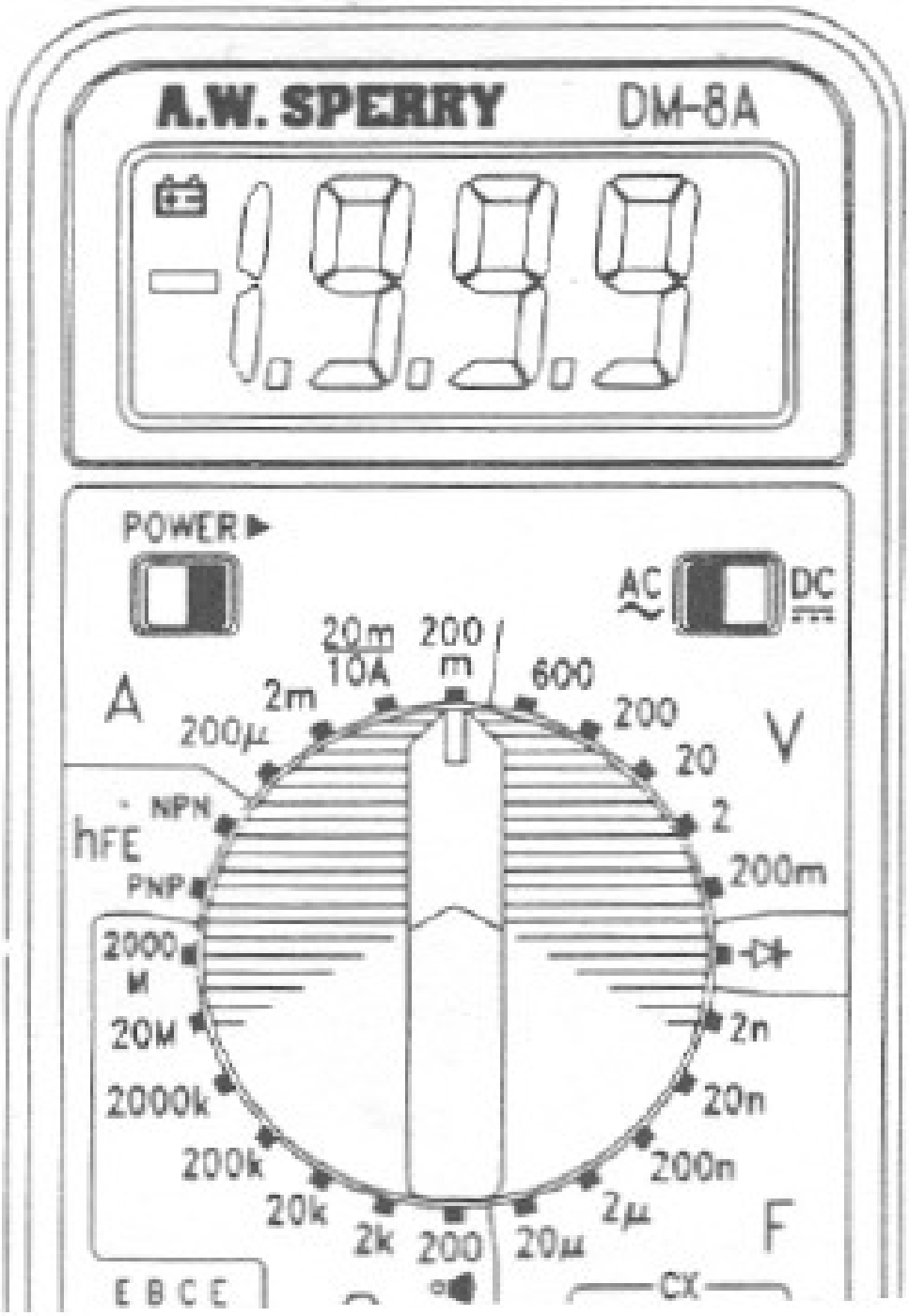
9/93 Form #236

OPERATING INSTRUCTIONS
MODEL DM-8A
DIGITAL MULTIMETER



FEATURES

- 36 Ranges, 9 Functions
- Limited Five Year Warranty
- Pocket Size
- Simple Operation
- Ergonomically contoured for your hand
- 200 Hour Battery Life
- HFE Transistor Test Function
- 10A AC/DC Ranges
- Recessed Safety Designed Input Terminals
- Overload Protection on All Ranges
- Diode Test Function
- Current Input Alert
- Capacitance Test Function

ACCESSORIES

The DM-8A comes packed complete on a see through blister card with one (1) set TL-58 Test Leads (1 black, 1 red), one (1) B-4 Battery, one (1) C-71 Carrying Case, one (1) F-25 Fuse installed, one (1) F-22 Fuse installed, one (1) spare F-22 fuse, Form #236 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 aviod 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: (1) or (-1) is displayed.

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%

DC VOLTS

Ranges: 200mV, 2V, 20V, 200V, 600V
Resolution: 100μV
Accuracy: ±(0.8% rdg + 1dgt)
Input impedance: 10MΩ
Overload protection: 600VDC or AC rms

AC VOLTS (50Hz - 500Hz)

Ranges: 200mV, 2V, 20V, 200V, 600V
Resolution: 100μV
Accuracy:
±(1.5% rdg + 3dgts) on 200mV to 20V ranges
±(2.0% rdg + 3dgts) on 200V to 600V ranges
Input impedance: 10MΩ
Overload protection: 600VDC or AC rms

DC CURRENT

Ranges: 200μA, 2mA, 20mA, 200mA, 10A
Accuracy:
±(1.0% rdg + 1dgt) on 200μA to 200mA ranges
±(3.0% rdg + 3dgts) on 10A range
Input protection: 0.5A / 250V fast blow fuse
10A/600V fast blow ceramic fuse

AC CURRENT (50Hz - 500Hz)

Ranges: 200μA, 2mA, 20mA, 200mA, 10A
Accuracy:
±(2.0% rdg + 4dgts) on 200μA to 200mA ranges
±(3.5% rdg + 4dgts) on 10A range
Input protection: 0.5A / 250V fast blow fuse
10A/600V fast blow ceramic fuse

RESISTANCE

Ranges:200Ω ,2KΩ ,20KΩ ,200KΩ ,2000KΩ ,20MΩ ,2000MΩ

Accuracy:

±(1.0% rdg + 4dgts) on 200Ω to 2000KΩ ranges

±(2.0% rdg + 4dgts) on 20MΩ range

±[(5.0% rdg - 10dgts)+10dgts] on 2000MΩ range

Open circuit volts: 0.3Vdc

(3.0Vdc on 200Ω ,2000MΩ ranges)

Overload protection: 500VDC or AC rms

CONTINUITY

Audible indication: Less than 100Ω

Overload protection: 500VDC or AC rms

DIODE TEST

Test current: 0.8mA ± 0.3mA

Accuracy: ±(3.0% rdg + 1dgt)

Open circuit volts: 3.0Vdc typical

Overload protection: 500VDC or AC rms

CAPACITANCE

Ranges: 2nF, 20nF, 200nF, 2μF, 20μF

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

Test frequency: 400Hz

TRANSISTOR hFE

Ranges: 0 - 1000

Base current: 10μAdc approx. (Vce=3.0Vdc)

OPERATION

Current Input Alert

The meter have a beeper that warns the user when the test lead is in the current jack while the meter is switched to make a voltage measurement. Another safety feature to protect the meter and you.

Voltage Measurements

1. Connect the red test lead to the "VΩ" jack and the black test lead to the "COM" jack.
2. Set the Function/Range switch to the desired voltage range and slide the "AC/DC" selector switch to the desired voltage type. 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.

Current Measurements

1. Set the Function/Range switch to the desired current range and slide the "AC/DC" selector switch to the desired current type.
2. For current measurements less than 200mA, connect the red test lead to the μA/mA jack and the black test lead to the COM jack.
3. For current measurements of 200mA or greater, connect the red test lead to the 10A jack and the black test lead to the COM jack.
4. Remove power from the circuit under test and open the normal circuit path where the measurement is to be taken. Connect the meter **in series** with the circuit.

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 "VΩ" 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 100Ω.

Note when using 2000MΩ Range

The 2000MΩ 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.

Diode Tests

1. Connect the red test lead to the "VΩ" 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, "1" is displayed. If the diode is shorted, ".000" or another number is displayed. If the diode is open, "1" is displayed in both directions.

Transistor Gain Measurements

1. Set the Function/Range switch to the desired hFE range (PNP or NPN type transistor).

2. Never apply an external voltage to the hFE sockets. Damage to the meter may result.
3. Plug the transistor directly into the hFE sockets. The sockets are labeled E, B, and C for emitter, base, and collector.
4. Read the transistor hFE directly from the display.

Capacitance Measurements

1. Set the Function/Range switch to the desired Cx (capacitance) range.
2. Never apply an external voltage to the Cx sockets. Damage to the meter may result.
3. Insert the capacitor leads directly into the Cx sockets.
4. Read the capacitance directly from 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.

Fuse Replacement

If no current measurements are possible, check for a blown overload protection fuse. There are two fuses; F1 for the μA/mA jack and F2 for the 10A jack. For access to fuses, remove the three screws from the back of the meter and lift off the front case. Replace F1 only with the original type 0.5A/250V, fast acting fuse. Replace F2 only with the original type 10A/600V, fast acting ceramic fuse.

FIVE YEAR LIMITED WARRANTY

A.W. Sperry Instruments, Inc., warrants that this Techmaster Series instrument has been carefully tested, inspected, and warranted for five (5) years from the date of purchase by the original end user, provided the instruments have 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 11788, 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 repari or replacement as its sole option of any defective product.

THIS WARRANTY AND THE OBLIGATIONS AND LIABILITIES OF SELLER THEREUNDER ARE EXCLUSIVE AND IN