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INSTRUCTIONS

MODEL AVR-4B-PS-PW PULSE GENERATOR

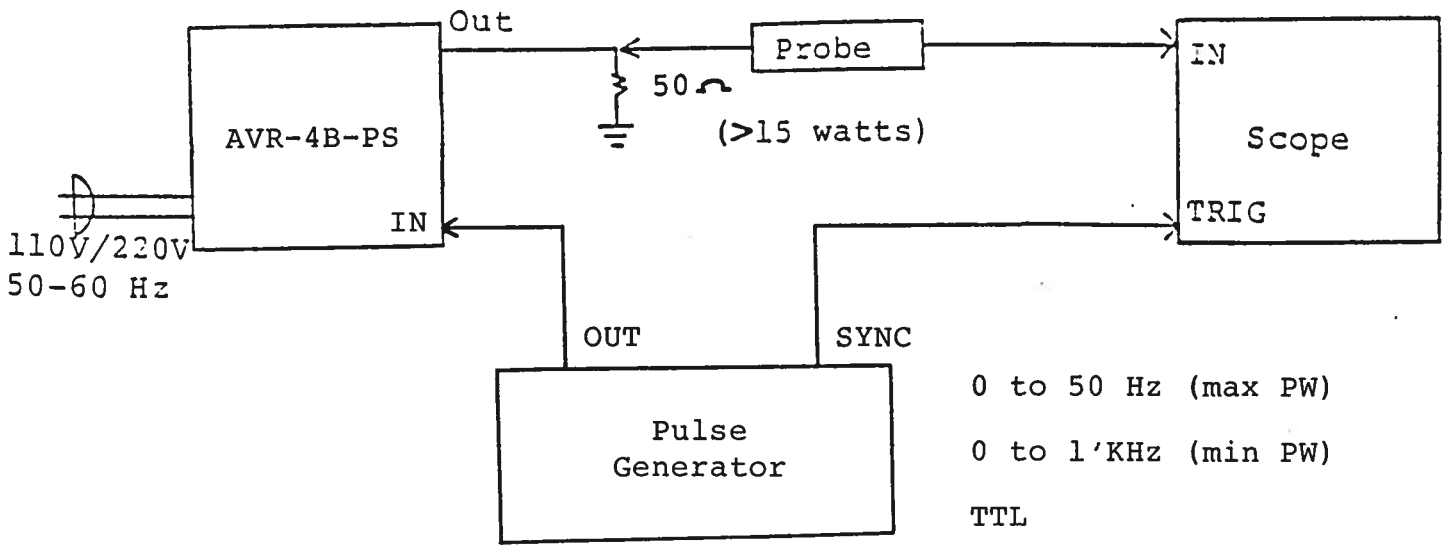
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## WARRANTY

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

Fig. 1

PULSE GENERATOR TEST ARRANGEMENT



Notes:

- 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 output pulse width is controlled by the 3 position PW range switch and the one turn PW control. 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.

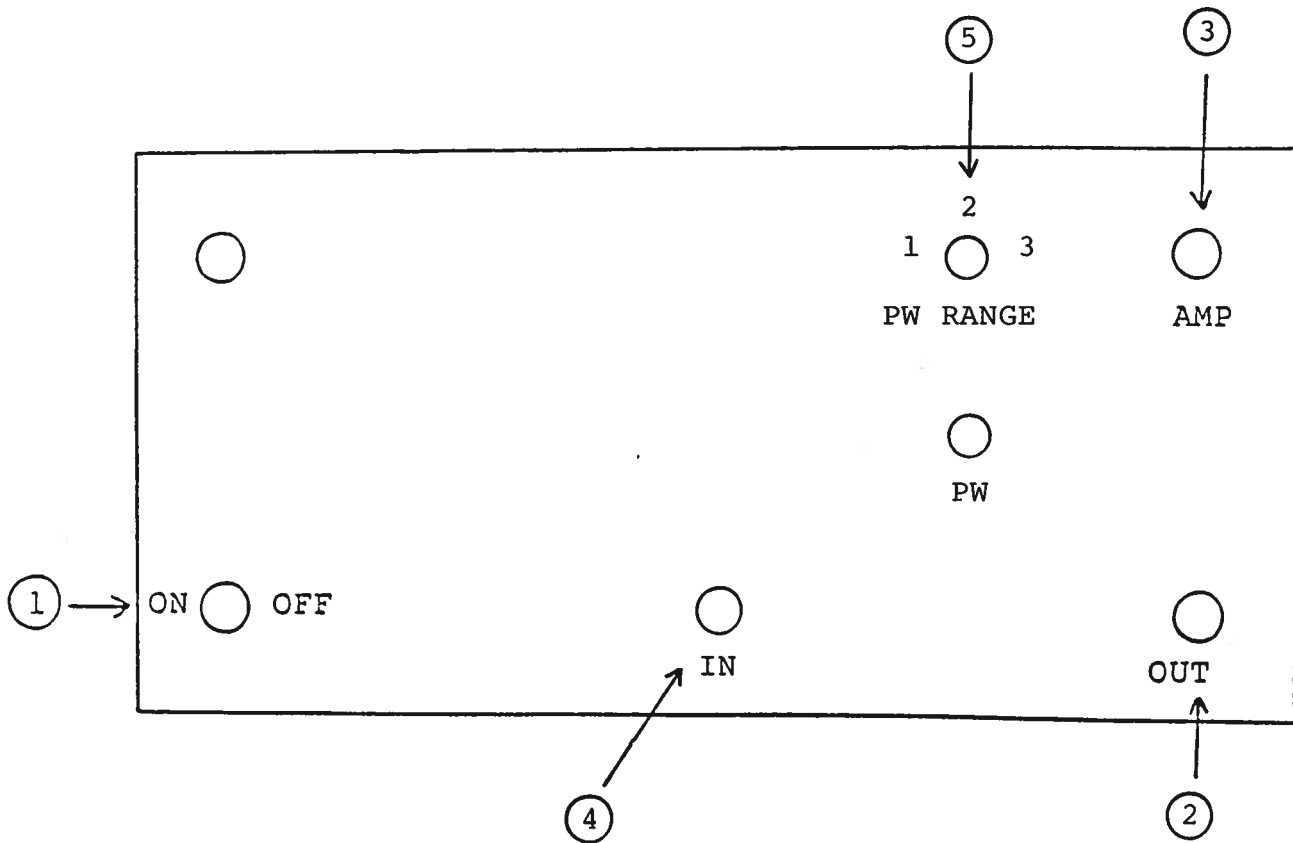
|    | PW min                    | PW max                    |
|----|---------------------------|---------------------------|
| 1) | 0.1 usec<br>PRF max 1 KHz | 1.0 usec<br>PRF max 1 KHz |
| 2) | 1.0 usec<br>PRF max 1 KHz | 10 usec<br>PRF max 500 Hz |
| 3) | 10 usec<br>PRF max 500 Hz | 100 usec<br>PRF max 50 Hz |

- 3) The output pulse amplitude is controlled by means of the front panel one turn AMP control.
- 4) The AVR-4-PS features an output impedance of the order of several ohms (rather than 50 ohms). The following consequences of this feature should be noted:
  - a) When used to switch some semiconductor devices (eg. bipolar and VMOS power transistors), the AVR unit will yield much faster switching times than those provided by 50 ohm pulse generators.
  - b) The AVR unit will safely operate in to load impedances in the range of 50 ohms to an open circuit. However, the fall time may degrade for load impedances higher than 1000 ohms.
  - c) The AVR unit may be effectively converted to a fifty ohm output impedance generator by placing a fifty ohm carbon composition resistor in series with the output of the unit and the load. The maximum available load voltage will then decrease to 200 volts (from 400 volts).
  - d) The output switching elements may fail if the unit is inadvertently operated into a short circuit. The switching elements are easily replaced in the field following the procedure outlined in the REPAIR Section.

- 5) **CAUTION:** The output stage is protected against overload condition by a 0.5 A slow blow fuse on the main frame back panel. However, the output switching elements (SL18T) may fail if the unit is triggered at a PRF exceeding 1 KHz or at duty cycles resulting in an average output power in excess of 16 watts. Heating and subsequent likely failure of the output stage is reduced if the following action is taken where possible:
- a) PRF is kept to a minimum, ie. operate in a low PRF range when possible rather than in a high PRF range.
  - b) Keep the output PW to a minimum.
- 6) 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.

Fig. 2

FRONT PANEL CONTROLS

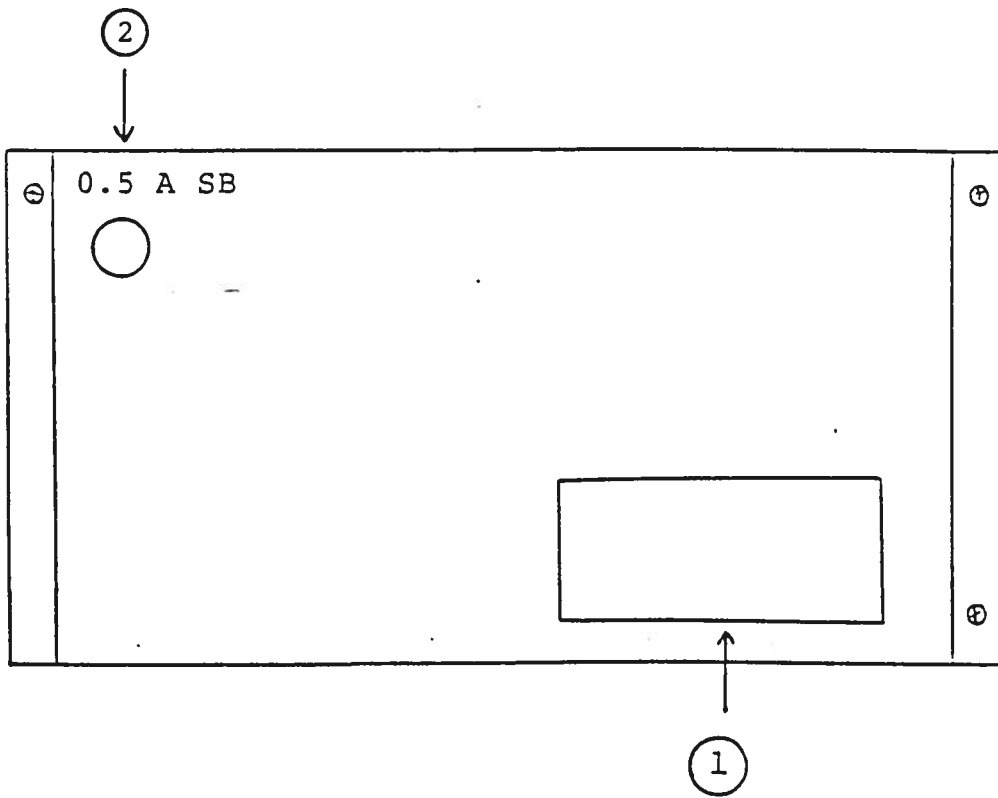


- (1) ON-OFF Switch. Applies basic prime power to all stages.
- (2) OUT Connector. BNC connector provides output to a 50 ohm load.
- (3) AMP Control. A one turn control which varies the output pulse amplitude from 0 to 400 V.
- (4) TRIG Input. The external trigger signal is applied at this input. Note that the output pulse width equals the input trigger pulse width.
- (5) PW Control. A one turn control and 3 position range switch which varies the output pulse width from 0.1 usec to 100 usec. 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 usec<br>PRF max 1 KHz | 1.0 usec<br>PRF max 1 KHz |
| Range 2 | 1.0 usec<br>PRF max 1 KHz | 10 usec<br>PRF max 500 Hz |
| Range 3 | 10 usec<br>PRF max 500 Hz | 100 usec<br>PRF max 50 Hz |

Fig. 3

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) 0.5 A SB. Protects output stage against overload condition.

AVR-4B-PS BLOCK DIAGRAM

Fig. 4

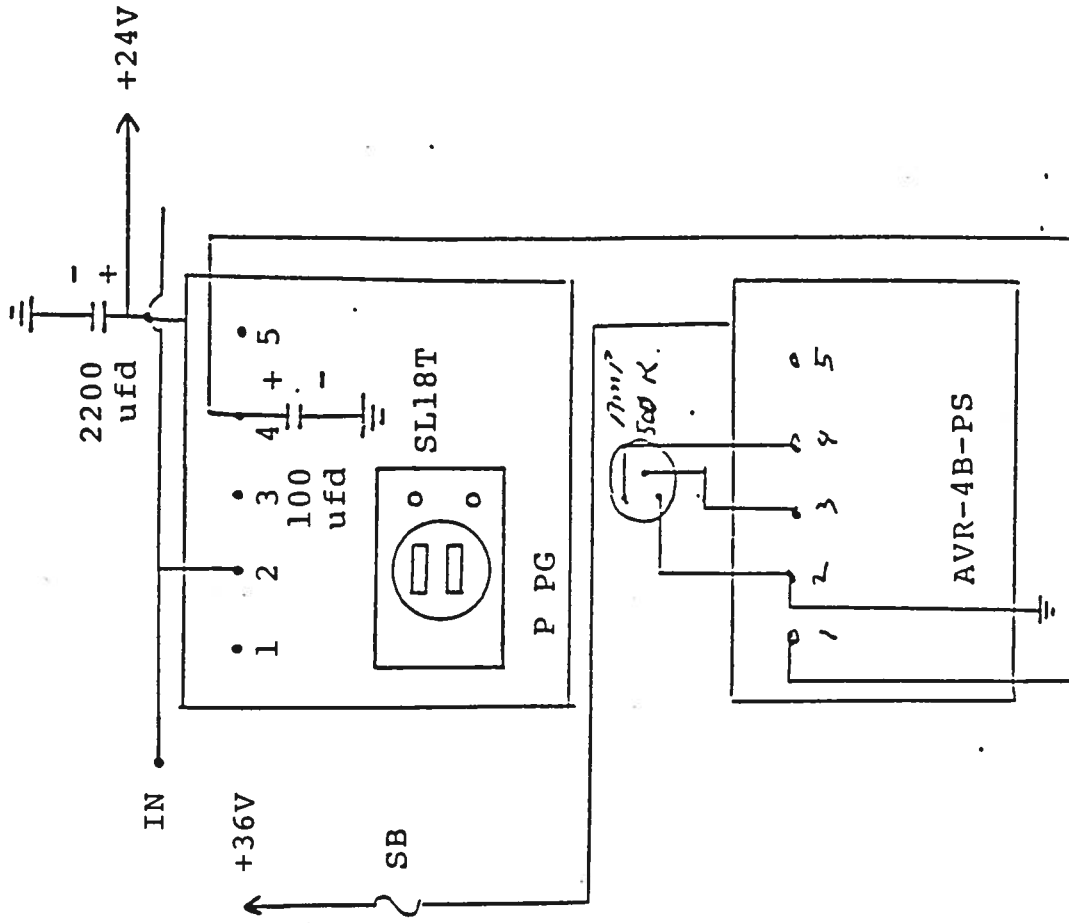
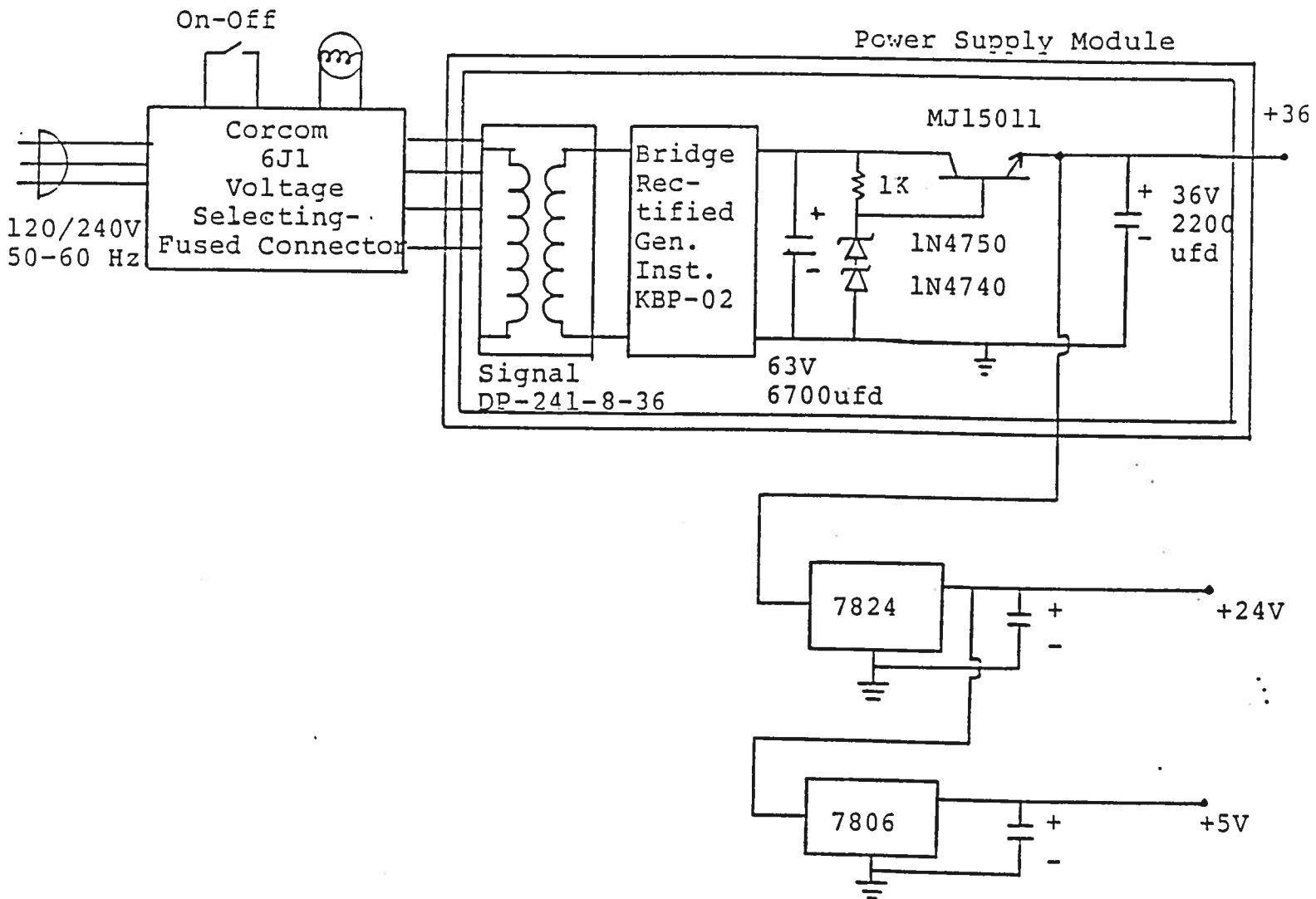


Fig. 4a

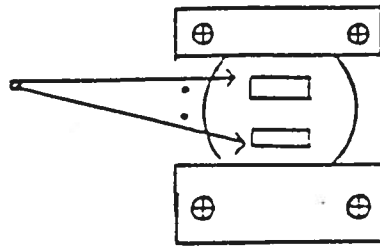
POWER SUPPLY



SL18T HEAT SINKING

BACK

155  
HEAT SINK  
ADHESIVE\*



SHORT LEAD →

## SYSTEM DESCRIPTION AND REPAIR PROCEDURE

The AVR-4-PS consists of the following basic modules:

- 1) AVR-4-PW-PG pulse generator module
- 2) AVR-4-PS power supply module

The modules are interconnected as shown in Fig. 4.

In the event of an instrument malfunction, it is most likely that the 0.5 A slow blow fuse or the main power fuse on the rear panel has blown. Replace if necessary. If the unit still does not function, it is most likely that some of the output switching elements (SL18T) may have failed due to an output short circuit condition or to a high duty cycle condition. The switching elements may be accessed by removing the cover plates on the bottom side of the instrument. The cover plate is removed by removing the two 2-56 Phillips screws. **NOTE:** First turn off the prime power. **CAUTION:** Briefly ground the SL18T tabs to discharge the 400 volts power supply potential. The elements may be removed from their sockets by means of a needle nosed pliers after removing the four counter sunk 2-56 Phillips screws which attach the small aluminum heat sinks to the body of the instrument. The SL18T is a selected VMOS power transistor in a TO 220 package and may be checked on a curve tracer. If defective, replacement units should be ordered directly from Avtech. When replacing the SL18T switching elements, take care to insure that the short lead (of the three leads) is adjacent to the back of the chassis. (See following Fig.). The SL18T elements are electrically isolated from the small aluminum heat sinks but are bonded to the heat sinks using WAKEFIELD TYPE 155 HEAT SINK ADHESIVE.

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