AVTECH ELECTROSYSTEMS LTD.

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INSTRUCTIONS

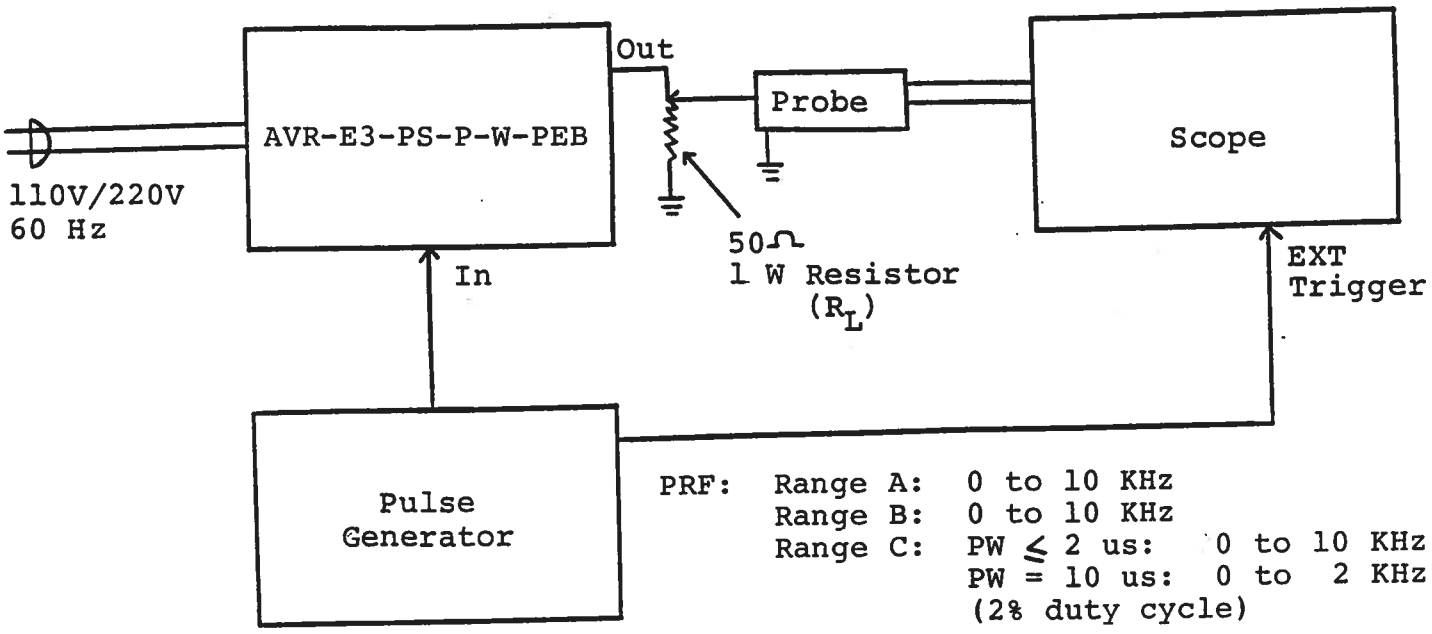
MODEL AVR-E3-PS-N-W-PEB PULSE GENERATOR

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 or liability assumed by Avtech with respect to this product and no other warranty or guarantee is either expressed or implied.

A. TEST ARRANGEMENT



PRF: Range A: 0 to 10 KHz
Range B: 0 to 10 KHz
Range C: PW $\leq$ 2 us: 0 to 10 KHz
PW = 10 us: 0 to 2 KHz
(2% duty cycle)

PW: 50 ns or larger

AMP: +2 to +5 volts
(TTL)

GENERAL OPERATING INSTRUCTIONS

1) The equipment should be connected in the general fashion shown above. Since the AVR unit provides an output pulse rise time as low as one ns, a fast oscilloscope (at least 500 MHz and preferably faster) should be used to display the waveform.

2) The output PRF is equal to the input trigger pulse PRF.

3) The output pulse width is controlled by the ten turn PW control and the 3 position range switch as follows. The max allowable PRF for each range is also shown:

	PW	PRF	
Range A:	2 ns to 6 ns	0 to 10 KHz	
Range B:	6 ns to 100 ns	0 to 10 KHz	
Range C:	100 ns to 2 us	0 to 10 KHz	
	10 us	0 to 2 KHz	(2% duty cycle limit)

4) The output amplitude is controlled by the ten turn AMP control. Note that when the pulse width range is changed (eg. from A to B), the output amplitude will change.

5) Note that when the pulse width range is changed (eg. from A to B), the output amplitude may also change. Also, the propagation delay will also change. The propagation delays for the three ranges are approximately as follows:

   A) 100 ns
   B) 250 ns
   C) 100 ns

6) CAUTION: The maximum PRF, PW or duty cycle conditions must not be exceeded. Under simultaneous conditions of wide pulse width, high PRF and high load current, the bias voltage applied to the output power stage decreases and as a result the attainable output peak voltage decreases to less than 130 volts. Under conditions of severe loading the output stage may be damaged. The output switching elements can be replaced following the procedure given in the following section.

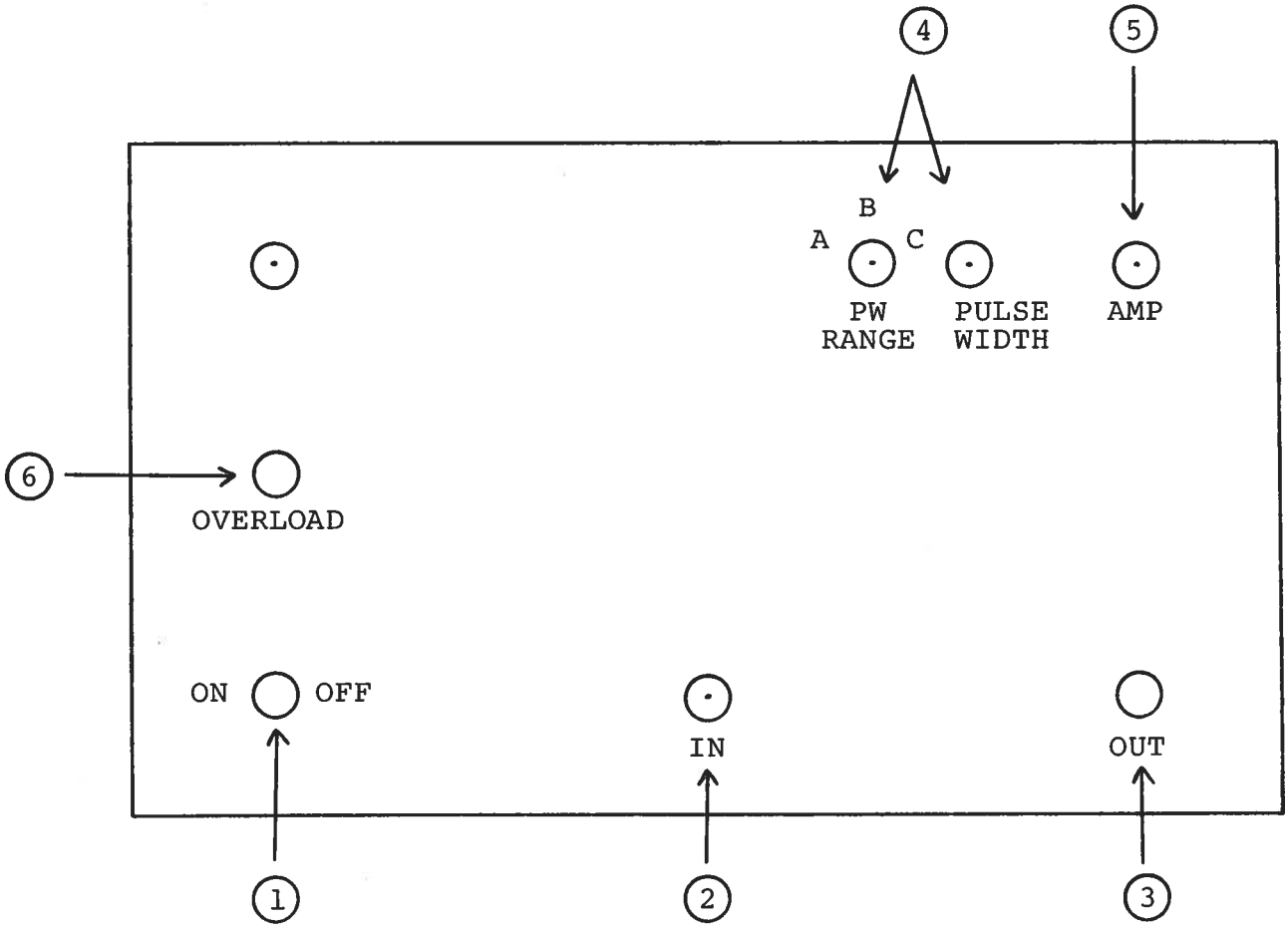
7) OVERLOAD INDICATOR. Units with a serial number higher than 5600 are protected by an automatic overload protective circuit which controls the front panel overload light. If the unit is overloaded (by operating at an exceedingly high duty cycle or by operating into a short circuit), the protective circuit 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 pulse width (i.e. switch to a lower range)
3) Removing output load short circuit (if any)

8) The AVR 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.

B) FRONT PANEL CONTROLS



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

(2) IN. BNC input connector for input TTL trigger signal (PW > 50 ns).

(3) OUT. BNC output connector supplies all three output ranges to a 50 ohm load.

(4) PW Controls. The output pulse width is controlled by the ten turn PW control and the 3 position range switch as follows. The max allowable PRF for each range is also shown:

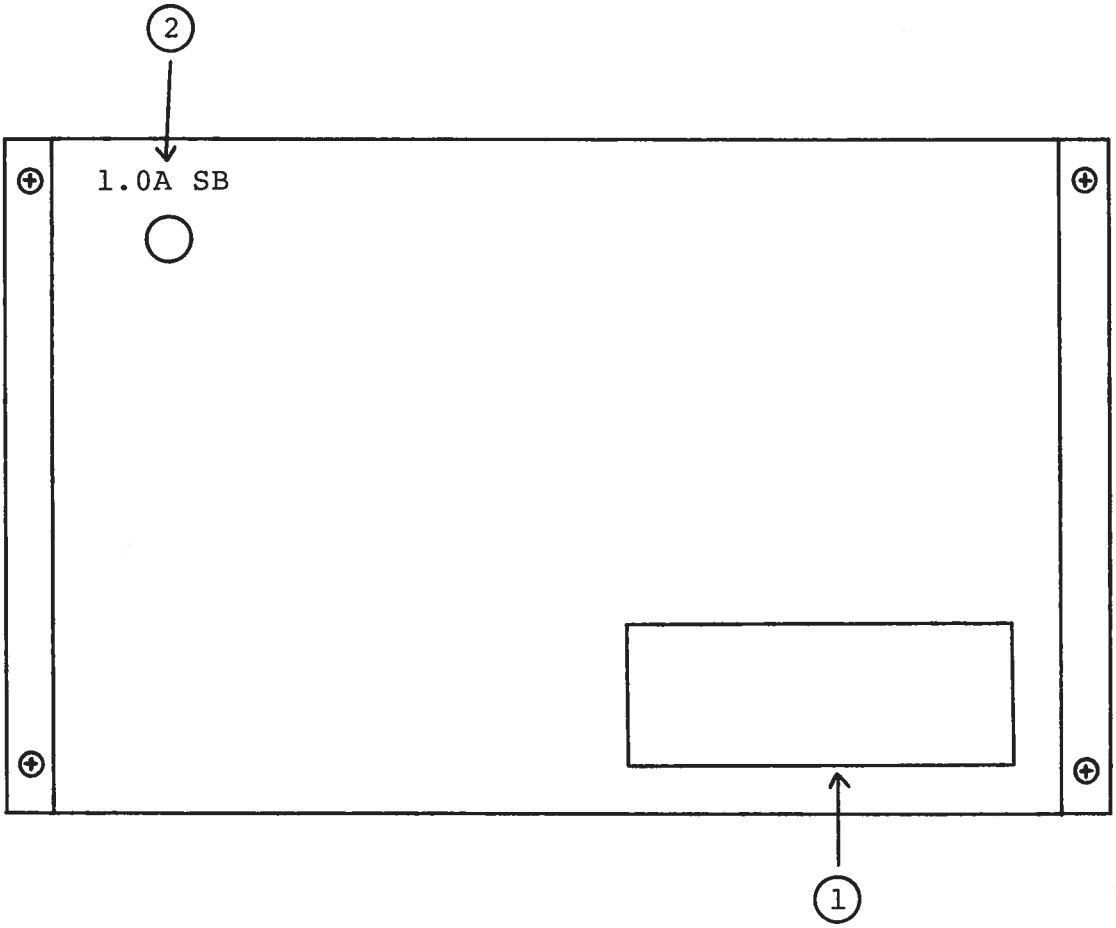
	PW	PRF	
Range A:	2 ns to 6 ns	0 to 10 KHz	
Range B:	6 ns to 100 ns	0 to 10 KHz	
Range C:	100 ns to 2 us	0 to 10 KHz	
	10 us	0 to 2 KHz	(2% duty cycle limit)

(5) AMP Control. The output amplitude (for all three ranges) is controlled by this 10 turn amplitude control.

(6) 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)

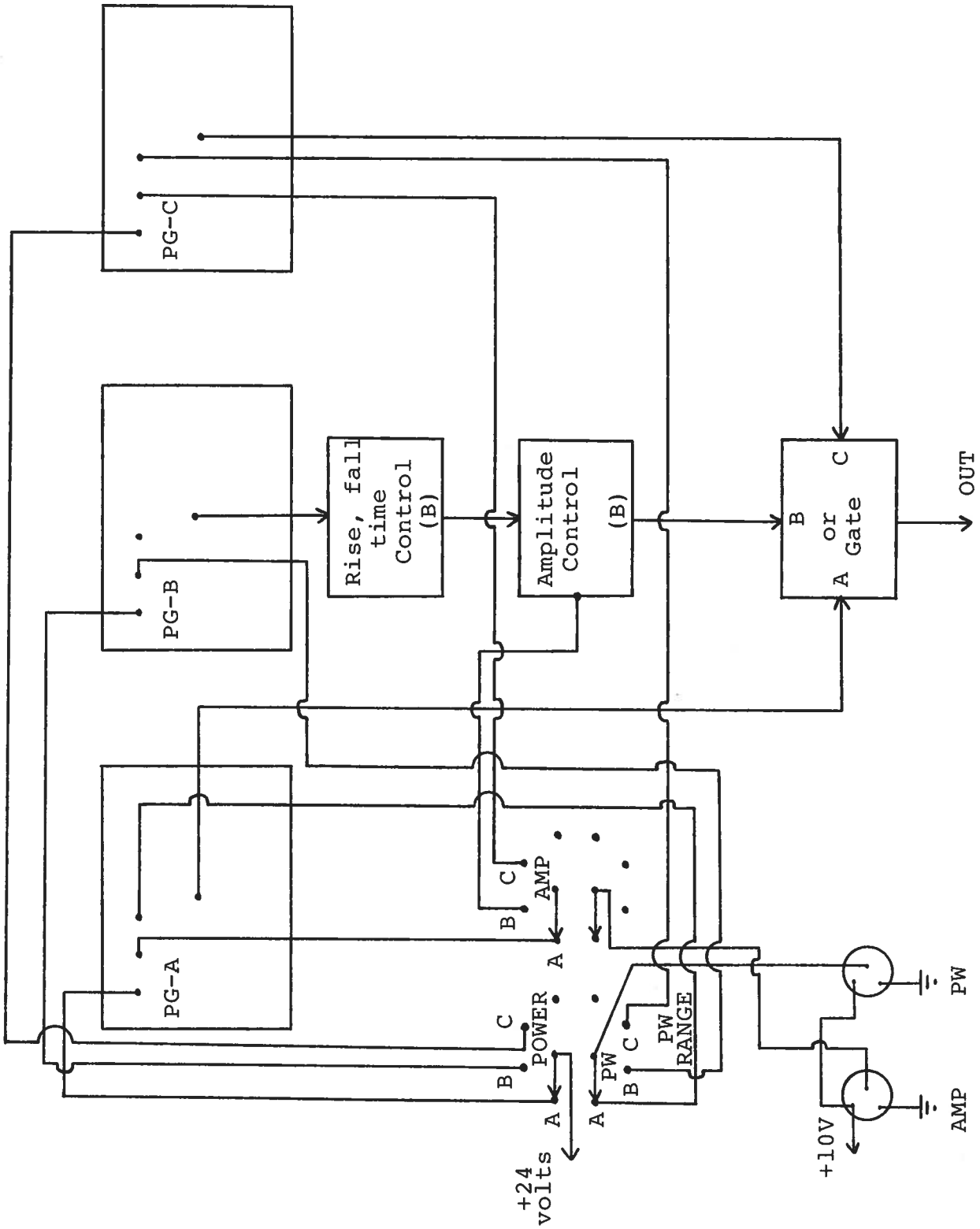
C) REAR PANEL CONTROLS



(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) 1.0A SB. Fuse which protects the output stage if the output duty cycle rating is exceeded.

D) FUNCTIONAL BLOCK DIAGRAM



SYSTEM DESCRIPTION AND REPAIR PROCEDURE

The AVR unit consists of the following basic modules:

a) PG-A pulse generator module
b) PG-B pulse generator module
c) PG-C pulse generator module
d) PS-BC power supply module (generates +390 volts for PG-B module and +150 volts for PG-C module)
e) TRF-B rise time, fall time module for B
f) EA-B amplitude control module for B
g) PE-PC power combiner module (or gate)
h) PS-15 module. Supplies -15V DC to various modules
i) 24 volts DC power supply board
j) AVR-OL overload module

The key modules are interconnected as shown in Fig. D.

In the event that the unit does not provide an output, check the 0.5 Ampere line fuse and the 1.0 Ampere SB fuse in the rear panel fuse holder. If no output is obtained for Range A, then the PG-A module must be replaced. If no output is obtained for Range B, it is most likely that the SL3 switching elements on the side of the PG-B module have failed. The case of the SL3 elements should be at a DC potential of 390 volts. If this potential is substantially less, then the SL3 elements should be replaced. If no output is obtained for Range C, it is most likely that the SL5 switching elements on the bottom of the PG-C module have failed. The SL5 elements may be accessed by removing the 1.5 x 3.0 inch cover plate on the bottom side of the AVR-E3-W-PS chassis and extracting the SL5 elements from their sockets by means of needle nose pliers. The SL5 element is an N channel VMOS transistor in a TO 220 package and its operation may be checked on a curve tracer. When re-installing the SL5 elements, take care to insure that the short lead is placed adjacent to the black dot on the bottom of the chassis.

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