VOLT-OHM-MILLIAMMETER

MODEL

526A-536A

INSTRUCTION

MANUAL

ELECTRONIC INSTRUMENT CO. INC.
3300 NORTHERN BLVD., L. I. CITY 1, N. Y.

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general description

GENERAL

The EICO Model 536 is a 1000 ohm per volt, 31 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 ac and dc voltage measurement from .1 volt (on the 1 volt scale) to 5000 volts (an internal high voltage multiplier is included. It also provides ac and dc current measurement from .1 ma (on 1 ma scale) to 1 ampere. Resistance and decibel ranges bring the total number of useful ranges to 31. Legible, two color scales provide comfortable reading of the 3 inch, 400ua meter.

The Model 526 is identical in every respect to the Model 536 with the exception that 1% multiplier resistors are used. The use of 1% resistors allows a maximum error of 3% of full-scale on dc and 5% on ac. This model is desirable where more accurate measurements are required, and is designed to meet the standards of laboratories and schools.

These instruments are of handy, pocket size, yet their accuracy and wide scope of ranges will meet almost every type of measurement requirement encountered in the electronics industry.

SPECIFICATIONS

Ranges:

DC Voltage: -0 to 1, 5, 10, 50, 100, 500, 5000 volts at 1000 ohms per volt.

AC Voltage: -0 to 1, 5, 10, 50, 100, 500, 5000 volts at 1000 ohms per volt.

DC Current: -0 to 1, 10, 100ma, and 1 amp.

AC Current: -0 to 1, 10, 100ma, and 1 amp.

Resistance: RX1..... 150 ohms, center scale
RX10 .... 1500 ohms, center scale
Low Ohms 55 ohms, center scale

Decibels: -20 db to +69 db in 6 ranges.

Overall Dimensions: 3 3/4 x 6 1/4 x 2 inches.

Weight: 1 1/2 pounds

Cabinet: Highly polished black bakelite

Panel: Highly polished black bakelite

Meter: 3 inch face, 400ua movement

operation

DC VOLTAGE MEASUREMENT

a) Set the DC-AC 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 - 5000V position. To use the 5000 volt range, insert the test leads in the pin jacks marked COMMON and 500V. 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.

AC VOLTAGE MEASUREMENT

The instructions for AC voltage measurement are the same as those for DC voltage measurement with the following differences in procedure and reading.

a) Set the DC-AC 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.

DC CURRENT MEASUREMENT

a) Set the DC-AC 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 .1A-1A position. To use the 1 amp. range insert the test leads in the pin jacks marked POSITIVE and -1 AMP.

e) DC currents are read on the black (0-100) scale marked DC. When using the .1 amp. (100 ma) range, read the scale directly in ma. To obtain the indicated current in ma on the 10 ma range, divide the reading on the 100 scale by 10; for the 1 amp. (1000 ma) range, multiply the 100 scale reading by 10 to obtain the current in ma.

AC CURRENT MEASUREMENT

The instructions for AC current measurement are the same as those for DC current measurement with the following differences in procedure and reading.

a) Set the DC-AC switch at the AC position.

b) Read the red 0-10 scale marked AC-AMPS on all current ranges except the 1 ma 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 1 ma range, multiply the reading on the AC-1MA (0-100) scale by 10 to obtain the current in ua; on the 10 ma range, read the AC-AMPS scale directly in ma; on the .1A (100 ma) and the 1A 1000 ma) 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 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 OHMS ADJUST 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 OHMS ADJUST 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.

DECIBEL MEASUREMENTS

The instruction for decibel measurement are the same as those for AC 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 algebraically 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 = 28db. As a further example, if the meter in the 10 volt position reads -8db, the actual value is 6 - 8 = -2db

SERVICE

If trouble developes in your instrument which you can not remedy yourself, write to our service department listing all possible indications that might be helpful. If desired you may return the instrument to our factory where it will be placed in operating condition for $2.50 plus the cost of parts replaced due to their being damaged in the course of construction. NOTE: Before returning this unit, be sure all parts are securely mounted. Attach a tag to the instrument, giving your home address and the trouble with the unit. Pack very carefully in a rugged container, using sufficient packing material (cotton, shredded newspaper, or excelsior), to make the unit completely immovable within the container. The original shipping carton is satisfactory, providing the original inserts are used or sufficient packing material inserted to keep the instrument immovable. Ship by prepaid Railway Express, if possible, to Electronic Instrument Co., inc., 33-00 Northern Blvd., Long Island City 1, New York. Return shipment will be made by express collect. Note that a carrier cannot be held liable for damages in transit if packing IN HIS OPINION, is insufficient.

GENERAL INSTRUCTIONS

The section of the manual beginning with this page is the CONSTRUCTION section. All pages in this section have page numbers followed by "C" (1C, 2C, etc.). The INSTRUCTION section resumes on the pages following the CONSTRUCTION section. Note that the CONSTRUCTION section is located centrally in the book and may be removed without disrupting the INSTRUCTION section that both precedes it and follows it.

Care taken in the construction of this instrument will reward the constructor with many years of satisfactory service and greater confidence in his instrument. We urge you to not rush the construction, but to take all the time necessary for proper assembly and wiring.

Furthermore, we urge strongly that you follow the wire and parts layout shown in the pictorial diagrams as closely as possible. Very often wires are placed as shown for a good reason, and certainly the appearance of the completed instrument will be improved and the difficulty of finding a wiring error will be reduced by the following the wire and parts layout shown.

UNPACKING THE KIT: Unpack the kit carefully and check each part against the parts list including those parts that are mounted to the chassis. If you have trouble identifying any parts refer to the pictorial diagrams or the color code chart.

You will find that the value of a component will vary within the allowable circuit tolerance. For example, the 4.7KΩ, ±10% resistor may measure anywhere between 4.2KΩ and 5.2KΩ. Tolerances on paper capacitors are substantially greater, and the tolerance for electrolytics is usually +100% and -50%.

CONSTRUCTION HINTS: USE THE BEST GRADE OF ROSIN CORE SOLDER ONLY, preferably one containing the new activated fluxes such as Kester "Resin-Five", Ersin "Multicore" or similar types. UNDER NO CIRCUMSTANCES USE ACID CORE SOLDER OR ACID FLUX since acid flux can cause serious corrosion. Before soldering make a certain of a good mechanical connection. Use a clean, freshly tinned soldering iron, no smaller than 100 watts, and place the solder on the joint (not on the iron) so that the solder is melted by the heat from the joint itself. Do not remove the soldering iron until the solder flows and check to see that the resulting joint is smooth and shiny when the solder has cooled. There are two extremes to be avoided; too little heat and too much heat. If too little heat is supplied, the joint will appear pitted and grey, indicating a rosin joint which is unsatisfactory. On the other hand, if too much heat is applied to a joint, the parts connected to it may either change value, loose their protective coating, or break down. If you are soldering close to a part, hold the lead between the part and the joint being soldered with the tip of a pair of longnose pliers. The pliers will conduct the heat away and prevent the component from being unduly overheated. If for any reason it is necessary to resolder a joint, be sure to use new solder.

It should also be noted that the leads on resistors, capacitors, and transformers are often longer than required. These leads should be trimmed to the proper length when necessary. Do not cut any lead until you have determined the required length when the lead is routed as shown in the diagrams.

BASIC TOOLS REQUIRED: These basic tools are required for the construction of the amplifier.

1. Screwdriver - 3/16" to 1/4" blade
2. Screwdriver - 1/8" blade
3. Longnose pliers - 5 or 6"
4. Diagonal cutters
5. Soldering iron (100 watts), or soldergun, or pencil iron (35 watts)
6. Gas pliers
7. High quality rosin or equivalent synthetic flux core solder. Do not use acid or paste flux under any circumstances.

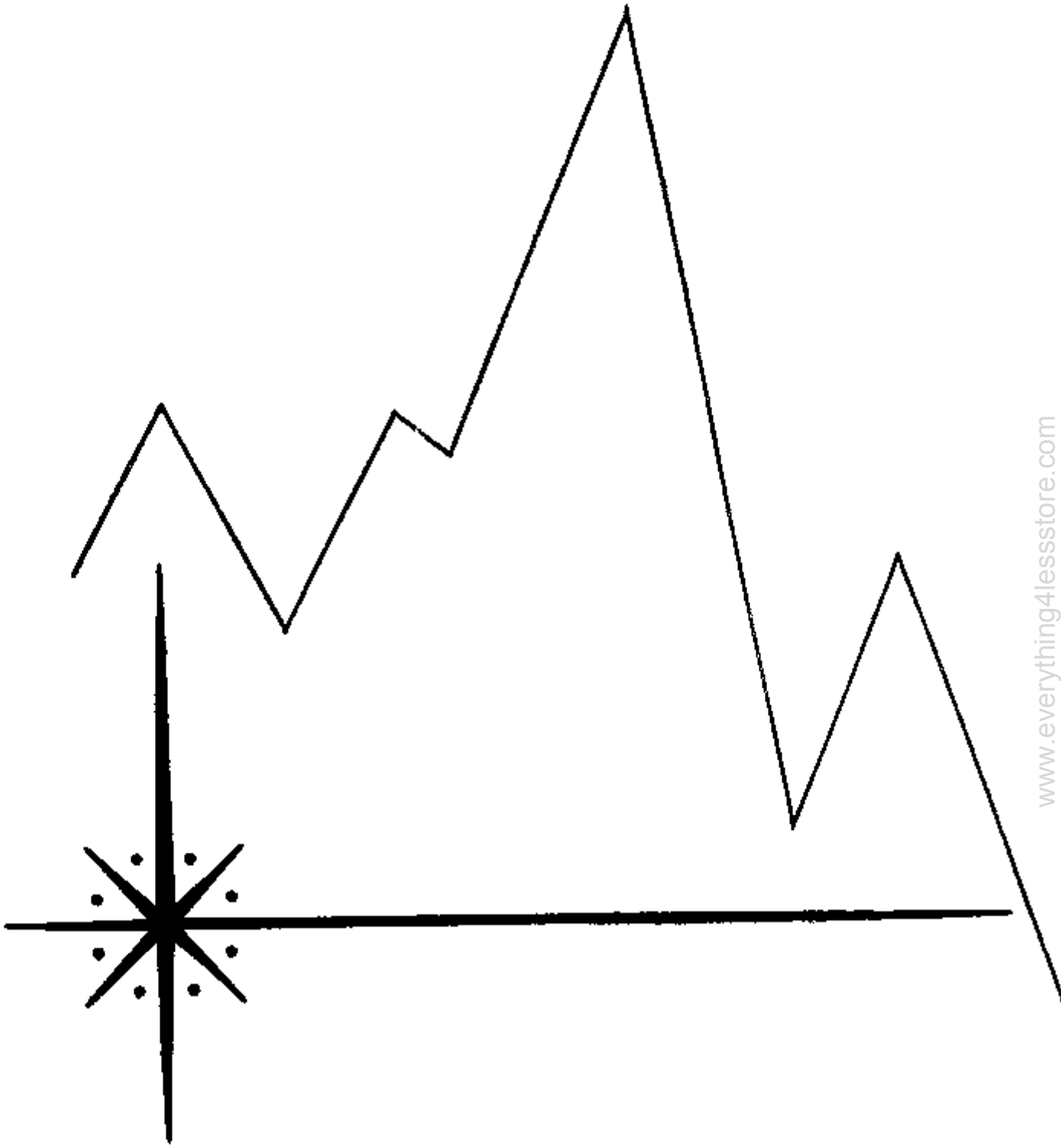
A set of spintites and a wire stripper are also very useful supplementary tools.

PARTS IDENTIFICATION: Please note that very many of the parts for which color coding is given may not be color coded, but have their values and ratings printed. The letter K is a multiplier (X1000) and on resistors or capacitors indicates that the printed numerical value must be multiplied by one thousand to obtain the value in ohms or micro-micro farads respectively. Note also that one microfarad (mf) is equal to one million; micro-microfarads (mmf). To aid in rapid identification, keep in mind that 5%, 10%, and 20% resistors are color coded whereas 1% resistor have their values printed; also that molded tubular capacitors may or may not be color coded, whereas disc capacitors and electrolytics will always have their values printed. Please note the following relationships between the units used to express resistance or capacity.

1,000,000 ohms (Ω) = 1000 kilohms (KΩ) = 1 megohm (MΩ)
1,000,000 micro-micro farads (mmf) = 1 micro farads (mf)

CONSTRUCTION PROCEDURE: The complete step-by-step mounting and wiring procedure follows. To keep the drawings uncrowded, unnecessary repetition of mounting or wiring details may be omitted. Note: The abbreviation (C) means connect but do not solder (until other leads have been connected). The abbreviation (S) means connect and solder.
Bend the ground lug tabs on the sockets toward the chassis to prevent accidental shorting to the socket pins.

$1.00



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