INSTRUCTIONS

MODEL AVO-8D-C-P-M 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 dissembled, 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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CAUTION

AVO-8D-C-M units with Serial Numbers higher than 8090 include the following changes:

a) The MONITOR OUT calibration factor is:

0.5V $\approx$ 500 Amps (to $\geq$ 1K)
(rather than 2.0V)

b) The black and red cables interconnecting the -PG module and the mainframe have been eliminated.

FIG. 1: PULSE GENERATOR TEST ARRANGEMENT

GENERAL OPERATING INSTRUCTIONS

1) The equipment should be connected in the general fashion shown above. Since the AVO unit provides an output pulse rise time as low as 0.1 us a fast oscilloscope (at least 50 MHz) should be used to display the waveform.

2) The user supplied lab power supply attaches to the -PG output module via the red and black SUPERCON connectors which are supplied. The positive terminal of the power supply is to be connected to the RED SUPERCON connector on the -PG module. The negative terminal on the lab power supply is to be connected to ground and to the BLACK SUPERCON connector on the -PG module.

3) The TRIG output channel provides TTL level signals. The TRIG output precedes the main output when the front panel ADVANCE-DELAY switch is in the 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 INT-EXT-MAN 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 terminals of the pulse generator module consists of the 1.5 x 4.0 cm copper bus bars protruding from the end of the -PG modules. The load may be bolted to the output bus bars using 10-32 bolts.

6) When the PW MODE switch is in the INT position, the output pulse width is controlled by the 3 position range switch and one turn fine control. (See (8) for PW control when the PW MODE switch is in the EXT position).

7) The output amplitude is controlled by the amplitude of the DC potential supplied to the SUPERCON connectors on the PG module. CAUTION!! DO NOT EXCEED 55 VDC.

8) An external clock may be used to control the output PRF of the unit by setting the front panel INT-EXT-MAN switch in the EXT position and applying a 50 ns (or wider) TTL level pulse to the TRIG BNC connector input. The external clock may also be used to control the output pulse width by setting the PW mode switch in the EXT position (in this case, $PW_{OUT} = PW_{IN}$).

9) The AVO-8D is designed to supply up to 500 Amperes peak to a maximum load voltage of 50 Volts. Factory tests are conducted with a 0.1 Ohm load capable of dissipating at least 4000 Watts. Higher load resistance values may be used but the input voltage must be limited to 55 Volts or less. Note that the unit may fail if the average output current exceeds 100 Amp.

10) Model AVO-8D will operate with a duty cycle at least as high as 85% when the pulse width is controlled by the front panel PULSE WIDTH and PULSE WIDTH RANGE controls. Note that the average output current must never exceed 100 Amp.

11) Model AVO-8D-C includes a high voltage protection circuit which sounds a loud audible alarm if the applied DC voltage exceeds ≈ 55 VDC. The output stages of the unit will not trigger while the alarm is sounding. The unit also includes a temperature limit circuit which sounds an audible alarm if the temperature of the output stage switching elements exceeds +35°C.

12) The unit can be converted from 110 to 220V 50-60 Hz operation by adjusting the voltage selector card in the rear panel fused voltage selector cable connector assembly.

13) The rear panel monitor output BNC (M) provides an output voltage (to 50 Ohms or higher) which is proportional to the current flowing through the bus bar output terminals (0.5 V ≈ 500 Amps).

14) If application assistance is required:

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FRONT PANEL CONTROLS

(1) ON-OFF Switch. Applies basic prime power to all stages.

(2) PRF Control. Varies PRF from 0.1 Hz to 1 kHz as follows:

Range 1	0.1 Hz to 1 Hz
Range 2	1 Hz to 10 Hz
Range 3	10 Hz to 0.1 kHz
Range 4	0.1 kHz to 1 kHz

(3) DELAY Control. Controls the relative delay between the reference output pulse provided at the TRIG output (4) and the -PG output. This delay is variable as follows:

Range 1	10 us to 100 us
Range 2	100 us to 1 ms
Range 3	1 ms to 10 ms

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 one turn control and 3 position range switch which varies the output pulse width as follows (when the PW MODE switch is in the INT mode):

Range 1	10 us to 100 us
Range 2	100 us to 1 ms
Range 3	1 ms to 10 ms

(6) OUT Connector. A multi pin connector which attaches the 2 foot cable from the pulse generator module to the main frame.

(7) EXT-INT Control. With this toggle 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 controls. With the toggle 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.

For single pulse operation, place the switch in the MAN position and push the single pulse button.

(8) PW MODE. With the MODE switch in the INT position the PW is controlled by the front panel controls whether the unit is triggered internally or externally. When the switch is in the EXT position, the PW is controlled by the TTL PW applied externally to the TRIG input.

FIG. 3: 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 (0.25 A SB).

(2) M OUT. BNC connector provides output voltage (to $R_L \geq 1000$ Ohms) which is proportional to load current through the bus bar output terminals (0.5 V $\approx$ 500 Amp).

FIG. 4: SYSTEM BLOCK DIAGRAM

START-UP CHECK LIST

1) The instruction manual has been studied thoroughly.

2) The -PG module is connected to the mainframe.

3) The load is connected to the output module. If the load is a diode, the anode of the load is connected to the OUT terminal. Note that with a diode load, a current limiting high power resistor must be placed in series with the diode to help limit the peak current. For initial testing, it is recommended that a resistive load be used. Factory tests are conducted using a 0.1 Ohm 4000 Watt resistive load.

4) The user-supplied lab power supply is connected with the positive terminal connected to the red SUPERCON on the PG module and the negative terminal connected to the black SUPERCON. The negative terminal is grounded. The power supply potential is set to zero.

5) Set the mainframe pulse width and PRF controls at the approximate desired values (while insuring that the duty cycle is less than 10%).

6) Set the INT-EXT switch on INT.

7) Connect the rear panel M output to the scope (1 VOLT/DIV) and connect the TRIG out to the scope time base.

8) Turn on the prime power to the mainframe. The scope time base should be triggering.

9) Connect a scope probe across the resistive test load and apply prime power to the lab power supply (after first insuring that the output amplitude is set to zero).

10) Gradually increase the output amplitude on the lab power supply and observe the waveforms on the scope and the DC current level on the DC power supply. A rectangular pulse should appear on the scope (for both the load voltage and monitor channels) and the amplitude should increase as the amplitude control on the mainframe is rotated clockwise. At the same time, the average current supplied by the DC supply will increase.

11) Observe the pulse width and pulse period on the scope and confirm that the duty cycle does not exceed 10% and that the peak current does not exceed 500 Amps (i.e. 0.5 Volts out from the monitor output).

12) Observe the DC current supplied by the DC supply and insure that the average current does not exceed 100 Amperes.

13) Adjust pulse width, pulse period (i.e. PRF) and amplitude to obtain the desired settings.

14) If additional assistance is required:

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