TRIPLETT

THE MIGHTY MITE VOM

Instruction Manual
Model 310 - VOM
Type 3

With Model 10 AC Amperes Adapter
And Model 101 Line Separation Adapter

INSTRUCTION MANUAL

TRIPLETT
MODEL 310 TYPE 3
HAND-SIZE VOM

TRIPLETT CORPORATION
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

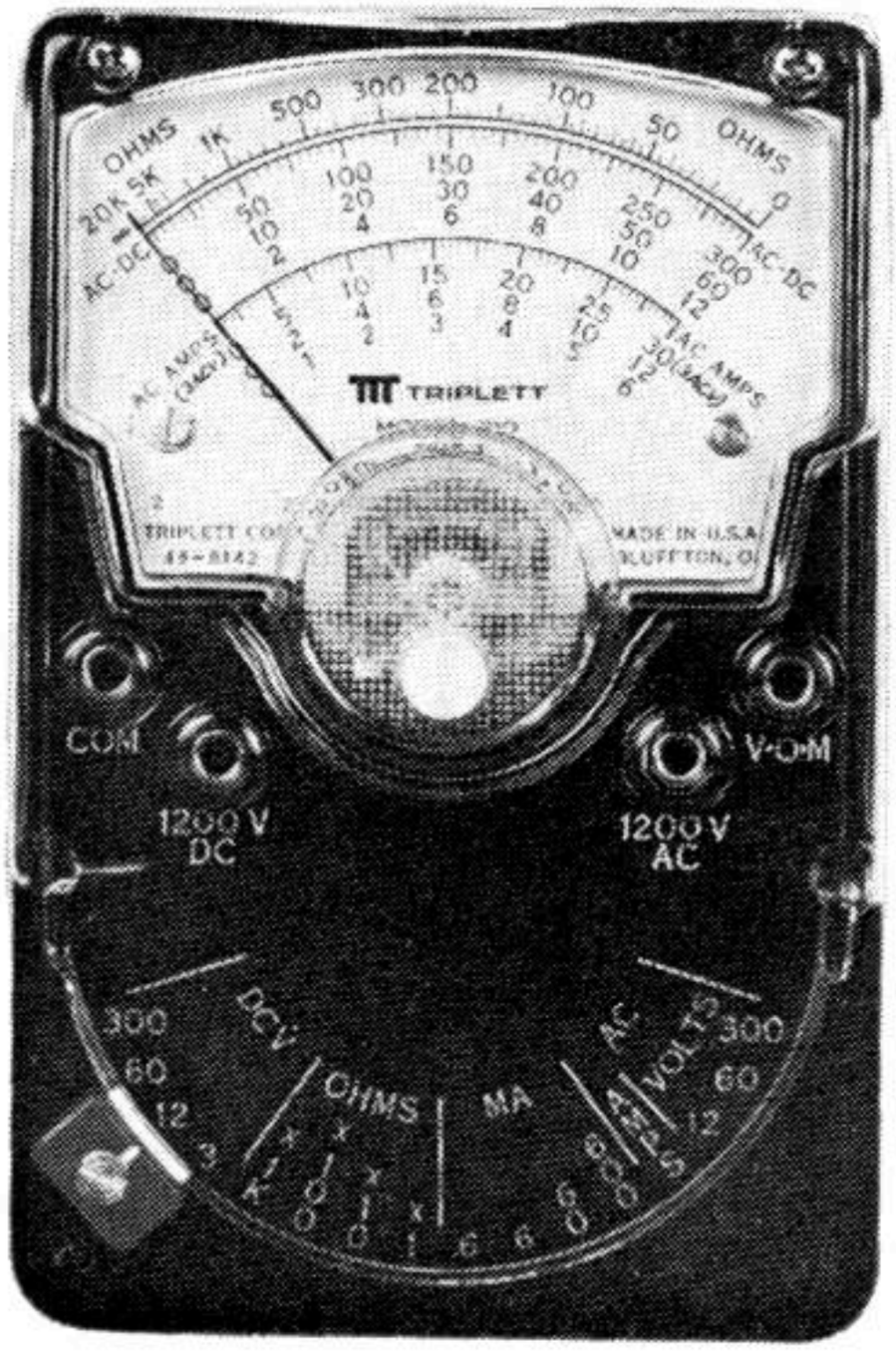
In high energy circuits such as distribution transformers and bus bars, dangerous arcs of explosive nature can occur if the circuit is shorted. If the tester is connected across a high energy circuit when set to a low resistance range, a current range, or any other low impedance range, the circuit is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

The Mighty Mite VOM



Model 310

DC Volts

Ranges:
0-3, 12, 60, 300, 1200 (20,000 ohms per volt)
Accuracy:
±3% of full scale value

AC Volts

0-3, 12, 60, 300, 1200 (5,000 ohms per volt)
Accuracy:
±4% of full scale value (on 60 cycle sine wave at 77°F)

Ohms

Ranges:
0-20,000, 200,000, 2 Meg., 20 Meg.
Accuracy:
±3% of DC scale with fully charged battery

Ohmmeter Specifications

	Range			
	X1	X10	X100	X1K
Max. Voltage (Volts)	1.6	1.6	1.6	18.0
Max. Current (mA)	8.0	.8	.08	.09
Max. Power (mW)	3.2	.32	.032	.605

DC Milliamperes

Ranges:
0-.6, 6, 60, 600 (250 mV)
Accuracy:
±3% of full scale value

AC Amperes (with optional Model 10 adapter)
Ranges:
0-6, 12, 30, 60, 120, 300

SPECIFICATIONS

Meter

50 μA — 250 mV (Pivot and Jewel)

Overload Protection

Meter movement protected by diode module.
RX1 range protected by fuse.
Voltage ranges protected by high impedance.

Batteries

One 1.5 volt "N" size (NEDA 910)
One 15 volt Eveready 504 (NEDA 220)

Weight

Approximately 14 oz.

Accessories supplied with the Model 310

1. One red and one black test lead
2. Alligator clips
3. Batteries: 1 — 1.5 V; and 1 — 15V
4. Instruction Manual

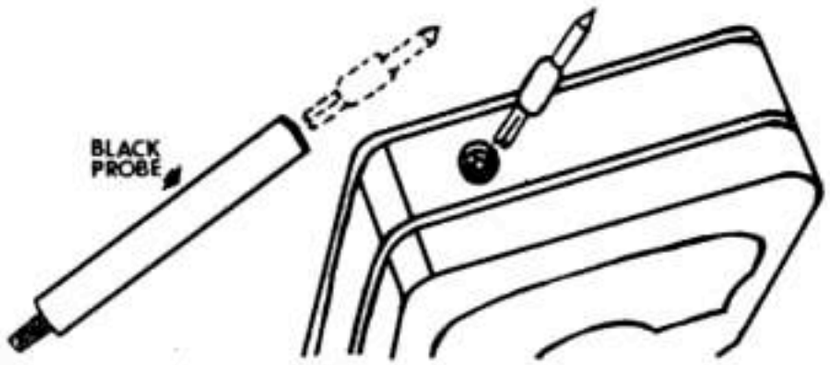
INTRODUCTION

The Triplett Model 310 is a handy hand-sized VOM with all the versatility and performance of larger more expensive bench-size models. It offers diode overload protection against damage to the meter movement caused by accidental overloads. A fuse is used to protect the RX1 range. The fuse and batteries can be easily replaced by removing a cover on the back. Its rugged, self-shielded, high torque bar-ring meter movement incorporating springback jewels provides dependable measurement capabilities on the job anywhere, even in strong magnetic fields. Small enough to be carried in your tool box, glove compartment, brief case, or shirt pocket, the Model 310 allows you to have 20,000 ohms per volt DC sensitivity (5,000 Ω/V AC) wherever you need it.

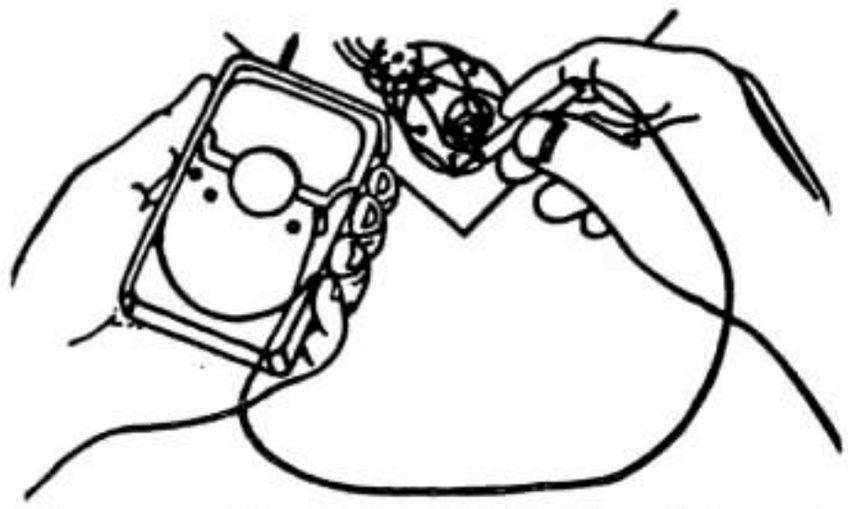
Versatility and readability have not been sacrificed in order to provide a portable VOM. The 310 offers 18 different ranges that can all be easily read on only 3 clearly defined scale arcs. A single selector switch allows you to switch easily from range-to-range and function-to-function.

For those hard-to-get-at-jobs when you wish you had an extra hand, try this:

Unscrew tip from the black test lead probe and insert it into end of tester.



By placing tip in the end jack of tester you can hold the tester in your hand and use the tester as the common probe. With test lead connected to VOM jack the other hand is free to operate the other lead as shown in the drawing below. The two leads can be connected together if a long lead is necessary.



CAUTION: This method should only be used in low voltage, low power applications.

(See the warning note in the front of this manual.)

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

The alligator clips provided with the tester fit over the end of the test probes. When measuring high voltage, these alligator clips allow measurement without handling the test probes. ALWAYS SHUT OFF THE 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 greater 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 3 and 300 volts are read on the 0-300 scale) by multiplying or dividing by a factor of 10 or 100 as indicated by the range/scale ratio (i.e.; on the 3 volt range divide the scale readings by 100).

The test probes should be disconnected from the voltage source (or the source shut off) before the switch position is changed. This practice will result in an increased life and reliability for the tester as well as a good safety practice.

The Meter Zero Adjust Screw is located near the center of the tester. It should be periodically adjusted so the meter pointer is on zero with no input into the tester.

Readings on the sensitive voltage, current and resistance ranges may sometimes be different than calculated values. Thermo-electric or electro-chemical reactions can sometimes generate voltage (and current) in a circuit due to elevated temperatures for 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.

Care:

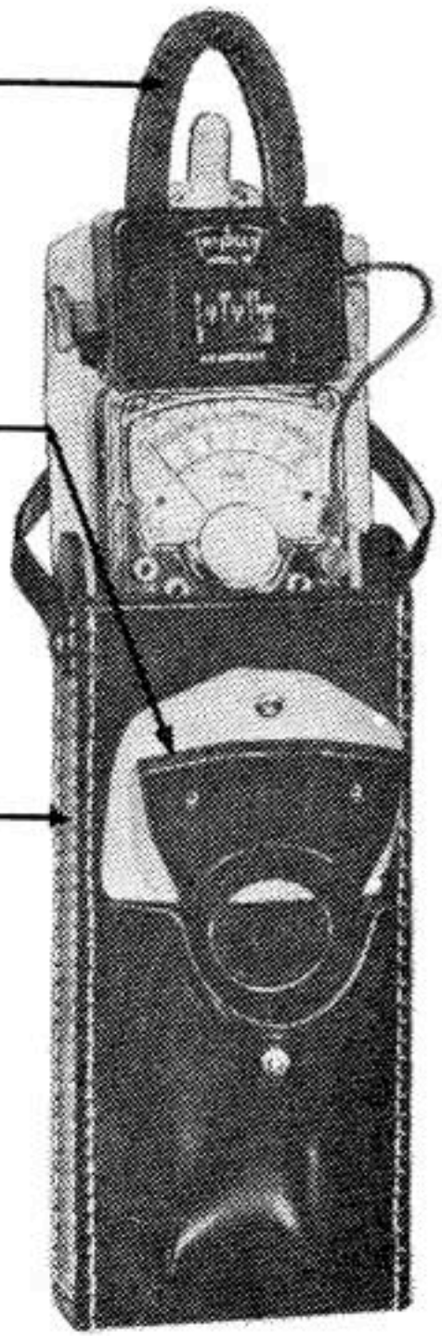
Although this instrument is portable and rugged it should be treated with care. Do not drop it or handle it roughly.

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 tester has not been used for a long period of time, rotate the switch in both directions several times to wipe the switch contacts for good contact.

ACCESSORIES FOR 310



Model 10 Clamp-on AC Ammeter — Cat. No. 60-211
Ranges, 0-6-12-30-60-120-300

Model 101 Line Separator — Cat. No. 60-218— Divides two conductor cords direct or increases Model 10 sensitivity 10x and 20x.

Model 379 Carrying Case — Cat. No. 10-1456 For Model 310 and Model 10 combination, plus Model 101.

Model 311 Lead — Cat. No. 79-161 42" long lead to separate Model 10 from 310 unit for easy reading in awkward spots. (not shown)

Model 369 Carrying Case — Cat. No. 10-1258.

DC VOLTAGE MEASUREMENTS

0-3 thru 0-300 Volts:

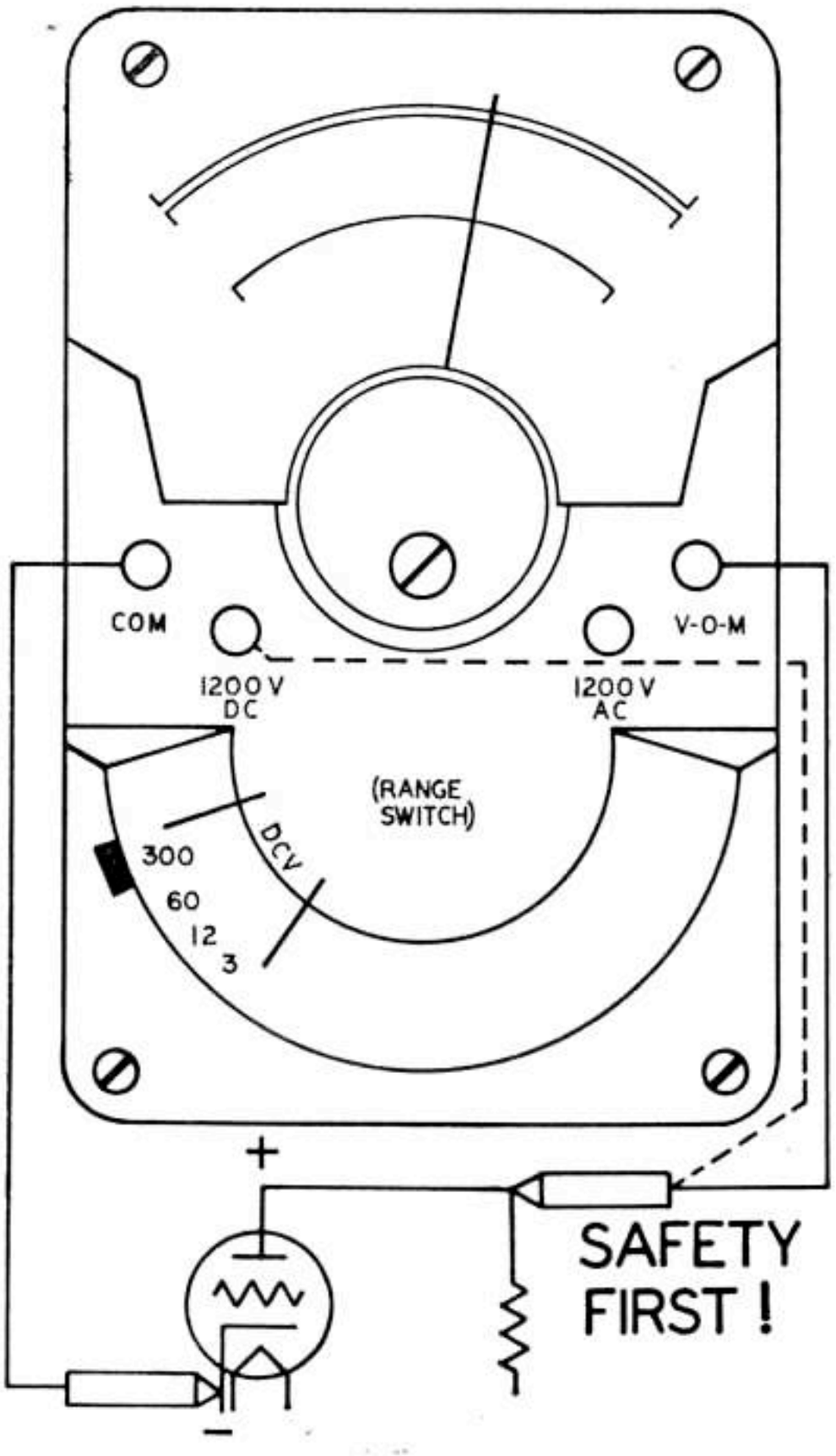
1. Insert test leads in VOM and COM jacks.
2. Set switch to appropriate DCV range.
3. Connect probes across voltage to be measured.
4. Read voltage on the black AC-DC scale.

0-1200 Volts:

1. Insert test leads in COM and 1200 VDC jacks.
2. Set switch to 3 DCV position.
3. Connect probes across voltage to be measured.
4. Read voltage on the black AC-DC scale.

DO NOT TOUCH THE VOM while it is connected to high voltage!

BE CAREFUL around high voltage!



0-3 thru 0-300 Volts:

1. Insert test leads in VOM and COM jacks.
2. Set switch to appropriate ACV range.
3. Connect probes across voltage to be measured.
4. Read voltage on black AC-DC scale.

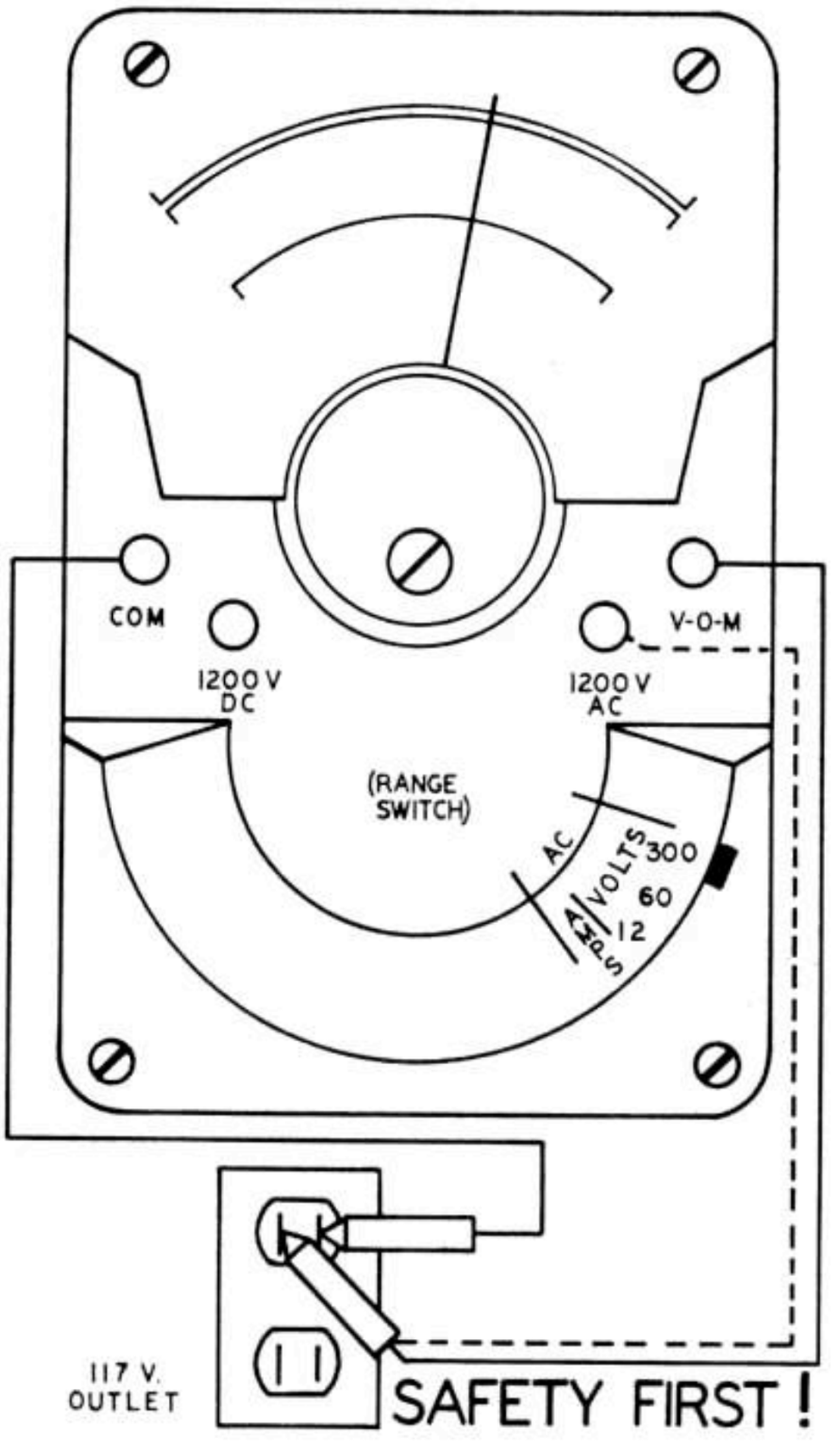
NOTE: For 3 AC Volts, set switch to AC AMPS. Read on AC AMPS scale (0-30 ÷ 10).

0-1200 Volts:

1. Insert test leads in COM and 1200 VAC jacks.
2. Set switch to 12 ACV.
3. Connect probes across voltage to be measured.
4. Read voltage on black AC-DC scale.

DO NOT TOUCH THE VOM while it is connected to high voltage!

BE CAREFUL around high voltage!



To Measure	Set Switch To	Lead Connections Black Lead "COM" Red Lead Listed Below	Read on Scale	Each Scale Div. Equals
DC Volts				
0-3	DCV 3	V-O-M	300÷100	.05 Volt
0-12	DCV 12	V-O-M	12	.20 Volt
0-60	DCV 60	V-O-M	60	1 Volt
0-300	DCV 300	V-O-M	300	5 Volt
0-1200	DCV 3	1200 V DC	12x100	20 Volt
AC Volts				
0-3	AC Amps	V-O-M	30 AC Amps÷10	.05 Volt
0-12	ACV 12	V-O-M	12	.20 Volt
0-60	ACV 60	V-O-M	60	1 Volt
0-300	ACV 300	V-O-M	300	5 Volt
0-1200	ACV 12	1200 V AC	12x100	20 Volt
OHMS				
0-20,000	Ω X1	V-O-M	0-20K	
0-200,000	Ω X10	V-O-M	0-20Kx10	
0-2 Meg.	Ω X100	V-O-M	0-20Kx100	
0-20 Meg.	Ω X1K	V-O-M	0-20Kx1000	
DC mA				
0-.6	MA .6	V-O-M	60÷100	.01 mA
0-6	MA 6	V-O-M	60÷10	.1 mA
0-60	MA 60	V-O-M	60	1 mA
0-600	MA 600	V-O-M	60x10	10 mA

X1 thru X1K Ohms:

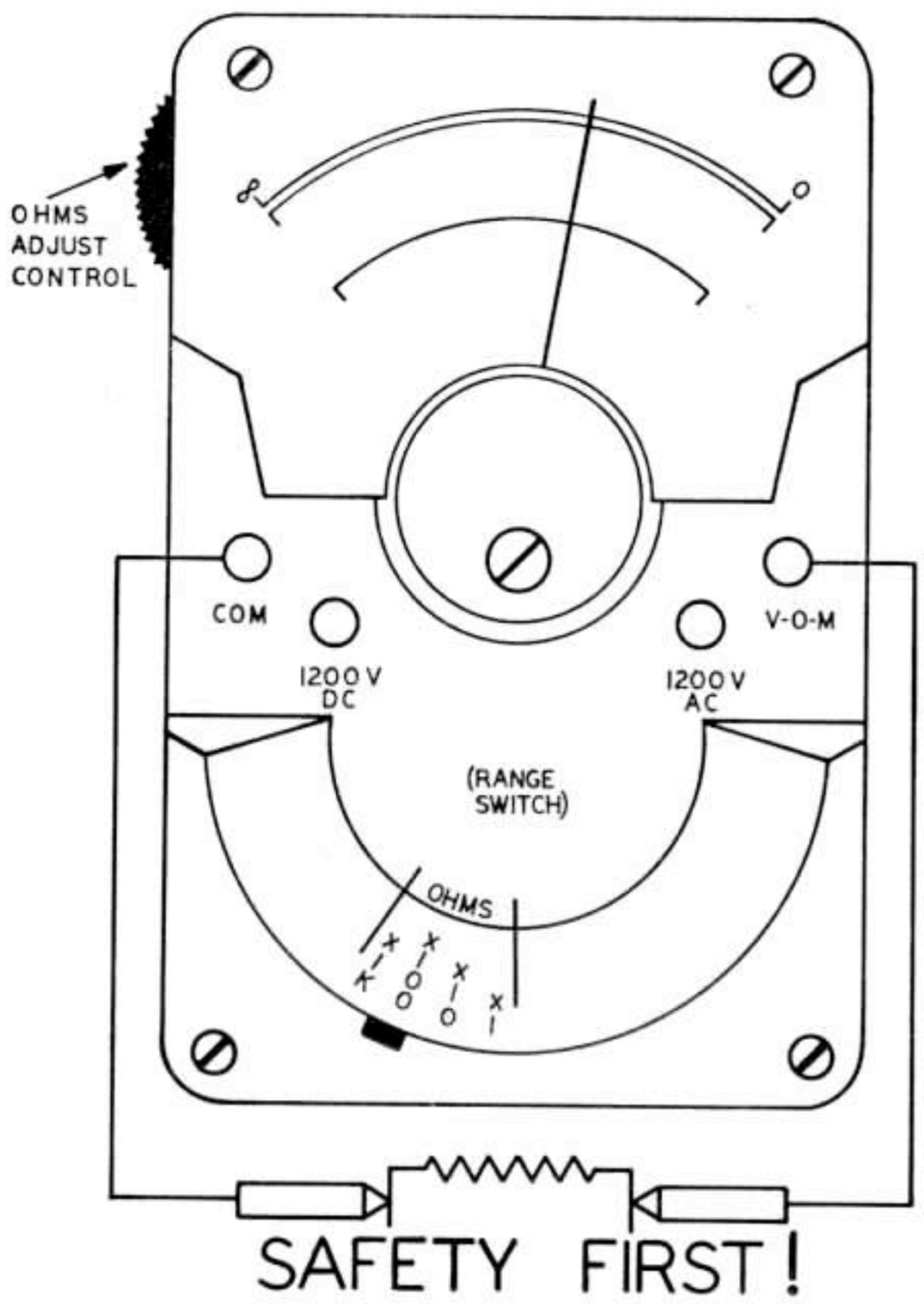
1. Insert test leads into VOM and COM jacks.
2. Set switch to appropriate OHMS range.
3. Short test probes together.
4. Adjust OHMS ADJUST CONTROL until meter reads zero ohms.
5. Connect probes to component to be measured.
6. Read ohms on OHMS scale (multiply value read by multiplier indicated by the switch).

A fuse protects the X1 range against accidental overloads. If the fuse should blow, all OHMS ranges will not operate.

DO NOT TOUCH circuitry while making measurements.

DISCONNECT or ISOLATE the device being tested from other circuitry.

NOTE: IK equals 1000.



DC CURRENT MEASUREMENTS

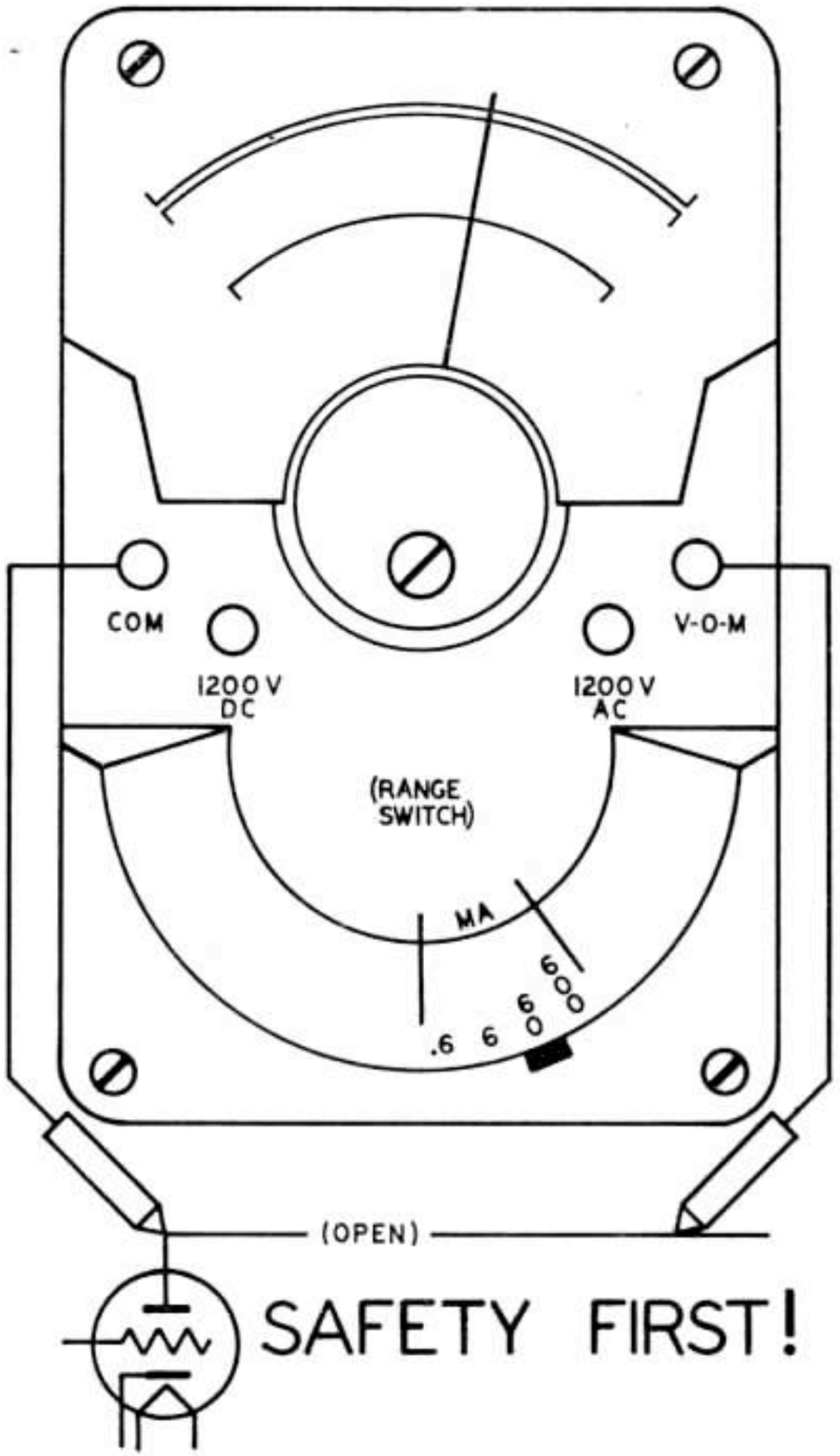
0-.6 thru 0-600 Milliamperes:

1. Insert test leads into VOM and COM jacks.
2. Set switch to appropriate mA range.
3. Connect the probes in series with the circuit (use alligator clips).
4. Turn circuit on.
5. Read current on black AC-DC scale.

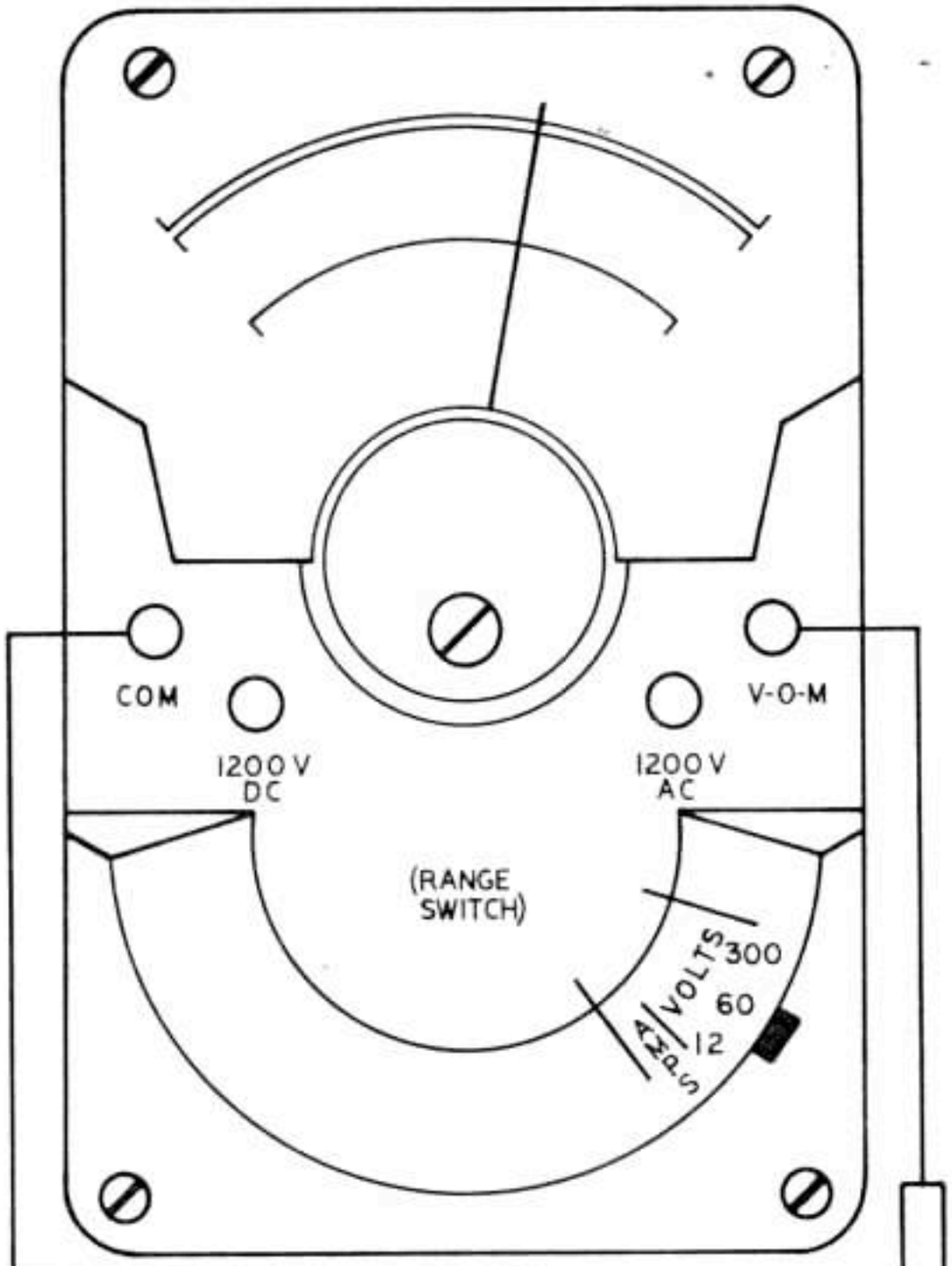
The approximate voltage drop across the Model 310 is shown below. Generally, this drop will not affect the circuit. But, in low voltage circuits, it may be necessary to compensate for this drop.

Current Range	Voltage Drop
0-.6, 6, 60 mA	250 mV
0-600 mA	330 mV

DISCONNECT POWER before connecting the Model 310 into the circuit.

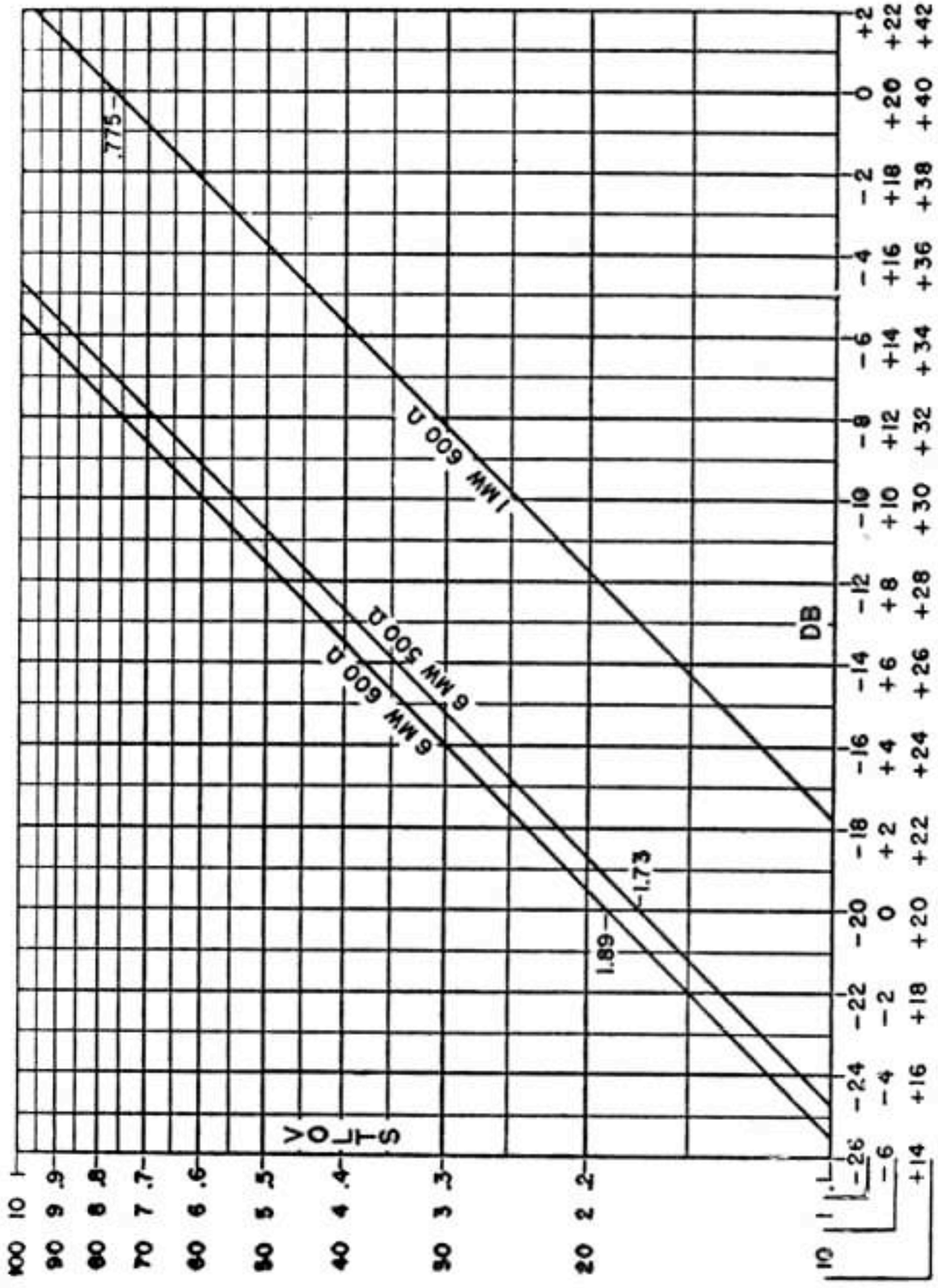


SAFETY FIRST!



In reading output Voltage use the same procedure as shown on page 14 for AC Volts.

SAFETY FIRST!



Battery Replacement

If the pointer cannot be adjusted to full scale on the X1, X10, or X100 OHMS ranges, replace the 1.5 V battery. Replace the 15 V battery if the X1K OHMS range cannot be adjusted for full scale.

1.5V Battery — NEDA 910F or 910M
15V Battery — NEDA 220

Battery Cover Latch Repair

If the slide on the battery cover breaks, order a new battery cover assembly. To repair the tab on the tester body, order the battery cover latch repair kit.

Fuse Replacement

If none of the OHMS ranges work, replace the fuse under the 1.5 V battery. Use a 1/16 AMP 8AG, MKB, or equivalent fuse.

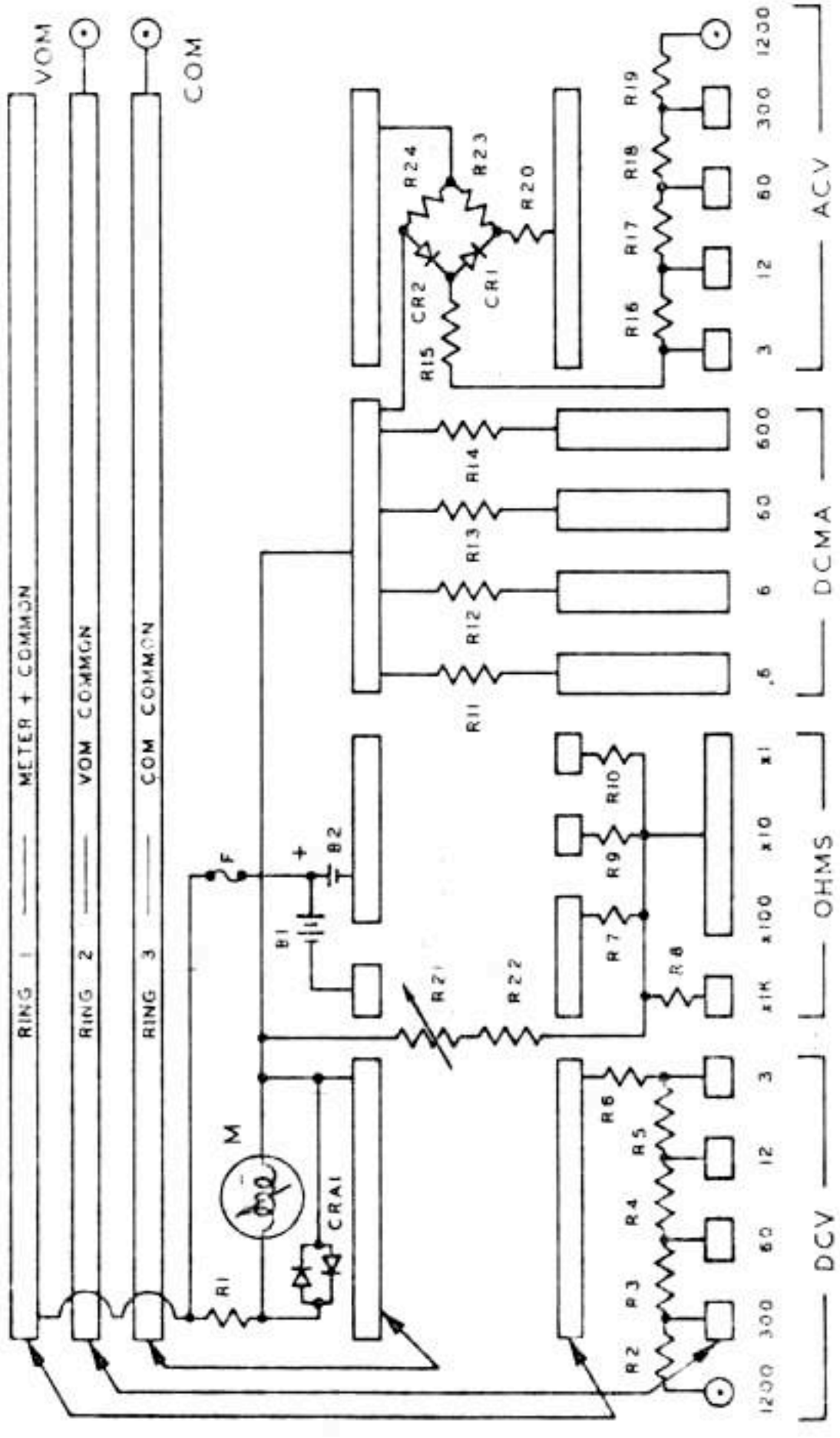
Cleaning Plastic Window

The plastic window has been treated at the factory to dissipate static charges. If cleaning is necessary, use cotton dipped in a solution of common household detergent and water. After cleaning, allow the solution to dry without rubbing; the resultant detergent film will effectively dissipate static charges.

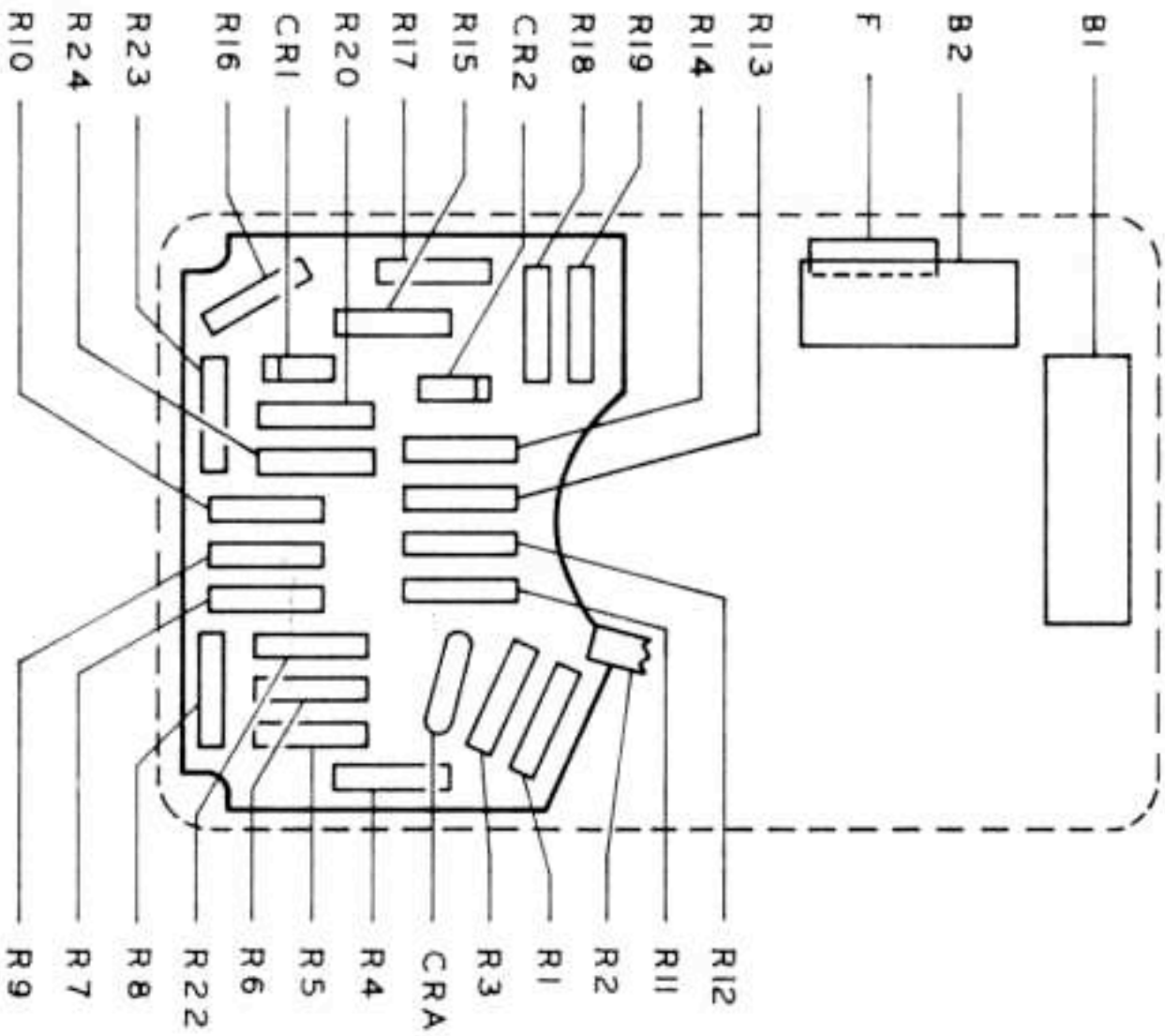
CAUTION: Solvents and liquids used in radio and TV shop work may craze or scar the plastic window if applied to it.

REPAIR OR SERVICE

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



COMPONENT LOCATION



REPLACEABLE PARTS LIST MODEL 310 TYPE 3

Circuit Symbol	Part Number	Qty. Used	Description
M	52-5467	1	Instrument assembly, pivot & jewel 50 μA
	10-2653	1	Front assembly
	41-5385	1	Base assembly
	20-718	1	Battery cover assembly
	46-32	1	Contact, battery 1.5V negative
	46-33	1	Contact, battery 15V negative
	46-89	1	Contact, battery positive
	24-776	1	Screw, battery contact retaining
B1	37-22	1	Battery 15 volt (NEDA 220)
B2	37-21	1	Battery 1.5 volt (NEDA 910-F or 910-M)
	87-405	1	P.C. Board with components
	87-250	1	P.C. Board less components
R1		1	Resistor, (Value may vary from 2300 to 3250Ω)
R2	15-2593	1	Resistor 18 Meg. 1% 1 watt
R3	15-2436	1	Resistor 4.8 Meg. 1% 1/2 watt
R4	15K-9603TB4	1	Resistor 960KΩ 1% 1/4 watt
R5, R8	15K-1803TA3	2	Resistor 180KΩ 1% 1/8 watt
R6, R7	15K-5502TA3	2	Resistor 55KΩ 1% 1/8 watt

REPLACEABLE PARTS LIST MODEL 310 TYPE 3

Circuit Symbol	Part Number	Qty. Used	Description
R9	15K-2201TC5	1	Resistor 2.2KΩ 1% 1/2 watt
R10	15K-2000TA3	1	Resistor 200Ω 1% 1/8 watt
R11	15-2596	1	Resistor 455Ω 1% 1 watt
R12	15K-420FTB4	1	Resistor 42Ω 1% 1/4 watt
R13	15-3496	1	Resistor 4.17Ω 1/2% 150 mA
R14	15-3647	1	Resistor .415Ω 1/4% 800 mA
R15		1	Resistor (Value may vary from 10.5K to 10.7K)
R16	15K-4502TA3	1	Resistor 45KΩ 1% 1/8 watt
R17	15K-2403TA3	1	Resistor 240KΩ 1% 1/8 watt
R18	15K-1204TB4	1	Resistor 1.2M 1% 1/4 watt
R19	15-4986	1	Resistor 4.5M 1% 1/2 watt
R20		1	Resistor (Value may vary from 2.4K to 2.7K)
R21	16-31	1	Resistor, Variable 20KΩ
	65-815	1	Bracket, R21 retaining
	5168	2	Lockwasher, R21 to bracket
	27-83	2	Nut, R21 to bracket
	32-5C	1	Terminal, R21 to circuit
	2434-2-6	1	Screw, R21 bracket & terminal
	5168	1	Lockwasher, R21 bracket & terminal
R22	15K-1502TA3	1	Resistor 15KΩ 1% 1/8 watt
R23, R24	15K-5001TA3	2	Resistor 5KΩ 1% 1/8 watt
CR1, CR2	11056	2	Diode
CRA1	11670	1	Diode assembly
	79-153	1	Test leads, needle point
	79-296	1	Test leads, blunt point
	2567-56	1	Tip, double end (ground lead)
	2250-70	1	Rectifier service kit
F	3207-37	1	Fuse, 1/16 Amp, 8AG, MKB
	10880	1	Lever assembly w/knob
	12317	1	Battery cover latch repair kit

TRIPLETT WARRANTY AND CONDITIONS OF SALE

The Triplett Corporation warrants instruments manufactured by it to be free from defective material or factory workmanship and agrees to repair or replace such instruments which under normal use and service, disclose the defect to be the fault of our manufacturing. Our obligation under this warranty is limited to repairing or replacing any instrument or test equipment which proves to be defective, when returned to us transportation prepaid within one (1) 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 or service stations in any way so as, in our judgment, to injure their stability or reliability or which have been subject to misuse, negligence, or accident, or which have had the serial number altered, effaced, or removed. Neither does this warranty apply to any of our products which have been connected, installed, or adjusted otherwise than in accordance with the instructions furnished by us. Accessories including batteries not of our manufacture used with this product are not covered by this warranty.

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

Upon acceptance of this material the purchaser agrees to assume all liability for any damages and bodily injury which may result from the use or misuse of the material by the purchaser, his employees, or others, and that the Triplett Corporation shall incur no liability for direct or consequential damage of any kind.

Parts will be made available for a maximum period of five (5) years after the manufacture of this equipment has been discontinued. Parts include all materials, charts, instructions, diagrams, accessories, et cetera, which were furnished in the standard or special models.

This warranty and conditions of sale are in lieu of all others expressed or implied and no representative or person is authorized to assume for us any other liability in connection with the sale of our products.

TRIPLETT CORPORATION
Bluffton, Ohio 45817

Printed in U. S. A. **84-254C**