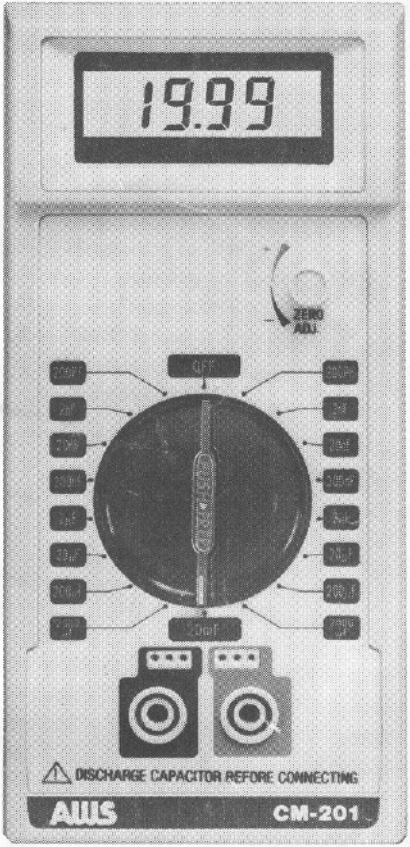
OPERATING INSTRUCTIONS



A.W. Sperry Instruments Inc.
245 MARCUS BLVD., HAUPPAUGE, N.Y. 11788

TABLE OF CONTENTS

(1)

Sec. 1

WARRANTY

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 purchaser provided the completed warranty card is returned within ten (10) days after purchase and 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 11788, postage prepaid for examination of 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.

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 OCCASIONED 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.

WARRANTY REGISTRATION

To validate warranty, please complete the warranty registration card enclosed with your instrument and return to A.W. Sperry Instruments Inc., 245 Marcus Blvd., 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 distributor, model number and date of purchase.

Sec. 2 INTRODUCTION

Congratulations on your purchase of an AWS CM-201 Digital Capacitance Meter.

The CM-201 is a meter which will allow the accurate measurement of almost any capacitor, It features 9 ranges providing a measurement capability from 0.5pf to 20mf. With a basic accuracy of 0.5% of reading this meter is a handy and useful tool for use in the laboratory, manufacturing plant or in the field.

Housed in shock resistant ABS plastic, this instrument stands up to the use and abuse of everyday service. Protection against accidental application of voltage is provided by a 0.8A, 250V fuse. Sockets and jacks are recessed to provide maximum safety.

Operation is simple. Range selection is accomplished by a single rotary switch designed for easy one hand operation. Connections can be made with clip on test leads or capacitor may be inserted into special test socket. A built in tilt stand and large 0.5" LCD numerals provide easy reading.

Sec. 3 FEATURES

- 0.5% basic accuracy.
- Wide measurement range.
- Large, easy-to-read display.
- Safety test leads.
- Test socket for plug-in components.
- Rugged construction.
- Built-in tilt stand.

Sec. 4 SPECIFICATIONS

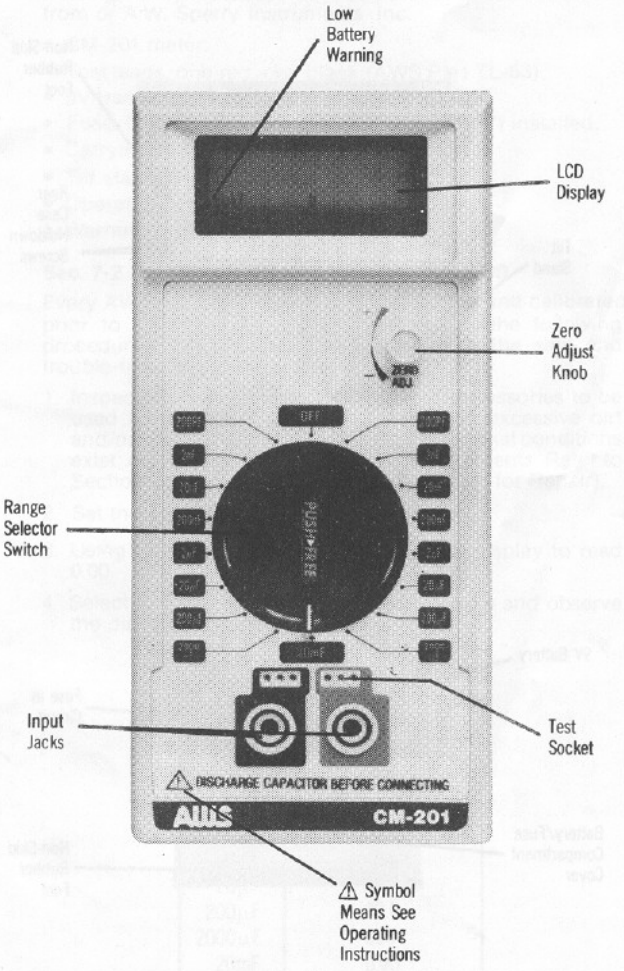
Ranges:	See below.
Display:	3 1/2 digit LCD with 0.5" high numerals, "—", "LO BATT", and decimal annunciators.
Overrange Indication:	3 least significant digits blanked.
Operating Environment:	0° to 35°C at < 80 relative humidity. 35° to 50°C at < 70 relative humidity.
Storage Environment:	-20° C to 60° C at < 80% relative humidity.
Accuracy:	Specified at 23° C ± 5° C at <75% relative humidity.
Power Source:	9V transistor type battery (NEDA 1604), AWS Part B-4.
Battery Life:	100 hrs. typical with carbon zinc cells. 200 hrs. typical with alkaline cells.
Battery Indicator:	"LO BATT" appears on display when 20% of battery life remains.
Sampling Rate:	2 times per second.
Fuse:	One fast acting high interrupting capacity 0.8A, 250V, 5 × 20mm fuse, AWS Part #F-17.
Dimensions:	7.09"L × 3.35"W × 1.50"D (180 × 85 × 38mm).
Weight:	10.6 oz. (300g).

Range	Resolution	Accuracy (23°C ±5°C)	Test Frequency
200pf	0.1pf	±(0.8%rdg+4dgt+0.5pf)	1000 Hz
2nf	1pf	±(0.5%rdg+1dgt)	"
20nf	10pf	"	"
200nf	100pf	"	"
2μf	1nf	"	"
20μf	10nf	"	100 Hz
200μf	100nf	± (1.0%rdg+dgt)	10 Hz
2000μf	1μf	± (2.0%rdg+1dgt)	"
20mf	10μf	"	"

Maximum test voltage: 3.2V.

Sec. 5

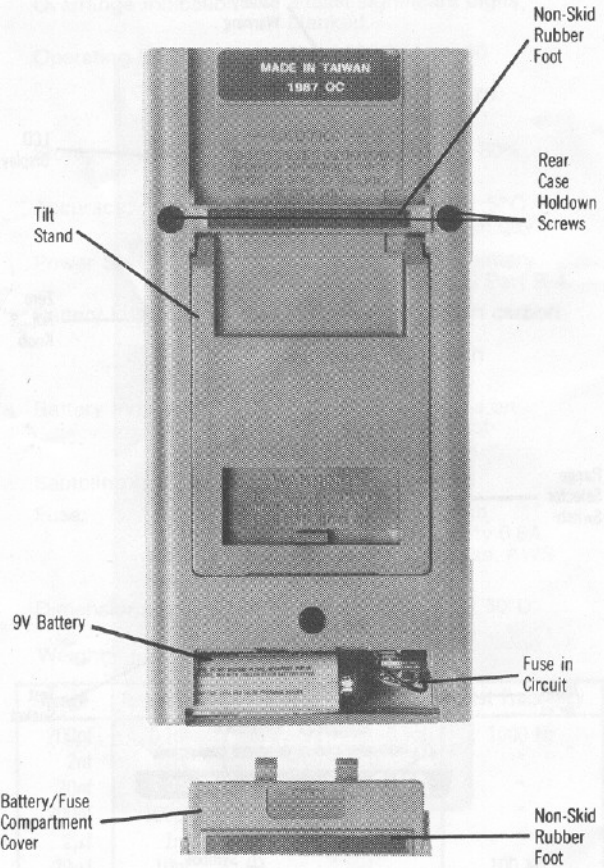
FRONT PANEL CONTROLS, INDICATORS AND CONNECTORS



Front Panel Controls, Indicators and Connectors
Sec. 5

Sec. 6

REAR PANEL PARTS IDENTIFICATION



Sec. 7 PREPARATION FOR USE

Sec. 7-1 Unpacking and Contents Check

The CM-201 comes complete and ready to use. Check the following content list when unpacking. If any pieces are missing, notify the distributor you purchased the instrument from or A.W. Sperry Instruments Inc.

- CM-201 meter.
- Test leads, one red, one black (AWS Part TL-53).
- 9V transistor type battery (AWS Part B-4).
- Fuse, 0.8A, 250V, 5 × 20mm (AWS Part F-17) installed.
- Carrying Case (AWS Part C-33).
- Tilt stand attached to back of instrument.
- Operating instructions, Form #181.
- Warranty card.

Sec. 7-2 Pre-Operation Procedures

Every AWS CM-201 is fully inspected, tested and calibrated prior to shipment. Before each operation, the following procedure should be performed to insure the safe and trouble-free operation of this instrument.

1. Inspect the instrument, test leads and accessories to be used for any sign of damage, including excessive dirt and/or grease contamination. If any abnormal conditions exist, do not attempt to take any measurements. Refer to Sections 10 (Maintenance) and 11 (Return for Repair).
2. Set the Range Selector Switch to 200pF.
3. Using the Zero Adjust Knob, adjust the display to read 0.00.
4. Select each range listed in the table below and observe the display reading indicated:

Range	Display Reading
200pF	00.0
2nF	.000
20nF	0.00
200nF	00.0
2μF	.000
20μF	0.00
200μF	00.0
2000μF	000
20mF	0.00

5. Insert the red and black test leads into the respective + and - Input Jacks. Short the test leads together for a few seconds. The display should read 1 with all other digits blanked.

Sec. 8 SAFETY PRECAUTIONS

1. Read these operating instructions thoroughly and completely before operating the CM-201. 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 CM-201 meter, test leads and accessories for any signs of damage or abnormalities before every use. If any abnormal conditions exist, do not attempt to take any measurements. Refer to Sec. 11, Return for Repairs.
3. Never apply voltage to the Input Jacks or Test Jacks. All capacitance tests should be made on de-energized circuits only.
4. Make sure that any capacitor being checked is fully discharged.
5. Do not operate this instrument in an explosive atmosphere (i.e., in the presence of flammable gases or fumes, vapor or dust).
6. Calibration and repair should be performed by qualified maintenance personnel.
7. Do not install substitute parts or perform any unauthorized modification of the instrument. Return the instrument to A.W. Sperry Instruments Inc. for service and repair to insure that safety features are maintained.

Sec. 9 OPERATION

Before taking any measurements, read Section 8, Safety Precautions. Always examine 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.

WARNING

All capacitance measurements should be made on de-energized circuits only. Never apply voltage to the input jacks or test sockets. Discharge capacitor before taking measurement.

1. Change the Range Switch for the range for the maximum expected capacitance.

2. Insert the black and red test leads into the − and + Input Jacks respectively.

3. When using the 200pF, 2nF or 20nF range, zero adjust as follows: Rotate Zero Adjust Knob until the display indicates zeros in every digit. For a more precise zero adjustment, make the zero adjustment on the 200pF range then switch back to the desired range.

4. Connect the alligator clips to the capacitor leads. The reading will appear. If the overrange indication appears, change the Range Switch of the next highest range until a reading appears.

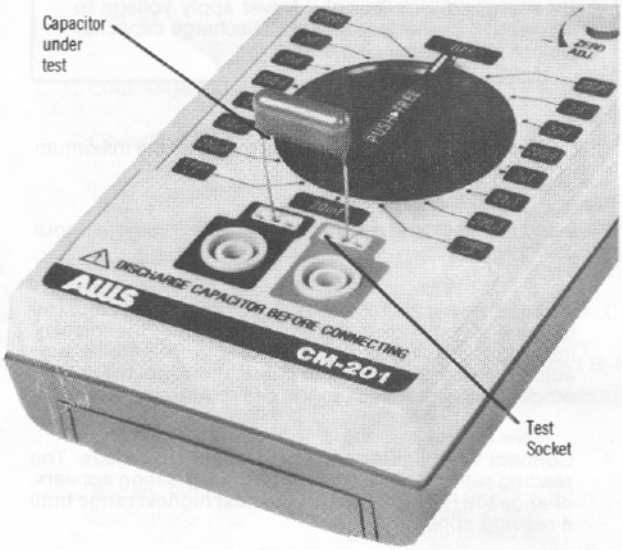
CAUTION

Always observe polarity markings when measuring polarized capacitors.

5. If the capacitor being measured is not in-circuit and has bare wire leads, the leads may be inserted into the Test Socket. Be sure to remove the test leads and make zero adjustment before inserting capacitor into socket (see Fig. 1).

CAUTION

Avoid shorting the test leads together. Shorting the test leads causes excessive battery drainage and will shorten battery life.



Using the Test Socket
Fig. 1

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. Never use liquid solvents or detergents. If the instrument gets wet for any reason, dry the instrument using low pressure air less than 25 PSI. Use care and caution around LCD display protector and areas where water or air could enter the interior of the instrument while drying.

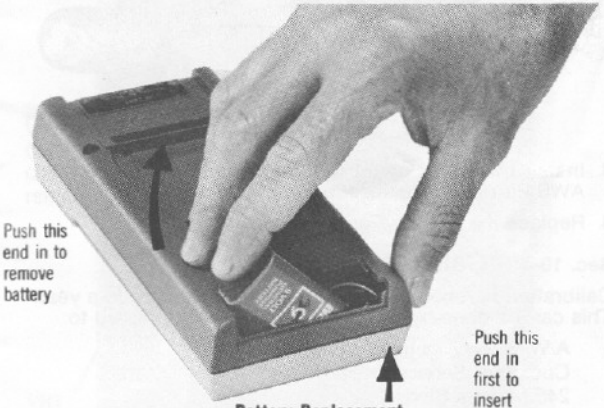
Sec. 10-2 Battery Replacement

The CM-201 has a self-contained power supply consisting of one popular transistor-type battery (NEDA 1604, AWS Part #B-4). When less than 20% of the battery life remains, "LO BATT" appears on the LCD display.

WARNING

Before attempting to replace the battery, disconnect the test leads from any capacitor or circuit and remove any capacitor from the test socket.

1. Disconnect the test leads from capacitor or circuit and remove any capacitor from the test socket.
2. Turn the Rotary Switch to the OFF position.
3. Remove the battery compartment cover by grasping the instrument with two hands and both thumbs on the compartment cover. Using both thumbs, slide the compartment cover towards the bottom of the instrument.
4. Remove the battery from the compartment and unsnap the battery connector (See Fig. 2).



Battery Replacement
Fig. 2

5. Replace the battery with a 9V transistor-type battery (NEDA 1604), AWS Part #B-4. For maximum battery life, alkaline cells are recommended.
6. Reverse the above procedure to complete battery replacement.

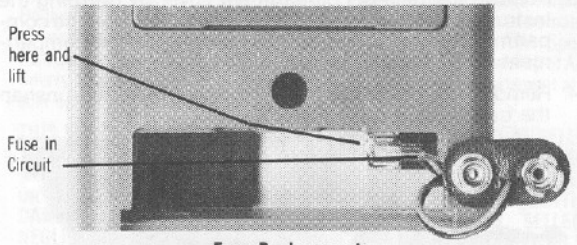
Sec. 10-3 Fuse Replacement

A 0.8A, 250V, 5 × 20mm fuse, AWS Part #F-17 is installed in the instrument to protect the instrument from voltage application.

WARNING

Before attempting to replace the fuse, disconnect the test leads from any capacitor or circuit and remove any capacitor from the test socket. Replace the fuse with AWS Part F-17 or approved equal.

1. Perform steps 1 through 3 of Battery Replacement.
2. Remove the fuse from the metal fuse clips by pressing against end of fuse with a pointed tool and lifting fuse out (see Fig. 3).



Fuse Replacement
Fig. 3

3. Install the replacement fuse being certain it meets the AWS Part F-17 specifications.
4. Replace the Battery/Fuse compartment cover.

Sec. 10-4 Calibration

Calibration is recommended to be performed once a year. This can be done by sending the instrument prepaid to:

A.W. Sperry Instruments Inc.
Customer Service Department
245 Marcus Blvd.
Hauppauge, N.Y. 11788

Specify in writing that calibration is necessary. The instrument will be returned to you, normally within one week.

CAUTION

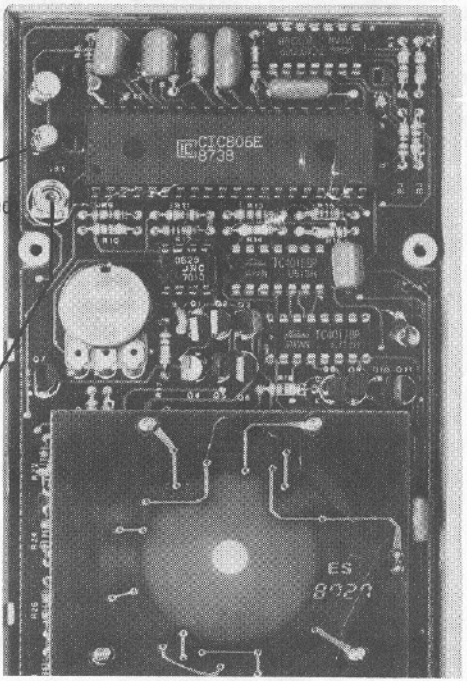
The following procedure should only be performed by persons trained and qualified in electronics and electronic equipment service. Do not attempt this procedure if not qualified.

NOTE: This procedure should be performed at an ambient temperature of 23° ±2°C and a relative humidity of less than 80%. Allow the instrument to stabilize at this temperature for a minimum of 30 minutes.

1. Remove the three back case screws and then lift off back case.
2. Select the 200pF range and set the display for a 00.0 reading using the Zero Adjust Knob.

NOTE: If the test leads are to be used during calibration, insert them into the Input Jacks before making the zero adjustment.

3. Select the 20μF range and connect a capacitance standard (19μF ± 0.1%) to the CM-201. Adjust VR1 until 19.00μF is displayed on the CM-201. (See Fig. 4)



CM-201 Calibration
Fig. 4

Sec. 11 RETURN FOR REPAIRS

Before returning your CM-201 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 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
245 Marcus Blvd.
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 copy or original 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 2 for full warranty disclosure. Repair estimates will be furnished if requested for out of warranty instruments. Be sure to include all accessories which may be related to the problem.