

DC POWER SUPPLY OPERATORS MANUAL

*MODELS : UP-3003T, UP-3005T, UP-3010S
UP-3003D, UP-3005D, UP-6003D*

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1. Introduction

Regulated DC power supplies are designed to provide the user with a stable, Very low ripple DCV output. They can be used in industry, the science labs, the repair bench and for educational training and any where a Clean DC output is needed.

These supplies are continuously variable for 0 Volts to their rated voltage with zero to the rated output currents as shown below. The output is voltage and the constant current limiting is controlled using a fine and course controls. Both the Current and voltage are monitored with an accurate the digit LED display

Each supply has its own Voltmeter for setting and display the voltage and monitoring the resultant current. The output may be disconnected from the Load using the output ON/Off switch.

2. Available models

Model Number	Main output		Fixed output
	Output voltage	Output Current	Output Current
UP-3003D	0 to 30V	0 to 3Amps	5V / 1Amp
UP-3005D	0 to 30V	0 to 5 Amps	5V / 1Amp
UP-6003D	0 to 60V	0 to 3 Amps	5V / 1Amp
UP-3010S	0 to 30V	0 to 10Amps	
UP-3003T	0 to 30V / 2CH	0 to 3Amps / 2CH	5V / 3Amp
UP-3005T	0 to 30V / 2CH	0 to 5Amps / 2CH	5V / 3Amp

3. Specifications

3-1. General

AC input : 110/220 ± 10% 50/60Hz switch selectable

Operating Temperature : 0° C to 40° C (32°F to 104°F) at < 80% R.H

Storage Temperature : -10° C to 70° C (14°F to 158°F) at a < 70% R.H

3-2. Accessories

Power cord.....1ea

Operation manual.....1ea

Output Cable.....1ea(Single Channel) or 2ea(Dual Channel)

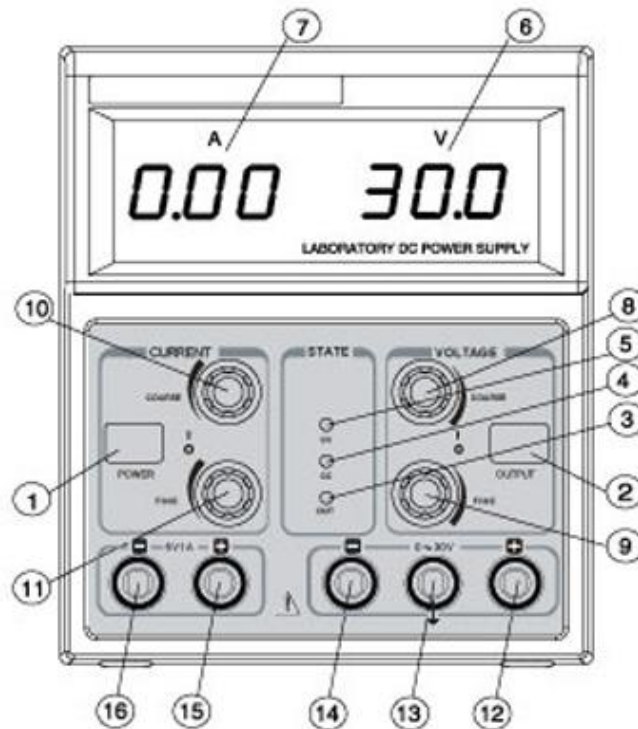
3-3. Electrical Specifications

Model	UP-3003D	UP-3005D	UP-6003D
Output Voltage	0 to 30Volts	0 to 30Volts	0 to 60Volts
Output Current	0 to 3 Amps	0 to 5Amps	0 to 3Amps
Constant voltage Operation			
Line Regulation	$\leq 0.01\% + 3mV$	$\leq 0.01\% + 3mV$	$\leq 0.01\% + 3mV$
Load Regulation	$\leq 0.01\% + 3mV$	$\leq 0.01\% + 3mV$	$\leq 0.01\% + 5mV$
Ripple and Noise	$\leq 1mV$ rms	$\leq 1mV$ rms	$\leq 1mV$ rms
Temperature coefficient	500ppm/ °C	500ppm/ °C	500ppm/ °C
Constant Current Operation			
Line Regulation	$\leq 0.2\% + 3mA$	$\leq 0.2\% + 3mA$	$\leq 0.2\% + 3mA$
Load Regulation	$\leq 0.2\% + 5mA$	$\leq 0.2\% + 5mA$	$\leq 0.2\% + 5mA$
Ripple and Noise	$\leq 3mA$ rms	$\leq 3mA$ rms	$\leq 3mA$ rms
Display			
Accuracy	3 and 1/2 digits. LED $\leq \pm 0.4\% + 1d$		
Recovery time	$\leq 100\mu s$		
Fixed Output			
Output Voltage	5 Volts		
Output current	1 Amp		
Voltage Accuracy	$\pm 1\%$		
Ripple and Noise	$\leq 2mV$ rms		
Weight(kg)	4.8	5.3	5.6
Dimensions(W*H*D mm)	130*165*330		

Model	UP-3003T	UP-3005T	UP-3010S
Output Voltage	0 to 30Volts / 2CH	0 to 30Volts / 2CH	0 to 30Volts
Output Current	0 to 3 Amps / 2CH	0 to 5Amps / 2CH	0 to 10Amps
Constant voltage Operation			
Line Regulation	$\leq 0.01\% + 3mV$	$\leq 0.01\% + 3mV$	$\leq 0.01\% + 5mV$
Load Regulation	$\leq 0.01\% + 3mV$	$\leq 0.01\% + 3mV$	$\leq 0.02\% + 5mV$
Ripple and Noise	$\leq 2mV$ rms	$\leq 1mV$ rms	$\leq 2mV$ rms
Temperature coefficient	150ppm/ °C	500ppm/ °C	300ppm/ °C
Constant Current Operation			
Line Regulation	$\leq 0.2\% + 3mA$	$\leq 0.2\% + 3mA$	$\leq 0.2\% + 3mA$
Load Regulation	$\leq 0.2\% + 3mA$	$\leq 0.2\% + 5mA$	$\leq 0.2\% + 5mA$
Ripple and Noise	$\leq 3mA$ rms	$\leq 3mA$ rms	$\leq 3mA$ rms
Display			
Accuracy	3 and 1/2 digits. LED Voltage $\leq \pm 0.5\% + 2d$, Current $\leq \pm 1\% + 2d$		
Recovery time	$\leq 100\mu s$		
Fixed Output			
Output Voltage	5 Volts		N/A
Output current	3 Amp		N/A
Voltage Accuracy	$\pm 1\%$		N/A
Ripple and Noise	$\leq 2mV$ rms		N/A
Weight(kg)	9	9.8	9
Dimensions(W*H*D mm)	245*130*345		

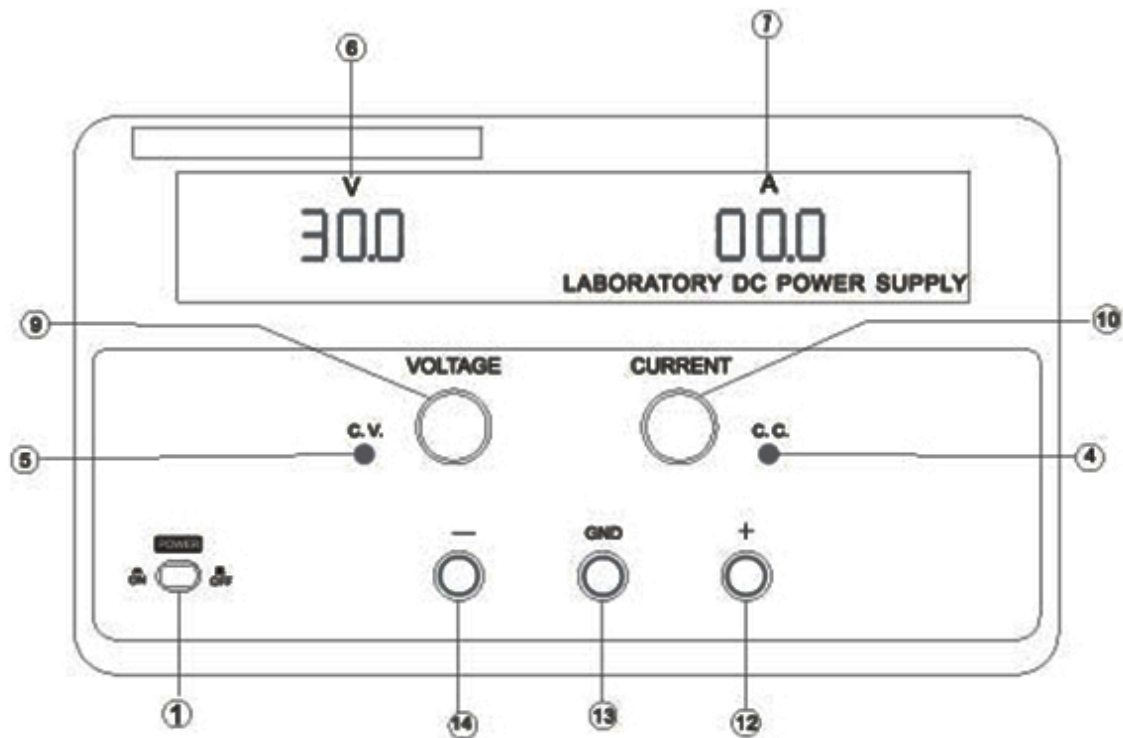
4. Panel Controls and indicators

4-1. Model : UP-3003D, UP-3005D, UP-6003D



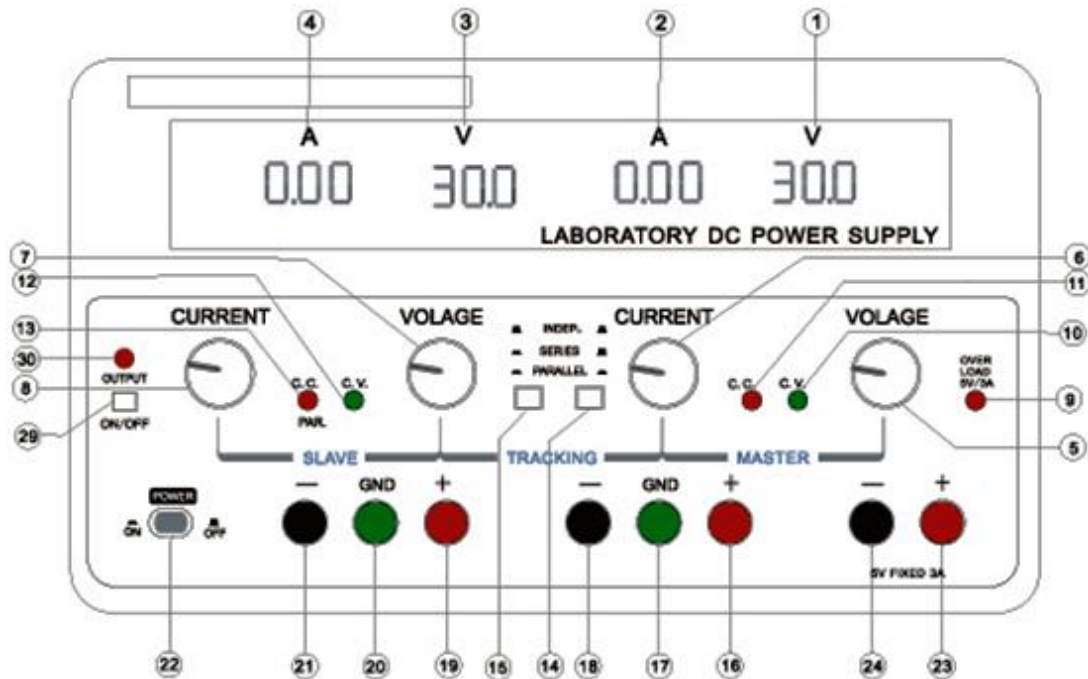
- (1) **Power switch** : Turns the power on and off
- (2) **Output standby** : When pressed, enables the output, the Volts and Amps LED meter displays the Voltage and Current values and the Output indicator is lit. When released the output is disabled and LED meters read Zero
- (3) **Output indicator** : Indicates if the output is on or in the standby mode
- (4) **CC indicator** : Lights when the unit is in the constant current mode
- (5) **CV indicator** : Light when the unit is in the constant voltage mode
- (6) **Voltmeter** : Displays the output voltage
- (7) **Ammeter** : Displays the output current
- (8) **Voltage Course** : Course control for setting output voltage
- (9) **Voltage fine** : Fine control for setting the output voltage
- (10) **Current Course** : Course control for setting the current limiting
- (11) **Current Fine** : Fine control for setting the current limiting
- (12) **+ output terminal** : Positive output terminal
- (13) **GND** : Chassis ground (earth ground terminal) terminal
- (14) **- Output terminal** : Negative output terminal
- (15) **5V + Out** : the positive terminal for the fixed 5volt supply
- (16) **5V - Out** : The negative terminal for the fixed 5 volt supply

4-2. Model : UP-3010S



- (1) **Power switch** : Turns the power on and off
- (4) **CC indicator** : Lights when the unit is in the constant current mode
- (5) **CV indicator** : Light when the unit is in the constant voltage mode
- (6) **Voltmeter** : Displays the output voltage
- (7) **Ammeter** : Displays the output current
- (8) **Voltage Course** : Course control for setting output voltage
- (10) **Current Course** : Course control for setting the current limiting
- (12) **+ output terminal** : Positive output terminal
- (13) **GND** : Chassis ground (earth ground terminal) terminal
- (14) **- Output terminal** : Negative output terminal

4-3. Model : UP-3003T, UP-3005T



- (1) (3) **Voltmeter Led displays** : display the output voltage
- (2) (4) **Ammeter Led displays** : Displays the load current
- (5) (7) **Voltage control** : Adjusts the Voltage to the required value
- (6) (8) **Current limit control** : Sets the current limit value
- (9) **Fixed supply overload indicator** : Lights when the fixed supply load current exceeds 3 amps
- (10) (12) **CV indicator** : Lights when the supply is in the constant voltage mode
- (11) (13) **CC indicator** : lights when the supply is in the constant current mode
- (14) (15) **Tracking select buttons** :
 - (A) when both tracking buttons are out Independent mode is selected
 - (B) When Tracking button (15) is pressed in and (14) is press out, Series operation is selected
 - (C) When tracking button (14) and (15) are both pressed in Parallel operation is selected

Note : When in series or parallel modes the right side power supply is the Master and the left side is the slave.

- (16) (19) Positive output terminals of the variable supplies
- (17) (20) Chassis ground terminal of the variable supplies
- (18) (21) Negative out terminals of the variable supplies
- (22) Power on/off switch
- (23) Positive terminal of the 5V fixed supply
- (24) Negative terminal of the 5V fixed supply
- (29) **Output On/Off** : When pressed, enables the variable outputs; the Voltage and Current meters will display values and the Output indicator is lit. When released the variable output are disabled and Volt and ammeter read Zero.

5. Operating instructions(Model : UP-3003D, UP-3005D, UP-6003D, UP-3010S)

5-1. Precautions

- (1) Be sure the AC line selector is set to appropriate AC line voltage
- (2) To avoid electrical shock, be sure the chassis ground of the unit is connected the AC input ground terminal.
- (3) Do not use the unit when the ambient temperature exceeds 40°C (104 °).
Allow sufficient ventilation space for the heat sinks located in rear of the unit.
- (4) The outputs of these units are floating; the appropriate output terminal must be grounded for a positive or negative voltage output

5-2. Setting the output voltage

Note: The procedure in 5-2 and 5-2 applies only to the variable output supply

- (1) Remove all test leads from the output terminals to the load
- (2) Turn the power supply on with the Power On/Off switch (1)
- (3) Press the Output/Standby button (2) the Out INDICATOR (3) should turn on
- (4) Rotate the Course Current (10) control clockwise until the CV indicator (5) is lit
- (5) Rotate the Course Voltage (8) control to the approximate output voltage
- (6) Rotate the fine Voltage control (9) to the exact required output voltage

5-3. Setting the Current limit

- (1) Determine the maximum safe load current
- (2) Press the Output/standby button (2) to the out position (out indicator off)
- (3) Short the + and - output terminals (14 & 12) with a test lead
- (4) Press the Output/standby button in. The CC indicator (4) should be lit and the CV (5) indicator off
- (5) Rotate the Course current control (10) to the approximate safe load current
- (6) Rotate the Fine current control (11) to the required safe load current
- (7) Press the Output/standby button (2) to the out position (out indicator off)
- (8) Remove the short circuit from the output terminals and connect the load to the output terminals
- (9) Press the Output/standby button (2) in. The CV indicator (5) should be lit and the CC Indicator (4) should be off
- (10) The voltage displayed on the voltmeter (6) should read what was set in 5-2 and the ammeter should (7) read the load Current
- (11) If the CC INDICATOR is lit repeat 5-1 and 5-1

6. Independent Operation instructions(Model : UP-3003T, UP-3005T)

6-1. Precautions for all modes

- (1) Be sure the AC line selector (29) is set to appropriate AC line voltage
- (2) To avoid electrical shock, be sure the chassis ground of the unit is connected the AC input ground terminal.
- (3) Do not use the unit when the ambient temperature exceeds 40°C (104 °).
Allow sufficient ventilation space for the heat sinks located in rear of the unit.
- (4) The outputs of these units are floating; the appropriate output terminal must be grounded for a positive or negative voltage output

6-2. Setting the output voltage

Note: The procedure in 4-2 and 4-3 applies only to the variable output supplies

- (1) Fig 4-1 illustrates connecting the loads when the supply is in the independent mode.
Both the Master and Slave supplies are in the independent mode
- (2) Press the tracking buttons (14) & (15) to the out position
- (3) Remove all test leads from the output terminals to the load
- (4) Turn the power supply on with the Power On/Off switch (22)
- (5) Press the Output/on/off button (29), the Out INDICATOR (28) should turn on
- (6) Rotate the Current control (6) (8) clockwise until the CV indicator (10) (12) is lit
- (7) Rotate the Voltage (5) (7) control to the required output voltage as displayed on the Voltmeter (1) (3)

6-3. Setting the Current limit

- (1) Determine the maximum safe load current for each supply
- (2) Press the Output on/off button (29) to the out position (out indicator will turn off)
- (3) Short the + and - output terminals (16) & (18) or (19 & 21) with a test lead
- (4) Press the Output on/off button (29) in. The CC indicator (11) or (13) should be lit and the CV indicator (10) or (12) should go off
- (5) Rotate the Current control (6) (8) to the maximum safe load current as displayed on the ammeter (2) (4)
- (7) Press the Output/standby button (29) to the out position (out indicator off)
- (8) Remove the short circuit from the output terminals and connect the load to the output terminals
- (9) Press the Output/On/Off (29) in. The CV indicator (10) (12) should be lit and the CC Indicator (11) (13) should be off
- (10) The voltage displayed on the voltmeter (1) (3) should read what was set in 4-2 and the ammeter should (2) (4) read the load current
- (11) If the CC INDICATOR is lit repeat 4-2 and 4-3

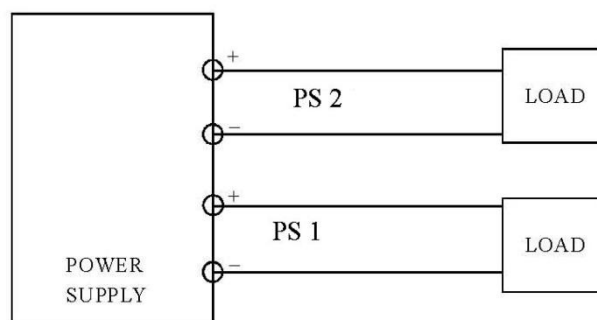


Fig 4-1 Independent operation

7. Series connected power supply(Model : UP-3003T, UP-3005T)

Pressing the left Tracking button in (15), the 2 power supplies are series connected. The connection between the 2 power supplies is internal. The Master (the right side power supply) Voltage control varies both supplies simultaneously in a one to one tracking relationship. When the master and slave are in the series mode, the total sum of the voltage is twice the reading of the Master supply's voltmeter and the current supplied to the load is equal to what is displayed on the Master or Slave Ammeter. A load connected to the power supply connected as a series supply is shown in Fig 5-1

The procedure for setting the supply voltage and current limit is the same as explained in 4-2 and 4-2 on page 8 for independent operation with the following modifications:

- 1) Set the current limit of the Slave supply fully clockwise and use the Master's current limit to set the current limit
 - 2) The Master's Voltage control will vary the output of both supplies and the output voltage will be double of what is displayed on the Master's or Slave's Voltmeter.
- example: If the master and slave voltmeters are reading 20Volts and the ammeters read 3 amps the voltage to the load is 40 volts and the current is 3amps

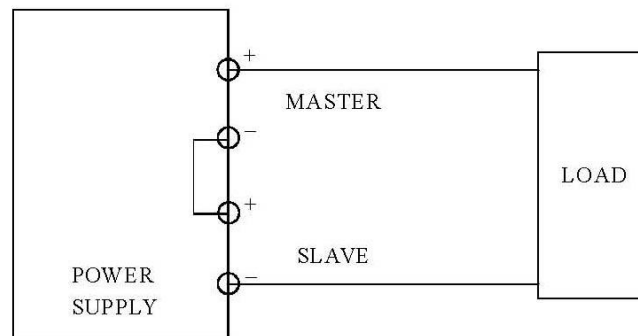


Fig 5-1 Series connected power supply

7-1. A positive and negative supply

Two power supplies connected in series used as a Plus and Minus tracking power supply is shown in fig 5-2. The Positive terminal of the Slave and the Negative terminal of the Master which is connected internally are then connected to the ground terminal.

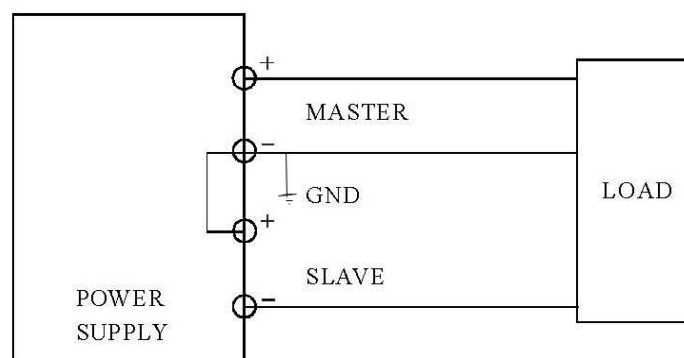


Fig 5-2 Positive and Negative power supply

8. Parallel connected power supply(Model : UP-3003T, UP-3005T)

When both Tracking buttons are pressed in (14) (15), the 2 power supplies are parallel connected. The connections between the 2 power supplies are internal as shown in Fig 6-1. The Master's Voltage control varies both supplies simultaneously in a one to one tracking relationship. When the master and slave are in parallel , the voltage is the same for both supplies as read on the Master's voltmeter and the current supplied to the load is double of what is displayed on the Master or Slave Ammeter. Example: if the Master and slave is set to 10 volts and each ammeter is reading 4 amps, the voltage to the load is 10V and the current is 8 amps

The procedure for setting the supply voltage and current limit is the same as explained in 4-2 and 4-2 on page 8 or independent operation with the following modifications:

- 1) The current limit and voltage control of the Slave supply is disabled, only the Master's Voltage control and current limit control is used.
- 2) The output voltage of the power supply is the same for both supplies and the load is connected to the Master supply.
- 3) The Current delivered to the load is twice the current that is displayed on the Master or Slave's ammeter

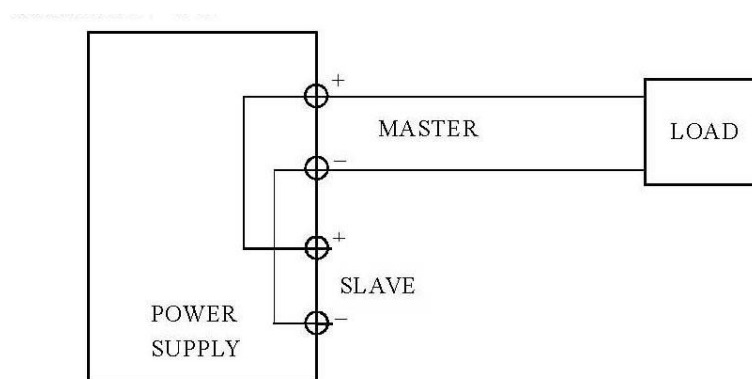


Fig 6.1 Parallel connected power supply

9. 5Volt, 3 Amp fixed power supply

The 5 volt, 3 Amp power supply delivers a fixed 5 volts and up to 3 amps to a load connected to its terminals. This supply is ideal for connecting TTL or Cmos ICs. This supply has an overload Indicator which lights when the load current exceeds 3 amps.

10. Maintenance

Warning

The following instructions are for use by qualified personnel only. To avoid electrical shock, Do not perform any servicing other than what is set forth in the operating instructions unless You are a qualified to do so.

- A) If the fuse blows, the CV or CC indicators nor the ammeter and voltmeter will be inoperative. The fuse should not blow under normal operating conditions. Try to determine the cause of failure, correct the problem and then replace the fuse (25) with one with the correct ratings.
- B) If the mode is Constant voltage but the set voltage is incorrect and the CC indicator is lit, the unit is in the Constant current mode. Check the connections to the load or the determined current value (see 4-2) and correct. When the line voltage is change, set the AC line voltage selector switch (30) to the correct position and replace the fuse with the correct value.
- C) If the mode is Constant current but the ammeter is reading a lower value of current than what was determined and the CV indicator is lit, the unit is in the Constant voltage mode. Recheck the connections to the load and the current setting that was performed in (4-3)
- D) If the output is unstable check if the line voltage is below the published specification



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