

# **CEN-TECH®**

## **DIGITAL CLAMP MULTIMETER**

**Model**    **42397**  
                  **95683**

### **SET UP AND OPERATING INSTRUCTIONS**



**Distributed exclusively by Harbor Freight Tools®.**

3491 Mission Oaks Blvd., Camarillo, CA 93011

Visit our website at: <http://www.harborfreight.com>





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

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**For technical questions or replacement parts, please call 1-800-444-3353.**

Cover Revised 09f

## SPECIFICATIONS

AC Amps	<p>Ranges: 20A/200A/1000A  Resolution: 10mA/100mA/1A  Accuracy: <math>\pm 2.5\%</math> rdg +8d* @ 50-60 Hz, 20A  <math>\pm 2.5\%</math> rdg +5d @ 50-60 Hz, 200A  <math>\pm 2.5\%</math> rdg +5d @ 50-60 Hz, 1000A (for 800A and below)  Above 800A the reading is only for reference.  Frequency: 50 - 60 Hz  Indication: Average (rms of sine wave)  Overload Protection: 1200A within 60 seconds (using clamp, <b>not</b> leads)</p>
AC Voltage	<p>Range: 200V/750V  Resolution: 100mV/1V  Accuracy: <math>\pm 1.2\%</math> rdg +5d @ 200V  <math>\pm 2\%</math> rdg +5d @ 750V  Frequency: 45-400 Hz  Indication: Average (rms of sine wave)  Input Impedance: 9 MW  Overload Protection: 750V rms AC</p>
DC Voltage	<p>Range: 200mV/20V/200V/1000V  Resolution: 0.1mV/10mV/100mV/1V  Accuracy: <math>\pm 0.8\%</math> rdg +3d @ 200mV-200V  <math>\pm 1.2\%</math> rdg +5d @ 1000V  Input Impedance: 9 MW  Overload Protection@ 200mV range: 250V DC  Overload Protection@ 20V – 1000V ranges: 1000V AC/DC peak</p>
Resistance	<p>Ranges: 200W/2kW/20kW/200kW/2MW  Resolution: 0.1W/1W/10W/100W/1kW  Accuracy: <math>\pm 1.2\%</math> rdg +5d @ 200W  <math>\pm 1\%</math> rdg +3d@ 2kW-200kW  <math>\pm 1.5\%</math> rdg +5d @2MW  Overload Protection: 250V rms AC</p>
Insulation Test (using 500V insulation tester, not included)	<p>Ranges: 20MW/2000MW  Resolution: 10kW/1MW  Accuracy: <math>\pm 2\%</math> rdg +2d @20MW  <math>\pm 4\%</math> rdg +2d @2000MW (up to 500MW)  <math>\pm 5\%</math> rdg +2d @2000MW (above 500MW)</p>
Operating Range	64° F - 82° F optimal, 32° F - 122° F usable, <80% Relative Humidity
Diode Test 	The approximate forward voltage drop of the diode will be displayed.
Continuity Test 	When resistance <50W, the buzzer will sound.
Sampling Rate	3 times per second
Battery	One 9 V (included)
Weight	11 oz.
Accessories	Test leads, battery, and carrying case

\*Least significant digit is the digit farthest right. #d is the number of least significant digits that a reading can be off by.

## Save This Manual

You will need the manual for the safety warnings and precautions, and operating and maintenance procedures. Keep your invoice with this manual. Write the invoice number on the inside of the front cover. Keep the manual and invoice in a safe and dry place for future reference.

## IMPORTANT SAFETY INFORMATION

In this manual, on the labeling, and all other information provided with this product:



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.

### **⚠ DANGER**

**DANGER** indicates a hazardous situation which, if not avoided, will result in death or serious injury.

### **⚠ WARNING**

**WARNING** indicates a hazardous situation which, if not avoided, could result in death or serious injury.

### **⚠ CAUTION**

**CAUTION**, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

### **NOTICE**

**NOTICE** is used to address practices not related to personal injury.

## **CAUTION**

**CAUTION**, without the safety alert symbol, is used to address practices not related to personal injury.

**WARNING:** If any warnings or safety precautions in the owner's manual are not followed completely, the protection provided by this product will be reduced.

**Read all instructions before using this tester!**

## **⚠ WARNING**

- ELECTRICAL SHOCK CAN CAUSE DEATH OR INJURY! NEVER TOUCH EXPOSED CONDUCTORS OF ELECTRICITY.**
- Inspect the Multimeter before use.** In addition to a general inspection, look specifically for:
  - Pay special attention to the insulation protecting the connectors.
  - Check the leads for exposed metal, damaged insulation, and continuity. Replace damaged test leads immediately, before use.
- Remove the test leads before performing maintenance, opening the case, or the battery compartment.**
- Do not use the multimeter if:**
  - The test leads are damaged in any way.
  - The battery is low.
  - Near any explosive gasses or fumes.
  - Any abnormal operation is detected. (If in doubt about the condition of the meter, have it serviced.)
  - The battery cover is open.
- This meter should be powered only by a single, correctly installed 9V battery.**

5. **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.
6. **Disconnect the circuit's power before connecting the meter in series, when measuring current.**
7. **Connect the common (COM) test lead first and disconnect it last.**
8. **Hold the probes with fingers behind guards.**
9. **Test cable voltages with care.** Only use one hand when securing the tester around the cable to reduce risk of injury in case of electric shock.
10. **Avoid electrical shock.** Use extreme caution when clamping around 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. **Due to the danger inherent in such work, we strongly recommend that only a licensed electrician work on high-voltage or other potentially dangerous circuits.**
16. **This product contains or produces chemicals, including lead, known to the State of California to cause cancer and birth defects (or other reproductive harm).**  
(California Health & Safety Code § 25249.5, *et seq.*)
17. **When using the Insulation Tester (not included), carefully follow all operating instructions and safety precautions outlined in the documentation provided with it.**
18. **Do not test voltage on circuits higher than 750 volts AC or 1000 volts DC.**

## CAUTION

1. **When possible, have an assistant nearby.**
2. **Store idle equipment.** When not in use, meters must be stored in a dry location to decrease exposure to moisture. Lock up meters and keep out of reach of children.
3. **Dress properly.** Protective, electrically nonconductive clothes and nonskid footwear are recommended when working.
4. **Wear ANSI-approved impact safety goggles.**
5. **Only use accessories intended for use with this meter.**
6. **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.
7. **Do not test current on circuits higher than 1000 amps.**

## CAUTION

1. **Avoid damaging meter.** Use only as specified in this manual.
2. **Prior to testing capacitors, resistance, diodes, or continuity; disconnect all power to the circuit and discharge all high-voltage capacitors.**
3. **Performance of this meter may vary depending on battery condition.**
4. **Use the proper settings, terminals, techniques, and range for the tests performed.** Always start with the range stated in the instructions.
5. **Be careful not to apply voltage to the Test Leads when they are connected**

to the COM (common) and Volt/Ohm Jacks and the Multimeter is in the Ohms testing setting. Damage can occur to the multimeter.

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

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## UNPACKING

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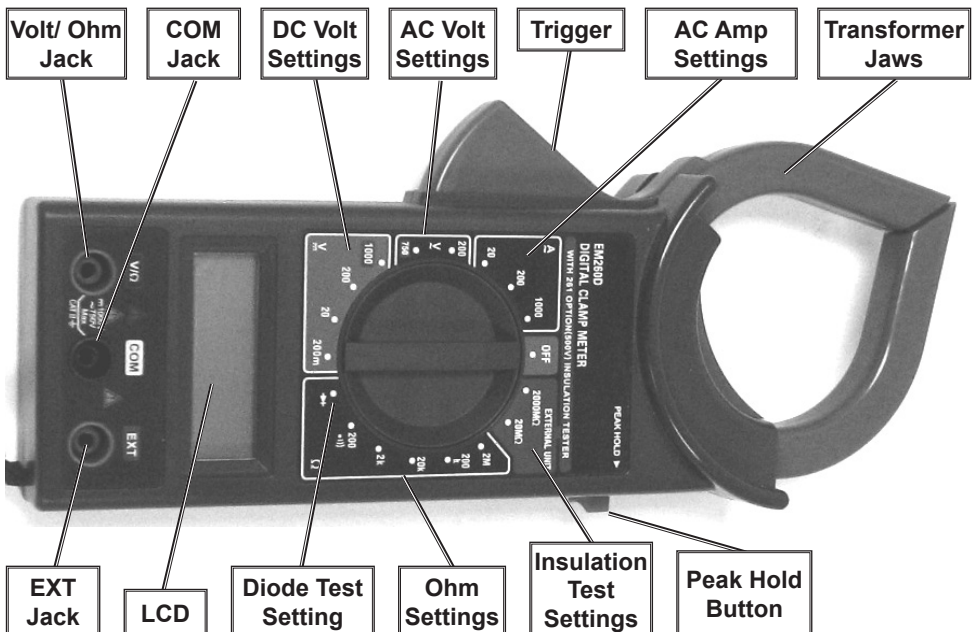
When unpacking, make sure the following parts are included: Digital Clamp Multimeter, black and red Test Leads, hand strap, 9V battery, and carrying case. If any parts are missing or broken, please call Harbor Freight Tools at the number on the cover of this manual.

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## OPERATION

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### Control Layout



## Peak Hold Function

1. The Peak Hold function is used to keep the display reading the highest measurement after the measurement is finished. Press and release the peak hold button to keep displaying the current measurement.
2. Press and release the Peak Hold button again to resume normal operation.
3. Make sure the Peak Hold button is not engaged before taking a measurement.

## AC Current Measurements

1. Turn the Range Selector Switch to the  $\sim$  A 1000 position.  
**⚠CAUTION: The Test Leads should not be used to test current and need to be removed from the multimeter. The test leads are unfused and are not intended to test amperage.**
2. Press the Transformer Jaws open and position the live (hot) conductor of the test item in the center of the Jaws for greater accuracy. Close the Jaws and read the measurement.
3. If the current is less than 200 amperes, set the Range Selector Switch to the lower range.
4. When testing is complete, switch the multimeter to OFF position and store multimeter in the carrying case.

## Resistance Measurements

**CAUTION:** Never measure resistance on a circuit with voltage running through it; doing so will damage the multimeter.

1. Turn the Range Selector Switch to the 200 Ohms (continuity  $\bullet\bullet$ ) position.
2. Plug the red Test Lead into the Ohms Jack. Plug the black Test Lead into the COM Jack.  
Short the Test Leads together. The

meter should read “0” Ohms and you should hear the continuity buzzer sound.

3. Touch the exposed conductors with the tips of the Test Leads.
4. Read measurement. To read higher ohm values switch to higher settings.
5. When testing is complete, switch the multimeter to OFF position, remove the Test Leads, and store multimeter and test leads in the carrying case.

**Note:** Insulation tests are done using the optional insulation tester.

## Voltage Measurements

1. **AC Measurements:** Turn the Range Selector Switch to  $\surd$  750.  
**DC Measurements:** Turn the Range Selector Switch to  $\surd$  1000.
2. Plug the red lead into the Volt/Ohm Jack. Plug the black lead into the COM Jack.
3. Carefully touch the exposed conductors with the tips of the probes to measure the voltage (not amperes). If voltage is less than 200V, switch to a lower range for more accurate reading.
4. **Note: Do not connect the meter in series, connect it in parallel.**
5. Read measurement.
6. When testing is complete, switch the multimeter to OFF position, remove the Test Leads, and store multimeter and test leads in the carrying case.

## Diode Measurement

### Test the voltage drop in diodes.

1. Turn the Range Selector Switch to the Diode ( $\rightarrow|$ ) position.
2. Plug the red Test Lead into the V 1K Jack. Plug the black Test Lead into the Com Jack. Switch the Multimeter ON.
3. Connect the red probe to the anode of the diode and the black to the cathode.
4. The approximate forward voltage drop of the diode will be displayed in mV. If the connection is reversed only "1" will be shown.

## Measurement Applications

- **Household uses** – Verify and measure current flow and voltage to such appliances as electric water heaters, fan motors, generators, and pumps. Measure excessive current flow on circuits in distribution panels which are tripping circuit breakers. Check for wire continuity or resistance using the Test Leads and Ohms function.
- **Distribution transformers** – Measure load on each phase for balance and for excessive current draw.
- **Motors** – Measure starting current, running current, and current imbalance between phases.
- **Variable speed motor controllers** – Measure input and output currents.

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## **MAINTENANCE**

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1. To prevent oxidation, periodically open Transformer Jaws and wipe the magnetic pole pieces with a lightly oiled cloth.
2. Wipe unit with a slightly damp cloth using a light detergent. Do not use solvents or abrasives.
3. Remove battery if not in use for long periods.
4. Store unit in the carrying case and place in a dry location.
5. Other than the battery, there are no replaceable parts on this unit. Repairs should be done by a qualified technician.

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## **Battery Replacement**

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1. Remove the Test Leads from the multimeter.
2. Turn the unit over.
3. Remove back cover.
4. Pull battery out of unit and replace.
5. Replace cover.

## **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.

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