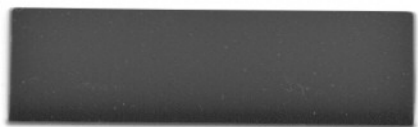
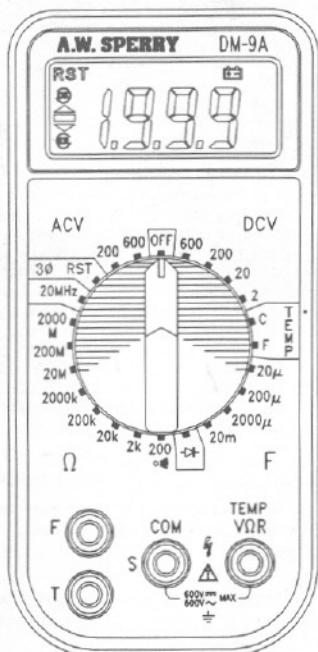


OPERATING INSTRUCTIONS

MODEL DM-9A

DIGITAL MULTIMETER





FEATURES

- 24 Ranges, 9 Functions
- Limited Five Year Warranty
- Pocket Size
- Simple Operation
- Ergonomically contoured for your hand
- 200 Hour Battery Life
- Recessed Safety Designed Input Terminals
- Overload Protection on All Ranges
- Diode Test Function
- Temperature Function
- Capacitance Function

ACCESSORIES

The DM-9A comes packed complete on a see through blister card with one (1) set TL-62 Test Leads (1 black, 1 red, 1 yellow), one (1) B-4 Battery, one (1) C-71 Carrying Case, one (1) F-2 Fuse installed, one (1) spare, one (1) TP-900 Thermostat Temperature Probe, Form #237 operating instructions and warranty card.

  When servicing, use only specified replacement parts.

SAFETY RULES

1. Reading these operating instructions thoroughly and completely before operating your DMM. Pay particular attention to **WARNINGS** and **CAUTIONS** which will inform you of potentially dangerous procedures. These instructions must be followed.

2. Always inspect your DMM, test leads and accessories for any sign of damage or abnormality before every use. If any abnormal conditions exist (e.g. broken test leads, cracked cases, display not reading, etc.) do not attempt to take any measurements.
3. Never ground yourself when taking electrical measurements. Do not touch exposed metal pipes, outlets, fixtures, etc., which might be at ground potential. Keep your body isolated from ground by using dry clothing, rubber shoes, rubber mats, or any approved insulating material.
4. Never touch exposed wiring, connections or any live circuit conductors when attempting to take measurements.
5. Never replace the protective fuse inside the DMM with any other than the AWS part number specified or approved equal.
6. Remember: Think Safety and Act Safely.
7. When testing for the presence of voltage, make sure the voltage function is operating properly by reading a known voltage in that range before assuming that a zero reading indicates a no-voltage condition.
8. Calibration and repair should be performed by qualified maintenance personnel only.
9. Do not attempt calibration or service unless another person, capable of rendering first aid and resuscitation is present.
10. Do not install substitute parts or perform any unauthorized modification of the instrument. Return the instrument to A.W. Sperry Instruments for service and repair to insure that safety features are maintained.
11. To avoid electric shock use CAUTION when working with voltages above 40Vdc or 20Vac. Such voltages pose a shock hazard.
12. Do not operate this instrument in an explosive atmosphere (i.e. in the presence of flammable gases or fumes, vapor or dust).


SPECIFICATIONS

Display: 3½ digit liquid crystal display (LCD) with a maximum reading of 1999.

Polarity: Automatic, positive implied, negative polarity indication.

Overrange: (OL) or (-OL) is displayed.

Zero: Automatic.

Low battery indication: The "  " is displayed when the battery voltage drops below the operating level.

Measurement rate: 2.5 times per second, nominal.

Operating environment: 0°C to 50°C at < 70% relative humidity.

Storage temperature: -20°C to 60°C, 0 to 80% R.H. with battery removed from meter.

Accuracy: Stated accuracy at 23°C ± 5°C, <75% relative humidity.

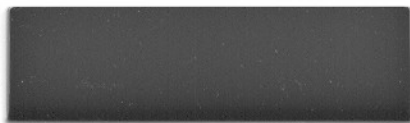
Power: Single standard 9-volt battery, NEDA 1604, JIS 006P, IEC 6F22. A.W. Sperry Part #B-4.

Battery life: 200 hours typical with carbon-zinc.

Fuse: Miniature Glass Type, 0.1A/250Vac, 5 x 20mm, Fast Acting.

Dimensions: 147mm (H) x 70mm (W) x 39mm (D).

Weight: Approx. 216g including battery.



DC VOLTS

Ranges: 2V, 20V, 200V, 600V

Resolution: 1mV

Accuracy: $\pm(1.2\% \text{ rdg} + 1\text{dgt})$

Input impedance: $10\text{M}\Omega$

Overload protection: 600VDC or AC rms

AC VOLTS (50Hz - 500Hz)

Ranges: 200V, 600V

Resolution: 100mV

Accuracy: $\pm(2.0\% \text{ rdg} + 4\text{dgts})$

Input impedance: $4.5\text{M}\Omega$

Overload protection: 600VDC or AC rms

RESISTANCE

Ranges: 200Ω , $2\text{K}\Omega$, $20\text{K}\Omega$, $200\text{K}\Omega$, $2000\text{K}\Omega$, $20\text{M}\Omega$, $200\text{M}\Omega$, $2000\text{M}\Omega$

Accuracy:

$\pm(1.0\% \text{ rdg} + 4\text{dgts})$ on 200Ω to $2000\text{K}\Omega$ ranges

$\pm(2.0\% \text{ rdg} + 4\text{dgts})$ on $20\text{M}\Omega$ range

$\pm[(5.0\% \text{ rdg} - 10\text{dgts}) + 10\text{dgts}]$ on $200\text{M}\Omega$ and $2000\text{M}\Omega$ ranges

Open circuit volts: 0.3Vdc

(3.0Vdc on 200Ω , $200\text{M}\Omega$, $2000\text{M}\Omega$ ranges)

Overload protection: 500VDC or AC rms

CONTINUITY

Audible indication: Less than 100Ω

Overload protection: 500VDC or AC rms



DIODE TEST

Test current: 1.0mA \pm 0.6mA

Accuracy: \pm (3.0% rdg + 1dgt)

Open circuit volts: 3.0Vdc typical

Overload protection: 500VDC or AC rms

CAPACITANCE

Ranges: 20 μ F, 200 μ F, 2000 μ F, 20mF

Accuracy: \pm (4.0% rdg + 10dgts) on all ranges

Test frequency: 21Hz

Test voltage: <3.5V

Input protection: 0.1A/250V fast acting fuse

FREQUENCY (Autoranging)

Ranges: 10Hz to 100KHz

Accuracy: \pm (0.5% rdg + 2dgts) on all ranges

Sensitivity: 2V RMS min.

Overload protection: 500VDC or AC rms

TEMPERATURE

Ranges: -20°C to 400°C, -4°F to 752°F

Accuracy: \pm (2.0% rdg + 2°C), \pm (2.0% rdg + 4°F)

Sensor type: K-type thermocouple

Overload protection: 500VDC or AC rms

PHASE INDICATOR

Frequency range: 45Hz to 450Hz

Voltage range: 80V to 480V

OPERATION

Voltage Measurements

1. Connect the red test lead to the "V Ω " jack and the black test lead to the "COM" jack.
2. Set the Function/Range switch to the desired voltage type (AC or DC) and range. If magnitude of voltage is not known, set switch to the highest range and reduce until a satisfactory reading is obtained.
3. Connect the test leads to the device or circuit being measured.
4. For dc, a (-) sign is displayed for negative polarity; positive polarity is implied.

Resistance and Continuity Measurements

1. Set the Function/Range switch to the desired resistance range or continuity position.
2. Remove power from the equipment under test.
3. Connect the red test lead to the "V Ω " jack and the black test lead to the "COM" jack.
4. Touch the probes to the test points. In ohms, the value indicated in the display is the measured value of resistance. In continuity test, the beeper sounds continuously, if the resistance is less than 100 Ω .

Note when using 2000M Ω Range

The 2000M Ω range has a fixed 10-count offset in the reading. When the test leads are shorted together in this range, the meter will display 010. This residual reading must be subtracted from the reading. For example, when measuring 1100M Ω on the 2000M Ω range, the display will read 1110, from which the 10 residual is subtracted to obtain the actual resistance of 1100M Ω .



Diode Tests

1. Connect the red test lead to the "V Ω " jack and the black test lead to the "COM" jack.
2. Set the Function/Range switch to the "⚡" position.
3. Turn off power to the circuit under test.
4. Touch probes to the diode. A forward-voltage drop is about 0.6V (typical for a silicon diode).
5. Reverse probes. If the diode is good, "OL" is displayed. If the diode is shorted, ".000" or another number is displayed.
6. If the diode is open, "OL" is displayed in both directions.

Capacitance Measurements

1. Set the Function/Range switch to the desired Cx (capacitance) range.
2. Connect the red test lead to the "F" jack and the black test lead to the "COM" jack.
3. Touch the probes to the capacitor. Observe polarity when measuring polarized capacitors.
4. Read the capacitance directly from the display.

Temperature Measurements

1. Set the Function/Range switch to the desired temperature range: °C or °F.
2. Connect a Type K thermocouple probe to the "TEMP" and "COM" input jacks. Jack on meter accepts a banana plug thermocouple probe.
3. Take temperature measurement using the thermocouple probe and read the temperature from the display.



Frequency Measurements

1. Set the Function/Range switch to the "Hz" position.
2. Connect the red test lead to the "V Ω " jack and the black test lead to the "COM" jack.
3. Connect the test leads to the point of measurement and read the frequency from the display.

Phase Indicator

1. Set the Function/Range switch to the "3 \emptyset RST" position.
2. Connect the red test lead to "R" jack, the black test lead to "S" jack and the yellow test lead to "T" jack.
3. Turn OFF power before connecting the test leads to the device or 3-phase power source, then turn ON the power being measured.
4. If the connection of Phase Sequence is correct, the R,S,T, and ⊗ symbols will appear on the display and the beeper sounds continuously.
5. If the connection of Phase Sequence is incorrect, the R,S,T, and ⊙ symbols will appear on the display. In this case, please change the connection of test leads until the ⊗ symbol appears on the display.

Battery Replacement

Power is supplied by a 9 volt "transistor" battery. (NEDA 1604, IEC 6F22). The " ⊗ " appears on the LCD display when replacement is needed. To replace the battery, remove the three screws from the back of the meter and lift off the front case. Remove the battery from case bottom.

