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INSTRUCTIONS

MODEL AVO-6D-C PULSE GENERATOR

S.N.:

WARRANTY

Avtech Electrosystems Ltd. warrants products of its manufacture to be free from defects in material and workmanship under conditions of normal use. If, within one year after delivery to the original owner, and after prepaid return by the original owner, this Avtech product is found to be defective, Avtech shall at its option repair or replace said defective item. This warranty does not apply to units which have been disassembled, modified or subjected to conditions exceeding the applicable specifications or ratings. This warranty is the extent of the obligation assumed by Avtech with respect to this product and no other warranty or guarantee is either expressed or implied.

TECHNICAL SUPPORT

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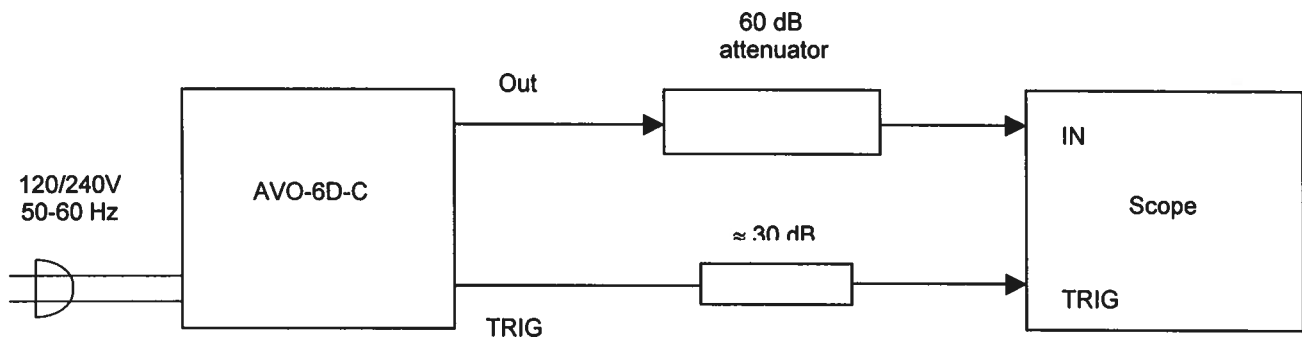
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FIG. 1: PULSE GENERATOR TEST ARRANGEMENT
(AVO-6D-T OUTPUT MODULE REMOVED)



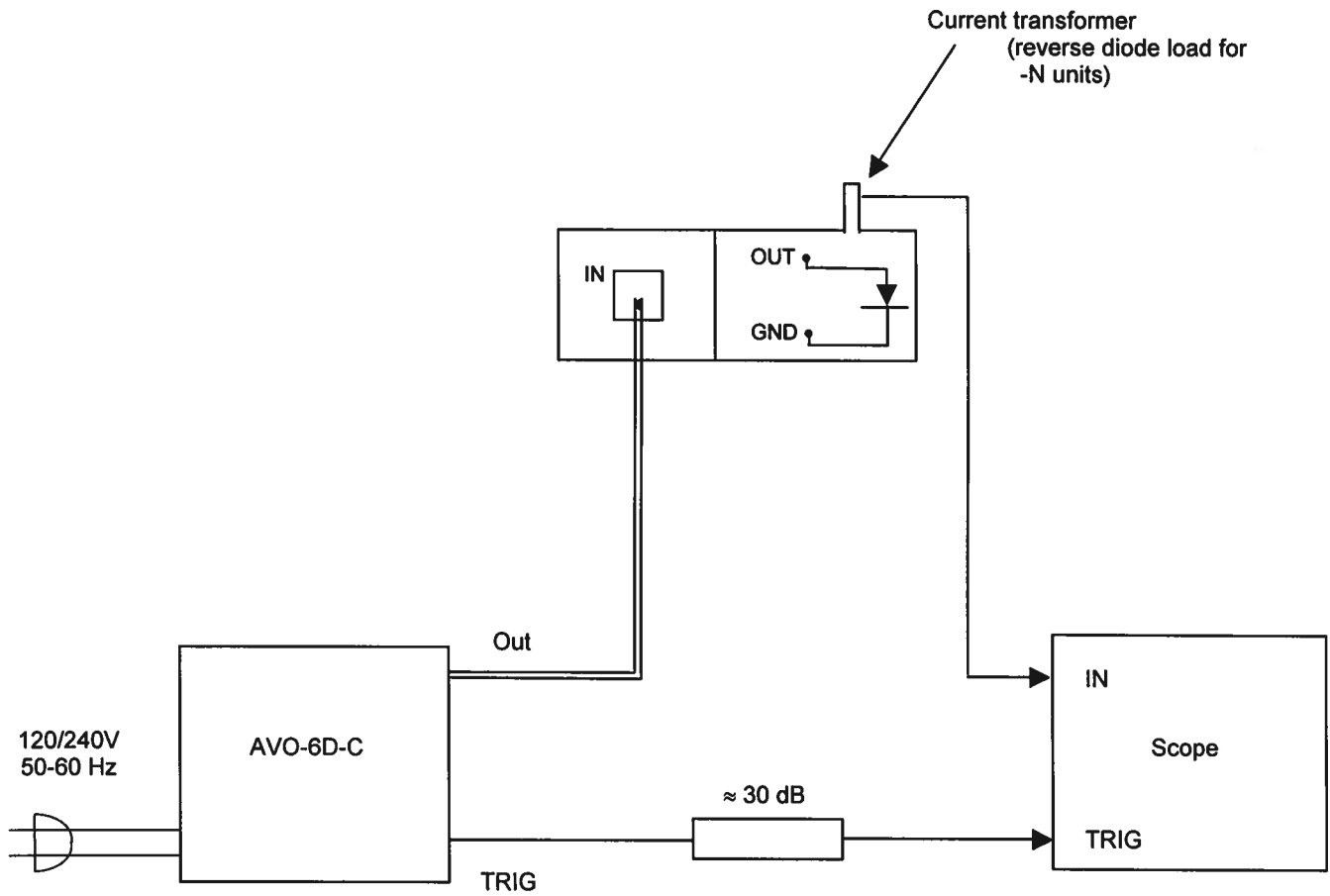
GENERAL OPERATING INSTRUCTIONS

- 1) The bandwidth capability of components and instruments used to display the pulse generator output signal (attenuators, cables, connectors, etc.) should exceed 100 MHz.
- 2) The use of a 60db attenuator at the scope vertical input channel will insure a peak input signal to the scope of less than one volt (necessary only if sampling scope used). If a high impedance real time scope is used, the pulse generator should be terminated using a shunt 50 Ohm resistor.
- 3) The TRIG output channel provides TTL level signals. To avoid overdriving the TRIG input channel of some scopes, a 30 db attenuator should be placed at the input to the scope trigger channel. The TRIG output precedes the main output when the front panel ADVANCE-DELAY switch is in ADVANCE position. The TRIG output lags the main output when the switch is in the DELAY position.
- 4) To obtain a stable output display the PW and PRF controls on the front panel should be set mid range. The front panel MODE switch should be in the INT position. The DELAY controls and the scope triggering controls are then adjusted to obtain a stable output. The scope may then be used to set the desired PRF by rotating the PRF controls.
- 5) The output pulse width is controlled by means of the front panel ten-turn PW control and the two-position range switch.
- 6) The output pulse amplitude is controlled by means of the front panel AMP control.
- 7) To voltage control the output pulse width, set the rear panel switch in the EXT position and apply 0 to +10V between terminal A and ground ($R_{IN} > 10K$). (option).
- 8) To voltage control the output amplitude, set the rear panel switch in the EXT position and apply 0 to +10V between terminal A and ground ($R_{IN} \geq 10K$). (option).
- 9) An external clock may be used to control the output PRF of the AVO unit by setting the front panel MODE switch in the EXT position and applying a 50 ns (or wider) TTL level pulse to the TRIG BNC connector input. With the MODE switch in the EXT A position, the output pulse width will be controlled by the front panel PW controls. If the switch is in the EXT B position, the output pulse width equals the input trigger pulse width.

- 10) **CAUTION:** The output duty cycle must not exceed 0.5%. For example for pulse width of less than 0.5 us, the PRF may be as high as 10 kHz. However, for pulse width of 5 us, the PRF must not exceed 1 kHz.
- 11) AVO-6D units with a serial number higher than 5600 are protected by an automatic overload protective circuit which controls the front panel overload light. If the unit is overloaded (by operating at an exceedingly high duty cycle or by operating into a short circuit), the protective circuit will turn the output of the instrument OFF and turn the indicator light ON. The light will stay ON (i.e. output OFF) for about 5 seconds after which the instrument will attempt to turn ON (i.e. light OFF) for about 1 second. If the overload condition persists, the instrument will turn OFF again (i.e. light ON) for another 5 seconds. If the overload condition has been removed, the instrument will turn on and resume normal operation. Overload conditions may be removed by:
 - 1) Reducing PRF (i.e. switch to a lower range)
 - 2) Reducing pulse width (i.e. switch to a lower range)
 - 3) Removing output load short circuit (if any)
- 12) The unit can be converted from 120 to 240V 50-60 Hz operation by adjusting the voltage selector card in the rear panel fused voltage selector-cable connector assembly.
- 13) For additional assistance:

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**FIG. 2: PULSE GENERATOR TEST ARRANGEMENT
(AVO-6D-T OUTPUT MODULE CONNECTED)**



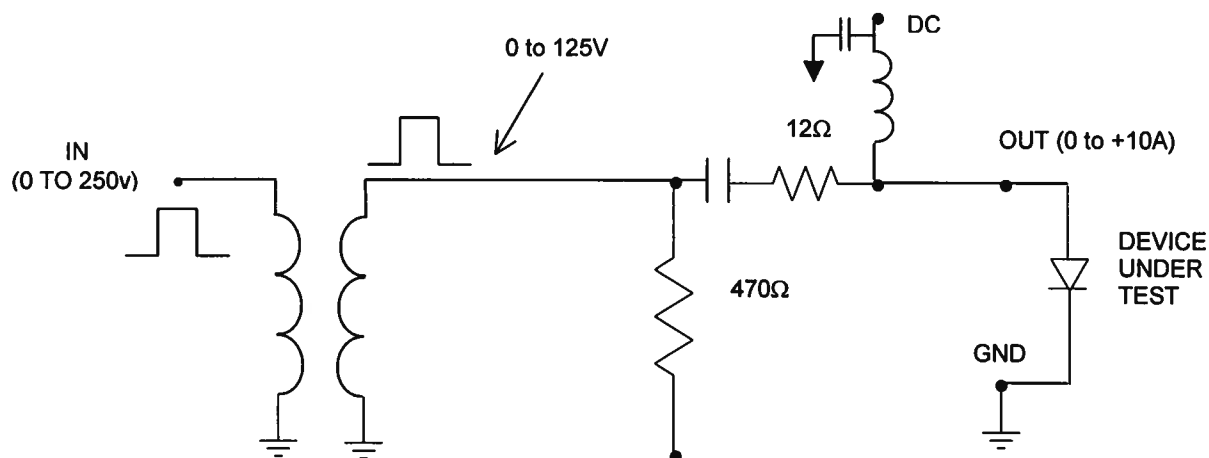
GENERAL INFORMATION

- 1) The AVO-6D-B consists of two parts, the mainframe and the output module. The mainframe is a voltage pulser, which, in conjunction with a transformer in the output module, generates 0 to +125 V (V_{OUT}). The output module contains a 12Ω series resistance. The diode load is connected in series with this resistance, so that the current through the diode is normally given by:

$$I_{DIODE} = \frac{V_{OUT} - V_{DIODE}}{12\Omega}$$

Where V_{DIODE} is the voltage drop across the diode.

- 2) The functional equivalent circuit of the output module is shown below:



Option "M" monitor
Output. (Requires "-M"
Option.)

FIG. 3: Output Module Functional Equivalent Circuit

(The equivalent circuit is shown for positive outputs. For "-N" instruments, the polarities are negative and diodes are reversed in direction.)

- 3) A fast current probe may be used to monitor the current waveform. Factory testing is conducted using a Tektronix CT2 current transformer.
- 4) The monitor output provides an attenuated replica (x 0.1) of the voltage applied to the 12 Ohm resistor. When used, the monitor output must be terminated in a 50 Ohm load.
- 5) A DC offset of up to 200 mA may be applied to the diode load. Note that the unit may be damaged if this current level is exceeded. Note that when the offset function is not used, it MUST be shifted to ground. The unit was shipped with a shorting bar soldered between the GND and the DC terminals.

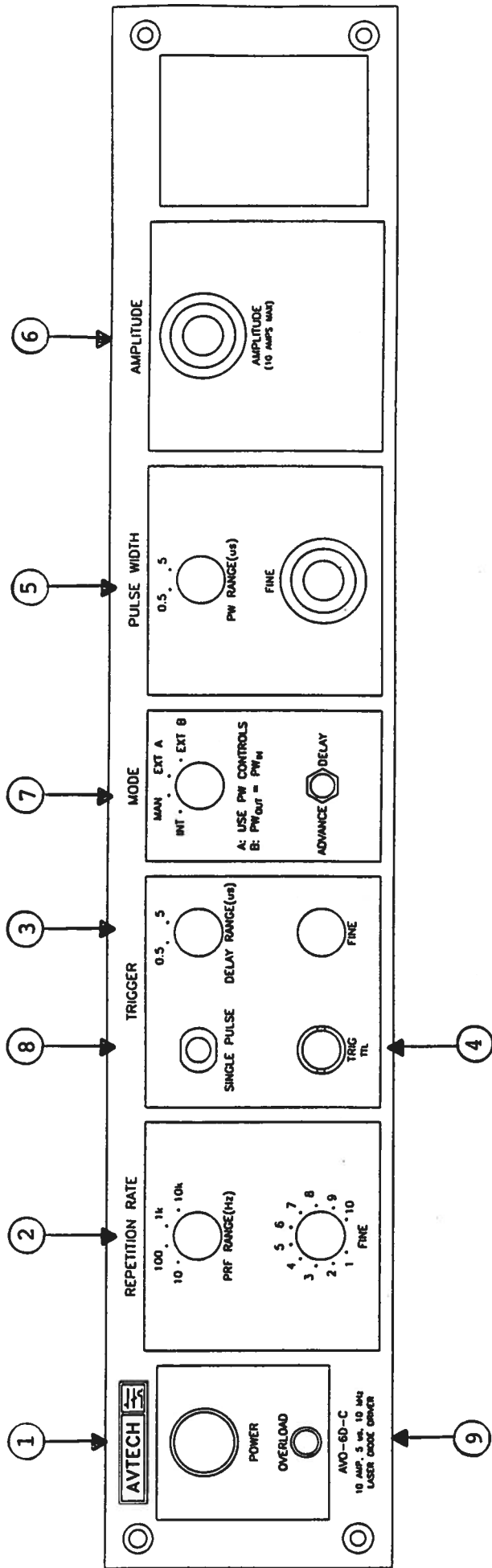


FIG. 4: FRONT PANEL CONTROLS

FRONT PANEL CONTROLS

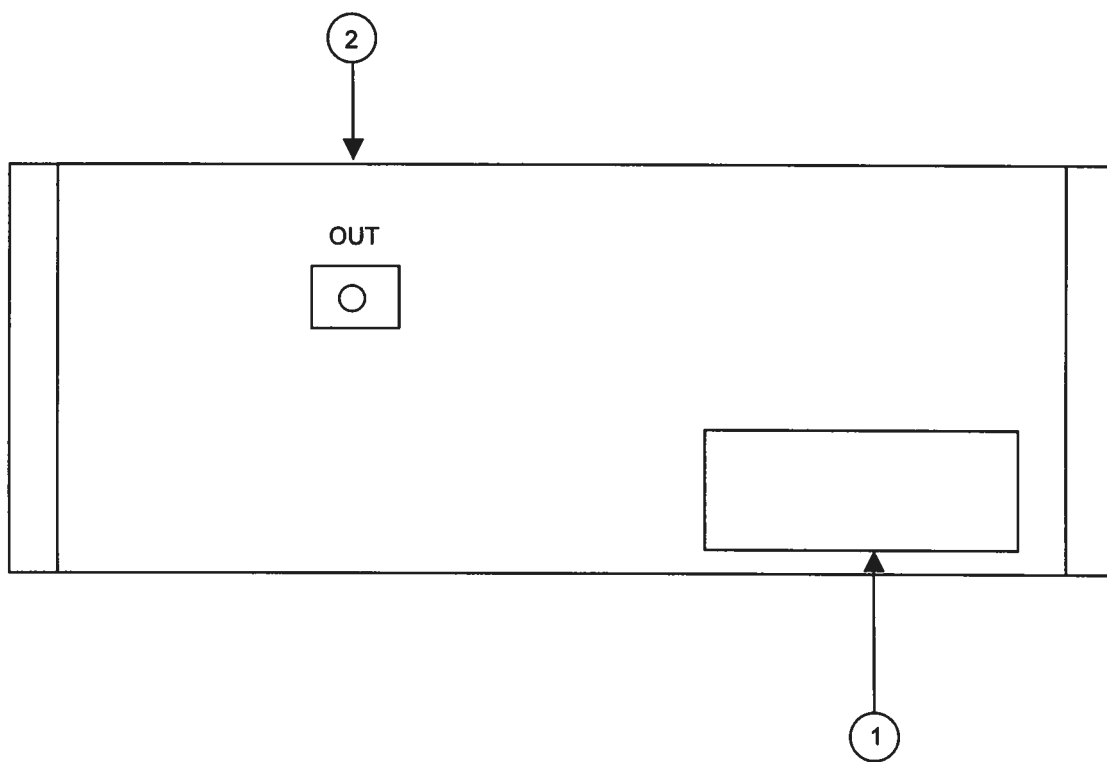
- 1) ON-OFF Switch. Applies basic prime power to all stages.
- 2) PRF Control. Varies PRF from 1Hz to 10 kHz as follows:

Range 1	1 Hz	10 Hz
Range 2	10 Hz to	100 Hz
Range 3	100 Hz to	1000 Hz
Range 4	1000 Hz to	10 kHz
- 3) DELAY Control. Controls the relative delay between the reference output pulse provided at the TRIG output (4) and the main output (5). This delay is variable over the range of 0 to about 0.5 us (Range 1) or 0.5 to 5.0 us (Range 2). The TRIG output precedes the main output when the ADVANCE-DELAY switch is in the ADVANCE position and lags when the switch is in the DELAY position.
- 4) TRIG Output. This output is used to trigger the scope time base. The output is a TTL level 100 ns (approx.) pulse capable of driving a fifty-Ohm load.
- 5) PW Control. A pot control and two-position range switch which vary the output pulse width from 50 to 500 ns and 0.5 us to 5.0 us.
- 6) AMP Control. A pot control which varies the output pulse amplitude from 0 to 250 V to a 50 Ohm load.
- 7) MODE. With this switch in the INT position, the PRF of the AVO unit is controlled via an internal clock, which in turn is controlled by the PRF control. With the switch in the EXT position, the AVO unit requires a 50 ns (or wider) TTL level pulse applied at the TRIG input in order to trigger the output stages. In addition, in this mode, the scope time base must be triggered by the external trigger source. With the MODE switch in the EXT A position the output pulse width is controlled by the PW controls. With the MODE switch in the ET B position, the output pulse width equals the input trigger pulse width. For single pulse operation, set the MODE switch in the MAN position.
- 8) SINGLE PULSE. For single pulse manual operation, set the front panel INT-EXT-MAN switch in the MAN position and push the SINGLE PULSE button.
- 9) OVERLOAD. An automatic overload protective circuit controls the front panel overload light. If the unit is overloaded (by operating at an exceedingly high duty cycle or by operating into a very low impedance), the protective circuit will turn the output of the instrument OFF and turn the indicator light ON. The light will stay ON *(i.e. output OFF) for about 5 seconds after which the instrument will

attempt to turn ON (i.e. light OFF) for about 1 second. If the overload condition persists, the instrument will turn OFF again (i.e. light ON) for another 5 seconds. If the overload condition has been removed, the instrument will turn on and resume normal operation. Overload conditions may be removed by:

- 1) Reducing the PRF
- 2) Reducing the pulse width

FIG. 5: BACK PANEL CONTROLS



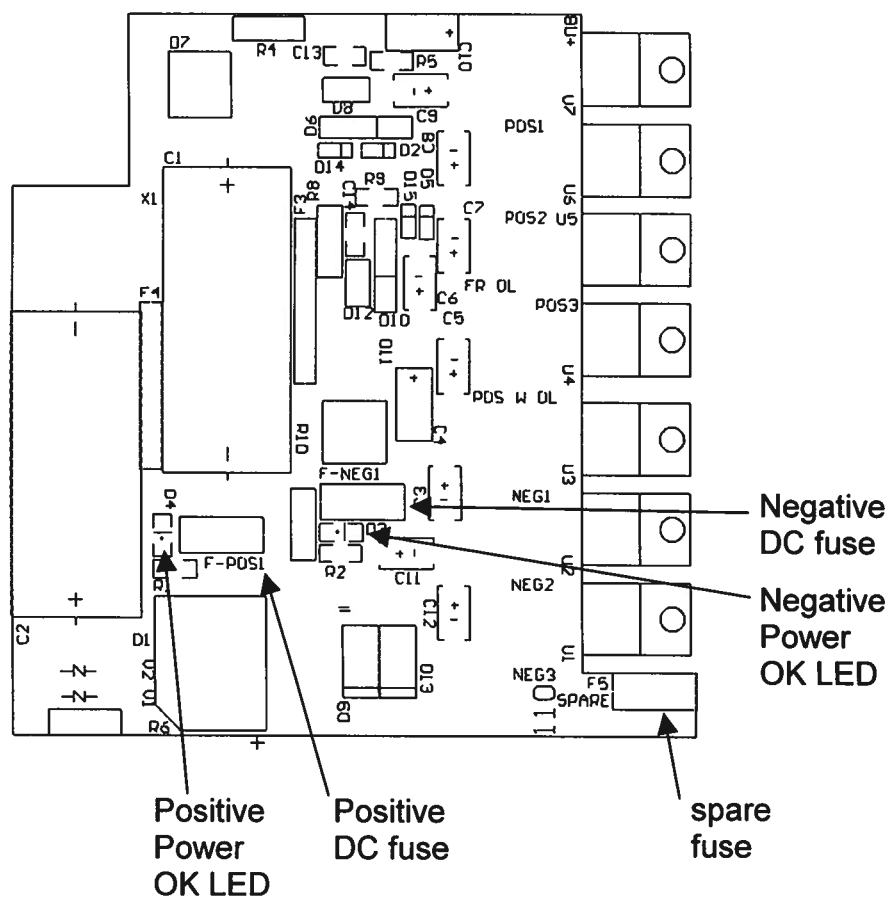
BACK PANEL CONTROLS

- 1) FUSED CONNECTOR, VOLTAGE SELECTOR. The detachable power cord is connected at this point. In addition, the removable cord is adjusted to select the desired input operating voltage. The unit also contains the main power fuse (0.5 A SB).
- 2) OUT. SMA output connector provides 0 to 250 Volts to the AVO-6D-T output module.

POWER SUPPLY AND FUSE REPLACEMENT

This instrument has three fuses (plus one spare). One, which protects the AC input, is located in the rear-panel power entry module, as described in the “Rear Panel Controls” section of this manual. If the power appears to have failed, check the AC fuse first.

The other two fuses (plus one spare) are located on the internal DC power supply, as shown below:



The positive fuse and the spare fuse on this circuit board are 1A slow-blow fuses, Littlefuse part number R452001. (This fuse can be ordered from Digikey, www.digikey.com. The Digikey part number is F1343CT-ND). The negative fuse is a 0.5A slow-blow fuse (Littlefuse R452.500, Digikey part number F1341CT-ND).

If you suspect that the DC fuses are blown, follow this procedure:

1. Remove the top cover, by removing the four Phillips screws on the top cover and then sliding the cover back and off.

2. Locate the two "Power OK" LEDs on the power supply circuit board, as illustrated above.
3. Turn on the instrument.
4. Observe the "Power OK" LEDs. If the fuses are not blown, the two LEDs will be lit (bright red). If one of the LEDs is not lit, the fuse next to it has blown.
5. Turn off the instrument.
6. If a fuse is blown, use needle-nose pliers to remove the blown fuse from its surface-mount holder.
7. Replace the fuse.