



DMM150
Digital Multimeter
Instructions

070-9235-01

CE

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Safety

This manual contains information and warnings that must be followed for operating the instrument safely and maintaining the product in a safe operating condition. To avoid potential injury, use the product only as specified.

 **CAUTION.** *Caution statements identify conditions or practices that could result in damage to the equipment or other property.*

 **WARNING.** *Warning statements identify conditions or practices that could result in personal injury or loss of life.*

Terms as Marked on Equipment



ATTENTION
Refer to manual



Double Insulated

Do Not Operate Without Covers — To avoid personal injury, do not apply any voltage or current to the product without the covers in place.

Electric Overload — Never apply a voltage to a connector on the product that is outside the range specified for that connector.

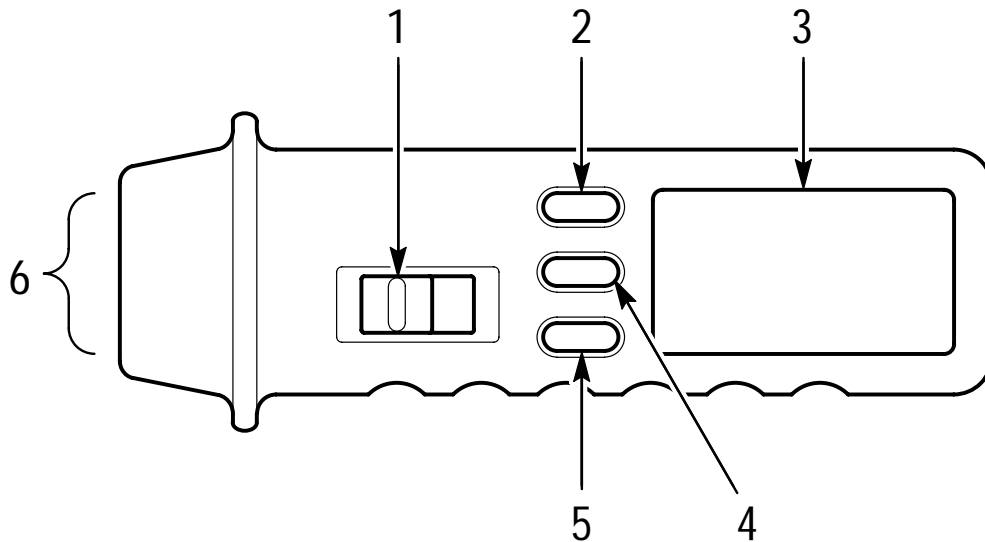
Do Not Immerse — The product is not waterproof.

Getting Started

The DMM150 Digital Multimeter is a rugged, handheld product that allows you to make accurate measurements quickly and easily. Whether you are a professional or hobbyist, this instrument provides a useful range of features:

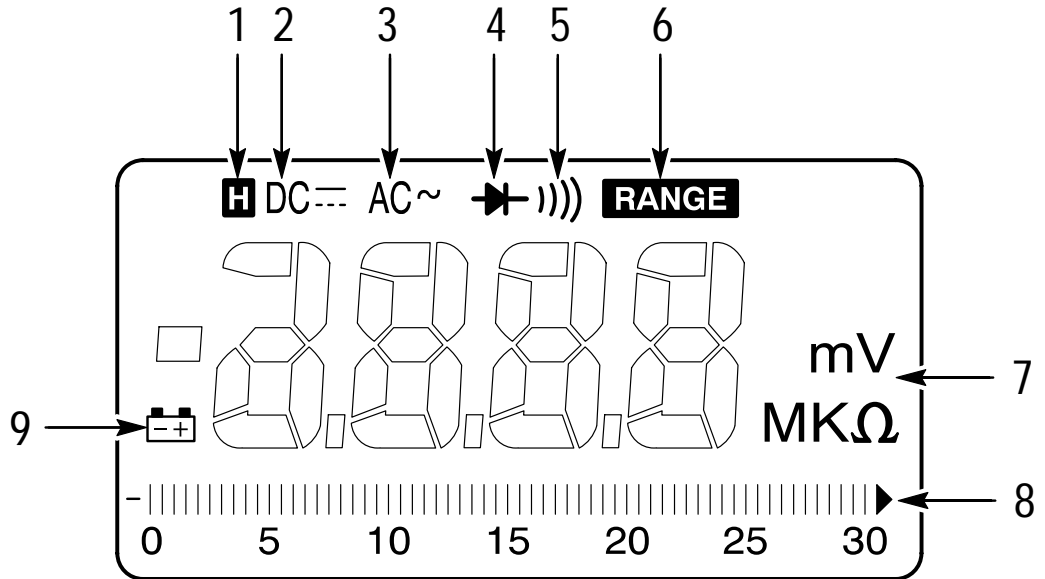
- Small, pen-style case
- 3½ digit LCD display with bar graph
- Auto range (volts, ohms)
- Measurement hold
- Measures DC and AC voltages, resistance, diode voltage, and continuity
- Diode and continuity tester with audible signal
- Overvoltage protected
- Recessed input jacks for safety
- Automatic power off after 10 minutes to prolong battery life
- Low-battery indicator
- Uses standard AAA batteries

Controls and Connectors



1. **Slide Switch** — Move to select the multimeter functions.
2. **Function Button** — Press to select options for each function. Select either AC or DC in the **V** position, or resistance, continuity, or diode check in the **Ω \rightarrow \rightarrow** position.
3. **Digital Display** — This liquid crystal display (LCD) has a maximum reading of 3200 ($3\frac{1}{2}$ digit). The display indicates auto range, auto polarity, decimal point, overrange, AC, DC, Ω , measurement units, and hold.
4. **RANGE Button**— Press to manually select measurement ranges.
5. **HOLD Button** — Press to hold or freeze the display.
6. **Inputs** — Inputs for the test leads.

Display Indications



1. Hold indicator
2. DC volts mode indicator
3. AC volts mode indicator
4. Diode check mode indicator
5. Continuity mode indicator
6. Manual ranging indicator
7. Measurement units
8. Analog bar graph
9. Low battery indicator

Operating Basics

Please read this section to learn how to use the multimeter safely and efficiently.

Preparing for Measurement

1. Wait 60 seconds after turning on the multimeter before making a measurement for optimum accuracy.
2. Slide the switch to the function you want to use before connecting the probes to a circuit.



CAUTION. *To avoid damaging the meter, disconnect the test leads from the test points before changing functions.*

3. Disconnect power to the equipment under test if you are measuring resistance, testing continuity, or checking diodes.
4. If you use the multimeter near equipment that generates electromagnetic interference, the display might be unstable or indicate incorrect measurement values.


Changing Ranges

Press the **RANGE** button to manually select ranges. If you do not manually select a range, the multimeter automatically selects a measurement range.

Holding a Measurement

To retain a measurement, press the **HOLD** button. The hold indicator (**H**) appears on the display and the measurement will not change. Press the **HOLD** button again to continue with normal operation.

Measuring Voltage

 **WARNING.** *To avoid electrical shock to the user or damage to the instrument, do not apply more than 600 VDC or 600 VAC_{RMS} between any terminal of the instrument and earth ground.*

Use extreme caution to avoid personal contact with high voltage when measuring in high voltage circuits.

1. Connect the black test lead to the **COM** (–) terminal and the red test lead to the **VΩ** (+) terminal.
2. Move the slide switch to the **V** function.
3. Press the **blue function button** to select AC or DC measurement.
4. Connect the test leads across the source or load. The multimeter automatically selects the range and displays the polarity and voltage.

Measuring Resistance



WARNING. *To prevent possible personal injury or damage to the multimeter, make sure the device being tested is off and no source of voltage is present.*

1. Connect the black test lead to the **COM** terminal and the red test lead to the **VΩ** terminal.
2. Move the slide switch to the Ω)) \rightarrow position. The default function is Ω .
3. Connect the test leads across the resistance.

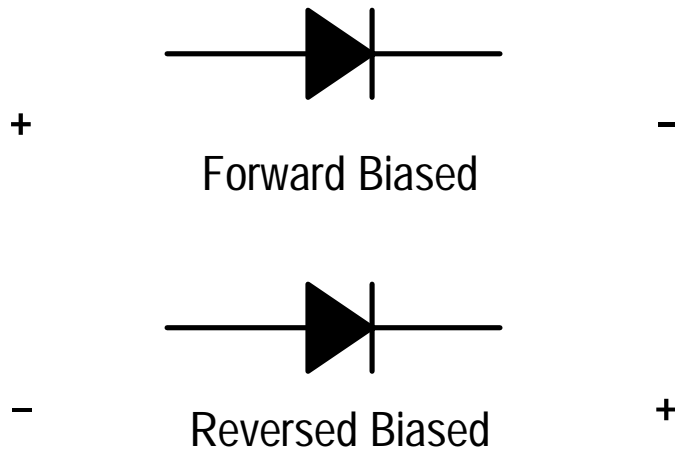
Checking Continuity

1. Connect the black test lead to the **COM** terminal and the red test lead to the **VΩ** terminal.
2. Move the slide switch to the Ω)) \rightarrow position.
3. Press the blue button until the)) symbol appears.
4. Connect the test leads across the circuit. The multimeter will sound a continuous beep if the resistance is less than 20 Ω .

Checking Diodes

1. Move the slide switch to the Ω \rightarrow \rightarrow position.
2. Press the blue button until the \rightarrow \rightarrow symbol appears.
3. Connect the test leads across the diode. The multimeter displays the voltage drop across the diode.

Typically, the forward voltage drop of good silicon diodes is between 0.400 V and 0.900 V. If the diode under test is defective, 000 (short circuit) or approximately 2.6 V (non-conducting) is displayed.



The display reads approximately 2.6 V with the diode reverse biased. The multimeter displays 000 or some other value lower than 2.6 V if the diode is shorted (or resistive).

Maintenance

The multimeter does not require periodic maintenance other than routine cleaning and battery replacement.

Cleaning

Remove dirt and grease using a cloth dampened with isopropyl alcohol or a mild detergent and water solution.

To prevent damage to multimeter materials, avoid using chemicals that contain benzene, benzene, toluene, xylene, acetone, or similar volatile solvents.

Replacing the Batteries

The multimeter uses two 1.5 V batteries. Refer to Figure 1.

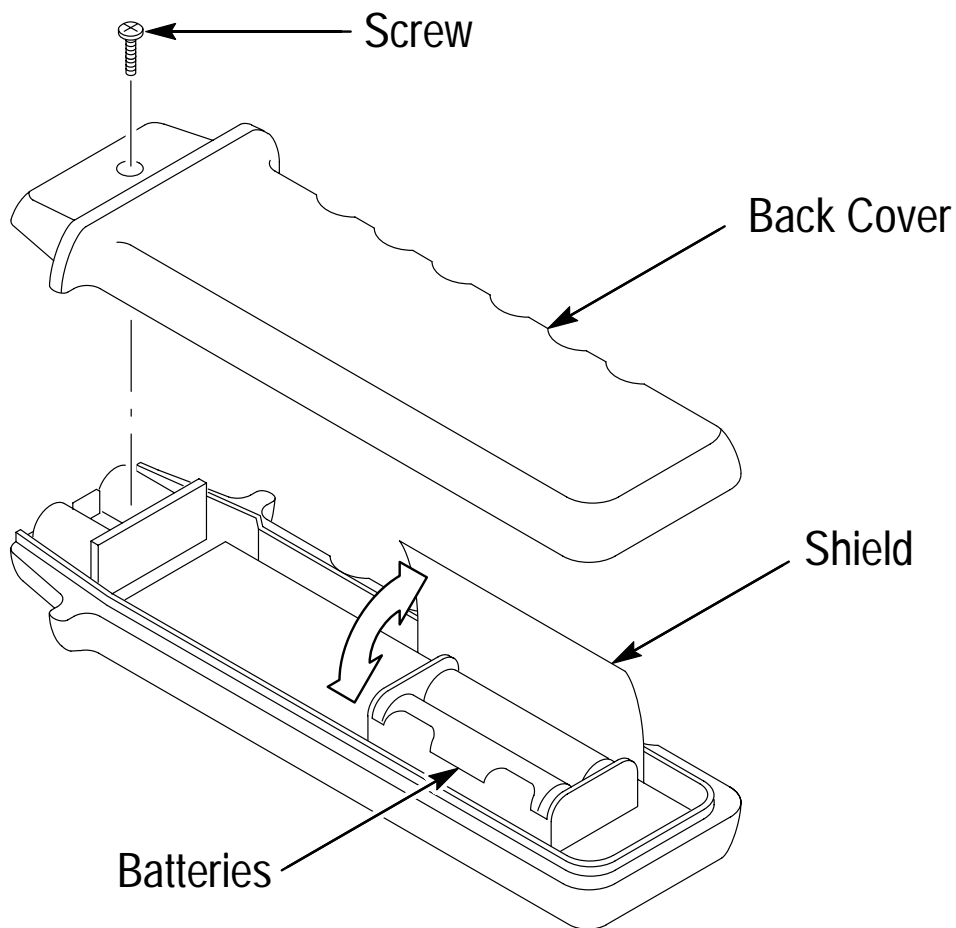



Figure 1: Replacing the Batteries

To replace the batteries, follow these instructions:

1. Disconnect the test leads from any circuit under test and turn off the multimeter.
2. Remove the test leads from the multimeter.
3. Lay the multimeter face down on a work surface that will not damage the multimeter face.
4. Remove the screw from the case back using a small Phillips screwdriver.
5. Gently lift the the case back at the end nearest the lead connections.
6. Lift the shield foil back to uncover the battery case.
7. Lift the battery case out of the multimeter, and carefully remove the batteries.
8. Install the new batteries in the correct polarity positions, and install the battery case into the multimeter.
9. Fold the shield foil over the battery case.
10. Replace the case back. Make sure the battery leads and shield foil do not get caught between the case front and back.
11. Reinstall the screw.

Specifications

General Characteristics

Display	3½ digit liquid crystal display (LCD) with a maximum reading of 3200 65 segment analog bar graph
Polarity Indication	Automatic; positive implied, negative indicated
Overrange Indication	“OL” or “-OL”
Low Battery Indication	The  symbol is displayed when the battery voltage drops below the operating voltage level.
Sampling Rate	2 times/second for digital display 12 times/second for analog bar graph
Operating Altitude	2200 m (7150 ft), maximum
Operating Temp.	0° C to +50° C, 0–80% relative humidity
Storage Temp.	-20° C to +60° C, 0–80% relative humidity (batteries removed)
Temperature Coefficient	0.15 x (specified accuracy)/°C <18°C or >28°C
Power Supply	Two standard 1.5 V batteries: NEDA 24A, AM4, or IEC LR03
Battery Life	Alkaline 800 hours
Dimensions (HxWxD)	42 mm × 145 mm × 24 mm (1.7 in × 5.7 in × 0.9 in)

Measurement Ranges and Accuracies

Accuracies are \pm (% reading + number of digits) at 23°C \pm 5° C, at less than 75% relative humidity.

Maximum Floating Voltage 600 VDC or 600 VAC_{RMS} CAT II between any terminal and earth GND

Maximum Input Voltage 600 VDC or 600 VAC_{RMS} CAT II between **V Ω** and **COM** terminals

DC Volts

Ranges 300 mV, 3 V, 30 V, 300 V, 600 V

Accuracy \pm (0.7% + 2 digits)

Input Impedance 10 M Ω

Resolution (by range)

300 mV 100 μ V

3 V 1 mV

30 V 10 mV

300 V 100 mV

600 V 1 V

AC Volts

Ranges 3 V, 30 V, 300 V, 600 V

Accuracy 3V: \pm (1.7% reading + 5 digits) at 40 Hz to 300 Hz

30 V, 300 V, 600 V:
 \pm (1.7% reading + 5 digits) at 40 Hz to 500 Hz

Input Impedance 10 M Ω paralleled by less than 100 pF

Resolution (by range)

3 V 1 mV

30 V 10 mV

300 V 100 mV

600 V 1 V

Resistance

Ranges 300 Ω , 3 k Ω , 30 k Ω , 300 k Ω , 3 M Ω , 30 M Ω

Accuracy

300 Ω Range \pm (1.2% reading + 4 digits)

3 M Ω Range \pm (1.5% reading + 3 digits)

30 M Ω Range \pm (1.3% reading + 5 digits)

Other Ranges \pm (1.0% reading + 2 digits)

Test Voltage

Open-Circuit

Voltage Approximately 1.3 V

Resolution (by range)

300 Ω 0.1 Ω

3 k Ω 1 Ω

30 k Ω 10 Ω

300 k Ω 100 Ω

3 M Ω 1 k Ω

30 M Ω 10 k Ω

Continuity Check

Threshold

The beeper sounds if the resistance of the circuit measured is < 20 Ω .

Diode Test

Test Current 1.5 mA maximum

Test Voltage 3.3 V maximum open circuit

Resolution 1 mV

Accuracy \pm (1.5% + 5 digits)
from 0.4 V to 0.8 V

Auto Power Off

The multimeter automatically shuts off approximately 10 minutes after the last function or mode change. The multimeter turns on again when another range is selected or any button is pressed.

Certifications and Compliances

EC Declaration of Conformity

Meets intent of Directive 89/336/EEC for Electromagnetic Compatibility and Low Voltage Directive 73/23/EEC for Product Safety. Compliance was demonstrated to the following specifications as listed in the Official Journal of the European Communities:

EMC Directive 89/336/EEC:

EN 55011 Class B Radiated and Conducted Emissions

EN 50082-1 Immunity:

IEC 801-2 Electrostatic Discharge Immunity
IEC 801-3 RF Electromagnetic Field Immunity

Low Voltage Directive 73/23/EEC:

EN 61010-1 Safety requirements for electrical equipment for measurement, control, and laboratory use

Overvoltage Category

Examples of products in this category:

CAT III Distribution-level mains, fixed installation

CAT II Local-level mains, appliances, portable equipment

CAT I Signal levels in special equipment or parts of equipment, telecommunications, electronics

Pollution Degree

Pollution Degree 2, as defined in EN 61010-1. Do not operate in environments where conductive pollutants may be present.

Standard Accessories

The DMM150 is shipped with the following items:

Test lead set 020-2130-00
(one black lead with probe, one black alligator clip,
short red test probe, long red test probe)

Instructions 070-9235-XX

Two batteries (1.5 V) NEDA 24A, AM4,
Installed or IEC LR03

WARRANTY SUMMARY

Tektronix warrants that the products it manufactures and sells will be free from defects in materials and workmanship for a period of three years from the date of purchase from an authorized Tektronix distributor. If a product or CRT proves defective within the respective period, Tektronix will provide repair or replacement as described in the complete warranty statement.

To arrange for service or obtain a copy of the complete warranty statement, please contact your nearest Tektronix distributor.

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