

LPS-305
**LINEAR PROGRAMMABLE
POWER SUPPLY**

OPERATION MANUAL

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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.

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 product 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).

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 the 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. Operation 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 an operating procedure, 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.

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 and 02 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: RS-232 Input

option 03: Rack mount Shelf

1.4 Accessories

Power cable

Operator's 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	LPS-305	
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: ±30V)		
Line regulation (change in AC ±10%)	1mV	5mV
Load regulation (load change 0~100%)	2mV	10mV
Ripple/noise rms (10Hz to 20MHz)	1.5mVrms	2mVrms
Ripple peak (p-p) (10Hz to 20MHz)	10mVp-p	20mVp-p
Transient response	200µs Typical	
Temperature coefficient	100ppm/°C Typical	

CONSTANT CURRENT CHARACTERISTICS (at rated output: $\pm 2.5A$)		
Line regulation (change in AC $\pm 10\%$)	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/ $^{\circ}C$ Typical	
Display	2x16 backlit LCD Front panel status annunciators with beeper	
Voltage Accuracy	$\pm(0.2\%$ of rdg + 2digits)	$\pm 2\%$
Current Accuracy	$\pm(0.5\%$ of rdg + 5 digits)	
Common-mode voltage	$\pm 240Vdc$	
Temperature ratings	Operating: $0^{\circ}C$ to $40^{\circ}C$ (less than 80% RH) Storage: $-40^{\circ}C$ to $70^{\circ}C$ (less than 80% RH)	
Dimensions (WxHxL)	8.4" x 5.2" x 15.7"	
Weight	Approx. 18 lbs	
Cooling	Forced air	
Power 115Vac $\pm 10\%$	47 to 63 Hz / 4A / approx. 250 W	
Options	Opt. 01: [230(240)Vac; factory-installable only] Opt. 02: (field-installable RS-232)	
Accessories	Instruction manual, power cord, fuse	

RS232 Interface:

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 fields which may affect the operation of 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 openings on the rear panel.

Since the power supply is fan cooled, it must be installed in a location that allows sufficient clearance at the rear and the sides for adequate circulation of air. A minimum 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 63 Hz. You can check the line voltage setting of your supply by examining the label on the rear panel.

2.5 Line fuse

The AC line fuse is located behind the fuseholder on the AC 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 keys is function entry (i.e. +Vset, -Iset, Tracking etc.). The second function for the soft keys is data entry (i.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 current setting.
Numeric entry key for number eight.
- (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 current 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.
Numeric entry key for number one.
- (12). "0" : Numeric entry key for zero.
- (13). 5V/3.3V(2) : 5V or 3.3V output selection 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 \pm 30V/ \pm 2.5A output.
- (21). -output Terminal(WHITE) : This terminal is used to output -30V/-2.5A with respect to the COM1 terminal.
- (22). GND 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.

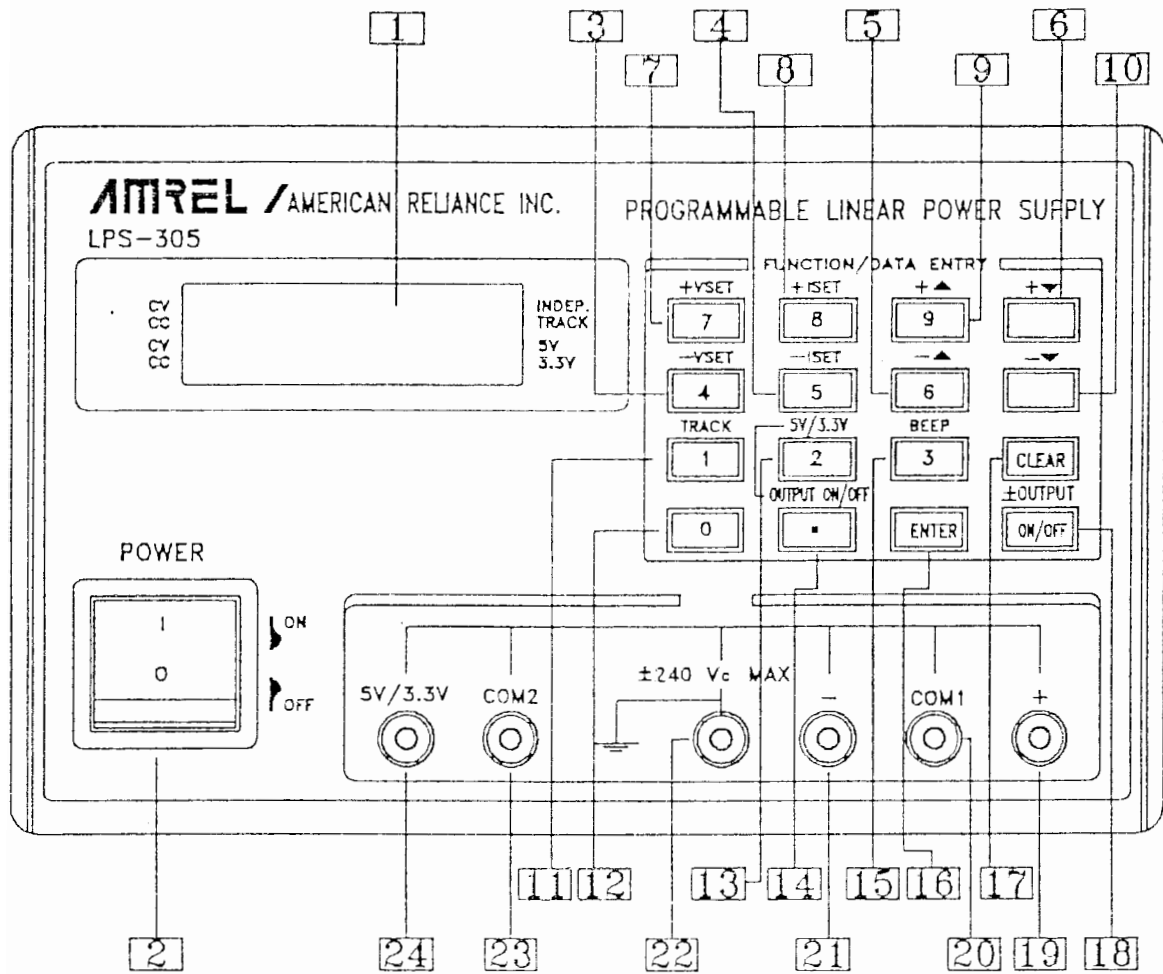


FIGURE A

3.2 LCD display message

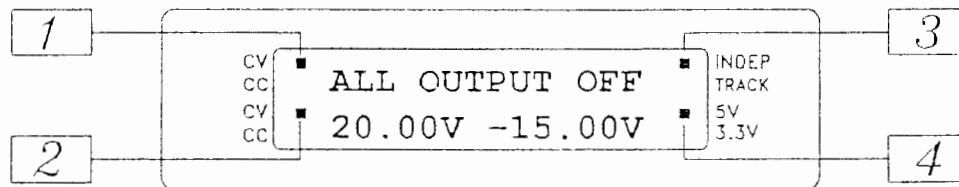


FIGURE B

STATUS ANNUNCIATORS

- | | |
|-------------|---|
| Position 1: | Indicates CV mode or CC mode for +output (positive). |
| Position 2: | Indicates CV mode or CC mode for -output (negative). |
| Position 3: | Indicates whether the supply is in independent mode or tracking mode. |
| Position 4: | Indicates 5V output or 3.3V output.
It will flash when the fixed output is on. |

ALPHANUMERIC LCD DISPLAY

Normally displays the preset or measured output voltage and current for both channels. When programmed from the front panel, the function being programmed (e.g. +Vset, -Iset, etc.), and the present value (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 (optional) | : 9 pin female DCE interface |
| (4). Label | : Indicator of input power requirements and fuse rating |

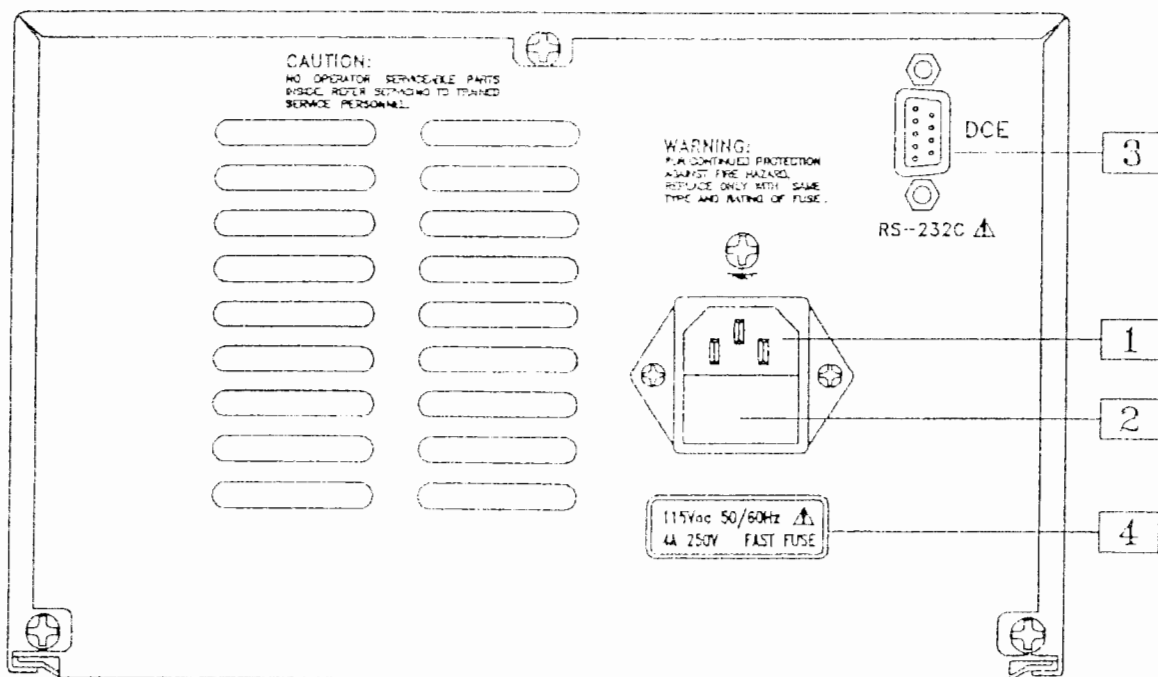


FIGURE C

4. OPERATION

4.1 Initial conditions

When the system is powered on, 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 -Vset values as shown in Figure 4.1.

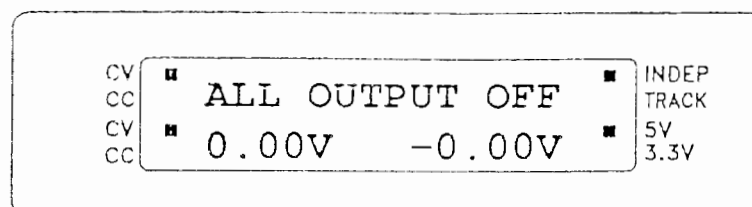


FIGURE 4.1

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 ERROR" 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 or -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 output voltage and current for the selected output are displayed. Pressing the ENTER key without entering 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 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 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 outputs

The selected output channel can be turned on and off from the front panel. The \pm 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.

4.5 Power limiting protection

In order to protect the power supply's transformer and heat sinks, the total current output of the two programmable channels is limited by firmware to a maximum of 5A. Whenever the total current output becomes greater than 5A, the power supply will automatically lower +Iset and -Iset setting values to bring the total current output back down to 5A.

4.6 Beeper

The internal beeper of the LPS is activated whenever the power supply switches from constant voltage (CV) mode to constant current (CC) mode or vice versa. The main application of this feature is to warn the user of changes in the load characteristics. For example, if the power supply is operating in CV mode and a short occurs in the load, the LPS will limit the current output to the ISET value, switch to CC mode, and the beeper will sound warning the user. Likewise if the power supply is operating in CC mode and an open occurs in the load, the LPS will limit the voltage output to the VSET value and switch to CV mode. One effect of this feature is that the power supply may beep occasionally when the voltage is ramped up or down, especially when the the ISET value is low ($< 0.5A$). This is part of the normal operations of the LPS-305. If the beeper function is not required, it can be turned off by pressing the BEEP ("3") key on the keypad or by sending a "BEEP0" command string over the RS-232 interface.

5. OUTPUT CONNECTIONS (APPLICATIONS)

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.

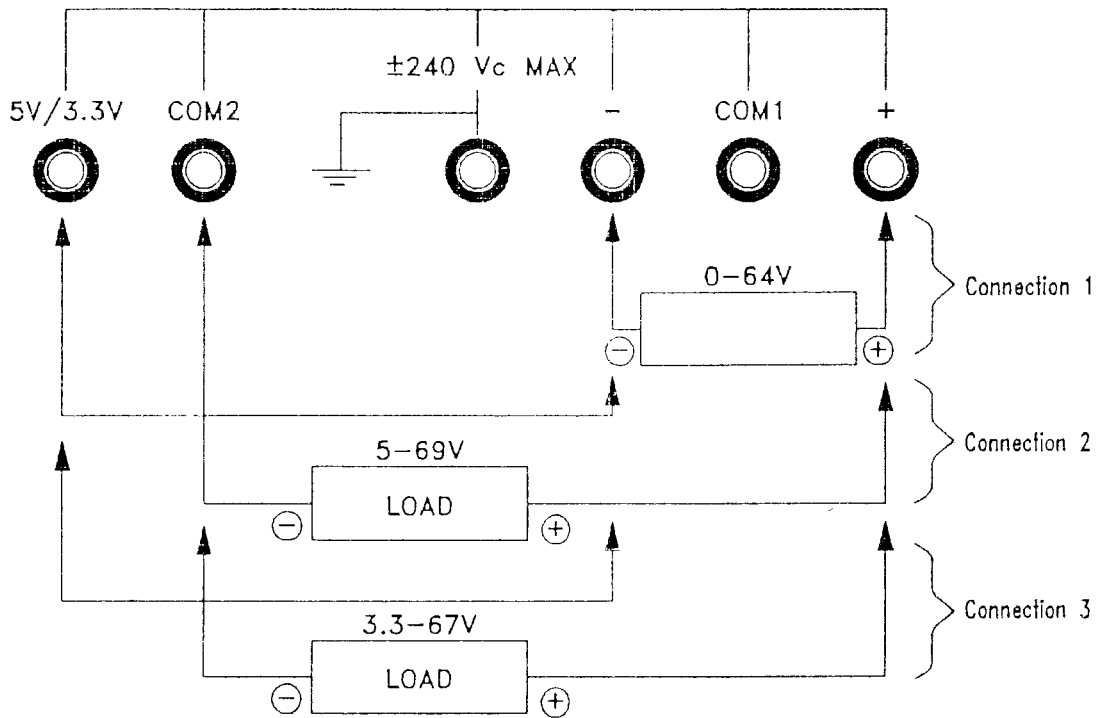


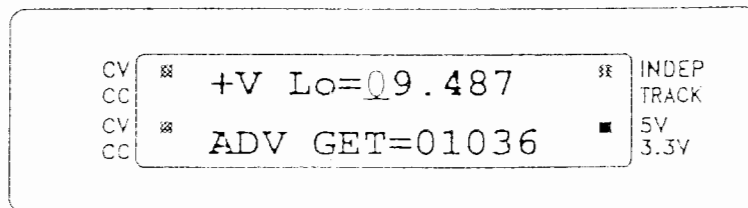
FIGURE D

6. CALIBRATION

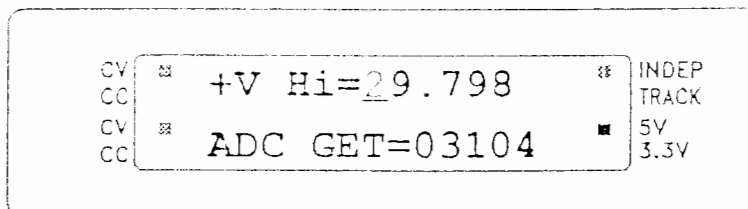
LPS-305's Calibration steps:

Equipment needed for calibration: DMM, such as Fluke model 45 or HP 3478A.

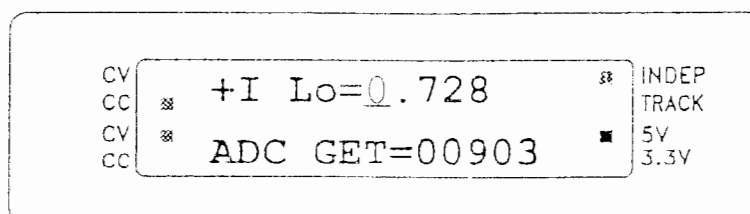
Step 1: Simultaneously press the "8" and the "▼" keys on the Keypad and the following message will appear on the LCD:



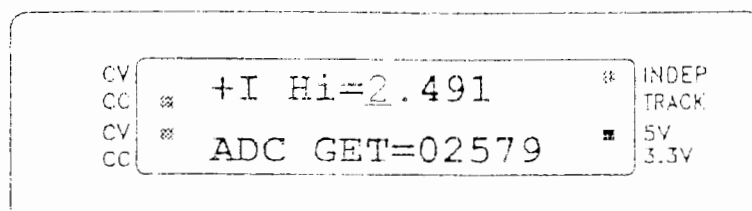
Step 2: Measure the DC voltage from the + output terminals (+ and COM1) with the DMM and key in the measured value (i.e. if the DMM shows 9.487V then key in 9.487) followed by the "ENTER" key. The following message will then appear on the LCD:



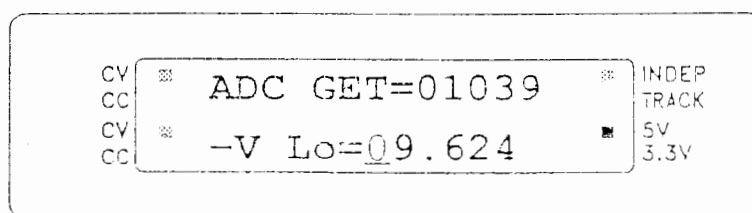
Step 3: Repeat step 2. Key in the measured value (i.e. if the DMM shows 29.798V then key in 29.798) followed by the "ENTER" key. The following message will then appear on the LCD:



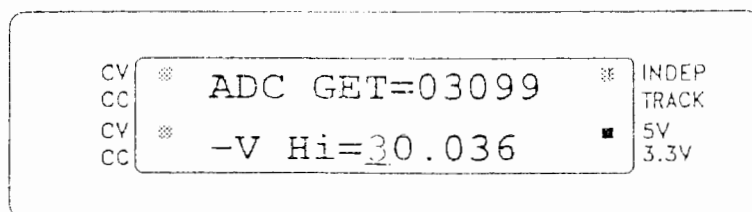
Step 4: Measure the DC current from +output terminals (+ and COM1) with the DMM and key in the value (i.e. if the DMM shows 0.728A, then key in 0.728) followed by the "ENTER" key. The following message will then appear on the LCD:



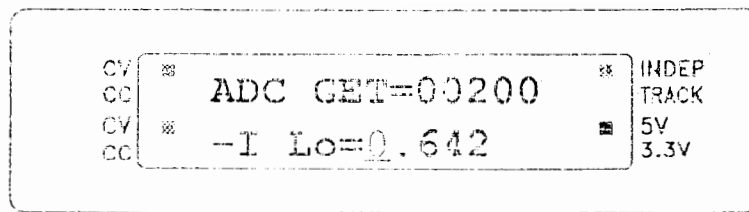
Step 5: Repeat step 4. Key in the measured value (i.e. if the DMM shows 2.491A then key in 2.491) followed by the "ENTER" key. The following message will then appear on the LCD:



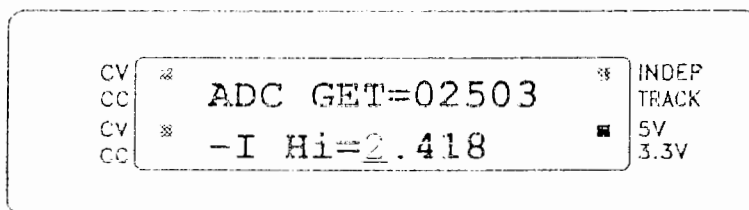
Step 6: Measure the DC voltage from -output terminals (- and COM1) with the DMM and key in the measured value (i.e. if the DMM shows 9.624V then key in 9.624) followed by the "ENTER" key. The following message will then appear on the LCD:



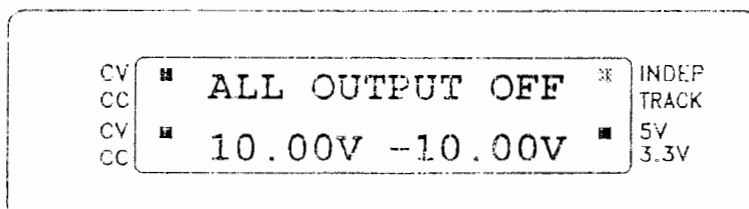
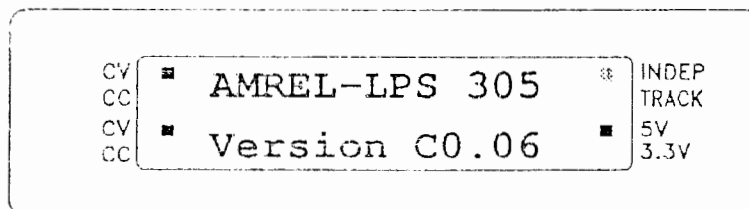
Step 7: Repeat step 6. Key in the measured value (i.e. if the DMM shows 30.036V, then key in 30.036) followed by the "ENTER" key. The following message will then appear on the LCD:



Step 8: Measure the DC current from -output terminals (- and COM1) with the DMM and key in the measured value (i.e. if the DMM shows 0.642A then key in 0.642) followed by the "ENTER" key. The following message will then appear on the LCD:



Step 9: Repeat step 8. Key in the measured value (i.e. if the DMM shows 2.418A, then key in 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, please call our toll-free technical support line at (800) 654-9838 and if necessary, follow instructions in sections 7.4.

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

7.3 WARRANTY INFORMATION

TWO-YEAR LIMITED WARRANTY

American Reliance warrants to the original user or purchaser that your unit is free from any defects in material or workmanship for a period of two years from the date of purchase. If any defects are discovered within the warranty period, AMREL will repair or replace the unit, subject to verification of the defect or malfunction, upon delivery or prepaid shipment to AMREL.

IMPORTANT:

- (1). Unless a problem is discovered upon inspection after purchase of the unit, please do not return the product to the distributor where it was purchased. American Reliance accepts the responsibility of keeping you a satisfied customer.
- (2). If post-warranty or any service not covered by this warranty is needed, please contact the AMREL Service Department at (818) 303-6688 for current fees.

This warranty does not apply to defects or to physical damage resulting from abuse, neglect, accident, unauthorized repair, alteration, or unreasonable use of the unit, resulting in (but not limited to) cracked or broken cases or parts, or to units damaged by excessive heat. Except upon initial purchase, this warranty does not cover finish or appearance items nor does it cover items damaged during shipment to AMREL for repair or calibration.

To receive service under this warranty, along with the returned instrument you must include proof of purchase, including date and place of purchase (i.e. a copy of your purchase receipt) or we will not be responsible for repairs or replacement of the unit under warranty.

AMREL assumes no responsibility for shipping and handling. However, repaired units will be shipped back to the customer with return shipping charges paid by American Reliance.

Any applicable implied warranties, including warranties of merchantability and fitness for a particular use, are hereby limited to two years for the date of purchase. Consequential or incidental damages resulting from loss of use, or from a breach of any applicable express or implied warranties are hereby excluded.

This warranty is in lieu of all other agreements and warranties, general or special, express or implied. No representative or person is authorized to assume for us any other liability in connection with the sale or use of this American Reliance product.

Some states do not allow limitations on how long implied warranties last and do not allow exclusion of incidental or consequential damages, so the above limitations and exclusions may not apply to you. This warranty gives you specific legal rights which may vary from state to state.

NON-WARRANTY SERVICE

Any AMREL out-of-warranty instrument that is believed to be defective but repairable may be sent to American Reliance for Non-warranty service. Please contact our service department at (818)575-5110 for current repair fees. The instrument should be returned to American Reliance, following the directions under the heading "Shipping Instructions" in this section.

WARRANTY SERVICE

American Reliance warrants this product for a period of two years to the original purchaser. If the instrument is believed to be defective while covered under warranty, it should be returned to American Reliance by following the directions under the heading "Shipping Instructions" in this section. American Reliance will, at our option, repair or replace the instrument if it is found to be defective. We will then return the serviced unit at no further cost to you.

7.4 SHIPPING INSTRUCTIONS

Any product returned to American Reliance for service must be shipped, freight prepaid (we will not accept COD shipments) to :

American Reliance Inc.
11801 Goldring Road
Arcadia, CA 91106
Attn: Service Dept.
RGA#: _____

The instrument must be carefully packed, preferably in its original carton, and should be accompanied by a letter or note containing the following information:

User's Name	Proof of Purchase
User's Address	Description of problem
Model number	Serial number

If other service is desired, such as calibration, it must be stated in the enclosed letter. American Reliance will return the serviced instrument via UPS ground (unless otherwise requested) with freight paid by American Reliance.

NOTE: Please contact our sales department to obtain a RGA number before returning any instruments for repair or calibration. This number must be clearly written on the front of the package or on the shipping label, otherwise we cannot accept delivery of the instrument.

APPENDIX A

A1 RS-232 COMMAND LIST

COMMAND	DESCRIPTION	EXAMPLE
VSET	voltage setup	VSET1 12.345
VOUT	voltage readback	VOUT2
ISET	current setup	ISET2 1.23
IOUT	current readback	IOUT1
OUT	0=+/- output off 1=+/- output on	OUT0 OUT1
TRACK	0=independent 1=tracking from channel 1 2=tracking from channel 2	TRACK0 TRACK1 TRACK2
STATUS	working status (see note 7)	STATUS
CALI	0=end calibration 1=begin calibration 2=input calibration parameter	CALI0 CALI1 CALI2 9.574
MODEL	display model number	MODEL
VERSION	display version number	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

A2 RS-232 COMMAND NOTES

1. All RS-232 commands are non-case sensitive ASCII codes.
2. RS-232 port uses asynchronous framing, 8 data bits, no parity bit, and 1 stop bit.
3. Maximum RS-232 data rate: 2400 bps.
4. All command strings are terminated by CR (carriage return) or LF (line feed) or BOTH.
5. Only one command is allowed in each command string.
6. The LPS will respond with an "OK" string when a command string is accepted. Any following commands sent before the "OK" is returned by the LPS will be ignored.
7. After the LPS accepts the STATUS command, it will return a decimal number in ASCII. Convert this decimal number to its binary equivalent with each bit representing the following:

bit 0: channel 1 0=CV 1=CC

bit 1: channel 2 0=CV 1=CC

bits 3,2: 00=independent
 10=tracking to channel 1
 11=tracking to channel 2

bit 4: 0=digital output OFF
 1=digital output ON

bit 5: 0=digital output 5V
 1=digital output 3.3V

bit 6: 0=output OFF
 1=output ON

bit 7: 0=not used
 1=digital output overload

bit 8: 0=fan OFF
 1=fan ON

bit 9: 0=beeper function disabled
 1=beeper function enabled

bit 10: 0=CC output compensated OFF
 1=CC output compensated ON

A3 SAMPLE PROGRAM

Microsoft QBasic 1.1

```
DECLARE SUB checkforok ()
DECLARE SUB delay ()
CLS
OPEN "COM1:2400,n,8,1,cd0,ds0,cs0,tb2048,rb2048" FOR RANDOM AS #1
PRINT #1, "out1"
checkforok
PRINT #1, "iset 1"
checkforok
FOR x = 0 TO 30
    v$ = STR$(x)
    PRINT #1, "vset "; v$
    checkforok
    PRINT #1, "vout"
    INPUT #1, rd$
    checkforok
    PRINT v$, rd$
NEXT x
PRINT #1, "out0"
checkforok
CLOSE
END

SUB checkforok
DO
    INPUT #1, a$
    LOOP UNTIL a$ = "OK"
delay
END SUB

SUB delay
FOR d = 1 TO 1000
NEXT d
END SUB
```