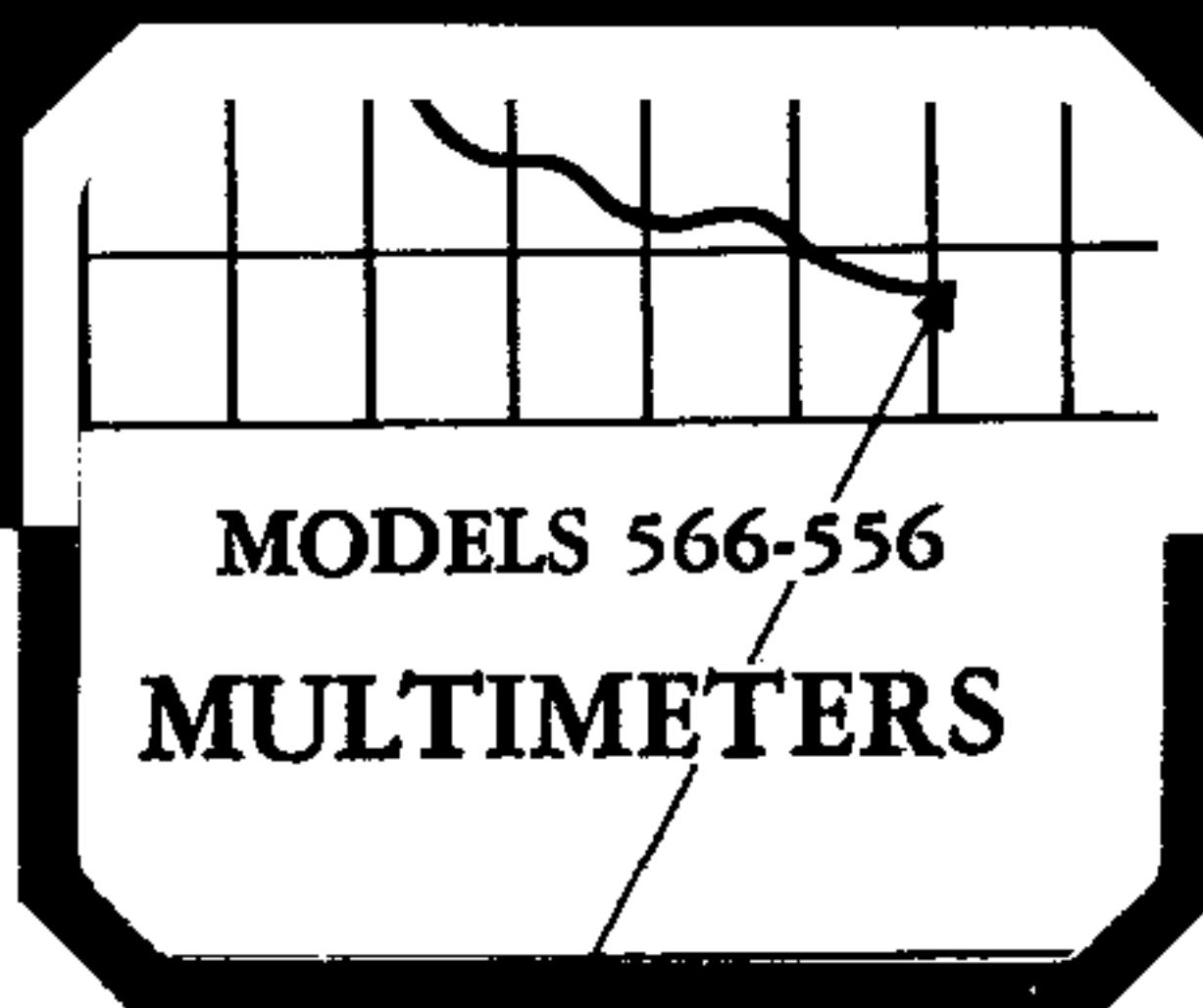


INSTRUCTION MANUAL FOR



**EICO ELECTRONIC
INSTRUMENT CO., Inc.**

283 MALTA STREET,

BROOKLYN, N. Y. 11207

INSTRUCTION AND OPERATING MANUAL
FOR THE MODELS 566 AND 556 MULTIMETERS

General Description

The EICO Model 566 is a 1000 ohm per volt, 38 range multimeter. It has been specifically designed for those engineers and servicemen who want a versatile, highly accurate, and stable instrument that is easily read, portable, and rugged enough for hard daily use.

This instrument provides a-c and d-c voltage measurement from .1 volt (on the 1 volt scale) to 5000 volts (an internal high voltage multiplier is included). It also provides a-c and d-c current measurement from .1ma (on 1ma scale) to 1 ampere. Resistance, output, and decibel ranges bring the total number of useful ranges to 38. An added feature of this instrument is an internal blocking capacitor that can be switched in when it is desired to measure the output signal voltage or the gain in decibels in circuits where d-c is present. Easy reading with less probability of error is obtained by the use of a 400ua, $4\frac{1}{2}$ inch meter.

The Model 556 is identical in every respect to the Model 566 with the exception that 1% multiplier resistors are used. The use of 1% resistors allows a maximum error of 3% of full-scale on d-c and 5% on a-c. This model is desirable where more accurate measurements are required, and is designed to meet the standards of laboratories and schools.

The accuracy, the wide scope of ranges, and the easy-reading features provided in both these instruments will meet almost every type of measurement requirement encountered in the electronics industry.

Specifications

Ranges - -

- D-C Voltage - 0-1-5-10-50-100-500-5000
volts at 1000 ohms per
volt.
- A-C Voltage - 0-1-5-10-50-100-500-5000
volts at 1000 ohms per
volt.
- D-C Current - 0-1-10-100ma and 1 amp.
- A-C Current - 0-1-10-100ma and 1 amp.
- Resistance - RX1 ----- 150 ohms
RX10 ----- 1500 ohms center
Low Ohms -- 55 ohms scale
- Output Voltage - 0-1-5-10-50-100-500-5000
volts.
- Decibels - -20db to +69db in 6 ranges.

Overall Dimensions - - 6 3/4" X 5 1/4" X 3"

Weight - - 2 1/4 pounds

Cabinet - - Highly polished black Bakelite

Panel - - Highly polished black Bakelite

Meter - - 4 1/2 inch face, 400ua movement

Operating Instructions

D-C Voltage Measurement - -

- a) Set the DC-AC-OUTPUT switch at the DC position
- b) Set the RANGE switch at the voltage

range which you can reasonably expect will include the voltage you are measuring. If you are in doubt about the voltage present, always set the switch at the highest voltage range before applying the unknown voltage to the instrument. Failure to observe this precaution may result in serious damage to the meter. If the unknown voltage is too low for accurate measurement on the highest range, rotate the RANGE switch towards the lowest voltage position until the range is found at which the voltage can be read accurately.

- c) When a voltage is being measured on any range except the 5000 volt range, insert the test leads in the pin jacks marked POSITIVE and COMMON. If the pointer is deflected in the wrong direction, simply reverse the test leads.
- d) Voltages in either the 500 or the 5000 volt range are measured with the RANGE switch in the 500V-5KV position. To use the 5000 volt range insert the test leads in the pin jacks marked COMMON and 5KV. Extreme caution must be exercised when making measurements on the 5000 volt range.
- e) DC voltages are read on the black 0-50, 0-100 scales marked DC. When using the 50 and 100 volt ranges, the meter may be read directly. To obtain the indicated voltage in volts on the 10 volt and 1 volt ranges, divide the reading on the 100 scale by 10 and 100 respectively; for the 500 and 5000 volt ranges, multiply the reading on the 50 scale by 10 and 100 respectively.

A-C Voltage Measurement - -

The instructions for A-C voltage measurement are the same as those for D-C voltage measure-

ment with the following differences in procedure and reading.

- a) Set the DC-AC-OUTPUT switch at the AC position.
- b) Read the red 0-50, 0-100 scales marked AC VOLTS on all voltage ranges except the 1 volt range, which is read on the red 0-10 scale marked AC-1V.
- c) The reading of the meter scales corresponding to each range position is the same as for DC with the exception of the special AC-1V scale, which is numbered in tenths of a volt.

D-C Current Measurement - -

- a) Set the DC-AC-OUTPUT switch at the DC position.
- b) Set the RANGE switch at the current range which you can reasonably expect will include the current you are measuring. If you are in doubt about the current present, always set the switch at the highest current range before inserting the instrument in the circuit. Failure to observe this precaution may result in serious damage to the meter. If the unknown current is too low for accurate measurement on the highest range, rotate the RANGE switch towards the lowest current position until the range is found at which the current can be read accurately.
- c) When a current is being measured on any range except the 1 amp. range, insert the test leads into the pin jacks marked POSITIVE and COMMON and place the instrument in series with the component through

which the current to be measured is flowing. If the pointer is deflected in the wrong direction, simply reverse the test leads.

- d) Currents in either the .1 amp. range or the 1 amp. range are measured with the RANGE switch in the .1-1A position. To use the 1 amp. range insert the test leads in the pin jacks marked POSITIVE and 1 AMP.
- e) D-C currents are read on the black (0-100) scale marked DC. When using the .1 amp. (100ma) range, read the scale directly in ma. To obtain the indicated current in ma on the 10ma range, divide the reading on the 100 scale by 10; for the 1 amp. (1000 ma) range, multiply the 100 scale reading by 10.

A-C Current Measurement - -

The instructions for A-C current measurement are the same as those for D-C current measurement with the following differences in procedure and reading.

- a) Set the DC-AC-OUTPUT switch at the AC position.
- b) Read the red 0-10 scale marked AC-AMPS on all current ranges except the 1ma range, which is read on the red 0-100 scale marked AC-1MA.
- c) The reading of the meter scales corresponding to each range position is as follows: on the 1ma range, multiply the reading on the AC-1MA (0-100) scale by 10 to obtain the current in ua; on the 10ma range, read the AC-AMPS scale directly in ma; on the .1A (100ma) and the 1A (1000ma) ranges, multiply the reading on the AC-AMPS scale by 10 and 100 respectively to obtain the current in ma.

Resistance Measurement - -

- a) Set the DC-AC-OUTPUT switch at the DC position.
- b) If you are measuring a resistance less than 100 ohms, set the RANGE switch at the LOW OHMS position. For a resistance between 100 and 1500 ohms, use the RX1 position, and for a resistance above 1500 ohms, use the RX10 position.
- c) Insert the test leads into the pin jacks marked COMMON and POSITIVE.
- d) To zero adjust on the RX1 and RX10 range, short the test leads and rotate the ZERO OHMS knob until the meter pointer is set directly over the zero of the black scale marked HI. On the LOW OHMS range, zero adjust by rotating the ZERO OHMS knob until the pointer is set over the zero of the HI scale (as before), but do not short the test leads.
- e) Connect the test leads across the component whose resistance is to be measured. On the RX1 and RX10 ranges, read the top black scale marked HI, reading directly in ohms on the RX1 range and multiplying the reading by 10 on the RX10 range. When using the LOW OHMS range, read the black scale marked LO directly in ohms. Note: Be certain that no voltage exists across the component to be measured, as such a voltage may result in serious damage to the meter.

Output Voltage Measurement - -

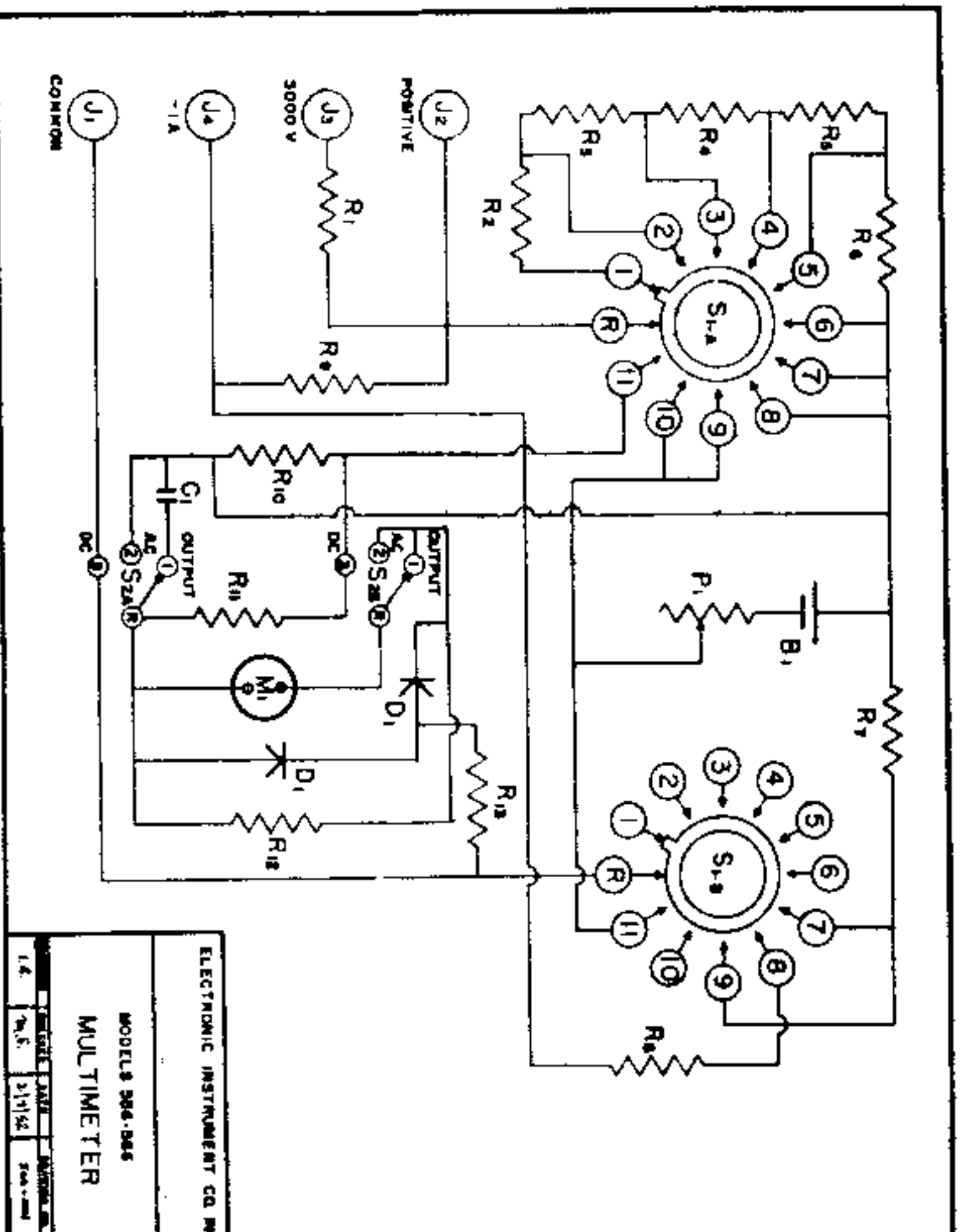
The instructions for output voltage measurement are the same as those for AC voltage measurement with the exception that the DC-AC-OUTPUT switch is set at the OUTPUT position. In addition, the following precautions should be noted.

- a) The capacitive reactance of the series blocking condenser has to be considered at low frequencies, since capacitive reactance increases as frequency decreases. For example, the multiplier resistance, R , for the 5 volt a-c range is 5000 ohms, and X_c , the capacitive reactance of the .1 mfd blocking capacitor at 600 cycles is $159,000 \div (600 \text{ cycles} \times .1 \text{ mfd}) = 2650 \text{ ohms}$. The total series impedance is $\sqrt{X_c^2 + R^2}$ or $\sqrt{(2650)^2 + (5000)^2} = 5650 \text{ ohms}$. Apparently, the effective internal resistance has been increased by 13% and the true voltage is $1/0.87$ times the indicated voltage. Therefore the indicated voltage must be increased by 15%, in this case, to obtain the true voltage. At 60 cycles, on this range, the true voltage would be ten times the indicated value, while at 1000 cycles the error would be only 4%.
- b) Do not measure across DC voltage sources exceeding 400 volts, as this is the rated working voltage of the blocking capacitor.

Decibel Measurement - -

The instructions for decibel measurement are the same as those for output voltage measurement except that the DB scale is read.

To obtain the correct value of db, consult the chart at the lower right hand side of the meter face, and add the value of db, shown as corresponding to the voltage range chosen, to the db reading on the meter. As an example, if the RANGE switch is set at 100 volts and the meter indicates + 2db, the actual value is $26 + 2 = 28\text{db}$. As a further example, if the meter in the 10 volt position reads - 8db, the actual value is $6 - 8 = - 2\text{db}$.



SYMBOL	DESCRIPTION
B1	1.5 VOLT BATTERY
C1	0.1 MPD CONDENSER
D1	RECTIFIER
M1	METER MOVEMENT
P1	600 OHM POT.
R1	4.5 MEG OHM RES. 2W
R2	400K OHM RES. 1/2W
R3	50K OHM RES. 1/2W
R4	40K OHM RES. 1/2W
R5	5K OHM RES. 1/2W
R6	4K OHM RES. 1/2W
R7	111.1 OHM RES. 1/2W
R8	9.09 OHM RES. 1/2W
R9	1.01 OHM RES. 1/2W
R10	940 OHM RES. 1/2W
R11	100 OHM RES. 1/2W
R12	2400 OHM RES. 1/2W
R13	672 OHM RES. 1/2W
S1	RANGE SWITCH
S2	2 P. - 11 POS. FUNCTION SWITCH