

EXTECH
383273

**DIGITAL
MULTIMETER**

INSTRUCTION MANUAL

Jan-1997 -00

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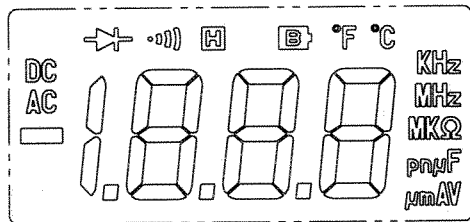
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I. SPECIFICATIONS

1-1 General Specifications

Operating Principle : Dual slope integration
 Numerical Display : 3 1/2 digit liquid crystal display (LCD)
 17mm height. maximum reading 1999 .

Unit and Sign Display :



- ▣ Decimal point
- AC Alternating current or voltage
- DC Direct current or voltage
- V Volts
- mV Millivolts (1×10^{-3} volts)
- A Ampere (amps). Current
- μA Microamperes (1×10^{-6} amps)
- μF Microfarads (1×10^{-6} Farads), Capacitance.
- nF Nanofarads (1×10^{-9} Farads), Capacitance.
- pF Picofarads (1×10^{-12} Farads), Capacitance.
- Ω Ohms. Resistance
- KΩ Kilohms (1×10^3 ohms). Resistance
- MΩ Megohm (1×10^6 ohms). Resistance
- KHz Kilohertz (1×10^3 cycles / sec). Frequency
- MHz Megahertz (1×10^6 ohms). Frequency

- Diode
- Continuity Beeper
- B Low Battery
- Negative polarity
- H Data Hold
- °F Fahrenheit temperature scale
- °C Celsius temperature scale

- Range Selection : All ranges are measured by single Range switch operation.
- Over Range Indication : "OL" appears on the display.
- Low Battery Indication : The **B** is displayed when the battery voltage drops below the operating voltage.
- Sampling Rate : 2.5 time per second except in Freq. Mode. 1 time per second in Freq. Mode.
- Power Requirements : 9-Volt battery (NEDA or JIS 006p IEC6f22) or 9V DC adapter, 0.3W minimum.
- Battery Life (typical) : Approx. 60hours. (Alkaline Battery)
- Operating Temperature and Humidity : 0°C to 40°C (32°F to 104°F)
RH below 80%
- Storage Temperature and Humidity : -10°C to 60°C (14°F to 140°F)
RH below 70%

Dimensions : 180 (L) × 82 (W) × 38(H) mm
7.09"(L)×3.2"(W)×1.5"(H)

Weight : 365g

Accessories : Test leads (pair), Operating Instruction, Spare fuse (0.5A / 250V), Software, Battery, RS-232C Cable, 9pin to 25pin Gender Changer.

Optional Accessories : K type thermocouple.

1-2 Electrical Specifications

Accuracies are ±(...% of reading + ...digits) at 23°C ±5°C, below 80% RH.

□ DC Voltage

Range	Resolution	Accuracy	Input Impedance	Overload Protection
200mV	0.1mV	0.5%+1	10MΩ	600Vrms
2V	1mV			1100Vpp
20V	10mV			
200V	100mV			
1000V	1V	0.5%+2		

□ AC Voltage (50Hz to 500Hz)

Range	Resolution	Accuracy	Input Impedance	Overload Protection
200mV	0.1mV	1%+5	10MΩ	600Vrms
2V	1mV			1100Vpp
20V	10mV			
200V	100mV			
750V	1V	1.2%+5		

□ DC Current


Range	Resolution	Accuracy	Burden Voltage	Overload Protection
200uA	0.1uA	1%+1	0.35V	0.5A / 250 Fast Blow Fuse & Diode
2mA	1uA			
20mA	10uA			
200mA	100uA			
20A	10mA	1.2%+3	0.8V	20A / 380V Fast Blow Fuse


□ AC Current (50Hz to 500Hz)

Range	Resolution	Accuracy	Burden Voltage	Overload Protection
200uA	0.1uA	1.2%+3	0.35V	0.5A / 250 Fast Blow Fuse & Diode
2mA	1uA			
20mA	10uA			
200mA	100uA			
20A	10mA	1.5%+5	0.8V	20A / 380V Fast Blow Fuse


□ Resistance (Ω)

Range	Resolution	Accuracy	Max. Open Circuit Voltage	Overload Protection
200Ω	0.1Ω	0.8%+2	3.2V	600Vrms
2KΩ	1Ω		0.5V	
20KΩ	10Ω			
200KΩ	100Ω			
2MΩ	1KΩ			
20MΩ	10KΩ	1.5%+3		

□ Diode ()

Range	Resolution	Accuracy	Max. Open Circuit Voltage	Max. Test Current	Overload Protection
	1mV	2%+ 2	3.2V	1.0mA	600Vrms

□ Continuity ()

Range	Operation Resolution	Max. Open Circuit Voltage	Overload Protection
	Continuity audible tone for tested resistance below 30Ω	3.2V	600Vrms

□ Frequency (Hz) (Test Range 10Hz - 20MHz Auto Range)

Range	Resolution	Accuracy	Max. Open Circuit Voltage	Overload Protection
2KHz	1Hz	0.5%+2	1.5Vrms	600Vrms
20KHz	10Hz			
200KHz	100Hz			
2MHz	1KHz			
20MHz	10KHz		3Vrms	

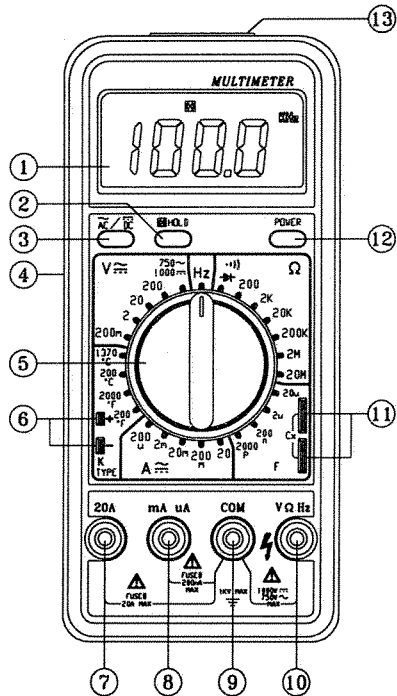
□ Temperature Probe used : K (CA) type sensor

Range	Resolution	Accuracy
°C	0.1/1°C	0°C~200°C ±(0.5%+1.5°C)
		-50°C~0°C ±(1% + 2°C)
		200°C~1300°C ±(1% + 2°C)
°F	0.1/1°F	0°F~200°F ±(0.5%+3°F)
		-58°F~0°F ±(1% + 5°F)
		200°F~1999°F ±(1% + 4°F)

□ Capacitance (F)

Range	Resolution	Accuracy	Test Frequency
2000pF	1pF	3%+10	400Hz
200nF	100pF		
2uF	1nF		
20uF	10nF		

II. NAME OF PARTS AND POSITIONS



- ① LCD Display :
Measured values, unit symbols and decimal points are displayed.
- ② Data Hold Button :
Push the Button to hold the reading and sign will appear . Push again, to release the holding.
- ③ AC/DC Function Button :
To select function for measuring DC voltage, DC current, AC voltage , AC current.
- ④ 9VDC Adaptor Connector :
To connect DC 9V for DC power supply, use 3.5 φ standard Jack.
- ⑤ Range Selector Switch :
For range selection.
- ⑥ Temperature Measuring Connector :
To insert K (CA) type sensor for temperature measurement.
- ⑦ 20A Measuring Connector :
To connect positive lead (red test lead) for current measurement below 20A.
- ⑧ mA and uA Measuring Connector :
To connect positive lead (red test lead) for current measurement below 200mA.
- ⑨ COM Measuring Connector :
To connect negative lead (black test lead) for voltage, current , resistance, diode, frequency , and continuity measurement.

- ⑩ " V- Ω -Hz " Measuring Connector :
To connect positive lead (red test lead) for voltage, resistance, diode , frequency, and continuity measurement.
- ⑪ Capacitance Measuring Connector :
To insert capacitor pins for capacitance measuring.
- ⑫ Power ON/OFF Button :
For Power ON and Power OFF Selection.
- ⑬ RS-232C interface Connector :
To connect the RS-232C cable to the terminals built into the PC and meter.

III. PRECAUTIONS AND PREPARATIONS FOR MEASUREMENT

- 1). DO NOT attempt to take any voltage or current measurement that exceed the maximum range of this instrument.
- 2). Be sure that battery is correctly placed in the case and connected to the battery snap.
- 3). Make certain the range selected is greater than circuit current or voltage prior to attempting measurement. When changing range it always breaks contact from the circuit with one of the test leads.
- 4). Check the input terminal position for red test lead according to the measurement ranges.

- 5). DO NOT measure if the rear cover of Multimeter is not secured.
- 6). When finish the measurement, turn OFF the power.
- 7). To avoid leakage problem, be sure to remove the battery when it is not to be used for a long time.
- 8). DO NOT use or store the instrument in a high temperature of high humidity environment.
- 9). DO NOT check resistance in a circuit while power is on or before circuit capacitors are discharged.

IV. MEASUREMENTS

4-1 DC Voltage Measurement

- 1). Connect red test lead to " V- Ω -Hz " terminal and black test lead to " COM " terminal.
- 2). Set range switch to desired V \approx range and set DC / AC push switch to DC position.
- 3). Connect Test prods of test leads IN PARALLEL to the circuit being measured.
- 4). Read the voltage value displayed on LCD.

NOTE :

- If the voltage is unknown before measurement, first , set the function switch to the high-test range then, change to a lower range, step by step.
- When the " OL " is displayed, the measuring circuit is overloaded. The function switch must be set to a higher range.
- Always avoid contact with high tension circuits when measuring high voltage.

4-2 AC Voltage Measurement

- 1). Connect red test lead to " V- Ω -Hz " terminal and black test lead to " COM " terminal.
- 2). Set range switch to desired V \cong range and set DC / AC push switch to AC position.
- 3). Connect Test prods of test leads IN PARALLEL to the circuit being measured.
- 4). Read the voltage value displayed on LCD.

NOTE : See DC voltage measurement NOTE 1. 2. 3

4-3 DC Current Measurement

- 1). Connect red test lead to "mA" Terminal for Current measurements up to 200mA. (For measuring Current between 200mA to 20A, Connect red test lead to "20A" terminal.) Connect black test lead to "COM" terminal.
- 2). Set range switch to desired A \cong range and set DC / AC push switch to DC position.
- 3). Cut the power to the circuit to be tested and Connect the instrument IN SERIES with the circuit ; with the black test lead on the negative " - " side and the red lead on the positive "+" side being measured.
- 4). Apply power and read the current value displayed on LCD.

4-4 AC Current Measurement

- 1). Connect red test lead to "mA" Terminal for Current measurements up to 200mA. (For measuring Current between 200mA to 20A, Connect red test lead to "20A" terminal.) Connect black test lead to "COM" terminal.
- 2). Set range switch to desired A \cong range and set DC / AC push switch to AC position.
- 3). Cut the power to the circuit to be tested and Connect the instrument IN SERIES with the circuit ; with the black test lead on the negative " - " side and the red lead on the positive "+" side of the circuit being measured.
- 4). Apply power and read the current value displayed on LCD.

4-5 Resistance Measurement

WARNING

Before taking any in-circuit resistance measurement remove power from the circuit being tested and discharge all Capacitors.

- 1). Connect red test lead to " V- Ω -Hz " terminal and black test lead to " COM " terminal.
- 2). Set range switch to desired Ω Range.
- 3). Connect the test leads to the circuit being measured and read the resistance value displayed on LCD.

4-6 Capacitance Measurement

- 1). Set range switch to desired capacitor (F) position.
- 2). Insert the capacitor pins into capacitance connector for measurement.
- 3). Read the capacitance on LCD.

4-7 Frequency Measurement

- 1). Set range switch to the Hz position.
- 2). Connect red test lead to "V- Ω -Hz" terminal and black test lead to "COM" terminal.
- 3). Connect test prods of test Leads to the circuit to be measured.
- 4). Read the frequency value (Hz) displayed on LCD.


4-8 Temperature Measurement

- 1). Set range switch to the TEMP $^{\circ}$ C or $^{\circ}$ F range.
- 2). Connect the K-type thermocouple probe to the temperature measurement jack.
- 3). Perform measurements by contacting the object being measured with the probe sensor.


4-9 Diode Tests

WARNING

Before taking any in-circuit measurement remove power from the circuit being tested and discharge all capacitors.

- 1). Connect red test lead to "V- Ω -Hz" terminal and black test lead to "COM" terminal.
- 2). Set range switch to diode test () position.
- 3). Connect the red test lead to the anode side and black test lead to the cathode side of the diode being tested.
- 4). Read forward voltage (Vf) value displayed on LCD.
- 5). If test leads are connect to the diode in a way different procedure (3). The reading should be nearly equal to the reading without any diode being connected. This can be used for distinguishing anode and cathode poles of a diode.

4-10 Continuity Measurement

- 1). Connect red test lead to "V- Ω -Hz" terminal and black test lead to "COM" terminal.
- 2). Set range switch to the () position.
- 3). Remove power from the circuit being tested and discharge all capacitors.
- 4). Connect the test lead to the circuit being measured.
- 5). When the impedance of a circuit is below 40 Ω . Continuous beeping tone shall be heard.

NOTE : Continuity Test is available to check open / short circuit. If precise data of resistance is needed, use Ω function.

V. BATTERY & FUSE REPLACEMENT

5-1 Battery Check-up & Replacement

WARNING

To prevent electrical hazard or shock turn off Multimeter and disconnect test leads before removing back cover.

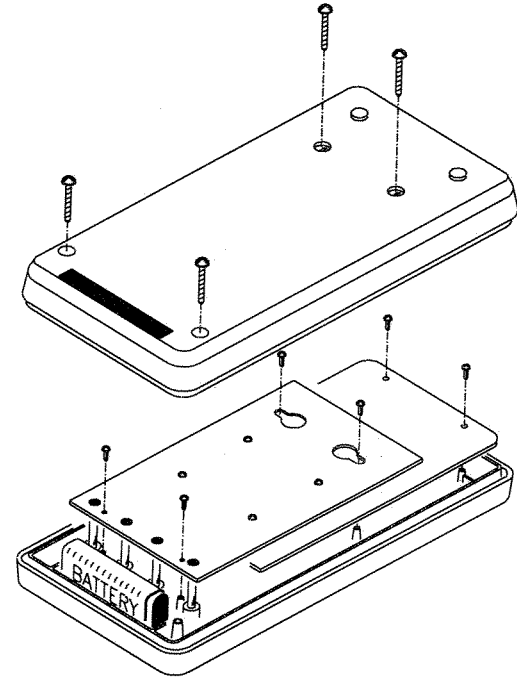
- 1). As battery power is not sufficient, **B+** will be displayed on LCD. Replacement with a new 9V battery is required.
- 2). After test leads are disconnected and the Multimeter is furred off, remove the bottom cover.
- 3). Remove battery from the holder and replace it with a standard 9 - Volt transistor battery.
- 4). Replace the battery cover.

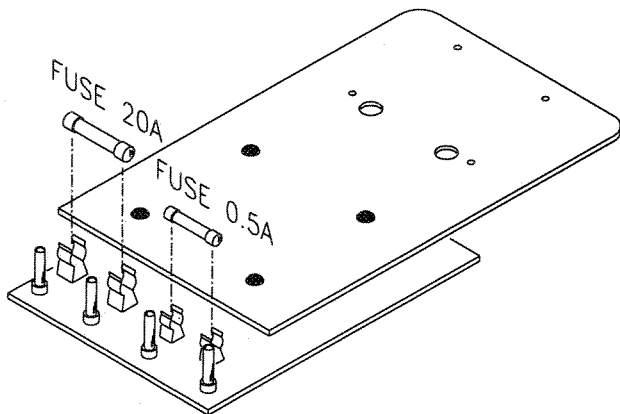
5-2 FUSE Replacement

WARNING

To prevent fire , use 0.5A / 250V size 50×20mm or 20A / 380V size 6 ϕ ×30.8mm fast blow type fuse.

- 1). Turn off the Multimeter and disconnect test leads.
- 2). Remove back cover with a screw driver.
- 3). Referring to Figure 2, remove the defective fuse and install a new fuse of the same size and rating.
- 4). Replace the battery cover.



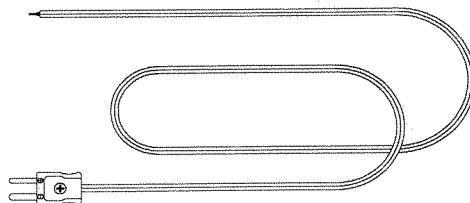


VI. OPTIONAL ACCESSORY

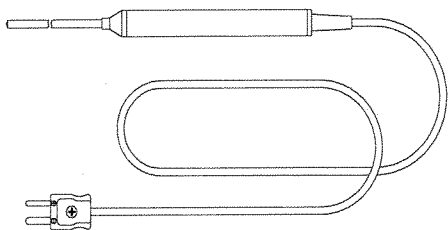
K (CA) type thermocouple.

Model	Range	Tolerances	Description
TP-K01 Bead probe	-50°C to 200°C -58°F to 392°F	±2.2°C or ±0.75% ±3.6°F or ±0.75%	100cm length with tape in salvation. Maximum insulating temperature : 260°C
TP-K02 immersion probe	-50°C to 1000°C -58°F to 1832°F	±2.2°C or ±0.75% ±3.6°F or ±0.75%	3.2 φ × 150mm Metal sheath 100cm Compensating wire.
TP-K03 Surface probe	-50°C to 750°C -58°F to 1382°F	±2.2°C or ±0.75% ±3.6°F or ±0.75%	100cm Compensating wire. 12.5 φ × 94mm handle

TP-K01: Available for general condition, especially for complex and any place hard to reach.



TP-K02: Available for temperature measurement of liquid, gels or air



TP-K03: Available for flat or curved surface measurement

