

User's Guide



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- ☒ pH, Conductivity & Dissolved Oxygen Instruments

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FIVE : USING THE RS-232-C SERIAL INTERFACE

Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made by qualified service personnel. Do not replace components with power cable connected.

Under certain conditions, dangerous voltages may exist even with power cable removed. To avoid injuries, always disconnect power, discharge circuits and remove external voltage sources before touching components.

DO NOT SERVICE OR ADJUST ALONE

Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.

DO NOT EXCEED INPUT RATINGS

This instrument must be connected to a properly grounded receptacle to minimize electric shock hazard. Operate at line voltages or frequencies in excess of those stated on the data plate may cause leakage currents in excess of 5.0mA peak.

SAFETY SYMBOLS

WARNING

The WARNING sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in personal injury. Do not proceed beyond a WARNING sign until the indicated conditions are fully understood and met.

CAUTION

The CAUTION sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product.. Do not proceed beyond a CAUTION sign until the indicated conditions are fully understood and met.



Chassis ground symbol.



Protective Conductor terminal.

DO NOT SUBSTITUTE PARTS OR MODIFY INSTRUMENT

Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification to the instrument. Return the instrument to a qualified dealers for service and repair to ensure that safety features are maintained.

INSTRUMENTS WHICH APPEAR DAMAGED OR DEFECTIVE SHOULD BE MADE INOPERATIVE AND SECURED AGAINST UNINTENDED OPERATION UNTIL THEY CAN BE REPAIRED BY QUALIFIED SERVICE PERSONNEL.

1.3 Accessories

Power cable

Operation manual

Fuse

1.4 Output Isolation

The output of the power supply is isolated from earth ground. Either output terminal may be grounded or the output may floated up to +/- 240 Vdc (including output voltage) from chassis ground

1. GENERAL INFORMATION

1.1 Introduction

This section contains a general description of your power supply as well as its performance specifications. Information about options and accessories are also provided.

The PSU300 series have been designed and tested according to EN-61010-1, Safety requirement for Electronic Measuring Apparatus.

1.2 Safety Considerations

SAFETY NOTES

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. The manufacturer assumes no liability for the customer's failure to comply with these requirements.

BEFORE APPLYING POWER

Verify that the power supply is set to match the available line voltage and the correct fuse is installed.

GROUND THE INSTRUMENT

This product is provided with a protective earth terminal. To minimize shock hazard, the instrument chassis and cabinet must be connected to an electrical ground. The instrument must be connected to the AC power supply mains through a three-conductor power cable, with the third wire firmly connected to an electrical ground (safety ground) at the power outlet. For instruments designed to be hard-wired to the AC power lines (supply mains), connect the protective earth terminal to a protective conductor before any other connection is made. Any interruption of the protective (grounding) conductor or disconnection of the protective earth terminal will cause a potential shock hazard that could result in personal injury. If the instrument is to be energized via an external autotransformer for voltage reduction, be certain that the autotransformer common terminal is connected to the neutral (earthed pole) of the AC power lines (supply mains).

The RS232 Ground is connected with chassis ground, and therefore the operator must take care if the computer is also connected with other measuring devices prevent a short cut.

CURRENT & FUSE RATING

	PSU301	PSU302	PSU304
Current Consumption	0.75A / AC 115V	1.42A / AC 115V	1.30A / AC 115V
	0.37A / AC 230V	0.75A / AC 230V	AC 230V / 80 Hz
Power Source	AC 115V / 60 Hz		AC 230V / 80 Hz
PSU301	2 Amp T type, 250V		1 Amp T type, 250V
PSU302	2.5Amp T type, 250V		1.25 Amp T type, 250V
PSU304	2.5Amp T type, 250V		1.25 Amp T type, 250V

Only fuses with the required rated current, voltage, and specified type (normal blow, time delay, etc.) should be used. Do not use repaired fuses or short circuited fuseholders. To do so could cause a shock or fire hazard.

DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE

Do not operate the instrument in the presence of flammable gases or fumes.

KEEP AWAY FROM LIVE CIRCUITS

1.5 Specifications

Model	PSU301	PSU302	PSU-304	
MAX. OUTPUT POWER	30W	60W	70W	
OUTPUTS	Single		Triple	
OUTPUT VOLTAGE				
Output Voltage	30V/15V	30V/15V	±30V	5V
Peak Output Voltage	32V/16V	32V/16V	±32V	
Setting Resolution	10mV		10mV	
OUTPUT CURRENT				
Output Current	1A/2A	2A/4A	1A	2A
Peak Output Current	1.2A/2.4A	2.2A/4.4A	1.2A	
Setting Resolution	1mA	2mA	1mA	
CONSTANT VOLTAGE CHARACTERISTICS (at rated output)				
Line Regulation (10% AC)	1mV		1mV	5mV
Load Regulation (100% load change)	2mV		2mV	10mV
Ripple/Noise rms (10Hz to 20MHz)	1mV rms		1.5mV rms	2mV rms
Ripple/Noise peak (10Hz to 20MHz)	10mV p-p		10mV p-p	20mV p-p
Transient Response	200 μs Typical			
Temperature Coefficient	100ppm/°C Typical			
CONSTANT CURRENT CHARACTERISTICS (at rated output)				
Line Regulation (10% AC)	5mA		5mA	
Load Regulation (100% load change)	2mA		2mA	
Ripple/Noise rms (10Hz to 20MHz)	1mA rms		1mA rms	
Ripple/Noise peak (10Hz to 20MHz)	5mA p-p		5mA p-p	
Temperature Coefficient	200ppm/°C Typical			
OTHER				
Display	16 character x 2 line backlit LCD			
Voltage Accuracy	±0.2% of rdg + 2 digits		±0.2%+2	
Current Accuracy	±0.5% of rdg + 5 digits		±0.5%+5	
Common Mode Voltage	±240Vdc			
Temperature Range	Operating: 0°C to 40°C, less than 80% RH; Storage: -45°C to 75°C, less than 80% RH			
Dimensions (W × H × L)	8.7" × 3.4" × 11.8"			
Weight	10 lbs	12 lbs	12 lbs	
Cooling	Forced Air			

***For output less than 5% of rated output , add 5 digits to the accuracy specification**

RS232 Interface: (standard)

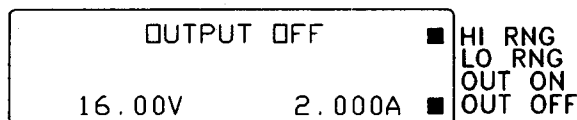
1. RS232C DCE interface: 9 pin D-SUB connector.
2. Port configuration: asynchronous 2400 baud, 8 data bits, 1 stop bits, no parity.

2. GETTING STARTED

2.1 Front Panel Controls and Output Terminals

A-1. The LCD Status Annunciators (PSU301/302):

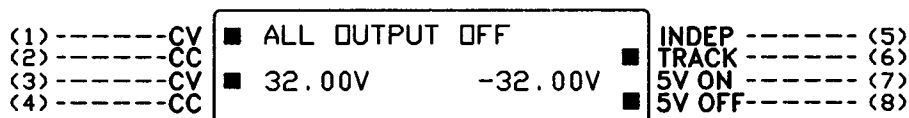
Display all functions and operating characteristics of the PSU301/302



- (1). HI RNG :The power supply is operating in high range.
- (2). LO RNG :The power supply is operating in low range.
- (3). OUT ON :The power supply is in output mode.
- (4). OUT OFF :The power supply is in output-off mode.

A-2. The LCD Status Annunciators (PSU304):

Display all functions and operating characteristics of the LPS-304



- (1) CV :The positive channel is operating under constant voltage mode.
- (2) CC :The positive channel is operating under constant current mode.
- (3) CV :The negative channel is operating under constant voltage mode.
- (4) CC :The negative channel is operating under constant current mode.
- (5) INDEP :The output of negative channel is independent from the positive channel.
- (6) TRACK :The output of negative channel is in sync. with the positive channel.

- (7) 5V ON :The constant 5V output terminal is in output mode.
- (8) 5V OFF :The constant 5V output terminal is in stand-by mode.

NOTE:

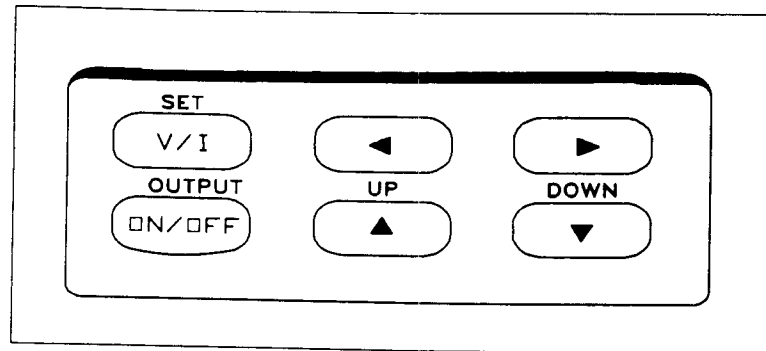
If the square dot annunciator indicating CV or CC mode is flashing, then the channel is in output setting mode.

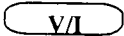


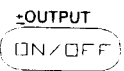


If the square dot annunciator is solid then the channel is not in the output setting mode.

(Press  key to select the channel.)

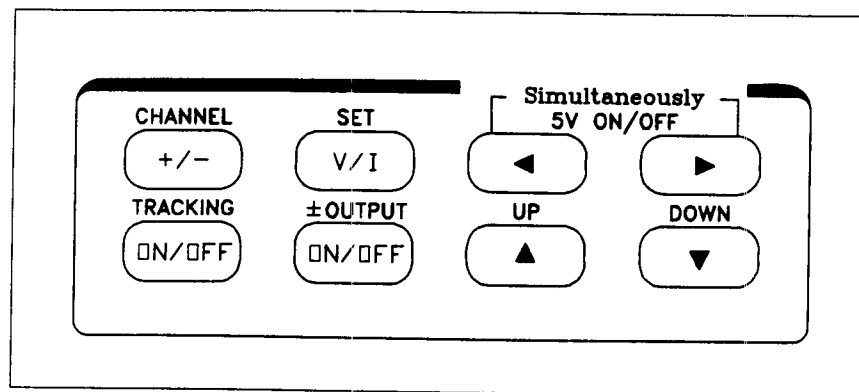
B-1. Key Pad Controls (PSU301/302):

For data input and mode selection



1.  Press this key to toggle between the voltage setting mode and the current setting mode.
2.  Press this key in the output setting mode to move the cursor one digit left until it comes to the desired digit to be varied.
3.  Press this key in the output setting mode to move the cursor one digit right until it comes to the desired digit to be varied. When the cursor is at the rightmost digit, press this key again will lock the new output value into the memory.
4.  Press this key to enable or disable the power supply output.
5.  Press this key to increase the value of the digit to be varied when the power supply is in the output setting mode.
6.  Press this key to decrease the value of the digit to be varied when the power supply is in the output setting mode.

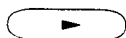
B-2. Key Pad Controls (PSU304):
For data input and mode selection.



1. Press this key to toggle between the positive and the negative channel.
2. Press this key to toggle between the voltage setting mode and the current setting mode.
3. Press this key in the output setting mode to move the cursor one digit left until it comes to the desired digit to be varied.
4. Press this key in the output setting mode to move the cursor one digit right until it comes to the desired digit to be varied. When the cursor is at the rightmost digit, press this key again will lock the new output value into the memory.
5. Press this key to toggle the tracking mode on and off. When the tracking mode is on, the output of the negative channel is in sync. with the positive channel.
6. Press this key to enable or diable the channel output.
7. Press this key to increase the value of the digit to be varied when the channel is in the output setting mode.
8. Press this key to decrease the value of the digit to be varied when the channel is in the output setting mode.

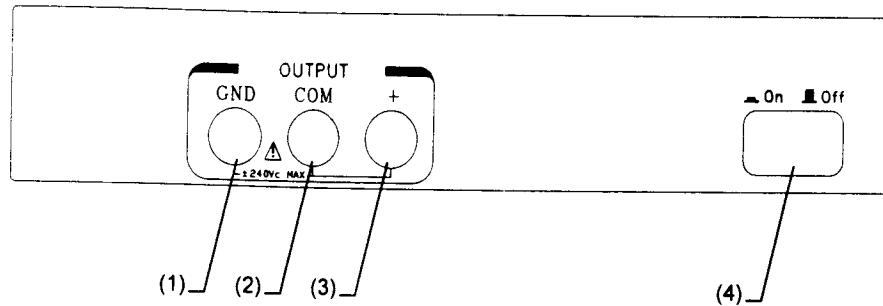
NOTE:

Simultaneously pressing



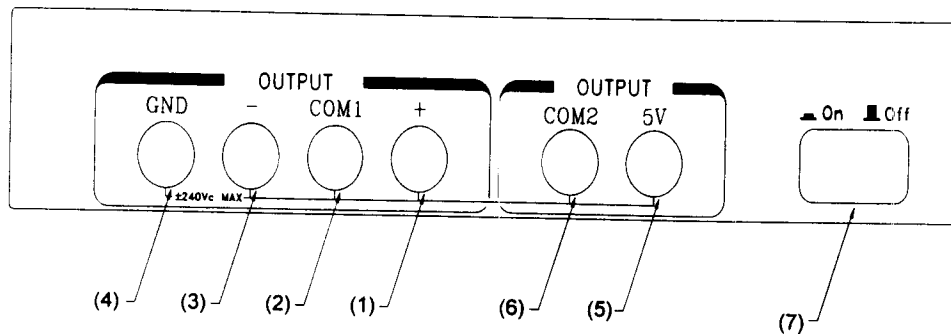
these two keys will enable or disable the constant 5V output terminal.

C-1. Output Terminals (PSU301/302):



1. + (RED) :Positive output terminal.
2. COM (BLACK) :Common output terminal.
3. GND (GREEN) :Ground (earth) output terminal connected to the main chasis.
4. ON OFF :Powers on/off the unit.

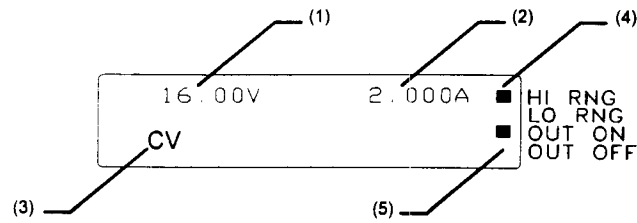
C-2. Output Terminals (PSU304):



1. + (RED) :Positive channel output terminal.
2. COM1 (BLACK) :Common terminal for both positive and negative channels.
3. --- (WHITE) :Negative channel output terminal.
4. GND (GREEN) :Ground (earth) terminal connected to the main chasis.
5. 5V (RED) :Constant 5V output terminal with respect to COM2 terminal.
6. COM2 (BLUE) :Common terminal for the constant 5V output terminal.
7. ON OFF :Powers on/off the unit.

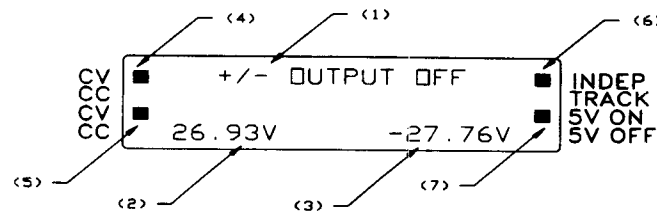
2.2 LCD Display

A-1. When the power supply is in output mode (PSU301/302):



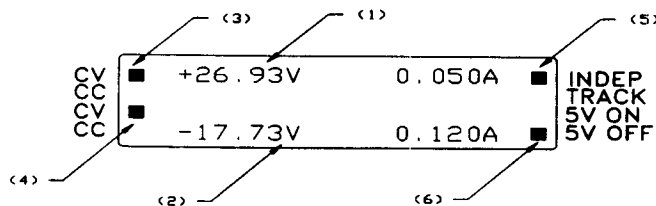
1. Indicates the power supply is outputting 16.00 V.
2. Indicates the power supply is outputting 2.000A.
3. Indicates the power supply is in constant voltage mode.
4. Indicates the power supply is in high range operating mode. .
5. Indicates the power supply is in output mode.

B-1. When the positive and the negative channels are in stand by mode (PSU304):



1. Indicates both the positive and the negative channels are in stand by mode, no output.
2. Indicates the positive channel output voltage is set at 26.93V DC.
3. Indicates the negative channel output voltage is set at -27.76V DC.
4. Indicates the positive channel is in constant voltage mode. When the square dot annunciator flashes, the channel is in the output setting mode.
5. Indicates the negative channel is in constant voltage mode.
6. Indicates the negative channel is independent from positive channel.
7. Indicates the constant 5V channel is in output mode.

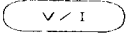




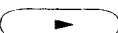
B-2. When the positive and the negative channels are in output mode (PSU304):



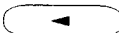
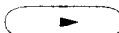


1. Indicates the positive channel is outputting 26.93 V 0.050A.
2. Indicates the negative channel is outputting -17.73V 0.120A.
3. Indicates the positive channel is in constant voltage mode.
4. Indicates the negative channel is in constant voltage mode.
5. Indicates the negative channel is independent from positive channel.
6. Indicates the constant 5V channel is in stand by mode.

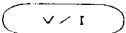



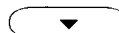
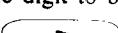
2.3 How To Set Voltage/Current

A. When the power supply is in stand by mode.

1. Press  key to toggle between voltage setting and current setting mode. Next, press  or  key to select the digit to be varied, then press  or  key to choose the desired value. At last, press  till the cursor disappeared to lock in the selected value.

B. When the power supply is in output mode.

1. If in CV mode, use cursor arrow keys  or  and then up/down keys  or  to directly set the voltage value. If in CC mode, use the cursor arrow keys and the up down keys to directly set the current value.

2. Or .Press  key to toggle between voltage setting and current setting mode. Next, press  or  key to select the digit to be varied, then press  or  key to choose the desired value. At last, press  till the cursor disappeared to lock in the selected value.

3. OPERATING CHARACTERISTICS AND CONFIGUATIONS

3.1 INTRODUCTION

These sections contain summary information on operating characteristics and how to configure the PSU300 series. The topics included are operating ranges, load consideration, parallel/series operation and tracking operation

3.2 OPERATING RANGES

All power supplies operate in either constant voltage (CV) or constant current (CC), over the rated output . Their respective voltage and current operating locus (figure 4.2) are found in operating quadrants for all models. The power supply acts as a constant voltage source for comparatively large values of load resistance and as a current source for comparatively small values of load resistance. The automatic crossover or transition between these two modes of operations occurs at a critical stage or "crossover" value of load resistance; $R_C = E_S/I_S$, where E_S is front panel voltage setting and I_S front panel current setting.

The following are the operating quadrants (current -vs- voltage) of the power supplies.

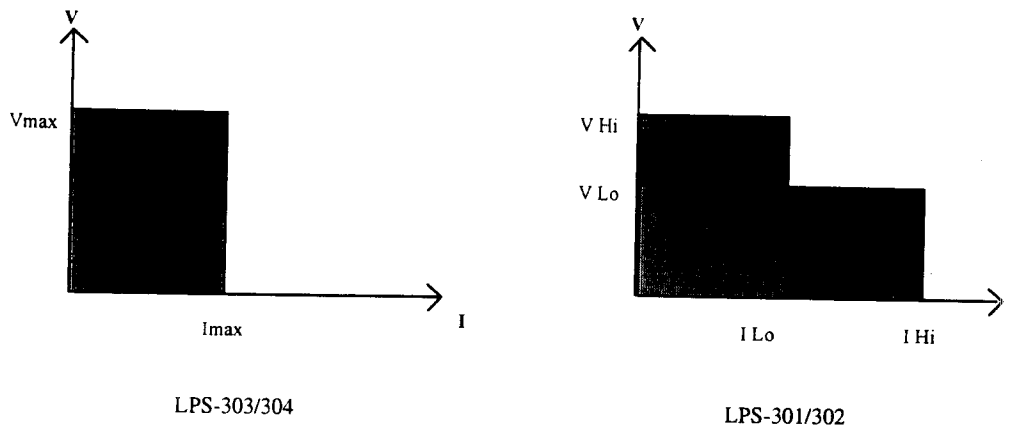


Figure 3.2. Operating Quadrants

3.3 LOAD CONSIDERATION AND CONNECTING MULTIPLE LOADS

When the power supply is being connected with multiple loads to the output, connect each load to the output terminal using separate load leads. This minimizes mutual coupling effects and takes full advantages of the supply's low output resistance. Each pair of wires should be as short as possible and twisted or bundled to reduce lead inductance and noise pickup.

If cabling considerations require the use of distribution terminals that are located remotely from the supply, connect the power supply output terminals to the remote distribution terminals by a pair of twisted or bundled wires. Connect each load to the distribution terminals separately.

OUTPUT ISOLATION: The output of the power supply is isolated from earth ground. Either output terminal may be grounded, or an external source of voltage may be connected between either output and ground. However, both output terminals must be kept within $\pm 240V_{dc}$ of ground. An earth ground terminal is provided on the front panel terminal block.

Each of the power supplies will operate accordingly to the various types of loads connected to the output.

CAPACITANCE LOADING: In normal conditions, the supply will be stable for almost any size load capacitance. However, large load capacitance may cause ringing in the supply's transient response. It is even possible that certain combinations of capacitance and ESR (equivalent series resistance) will result in instability. If this is the case, the solution is to increase or decrease total load capacitance.

3.4 PARALLEL CONNECTION OPERATION

NOTE: Power supplies equipped with SCR crowbars should not be used in series or parallel with each other unless a master-slave interconnection is employed and their crowbars interlock.

Greater current capability can be achieved by connecting outputs in parallel. **However, only power supplies which have equivalent voltage and current output ratings may be connected in parallel. Otherwise, damage to the unit may result.**

A typical connection is shown in figure 4.4 through the front of two PSU301. All leads are kept as short as possible and are bundled together. The CV and CC operations have identical setup.

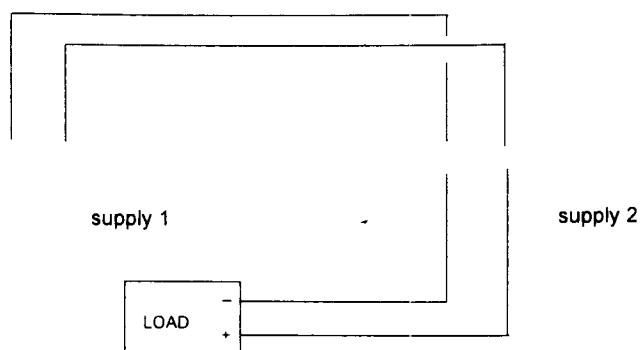


Figure 3.4 Parallel Configuration

3.4.1 CV OPERATION

Although both outputs operate independently of each other in CV operation, one of the outputs must dominate (control) over the other. Additionally, the dominant output must operate in CV mode, while the other output may operate in CC mode.

As an example of this operation, let's assume in figure 4.4 that supply 2 operates in CC mode and supply 1 operates in CV mode. Perform the following steps:

1. Set supply 2 to the maximum output voltage of desired range.
2. Set supply 1 to the desired operating voltage.

The voltage of supply 1 controls the voltage across the load. The output currents are algebraic sums of the individual outputs.

3.4.2 CC OPERATION

The CC operation is similar in many ways to the CV operation, except that the output current must also be set. To obtain CC operation, perform the following steps:

1. Program output voltage of the two supplies to the desired operating voltage.
2. Program supply 1 to one-half the desired operating current.
3. Program supply 2 to one-half the desired operating current.

Both outputs operate in CC mode.

3.5 SERIES CONNECTION OPERATION

NOTE: Power supplies equipped with SCR crowbars should not be used in series or parallel with each other unless a master-slave interconnection is employed and their crowbars interlock.

Greater output voltage capability can be obtained by connecting outputs in series. A **note of caution**, since **current is the same in each element of a series circuit**, both outputs need identical rated currents. If this is not followed, excessive current may be forced into one of the outputs and cause a failure.

Figure 3.5 illustrates the Series configuration on a PSU304

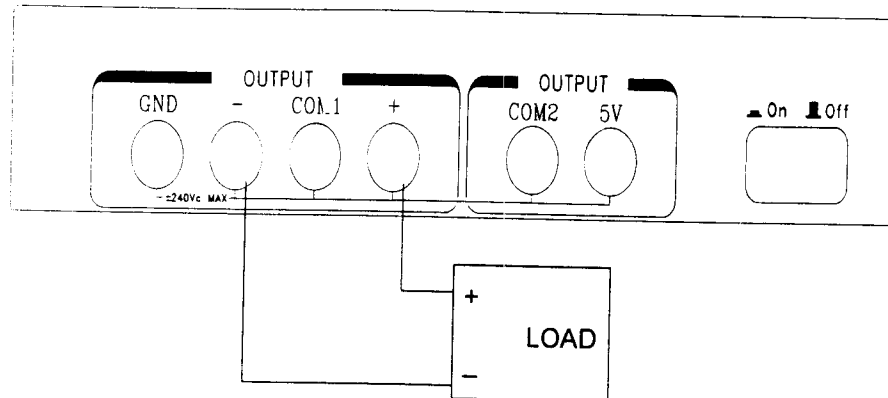


Figure 3.5 Series Configuration

3.5.1 CV OPERATION

In CV operation, first program the current of both outputs to the desired value. Secondly, program the desired operating voltage to equal the sum of the output voltages.

3.5.2 CC OPERATION

In CC operation, one output will operate in CV mode, the other in CC mode. To obtain this operation, perform the following:

1. Program the output current of the two channels to the desired operating current.
2. Program output positive channel to one-half the desired operating voltage.
3. Program output negative channel to one-half the desired operating voltage.

At load levels less than one half the total voltage limit, the output that was originally in CC mode, stays in CC mode.

At load voltages greater than one-half the total voltage limit, the output that was originally in CC mode, changes to CV mode. The secondary output will regulate the current in CC mode and provide the necessary voltage.

3.6 TRACKING OPERATION (PSU304)

PSU304 has extra capability of tracking since it has two output channels. When the tracking mode is enabled, voltage and current output of negative channel is in sync. with positive channel and is controlled by the positive channel. For instance, an one volt step up in positive channel would also cause a one volt step up in negative channel.

If a positive and negative supply is desired (e.g. op-amp application) use the output connector pair connected as in circuit common. Positive channel provides +V, negative channel provides -V and COM1 connects to ground.

WARNING: Under certain circumstances, potentials as low as 24 volts can cause severe injury or even death from electrocution. Please observe proper safety precautions when using such output voltages.

3.7 RANGE OPERATION (PSU301/302)

The models PSU301 and PSU302 have two (HI/LO) operating ranges. These ranges are switched automatically by the power supplies. When low range is active the square dot annunciator in the LCD will point to LO RNG. When high range is active the square dot annunciator will point to HI RNG.

4. USER MAINTENANCE / SERVICE



4.1 Fuse Replacement

If the fuse is suspected of being defective, it should be inspected and, if necessary, replaced. To inspect or replace the fuse, please perform the following steps :

- (1). Disconnect the AC line cord from the unit to reduce electrical shock hazard.
- (2). Remove the fuse by sliding out the fuse holder. The fuseholder is beneath the AC Receptacle. Test the fuse for electrical continuity with any ohmmeter.
- (3). If the fuse is found to be defective, replace it with a replacement fuse as specified in the label on the rear panel.
- (4). Replace the fuse in the fuseholder and re-install.
- (5). Reconnect the AC power cord.

NOTE : USE OF ANY FUSE OTHER THAN THE ONE SPECIFIED MAY CAUSE DAMAGE TO THE UNIT, POSE A SEVERE FIRE HAZARD, AND WILL VOID THE WARRANTY.

4.2 In Case Of Difficulties

This power supply has been designed to be accurate, reliable, and easy-to-use. However, it is possible that you may experience difficulties during operation. If there appears to be any kind of problem during use of the unit, please perform the following steps to help determine the cause :

- (1). Re-read the operating instructions. It is very easy to inadvertently make mistakes in operating procedure.
- (2). Remove and test the fuse. The power supply will not function with an open fuse.

If the preceding two steps fail to resolve the problem, please call your local distributors.

NOTE : ATTEMPTED REPAIR, MODIFICATIONS, OR TAMPERING BY UNAUTHORIZED PERSONNEL WILL VOID THE WARRANTY.

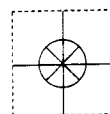
5. USING THE RS-232-C SERIAL INTERFACE

This section describes how to set up the RS-232-C interface for remote control.

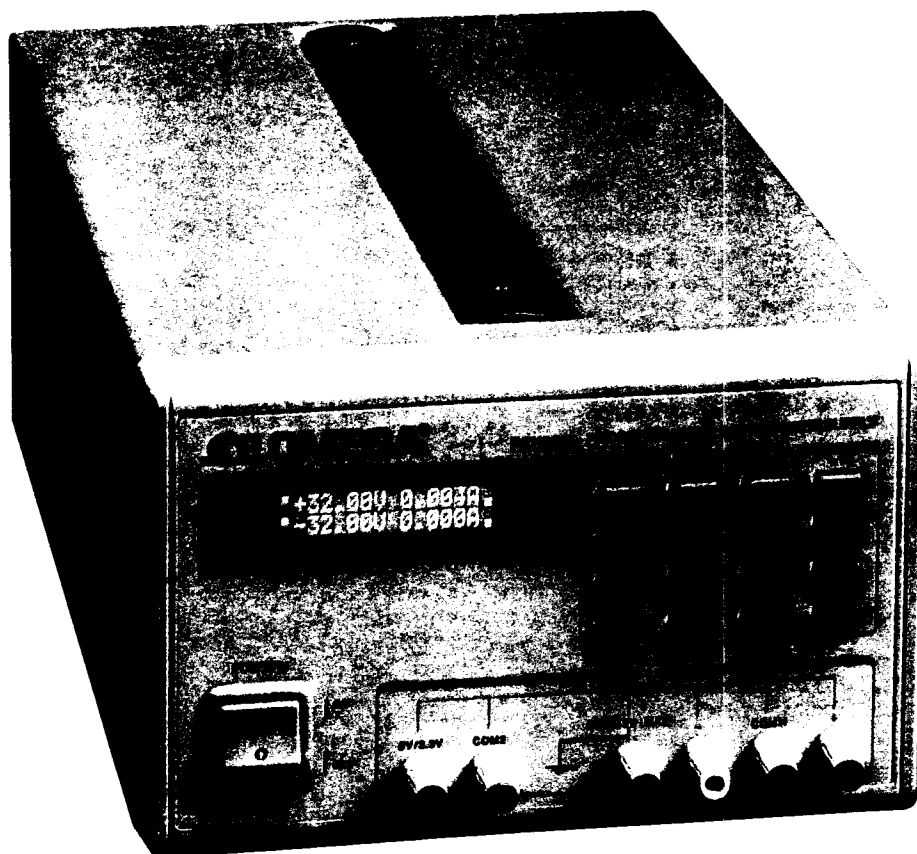
The Interface of PSU300 Series are designed in accordance with EIA (Electronic Industries Association) standard RS-232-C. Through its interface the PSU300 Series can be remotely controlled and transmit its internal data to a host computert.

Command	Description	Example
VSET	Voltage setup	VSET1 12.345
VOUT	Voltage readback	VOUT2
ISSET	Current setup	ISSET2 1.23
IOUT	Current readback	IOUT1
OUT	0 = +/— output off 1 = +/— output on	OUT0 OUT1
TRACK	0 = independent 1 = tracking from ch1 2 = tracking from ch2	TRACK0 TRACK1 TRACK2
STATUS	Working status (see note7)	STATUS
CALE	0 = end calibration 1 = begin calibration 2 = input calibration parameter	CALI0 CALI1 CALI2 9.574
MODEL	Display model no	MODEL
VERSION	Display version no	VERSION
HELP	Display command list	HELP
BEEP	0 = beeper function disable 1 = beeper function enable 2 = force beeper alarm 3 = beeper alarm off	BEEP0 BEEP1 BEEP2 BEEP3
VDD	0 = digital output off 3 = digital output 3.3V 5 = digital output 5V	VDD0 VDD3 VDD5
LOWA	0 = CC output compensated off 1 = CC output compensated on	LOWA0 LOWA1

1 YEAR
WARRANTY



User's Guide



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MANCHESTER, UK

PSU305

Power Supply

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1. GENERAL INFORMATION

1.1 Introduction

This section contains a general description of your power supply as well as its performance specifications. Information about options and accessories are also provided.

The PSU305 series has been designed and tested according to EN-61010-1, Safety requirement for Electronic Measuring Apparatus.

1.2 Safety Considerations

SAFETY PRECAUTIONS

SAFETY NOTES

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. The manufacturer assumes no liability for the customer's failure to comply with these requirements.

BEFORE APPLYING POWER :

Verify that the power supply is set to match the available line voltage and the correct fuse is installed.

GROUND THE INSTRUMENT

This product is provided with a protective earth terminal. To minimize shock hazard, the instrument chassis and cabinet must be connected to an electrical ground. The instrument must be connected to the AC power supply mains through a three-conductor power cable, with the third wire firmly connected to an electrical ground (safety ground) at the power outlet. For instruments designed to be hard-wired to the AC power lines (supply mains), connect the protective earth terminal to a protective conductor before any other connection is made. Any interruption of the protective (grounding) conductor or disconnection of the protective earth terminal will cause a potential shock hazard that could result in personal injury. If the instrument is to be energized via an external autotransformer for voltage reduction, be certain that the autotransformer common terminal is connected to the neutral (earthed pole) of the AC power lines (supply mains).

The RS232 (option) Ground is connected with chassis ground, and therefore the operator must take care if the computer is also connected with other measuring devices prevent a short cut.

FUSES

Only fuses with the required rated current, voltage, and specified type (normal blow, time delay, etc.) should be used. Do not use repaired fuses or short circuited fuseholders. To do so could cause a shock or fire hazard.

DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE

Do not operate the instrument in the presence of flammable gases or fumes.

KEEP AWAY FROM LIVE CIRCUITS

Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made by qualified service personnel. Do not replace components with power cable connected.

Under certain conditions, dangerous voltages may exist even with power cable removed. To avoid injuries, always disconnect power, discharge circuits and remove external voltage sources before touching components.

DO NOT SERVICE OR ADJUST ALONE

Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.

DO NOT EXCEED INPUT RATINGS

This instrument must be connected to a properly grounded receptacle to minimize electric shock hazard. Operate at line voltages or frequencies in excess of those stated on the data plate may cause leakage currents in excess of 5.0mA peak.

SAFETY SYMBOLS

WARNING

The WARNING sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in personal injury. Do not proceed beyond a WARNING sign until the indicated conditions are fully understood and met.

CAUTION



The CAUTION sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product. Do not proceed beyond a CAUTION sign until the indicated conditions are fully understood and met.



Chassis ground symbol



Protective Conductor terminal



Caution, risk of electric shock

DO NOT SUBSTITUTE PARTS OR MODIFY INSTRUMENT

Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification to the instrument. Return the instrument to a qualified dealers for service and repair to ensure that safety features are maintained.

INSTRUMENTS WHICH APPEAR DAMAGED OR DEFECTIVE SHOULD BE MADE INOPERATIVE AND SECURED AGAINST UNINTENDED OPERATION UNTIL THEY CAN BE REPAIRED BY QUALIFIED SERVICE PERSONNEL.

1.3 Options

Options 01 determine which line voltage is set at the factory. This information is on the rear panel label.

Option 01: 230 (240) Vac AC Input

Option 02: Rack mount Shelf

1.4 Accessories

Power cable

Operation manual

Fuse

1.5 Output Isolation

The output of the power supply is isolated from earth ground. Either output terminal may be grounded or the output may floated up to +/- 240 Vdc (including output voltage) from chassis ground

1.6 Specifications

TRIPLE OUTPUT LINEAR POWER SUPPLY UP TO 165 WATTS

Model	PSU305	
MAX. OUTPUT POWER	165 WATTS	
OUTPUT VOLTAGE		
Output Voltage	0 to +30V / 0 to -30V	Fixed 3.3V / 5V
Setting Resolution	10mV	
Max. output voltage	+32V / -32V	
Dual tracking	0 to ±30V	
Tracking deviation	±20mV	
OUTPUT CURRENT		
Output Current	0 to +2.5A / 0 to -2.5A	3A
Setting Resolution	1mA	
Max. output current	+3A / -3A	Current limited approx. 3.3A
Dual tracking	0 to ±2.5A	
Tracking deviation	±5mA	
CONSTANT VOLTAGE CHARACTERISTICS (at rated output)		
Line regulation(for change of AC ±10%)	1mV	5mV
Load regulation(for load change 0 100%)	2mV	10mV
Ripple/Noise rms (10Hz to 20MHz)	1.5mVrms	2mVrms

Ripple/Noise peak (10Hz to 20MHz)	10mVp-p	20mVp-p
Transient Response	200μs Typical	
Temperature Coefficient	100ppm / °C Typical	
CONSTANT CURRENT CHARACTERISTICS (at rated output : ±2.5A)		
Line regulation (for change of AC ±10%)	15mA Typical	
Load regulation (for change from short to full load)	10mA Typical	
Ripple/Noise rms (10Hz to 20MHz)	1mA _{rms} Typical	
Ripple peak (p-p)(10Hz to 20MHz)	5mA _{p-p} Typical	
Temperature Coefficient	200 ppm / °C Typical	
Display	2×16 LCD with backlit; Front Panel Status Annunciators with beeper	
Voltage Accuracy	±(0.2% of rdg +2 digits)	± 2%
Current Accuracy	±(0.5% of rdg +5 digits)	
Common Mode Voltage	±240Vdc	
Temperature ranges	Operating: 0°C to 40°C, less than 80% RH; Storage: -40°C to 70°C, less than 80% RH	
Dimensions (W × H × L)	8.4" × 5.2" × 15.7"	
Weight	Approx. 18 lbs	
Cooling	Fan Cooled	
Power Source	AC 115V ± 10% OR 230V ± 10%, 47 to 63Hz	
Current Consumption	2.88A / AC 115V or 1.48A / AC 230V	
Fuse Rating	5AT / 250V for AC 115V, 2.5AT / 250V or AC 230V	
Options	Opt 01 [230 (240) Vac; factory-installable only]	
Accessories	User's manual, power cord, fuse	

*For output less than 5% of rated output, add 5 digits to the accuracy specification

RS232 Interface capabilities:

1. RS232C DCE interface: 9-pin D-SUB connector.
2. Port configuration: asynchronous 2400 baud, 8 data bits, 1 stop bits, no parity.

2. INSTALLATION

2.1 Introduction

This section contains instructions for checking and mounting your power supply and connection your power supply to AC power.

The power supply generates operating magnetic which may affect the operation other instruments. If your instrument is susceptible to operating magnetic fields, position it more than three inches from the power supply.

2.2 Initial inspection

Your supply was thoroughly inspected and tested before shipment. As soon as you receive it, remove it from its packaging case and check to make sure it has not been damaged during shipment. Check that there are no broken connectors or keys and that the cabinet and panel surfaces are free from dents and scratches.

2.3 Location and cooling

Your power supply can operate without sacrificed performance within the temperature range of 0 to 40 °C (measured at the fan intake). The fan, located at the rear of the unit, cools the supply by drawing air in through the openings on the sides and exhausting it through the opening on the rear panel. Since the power supply is fan cooled, it must be installed in a location that allows sufficient clearance of 1 inch (25mm) is required on all sides for proper ventilation.

2.4 Input power requirements

You can operate this power supply from a nominal 115V or 230(240) Vac single phase power source at 47 to 63Hz. You can check the line voltage setting of your supply by examining the label on the rear panel.

2.5 Line fuse

You can operate this located behind the fuseholder on the QC input socket. To access the fuse, remove the power cord and pull out the fuseholder on the AC input socket. The current rating of the fuse is based on the line voltage setting of your supply.

3. GETTING STARTED

3.1 Front panel controls and output terminals

Note : most soft keys have two functions. The first function of the key is function entry (i.e. + Vset, -Iset, Tracking etc.)The second function for the soft keys is data entry (ji. E. 0~9).

REFER TO THE FIGURE A.

- | | |
|------------------|---|
| (1) LCD display | : Displays alphanumeric information with status annunciators. A detailed listing of descriptions is presented in section 3.2. |
| (2) Power on/off | : Powers on the unit. |
| (3) + Vset(7) | : + output control key used to display or alter the present voltage setting. Numeric entry key for number seven. |
| (4) + Iset (8) | : + output control key used to display or alter the present voltage setting. Numeric entry key for number seven. |
| (5) + ▲ (up) (9) | : + output control key used to increase the voltage settings when the supply is in the CV mode or the current settings when the supply is in the CC mode. It will change voltage or current by 10mV, or 1mA respectively. If the key is pressed and held, it will continually increase the setting until it is released. Numeric entry key for number nine, |
| (6) + ▼ (down) | : + output control key used to decrease the voltage settings when the supply is in the CV mode or the current settings when the supply is in the CC mode by 10mV or 1mA per step. If the key is pressed and held, it will continually decrease the setting until it is released, |
| (7) - Vset (4) | : - output control key used to display or alter the present voltage setting. Numeric entry key for number four. |
| (8) - Iset (5) | : - output control key used to display or alter the present voltage setting. Numeric entry key for number five. |
| (9) - ▲ (up) (6) | : - output control key. The function is as same as positive channel. Numeric entry key for number six. |
| (10) - ▼ (down) | : - output control key. The function is as same as positive channel. |
| (11) TRACK(1) | : Mode control key which toggles the tracking mode on or off. |
| (12) "0" | : Numeric entry key for zero. |
| (13) 5V/3.3V(2) | : 5V or 3.3V output selecting key. Numeric entry key for number two. |
| (14) "." | : 5V or 3.3V output control key which toggles the output on or off. Decimal |

point key.

- (15) Beep (3) : Beeper control key which toggle the beeper on or off.
Numeric entry key for number three.
- (16) Enter : Enter the values on the display for the specified function and return the display to output-off mode or metering mode.
- (17) Clear : Used in conjunction with the numeric entry keys to clear partially set commands.
Also returns unit to the previous mode.
- (18) \pm output(on/off) : mode control key which toggles the \pm output on or off simultaneously.
- (19) output terminal (RED) : This terminal is used to output +30V/+2.5A with respect to the COM1 terminal.
- (20) COM1 Terminal(BLACK) : The common terminal which is used for +30V/+2.5A output.
- (21) – output Terminal(WHITE) : This terminal is used to output +30V/+2.5A with respect to the COM1 terminal.
- (22) GDN Terminal (GREEN) : This ground(earth) terminal is connected to the main chassis.
- (23) COM2 Terminal(BLUE) : The common terminal which is used for 5V/3A or 3.3V/3A output.
- (24) 5V/3.3V Terminal)RED) : This terminal is used to output 5V/3A or 3.3V/3A with respect to the COM2 terminal.

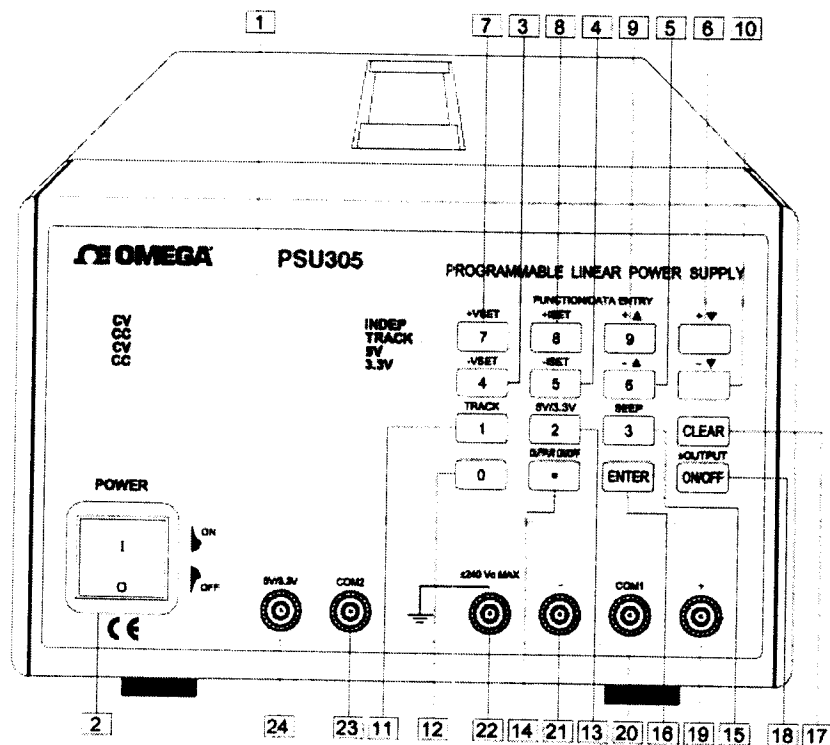
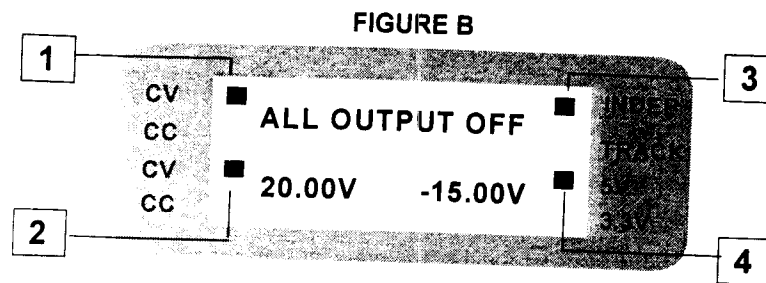


FIGURE A

3.2 LCD display message



STATUS ANNUNCIATORS

- Position 1: Indicator of CV mode or CC mode of + output (positive).
It will flash when the output is enabled.
- Position 2: Indicator of CV mode or CC mode of - output (negative).
It will flash when the output is enabled.
- Position 3: Indicator of the independent mode or tracking mode.
Flashing cursor implies the unit is working normally.
- Position 4: Indicator of the selected output 5V or 3.3V.
It will flash when the output is on.

ALPHANUMERIC LCD DISPLAY

Normally LCD panel displays the preset or measured output voltage and current for both channels. When operating at the front panel, the programmed functions (e.g. + Vset, - Iset...etc), and The preset values (e.g. + Vset = 10.00V) will be displayed. Error conditions are also displayed on the LCD panel.

3.3 Rear panel

REFER TO FIGURE C.

- (1) Input AC socket : AC receptacle for power cord
- (2) Fuseholder : Fuseholder for line fuse
- (3) RS-232C interface : 9-pin female DCE interface
- (4) Label : Indicator of input power requirements and fuse rating.

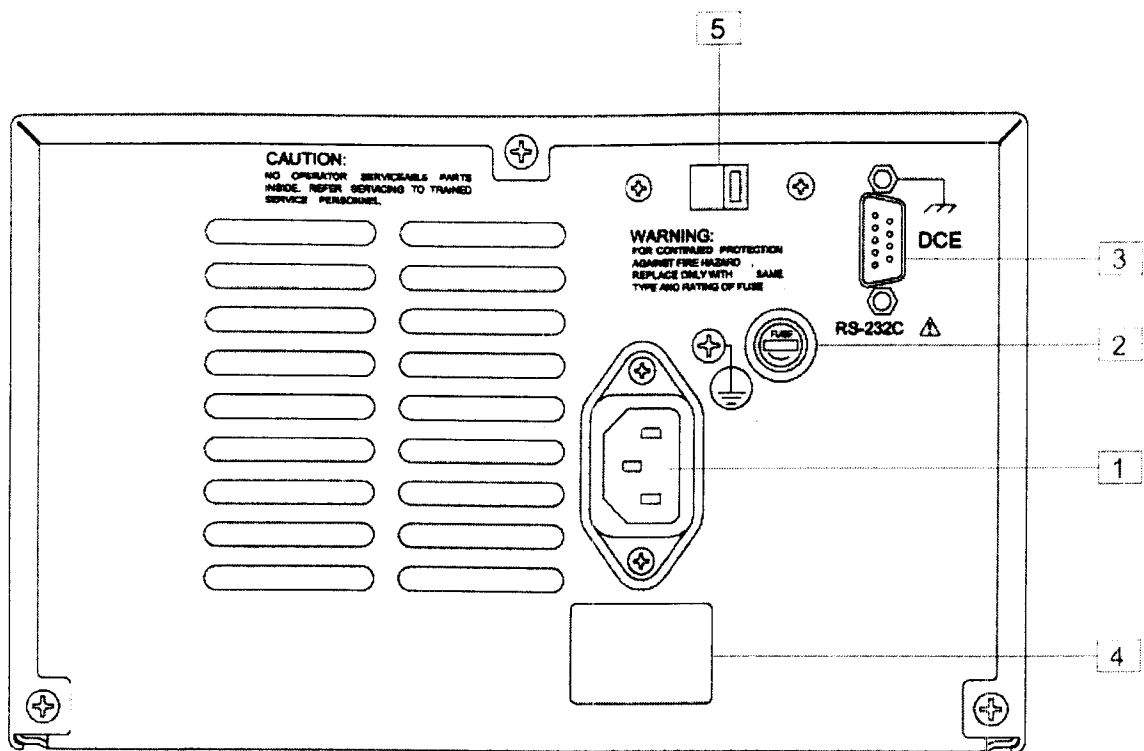


FIGURE C

4. OPERATION

4.1 Initial conditions

When AC voltage is applied, the power supply undergoes a self-test and disables all outputs by default. The display will show an "ALL OUTPUT OFF " message along with the + Vset and – Vest values as shown in Figure 4.1.

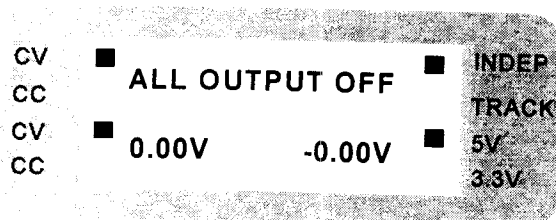


FIGURE 4.1

4.2 Control of output functions

The power supply will accept programming values directly in volts or amps. All input values will be rounded-off to the nearest multiple of the resolution (typically 10mV or 1mA) for that particular output. If the programming value is outside the valid range, an "INPUT REEOE" message will be displayed on the LCD for one second and the power supply will return to the previous set value.

When you press the +Vset, +Iset, -Vset, -Iset, the output selected (+output or –output) and the present setting for that function will be displayed. You can change setting using the numeric entry keys. Pressing the number keys will cause the present numeric setting to become blank and be replaced with the new numbers on the display. You can use the CLEAR key to erase previous keystrokes if you make a mistake. Pressing the ENTER key will enter the values displayed for the function indicated, initiate that function, and return the display to the output off mode or to the metering mode (output on) in which the measured numbers will result in retention of the previous values and return to the previous mode. You can also return to the previous mode at anytime by pressing the CLEAR key.

The up/down arrow keys for each output are used to change voltage and current and current setting when the power supply is in the CV mode and in the CC mode respectively.

NOTE

The up/down keys change the LSB of the voltage or current (typically 10mV or 1mA) each time they are pressed. If the key is held down for more than 1 second, the power supply will automatically step up/ down until the key is released. The up/down step rate will increase if the key is held down for more than 2 seconds.

The up/down step function can only be used when the power supply is in the metering mode. The function is disabled when the power supply is in the programming mode (i.e. when + Vset, +Iset, - Vset, -Iset or -Iset, is pressed).

The power supply can be programmed by the numeric entry keys or the up/down step function even when the selected output is disabled.

4.3 Enabling/Disabling the output

The selected output channel can be turned on and off from the front panel. The output on/off key toggles both the +output and –output on and off simultaneously. The “.” key toggles the 5V or 3.3V output on and off. An output disabled by the output on/off key will behave as if it were programmed to zero volts.

4.4 Overload protection of 5V or 3.3V output

When the 5V or 3.3V output current is approximately 20 percent above the current output rating or if the output is shorted, the overload protection circuit will be activated and the output will be disabled. To reset the output, first clear the condition that caused the overload then press the “.” (on/off) key to enable the output to its previous state.

5. OUTPUT CONNECTIONS (APPLICATIONS)

5.1 Serial output

If the load is connected between the positive and negative output terminals, the unit becomes a power source which can supply twice as much voltage as the rated output voltage.

PLEASE REFER TO FIGURE D.

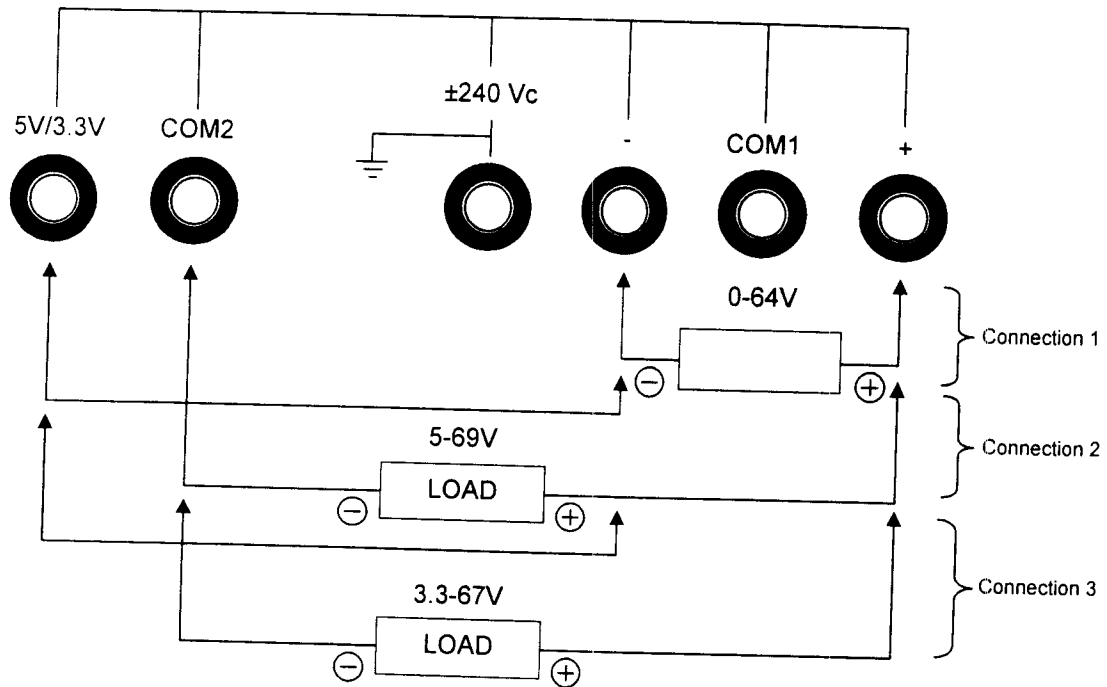


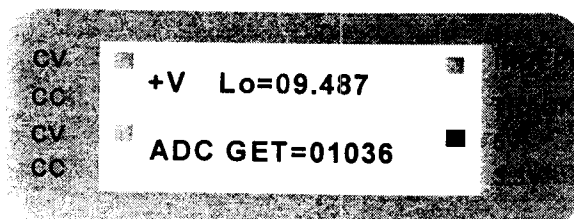
FIGURE D

6. CALIBRATION

Calibration steps:

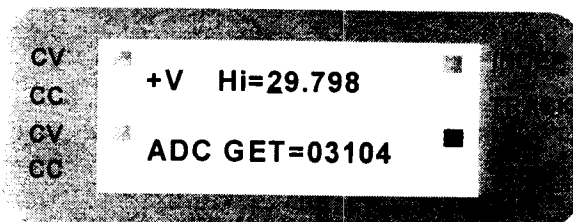
Equipment needed for calibration: DMM, such as HHM290.

Step 1: Simultaneously press the "8" and the " -▼ " keys on the Keypad and the following message will Appear on the LCD:

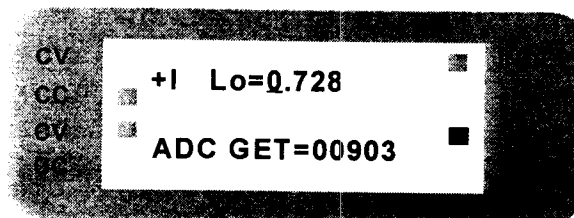


Step 2: Measure the DC voltage from the +output terminals (+ and COM1) with the DMM and key in the measured value (i.e. if the DMM shows 9.487V then key in 9.487) followed by the "ENTER" key.

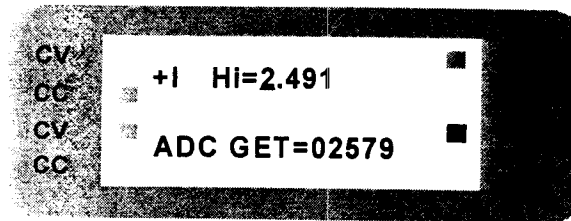
The following message will then appear on the LCD:



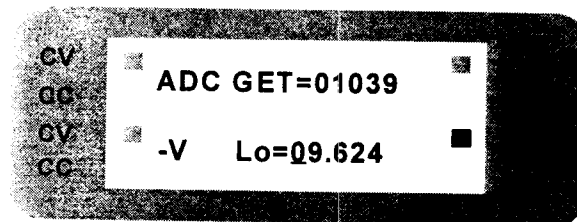
Step 3: Repeat step 2. Key in the measured value (i.e. if the DMM shows 29.798V then key in 29.798) followed by the " ENTER " key. The following message will then appear on the LCD.



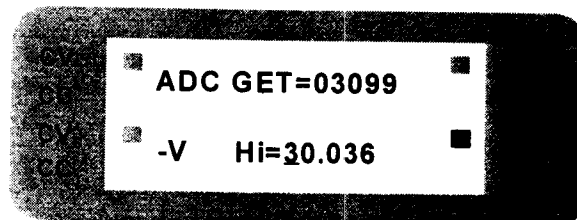
Step 4: Measure the DC current from +out terminals (+ and COM1) with the DMM and keyin the value (i.e. if the DMM shows 0.728A, then keyin 0.728) followed by the "ENTER" key. The following message will then appear on the LCD:



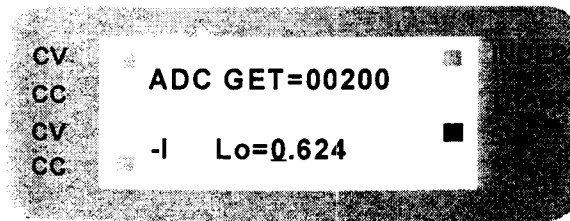
Step 5: Repeat step 4. Keyin the measured value (i.e. if the DMM shows 2.491A then keyin 2.491) followed by the "ENTER" key. The following message will then appear on the LCD:



Step 6: Measure the DC voltage from –output terminals (- and COM1) with the DMM and keyin the measured value (i.e. if the DMM shows 9.624V then keyin 9.624) followed by the "ENTER" key.
The following message will then appear on the

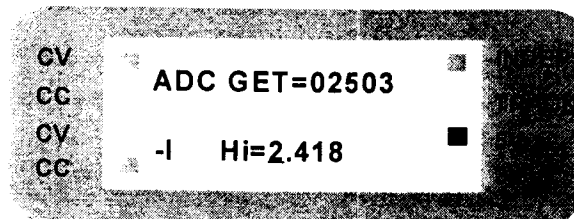


Step 7: Repeat step 6. Keyin the measured value (i.e. if the DMM shows 30.036V, then keyin 30.036) followed by the "ENTER" key. The following message will then appear on the LCD:

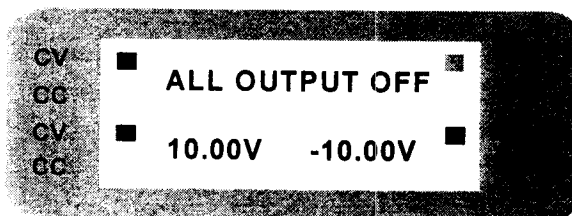
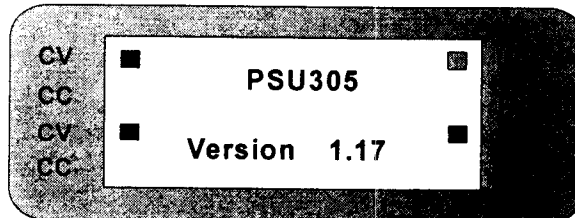


Step 8: Measure the DC current from –output terminals (- and COM) with the DMM and keyin the measured value (i.e. if the DMM shows 0.642A then keyin 0.642) followed by the “ENTER” key.

The following message will then appear on the LCD:



Step 9: Repeat step 8. Keyin the measured value (i.e. if the DMM shows 2.418A, then keyin 2.418) followed by the “ENTER” key. The following message will then appear on the LCD :



7. USER MAINTENANCE/SERVICE

7.1 Fuse Replacement

If the fuse is suspected of being defective, it should be inspected and, if necessary, replaced. To inspect or replace the fuse, please perform the following steps:

- (1) Disconnect the AC line cord from the unit to reduce electrical shock hazard.
- (2) Remove the fuse by sliding out the fuse holder. The fuseholder is beneath the AC Receptacle. Test the fuse for electrical continuity with an ohmmeter.
- (3) If the fuse is found to be defective, replace it with a replacement fuse as specified in the label on the rear panel.
- (4) Replace the fuse in the fuseholder and re-install.
- (5) Reconnect the AC power cord.

NOTE: USE OF ANY FUSE OTHER THAN THE ONE SPECIFIED MAY CAUSE DAMAGE TO THE UNIT, POSE A SEVERE FIRE HAZARD, AND WILL VOID THE WARRANTY.

7.2 In Case of Difficulties

This programmable power supply has been designed to be accurate, reliable, and easy-to-use. If you experience any difficulties during the use of the unit, please perform the following steps.

- (1) Re-read the operation instructions, It is very easy to inadvertently make mistakes in operation procedures.
- (2) Remove and test the fuse. The power supply will not function with an open fuse.

If the preceding two steps fail to resolve the problem.

NOTE: ATTEMPTED REPAIR, MODIFICATIONS, OR TAMPERING BY UNAUTHORIZED PERSONNEL WILL VOID THE WARRANTY.

7.3 Using the RS-232-C Serial Interface

This section describes how to set up the RS-232-C interface for remote control.

The interface of PSU305 are designed in accordance with EIA (Electronic Industries Association) standard RS-232-C. Through its interface be TPT-3025 be remotely controlled and transmit its internal data to a host computer.

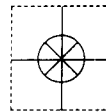
Command	Description	Example
VSET	Voltage setup	VSET1 12.345
VOUT	Voltage readback	VOUT2
ISET	Current setup	ISET2 1.23
IOUT	Current readback	IOUT1
OUT1	0=+/- output off 1=+/- output on	OUT0 OUT1
TRACK	0=independent 1=tracking from ch1 2=tracking from ch2	TRACK0 TRACK1 TRACK1
STATUS	Working status(see note7)	STATUS
CAL1	0=end calibration 1=end calibration 2=end calibration	CALI0 CALI1 CALI2 9.574
MODEL	Display model no.	MODEL
VERSION	Display version no.	VERSION

HELP	Display command list	HELP
BEEP	0=beeper function disable	BEEP0
	1=beeper function disable	BEEP1
	2=force beeper alarm	BEEP2
	3=beeper alarm off	BEEP3
VDD	0=digital output off	VDD0
	3=digital output 3.3V	VDD3
	5=digital output 5v	VDD5
LOWA	0=CC output compensated off	LOWA0
	1=CC output compensated on	LOWA1

NOTE:

1. All RS232 commands are case-nonsensitivity ASCII codes.
2. Use async framing 8 data bits, no parity bit, 1 stop bit.
3. Bit rate=2400bps.
4. Every command string is terminated by CR or LF or BOTH (carriage return)
5. There is one command allowable in a command string.
6. A command string enters before "OK" prompt will be reject & no function.
7. STATUS operation explanation:
After a PSU305 accept A "STATUS" command, it will display a decimal number in ASCII. Convert this decimal number to binary form each bit indicate a action/status:

Bit 0:	channel 1	0=CV 1=CC
Bit 1:	channel 2	0=CV 1=CC
Bit 3,2:	00:independent 10:tracking to channel 1 11:tracking to channel 2	
Bit 4:	0:digital output off	
Bit 5:	0:digital output 5V 1:digital output 3.3V	
Bit 6:	0:output off 1:output on	
Bit 7:	0:nothing 1:digital output overload	
Bit 8:	0:fan off 1:fan on	
Bit 9:	0:beeper function disable 1:beeper function enable	
Bit 10:	0=CC output compensated off 1:CC output compensated on	



User's Guide



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ISO 9002
CERTIFIED
CORPORATE QUALITY

MANCHESTER, UK

PSU505 Programmable DC Power Supply

※※※ 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 PSU505 is a triple outputs and programming DC power supply. PSU505 comes with 12 bits resolution. Total 210W 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 0~30V/3A outputs are required to output in serial or parallel mode. Tracking function is convenient and changeable for users in circuit application. PSU505 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, PSU505 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, PSU505 provides voltage and current measurement. Users can reduce the measurement equipment budget and space.

4. **Memory and timer function:**

PSU505 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. PSU505 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 60V 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, PSU505 will output the same voltage/current at CH2. This is convenient to test two samples at the same time.

2. Specification

Model	PSU505	
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% (47Hz ~ 63Hz)
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

PSU505 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 -20°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.

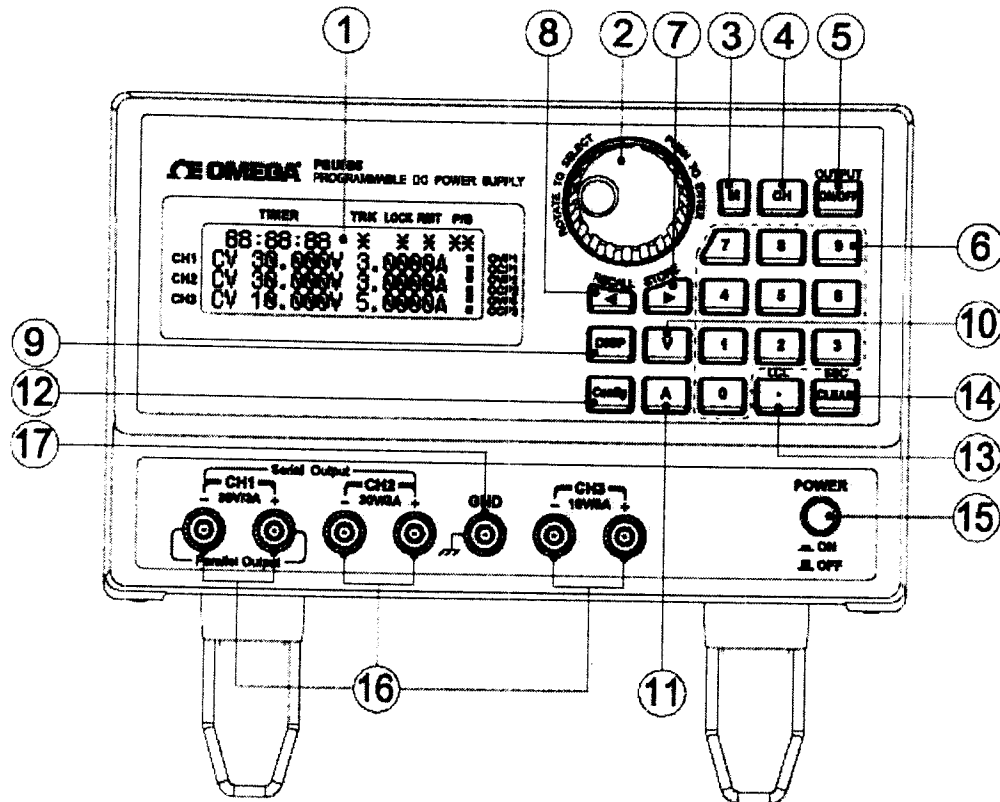
3.8 End Test

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

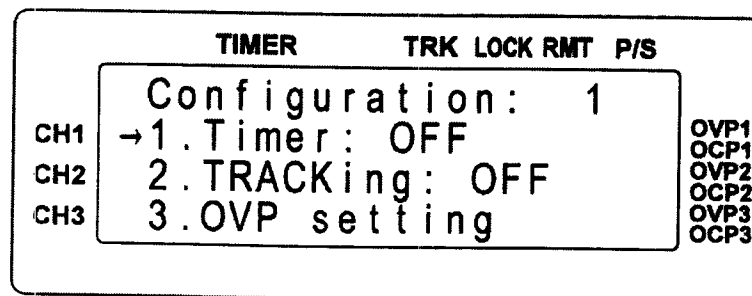
4.1 PSU505 Panel Description

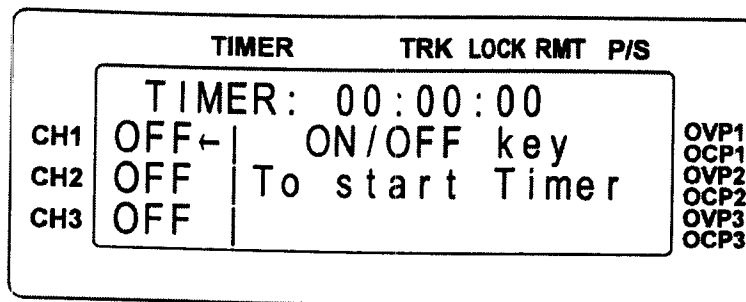
4.1.1 Front Panel Description



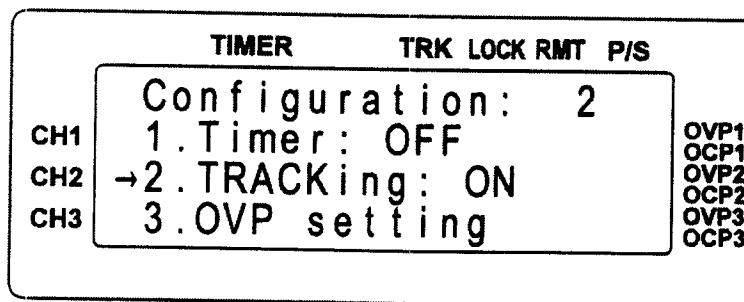
- (1) Display:
Display is a 20x4 yellow green backlight LCD
- (2) Rotary(ENTER):
Rotary can adjust voltage and current. Users can press it as ENTER function.
- (3) M:
Press M key to memory configuration display. Users can select which setting to store and recall by pressing STORE and RECALL key.
- (4)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

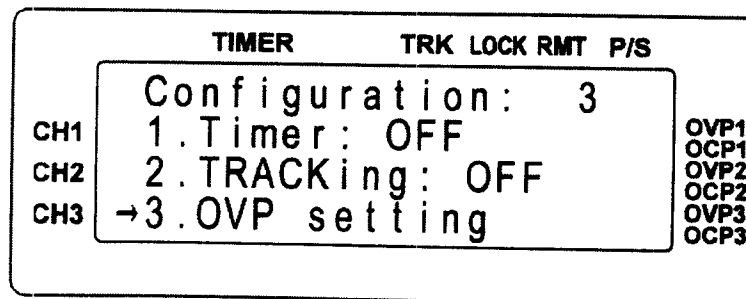




- A. Using rotary or ◀▶ to move the cursor onto the digit and input the number. Timer: 00:00:00 (HH:MM:SS)
 - B. Switching CH1/CH2/CH3 by press CH key. Then press rotary to switch ON/OFF
 - C. Start Timer when press ON/OFF key
 - D. Press rotary + CLEAR to pause the timer. Restart by repeating the same 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	OCP1
CH3	OFF	10.00V		5.000A	OVP2
					OCP2
					OVP3
					OCP3

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			OCP1
CH3	6	.Interface:RS-232			OVP2
					OCP2
					OVP3
					OCP3

	TIMER	TRK	LOCK	RMT	P/S
	OCP setting:				
CH1	OFF	→30.00V		3.000A	OVP1
CH2	OFF	30.00V		3.000A	OCP1
CH3	OFF	10.00V		5.000A	OVP2
					OCP2
					OVP3
					OCP3

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			OCP1
CH3	6	.Interface:RS-232			OVP2
					OCP2
					OVP3
					OCP3

6. Interface: Transmission interface. Users can select RS232, USB, GPIB (only PPS 3210 Optional), LAN Port (only PPS 3210

Optional) by using rotary.

	TIMER	TRK	LOCK	RMT	P/S
	Configuration: 6				
CH1	4.OCP setting				
CH2	5.Baud rate:38400				
CH3	→6.Interface:RS-232				
					OVP1 OCP1 OVP2 OCP2 OVP3 OCP3

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.

	TIMER	TRK	LOCK	RMT	P/S
	Configuration: 7				
CH1	→7.DHCP: ON				
CH2	8.IP170. 85.170. 81				
CH3	9.BEEP: ON				
					OVP1 OCP1 OVP2 OCP2 OVP3 OCP3

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

	TIMER	TRK	LOCK	RMT	P/S
	Configuration: 8				
CH1	7.DHCP: ON				
CH2	→8.IP170. 85.170. 81				
CH3	9.BEEP: ON				
					OVP1 OCP1 OVP2 OCP2 OVP3 OCP3

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

	TIMER	TRK	LOCK	RMT	P/S
	Configuration: 9				
CH1	7.DHCP: ON				
CH2	8.IP170. 85.170. 81				
CH3	→9.BEEP: ON				
					OVP1 OCP1 OVP2 OCP2 OVP3 OCP3

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.

	TIMER	TRK	LOCK	RMT	P/S
	Configuration: 10				
CH1	→10.Key lock:OFF				
CH2	11.Parallel out:OFF				
CH3	12.Serial out: OFF				
					OVP1 OCP1 OVP2 OCP2 OVP3 OCP3

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.

	TIMER	TRK	LOCK	RMT	P/S
	Configuration: 11				
CH1	10.Key lock:OFF				
CH2	→11.Parallel out:OFF				
CH3	12.Serial out: OFF				
					OVP1 OCP1 OVP2 OCP2 OVP3 OCP3

12. Serial out: Serial output. The initial value is OFF. Press rotary to turn on serial output. The total output voltage is 60V because the CH1 and CH2 are connected serialized.

	TIMER	TRK	LOCK	RMT	P/S
	Configuration: 12				
CH1	10.Key lock:OFF				
CH2	11.Parallel out:OFF				
CH3	→12.Serial out: OFF				
					OVP1 OCP1 OVP2 OCP2 OVP3 OCP3

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

	TIMER	TRK	LOCK	RMT	P/S
	Configuration: 13				
CH1	→13.Address: 0				
CH2	14.Hot Key: OFF				
CH3	15.Initial Mode:OFF				
					OVP1 OCP1 OVP2 OCP2 OVP3 OCP3

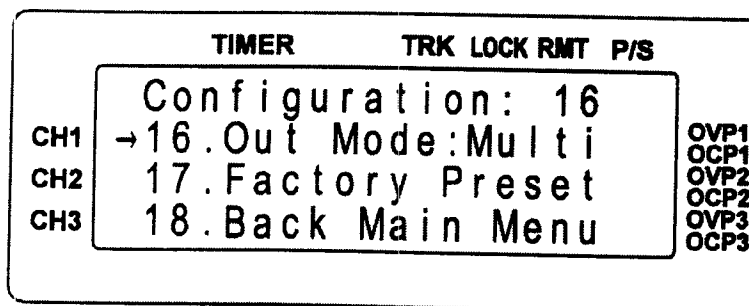
- 14.Hot Key: Express function key. The initial value is OFF. Press rotary to turn on hot key. The users can recall the correspondent settings from the memory via input 0~9.

	TIMER	TRK	LOCK	RMT	P/S
	Configuration: 14				
CH1	13.Address: 0				
CH2	→14.Hot Key: OFF				
CH3	15.Initial Mode:OFF				
					OVP1 OCP1 OVP2 OCP2 OVP3 OCP3

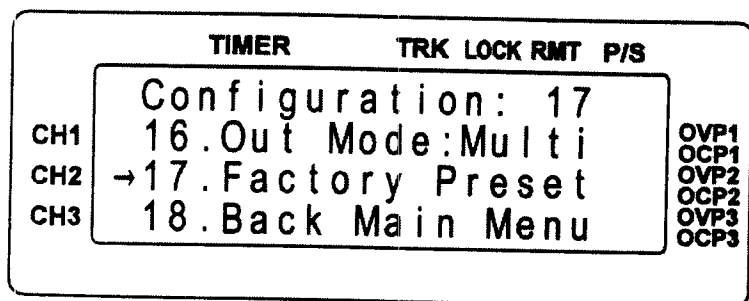
- 15.Initial Mode: Memorize the settings before the instrument shutdown. The initial value is OFF. Press rotary to turn on the function. When the function is enable, all setting will be saved before the instrument shutdown and recalled after the instrument power on.

	TIMER	TRK	LOCK	RMT	P/S
	Configuration: 15				
CH1	13.Address: 0				
CH2	14.Hot Key: OFF				
CH3	→15.Initial Mode:OFF				
					OVP1 OCP1 OVP2 OCP2 OVP3 OCP3

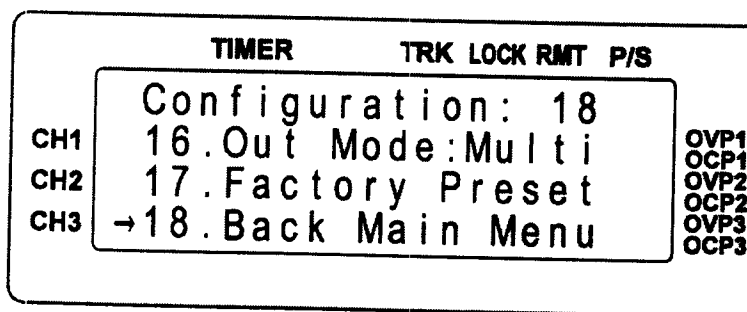
- 16.Out Mode: Output mode. The initial value is single. Press rotary to switch to multi mode. In the multi mode, CH1/CH2/CH3 output on or off will synchronize by press the ON/OFF key.



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:

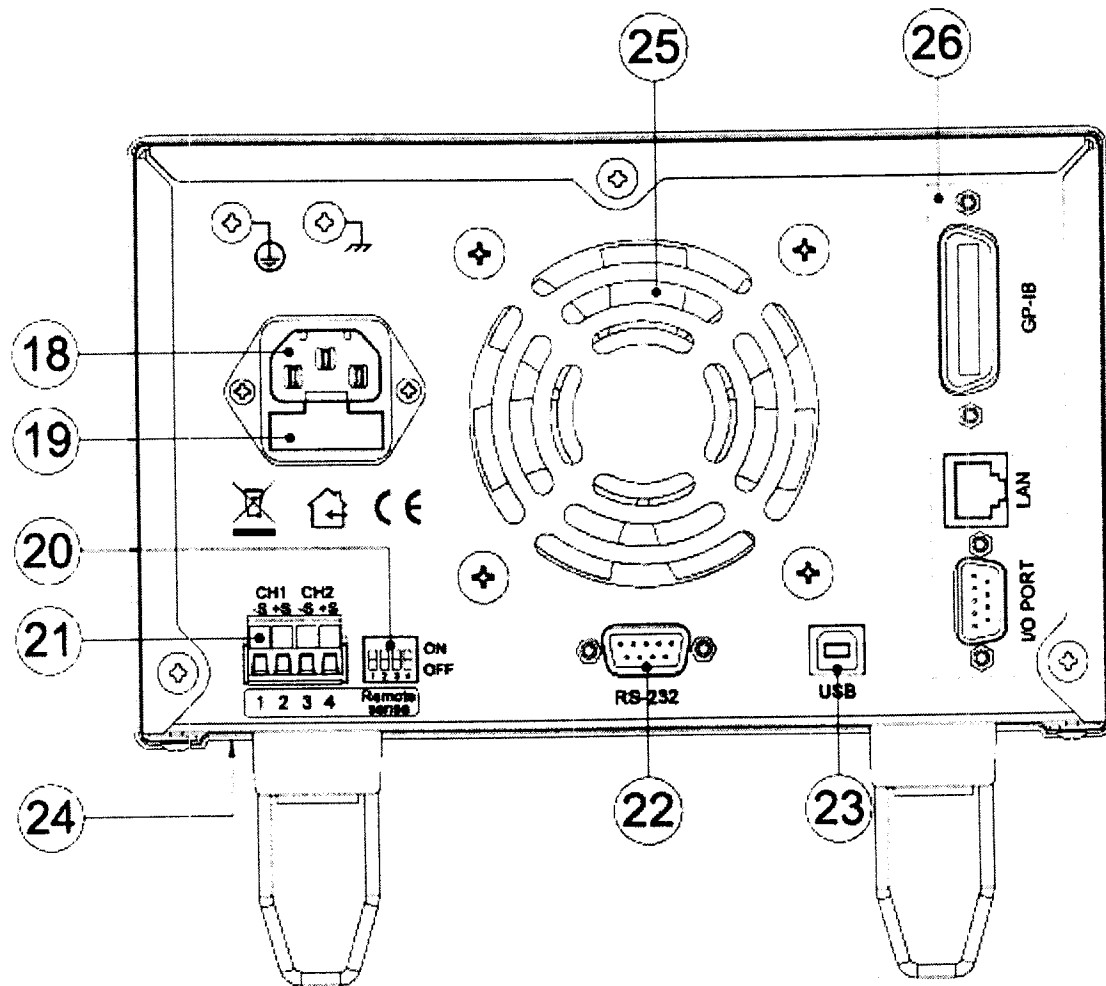
Please recognize the mark on front panel and notice the positive and

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: (only PPS 3210)

Panel Description

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: (only PPS 3210)

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: (only PPS 3210)

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	OC11
CH3	OFF	5.00V		3.000A	OVP2
					OC22
					OVP3
					OC33

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	OC11
CH3	OFF	5.00V		3.000A	OVP2
					OC22
					OVP3
					OC33

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. RS-232/USB Package Mode

Communication protocol includes OMEGA 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 rti
-039	Trigger error
-040	Trigger ignored
-041	Arrn ignored
-042	Init ignored
-043	Trigger deadlock
-044	Arrn 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 OMEGA PSU505 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

IOOUT2[?]	channel 2 current readback
IOOUT3[?]	channel 3 current readback
ISSET[1]	channel 1 current setting
ISSET[1][?]	return channel 1 current setting
ISSET2	channel 2 current setting
ISSET2?	return channel 2 current setting
ISSET3	channel 3 current setting
ISSET3?	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)
OISSET[1]	set channel 1 overcurrent protect
OISSET[1]?	return channel 1 overcurrent value
OISSET2	set channel 2 overcurrent protect
OISSET2?	return channel 2 overcurrent value
OISSET3	set channel 3 overcurrent protect
OISSET3?	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
VOLTAGE:2	channel 2 voltage setting
VOLTAGE:2?	return channel 2 voltage setting
VOLTAGE:3	channel 3 voltage setting
VOLTAGE:3?	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>	==>	triger beep to on
BEEP off <NL>	==>	triger 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

==> input low scale current parameter

==> input high scale current parameter
and rember to EPROM.

Q4. How to exit calibration procedure?

CALI OFF <NL>

Q5. How to set voltage?

==> set channel 1 voltage to 10V

==> set channel 2 voltage to 5.123V

==> set channel 3 voltage to 3.3V

==> set channel 1 voltage to 35V is fail,
because out of range

Q6. How to read the voltage setting value?

==> return channel 1 voltage setting

```
==> return channel 2 voltage setting
```

Q7. How to set current?

==> set channel 1 current to 1.1A

==> set channel 2 current to 2.1A

==> set channel 3 current to 4.3022A

==> set channel 1 current to 250mA

Q8. How to read the current setting value?

==> return channel 1 current setting

==> return channel 2 current setting

Q9. How to read the voltage output value?

==> return channel 3 voltage output

==> return channel 1 voltage output

```
==> return channel 2 voltage output
```

```
==> return channel 1 voltage output
```

Q10. How to read the current output value?

==> return channel 3 current output

==> return channel 1 current output

```
==> 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	currсор shift left
:RIGHT	currсор 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 item
: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
:ISSET[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 eeprom 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:CURREN3? <NL> ==> read back current 3 result
 MEAS:2:CURREN? <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:CURR: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.
 ISET2:1.5 <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:CURRENT3: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.
OISSET2 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 :PSU505

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

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