OPERATOR'S MANUAL

VOLT-OHM-MILLIAMMETER
MODEL 263

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Printed in U.S.A.
1-110712

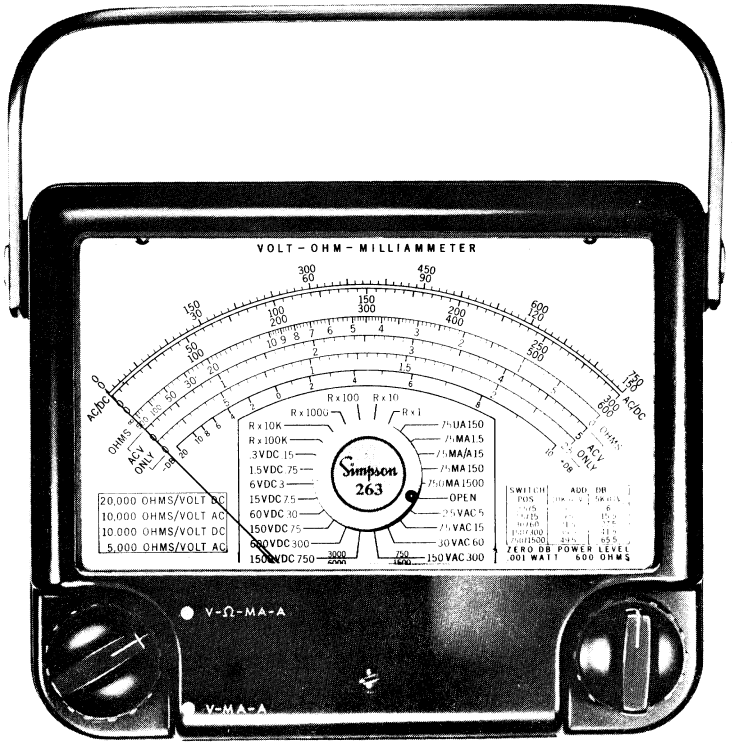

FIGURE 1. THE SIMPSON MODEL 263
VOLT-OHM-MILLIAMMETER

SECTION I
GENERAL DESCRIPTION

INTRODUCTION

The Simpson Model 263 Volt-Ohm-Milliammeter is a rugged, accurate, compact, easy to operate instrument, used for measuring electrical characteristics of circuits and circuit components. It indicates quantity measurements for AC and DC voltages, Direct Currents, Resistances, Decibels and AF Output voltages.

By utilizing unique switching circuits in the Model 263, each of the Voltage and Current ranges can be doubled in value by the flick of a switch located in the lower left hand corner of the tester. By increasing the number of ranges in this manner more readings can be made in the upper portion of the scale where the accuracy is the greatest utilizing the large 7-inch meter for optimum readability and resolution.

The Simpson Model 263 has been designed to minimize the possibility of accidental damage to the meter due to overloads. Special overload circuitry protects the meter from burn-out or mechanical damage such as a bent pointer even with 1000 times the normal current applied. Naturally, care and caution should always be exercised to protect both you and your Model 263.

The instrument is housed in a sturdy, black phenolic case. It is molded with reinforced walls for maximum durability. All of the component parts in the tester are attached to the front panel. The entire instrument slips into and out of the

case in one piece. No external power is required for the operation of the instrument. Self contained batteries are used to furnish the power required for resistance measurements. The batteries are in a separate compartment to eliminate the possibility of tester damage in the event of battery leakage and to make it unnecessary to disassemble the tester to replace batteries.

Conforming to the latest engineering developments, most of the component parts are mounted on a printed circuit board. This simplifies assembly, reduces maintenance and extends the useful life of the instrument.

The Adjust-A-Vue handle is attached on each side of the instrument case. The handle may be used to support the instrument in a convenient sloping position for easy viewing on the bench top. Of course the tester can also be placed in either a vertical or horizontal position.

ACCESSORIES AVAILABLE

High Voltage Probes
15KV/30KV @ 20,000 and 10,000 ohms/volt. Simpson Part No. 0141.

SPECIFICATIONS

Ranges	(20K ohms/volt)	(10K ohms/volt)
D.C. Voltage	.15	.3
	.75	1.5
	3.0	6.0
	7.5	15
	30	60
	75	150
	300	600
	750	1500
	3000	6000
A.C. Voltage	(10K ohms/volt)	(5K ohms/volt)
	2.5	5.0
	7.5	15
	30	60
	150	300
	750	1500
A.F. Output Voltage (.1 MFD Internal Series Capacitor)	2.5	5.0
	7.5	15
	30	60
	150	300

Volume Level in DB
(Based on 1 MW Across 600 ohm Line)

(10K ohms/volt)	(5K ohms/volt)
-20 to +10	-14 to +16
-10.5 to +19.5	-4.5 to +25.5
+1.5 to +31.5	+7.5 to +37.5
+15.5 to +45.5	+21.5 to +51.5
+29.5 to +59.5	+45.5 to +75.7

Direct Current		MV Drop		MV Drop
	75 μa	150	150 μa	300
	.75 mA	150	1.5 mA	300
	7.5 mA	159.6	15 mA	319.3
	75 mA	160.6	150 mA	321.2
	750 mA	160.7	1500 mA	321.4
	7.5 Amp	161.0	15 Amp	322.0

Resistance		
Rx1	0-500 Ohms	4.5 ohm center
Rx10	0-5000 Ohms	45 ohm center
Rx100	0-50,000 Ohms	450 ohm center
Rx1K	0-500,000 Ohms	4500 ohm center
Rx10K	0-5 Megohms	45K ohm center
Rx100K	0-50 Megohms	450K ohm center

Accuracy	
D.C. Voltage and Current	± 1-1/2% of F.S.
A.C. Voltage	± 3% of F.S.
Ohms	±3° of Arc

Overall Dimensions 6"x7-1/4"x3-5/8"
Weight 3-1/2 lbs.

Frequency Response
A.C. Voltage Ranges
The frequency response of the AC Ranges is essentially flat over the wide range of 20 cycles per second to 450,000 cycles per second.

A.C. Output Ranges
The frequency response of the output ranges are essentially the same as the A.C. voltage ranges except that a small

error is introduced at the low frequency end of the lower ranges due to the capacitive reactance of the series capacitor at these frequencies.

CONTROLS AND CONNECTORS

FUNCTION AND RANGE SWITCH

The control for the function and range switch is located in the lower right hand corner of the front panel. The function and range indicator is located in the lower center of the meter dial area, and is driven by a chain linkage from this control. The switch shaft is connected directly to the indicator, so there is no chance that any difference will ever occur between the indicator reading and the actual function and range for which the instrument is set.

RANGE EXTENDER SWITCH

This switch is located in the lower left hand corner of the tester and is the top knob of a dual control. When this switch is set to the V-Ohm-MA-A position printed in red, the sensitivity of the tester is 20,000 ohms/volt on D.C. and 10,000 ohms/volt on A.C. The ranges of the tester to be used when in this position are indicated in red within the indicator box on the meter dial.

When this switch is set to the V-MA-A position printed in green, the sensitivity of the tester is 10,000 ohms/volt on D.C. and 5000 ohms/volt on A.C. The ranges of the tester to be used when in this position are indicated in green within the indicator box on the meter dial.

ZERO OHMS CONTROL

This control is located in the lower left hand corner of the tester and is the lower knob of a dual control. This is used to obtain a zero indication for the ohmmeter when the test leads are shorted together. During operation, the zero indication is checked each time the ohmmeter is used. This compensates for aging of the internal batteries and permits them to be used for a longer period of time.

CIRCUIT JACKS

There are six circuit jacks on the Model 263. Three are on the left side of the case, and the other three are on the right side of the case.

The three jacks on the right are legended COM.–, + and 7.5/15A+. The COM.– jack is used for all ranges and functions. The + jack is used in conjunction with the COM.– jack for all ranges and functions with the exception of the 7.5/15A+, 3000/6000 V.D.C., 750/1500 V.A.C. and OUTPUT ranges. The 7.5/15A + jack is used in conjunction with the COM.– jack for the 0-7.5 and 0-15 ampere Direct Current measurements.

The legending of the 3 jacks on the left are 750/1500 V.A.C., OUTPUT and 3000/6000 V.D.C.

The output jack connects a 0.1 uf capacitor in series with the A.C. volt ranges to provide D.C. isolation as required in some output voltage measurements.

The other two jacks are used to extend the A.C. and D.C. voltage ranges as indicated.

Whenever polarity is involved, as for DC voltage and current measurements, the black lead, connected to the COM.– jack, is used for negative polarity and the red lead is used for positive polarity. For AC and OUTPUT voltage measurements, polarity is not identified. For resistance measurements, positive polarity is applied through the + jack to the resistance being measured, and negative polarity is applied through the COM.– jack.

SECTION II
OPERATING INSTRUCTIONS

CAUTION

When making voltage or current measurements, as a safety precaution, form the habit of turning off all power to the circuit under test and discharging all capacitors. Connect the test leads at the desired points in the circuit. Then turn on the power while taking the readings. Turn off the power and discharge all capacitors before disconnecting test leads from the circuit.

SHOCK HAZARD (As defined in Underwriters Laboratories Radio and Television Receiving Appliances Standards for Safety, Eleventh Edition, dated November, 1964).

"A shock hazard is considered to exist at any part involving a potential of between 30 volts and 40 kilovolts peak in the following cases:

A. If the current through a load of not less than 500 ohms exceeds 300 milliamperes after 0.0003 seconds.

B. If the current through a load of not less than 500 ohms exceeds 5 milliamperes after 0.2 seconds.
C. If the time required for the current through a load of not less than 500 ohms to decrease to 5 milliamperes is between 0.1 and 0.2 seconds, and the total quantity of electricity passed through the load up to that time exceeds 4 millicoulombs.
D. If the time required for the current through a load of not less than 500 ohms to decrease to 5 milliamperes is between 0.03 and 0.1 seconds, and the total quantity of electricity passed through the load up to that time exceeds $75T-350T^2$ millicoulombs, where T is time in seconds.
E. If the potential is more than 5 kilovolts peak and if the total capacitance of the circuit is more than 3000 micro-microfarads."

INITIAL ADJUSTMENTS

Position the Instrument

Place the instrument in its operating position. It may be positioned vertically or horizontally, or the Adjust-A-Vue handle may be used as a support to position the instrument at a convenient angle. The most accurate measurements will always be obtained when the instrument is positioned horizontally.

Zero Deflection

Before making any measurements with the Simpson Volt-Ohm-Milliammeter Model 263, check to see that the pointer indicates zero when the meter is in its operating position. If the pointer is off zero, turn the screw located in the case below the center of the meter scale to correct the pointer position. Use a small screwdriver to turn this screw slowly

either clockwise or counter-clockwise until the pointer is exactly over the zero mark at the left side of the scale.

MEASURING D.C. VOLTAGES 0-1500 VOLTS

1. Plug the black test lead into the COM.-jack and the red test lead into the + jack.
2. Set Range switch indicator to the desired D.C. voltage range printed in either red or green.
3. If the particular range desired is printed in red the Range extender switch located in the lower left hand corner must be set to the red dot position. The sensitivity of the tester at this time is 20,000 ohms/volt. If the particular range desired is printed in green the Range extender switch must be set to the green dot position. The sensitivity of the tester at this time is 10,000 ohms/volt. WHEN IN DOUBT AS TO WHICH RANGE SHOULD BE USED, ALWAYS USE THE HIGHEST VOLTAGE RANGE FIRST AS A PROTECTION TO THE INSTRUMENT.
4. Connect the black test lead to the negative side of the circuit to be measured and the red test lead to the positive side of the circuit.
5. Turn the power on in the circuit to be tested; if the pointer deflects to the left of the zero, the actual circuit polarity is the reverse of the anticipated polarity, turn the power off in the circuit, reverse the test lead connections, and turn power on again. This will apply the correct polarity to the meter.
6. For any of the D.C. voltage ranges selected read the voltage on the black AC/DC arc on the top of the dial, and multiply reading by necessary multiplying factor.

Example:
To read 3V, read 0-300 scale and multiply reading by .01.
To read 30V, read 0-300 scale and multiply reading by .1.

7. Turn the power off in the circuit which is being measured and discharge all capacitors before disconnecting the test leads.

MEASURING D.C. VOLTAGE 0-3000/6000 VOLT RANGE ONLY.

CAUTION

Be extremely careful when working in high voltage circuits. Never touch the meter or the test leads while power is on in the circuit being measured.

1. Set range selector switch to the 3000/6000V D.C. position (the same position as for the 750/1500V D.C. range).
2. Plug the black test lead into the COM.-jack, and the red test lead into the 3000/6000V D.C. jack.
3. If it is desired to use the 3000 volt range set the range extender switch to the red dot position (20,000 ohms/volt). If it is desired to use the 6000 volt range set the range extender switch to the green dot position (10,000 ohms/volt).
4. Be sure power is off in the circuit to be measured and discharge all capacitors. Then connect the black test lead to the negative side of the circuit and the red test lead to the positive side of the circuit.
5. Turn power on for the circuit. Do not touch the meter or the test leads. If the pointer deflects to the left side of zero, the actual circuit polarity is the reverse of the anticipated polarity. Turn power off in the circuit, discharge the capacitors, reverse the test leads, and turn power on again. This will apply the correct polarity to the meter.
6. Read either one of the above voltage ranges on the AC/DC arc. Multiply the 0-300 reading by 10 to obtain 0-3000 and the 0-600 reading by 10 to obtain 0-6000.
7. Turn power off and discharge all capacitors before removing the test leads.

MEASURING A.C. VOLTAGES 0-300 VOLTS

CAUTION

Be extremely careful when working in high voltage circuits. Never touch the meter or test leads while power is on in the circuit being measured, particularly in power type circuits with voltages greater than 250 volts and current capabilities greater than 25 amperes. Discharge all capacitors before connecting or disconnecting test leads.

The Simpson Volt-Ohm-Milliammeter Model 263 rectifier circuit responds to the average value of the A.C. voltage being applied. The meter dial, however, is calibrated in terms of the R.M.S. value, which will be correct for all sine wave measurements.

1. Plug the black test lead into the COM.-jack and red test lead into the + jack.

2. Set Range switch indicator to the desired A.C. voltage range printed in either red or green.
3. If the particular range desired is printed in red the range extender switch located in the lower left hand corner must be set to the red dot position. The sensitivity of the tester at this time is 10,000 ohms/volt. If the particular range desired is printed in green the Range extender switch **must** be set to the green dot position. The sensitivity of the tester at this time is 5000 ohms/volt.
   WHEN IN DOUBT AS TO WHICH RANGE SHOULD BE USED ALWAYS USE THE HIGHEST VOLTAGE RANGE FIRST AS A PROTECTION TO THE INSTRUMENT.
4. Be sure power is turned off in the circuit to be measured and connect the test leads across the voltage to be measured.
5. Turn power on in circuit to be measured. For the 0-2.5 range read the 0-2.5 scale printed in red directly. For 0-5.0 range read the 0-5.0 scale printed in green directly.
6. For the remainder of the AC ranges read the AC/DC arc, and use the proper multiplying factor.
7. Turn power off and discharge all capacitors before disconnecting test leads.

MEASURING A.C. VOLTAGES 0-750/1500 VOLTS RANGE ONLY

1. Set the Range selector switch to the 75/1500 VAC position (the same position as for the 150/300 VAC position).
2. Plug the black test lead into the COM.– jack, and the red test lead into the 750/1500 VAC jack.

3. If it is desired to use the 750 VAC range, set the Range extender switch to the red dot position (10,000 ohms/volt). If it is desired to use the 1500 volt range set the Range extender switch to the green dot position (5000 ohms/volt).
4. Be sure power is off in the circuit to be measured and discharge all capacitors. Then connect the test leads across the voltage to be measured.
5. Turn power on in the circuit to be measured. Do not touch the meter or test leads.
6. Read either one of the above voltage ranges on the AC/DC arc. Read the 0-750V AC direct and read the 0-1500V AC on the 150 volt scale and multiply by 10.
7. Turn power off and discharge all capacitors before disconnecting test leads.

MEASURING OUTPUT VOLTAGES

An output voltage is the AC component only in a mixture of AC and DC voltage, such as the normal condition in an audio amplifier. The Model 263 has a capacitor connected in series with its OUTPUT jack which blocks the DC component of the current from passing into the measuring circuit, but permits the AC component to pass. The blocking capacitor has some effect on the AC response characteristics at the lower frequencies.

1. Connect the black test lead in the COM.– jack, and the red test lead in the OUTPUT jack.
2. Set the Range switch indicator for any of the eight VAC ranges which is appropriate for the output voltage to be measured. The ranges are 0-2.5, 7.5, 30, 150 VAC at 10,000 ohms/volt, and 0-5, 15, 60, 300 VAC at 5000 ohms/volt.

NOTE

Do not make measurements in circuits where the DC voltage present exceeds the voltage rating (400 volts DC) of the internal series capacitor.

3. Connect the black test lead to the grounded side of the circuit to be measured, and the red test lead to the "hot" side. If neither side of the circuit is grounded, connect the black test lead to the side which is the closer to ground potential.
4. Turn power on in the circuit to be measured. Do not touch the meter or the test leads.
5. To read output voltage proceed as according to instructions for AC voltage measurements.

MEASURING DECIBELS

For some applications, output voltages or audio frequency voltages are to be measured in terms of decibels. The decibel scale (DB), at the bottom of the dial, is numbered from −20 through 0 to +10. To measure decibels, proceed according to instructions for Output Voltages or for AC Voltages, and read the DB arc. The DB readings will be correct on an absolute scale if 0 DB is 0.001 watt (1 milliwatt) across 600 ohms (0.775 volt), and if the voltage read with the Model 263 was measured across 600 ohms.

To obtain DB values across 600 ohms:

For the 2.5 VAC range read the DB arc directly.
For the 7.5, 30, 150, 750 VAC ranges add a fixed number as shown in red at the lower right hand corner of the dial.
For the 5, 15, 60, 300, 1500 VAC ranges add a fixed number as shown in green at the lower right hand corner of the dial.

The accuracy of the correction factors is a function of the DB reading. In general, the error will not exceed ±1 DB. If better accuracy is required, calculate the DB from the indicated AC voltage.

MEASURING RESISTANCES

The six resistance ranges of the Model 263 are not affected by the position of the Range extender switch. The ohmmeter circuit will operate the same with this switch in either position.

When DC resistances are measured, the batteries inside the case of the Model 263 furnish power for the measuring circuit. Correction for battery voltage variation over long periods of time is provided by means of the ZERO OHMS control which is part of the ohmmeter circuit.

Each time the ohmmeter is to be used, short the test prods together and adjust the zero ohms control so the meter reads full scale. ("O" ohms). Check and adjust as required each time a different range is used. Use the following procedure:

1. Set the range switch at the desired resistance range position.
2. Connect the black test lead in the COM.−jack, and the red test lead in the + jack.
3. Connect the contact ends of the test leads together to provide zero ohms resistance between them.
4. Observe the meter indication. It should read O at the right end of the OHMS arc.
5. If the pointer does not read zero, rotate the ZERO OHMS knob at the lower left on the front panel until it does. If the pointer cannot be brought up to the 0 mark, one or more batteries need to be replaced. (See Battery replacement procedure page 28.)

6. After the pointer is adjusted for zero, separate the contact ends of the test leads and the ohmmeter is ready for use on that range.
7. Disconnect power from any resistor or circuit before measuring its resistance with the ohmmeter. Do not apply any power before the measurements are complete and the test leads are disconnected.
8. Connect the test leads across the resistance which is to be measured. If there is a "forward" and "backward" resistance such as in rectifiers and diodes, observe polarity in the lead connections to control each direction of test. The red test lead will provide positive polarity, and the black test lead will provide negative polarity.

NOTE

The resistance of rectifiers may measure as different values on different ranges of the Model 263. For example, a crystal diode could measure 80 ohms on Rx1 range, and then measure 300 ohms on the Rx100 range. This is normal, and is a result of the diode characteristic. The difference in reading does not indicate a fault in the ohmmeter.

9. Read the indication on the OHMS arc on the dial. Note that this arc reads from right to left for increasing values.
10. Multiply the readings by the multiplier factor indicated at the switch position; the result is the resistance value in ohms. K on the dial stands for "thousand".

DIRECT CURRENT MEASUREMENTS, 0-1.5 AMPERES

CAUTION

Never connect the test leads across any source voltage directly when the Model 263 is used as a current meter. This will damage the instrument. Always connect the meter in series with the load across the source of voltage.

1. Set Range switch indicator to the desired MA range printed in either red or green.
2. If the particular range desired is printed in red, the Range extender switch must be set to the red dot position. The maximum millivolt drop of any range printed in red is 161 MV. If the particular range desired is printed in green the Range extender switch must be set to the green dot position. The maximum millivolt drop of any range printed in green is 322 MV. When in doubt as to the value of current present, always use the highest range as a protection to the instrument. After obtaining the first reading, reset the range switch for a lower range and a more accurate reading if the current value is within the lower range.
3. Plug the black test lead into the jack marked COM.– and the red test lead into the jack marked +. These jacks are both located on the right side of the instrument.
4. Open the circuit in which the current is to be measured Connect the meter in series with the circuit. Connect the red test probe toward the positive side, and the black test probe toward the negative side of the opened circuit.

5. Turn on the power in the circuit which is to be measured.
6. Read the current value on the black arc marked AC/DC which is at the top of the dial. If the pointer is deflected to the left of the scale, the test probes are connected opposite to the way they should be. Turn off the power, reverse the connections of the test probes, and turn on the power again.
7. Read all MA ranges on the top AC/DC arc and use proper multiplier to convert these scales to direct reading.
8. Turn the power off in the circuit which is being measured and discharge all capacitors before disconnecting test leads.

DIRECT CURRENT MEASUREMENTS 0-7.5/15 AMPERES

CAUTION

Never connect the test leads across any source voltage directly when your Model 263 is used as a current meter. This may damage the instrument. Always connect the meter in series with the load across the source of voltage.

1. Set the Range switch indicator to the 7.5MA/A15 position. Note that this position is used for both the MA and AMP ranges. For the 7.5A range the Range extender switch is set to the red dot position. For the 15A range the Range extender switch is set to the green dot position.
2. Plug the black test lead into the jack marked COM. on the right hand side of the instrument. Plug the red test lead into the jack marked +7.5/15A on the right hand side of the instrument.

3. Open the circuit in which the current is to be measured. Connect the meter in series with the circuit. Connect the red test probe toward the positive side, and the black test probe toward the negative side of the opened circuit.
4. Turn the power on in the circuit which is to be measured.
5. Read either range on the top AC/DC arc and use proper multiplier to convert these scales to direct reading.

SECTION III
THEORY OF OPERATION

GENERAL

The basic meter movement of the Model 263 will be deflected to full scale whenever 40 microamperes of direct current passes through its circuit. When less current passes through its circuit, the amount of its deflection is proportional to the quantity of current. Since the meter movement has a fixed resistance, the amount of voltage drop across it is proportional to the current and to the amount of pointer deflection.

VOLTAGE MEASUREMENTS - DC CIRCUIT

The basic meter on these ranges in one instance is shunted to 50 microamperes and calibrated to 3000 ohms providing a full scale deflection of 150 millivolts and a sensitivity in terms of ohms/volt of 20,000.

In the other instance the meter is shunted to 100 microamperes and calibrated to 3000 ohms providing a full scale

deflection of 300 millivolts and a sensitivity in terms of ohms/volt of 10,000.

To determine the value of resistance required for any range simply multiply the full scale value desired by the ohms/volts sensitivity.

VOLTAGE MEASUREMENTS - AC

To measure AC voltages, a modified bridge rectifier within the Model 263 develops a DC voltage which is porportional to the average value of the measured voltage, and this is used to pass direct current through the meter movement. Deflection of the pointer is proportional to the DC voltage, which is in turn proportional to the average AC value applied. The meter scale is calibrated in terms of the RMS value, and will be correct assuming that the measured voltage is in the form of a sine wave.

The basic range of the AC circuit is 2.5 volts with an AC circuit resistance of 25,000 ohms. In terms of ohms per volt the basic sensitivity is 10,000 ohms/volt.

This circuit is then shunted to provide a range of 5.0 volts with an AC circuit resistance of 25,000 ohms. In terms of ohms per volt the sensitivity is 5000 ohms/volt.

To determine the resistance required for any range simply mutliply the full scale value by the ohms/volt sensitivity.

VOLTAGE MEASUREMENTS - OUTPUT

For measurements of Output Voltages, a series capacitor prevents the DC component of voltage from affecting the meter circuit, but permits the AC component to be applied to the normal AC voltage measuring circuit. For very low AC frequencies, the capacitive reactance of the series capacitor may be great enough to reduce the relative amount of voltage which is actually applied to the AC measuring circuit.

CURRENT MEASUREMENTS

When the Model 263 is used to measure direct current, resistance is connected in parallel with the meter movement. The total circuit current divides between the meter and its parallel shunt in inverse proportion to their resistances. The meter resistance remains at 3000 ohms but in one instance the basic meter is shunted at 50ua and the other instance shunted to 100ua providing one set of current ranges with a 150 millivolt drop and another set of ranges with a 300 millivolt drop.

RESISTANCE MEASUREMENTS

When the Model 263 is used to measure resistance, dry cell batteries within the instrument furnish a known voltage through the meter circuit and through the measured resistance in series with the meter. With zero resistance in series with the test leads (test leads shorted together), the pointer is deflected to full scale; as resistance is added between the test leads, total current is decreased, and the pointer is deflected to a point less than full scale. The markings on the Model 263 show relative pointer deflection, which results from adding the indicated amount of resistance in series between the test leads. For the Rx1, x10, x100 and x1000 Ranges one "D" size dry cell furnishes

1.5 volts DC for measuring resistances. For the Rx10K and Rx100K Ranges, a 22.5 volt battery is used.

NOTE

Do not make resistance measurements with the Model 263 where any voltage is present in any circuit or on any component since this voltage could result in a reading error and/or damage to the meter circuit.

CAUTION

Some semiconductor devices can be damaged by excessive current or voltage.

It is recommended that the characteristics of the device to be tested, be determined before resistance measurements are made with this Tester.

Listed below are the Open Circuit Voltage and Short Circuit Current for each Resistance range:

RANGE	OPEN CIRCUIT VOLTAGE	SHORT CIRCUIT CURRENT
Rx1	1.5	333 MA
Rx10	1.5	34 MA
Rx100	1.5	3.4 MA
Rx1K	1.5	.4 MA
Rx10K	22.5	480 Microamps
Rx100K	22.5	48 Microamps

SECTION IV

MAINTENANCE

PARTS LIST

Reference Symbol	Description	Simpson Part No.
R1	Resistor, 1.93 Ω (Bobbin)	10-675221
R2	Resistor, 19.3 Ω	1-110751
R3	Resistor, 193 Ω	1-110750
R4	Resistor, 5786 Ω	1-110749
R5	Resistor, 3.6 Ω (Bobbin)	10-675219
R6	Resistor, 8.15Ω(Bobbin)	10-675220
R7	Resistor, 32.4 Ω 5905-022-5571	1-110748
R8	Resistor, 93.5 Ω	1-110743
R9	Resistor, 324 Ω	1-110747
R10	Resistor, 1.33K Ω	1-110742
R11	Resistor, 2.04K Ω	1-110746
R12	Resistor, 42.8K Ω	1-110741
R13	Resistor, 1.2K Ω 5905-552-5256	1-110745
R14	Resistor, 445K Ω	1-110740
R15	Resistor, 20.4K Ω	1-110744
R16	Potentiometer & Switch	1-110715
R17	Resistor, 12K Ω	1-110739
R18	Resistor, 45K Ω	1-110738
R19	Resistor, 90K Ω	1-110737
R20	Resistor, 450K Ω	1-110736
R21	Resistor, 900K Ω	1-110735
R22	Resistor, 4.5 Megohms	1-110734
R23	Resistor, 9 Megohms	1-110733
R24	Resistor, 15 Megohms	1-117136
R25	Resistor, 15 Megohms	1-117136
R26	Resistor, 15 Megohms	1-117136

R27	Resistor, 6 Megohms	1-110728
R28	Resistor, 1.2 Megohms	1-110732
R29	Resistor, 225K Ω	1-110730
R30	Resistor, 50K Ω	1-110731
R31	Rheostat, 1 Ω	1-110753
R32	Resistor, 47K Ω	1-110725
R33	Resistor, 3.9K Ω	1-110723
R34	Resistor, 12.5K Ω	1-110727
R35	Resistor, 25K Ω	1-110726
R36	Resistor, 15K Ω	1-117530
R37	Resistor, 3K Ω	1-110757
R38	Shunt Assy. 1500/750 Ma. (Calibrated in Tester)	1-110752
R39	Shunt Assy. 7.5/15 Amp (Calibrated in Tester)	0-007140
R40	Potentiometer 4K) Packaged as	
R41	" 7K) one unit	
R42	" 25K) under	
R43	" 2.5K) Part No.	1-110721
R44	Resistor 1.5K Ω	1-110756
C1	Capacitor .1 MFD 400V	1-113733
C2	" .1 MFD 250V	1-110977
D1	Diode OA 180	1-110722
D2	Diode OA 180	1-110722
D3	Varistor	1-110670
	Test Lead Set (one black and one red lead)	0115
	Molded Phenolic Case, Finished	3-330154
	Adjust-A-Vue Handle Assy.	3-310812
	Knob, Bar, Unlined	1-110170
	Knob, Round, Range Switch	3-811211
	Knob, Bar, Lined	1-110717
	Knob, Round, Range Extender Switch	1-110718

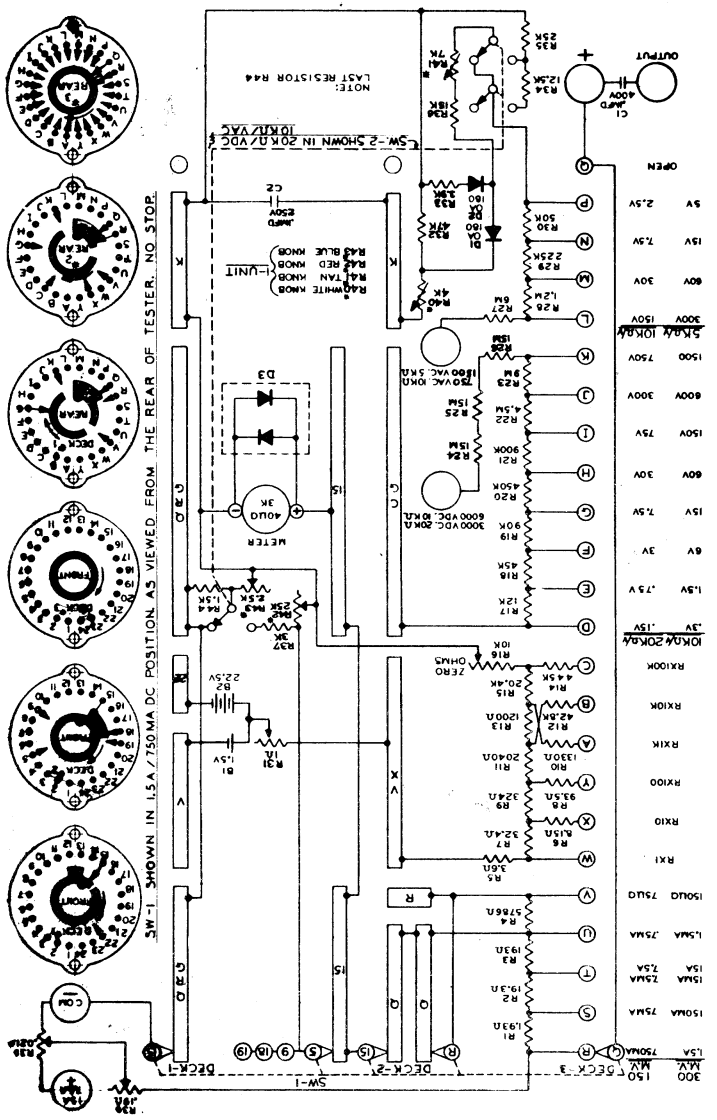

FIGURE 2. SCHEMATIC DIAGRAM, SIMPSON VOLT-OHM-MILLIAMMETER MODEL 263

BATTERY REPLACEMENT

To replace batteries, remove the 3 screws holding the battery plate on the back of the case. When it is no longer possible to bring the pointer to zero on the R X 1, R X 10, R x 100 and R x 1K ranges, (see MEASURING RESISTANCES Page 17) replace the #2 size D flashlight cell. When it is no longer possible to bring the pointer to zero on the R x 10K & R x 100K ranges, replace the 22.5 volt battery. This will restore operation of the ohmmeter circuits.

Whenever these batteries are replaced be sure to observe correct polarity. The positive polarity for both batteries is indicated by a raised + mark in the center of the Battery Compartment.

NOTE: When batteries reach the end of their useful life, they should be replaced promptly. Failure to do so may result in damage to your Model 263 due to battery leakage, even though the battery may be advertised as "Leakproof".

SERVICE NOTE

It is recommended that all service of the printed circuit boards be referred to an Authorized Repair Station or to the Simpson Electric Company factory.

If it is necessary to replace components, do not apply heat directly to the printed circuit board. Cut leads close to the body of the component and solder the replacement to the leads.

OPENING THE CASE

The Simpson Volt-Ohm-Milliammeter Model 263 has been designed to provide easy access for all necessary adjustment and replacement of parts. Use a 1/4-inch screwdriver to remove the four screws through the back of the case. Then remove the front panel assembly from the case. This assembly includes the meter movement, front panel, printed circuit, and will come out as a unit.

NOTE

The test leads must be removed from their jacks to permit opening and closing of the case.

TEST LEADS

Each Simpson Volt-Ohm-Milliammeter Model 263, is furnished with one pair of four-foot test leads. One lead is black and the other red for easy polarity identification.

The wire is very finely stranded and extra-flexible. Its insulation is a special high-grade rubber which has far more insulation strength than the largest voltages to which your instrument will ever be subjected.

TEST LEAD INSPECTION

Periodic inspection of the test leads is recommended to detect cuts, burns or other damage that could reduce the insulation strength of the leads. When replacement is indicated, ask your local distributor for catalog number 0115.

MAINTENANCE

D.C. HIGH VOLTAGE TESTING

D.C. HIGH VOLTAGE TEST PROBES
20,000 OHMS/VOLT
10,000 OHMS/VOLT

The DC high voltage probes extend the range of a multimeter in a safe, convenient manner at nominal cost. Their primary purpose is the measurement of direct current terminal potentials of very high voltage, and low power capacity. An example which is the anode supply used in television receivers and other cathode ray tube type circuitry.

The probe body is made of high temperature polystyrene in order to provide high dielectric strength and low leakage. It contains a high megohm precision resistor.

A shielded cable and internal probe shield are used to protect the operator from any possible flash-over and ground any electrostatic charge that might accumulate on the probe body.

The internal shield and cable shield are connected to the ground return lead by a flexible copper braid between the two elbow connectors. A 48 inch ground return lead with an insulated clip completes the test lead set. No additional wires are needed.

Part No. 0141	20K ohm/volt	15,000 Volts, D.C.
	10K ohm/volt	30,000 Volts, D.C.

REPAIR STATIONS AND PARTS DEPOTS

Simpson Official Repair Stations and Parts Depots have been established throughout the United States and Canada. To obtain repair or recalibration for any item of Simpson, equipment, contact the Repair Station which has been provided for your area and arrange with them for the service which you require. A list of these Repair Stations and Parts Depots is included in the rear of this manual.

SIMPSON WARRANTY REPAIR STATIONS AND PARTS DEPOTS

Arizona, Phoenix 85016 — Area Code 602
Metercraft Inc. — 279-6249
3308 N. 24th St.

California, San Diego 92111 — Area Code 714
Meter Master, Inc. — 278-2200
8139 Engineer Road

California, Glendale 91201 — Area Code 213
JSD Engineering Company — 849-6187
6915 San Fernando Road

California, Los Angeles 90022 — Area Code 213
Meter Master, L.A. — 685-7313
Div. of Kierulff Electronics, Inc.
5645 East Washington Blvd.

California, Mountain View 94041 — Area Code 415
Kierulff/Metermaster — 968-6292
2484 Middlefield Road

California, San Francisco 94105 — Area Code 415
Pacific Electrical Instrument Lab. — 421-7185
111 Main Street

Canada, London, Ontario — Area Code 519
Bach-Simpson Ltd. — 451-9490
1255 Brydges Street
P.O. Box 484

Colorado, Denver 80209 — Area Code 303
Metermaster Instrument Corporation — 934-4601
748 So. Broadway

Connecticut, New Haven 06511 — Area Code 203
Kaufman Instrument Labs Inc. — 776-7201
810 Dixwell Avenue

Florida, Miami 33136 — Area Code 305
Florida Precision Instrument Corp. — 374-1731
800 N.W. 7th Avenue

Florida, Orlando 32806 — Area Code 305
Electro Tech Inc. — 423-5589
307 - 27th Street

Georgia, Hapeville 30054 — Area Code 404
Electro-Tech, Inc. — 758-7205
3020 Commerce Way

Hawaii, Honolulu 96817 — 851-457
Electronic Systems Inc. — 811-132
1622-26 Silva Street

Illinois, Chicago 60625 — Area Code 312
A & M Instrument, Incorporated — 539-4460
4801 North Ridgeway Avenue

Illinois, Chicago 60644 — Area Code 312
Pacific Indicator Company — 261-1330
5217 W. Madison Street

Illinois, Chicago 60644 — Area Code 312
Simpson Electric Company — 379-1121
5200 W. Kinzie Street

Kansas, Shawnee Mission 66205 — Area Code 913
Sturtz Instrument Co. — 236-4705
4705 Mission

Louisiana, New Orleans 70115 — Area Code 504
Industrial Instrument Works — 895-5621
3305 Tchoupitoulas Street

Maryland, Baltimore 21211 — Area Code 301
Edgerly Instrument Lab., Inc. — 243-6611
205 West 28th Street

Massachusetts, Cambridge 02138 — Area Code 617
A. S. Mancib — 864-2494
363 Walden Street

Massachusetts, Needham Heights 02194 — Area Code 617
Instruments, Incorporated — 444-9410
570 Hillside Avenue

Michigan, Detroit 48220 — Area Code 313
Ram Meter, Inc. — 547-1000
1100 Hilton Road Ferndale

Minnesota, Minneapolis 55411 — Area Code 612
Instrumentation Services Inc. — 521-8803
917 Plymouth Avenue

Missouri, St. Louis 63112 — Area Code 314
Scherrer Instruments — 367-9800
5449 Delmar Blvd.

New Jersey, Belleville 07109 — Area Code 201
Marshall Instruments, Inc. — 751-1190
236 Washington Avenue

New York, Buffalo 14216 — Area Code 716
Electrical Instrument Labs. — 392-2726
932 Hertel Avenue

N. Y., Great Neck, Long Island 11022 — Area Code 212
Simpson Instrument Sales & Service, Inc. — 683-0674
130 Gutter Mill Road — Area Code 516
482-3103

New York, Great Neck, L.I. 11022 — Area Code 516
A & M Instrument, Inc. — 487-0500
Community Drive

New York, New York 10011 — Area Code 212
Electro-Tech Equipment Company — 675-2400
85 Tenth Avenue

New York, Syracuse 13215 — Area Code 315
Syracuse Instrument Lab. — 492-1651
4895 South Avenue Box 96

New York, Vestal 13850 — Area Code 607
Compton Industries Inc. — 748-3349
333 Vestal Parkway East
P.O. Box 351

North Carolina, Charlotte 28206 — Area Code 704
Electro-Tech Inc. — 333-0326
3107 Gullman Avenue

Ohio, Cleveland 44135 — Area Code 216
Weschler Electric Company — 251-4609
4250 W. 130th Street

Ohio, Cleveland 44103 — Area Code 216
Pioneer-Standard Electronics, Inc. — 432-0010
5403 Prospect Avenue

Ohio, Dayton 45404 — Area Code 513
SREPCO Electronics Div. of — 224-0871
Pioneer Standard Electronic, Inc.
314 Leo Street

Oklahoma, Tulsa 74011 — Area Code 918
Tri-State Instrument Lab. — 936-0489
3244 East 15th Street, Box 5057

Oregon, Portland 97217 — Area Code 503
Industrial Instrument Repair Lab. — 285-6629
1910 N. Killingsworth St.

Pennsylvania, Philadelphia 19115 — Area Code 215
Sunshine Scientific Instrument — 673-5600
1810 Grant Avenue

Texas, Dallas 75204 — Area Code 214
Ultra Instrument Lab., Inc. — 826-6395
3515 Swiss Avenue, Suite 117 — 826-6396

D.C., Washington 20001 — Area Code 202
Electronic Wholesalers, Inc. — 483-5200
2345 Sherman Avenue N.W.

Washington, Seattle 98119 — Area Code 206
The Instrument Lab. Inc. — 283-5850
934 Elliott Avenue West

Wisconsin, Milwaukee 53202 — Area Code 414
The Electro-Mechano Company — 272-4050
241 East Erie Street

WARRANTY

SIMPSON ELECTRIC COMPANY warrants each instrument and other articles of equipment manufactured by it to be free from defects in material and workmanship under normal use and service, its obligation under this warranty being limited to making good at its factory any instrument or other article of equipment which shall within 1 year after delivery of such instrument or other article of equipment to the original purchaser be returned intact to it, or to one of its authorized service stations, with transportation charges prepaid, and which its examination shall disclose to its satisfaction to have been thus defective; this warranty being expressly in lieu of all other warranties expressed or implied and of all other obligations or liabilities on its part, and SIMPSON ELECTRIC COMPANY neither assumes nor authorizes any other persons to assume for it any other liability in connection with the sale of its products.

This warranty shall not apply to any instrument or other article of equipment which shall have been repaired or altered outside the SIMPSON ELECTRIC COMPANY factory or authorized service stations, nor which has been subject to misuse, negligence or accident, incorrect wiring by others, or installation or use not in accord with instructions furnished by the manufacturer.

Simpson ELECTRIC COMPANY

5200 Kinzie St., Chicago 44, Illinois • Phone: EStebrook 9-1121 • Long Distance Dial 312

In Canada: Bach-Simpson, Ltd., London, Ontario


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