

MODEL SP-6A

16 Range Analog Multimeter



Shown 1/2
actual size

A.W. SPERRY INSTRUMENTS INC.

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ONE YEAR LIMITED WARRANTY

A.W. Sperry Instruments, Inc., warrants that this AWS instrument has been carefully tested, inspected, and warranted for one (1) year from the date of purchase by the original end user, provided the instrument has not been misused, damaged due to negligence, neglect or unauthorized repair, abused or used contrary to the operating instructions. Instruments and proof of purchase in the form of a legible copy or original of the sales receipt clearly identifying the distributor, model number and date of purchase must be returned to A.W. Sperry Instruments, Inc., Attention: Customer Service Center, 245 Marcus Boulevard, Hauppauge, New York 117885, postage prepaid for examination and verification of manufacturing defect under warranty. A.W. Sperry Instruments, Inc., shall be the sole judge of such defect. The liability of A.W. Sperry Instruments, Inc., shall be limited to the repair or replacement at its sole option of any defective product.

1) INTRODUCTION

Congratulations. You have purchased an Analog Multimeter manufactured to the highest quality standards. A minimum amount of maintenance and an understanding of these operating instructions is all that is needed to keep this instrument in excellent working condition.

Please take the time to read these operating instructions thoroughly and completely. Failure to follow these instructions may result in electrical shock, instrument damage and/or damage to the equipment under test. Always use extreme caution when working on or around electrically operated equipment.

2) SAFETY PRECAUTIONS

Always inspect the instrument, test leads and other accessories for damage prior to every use.

Always consider electrical and electronic equipment to be energized (live). Never assume any equipment is de-energized.

Never ground yourself when taking electrical measurements. Isolate yourself from ground by using dry rubber insulating mats to cover all exposed grounded metal. Stand on rubber mats and wear dry clothing.

Never take resistance measurements on energized (live) electrical or electronic equipment.

Use one hand, instead of two, whenever possible to take measurements. If two hands must be used, use extreme caution not to contact any energized conductors with your hands. Be certain test lead probes are dry and clean.

Do not hold the instrument when taking measurements. Place the instrument on a clean, insulating surface prior to taking any measurement.

Don't become part of the circuit. Think Safety. Act Safely.

3) INSTRUMENT DATA

3-1) Description

The A.W. Sperry SP-6A is an Analog Multimeter capable of measuring 6 functions on 16 ranges. A mirror scale is provided to reduce the possibility of parallax. Small, light weight and rugged construction. This meter was designed for the homeowner, hobbyist and professional needing to make electrical and electronic equipment measurements.

3-2) Features

- 1) 6 Functions - 16 Ranges
- 2) Fuse protected for extra safety.
- 3) Safety Recessed Test Lead Connections
- 4) Extra Long Probe Tips Can Be Used in Many Industrial Type Applications
- 5) High Impact Thermoplastic Case
- 6) Mirrored Scale Plate
- 7) Gold Plated Printed Circuit Board

- 8) Diode Protected Meter Movement
- 9) Silver Plated Switch Assembly
- 10) Small & Lightweight
- 11) Uses Only One 1.5V AA Battery
- 12) Perfect For The Homeowner, Hobbyist and Professional

3-3) Specifications

- Sensitivity: 2K Ω V/AC/DC
- Fuse: One (1) 0.25 Amp, 250V.
5mm x 20mm AWS Part # F-16
- Power Source: One(1) 1.5V AA size battery
AWS Part # B-1
- Size: 1-3/16"D x 2-3/8"W x 2-1/2"H
- Weight: 3.7 oz. (including battery)

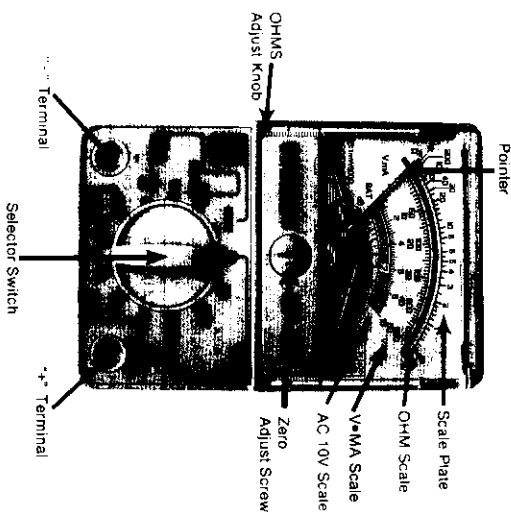
Ranges and Accuracy

- DC Voltage: 0-10/50/250/500 Vdc, \pm 4% F.S.
- AC Voltage: 0-50/250/500 Vac, \pm 5% F.S.
- DC Current: 0-50/250 mA dc, \pm 4% F.S.
- Battery: 1.5V Button Cell/1.5V AA/9 Vdc
- Resistance: 0-1M Ω mid-scale, \pm 4% Arc length
- Decibels: -20 to +56 db (on ACV ranges)

3-4) Packaging

Comes complete with one set TL-34 Test Lead, one B-1 "AA" type battery (installed in the instrument), one fuse (installed) and operating instructions.

3-5) Front Panel Identification



4) PREPARATION FOR USE

This procedure should be followed before each and every use

CAUTION

Before attempting to use this meter be certain to read this operating instruction thoroughly and completely. Failure to follow these instructions may result in electrical shock, instrument damage and/or damage to equipment under test.

- 1) Inspect the Analog Multimeter for any signs of damage to the thermoplastic case. Do not use if cracked, distorted, excessively dirty or any other abnormal condition exists.
- 2) Rotate the selector switch one full turn. Check that the switch clicks into each of the 13 positions and has no excessive play in each position. Do not use if the switch is loose.
- 3) Inspect the test leads for any signs of damage. Check for cracks in the insulation, broken or damaged probes, loose probe pins or bent probe pins. Do not use if any abnormal conditions exist.
- 4) Place the Analog Multimeter on a flat horizontal surface. Using a small screw driver adjust the "zero adjust" screw until the meter movement pointer lines up with the "0" reading on the left side of the scale plate.
- 5) Insert the black test lead into the "-" terminal of the instrument and the red test lead into the "+" terminal. Make certain that the leads are seated all the way into the instrument and fit snugly. If the fit feels loose do not use the instrument or the test leads.

6) Place the selector switch on the instrument into the "X1K" position, hold the lips of the Red and Black test leads together and adjust the "OHMS adjust knob" until the meter movement pointer reads "0" on the OHMS scale located at the extreme right side of the scale plate if a "0" reading cannot be obtained a weak battery is the most probable cause. Follow the battery replacement procedure in sec 6-1.

Note: The battery is only used for resistance measurements with the selector switch in the "X1K" position. The instrument can be used in all other ranges with a weak, dead or missing battery.

7) The instrument is now ready for use. Follow the Measurement procedures in this manual for all measurements. Read all Safety Precautions in sec 2 before proceeding.

5) OPERATION

5-1) Voltage Measurements

- 1) Follow the Preparation for Use procedure in sec 4
- 2) Read all Safety Precautions in sec. 2.

CAUTION

500 Vac/dc is the maximum voltage that can be measured using this meter. Attempting to measure higher voltages may result in electrical shock, instrument damage and/or damage to equipment under test.

3) Select an AC or DC voltage range using the selector switch that is higher than the maximum voltage to be measured. If the maximum voltage may be higher than 500 Vac/dc, do not attempt to take a measurement.

4) Apply the test leads to the two points in the circuit at which the voltage is to be measured. When measuring DC voltage the black lead should be connected to the more negative point of measurement. When measuring AC voltage the polarity does not matter.

5) Read the AC or DC voltage using the V-MA scale directly below the mirror scale. Use the numbers whose full scale reading matches the range selected by the "Selector Switch". When using the 10 Vac range the readings must be taken from the red scale marked AC10V.

6) The dB scales can be used to measure the milliwatt power dissipation in a 600 load by measuring the AC voltage across a 600 OHM load. An AC voltage of 0.775 Vrms across 600 OHMS is equal to 1mW or "0" dB. When converting an AC voltage measurement to dB take the dB readings from the lowest arc on the scale plate and then add the appropriate dB correction as listed in the chart printed in the lower right corner of the instrument scale plate.

5-2) DC Current Measurements

- 1) Follow the Preparation for Use procedure in sec. 4.
- 2) Read all Safety Precautions in sec. 2.

CAUTION

250 mAdc is the maximum current that can be measured using this meter. The instrument must be connected in series with the circuit to be measured. Do not impress voltages across the "+" and "-" terminals when set to the mAdc ranges. Doing so may result in electric shock, instrument damage and/or damage to equipment under test.

3) Select the mAdc range that is higher than the maximum current to be measured. If the maximum current is unknown do not attempt to take a measurement.

4) Remove power from the circuit to be tested and discharge any capacitors and inductors.

5) Connect the test leads into the circuit so that the meter is in series with the circuit where current is to be measured. The current should enter through the red lead and leave through the black lead in order for the meter to indicate in an up scale direction.

6) Turn on power to the circuit under test. Read the current on the V-mA scale and use the full scale numbers which correspond to the range selected.

7) Turn off the power to the circuit under test. Discharge all capacitors and inductors. Remove the test leads from the circuit under test.

5-3) Resistance Measurements

- 1) Follow the Preparation for Use procedure in sec. 4.
- 2) Read all safety precautions in sec. 2.

CAUTION

Resistance measurements must be made on de-energized (dead) circuits only. Impressing a voltage across the instrument terminals while set to any resistance range may result in electric shock, instrument damage and/or damage to equipment under test. Be certain equipment is completely de-energized.

- 3) Set the selector switch to "X1K" position. Hold the test lead tips together and adjust for a "0" OHM reading using the "OHM Zero Adjust" knob. If a zero reading cannot be obtained a weak battery is the most probable cause. See sec 6-1.
- 4) Connect the instrument to the two points between which the resistance is to be measured. Read the resistance on the uppermost "Ω" scale. Multiply the reading by 1K(1000).
- 5) When reading resistors in circuit there may exist more than one conductive path and the reading taken is a combination of circuit paths. When trying to read one resistor in circuit it is advisable to remove that resistor before measurement to avoid reading multiple conductive paths.

5-4) Battery Measurements

- 1) Follow the Preparation for use procedure in sec. 4.
- 2) Read all safety precautions in sec. 2.
- 3) The Meter comes with three separate battery check ranges that enable you to test 1.5V button cell, 1.5Vdc or 9Vdc batteries.
- 4) Connect red probe to + Jack, black to - Jack.
- 5) Set the range selector switch to 9V battery check range.
- 6) Connect the test leads to the 9Vdc battery under test. A good 9Vdc battery will read in the green portion of the Arc.
- 7) To check 1.5V Button Cell or 1.5Vdc batteries follow the above procedures with the range selector switch set to the appropriate 1.5V button cell or 1.5Vdc ranges.
- 8) The "2" section on the scale plate shows that the battery may be starting to decay.

6) MAINTENANCE

6-1) Battery Replacement

- 1) Disconnect test leads from any circuit and then disconnect test leads from the instrument.
- 2) Turn instrument upside down and lay on a soft flat surface which will not scratch the scale window.
- 3) Remove the phillips head screw and lift off the back case.
- 4) Remove the battery by prying up near the center of the battery using a coin.
- 5) Replace the battery with a new 1.5 Vdc, AA size battery. When installing the battery make sure the polarity matches that indicated in the battery compartment.
- 6) Replace the back cover by sliding the end with the small tab in first. Then replace the phillips head screw and tighten to a snug fit. Do not over tighten screw.

6-2) Fuse Replacement

- 1) Follow steps 1-3 in Section 6-1.
- 2) Remove the fuse and replace with a miniature glass type fuse, 0.25Amp, 250V, 5mm x 20mm, or approved equal.

CAUTION

Do not short fuse out of the circuit, or use a fuse with higher rating than 0.25Amp, or alter circuit to eliminate the fuse. These actions negate the safety purpose of the fuse, can cause extensive damage to the instrument and/or injury to the user.

6-3) Cleaning

The exterior of the instrument can be cleaned with a soft dry cloth to remove any oil, grease or grime. Never use any liquid solvents or detergents. Do not polish the instrument. If the instrument gets wet for any reason, dry the inside and outside of the instrument using low pressure air, less than 25 PSI.