xylene, and acetone.
-

Operation environment

- Location: indoor, no direct sunlight, dust free, almost non-conductive pollution (note below).
- Relative humidity: <80%
- Altitude: <2000m
- Temperature: 0°C ~ 40°C

(Pollution Degree) EN 61010-1:2001 specifies the pollution degrees and their requirements as follows. The instrument falls under degree 2.

Pollution refers to “addition of foreign matter, solid, liquid, or gaseous (ionized gases), that may produce a reduction of dielectric strength or surface resistivity”.

Pollution degree 1: No pollution or only dry, non-conductive pollution occurs. The pollution has no influence.

Pollution degree 2: Normally only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation must be expected.

Pollution degree 3: Conductive pollution occurs, or dry, nonconductive pollution occurs which becomes conductive due to condensation which is expected. In such conditions, equipment is normally protected against exposure to direct sunlight, precipitation, and full wind pressure, but neither temperature nor humidity is controlled.

Storage environment	● Location: indoor
	● Relative humidity: <70%
	● Temperature: -10°C ~ 70°C

Power cord for the United Kingdom

When using the power supply series in the United Kingdom, make sure the power cord meets the following safety instructions.

NOTE: This lead/appliance must only be wired by competent persons.



WARNING: THIS APPLIANCE MUST BE EARTHED.

IMPORTANT: The wires in this lead are coloured in accordance with the following code:

Green/Yellow:	Earth
Blue:	Neutral
Brown:	Live



As the colours of the wires in main leads may not correspond with the colours marking identified in your plug/appliance, proceed as follows:

- The wire which is coloured Green & Yellow must be connected to the Earth terminal marked with the letter E or by the earth symbol \oplus or coloured Green or Green & Yellow.
- The wire which is coloured Blue must be connected to the terminal marked with the letter N or coloured Blue or Black.
- The wire which is coloured Brown must be connected to the terminal marked with the letter L or P or coloured Brown or Red.

If in doubt, consult the instructions provided with the equipment or contact the supplier.

This cable/appliance should be protected by a suitably rated and approved HBC mains fuse: refer to the rating information on the equipment and/or user instructions for details. As a guide, cable of 0.75mm² should be protected by a 3A or 5A fuse. Larger conductors would normally require 13A types, depending on the connection method used.

Any moulded mains connector that requires removal/replacement must be destroyed by removal of any fuse & fuse carrier and disposed of immediately, as a plug with bared wires is hazardous if engaged in live socket. Any re-wiring must be carried out in accordance with information detailed on this label.

1. Product Introduction

1.1 Description

This is a high accuracy programmable DC power supply with single output. With easy connection to computer via RS-232 interface, this power supply satisfies users' demand for auto-testing and auto-control. The software commands are fully complied with the SCPI format; it is convenient for user to precede auto-tested and auto-controlled application program. Also, the digitalization of system makes a speedy, precise and convenient input of information controlled by keyboard. The adjustment of voltage/current is made by software calibration without manual error that will increase the preciseness of the instrument.

1.2 Features

- High accuracy, high resolution
- Over load, over voltage, over current, over temperature and reverse polarity protections
- CV and CC operations, auto CV and CC switch
- 122*32 backlit LCD display
- High speed rotary dial and keypad input
- Built-in beeper alarm
- Panel lock and output ON/OFF function
- List mode function, 100 sets save & recall for voltage, current and time setups, easy use in auto test
- Remote sense function
- Smart cooling fan achieving low noise
- RS-232 interface, labview driver
- Supports SCPI commands
- Compact design, light weight

2. Panel Introduction

2.1 Front and Rear Panel

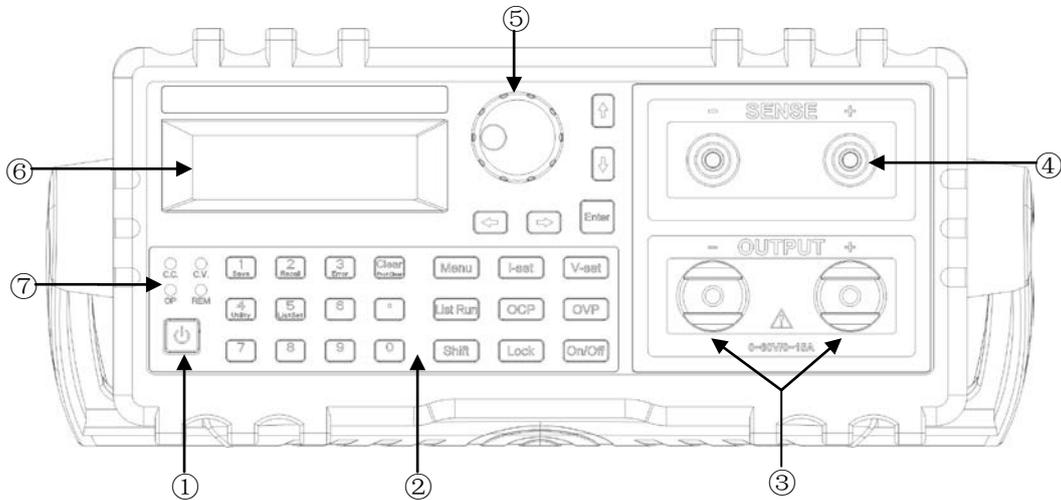


Fig.2.1-1 Front Panel

- | | | |
|-----------------------------|---------------------------------------|---------------------|
| 1. Power switch | 2. Function button and Numeric button | 3. Output terminals |
| 4. Remote sensing terminals | 5. Rotary knob | 6. LCD display |
| 7. LED indicator | | |

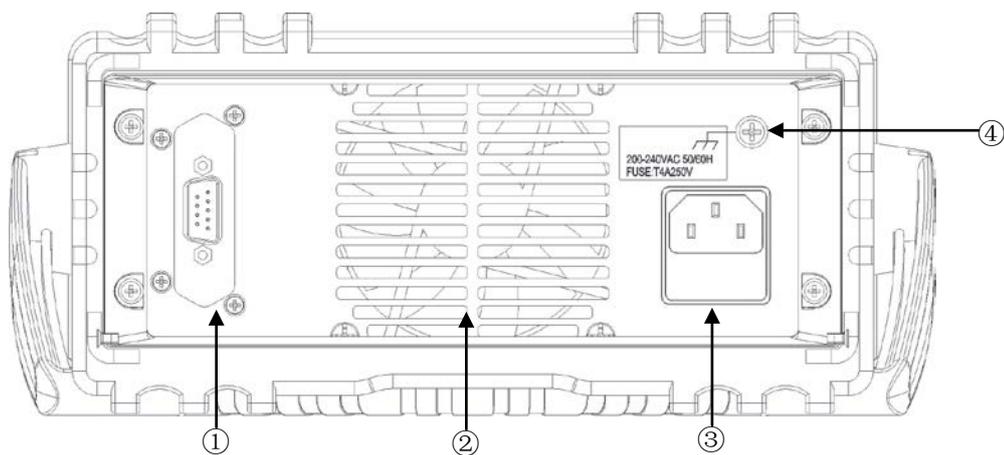


Fig.2.1-2 Rear Panel

- | | |
|-----------------------------|-------------------------------|
| 1. RS-232 interface | 2. Cooling fan |
| 3. Power cord / fuse socket | 4. Ground terminal of chassis |

2.2 Key Description

There are 26 buttons on the front panel (not including POWER button). The word on each button represents the basic function. Press the button directly to use the basic function. The word beneath button represents the second function of the key. Press **[Shift]** button and then function button to select its second function. Firstly, press **[Shift]** button and the button backlight turns on. Then press the function key, followed by a short beep sound (Beeper is set ON).

Key name	Main function	Second function
0	Input digit 0	
1	Input digit 1	Save
2	Input digit 2	Recall
3	Input digit 3	
4	Input digit 4	Utility
5	Input digit 5	List set
6	Input digit 6	
7	Input digit 7	
8	Input digit 8	
9	Input digit 9	
•	Input decimal point	
Clear	Exit	ProtClear: clear protection
Menu	Select menu	
I-set	Set current	
V-set	Set voltage	
ListRun	Turns on/off the auto-run programs	
OCP	Set Over Current Protection value	
OVP	Set Over Voltage Protection value	
Shift	Select the second function	
Lock	1. Lock the front panel 2. Switch to local operation	
On/Off	Turn on/off output	
← →	Move flash digit to the left/right	
↑ ↓	Move flash digit up and down; Increase or decrease value.	
Enter	Confirm input	

2.2 Indicator Description

There are 4 LED indicators on the front panel: CV, CC, OP, REM.

CV indicator (Green): This indicator lights on in GREEN to indicate a CV operation mode.

CC indicator (Red): This indicator lights on in RED to indicate a CC operation mode.

OP indicator (Red): This indicator lights on in RED to indicate a protection mode.

REM indicator (Green): This indicator lights on in GREEN to indicate a remote operation mode.

3. Operation Introduction

3.1 Front Panel Operation

- 1) The applied Voltage/Current Unit for this series instruments is Volt (V) and Amp (A) .
- 2) The factory setting is in panel operation mode that enable user to operate the instruments directly from panel control knob.
- 3) When the remote controller is on line, the **[Lock]** button backlight turns on and the operation can only be proceed through it. But the **[On/Off]** button is still available for operation. All other button operations are closed unless press **[Lock]** button again to unlock the front panel. The **[Lock]** button backlight turns off.
- 4) The output of power supplies is always at OFF status after power on.

3.2 How to Input

3.2.1 Input via Numeric buttons

Use numeric buttons from 0 to 9 and decimal point to input targeted values, and then press **[Enter]** button to confirm input. If the input value is wrong, press **[Clear]** button to clear the present values, then input correct values.

3.2.2 Input via Step Button

In practices, a set of voltage or current value with same interval is commonly used. It is complicated and time consuming to input this kind of value by repeatedly pressing the numeric buttons and **[Enter]** button. It is also complex by using the rotary knob because voltage or current value may be multi-digit. It is very convenient to use the step input method. Every press on the corresponding button makes the voltage or current increase or decrease by a step value. The input value is validated automatically without pressing **[Enter]** button

For example, to generate a series of voltage with interval 1.1V, press buttons sequentially as below:

Press **[Shift]** **[4]** to enter function setting mode.

Press **[Menu]** again until “Utility V Step” is shown on the LCD,

Press **[1]** **[.]** **[1]** **[Enter]** to complete step voltage value setup,

Press **[V-set]** until “Voltage” is shown on the LCD,

Press **[↑]** to increase the voltage by 1.1V or press **[↓]** to decrease the voltage by 1.1V.

Repeat this operation, a series of voltage with equal interval can be generated. The same procedure can be used for the current operation.

3.2.3 Input via Rotary Knob

In some applications, it requires to adjust the output signal continuously. It is convenient to use rotary knob to make adjustment. Press buttons **[←]** or **[→]** to move the cursor left or right. Rotate the knob to the right to continuously increase the cursor-located digit by 1 and make the carry to a higher unit position. Rotate the knob to the left to continuously decrease the cursor-located digit by 1 and make the carry to a lower unit position. The modified value is validated immediately without pressing the **[Enter]** button.

3.3 Output Voltage Setting

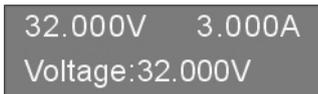
Press button **[V-set]** until “Voltage” is shown on the LCD.

Setting method 1: Press **[numeric buttons 0-9] [Decimal Point] [Enter]** to set output voltage.

Setting method 2: Press buttons **[◀]** or **[▶]** to move the cursor left or right. Rotate the rotary knob left or right to increase or decrease the digit on cursor.

For example: Set output voltage to 32.000V.

Press **[V-set] [3] [2] [.] [0] [0] [0] [Enter]**.



32.000V 3.000A
Voltage:32.000V

3.4 Output Current Setting

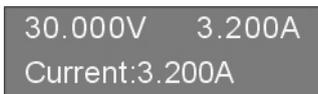
Press button **[I-set]** until “Current” is shown on the LCD.

Setting method 1: Press **[numeric buttons 0-9] [Decimal Point] [Enter]** to set output current.

Setting method 2: Press buttons **[◀]** or **[▶]** to move the cursor left or right. Rotate the rotary knob left or right to increase or decrease the digit on cursor.

For example: Set output current to 3.200A.

Press **[I-set] [3] [.] [2] [0] [0] [Enter]**.



30.000V 3.200A
Current:3.200A

3.5 Over Voltage Protection Setting

The Over Voltage Protection (OVP) function protects the power supply and DUT from damage caused by voltage over the setup voltage. Before operation, set the OVP function ON and set the OVP value. When the output voltage exceeds this value, the output will be shut down and “OP” indicator will light on. With OVP function ON, the output voltage is restricted within the OVP range.



WARNING To avoid damage to the power supply, the OVP setting range **MUST NOT** exceed 120% of rated voltage.

When the power supply is under OVP mode, firstly clear external causes. And then turn on the output again.

3.5.1 OVP Value Setting

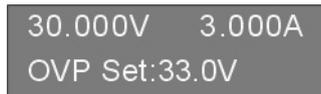
Press [**OVP**] until “OVP Set” is shown on the LCD.

Setting method 1: Press [**numeric buttons 0-9**] [**Decimal Point**] [**Enter**] to complete OVP setting.

Setting method 2: Press buttons [**◀**] or [**▶**] to move the cursor left or right. Rotate the rotary knob left or right to increase or decrease the digit on cursor.

For example: Set over voltage protection value to 33.0V.

Press [**OVP**] [**3**] [**3**] [**.**] [**0**] [**Enter**].

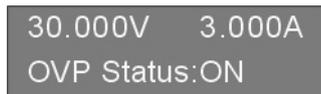


30.000V 3.000A
OVP Set:33.0V

3.5.2 OVP Status Setting

Press [**Menu**] button until “OVP Status” is shown on the LCD

Press buttons [**▲**] or [**▼**] to turn on or off the OVP function.



30.000V 3.000A
OVP Status:ON

3.6 Over Current Protection Setting

The Over Current Protection (OCP) function protects the power supply and DUT from damage caused by current over the setup current. Before operation, set the OCP function ON and set the OCP value. When the output current exceeds this value, the output will be shut down and “OP” indicator will light on. With OCP function ON, the output current is restricted within the OCP range.

3.6.1 OCP Value Setting

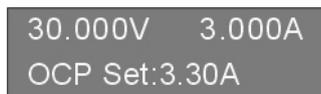
Press [**OCP**] button until “OCP Set” is shown on the LCD.

Setting method 1: Press [**numeric buttons 0-9**] [**Decimal Point**] [**Enter**] to complete OCP setting.

Setting method 2: Press buttons [**◀**] or [**▶**] to move the cursor left or right. Rotate the rotary knob left or right to increase or decrease the digit on cursor.

For example: Set over current protection value to 3.30A.

Press [**OCP**] [**3**] [**.**] [**3**] [**0**] [**Enter**].

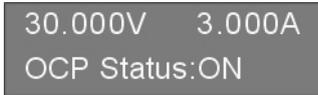


30.000V 3.000A
OCP Set:3.30A

3.6.1 OCP Status Setting

Press [**Menu**] button until “OCP Status” is shown on the LCD.

Press buttons [**▲**] or [**▼**] to turn on or off the OVP function.



30.000V 3.000A
OCP Status: ON

3.7 Output Delay Time Setting

Press [**Menu**] button until “Delay” is shown on the LCD.

Setting method 1: Press [**numeric buttons 0-9**] [**Enter**] to complete delay time setting.

Setting method 2: Press buttons [**◀**] or [**▶**] to move the cursor left or right. Rotate the rotary knob left or right to increase or decrease the digit on cursor.

For example: Set the delay time to 99999s.

Press [**Menu**] [**9**] [**9**] [**9**] [**9**] [**9**] [**Enter**].



30.000V 3.000A
Delay :99999s

Note: The Delay setting is effective only under the Auto running operation. Delay setting will be saved to the memory address simultaneously.

3.8 Function Setup

Press [**Shift**] [**4**] buttons to proceed to “Utility” function setting, then press [**Menu**] to select the options under the this function.

3.8.1 Voltage Step Setting

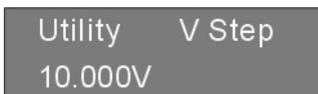
Press [**Menu**] button until “Utility V Step” is shown on the LCD. Set the maximum value of Step to be the maximum value of the voltage range.

Setting method 1: Press [**numeric buttons 0-9**] [**Decimal Point**] [**Enter**] to set step voltage.

Setting method 2: Press buttons [**◀**] or [**▶**] to move the cursor left or right. Rotate the rotary knob left or right to increase or decrease the digit on cursor.

For example: Set the step voltage to 10.000V.

Press [**1**] [**0**] [**.**] [**0**] [**0**] [**0**] [**Enter**].



Utility V Step
10.000V

3.8.2 Current Step Setting

Press [Menu] button until “Utility I Step” is shown on the LCD. Set the maximum value of Step to be the maximum value of the current range.

Setting method 1: Press [numeric buttons 0-9] [Decimal Point] [Enter] to set step current.

Setting method 2: Press buttons [◀] or [▶] to move the cursor left or right. Rotate the rotary knob left or right to increase or decrease the digit on cursor.

For example: Set the step current to 0.500A.

Press [0] [.] [5] [0] [0] [Enter].



Utility I Step
0.500A

3.8.3 RS-232 Baud Rate Setting

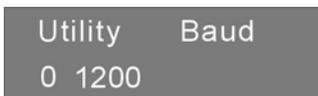
Press [Menu] button until “Utility Baud” is shown on the LCD, use the numeric buttons or rotary knob to modify the corresponding code of baud rate to make sure that the baud rate meets the requirement of the PC remote control.

The table below shows the corresponding code of baud rate.

Code	0	1	2	3	4	5	6	7	8	9
Baud rate	1200	2400	4800	9600	14400	19200	28800	38400	57600	115200

Setting method 1: Press [numeric buttons 0-9] [Enter] to set baud rate.

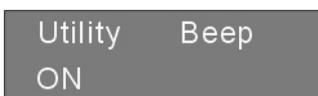
Setting method 2: Rotate the rotary knob choose a code.



Utility Baud
0 1200

3.8.4 Beeper Setting

Press [Menu] button until “Utility Beep” is shown on the LCD, then press [▲] [▼] or rotary knob to turn on or off the beeper.



Utility Beep
ON

3.8.5 Hotkey Setting

Press key [Menu] until “Utility HotKey” is shown on the LCD. Press [▲] [▼] or rotary knob to turn on or off the hotkey function. After the hotkey function is set ON, the numeric button 0 to 9 means the setting data of index number 0 to 9 in memory bank. So the setting data of index number 0 to 9 can be recalled by pressing the corresponding number.



Utility HotKey
ON

3.8.6 Voltage Self-test Setting

Press **[Menu]** button until “Utility VselfTe” is shown on the LCD. Press **[↑]** **[↓]** or rotary knob to turn on or off the voltage self-test function. Users can enable this function to improve the voltage accuracy and get the accurate setting voltage at the output terminal.



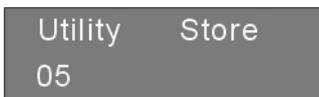
3.8.7 Save the Setting Data

The frequently used parameters can be stored into the 100 sets of Non-Volatile Memory in the power supply. User can easily recall those data for use. Parameters to be stored include Output voltage value, Output current value, Over Voltage Protection level, Over Current Protection level, Over Voltage Protection status, Over Current Protection status and the Delay time.

Press **[Menu]** button until “Utility Store” is shown on the LCD. Use the numeric buttons to input the memory address to save the data, then press **[Enter]** to complete the store.

For example: Store the setting data to the memory address of 5.

Press **[5]** **[Enter]**.



3.8.8 Recall the Setting Data

Press **[Menu]** button until “Utility Recall” is shown on the LCD. Use the numeric buttons to input the memory address to recall the data, then press **[Enter]** to complete the recall.

For example: Recall the setting data from the memory address of 5.

Press **[5]** **[Enter]**.



Note: When a setting is recalled, the output automatically turns off.

3.8.9 Software Version

Press **[Menu]** button until “Utility Version” is shown on the LCD. The instrument software version is displayed at the same time.



3.8.10 Remote Sensing Setting

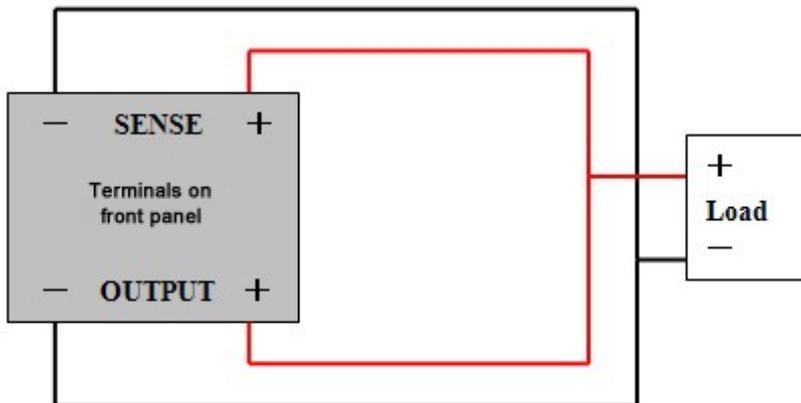
When the load is consuming large current, there will be voltage drop on the connecting cable between terminals of power supply and the load. In Constant Voltage mode, the remote sensing function automatically compensates voltage drop on the connecting cable.

Before using the remote sensing function, make sure that the power supply is under remote sensing mode. Before set on the remote sensing function, the output must be turned OFF. The remote sensing cable is suggested to use twisted-pair cable and do not twist the remote sensing cable with connecting cable of the load.

Press **[Menu]** button until “Utility Sense” is shown on the LCD. Press **[↑]** **[↓]** or rotary knob to turn on or off the remote sensing function.



Connecting illustration for remote sensing:



3.9 Auto Running Operation

3.9.1 Start Memory Address Setting

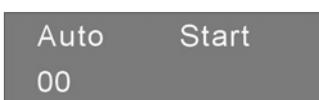
Press **[Menu]** **[5]** until “Auto Start” is shown on the LCD. The power supply enters auto run mode. Press **[Menu]** button to select functions in this menu.

Setting method 1: Press **[numeric buttons 0-9]** **[Enter]** to set start memory address.

Setting method 2: Press buttons **[←]** or **[→]** to move the cursor left or right. Rotate the rotary knob left or right to increase or decrease the digit on cursor.

For example: Set the start memory address to 0.

Press **[0]** **[Enter]**.



3.9.2 End Memory Address Setting

Press **Menu** button until “Auto End” is shown on the LCD.

Setting method 1: Press **[numeric buttons 0-9] [Enter]** to set end memory address.

Setting method 2: Press buttons **[◀]** or **[▶]** to move the cursor left or right. Rotate the rotary knob left or right to increase or decrease the digit on cursor.

For example: Set the end memory address to 8.

Press **[8] [Enter]**.



3.9.3 Cycle Times Setting

Press **Menu** button until “Auto Cycle” is shown on the LCD.

Setting method 1: Press **[numeric buttons 0-9] [Enter]** to set cycle times from number 0 to 99999. Number 0 represents infinite loop.

Setting method 2: Press buttons **[◀]** or **[▶]** to move the cursor left or right. Rotate the rotary knob left or right to increase or decrease the digit on cursor.

For example: Set the cycle times to 99.

Press **[9] [9] [Enter]**.



3.9.4 Enter/Exit Auto Running Operation

Press **ListRun** to enter or exit the auto running operation mode. If the Auto key light turns on, it means the instrument has entered the auto running operation.

Under this mode, “LeftTime” shown on the LCD represents the left time of running settings on the present memory address; “LeftCycle” represents left executed cycles; “No.” means the memory address.

Press **[On/Off]** mode to start output.



3.10 Output On/Off

The Output **[On/Off]** button on front panel is used to turn on or off the output.

3.11 Panel Lock

The **[Lock]** button on front panel is used to lock the front panel from misinput. Press **[Lock]** button, then the button backlight lights on, meaning the front panel is locked. All the other buttons and rotary knob are disabled except **[Lock]** button and **[On/Off]** button.

3.12 Rotary Knob

Press the rotary knob to switch the cursor position.

3.13 Protection Function

This power supply is built with Over Voltage Protection (OVP), Over Current Protection (OCP), Over Power Protection (OPP) and Over Temperature Protection (OTP).

OVP and OCP level can be set via the **[OVP-set]** and **[OCP-set]** buttons on the front panel respectively.

OPP function protects the power supply when the output power exceeds rated power. The output is shut down under OPP mode.

OTP function protects the power supply when the instrument produces abnormal high temperature during operation process. The output is shut down under OTP mode.

3.14 Operation Mode

3.14.1 Constant Voltage Operation

- (1) Connect load to output terminal.

For the safety, turn off the output before connecting the load to output terminals of (+) and (-).

- (2) Set the current limit value.

Press **[I-set]** until “Current” is shown on the LCD, the panel operation is set to current value input mode. Set the desired value by using the number buttons or the rotary knob.

- (3) Set the desired output voltage value.

Press **[V-set]** until “Voltage” is shown on the LCD, the panel operation is set to voltage value input mode. Set the desired change value by using the number buttons or the rotary knob.

- (4) Start the output.

Press **[On/Off]** to enable output. Now, the meter displays the actual output measurement value.

- (5) Constant voltage mode confirmation.

Check whether the CV indicator is on or not to make sure the output operation is under the constant voltage mode. If the CC indicator is on, it needs to increase its current limit value to ensure that the output operation is under constant voltage mode.

3.14.2 Constant Current Operation

- (1) Connect load to output terminal.

For the safety, turn off the output before connecting the load to output terminals of (+) and (-).

- (2) Set the voltage limit value.

Press [**V-set**] until “Voltage” is shown on the LCD, the panel operation is set to voltage value input mode. Set the desired change value by using the number buttons or the rotary knob.

- (3) Set the desired output current value.

Press [**I-set**] until “Current” is shown on the LCD, the panel operation is set to current value input mode. Set the desired change value by using the number buttons or the rotary knob.

- (4) Start the output.

Press [**On/Off**] to enable output. Now, the meter displays the actual output measurement value.

- (5) Constant current mode confirmation.

Check whether the CC indicator is on or not to make sure the output operation is under the constant current mode. If the CV indicator is on, it needs to increase its voltage limit value to ensure that the output operation is under constant current mode.

3.14.3 CV/CC Switch

When the output current level reaches the setting with the Output ON, the CC indicator turns red. The instrument operates in Constant Current mode. When the output voltage level reaches the setting, the CV indicator turns green. The instrument operates in Constant Voltage mode. The instrument automatically switches between Constant Current mode and Constant Voltage mode, according to load condition.

4. Remote Control

With the remote control function provided, this series power supply can communicate with PC by RS-232 interface and enable all the panel operations by series port software.

4.1 Interface Setting

4.1.1 Interface

The RS-232 interface is installed on the real panel of instrument.



RS-232 interface

4.1.2 COM Port Setting

Set up the COM port inside PC according to the following list

- (1) Baud rate: 9600
- (2) Parity bit: None
- (3) Data bit: 8
- (4) Stop bit: 1
- (5) Data flow control: None

Note 1: If the power supply has no response under the remote control, please check the following items.

- Check whether the connection cable is broken off or not.
- Check whether the connection cable is crossover cable.
- Check whether the pin connection among interface cable, power cord and PC is correct or not.
- Check whether the interface cable is properly connected or not.
- Check whether the communication parameters setup is compliant to COM port setting or not.
- Check whether the end character is line break or not (hexadecimal 0X0A).

Note 2: When the remote controller is on line, the [**Lock**] button backlight turns on and the operation can only be proceeded through it. At this time, all the panel operations are closed unless the [**Lock**] button is pressed again.

4.2 SCPI Commands

For detailed SCPI commands, please refer to the programming software in the CD ROM attached to the instrument.

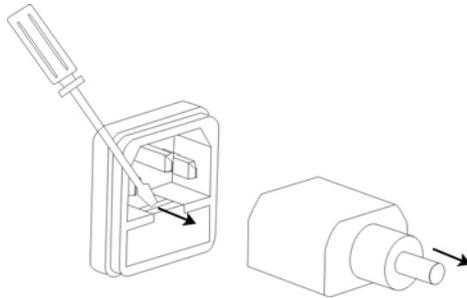
5. Maintenance

5.1 Inspection

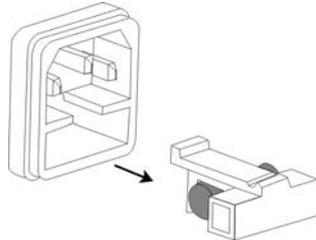
- Inspect the instrument at regular intervals so that it maintains its initial performance for a long time.
- Check the input power cord for damage of the vinyl cover and overheating of the plug and cord stopper. Check the terminal screws and binding posts for loosening.

5.2 Fuse Replacement

Step (1) Take off the power cord and remove the fuse socket using a minus driver.



(2) Replace the fuse in the holder.



Fuse rating 220V: For models 30V/20A and 60V/10A: T4AL/250V
 For models 15V/60V, 30V/30V and 60V/15A: T8AL/250V
 110V: For models 30V/20A and 60V/10A: T8AL/250V

6. Technical Specifications

The specifications apply when the power supply series are powered on for at least 30 minutes under regulated temperature.

Model	15V/60A	30V/30A	60V/15A	30V/20A	60V/10A
Rated output (0°C~40°C)					
Voltage	0~15V	0~30V	0~60V	0~30V	0~60V
Current	0~60A	0~30A	0~15A	0~20A	0~10A
OVP	0.1~18V	0.1~34V	0.1~64V	0.1~34V	0.1~64V
OCV	0.1~62 A	0.1~34A	0.1~17A	0.1~24A	0.1~12A
Constant Voltage Operation (CV)					
Line regulation	≤0.01%+4mV				
Load regulation	≤0.1%+5mV				
Recovery time	≤1.5ms (50% load change)				
Ripple & Noise	2mVrms, 30mVpp				
Temperature co-efficient	≤300ppm/°C				
Constant Current Operation (CC)					
Line regulation	≤0.2%+3mA				
Load regulation	≤0.2%+5mA				
Ripple & Noise	≤10mArms				
Display					
Voltmeter	5 digits display				
Ammeter	5 digits display				
Setting resolution	1mV/1mA				
Reading resolution	1mV/1mA				
Setting accuracy	Voltage	±(0.03% of reading + 10mV) (25±5°C)			
	Current	±(0.3% of reading + 10mA) (25±5°C)			
Reading accuracy	Voltage	±(0.02% of reading +5mV) (25±5°C)			
	Current	±(0.05% of reading +10mA) (25±5°C)			
Protection	Over load, over voltage, over current, over temperature and reverse polarity protections				
Programming interface	RS-232, support SCPI commands				
Memory	100 sets				
Insulation	Between terminals and chassis/other terminals: ≤60VDC				
Power source	AC220V±10%, 50/60Hz			AC110/220V±10%, 50/60Hz	
Accessory	Operation manual x1, Power cord x1, Software CD x1, RS-232 cable x1				
Dimension(W*H*D)	215×89×412mm			215×89×352mm	
Weight	5.5kg			4.5kg	