HP6237B Power Supply Operating Instructions

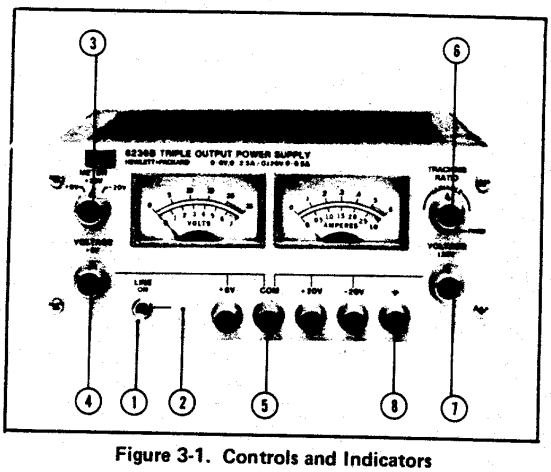

Figure 3-1. Controls and Indicators

3-1 TURN-ON CHECKOUT PROCEDURE

3-2 The following steps describe the use of the Model 6236B or 6237B front panel controls and indicators illustrated in Figure 3-1 and serve as a brief check that the supply is operational. Follow this checkout procedure or the more detailed performance test of paragraph 5-6 when the instrument is received and before it is connected to any load equipment. Proceed to the more detailed procedures beginning in paragraph 5-6 if any difficulties are encountered.

NOTE

For the Model 6237B, substitute +18V for +6V in the following steps.

a. Connect line cord to power source and turn LINE switch ① on. LINE ON indicator ② will light.

b. Set METER switch ③ to the +6V position and, with no load connected, vary +6V VOLTAGE control ④ over its range and check that the voltmeter responds to the control setting and the ammeter indicates zero.

c. Set the +6V VOLTAGE control for a 6-volt meter indication and short the +6V output terminal to COM (common) terminal ⑤ with an insulated test lead. The ammeter should indicate a short-circuit output current of approximately 1.0A (1.1A in the 6237B). Remove the short from the output terminals.

d. Set the METER switch to the +20V position and turn TRACKING RATIO control ⑥ fully clockwise to the FIXED position. With no load connected, vary ±20V VOLTAGE control ⑦ over its range and check that the voltmeter responds to the control setting and the ammeter indicates zero.

e. Set the ±20V VOLTAGE control for a 20-volt meter indication and short the +20V output terminal to the common terminal with an insulated test lead. The ammeter should indicate a short-circuit output current of 0.55A ±5%. Remove the short from the output terminals.

f. Repeat steps (d) and (e), but substitute the −20V position of the METER switch and the −20V output terminal.

g. Adjust the +20V output for a 20V meter indication. Then set the METER switch to the −20V position and check the effect of the TRACKING RATIO control on the voltage of the −20V output. The −20V output should be adjustable from less than 0.5 volts to a maximum of 18 to 22 volts.

3-3 If this brief checkout procedure or later use of the supply reveals a possible malfunction, see Section V of this manual for detailed test, troubleshooting, and adjustment procedures.

3-6 OPERATION

3-7 This power supply can be operated individually or in parallel with another supply (see paragraph 3-19). All output terminals are isolated from ground. The ±20V and +6V or +18V outputs use a single common output terminal. This common (COM) terminal or any one of the other output terminals may be grounded to the chassis at the front panel ground terminal (⑧ in Figure 3-1), or all outputs may be left floating. Loads can be connected separately between each of the 0 to 20V output terminals and the COM terminal, or between the −20V and the +20V terminals for a 0 to 40V output.

3-8 Tracking Ratio Control

3-9 With the TRACKING RATIO control in the FIXED position, the voltage of the −20V supply tracks that of the +20V supply within 1% for convenience in varying the symmetrical voltages needed by operational amplifiers and other circuits using balanced positive and negative inputs. Turn the TRACKING RATIO control counterclockwise out of the FIXED position to set the voltage of the −20V supply lower than that of the +20V supply. The negative supply can be set from a minimum of less than 0.5 volts to a maximum within 10% of the +20V supply's output. Once this is done, the ±20V VOLTAGE control still controls both outputs and maintains a constant ratio between their voltages.

3-10 Overload Protection Circuits

3-11 **±20-Volt Current Limit.** The +20V and −20V outputs are individually protected against overload or short-circuit damage by separate current limit circuits adjusted at the factory to limit the output current to 0.55A ±5%. (This is 110% of the maximum rated output.) The current limits can be set by adjusting resistor R6 for the +20V output and R26 for the −20V output. (See paragraph 5-47 for current limit calibration instructions.) No deterioration of supply performance occurs if the output current remains below the current limit setting. If a single load is connected between the +20V and −20V outputs, the circuit set for the lesser current limit will limit the output.

3-12 **+6V Current Foldback (Model 6236B).** The overload and short-circuit protection circuit for the +6V output of the Model 6236B reduces the output current limit as the output terminal voltage decreases. (The operating region of the +6V output is enclosed by heavy lines in Figure 3-3). The maximum rated output current is 2.5A and the current limit is factory-adjusted to operate at 2.75A ±5% when the output is 6 volts. At lower output voltages, the circuit reduces the maximum obtainable output current linearly until 1A ±15% flows when the output is shorted. The short-circuit current cannot be adjusted, but R46 can be set to limit the maximum current at 6V to 2.75A ±5%. (See paragraph 5-47 for current limit calibration instruction.)

3-13 **+18-Volt Current Limit (Model 6237B).** The +18-volt output of the Model 6237B is protected by a fixed current limit circuit that operates at 1.1A (110% of its maximum rated output). The circuit is similar to the ones in the ±20-volt supplies. (See paragraph 5-47 for calibration instructions.)

3-14 Operation Beyond Rated Output

3-15 The supply may be able to provide voltages and currents greater than its rated maximum outputs if the line voltage is at or above its nominal value. Operation can extend into the shaded areas on the meter faces without damage to the supply, but performance cannot be guaranteed to meet specifications. If the line voltage is maintained in the upper end of the input voltage range, however, the supply probably will operate within its specifications.

3-16 Connecting Loads

3-17 Connect each load to the power supply output terminals using separate pairs of connecting wires. This minimizes mutual coupling between loads and takes full advantage of the low output impedance of the supply. Load wires must be of adequately heavy gauge to maintain satisfactory regulation at the load. Make each pair of connecting wires as short as possible and twist or shield

them to reduce noise pick-up. If shielded wire is used, connect one end of the shield to the power supply ground terminal and leave the other end unconnected.

3-18 If load considerations require locating output power distribution terminals at a distance from the power supply, then the power supply output terminals should be connected to the remote distribution terminals by a pair of twisted or shielded wires and each load should be connected to the remote distribution terminals separately.

3-19 Parallel Operation

3-20 Two or more power supplies can be connected in parallel to obtain a total output current greater than that available from one supply. The total output current is the sum of the output currents of the individual supplies. The output voltage controls of one power supply should be set to the desired output voltage, and the other supply set for a slightly larger output voltage. The supply set to the lower output voltage will act as a constant voltage source, while the supply set to the higher output will act as a current-limited source, dropping its output voltage until it equals that of the other supply. The constant voltage source will deliver only that fraction of its rated output current necessary to fulfill the total current demand.

3-21 Special Operating Considerations

3-22 Pulse Loading. The power supply will automatically cross over from constant-voltage to current-limit operation in response to an increase in the output current over the preset limit. Although the preset limit may be set higher than the average output current, high peak currents as occur in pulse loading may exceed the preset current limit and cause crossover to occur and degrade performance.

3-23 Output Capacitance. An internal capacitor across the output terminals of the power supply helps to supply high-current pulses of short duration during constant-voltage operation. Any capacitance added externally will improve the pulse current capability, but will decrease the load protection provided by the current limiting circuit. A high-current output pulse may damage load components before the average output current is large enough to cause the current limiting circuit to operate.

3-24 Reverse Current Loading. An active load connected to the power supply may actually deliver a reverse current to the supply during a portion of its operating cycle. An external source cannot be allowed to pump current into the supply without risking loss of regulation and possible damage to the output capacitor. To avoid these effects, it is necessary to preload the supply with a dummy load resistor so that the power supply delivers current through the entire operating cycle of the load device.

3-25 Reverse Voltage Protection. Internal diodes connected with reverse polarity across the output terminals protect the output electrolytic capacitors and the driver transistors from the effects of a reverse voltage applied across a supply output. Since series regulator transistors cannot withstand reverse voltage either, diodes are also connected across them. When operating supplies in parallel, these diodes protect an unenergized supply that is in parallel with an energized supply.

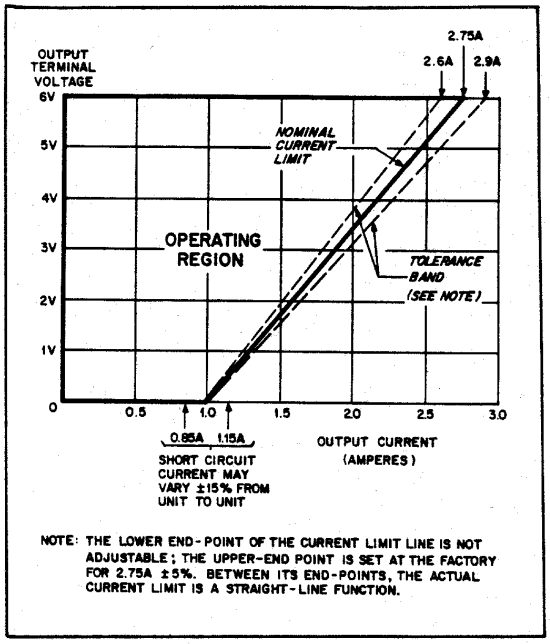

Figure 3-3. Current Limit Characteristics of the 6V Supply (Model 6236B)