CEN-TECH®

SEVEN FUNCTION DIGITAL MULTIMETER

Model 98025

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.

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

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.

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.**

General Safety Rules

WARNING Read all safety warnings and 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. 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.
3. Do not use the multimeter if:
   a. The test lead is damaged in any way.
   b. The battery is low.
   c. Near any explosive gasses or fumes.
   d. Any abnormal operation is detected.
   (If in doubt about the condition of the meter, have it serviced.)
   e. The battery cover is open.

4. 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. 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.
10. 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.
11. Keep children away. Children must never be allowed in the work area.
12. Stay alert. Watch what you are doing, use common sense. Do not operate any meter when you are tired.
13. 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.
14. 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.
15. 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.)
16. Do not test voltage on circuits higher than 750 volts AC or 1000 volts DC. This type of testing should only be done by a qualified electrician.
17. Do not test current on circuits higher than 200 mA.
18. 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.
19. Dress properly. Protective, electrically nonconductive clothes and nonskid footwear are recommended when working.
20. Wear ANSI-approved impact safety goggles.
21. Only use accessories intended for use with this meter.
22. 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.
23. Avoid damaging meter. Use only as specified in this manual.
24. Prior to testing, resistance, diodes, or continuity; disconnect all power to the circuit and discharge all high-voltage capacitors.

25. Performance of this meter may vary depending on battery condition.
26. Use the proper settings, terminals, techniques, and range for the tests performed. Always start with the range stated in the instructions.
27. Do not apply voltage to the Test Leads when the Multimeter is in the Ohms testing setting. Damage can occur to the multimeter.
28. Do not switch between testing modes with the multimeter connected to a circuit.
29. Never attempt to use the meter at a setting combination marked as blank on the scale.
30. Prior to testing capacitors, resistance, diodes, or continuity; disconnect all power to the circuit and discharge all high-voltage capacitors.
31. Check fuse before testing current.
32. Use the proper settings, terminals, techniques, and range for the tests performed. Always start with the range stated in the instructions.
33. Have the Multimeter calibrated by a qualified technician every year. A multimeter that is not calibrated yearly will not yield accurate results.

SAVE THESE INSTRUCTIONS.

SPECIFICATIONS

Power Requirements	9V Battery
Frequency	45 to 450 Hz
DC Amps	Ranges: 200mA/2000mA/ 20mA/ 10A
Accuracy	(@0mA-200mA) 1.2%±2D; (@10A) 3%±2D
DC Voltage	Ranges: 200mV/2000mV 20/200/1000V
Accuracy	(@200mV) 0.5%±1D (@2000mV-200V) 1%±2D (@1000V) 1%±2D
AC Voltage	Ranges: 200/750V
Accuracy	(45-450 Hz) 1.2%±10D
Resistance	Ranges: 200/2000/20K/ 200K/2000K Ohm

UNPACKING

When unpacking, check to make sure that the item is intact and undamaged. If any parts are missing or broken, please call Harbor Freight Tools at the number shown on the cover of this manual as soon as possible.

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.

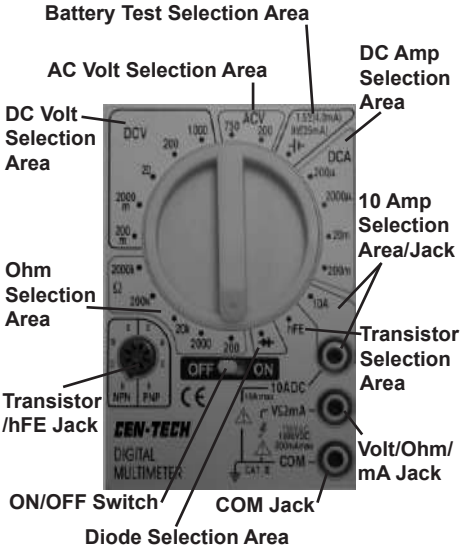
WARNING **TO PREVENT SERIOUS INJURY FROM ACCIDENTAL OPERATION: ELECTRICAL SHOCK CAN CAUSE DEATH OR INJURY. AVOID TOUCHING EXPOSED CONDUCTORS OF ELECTRICITY.**

Do not test voltage on AC circuits higher than 750 volts.

Do not test voltage on DC circuits higher than 1000 volts.

Do not test current on circuits higher than 10 amps.

1. Disconnect Test Leads. Use a screwdriver to remove both screws on the rear of the unit. Observe polarity, and attach a 9V battery to the posts. Replace and secure the cover.



2. Do not apply voltage to the Test Leads when they are connected to the COM (Bottom) and VWmA (Center) Jacks and the Multimeter is in an Ohms testing setting. Damage can occur to the multimeter or the fuse may blow.

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

AC Voltage Measurements

1. Measure AC conductors carrying up to 750 VAC, 45-450 Hz.

2. Turn the Range Selector Switch to 750 ACV setting. Always start with the highest range if the voltage is unknown.

3. Plug the red lead into the VWmA (Center) Jack. Plug the black lead into the COM (Bottom) Jack. Switch the Multimeter ON.

4. Carefully touch the exposed conductors with the tips of the probes to measure the voltage (not amperes).

5. Read measurement.

6. If the voltage is less than 200 volts, set the Range Selector Switch to the lower range.

7. When testing is complete, remove Test Leads and store with multimeter.

DC Voltage Measurements

1. Measure DC conductors carrying up to 1000 VDC.

2. Turn the Range Selector Switch to 1000 DCV setting.

3. Follow the directions above under “AC Voltage Measurements”, only use the DC settings instead.

DC Current Measurements

1. Measure DC conductors carrying up to 10 amperes.

2. Turn the Range Selector Switch to the 10A position.

3. Always start with the highest range if the amperage is unknown.

4. Plug the red lead into the 10A (Top) Jack. Plug the black lead into the

COM (Bottom) Jack. Switch the Multimeter ON.

5. Carefully touch the exposed conductors with the tips of the probes to measure the amperage.

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

6. Read measurement.

7. If the reading is less than .2 AMPs, switch the red lead to the VWmA (Center) Jack and set the Range Selector Switch to the 200 mA setting.

8. When testing is complete, remove Test Leads and store with multimeter.

Resistance Measurements

1. Measure circuit resistance up to 2000K Ohms.

2. Warning: Never measure resistance on a circuit with voltage running through it.

3. Turn the Range Selector Switch to the 200 W position.

4. Plug the red Test Lead into the VWmA (Center) Jack. Plug the black Test Lead into the Com (Bottom) Jack. Switch the Multimeter ON.

5. Short the Test Leads together. The meter should read “0” Ohms.

6. Touch the exposed conductors with the tips of the Test Leads.

7. Read measurement.

8. If the reading is “1”, set the Range Selector Switch to the next higher Ohm (W) position.

Transistor (hFE) Measurements

1. Test transistors to ensure proper function.

2. Turn the Range Selector Switch to the hFE position.

3. Switch the Multimeter ON.

4. Insert the transistor pins into the appropriate hFE jack (NPN or PNP) according to the EBC (Emitter, Base, Collector) sequence.

5. The meter will show the approximate hFE value.

Diode Measurement

1. Test the voltage drop in diodes.

2. Turn the Range Selector Switch to the Diode (→|-) position.

3. Plug the red Test Lead into the VWmA (Center) Jack. Plug the black Test Lead into the Com (Bottom) Jack. Switch the Multimeter ON.

4. Connect the red probe to the anode of the diode and the black to the cathode.

5. The approximate forward voltage drop of the diode will be displayed in mV. If the connection is reversed only “1” will be shown.

Battery Charge Measurement

1. Test the amount of charge left in batteries.

NOTE: This setting is for testing the charge of small 9V or 1.5V batteries only. Never use this setting to test automotive or lead-acid batteries. **The high current could cause damage to the meter and/or cause severe personal injury.** Use the appropriate DC Voltage setting to test the open circuit voltage of such batteries instead.

2. Turn the Range Selector Switch to the Battery (⊣⊢) position.

3. Plug the red Test Lead into the VWmA (Center) Jack. Plug the black Test Lead into the Com (Bottom) Jack. Switch the Multimeter ON.
4. Connect the red probe to the positive terminal of the battery and the black to the negative terminal.
5. The battery amperage under a load of 370 mW will be displayed to a resolution of .1mA.
6. Normal amperage:
   For a standard 9V (6LR61) battery = 25 mA
7. For a 1.5 V “AA” (LR6) battery = 4 mA
8. To prevent accidents, turn off the tool and disconnect its power supply after use. Clean, then store the tool indoors out of children’s reach.User-Maintenance Instructions

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

⚠WARNING TO PREVENT SERIOUS INJURY FROM ACCIDENTAL OPERATION:
Turn the Power Switch of the tool to its “OFF” position and remove the test leads before performing any inspection, maintenance, or cleaning procedures.

Cleaning, Maintenance, and Lubrication

1. **BEFORE EACH USE,** inspect the general condition of the tool. Check for loose screws, misalignment or binding of moving parts, cracked or broken parts, damaged electrical wiring, and any other condition that may affect its safe operation.
2. **AFTER USE,** clean external surfaces of the tool with clean cloth.
3. Replace battery as necessary.
4. No replaceable parts.

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.

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