

# 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.

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# AMES<sup>TM</sup>

I N S T R U M E N T S

64014

## COMPACT DIGITAL MULTIMETER



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.**

## Table of Contents

Safety .....	2	Operation .....	8
Specifications .....	5	Maintenance .....	14
Setup .....	6	Warranty .....	16

### WARNING SYMBOLS AND DEFINITIONS

	<p>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.</p>
	<p>Indicates a hazardous situation which, if not avoided, will result in death or serious injury.</p>
	<p>Indicates a hazardous situation which, if not avoided, could result in death or serious injury.</p>
	<p>Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.</p>
	<p>Addresses practices not related to personal injury.</p>

# 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.**
3. Inspect the Multimeter 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 Multimeter 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 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 600 volts.

17. Do not test current on circuits higher than 10 amps.

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 Multimeter is in the Ohms testing setting. Damage can occur to the Meter.

26. Do not switch between testing modes with the multimeter connected to a circuit.

27. Do not use the meter at a setting marked as blank on the scale.

28. Have the multimeter calibrated by a qualified technician every year to maintain accurate results.

29. Do not disassemble multimeter; 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

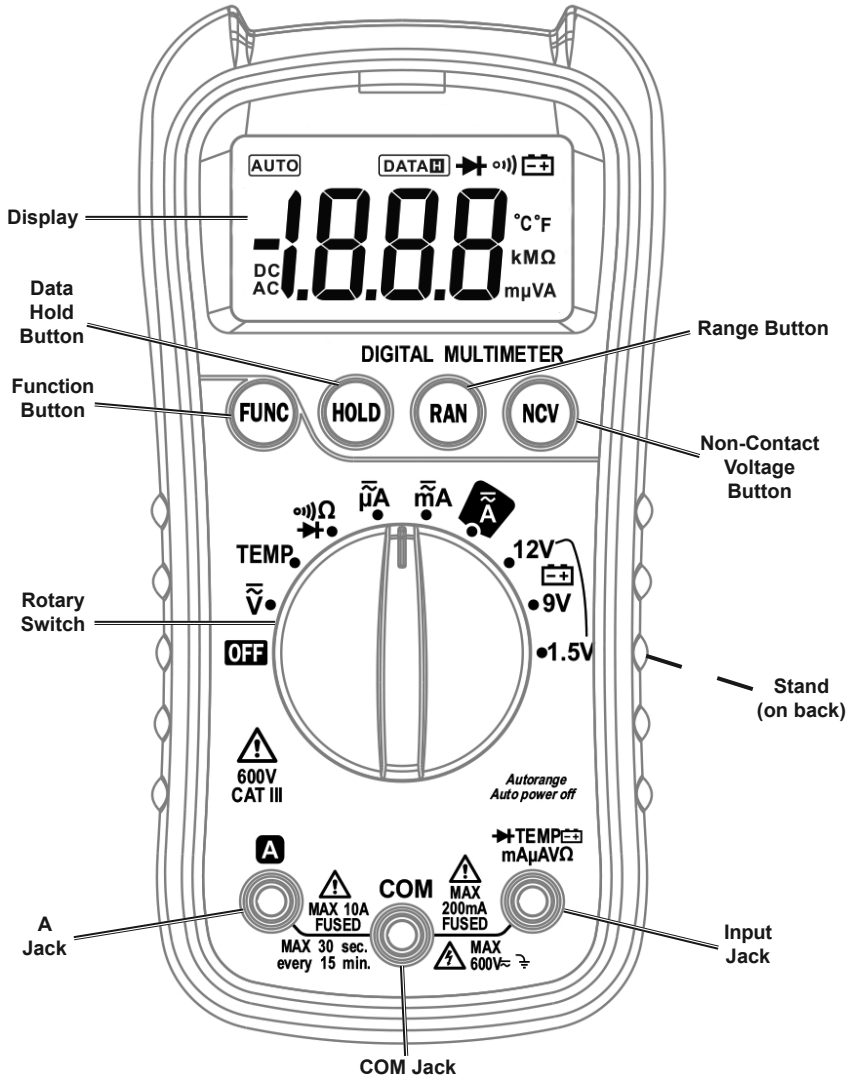
DC Voltage	Ranges: 200mV / 2V / 20V / 200V / 600V DC (max) Input Impedance: 10M $\Omega$
DC Voltage Accuracy	(@200mV - 200V) $\pm$ 0.5% of rdg + 3D (@600V) $\pm$ 0.8% of rdg + 3D
DC Current	Ranges: 200 $\mu$ A / 2000 $\mu$ A / 20mA / 200mA / 10A
DC Current Accuracy	(@ 200 $\mu$ A - 200mA) $\pm$ 0.8% of rdg +3D (@10A) $\pm$ 1.0% of rdg + 10D
AC Voltage	Ranges: 2V / 20V / 200V / 600V AC rms (max) Frequency Response: 40Hz - 400Hz
AC Voltage Accuracy	(@2V - 200V) $\pm$ 0.5% of rdg + 5D (@600V) $\pm$ 1.0% of rdg + 5D
AC Current	Ranges: 200 $\mu$ A / 2000 $\mu$ A / 20mA / 200mA / 10A
AC Current Accuracy	(@200 $\mu$ A - 20mA) $\pm$ 1.0% of rdg + 3D (@200mA) $\pm$ 1.2% of rdg +3D (@10A) $\pm$ 1.5% of rdg + 10D
Resistance	Ranges: 200 $\Omega$ / 2k $\Omega$ / 20k $\Omega$ / 200k $\Omega$ / 2M $\Omega$ / 20M $\Omega$
Resistance Accuracy	(@200 $\Omega$ - 2M $\Omega$ ) $\pm$ 0.8% of rdg + 4D (@20M $\Omega$ ) $\pm$ 1.0% of rdg + 4D
Diode	1.5V forward voltage drop
Battery Test Accuracy	(@12V / 9V) $\pm$ 0.8% of rdg +7D (@1.5V) $\pm$ 3.0% of rdg +5D
Continuity	Meter beeps at $<$ 50 $\Omega$ $\pm$ 20 $\Omega$
Temperature	Range: -4°F - 1382°F (-20°C - 750°C)
Temperature Accuracy	(@-20°C - 750°C) $\pm$ 2.0% of rdg +2D (@-4°F - 1382°F) $\pm$ 2.0% of rdg + 4D
Operating Temperature	Range: 32°F - 104°F (0°C - 40°C)
Operating Humidity	$<$ 80% RH
Overload Protection	(mA jack) FF 400mA H 600V fuse (F2) (A jack) FF 10A H 600V fuse (F1)
Display	LCD
Battery	9V (included)

# Setup - Before Use:

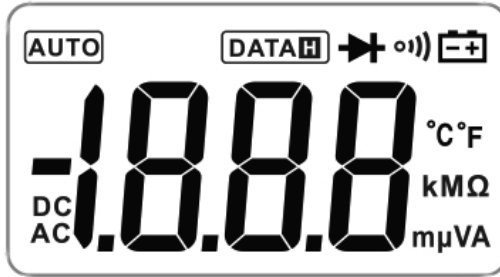


Read the ENTIRE IMPORTANT SAFETY INFORMATION section at the beginning of this manual including all text under subheadings therein before set up or use of this product.

## Functions



## Display



Symbol	Description
AUTO	Auto range mode
DATA □	Indicates that display data is being held
▶	Diode test
•	Continuity buzzer
⊖ +	Battery low indicator
DC	Direct current
AC	Alternating current
°C °F	Celsius / Fahrenheit (temperature)
kMΩ	Ohms, Kilohms, Megohms (resistance)
mμVA	Milli/Micro, Volts (voltage) / Amperes (current)

# 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 Operation

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### FUNC Button


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Press the **FUNC** Button to switch between AC/DC or other functions.

### Data Hold Button

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The data **HOLD** function keeps the current reading on the Display.

1. To activate hold, press the **HOLD** Button. The reading will be held on the Display and the  symbol will appear.
2. Press **HOLD** again to release the hold.

### RAN Button

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The **RAN** function allows you to manually switch through different ranges.

1. Press the **RAN** Button to enable manual selection. When enabled, the **AUTO** indicator will disappear from the Display.
2. Pressing the **RAN** Button will progress the reading to the next higher range and as you press it will move the range up until the highest is reached.
3. When the highest is reached, the next press of the **RAN** Button will switch to the range to the lowest.
4. Hold down the **RAN** Button to return to auto range. When in auto range the **AUTO** indicator will reappear on the Display and you can release the **RAN** Button.



## NCV (Non-Contact AC Voltage) Button

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The **NCV** function allows you to use the Meter for voltage detection.

1. To activate, hold down the **NCV** Button in any mode.
  2. Move the Meter close to the voltage source or unshielded conductor. If voltage is detected, the meter will beep and the Non-Contact Voltage Indicator will flash.
  3. Release the **NCV** Button to stop voltage detection.
- 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 Operation

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If the Meter is not used for approximately 15 minutes, it automatically turns itself off to conserve battery power. To turn the Meter back on after auto-off, press any Button or turn the rotary switch. To disable Auto Power-Off, press and hold down the **HOLD** Button when powering on the Meter.

## Measurement Operation

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**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 III circuits. Exposed probes are rated for use with CAT II circuits.

### AC/DC Voltage Measurement

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Measure AC conductors carrying up to 600 VAC, from 40 Hz to 400 Hz.

Measure DC conductors carrying up to 600 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.

**WARNING!** To prevent damage to the Meter or personal injury, do not measure voltages higher than 600 VDC or 600 VAC rms.

1. Plug black test lead into **COM** Jack. Plug red test lead into **Input** Jack.
2. Turn Rotary Switch to the  $\tilde{V}$  position.

3. Press **FUNC** Button to choose between AC and DC voltage.
4. While observing polarity, carefully touch exposed conductors with tips of probes.
5. Read measured voltage on the Display.
  - "OL" displayed on the Meter indicates the measurement exceeds the current range.
6. When testing is complete, turn Rotary Switch to **OFF**, remove Test Leads and store with Meter.

### Temperature Measurement

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Measure temperature from -4°F to 1382°F (-20°C to 750°C).

1. Connect red end of Thermocouple (included) to the **Input** Jack and the black end to the **COM** Jack.
2. Turn Rotary Switch to the **Temp** position. The Display will show the current ambient temperature. Press **FUNC** to switch between Celsius and Fahrenheit.
3. Touch the tip of the Thermocouple to the object to be tested.

4. Read measured temperature on the Display.
5. When is complete, turn Rotary Switch to OFF remove Thermocouple and store with Meter.



**WARNING!** To prevent electric shock, remove Thermocouple before switching between testing modes.

## Continuity Measurement

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Test continuity between two points of a circuit.

**WARNING!** To prevent electric shock, turn off all power and fully discharge capacitors in 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  position.
3. Press **FUNC** until  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  $50\Omega \pm 20\Omega$ , the 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 out of range, **OL** is displayed.


## Resistance Measurement

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Measure circuit resistance up to 20M ohms.

**WARNING!** To prevent electric shock, turn off all power and fully discharge capacitors in 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  position. The default position is resistance.
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.

- Keep test leads as short as possible.
- Resistors should be measured out of circuit.



**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.

## Diode Measurement

Test voltage drop in diodes.

**WARNING!** To prevent electric shock, turn off all power and fully discharge capacitors in 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  position.
3. Press **FUNC** until  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.

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

## Current Measurement

Measure current in AC and DC circuits carrying up to 10 amperes.

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

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

**WARNING!** Check fuses before making current measurements. To prevent damage to the meter, be sure to use the correct input jacks.

1. Turn the Rotary Switch to the appropriate position, depending on the amperage of the circuit under test.
  - Selections are  $\mu\text{A}$  microamperes,  $\text{mA}$  milliamperes, or  $\text{A}$  amperes.
2. Press **FUNC** to select AC or DC.
3. Always start with the highest range if the amperage is unknown.
4. Turn off power to the circuit and allow capacitors to discharge.

**WARNING!** To prevent damage to the Meter, never measure open-circuit voltages exceeding 600V between the input terminals and ground.

5. Break the circuit and connect the Test Leads in series with the circuit being measured. Connect the black lead on the lower voltage side.

- Plug black test lead into **COM** Jack.
- If amperage is < 200mA, plug red test lead into **Input** Jack.
- If amperage is > 200mA (10A maximum), plug red test lead into **A** Jack.

6. Power on the circuit and read measurement. If "**OL**" is displayed then the measurement exceeds the current rating. Move the rotary switch to a higher range.

**Note:** Measure for a maximum 30 seconds and allow 15 minutes to pass between measurements.

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

## Battery Test

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To measure voltage stored in a battery.

1. Set the Rotary Switch to the range that matches the battery under test.
  - Selections are **12V**, **9V** or **1.5V**.
2. Plug the red lead to the **Input** Jack. Plug the black test lead into **COM** jack.
3. Connect the red test lead to the positive (+) terminal of the battery and the black test lead to the negative (-) terminal of battery.
4. Read the measurement on the Meter Display.
5. When testing is complete, turn Rotary Switch to **OFF**, remove Test Leads and store with Meter.

**WARNING!** To prevent damage to the Meter, do not connect the Meter to a battery with a voltage rating exceeding 60 VAC or 30 VDC.

# Maintenance and Servicing




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

SAFETY

## Cleaning, Maintenance, and Lubrication

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

## Battery Replacement

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

1. Power off Meter and remove its Test Leads.
2. Turn Meter over and remove screw on back cover. Save the screw.
3. Carefully remove battery cover and tilt stand from back of Meter.
4. Remove battery from the battery compartment.
5. Replace battery with the same type and rating.
6. Replace battery cover and tilt stand. Fasten securely with saved screw.

**Note:** Do not reverse the polarity of the battery.

## Fuse Replacement

1. Power off Meter and remove Test Leads.
2. Turn Meter over and remove screw from back. Save the screw.
3. Carefully remove battery cover and tilt stand from back of meter.
4. Carefully pull the outside cover off the Meter.
5. Remove four screws from back cover, one from each corner. Save screws.

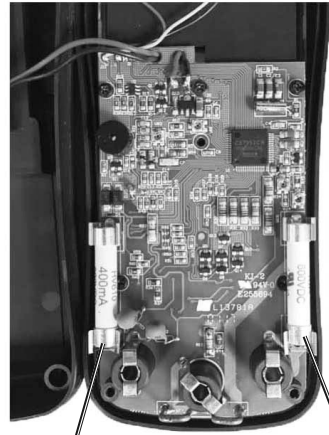
**One screw at each corner.**



OPERATION

MAINTENANCE

- Carefully open the case and separate the case top and bottom. Lie the two sides of the case next to each other being careful to **not pull the wires**.



F2 = 400mA

F1 = 10A

- Carefully remove fuses one at a time. Gently pry one end loose and remove from its bracket. Make note of the rating.

- Replace with new fuse of the same type and rating.
- Rejoin the covers being careful to **not pinch wires**. Secure covers with the four saved screws.
- Reattach Meter's outside cover.
- Reattach battery cover and tilt stand. Secure with the saved screw and tighten securely.

## Calibration

Have the Meter calibrated by a qualified technician every year.

**Record Serial Number Here:**

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

## 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.

