



**AUTO RANGING  
AUTO POWER OFF  
RS232 INTERFACED  
MULTIMETER  
Model 4000ZC  
3 3/4 DIGITS**

**DIGITAL MULTIMETER**

**OPERATION MANUAL**

*This LCD Auto Ranging & Auto Power off digital multimeter is a portable, compact, 3 3/4 digits multimeter. It connects to computer by RS232 interface. It is ideal for field, lab, shop, car, and home applications.*

**1. SPECIFICATIONS**

**1.1 GENERAL SPECIFICATIONS**

- Display : 3 3/4 digits LCD with a max. reading of 4000.
- Range control : Auto range control
- Polarity : Automatic negative polarity indication.
- Zero adjustment : Automatic.
- Overrange indication: The "OL" display.
- Low-battery : The "LO" is shown on when the battery voltage gets below 2.4V.
- Auto Power Off : 30 minutes after use or no key-input, the meter automatically enters into power off mode.
- Safety standards : CE EMC/LVD. The meter is compliance with the standards of IEC 1010

Pollution Degree 2, Overvoltage Category II.

- Operating environment: Temperature 32 to 104°F (0°C to 40°C), humidity <85% RH.
- Storage environment: Temperature -4 to 140°F (-20°C to 60°C), humidity <85% RH.
- Power Type : 2x 1.5 V AA batteries.
- Dimension : 145(H)x 73(W) x 40(D) mm
- Weight : Approx. 260g (including battery and holster).

**1.2 ELECTRICAL SPECIFICATIONS**

Accuracy is ±(% of reading + number in last digit) at 23 ± 5°C, <75% RH, for most ranges.

- DC Voltage**
- |                      |             |  |
|----------------------|-------------|--|
| 400mV, 4V, 40V, 400V | : ±(0.5%+5) | △ Max. Voltage from "VΩmA" socket to "COM" socket is 600V $\tilde{\sim}$ from "COM" socket to earth is 300V $\tilde{\sim}$ . |
| 600V                 | : ±(0.8%+5) |  |
| Input Impedance      | : 10MΩ      |  |

- AC Voltage**
- |                    |             |
|--------------------|-------------|
| 4V, 40V, 400V      | : ±(0.8%+5) |
| 400mV, 600V        | : ±(1.2%+5) |
| Impedance          | : 10MΩ      |
| Frequency response | : 40—400Hz  |

- Resistance**
- |                             |                   |
|-----------------------------|-------------------|
| 400Ω, 4kΩ, 40kΩ, 400kΩ, 4MΩ | : ±(1%+5)         |
| 40MΩ                        | : ±(2%+5)         |
| Overload protection         | : 250V DC/AC RMS. |

- DC Current**
- |                     |   |
|---------------------|---|
| 400μA, 4000μA       | : ±(2%+5)   |
| 40mA, 400mA         | : ±(1.5%+5)                                       |
| 4A 10A              | : ±(2%+5) △ Caution: Maximal operation time <15s. |
| Overload protection | : Fast 0.5A/250V, 10A/250V fuse.                  |

- AC Current**
- |                     |   |
|---------------------|---|
| 400μA, 4000μA       | : ±(2.5%+3)   |
| 40mA, 400mA         | : ±(2%+5)   |
| 4A 10A              | : ±(2.5%+5) △ Caution: Maximal operation time <15s. |
| Overload protection | : Fast 0.5A/250V, 10A/250V fuse.                    |
| Frequency response  | : 40—400Hz  |

- Capacitance**
- |                     |                   |
|---------------------|-------------------|
| 40nF                | : ±(3.5%+10)      |
| 400nF, 4μF, 40μF    | : ±(3%+5)         |
| 100μF               | : ±(3.5%+5)       |
| Overload protection | : 250V DC/AC RMS. |

- Frequency and Duty cycle**
- |                       |                       |                            |
|-----------------------|-----------------------|----------------------------|
| Frequency 10Hz-10MHz  | : ±(0.1%+5)           | Frequency lower than 10kHz |
| Duty cycle 0.1%-99.9% | : ±(2.5%+5)           |                            |
| Sensitivity           | : Sine wave 1.5V RMS. |                            |
| Overload protection   | : 250V DC/AC RMS.     |                            |

- Temperature** (Using K type thermocouple probe)
- |                |                                      |
|----------------|--------------------------------------|
| 0°C--+40°C     | : ±3°C (Build-in temperature sensor) |
| -50°C--+200°C  | : ± 0.75% ±3°C                       |
| +200°C--+750°C | : ± 1.5% ±3°C                        |

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- Diode Test**
- |                     |            |              |                  |
|---------------------|------------|--------------|------------------|
| Test current        | : ±1±0.6mA | Test voltage | : Approx. 1.5V   |
| Overload protection |            |              | : 250V DC/AC RMS |

- Continuity Test**
- |                     |                            |
|---------------------|----------------------------|
| Audible indication: | less than (60+20)Ω Approx. |
| Overload protection | : 250V DC/AC RMS.          |

**2. OPERATION**

- CAUTION:**
- 1) When measuring voltage, ensure that instrument is not connected or switched to resistance range. Always ensure that the correct terminals are used for the type of measurement to be made.
  - 2) Use extreme care when measuring voltage above 50V, especially from sources where high energy exists to avoid electric shock.
  - 3) Avoid making connections to "alive" circuits whenever possible.
  - 4) When making current measurements ensure that the circuit is not "alive" before open it in order to connect the test leads.
  - 5) Before making resistance measurements or diode test, ensure that the circuit under test is discharged.
  - 6) Always ensure that the correct function and range is selected before testing. If in doubt about the correct range to use, start with the highest and then work downwards.
  - 7) Extreme care should be taken when using this meter to measure a current transformer connected to the terminals where an open circuit connects with.
  - 8) Ensure that the test leads and probes are in good condition with no damage to the insulation.
  - 9) Take care not to exceed the over-load limits as given in the specifications.
  - 10) Before opening the case of the instrument to replace battery, disconnect the test leads from any external circuit, set the selector switch to "OFF" position.

- 2.1 Check the 3-volt battery.**  
If the battery is weak, a "LO" symbol will appear on the left of the display. It means that the battery should be replaced.

- 2.2 DC and AC Voltage measurement**
- 1) Connect the black test lead to "COM" socket and red test leads to the "VΩHz" socket.
  - 2) Set the selector switch to desired "V  $\tilde{\sim}$ " position, and press "SELECT" key to choose function. (DC or AC)
  - 3) Connect the probes across the source or load under test.

- 2.3 DC and AC Current measurement**
- 1) Connect the black test lead to "COM" socket and red test leads to the "VΩHz" socket.
  - 2) For measurement up to 400mA. Set the selector switch to desired "mA  $\tilde{\sim}$ " or "A  $\tilde{\sim}$ " position, and press "SELECT" key to choose function. (DC or AC)
  - 3) For current measurement from 400mA to 10A, connect the red test lead to "10A" socket. Set selector switch to "A  $\tilde{\sim}$ " position, and press "SEL" key to choose function.
  - 4) Connect the probes across the source or load under measurement.

- 2.4 Resistance measurement and Diode, Continuity Test**
- 1) Connect the black test lead to "COM" socket and red test leads to the "VΩHz" socket.
  - 2) Set the selector switch to "Ω /  $\rightarrow$  /  $\rightarrow$ " position and press "SELECT" key to choose function.
  - 3) Connect the probes across circuit to be tested.
- Caution: Ensure that the circuit to be tested is "dead". Max. input over-load: 250V RMS. and <10sec.

**2.5 Capacitance measurement**

- 1) Before testing, discharge the capacitor by shorting its leads together. Use caution in handling capacitors because they may have a charge on them with considerable power before discharging.
  - 2) Connect the black test lead to "COM" socket and red test leads to the "VΩHz" socket.
  - 3) Set the selector switch to "C" position.
  - 4) Press "REL" key, you can use the relative function to eliminate the zero error.
  - 5) Connect the probes across capacitor to be tested.
- Note: When testing 100μF capacitor, note that there will be approx. 15 sec time lag.

**2.6 Frequency and Duty cycle measurement**

- 1) Connect the black test lead to "COM" socket and red test leads to the "VΩHz" socket.
- 2) Set the selector switch to "Hz" position and press "Hz/DUTY" key to choose function.
- 3) Connect the probes across the source or load under measurement.
- 4) When using the Adapter, the correct reading should come after the calculation of the reading on the LCD display times 128. But when connecting the computer with RS232 and selecting "Adapter 128" box inside "Configure" column, the correct result will directly come out.

**2.7 Temperature measurement**

- Set the selector switch to the "C" range and connect the K type thermocouple's black test lead to "COM" socket and red test lead to the "VΩHz" socket.

**2.8 Manual range and auto range**

- 1) Default is set to be "Auto" range when the meter first turns on. Press "RANGE" key the meter to enter the "Manual" mode. Each press of "RANGE" key increments the range.
- 2) Hz/Duty and Capacity and Temperature functions cannot be manually changed.
- 3) Press "RANGE" key more than 2 seconds, the meter changes back to "Auto".

**2.9 Relative value display**

- Press "REL" key meter to enter relative measurement mode, the present value will be stored in memory, new display value is equalled measurement value subtract stored value. All functions are with the capability except for Hz/Duty function.

Example:  
When you test the capacitance, you can use the Relative function to eliminate the zero error.

**2.10 Auto Power Off and disable**

- 1) When the meter has been turned on after 30 minutes without any action, the meter will automatically change to "OFF" mode.
- 2) To disable Auto Power Off function, press "SELECT" key when power on the meter.

**2.11 RS232 Computer interface**

- 1) Set up your PC under Windows system. Insert the diskette to the drive. Click "Setup.exe" Follow up setup message from the screen.
- 2) Connect the RS232 cable between the meter's and the computer's serial ports. On the "PROGRAM" menu box, then "DMM" is shown, click on "DMM" into start.
- 3) Push "RS232", RS232 status and the symbol of "RS232" appears on the LCD. Push "RS232" again, RS232 is disconnected and the symbol of "RS232" disappears. For detail information on the computer interfacing, please check the software comes with the meter.

**3. CARE AND MAINTENANCE**

**3.1 CARING FOR YOUR MULTIMETER**

Your Digital MultiMate is an example of superior design and craftsmanship. The following

suggestions will help you care for the multimeter so you can enjoy it for years.

- 1) Keep the meter dry. If it gets wet, wipe it dry immediately. Liquids can damage or corrode electronic circuits.
- 2) Use and store the multimeter only in normal temperature environments. Extreme temperature can shorten the life of electronic devices, damage batteries, and distort or melt plastic parts.
- 3) Handle the multimeter gently and carefully. Dropping it can damage the circuit boards and can cause the multimeter to work improperly even the holster can provide enough protection.
- 4) Keep the multimeter away from dust and dirt, which can cause premature wear of parts.
- 5) Wipe the multimeter with a damp cloth occasionally to keep it clean. Do not use harsh chemicals, cleaning solvents, or strong detergents to clean the multimeter.
- 6) Use only fresh batteries of the required size and type. Always remove old or weak batteries out. They can leak chemicals that destroy electronic circuits. Alkaline batteries are highly recommended.

### 3.2 MAINTENANCE

#### 3-Volt battery replacement or fuse replacement

- a) When no use for a while, set the selector switch to **OFF** position and remove the test leads from the terminals.
- b) To replace the batteries, remove the screw on the bottom case and lift the bottom case. Remove the used battery and replace it with a battery of the same type.
- c) To remove the screws on the bottom case and lift the case. Replace the fuse with same type and rating: 5×20mm 0.5A/250V fast-blow fuse or 6×25mm 10A/250V fast-blow fuse as the replacements.

For any further assistant, please check the website: [www.multimeterwarehouse.com](http://www.multimeterwarehouse.com), for the customer in Northern America, please call 1-888 524 8676 for more information, For more technical information regarding multimeter application, please visit our website:

<http://www.multimeterwarehouse.com/techcenter.htm>

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