

1. INTRODUCTION

This Digital Multimeter (VIOT, model M7) is a compact precision, battery operated instrument with 3-1/2 digits LCD display.

Features:

- ✓ High accuracy: see each function for details;
- ✓ Icon display: shows what functions is at test
- ✓ Large LCD display: height 22mm
- ✓ Single 30 position rotary switch for FUNCTIONS and RANGE selection, allows fast and convenient operation.
- ✓ Color jacks with fully protection test leads.
- ✓ Lower overage power Auto-Power Off
- ✓ Soft carrying case.

2. GENERAL SPECIFICATION

- 1) Display: 3-1/2 digits LCD with a maximum reading of 1999.
- 2) Measurement rate: updates 2-3/sec.
- 3) Over range indication: only "1" is displayed at the left side digit.
- 4) Automatic polarity indication.
- 5) The icon "E3" is displayed when the battery voltage drops below the operating voltage.
- 6) Full range over load protection.
- 7) Capacitance measurement Auto-Zeroing.
- 8) Auto Power Off: It will be automatically turned off after idling for 15 minutes. It needs to be turned off and back on again to continue the operation.
- 9) Operating temperature: 0°C-40°C(104°F), 0-85% R.H.
Storage temperature: -10°C-50°C(122°F), 0-85% R.H.
- 10) Power: Single standard 9V battery IEC 6F22, NEDA 1604, JIS 006P.
- 11) Dimensions: 176L*88W*38Hmm.
- 12) Weight: approx 310g (including battery)
- 13) Accessories: test leads (pair), spare fuse 0.5A (inside case), K-type thermocouple, operation manual.

3. ELECTRICAL SPECIFICATIONS

Accuracy is given as ± (% of reading + number) for one year, at 23°C±5°C RH<75%

- 1) DCV

Range	Accuracy
200mV	±(0.5%+1)
2V	
20V	±(0.5%+3)
200V	
1000V	±(0.8%+3)

Input impedance: 10MΩ on all range

- 2) ACV

Range	Accuracy
2V	
20V	±(1.0%+5)
200V	
750V	±(1.2%+5)

Input impedance: 10MΩ Frequency range: 40 ~ 400Hz

- 3) DCA

Range	Accuracy
2mA	±(1.0%+3)
20mA	
200mA	±(1.5%+5)
2A	±(2.0%+10)

Measuring voltage drop: 200mV

- 4) ACA

Range	Accuracy
200mA	±(2.0%+5)
2A	±(3.0%+10)

Measuring voltage drop: 200mV Frequency range: 40 ~ 400Hz

- 5) CAPACITANCE

Range	Accuracy
2nF	
20nF	
200nF	±(4.0%+3)
2μF	
20μF	

- 6) OHM

Range	Accuracy
200Ω	±(1.0%+10)
2KΩ	
20KΩ	±(1.0%+1)
200KΩ	
2MΩ	
20MΩ	±(1.0%+5)

- 7) TEMPERATURE MEASUREMENT (With K-type thermocouple)

Range	Accuracy
-40°C ~ 400°C	±(0.8%+3)
400°C ~ 1000°C	±(1.5%+15)

- 8) FREQUENCY MEASUREMENT

Range	Accuracy
20KHz	1.5%±10

Sensitivity: 100mV rms

4. PRECAUTIONS AND PREPARATIONS FOR MEASUREMENT

- 1) Be sure that battery is correctly placed in the battery compartment and the cover is snapped in.
- 2) Input limit shown below:

Function Range	Input terminals	Maximum input
DCV 200mV		250VDC
DCV 2-1000V	V/OHM COM	1000VDC
ACV 2-750V		750VAC
OHM	V/OHM COM	250V DC/AC
Freq.	V/OHM/Hz COM	
Diode	V/OHM COM	
DCA 200mA	A COM	200mA DC/AC
ACA 200mA		
DCA & ACA 20A	20A COM	20A DC/AC
- 3) Inspect the test leads for damaged insulation or exposed metal. Check test lead continuity. Damaged leads should be replaced.
- 4) Select the proper function and range for your measurement.
- 5) Check the input terminal position for red test lead depends on measurement ranges.
- 6) Booth test leads should be disconnected from the circuit under test when changing the test ranges.
- 7) To avoid electrical shock or damage to the meter; do not apply more than 500V between any terminal and earth ground.
- 8) To avoid electrical shock, take caution when working on circuit above

60VDC or 25VAC rms, such voltage pose a shock hazard.

- 9) Switch the meter off when the measurement is done. Remove the battery from the battery compartment if the meter is not to be used for a long period of time.
- 10) Do not tamper with the circuit to avoid damage.
- 11) Do not use or store the instrument in a place of direct sunlight, high temperature and high humidity.

5. METHOD OF MEASUREMENT

5.1 DCV & ACV MEASUREMENT

- 1) Set the Function range switch at the required position.
- 2) Connect black test lead to "COM" input and red test lead to the "V/OHM" input terminal.
- 3) Connect test leads to measuring points. The voltage is displayed.
- 4) Negative Polarity of the red lead is indicated by a "-" sign.

Note:

- a) If the voltage to be tested is unknown before the test, set the Function range to the highest and work down ward.
- b) When only the "1" is displayed, over range is detected and the function range switch should be set to a higher range.
- c) Never try to measure the voltage above 1000V! Although the indication is possible to show, there is a danger of damaging the internal circuitry.

5.2 DCA & ACA MEASUREMENT

- 1) Connect the black test lead to the "COM" terminal and the red test lead to "A" terminal for a maximum of 0.5A.
- 2) Set the function range switch at the required position.
- 3) Connect test leads to measuring points and read the display value. The polarity at the red test lead connection will be indicated at the same time as the current is on display.

Note:

- a) If the current range is unknown beforehand, set the function range switch to the highest range and work down ward.
- b) When only "1" is displayed at the left side, it indicates an over range and the function range switch should be set to a higher range.

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5.8 TRANSISTOR hFE TEST

- 1) Set the function range switch to the "hFE" position.
- 2) Make sure the transistor is "NPN" or "PNP" type.
- 3) Insert transistor legs correctly in E.B.C connector.
- 4) Display reading is approx. transistor hFE value.

Note:

Test condition: Base current approx. 10 μ A. V_{CE} approx. 2.8V

6. BATTERY AND FUSE REPLACEMENT

- 1) Battery and fuse replacement should only be done after the test leads have been disconnected and power is turned off.
- 2) Loosen screws with suitable screwdriver and remove the battery compartment cover (back bottom).
- 3) The meter is powered by a single 9V battery (IEC 6F22, NEDA 1604, JIS 006P).
- 4) Snap the battery connector leads to the terminals of a new battery and reinsert the new battery into the case top. Organize the battery wire so that they will not be pinched between the case bottom and case top.
- 5) The meter is protected by fast action fuse, 0.5A/250V, dimensions ϕ 5*20mm.
- 6) Replace the case bottom and reinstall the three screws. Never operate the meter unless the case bottom is fully closed.

△WARRANTY△

Warrants this instrument to be free from defects in material and workmanship for a period of one year. Any instrument found defective within one year from the delivery date can be returned to the dealer with transportation charges prepaid. We will replace it at no charge to the original purchaser. This warranty does not cover expendable items such as batteries or fuses. If the defect has been caused by a misuse or abnormal operation conditions, the repair cost will be billed to the buyer. Contact the North American dealer at www.trade777.com/VIOT.

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- c) Excessive current may blow up the fuse that must be replaced when the input is from "A" terminal. Fuse type is 0.5A.
- d) A fuse does not protect the 20A range; maximum 10A continuous or maximum 20A measuring time must be less than 15 seconds.

5.3 RESISTANCE MEASUREMENT

- 1) Connect black test lead to "COM" terminal and red test lead to the "V/OHM" input terminal.
- 2) Set the function range switch to the OHM range.
- 3) Connect the test leads across the resistance under measurement and read the display value.

Note:

- a) The polarity of the red test lead is "+".
- b) When the input is not connected, i.e. at open circuit, the figure "1" will be displayed for the over range condition.
- c) If the resistance value being measured exceeds the maximum value of the range selected, an over range indication "1" will be displayed at the left and function range switch should be set to a higher range.
- d) 200M Ω range has a 10 digits (1M Ω) constant, the figure will appear in short circuit status, and it should be subtracted from measurement result, for instance: when measuring 100M Ω resistor, figure 101.0 will be shown in display and the last 10 digits should be subtracted.

5.4 CAPACITANCE MEASUREMENT

WARNING: The capacitor should be discharged before the testing. Never apply voltage to the "Cx" input socket, or serious damage may result.

- 1) Set the function range switch at the "Cx" position. Before connecting the capacitor, the display could be zeroed automatically slow.
- 2) Connect the test capacitor to the "Cx" input socket (not test leads) and read the display value.

5.5 FREQUENCY MEASUREMENT

- 1) Set the function range switch at the required "Hz" position.
- 2) Connect test leads to measuring points and read the display value.

Note: Do not apply more than 250V rms to the input. Indication is possible a voltage higher than 100V rms, but reading maybe out of specification.

5.6 TEMPERATURE MEASUREMENT

- 1) Set the function range switch at the "TEMP" position.
- 2) Note the polarity of the K Type plug of the thermocouple when inserting it to the TEMP Port.
- 3) Leave or fasten the thermocouple sensor end (testing end) on or inside the subject being tested.
- 4) The value of the temperature is shown on the display in degrees centigrade (°F).

Note:

- a) The testing temperature is displayed automatically when the thermocouple is inserted into the TEMP port.
- b) The surrounding temperature is shown when the circuit of the sensor is unplugged.
- c) The temperature limit is 482°F; 572°F is acceptable within a short period.
- d) Take caution not to damage the sensor tip at any time.

5.7 DIODE & CONTINUITY TEST

- 1) Set the function range switch at the "H \rightarrow h" position.
- 2) Connect the black test lead to "COM" terminal and red test lead to "V/OHM" input terminal; (Note: the polarity of the red test lead is "+").
- 3) This range with "AUDIBLE CONTINUITY TEST" function. Built-in buzzer sounds if the resistance between two probes is less than 30 \pm 10 Ω .
- 4) Connect the test leads across the diode and read the display value.

Note:

- a) When the input is not connected, i.e. at open circuit, "1" will be displayed at the left on LCD.
- b) Test condition: Forward DC current approx. 1mA. Reversed DC voltage approx. 2.8V.
- c) The meter displays the forward voltage drop and displays figure "1" for overload when the diode is reversed.

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