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INSTRUCTIONS

MODEL AVR-G1-C-PN 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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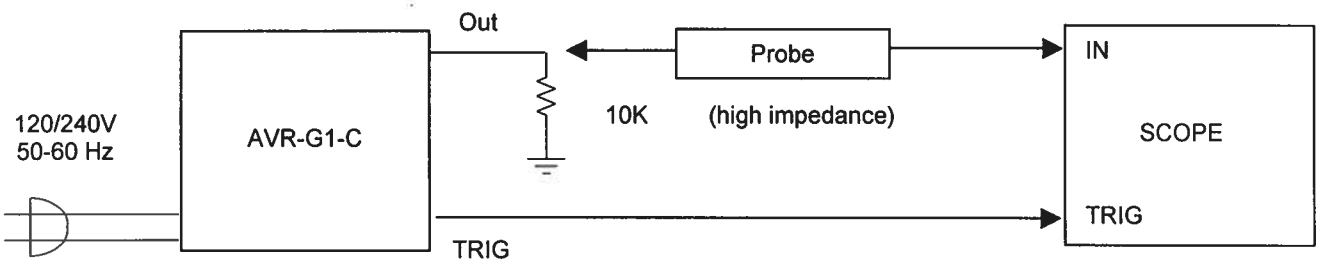
FIG. 1: PULSE GENERATOR TEST ARRANGEMENT



GENERAL OPERATING INSTRUCTIONS

1) CAUTION: EXTREME CAUTION SHOULD BE FOLLOWED WHEN USING THIS INSTRUMENT AS IT GENERATES OUTPUT PULSE AMPLITUDES AS HIGH AS 250 VOLTS.

2) The bandwidth capability of components and instruments used to display the pulse generator output signal (attenuators, cables, connectors, etc.) should exceed 100 MHz.

3) The desired output polarity is selected by means of the front panel POLARITY switch. CAUTION: To avoid stressing the output stages the amplitude should be turned down to near zero before changing the polarities. Note that protection circuitry inhibits polarity reversal if the output voltage exceeds about 75 Volts.

4) 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.

   The DELAY control controls the relative delay between the reference output pulse provided at the TRIG output and the main output. This delay is variable over the range of 0.1 us to 1 ms:

	MIN	MAX
Range 1	0.1 us	1.0 us
Range 2	1.0 us	10 us
Range 3	10 us	100 us
Range 4	100 us	1 ms

5) The output pulse width is controlled by means of the front panel ten-turn PW control and by the PW RANGE control. Note that the MODE A-B switch must be in the A position. The minimum and maximum PW for each range and the corresponding maximum PRF are as follows. Note that the unit may fail if operated at duty cycles exceeding 20%:

	PW min	PW max
Range 1	0.1 us PRF max 1 kHz	1.0 us PRF max 1 kHz
Range 2	1.0 us	10 us

	PRF max 1 kHz	PRF max 1 kHz
Range 3	10 us PRF max 1 kHz	100 us PRF max 1 kHz
Range 4	100 us PRF max 1 kHz	1 ms PRF max 200 Hz

To voltage control the output pulse width within each range, set the rear panel switch in the EXT position and apply 0 to +10 Volts between terminal A and ground ($R_{IN} \geq 10K$). (option).

6) To obtain a stable output display the PRF control on the front panel should be set mid range. The front panel INT-EXT toggle switch should be in the INT position and the MODE A-B switch should be in the A 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 and PRF FINE controls.

7) The output pulse amplitude is controlled by means of the front panel ten-turn AMP control. To voltage control the output amplitude, set the rear panel switch in the EXT position and apply 0 to +10 Volts between BNC terminal A and ground ($R_{IN} \geq 10K$). (EA option).

8) An external clock may be used to control the output PRF of the AVR unit by setting the front panel INT-EXT toggle switch in the EXT position and applying a 50 ns (or wider) TTL level pulse to the TRIG BNC connector input. With the MODE A-B switch in the A position, the output pulse width will be controlled by the front panel PW controls. If the switch is in the B position, the output pulse width equals the input trigger pulse width.

9) For single pulse manual operation, set the front panel INT-EXT-MAN switch in the MAN position and push the SINGLE PULSE button.

10) <u>OVERLOAD INDICATOR</u>. AVR-G-C 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)

11) This unit will safely withstand a short circuit load condition but it is specifically designed to be used with a high impedance load ($R_L \geq 10k$). Never attempt to operate the unit with a 50-Ohm load. The unit has an output resistance of 50 Ohms. The output cable length should not exceed 1 metre as this will cause the rise, fall time to increase.

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 further assistance:

Tel: 613-226-5772
Fax: 613-226-2802
Email: info@avtechpulse.com

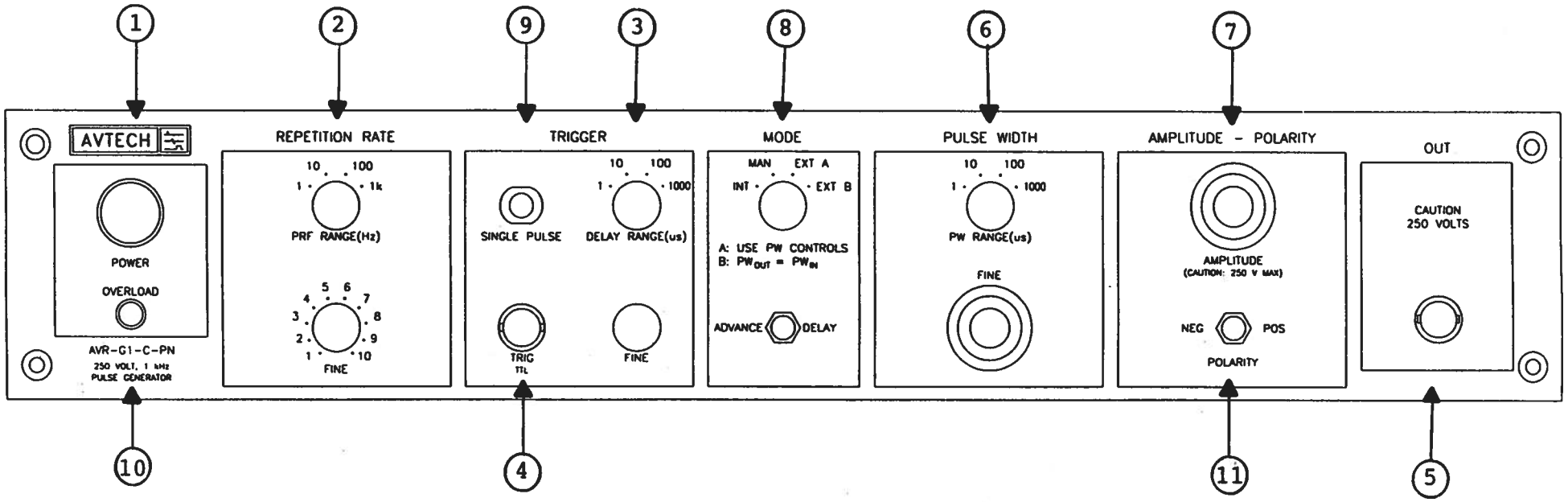


FIG. 2: FRONT PANEL CONTROLS

FRONT PANEL CONTROLS

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

(2) PRF Control. Varies PRF from 1.0 Hz to 1.0 kHz as follows:

Range 1	1	Hz to 10 Hz
Range 2	10	Hz to 100 Hz
Range 3	100	Hz to 1 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 0.1 to about 1 ms. Delay LEADS or LAGS depending on the position of the ADVANCE-DELAY switch.

	MIN	MAX
Range 1	0.1 us	1.0 us
Range 2	1.0 us	10 us
Range 3	10 us	100 us
Range 4	100 us	1 ms

(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. This output precedes the output at (5) if the two-position ADVANCE-DELAY switch is in the ADVANCE position. This output follows the output at (5) if the switch is in the DELAY position. The delay range is variable from 0.1 us to 1 ms. The external trigger signal is applied at this input when the EXT-INT toggle switch is in the EXT position.

(5) OUT Connector. BNC connector provides output to a 10K (or higher) load.

(6) PW Control. A one-turn control (ten turn control for units with the -PWT option) and 4-position range switch, which varies the positive output pulse width from 0.1 us to 1 ms (when the MODE A-B switch is in the A position). The minimum and maximum PW for each range and the corresponding maximum PRF are as follows. Note that the unit may fail if operated at duty cycles exceeding the above.

	PW min	PW max
Range 1	0.1 us PRF max 1 kHz	1.0 us PRF max 1 kHz
Range 2	1.0 us PRF max 1 kHz	10 us PRF max 1 kHz
Range 3	10 us PRF max 1 kHz	100 us PRF max 1 kHz
Range 4	100 us PRF max 1 kHz	1 ms PRF max 200 Hz

7) AMP Control. A ten turn control, which varies the output pulse amplitude.

8) EXT-INT-MAN Control. With this toggle switch in the INT position, the PRF of the AVR unit is controlled via an internal clock, which in turn is controlled by the PRF control. With the toggle switch in the EXT position, the AVR 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 A-B switch in the EXT A position the output pulse width is controlled by the PW controls. With the MODE A-B switch in the EXT B position, the output pulse width equals the input trigger pulse width. For single pulse operation, set the INT-EXT-MAN switch in the MAN position.

9) 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.

10) OVERLOAD INDICATOR. AVR 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)

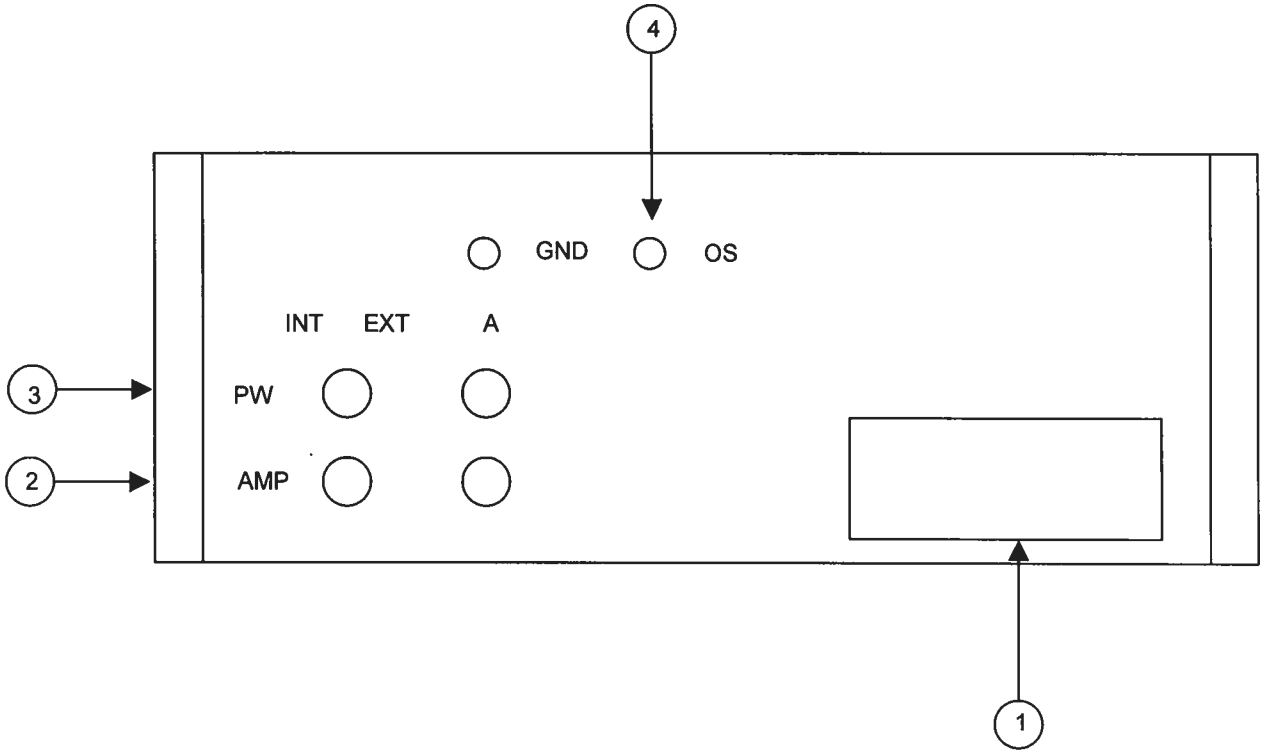
11) POLARITY. The desired output polarity is selected by means of the POLARITY switch. CAUTION: To avoid stressing the output stages the amplitude should be turned down to near zero before changing the polarities. Note that protection circuitry inhibits polarity reversal if the output voltage exceeds about 75 Volts.

TOP COVER REMOVAL AND RACK MOUNTING

1) The interior of the instrument may be accessed by removing the four Phillips screws on the top panel. With the four screws removed, the top cover may be slid back (and off).

2) The -R rack mount kit may be installed after first removing the one Phillips screw on the side panel adjacent to the front handle.

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 (0.5 A SB).

(2) EA. To voltage control the output amplitude, set the switch in the EXT position and apply 0 to +10 Volts between BNC terminal A and ground ($R_{IN} \geq 10K$). (option).

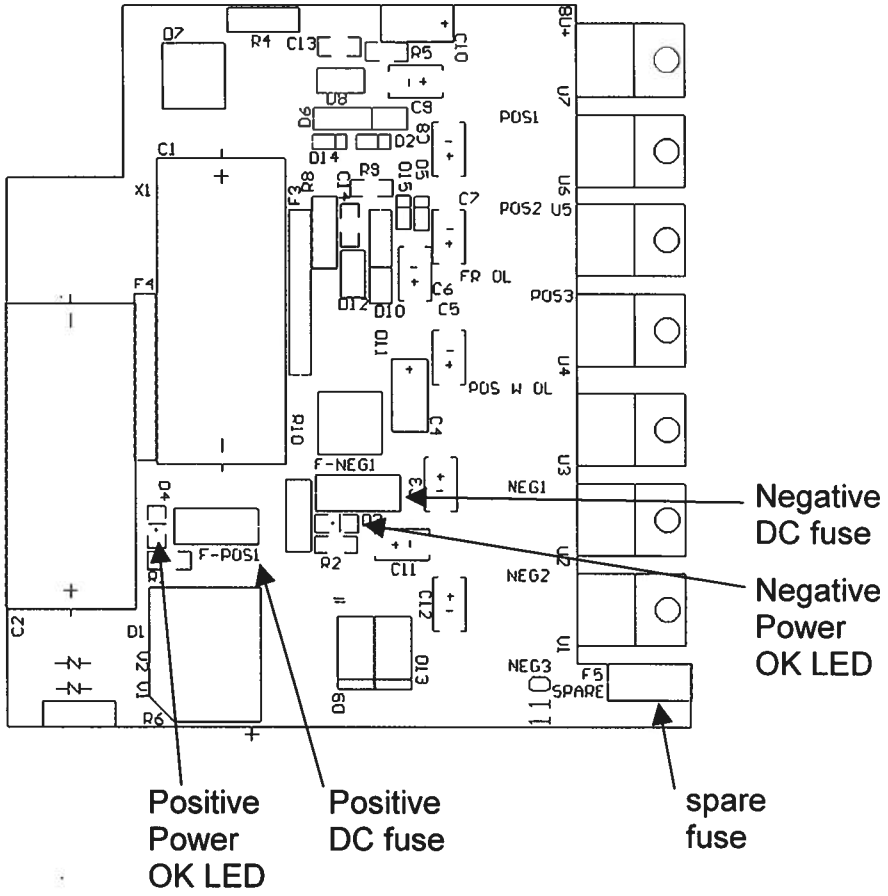
(3) EW. To voltage control the output pulse width, set the switch in the EXT position and apply 0 to +10 Volts between BNC terminal A and ground ($R_{IN} \geq 10K$). (option).

(4) OS. To DC offset the out pulse from 0 to ±50 Volts, apply the required DC potential (0 to ±50 Volts) to this terminal. (option).

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.

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