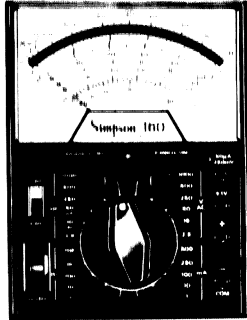


new VOMs

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160 Handi-VOM

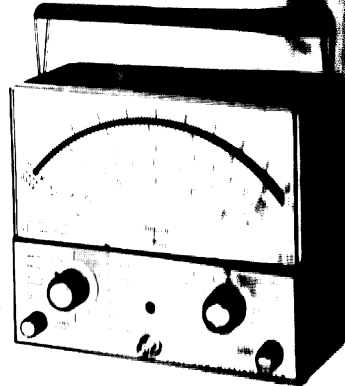
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with Full-Size VOM Features

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- 5 Resistance Ranges . . . Plus 500V DC Millivolt Range

314 Solid-State VOM

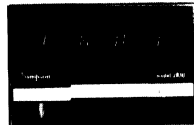
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- Low power and conventional ohms
- Frequency compensated, 100 Meg Ω probe
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OPERATOR'S MANUAL

VOLT-OHM-MILLIAMMETER

260⁽⁶⁰⁾*SERIES 6P

**260" IS THE REGISTERED TRADEMARK
OF THE SIMPSON ELECTRIC COMPANY

SIMPSON ELECTRIC COMPANY

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FOREWORD

We compliment you on your selection of a Simpson 260[®]-6P. The 260[®]-6P is the ultimate in overload protected Volt-Ohm-Milliammeters available today. It was designed in the Simpson engineering laboratory by men of skill and experience. Every thought was carefully implemented to make this the best 260[®]-6P to date. Our plants are modern in every respect and are manned by craftsmen who transform the engineer's ideas into reality, creating test equipment with unprecedented popular acceptance. This popularity for nearly half a century is reflected in the growth which has made Simpson Electric Company The World's Largest Manufacturer of Volt-Ohm-Milliammeters.

To get full use from your 260[®]-6P, you should understand it completely. We suggest that you read this manual thoroughly to provide a background upon which that understanding can be founded.

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*"260" IS THE REGISTERED TRADEMARK
 OF THE SIMPSON ELECTRIC COMPANY



FIG. 1 260[®] SERIES 6P OVERLOAD PROTECTED
 VOLT-OHM-MILLIAMMETER

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INTRODUCTION

The Simpson Volt-Ohm-Milliammeter 260 Series 6P is a rugged, accurate, compact, easy-to-use instrument. The instrument can be used to make accurate measurements of D.C. and A.C. voltage, direct current, resistance and decibels. In addition, an "Output" voltage function is provided for measuring the A.C. component of mixed A.C. and D.C. voltages in amplifier and similar circuits.

The 260 Series 6P has the following new features: an improved overload protection circuit, a 0.1 volt D.C. range, 0-500 volt D.C. and A.C. ranges, a 'TRANSIT' position on the range switch, non-skid rubber case feet, improved test leads and an externally accessible battery and fuse compartment. Batteries and fuse can be changed quickly by loosening the single screw of the compartment cover on the back of the case. See page 39 for instructions on Battery Installation.

To complement the circuit accuracy, the 260 6P features the new Simpson taut-band, self shielding annular movement. The taut-band suspension provides a high degree of repeatability and is highly resistant to damage by shock or vibration. Several internally located calibration circuits are provided to increase the initial accuracy of the 260 6P and to facilitate recalibration should it become necessary.

If the 260-6P is used as recommended in the Operator's Manual, it will give many years of trouble-free service.

CAUTION: The 260-6P is safe to use but it is capable of measuring voltages which are dangerous and which can be fatal. Therefore, care must be exercised when measuring high voltage or current in high voltage circuits. For personal protection when making such measurements, turn off the power to the circuit under test. Connect the test leads to the circuit and then apply power. After taking the reading, remove power from the test circuit before disconnecting the test leads.

SPECIFICATIONS

RANGES

DC MILLIVOLTS

0-250 MV

Sensitivity: 20,000 ohms per volt

DC VOLTS

0-1-2.5-10-50-250-500-1000

Sensitivity: 20,000 ohms per volt

AC VOLTS

0-2.5-10-50-250-500-1000

Sensitivity: 5,000 ohms per volt

DC MICROAMPERES

0-50 250 MV Drop

DC MILLIAMPERES

0-1-10 250 MV Drop Approx.

0-100 280 MV Drop Approx.

0-500 400 MV Drop Approx.

DC AMPERES

0-10 250 MV Drop Approx.

OHMS

RX1 0-2,000 12 ohms center

RX100 0-200,000 1,200 ohms center

RX10,000 0-20 megohms 120,000 ohms center

Specifications

Range	Nominal Open Circuit Voltage	Nominal Short Circuit Current
RX1	1.5	125 MA
RX100	1.5	1.25 MA
RX10,000	9.0	75 μ AMPS

OUTPUT VOLTS (AC)

0-2.5-10-50-250

DECIBELS

With zero DB power level equal to 1 milliwatt across a
600 ohm line -20 to +10 DB

- 8 to +22 DB

+ 6 to +36 DB

+20 to +50 DB

BATTERIES

One 1.5 volt, NEDA 13F battery and one 9 volt alkaline,
NEDA 1604A battery.

FUSE

3 ampere, 250 volts. Type 3 AG.

TEST LEADS

One red and one black test lead, each approximately 48
inches long. Two screw-on type alligator clips supplied.

SIZE

5-1/4" x 7" x 3-1/8"

WEIGHT

3 pounds

Specifications

ACCURACY

Calibrated at 77°F, $\pm F \pm 2^\circ F$.

DC VOLTAGE

All ranges 2% of full scale

AC VOLTAGE (See Note)

All ranges 3% of full scale

DC CURRENT

0-50 microamperes 1.5% of full scale

Other ranges 2% of full scale

RESISTANCE RANGES

R x 1 0-2000 Ω 2.5% of arc

R x 100 0-200,000 Ω 2% of arc

R x 10,000 0-20 megohms 2% of arc

FREQUENCY RESPONSE

Referenced to response at 100 Hz when making level measurements. See curves on pages 24 and 29.

Accuracies specified are for the 260-6P in a horizontal position.

NOTE: Responds to the average value of an A.C. current and is calibrated to indicate the R.M.S. value of a pure sine wave.

SECTION I

GENERAL DESCRIPTION

OVERLOAD PROTECTION

All of the ranges with exception of 10 AMPS, 500/1000 V. A.C. and D.C. are protected by an electronic overload protection system. The protection is from the usual overloads that would damage the VOM. A transistorized circuit senses the voltage drop across the indicating instrument and actuates a relay when the voltage reaches approximately 4 to 5 times rated full scale voltage. Sensing of the voltage drop is by means of a bridge network so that overload protection is provided regardless of polarity. The relay operates at a uniform percent of overload since the indicating instrument circuit is common to all ranges. When actuated by an overload the relay contacts, which are in the - COMMON CIRCUIT, latch open and remain open until the reset button on the front panel is depressed. The reset button is located to the right of the + 1V jack.

A switch that is opened when the relay latches, opens the relay latches, opens the relay circuit and prevents continuous battery drain. This condition occurs when the reset button has been released. When the reset button has been pressed so that the VOM is operational, the protection circuit draws less than 1 microampere, which is less than the shelf life drain of the battery.

Since the 9 volt battery is used for both the R x 10,000 ohms range and the protection circuit, the VOM is designed so that the protection circuit will function normally as long as the

General Description

R x 10,000 ohms range can be set to zero. See ZERO OHMS ADJUSTMENT on page 36 under RESISTANCE MEASUREMENTS.

CAUTION

The 9 volt battery must be installed and tested before the 260-6P is used. Perform the overload test described on Page 17 under Section II, OPERATING INSTRUCTIONS to insure proper overload battery operation prior to using the 260-6P.

The 3 ampere fuse in the input circuit adds protection to the relay contacts. Some overload conditions may cause the fuse to burn out as well as open the relay contacts.

RESETTING THE VOM AFTER AN OVERLOAD

When an overload of sufficient magnitude to trigger the protection circuit is applied to the VOM, the reset button will extend approximately 3/16" above the surface of the panel. To reset the VOM for normal operation, first remove the overload and depress the reset button.

If the overload remains connected to the 260-6P, resetting the overload protection reset button will not connect the VOM input circuit.

FRONT PANEL

The instrument has a large easy-to-read 4-1/2" indicating instrument at the top of the front panel. Below the indicating instrument are three operating controls, eight circuit jacks and the reset button. All switch positions and circuit jacks

General Description

are marked with white characters on black background to insure long-lasting, easy readability.

RANGE SWITCH

The range switch is located in the center of the lower part of the front panel and has 12 positions. It may be turned in either direction. There are five voltage positions, four direct current positions and three resistance positions.

FUNCTION SWITCH

The function switch is on the lower left of the front panel. It has three positions: -D.C., +D.C. and A.C. To measure current, D.C. voltage or resistance, set the function switch at -D.C. or +D.C. according to the polarity of applied current or voltage. The function switch permits reversal of the test lead connections without removing the leads from the circuit under test.

ZERO OHMS

The control at the lower right on the panel is marked ZERO OHMS. It is a variable resistor in the ohmmeter circuit that compensates for variations in the voltage of the internal batteries.

CIRCUIT JACKS

There are eight jacks, two in each corner of the front panel. These are the connectors for the test leads. The elbow prods of the test leads are plugged into the proper jacks to obtain the circuit and range desired for each application.

General Description

At the lower left are COMMON and + jacks. Connect the black test lead to COMMON for all circuits and ranges except 10 amperes D.C. Connect the red test lead to the + jack for all circuits and ranges except those designated by the other circuit jacks.

Across the top of the panel are jacks marked - 10A., +1V., dual marking of +50 μ AMPS and +250 MV at a single jack and +10 A. For the 50 microampere or 250 millivolt D.C. range, connect the red test lead to this dual marked jack. For the 10 ampere D.C. range, use the black test lead in the -10 A. jack and the red test lead in the +10 A. jack.

At the lower right are OUTPUT and 1000 V. jacks. For all audio frequency output ranges, connect the red test lead to the OUTPUT jack. For 1000 volts A.C. or D.C., connect the red test lead to the 1000 V. jack.

PHENOLIC CASE

The phenolic case is designed with heavy reinforced walls for maximum durability and provides excellent protection for the circuit components.

The case has an externally accessible battery and fuse compartment. Access to the batteries and fuse is obtained by unscrewing a single captivated screw at the bottom of the case and sliding out the compartment cover. A spare fuse is also provided in the compartment.

Rubber plug bumpers on the bottom of the case reduce sliding should the 260-6P be accidentally pulled by the test leads when the instrument is on a workbench.

General Description

PRINTED CIRCUIT

Most of the component parts are mounted on a printed circuit board which simplifies assembly and maintenance, thus extending the useful life of the instrument.

ADJUST -A-VUE HANDLE

A carrying handle is attached to the instrument case. The handle may be used to support the instrument in a convenient sloping position for easy viewing. The VOM case can also be placed in either a vertical or horizontal position. The horizontal position is preferable for greater accuracy since the instrument is calibrated in this position.

TEST LEADS

Each instrument is furnished with one pair of test leads 4 feet long. One lead is black and the other red for easy polarity identification. The test lead wire consists of a large number of fine strands and is very flexible.

The insulation of the wire is high grade rubber and is more than adequate for the highest voltage that the instrument will measure. The red and black test leads have probe tips which are threaded near the base. The alligator clips may be screwed on or off either test lead to provide a probe or a clip for the operator's convenience. Each alligator clip is covered by a rubber foot for added protection.

TEST LEAD INSPECTION

Periodic inspection of the test leads is recommended to detect cuts, burned areas or other damage that could reduce the

General Description

insulation strength of the leads. When replacement is indicated order catalog number 0115 from your local parts distributor.

FUSE PROTECTION

A 3 ampere fuse is connected in series with the input circuit as additional protection to the VOM, especially to the relay contacts. If the R x 1 or current ranges are overloaded, it is possible that the fuse may burn out in addition to the opening of the relay contacts. If the instrument fails to indicate, the fuse may be burned out. See Section III, MAINTENANCE, for fuse replacement. A spare fuse is furnished with the 260. Both fuses are located in the battery and fuse compartment.

MOVEMENT OVERLOAD PROTECTION

In addition to the overload protection circuit, a varistor protects the indicating instrument circuit. The varistor limits the current through the moving coil in case of overload.

The relay, fuse and varistor will prevent serious damage to the 260-6P in most cases of accidental overload. However, no overload protection system is completely foolproof and misapplication on high voltage circuits can damage the instrument. Care and caution should always be exercised to protect both you and your VOM.

INTERNAL BATTERIES

There are two batteries in the ohmmeter circuits. One is a NEDA 13F size D cell that furnishes 1.5 volts for the R x 1 and R x 100 ranges. A NEDA 1604A alkaline battery furnishes

Operating Instructions

9 volts for the R x 10,000 range. The 1.5 volt D cell is held in place with two spring clips which also serve as battery contacts. The polarity symbols for the D cell are marked near the battery contacts. The 9 volt battery is held in place with a spring clip but contact is made with a separate connector that is polarized. Always observe correct polarity when replacing the 1.5 volt D cell.

SECTION II

OPERATING INSTRUCTIONS

UNPACKING

After unpacking the 260 you will find the 1.5 volt and 9 volt batteries in a polyethylene bag inside the box with the instrument and test leads. Two alligator clips for the test leads are in another polyethylene bag. See Section III MAINTENANCE for instructions on how to open the battery compartment and install the batteries.

ADJUST POINTER FOR ZERO

With the volt-ohm-milliammeter in operating position, check that the pointer indicates zero at the left side of the scale when there is no input to the 260-6P. If pointer is off zero, adjust the screw located in the case below center of the dial. Use a small screwdriver to turn the screw slowly clockwise or counterclockwise until the pointer is exactly over the

Operating Instructions

zero mark at the left side of the scale. With the indicating pointer set on the zero mark, reverse the direction of rotation of the zero adjuster. Rotate the zero adjuster a sufficient amount to introduce mechanical freedom or "play" but insufficient to disturb the position of the indicating pointer. This procedure will eliminate disturbances to the zero setting from subsequent changes in temperature, humidity, vibration and other environmental conditions.

POLARITY CORRECTION

When making D.C. measurements with the test leads connected to the + and COMMON jacks, polarity can be reversed with the function switch without reversing the test leads. When making measurements on the 50 μ AMPS/250 MV range, 1 volt D.C. range of 10 A. range, polarity can be corrected only by reversing the test leads.

CAUTION

Before making measurements, turn off the power to the circuit being measured. Discharge any capacitors in the circuit undergoing measurement. Connect test leads to circuit being measured and turn on power. When measuring high voltage, never touch the 260 6P, the test leads or test probes with the power supply turned on. After making the measurement, turn off power to the circuit being measured before disconnecting the test leads.

Operating Instructions

The alligator clips provided with the test leads screw onto the probe tips. Each alligator clip is covered with a rubber insulator to provide additional protection against electrical shock. When measuring high voltages, the use of the clips will permit measurement without handling the test probes. Be sure power to circuit being measured is shut off before connecting or disconnecting the clips even though they are covered with insulators.

The range switch or function switch positions should be changed only when the power to the circuit being measured is turned off or when the test leads are disconnected. This will eliminate arcing at the switch contacts and prolong the life of the 260-6P.

Instructions For Testing Condition of Overload Protection Battery in 260-6P

1. Rotate the range switch to the R x 10,000 position.
2. Set the function switch to the DC position.
3. Plug the black test lead in the COMMON jack.
4. Touch the other end of the black test lead to the + 1V. jack.
5. Reset button should release indicating that the 9 volt battery is in good condition.
6. No damage will occur as a result of this test.

Operating Instructions

D.C. VOLTAGE MEASUREMENTS

MEASURING D.C. VOLTAGE 0-250 MILLIVOLTS

CAUTION

When using the 260-6P as a millivoltmeter, care must be taken to prevent damage to the indicating instrument from excessive voltage. Before using the 250 millivolt range, first use the 1.0 volt D.C. range to determine that the voltage measured is no greater than 250 millivolts (or .25 D.C.).

1. Set the function switch at +D.C.
2. Plug the black test lead in the -COMMON jack and the red test lead in the +50 μ AMPS/250 MV jack.
3. Set the range switch at 50 μ AMPS (dual position with 50 V.).
4. Connect the black test lead to the negative side of the circuit being measured and the red test lead to the positive side of the circuit.
5. Read the voltage on the black scale marked D.C. and use the figures marked 0-250. Read directly in millivolts.

MEASURING D.C. VOLTAGE 0-1 VOLT

1. Set the function switch at +D.C.

Operating Instructions

2. Plug the black test lead in the -COMMON jack and the red test lead in the +1 V. jack.
3. Set the range switch at 1 V. (dual position with 2.5 V).
4. Connect the black test lead to the negative side of the circuit being measured and the red test lead to the positive side of the circuit.
5. Read the voltage on the black scale marked D.C. Use the figures marked 0-10 and divide the reading by 10.

MEASURING D.C. VOLTAGE 0-2.5 THROUGH 0-500 VOLTS

1. Set the function switch on the left side of the front panel at +D.C.
2. Plug the black test lead, in the -COMMON jack and the red test lead in the + jack.
3. Set the range switch at one of the five voltage range positions marked 2.5 V., 10 V., 50 V., 250 V. or 500 V. When in doubt as to the voltage present, always use the highest voltage range as a protection to the instrument. If the voltage is within a lower range, the switch may be set for the lower range to obtain a more accurate reading.
4. Connect the black test lead to the negative side of the circuit being measured and the red test lead to the positive side of the circuit.

Operating Instructions

5. Read the voltage on the black scale marked D.C. For the 2.5 V. range, use the 0–250 figures and divide by 100. For the 10 V., 50 V., and 250 V. ranges, read the figures directly. For the 500 V. range, use the 0–50 figures and multiply by 10.

MEASURING D.C. VOLTAGE

0–1000 VOLTS

WARNING

Be extremely careful when working with high voltage circuits. Do not touch the instrument or test leads while power is on in the circuit being measured.

1. Set the function switch at +D.C.
2. Set the range switch at 1000 V. (dual position with 500 V.).
3. Plug the black test lead in the COMMON jack and the red test lead in the 1000 V. jack.
4. Be sure power is off in the circuit being measured and all capacitors have been discharged. Connect the black test lead to the negative side of the circuit being measured and the red test lead to the positive side of the circuit.
5. Turn on power in the circuit being measured.

Operating Instructions

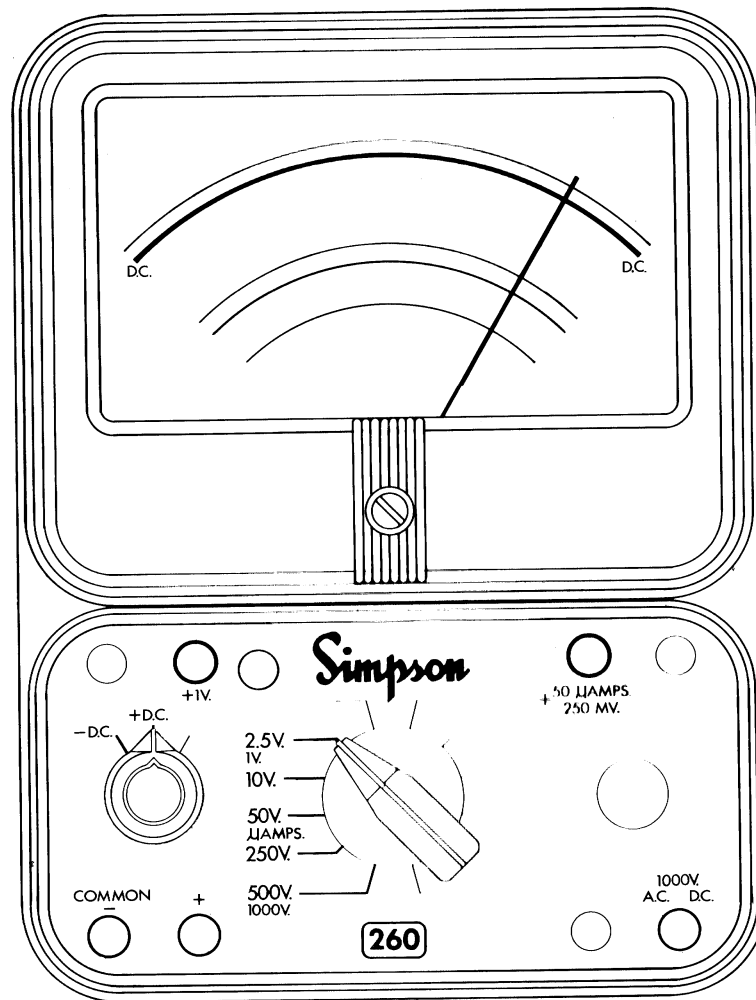


FIG. 2 JACKS AND SWITCH POSITIONS FOR MEASURING D.C. VOLTAGE

Operating Instructions

6. Read the voltage using the 0–10 figures on the black scale marked D.C. Multiply the reading by 100.

Note: To measure higher D.C. voltage, see Section IV, ACCESSORIES, for high voltage accessory probes.

A.C. VOLTAGE MEASUREMENTS

MEASURING A.C. VOLTAGE

(See CAUTION note under OPERATING INSTRUCTIONS)

0–2.5 THROUGH 0–500 VOLTS

CAUTION

When measuring line voltage such as from a 120 volt, 240 volt or 480 volt source, be sure that the range switch is set to the proper voltage position.

The Simpson 260 responds to the average value of an A.C. waveform. It is calibrated in terms of the R.M.S. value of a pure sine wave. If the input is nonsinusoidal, the reading may be either higher or lower than the true R.M.S. value of the measured voltage, depending upon its waveform. Thus an error may be introduced if the 260 is used to measure a nonsinusoidal waveform.

Operating Instructions

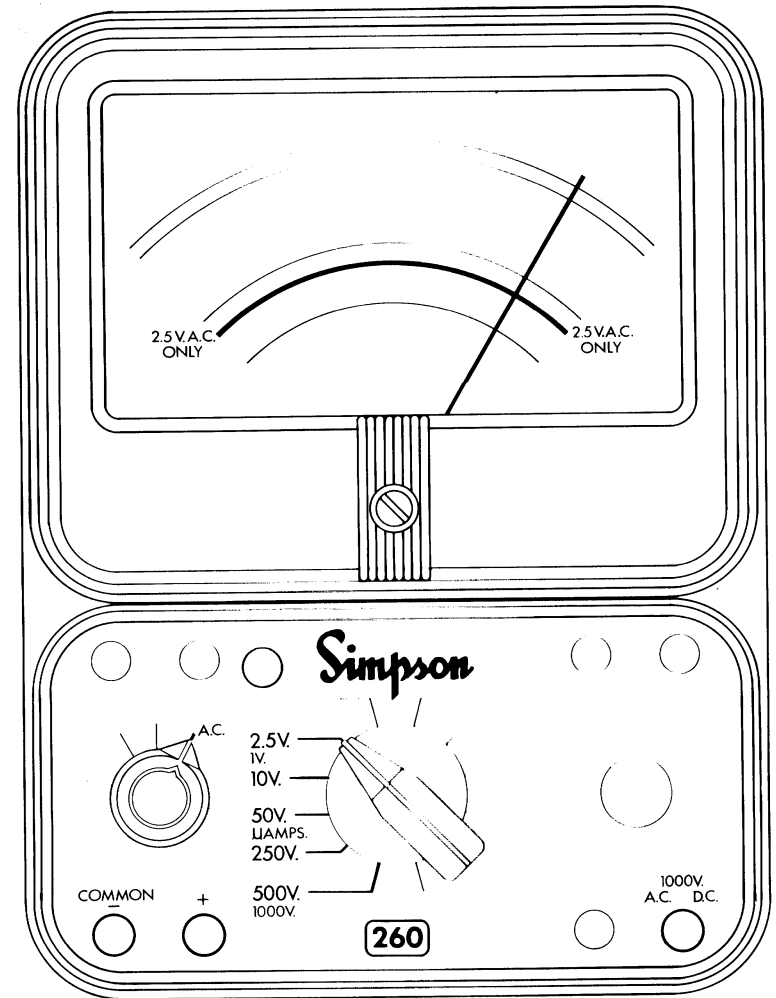


FIG. 3 JACKS AND SWITCH POSITIONS FOR MEASURING A.C. VOLTAGE

Operating Instructions

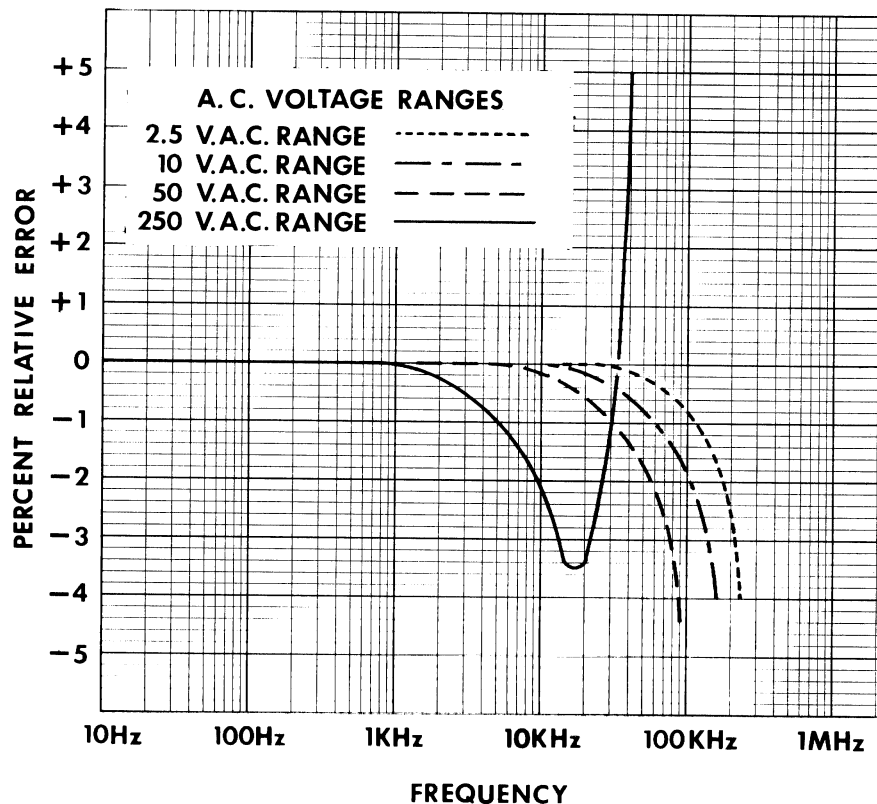


FIG. 4 FREQUENCY RESPONSE A.C. VOLTAGE RANGES

Operating Instructions

1. Set the function switch at A.C.
2. Set the range switch at one of the five voltage range positions marked 2.5 V., 10 V., 50 V., 250 V. or 500 V. When in doubt as to the actual voltage present, always use the highest voltage range as a protection to the instrument. If the voltage is within a lower range, the switch may be set for the lower range to obtain a more accurate reading.
3. Plug the black test lead in the -COMMON jack and the red test lead in the + jack.
4. Connect the test leads across the voltage source.
5. Turn on power in the circuit being measured.
6. For the 0-2.5 V. range, read the value directly on the scale marked 2.5 V. A.C. ONLY. For the 10 V., 50 V. and 250 V. ranges, read the red scale marked A.C. and use the black figures immediately above the scale. For the 500 V. range, read the red scale marked A.C. and use the 0-50 figures. Multiply the reading by 10.

Note: When measuring higher frequency A.C. voltage, such as in the kilohertz range, connect the ground of the signal source to the -COMMON jack of the 260-6P.

Operating Instructions

MEASURING A.C. VOLTAGE

0-1000 VOLTS

CAUTION

Be extremely careful when working in high voltage circuits. Do not touch the instrument or test leads while power is on in the circuit being measured.

1. Set the function switch at A.C.
2. Set the range switch at 1000 V. (dual position with 500 V.).
3. Plug the black test lead in the -COMMON jack and the red test lead in the 1000 V. jack.
4. Be sure the power is off in the circuit being measured and that all its capacitors have been discharged. Connect the test leads to the circuit.
5. Turn on the power in the circuit being measured.
6. Read the voltage on the red scale marked A.C. Use the 0-10 figures and multiply by 100.

OUTPUT VOLTAGE AND DECIBEL MEASUREMENTS

MEASURING OUTPUT VOLTAGE

It is often desired to measure the A.C. component of an Output Voltage where both A.C. and D.C. voltage levels exist. This occurs primarily in amplifier circuits.

Operating Instructions

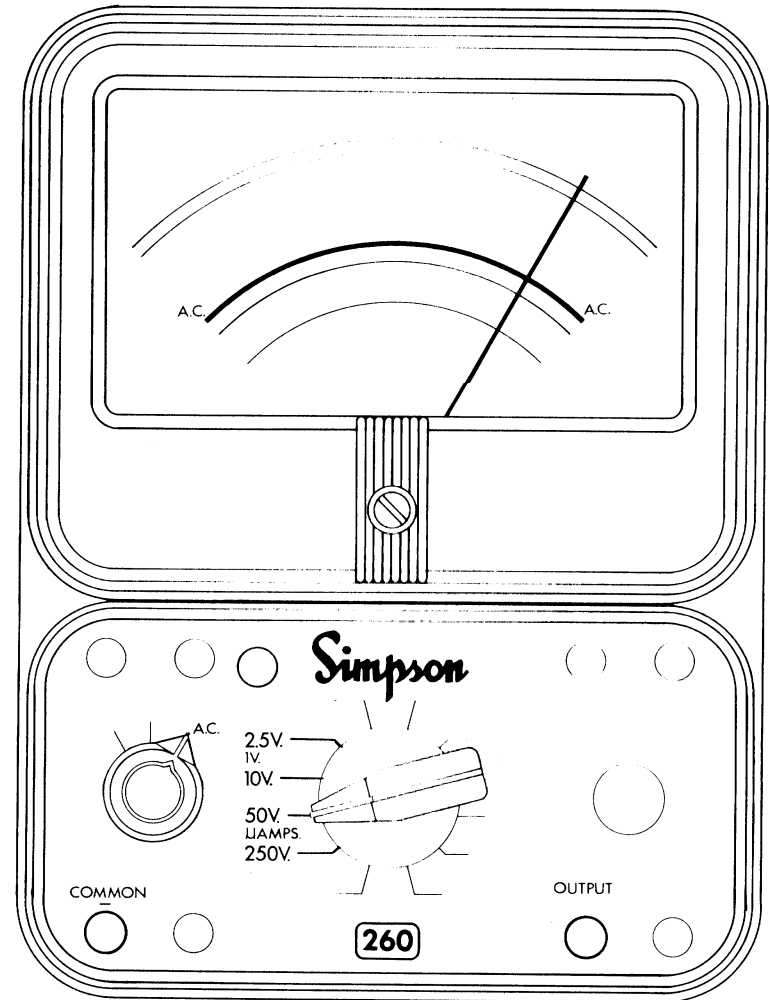


FIG. 5 JACKS AND SWITCH POSITIONS FOR MEASURING OUTPUT

Operating Instructions

The 260 6P has a .1 mfd, 400 volt capacitor in series with the OUTPUT jack. The capacitor blocks the D.C. component of the current in the test circuit, but allows the A.C. or desired component to pass on to the indicating instrument circuit. The blocking capacitor may alter the A.C. response at low frequencies but is usually ignored at audio frequencies.

CAUTION

When using OUTPUT, do not apply to a circuit whose D.C. voltage component exceeds the 400 volt rating of the blocking capacitor.

1. Set the function switch at A.C.
2. Plug the black test lead in the -COMMON jack and the red test lead in the OUTPUT jack.
3. Set the range switch at one of the range positions marked at 2.5 V., 10 V., 50 V. or 250 V.
4. Connect the test leads across the circuit being measured with the black test lead to the ground side.
5. Turn on the power in the test circuit. Read the output voltage on the appropriate A.C. voltage scale. For the 0-2.5 V. range, read the value directly on the scale marked 2.5 V. A.C. ONLY. For the 10 V., 50 V. or 250 V. ranges, use the red scale marked A.C. and read the black figures immediately above the scale.

Operating Instructions

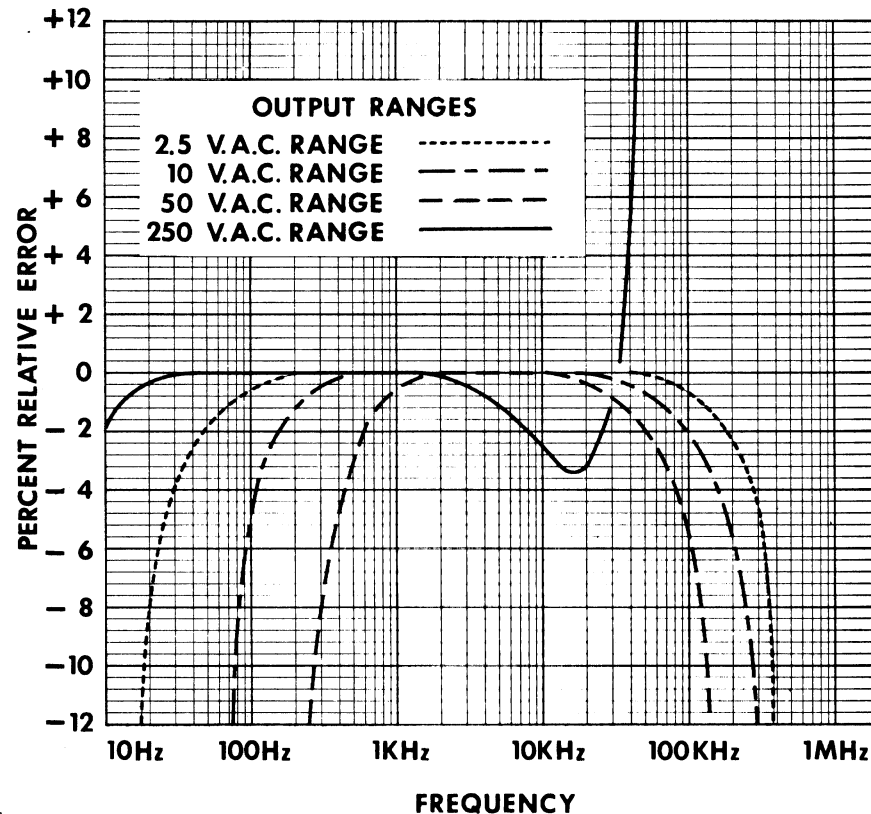


FIG 6. FREQUENCY RESPONSE OUTPUT RANGES

Operating Instructions

MEASURING DECIBELS

For some applications, output voltages and audio frequency voltage are frequently measured in terms of decibels. The decibel scale (DB) at the bottom of the dial is marked from -20 to +10.

To measure decibels, read the DB scale in accordance with instructions for measuring A.C. For example, when the range switch is set on the 1.5 V. position, the DB scale is read directly.

The DB readings on the scale are references to zero DB power level of .001 watt in 600 ohms, or .775 V. A.C. across 600 ohms.

For the 10 V. range, read the DB scale and add +12 DB to the reading. For the 50 V. range, read the DB scale and add +26 DB to the reading. For the 250 V. range, read the DB scale and add +40 DB to the reading.

If the zero DB reference level is .006 watt in 500 ohms, subtract 7 DB from the reading.

Operating Instructions

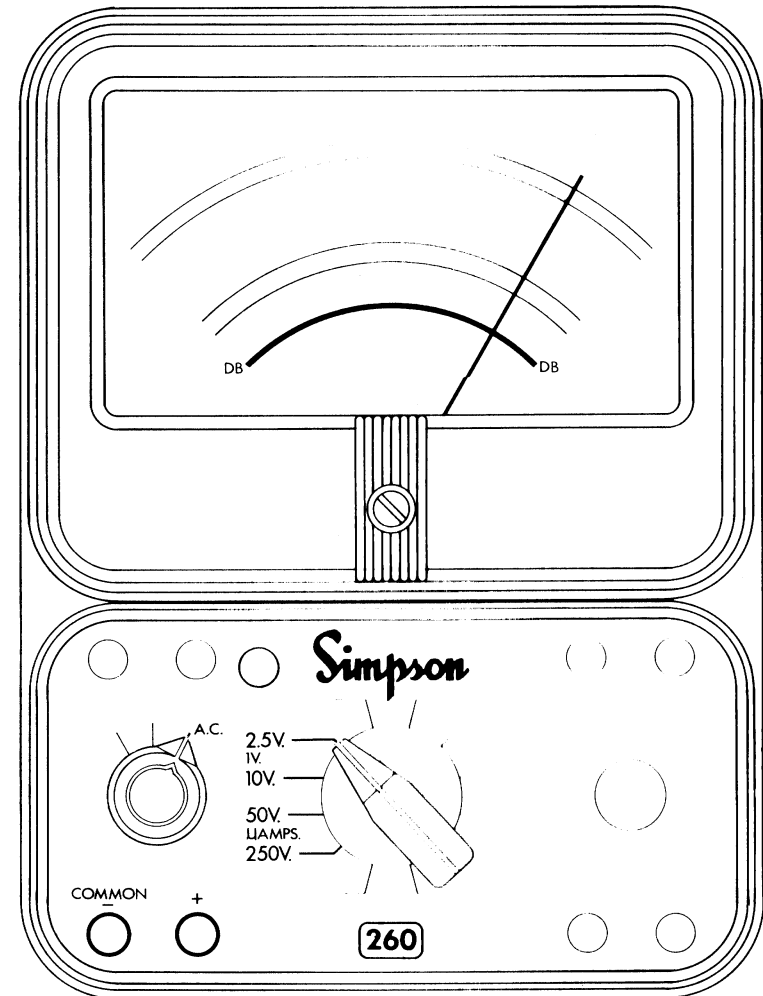


FIG. 7 JACKS AND SWITCH POSITIONS FOR MEASURING DECIBELS

Operating Instructions

DIRECT CURRENT MEASUREMENTS

(See CAUTION note under OPERATING INSTRUCTIONS)

VOLTAGE DROP

The voltage drop across the 260 on all milliampere current ranges is approximately 250 millivolts measured at the jacks. An exception is the 0–500 MA range with a drop of approximately 400 millivolts. The voltage drop will not affect most circuits whose current is being measured. In some transistor circuits, it may be necessary to compensate for the added voltage drop when making measurements.

MEASURING DIRECT CURRENT

0–50 MICROAMPERES

CAUTION

Never connect the test leads directly across voltage when the 260 is used as a current indicating instrument. Always connect the instrument in series with the load across the voltage source

1. Set the function switch at +D.C.
2. Plug the black test lead in the –COMMON jack and the red test lead in the +50 μ AMPS/250 MV jack.
3. Set the range switch at 50 μ AMPS (dual position with 50 V.).

Operating Instructions

4. Open the circuit in which the current is being measured. Connect the instrument in series with the circuit. Connect the red test lead at the positive side and the black test lead at the negative side.
5. Read the current on the black D.C. scale. Use the 0–50 figures to read directly in microamperes.

Note: In all direct current measurements, be certain the power to the circuit being tested has been turned off before disconnecting test leads and restoring circuit continuity.

The internal voltage drop of the 260 on the 50 microampere range is 250 millivolts. The 50 microampere range serves as a dual function. Either 50 microamperes D.C. or 250 millivolts D.C. can be measured at this single jack position.

MEASURING DIRECT CURRENT

0–1 THROUGH 0–500 MILLIAMPERES

1. Set the function switch at +D.C.
2. Plug the black test lead in the –COMMON jack and the red test lead in the + jack.
3. Set the range switch at one of the four range positions marked 1 MA., 10 MA., 100 MA. or 500 MA.
4. Open the circuit in which the current is being measured. Connect the VOM in series with the circuit. Connect the red test lead to the positive side and the black test lead to the negative side.

Operating Instructions

5. Read the current in milliamperes on the black D.C. scale. For the 1 MA range, use the 0–10 figures and divide by 10. For the 10 MA range, use the 0–10 figures directly. For the 100 MA range, use the 0–10 figures and multiply by 10. For the 500 MA range, use the 0–50 figures and multiply by 10.

MEASURING DIRECT CURRENT

0–10 AMPERES

1. Plug the black test lead in the –10 A. jack and the red test lead in the +10 A. jack.
2. Set the range switch at 10 AMPS (dual position with 10 MA).
3. Open the circuit in which the current is being measured. Connect the instrument in series with the circuit. Connect the red test lead at the positive side and the black test lead at the negative side.

Note: The function switch has no effect on polarity for the 10 AMPS range.

4. Read the current on the black D.C. scale. Use the 0–10 figures to read directly in amperes.

CAUTION

When using the 10 ampere range, never remove a test lead from its panel jack while current is flowing through the circuit. Otherwise damage may occur to the banana plug and jack.

Operating Instructions

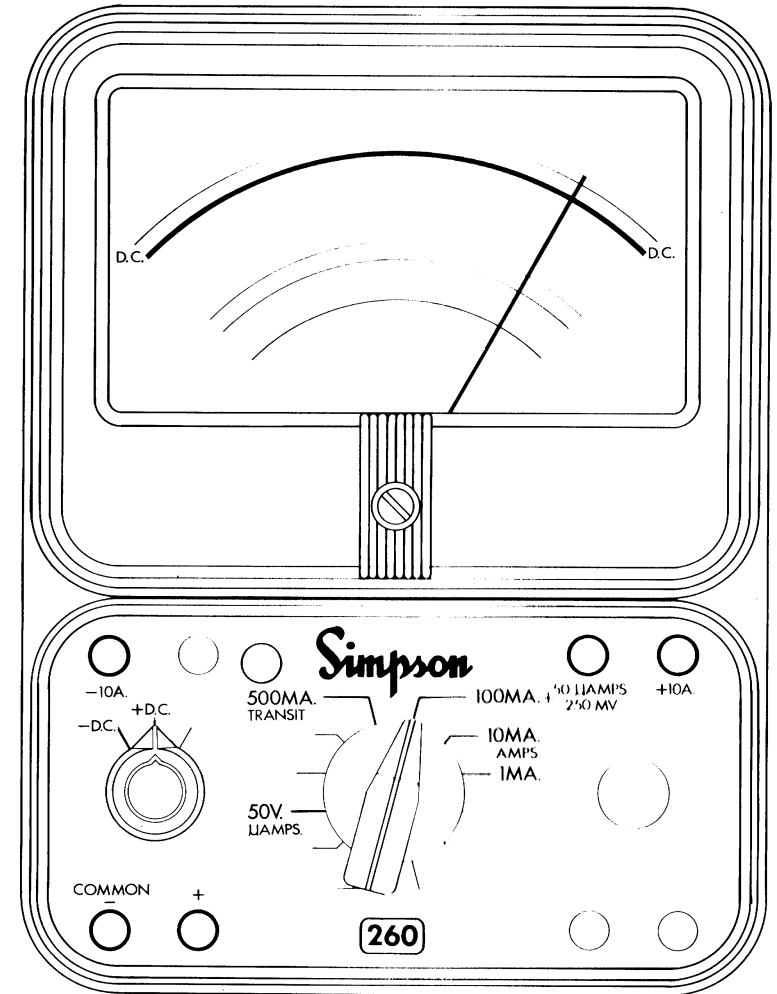


FIG. 8 JACKS AND SWITCH POSITIONS FOR MEASURING DIRECT CURRENT

Operating Instructions

TRANSIT

The 500 MA. range switch position is also the TRANSIT position. The additional damping of the movement in the TRANSIT position will reduce pointer swing with the 260 is carried.

RESISTANCE MEASUREMENTS

ZERO OHMS ADJUSTMENT

When resistance is measured, VOM batteries B1 and B2 furnish power for the circuit. Since batteries are subject to variation in voltage and internal resistance, the instrument must be adjusted to zero prior to measuring a resistance, as follows:

1. Turn range switch to desired ohms range.
2. Plug the black test lead in the -COMMON jack and the red test lead in the + jack.
3. Connect ends of test leads to short the VOM resistance circuit.
4. Rotate the ZERO OHMS control until pointer indicates zero ohms. If pointer cannot be adjusted to zero, one or both of the batteries must be replaced. For battery replacement, see Section III, MAINTENANCE.
5. Disconnect ends of test leads and connect to component being measured.

Operating Instructions

MEASURING RESISTANCE

CAUTION

Before measuring resistance, be sure power is off to the circuit being tested. Disconnect the component from the circuit before measuring its resistance.

Set the range switch to one of the resistance range positions as follows:

1. Use Rx1 for resistance readings from 0 to 200 ohms.
2. Use Rx100 for resistance readings from 200 to 20,000 ohms
3. Use Rx10,000 for resistance readings above 20,000 ohms.

Set the function switch at either D.C. or +D.C. position. Operation is the same in either position.

Adjust ZERO OHMS control for each resistance range.

4. Observe the reading on the OHMS scale at the top of the dial. Note that the OHMS scale reads from right to left for increasing values of resistance.
5. To determine the actual resistance value, multiply the reading by the factor at the switch position. (K on the OHMS scale equals one thousand).

Operating Instructions

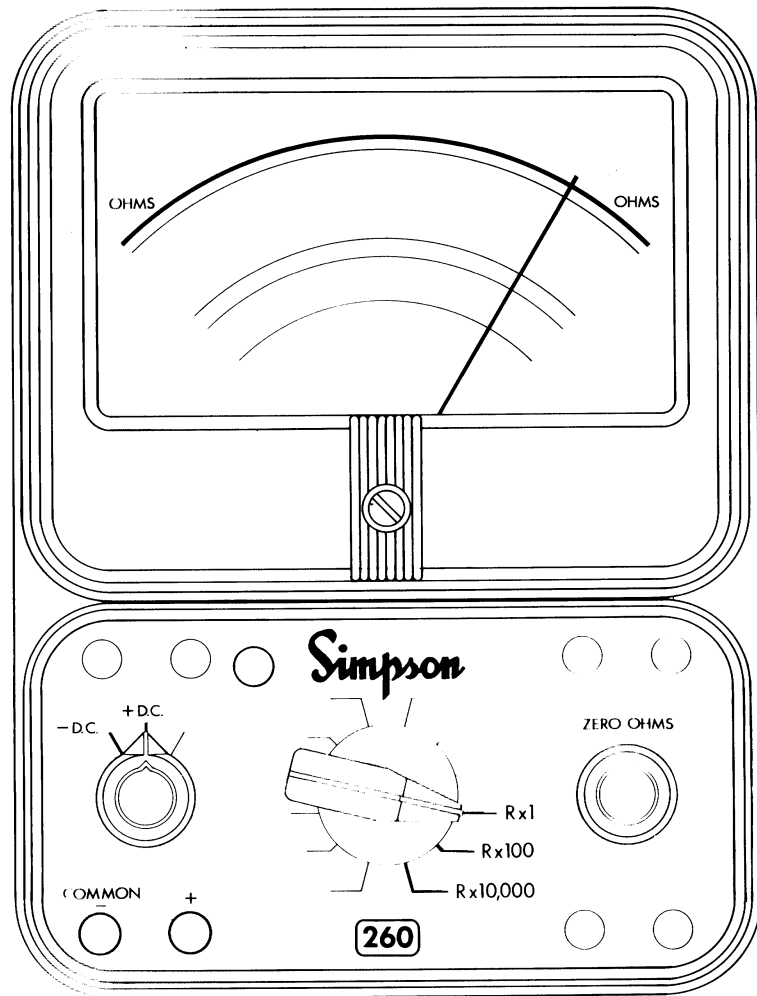


FIG. 9 JACKS AND SWITCH POSITIONS FOR MEASURING RESISTANCE

Maintenance

If there is a “forward” and “backward” resistance such as in diodes, the resistance should be relatively low in one direction (for forward polarity) and higher in the opposite direction. Rotate the function switch between the two D.C. positions to reverse polarity. This will determine if there is a difference between the resistance in the two directions.

The resistance of such diodes will measure differently from one resistance range to another on the same VOM with the function switch in a given position. For example, a diode which measures 80 ohms on the R x 1 range may measure 300 ohms on the R x 100 range. The difference in values is a result of the diode characteristic and does not indicate any fault in the VOM.

SECTION III

MAINTENANCE

BATTERY REPLACEMENT

Two batteries are used inside the case to supply power for resistance measurements. One is a 1.5 volt D cell and the other is a 9 volt alkaline battery. When it is no longer possible to adjust the pointer to zero for the Rx1 and Rx100 ranges (see ZERO OHMS ADJUSTMENT on page 36), replace the 1.5 volt D cell. When it is no longer possible to adjust the pointer to zero on the Rx10,000 range, replace the 9 volt battery.

Recommended replacement batteries are:

1.5 volt D cell, NEDA 13F (Burgess No. 2 on Eveready No. 950). When a 9 volt alkaline battery Mallory

Maintenance

MN 1604 is not readily available, as a temporary expedient only, use a 9 volt zinc-carbon battery NEDA 1604, such as Eveready 216 or 222, or equivalent. Replace with alkaline battery at first opportunity.

To install or replace a battery, remove the cover to the externally accessible battery compartment by loosening the single captivated screw. A small coin may be used to loosen the screw.

NOTE: When the batteries reach the end of their useful life, they should be replaced promptly. Failure to do so may result in corrosion at the battery contacts due to battery leakage.

Observe polarity when replacing the 1.5 volt D cell and connect as indicated. The D cell is held in place with spring clips which also act as battery contacts. Polarity for the D cell is marked adjacent to the battery contact clips. The 9 volt battery contacts and connector are polarized. To remove the 9 volt battery, first withdraw the battery with mated connector from the compartment. Then disconnect the connector.

FUSE REPLACEMENT

The fuse is mounted in a holder in the externally accessible battery and fuse compartment. A spare fuse is located in a well between the + terminal of the D cell and the side of the case. Access to the compartment is obtained by loosening the single captivated screw on the compartment cover. To replace a burned out fuse, remove it from the holder and replace it only with a 3 ampere, 250 volt, quick acting type 3 AG fuse.

Maintenance

When removing the fuse from its holder, first remove the 9 volt battery.

CARE

Your 260-6P VOM is a very fine instrument. It has been designed to give many years of service. Give it good care and help to prolong its life by observing the following practice:

1. Keep the instrument in a horizontal position when storing and away from the edge of a workbench, shelf or other areas where it may be knocked off and damaged.
2. Avoid rapid or extreme temperature changes.
3. Avoid overloading the measuring circuits of the instrument. Develop a habit of checking the range position before connecting the test leads to a circuit.
4. Place the range switch in the 'TRANSIT' position when the instrument is not in use or when being moved. The indicating instrument is damped in the TRANSIT position to reduce swinging of the pointer when the 260 is carried.
5. If the 260 has not been used for a long period of time, rotate the function and range switches in both directions to wipe the switch contacts for good electrical contact.
6. The instrument may be protected by one of three carrying cases. These can be obtained through your local electronic parts distributor.

Maintenance

PART NO.	DESCRIPTION
00549	Utility Vinyl Case
01818	Leather Case
00805	Ever-Ready Leather Case

HOW TO OPEN THE CASE

To gain access to the inside of the case for replacement of parts, remove the four screws in the bottom of the case. Two of the screws can be reached only by first removing the cover from the battery compartment. After removing the screws, lift the case from the panel. When replacing the case, be certain that the wires leading to the battery compartment are seated in their respective slots in the compartment wall. This will prevent damage to the wire insulation during mating of panel and case.

Courtesy of:
Simpson260.com

Maintenance

PARTS LIST

Reference Symbol	Description	Simpson Part No.
R-1	Rheostat, 200K Ohms	1-110193
R-2	Rheostat, 5K ohms	5-114099
R-3	Resistor, 15K Ohms	5-110756
R-4	Resistor, 45K Ohms	1-114192
R-5	Resistor, 150K Ohms	1-113366
R-6	Resistor, 800K Ohms	1-113363
R-7	Resistor, 4 megohms	1-113362
R-8	Resistor, 5 megohms	5-110459
R-9	Resistor, 7.5 megohms	5-111668
R-10	Resistor, 2.5 megohms	1-117904
R-11	Resistor, 0.025 Ohm Shunt, (Calibrate in VOM)	3-811793
R-12	Resistor, 0.47 Ohm (wirewound)	5-110193
R-13	Resistor, 2 Ohms (wirewound)	5-115271
R-14	Resistor, 22.5 Ohms (wirewound)	5-110194
R-15	Resistor, 238 Ohms	1-115897
R-16	Resistor, 11.2 Ohms (wirewound)	5-110192
R-17	Resistor, 1.109K Ohms	5-112938
R-18	Resistor, 123.5 Ohms	5-112939
R-19	Resistor, 18.2K Ohms	5-113020
R-20	Resistor, 114K Ohms	5-112941
R-21	Potentiometer, 11.25K Ohms	5-115263
R-22	Rheostat, 5K Ohms	1-116254
R-23	Resistor, 4K Ohms	5-114835
R-24	Resistor, 4K Ohms	5-114835

Reference Symbol	Maintenance Description	Simpson Part No.
R 25	Rheostat, 5K Ohms	1-116254
R 26	Resistor, 7.5K Ohms	1-113370
R 27	Resistor, 37.5K Ohms	1-113393
R 28	Resistor, 200K Ohms	1-113365
R 29	Resistor, 1 megohm	1-113392
R 30	Resistor, 1.25 megohms	5-115068
C 1	Capacitor, .1 μ F, 400 V.	1-113733
D 1	Diode, Germanium	1-115970
D 2	Diode, Germanium	1-115970
D-8	Diode, Silicon	5-114005
V-1	Varistor, Silicon	1-110670
F-1	Fuse, 3 Amp, 250 V. 3 AG (1-1/4" x 1/4") Quick Acting	5-115272
	Knobs:	
	For Function Switch	1-115789
	For Zero Ohms Adjust	1-115790
	For Range Switch (Less Set Screw)	3-260180
	Set Screw (for Knob 3-260180)	1-114178
RY 1	Relay	5-112629
SW 3	Switch	5-110179
OM 1	Overload Protection Module	10-862385
B 1	Battery, 1.5 V. Size "D", Eveready 950, or equivalent	1-111798
B 2	Battery, 9 V. Alkaline Mallory MN-1604	5-114907

Maintenance	
Case Assembly, Phenolic, Complete, (including handle less Battery Compartment Cover)	10-861725
Battery Compartment Cover Assembly (for case)	10-861724
Carrying Handle (for case)	10-860158
Rubber Bumper Plug	5-115039
260-6P Indicating Instrument with Panel Assembly	D13794
Cover Assembly for Indicating Instrument	0-005674
Combination Probe Tip Leads, one red and one black, with removable alligator clips	00115
Crocodile Clip Test Leads, one red and one black	07500

ACCESSORIES

D.C. HIGH VOLTAGE PROBE
(20,000 ohms per volt)

5,000 volts A.C.	No. 0505
5,000 volts D.C.	No. 0506
10,000 volts D.C.	No. 00507
25,000 volts D.C.	No. 00508
50,000 volts D.C.	No. 00509

GENERAL DESCRIPTION

The D.C. high voltage probes extend the range of a 20,000 ohms per volt multimeter in a safe, convenient manner at nominal cost. Their primary purpose is the measurement of terminal potentials of high voltage, low power, direct current sources. Examples are anode supplies in television receivers and other cathode ray tube circuitry.

CAUTION

Do not use on electrical equipment that can deliver high power under short-circuit conditions such as from a large D.C. motor-generator set.

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

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

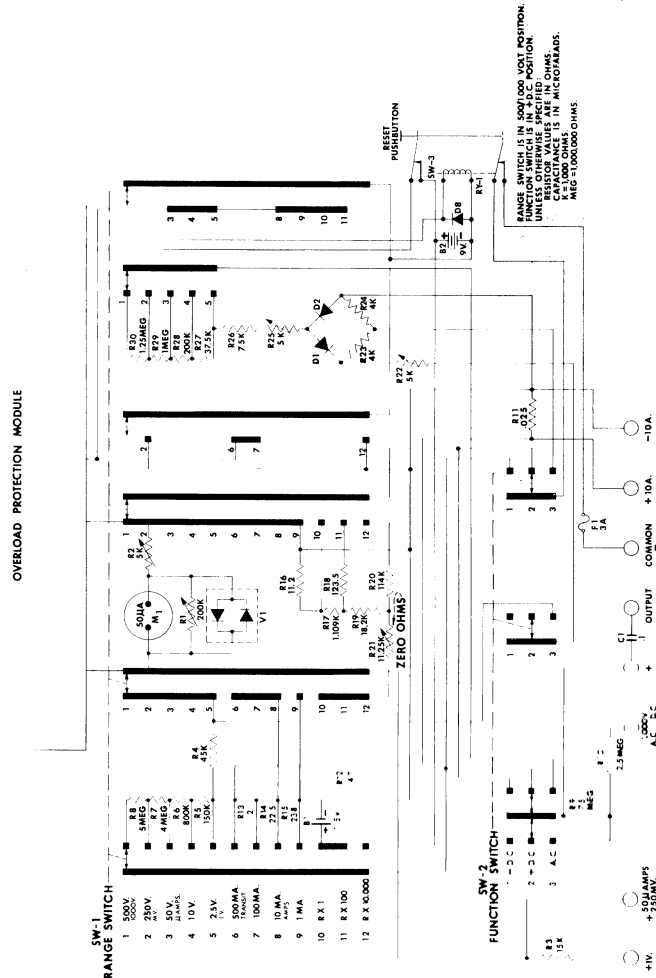


FIG. 10 SCHEMATIC DIAGRAM

Accessories

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

ELECTRICAL SPECIFICATIONS

The D.C. high voltage probes are designed for use with the Simpson 260 Series 6P or any 20,000 ohms per volt VOM having a 1.5 volt D.C. range and scale graduations from 0–10 or multiple thereof for the 10 KV probe, 0–25 or multiple thereof for the 50 KV probe.

Accuracy: Probe Resistance $\pm 2\%$

The D.C. high voltage test probes are available at your local electronic parts distributor. Instructions are furnished with each high voltage probe.

A.C. HIGH VOLTAGE PROBE (5,000 ohms per volt)

10,000 volts A.C. No. 00161

GENERAL DESCRIPTION AND ELECTRICAL SPECIFICATIONS

The 10,000 volts A.C. probe is similar to the high voltage D.C. probes with the following exceptions: The A.C. high voltage probe is designed primarily to extend the range of a 5,000 ohms per volt VOM. The probe is used with the instrument in the 10 volt A.C. position. Read the 0–10 volt A.C. scale and multiply by 1000.

CAUTION

Do not use on electrical equipment that can deliver high power under short-circuit conditions such as from a power distribution transformer.

AMP-CLAMP MODEL 150

The Simpson Amp Clamp Model 150 allows A.C. current measurements without breaking the circuit under test. The Amp-Clamp works in effect as a transformer containing a split core for accommodating the conductor which carries the current being measured.

The current-carrying conductor becomes the transformer primary and a coil in the Amp-Clamp serves as the secondary winding. The Amp-Clamp output voltage is proportional to the current measured and can be applied to the 260 as an A.C. voltage.

The Amp-Clamp has a range selector with 6 positions. Any of the following current ranges can be used with the 260:

5, 10, 25, 50, 100 or 250 amperes.

1. Set the function switch of the 260 to A.C. and the range switch to 2.5V.
2. Set the current range selector on the Amp-Clamp to a range which covers the probable current being measured.
3. Connect the Amp-Clamp leads to the -COMMON and + jacks of the 260.

Accessories

4. Open the jaws of the Amp-Clamp and place around the conductor whose current is to be measured.
5. The current range to which the Amp-Clamp range switch is set expresses in amperes the A.C. current flowing in the circuit under test with full scale deflection of the 260. The reading observed on the 260 can be converted directly to the current measured by any one of the Amp-Clamp ranges. Multiply the reading on the 2.5 V.A.C. ONLY scale of the 260 by the factor indicated on the Amp-Clamp instruction plate. The factors are also listed below:

Test Current Range Selected on Amp-Clamp	Multiply Reading By Factor:
5 Amperes	2
10 Amperes	4
25 Amperes	10
50 Amperes	20
100 Amperes	40
250 Amperes	100

SECTION V APPLICATIONS

GENERAL

The Simpson Volt Ohm Milliammeter 260 Series 6P is designed to measure almost all characteristics of electrical and electronic circuits. It is the most versatile piece of test equipment that you can own.

**Unbeatable
portability
and range
coverage!**



the
new **Simpson 460** DIGITAL
VOM



- Completely portable . . . no separate battery pack or power supply needed. Self-contained battery or line operation.
- Non-blinking 3½-digit display of 26 most used ranges . . . 5 each AC/DC voltages and AC/DC currents . . . 6 resistances . . . with "plus" and "minus" and overrange . . . analog meter readout . . . analog to digital converter uses the dual slope technique.
- A compact, lightweight, multi-use Digital VOM for lab, in-field or general testing .

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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 90 days 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.



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