
USER'S MANUAL

Digital Multimeter

DMR-6600

CIRCUIT-TEST ELECTRONICS
www.circuittest.com

Introduction

This meter measures AC/DC Voltage, AC/DC Current, Resistance, Capacitance, Diode Test and Continuity. Proper use and care of this meter will provide many years of reliable service.

Safety



This symbol adjacent to another symbol, terminal or operating device indicates that the operator must refer to an explanation in the Operating Instructions to avoid personal injury or damage to the meter.

WARNING

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

CAUTION

This CAUTION symbol indicates a potentially hazardous situation, which if not avoided, may result damage to the product.



This symbol advises the user that the terminal(s) so marked must not be connected to a circuit point at which the voltage with respect to earth ground exceeds (in this case) 1000 VAC or VDC.



This symbol adjacent to one or more terminals identifies them as being associated with ranges that may, be subjected to particularly hazardous voltages. For maximum safety, the meter and test leads should not be handled when these terminals are energized.



Double Insulation.

SAFETY INFORMATION

Caution and proper guidelines must be followed for personal and product safety. Read this instruction manual carefully and completely before using the meter. Lack of caution or poor safety practices can result in serious injury or death.

- Always start with power off. Set the function switch to the correct setting before making any measurements and do not change position of the function switch during measurements.
- Do not use the meter if the meter or test leads look damaged or if there is doubt that the meter is not operating properly.
- When using the test probes always keep fingers behind the finger guards. Never touch the exposed probe tip.
- Always consider circuits to be energized. Never assume any equipment to be de-energized.
- Use caution when working above 35VDC or 25VAC RMS as these voltages pose a shock hazard.
- Never connect unit to AC or DC powered circuits when the function switch is set to resistance, diode check or continuity ranges.
- Always disconnect the power when performing resistance, or diode tests.
- Always turn off the power to the circuit under test before unsoldering or breaking the circuits. Small amount of current can be dangerous.
- Disconnect test leads before removing the batteries or the fuse.
- Do not operate the unit unless the case is completely closed.

SAFETY INSTRUCTIONS

This meter has been designed for safe use, but must be operated with caution. The rules listed below must be carefully followed for safe operation.

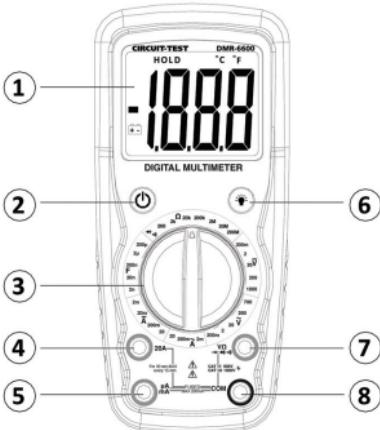
1. **NEVER** apply voltage or current to the meter that exceeds the specified maximum:

| Input Limits | |
|--|--|
| Function | Maximum Input |
| V DC or V AC | 1000V DC, 700V AC |
| mA DC/AC | 200mA DC/AC |
| A DC/AC | 20A DC/AC (30 seconds max every 15 min.) |
| Resistance, Capacitance, Continuity, Diode | 250V DC/AC rms |

2. **USE EXTREME CAUTION** when working with high voltages.
3. **NEVER** connect the meter leads across a voltage source while the function switch is in the current, resistance, or diode mode. Doing so can damage the meter.
4. **ALWAYS** discharge filter capacitors in power supplies and disconnect the power when making resistance or diode tests.
5. **ALWAYS** turn off the power and disconnect the test leads before opening the covers to replace the fuse or batteries.
6. **NEVER** operate the meter unless the back cover and the battery and fuse covers are in place and fastened securely.

Controls and Jacks

1. 2000 count LCD Display
2. Power ON/OFF button
3. Function switch
4. 20A (positive) input jack
5. μ A/mA input jack
6. Backlight button.
7. Positive input jack
8. COM (negative) input jack



Symbols and Annunciators

| | |
|----|---------------------|
| • | Continuity |
| →+ | Diode |
| Ω | Ohms |
| ⎓ | Volts DC |
| ⎓ | Volts AC |
| ⎓ | Amps DC |
| ⎓ | Amps AC |
| F | Farads |
| μ | micro (farads) |
| m | milli (volts, amps) |
| M | Mega (ohms) |
| k | Kilo (ohms) |
| n | nano (farads) |

Specifications

| | |
|--------------------------------|--|
| Display: | 2000 counts LCD display. |
| Polarity: | Automatic, (-) negative polarity indication. |
| Input Impedance: | 10MΩ |
| Overrange: | “1” is displayed. |
| Low battery indication: | “  ” is displayed if the battery voltage drops below operating voltage. |
| Measurement rate: | 2 times per second, nominal. |
| Operating Temperature: | 0°C to 50°C (32°F to 122°F) at < 70 % relative humidity. |
| Storage temperature: | -20°C to 60°C (-4°F to 140°F) at < 80 % relative humidity. |
| Fuse: | 200mA/250V (5 x 20mm Fast blow), 20A/250V (6.35 x 25mm Fast blow - ceramic) |
| Battery: | One 9V, NEDA 1604 battery. |
| Dimensions: | 182 (H) x82 (W) x 55 (D) |
| Weight: | Approx.: 360g |
| Enclosure: | Double molded |
| Safety / Approvals: | This meter is UL and CUL approved and conforms to IEC61010-1 for Overvoltage Category CAT IV 600V and CAT III 1000V. |

DC Voltage

| Range | Resolution | Accuracy |
|---------|------------|---------------------------------------|
| 200.0mV | 0.1mV | $\pm 0.5\%$ of reading ± 2 digits |
| 2.000V | 1mV | |
| 20.00V | 10mV | |
| 200.0V | 100mV | |
| 1000V | 1V | $\pm 0.8\%$ of reading ± 2 digits |

AC Voltage

| Range | Resolution | Accuracy |
|---------|------------|---------------------------------------|
| 200.0mV | 0.1mV | $\pm 1.0\%$ of reading ± 5 digits |
| 2.000V | 1mV | |
| 20.00V | 10mV | |
| 200.0V | 100mV | |
| 700V | 1V | $\pm 1.2\%$ of reading ± 5 digits |

DC Current

| Range | Resolution | Accuracy |
|---------|------------|---------------------------------------|
| 2.000mA | 1uA | $\pm 1.0\%$ of reading ± 3 digits |
| 20.00mA | 10uA | |
| 200.0mA | 100uA | |
| 20.00A | 10mA | |

Overload Protection: 0.2A / 250V and 20A / 250V Fuse.

AC Current

| Range | Resolution | Accuracy |
|---------|------------|---------------------------------------|
| 2.000mA | 1uA | $\pm 1.2\%$ of reading ± 3 digits |
| 200.0mA | 100uA | |
| 20.00A | 10mA | |
| | | $\pm 3\%$ of reading ± 10 digits |

Overload Protection: 0.2A / 250V and 20A / 250V Fuse.

Note: Accuracy is given at 18°C to 28°C (65°F to 83°F), < 70 % RH

Resistance

| Range | Resolution | Accuracy |
|---------|------------|------------------------------|
| 200.0Ω | 0.1Ω | ±1.0% of reading ± 4 digits |
| 2.000kΩ | 1Ω | ±1.0% of reading ± 2 digits |
| 20.00kΩ | 10Ω | |
| 200.0kΩ | 100Ω | ±1.2% of reading ± 2 digits |
| 2.000MΩ | 1kΩ | |
| 20.00MΩ | 10kΩ | ±2.0% of reading ± 5 digits |
| 200.0MΩ | 10kΩ | ±5.0% of reading ± 10 digits |

Capacitance

| Range | Resolution | Accuracy | |
|---------|------------|------------------------------|------------------------------|
| 2.000nF | 1pF | ±4.0% of reading ± 20 digits | |
| 20.00nF | 10pF | ±4.0% of reading ± 3 digits | |
| 200.0nF | 0.1nF | ±4.0% of reading ± 3 digits | |
| 2.000uF | 1nF | | |
| 200.0uF | 0.1uF | ≤20uF | ±4.0% of reading ± 15 digits |
| | | ≥21uF | unspecified |

Input Protection: 250V dc or 250V ac rms.

Diode Test

Test current: 1mA typical

Open circuit voltage: 2.8V dc typical

Overload protection: 250V dc or ac rms.

Audible continuity

Audible threshold: Less than 50Ω Test current: <0.3mA

Overload protection: 250V dc or ac rms.

Operating Instructions

WARNING: Risk of electrocution. High-voltage circuits, both AC and DC, are very dangerous and should be measured with great care.

If "1" appears in the display during a measurement, the value exceeds the range you have selected. Change to a higher range.

NOTE: On some low AC and DC voltage ranges, with the test leads not connected to a device, the display may show a random, changing reading. This is normal and is caused by the high-input sensitivity. The reading will stabilize and give a proper measurement when connected to a circuit.

NOTE: To extend the battery life of the meter the backlight will automatically turn off in approximate 30 seconds.

DC Voltage Measurements

CAUTION: Do not measure DC voltages if a motor on the circuit is being switched ON or OFF. Large voltage surges may occur that can damage the meter.

1. Set the function switch to the $\overline{\overline{V}}$ position.
2. Insert the black test lead banana plug into the negative **COM** jack and the red test lead banana plug into the positive **V** jack.
3. Touch the black test probe tip to the negative side of the circuit and red test probe tip to the positive side of the circuit.
4. Read the voltage in the display. If polarity is reversed, the display will show (-) minus sign before the value.
5. Reset the function switch to successively lower $\overline{\overline{V}}$ positions to obtain a higher resolution reading.

AC Voltage Measurements

WARNING: Risk of Electrocution. The probe tips may not be long enough to contact the live parts inside some 240V outlets for appliances because the contacts are recessed deep in the outlets. As a result, the reading may show 0 volts when the outlet actually has voltage on it. Make sure the probe tips are touching the metal contacts inside the outlet before assuming that no voltage is present.

CAUTION: Do not measure AC voltages if a motor on the circuit is being switched ON or OFF. Large voltage surges may occur that can damage the meter.

1. Set the function switch to the \tilde{V} position.
2. Insert the black test lead banana plug into the negative **COM** jack and the red test lead banana plug into the positive **V** jack.
3. Touch the black test probe tip to the negative side of the circuit and the red test probe tip to the positive side of the circuit.
4. Read the voltage in the display. The display will indicate the proper decimal point and value. If the polarity is reversed, the display will show (-) minus before the value.
5. Reset the function switch to successively lower \tilde{V} positions to obtain a higher resolution reading.

DC Current Measurements

CAUTION: Do not make current measurements on the 20A scale for longer than 30 seconds. Exceeding 30 seconds may cause damage to the meter and/or the test leads.

1. Insert the black test lead banana plug into the negative **COM** jack.
2. For current measurements up to 200mA DC, set the function switch to the highest DC mA position and insert the red test lead banana plug into the (mA) jack.
3. For current measurements up to 20A DC, set the function switch to the 20A range and insert the red test lead banana plug into the (20A) jack.

4. Remove power from the circuit under test, then open up the circuit at the point where you wish to measure current.
5. Touch the black test probe tip to the negative side of the circuit. Touch the red test probe tip to the positive side of the circuit.
6. Apply power to the circuit.
7. Read the current in the display.
8. For mA DC measurements, reset the function switch to successively lower mA DC positions to obtain a higher resolution reading.

AC Current Measurements

WARNING: To avoid electric shock, do not measure AC current on any circuit whose voltage exceeds 250V AC.

CAUTION: Do not make current measurements on the 20A scale for longer than 30 seconds. Exceeding 30 seconds may cause damage to the meter and/or the test leads.

1. Insert the black test lead banana plug into the negative **COM** jack.
2. For current measurements up to 200mA AC, set the function switch to the highest AC mA position and insert the red test lead banana plug into the (mA) jack.
3. For current measurements up to 20A AC, set the function switch to the 20A range and insert the red test lead banana plug into the (20A) jack.
4. Remove power from the circuit under test, then open up the circuit at the point where you wish to measure current.
5. Touch the black test probe tip to the negative side of the circuit. Touch the red test probe tip to the positive side of the circuit.
6. Apply power to the circuit.
7. Read the current in the display.
8. For mA AC measurements, reset the function switch to successively lower mA DC positions to obtain a higher resolution reading.

Resistance Measurements

WARNING: To avoid electric shock, disconnect power to the unit under test and discharge all capacitors before taking any resistance measurements. Remove the batteries and unplug the line cords.

1. Set the function switch to the Ω position.
2. Insert the black test lead banana plug into the negative **COM** jack and the red test lead banana plug into the positive Ω jack.
3. Touch the test probe tips across the circuit or part under test. It is best to disconnect one side of the part under test so the rest of the circuit will not interfere with the resistance reading.
4. Read the resistance in the display.

Continuity Check

WARNING: To avoid electric shock, never measure continuity on circuits or wires that have voltage on them.

1. Set the function switch to the $\rightarrow \cdot \cdot \cdot$ position.
2. Insert the black lead banana plug into the negative **COM** jack and the red test lead banana plug into the positive Ω jack.
3. Touch the test probe tips to the circuit or wire to be tested.
4. If the resistance is less than approximately 50Ω , the audible signal will sound.

Diode Test

WARNING: To avoid electric shock, do not test any diode that has voltage on it.

1. Set the function switch to $\rightarrow \cdot \cdot \cdot$ position.
2. Insert the black test lead banana plug into the negative (-) jack **COM** and the red test lead banana plug into the positive (+) jack Ω .

3. Touch the test probe tips to the diode or semiconductor junction you wish to test. Note the meter reading
4. Reverse the probe polarity by switching probe position. Note this reading.
5. The diode or junction can be evaluated as follows:
 - A. If one reading shows a value and the other reading shows "1", the diode is good.
 - B. If both readings show "1", the device is open.
 - C. If both readings are very small or 0, the device is shorted.

NOTE: The value indicated in the display during the diode check is the forward voltage.

Capacitance Measurements

WARNING: To avoid electric shock, disconnect power to the unit under test and discharge all capacitors before taking any capacitance measurements. Remove the batteries and unplug the line cords.

1. Set the function switch to the **F** position.
2. Insert the black test lead banana plug into the negative (-) jack **COM** and the red test lead banana plug into the positive (+) jack **HT**.
3. Touch the test leads to the capacitor to be tested.

Maintenance

Replacing the Battery

WARNING: To avoid electric shock, disconnect the test leads from any source of voltage before removing the battery door.

1.  will appear in the display when the battery drops below the operating voltage and requires replacing.
2. Turn off the meter and disconnect the test leads from the meter.
3. Remove the two screws securing the battery cover.
4. Replace the 9V battery observing the correct polarity.
5. Replace the cover and secure the two screws.

WARNING: To avoid electric shock, do not operate your meter until the battery door is in place and fastened securely.

Replacing the Fuses

WARNING: To avoid electric shock, disconnect the test leads from any source of voltage before removing the fuse cover.

1. Turn off the meter and disconnect both test leads from the meter.
2. Remove the two screws securing the battery/fuse cover and remove the battery.
3. Remove the old fuse from its holder by gently pulling it out.
4. Replace with fuse of proper size and value (200mA/250V fast blow for 200mA range, 20A/250V fast blow for 20A range).
5. Replace the battery and the cover and tighten the screws.

WARNING: To avoid electric shock, do not operate your meter until the fuse door is in place and fastened securely.

Limited Warranty

Circuit-Test Electronics warrants to the original purchaser that this product be free of defect in material or workmanship for a period of 2 years from the date of purchase.

Any product which has been subjected to misuse or accidental damage is excluded from the warranty. Except as stated above, Circuit-Test Electronics makes no promises or warranties either expressed or implied including warranties of merchantability or the fitness for any particular purpose.