EN

AX-3003P AX-6003P

1. 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.

2. Safety instructions

2.1. Safety Terms and Symbols

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.
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



Earth (ground) terminal



Protective conductor terminal

2.2. 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

2.3. Power Supply

WARNING

AC Input voltage: 110V~120V/220~240V ±10%, 50/60Hz. Connect the protective grounding conductor of the AC power cord to an earth ground to avoid electrical shock.

2.4. Fuse

WARNING

- 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.

2.5. Cleaning

- Before cleaning, disconnect the AC mains.
- To clean the power supply, use a soft cloth dampened in a solution of mild detergent and water. Do not spray cleaner directly onto the instrument, since it may leak into the cabinet and cause damage.
- Do not use chemicals containing benzene, benzene, toluene, xylene, acetone, or similar solvents.
- Do not use abrasive cleaners on any portion of the instrument.

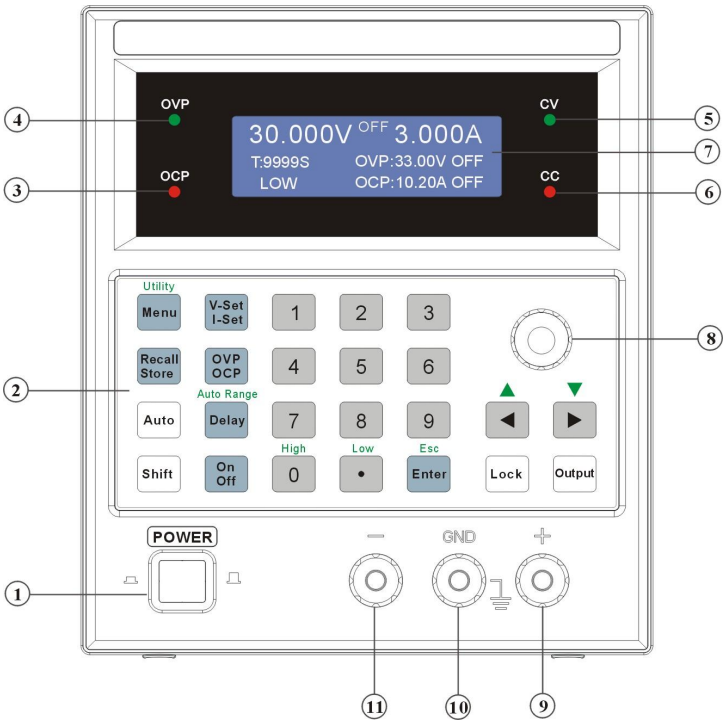
2.6. Operation notes

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

3. Quick Starting

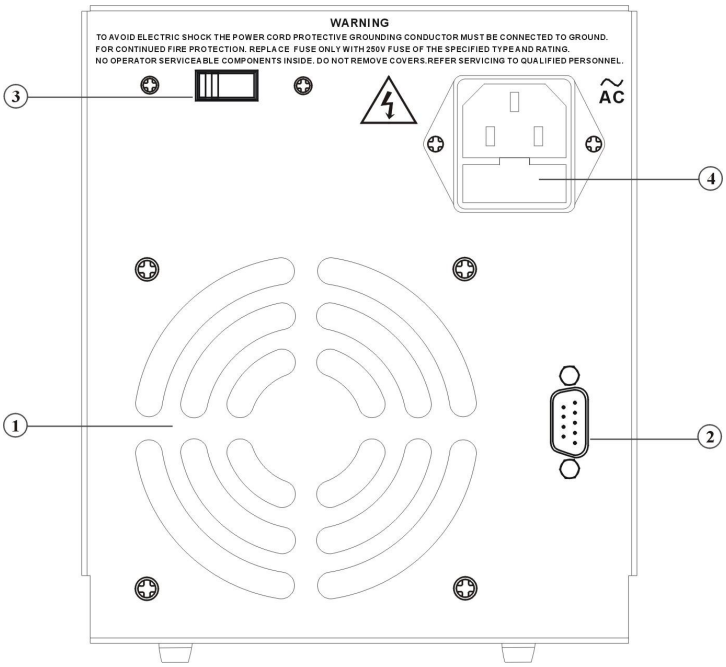
3.1. Front Panel and Rear Panel

Front Panel



1. Power switch
2. Function key and Numeric keypad
3. OCP indicator
4. OVP indicator
5. CV indicator
6. CC indicator
7. LCD display
8. Rotary knob
9. Positive output terminal
10. Ground terminal
11. Negative output terminal

Rear Panel



1. Cooling fan
2. USB interface
3. AC110/220V power selection switch
4. Power cord / fuse socket

There are four indicators on both sides of the screen, as shown above.

CV indicator: The CV light turns green to indicate the instrument is in the CV mode.

CC indicator: The CC light turns red to indicate the instrument is in the CC mode.

OVP indicator: The OVP light turns green to indicate the over voltage protection function is on.

OCP indicator: The OCP light turns red to indicate the over current protection function is on.

4. Operation Instructions

4.1. Basic Operations

- The applied Voltage/Current Unit for this series instruments is Volt and Amp.
- The factory setting is in panel operation mode that enable user to operate the instruments directly from panel control knob. Besides, when the remote controller is on line, the Lock key light turns on and the operation can only be proceed through it. At this time, all the panel operations are closed unless the key [Lock] is pressed, but the Output is still working. Whenever the power is reset, the output will be at OFF status and the operation is through front panel operation mode.
- When users operate the power supply with dual range, during the switch process, the output is at OFF automatically. And if the original setting value is more than the maximum output range after switch, the setting value will be modified automatically to the maximum output value after switch
- When the Output key light turns on, the CV or CC indicator at the right side of the LCD represents the instrument is in the CV or CC mode and the LCD displays the output measurement value.
- The output of power supplies is always at OFF status after power on.

5. Numeric Keypad Input

If an option is selected, you can input the parameters by using the numeric keys. There are ten numeric keys for data input. The input method is the shift input from right to left.

The data can have only one decimal point. If one data input has more than one decimal point, only the first one is valid. After input a new value, press key [Enter] to validate it. If the input data has error, there are three ways to correct it.
Method 1: If the destination side of output signal can receive the wrong signal, press key [Enter] to terminate the current operation. Input the correct data, and press the key [Enter] to validate the input.
Method 2: If the destination side of output signal can not receive the wrong signal, the wrong input is not validated because of no any wrong signal at the output. Reselect the operation, input correct data, and press the key [Enter] to validate the input.
Method 3: Press keys [Shift] [Enter], then input the correct data, and press the key [Enter] to validate the input.

6. Step Key Input

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 data by repeatedly pressing the numeric keypad and Enter key. 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 pressing the corresponding soft key can make the voltage or current increase or decrease by a step value. The modified data is validated automatically without pressing the Enter key.
For example, to generate a series of voltage with interval 1.1V, press the keys sequentially as following:
Press keys [Shift] [Menu] to enter function setting interface,
Press key [Menu] again until “Utility V Step” is shown on the LCD,
Press keys [1] [.] [1] [Enter] to complete step voltage value setup,
Press key [V-Set/I-Set] again until “Voltage” is shown on the LCD,
Press keys [Shift] [<] to increase the voltage by 1.1V or press keys [Shift] [>] 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.

7. Knob Adjustment

In some applications, it requires to adjust the output signal continuously. Using the rotary knob can complete this task. Press key [<] 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. When you use the knob to modify a specified data, the modified data is validated instantaneously without pressing the Enter key. A coarse adjustment is made by moving the cursor to the left; and a fine adjustment is made by moving the cursor to the right.

8. Parameters Setup

8.1. Output Voltage Setting

Press key [V-Set/I-Set] until “Voltage” is shown on the LCD.
Setting method 1: Press [Number key (voltage value)] [Enter] to set output voltage.
Setting method 2: Press [Number knob (voltage value)] to change the output voltage setting immediately. When use this method with the output ON, the output voltage will be changed following the input value by rotating the knob. Press key[<] or [>] to move the cursor left or right, and tune the rotary knob left or right to add or subtract the digit on cursor, or to decrease or increase the digits continuously by steps, so as to make coarse or fine adjustment of the voltage. Apply the same procedures for other parameters adjustments.
For example: Set output voltage to 32.000V.
Press [V-Set] [3] [2] [.] [0] [0] [0] [Enter].

8.2. Output Current Setting

Press key [V-Set/I-Set] until "Current" is shown on the LCD.
Setting method 1: Press [Number key (current value)] [Enter] to set output current.
Setting method 2: Press [Number knob (current value)] to change the output current setting immediately. When use this method with the output ON, the output current will be changed following the input value by rotating the knob.
For example: Set output current to 3.200A.
Press [I-Set] [3] [.] [2] [0] [0] [Enter].

8.3. Over Voltage Protection Setting

Press key [OVP], to set the maximum output voltage. If the adjusted value or actual output value is more than the maximum value, the output voltage will automatically stop, the OVP indicator turns on, and warning signal by the beeper will be heard.
Press key [OVP/OCP] until "OVP Set" is shown on the LCD.
Setting method 1: Press [Number key (voltage value)] [Enter] to complete OVP setting.
Setting method 2: Press [Number knob (voltage value)] to change OVP setting immediately.
For example: Set over voltage protection value to 33.0V.
Press [OVP] [3] [3] [.] [0] [Enter].

8.4. Over Voltage Protection Status Setting

Press key [Menu] until "OVP Status" is shown on the LCD, to proceed over voltage protection status setting, then press [On/Off] to turn on or off the OVP function.

8.5. Over Current Protection Setting

Press key [OCP], to set the maximum output current. If the adjusted value or actual output value is more than the maximum value, the output current will automatically stop, the OCP indicator turns on, and warning signal by the beeper will be heard.
Press key [OVP/OCP] until "OCP Set" is shown on the LCD.
Setting method 1: Press [Number key (current value)] [Enter] to complete OCP setting.
Setting method 2: Press [Number knob (current value)] to change OCP setting immediately.
For example: Set over current protection value to 3.30A.
Press [OCP] [3] [.] [3] [0] [Enter].

8.6. Over Current Protection Status Setting

Press key [Menu] until "OCP Status" is shown on the LCD, to proceed over current protection status setting, then press [On/Off] to turn on or off the OCP function.

8.7. Voltage/Current Delay Time Setting

Press key [Delay], "Delay" is shown on the LCD.
Setting method 1: Press [Number key (delay time)] [Enter] to complete voltage and current delay time setting.
Setting method 2: Press [Number knob (delay time)] to change voltage and current delay time setting immediately.
For example: Set the delay time to 99999s.
Press [Delay] [9] [9] [9] [9] [9] [Enter].
Note: The Delay setting is effective only under the Auto running operation, therefore, during the storage proceeding, the Delay setting will be saved to the memory address simultaneously.

8.8. Function Setup

Press [Shift] [Menu], proceed to the function setting, then press [Menu] to select the options under the current function.

8.9. Voltage Step Setting

Set the maximum value of Step to be the rating value of the setting range.
Press key [Menu] until "Utility V Step" is shown on the LCD.
Setting method 1: Press [Number key (voltage value)] [Enter] to set step voltage.
Setting method 2: Press [Number knob (voltage value)] to change step voltage immediately.

For example: Set the step voltage to 10.000V.
Press [1] [0] [.] [0] [0] [0] [Enter].

8.10. Current Step Setting

Set the maximum value of Step to be the rating value of the setting range.
Press key [Menu] until "Utility I Step" is shown on the LCD.
Setting method 1: Press [Number key (current value)] [Enter] to set step current.
Setting method 2: Press [Number knob (current value)] to change step current immediately.
For example: Set the step current to 0.500A.
Press [0] [.] [5] [0] [0] [Enter].

8.11. Beeper Setting

Press key [Menu] until "Utility Beep" is shown on the LCD, then press [On/Off] to turn on or off the beeper.

8.12. Hotkey Setting

Press key [Menu] until "Utility HotKey" is shown on the LCD, then press [On/Off] to turn on or off the hotkey function. The original status is at OFF, press [On/Off] once, the status is changed to ON. After leaving the Menu, the number 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.

8.13. Voltage Self-test Setting

Press key [Menu] until "Utility VselfTe" is shown on the LCD, then press [On/Off] to turn on or off the voltage self--test function. The original status is at ON, press [On/Off] once, the status is changed to OFF. Users can enable this function to improve the voltage accuracy and get the accurate setting voltage at the output terminal.

8.14. Recall the Setting Data from the Memory Bank

Press key [Menu] or [Recall/Store] until "Utility Recall" is shown on the LCD, use the number key 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.

8.15. Save the Setting Data to one of the Memory Groups

Press key [Menu] or [Recall/Store] until "Utility Store" is shown on the LCD, use the number key 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].
Note: The storing setting function includes the store of the Output range, 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.

8.16. Auto Range

Press key [Shift [Delay] until "Auto Start" is shown on the LCD, enter auto range setting item selection, press [Menu] to select the options under the current function.
When users operate the power supply with dual range, the several groups of running stored parameters should be set under the same ranges, otherwise, during the auto running and switch process, the output is at OFF automatically.

8.17. Start Memory Address Setting

Press key [Menu] until "Auto Start" is shown on the LCD.
Setting method 1: Press [Number key (memory address)]

[Enter] to set start memory address.
Setting method 2: Press [Number knob (memory address)] to change start memory address immediately.
For example: Set the start memory address to 0.
Press [0] [Enter].

8.18. End Memory Address Setting

Press key [Menu] until "Auto End" is shown on the LCD.
Setting method 1: Press [Number key (memory address)] [Enter] to set end memory address.
Setting method 2: Press [Number knob (memory address)] to change end memory address immediately.
For example: Set the end memory address to 8.
Press [8] [Enter].

8.19. Cycle Times Setting

Press key [Menu] until "Auto Cycle" is shown on the LCD.
Setting method 1: Press [Number key (cycle times)] [Enter] to set cycle times from number 0 to 99999. Number 0 represents infinite loop.
Setting method 2: Press [Number knob (cycle times)] to change cycle times immediately.
For example: Set the cycle times to 99.
Press [9] [9] [Enter].

8.20. Enter/Exit Auto Running Operation

Press [Auto] 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, LeftCycle represents left executed cycles, No. means the memory address, High/Low is high or low range. (The message High/Low is only for the models with dual range.)

8.21. Output

The Output key is for turning on or off the output.

8.22. Lock

The Lock key is for locking up the panel setting. When the key light turns on, the other key and knob is disabled except Lock and Output key.

8.23. 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.

8.24. Over Temperature Protection

The instrument provides the Over Temperature Protection function. In order to insure user's safety and safe operation for instrument, the output will automatically turns off if the instrument produces abnormal high temperature during operation process.

8.25. Operation methods

8.25.1.

The applied Voltage/Current Unit for this series instruments is Volt and Amp.

8.25.2. Constant Voltage Operation

Connect load to output terminal.
For the safety, when connect the load to output terminals of (+) and (-), it must turn off the power.
Select output range.
Turn on the power after the load is well connected, select the adequate operation range by pressing [High] or [Low].
Set the current limit value.
Press [V-Set/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 key or the knob

(the knob can be used together with [<] or [>] to adjust the resolution).
Set the desired output voltage value.
Press [V-Set/I-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 key or the knob (the knob can be used together with [<] or [>] to adjust the resolution).
Start the output.
Press [Output] to enable output, now, the meter displays the actual output measurement value.
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 enlarge its current limit value to assure that the output operation is under constant voltage mode.

8.25.3. Constant Current Operation

Connect load to output terminal.
For the safety, when connect the load to output terminals of (+) and (-), it must turn off the power.
Select output range.
Turn on the power after the load is well connected, select the adequate operation range by pressing [High] or [Low].
Set the voltage limit value.
Press [V-Set/I-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 key or the knob (the knob can be used together with [<] or [>] to adjust the resolution).
Set the desired output current value.
Press [V-Set/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 key or the knob (the knob can be used together with [<] or [>] to adjust the resolution).
Start the output.
Press [Output] to enable output, now, the meter displays the actual output measurement value.
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 enlarge its voltage limit value to assure that the output operation is under constant current mode.

8.25.4. Store and Recall Operation

The storing setting function includes the store of the Output range, 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.
Store the present setting status to the memory bank.
Press [Recall/Store] until “Utility Store” is shown on the LCD, set the panel operation to storing setting selection, input the desired memory address by using number key or knob, then press [Enter] to complete the change of store.
Recall the setting status from the memory bank.
Press [Recall/Store] until “Utility Recall” is shown on the LCD, set the panel operation to recall setting selection, use the number key or knob to recall the desired memory address, then press [Enter] to complete the change of recall.

8.25.5. Auto Running Operation

The function must be used together with the Delay setting which is defined as the operation delay time of next running operation. The Delay function is workable only under Auto Running operation.
The setting and store of very group of data.
A group setting includes the Output range, Output voltage value, Output current value, Over Voltage Protection level, Over Current Protection level, Over Voltage status (ON/OFF), Over Current status (ON/OFF), and Delay time.
User can proceed the setting and store it to the memory bank group by group up to 100 groups maximum.
Recall range setting (Auto running operation range).
Regarding the setting description, please refer to Auto Range operation in section 3.5.
Enter Auto mode by pressing [Auto], now, the operation is in the auto running function.

Press [Output] to turn on the output.
Under this mode, it can monitor the current operation setting address, left time and left cycle.

9. Remote Control

9.1.

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

9.2. USB Interface

The USB interface is installed on the real panel of instrument.

10. Technical specifications

10.1. Data Sheet

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

1	AX-3003P	AX-6003P
2	30V/3A	36V/3A
3	0~30V	0~60V
4	0~3A	0~3A
5	0.1~34V	0.1~64V
6	0~3.5A	0~3.5A

1. Model
2. Output range
3. Voltage
4. Current
5. OVP
6. OCP

Voltage output
Line regulation:≤0.01%+3mV
Load regulation:≤0.01%+3mV (I≤3A) / ≤0.02%+5mV (I>3A)
Recovery time:≤100us (50% load change, minimum load 0.5A)
Ripple & Noise:≤1mV rms (I≤3A) (5Hz~1MHz) / ≤2mV rms (I>3A) (5Hz~1MHz)
Temp. co-efficient:≤300ppm/°C
Setting accuracy:±(0.03% of reading + 10mV) (25±5°C)
Current output
Line regulation:≤0.2%+3mA
Load regulation:≤0.2%+3mA (I≤3A) / ≤0.2%+5mA (I>3A)
Ripple & Noise:≤3mA rms (I≤3A) / ≤6mA rms (I>3A)
Setting accuracy:±(0.2% of reading + 10mA) (25±5°C)
Display
Voltage: 5 digits display
Current: 5 digits display
Voltage resolution: 1mV
Current resolution: 0.1mA
Readback accuracy (25±5°C): ±(0.02% of reading +5mV) ; ±(0.02% of reading +5mA)
Protection: OLP, OVP, OCP, OTP and reverse polarity protection
Key lock:Provided
Interface:USB interface, SCPI commands provided
Save /Recall:100 sets
Insulation:Between chassis and output terminal: ≥20MΩ/500VDC; Between chassis and AC cord: ≥30MΩ/500VDC
Operation environment
Indoor use
Altitude: ≤2000m
Ambient temperature: 0~40°C
Relative humidity: ≤80%
Installation category: II
Pollution degree: 2
Storage environment: Ambient temperature: -10~70°C; Relative humidity: ≤70%
Power source: AC 110V/220V±10%, 50/60Hz
Accessories: Operation manual, Power cord, Software CD, USB cable

Dimension: 296 (D) ×126 (W) ×143 (H)mm
Weight:≤5.5kg
Maximum Setting Value
Model / AX-3003P / AX-6003P
Output range Item / 30V/3A / 60V/3A
Output voltage / 32V / 62V
Output current / 3.2A / 3.2A