4CH PROGRAMMABLE DC POWER SUPPLY USER MANUAL

PREFACE

Dear user

Hello! Thank you for purchasing the new electronic instrument. In order to use this instrument correctly, please read the full text of this manual carefully before using this instrument, especially the "safety precautions".

If you have read the full text of this manual, it is recommended that you keep this manual properly and place it with the instrument or at a place where you can read it at any time for reference in the future use.

Verification and correction statement

The company specially declares that the instruments and equipment listed in this manual fully comply with the specifications and characteristics specified in the company's technical specifications. The instrument has passed the factory calibration of the company before leaving the factory, and the calibration procedures and steps are in accordance with the specifications and standards of the electronic inspection center.

Product quality assurance

The company guarantees that the new instruments produced and manufactured by the company have been strictly confirmed in quality. At the same time, the company is responsible for repairing free of charge if any construction defect or part failure is found within one year after delivery. However, if the user has changed the circuit, function, or repaired the instrument and parts or damaged the outer box, our company will not provide free warranty service. If all ground wires are not properly connected according to the regulations or the machine is not operated according to the safety specifications, the company will not provide free warranty service.

This guarantee does not include the accessory equipment of this instrument and other accessories not produced by our company.

During the one-year warranty period, please return the faulty unit to our maintenance center or the dealer designated by our company, and our company will properly repair it.

If the unit fails under abnormal use, human negligence, or non human control, such as earthquake, flood, riot, or fire and other non human control factors, the company will not provide free warranty services.

(The company follows the sustainable development strategy and reserves the right to improve the contents of this manual without prior notice)

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Chapter I Product Introduction

The four programmable DC power supply is a new generation of high-quality programmable linear DC power supply, which can independently adjust the voltage and current. This series of products are equipped with RS232 communication interface, which has the characteristics of both desktop and system type. It can be combined with other instruments at will, and integrated into a test system with special functions to meet the measurement needs in different occasions. The upper computer program can be edited through the communication protocol, bringing great convenience to users, It is a new generation product of common programmable power supply with high cost performance.

This series of power supply has the following characteristics:

• Stepless servo, intelligent fan system

• Multiple groups of data storage

• Standard 19 inch 3U instrument architecture design

• Support RS232, communication

• 1mV, 0.1mA high resolution

• OCP, OVP, OTP and other protection functions

Four circuits can independently adjust voltage and current

Chapter II Technical Specifications

2.1 Main technical specifications

Technical Specifications of Four Circuit Programmable DC Power Supply:

Specification		MPS-3054	MPS-30104	MPS-6034	MPS-6054
Rated output voltage		0~30V*4CH	0~30V*4CH	0~60V*4CH	0~60V*4CH
Rated output current		0~5A*4CH	0~10A*4CH	0~3A*4CH	0~5A*4CH
Transformer mode		Linear power supply			
Load regulation rate	voltage	≤0.02%+5mV			
	current	≤0.02%+5mA			
Power regulation rate	voltage	≤0.02%+5mV			
	current	≤0.02%+5mA			
Set value resolution	voltage	1mV			
	current	0.1mA			
Set accuracy (25℃±5℃)	voltage	≤0.05%+5byte			
	current	≤0.05%+2mA			
Read back resolution	voltage	1mV			
	current	0.1mA			
Read back accuracy (25℃±5℃)	voltage	≤0.05%+5byte			
	current	≤0.05%+2mA			
Ripple and noise	voltage	≤8mV(rms)	≤8mV(rms)	≤3mV(rms)	≤3mV(rms)
	current	≤5mA(rms)	≤5mA(rms)	≤3mA(rms)	≤3mA(rms)
Temperature and humidity	Operating environment	0 ～ 40 ℃ ≤ 80% RH			
	Storage environment	-15 ～ 70 ℃ ≤ 80% RH			
Interface	standard	RS232			
Bare metal size（W*H*D）	mm	480*142*370			
Net weight	kg	28			

2.2 Supplementary characteristics

Status memory capacity: 9 groups of operation status

Recommended calibration frequency: 1 year/1 time

Heat dissipation mode: forced air cooling

Operating ambient temperature: 0 to 40 ℃

Storage ambient temperature: - 20 to 70 ℃

Use environment: indoor use design, pollution level 2, maximum humidity 80%

Chapter Ⅲ Quick Start

This chapter will briefly introduce the appearance and basic functions of the four programmable DC power supply, so that you can quickly understand the four programmable DC power supply. At the same time, you will be informed of the basic inspection to be done after getting the power supply to ensure the normal operation of the product.

3.1 Introduction to front and rear panels

The front panel of four programmable DC power supply is shown in the figure below.
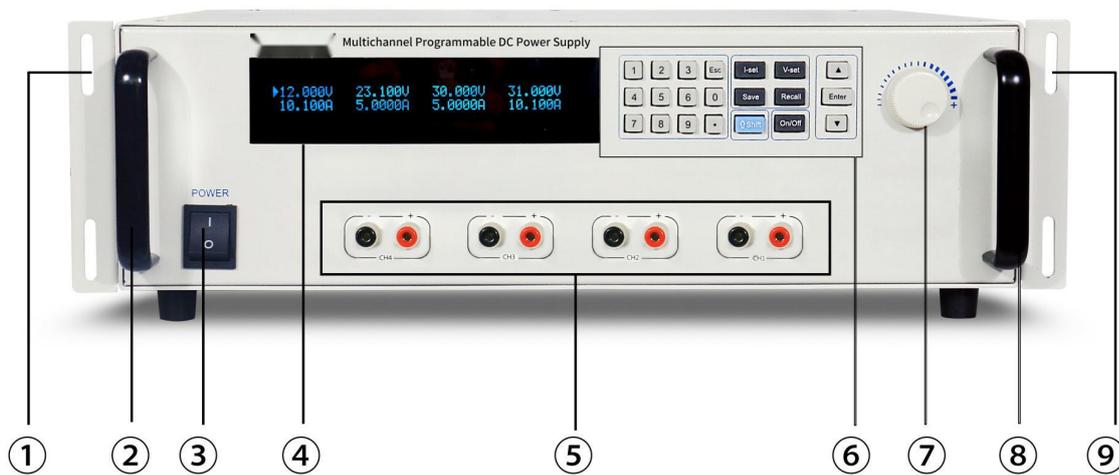
Pic 3.1

① ⑨Standard 19 inch cabinet fixing hole

② ⑧⑦Five channel programmable DC power handle

③ power switch

④ LED display

⑤ Four groups of output terminals

⑥ From left to right, there are 0-9 number keys, ESC exit key, function key, up and down movement key and Enter key

⑦ Adjusting knob

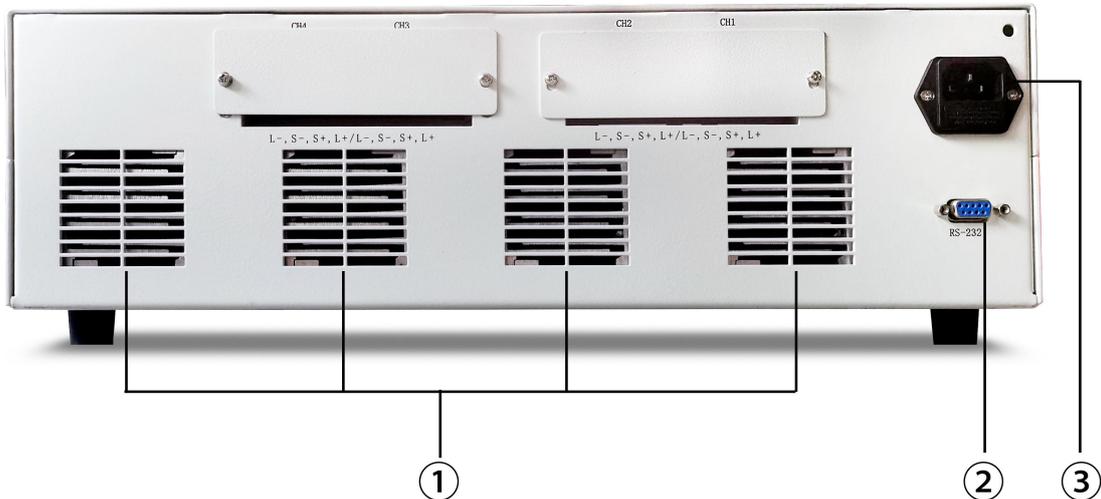The rear panel layout of four programmable DC power supply is shown in the figure below。

Fig. 3.2 Rear panel of four programmable DC power supply

① Heat sink

② Communication interface RS232

③ Power input socket

3.2 Pre inspection

Please check the power supply according to the following steps to ensure that the power supply can be used normally.

1. Inspection

 Please check whether you have received the following accessories while receiving the power supply. If there is any missing, please contact the nearest dealer。

☐ One power cord (according to the voltage standard used in the region)

☐ One operation manual (standard configuration)

☐ One communication line (standard configuration)

☐ One warranty card (standard configuration)

2. Connect the power cord and turn on the power

After power on, the power supply first performs system self-test, and then enters standby mode.

⚠ Warning: The power supply is provided with a three core power cord when leaving the factory. Your power supply should be connected to the three core junction box. Before operating the power supply, you should first make sure that the power supply is well grounded.

3.3 If the power supply fails to start

Use the following methods to solve the problems you may encounter when turning on the power.

1. Check whether the power cord is connected properly

Model	Fuse value
	220V
MPS-3054	10A
MPS-30104	15A
MPS-6034	10A
MPS-6054	15A

2.Replacement method of fuse
Use a screwdriver to open the small plastic cover under the power input socket on the back panel of the power supply, and you can see the fuse. Please use a fuse with the same specification.

Chapter IV Panel Operation

This chapter describes the operation of the power front panel in detail, which is divided into the following sections:

    Keyboard arrangement

    Introduction to front panel operation

    Voltage setting operation

    Current setting operation

    Storage operation

    Menu operation

    Output on/off operation

4.1 Keyboard arrangement

Key description

Key position	Key Function Description
0-9:	Number keys
Esc:	Number key input and exit
I-Set	Set the maximum output current of the power supply
V-Set	Set power output voltage
Save	Store the current relevant parameters of the power supply to the specified storage location
Recall	Call out the power related setting parameters from the specified storage location
Shift	Composite key, used in combination with multi-function key
On/off	Control power output status
▲	Turn up key (select menu item in menu operation to increase output voltage on the working interface)
▼	Turn down key (select the menu item in menu operation, and the output voltage can be reduced in the working interface)
Enter	Confirm key
knob	Used to change the setting of power supply voltage and current

4.2 Basic operation of front panel

When the power is turned on, LED displays two data of the first channel, the first window displays the voltage value, and the second window displays the current value. When the instrument is in the output state, the current window displays the actual current, and when the instrument is in the off state, the current window displays the set current. Press ▲ and ▼ keys to switch the parameter display from CH1 to CH5, and the LED indicator light indicates the working status of the currently displayed channel and five channels.

4.3 Voltage setting operation

The voltage setting range is between 0V and the maximum voltage setting value. You can use the following two methods to set the output voltage value through the front panel, and set the voltage as the value of the current display channel.

Method 1: Press the V-Set key, then press the 0 to 9 number keys to input the voltage value, and then press the Enter key to determine the voltage value.

Method 2: Press the V-Set key, and then turn the knob left and right to change the voltage setting value (press the knob inward, the screen flashes, and then turn the setting voltage left and right; press the knob to move the cursor position, and press the "Enter" key to confirm and exit the setting mode).

4.4 Current setting operation

The setting range of constant current is between 0A and full rated output current. You can use the following two methods to set the output current value through the front panel, and set the current as the value of the current display channel.

Method 1: Press the V-Set key, then press the number keys 0 to 9 to enter the current value, and then press the Enter key to determine the current value.

Method 2: Press the V-Set key, and then rotate the knob left and right to change the voltage setting value (press the knob inward, the screen flashes, and then rotate the setting current left and right; press the knob to move the setting cursor position; press the "Enter" key to confirm and exit the setting mode).

4.5 Access operation

The power supply can store some commonly used parameters in 9 groups of nonvolatile memories for users to call out quickly. You can use the Save and Recall keys on the front panel to access (0~9) group stores.

The storage contents include: 1. voltage setting value 2. current setting value 3. OVP 4.0CP

You can press Save, then press 1 to 9, and press Enter to store the power parameters in the specified storage area.

You can press the Recall key, then press the 1 to 9 number keys, and press the Enter key to retrieve the parameters from the specified storage area for use.

Prompt: it is the parameter of the current channel when storing parameters, and it is the parameter of all channels when calling parameters.

4.6 OVP/OCP/V SENSE function setting

Press shift and then press the number keys "1 to 4" to enter the parameter settings of CH1 to CH4 respectively. Press ▲ and ▼ to switch the display of CH1 to CH4 parameters

OVP value (overvoltage protection value setting, set by number key and confirm by "Enter" key)

OVP ON/OFF

OCP value (overcurrent protection value setting, set by number key, and confirm by "Enter" key)

OCP ON/OFF (Enable switch of overcurrent protection, ON, OFF, set by knob, and confirm with "Enter" key)

SENSE ON/OFF (SENSE enable switch, ON, OFF, set by knob, and confirm with "Enter" key)

4.7 Menu Settings

Press shift and then press the number key "0" to enter the menu setting function. Press ▲ and ▼ to switch options. The screen displays as follows:

P-UP ON/OFF（The power-on state enable switch is ON and OFF. It is set by the knob and confirmed by the "Enter" key. When it is set to ON, the power supply will output automatically after power-on. When it is set to OFF, the power supply will not output automatically after power-on,)

P-ST ON/OFF（The power on parameter memory switch is turned on and off, set by the knob and confirmed by the "Enter" key. When it is set to ON, the parameters of the last power-off will be maintained after the power supply is powered on. When it is set to OFF, the system default parameters will be called after the power supply is powered on,)

ADD XXX (address setting, 1-128, turn the knob left and right to change the setting value and press Enter for confirmation)

BAUD XXXX (communication baud rate setting, 4800-38400, confirm with the "Enter" key of knob setting)

Chapter V Remote Operation Mode

5.1 Communication between power supply and host

The power supply can be connected to the PC host interface through the DB9 plug on the back panel. The following contents can help you understand how to control the power output through the host.
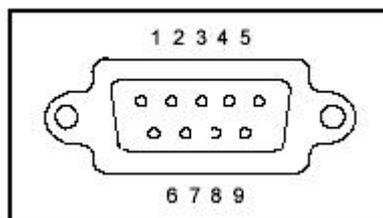
1. Communication setting

Before communication, you should first match the power supply with the following parameters of the control host:

(1) Baud rate: 9600

(2) Check: NONE (3) Data bit: 8, stop bit: 1 (fixed value)

2. DB9 serial interface

The DB9 interface on the rear panel of the power supply can be connected to the interface of the host.

3. Interface pin definition

1	NC
2	RXD （receive）
3	TXD （send）
4	NC
5	GND （ground）
6	NC
7	NC
8	NC
9	NC

ChapterⅥ SCPI Communication Protocol

Command format

The short mnemonic uppercase format is supported according to the SCPI command syntax.

1. The curly braces ({}) contain the parameter options of the given command string. Braces are not sent with the command string.

2. The vertical bar (|) separates multiple parameter selections for a given command string. For example, in the above command, {0 | 1 | OFF | ON} means that you can specify "0", "1", "OFF", and "ON". The vertical bar is not sent with the command string.

3. Angle brackets (<>) indicate that a value must be specified for the parameter in brackets. For example, VOLTage {<voltage value>}, angle brackets are not sent with the command string. You must specify a value for the parameter. For example: VOLT 1.23

4. The colon (:) is used to separate the command keyword from the next level keyword. Example: SYST: LOC

5. Question mark (?) By adding a question mark (?) to a command You can query the current value of the parameter. For example: MEAS: VOLT?

6. Space You must use white space characters, [TAB] or [Space] to separate parameters from command keywords.

7. The command string sent to the instrument by the terminator must end with a ＼r ＼n (0X0D, 0X0A)

character. Command string termination always resets the current SCPI command path to the root level.

Remote interface connection

The power supply can be connected to the RS-232 interface through the level conversion circuit through the DB9 plug on the back panel. The following contents can help you understand how to control the power supply output through a PC.

Communication settings

Before communication, you should first match the power supply with the following parameters of the PC.

Baud rate: 4800/9600/19200/

Data bits: 8

Stop bit: 1

Check: None

IEEE 488.2 General Commands

*IDN?

This query command reads the identification string of the power supply.

Return parameters: manufacturer name, product model, hardware version number, software version number.

SYSTem command

The SYSTem command is used to set and query system related status

SYSTem:LOCal

This command sets the power supply to the local operation mode.

Example: SYST: LOC

SYSTem:REMote

This command sets the power supply to the remote operation mode.

Example: SYST: REM

SYSTem: BEEPer {0 | 1 | OFF | ON}

This command enables or disables the power tone.

Example: SYST: BEEP OFF "Disable the prompt tone of the power supply"

SYST: BEEP 1 "Enable power tone"

SYSTem :BEEPer?

This command can query the prompt tone status of the power supply.

Example: SYST: BEEP?

Return parameter: 0 (disable prompt tone) | 1 (enable prompt tone)

Apply command

The Apply command is used to set or read the voltage value, current value, output state and SENSE state of the five channels at the same time.

APPly:VOLTage {<CH1 Voltage >, <CH2 Voltage >,<CH3 Voltage, <CH4 Voltage >}

This command sets the voltage value of four channels at the same time

Example: APP: VOLT 12,5,3,20.1

Set the output voltage as 12V, 5V, 3V, 20.1V respectively

APPly:VOLTage?

This command queries the set voltage value of the four channels at the same time

Example: APP: VOLT?

Return parameters: CH1 set voltage (X.XXX), CH2 set voltage (X.XXX), CH3 set voltage (X.XXX), CH4 set voltage (X.XXX)

APPly:CURRent {<CH1 Current >, <CH2 Current >,<CH2 Current >, <CH4 Current >}

This command sets the current value of four channels at the same time

Example: APP: CURR 3,1,3,2.123,

Set the output current to 3A, 1A, 3A, 2.123A respectively

APPly:CURRnet?

This command queries the set current value of the four channels at the same time

Example: APP: CURR?

Return parameters: CH1 set current (X.XXX), CH2 set current (X.XXX), CH3 set current (X.XXX), CH4 set current (X.XXX)

APPly:OUTput   {<0 |1 |ON|OFF>, <0 |1 |ON |OFF >,<0 |1 |ON|OFF >,<0 |1 |ON|OFF >}

This command sets the output status of four channels at the same time

Example: APP: OUT OFF, 0,1, ON

Set the five channel output states to OFF, OFF, ON and ON respectively

APPly:OUTput?

This command queries the output status of four channels at the same time

Example: APP: OUT?

Return parameters: CH1 output status (0 | 1), CH2 output status (0 | 1), CH3 output status (0 | 1), CH4 output status (0 | 1)

APPly:SENSEput   {<0 |1 |ON|OFF>, <0 |1 |ON |OFF >,<0 |1 |ON|OFF >,<0 |1 |ON|OFF >}

This command sets the SENSE status of the four channels at the same time

Example: APP: OUT OFF, 0,1, ON

Set the five channel SENSE states to OFF, OFF, ON, and ON respectively

APPly:SENSe?

This command queries the SENSE status of four channels at the same time

Example: APP: SENS?

Return parameters: CH1SENSE state (0 | 1), CH2SENSE state (0 | 1), CH3SENSE state (0 | 1), CH4SENSE state (0 | 1)

Measure command

The Measure command is used to query the actual output voltage and current values of the power supply

MEASure: VOLTage?

This command queries the actual output voltage value of the current channel of the power supply

Example: MEAS: VOLT?

Return parameter: actual voltage value (X. XXX)

MEASure:VOLTage:ALL?

This command queries the actual output voltage of the four power supply channels at the same time

Example: MEAS: VOLT: ALL?

Return parameters: CH1 actual voltage value (X.XXX), CH2 actual voltage value (X.XXX), CH3 actual voltage value (X.XXX), CH4 actual voltage value (X.XXX)

MEASure: CURRent?

This command queries the actual output current value of the current channel of the power supply

Example: MEAS: CURR?

Return parameter: actual current value (X. XXX)

MEASure: CURRent:ALL?

This command queries the actual output current value of the four power supply channels at the same time

Example: MEAS: CURR: ALL?

Return parameters: CH1 actual current value (X.XXX), CH2 actual current value (X.XXX), CH3 actual current value (X.XXX), CH4 actual current value (X.XXX)

OUTPUT command

The OUTPUT command is used to set and query the output of the power supply

OUTPut {<0 | 1 | OFF | ON>}

This command enables or disables the output state of the current channel of the power supply

Example: OUTP OFF "Disable power output"

OUTP 1 "Enable power output"

OUTPut?

This command can query the output status of the current channel of the power supply

Example: OUTP?

Return parameter: 0 (disable output) | 1 (enable output)

VOLTage command

The VOLTage command is used to set and query the set voltage value

VOLTage {<voltage>}

This command is used to set the output voltage value of the current channel of the power supply

Example: VOLT 12.345

The set voltage is 12.345V

VOLTage?

This command is used to query the set voltage value of the current channel of the power supply

Example: VOLT?

Return parameter: voltage setting value (X.XXX)

CURRENT command

The CURRENT command is used to set and query the set current value

CURRent {<current>}

This command is used to set the output current value of the current channel of the power supply

Example: CURR 2.345

Set the output current value of the current channel of the power supply to 2.345A

CURRent?

This command is used to query the set current value of the current channel of the power supply

Example: CURR?

Return parameter: current setting value of current channel of power supply (X.XXX)

INSTRUMENT command

The INSTRUMENT command is used to switch the current channel of the power supply

INSTrument {<1|2|3|4>}

This command is used to switch the current channel of the power supply

Example: INST 1

Set the power CH1 channel as the current channel

INSTrument?

This command is used to query which channel is the current channel of the power supply

Example: INST?

Return parameter: current channel of power supply (1 | 2 | 3 | 4)

Warranty Card

What the warranty covered:

If the machine break down due to its defectiveness, MATRIX will provide free maintenance during warranty period. If the machine break down due to wrong operation or carelessness, then Matrix provide paid service within warranty period.

How long does this warranty last:

This warranty lasts for 3 years from the date of original purchase of all MATRIX branded products.

Who is covered:

This warranty covers only the original purchaser of this product. This warranty is not transferable to subsequent owners or purchasers of this product.

What do customers need to do to get repairs/service under the warranty policy?

If the machine get problem, please contact our local distributor. If you cannot find the local distributor, you can contact us directly, our email is service@szmatrix.com, our telephone No. is 0086 755 2836 4276.

What information do customers need to supply?

Model No.	
Serial No.	
Problem description	
Picture	
Video if necessary	