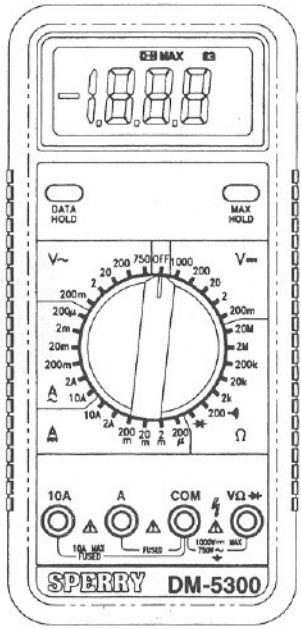
11 pgs.

OPERATING INSTRUCTIONS
Model DM-5300
DIGITAL MULTIMETER



PLEASE READ THESE OPERATING INSTRUCTIONS CAREFULLY

Misuse and or abuse of these instruments cannot be prevented by any printed word and may cause injury and or equipment damage. Please follow all these instructions and measurement procedures faithfully and adhere to all standard industry safety rules and practices.

A.W. SPERRY INSTRUMENTS INC.

2158 Joshua's Path, Suite 302, Hauppauge, N.Y. 11788
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FIVE YEAR LIMITED WARRANTY

.A.W. Sperry Instruments, Inc., warrants that this instrument has been carefully tested, inspected. and warranted for one (5) year 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, 2150 Joshuas Path 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 repair or replacement as its sole option of any defective product.

THIS WARRANTY AND THE OBLIGATIONS AND LIABILITIES OF SELLER THEREUNDER ARE EXCLUSIVE AND IN LIEU OF AND BUYER HEREBY WAIVES ALL OTHER REMEDIES, EXPRESS WARRANTIES, GUARANTEES OR LIABILITIES, OF AND FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES OR WHETHER OR NOT OCCASSIONED BY SELLER'S NEGLIGENCE. THIS WARRANTY SHALL NOT BE EXTENDED, ALTERED OR VARIED EXCEPT BY A WRITTEN INSTRUMENT SIGNED BY SELLER AND BUYER. SOME STATES ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIED LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.

NOTE: Recommended calibration should not exceed one year. Calibration service charges are not covered under terms and conditions of warranty.

WARRANTY REGISTRATION

To validate warranty, please complete the warranty registration card enclosed with your instrument and return to A.W. Sperry Instruments, Inc. 2150 Joshua's Path Hauppauge. N.Y. 11788 within 10 days of purchase. No postage required.

WARRANTY RETURN

Refer to section "Return for Repairs" for complete instructions. All warranty returns must include a legible copy or original of the sales receipt clearly identifying the model number, serial number and date of purchase.

Sec. 1 DESCRIPTION

This exceptional 3½ digit, handheld, digital multimeter have the capacity of reading up to 9 functions on up to 30 ranges. This DMM offer a powerhouse of measurement capability in a self-contained housing. It is designed for the professional at work in the field or in the laboratory, yet simple enough to operate making it perfect for for the hobbyist too.

Safety was a prime consideration in the design of this DMM. Housed in shock resistant plastic, these instruments stand up to the use and abuse of everyday service, and electrically insulates the user from potential shock hazards. Electronic overload protection against accidental application of voltage to resistance and continuity circuits, combined with rugged construction make it a durable and reliable instrument.

Sec. 2 FEATURES

- 30 Ranges, 9 Functions
- Drop Proof to 10 feet
- 10A DC/AC Range
- Meets IEC-348. UL-1244 standards
- Overload Protection on all Ranges
- Diode Test
- Continuity Buzzer
- Safety / Color Input Jack
- Safety Test Leads
- Built-in Hanger and Tilt Stand
- Large 3½ Digit LCD Display
- 5 Year Limited Warranty

Sec. 3 SPECIFICATIONS

- **Display:** 3½ digit, 17mm large LCD maximum reading of 1999.
- **Polarity:** Automatic, positive implied, negative indicated.
- **Overrange:** (OL) or (-OL) is displayed.
- **Low battery indication:** The " ⊟ " is displayed when the battery voltage drops below accurate operating level.
- **Measurement rate:** 2.5 per second, nominal.
- **Operating Environment:** 0°C to 50°C at < 70% R.H.
- **Storage Temperature:** -20°C to 60°C, 0 to 80% R.H. with battery removed from meter.
- **Power:** Standard 9-volt battery, NEDA 1604, JIS 006P, IEC 6F22.
- **Battery life:** 250 hours typical with carbon-zinc.
- **Fuse:** 2A/600V,6.3x25.4mm fast acting AWS Part #F-24.

  10A/600V,6.3x25.4mm fast acting AWS Part #F-25.
- **Dimensions:** 7.5"H x 3.4"W x 1.5"D (189H x 87W x 37D mm)
- **Weight:** Approx. 12.9 oz. (370g) including battery.

RANGES:

*Accuracy is given as ±([% of reading]+[number of least significant digits]) at 18°C to 28°C, with relative humidity up to 70%.

DC Volts

Range	Resolution	Accuracy	Input Impedance
200mV	100μV	±(0.5% rdg + 1d)	10MΩ
2V	1mV	±(0.5% rdg + 1d)	10MΩ
20V	10mV	±(0.5% rdg + 1d)	10MΩ
200V	100mV	±(0.5% rdg + 1d)	10MΩ
1000V	1V	±(0.5% rdg + 1d)	10MΩ

Overload Protection: 500VDC/350VAC RMS for 15 seconds on 200mV range
1000VDC/750VAC RMS on all other ranges

AC Volts

Range	Resolution	Accuracy (50Hz to 500Hz)	Input Impedance
200mV	100μV	±(1.2% rdg + 3d)	10MΩ
2V	1mV	±(1.2% rdg + 3d)	10MΩ
20V	10mV	±(1.2% rdg + 3d)	10MΩ
200V	100mV	±(1.2% rdg + 3d)	10MΩ
750V	1V	±(2.0% rdg + 3d)	10MΩ

Response: Average responding calibrated in RMS of sine wave.
Overload Protection: 500VDC/350VAC RMS for 15 seconds on 200mV range
1000VDC/750VAC RMS on all other ranges

DC Current

Range	Resolution	Accuracy	Burden Voltage
200μA	0.1μA	±(1.0% rdg + 1d)	250mV
2mA	1μA	±(1.0% rdg + 1d)	250mV
20mA	10μA	±(1.0% rdg + 1d)	250mV
200mA	100μA	±(1.0% rdg + 1d)	250mV
2A	1mA	±(1.5% rdg + 1d)	600mV
10A	10mA	±(3.0% rdg + 3d)	300mV

Overload Protection: 2A/600V fuse on A input (fast blow ceramic fuse).
10A/600V fuse on 10A input (fast blow ceramic fuse).

AC Current

Range	Resolution	Accuracy (50Hz to 500Hz)	Burden Voltage
200μA	0.1μA	±(1.2% rdg + 3d)	250mV
2mA	1μA	±(1.2% rdg + 3d)	250mV
20mA	10μA	±(1.2% rdg + 3d)	250mV
200mA	100μA	±(1.2% rdg + 3d)	250mV
2A	1mA	±(2.0% rdg + 3d)	600mV
10A	10mA	±(3.5% rdg + 4d)	300mV

Overload Protection: 2A/600V fuse on A input (fast blow ceramic fuse).
10A/600V fuse on 10A input (fast blow ceramic fuse).

Resistance

Range	Resolution	Accuracy	Open Circuit Volts
200Ω	0.1Ω	±(1.0% rdg+4d)	3.0Vdc
2KΩ	1Ω	±(0.8% rdg+2d)	0.3Vdc
20KΩ	10Ω	±(0.8% rdg+2d)	0.3Vdc
200KΩ	100Ω	±(0.8% rdg+2d)	0.3Vdc
2MΩ	1KΩ	±(0.8% rdg+2d)	0.3Vdc
20MΩ	10KΩ	±(2.0% rdg+5d)	0.3Vdc

Overload Protection: 500V DC or RMS AC

Continuity Test

Audible Threshold	Open Circuit Volts	Response Time
Less than 100Ω	3.0Vdc typical	≈ 500msec

Overload Protection: 500V DC or RMS AC

Diode Test

Resolution	Accuracy	Test Current	Open Circuit Volts
1mV	±(1.0% rdg+1d)	1.0 ± 0.6mA	3.0Vdc typical

Overload Protection: 500V DC or RMS AC

Sec. 4 SAFETY RULES

1. Read 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. Refer to section 13 Return for Repair.
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.)

Sec. 5 UNPACKING AND CONTENTS CHECK

The A.W. Sperry DM-5300 come complete and ready to use. Check the following contents list when unpacking. If any pieces are missing notify the distributor you purchased the instrument from or A.W. Sperry Instruments, Inc.

- Operating Instructions form #260.
- TL-58 Test Leads 1 red,1 black heavy duty with prod tips connected to 90° shielded banana plugs.
- 9V Transistor Type Battery (AWS Part #B-4) See Battery Replacement section 10.2 for proper installation.
- Two Fuses installed, One F-25 fuse, fast acting, high interrupting capacity 10 Amp,600Vac rating 6.3x25.4mm. One F-24 Fuse, fast acting, 2A,600Vac rating 6.3x25.4mm. One spare F-24 Fuse. See Fuse Replacement section 10.3.

Sec. 6 BATTERY REPLACEMENT

This DMM has a self-contained power supply consisting of One 9V Transistor Type Battery (NEDA #1604, AWS Part #B-4).
When the multimeter displays the " ⊟ " the battery must be replaced to maintain proper operation.

WARNING

TO PREVENT ELECTRICAL SHOCK HAZARD, TURN OFF THE MULTIMETER AND DISCONNECT TEST LEADS BEFORE REMOVING THE BACK COVER.

1. After disconnecting test leads and turning off the multimeter, remove back cover by removing the three screws; then lift off the back cover.
2. Replace the battery.
3. Replace the back cover.

Sec. 7 FUSE TEST AND REPLACEMENT

Use the following steps to test the internal fuses of the meter:

1. Turn the function / range switch to the (⊣▶⊢) position. Plug a test lead into the VΩ input terminal.
2. Touch the probe to the A input terminal. The display should indicate 1.400 or less, otherwise the fuse is probably bad.
3. Touch the probe to the 10A input terminal. The display should indicate .001 or less, otherwise the 10A fuse is probably bad.

WARNING

TO PREVENT ELECTRICAL SHOCK HAZARD, TURN OFF THE MULTIMETER AND DISCONNECT TEST LEADS BEFORE REMOVING THE BACK COVER.

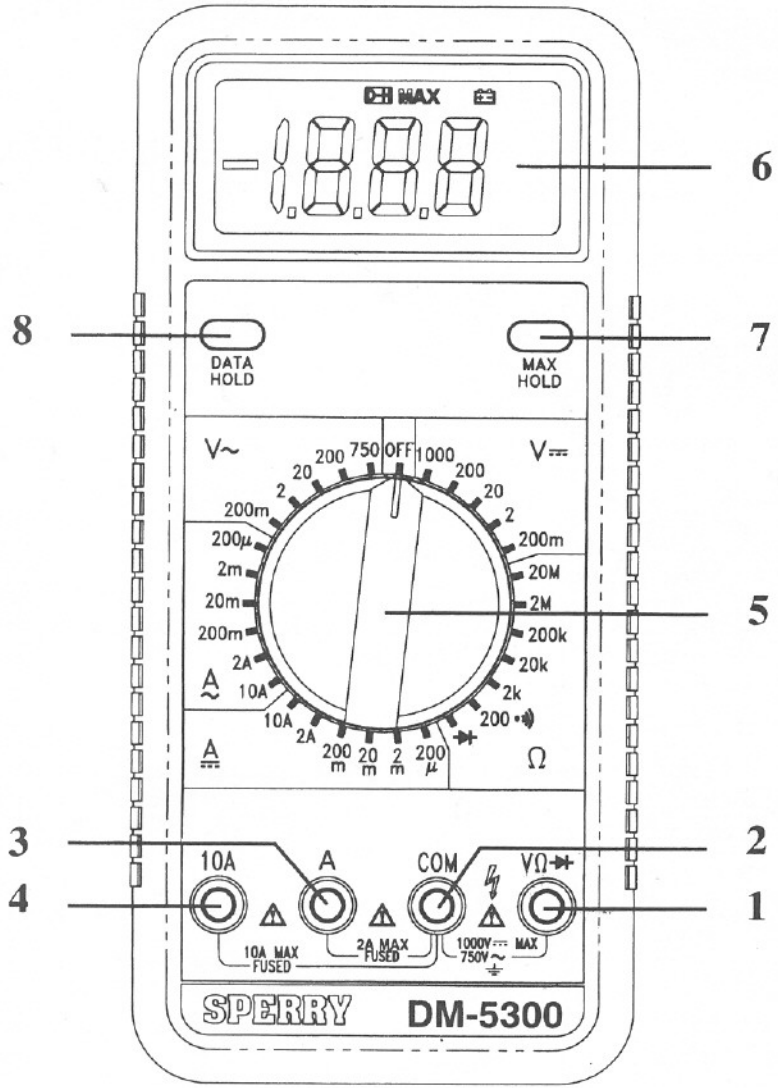
A Input Terminal

1. After disconnecting test leads and turning off the multimeter, remove back cover by removing the three screws; then lift off the back cover.
2. Carefully remove the fuse (6.3x25.4 mm) from the fuse holder. Replace with a 2A/600V replacement fuse, AWS Part #F-24 or approved equal.
3. Re-connect the battery and replace it in the battery compartment.
4. Replace the back cover by reversing the procedure used to remove it.

10A Input Terminal

1. After disconnecting test leads and turning off the multimeter, remove back cover by removing the three screws; then lift off the back cover.
2. Carefully remove the 10A/600V fuse from the 10Ampere fuse holder. Replace with a new 10A/600V fuse, AWS Part #F-25 or approved equal.
3. Re-connect the battery and replace it in the battery compartment.
4. Replace the back cover by reversing the procedure used to remove it.

. 8 FRONT PANEL CONTROLS



1 VΩ⊣◀ Volt, Ohms, Diode, Input Terminal
This is the positive input terminal for all functions except current measurements, Connection is made here using the red test lead.

2 COM Common Terminal
This is the negative (ground) input terminal for all measurement modes. Connection is made to it using the black test lead.

3 A Amperes Input Terminal
This is the positive input terminal for current measurement (ac or dc) up to 2A. Connection is made to it using the red test lead.

4 10A 10 Amperes Input Terminal
This is the positive input terminal for current measurement (ac or dc) up to 10A. Connection is made to it using the red test lead.

5 Function Selector Rotary Switch
This rotary switch selects the measurement function when aligned with function symbols on the panel.

6 Liquid Crystal Display (LCD)
This liquid crystal display provides a 3½ digit measurement data display having a maximum count of 1999.

7 MAX HOLD Button
This measurement function is used to measure the maximum value of a signal.
To use this function, select the function and range and press the MAX button. When this is done, the "MAX" annunciator will appear in the display. Next, by inputting a signal, the MAX function operates. This maximum value is held in digital memory for a long period.
To exit the MAX mode, press the MAX button once again.

8 DATA HOLD Button
Press (DATA HOLD) button to toggle in and out of the Data Hold mode. In the Data Hold mode, the "D-H" annunciator is displayed and the last reading is held on the display. Press the (DATA HOLD) button again to exit and resume readings.

Sec. 9 OPERATION

Before making any measurements always examine the instrument and accessories used with the instrument for damage, contamination (excessive dirt, grease, etc.) and defects. Examine the test leads for cracked or frayed insulation and make sure the lead plugs fit snugly into the instrument jacks. If any abnormal conditions exist do not attempt to make any measurements. Instead refer to Sec. 14 Return for Repairs.

Sec. 9.1 VOLTAGE MEASUREMENTS

1. Insert the black and red test leads into the respective "COM" and "V-Ω" terminals.
2. Place the range selector switch into the 1000Vdc position if a dc voltage is to be measured or into the 750Vac position if an ac voltage is to be measured. Always start in the highest range of the function to be measured.

CAUTION

To avoid possible electric shock, instrument damage and / or equipment damage, do not attempt to take any voltage measurements if the voltage is above 1000Vdc / 750Vac or if the voltage is unknown. 1000Vdc and 750Vac is the maximum voltages that this instrument is designed to measure. The "COM" terminal potential should not exceed 500V measured to ground.

3. Apply the test leads to the two points at which the voltage reading is to be taken. Be careful not to touch any energized conductors with any parts of your body.
4. Turn the range selector switch to the next lower range for a more accurate reading only if the reading is within that next lower range.
5. When measurements are completed, disconnect the test leads from the circuit under test. Remove the test leads from the instrument.

Sec. 9.2 CURRENT MEASUREMENTS

1. Insert the black and red test leads into the respective "COM" and "10A" terminals.
2. Place the function switch to the 10A position. Always start with the highest range of the function to be measured.

CAUTION

Do not attempt to measure a current if it is unknown or above 10A ac / dc. The A input terminal is protected by a 2A/600V fast blow fuse. The 10A input terminal is protected by a 10A/600V hi-energy, fast blow fuse.

3. Completely de-energize the circuit in which the current is to be measured. Place the DMM in series with the conductor carrying the current which is to be measured. Energize the circuit.
4. If the reading is less than 2A, you can switch to a lower range for greater accuracy. If not, you have completed your measurement.

CAUTION

Before changing ranges, always de-energize the circuit completely. An open circuit exists between the test leads during range change on the DMM.

5. To change to a lower range, move the red test lead to the "A" jack on the DMM and switch the range selector switch to the "2A" position.

CAUTION

The A ranges are fuse protected. To avoid possible electrical shock, instrument damage and / or equipment damage do not:

1. Attempt to take A current readings on circuits having more than 2A current flow.
2. Impress a voltage between the "COM" and "A" terminals exceeding 600Vac / dc. Some circuit damage may result for voltages below 600Vac / dc.

3. Raise the "COM" terminal potential above 500V to ground.
4. Energize the circuit. If the reading is within the next lower range, switch to that range at completely de-energizing the circuit under test. Continue changing to lower ranges if the reading is within the next lowest range to obtain the best accuracy.
5. Completely de-energize the circuit before removing the test leads.

Sec. 9.3 RESISTANCE AND DIODE MEASUREMENTS

1. Insert the black and red test leads into the respective "COM" and "V-Ω" terminals.
2. Place the range selector switch into the Ω range desired for a measurement. (The diode check entails injecting a given current into the diode junction to be tested and reading the voltage drop across the diode).

CAUTION

All resistance and diode measurements should be taken on deenergized circuits only. To avoid possible electrical shock, instrument damage and/or equipment damage do not connect the "COM" and "V-Ω" terminals to circuits having a potential difference exceeding 500Vdc/ac. Do not connect the "COM" terminal to potentials exceeding 500V to ground.

3. Completely de-energize the circuit or deive which is to be measured Connect the test leads to the device (the red test lead is positive with respect to the black test lead). When measuring a diode, connect the "V-Ω" terminal to the anode. A reading of (1) or (-1) indicates an overrange condition or the diode juction is reverse biased. This will occur with the test leads open on all resistance or diode ranges. If overrange occurs when taking a reading, switch to the next highest range for resistance measurements.

Sec. 9.4 CONTINUITY MEASUREMENTS

1. Place the range selector switch into the ( ) position.
2. Insert the black and red test leads into the respective "COM" and "V-Ω" terminals.

CAUTION

All continuity measurements should be taken on de-energized circuits only. To avoid possible electrical shock, instrument damage and/or equipment damage do not connect the common and ohm terminals to circuits having a potential difference exceeding 500Vdc/ac. Do not connect the common terminal to potentials exceeding 500V to ground.

3. Touch the test leads to the two points at which continuity is to be tested. The tone will sound if the reading on the display is approximately less than 100Ω.

⚠ ▣ When servicing, use only specified replacement parts.

Sec. 10 MAINTENANCE

Maintenance consists of periodic cleaning, battery replacement, fuse replacement and recalibration.

Sec. 10.1 CLEANING

The exterior of the instrument can be cleaned with a soft clean cloth to remove any oil, grease or grime from the exterior of the instrument. Never use liquid solvents or detergents. If the instrument gets wet for any reason, dry the instrument using low pressure "clean" air at less than 25 PSI. Use care and caution around the LCD display protector and areas where water or air could enter the interior of the instrument while drying.

Sec. 10.2 BATTERY REPLACEMENT

Required when " ⊟ " appears on display or nothing appears. See Battery Replacement in section 6.

Sec. 10.3 FUSE REPLACEMENT

Required when current ranges do not function. See Fuse Test and Replacement in section 7.

Sec. 11 ACCESSORIES

The following accessories are available to expand the measurement capabilities of the DM-5300. Refer to their respective data sheets or operating instructions for full specifications.

Sec. 11.1 AC & AC/DC CURRENT MEASUREMENT CA-200 and CA-250

The model CA-200 is a split core current transformer capable of measuring AC Current up to 200Aac.

The model CA-250 is a split core current transformer capable of measuring AC or DC Current up to 2000 Aac/Adc.

Model	Input	Output	Jaw Size
CA-200	0-200Aac	200mVFS	5/8"
CA-250	0-200/2000Aac	2VFS	2 1/8"
	0-200/2000Adc		

Sec. 11.2 HIGH VOLTAGE DC MEASUREMENT HVP-860

The Model HVP-860 is a high voltage probe capable of measuring up to 50,000Vdc.

Input: 0 - 50,000Vdc
Output: 0 - 50Vdc at a 10MΩ load
Accuracy: ±(1.5% of F.S.)

CAUTION

The HVP-860 is designed to be used by technicians trained in High Voltage measurement techniques. It is designed for use on high impedance, low energy circuits only. These types of circuits are normally found in electronic equipment. It is not designed to be used on High Voltage electrical distribution equipment and circuits. These type of circuits have essential unlimited energy where special equipment is recommended. DO NOT use on these types of High Energy circuits!

Sec. 11.3 TEMPERATURE ADAPTER - TA-1A

The Model TA-1A is a temperature adapter capable of measuring temperature up to 1300°C/2372°F.

Temperature Range: °F/°C Selectable
-50°C to 1300°C/-58°F to 2372°F
Output: 1mVdc/°C or °F
Required Load on Output: 10MΩ

Sec. 11.4 CARRYING CASE - C-67

Carrying Case for DM-5300.

Sec. 11.5 PVC SHOCKGUARD HOLSTER - C-68

Holster for DM-5300.

Sec. 11.6 ALLIGATOR CLIPS - AG-940

Two black, Insulated Push-on Alligator Clips.

Sec. 12 CALIBRATION

Calibration on these meters should be performed every year. This can be done by sending the instruments prepaid to:

A.W. Sperry Instruments, Inc.
2150 Joshuas Path, Suite 302
Hawppauge, N.Y.
11788

Specify in writing that calibration is necessary. The instrument will be returned to you normally within one week. Estimates will be furnished upon request.

CAUTION

The following procedure should be performed by persons trained and qualified in electronics and electronic equipment service. DO NOT attempt this procedure if not qualified.

WARNING

Do not attempt calibration or service unless another person, capable of rendering first aid and resuscitation is present.

Sec. 13 RETURN FOR REPAIRS

Before returning your digital multimeter for repair be sure to check that the failure to operate properly is not due to the following:

1. Weak battery.
2. Open fuse.
3. Open, loose or intermittent test leads.

If these conditions do not exist and the instrument fails to operate properly, return the instrument and accessories prepaid to:

A.W. Sperry Instruments, Inc.
Customer Service Department
2150 Joshua's Path, Suite 302
Hauppauge, N.Y. 11788

State in writing what is wrong with the instrument. All warranty repairs must include proof of purchase in the form of a legible or original copy of the sales receipt clearly identifying the distributor, model number and date of purchase and must have a warranty card on file. See warranty statement on page 1 for full warranty disclosure. Repair estimate will be furnished if requested for out of warranty instruments. Be sure to include all accessories which may be related to the problem, and a note describing the malfunction you observed.