— Since 2003

Programmable DC Power Supply User Manual

MPS-3000S series

MATRIX TECHNOLOGY INC.

Applicable model: MPS-3000S-2000-1

Version: 1.01

— Since 2003

Verification and correction statement

The Company hereby affirms that the instruments and equipment listed in this manual are fully in compliance with the specifications and characteristics specified in the Companys technical specifications. The instruments have been tested at the Companys factory prior to leaving the factory, and the procedures and steps of the testing are in compliance with the specifications and standards of the Electronic Testing Center.

Product quality assurance

Our company guarantees that all newly manufactured instruments have undergone strict quality verification and ensures that within one year after leaving the factory, if any construction defects or component failures are discovered, our company will provide free repairs. However, if users modify circuits, functions, or repair instruments and parts or damage the outer box themselves, our company will not provide free warranty services. If abnormal conditions occur due to failure to properly connect all ground wires or operating the machine in violation of safety regulations, our company will also not provide free warranty services.

This warranty does not cover the accessories of this instrument, such as the 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 us, and we will repair it properly.

If the unit fails under abnormal use, or due to human negligence, or due to non-human factors, such as earthquake, flood, riot or fire, etc., the Company will not provide free warranty service.

(The Company follows a sustainable development strategy and reserves the right to make improvements to the contents of this manual without prior notice)

Operating Manual

1. Operating Manual (General)

1.1 Front Panel Introduction

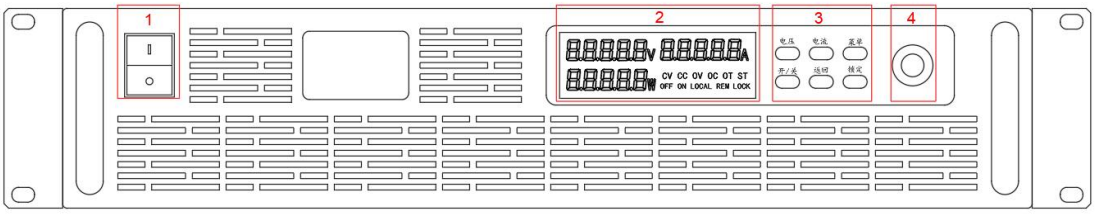

Figure 1-1 Front panel

①、Power switch
②、Display screen
③、Function buttons
④、knob

1.2 Rear Panel Introduction

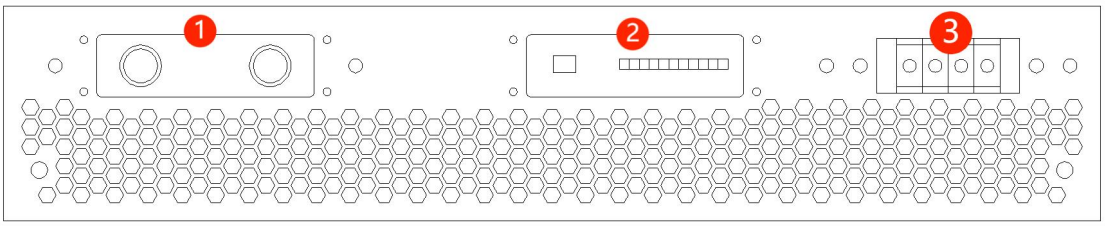

Figure 1-2 Rear panel

①. Power output port
②. Remote Communication Interface
③. AC input port

1.3 Front panel indicators and function key descriptions

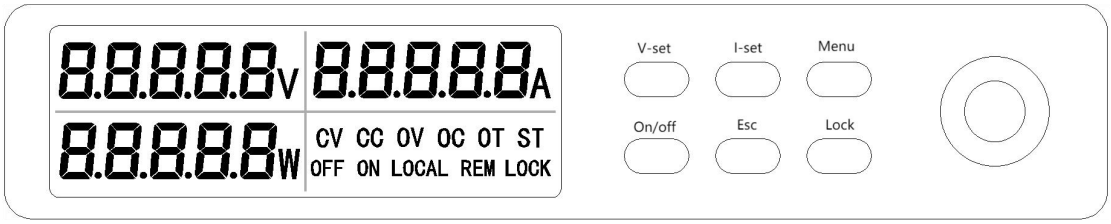

Figure 1-3

1、Power button instructions

Symbol	Explain
voltage	Enter voltage preset interface or output adjustment mode
Current	Enter the current preset interface or output adjustment status
Turn on/off	Turn power on or off
menu	Menu key
return	Use to exit settings or menu
lock	Lock/unlock the keyboard or exit remote operation mode
knob	Used to move the focus, increase or decrease values, and confirm key

1.4 Screen Introduction

1. The standby screen after startup, where the device waits for settings.

Figure 1-4 Power Display Interface

2. The CV CC indicator will flash, signaling voltage and current configuration. Use U-SET to adjust voltage and I-SET to set current. (In preset mode, press the knob to toggle digit selection—each press advances one digit in a cyclic sequence.) During operation, fine-tune the output voltage to the last three digits (some models only support two digits).

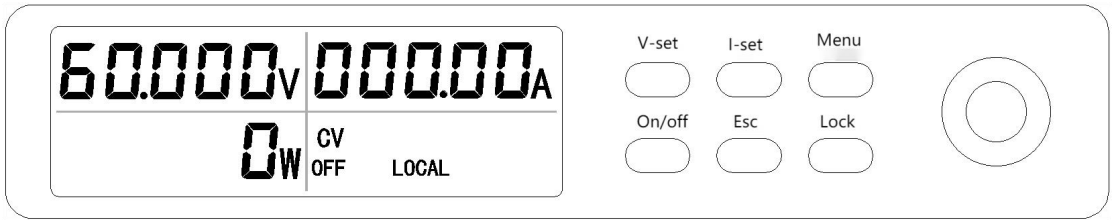

Figure 1-5 Voltage and Current Preset Interface

3. Hold the Menu button while the OV OC indicator flashes, indicating overvoltage and overcurrent settings are being configured. This interface defaults to overvoltage settings. Press the Menu button again to access the overcurrent settings interface. (Use the knob to switch digit positions—each press advances one digit in a cyclic manner.)

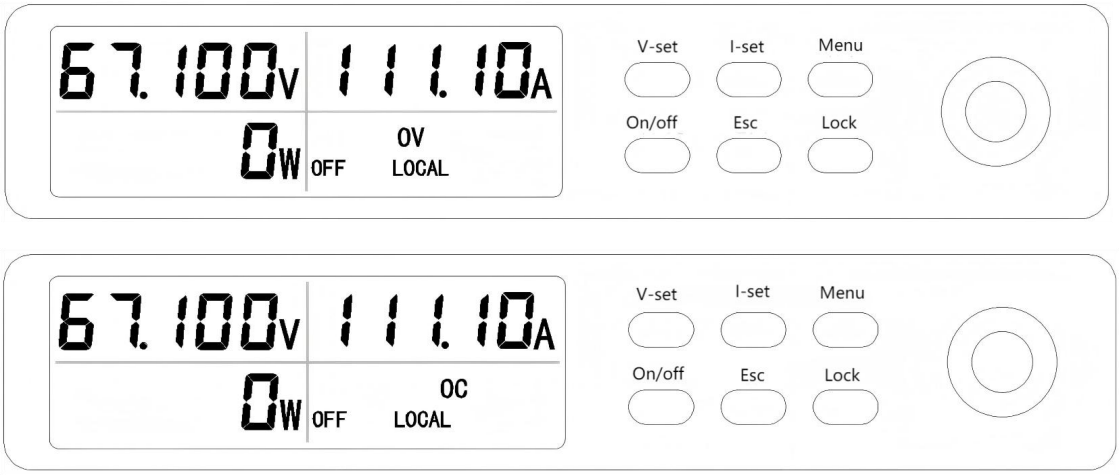

Figure 1-6 Overvoltage and Overcurrent Setting Interface

4. Press the menu key to enter the communication address settings interface. The default communication address is 01, which can be changed by rotating the knob.

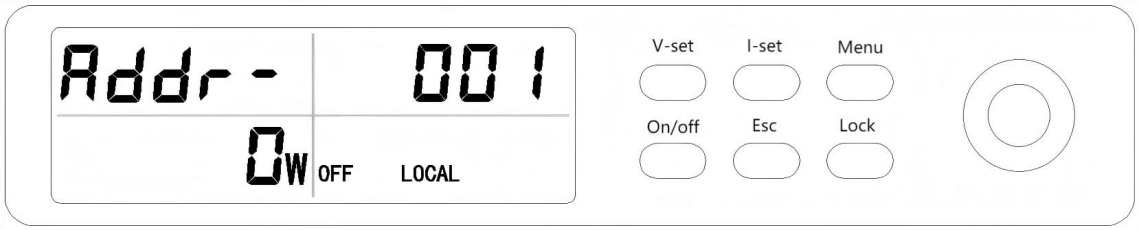

Figure 1-7 Communication Address Setup Interface

5. Press the 【 Menu 】 key to enter the baud rate setting interface. The default baud rate is 9600, which can be changed by turning the knob. (There are several types of parameter settings: 600120024004800960019200384005760011520O)

Figure 1-8 Baud rate setting interface

6. Press the [Menu] key to enter the Soft Start Time setting interface. Use the adjustment knob to set the desired soft start time (in seconds). (This value represents the time required for the output voltage to ramp

up from 0V to the set value after power-on; this setting is active during each startup, but is ineffective while the unit is already in operation.)

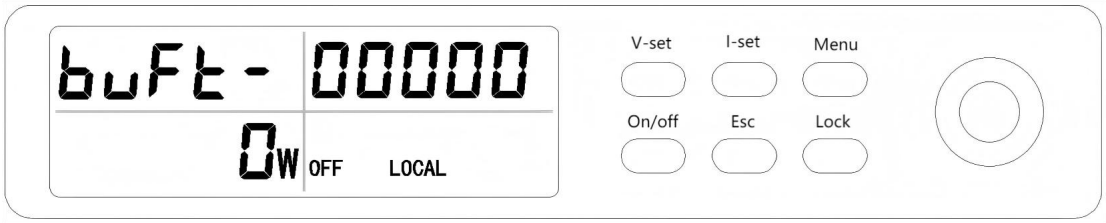

Figure 1-9 Soft Start Time Setting Interface

7. Press the menu key again to enter the start-stop function settings interface. During automated testing, you can configure automatic startup after power loss, enabling power output without pressing the ON/OFF key.

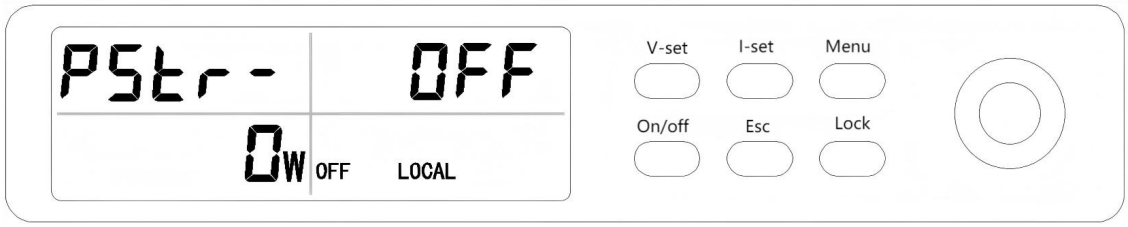

Figure 1-10 Startup/Stop Function Settings Interface

8. Press the Lock key. When the remote text appears, you will enter the lock interface. During normal testing, you can lock the device to prevent accidental button presses. Hold the Lock key until the remote text disappears to unlock the device.

Figure 1-11 Lock button settings interface

Key technical parameters

Series	MPS-3000S
IO	Input: AC 220V ±10%,50Hz ±10%, LN+PE Output: Maximum voltage DC2000V, maximum current 1A
Voltage regulation accuracy	Source effect: ≤0.05% of the rated value Time drift: ≤0.01% of the rated value Temperature drift: ≤0.01%/℃ ±2 characters (within 30 minutes) Load effect: ≤0.01% of rated value ±2 words
Current regulation accuracy	Source effect: ≤0.1% of the rated value Time drift: ≤0.3% of the rated value Temperature drift: ≤0.05%/℃ ±2 characters (within 30 minutes) Load effect: ≤0.1% of rated value ±2 words
Ripple (r.m.s)	≤0.1% + 20 mV (measured at 20%-100% output)
Efficiency	≥85% (measured at rated output)
Output display method	LCD digital display
Display resolution	0.1V; 0.0001A
Output voltage and current settings	Rotary Encoder and Key Setting
Protection function	1) Short circuit, overvoltage, overcurrent, and overheating protection with corresponding fault indicators; 2) Implement cooling fan systems for heat dissipation of main transformers, IGBT modules, and rectifier diodes;
Operate mode	full load continuous operation
Indication error	Voltage meter: ≤±0.05% ±1 digit (measuring range: 20%–100% of rated value) Ammeter: ≤ ± 0.1% ± 1 digit (measuring range: 10%–100% of rated value)
Case dimensions	430*88*460mm; 2U standard chassis
service environment	1) Usage environment: Indoor use 2) temperature ： -20℃~40℃; 3) Air humidity: ≤80%
Weight	Approximately 14 kg

Model	Voltage	Currnet	Watt
MPS-3000S-1000-1	0-1000V	0-1A	1000W
MPS-3000S-1000-2	0-1000V	0-2A	2000W

MPS-3000S-1000-3	0-1000V	0-3A	3000W
MPS-3000S-1500-1	0-1500V	0-1A	1500W
MPS-3000S-1500-2	0-1500V	0-2A	3000W
MPS-3000S-2000-1	0-2000V	0-1A	2000W
MPS-3000S-2000-1.5	0-2000V	0-1.5A	3000W
MPS-3000S-3000-0.5	0-3000V	0-0.5A	1500W
MPS-3000S-3000-1	0-3000V	0-1A	3000W

Appendix: Modbus-RTU Communication Protocol

1 Modbus Register Definition

NO.	Register address	rw	Explain
03	0000H	r	Status bit (see section 1.1 below for description)
03	0001H	r	reserve
03	0002H	r	16-bit temperature (floating-point number)
03	0003H	r	Temperature (16-bit floating-point number)
03	0004H	r	Actual voltage is 16 bits low (floating-point number)
03	0005H	r	Actual voltage is 16-bit (floating-point number)
03	0006H	r	Current current is 16 bits (floating-point number) lower
03	0007H	r	Actual current value is 16-bit floating-point number
03	0008H	r	reserve
03/06/16	0009H	rw	Control bit (see section 1.2 below for details)
03/16	000AH	rw	Set the voltage to 16-bit floating-point value
03/16	000BH	rw	Set the voltage to 16-bit floating-point value
03/16	000CH	rw	Set current value to 16-bit floating-point number
03/16	000DH	rw	Set current value to 16-bit floating-point number
03/06/16	0100H	rw	Mail address (1~255)
03/06/16	0101H	rw	Communication rate (1~9 corresponds to 600,1200,2400,4800,9600,19200,38400,57600,115200)
03/16	0102H	rw	Set the overvoltage limit to 16 bits (floating-point number)
03/16	0103H	rw	Set the overvoltage high value to 16 bits (floating-point number)
03/16	0104H	rw	Set the low 16 bits of overflow (floating-point number)
03/16	0105H	rw	Set the overflow high to 16 bits (floating-point number)

NO.	Register address	rw	Explain
03/16	0106H	rw	Keep
03/16	0107H	rw	Keep
03/16	0108H	rw	The default command control output voltage of Shanghai Electric is 16 bits (floating-point number) lower.
03/16	0109H	rw	The default command control output voltage of Shanghai Electric is 16 bits (floating-point number) higher.
03/16	010AH	rw	The default command control output current of Shanghai Electric is 16 bits (floating-point number) lower.
03/16	010BH	rw	The default command control output current of Shanghai Electric is 16 bits high (floating-point number)
03/16	010CH	rw	The default command control of Shanghai Electric reduces the PWM cycle by 16 bits (integer value).
03/16	010DH	rw	The default command control for Shanghai Electric sets the PWM period to 16 bits (integer).
03/16	010EH	rw	The default command control for Shanghai Electric sets the PWM duty cycle to 0 with 16-bit low-bit precision (integer).
03/16	010FH	rw	The default command control for Shanghai Electric sets the PWM duty cycle to 0 high and 16 bits (integer).
03/16	0110H	rw	The default command control for Shanghai Electric sets the PWM duty cycle to 1 with 16-bit precision (integer).
03/16	0111H	rw	The default command control for Shanghai Electric sets the PWM duty cycle to 1 high and 16 bits (integer).
03	0112H	r	16-bit low-rated voltage (floating-point number)
03	0113H	r	Rated voltage with 16-bit floating-point precision
03	0114H	r	Rated current is 16 bits lower (floating-point number)
03	0115H	r	Rated current with 16-bit floating-point precision

*** Note：**

(1) "r": a read-only register; "rw": a read-write register;

(2) "03/06/16": Supports 06 function code; "03/16": Does not support 06 function code;

(2) Registers 0100H~0105H and 0108H~0111H are power loss-holding registers that should not be frequently written to. These registers have a lifespan of approximately 50,000 write cycles, and exceeding this limit may damage the power supply. To prevent frequent writes, the system imposes a write restriction: after each power startup, only up to 100 modifications are allowed. Exceeding this limit requires a power cycle to restore normal write functionality.

(3) Floating-point numbers and 32-bit integers support only 16-bit commands, and the high and low 16-bit fields must be written by the same instruction; otherwise, the write operation will fail.

1.1 Status state description

bit	0 representation	1 representation
Bit0	The power supply is not turned on	The power supply has started
Bit1	Local control	telecontrol
Bit2	Keep	Keep
Bit3	Keep	Keep
Bit4	output disable	Enable output
Bit5	constant current	constant voltage
Bit6	Keep	Keep
Bit7	Keep	Keep
Bit8	undervoltage	normal
Bit9	overvoltage	normal
Bit10	overcurrent	normal
Bit11	Overheating	normal
Bit12	Keep	Keep
Bit13	Keep	Keep
Bit14	Keep	Keep
Bit15	Keep	Keep

1.2 Control bit description

bit	0 representation	1 representation
Bit0	Turn off the power supply	Power on the startup unit
Bit1	Local control	telecontrol
Bit2	Keep	Keep
Bit3	Keep	Keep
Bit4	Keep	Keep
Bit5	Keep	Keep
Bit6	Keep	Keep
Bit7	Keep	Keep
Bit8	Keep	Keep
Bit9	Keep	Keep
Bit10	Keep	Keep
Bit11	Keep	Keep
Bit12	Keep	Keep
Bit13	Keep	Keep
Bit14	Keep	Keep
Bit15	Keep	Keep

2 Floating-point data description

Floating-point numbers use the IEEE 32-bit standard floating-point format (the standard C language format), with a length of 32 bits, as shown below:

31	D30—D23	D22—D16	D15—D8	D7—D0
Floating-point number sign S	Step E	High digit of the last digit	Median of trailing digits	Least significant digit

For example, the floating-point number 60.00 corresponds to a 16-ary hexadecimal 4-byte value: 42 70 00 00.

3 Floating-point data instance

3.1 data backread

NO.	Register address	Register value	Representing actual values
03	0002H	0000H	Power supply temperature 25.00°C
03	0003H	41C8H	
03	0004H	0000H	The actual voltage of the power supply is 100.00V
03	0005H	41C8H	
03	0006H	C000H	The actual current of the power supply is 80.375A
03	0007H	42A0H	

3.2 power supply control

NO.	Register address	Register value	representing practical significance
03/06/16	0009H	0003H	Remote power startup
03/16	000AH	0000H	Set the power supply voltage to 120V
03/16	000BH	42F0H	
03/16	000CH	0000H	Set the power supply current to 88.00A
03/16	000DH	42B0H	