DSA-720 TRMS CLAMP AMMETER

Operating Instructions

DIGISNAP™ DIGITAL

SNAP-AROUND

VOLT-OHM-AMMETER

MODELS

DSA-700	**2000 counts, AC current**
DSA-710	**2000 counts, AC current, Peak-hold**
DSA-720	**2000 counts, Trms AC current, Peak-hold**
DSA-730	**2000 counts, AC current, Peak-hold, °F**
DSA-740	**2000 counts, DC/AC current**
DSA-750	**2000 counts, Trms DC/AC current, EL panel LCD**
DSA-760	**4300 counts, AUTO, DC/AC current, Peak-hold**
DSA-770	**4300 counts, AUTO, DC/AC current, Peak-hold, °C/°F**
DSA-780	**4000 counts, AUTO, Trms DC/AC current, Peak-hold, Bar-Graph**

A.W. SPERRY INSTRUMENTS, INC.

245 MARCUS BLVD. HAUPPAUGE, N.Y. 11788-2075

800-645-5398 or 516-231-7050

FAX: 516-434-3128, TLX: 645104 SPERRYINC HAUP

SEC-1 FEATURES

- Limited Lifetime Warranty
- Ellipse shaped jaws
- Industry standard safety Test Leads
- Recessed Safety Designed 3 Input Terminals
- “Data Hold” Button (all Models)
- “Peak Hold” Button (DSA-710, DSA-720, DSA-730, DSA-760, DSA-770, DSA-780)
- Overload Protection on all Range (600VDC//600VACrms)
- Continuity Buzzer
- DC voltage and AC voltage ranges
- Diode test
- Frequency Measurement (except DSA-700)
- Capacitance Test (DSA-780)
- High speed Bar Graph (DSA-780)

SEC-2 SPECIFICATIONS

DISPLAY:

3-3/4 (3-1/2) DIGIT LCD, maximum reading 4300, 4000, 2000 with automatic sign, AC, Batt and hold annunciators.

OVERRANGE INDICATION:

“OL” is display (except DSA-780 display becomes “4000” with most significant digit blinks, In Frequency range, the display becomes “0000” with most significant digit blinks).

LOW BATTERY:

LCD is displayed “  ” when the battery voltage drops below the operating voltage.

MEASUREMENT RATE:

2.5 measurement per second nominal

BAR GRAPH RATE:

20 measurement per second (DSA-780)

OPERATING TEMPERATURE:

5°C to 40°C (41°F to 104°F) 50%RH at 40°C, MAX. 80%RH up to 31°C

STORAGE TEMPERATURE:

-20°C to 60°C (0°F to 140°F) 0-80%RH

ACCURACY:

Accuracy specifications at 23±5°C (73.4°F±9°F) less than 75%RH

TEMPERATURE COEFFICIENT:

0.1 times the applicable accuracy specification per °C from 0°C to 18°C and 28°C to 50°C (32°F to 64°F and 82°F to 122°F)

POWER:

9V transistor type battery (NEDA 1604) AWS Part #B-4

DIMENSION:

9.7" (247mm) long 3.7" (94mm) wide 1.8" (46mm) high

MAXIMUM CABLE SIZE:

ACA 1.8"Φ (46mmΦ) DCA/ACA 1.9"Φ (48mmΦ)

WEIGHT:

ACA 13.4oz (380g), DCA/ACA 15oz (430g) (For Indoor use only)

Altitude up to 2000 meters.

According to EN61010-1, EN61010-2-032. This equipment has been evaluated to INSTALLATION CATEGORY III. Pollution Degree 2.

2-1 ELECTRICAL SPECIFICATION

Accuracies are ± (reading plus number of digits). At 23±5°C < 75%RH

RESISTANCE									
MODEL	**DSA-700**	**DSA-710**	**DSA-720**	**DSA-730**	**DSA-740**	**DSA-750**	**DSA-760**	**DSA-770**	**DSA-780**
Range: 200.0Ω, 200.0KΩ, Accuracy: ±(1,2%+2)	√								
Range: 2.000KΩ, 200.0KΩ, Accuracy: ±(1,2%+1)		√	√	√	√	√			
Range: 400.0Ω, 4.000KΩ, 40.00KΩ, 400.0KΩ, 4000KΩ, 40.00MΩ Accuracy: ±(0,3%+5) at 400Ω range ±(0,3%+1) at 4KΩ - 400KΩ range ±(0,5%+1) at 4000KΩ range ±(2%+4) at 40MΩ range									AUTO
Range: 430.0Ω, 4.300KΩ, 43.00KΩ, 430.0KΩ, 4300KΩ, 43.00MΩ Accuracy: ±(0,5%+2) at 430Ω range							AUTO	AUTO	

±(0,5%+1) at 4.3KΩ - 430KΩ range ±(0,8%+1) at 4.3MΩ range ±(2%+4) at 43MΩ range									

Open Circuit voleage: <3V at Ω range, <0,5V at KΩ MΩ range. OL-Protection: 600V DC or Acrms

CAPACITANCE MEASUREMENT

MODEL	**DSA-780**
Range: 4.000nF, 40.00nF, 400.0nF, 4.000µF, 40.00µF, Accuracy: ±(3%+20), at 4.0nF range, ±(3%+4) at 40nF-20µF range. ±(6%+4) at >20µF	AUTO

OL-Protection: 600V DC or Acrms

CONTINUITY BEEPER & DIODE TEST									
MODEL	**DSA-700**	**DSA-710**	**DSA-720**	**DSA-730**	**DSA-740**	**DSA-750**	**DSA-760**	**DSA-770**	**DSA-780**
Range: → Threshold: Approx. <100Ω → Test current: 1.0mA±0.6mA Accuracy: ±(6%+3) Audible indication: <30mV	√	√	√	√	√	√			
Range: 2KW → Threshold: <30Ω		√	√	√	√	√			
Range: → Threshold: <40Ω±20Ω Range: → Test current: 1.0mA±0.6mA Accuracy: ±(3%+1)									√
Range: → Threshold: <50Ω±30Ω Range: → Test current: 1.0mA±0.6mA Accuracy: ±(10%+3)							√	√	

OL-Protection: 600V DC or Acrms

FREQUENCY MEASUREMENT									
MODEL	**DSA-700**	**DSA-710**	**DSA-720**	**DSA-730**	**DSA-740**	**DSA-750**	**DSA-760**	**DSA-770**	**DSA-780**

Range: 2.000KHz, 20.00KHz Accuracy: ±(0,1%+3) Sensitivity: 80Vrms min. (10-1999 reading)	Voltage AUTO	Voltage AUTO	Voltage AUTO	Voltage AUTO	Voltage AUTO	Voltage AUTO			
Range: 100.00Hz, 1.0000KHz, 10.000KHz, 100.00KHz, 500.0KHz Accuracy: ±(0,1%+2) Sensitivity: 2Vrms min. (100-999 reading) 5Arms min. @40-500Hz									Voltage current AUTO
Range: 430.0Hz, 4.300KHz Accuracy: ±(1,0%+3) Sensitivity: 1Vrms min. (100-4300 reading) 5Arms min. @40-500Hz							Voltage current	Voltage current	

TEMPERATURE MEASUREMENT

MODEL	DSA-730	DSA-770
Range: -4°F - 2000°F (1°F), Accuracy: ±(2%+6) at -4°F - 932°F, ±(3%+4) at 932°F - 2000°F	√	
Range: -20°C - 850°C (1°C), Accuracy: ±(0,5%+3), Range: -4°F - 1562°F (1°F) Accuracy: ±(0,5%+6)		√

OL-Protection: 600V DC or Acrms

DC VOLTAGE									
MODEL	**DSA-700**	**DSA-710**	**DSA-720**	**DSA-730**	**DSA-740**	**DSA-750**	**DSA-760**	**DSA-770**	**DSA-780**

Range: 2.000V, 200.0V, 600V Accuracy: ±(0,5%+1)	√								
Range: 600V Accuracy: ±(0,5%+1)		√	√	√	√	√			
Range: 400.0mV, 4.000V, 40.00V, 400.0V, 600V Accuracy: ±(0,25%+1)									AUTO
Range: 430.0mV(manu), 4.300V, 43.00V, 430.0V,600V Accuracy: ±(0,25%+1)							AUTO	AUTO	

Input impedance: >10MΩ, OL-Protection: 600V DC or AC ms.

AC VOLTAGE (50Hz - 500Hz)									
MODEL	**DSA-700**	**DSA-710**	**DSA-720**	**DSA-730**	**DSA-740**	**DSA-750**	**DSA-760**	**DSA-770**	**DSA-780**
Range: 200.0V, 600.0V Accuracy: ±(1,2%+4) at 50-60Hz, ±(2,0%+4) at 40-500Hz	√	√	TRMS	√	√	TRMS			
Range: 4.000V, 40.00V,400.00V,600V Accuracy: ±(0,75%+4) at 50-60Hz, ±(2,0%+4) at 40-500Hz									AUTO TRMS
Range: 4.300V, 43.00V, 430.0V, 600V Accuracy: ±(1,2%+4) on 4.3V, ±(0,75%+4) on the other ranges							AUTO	AUTO	

Input impedance: >10MΩ, OL-Protection: 600V DC or AC ms.

DC CURRENT (PUT CONDUCTOR AT THE CENTER OF THE JAWS)

MODEL	**DSA-740**	**DSA-750**	**DSA-760**	**DSA-770**	**DSA-780**
Range: 200.00A, 1200A, Accuracy: ±(1,5%+5)	√	√			
Range: 400.00A, 1200A, Accuracy: ±(1,5%+5)					√
Range: 430.00A, 1200A, Accuracy: ±(1,5%+5)			√	√	

OL-Protection: 1200A dc max. for 1 minute

AC CURRENT (PUT CONDUCTOR AT THE CENTER OF THE JAWS)

MODEL	DSA-700	DSA-710	DSA-720	DSA-730	DSA-740	DSA-750	DSA-760	DSA-770	DSA-780
Range: 20.00A, 200.0A, 1000A Accuracy: ±(1,5%%+4) at 50-60Hz, ±(3,5%+5) at 40-500Hz	√	√	TRMS	√					
Range: 400.0A, 1000A Accuracy: ±(1,75%%+4) at 50-60Hz, ±(3,5%+5) at 40-500Hz									TRMS
Range: 430.0A, 1000A Accuracy: ±(1,75%%+4) at 50-60Hz, ±(3,5%+5) at 40-500Hz							√	√	
Range: 200.0A, 1000A Accuracy: ±(1,75%%+4) at 50-60Hz, ±(3,5%+5) at 40-500Hz					√	TRMS			

OL-Protection: 1000 ac max. for 1 minute

SEC-3 FRONT PANEL CONTROLS AND INDICATORS

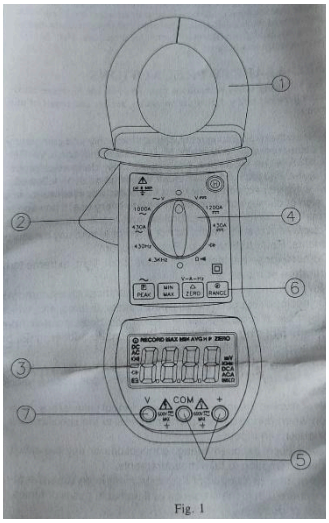

Fig. 1

1. TRANSFORMER JAWS: Pick up the AC or AC/DC current flowing through the conductor.
2. TRIGGER: Press the trigger to open the transformer jaws.
3. LCD DISPLAY: A 3-3/4 (3-1/2) display indicates measured values, and features symbols indicating function.
4. FUCTION SELECTOR.

5. INPUT JACKS (+ and COM): Test leads are inserted into these jacks for all function measurements (except voltage and current function)
6. FUNCTION KEY SELECTOR
7. VOLTAGE INPUT JACK: Only for ACV or DCV measurements.

FUNCTION KEY

H Button: (DSA-700, DSA-710, DSA-720, DSA-730, DSA-740, DSA-750)

Press "**H**" button to toggle in and out of DATA Hold mode, In the Hold mode may be exited when changing function).

H Button: (DSA-760, DSA-770)

In voltage, current, frequency and diode functions, Press "**H**" button to toggle in and out of the Auto Hold mode, the "**H**" annunciators is displayed. In Auto hold mode, the meter will capture and hold the first stable non-zero (> 100 digits) reading after a zero reading (< 100 digits). Several consecutive measurements can be held and displayed without pressing the (A-H) button. Simply by shorting the test leads together between measurements. In resistance, continuity and temperature functions, press "**H**" button to toggle in and out of the DATA Hold mode, the "**H**" annunciators is displayed.

"**H**" **Button:** (DSA-780)

Press "**H**" button to toggle in and out of the Data Hold mode, except if you are already in the MIN MAX Recording mode.

In the Data Hold mode, the "HOLD" annunciator is displayed and the last reading is held on the display, the beeper emits a tone. Pressing (MIN/MAX) button when you are in the Data Hold mode causes you to exit Data Hold and enter the MIN MAX Recording mode.

In the MIN MAX Recording mode, press (HOLD) again to resume recording.

MAX HOLD Button: (DSA-710, DSA-720, DSA-730, DSA-740, DSA-750)

Press "MAX" button to toggle in and out of MAX Hold mode (holding the highest absolute reading). In the MAX Hold mode, the **"MAX"** annunciator is displayed.

The MAX hold function is not available in the frequency count mode.

PEAK HOLD Button: (only AC current ranges 40-60Hz) (DSA-710, DSA-720, DSA-730, DSA-780)

Press "PEAK" button two times to toggle in and out of PEAK Hold mode. In the Peak Hold mode, the **"**HOLD **P"** Or **"P"** annunciator is displayed. {Accuracy: ±[10%(reading – residual offset) + 10dgts], effect reading: 80 – 2000 or 80 - 4000}

PEAK HOLD Button: (only AC functions 40-60Hz) (DSA-760, DSA-770)

Press "PEAK" button to toggle in and out of PEAK Hold mode. In the PEAK Hold mode, the **"MAX P"** annunciator is displayed. [Accuracy: ±(10%rdg + 10dgts), effect reading: 800 – 4300 (43V to 600V range)]

- **Button: (DSA-750)**

Press ;,; button, turn on the backlight.

- **Button (DSA-750)**

Press ;,; button, turn off the backlight.

DCA ZERO Button: (DSA-740, DSA-750)

In DC current function press (DCA ZERO) button to toggle in and out of the Relative mode, the "ZERO" annunciator turn on, zero the display, and store the displayed reading as a reference value.

MIN/MAX Button: (DSA-760, DSA-770)

Press (MIN/MAX) to enter the MAX MIN AVG Recording mode (manual range only). The RECORD annunciator turns on and the automatic power-off feature is disabled.

Push (MAX/MIN) to cycle through the maximum (MAX), minimum (MIN), average (AVG) and present readings. (AVG) is average last ten times reading can be displayed. Press and hold down the (MAX/MIN) for seconds to exit and erase recorded reading.

MIN/MAX Button: (DSA-780)

Press (MIN/MAX) button to enter MIN MAX Recording mode. The minimum, maximum values are reset to present input the readings are stored in memory, and the "HOLD" annunciator turns on. Push the button to cycle through the minimum (MIN), maximum (MAX), and present readings. The MIN or MAX annunciator turns on the indicate what value is being displayed.

In the MIN MAX Recording mode, press (HOLD) button to stop the recording of readings, press again to restart recording. If recording is stopped, the minimum, maximum, or present values and analog display are frozen. In the MIN MAX Recording mode, when a new minimum value is exceeding the actual minimum readings or a new minimum value is overload, the minimum or maximum value will held on the display, but the analog display continues to be active. AC current ranges without MIN/MAX function.

ΔZERO Button: (DSA-760, DSA-770)

In voltage, current, frequency and diode functions, (ΔZERO) button to toggle in and out of the Relative mode, the "ZERO" annunciator turn on, zero to display, and store the displayed reading as a reference value.

ΔZERO Button: (DSA-780)

Press (ΔZERO) button to enter the Relative mode, the "ΔZERO" annunciator turn on, zero the display and store the displayed reading as a reference value. Press and hold down the (ΔZERO) button for 2 seconds to exit the relative mode.

RANGE Button: (DSA-760, DSA-770)

Press (RANGE) button to select the Manual Range mode and turn on the "O" annunciator. (The meter selected next range it was in the manual ranging was selected).

In the Manual Range mode. Each time you press (RANGE) button, the range (and the input range annunciator) increments, and a new value is displayed. To exit the Manual Range mode and return to autoranging, press and hold down (RANGE) button for 2 seconds. The "O" annunciator will disappear.

In the Temperature function. Press (RANGE) button to select °F or °C scale.

RANGE Button: (DSA-780)

Press (RANGE) button to select the Manual Range mode and turn off the "AUTO" annunciator. (The meter remains in the range it was in when the manual ranging was selected).

In the Manual Range mode, each time you press (RANGE) button, the range (and the input range annunciator) increments, and a new value is displayed. To exit the Manual Range mode and return to autoranging, press and hold down (RANGE) button for 2 seconds. The "AUTO" annunciator turns back on.

SEC-4 SAFETY PRECAUTIONS:

The following safety precautions must be observed to insure maximum personal safety during the operation, service and repair of this meter:

1. Read these operating instructions thoroughly and completely before operating your meter. Pay particular attention to WARNINGS which will inform you of potentially dangerous procedures. The instructions in these warnings must be followed.
2. Always inspect your meter, test leads and accessories for any sign of damage or abnormality before every use. If any abnormal conditions exist (eg. Broken test leads, cracked cases, display not reading, etc) do not attempt to take any measurements. Refer to Return for Repair section.
3. Do not expose the instrument to direct sun light, extreme temperature or moisture.
4. 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.
5. To avoid electric shock use CAUTION when working with voltages above 40 Vdc or 20 Vac. Such voltages pose a shock hazard.
6. Never exceed the maximum allowable input value of any function when taking a measurement. Refer to the specifications for maximum inputs.
7. Never touch exposed wiring, connections or any live circuit when attempting to take measurements.
8. Do not attempt to operate this instrument in an explosive atmosphere (i.e. in the presence of flammable gases or fumes, vapor or dust).
9. When testing for the presence of voltage, make sure the voltage function is operating properly by reading a known voltage in that function before assuming that a zero reading indicates a no-voltage condition. Always test your meter before and after taking measurements on a known live circuit.
10. Calibration and repair of any instrument should only be performed by qualified and trained service technicians.
11. Do not attempt calibration or service unless trained and another person, capable of rendering first aid and resuscitation is present.

12. 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.
13. Remember: Think safety, Act safely.

SEC-5 OPERATION

Before making any measurements read section – Safety Precautions. Always examine the instrument and accessories to be 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 condition exists, do not attempt to take any measurements.

5-1 CURRENT MEASUREMENT

WARNING

These Snap-Arounds are designed to take current measurements on circuits with a maximum voltage difference of 500VAC between any conductor and ground potential. Using the Snap-Around for current measurements on circuits above this voltage may cause electric shock, instrument damage and/or damage to the equipment under test. Before measuring current make certain that the test are removed from the instrument.

WARNING

The Snap-Around is overload protected up to 500VAC for up to 1 min. Do not take current readings on circuits where the maximum current potential is not known. Do not exceed the maximum currents that this instrument designed to measure.

1. Set Function Switch to ACA 1000A or DCA 1200A Range. In DC current measurement use ΔZERO button or DCA ZERO button, offset the residual magnetic of the jaws.
2. Make sure that all Hold switch is not on.
3. Open transformer jaws by pressing against the trigger.
4. Enclose one conductor in transformer jaws and release trigger. Jaws should be completely closed before taking a reading.
5. The reading will be indicated on the display.
6. To hold the display press the “Hold” button.

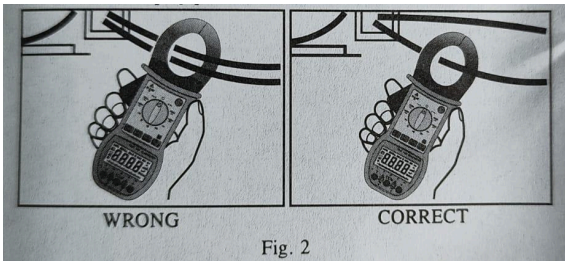

Fig. 2

5-2 VOLTAGE MEASUREMENTS

1. Connect red test lead to V input connector and black test lead to COM input connector.
2. Set Function/Range Switch to desired ACV or DCV position. If magnitude of voltage is not known, set switch to highest range and reduce until a satisfactory reading is obtained.
3. Turn off power to the service or circuit being tested and discharge all capacitors.
4. Connect the test leads to the device or circuit being measured. (Fig. 4)
5. Turn on power to the device or circuit being measured. Voltage value will appear on digital display.
6. Turn off power to the device or circuit being tested and discharge all capacitors prior to disconnecting test leads.

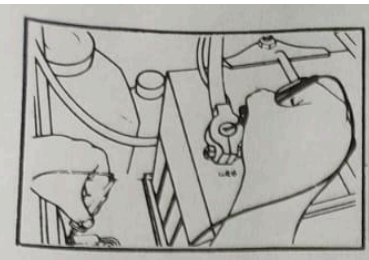

Fig. 3

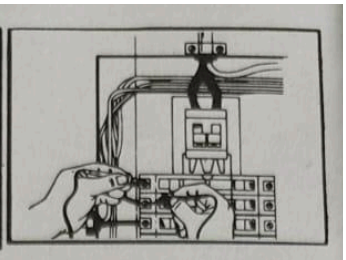

Fig. 4

5-3 RESISTANCE MEASUREMENTS

> WARNING
>
> Attempting resistance or continuity measurements on live circuits can cause electrical shock, damage to the instrument and damage to the equipment under test. Resistance measurements must be made on de-energized (DEAD) circuits only for maximum personal safety. The electronic overload protection installed in this instrument will reduce the possibility of damage to the instrument but not necessarily avoid all damage or shock hazard.

All resistance ranges on the instrument are low-power ohms except for the 200-ohm range. The low power ohm allows accurate measurements of in-circuit resistance, since the test voltage is below that necessary to turn on a diode junction.

1. Connect red test lead to + input connector and black test lead to the COM input connector.
2. Set Function/Range Switch to desired ohm position. If magnitude of resistance is not known, set switch to highest range and reduce until a satisfactory reading is obtained.
3. If the resistance being measured is connected to a circuit turn off power to the circuit being tested and discharge all capacitors.
4. Connect test leads to the circuit being measured (Fig. 5) When measuring high resistance, be sure not to contact adjacent points even if insulated, because some insulators have a relatively low insulation resistance.
5. Read resistance value on digital display if a high resistance value is shunted by a large value of capacitance, allow digital LCD to stabilize.

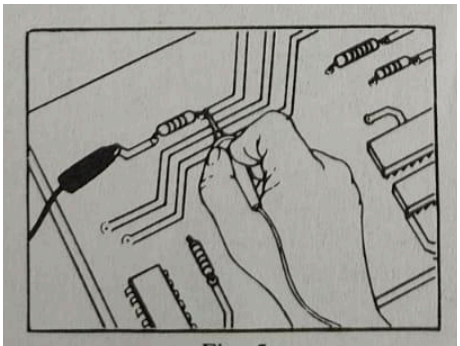

Fig. 5

5-4 DIODE TEST MEASUREMENTS

The special Diode Test Function allows relative measurements of forward voltage drops across diodes.

5-4-1 DIODE TESTS

1. Connect red test lead to the + input connector and black test lead to the COM input connector.
2. Set Function/Range Switch to the diode test position.
3. If the semiconductor junction being measured is connected to a circuit, turn off power to circuit being and discharge all capacitors.
4. Connect test leads to the device.
5. Read forward value on digital display.
6. If the digital display reads overrange OL reverse the lead connections. The placement of the test leads when the forward reading is displayed indicates the orientation of the diode. The red lead is played with both lead connections, the junction is open. If a low-reading (less than 1000) is obtained with both lead connections, the junction is shorted internally or (if junction is measured in a circuit) the junction must be disconnected from the circuit in order to verify its operation.

5-5 CONTINUITY MEASUREMENTS

1. Set the selector switch to the position.
2. Continuity between probe tips will be indicated by the audible buzzer when resistance is below 100 ohm.

5-6 FREQUENCY MEASUREMENT

1. Set the Function/Range switch to the Hz position.
2. Connect the red test lead to the + input connector and the black test lead to the COM input connector.
3. Connect the test lead to the point of measurement and read the frequency from the display.

5-7 TEMPERATURE MEASUREMENTS

WARNING

Remove test leads being measured.

1. Set the Function/Range switch to the "°F/°C" position.
2. Connect the temperature transition adaptor to the meter and make sure "+" and "-" polarity is right position.
3. Connect a type K thermocouple to the jack on the transition adaptor. Place the probe or thermocouple tip on or in the material to be measured and take the temperature reading directly from the display.

5-8 CAPACITANCE MEASUREMENTS

1. Set the Function/Range switch to the desired "→←" range.
2. Discharge capacitors before trying to measure it.
3. Connect the red lead to the + input connector and the black lead to the COM input connector.
4. Connect the test leads to the capacitor and read the capacitance directly from the display.

SEC-6 BATTERY REPLACEMENT

WARNING

TO AVOID ELECTRIC SHOCK, DISCONNECT MEASURING TERMINALS BEFORE REMOVING COVER.

1. The battery is installed inside the case.
2. Remove the screw on the back of the battery cover for battery replacement.

SEC-7 RETURN FOR REPAIR

Before returning your instrument for repair make sure the failure to operate in not caused by

1. Weak or de-energized battery
2. Broken test leads
3. Data Hold or Peak Hold is on

If all of these conditions are checked to be fine and your instrument still does not operate properly then send it back freight prepaid to:

A.W. SPERRY INSTRUMENTS, INC

245 Marcus Blvd.

Hauppauge, NY 11788-2075

Include all accessories and a note explaining what is wrong with the instrument. Should you require an estimate please indicate “ESTIMATE ONLY” on your note. Be certain to include your return address and daytime phone number should we need to contact you.