

# Owner's Manual & Safety Instructions

**Save This Manual** Keep this manual for the safety warnings and precautions, assembly, operating, inspection, maintenance and cleaning procedures. Write the product's serial number in the back of the manual near the assembly diagram (or month and year of purchase if product has no number). Keep this manual and the receipt in a safe and dry place for future reference.

171

# AMES

INSTRUMENTS™

64017

## 1000A AC/DC TRMS DIGITAL CLAMP METER



Visit our website at: <http://www.harborfreight.com>  
Email our technical support at: [productsupport@harborfreight.com](mailto:productsupport@harborfreight.com)

When unpacking, make sure that the product is intact and undamaged. If any parts are missing or broken, please call 1-888-866-5797 as soon as possible.

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### **⚠WARNING**


**Read this material before using this product.  
Failure to do so can result in serious injury.  
SAVE THIS MANUAL.**

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### WARNING SYMBOLS AND DEFINITIONS

	This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.
<b>⚠ DANGER</b>	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
<b>⚠ WARNING</b>	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
<b>⚠ CAUTION</b>	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
<b>NOTICE</b> <b>CAUTION</b>	Addresses practices not related to personal injury.

# IMPORTANT SAFETY INFORMATION

## Safety Warnings and Precautions

### **⚠ WARNING**

**Read all safety warnings and all instructions.**

*Failure to follow the warnings and instructions may result in electric shock, fire and/or serious injury.*

**Save all warnings and instructions for future reference.**

1. Electrical shock can cause death or injury! NEVER TOUCH exposed conductors of electricity.
2. **Test cable voltages with care.** One use one hand when securing the clamp around cable.
3. Inspect the Meter before use. In addition to a general inspection, look specifically for:
  - a. Pay special attention to the insulation protecting the connectors.
  - b. Check the leads for exposed metal, damaged insulation, and continuity.
  - c. Replace damaged test lead immediately, before use.
4. Do not use the Meter if:
  - a. Either of the test leads are damaged in any way.
  - b. Test leads are dirty or have residue on them.
  - c. The battery is low.
  - d. Near any explosive gasses or fumes.
  - e. Any abnormal operation is detected.  
(If in doubt about the condition of the Meter, have it serviced before use.)
  - f. The battery cover is open.
5. Power this Meter using only the battery(ies) referenced in the Specifications Chart.
6. Use caution when working near voltages above 30 VAC rms, 42 VAC peak, or 60 VDC. Voltages this high present a risk of electric shock.
7. Disconnect the circuit's power before connecting the Meter in series, when measuring current.
8. Connect the common (COM) test lead first and disconnect it last.
9. Hold the probes with fingers behind guards.
10. Avoid electrical shock. Use extreme caution when working near uninsulated conductors or bus bars. Prevent body contact with grounded surfaces such as pipes, radiators, ranges, and cabinet enclosures when testing voltages.
11. Observe work area conditions. Do not test voltages in damp or wet locations. Don't expose to rain. Keep work area clean and well lit.
12. Keep children away. Children must never be allowed in the work area.
13. Stay alert. Watch what you are doing, use common sense. Do not operate any Meter when you are tired.

14. Do not operate Meter if under the influence of alcohol or drugs. Read warning labels on prescriptions to determine if your judgment or reflexes are impaired while taking drugs. If there is any doubt, do not operate the Meter.
15. People with pacemakers should consult their physician(s) before use. Electromagnetic fields in close proximity to heart pacemaker could cause pacemaker interference or pacemaker failure.
16. Do not test voltage on circuits higher than 1000 VDC or 750 VAC.
17. Do not test current on circuits higher than 1000A.
18. Dress properly. Protective, electrically nonconductive clothes and nonskid footwear are recommended when working.
19. Wear ANSI-approved safety goggles during use.
20. Only use accessories intended for use with this Meter.
21. Avoid damaging Meter. Use only as specified in this manual.
22. Prior to testing resistance, diodes, or continuity; disconnect all power to the circuit and discharge all high-voltage capacitors.
23. Performance of this Meter may vary depending on battery condition.
24. Use the proper settings, terminals, techniques, and range for the tests performed. Start with the range stated in the instructions.
25. Do not apply voltage to the Test Leads when the Meter is in the Ohms testing setting. Damage can occur to the Meter.
26. Do not switch between testing modes with the Meter connected to a circuit.
27. Do not use the Meter at a setting marked as blank on the scale.
28. Have Meter calibrated by a qualified technician every year to maintain accurate results.
29. Do not disassemble charger; take it to a qualified technician when service or repair is required. Incorrect reassembly may result in a risk of electric shock or fire.
30. The warnings, cautions, and instructions discussed in this instruction manual cannot cover all possible conditions and situations that may occur. It must be understood by the operator that common sense and caution are factors which cannot be built into this product, but must be supplied by the operator.



**SAVE THESE INSTRUCTIONS.**

# Specifications

DC Voltage	Ranges: 60mV / 600mV / 6V / 60V / 600V / 1000V
DC Voltage Accuracy	(@60mV-600V) $\pm 0.5\%$ of rdg + 5D (@1000V) $\pm 0.8\%$ of rdg + 4D
DC Current	Ranges: 60A / 600A / 1000A
DC Current Accuracy	$\pm 2.0\%$ of rdg + 8D
AC Voltage	Ranges: 60mV / 600mV / 6V / 60V / 600V / 750V Frequency Range: 40-400Hz
AC Voltage Accuracy	(@60mV-600V) $\pm 0.6\%$ of rdg + 5D; (@750V) $\pm 0.8\%$ of rdg + 4D
AC Current	Ranges: 60A / 600A / 1000A Frequency Range: (@0A - 600A) 40-400Hz (@600A-1000A) 40-60Hz
AC Current Accuracy	$\pm 2.0\%$ of rdg + 8D
Inrush Current	Ranges: 60A / 600A / 1000A Frequency Range: 40-400Hz
Inrush Current Accuracy	(@0A-60A) Reference only; (@600A-1000A) $\pm 5.0\%$ of rdg + 60D
Resistance	Ranges: 600 $\Omega$ / 6k $\Omega$ / 60k $\Omega$ / 600k $\Omega$ / 6M $\Omega$ / 60M $\Omega$
Resistance Accuracy	(@600 $\Omega$ -600k $\Omega$ ) $\pm 0.8\%$ of rdg + 3D (@6M $\Omega$ -60M $\Omega$ ) $\pm 2.0\%$ of rdg + 5D
Continuity	Meter beeps at $< 50\Omega$
Diode	Forward DC Current: $\sim 1\text{mA}$ Reverse DC Voltage: $\sim 3.2\text{V}$
Capacitance	Ranges: 9.999nF / 99.99nF / 999.9nF / 9.999 $\mu\text{F}$ / 99.99 $\mu\text{F}$ / 999.9 $\mu\text{F}$ / 9.999mF / 99.99mF
Capacitance Accuracy	$\pm 3.0\%$ of rdg + 5D
Frequency	Current Mode Range: 100Hz / 1000Hz Voltage Mode Range: 100Hz / 1000Hz / 10kHz Hz/Duty Mode Range: 10Hz / 100Hz / 1000Hz / 10kHz / 100kHz / 1000kHz / 10MHz
Frequency Accuracy	Current Mode: $\pm 1.5\%$ of rdg + 5D Voltage Mode: $\pm 1.5\%$ of rdg + 5D Hz/Duty Mode: $\pm 0.3\%$ of rdg + 5D
Duty Cycle	0.1%-99.9%
Duty Cycle Accuracy	$\pm 3.0\%$
Sampling Rate	$\sim 3$ samples per second
Operating Temperature	Range: 64.4°F - 82.4°F (18°C - 28°C)
Display	Liquid Crystal Display (LCD)
Battery	9V (Included)

SAFETY

SETUP

OPERATION

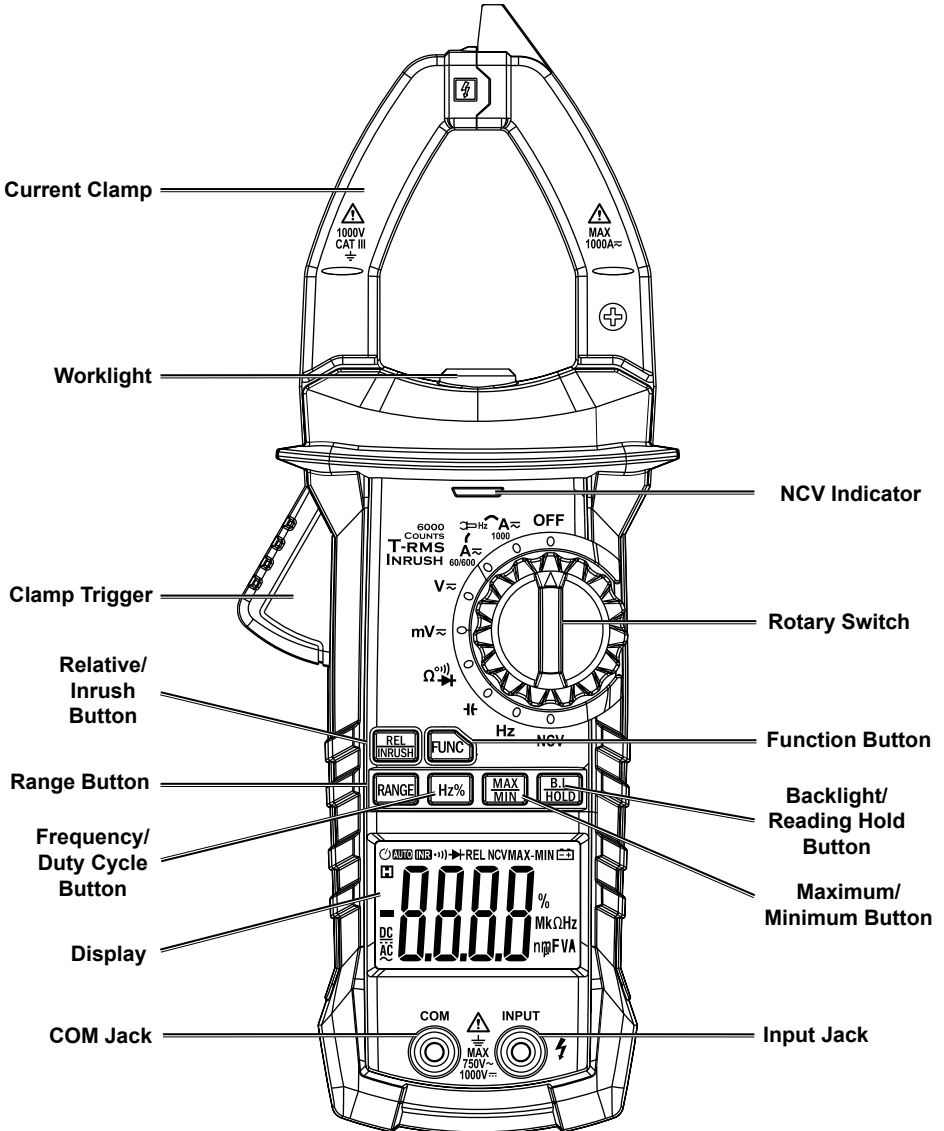
MAINTENANCE

# Setup - Before Use:



Read the **ENTIRE IMPORTANT SAFETY INFORMATION** section at the beginning of this manual including all text under subheadings therein before set up or use of this product.

## Functions



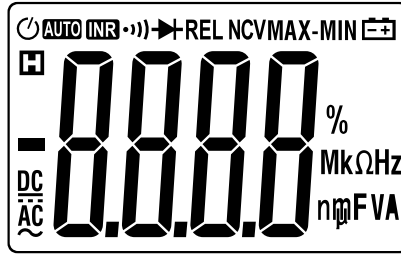
SAFETY

SETUP

OPERATION

MAINTENANCE

# Display



Symbol	Description
<u>AC</u>	Alternating current
<u>DC</u>	Direct current
□+	Indicates that display data is being held
⏻	Auto Power-Off
<b>AUTO</b>	Auto range mode
<b>INR</b>	Inrush mode
••)	Continuity
→	Diode test
<b>REL</b>	Relative measurement mode
<b>NCV</b>	Non-contact voltage detection
<b>MAX</b>	The maximum value is being measured
<b>MIN</b>	The minimum value is being measured
□+	Battery low
%	Percent (Duty cycle)
<b>Ω, kΩ, MΩ</b>	Ohms, Kilohms, Megaohms (Resistance)
<b>nF, μF, mF</b>	Nanofarads, Microfarads, Millifarads (Capacitance)
<b>mV, V</b>	Millivolts, Volts (Voltage)
<b>A</b>	Amperes (Current)
<b>Hz, kHz</b>	Hertz, Kilohertz (Frequency)

# Operating Instructions



Read the **ENTIRE IMPORTANT SAFETY INFORMATION** section at the beginning of this manual including all text under subheadings therein before set up or use of this product.

Electrical shock can cause death or injury! NEVER TOUCH exposed conductors of electricity.

## General Operating Instructions

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### REL/INRUSH

---

1. Press the **REL/INRUSH** button once to enter relative measurement mode and store a reference value.
  2. Take additional measurements to display difference between measured value and reference value.
  3. Hold **REL/INRUSH** button for two or more seconds to enter inrush mode.
- Note:** Relative measurement mode can only be used in manual range mode.

### Manual Range

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The Meter's default range is **AUTO**. To select manual range, press **RAN**. Each press of the button increases the range. Hold the **RAN** button to return to auto-range.

**Note:** Manual range cannot be used while measuring frequency.

### Frequency and Duty Cycle Measurements

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1. While working with voltage or current ranges, press the **H<sub>z</sub>%** button one time to measure the frequency of the voltage or current.
  2. Press the **H<sub>z</sub>%** button twice to measure the duty cycle of the voltage or current. The range is set to manual.
  3. Press the **H<sub>z</sub>%** button a third time to return to normal voltage or current measurement.
- Note:** Frequency and duty cycle modes cannot be used while in minimum or maximum value mode.

### Minimum and Maximum Value Measurements

---

1. Press the **MIN/MAX** button one time to measure the maximum value at any range.
  2. Press the **MIN/MAX** button two times to measure the minimum value at any range.
  3. Press the **MIN/MAX** button three times to display difference between maximum and minimum measurements.
  4. Hold the **MIN/MAX** button for one or more seconds to return to normal mode.
- Note:** The Meter is automatically set to manual range mode when measuring minimum or maximum value.
- Note:** Frequency and duty cycle modes cannot be used while in minimum and maximum value mode.



## Backlight and Worklight

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1. Press the **B.L HOLD** button for two or more seconds to turn on the LCD backlight for 30 seconds.
  2. Press the **B.L HOLD** button for two or more seconds again to turn the LCD backlight off.
  3. While in current range modes, turning the backlight on also turns the clamp Worklight on.
- Note:** Frequent use of the backlight will shorten the life of the batteries. Only use the backlight when necessary.

## Data Hold

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The data hold function keeps the current reading on the Display. To activate data hold:

1. Press the **B.L HOLD** button and the reading will be held on the Display. The **□** symbol appears.
2. Press **B.L HOLD** again to release the hold.

## NCV (Non-Contact Voltage)

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1. Turn Rotary Switch to the **NCV** position.
  2. Move the tip of the clamp close to the unshielded conductor. If detected voltage is >110V AC, Meter will beep and the NCV Indicator will flash.
- WARNING! Even if no indication is given, voltage may still be present.** Do not rely solely on NCV detection to determine the presence of voltage.

## Auto Power-Off

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If the Meter is not used for approximately 15 minutes, it will automatically turn itself off to conserve battery power. To turn the Meter back on after auto-off, press the **FUNC** button. To disable Auto Power-Off, hold the **FUNC** button while powering the Meter on.

## Measurement Operation

**Note:** Remove plugs from ends of Test Leads (included) before connecting to Meter.

**Note:** Test Lead probes have removable covers for overvoltage protection. With covers in place, Test Leads are rated for use with CAT IV circuits. Exposed probes are rated for use with CAT II circuits.

## Current Measurement

**WARNING!** To avoid electric shock, use only one hand to hold Meter when measuring current.

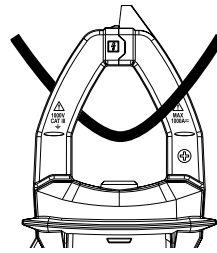
**WARNING!** Remove test leads before taking measurements with the Current Clamp.

**Note:** Amperage is always tested in series with circuit under test.

**Note:** To measure 2- and 3-wire power cords, use an AC Line Splitter (not included) and follow its instructions.

**Note:** When using manual range mode, always start with the highest range if the amperage is unknown.

**Note:** Center conductor between guides in Clamp jaws, as shown.



## AC/DC Current

Measure AC and DC conductors carrying up to 1000 amperes.

1. Turn the Rotary Switch to the **A $\approx$  60/600** or **A $\approx$  1000** position, depending on the amperage of the conductor under test.
2. Always start with the highest range if the amperage is unknown.
3. Using one hand, press Trigger to open Current Clamp. Position Clamp jaws around conductor to be tested.

**Note:** When measuring DC current, ensure that current flows in the direction indicated by the Positive (+) and Negative (-) Symbols on the Current Clamp.

4. Read measurement. Switch to lower ranges, as necessary, to get the most accurate reading.
5. When testing is complete, turn Rotary Switch to **OFF**, and store Meter.

**Note:** If the Display shows **OL** while in manual range mode, the measurement has exceeded the selected range. A higher range should be selected.

## Inrush Current

---

Measure inrush current of AC conductors carrying up to 1000 amperes.

1. Turn the Rotary Switch to the **A $\approx$  60/600** or **A $\approx$  1000** position, depending on the amperage of the conductor under test.
2. Press **REL/INRUSH** for two or more seconds to switch to **INRUSH** current mode. ---- displays while the inrush current is being detected.
3. Using one hand, press Trigger to open Current Clamp and insert conductor inside the jaws.

4. Read measured inrush current on the Display. The current is only measured once and the reading is held on the Display.
5. When testing is complete, turn Rotary Switch to **OFF**, and store Meter.

**Note:** If the Display shows **OL** while in manual range mode, the measurement has exceeded the selected range. A higher range should be selected.

## AC/DC Voltage Measurement

---

Measure AC conductors carrying up to 750 VAC, 40-400 Hz.

Measure DC conductors carrying up to 1000 VDC.

**WARNING!** Use caution when working near voltages above 30 VAC rms, 42 VAC peak, or 60 VDC. Voltages this high present a risk of electric shock.

1. Plug black test lead into **COM** Jack. Plug red test lead into **INPUT** Jack.
2. Turn Rotary Switch to the **V $\approx$**  or **mV $\approx$**  position, depending on the voltage of the conductor under test.

3. Press **FUNC** button to choose between AC and DC voltage.
4. Carefully touch exposed conductors with tips of probes.
5. Read measured voltage on the Display.
6. When testing is complete, turn Rotary Switch to **OFF**, remove Test Leads and store with Meter.

**Note:** If voltage is too high, Meter will beep.

## Frequency/Duty Cycle Measurement

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Measure frequency up to 10MHz.

**Note:** Frequency and duty cycle modes cannot be used while in minimum and maximum value mode.

### In Current Mode

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**WARNING!** Remove test leads before taking measurements with the Current Clamp.

1. Turn the Rotary Switch to the **A $\approx$  60/600** or **A $\approx$  1000** position, depending on the amperage of the conductor under test.
2. Press the Trigger to open the Current Clamp and insert conductor inside the jaws.

3. Press **Hz%** to choose between frequency and duty cycle modes.
4. Read measured frequency or duty cycle on the Display.
5. When testing is complete, turn Rotary Switch to **OFF**, and store Meter.

**Note:** Current test range is 10Hz ~ 1kHz

### In Voltage/Frequency Mode

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1. Plug black test lead into **COM** Jack. Plug red test lead into **INPUT** Jack.
2. Turn the Rotary Switch to the **V $\approx$** , **mV $\approx$** , or **Hz** position.
3. In voltage position, press **FUNC** to select **AC** mode.
4. Connect the Test Leads across the circuit to be measured.
5. Press **Hz%** to choose between frequency and duty cycle modes.
6. Read measured frequency or duty cycle on the Display.

7. When testing is complete, turn Rotary Switch to **OFF**, remove Test Leads and store with Meter.

**Note:** Frequency test range is 10Hz-10kHz. If the frequency is lower than 10.0Hz, **00.0** is shown on the Display.

**Note:** If the duty cycle is less than 10%, **UL** is displayed. If the duty cycle is greater than 94.9%, **OL** is displayed.

**Note:** Input signal test range is 10Hz-1kHz.

## Resistance Measurement

---

Measure circuit resistance up to 60M Ohms.

**WARNING!** To prevent electric shock, turn off all power and fully discharge capacitors on the circuit under test before measuring.

**Note:** When measuring Ohms, start with the lowest range if the resistance is unknown.

1. Plug black test lead into **COM** Jack. Plug red test lead into **INPUT** Jack.
2. Turn the Rotary Switch to the  $\Omega \bullet \rightarrow$  position.
3. Carefully touch exposed conductors with tips of probes.

4. Read measured resistance on the Display.
5. When testing is complete, turn Rotary Switch to **OFF**, remove Test Leads and store with Meter.

**Note:** Sometimes the resistor value and measured resistance differ. This is due to the Meter's output test current going through all possible paths between leads.

**Note:** For resistance measurements above 1M $\Omega$ , allow a few seconds to get a steady reading.

**Note:** When leads are disconnected or measurement is out of range, **OL** is displayed.

## Continuity Measurement

---

Test continuity between two points of a circuit.

**WARNING!** To prevent electric shock, turn off all power and fully discharge capacitors on the circuit under test before measuring.

1. Plug black test lead into **COM** Jack. Plug red test lead into **INPUT** Jack.
2. Turn the Rotary Switch to the  $\Omega \bullet \rightarrow$  position.
3. Press **FUNC** until  $\bullet \rightarrow$  is displayed.

4. Connect the test leads across the circuit to be measured.
5. Read measured resistance on the Display. If the measured resistance is less than 50 $\Omega$ , Meter will beep.
6. When testing is complete, turn Rotary Switch to **OFF**, remove Test Leads and store with Meter.

**Note:** If Test Leads are open or the resistance of the circuit is over 600 $\Omega$ , **OL** is displayed.

## Diode Measurement

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Test voltage drop in diodes.

**WARNING!** To prevent electric shock, turn off all power and fully discharge capacitors on the circuit under test before measuring.

1. Plug black test lead into **COM** Jack. Plug red test lead into **INPUT** Jack.
2. Turn the Rotary Switch to the  $\Omega$   $\cdot$   $\mu$   $\rightarrow$  position.
3. Press **FUNC** until  $\rightarrow$  is displayed.

4. Connect red probe to diode's anode and black probe to its cathode.
5. Read measured forward-biased voltage drop on the Display.

**Note:** If the test leads are reversed or open, **OL** is displayed.

6. When testing is complete, turn Rotary Switch to **OFF**, remove Test Leads and store with Meter.

## Capacitance Measurements

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Measure capacitance up to 99.99mF.

**WARNING!** Turn off all power and fully discharge capacitors on the circuit under test before measuring.

1. Plug black test lead into **COM** Jack. Plug red test lead into **INPUT** Jack.
2. Turn the Rotary Switch to the  $\text{f}$  position.

3. Carefully touch capacitor leads with tips of probes.
4. Read measured capacitance on the Display.
5. When testing is complete, turn Rotary Switch to **OFF**, remove and store capacitor and Meter.

# Maintenance and Servicing



Procedures not specifically explained in this manual must be performed only by a qualified technician.


## Cleaning, Maintenance, and Lubrication

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1. Wipe unit with a dry, lint-free cloth. Do not use solvents or abrasives.
2. Remove batteries if not in use for long periods.
3. Store unit in a dry location.
4. Other than the batteries, there are no replaceable parts on this unit. **Repairs should be done by a qualified technician.**

## Battery Replacement

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If the  sign appears on the Display, the battery should be replaced.

1. Remove Test Leads from the Meter.
  2. Turn the unit over.
  3. Remove screw on battery cover.
  4. Remove battery cover carefully.
  5. Pull batteries out of unit and replace with the same.
  6. Replace cover and retighten screw.
- Note:** Do not reverse the polarity of the batteries.

## Calibration

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1. Have the Meter calibrated by a qualified technician every year. A Meter that is not calibrated yearly may not yield accurate results.

## Limited 90 Day Warranty

Harbor Freight Tools Co. makes every effort to assure that its products meet high quality and durability standards, and warrants to the original purchaser that this product is free from defects in materials and workmanship for the period of 90 days from the date of purchase. This warranty does not apply to damage due directly or indirectly, to misuse, abuse, negligence or accidents, repairs or alterations outside our facilities, criminal activity, improper installation, normal wear and tear, or to lack of maintenance. We shall in no event be liable for death, injuries to persons or property, or for incidental, contingent, special or consequential damages arising from the use of our product. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation of exclusion may not apply to you. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

To take advantage of this warranty, the product or part must be returned to us with transportation charges prepaid. Proof of purchase date and an explanation of the complaint must accompany the merchandise. If our inspection verifies the defect, we will either repair or replace the product at our election or we may elect to refund the purchase price if we cannot readily and quickly provide you with a replacement. We will return repaired products at our expense, but if we determine there is no defect, or that the defect resulted from causes not within the scope of our warranty, then you must bear the cost of returning the product.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

### Record Serial Number Here:

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**Note:** If product has no serial number, record month and year of purchase instead.

