



# AVTECH ELECTROSYSTEMS LTD.

NANOSECOND WAVEFORM ELECTRONICS  
SINCE 1975

□ P.O. BOX 265  
OGDENSBURG, NY  
U.S.A. 13669-0265  
TEL: (315) 472-5270  
FAX: (613) 226-2802

TEL: 1-800-265-6681  
FAX: 1-800-561-1970

e-mail: [info@avtechpulse.com](mailto:info@avtechpulse.com)  
<http://www.avtechpulse.com>

□ P.O. BOX 5120 STN. F  
OTTAWA, ONTARIO  
CANADA K2C 3H4  
TEL: (613) 226-5772  
FAX: (613) 226-2802

## INSTRUCTIONS

### MODEL AVMH-4-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

Phone: 613-226-5772 or 1-800-265-6681

Fax: 613-226-2802 or 1-800-561-1970

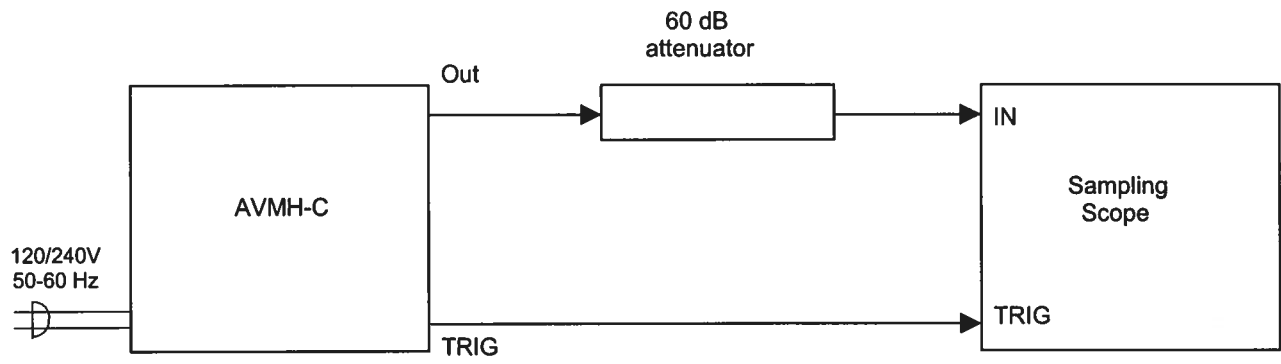
E-mail: [info@avtechpulse.com](mailto:info@avtechpulse.com)

World Wide Web: <http://www.avtechpulse.com>

## TABLE OF CONTENTS

WARRANTY .....	2
TABLE OF CONTENTS .....	3
FIG. 1: PULSE GENERATOR TEST ARRANGEMENT .....	4
GENERAL OPERATING INSTRUCTIONS .....	5
FIG. 2: FRONT PANEL CONTROLS .....	7
FRONT PANEL CONTROLS .....	8
FIG. 3: BACK PANEL CONTROLS .....	10
BACK PANEL CONTROLS .....	11
POWER SUPPLY AND FUSE REPLACEMENT .....	12
PERFORMANCE CHECK SHEET .....	14

FIG. 1: PULSE GENERATOR TEST ARRANGEMENT

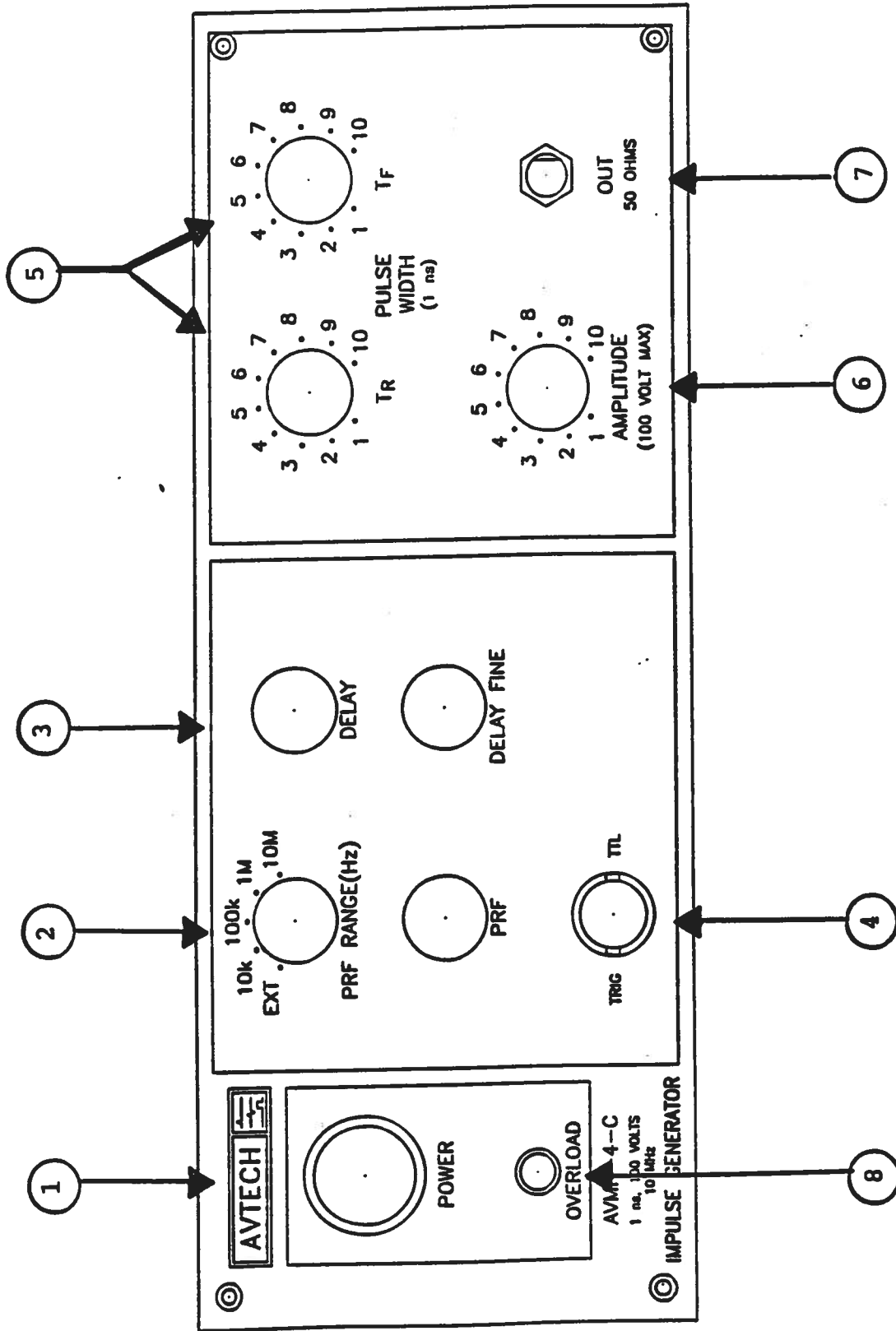


## GENERAL OPERATING INSTRUCTIONS

- 1) The bandwidth capability of components and instruments used to display the pulse generator output signal (attenuators, cables, connectors, etc.) should exceed ten gigahertz.
- 2) The use of 60 dB attenuator at the sampling scope vertical input channel will insure a peak input signal to the sampling scope of less than one Volt.
- 3) The TRIG output channel provides a +2 Volt 20 ns pulse.
- 4) To obtain a stable output display the PRF control on the front panel should be set mid-range while the PRF range switch may be in either range (But not in the EXT position). The front panel DELAY control and the scope triggering controls are then adjusted to obtain a stable output. It is recommended that the DELAY control first be set max counter clockwise and then turned clockwise until a stable display is obtained. The scope may then be used to set the desired PRF by rotating the PRF control and by means of the PRF range switch. The stability of the display on some sampling scopes is very sensitive to the trigger delay setting, particularly at high PRF (eg. 5 to 10 MHz). If necessary, consult your sample scope instructions manual for the proper triggering method.
- 5) The output pulse width is controlled by means of the one-turn  $T_R$  and  $T_F$  controls. The  $T_R$  control controls the position of the leading edge while the  $T_F$  control determines the position of the falling edge. Clockwise rotation of these controls causes the pulse edge to move to the right. It is necessary to sequentially adjust the  $T_R$ ,  $T_F$  and AMP controls to obtain the desired output pulse width and amplitude.
- 6) The output pulse amplitude is controlled by means of the front panel one-turn AMP control. The pulse width may change by several nanoseconds as the output amplitude is reduced from maximum to minimum. Therefore it is convenient to first set the desired amplitude and then set the desired pulse width as described above.

- 7) An external clock may be used to control the output PRF of the AVMH unit by setting the front panel PRF range switch in the EXT position and applying a 10 ns (or wider) TTL level pulse to the TRIG BNC connector input.
- 8) **WARNING:** Model AVMH-C may fail if triggered at a PRF greater than 10 MHz.
- 9) The Model AVMH-C pulse generator can withstand an infinite VSWR on the output port.
- 10) To invert the output of the AVMH unit, connect the AVX-2-T unit to the OUT port. An inverted pulse is then obtained at the OUT port of the AVX-2-T unit. To offset the inverted pulse, apply the required DC level to the DC terminal of the AVX-2-T unit. (PN option).
- 11) To DC offset the output pulse connect a DC power supply set to the required DC offset value to the back panel terminals marked O.S. The maximum attainable DC offset voltage is  $\pm 50$  Volts, 200 mA (option).
- 12) The rear panel monitor output (-M) provides a 20dB attenuated coincident replica of the main output (option).
- 13) 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 the amplitude
  - 3) Reducing pulse width (i.e. switch to a lower range)
- 14) The AVMH-C 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.
- 15) For additional assistance:  
Tel: 613-226-5772  
Fax: 613-226-2802  
Email: [info@avtechpulse.com](mailto:info@avtechpulse.com)

FIG. 2: FRONT PANEL CONTROLS



## FRONT PANEL CONTROLS

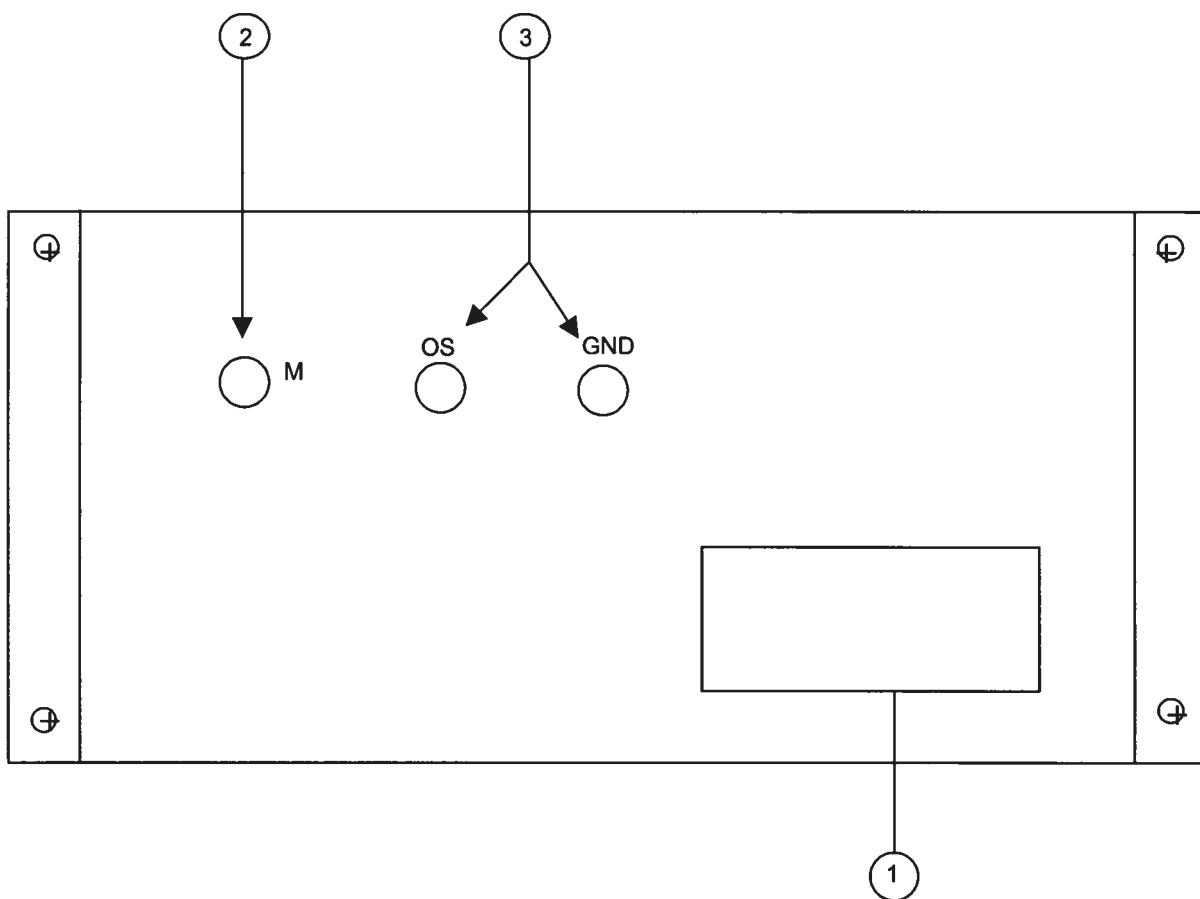
- (1) ON-OFF Switch. Applies basic prime power to all stages.
- (2) PRF Control. With this range switch in the 10K, 100K 1M and 10M positions, the PRF of the AVMH unit is controlled via an internal clock which in turn is controlled by the PRF controls. With the range switch in the EXT position, the AVMH unit requires a 10ns (or wider) TTL level pulse applied at the TRIG input in order to trigger the output stages.
- (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 at least 150 ns.
- (4) TRIG Output. When triggered internally, this output precedes the main output (5) and is used to trigger the scope time base. The output is a +2V 20 ns (approx) pulse capable of driving a fifty-Ohm load. Set scope to trigger on positive edge. The external trigger signal is applied at this point when the PRF INT toggle switch is in the EXT position.
- (5) PW Control. Two one-turn controls which vary the output pulse width.  $T_R$  determines the position of the rising edge while  $T_F$  determines the position of the falling edge.
- (6) AMP Control. A one-turn control which varies the output pulse amplitude from 0 to max output to a fifty-Ohm load.
- (7) OUT Connector. SMA connector provides output to a fifty-Ohm load.



(8) OVERLOAD INDICATOR. 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 the amplitude
- 3) Reducing pulse width (i.e. switch to a lower range)

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.

For AC line voltages of 110-120V, the power selector card should be installed so that the "120" marking is visible from the rear of the instrument.

For AC line voltages of 220-240V, the power selector card should be installed so that the "240" marking is visible from the rear of the instrument.

If it is not set for the proper voltage, remove the fuse and then grasp the card with a pair of pliers and remove it. Rotate horizontally through 180 degrees. Reinstall the card and the correct fuse.

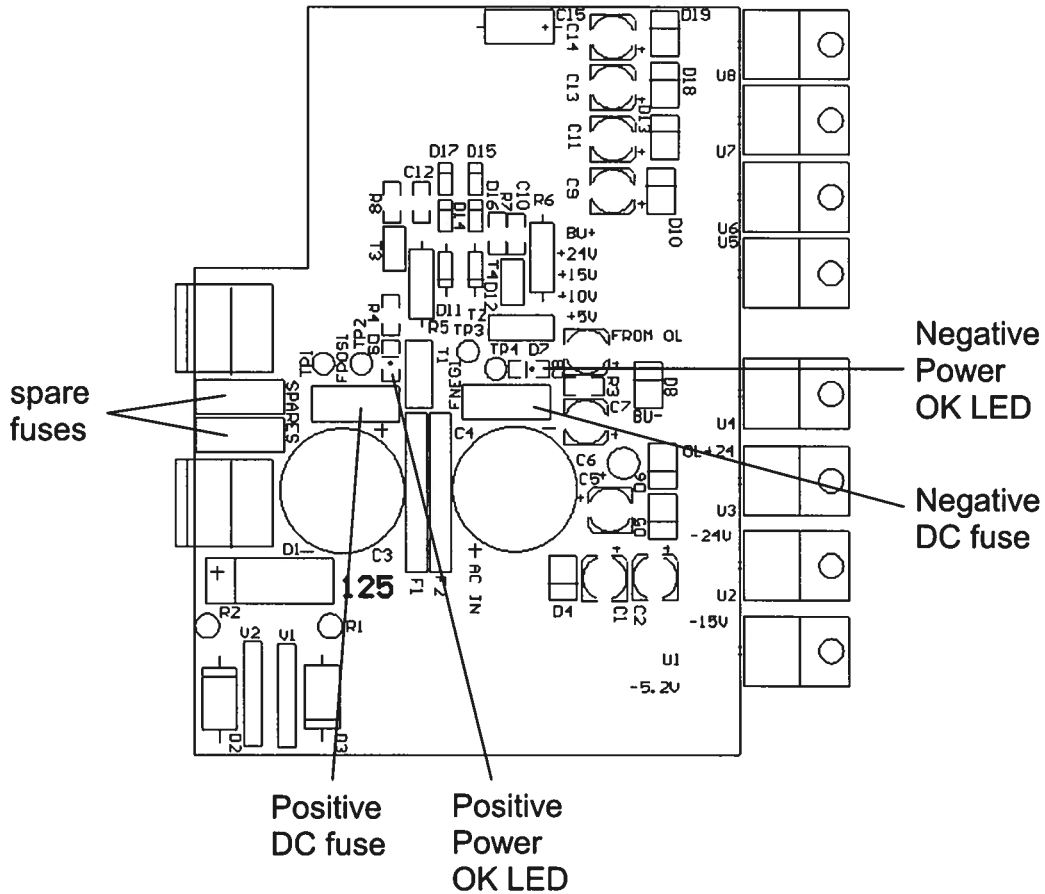
In the 120V setting, a 1.0A slow blow fuse is required. In the 240V setting, a 0.5A slow blow fuse is required.

- (2) MONITOR: The monitor output (-M) provides a 20dB attenuated coincident replica of the main output (option)
- (3) DC OFFSET Input. To DC offset the output pulse, connect a DC power supply set to the desired offset value to these terminals. The maximum allowable DC offset voltage is  $\pm 50$  Volts (200 mA). (OS Option).

## POWER SUPPLY AND FUSE REPLACEMENT

This instrument has three main fuses, plus two spares. 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 two spares) are located on the internal DC power supply, as shown below:



The positive fuse and one of the spare fuses on this circuit board are 1.5A slow-blow fuses, Littlefuse part number R45201.5. (This fuse can be ordered from Digikey, [www.digikey.com](http://www.digikey.com). The Digikey part number is F1344CT-ND). The negative fuse and the second spare fuse are 0.5A slow-blow fuses (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. (Spare 1.5 Amp and 0.5 Amp fuses are provided on the circuit board. They may be transferred to the active fuse locations using needle-nose pliers.)

May 12, 2003