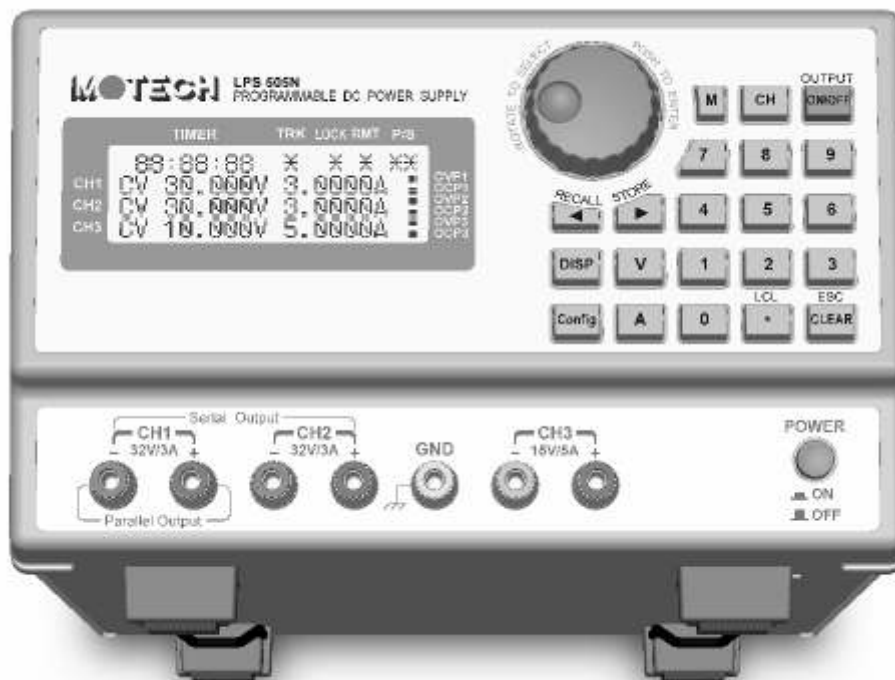


LPS 505N

Programmable DC

Power Supply

User's Manual



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6F, No. 248, Sec. 3, Pei-Shen Road, Shen-Keng Hsiang, Taipei Hsien, 222, Taiwan

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MOTECH INDUSTRIES INC.

6F, No. 248, Sec. 3, Pei-Shen Road, Shen-Keng Hsiang, Taipei Hsien, 222, Taiwan
Telephone : (886-2) 2662-5093
Facsimile : (886-2) 2662-5097

Email : instrument@motech.com.tw

URL : www.motech.com.tw

※※※ Storage. Freight. Maintenance. Disposal ※※※

Storage

When don't use the device, please pack it properly and store under a good environment.

(The packing is no needed when the device under appropriate environment.)

Freight

Please use the original packing material when move the device. If the packing material is missing, please use the equivalent buffer material to pack and mark it fragile and waterproof to avoid the device damage during movement. The device is precision equipment, please use qualified transportation as possible. And, please avoid heavy hitting to damage the device.

Maintenance

There is no maintenance operation for the general user (except for the note in the manual). Please contact our company or agent when the device occurred the user judgment abnormal. Don't maintain by yourself to avoid occurred unnecessary danger and serious damage to the device.

Disposal

When the device in badly condition and can't be used or repaired, please discard it according to your company disposal procedures or local legal procedures. Don't discard arbitrary to avoid polluting environment.

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1. Introduction

1.1 An Overview of Product

Motech LPS 505N is a triple outputs and programming DC power supply. LPS 505N comes with 12 bits resolution. Total 222W power output is provided by triple independent outputs. Double output provide 0~32V/3A, the other one provides 0~15V/5A 30W. For the 0~15V/5A output, users can use auto-ranging while constant 30W power output. This is the unique feature and it differs from other traditional power supplies. Those two 0~32V/3A outputs are required to output in serial or parallel mode. Tracking function is convenient and changeable for users in circuit application. LPS 505N has rotary and number key for user to easily operation. The configuration can be stored in memory (Max.100). Timer (1 sec~100 hrs) control when output can be switched off. It can provide the safety for burning room and electroplating application. OVP, OCP can be controlled and monitored by front panel. Users will not change the original setting because of the key lock function. When source and load change, LPS 505N has stable output due to 0.01% load and line regulation and max. 50 us respond time. Average measurement time is 50 ms to increase the production quantity.

1.2 Features

1. Triple output:

Voltage Ranges : 0 ~ 32V (CH1&CH2) / 0 ~ 15V (CH3)

Current Ranges : 0 ~ 3A (CH1&CH2) / 0 ~ 5A (CH3)

Power Ranges : 0 ~ 96W (CH1&CH2) / 0 ~ 30W (CH3)

The third output is an auto-ranging output. Users can change voltage and current as they want based on maximum 30W output. For example, output 15V/2A or 6V/5A voltage and current should be within the output range.

2. Digital rotary, number key, function key setting:

Digital rotary can change voltage rapidly. Simulate the surge of the voltage output. It provides the solution for the trigger circuit testing. User can set up voltage by number key quickly. It differs from original VR adjusting. Function key provide users operation more friendly and easily.

3. Precious measurement on voltage & current:

Besides precise output, LPS 505N provides voltage and current measurement.

Users can reduce the measurement equipment budget and space.

4. Memory and timer function:

LPS 505N has large memory to memorize 100 settings. Operators are unnecessary to remember the settings. It can be easily to recall the settings. For safety issue, timer function will automatically switch off the machine when they are burning in burning room. LPS 505N can also provides time control good current resolution for electroplate application as customers' need.

5. OVP, OCP & lock protection function:

OVP, OCP provide the safety for the laboratory. The setting will not be changed due to the key lock function.

6. Series, parallel mode:

In serial mode, CH1/CH2 can output maximum 64V with positive/negative output. It can be used for OP circuit design. In parallel mode, CH1/CH2 can output 6A maximum.

7. Dual tracking:

Users only needs to setup CH1 output voltage and current, LPS 505N will output the same voltage/current at CH2. This is convenient to test two samples at the same time.

2. Specification

Model	LPS 505N	
Channel NO.	CH1 & CH2	CH3
Output Voltage	0~32V	0~15V
Output Current	0~3A	0~5A
Output Power (CH3 Auto Ranging)	96W	30W
Line Regulation ±(% of output +offset)		
Voltage	0.01% + 2mV	
Current	0.01% + 300uA	
Load Regulation ±(% of output +offset)		
Voltage	≤3mV	≤5mV
Current	0.01% + 300uA	
Ripple and Noise (20Hz ~ 20MHz)		
Normal Mode Voltage	700uVrms / 7mVpp	1mVrms / 20mVpp
Normal Mode Current	< 1mA	< 5mA
Resolution		
Programming	10mV / 1mA	10mV / 2mA
Readback	10mV / 1mA	3mV / 2mA
Programming Accuracy ±(% output +offset)		
Voltage	0.05% + 20mV	0.05% + 6mV
Current	0.05% + 3mA	0.05% + 4mA
Readback Accuracy ±(% output +offset)		
Voltage	0.05% + 20mV	0.05% + 6mV
Current	0.05% + 3mA	0.05% + 4mA
Temperature Coefficient per°C ±(% output +offset)		
Voltage	< 0.1% + 3mV	
Current	< 0.2% + 2mA	
Tracking Accuracy ±(% of output +offset)		
Voltage	0.1% + 40mV	
Transient Response Time	< 50uS	
Stability, constant output & temperature ±(% of output +offset), 8hrs		
Voltage	< 0.2% + 2mV	
Current	< 0.1% + 1mA	

Specification

Voltage Programming Speed	
Rising Time at Full Load	3mSec
Rising Time at No Load	3mSec
Falling Time at Full Load	8mSec
Falling Time at No Load	250mSec
General	
AC Line Input Voltage Ranges	115/220 VAC \pm 10% (50/60Hz)
Temperature Ratings	Operating(0°C ~ 40°C) , Storage (- 10°C ~ 70°C)
Common-Mode Voltage	\pm 240Vdc
Dimensions (W×H×D)mm	(216 × 135 × 432)
Weight	6.5 kg

LPS 505N Features :

- LCD display, triple independent output and display on LCD
- CH3 auto-ranging output
- Low Ripple, Low Noise
- Number and function key
- Store and recall settings (100)
- Timer (1 sec ~ 100 hours)
- Precise voltage and current measurement
- OVP, OCP and key lock
- Serial and parallel mode
- Dual Tracking Mode
- Average measurement time 50m sec
- Standard RS232, USB interface

3. Notices before Using

3.1 Confirm Attachment before Using

Please follows the below items to protect your rights as you receive this instrument.

1. If there is ruin or scratch bad condition on product overlook.
2. The standard attachment as table 7-1, please confirm if there is any missing.
- ※ If above conditions, please inform us for prompt service.

3.2 The Description of Using

The tester is an accurate instrument. Please read through this manual to prevent improper operation and arbitrary using from causing this instrument damaged. Please calibrate once a year for keeping accuracy.

3.3 Ambient Environment

1. Do not use the tester in a dusty, vibrating, sunlight and corrosive gas. Please use this instrument under the ambient temperature is 0~40°C and the relative humidity is 20%~80%. If the temperature is over 40°C, please don't use temporary until the temperature is down to normal. Please check to avoid the unit damage which result from over temperature.
2. The tester is equipped with a cooling fan on the rear panel to keep the internal temperature down, so adequate ventilation should be ensured. The tester should be located at least 10cm from any object or wall behind it. Do not block the ventilation holes to keep the tester in good precision.
3. The tester has been carefully designed to prevent the noise from the AC power source. However, it should be used in the noise-free environment as low as possible. If noise is inevitable, please install a power filter.

3.4 Storage

The tester should be stored within the temperature range -10°C ~ 70°C, the relative humidity 80% RH. If the unit is not to be in use for a long time, please store it in the original or similar package and keep it from direct sunlight and humidity.

3.5 Power-Line Voltage

The tester is an instrument which uses AC power 115V/220V 50Hz/60Hz. Before plugging in the power cord, make sure the power switch is in the off position and the voltage of the rear panel is the same as the required voltage.

3.6 Fuse

There is one fuse installed in the rear panel. When replacing the fuse, please notice the following:

1. Please turn off the power and disconnect the AC power cord and all the other connections to the power supply.
2. The checking of fuse can't sure with the eyes, the testing value under 15Ω is normal.
3. When replacing the fuse, the cap jut out the rear panel on fuse stand using flat type screwdriver or pressing softly by hand.

Mark	Center Voltage	Range	Fuse
115	115V	100V~125V	Slow
220	220V	200V~250V	Slow

Warning :

For continues protection against fire hazard, replace only with the same type and rating of fuse as specified.

3.7 Warming Up

This tester activates at power on. However, in order to meet the accuracy in the specification, please warm it up for 30 minutes or longer.

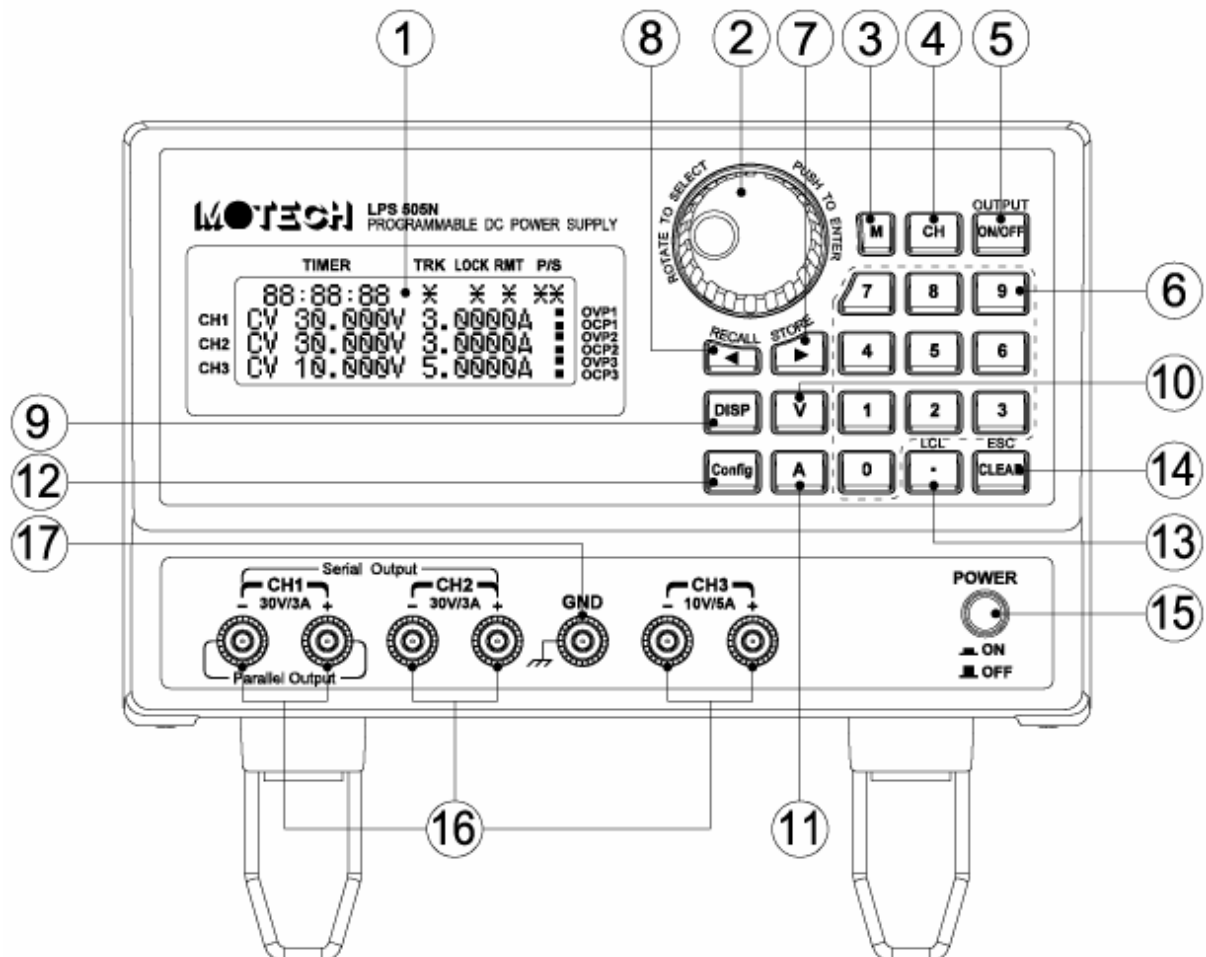
3.8 End Test

When tests are done and the tester is not in use or need to leave for a while during usage, make sure to turn off the power switch.

4. Panel Description

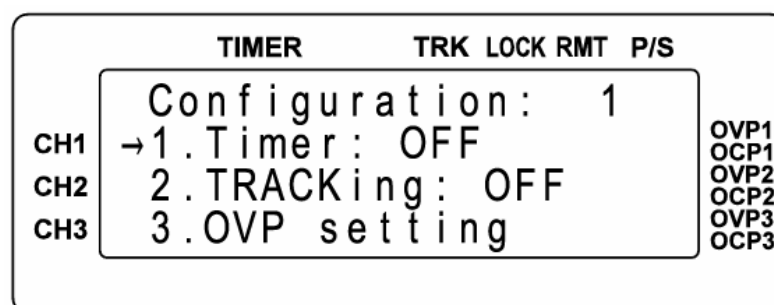
4.1 LPS 505N Panel Description

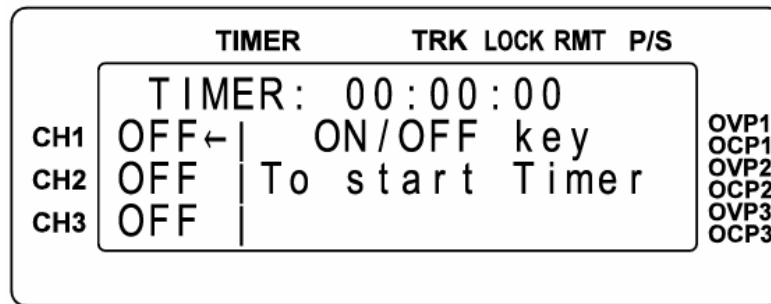
4.1.1 Front Panel Description



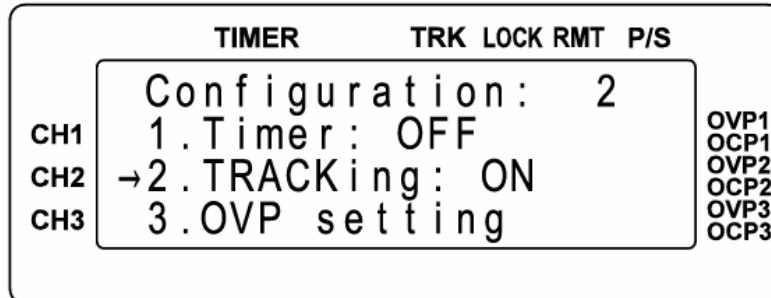
- (1) Display:
Display is a 20x4 yellow green backlight LCD
- (2) Rotary(ENTER):
Rotary can adjust voltage and current. Users can press it as ENTER function.
- (3) M:
Press M key to memory configuration display. Users can select which setting to store and recall by pressing STORE and RECALL key.
- (4) CH:
Selecting CH1/CH2/CH3

- (5) ON/OFF:
Switching power output on or off of the instrument
 - (6) Number Key:
Input number by number key. To set the voltage or current, press the “V” or “A” key after the number input.
 - (7) ►(STORE):
When the output is on, press the key to move the cursor to select digit for adjustment. Users can adjust the digit by rotary. In memory function, store into memory by pressing this key.
 - (8) ◀(RECALL):
When the output is on, press the key to move the cursor to select digit for adjustment. Users can adjust the digit by rotary. In memory function, recall from the memory by pressing this key.
 - (9) DISP:
Press this key to select the display to show the voltage/current or power/resistance readout.
 - (10) V(Voltage):
Press this key to set voltage after number input.
 - (11) A(Current):
Press this key to set current after number input.
 - (12) Config:
Press this key to enter the configuration setting. There 16 items to be set in this mode.
1. Timer: The initial value is OFF. Press the rotary to enter timer configuration.

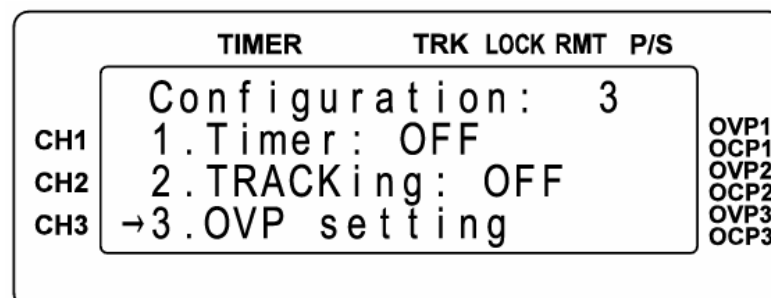




- A. Using rotary or ◀▶ to move the cursor onto the digit and input the number. Timer: 00:00:00 (HH:MM:SS)
 - B. Switching CH1/CH2/CH3 by press CH key. Then press rotary to switch ON/OFF
 - C. Start Timer when press ON/OFF key
 - D. Press rotary + CLEAR to pause the timer. Restart by repeating the same step
2. TRACKING: The initial value is OFF, switch to ON by pressing the rotary. The CH2 will have the same voltage and current setting as the CH1.



3. OVP setting: Over voltage protection. Press the rotary to enter OVP Configuration. Press "CH" to select CH1/CH2/CH3. Users can press ON/OFF to enable or disable OVP and input the voltage value via the number keys. Please remember to press rotary to save the settings.



	TIMER	TRK	LOCK	RMT	P/S
	OVP setting:				
CH1	OFF→30.00V			3.000A	OVP1
CH2	OFF 30.00V			3.000A	OC1
CH3	OFF 10.00V			5.000A	OVP2
					OC2
					OVP3
					OC3

4. OCP setting: Over current protection. Press rotary to enter OCP Configuration. Press “CH” to select CH1/CH2/CH3. Users can press ON/OFF to enable or disable OCP and input current value via the number keys. Please remember to press rotary to save the settings.

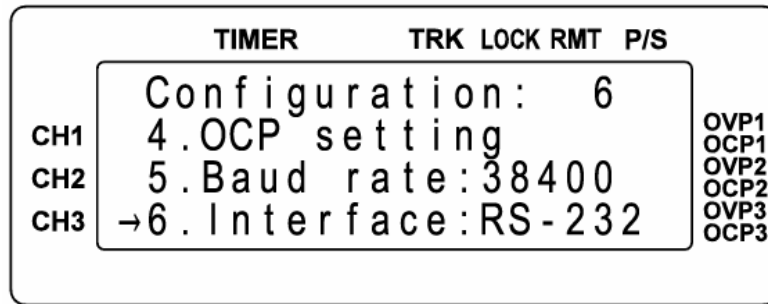
	TIMER	TRK	LOCK	RMT	P/S
	Configuration: 4				
CH1	→4.OCP setting				OVP1
CH2	5.Baud rate:38400				OC1
CH3	6.Interface:RS-232				OVP2
					OC2
					OVP3
					OC3

	TIMER	TRK	LOCK	RMT	P/S
	OCP setting:				
CH1	OFF→30.00V			3.000A	OVP1
CH2	OFF 30.00V			3.000A	OC1
CH3	OFF 10.00V			5.000A	OVP2
					OC2
					OVP3
					OC3

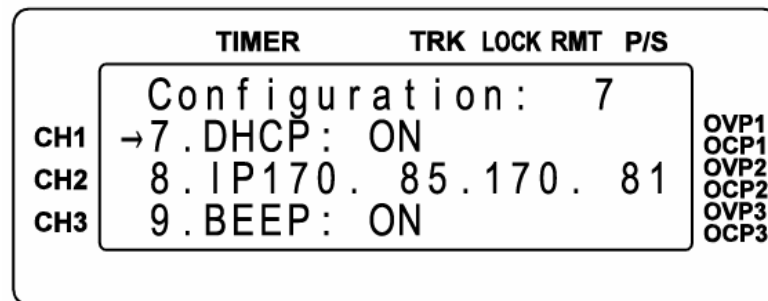
5. Baud rate: Transmission speed. Users can select baud rate for 1200, 2400, 4800, 9600, 19200, 38400 by rotary.

	TIMER	TRK	LOCK	RMT	P/S
	Configuration: 5				
CH1	4.OCP setting				OVP1
CH2	→5.Baud rate:38400				OC1
CH3	6.Interface:RS-232				OVP2
					OC2
					OVP3
					OC3

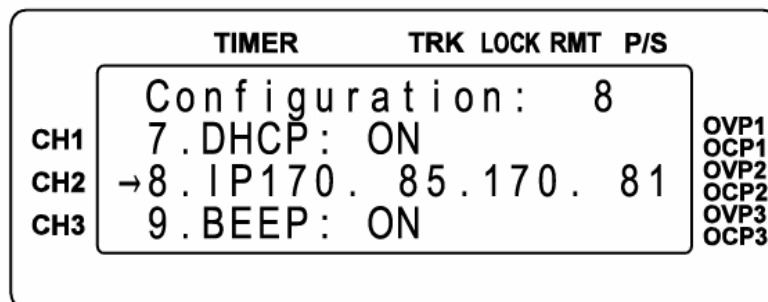
6. Interface: Transmission interface. Users can select RS232, USB, GPIB (Optional), LAN Port (Optional) by using rotary.



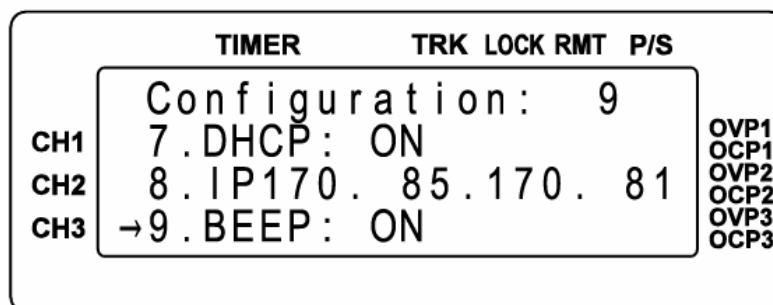
7. DHCP : This parameter is for LAN port setting. The default value is Off mode. You may change the mode by press the rotary. At DHCP "On" mode, a dynamic IP address can be obtained from the server.



8. IP***.***.***.*** : Setting of IP address. You may key-in the right IP address for PPS 3210 .

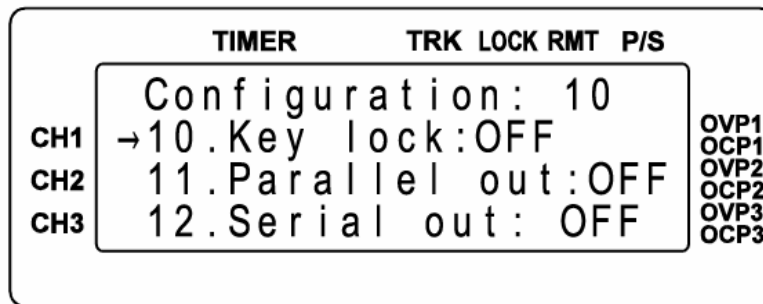


9. BEEP: Buzzer. Press rotary to switch the buzzer on or off.

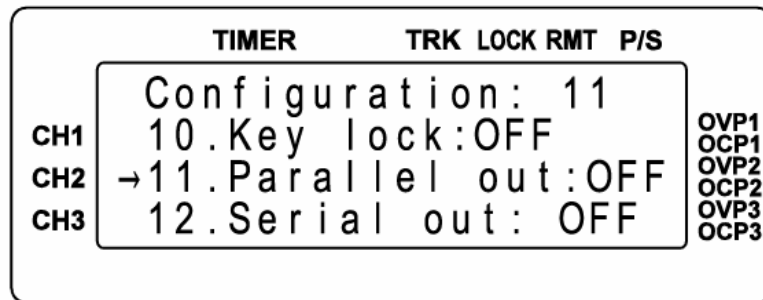


- 10.Key lock: Key lock function. The initial value is OFF. Press rotary to

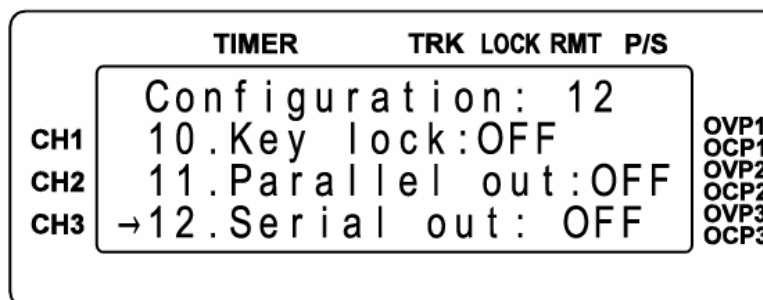
turn on key lock function. All keys are disabled except Rotary + CLEAR can disable the key lock.



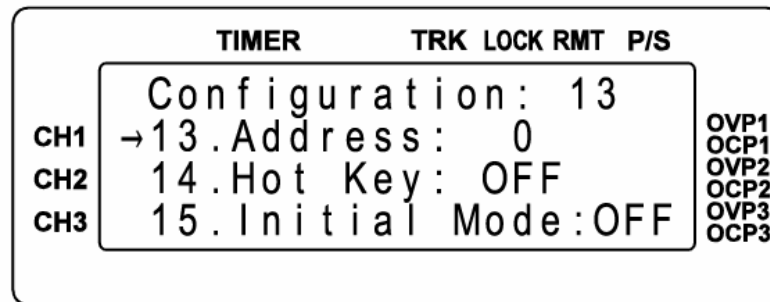
11.Parallel out: Parallel output. The initial value is OFF. Press rotary to turn on parallel output. The total output current is 6A because the CH1 and CH2 are connected parallelized.



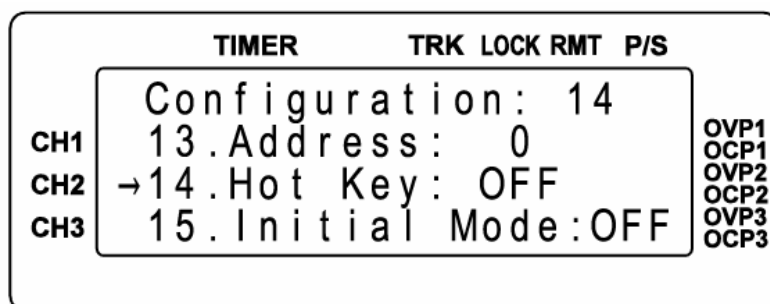
12.Serial out: Serial output. The initial value is OFF. Press rotary to turn on serial output. The total output voltage is 64V because the CH1 and CH2 are connected serialized.



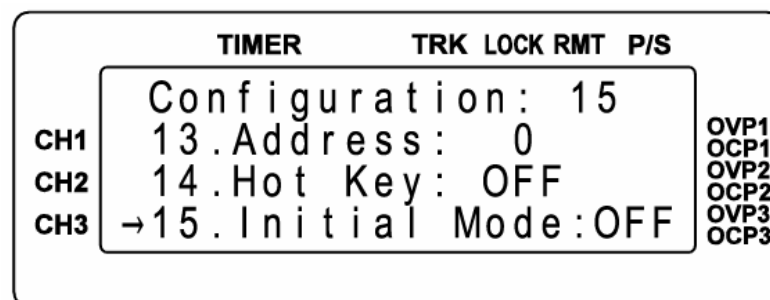
13.Address: GPIB address setting. Acceptable range is 00~31. Users can input the number and press rotary to save the settings.



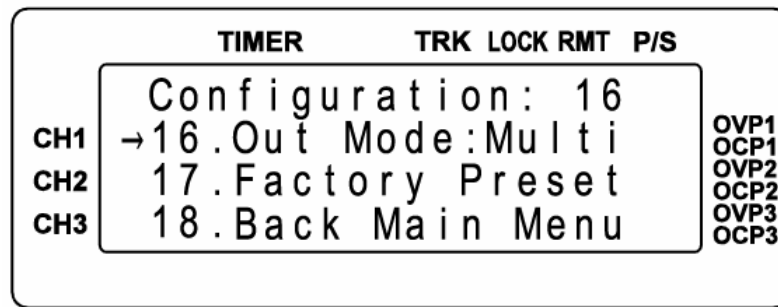
- 14.Hot Key: Express function key. The initial value is OFF. Press rotary to turn on hot key. The users can recall the correspondent settings from the memory via input 0~9.



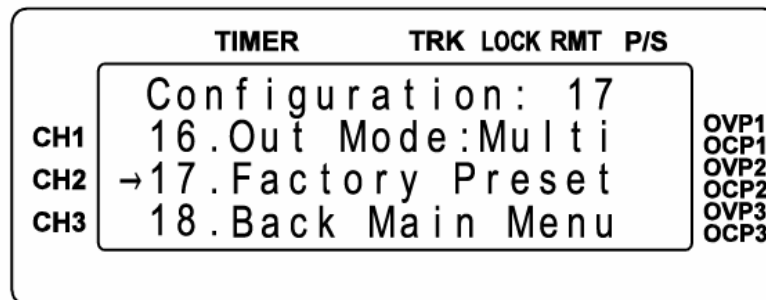
- 15.Initial Mode: Memorize the settings before the instrument shutdown. The initial value is OFF. Press rotary to turn on the function. When the function is enable, all setting will be saved before the instrument shutdown and recalled after the instrument power on.



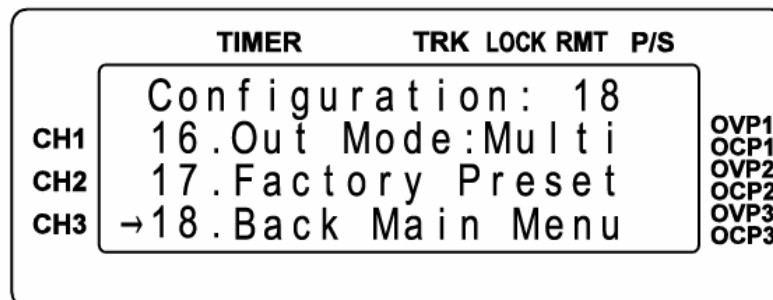
- 16.Out Mode: Output mode. The initial value is single. Press rotary to switch to multi mode. In the multi mode, CH1/CH2/CH3 output on or off will synchronize by press the ON/OFF key.



17.Factory Preset : Reset to default settings



18.Back Main Menu : Quit configuration and save the settings



PS : Setting will be saved, after the last item (16. Back Main Menu) is entered.

(13) . (LCL):

Use as a decimal point. Or, users can press the key to reset to LOCAL mode when in REMOTE connection.

(14) CLEAR(ESC):

Clear the number input. Or, back to the previous display.

(15) Power Switch(POWER ON/OFF)

Power switch, ■ is OFF, ■ is ON. Please read **Notices before Using** before power on.

(16) CH1/CH2/CH3 Power Output:

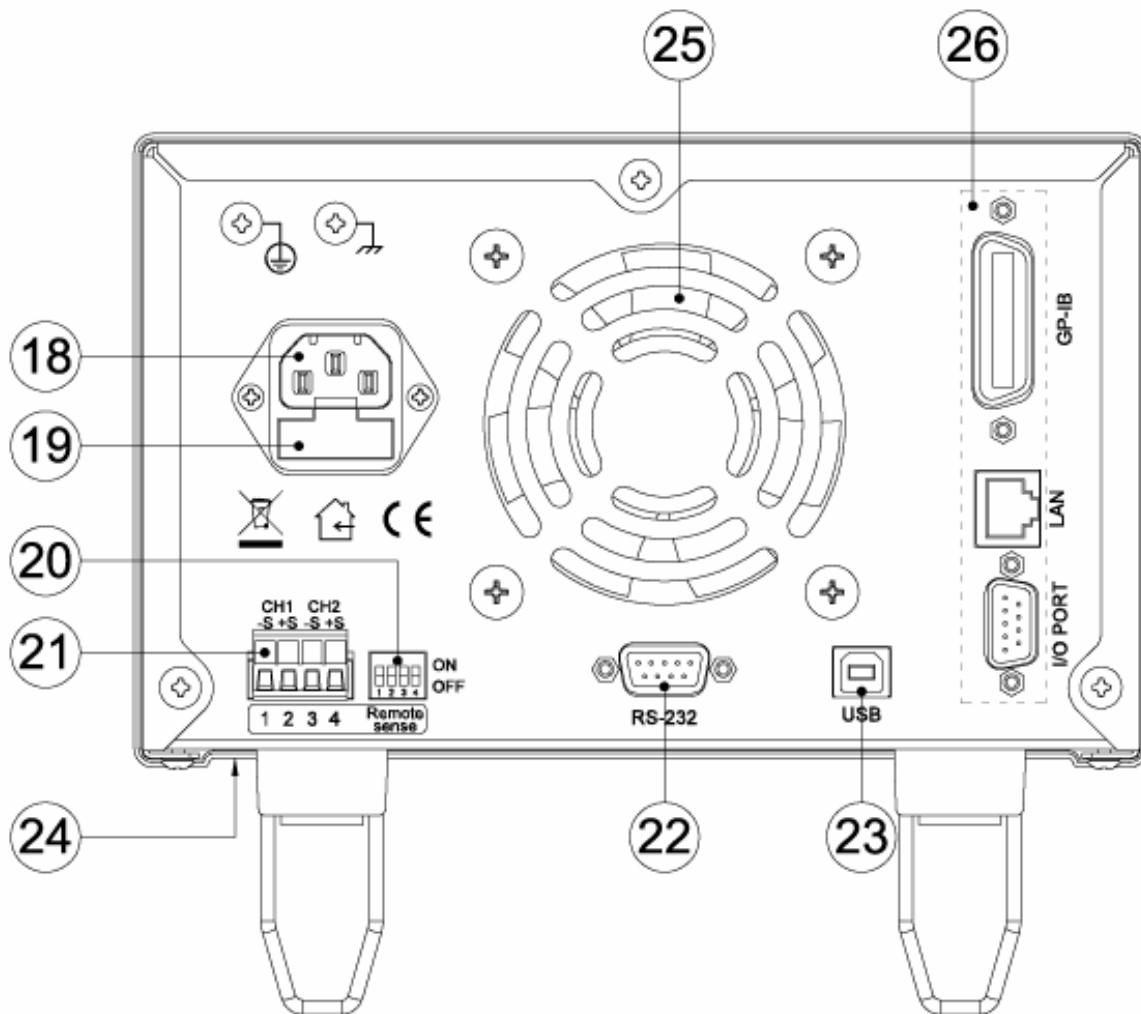
Please recognize the mark on front panel and notice the positive and

negative pole.

(17) GND:

Connected to the ground. Please note that the power core has the third pin, or it will not work.

4.1.2 Rear Panel Description



(18) AC Power Input:

The plug connected to the AC source. It uses for 115V/220V.

(19) Fuse:

The fuse used for power source. When the switch set to 115V, using 5A slow fuse; set to 220V, using 2.5A slow fuse.

(20) Remote Sense/Local Sense dip switch: (PPS 3210 only)

When the switch set to ON, it becomes to local sense mode, which means positive pole connect to +Sense, negative pole connect to -Sense. When the switch set to OFF, it becomes to remote sense mode. It has voltage compensation when it collaborate with \pm Sense.

(21) CH1 \pm S / CH2 \pm S: (PPS 3210 only)

When the switch set to OFF, it becomes to local sense mode. It has voltage compensation when it collaborates with \pm Sense. CH1 +Sense and positive pole connect to DUT positive pole. CH1 -Sense and negative pole connect to DUT negative pole.

(22) RS232 Interface

(23) USB Interface

(24) 115V/220V Power switch (At the bottom of the instrument near the front panel)

(25) Cooling Fan:

Depends on the current of the load, it will adjust the rotation speed of the fan. It is a fuzzy fan.

(26) Optional Interface:

There are GPIB, LAN, I/O port.

5. Operation Setting

5.1 Voltage Setting

Press “CH” to select channel, there are CH1/CH2/CH3 to choose. (Please follow the * sign in the left side of the LCD) Use the number key to input the voltage. And, press “V” to finish the setting. The voltage will be set immediately.

	TIMER	TRK	LOCK	RMT	P/S	
	30V					
CH1	OFF*	30.00V		3.000A		OVP1
CH2	OFF	10.01V		3.000A		OCP1
CH3	OFF	5.00V		3.000A		OVP2
						OCP2
						OVP3
						OCP3

5.2 Current Setting

Press “CH” to select Channel, there are CH1/CH2/CH3 to choose. (Please follow the * sign in the left side of the LCD) Use the number key to input the current. And, press “A” to finish the setting. The current will be set immediately.

	TIMER	TRK	LOCK	RMT	P/S	
	3A					
CH1	OFF*	30.00V		3.000A		OVP1
CH2	OFF	10.01V		3.000A		OCP1
CH3	OFF	5.00V		3.000A		OVP2
						OCP2
						OVP3
						OCP3

5.3 OVP

Press “Config” to enter Configuration display, adjust rotary or ◀▶ to move the cursor to OVP setting. Press rotary to enter OVP setting display. Users can press “CH” to select channel of setting. (Please follow the * sign in the left side of the LCD) Press the ON/OFF key to choose enable or disable. Use the number key to input the voltage. Please remember to press rotary to finish the setting.

5.4 OCP

Press “Config” to enter Configuration display, adjust rotary or ◀▶ to move the cursor to OCP setting. Press rotary to enter OCP setting display. Users can press “CH” to select channel of setting. (Please follow the → sign in the left side of the LCD) Press the ON/OFF key to choose enable or disable. Use the number key to input the current. Please remember to press rotary to finish the setting.

5.5 Rotary Controller (output on)

When output is on, users can adjust the voltage by rotary. Press ◀ or ▶ key to adjust the cursor position. Adjust the voltage by rotary. If users want to change channel, just press “CH”. This provides a convenient testing tool when users are observing the variation of the voltage.

	TIMER	TRK	LOCK	RMT	P/S	
CH1	CV *	1.99V		0.000A		OVP1
CH2	OFF	10.01V		3.000A		OCP1
CH3	OFF	5.00V		3.000A		OVP2
						OCP2
						OVP3
						OCP3

6. Remote Interface Protocol and Package Mode

Communication protocol includes MOTECH and SCPI instructions Protocol.

6.1 Preface

SCPI interface provides users to operate the power supply by connecting to PC via IEEE-488.2 or RS-232 interface. It also allows users to control and monitor the instrument remotely. SCPI IEEE-488 supports multiple power supply to control. (Max. 32 set)

6.2 Definition of Parameters

Type	Valid arguments
=====	
<boolean>	“ON” or 1, “OFF” or 0
<NR1>	The data format <NR1> is defined in IEEE-488.2 for integers. Zero, positive and negative integer numeric values are valid data.
<NRf>	The data format <NRf> is defined in IEEE-488.2 for flexible Numeric Representation. Zero, positive and negative floating point numeric values are some examples of valid data.
<string>	Characters enclosed by single or double quotes
<NL>	New line, Hex code is 0x0Ah
<Rtn>	Return, Hex code is 0x0Dh
<END>	End or identify

6.3 Error/Event Queue

The SCPI maintains an Error/Event Queue as defined by SCPI. The queue holds up to 10 errors and events. It is queried by using the system : error ? command which reads in a First In/First Out (FIFO) manner. The read operation removes the entry from the queue. The *CLS command will clear all entries from the queue.

Error Description

=====	
-000	No error
-002	GET not allowed
-003	Parameter not allowed
-004	Missing parameter
-005	Command Header Error
-006	Header Separator Error
-007	Program mnemonic too long
-008	Undefined header
-009	Header suffix out of range
-010	Numeric data error
-011	Invalid character in number
-012	Exponent too large
-013	Too many digits
-014	Numeric data not allowed
-015	Suffix error
-016	Invalid suffix
-017	Suffix too long
-018	Suffix not allowed
-019	Character data error
-020	Invalid character data
-021	Character data too long
-022	Character data not allowed
-023	String data error
-024	Invalid string data
-025	String data not allowed
-026	Block data error
-027	Invalid block data
-028	Block data not allowed
-029	Expression error
-030	Invalid expression
-031	Expression data not allowed
-032	Macro error
-033	Invalid outside macro definition
-034	Invalid inside macro definition
-035	Macro parameter error
-036	Execution error

-037	Invalid while in local
-038	Settings lost due to rtl
-039	Trigger error
-040	Trigger ignored
-041	Arm ignored
-042	Init ignored
-043	Trigger deadlock
-044	Arm deadlock
-045	Parameter error
-046	Settings conflict
-047	Data out of range
-048	Too much data
-049	Illegal parameter value
-050	Data corrupt or stale
-051	Data questionable
-052	Hardware error
-053	Hardware missing
-054	Mass storage error
-055	Missing mass storage
-056	Timer currently running
-057	Timer error
-058	Timer syntax error
-059	Cannot create timer
-060	Password error
-082	Missing media
-083	Corrupt media
-084	Media full
-085	Directory full
-086	File name not found
-087	File name error
-088	Media protected
-089	Expression Error
-090	Math error in expression
-091	Macro error
-092	Macro syntax error
-093	Macro execution error
-094	Illegal macro label
-095	Macro parameter error

- 096 Macro definition too long
- 097 Macro recursion error
- 098 Macro redefinition not allowed
- 099 Macro header not found
- 100 Program error
- 101 Cannot create program
- 102 Illegal program name
- 103 Illegal variable name
- 104 Program currently running
- 105 Program syntax error
- 106 Program runtime error
- 107 Device-specific error
- 108 Syntax error
- 109 Data type error
- 110 Input voltage overwrite error
- 111 Input current overwrite error

6.4 Compatible MOTECH LPS and PPS Protocol

Command	Description
=====	
ADDRess	set the address of the machine
BEEP	set beep on(1) or off(0)
CALi	calibration procedure
CURR[1]	channel 1 current setting
CURR[1]?	return channel 1 current setting
CURR2	channel 2 current setting
CURR2?	return channel 2 current setting
CURR3	channel 3 current setting
CURR3?	return channel 3 current setting
CURRENT[1]	channel 1 current setting
CURRENT[1]?	return channel 1 current setting
CURRENT2	channel 2 current setting
CURRENT2?	return channel 2 current setting
CURRENT3	channel 3 current setting
CURRENT3?	return channel 3 current setting
HOTKey	set hot key function, on(1) or off(0)
IOUT[1][?]	channel 1 current readback

IOUT2[?]	channel 2 current readback
IOUT3[?]	channel 3 current readback
ISet[1]	channel 1 current setting
ISet[1][?]	return channel 1 current setting
ISet2	channel 2 current setting
ISet2?	return channel 2 current setting
ISet3	channel 3 current setting
ISet3?	return channel 3 current setting
LOCK	set rotary and keypad lock on(1) or off(0)
MODEL	display model NO.
OCP[1]	set channel 1 current protect to off(0) or on(1)
OCP2	set channel 2 current protect to off(0) or on(1)
OCP3	set channel 3 current protect to off(0) or on(1)
OISet[1]	set channel 1 overcurrent protect
OISet[1]?	return channel 1 overcurrent value
OISet2	set channel 2 overcurrent protect
OISet2?	return channel 2 overcurrent value
OISet3	set channel 3 overcurrent protect
OISet3?	return channel 3 overcurrent value
OUT[1]	set channel 1 output on(1) or off(0)
OUT2	set channel 2 output on(1) or off(0)
OUT3	set channel 3 output on(1) or off(0)
OVP[1]	set channel 1 voltage protect to off(0) or on(1)
OVP2	set channel 2 voltage protect to off(0) or on(1)
OVP3	set channel 3 voltage protect to off(0) or on(1)
OVSet[1]	set channel 1 overvoltage protect
OVSet[1]?	return channel 1 overvoltage value
OVSet2	set channel 2 overcurrent protect
OVSet2?	return channel 2 overcurrent value
OVSet3	set channel 3 overcurrent protect
OVSet3?	return channel 3 overcurrent value
PARAllel	set parallel output on(1) or off(0)
SERIAL	set serial output on(1) or off(0)
STATUS?	current NLPS working status
TRACK	set CH2=CH1
VERSION?	display version NO.
VOLT[1]	channel 1 voltage setting
VOLT[1]?	return channel 1 voltage setting

VOLT2	channel 2 voltage setting
VOLT2?	return channel 2 voltage setting
VOLT3	channel 3 voltage setting
VOLT3?	return channel 3 voltage setting
VOLTAGE[1]	channel 1 voltage setting
VOLTAGE[1]?	return channel 1 voltage setting
VOLTAGE2	channel 2 voltage setting
VOLTAGE2?	return channel 2 voltage setting
VOLTAGE3	channel 3 voltage setting
VOLTAGE3?	return channel 3 voltage setting
VOUT[1][?]	channel 1 voltage readback
VOUT2[?]	channel 2 voltage readback
VOUT3[?]	channel 3 voltage readback
VSET[1]	channel 1 voltage setting
VSET[1]?	return channel 1 voltage setting
VSET2	channel 2 voltage setting
VSET2?	return channel 2 voltage setting
VSET3	channel 3 voltage setting
VSET3?	return channel 3 voltage setting

example:

Q1. How to set machine address (same GPIB ID)?

ADDR 10 <NL>	==>	address is 10
ADDRESS 5 <NL>	==>	address is 5
ADDR 70 <NL>	==>	address is out of maximum value, refer to error code

Q2. How to set beep?

BEEP 1 <NL>	==>	trigger beep to on
BEEP off <NL>	==>	trigger beep to off

Q3. How to enter calibration procedure?

Step 1: CONT:PWD:13579 <NL>	==>	enable password to verify
Step 2: CALI 1 <NL>	==>	entry to calibration procedure for channel 1
Step 3: CALI 7.5010203 <NL>	==>	input low scale voltage parameter
Step 4: CALI 23.123456 <NL>	==>	input high scale voltage parameter

Step 5: CALI 0.7510203 <NL> ==> input low scale current parameter
Step 6: CALI 2.2567890 <NL> ==> input high scale current parameter
and rember to EPROM.

Q4. How to exit calibration procedure?

CALI OFF <NL>

Q5. How to set voltage?

VSET 10 <NL> ==> set channel 1 voltage to 10V
VSET2 5.123 <NL> ==> set channel 2 voltage to 5.123V
VOLT3 3.3V <NL> ==> set channel 3 voltage to 3.3V
VOLTAGE1 35 <NL> ==> set channel 1 voltage to 35V is fail,
because out of range

Q6. How to read the voltage setting value?

VSET? <NL> ==> return channel 1 voltage setting
VSET2? <NL> ==> return channel 2 voltage setting

Q7. How to set current?

ISSET : 1.1 <NL> ==> set channel 1 current to 1.1A
ISSET2 : 2.1A <NL> ==> set channel 2 current to 2.1A
CURR3 4.3022 <NL> ==> set channel 3 current to 4.3022A
CURRENT1 0.250 <NL> ==> set channel 1 current to 250mA

Q8. How to read the current setting value?

ISSET? <NL> ==> return channel 1 current setting
ISSET2? <NL> ==> return channel 2 current setting

Q9. How to read the voltage output value?

VOLT3? <NL> ==> return channel 3 voltage output
VOLTAGE1? <NL> ==> return channel 1 voltage output
VOUT2? ; ==> return channel 2 voltage output
VOUT ; ==> return channel 1 voltage output

Q10. How to read the current output value?

CURR3? <NL> ==> return channel 3 current output
CURRENT1? <NL> ==> return channel 1 current output
IOUT2? ; ==> return channel 2 current output

IOUT ; ==> return channel 1 current output

Q11. How to set the tracking mode?

TRACK 1 <NL> ==> CH2 = CH1

TRACK : ON; ==> CH2 = CH1

TRACK 0 <NL> ==> tracking off

TRACK OFF <NL> ==> tracking off

Q12. How to set the parallel output mode?

PARA 1; ==> parallel on

PARALLEL ON <NL> ==> parallel on

PARA 0 <NL> ==> parallel off

PARALLEL OFF <NL> ==> parallel off

Q13. How to set the serial output mode?

SER : 1 <NL> ==> serial on

SERIAL : ON <NL> ==> serial on

SER 0 <NL> ==> serial off

SERIAL OFF; ==> serial off

Q14. How to read back calibration parameter?

CAL? ; ==> return the calibration data

CALI? <NL> ==> return the calibration data

Q15. How to lock keypad and knob?

LOCK : 1; ==> lock the keypad and knob

LOCK ON <NL> ==> lock the keypad and knob

Q16. How to read back address number?

ADDR ? <NL>

ADDRESS ? ;

6.5 SCPI Compatible Information

The SCPI conforms to all specifications for devices as defined in IEEE-488.2 and complies with SCPI command syntax version 1995.0. Confirmed Commands are those commands which are approved commands in the SCPI 1995 Specification, Volume 2: Command Reference.

6.5.1 SCPI Frequent Command

Command	Description
=====	
*CLS	Clear status (include error code)
*CAL?	As same as CALi? command, return calibration parameter
*IDN?	Response: <Manufacturer>, <model>, <serial number>, <firmware type, & version>
*RCL	Recalls settings from memory. Memory numbers from 0 to 99 are valid.
*RST	Resets the power supply to its power on state.
*SAV	1. Saves defined parameters 2. Saves current settings to memory. Memory numbers from 0 to 99 are valid.
*WAI	Sets the device to wait until all previous commands and queries are complete before executing commands following the *WAI command.

example:

Q17. How to save V/I to memory?

*SAV : 15;	==>	Saves current settings to memory number 15
SAV 0 <NL>	==>	Saves current settings to memory number 0

Q18. How to recall memory V/I variable to output?

*RCL : 3 <NL>	==>	recall setting from memory location 3
RCL 120;	==>	the data value is invalid

Q19. How to save parameter?

SAV;
*SAV <NL>

Q20. How to do the software reset procedure?

*RST;
RST <NL>

Q21. How to return the device identification?

*IDN?;
IDN? <NL>

6.5.2 SCPI Command for Subsystem

OUT[n]	on/off subsystem
[:STATe] <bool> <NL>	enable/disable output action
ALL	multi-channel to select instruct
TRACK <NL>	enable track mode
PARAllel <NL>	enable parallel mode
SERial <NL>	enable serial mode
NORMAL <NL>	resume normal mode
STATus	status subsystem.
[?]<NL>	read back machine status
ERROR[?] <NL>	read back machine error code
CCP[?] <NL>	read back Iset DAC value
CVP[?] <NL>	read back Vset DAC value
MONV[?] <NL>	read back Vout DAC value
MONI[?] <NL>	read back Iout DAC value
DISPlay	display subsystem
:[KEYpad]	simute keypad action
:DOT	simulate key '.' ASCII code is 0x2e
:0	simulate key '0' ASCII code is 0x30
:1	simulate key '1' ASCII code is 0x31
:2	simulate key '2' ASCII code is 0x32
:3	simulate key '2' ASCII code is 0x33
:4	simulate key '2' ASCII code is 0x34
:5	simulate key '2' ASCII code is 0x35
:6	simulate key '2' ASCII code is 0x36

:7	simulate key '2' ASCII code is 0x37
:8	simulate key '2' ASCII code is 0x38
:9	simulate key '2' ASCII code is 0x39
:VOLT	simulate key 'V'
:V	simulate key 'V'
:AMP	simulate key 'A'
:A	simulate key 'A'
:OUTput	simulate ON/OFF key action
:Channel	simulate CH select
:LEFT	currsor shift left
:RIGHT	currsor shift right
:MEMory	into memory item
:CLEAR	simulate CLEAR key
:ESC	simulate CLEAR key
:CLR	simulate CLEAR key
:ENTer	simulate enter key
:MULTI	simulate double key
:1	into calibration mode for channel 1
:2	into calibration mode for channel 2
:3	into calibration mode for channel 3
:~CLEAR	unlock key or pause timer action
:~ESC	unlock key or pause timer action
:~CLR	unlock key or pause timer action
:~DISPlay	switch V,A/W,OHM select
:~CONFIG	into config iotem
:~KNOB	simute knob action
:~LEFT	simulate knob turns left
:~RIGHT	simulate knob truns right
PROGram	program subsystem
:ON/OFF<NL>	enables/disables program action
[:n] <NL>	select [n] page program number, n range from 0 ~ 99
:VSET[n]	volt setting for channel n
[:level] <NL>	voltage level
:~ISET[n]	current setting for channel n
[:level] <NL>	current level
:~TIMER	setting timer for standard

:hh:mm:ss<NL>	unit is second
:FASTimer	setting timer for fast action
[:level] <NL>	unit is mini second, range from 4~65535ms
:NEXT	next step
:END<NL>	end program to running.
:NEXT<NL>	next page
:JUMP:PAGE<NL>	jump to page n; n from 0 ~ 99
:? <NL>	Response program n parameter
:TIMER? <NL>	Response current timer parameter
:SAVE<NL>	save programmable 0 ~ programmable 99 value
TIMer	timer subsystem
:ON/OFF <NL>	enables/disables timer action
:hh:mm:ss <NL>	setting timer
:TIMER? <NL>	Response current timer parameter
:PAUSE <NL>	
:? <NL>	Response timer parameter
MEMory	memory subsystem
[:n] <NL>	select [n] page memory number, n range from 0 ~ 99
:VSET[n]	volt setting for channel n
[:level] <NL>	voltage level
:ISET[n]	current setting for channel n
[:level] <NL>	current level
:READ	read eeprom data
:ROM <NL>	read ROM data
[:n] <NL>	read eeprom page number, from 0 ~ 15
:?	read back memory parameter
:CALibration	
:? <NL>	read back calibration parameter
:SAVE	save calibration parameter
:V1	voltage low level parameter
[:level] <NL>	
:V2	voltage high level parameter
[:level] <NL>	
:I1	current low level parameter

[:level] <NL>	
:I2	current high level parameter
[:level] <NL>	
:CCV1	read back voltage low level DAC parameter
[:level] <NL>	
:CCV2	read back voltage high level DAC parameter
[:level] <NL>	
:CCI1	read back current low level DAC parameter
[:level] <NL>	
:CCI2	read back current high level DAC parameter
[:level] <NL>	
:SERial? <NL>	read back serial number
:PWD password to setting	
:PASSword	:
:<string> <NL>	the string must less 15 charster
:PWD? <NL>	return password number
:PASSword? <NL>	:
:CHIP? <NL>	return the can programmable CHIP type
:SAVE <NL>	restore special parameter
CONTrol	control subsystem
:OEM	enables/disables OEM type
[:state] <bool> <NL>	
:ISP	enables/disables ISP flag
[:state] <bool> <NL>	
:FASTREQ	enables/disables fast output mode
[:state] <bool> <NL>	
:HOTKey	enables/disables hotkey mode
[:state] <bool> <NL>	
:LOCK	enables/disables keypad and rotary lock
[:state] <bool> <NL>	
:MONitor	enables/disables monitore to send "status" & V/I message
[:state] <bool> <NL>	

:BAUD	select baud rate:
[:level] <NL>	38400,19200,9600,4800,2400,1200
:COMMunication	communication kind to select
:[MODE] <NL>	[MODE] is
	"USB","RS232","ETHNET","GPIB"
:? <NL>	response MODE data
:DHCP	select DHCP command
[:state] <bool> <NL>	enables/disables DHCP mode
:xx.xx.xx.xx <NL>	setting DHCP address(the value is hexadecimal)
:? <NL>	response DHCP data address(the value is hexadecimal)
:IP	select IP command
:xx.xx.xx.xx <NL>	setting IP address(the value is hexadecimal)
:? <NL>	response IP data address(the value is hexadecimal)
:MAC	
:xxxxxx <NL>	setting MAC address(the value is hexadecimal)
:? <NL>	response MAC data address(the value is hexadecimal)
:Channel	select channel
[:level] <NL>	channel number
:MINUSREQ	enables/disables minus sign to display,default is disable
[:state] <bool> <NL>	
:ADDRess	setting address
[:level] <NL>	address number
:? <NL>	return address number
:DEFault <NL>	resume factory preset
:DAC	
:VSET[n]	direct DAC to output for channel n
[:level] <NL>	voltage DAC count
:ISET[n]	direct DAC to output for channel n
[:level] <NL>	current DAC count
:PWD	password to test and verify
:PASSword	:

:<string> <NL>	the string must less 30 charster
MEASure	measure subsystem
[:n]	setting to channel number
:CURRent[n]? <NL>	Return the floating point value of the DC output current in amps.
:VOLTage[n]? <NL>	Return the floating point value of the DC output voltage in volts.
:POWER[n]? <NL>	Return DC output power in watts.
:RESistance[n]? <NL>	Return DC output impedance in ohms.
[SOURce]	source subsystem
[:n]	setting to channel number
:CURRent[n]	Sets the floating point value of the DC output current in amps.
[:level] <NL>	current level output
:PROTection	over current protection
[:level] <NL>	Sets the over current protection trip point in amps.
:? <NL>	Return over current value
:TRIGger	trigger current protection
[:state] <bool> <NL>	enables/disables current protection action
:VOLTage[n]	Sets the floating point value of the DC output voltage in volts.
[:level] <NL>	voltage level output
:PROTection	over voltage protection
[:level] <NL>	sets the over voltage protection trip point in volts.
:? <NL>	Return over voltage value
:TRIGger	trigger voltage protection
[:state] <bool> <NL>	enables/disables voltage protection action

example:

Q22. How to set tracking mode?

OUT : TRACK <NL>

Q23. How to set serial output mode?

OUT : SER <NL>

OUT SERIAL ;

Q24. How to set parallel output mode?

```
OUT : PARA <NL>
OUT  PARALLEL ;
```

Q25. How to resume normal output mode?

```
OUT : NORM ;
OUT  NORMAL <NL>
```

Q26. How to read back machine status?

```
STATUS? <NL>
```

Q27. How to read back machine error code?

```
STAT      ERR ;
STATUS    ERR? <NL>
STATUS :  ERROR <NL>
STAT?    : ERROR? ;
```

Q28. How to simulate keypad?

*RCL : 3 <NL>	==>	recall setting from memory location 3
RCL 120;	==>	the data value is invalid
DISPLAY 0 <NL>	==>	simulate keypad '0'
DISP 5 <NL>	==>	simulate keypad '5'
DISPLAY VOLT <NL>	==>	simulate keypad "VOLT"
DISPLAY : V <NL>	==>	simulate keypad "VOLT"
DISP A <NL>	==>	simulate keypad "AMP"
DISPLAY OUTPUT <NL>	==>	simulate keypad "ON/OFF"
DISP CHANNEL <NL>	==>	simulate keypad "CH"
DISPLAY : LEFT <NL>	==>	simulate keypad "< "
DISP RIGHT <NL>	==>	simulate keypad " >"
DISPLAY : MEMORY <NL>	==>	simulate keypad 'M'
DISPLAY MEM <NL>	==>	simulate keypad 'M'
DISP CLEAR <NL>	==>	simulate keypad "CLEAR"

Q29. How to simulate double key?

DISPLAY MULTI 1 <NL>	==>	simulate keypad "ENTER" & "1"
DISPLAY : MULTI : 2 <NL>	==>	simulate keypad "ENTER" & "2"
DISP : MULTI ESC ;	==>	simulate keypad "ENTER" &

"CLEAR"

Q30. How to simulate rotary?

DISPLAY : KNOB LEFT <NL> ==> simulate rotary left scroll
DISP : KNOB : RIGHT <NL> ==> simulate rotary right scroll

Q31. How to read voltage setting DAC value?

STATUS : CVP <NL> ==> read CVP DAC value
STATUS CVP? ; ==> read CVP DAC value

Q32. How to read current setting DAC value?

STATUS CCP ; ==> read CCP DAC value
STATUS : CCP? <NL> ==> read CCP DAC value

Q33. How to read voltage DAC value?

STATUS : MONV ; ==> read MONV DAC value
STATUS MONV? <NL> ==> read MONV DAC value

Q34. How to read current DAC value?

STATUS MONI <NL> ==> read MONI DAC value
STATUS : MONI? ; ==> read MONI DAC value

Q35. How to setting tri-channel to synchronous output?

OUT ALL 1 <NL> ==> tri-channel output is ON
OUT:ALL:OFF ; ==> tri-channel output is OFF

Q36. How to setting timer?

TIMER 00:10:00 <NL> ==> setting timer 10 minute to stop
TIM : 99:59:59 ; ==> setting timer 99 hour 59 minute 59
second to stop

Q37. How to start timer?

TIMER ON ;
TIM : ON <NL>

Q38. How to close timer?

TIMER OFF <NL>
TIM : OFF ;

Q39. How to read timer parameter?

TIMER ? <NL>

TIM : ? ;

Q40. How to setting program?

step 1: PROG : 10 <NL>	==>	select page number is 10,page number from 0 ~ 99.
step 2: PROG:VSET1:16V <NL>	==>	sets channel 1 voltage is 16V.
step 3: PROG:VSET2:25V <NL>	==>	sets channel 2 voltage is 25V.
step 4: PROG:VSET3:3.3V <NL>	==>	sets channel 3 voltage is 3.3V.
step 5: PROG:ISSET1:1A <NL>	==>	sets channel 1 current is 1A.
step 6: PROG:ISSET2:2A <NL>	==>	sets channel 2 current is 2A.
step 7: PROG:ISSET3:3.3A <NL>	==>	sets channel 3 current is 3.3A.
step 8: PROG:TIMER:00:05:00<NL>	==>	sets run-time is 5 minute.
step 9: PROG:NEXT:NEXT <NL>	==>	select next status is next page
:		
:		
:		

Q41. How to save program?

PROGRAM : SAV <NL>

PROG SAVE ;

Q42. How to start program?

PROG : 10 ;	==>	select page number is 10,page number from 0 ~ 99.
PROGRAM : ON <NL>	==>	program is on,from page 10 to running

Q43. How to close program?

PROG OFF ;

Q44. How to read program parameter?

PROGRAM : ? <NL>	==>	Return program parameter
PROGRAM : TIMER? ;	==>	Return timer parameter

Q45. How to setting memory?

step 1: MEM:1 <NL>	==>	select memory number is 1
step 2: MEM:VSET:1.5 <NL>	==>	sets channel 1 voltage is 1.5 V.
step 3: MEM:ISSET3:5 <NL>	==>	sets channel 3 current is 5 A.
:		
:		
:		

Q46. How to read EPROM data?

MEM : READ : 3 <NL>	==>	read eprom page 3 data
MEMORY READ 16 <NL>	==>	the command is avalid,page less than 16

Q47. How to read memory parameter?

step 1: MEM:2 <NL>	==>	select memory number is 2
step 2: MEM:? <NL>	==>	read back memory NO.2 parameter

Q48. How to read calibration parameter?

CONT:PWD:13579 <NL>	==>	enable password to verify
MEM:CALIBRATION:? <NL>		
MEMORY:CAL:? <NL>		

Q49. How to setting calibration parameter?

step 1: CONT:PWD:13579 <NL>	==>	enable password to verify 2
step 2: CONT:CH:1 <NL>	==>	select channel 1.
step 3: MEM:CAL:V1:???? <NL>	==>	sets voltage low level parameter
step 4: MEM:CAL:CCV1:???? <NL>	==>	sets read back voltage low level DAC parameter
step 5: MEM:CAL:V2:???? <NL>	==>	sets voltage high level parameter
step 6: MEM:CAL:CCV2:???? <NL>	==>	sets read back voltage high level DAC parameter
step 7: MEM:CAL:I1:???? <NL>	==>	sets current low level parameter
step 8: MEM:CAL:CCI1:???? <NL>	==>	sets read back current low level DAC parameter
step 9: MEM:CAL:I2:???? <NL>	==>	sets current high level parameter
step 10: MEM:CAL:CCI2:???? <NL>	==>	sets read back current high level DAC parameter
step 11: CONT:CH:2 <NL>	==>	select channel 2.
:		

```

:
CONT:CH:3 <NL>          ==>  select channel 3.
:
MEM:CAL:SAVE <NL>       ==>  save calibration parameter

```

Q50. How to read back serial number?

```

MEM:SERIAL:? <NL>
MEMORY SER ? <NL>

```

Q51. How to change baud rate?

```

CONT:BAUD:19200 <NL>    ==>  modify baud is 19200
CONTROL BAUD 9600 <NL>  ==>  modify baud is 9600
CONTROL BAUD:2400 <NL>  ==>  modify baud is 2400
CONT:BAUD 4800 <NL>     ==>  modify baud is 4800

```

Q52. How to select communication port?

```

CONT:COMM:RS232 <NL>    ==>  modify communication port is RS-232
CONT COMMUNICATION:USB <NL> ==>  modify communication port is USB
CONTROL:COMM RS232 <NL> ==>  modify communication port is RS-232

```

Q53. How to modify machine ID(address)?

```

CONTROL:ADDR:23 <NL>    ==>  modify id is 23
CONT:ADDRESS 09 <NL>    ==>  modify id is 9
CONT ADDR:00 <NL>       ==>  modify id is 0

```

Q54. How to check password?

```

CONT:PASSWORD:13579 <NL> ==>  enable password to verify
CONTROL:PWD:23 <NL>      ==>  check the password

```

Q55. How to entry or leave monitor mode?

```

CONT:MONITOR:ON <NL>    ==>  entry monitor mode
CONTROL MONI ON <NL>    ==>  exit monitor mode

```

Q56. How to change channel?

```

CONT:CHANNEL:1 <NL>     ==>  change channel number is 1
CONT CH 0 <NL>          ==>  change channel number is 1
CONTROL CH:2 <NL>       ==>  change channel number is 2

```

Q57. How to entry or leave lock status?

CONT:LOCK:ON <NL>	==>	entry lock mode
CONTROL:LOCK OFF <NL>	==>	exit lock mode

Q58. How to entry or leave lock status?

CONT:HOTK:ON <NL>	==>	entry hotkey mode
CONTROL HOTKEY OFF <NL>	==>	exit hotkey mode

Q59. How to display minus symbol?

CONT:MINUSREQ:ON <NL>	==>	enable minus flag is on
CONTROL MINUSREQ OFF <NL>	==>	normal LCD display

Q60. How to change DAC to direct output?

CONTROL DAC:VSET1:1000 <NL>	==>	define vset1 DAC count is 1000
CONT:DAC:VSET3:60000 <NL>	==>	define vset3 DAC count is 60000
CONT DAC ISET2 5000 <NL>	==>	define iset2 DAC count is 5000

Q61. How to measure current?

MEASURE CURR1? <NL>	==>	read back current 1 result
MEAS:CURRENT3? <NL>	==>	read back current 3 result
MEAS:2:CURRENT? <NL>	==>	read back current 2 result
MEAS 3 CURR? <NL>	==>	read back current 3 result
MEAS:CURR3? <NL>	==>	read back current 3 result
CURR1? <NL>	==>	read back current 1 result
CURRENT2? <NL>	==>	read back current 2 result
IOUT1? <NL>	==>	read back current 1 result
IOUT2 <NL>	==>	read back current 2 result

Q62. How to measure voltage?

MEASURE VOLT1? <NL>	==>	read back voltage 1 result
MEAS:VOLTAGE3? <NL>	==>	read back voltage 3 result
MEAS:2:VOLTAGE? <NL>	==>	read back voltage 2 result
MEAS 3 VOLT? <NL>	==>	read back voltage 3 result
MEAS:VOLT3? <NL>	==>	read back voltage 3 result
VOLT1? <NL>	==>	read back voltage 1 result
VOLTAGE2? <NL>	==>	read back voltage 2 result
VOUT1? <NL>	==>	read back voltage 1 result

VOUT2 <NL> ==> read back voltage 2 result

Q63. How to measure power?

MEASURE POW1? <NL> ==> read back power 1 result

MEAS:POWER3? <NL> ==> read back power 3 result

EAS:2:POWER? <NL> ==> read back power 2 result

MEAS 3 POW? <NL> ==> read back power 3 result

MEAS:POW3? <NL> ==> read back power 3 result

Q64. How to measure resistance?

MEASURE RES1? <NL> ==> read back resistance 1 result

MEAS:RESISTANCE3? <NL> ==> read back resistance 3 result

MEAS:2:RESISTANCE? <NL> ==> read back resistance 2 result

MEAS:3:RES? <NL> ==> read back resistance 3 result

MEAS:RES3? <NL> ==> read back resistance 3 result

Q65. How to define voltage output?

SOUR:VOLTAGE2:12 <NL> ==> sets voltage is 12V for channel 2.

SOURCE VOLT1 30 <NL> ==> sets voltage is 30V for channel 1.

SOUR:1:VOLT:23 <NL> ==> sets voltage is 23V for channel 1.

VOLT3:10 <NL> ==> sets voltage is 10V for channel 3.

VOLTAGE3:5 <NL> ==> sets voltage is 5V for channel 3.

VSET2:15 <NL> ==> sets voltage is 15V for channel 2.

Q66. How to define current output?

SOUR:CURRENT2:1 <NL> ==> sets current is 1A for channel 2.

SOURCE CURR1 3 <NL> ==> sets current is 3A for channel 1.

SOUR:2:CURRE:2 <NL> ==> sets current is 2A for channel 2.

CURR3:1.2 <NL> ==> sets current is 1.2A for channel 3.

CURRENT3:5 <NL> ==> sets current is 5A for channel 3.

ISSET2:1.5 <NL> ==> sets current is 1.5A for channel 2.

Q67. How to define over voltage protection?

SOUR:VOLTAGE3:PROT:12 <NL> ==> sets over voltage is 12V for channel 3.

SOURCE VOLT1:PROT 30 <NL> ==> sets over voltage is 30V for channel 1.

SOUR:VOLT2 PROTECTION:10<NL> ==> sets over voltage is 10V for channel

	2.
SOUR:3 VOLT PROTECTION:5<NL> ==>	sets over voltage is 5V for channel 3.
VOLTAGE3:PROT: 7 <NL> ==>	sets over voltage is 7V for channel 3.
VOLT2:PROT 18 <NL> ==>	sets over voltage is 18V for channel 2.
VOLT1 PROTECTION:27 <NL> ==>	sets over voltage is 27V for channel 1.
VOLT PROTECTION 25 <NL> ==>	sets over voltage is 25V for channel 1.
OVSET2:19 <NL> ==>	sets over voltage is 19V for channel 2.

Q68. How to define over current protection?

SOUR:CURREN3:PROT:1.2 <NL> ==>	sets over current is 1.2A for channel 3.
SOURCE CURR1:PROT 3 <NL> ==>	sets over current is 3A for channel 1.
SOUR:CURR2 PROTECTION:2<NL> ==>	sets over current is 2A for channel 2.
SOUR:3 CURR PROTECTION:5<NL> ==>	sets over current is 5A for channel 3.
CURRENT3:PROT: 2.7 <NL> ==>	sets over current is 2.7A for channel 3.
CURR2:PROT 1.8 <NL> ==>	sets over current is 1.8A for channel 2.
CURR1 PROTECTION:2.7 <NL> ==>	sets over current is 2.7A for channel 1.
CURR PROTECTION 2.5 <NL> ==>	sets over current is 2.5A for channel 1.
OISET2 1.9 <NL> ==>	sets over current is 1.9A for channel 2.

Q69. How to read back over voltage parameter?

SOUR:VOLTAGE3:PROT:? <NL> ==>	return over voltage for channel 3.
SOURCE VOLT1:PROT ? <NL> ==>	return over voltage for channel 1.
SOUR:VOLT2 PROTECTION:? <NL> ==>	return over voltage for channel 2.
SOUR:3 VOLT PROTECTION:??<NL> ==>	return over voltage for channel 3.
VOLTAGE3:PROT:? <NL> ==>	return over voltage for channel 3.

VOLT2:PROT ? <NL>	==>	return over voltage for channel 2.
VOLT1 PROTECTION:? <NL>	==>	return over voltage for channel 1.
VOLT PROTECTION ? <NL>	==>	return over voltage for channel 1.
OVSET2? <NL>	==>	return over voltage for channel 2.

Q70. How to read back over current parameter?

SOUR:CURRENT3:PROT:? <NL>	==>	return over current for channel 3.
SOURCE CURR1:PROT ? <NL>	==>	return over current for channel 1.
SOUR:CURR2 PROTECTION:? <NL>	==>	return over current for channel 2.
SOUR:3 CURR PROTECTION:?<NL>	==>	return over current for channel 3.
CURRENT3:PROT:? <NL>	==>	return over current for channel 3.
CURR2:PROT ? <NL>	==>	return over current for channel 2.
CURR1 PROTECTION:? <NL>	==>	return over current for channel 1.
CURR PROTECTION ? <NL>	==>	return over current for channel 1.
OISET2? <NL>	==>	return over current for channel 2.

Q71. How to enable or disable over voltage?

SOUR:VOLTAGE3:PROT:TRIG:ON <NL>	==>	enable over voltage for channel 3.
SOURCE VOLT1:PROT:TRIG:OFF <NL>	==>	disable over voltage for channel 1.
SOUR:VOLT2 PROTECTION:TRIG:OFF <NL>	==>	disable over voltage for channel 2.
SOUR:3 VOLT PROTECTION::TRIG:OFF <NL>	==>	disable over voltage for channel 3.
VOLTAGE3:PROT:TRIG:ON <NL>	==>	enable over voltage for channel 3.
VOLT2:PROT TRIGGER ON <NL>	==>	enable over voltage for channel 2.
VOLT1 PROTECTION:TRIG:OFF <NL>	==>	disable over voltage for channel 1.
VOLT PROTECTION TRIG:OFF <NL>	==>	disable over voltage for channel 1.
OVP2:ON <NL>	==>	enable over voltage for channel 2.
OVP3 OFF <NL>	==>	disable over voltage for channel 3.

Q72. How to enable or disable over current?

SOUR:CURRENT3:PROT:TRIG:ON <NL>	==> enable over current for channel 3.
SOURCE CURR1:PROT:TRIG:OFF <NL>	==> disable over current for channel 1.
SOUR:CURR2 PROTECTION:TRIG:OFF <NL>	==> disable over current for channel 2.
SOUR:3 CURR PROTECTION::TRIG:OFF <NL>	==> disable over current for channel 3.
CURRENT3:PROT:TRIG:ON <NL>	==> enable over current for channel 3.
CURR2:PROT TRIGGER ON <NL>	==> enable over current for channel 2.
CURR1 PROTECTION:TRIG:OFF <NL>	==> disable over current for channel 1.
CURR PROTECTION TRIG:OFF <NL>	==> disable over current for channel 1.
OCP2:ON <NL>	==> enable over current for channel 2.
OCP3 OFF <NL>	==> disable over current for channel 3.

Q73. How to setting program?

PROG 10;
PROG ISET1 1;
PROG ISET2 1;
PROG ISET3 1;
PROG VSET1 1;
PROG VSET2 1;
PROG VSET3 1;
PROG FAST 4;
PROG NEXT NEXT;
PROG ?;
PROG 11;
PROG ISET1 1;
PROG ISET2 1;
PROG ISET3 1;

PROG VSET1 3;
PROG VSET2 3;
PROG VSET3 3;
PROG FAST 4;
PROG NEXT NEXT;
PROG ?;
PROG 12;
PROG ISET1 1;
PROG ISET2 1;
PROG ISET3 1;
PROG VSET1 5;
PROG VSET2 5;
PROG VSET3 5;
PROG FAST 5;
PROG NEXT NEXT;
PROG ?;
PROG 13;
PROG ISET1 1;
PROG ISET2 1;
PROG ISET3 1;
PROG VSET1 7;
PROG VSET2 7;
PROG VSET3 7;
PROG FAST 10;
PROG NEXT NEXT;
PROG ?;
PROG 14;
PROG ISET1 1;
PROG ISET2 1;
PROG ISET3 1;
PROG VSET1 10;
PROG VSET2 10;
PROG VSET3 10;
PROG FAST 4;
PROG NEXT NEXT;
PROG ?;
PROG 15;
PROG ISET1 1;

```
PROG ISET2 1;
PROG ISET3 1;
PROG VSET1 15;
PROG VSET2 15;
PROG VSET3 15;
PROG FAST 4;
PROG NEXT NEXT;
PROG ?;
PROG 16;
PROG ISET1 1;
PROG ISET2 1;
PROG ISET3 1;
PROG VSET1 25;
PROG VSET2 25;
PROG VSET3 5;
PROG FAST 4;
PROG NEXT NEXT;
PROG ?;
PROG 17;
PROG ISET1 1;
PROG ISET2 1;
PROG ISET3 1;
PROG VSET1 9;
PROG VSET2 9;
PROG VSET3 0;
PROG FAST 4;
PROG NEXT NEXT;
PROG ?;
PROG 18;
PROG ISET1 1;
PROG ISET2 1;
PROG ISET3 1;
PROG VSET1 29;
PROG VSET2 29;
PROG VSET3 10;
PROG FAST 4;
PROG NEXT NEXT;
PROG ?;
```

PROG 19;
PROG ISET1 1;
PROG ISET2 1;
PROG ISET3 1;
PROG VSET1 23;
PROG VSET2 23;
PROG VSET3 5;
PROG FAST 4;
PROG NEXT NEXT;
PROG ?;
PROG 20;
PROG ISET1 1;
PROG ISET2 1;
PROG ISET3 1;
PROG VSET1 17;
PROG VSET2 17;
PROG VSET3 4;
PROG FAST 4;
PROG NEXT NEXT;
PROG ?;
PROG 21;
PROG ISET1 1;
PROG ISET2 1;
PROG ISET3 1;
PROG VSET1 13;
PROG VSET2 13;
PROG VSET3 3;
PROG FAST 4;
PROG NEXT NEXT;
PROG ?;
PROG 22;
PROG ISET1 1;
PROG ISET2 1;
PROG ISET3 1;
PROG VSET1 8;
PROG VSET2 8;
PROG VSET3 2;
PROG FAST 4;

```
PROG NEXT NEXT;  
PROG ?;  
PROG 23;  
PROG ISET1 1;  
PROG ISET2 1;  
PROG ISET3 1;  
PROG VSET1 2;  
PROG VSET2 2;  
PROG VSET3 1;  
PROG FAST 4;  
PROG NEXT NEXT;  
PROG ?;  
PROG 24;  
PROG ISET1 1;  
PROG ISET2 1;  
PROG ISET3 1;  
PROG VSET1 1;  
PROG VSET2 1;  
PROG VSET3 12;  
PROG FAST 4;  
PROG NEXT NEXT;  
PROG ?;  
PROG 25;  
PROG ISET1 1;  
PROG ISET2 1;  
PROG ISET3 1;  
PROG VSET1 0.2;  
PROG VSET2 0.51;  
PROG VSET3 8.765;  
PROG FAST 100;  
PROG NEXT JUMP 10;  
PROG ?;  
PROG 30;  
PROG ISET1 0.01;  
PROG ISET2 0.01;  
PROG ISET3 0.01;  
PROG VSET1 0.2;  
PROG VSET2 0.51;
```

```
PROG VSET3 8.765;
PROG FAST 10;
PROG NEXT NEXT;
PROG ?;
PROG 31;
PROG ISET1 0.01;
PROG ISET2 0.01;
PROG ISET3 0.01;
PROG VSET1 12;
PROG VSET2 0.51;
PROG VSET3 8.765;
PROG FAST 4;
PROG NEXT JUMP 30;
PROG ?;
;
```

Q74. How to getting DHCP address?

```
CONT:DHCP:? <NL>          ==>  response DHCP address
CONTROL DHCP ? <NL>       ==>  response DHCP address
```

Q75. How to enable or disable DHCP status?

```
CONT:DHCP:ON <NL>          ==>  enable DHCP
CONTROL DHCP 1 <NL>        ==>  enable DHCP
CONT:DHCP:0 <NL>           ==>  disable DHCP
CONTROL DHCP OFF <NL>      ==>  disable DHCP
```

Q76. How to setting DHCP address?

```
CONT:DHCP:192.168.10.1 <NL> ==>  setting DHCP address
```

Q77. How to getting IP address?

```
CONT:IP:? <NL>             ==>  response IP address
CONTROL IP ? <NL>          ==>  response IP address
```

Q78. How to setting IP address?

```
CONT:IP:192.168.10.1 <NL>   ==>  setting IP address
CONTROL IP 192.168.10.1 <NL> ==>  setting IP address
```

Q79. How to getting MAC address?

CONT:MAC:? <NL> ==> response MAC address
 CONTROL MAC ? <NL> ==> response MAC address

Q80. How to setting MAC address?

CONT:MAC:xx xx xx xx xx xx <NL> ==> setting MAC address

6.6 Rules of Status Definition

byte 0:	bit 7	channel 3 on/off status
	bit 6	channel 2 on/off status
	bit 5	channel 1 on/off status
	bit 4	channel 3 OVP setting flag
	bit 3	channel 2 OVP setting flag
	bit 2	channel 1 OVP setting flag
	bit 1	channel 3 OCP setting flag
	bit 0	channel 2 OCP setting flag
byte 1:	bit 7	channel 1 OCP setting flag
	bit 6	output mode status; 0: single output 1: multi-output
	bit 5	power on status,0:output off,1: rember pre-setting status
	bit 4	hot-key flag
	bit 3	serial output mode
	bit 2	parallel output mode
	bit 1	track output mode
	bit 0	beep trigger flag
byte 2:	bit 7	disable remote mode, inhib communication
	bit 6	programmable flag
	bit 5	remote flag
	bit 4	keypad between push and pop status
	bit 3	machine running at time mode
	bit 2	machine running at sub-menu mode
	bit 1	machine running at configuration sub-menu mode
	bit 0	machine running at memory item mode

byte 3:	bit 7	machine running at power on status
	bit 6	keypad & Rotary lock flag
	bit 5	machine running at EPROM write or read mode
	bit 4	machine running at synchize mode
	bit 3	display I/V or W/ohm flag
	bit 2	machine running at LCD process mode
	bit 1	detect double- key flag
	bit 0	machine running at key-pad process mode
byte 4:	bit 7	channel 3 CV/CC status
	bit 6	channel 2 CV/CC status
	bit 5	channel 1 CV/CC status
	bit 4	channel 3 OVP is occur flag
	bit 3	channel 2 OVP is occur flag
	bit 2	channel 1 OVP is occur flag
	bit 1	channel 3 OCP is occur flag
	bit 0	channel 2 OCP is occur flag
byte 5:	bit 7	channel 1 OCP is occur flag
	bit 6	relay switch flag
	bit 5	in line system program flag
	bit 4	password is correct flag
	bit 3	machine running at DAC read-back mode
	bit 2	timer pasue flag
	bit 1	machine running at calibration mode
	bit 0	reserved
byte 6:	bit 7	display lock message flag
	bit 6	continue to send "V/I,status" message flag
	bit 5	reserved
	bit 4	reserved
	bit 3	DHCP on or off flag
	bit 2	when the bit is on,LCD to display minus('-') signal
	bit 1	fast-output flag
	bit 0	when the machine is OEM version,the flag must on
byte 7:	fan PWM value.	

7. Accessories

Model :LPS 505N

Serial number:

Accessories

Date:

No	Description	P/N	Q'ty	Selection
1.	Power cord	ZPO-640MI	1	<input type="checkbox"/> Yes <input type="checkbox"/> No
2.	Black & Red Test Lead	ZTP-LPSMI-1	3	<input type="checkbox"/> Yes <input type="checkbox"/> No
3.	User's manual	ZOM-505ME	1	<input type="checkbox"/> Yes <input type="checkbox"/> No

Version: 1.0



MOTech INDUSTRIES INCORPORATED

6 F, No. 248, Sec. 3, Pei-Shen Road, Shen-Keng Hsiang, Taipei Hsien 222, Taiwan

Tel: 886-2-2662-5093, 886-2-2662-5194, Fax: 886-2-2662-5097

<http://www.motechind.com>, e-mail: t&m@motechind.com

ZOMG-505ME