

Quality is the indispensable component
of every Simpson instrument

Simpson

INSTRUMENTS THAT STAY ACCURATE

260 Add-A-Tester Adapter

OPERATOR'S MANUAL

**AC AMMETER
MODEL 653**

SIMPSON ELECTRIC COMPANY

5200 W. Kinzie St., Chicago 44, Illinois, ES 9-1121

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

New SIMPSON 260 "Add-A-Tester" Line

TRANSISTOR TESTER, Model 650 \$26.95

Beta Ranges: 0-10, 0-50, 0-250, (F.S.)
Beta Accuracy: $\pm 3\%$, with 260 $\pm 5\%$ nominal
Ico Range: 0-100 μ a
Ico Accuracy: $\pm 1\%$, with 260 $\pm 3\%$ (F.S.)

DC VTVM, Model 651 \$32.95

Voltage Ranges: 0-.5/1.0/2.5/5.0/10/25/50/100/
250/500

Accuracy: $\pm 1\%$, with 260 $\pm 3\%$ (F.S.)
Input Impedance: greater than 10 megs all ranges

TEMPERATURE TESTER, Model 652 . . . \$38.95

Temperature Ranges: -50°F to $+100^{\circ}\text{F}$, $+100^{\circ}\text{F}$ to
 $+250^{\circ}\text{F}$

Accuracy: with 260 $\pm 2^{\circ}$ (nominal)

Three lead positions provided

Sensing Element: thermistor

AC AMMETER, Model 653 \$18.95

Ranges: 0-0.25/1/2.5/12.5/25 amps

Accuracy: $\pm 1\%$, with 260 $\pm 3\%$ nominal

Frequency Range: 50 cycles to 3000 cycles

AUDIO WATTMETER, Model 654 \$18.95

Load Ranges: 4,8,16,600 ohms

Wattage: Continuous 25 watts (8,600 ohms)

50 watts (4,16 ohms)

Intermittent 50 watts (8,600 ohms)

100 watts (4,16 ohms)

Accuracy: $\pm 5\%$, with 260 $\pm 10\%$ nominal

Direct reading scale from 17 microwatts to 100 watts

MICROVOLT ATTENUATOR, Model 655 \$18.95

Ranges: 2.5 microvolts to 250,000 microvolts
continuously variable in decade steps

Frequency: DC to 20 KC

Accuracy: $\pm 1\text{db}$

BATTERY TESTER, Model 656 \$19.95

Checks all radio and hearing aid batteries up to 90
volts at the manufacturer's recommended load, or
any external load.

Note: All Simpson 260 Adapters provide for normal 260
usage without disconnecting the adapter.



OPERATOR'S MANUAL

AC AMMETER MODEL 653



Just plug it in

SIMPSON ELECTRIC COMPANY

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OPERATOR'S MANUAL

SIMPSON AC AMMETER MODEL 653

SECTION I

GENERAL DESCRIPTION

INTRODUCTION

The Simpson AC Ammeter Adapter Model 653 is a compact, accurate, wide-range instrument. When it is used in conjunction with a Simpson 260* or 270 Multimeter, AC currents can be measured over a frequency range of 50 to 3000 cycles per second. This wide frequency range in general exceeds commercial and military power frequency requirements.

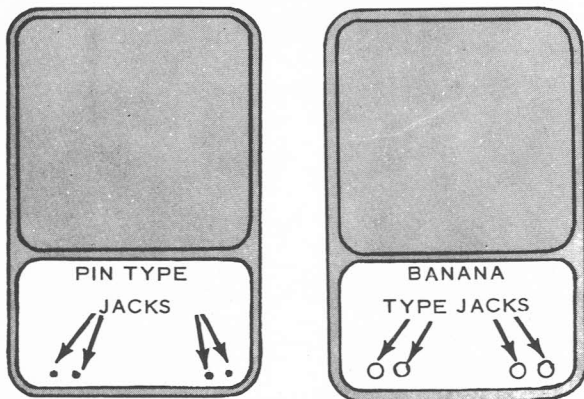
The Simpson VOM-plus-adapter concept is completely unique in approach and versatility. Each of the adapter models, of which the AC Ammeter is but one example, provides specific measurement and testing capabilities at a fraction of the cost normally required for separate testers.

* Trade Mark Registered U. S. Patent Office



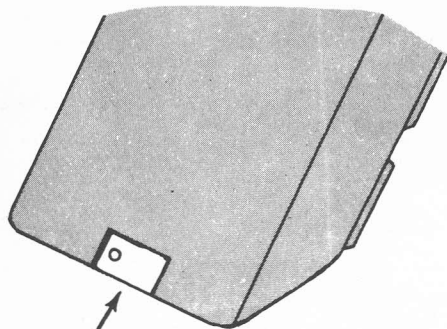
FIGURE 1 – SIMPSON AC AMMETER MODEL 653

GENERAL DESCRIPTION



(a) 260, Series II

(b) 260, Series III



ADAPTER LOCK PROVISION
(ONLY ON MODELS PRODUCED AFTER
JUNE 1ST, 1959)

FIGURE 2 - 260 SERIES IDENTIFICATION

GENERAL DESCRIPTION

ACCESSORIES FURNISHED

Each instrument is furnished with an Operator's Manual and four extra pin-type plugs. The four pin-type plugs are used only when the Model 653 is to be used with a 260 Series II (see figure 2 for 260 Series II and Series III identification).

SPECIFICATIONS

AC Current:

Ranges: 0-.25/1/2.5/12.5/25 amperes

Accuracy:

Adapter only $\pm 2\%$

Adapter with 260 $\pm 3\%$ (F.S.) nominal

Adapter with 270 $\pm 3\%$ (F.S.)

Frequency Response:

Essentially flat from 50 to 3000 cycles per second.

Insulation Level: 600 v RMS (max.)

Power Input: None required.

Size: 5-5/16 x 4-3/8 x 3-7/16 inches.

Weight: 2 lbs.

GENERAL DESCRIPTION

MODIFICATION KITS

Adapter Case Kit 401 for 260 Series III and 270.

Use of this kit is optional. The kit converts the 260 Series III or the 270 VOM produced prior to June 1, 1959. It consists of a modified case which permits latching the Model 653 securely to the underside of the VOM.

Adapter Case Kit 402 for 260 Series II.

Use of this kit is optional for this adapter. It includes a modified case which permits latching the Model 653 securely to the underside of the multimeter, and also provides a 50 μ A D.C. current range for the 260. The 50 microampere range is required for other Adapter Models.

CONTROLS AND CONNECTORS

BINDING POSTS

AC currents to be measured are applied to the Model 653 through two of the six binding posts located along the bottom of the front panel. One of the binding posts (marked \pm) is common for all ranges. Each of the remaining five binding posts represents a current range for the instrument.

GENERAL DESCRIPTION

260 - 653 SWITCH

This is a convenience switch located at the right center of the front panel. It allows the use of the VOM without detaching the Model 653.

260 DIRECT JACKS

The 260 DIRECT jacks are located at the left center of the front panel. When the 260 DIRECT - 653 ADAPTER switch is in the 260 DIRECT position, these jacks are connected directly to the 260/270 input jacks marked + and COMMON -.

SECTION II

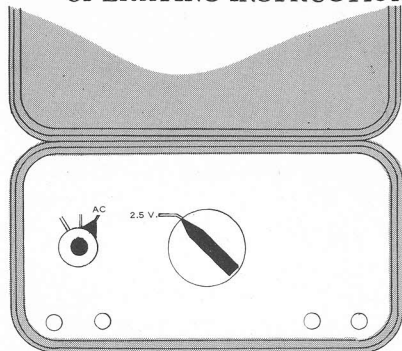
OPERATING INSTRUCTIONS

1. Initial Adjustments

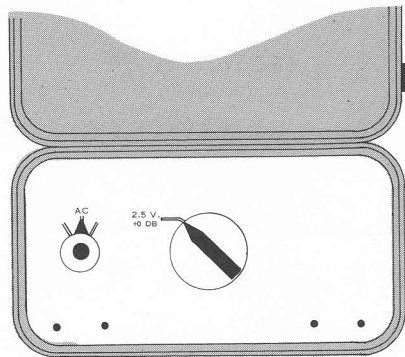
a. 260/270 control settings.

1. With the Model 653 disconnected, check the meter pointer position for zero indication with the VOM in its operating position. If the pointer is off zero, adjust the bakelite screw just under the meter. Refer to the VOM Operator's Manual for this adjustment.

OPERATING INSTRUCTIONS



(a) 260 Series III Control Positions



(b) 260 Series II Control Positions

FIGURE 3 – 260 CONTROL POSITIONS
FOR USE WITH MODEL 653

OPERATING INSTRUCTIONS

2. Set the **260/270** for AC operation.
 3. Set the **260/270** range switch to the 2.5 volts position.
- b. Connecting the Model 653 to the 260/270.
1. Insert the top four plugs of the Model 653 into the lower four jacks on the front panel of the **260/270**.
 2. Position the locking latch underneath the instrument to secure the two units together.

CAUTION

If your **260/270** case does not have the locking provision, avoid applying excessive pressure to the top of the Adapter when it is connected to the VOM and used in the Adjust-A-Vue position. A modification kit which includes a new case with an adapter lock provision is recommended for optimum rigidity (see page 4).

- c. Model 653 Control Settings.
1. Set the 260 Direct – 653 Adapter switch of the Model 653 to the 653 ADAPTER position.

2. Measuring A.C. Current**WARNING**

Always remove all power from the circuit to be tested before connecting or disconnecting the test leads, and before changing the range connections of the leads.

a. De-energize the circuit under test.

b. Connect a suitable lead from the \pm binding post on the Model 653 to one side of the circuit under test.

c. Select a second binding post which will provide a suitable current indication. When in doubt as to the amount of current to be measured, use the 25A binding post first, and then change to a lower range if the current is within the lower range. Connect a suitable lead from this selected binding post to the other side of the circuit under test.

NOTE

The test leads and connections for steps b and c must be adequate for the circuit under test. The test leads must have ample current carrying capacity and each connection must be tight and offer low resistance.

d. Record the **260/270** meter reading indicated on the 2.5 V.A.C. scale.

e. Multiply the reading by the factor indicated above the range binding post used.

3. Using the VOM circuit while the Model 653 is attached.

a. Set the 260 Direct - 653 Adapter switch of the Model 653 at its 260 DIRECT position.

b. Connect the regular VOM test leads to the 260 DIRECT jacks at the left side of the Model 653. Proceed with the standard operating instructions for the VOM, according to its Operator's Manual.

SECTION III**THEORY OF OPERATION****GENERAL**

The Model 653 AC Ammeter consists of a current transformer, an accurate load on the secondary and provisions for a voltmeter measurement across the load. Any AC current through the primary is transformer-coupled to produce a proportional AC current in the secondary. The secondary

THEORY OF OPERATION

current passes through the load resistor, producing a voltage across the load resistor which is again proportional to the primary current. The 260/270 VOM reads the amount of voltage across the load resistor which is indicative of the amount of current passing through the primary.

With the highly accurate components which are used in the construction of the Model 653 AC Ammeter, the accuracy of measurements obtained is excellent for most applications.

Circuit connections for the Model 653 are the same as for any other type of ammeter. The primary circuit of the transformer is connected in series with the circuit under test, and offers very little impedance in the circuit. The inductive effect of the transformer is negligible for frequencies up through 3000 cycles per second.

SECTION IV MAINTENANCE

CASE REMOVAL

To remove the instrument from the case, remove the four screws located in the four corners on the back of the instrument case. All of the components are attached to the front panel.

PARTS REPLACEMENT

All of the components of the Model 653 have been engineered for many years of useful life. However, there are conditions under which parts may become damaged or faulty, and require replacement. Refer to the circuit diagram in figure 4 to help identify and locate any suspected part.

In the event of any component failure, order replacement parts from Simpson Electric Company or from any Authorized Warranty Repair Station. A list of these repair stations is included, beginning on page 14.

MAINTENANCE

PARTS LIST

| Reference Symbol | Description | Simpson Part No. |
|------------------|-----------------------------------|------------------|
| T1 | Current Transformer | 1-118211 |
| S1 | Switch, DPDT, slide | 1-118192 |
| R1 | Resistor, 4.0 ohms ±0.5%, 3 W. | 10-805086 |
| | Case, Adapter | 10-860379 |

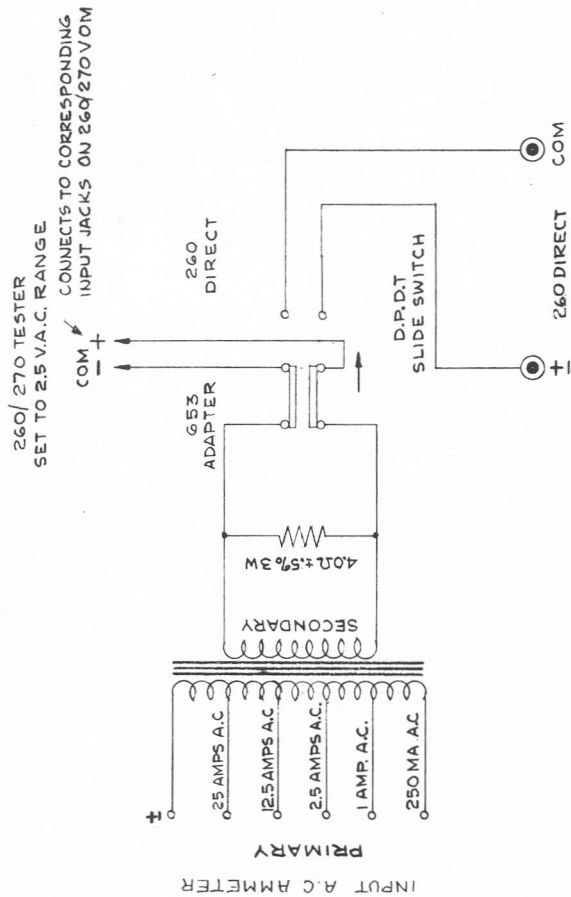


FIGURE 4 - SCHEMATIC DIAGRAM, SIMPSON AC AMMETER MODEL 653

**SIMPSON WARRANTY REPAIR STATIONS
AND PARTS DEPOTS**

*California, Los Angeles ADams 2-4201
Quality Electric Company
3700 South Broadway
States: So. California below Fresno and Arizona

*California, San Francisco GARfield 1-7185
Pacific Electrical Instrument Lab.
111 Main Street
States: No. California above Fresno and Nevada

Canada

Bach-Simpson Ltd. GLadstone 1-9490
1255 Brydges Street
P.O. Box 484
London, Ontario, Canada

*Colorado, Denver RAce 2-8670
Meter-Master Instrument Service
2379 Downing Street
States: Wyoming, Utah, Colo. and New Mexico

*Georgia, Atlanta PLaza 3-4128
Electro-Tech Equipment
690 Murphy Avenue S. W.
States: Alabama, Georgia, Florida,
No. & So. Carolina, and Tenn.

*Parts Depots

*Illinois, Chicago COLumbus 1-1330
Pacific Indicator Company
5217 W. Madison Street
States: Chicago, Wisconsin and Indiana

*Louisiana, New Orleans TWInbrook 5-5621
Industrial Instrument Works
3328 Magazine Street
States: Arkansas, Mississippi and Louisiana

*Massachusetts, Cambridge UNiversity 4-2494
Alvin C. Mancib Company
363 Walden Street
States: Vermont, New Hampshire, Massachusetts,
Connecticut, Rhode Island and Maine

*Michigan, Detroit LIncoln 7-1000
Ram Meter, Inc.
1100 Hilton Road, Ferndale
States: Michigan

*Minnesota, Minneapolis KELlogg 7-5411
Instrumentation Services
917 Plymouth Avenue
States: Minnesota, North and South Dakota

*Missouri, St. Louis FOrEst 7-9799
Scherrer Instruments
5449 Delmar Blvd.
States: Illinois below Peoria, Iowa, Missouri,
and Kansas

*Parts Depots

*New York, Buffalo EXport 2-2726
Electrical Instrument Labs.
1487 Hertal Avenue
States: New York State except Met. N. Y.

*New York 7, New York BARclay 7-4977
Simpson Instrument Service Corp.
27 Park Place
States: Metropolitan New York and New Jersey,
above Trenton

New York, Syracuse HYatt 2-1651
Syracuse Instrument Lab.
2904 South Avenue

*Ohio, Cleveland CLearwater 1-4609
Weschler Electric Company
4250 W. 130th Street
States: Ohio and Kentucky

Oregon, Portland BELmont 4-6683
The Instrument Laboratory
1316 S. E. 7th Avenue

*Pennsylvania, Philadelphia ORchard 3-5600
Sunshine Scientific Instrument
1810 Grant Avenue
States: Penn. Md. New Jersey below Trenton,
Virginia, W. Virginia, Washington, D.C.,
Delaware

*Parts Depots

*Texas, Dallas TAYlor 4-2626
Nelson Electronic Eng. Co., Inc.
6329 Gaston Avenue
States: Oklahoma and Texas

Texas, Houston CA 8-2835
Nelson Electronic Eng. Co., Inc.
3615 Gulf Freeway

*Washington, Seattle ATwater 3-5850
The Instrument Laboratory, Inc.
934 Elliott Avenue West
States: Oregon, Washington, Idaho and Montana

*Parts Depots

H- 00224

Batteries Out 1 man

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Requires:

1- "D" CELL

4- AA-CELLS.

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.