

**MODEL  
 630-PL  
 TYPE 5  
 AND  
 MODEL  
 630-APL  
 TYPE 5**

**VOLT-OHM-MILLIAMMETER**

# **INSTRUCTION MANUAL**

**TT** **TRIPLETT**

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## **MODEL 630-PL**

**AND**

## **MODEL 630-APL**

# **VOLT-OHM-MILLIAMMETER**

**Triplett Corporation**  
**One Triplett Drive**  
**Bluffton, Ohio 45817**



## **SAFETY RULES**

### **Warning**

This tester has been designed with your safety in mind. However, no design can completely protect against incorrect use. Electrical circuits can be dangerous and/or lethal when lack of caution or poor safety practices are used.

### **Read The Manual**

Read this Instruction Manual carefully and completely.

Voltages and currents within the capability of this test equipment can be hazardous. Follow the instructions in this manual for every measurement. Read and understand the general instructions before attempting to use this tester. Do not exceed the limits of the tester.

### **Safety Check**

Double check the switch setting and lead connections before making measurements. Are you following all of the instructions?

Disconnect the tester or turn off the power before changing switch positions.

Do not connect to circuits with voltage present when switch is in any ohms or current position.

When replacing fuses use only specified type fuses and insert in correct fuse holder.

### **Don't Touch**

Don't touch exposed wiring, connections or other "live" parts of an electrical circuit. If in doubt, check the circuit first for voltage before touching it.

Turn off the power to a circuit before connecting test probes to it. Be sure there is no voltage present before you touch the circuit.

Do not use cracked or broken test leads.

### **High Voltage Is Dangerous**

Always start with the power off. Be sure there is no voltage present before making connections to the circuit.

Don't touch the tester, its test leads, or any part of the circuit while it is on.

Before disconnecting the tester, turn the circuit off and wait for the meter to return to "zero."

### **Distribution Circuits Pack A Punch**

In high energy circuits such as distribution transformers and bus bars, dangerous arcs of explosive nature can occur if the circuit is shorted. If the tester is connected across a high energy circuit when set to a low resistance range, a current range, or any other low impedance range, the circuit is virtually shorted.

Special equipment designed for use with these circuits is available. Contact a qualified person for assistance before attempting to make measurements on any high energy circuit.

### **Safety Is No Accident**

## **TABLE OF CONTENTS**

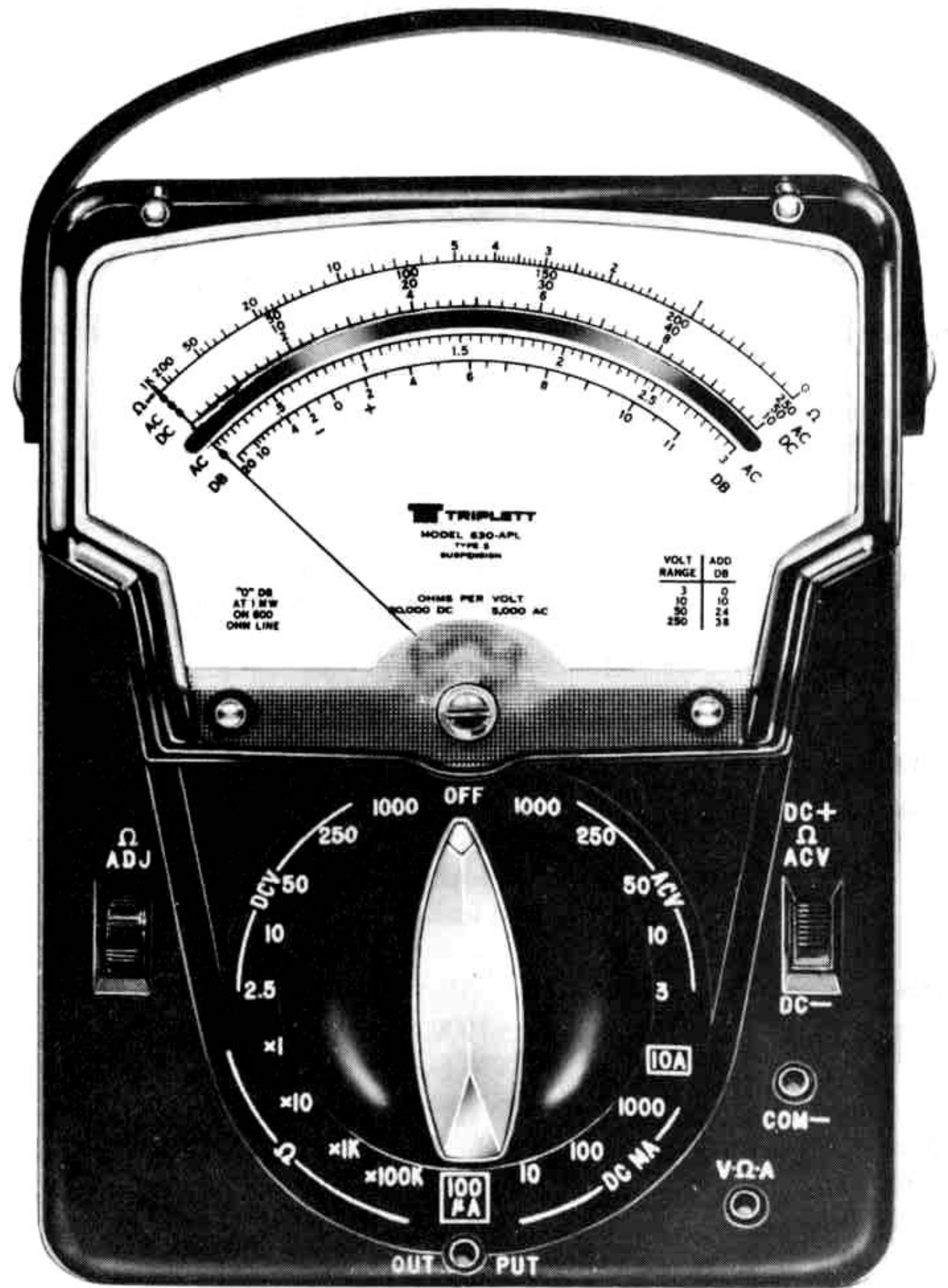
### **Model 630-PL and Model 630-APL**

Safety Rules .....	2
Specifications .....	6
Introduction .....	8
Care Of Your VOM .....	9
General Instructions .....	10
Measuring DC Volts .....	12
Measuring AC Volts .....	14
Measuring DC Current .....	16
Measuring Resistance .....	17
Measuring Output Voltage .....	18
Measuring Decibels (dB) .....	20
Maintenance .....	21
Accessories .....	22
Replaceable Parts .....	28, 29
Schematic .....	30
Parts Location Photo .....	31
Limited Warranty .....	32





Model 630-PL



Model 630-APL

## SPECIFICATIONS

### DC Volts

Ranges	0-250 Millivolt, 0 - 2.5, 10, 50, 250, 1000
Accuracy	
630-PL	± 2% of Full Scale Reading
630-APL	± 1½ % of Full Scale Reading (Calibrated at 77 °F (25 °C))
Sensitivity	20,000 Ohms per Volt, 10,000 Ohms per Volt on 0-250 Millivolt
Maximum Input Voltage	1000 Volts

### AC Volts

Ranges	0 - 3, 10, 50, 250, 1000
Accuracy	3% of Full Scale Reading (Calibrated at 77 °F (25 °C))
Sensitivity	5000 Ohms per Volt
Maximum Input Voltage	1000 Volts RMS

### DC Current

Ranges	0-100 Microamperes at 250 mV 0 - 10, 100, 1000 Milliampere at 250 mV 0-10 Amperes at approx. 1 Volt (at end of test leads)
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### Ohms

Ranges	0 - 1000, 10,000 . . . 0 - 1M, 100M (4.4 - 44, 4400 - 440,000 at Center Scale)			
Accuracy				
630-PL	± 2% of Full Scale Length			
630-APL	± 1½ % of Full Scale Length			
	X1	X10	X1K	X100K
Maximum Voltage - Volts	1.6	1.6	1.6	34
Maximum Current - mA	364	36.4	.364	.0773
Maximum Power Transfer to Load - mW	150	75.0	.150	.655

## SPECIFICATIONS (Continued)

Output Volts	0 - 3, 10, 50, 250 at 5000 Ohms per Volt
Decibels	- 20 to + 11, 21, 35, 49 on 600 Ohm Line
Scales	
630-PL	4.5 Inches Long (max.)
630-APL	4.5 Inches Long (max.) Mirror Scale
Batteries	One 1.5 volt and one 30 volt battery. Batteries are packed separately.
Test Leads	One red and one black lead supplied, each 48 inches long. Two insulator type alligator clips included.
Rubber Feet	Four rubber feet are supplied to fit into four holes in the rear of VOM case.
Size	3½" x 5½" x 7½"
Weight	Approximately 4 pounds



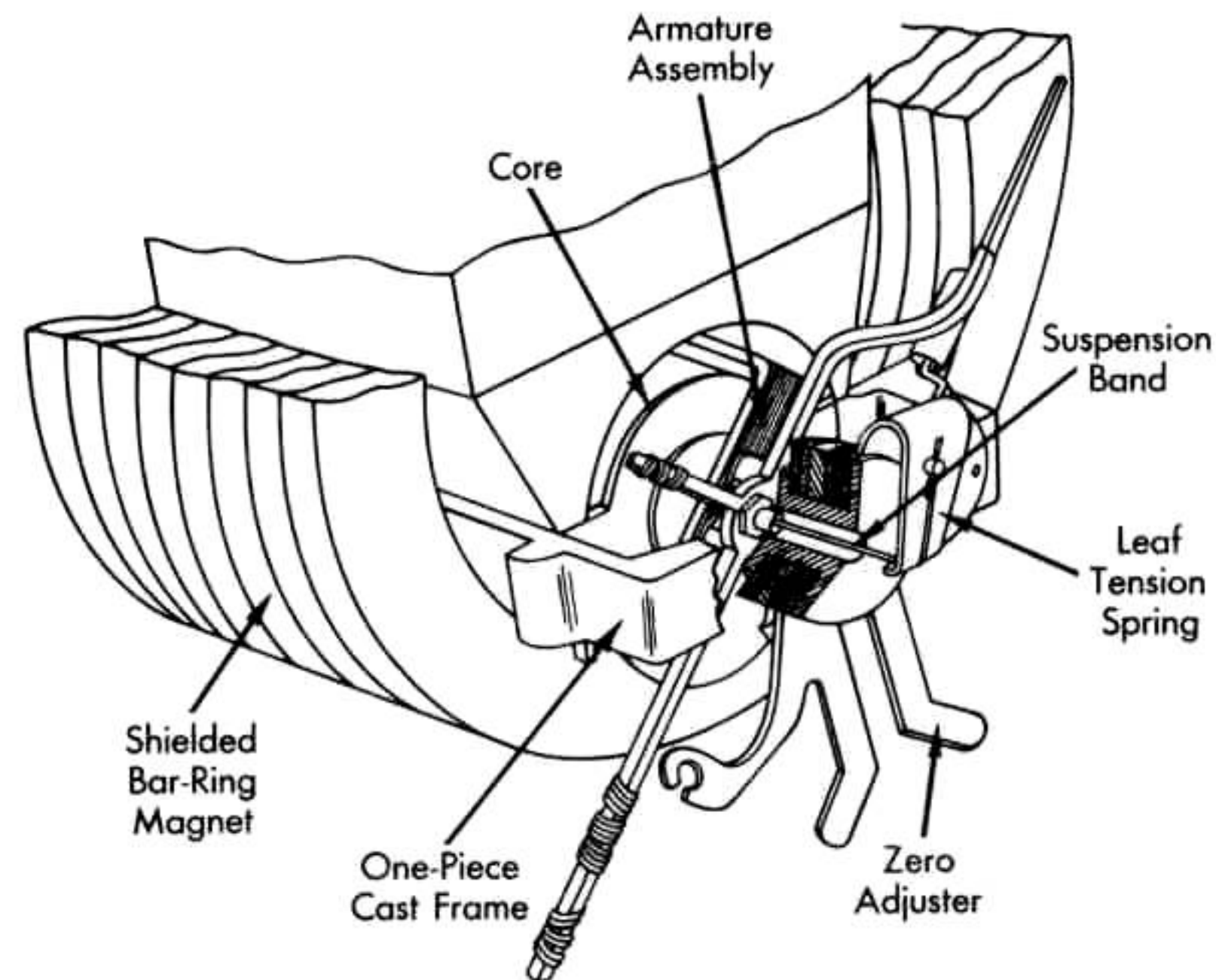
## INTRODUCTION

Your VOM is a compact, rugged, portable volt-ohm-milliammeter. It has been designed to make fast, accurate measurements on all types of electrical and electronic equipment and is backed by a company which has been making quality instruments and test equipment for over half a century.

The Model 630-APL features increased accuracy of measurement as listed in the Specification Section. This is possible through the use of a more accurate basic meter and the use of  $\frac{1}{2}\%$  accuracy resistors.

The indicating portion of the VOM is actuated by the latest concept in instrumentation, namely, a taut band suspension meter (shown below) having a sensitivity of 50 microampere full scale. This meter, by omitting conventional pivots, bearings and hairsprings provides the following advantages.

1. Increased repeatability by elimination of friction between pivots and bearings.



## INTRODUCTION (Continued)

2. Greater ruggedness and durability as no moving parts are in contact and the elimination of the hairspring prevents snagging and tangling. The tension spring acts as a built-in shock absorber.
3. Temperature variations can not cause sticky operation of the pointer.

Reference to the illustration will assist in understanding the principle of operation. The moving coil floats in the magnet by virtue of the suspension bands which are held in tension by a spring. These bands, which are fabricated of a precious metal alloy, provide torque and carry the current to the moving coil. The moving coil assembly is held by a rigid one piece die cast frame in a large self-shielded "Bar Ring" magnet.

## CARE OF YOUR VOM

- Although this instrument is portable and rugged it should be treated with care. Do not drop or handle it roughly.
- Avoid placing it on a bench where machine tools are used or severe vibration is encountered.
- When possible keep it in a place of moderate temperature. Avoid subjecting it to extreme temperatures and severe temperature changes.
- If the VOM has not been used for a long period of time, rotate the selector switch in both directions several times to wipe the switch contacts for good contact.
- Turn the selector switch to OFF when the VOM is to be carried. The meter is damped in the OFF position to prevent wild swinging of the pointer.



## GENERAL INSTRUCTIONS

The following section should be read carefully; it contains instructions and precautions to be observed in making measurements with the VOM.

- Measurements are made with the test leads plugged into the COM- and V- $\Omega$ -A jacks, except when measuring output volts (dB). For these ranges the V- $\Omega$ -A test lead is plugged in the appropriate jack (one test lead is in the COM- jack for all measurements).
- The insulated alligator clips provided with the VOM fit over the end of the test probes. When measuring high voltages, the use of these alligator clips will allow measurement without handling the test probes. As a safety measure, always shut off power source before attempting to connect alligator clips.
- When the approximate value of the quantity being measured is not known, always start on the highest range. For greatest accuracy, choose the range which will allow readings to be taken in the upper (right hand) portion of the scale.
- Readings are taken on the scale having the appropriate significant figures (both 2.5 and 250 volts are read on the 0-250 scale) by multiplying or dividing by a factor of 10 or 100 as indicated by the range scale ratio (i.e.; on the 2.5 volt range divide the scale readings by 100).
- The polarity reversing switch reverses the polarity of the entire VOM at the input jacks. This allows fast switching in case of wrong polarity; and also provides a convenient polarity reversal for ohms ranges, a very useful tool in semiconductor checking. The V- $\Omega$ -A jack is positive when the polarity switch is in the DC + - $\Omega$ -ACV position.
- Whenever possible, the test probes should be disconnected from the voltage source (or the source shut off) before the range switch or polarity switch positions are changed. This practice will result in an increased life and reliability for the VOM.

## GENERAL INSTRUCTIONS (Continued)

- The Meter Zero Adjust Screw is located on the lower center of the meter cover. It should be periodically adjusted so the meter pointer is on zero with no input into the VOM.
- Readings on the sensitive voltage, current and resistance ranges may sometimes be different than calculated values. Thermo-electric or electro-chemical reaction can sometimes generate voltage (or current) in a circuit due to elevated temperatures from soldering, contact of dissimilar metals, chemical fumes or moisture. Also, the fingers should never touch the metal parts of the test probes since body resistance can cause erroneous readings—particularly on the high ohmmeter ranges.

**CAUTION:** Always observe the following rules and procedures when making measurements in high voltage circuits:

1. Turn off equipment or other source of voltage, before connecting test probes. Make sure no capacitors in the circuit being tested remain charged to a high voltage.
2. Install alligator clips on test probes. While holding the insulated section of the test probe, check circuit to see if any voltage (or current) is present. If no voltage is present, connect the alligator clips to the circuit to be measured.
3. Turn on equipment, or voltage source, and take required readings. **DO NOT** handle or touch the VOM, test leads or test probes with power source turned on.

Observing the above rules and precautions will result in continued accurate measurements with your VOM or increased safety to equipment and personnel.

## MEASURING DC VOLTS

### 0-250 DC Millivolts:

1. Insert test leads in V- $\Omega$ -A and COM- jacks.
2. Place selector switch in 100  $\mu$ A position.
3. Connect the test probes across the voltage to be measured as shown in Fig. 1.
4. Read DC millivolts on black "AC-DC" scale.

### 0-2.5 thru 0-1000 DC Volts:

1. Insert test leads in V- $\Omega$ -A and COM- jacks.
2. Place selector switch in appropriate DCV position.
3. Connect the test probes across the voltage to be measured as shown in Fig. 1.
4. Read voltage on black "AC-DC" scale.

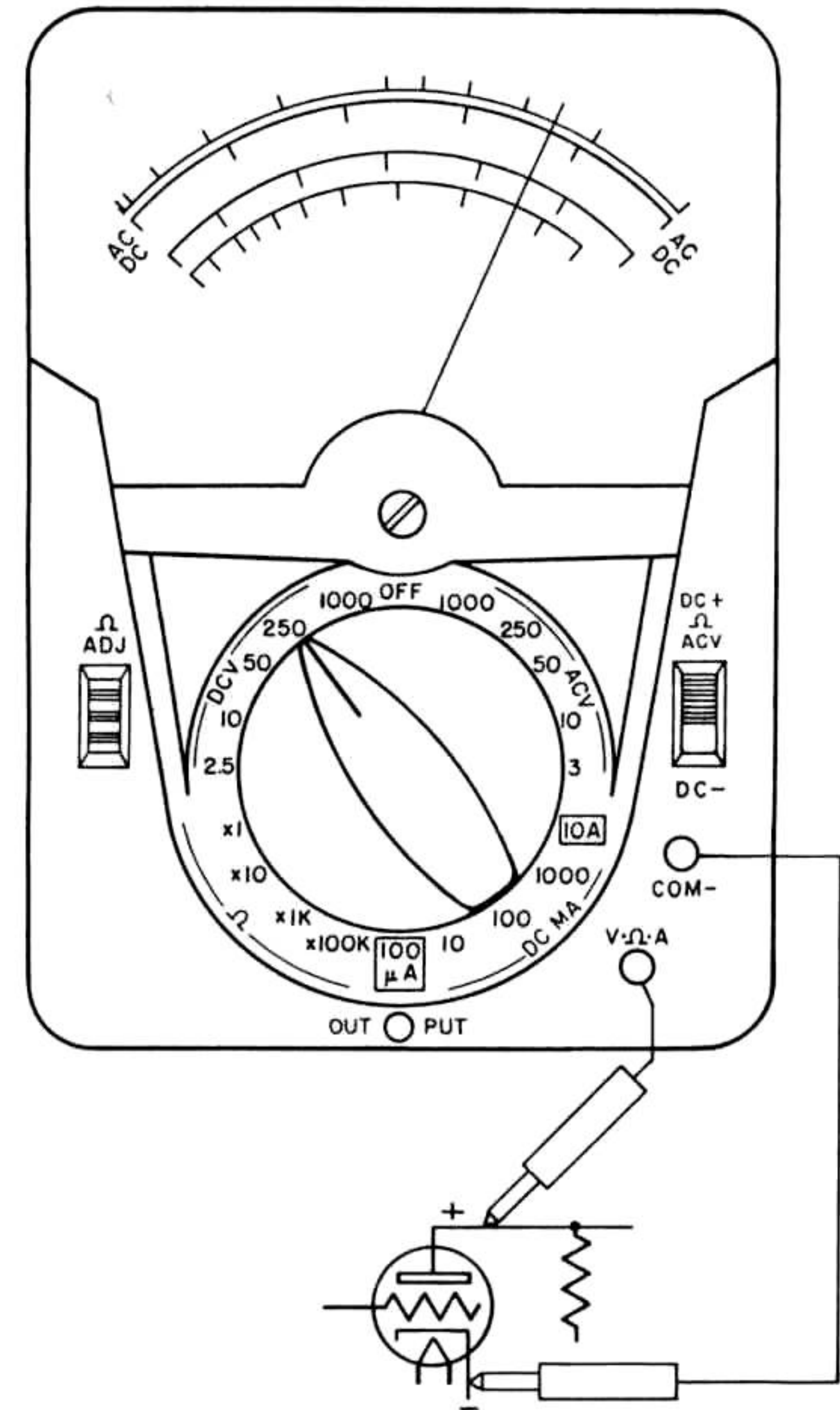


Fig. 1. Measuring DC Volts



## MEASURING AC VOLTS

### 0-3 AC Volts:

1. Insert test leads in V- $\Omega$ -A and COM- jacks.
2. Place selector switch in 3 VAC position.
3. Connect the test probes across the voltage to be measured as shown in Fig. 2.
4. Read voltage on lower red 0-3 "AC" scale.

### 0-10 thru 0-1000 AC Volts:

1. Insert test leads in V- $\Omega$ -A and COM- jacks.
2. Place selector switch in appropriate ACV position.
3. Connect the test probes across the voltage to be measured as shown in Fig. 2.
4. Read voltage on black "AC-DC" scale.

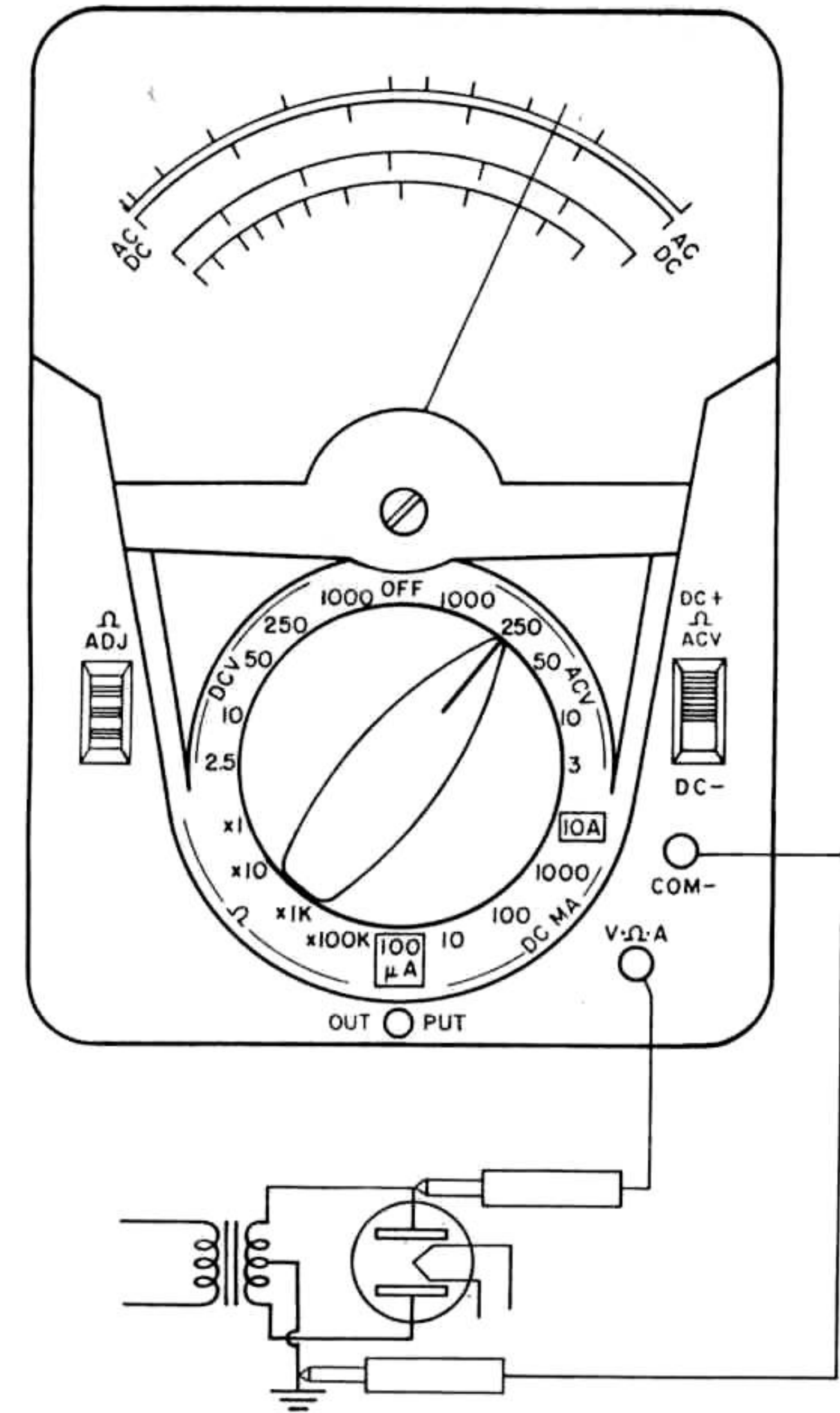


Fig. 2. Measuring AC Volts

## MEASURING DC CURRENT

### 0-100 $\mu\text{A}$ thru 0-10 Amps:

1. Insert test leads in V- $\Omega$ -A and COM- jacks.
2. Place selector switch in appropriate position.
3. Connect the test probes in series with the circuit (use alligator clips) as shown in Fig. 3.
4. Read current on black "AC-DC" scale.

In most cases, the voltage drop across the VOM on current ranges will not affect the circuit being measured. However, in some low voltage transistor circuits it may be necessary to compensate the circuit for the added voltage drop.

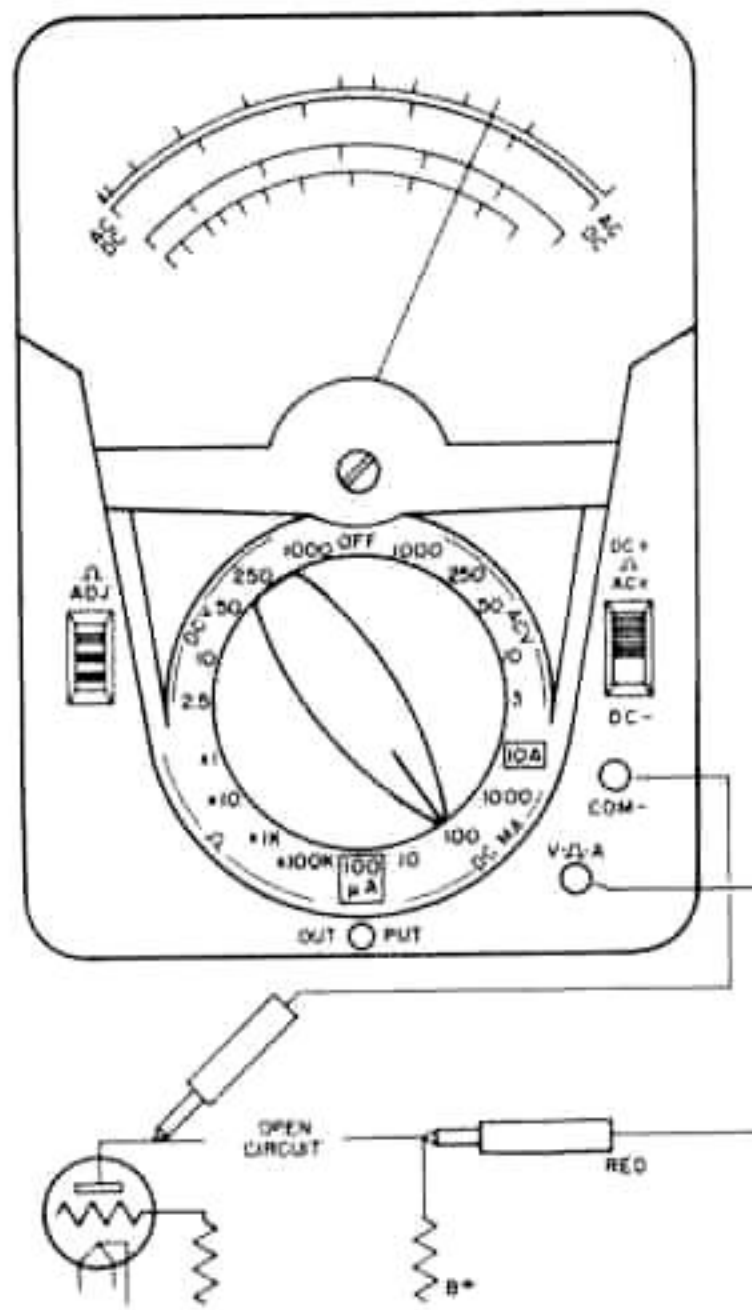


Fig. 3. Measuring DC Current

## MEASURING RESISTANCE

### X1 thru X100K Ohms Ranges:

1. Place selector switch in appropriate ohms range.
2. Short test probes together.
3. Adjust " $\Omega$ ADJ" control until meter reads zero ohms.
4. Connect test probes to component being measured.
5. Read ohms on top black " $\Omega$ " scale (multiply value read times range switch factor).

The component being measured should be disconnected from the circuit before its resistance is measured since any added circuit path can cause an error in measurement. Also any voltage or current present in the circuit during measurement can cause an error in resistance measurement.

When using the ohmmeter for general continuity and circuit tracing it is recommended the X1K resistance range be used. The lower battery drain on this range (compared to the X1 range) will result in increased battery life.

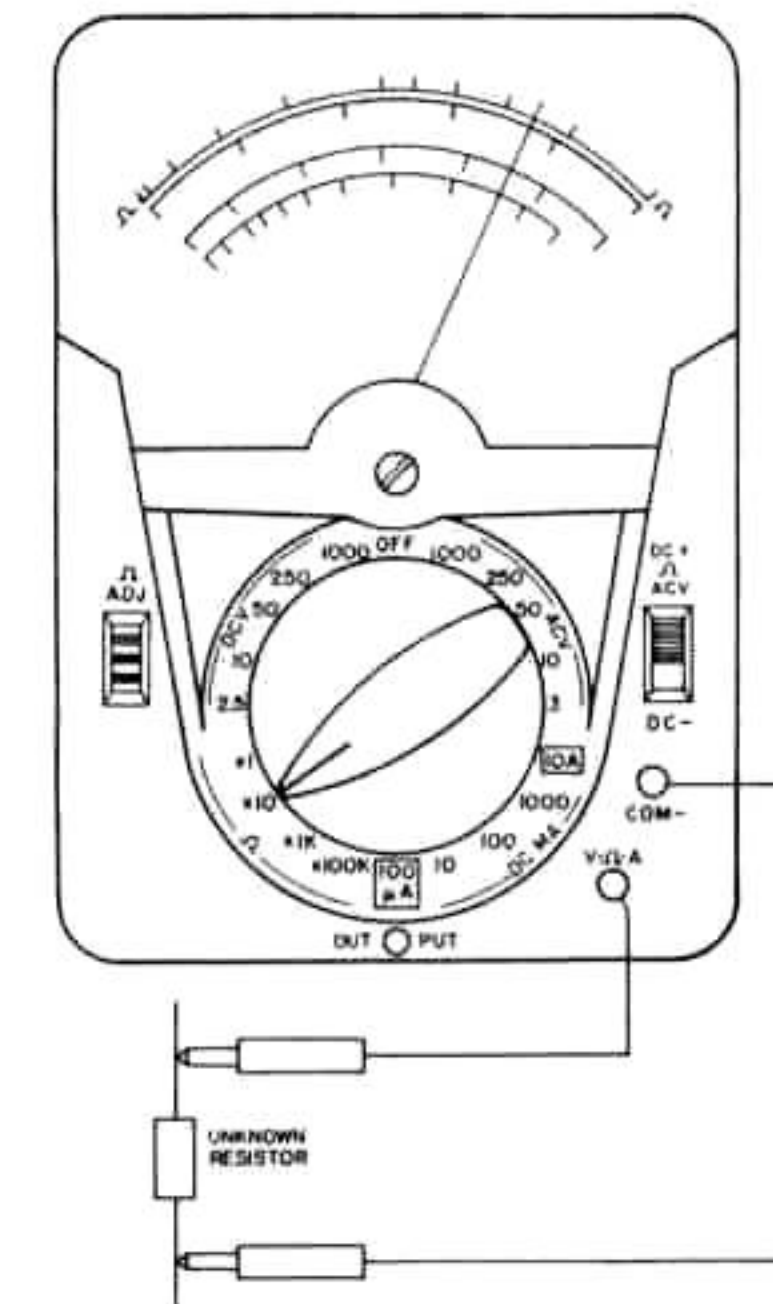


Fig. 4. Measuring Resistance



## MEASURING OUTPUT VOLTAGE

Output voltage is the AC part of a combined AC and DC voltage. Such a voltage is usually found in amplifier circuits, but it may also be found in other circuits. To measure output voltage, the DC part of the combined voltage must be removed or "blocked." This is done by inserting a capacitor in series with the AC voltage section of the VOM. The VOM has a .1  $\mu\text{F}$  400 VDC capacitor between the OUTPUT and V- $\Omega$ -A jacks to do this.

0-3 Volts (Figure 5):

1. Insert test leads into the OUTPUT and COM- jacks.
2. Set the selector switch to 3 ACV position.
3. Connect test probes across the voltage to be measured.
4. Read voltage on the red 0-3 "ACV" scale.

0-10 thru 0-250 Volts (Figure 5):

1. Insert test leads into the OUTPUT and COM- jacks.
2. Set selector switch to appropriate ACV range.
3. Connect test probes across the voltage to be measured.
4. Read voltage on "AC-DC" scale.

DO NOT USE THE OUTPUT range in circuits where the sum of the DC voltage and the peak AC voltage is greater than 400 volts.

The impedance of the capacitor is generally insignificant at audio frequencies. However, it may cause the meter to read low at low frequencies. Its effect should be considered in critical low frequency measurements.

WHEN THE VOLTAGE BEING MEASURED is AC with no DC present, the standard AC voltage measurement procedure should be used.

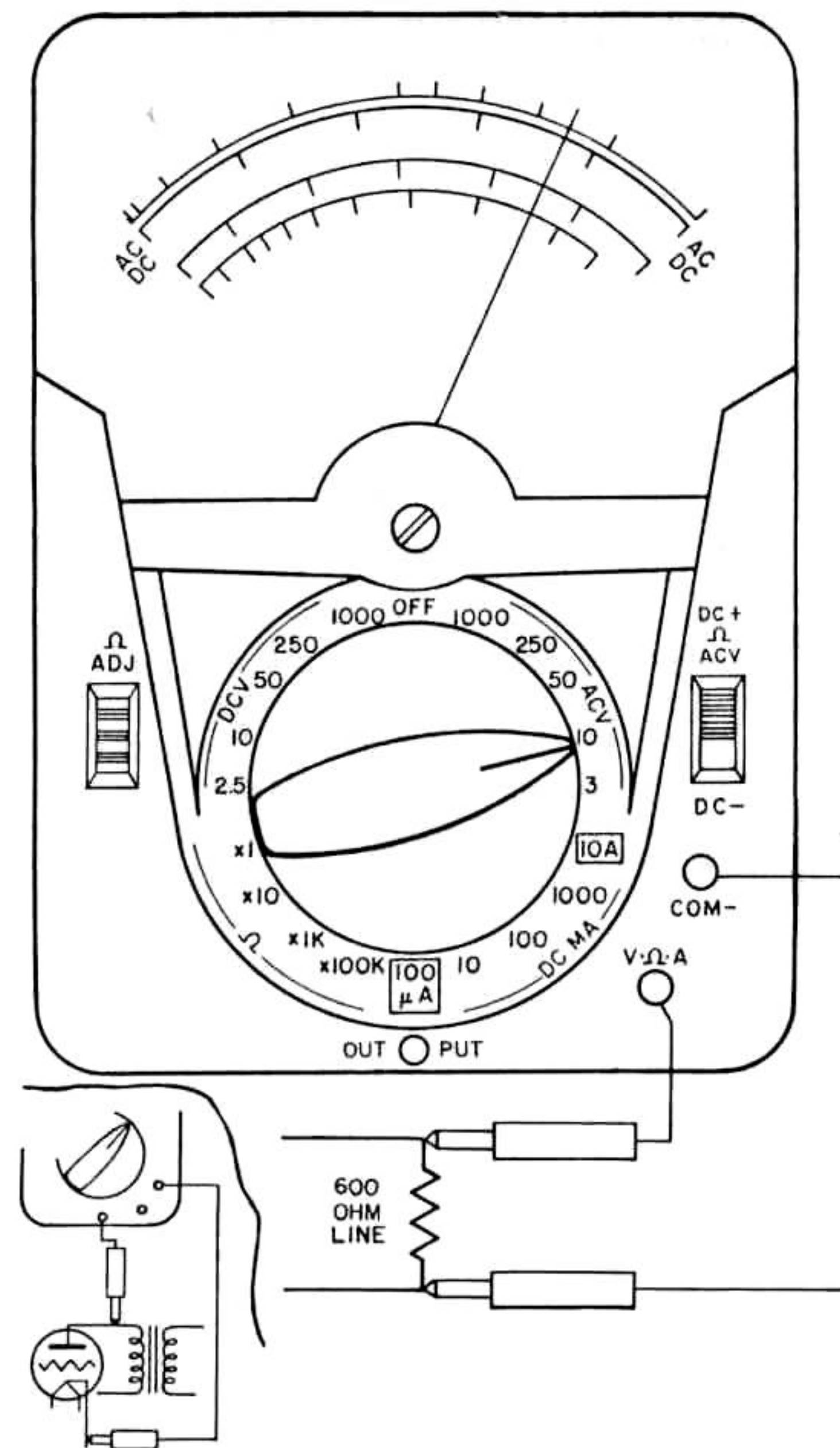


Fig. 5. Measuring Output Voltage

## MEASURING DECIBELS (dB)

The decibel is a unit that expresses the ratio of power levels. It is mathematically derived to reduce multiplication and division to addition and subtraction, respectively, (e.g. — 10 dB represents multiplication by 10, 20 dB — 100, 30 dB — 1000). The decibel roughly approximates human hearing ratios. For this reason, it is commonly used in audio and telephone measurements.

Because the decibel represents a ratio, there is a reference level. The reference level for 0 dB is 1 milliwatt into a 600 ohm load (.775 ACV across 600 ohms). Measurements made across loads other than 600 ohms are relative measurements.

To measure decibels, connect the VOM the same as for measuring AC voltage (or OUTPUT voltage, if there is DC voltage present). But, read the dB scale instead of the voltage scales. A chart on the dial shows the dB values to be added to the reading for the different voltage ranges. (e.g. — When the selector switch is set to the 50 VAC position, add 24 dB to the indicated value.) As explained above, addition of dB represents multiplication of power (or voltage).

## MAINTENANCE

### Battery Replacement

Two batteries are used in the ohmmeter circuits.

A 1.5 volt battery, (size D NEDA 13F), is used in the X1, X10, and X1K ranges. If the pointer cannot be adjusted to zero when the selector switch is on one of these ranges and the test prods are touched together, the 1.5 volt battery should be replaced.

The 30 volt battery, NEDA 210, is used in the X100K range. The 30 volt battery should be replaced if the pointer cannot be adjusted to zero when the selector switch is on the X100K range and the test prods are touched together.

To replace the batteries, remove the four screws in the bottom of the case and lift the back up and off. Remove the old batteries and replace with new ones. Be careful to observe polarity as indicated on the battery compartment.

### Fuse Replacement

Spare 1¼ amp and 10 amp fuses are supplied with this instrument and are stored in the bottom of the battery compartment. CAUTION: Use only the fuses supplied or identical fuses as listed in the parts list. The substitution of fuses of other types and values may not afford proper protection and may also disturb the accuracy of the meter.

### Cleaning The Plastic Window

The plastic window has been treated at the factory to dissipate static charges that otherwise would attract the meter pointer and make it cling to the window.

If cleaning is required use cotton dipped in a solution of household detergent and water. After cleaning allow the solution to dry without rubbing or polishing.



## ACCESSORIES

The usefulness and range of your VOM can be extended by the use of the following listed accessories.

### High Voltage Measurements

Accessory probes are available for measuring high voltages such as found in television receivers and other equipment. To use these probes, plug the probe into the V- $\Omega$ -A jack, connect the black ground lead into the COM- jack, and set the selector switch to the position indicated below.

Use extreme caution in measuring high voltages—observe all the rules and precautions listed in the “General Instructions” regarding high voltage measurements.

Probe Part No.	Range	Set Selector Switch To:	Read on Range:	Multiply By:
79-449	0-5kV DC	3V DC	0-50V DC	100
79-450	0-5kV AC	3V AC	0-50AC	100
79-165	0-10kV AC	3V AC	0-10V AC	1000
79-83	0-10kV DC	2.5V DC	0-10V DC	1000
79-130	0-25kV DC	2.5V DC	0-250V DC	100
79-166	0-25kV AC	3V AC	0-250V AC	100

## Measuring High DC Current

The use of accessory shunts extend the DC current ranges of this instrument.

**Plug-in Type.** Set the selector switch to the 10 DC MA position, plug the shunt into the V- $\Omega$ -A and COM- jacks and connect the circuit to be measured in series with the binding posts on the shunt.

Part No. 91-243

0-25 DC Amp

**Portable Type.** Set the selector switch to the 10 DC MA position, plug the leads on the shunt into the V- $\Omega$ -A and COM- jacks and connect the circuit to be measured in series with the binding posts on the shunt.

Part No. 91-244 0-50 DC Amp

Part No. 91-191 0-100 DC Amp

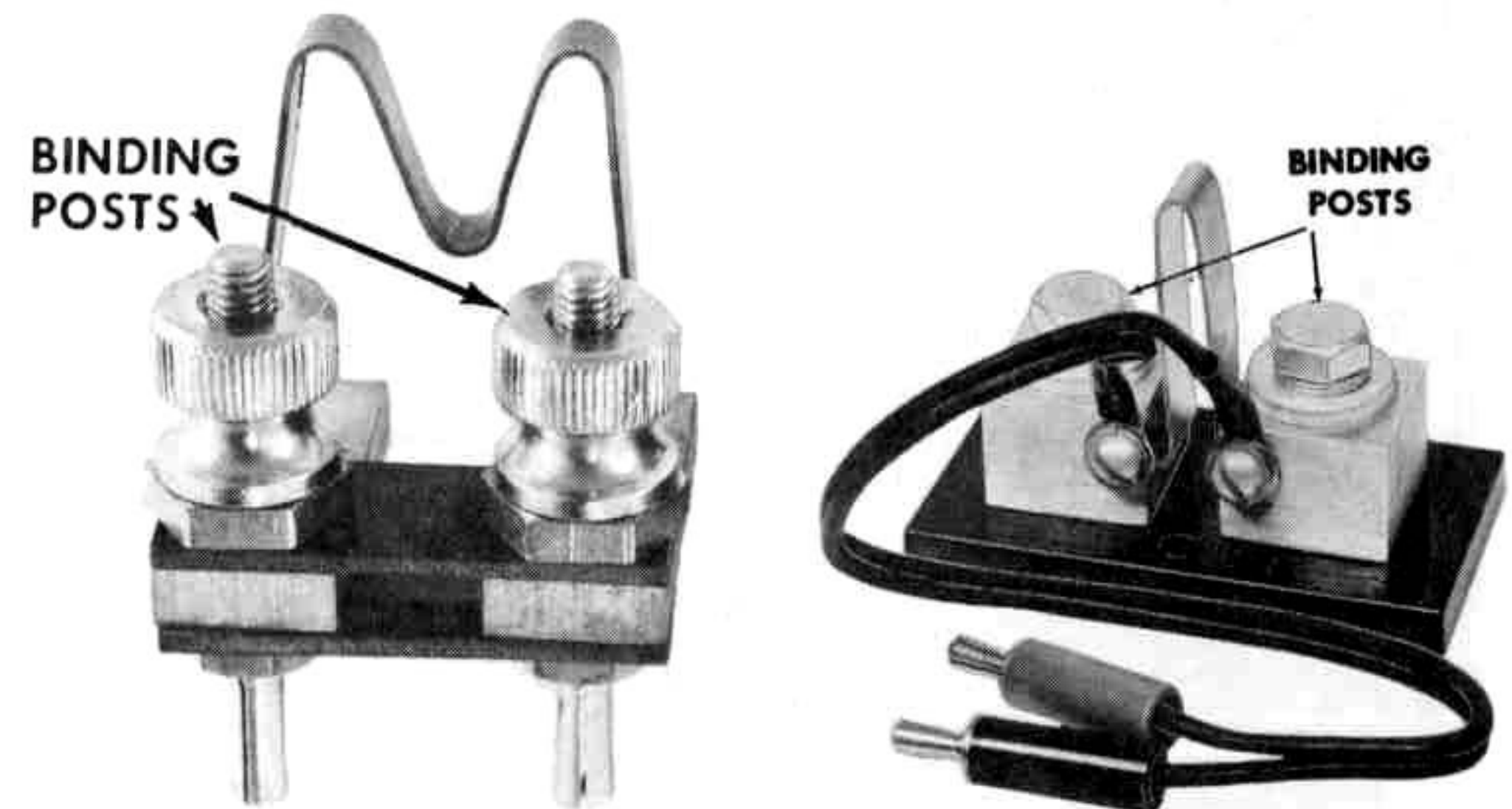
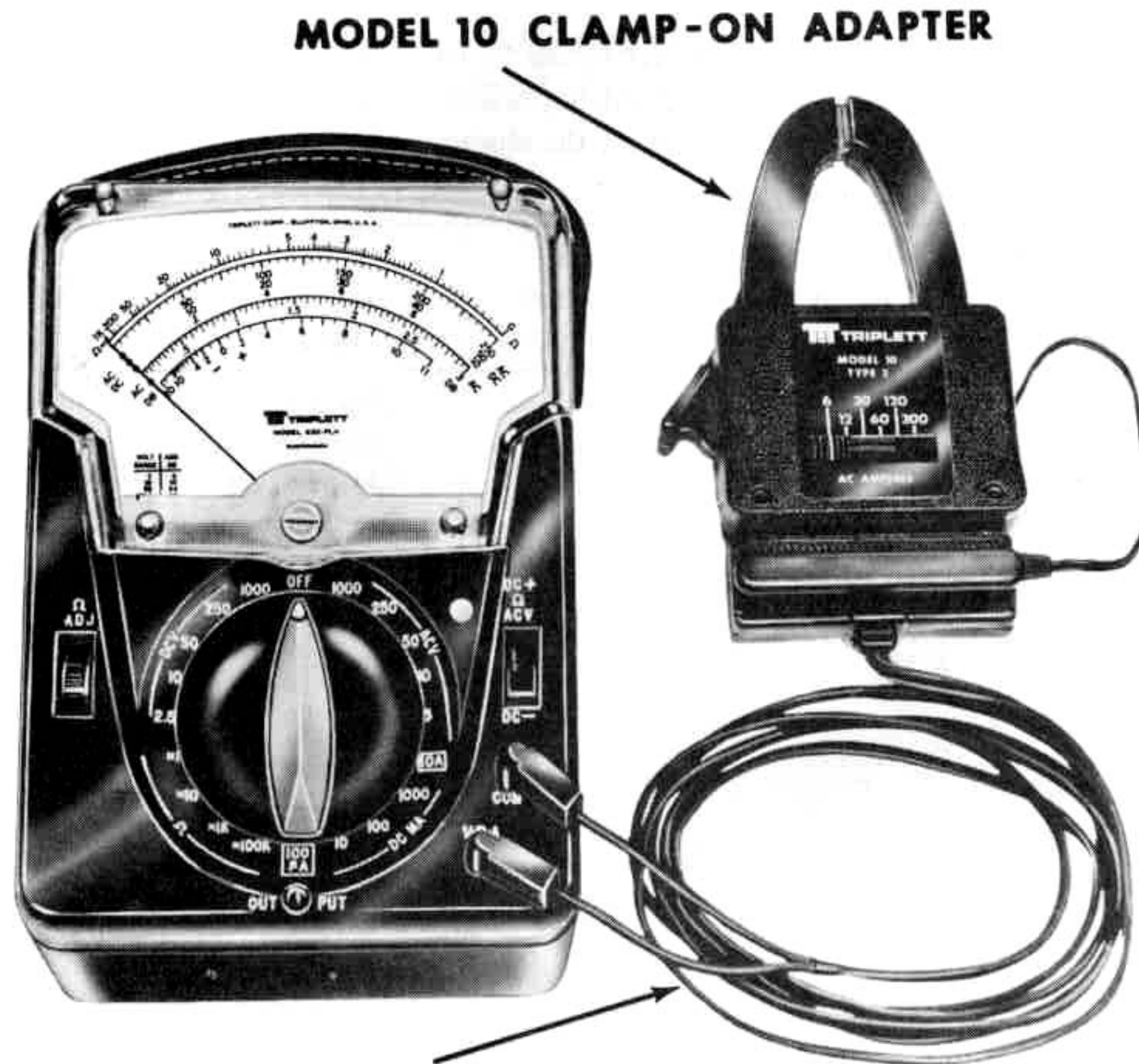


Fig. 6. High DC Shunts



## AC Current Measuring Adapter

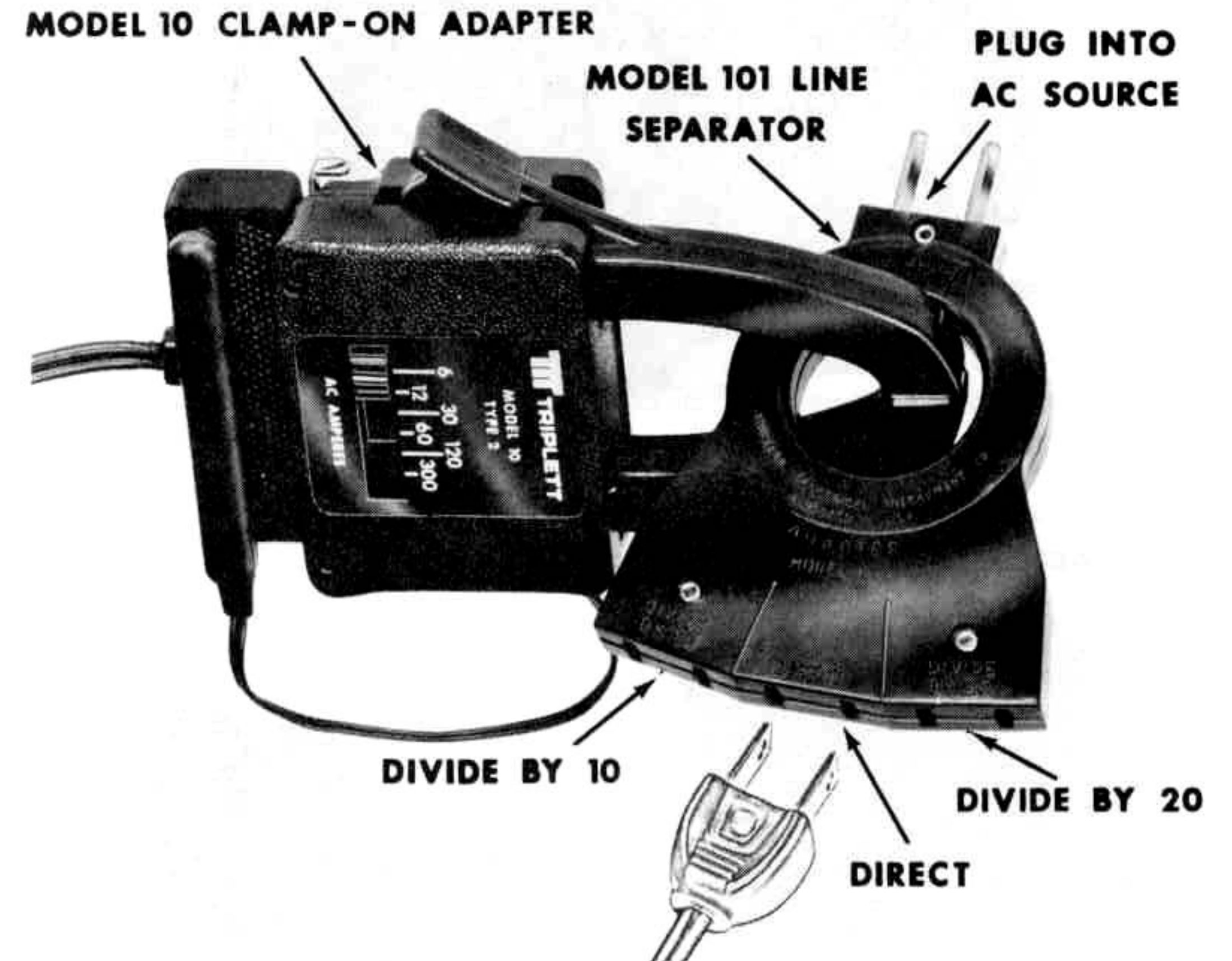
AC line loads can be checked easily, without breaking the conductors or insulation of the circuit under test, when the Model 10 CLAMP-ON AMMETER ADAPTER (Cat. No. 60-211) is used. The Adapter is connected with a No. 611 LEAD ASSEMBLY (Part No. 79-415). The lever on the side of the Model 10 Adapter is pressed to open the split yoke of the adapter so it can be placed over and closed around the lead or bus bar carrying the current being measured. Readings up to 300 AC amperes can be made.



**NO. 611 LEAD ASSEMBLY**

**Fig. 7. Model 10 Clamp-On Adapter**

THE MODEL 101 LINE SEPARATOR (Cat. No. 60-218) is used to divide a circuit using two-conductor cable so one conductor can be encircled by the adapter yoke. The Model 101 is plugged into the AC outlet and the AC cord of the equipment to be measured is plugged into the appropriate socket on the Model 101. The split yoke of the Model 10 Adapter is clipped through the loop in the Model 101 to make the current measurement. Use of the "Divide by 10" and "Divide by 20" sockets on the Model 101 Line Separator makes a convenient and fast method of measuring extremely low AC current.



**Fig. 8. Model 101 Line Separator**





Model 639-OS

**Case 639-OS**  
 Black quality case, has built-in stand on back. Flaps open to permit use of tester in case. Compartment for accessories. For use with 630 series testers. Felt lined, leather strap handle.



Carrying Case



Model 639-N

630-N black cowhide quality carrying case. For use with 630 series testers. Stand included at no extra cost. Leather strap handle.

Model 639 quality carrying case has adequate space for Triplett 630 series tester, instructions, and accessories. Black cowhide leather, provided with strong quality strap handle.

Model 639-P is a quality carrying case padded with  $\frac{3}{8}$ " sponge rubber which gives the instrument maximum protection. Has adequate space for any 630 series tester, instructions, and leads. Black cowhide; leather strap handle.

Carrying Cases



Rear view shows large accessory compartment permitting free access to tester stand, leads and instructions.

Model 639/639-P





## REPLACEABLE PARTS

Ref. No.	Description	630-PL	630-APL
B1	Battery 30V (NEDA 210)	37-19	37-19
B2	Battery 1.5V (NEDA 13F)	2426-1	2426-1
C1	Capacitor .1 $\mu$ F 400V	43-69	43-69
F1	Fuse 10 Amp 250V	3207-21	3207-21
F2	Fuse 1 1/4 Amp 250V	3207-67	3207-67
M1	Meter VOM Front	52-7397	52-7401
R1	Resistor 3.75 Meg	15-2842	15-2858
R2	Resistor 1 Meg	15K-1004TC5	15K-1004UC5
R3	Resistor 200k	15K-2003TC5	15K-2003UC5
R4	Resistor 35k	15K-3502TC5	15K-3502UC5
R5	Resistor 5000 $\Omega$	15K-5001TC5	15K-5001TC5
R6	Resistor 5000 $\Omega$	15K-5001TC5	15K-5001TC5
R7	Resistor .25 $\Omega$	15-5376	15-5376
R8	Resistor 2.5 $\Omega$	15-2869	15-2869
R9	Resistor 25.12 $\Omega$	15-2850	15-2850
R10	Resistor 5000 $\Omega$	15K-5001TC5	15K-5001UC5
R11	Resistor 423k	15K-4233TC5	15K-4233UC5
R12	Resistor 13.6k	15K-1362TC5	15K-1362TC5
R13	Resistor 4690 $\Omega$	15K-4691TC5	15K-4691UC5
R14	Resistor 37.2 $\Omega$	15-4116	15-4115
R15	Resistor 3.7 $\Omega$	15-3223	15-3223
R16	Resistor 732 $\Omega$	15K-7320TC5	15K-7320TC5
R17	Resistor 6.5 $\Omega$	15-4114	15-4114
R18	Resistor 45k	15K-4502TC5	15K-4502UC5
R19	Resistor 150k	15K-1503TC5	15K-1503UC5
R20	Resistor 800k	15K-8003TC5	15K-8003UC5
R21	Resistor 4 Meg	15K-4004TC5	15-2866
R22	Resistor 7.5 Meg	15-1262	15-2867
R23	Resistor 7.5 Meg	15-1262	15-2867
R24, R25, R26	Not Used		

## REPLACEABLE PARTS (Continued)

Ref. No.	Description	630-PL	630-APL
R27	$\Omega$ ADJ Control 20k	16-31	16-31
R28	Shunt Assembly 10 Amp	90-1036	90-1036
R29, R30	Not Used		
R31	Resistor 5100 $\Omega$	15R-512JC	15R-512JC
SW1	Switch	22-319	22-319
	Switch, with Resistors	22-586	22-585
SW2	Switch, Slide	22-152	22-152
CRA1	Rectifier Assem.	2250-30	2250-30
CR1	Diode Assembly Meter Protect	11670	11670
	Knob Red, with Spring	34-62	34-62
	Case with Handle	10-784	10-784
	Test Leads	79-127	79-127

### Repair or Service

In the event repair or service is required, please outline the nature of the difficulty. By providing this information, Triplet can supply more efficient service.



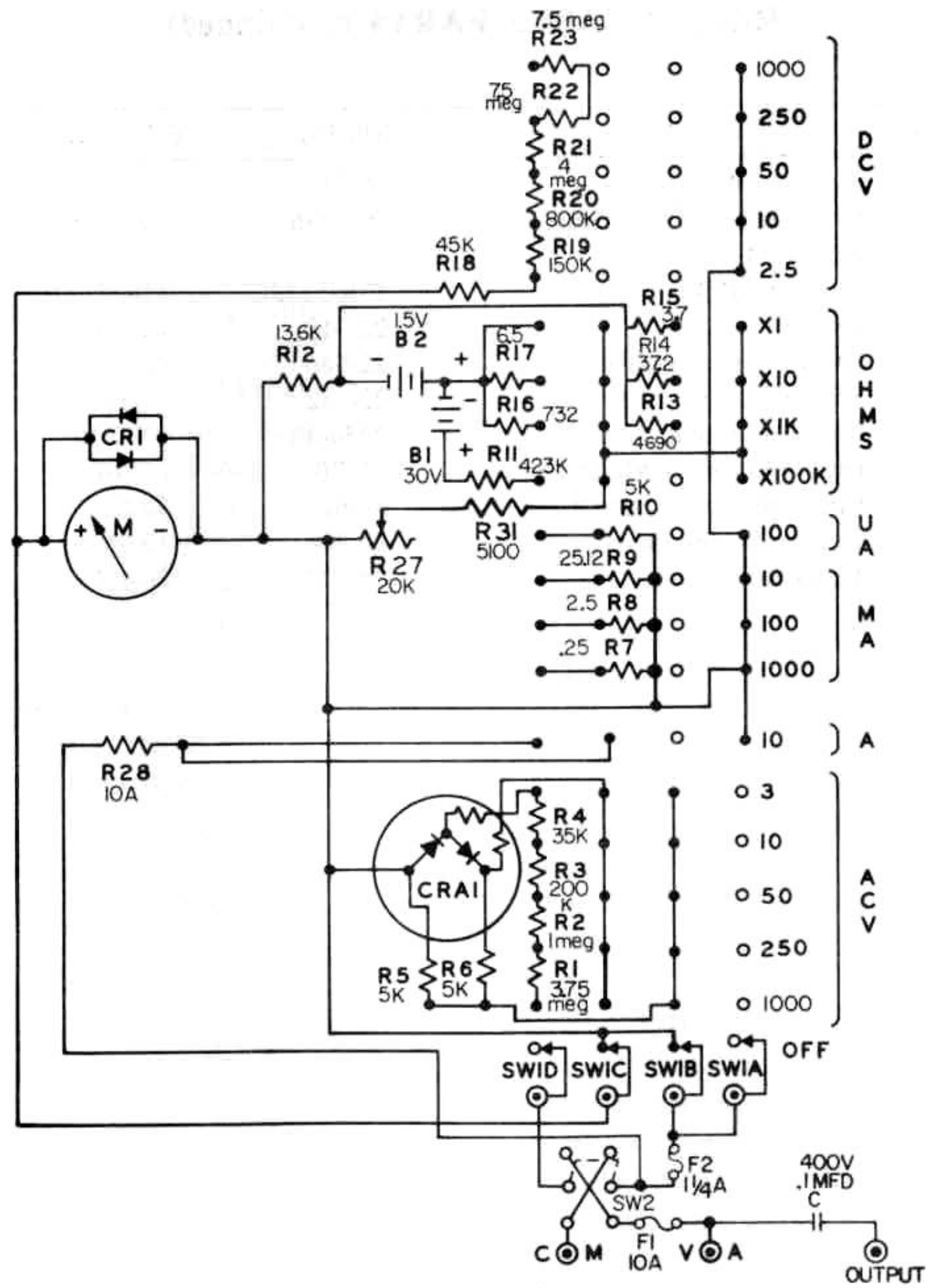


Fig. 9. Schematic

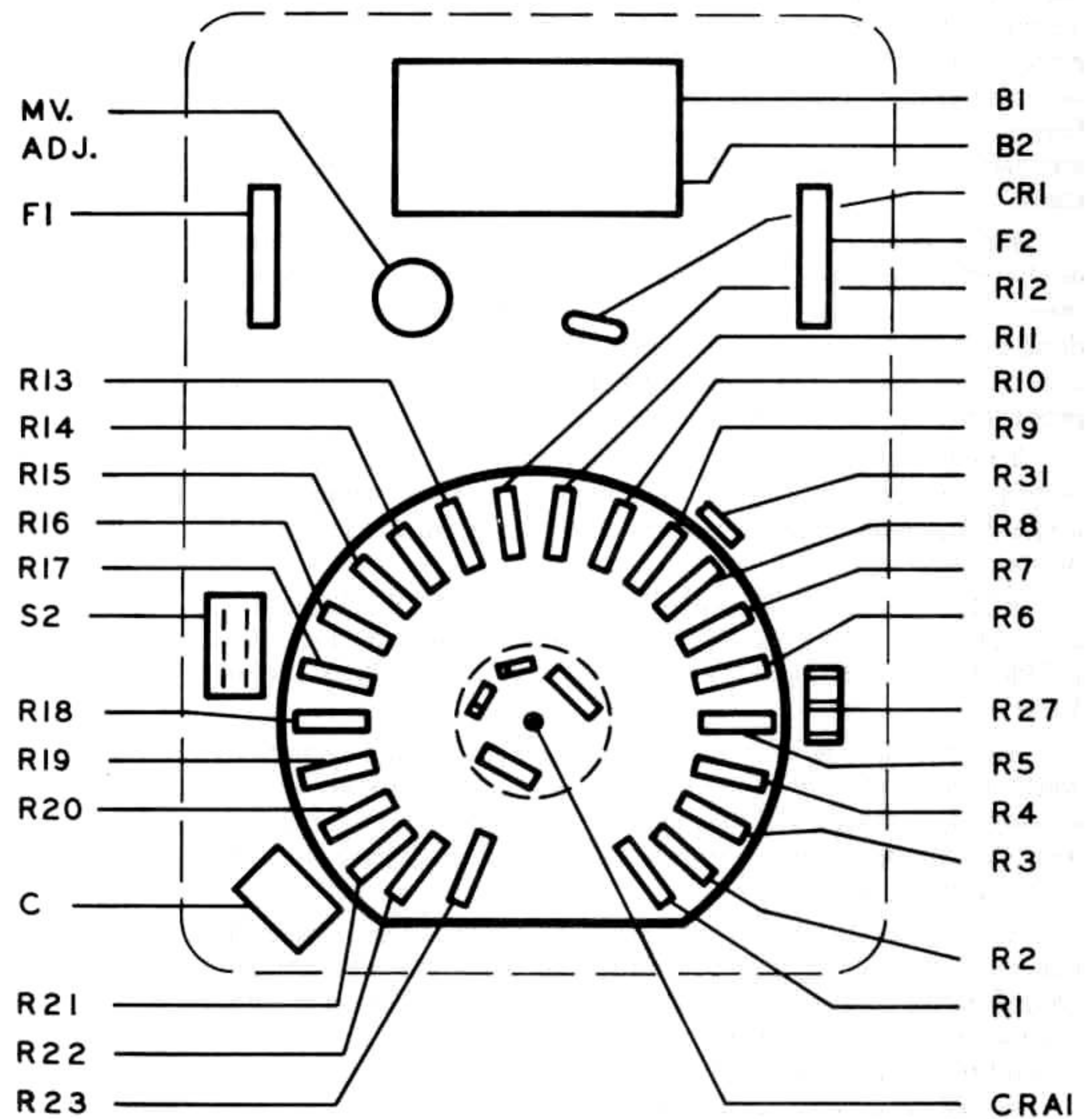


Fig. 10. Parts Location

## **LIMITED WARRANTY**

The Triplett Corporation warrants instruments and test equipment manufactured by it to be free from defective material or factory workmanship and agrees to repair or replace such products which, under normal use and service, disclose the defect to be the fault of our manufacturing, with no charge for parts and service. If we are unable to repair or replace the product, we will make a refund of the purchase price. Consult the Instruction Manual for instructions regarding the proper use and servicing of instruments and test equipment. Our obligation under this warranty is limited to repairing, replacing or making refund on any instrument or test equipment which proves to be defective within one year from the date of original purchase.

This warranty does not apply to any of our products which have been repaired or altered by unauthorized persons in any way so as, in our sole judgment, to injure their stability or reliability, or which have been subject to misuse, abuse, misapplication, negligence or accident or which have had the serial numbers altered, defaced, or removed. Accessories, including batteries, not of our manufacture used with this product are not covered by this warranty.

To register a claim under the provisions of this warranty, return the instrument or test equipment to Triplett Corporation, Bluffton, Ohio 45817, transportation prepaid. Upon our inspection of the product, we will advise you as to the disposition of your claim.

**ALL WARRANTIES IMPLIED BY LAW ARE HEREBY LIMITED TO A PERIOD OF ONE YEAR, AND THE PROVISIONS OF THE WARRANTY ARE EXPRESSLY IN LIEU OF ANY OTHER WARRANTIES EXPRESSED OR IMPLIED.**

The purchaser agrees to assume all liability, for any damages and bodily injury which may result from the use or misuse of the product by the purchaser, his employees, or others, and the remedies provided for in this warranty are expressly in lieu of any other liability Triplett Corporation may have, including incidental or consequential damages.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. No representative of Triplett Corporation or any other person is authorized to extend the liability of Triplett Corporation in connection with the sale of its products beyond the terms hereof.

Triplett Corporation reserves the right to discontinue models at any time, or change specifications, price or design, without notice and without incurring any obligation.

This warranty gives you specific legal rights, and you may have other rights which vary from state to state.