

ENGLISH

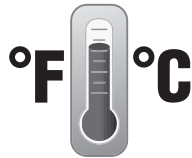
MM400

CAT
III

1m

INSTRUCTION MANUAL

Auto-Ranging Digital Multimeter

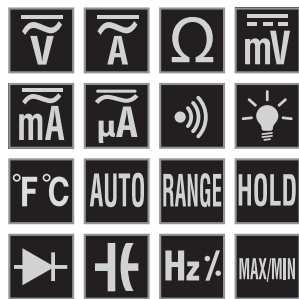


- DATA HOLD
- AUDIBLE CONTINUITY
- MIN / MAX
- TEMPERATURE
- DIODE TEST
- CAPACITANCE

600V $\approx$

10A $\approx$

40M Ω



**KLEIN
TOOLS**



For Professionals Since 1957

www.itm.com

information@itm.com

1.800.561.8187

GENERAL SPECIFICATIONS

Klein Tools MM400 is an auto-ranging multimeter that measures AC/DC voltage, AC/DC current, and resistance. It can also measure temperature, capacitance, frequency, duty-cycle, and test diodes and continuity.

- **Operating Altitude:** 6562 ft. (2000m)
- **Relative Humidity:** <80% non-condensing
- **Operating Temp:** 32°F to 104°F (0°C to 40°C)
- **Storage Temp:** 14°F to 140°F (-10°C to 60°C)
- **Accuracy:** Values stated at 65°F to 83°F (18°C to 28°C)
- **Temp Coefficient:** 0.1 x (Quoted Accuracy) per °C above 28°C or below 18°C, corrections are required when ambient working temp is outside of Accuracy Temp range
- **Dimensions:** 6.04" x 3.07" x 1.78" (153.4 x 78.0 x 45.2 mm)
- **Weight:** 8.1 oz. (230 g)
- **Calibration:** Accurate for one year
- **Standards:** Conforms to: UL STD 61010-1, 61010-2-030, 61010-2-033.

Certified to: CSA STD C22.2 # 61010-1,
61010-2-030, 61010-2-033.
IEC EN 61010-1, 61010-2-030,
61010-2-033, 61326-1.

- **Pollution degree:** 2
- **Accuracy:** ± (% of reading + # of least significant digits)
- **Drop Protection:** 3.3 ft. (1m)
- **Safety Rating:** CAT III 600V, Class 2, Double insulation
CAT III: Measurement category III is applicable to test and measuring circuits connected to the distribution part of the building's low-voltage MAINS installation.
- **Electromagnetic Environment:** IEC EN 61326-1. This equipment meets requirements for use in basic and controlled electromagnetic environments like residential properties, business premises, and light-industrial locations.

Specifications subject to change.

ELECTRICAL SPECIFICATIONS

VOLTAGE (AUTO-RANGING)

Function	Range	Resolution	Accuracy
AC Voltage (V AC)	4.000V	1mV	±(1.2% + 5 digits)
	40.00V	10mV	±(1.5% + 5 digits)
	400.0V	100mV	
	600V	1V	±(2.0% + 5 digits)
DC Voltage (V DC)	400.0mV	0.1mV	±(1.0% + 8 digits)
	4.000V	1mV	±(1.2% + 3 digits)
	40.00V	10mV	
	400.0V	100mV	
	600V	1V	±(1.5% + 3 digits)

Input Impedance: 10MΩ

Frequency Range: 50 to 60Hz

Maximum Input: 600V AC RMS or 600V DC

CURRENT (AUTO-RANGING)

AC Current (μA and mA)	400.0μA	0.1μA	±(1.5% + 5 digits)
	4000μA	1μA	±(1.8% + 5 digits)
	40.00mA	10μA	
	400.0mA	100μA	
	10A	10mA	±(3.0% + 7 digits)
DC Current (μA and mA)	400.0μA	0.1μA	±(1.0% + 5 digits)
	4000μA	1μA	±(1.5% + 5 digits)
	40.00mA	10μA	
	400.0mA	100μA	
	10A	10mA	±(3.0% + 7 digits)

Overload Protection: 500mA / 600V and 10A / 600V Fuses

Frequency Range: 50 to 60Hz

Maximum Input: μA/mA setting: 500mA AC RMS / DC
10A setting: 10A AC RMS / DC

RESISTANCE (AUTO-RANGING)

Range	Resolution	Accuracy
400.0Ω	0.1Ω	±(1.5% + 5 digits)
4.000kΩ	1Ω	
40.00kΩ	10Ω	
400.0kΩ	100Ω	
4.000MΩ	1kΩ	±(2.0% + 10 digits)
40.00MΩ	10kΩ	

Maximum Input: 600V DC or 600V AC RMS

ELECTRICAL SPECIFICATIONS
CAPACITANCE (AUTO-RANGING)

Range	Resolution	Accuracy
40.00nF	10pF	$\pm(5.0\% + 35 \text{ digits})$
400.0nF	0.1nF	$\pm(3.0\% + 5 \text{ digits})$
4.000 μ F	1nF	
40.00 μ F	10nF	
200.0 μ F	0.1 μ F	$\pm(5.0\% + 5 \text{ digits})$

Maximum Input: 600V DC or 600V AC RMS

FREQUENCY (AUTO-RANGING)

9.999Hz	0.001Hz	$\pm(1.5\% + 5 \text{ digits})$
99.99Hz	0.01Hz	
999.9Hz	0.1Hz	$\pm(1.3\% + 5 \text{ digits})$
9.999kHz	1Hz	
50.00kHz	10Hz	

Sensitivity: >8V RMS

Maximum Input: 600V DC or 600V AC RMS

DUTY CYCLE

0.1% to 99.9%	0.1%	$\pm(1.2\% + 2 \text{ digits})$
---------------	------	---------------------------------

Pulse width: >100us, <100ms

Frequency width: 5Hz to 10kHz

Sensitivity: >8V RMS

Maximum Input: 600V DC or 600V AC RMS

TEMPERATURE

0° to 1000°F	0.1°F / 1.0°F	$\pm(3.0\% + 9^\circ\text{F})$
-18° to 538°C	0.1°C / 1.0°C	$\pm(3.0\% + 5^\circ\text{C})$

ELECTRICAL SPECIFICATIONS

- **Diode Test:** 1.5 mA max, open circuit voltage 3.0V DC
- **Continuity Check:** Audible signal <50Ω
- **Sampling Frequency:** 3 samples per second
- **Overload:** "OL" indicated on display, overload protection 600V RMS in all settings
- **Polarity:** "-" on display indicates negative polarity
- **Display:** 3 ³/₄ digit, 4000 Count LCD

WARNINGS

To ensure safe operation and service of the meter, follow these instructions. Failure to observe these warnings can result in severe injury or death.

- Before each use verify meter operation by measuring a known voltage or current.
- Never use the meter on a circuit with voltages that exceed the category based rating of this meter.
- Do not use the meter during electrical storms or in wet weather.
- Do not use the meter or test leads if they appear to be damaged.
- Use only with CAT III or CAT IV rated test leads.
- Ensure meter leads are fully seated, and keep fingers away from the metal probe contacts when making measurements.
- Do not open the meter to replace batteries while the probes are connected.
- Use caution when working with voltages above 25V AC RMS or 60V DC. Such voltages pose a shock hazard.
- To avoid false readings that can lead to electrical shock, replace batteries when a low battery indicator appears.
- Do not attempt to measure resistance or continuity on a live circuit.
- Always adhere to local and national safety codes. Use personal protective equipment to prevent shock and arc blast injury where hazardous live conductors are exposed.

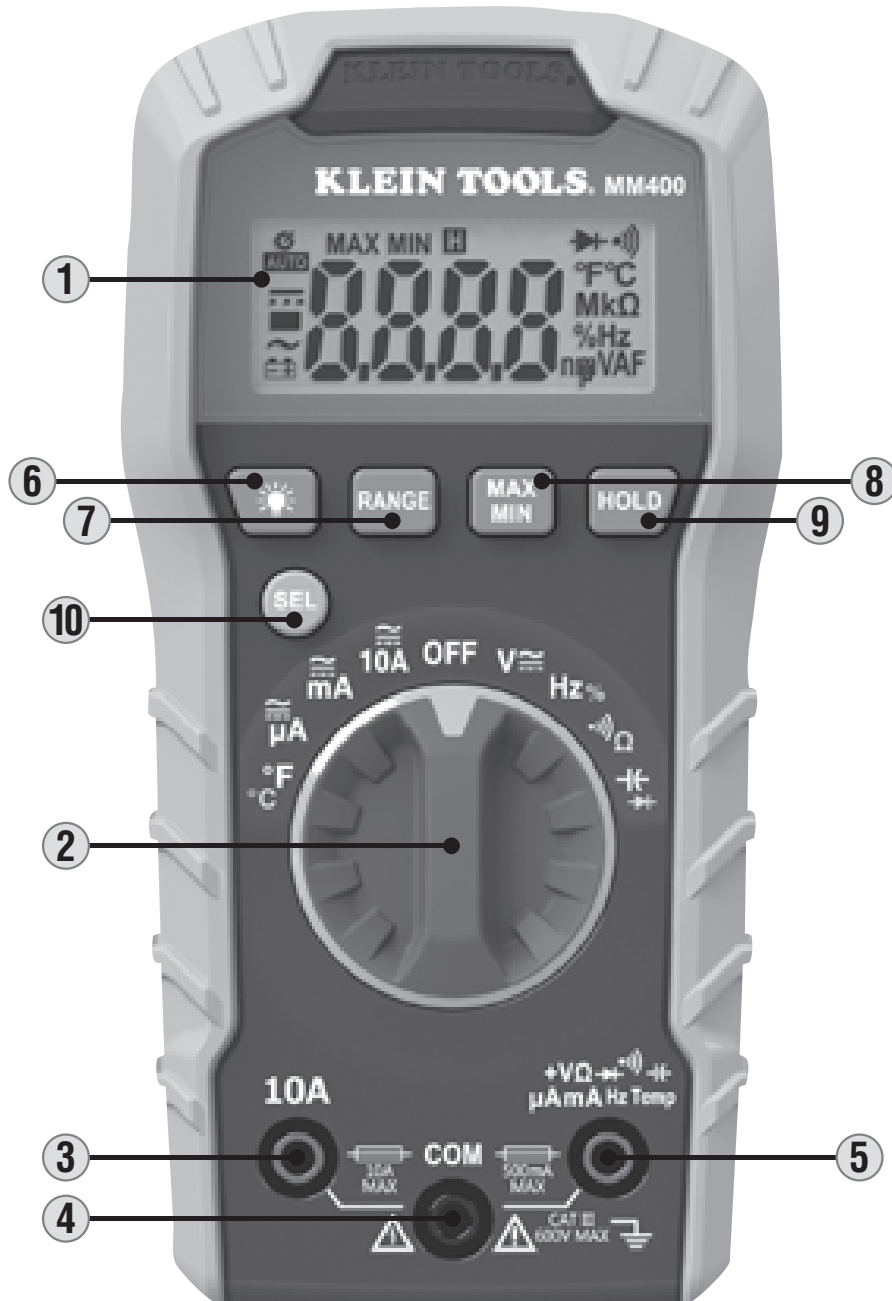
SYMBOLS ON METER

	AC/DC Voltage or Current	Ω	Resistance (in Ohms)
	Audible Continuity		Diode
	Capacitance	Hz	Frequency
%	Duty-cycle		Double Insulated Class II
°F/°C	Temperature (Fahrenheit / Celsius)		Ground
	Fuse (with rating below symbol)		
	Warning or Caution <i>To ensure safe operation and service of this meter, follow all warnings and instructions detailed in this manual.</i>		
	Risk of Electrical Shock <i>Improper use of this meter can lead to risk of electrical shock. Follow all warnings and instructions detailed in this manual.</i>		

SYMBOLS ON LCD

	Data Hold		Audible Continuity
	Diode	AUTO	Auto Ranging
	AC (Alternating Current)		DC (Direct Current)
	Low Battery		Auto Power Off
MAX	Maximum Value	MIN	Minimum Value
°F	Degrees Fahrenheit	°C	Degrees Celsius
M	Mega (value x 10 ⁶)	k	kilo (value x 10 ³)
m	mili (value x 10 ⁻³)	μ	micro (value x 10 ⁻⁶)
n	nano (value x 10 ⁻⁹)	V	Volts
A	Amps	F	Farads
Ω	Ohms	Hz	Hertz (Frequency)
%	Duty-Cycle		

FEATURE DETAILS



NOTE: *There are no user-serviceable parts inside meter.*

- | | |
|-----------------------------|------------------------------|
| 1. 4000 count LCD display | 6. Backlight ON/OFF button |
| 2. Function selector switch | 7. "RANGE" button |
| 3. "10A" jack | 8. "MAX/MIN" button |
| 4. "COM" jack | 9. "HOLD" (Data Hold) button |
| 5. "VΩ" jack | 10. "SEL" (Select) button |

FUNCTION BUTTONS

ON/OFF

To Power ON the meter rotate the Function Selector switch ② from the OFF setting to any measurement setting. To Power OFF the meter rotate the Function Selector switch ② to the OFF setting. By default, the meter will automatically Power OFF after 30 minutes of inactivity. Reactivate meter by pressing any button. To deactivate the automatic Power OFF feature, power the meter ON with the SEL button ⑪ depressed. When automatic Power OFF is deactivated, the  symbol will not be visible in the display.

"SEL" (SELECT) BUTTON (FOR SECONDARY FUNCTIONS)

The "SEL" button ⑩ activates the secondary function for each application accessible by the function selector switch ②. For current and voltage, it toggles between AC and DC. For the other functions, it switches between °F and °C, between Hz and % Duty-cycle, between Continuity and Resistance, and between Capacitance and Diode-test. The default function for each application is printed on the meter in white; the secondary function for each location is printed on the meter in orange.

"HOLD" (DATA HOLD) BUTTON

Press the "HOLD" button ⑨ to hold the measurement on the display. Press again to release the display and return to live measuring.

"RANGE" BUTTON

The meter defaults to auto-ranging measurement mode **AUTO**. This automatically determines the most appropriate measurement range for the testing that is being conducted. To manually force the meter to measure in a different range, use the "RANGE" button ⑦.

1. Press the "RANGE" button ⑦ to manually select measurement range (**AUTO** is deactivated on the LCD). Repeatedly press the "RANGE" button ⑦ to cycle through the available ranges, stopping once the desired range is reached.
2. To return to auto-ranging mode, press and hold the "RANGE" button ⑦ for more than one second (**AUTO** is reactivated).

"MAX/MIN" BUTTON

When the "MAX/MIN" button ⑧ is pressed, the meter keeps track of the minimum and maximum value of the measurement as the meter continues to take samples. The first press of the "MAX/MIN" button ⑧ displays the Max value, the second press displays the Min value.

To return to normal measuring mode, press and hold the "MAX/MIN" button ⑧ for more than one second.

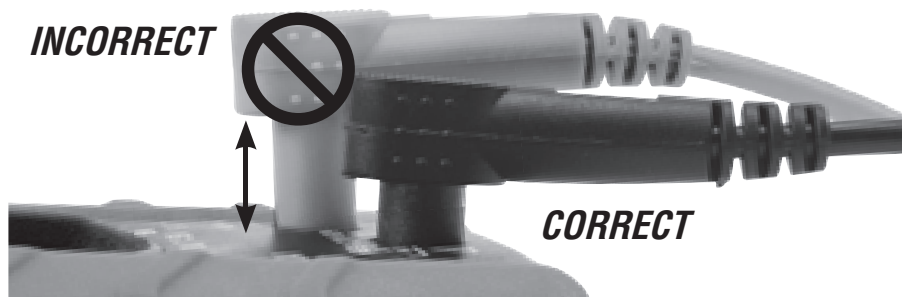
BACKLIGHT BUTTON

Press and hold the backlight button ⑥ for more than one second to turn the backlight on or off. Backlight automatically turns off after approximately 3 minutes.

OPERATING INSTRUCTIONS

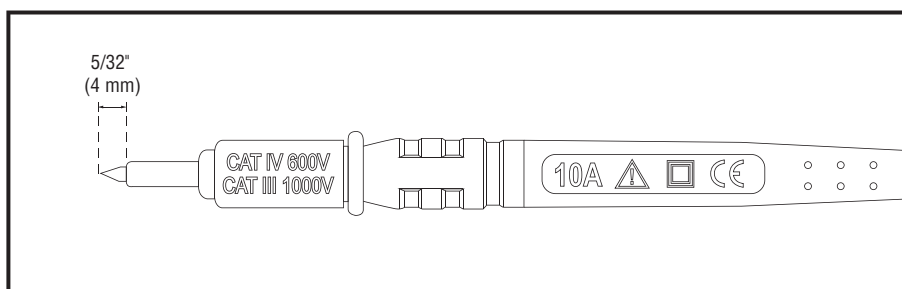
CONNECTING TEST LEADS

Do not test if leads are improperly seated. Results could cause intermittent display readings. To ensure proper connection, firmly press leads into the input jack completely.



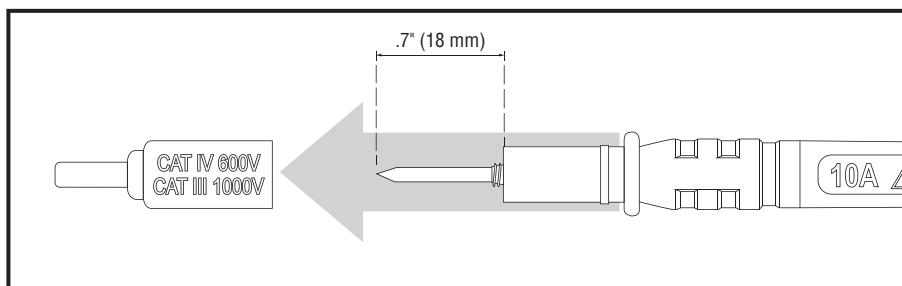
TESTING IN CAT III / CAT IV MEASUREMENT LOCATIONS

Ensure the test lead shield is pressed firmly in place. Failure to use the CAT III / CAT IV shield increases arc-flash risk.



TESTING IN CAT II MEASUREMENT LOCATIONS

CAT III / CAT IV shields may be removed for CAT II locations. This will allow testing on recessed conductors such as standard wall outlets. Take care not to lose the shields.

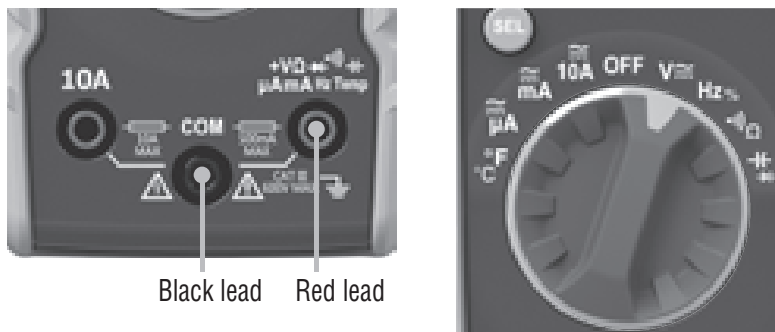


OPERATING INSTRUCTIONS

AC/DC VOLTAGE (LESS THAN 600V)

1. Insert RED test lead into VΩ jack ⑤, and BLACK test lead into COM jack ④, and rotate function selector switch ② the V $\approx$ setting.

NOTE: The meter defaults to AC measurement. Press the "SEL" button ⑩ to toggle between AC and DC modes. The AC $\sim$ or DC $\equiv$ icon on the LCD indicates which mode is selected.



2. Apply test leads to the circuit to be tested to measure voltage. The meter will auto-range to display the measurement in the most appropriate range.

NOTE: If "-" appears on the LCD, the test leads are being applied to the circuit in reverse polarity. Swap the position of the leads to correct this.

NOTE: When in a voltage setting and the test leads are open, readings of order mV may appear on the display. This is noise and is normal. By touching the test leads together to close the circuit the meter will measure zero volts.

OPERATING INSTRUCTIONS

AC/DC CURRENT

NOTE: The meter defaults to AC measurement. Press the "SEL" button ⑩ to toggle between AC and DC modes. The AC or DC icon on the LCD indicates which mode is selected.

1. Attach test leads to the appropriate jacks and rotate function selector switch ② to the appropriate setting as follows:
- **For AC/DC currents >400mA and <10A:** Insert RED test lead into 10A jack ③, and BLACK test lead into COM jack ④, and rotate function selector switch ② to the 10A AC/DC $\approx_{10A}$ setting.



Red lead Black lead



- **For mA AC/DC currents <400mA:** Insert RED test lead into V Ω jack ⑤, and BLACK test lead into COM jack ④, and rotate function selector switch ② to the mA AC/DC $\approx_{mA}$ setting.



Black lead Red lead



- **For μ A DC currents <400 μ A:** Insert RED test lead into V Ω jack ⑤, and BLACK test lead into COM jack ④, and rotate function selector switch ② to the μ A AC/DC $\approx_{\mu A}$ setting.



Black lead Red lead



OPERATING INSTRUCTIONS

2. To measure current: Remove power from circuit, open circuit at measurement point, connect meter in-series in the circuit using the test leads, and apply power to circuit.
3. Measure the current. The meter will auto-range to display the measurement in the most appropriate range.

⚠ Do not attempt to measure more than 10A.

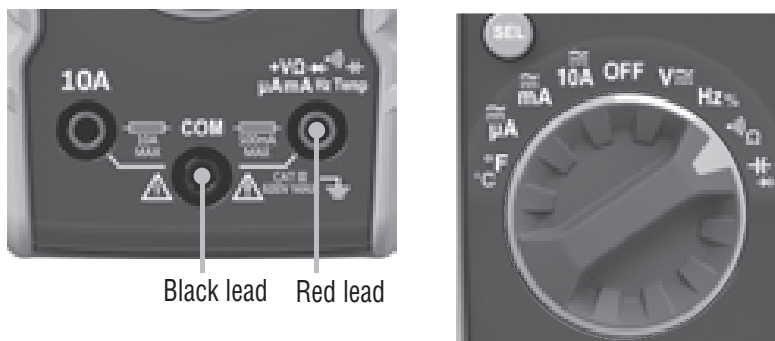
⚠ When measuring currents greater than 6A, a measurement time of 30 seconds followed by 10 minutes of recovery time is recommended.

RESISTANCE MEASUREMENTS

1. Insert RED test lead into VΩ jack ⑤, and BLACK test lead into COM jack ④, and rotate function selector switch ② to the Continuity/Resistance Ω setting.

NOTE: The meter defaults to Continuity testing in this mode. To enter Resistance testing mode, press the "SEL" button ⑩ once. The Resistance icon Ω will appear on the display.

2. Remove power from circuit.
3. Measure resistance by connecting test leads to circuit. The meter will auto-range to display the measurement in the most appropriate range.



NOTE: When in a Resistance setting and the test leads are open (not connected across a resistor), or when a failed resistor is under test, the display will indicate O.L. This is normal.

⚠ DO NOT attempt to measure resistance on a live circuit.

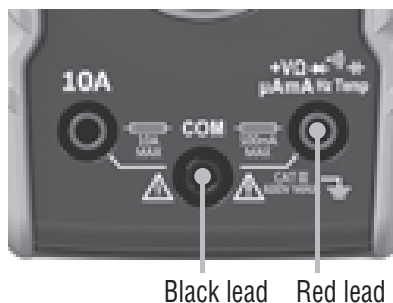
OPERATING INSTRUCTIONS

CONTINUITY

1. Insert RED test lead into V Ω jack ⑤, and BLACK test lead into COM jack ④, and rotate function selector switch ② to the Continuity/Resistance $\bullet\Omega$ setting.

NOTE: The meter defaults to Continuity testing in this mode. Ensure that the Continuity Testing icon $\bullet\Omega$ is visible on the display. If not, press the "SEL" button ⑩ once.

2. Remove power from circuit.
3. Test for continuity by connecting conductor or circuit with test leads. If resistance is measured less than 50 Ω , an audible signal will sound and display will show a resistance value indicating continuity. If circuit is open, display will show "OL".



⚠ DO NOT attempt to measure continuity on a live circuit.

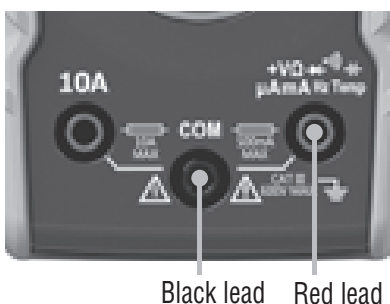
OPERATING INSTRUCTIONS

CAPACITANCE

1. Insert RED test lead into VΩ jack ⑤, and BLACK test lead into COM jack ④, and rotate function selector switch ② to the Capacitance/Diode $\rightarrow +$ setting.

NOTE: The meter defaults to Capacitance testing in this mode. Ensure that the display reads "0 nF" with test leads open. If not, press the "SEL" button ⑩ once.

2. Remove power from circuit.
3. Measure capacitance by connecting test leads across the capacitor. The meter will auto-range to display the measurement in the most appropriate range.

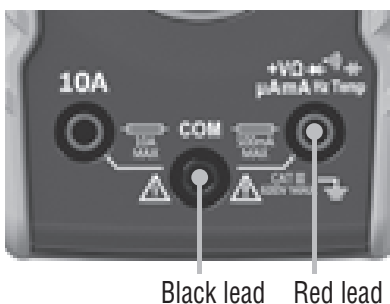


DIODE TEST

1. Insert RED test lead into VΩ jack ⑤, and BLACK test lead into COM jack ④, and rotate function selector switch ② to the Capacitance/Diode $\rightarrow +$ setting.

NOTE: The meter defaults to Capacitance testing in this mode. To enter Diode testing mode, press the "SEL" button ⑩ once. The Diode icon $\rightarrow +$ will appear on the display.

2. Touch test leads to diode. A reading of 200-700mV on display indicates forward bias, "OL" indicates reverse bias. An open device will show "OL" in both polarities. A shorted device will show approximately 0mV.



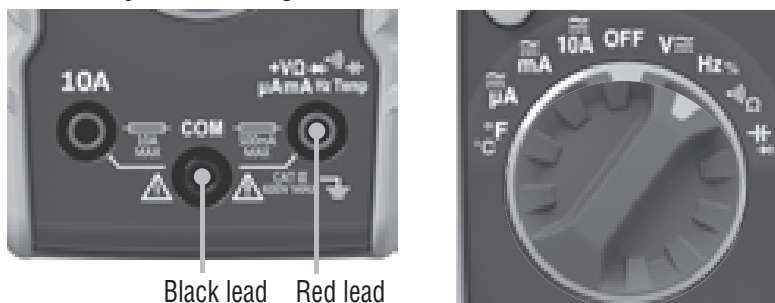
OPERATING INSTRUCTIONS

FREQUENCY / DUTY-CYCLE

1. Insert RED test lead into V Ω jack ⑤ and BLACK test lead into COM jack ④, and rotate function selector switch ② to the Frequency/Duty-Cycle Hz% setting.

NOTE: The meter defaults to Frequency testing in this mode. To enter Duty-Cycle testing mode, press the "SEL" button ⑩ once. Ensure that the appropriate icon (either Hz or %) appears on the display.

2. Measure by connecting test leads across the circuit.

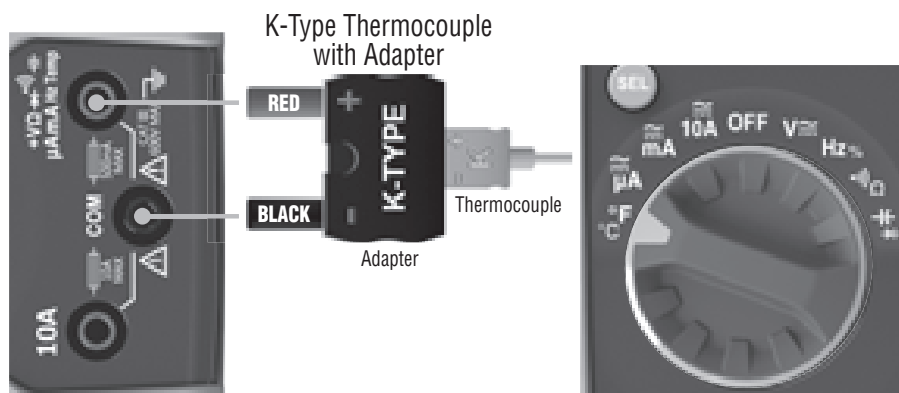


TEMPERATURE

1. Insert K-type thermocouple into the V Ω ⑤ and COM ④ jacks, and rotate function selector switch ② to the Temperature $^{\circ}$ F setting.

NOTE: The meter defaults to Fahrenheit scale in this mode. To enter Celsius scale, press the "SEL" button ⑩ once. Ensure that the appropriate icon (either $^{\circ}$ F or $^{\circ}$ C) appears on the display. Default temperature scale may be changed by powering on the meter with the "HOLD" button ⑨ depressed.

2. To measure temperature, make contact between the thermocouple tip and the object being measured. When thermocouple tip and object are in thermal equilibrium, the measurement on the display will stabilize. The meter will auto-range to display the measurement in the most appropriate range.



⚠ **Remove thermocouple before switching meter to other measurement functions.**

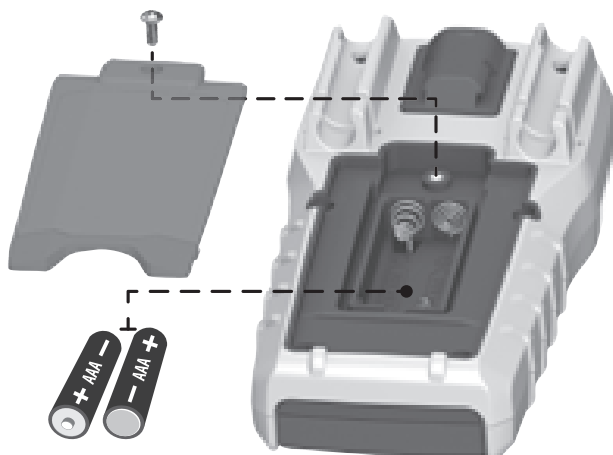
⚠ **The thermocouple included with the original purchase is suitable for temperatures below 356°F / 180°C only. To measure higher temperatures, a K-type thermocouple with**

MAINTENANCE

BATTERY REPLACEMENT

When  indicator is displayed on LCD, batteries must be replaced.

1. Remove screw from battery door.
2. Replace 2 x AAA batteries (note proper polarity).
3. Replace battery door and fasten securely with screw.



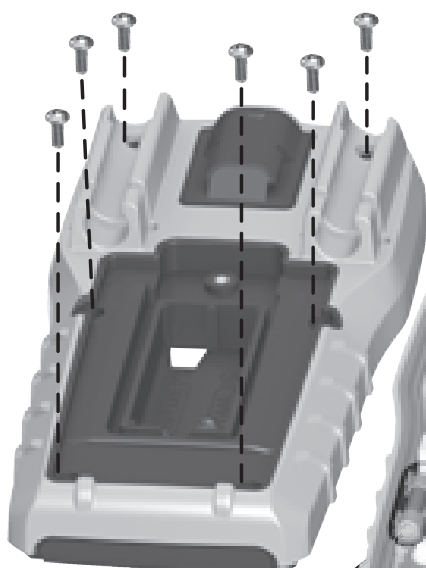
 **To avoid risk of electric shock, disconnect leads from any voltage source before removing battery door.**

 **To avoid risk of electric shock, do not operate meter while battery door is removed.**

FUSE REPLACEMENT

A fuse may blow if more than 500mA is applied to the V Ω jack , or more than 10A is applied to the 10A jack . To access fuses:

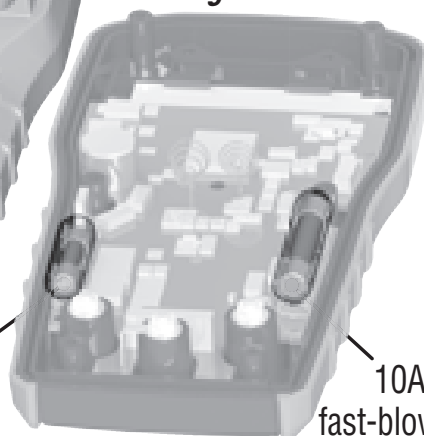
1. Remove 6 screws from back of meter and remove back housing.
2. Replace blown fuse(s) with:
 - V Ω (μ A/mA) jack :** 500mA/600V fast-blow (Klein Cat. No. 69033)
 - 10A jack :** 10A/600V fast-blow (Klein Cat. No. 69032)
3. Replace back housing and fasten securely with screws.



 **To avoid risk of electric shock, disconnect leads from any voltage source before accessing fuses.**

 **To avoid risk of electric shock, do not operate meter while back housing is removed.**

500mA/600V
fast-blow fuse



10A/600V
fast-blow fuse

CLEANING

Be sure meter is turned off and wipe with a clean, dry lint-free cloth. ***Do not use abrasive cleaners or solvents.***

STORAGE

Remove the batteries when meter is not in use for a prolonged period of time. Do not expose to high temperatures or humidity. After a period of storage in extreme conditions exceeding the limits mentioned in the General Specifications section, allow the meter to return to normal operating conditions before using.

DISPOSAL / RECYCLE



Do not place equipment and its accessories in the trash. Items must be properly disposed of in accordance with local regulations. Please see www.epa.gov or www.erecycle.org for additional information.