



## OPERATING INSTRUCTIONS MM5 Multimeter

**General:** The instrument is supplied in an attractive plastic case with leads, prods and clips.

**Preliminary Check.** To ensure accurate readings, the instrument must be used face upward. If the pointer does not read zero, the slotted mechanical zero adjuster which is located below the scale should be readjusted.

**The Scale Plate.** Two basic scales are provided, each approximately 2.75 inches (6.98 cm.) in length. The inner scale is for resistance measurements only and is scaled 0-20k $\Omega$  (125  $\Omega$  mid-scale). The outer scale is for a.c. and d.c. voltage and d.c. current; it has 50 divisions which are calibrated 0-25 and 0-100.

**Construction:** New materials, new techniques and considerable reduction in component complexity ensure increased reliability and ease of servicing.

Three precision thick film networks (representing a total of twelve discrete components) reduce the number of components to a minimum. Each network comprises precision matched resistors appropriate to the particular function for which they are required. They should be handled with care, particularly when opening the instrument to replace batteries, etc.

### WARNING

For maximum user safety, care should be taken to ensure that when measuring voltages the instrument should not be switched to either the current or resistance range.



## USING THE INSTRUMENT

**A.C. and D.C. Voltage Measurements.** To measure a.c. or d.c. voltage the leads should be connected across the source to be measured, the basic scale should be used (i.e. 0-25 or 0-100). The readings obtained should be multiplied by the appropriate factor, e.g., assuming that a 250V mains supply is being measured, the range switch should be set to 250V a.c. The readings should then be made on the scale marked 0-25 and multiplied by ten.

**A.C. Measurement with D.C. Component.** If measuring an a.c. voltage in a circuit also carrying d.c., a capacitor should be connected in series with the instrument to block the d.c. The value of blocking capacitor chosen will depend upon the frequency of a.c. to be measured.

**D.C. Current Measurements.** To measure d.c. current the meter must be connected in series with the circuit under test. Measurements are made in a similar manner to that previously described, except that the scale marked 0-100 is used throughout. The readings obtained, however, should be divided by the appropriate factor.

**Note.** If the voltage or current to be measured is unknown, always switch to the highest range, then switch progressively to a lower range until a suitable pointer deflection is obtained.

**Warning.** Take extreme care when making connections to live circuits, particularly those working at voltages above 50V.

**Resistance and Continuity Measurements.** Select the resistance range required, join the leads together, and adjust the ohms zero control until full scale deflection is obtained (the ohms zero control is situated above the range switch). On switching to the other ohms range, again check the zero and adjust if necessary.

If it is not possible to set the pointer to read zero, it is most likely due to the internal cell (Ever Ready type HP7 (or IEC R6) being discharged. This should be checked and, if necessary, replaced. If the instrument is to be stored for any length of time, it is advisable to remove the cell.

To measure resistance, connect the leads across the component under test: if the "ohms x 1" range is used, a direct reading is given on the scale marked 0-20k $\Omega$ . When using "ohms x 100" range, use the same scale and multiply readings by 100.

**Note.** When switched to resistance ranges, a positive potential appears at the negative socket; this is of particular importance when testing metal rectifiers, electrolytic capacitors and other polarity-conscious components.

**External Accessories.** Four external accessories are available for this instrument. These are: (a) multiplier for the measurement of voltages up to 2500V d.c., and (b) shunts for the measurement of 5, 10 and 25A d.c.

To use the voltage multiplier, the range switch should be set to the 1000V d.c. position and the multiplier plugged in to the high potential socket on the instrument (normally this will be the + socket). The test lead is then inserted into the socket on the multiplier.

To measure d.c. current the instrument should be set to the 0,1mA range. The shunt is then plugged into the test sockets, and the test leads transferred to the shunt sockets.

**Attractive Carrying Cases.** Can be supplied in two versions: one to house the instrument, leads, clips

and prods; the other to house these and also the high voltage multiplier, a d.c. shunt and a pair of prod clips.

**Table of Ranges**

D.C. Current	D.C. Voltage	A.C. Voltage
First indication 2 $\mu$ A	Sensitivity (10 000 $\Omega$ /V) First indication 2mV	Sensitivity (1 000 $\Omega$ /V) First indication 200mV
0-0,1mA (100 $\mu$ A)	0-100mV*	
0-1mA	0- 2,5V	
0-10mA	0- 10V	0-10V
0-100mA	0- 25V	0-25V
0- 1A	0-100V	0-100V
	0-250V	0-250V
	0-1000V	0-1000V

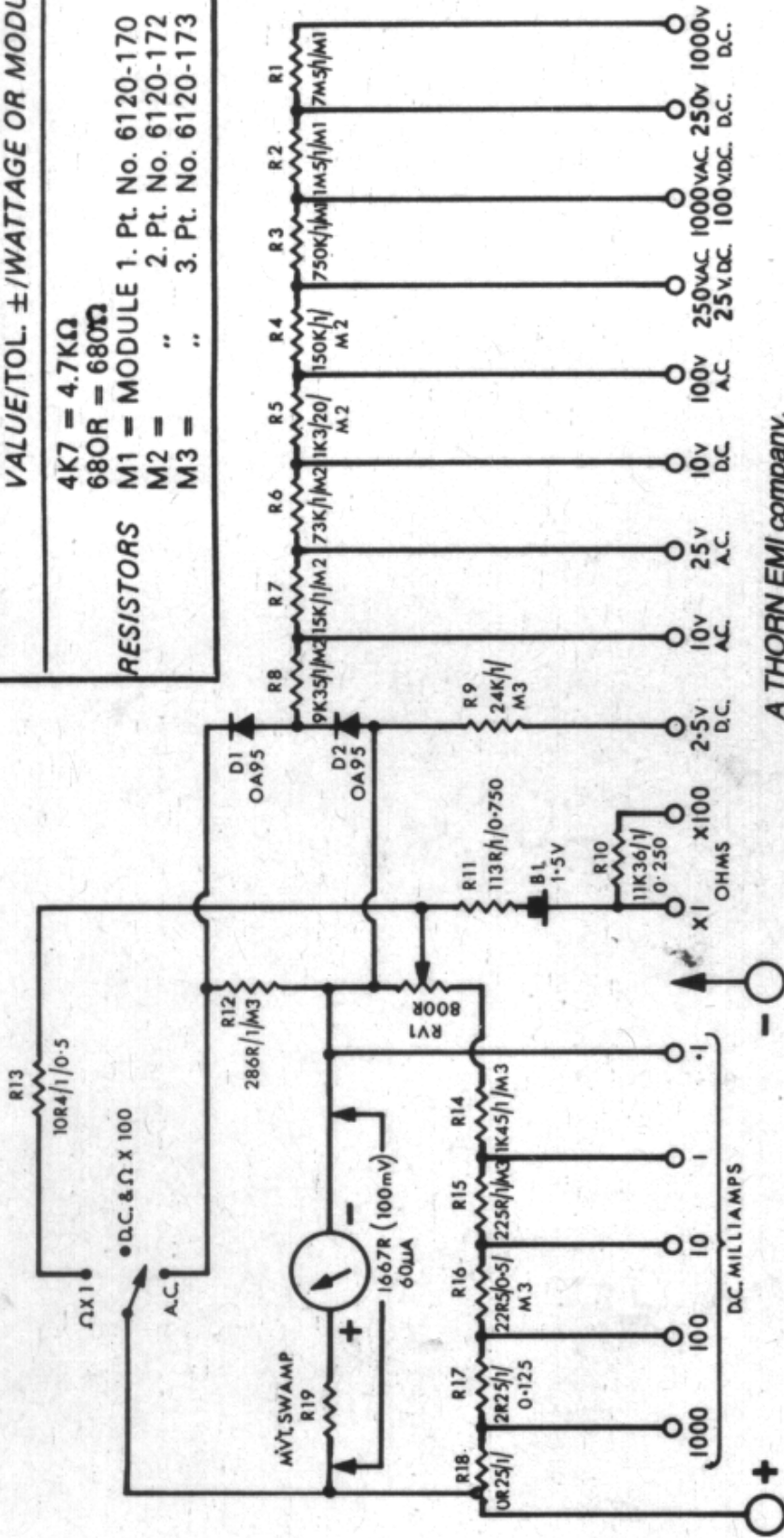
\*Set the range switch to its 0,1mA (100 $\mu$ A) position to obtain the 100mV range.

Resistance	First indication
0-20 000 $\Omega$	5 $\Omega$ .
0-2M $\Omega$	125 $\Omega$ mid-scale } Using internal 12 500 $\Omega$ mid-scale } 1,5V cell

**Accuracy**

- D.C. 2,25% of full scale
- A.C. 2,75% of full scale

# CIRCUIT DIAGRAM: MULTIMINOR Mark 5



CIRCUIT REFERENCE CODING	
VALUE/TOL.	±/WATTAGE OR MODULE
4K7	= 4.7KΩ
680R	= 680Ω
M1	= MODULE 1. Pt. No. 6120-170
M2	= " 2. Pt. No. 6120-172
M3	= " 3. Pt. No. 6120-173

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