ENGLISH

MM720

INSTRUCTION MANUAL
Auto-Ranging
Digital Multimeter

True RMS
Measurement
Technology

°F °C

- HIGH VISIBILITY DISPLAY
- DATA HOLD
- LOW IMPEDANCE
- AUDIBLE CONTINUITY
- MIN / MAX / RELATIVE
- TEMPERATURE
- DIODE TEST
- CAPACITANCE & FREQUENCY

1000V ≂
10A ≂
60MΩ

2 m IP42

KLEIN TOOLS

Intertek
5000573

CAT IV 600V
CAT III 1000V

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GENERAL SPECIFICATIONS

Klein Tools MM720 is an automatically ranging true root mean square (TRMS) digital multimeter that measures AC/DC voltage, AC/DC current, and resistance. It can also measure temperature, capacitance, frequency, duty-cycle, test diodes and continuity. It features a high visibility, reverse contrast LCD display with an optical sensor to automatically optimize viewability in dark or bright ambient lighting.

- **Environment:** Indoor. DO NOT expose to moisture, rain, or snow.
- **Operating Altitude:** 6562 ft. (2000m)
- **Relative Humidity:** <90% non-condensing
- **Operating Temp:** 14°F to 122°F (-10°C to 50°C)
- **Storage Temp:** -4°F to 140°F (-30°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:** 6.94" × 3.37" × 1.88" (176.3 × 85.7 × 47.7 mm)
- **Weight:** 12.2 oz. (345 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.
  EC EN 61010-1, 61010-2-030, 61010-2-033, 61326-1.
- **Pollution degree:** 2
- **Accuracy:** ± (% of reading + # of least significant digits)
- **Drop Protection:** 6.6 ft. (2m)
- **Ingress Protection:** IP42 (see **WARNINGS**)
- **Safety Rating:** CAT IV 600V, CAT III 1000V, 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.*

CAT IV: *Measurement category IV is applicable to test and measuring circuits connected at the source 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 (50–60 Hz)
AC Voltage (V AC)	6.000V	1mV	±(1.0% + 3 digits)
	60.00V	10mV	
	600.0V	100mV	
	1000V	1V	±(1.2% + 5 digits)
DC Voltage (V DC)	600.0mV	0.1mV	±(0.5% + 5 digits)
	6.000V	1mV	
	60.00V	10mV	
	600.0V	100mV	±(0.8% + 3 digits)
	1000V	1V	±(1.0% + 3 digits)

Input Impedance: 10MΩ
Frequency Range: 50 to 400Hz
Maximum Input: 1000V AC RMS or 1000V DC

CURRENT (AUTO-RANGING)

AC Current (µA and mA)	600.0µA	0.1µA	±(1.0% + 5 digits)
	6000µA	1µA	
	60.00mA	10µA	
	600.0mA	100µA	
	6.000A	1mA	±(2.0% + 3 digits)
	10.00A	0.01A	±(2.0% + 5 digits)
DC Current (µA and mA)	600.0µA	0.1µA	±(1.0% + 3 digits)
	6000µA	1µA	
	60.00mA	10µA	
	600.0mA	100µA	
	6.000A	1mA	±(1.5% + 3 digits)
	10.00A	0.01A	

Overload Protection: 800mA/1000V and 10A/1000V fuses
Frequency Range: 50 to 400Hz
Maximum Input: µA/mA setting: 600mA AC RMS / DC
10A setting: 10A AC RMS / DC

RESISTANCE (AUTO-RANGING)

Function	Resolution	Accuracy
600.0Ω	0.1Ω	±(1.2% + 5 digits)
6.000kΩ	1Ω	
60.00kΩ	10Ω	
600.0kΩ	100Ω	
6.000MΩ	1kΩ	
60.00MΩ	10kΩ	±(2.0% + 10 digits)

Maximum Input: 600V DC or 600V AC RMS

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ELECTRICAL SPECIFICATIONS

CAPACITANCE (AUTO-RANGING)

Range	Resolution	Accuracy
60.00nF	10pF	±(3.5% + 10 digits)
600.0nF	0.1nF	±(3.0% + 5 digits)
6.000µF	1nF	
60.00µF	10nF	
600.0µF	100nF	
6000µF	1µF	±(3.5% + 5 digits)

Maximum Input: 600V DC or 600V AC RMS

FREQUENCY (AUTO-RANGING)

9.999Hz	0.001Hz	±(1.0% + 5 digits)
99.99Hz	0.01Hz	
999.9Hz	0.1Hz	
9.999kHz	1Hz	
99.99kHz	10Hz	
500.0kHz	100Hz	

Voltage Range: 2V to 220V RMS
Maximum Input: 600V DC or 600V AC RMS

DUTY CYCLE

1.0% to 99.9%	0.1%	±(1.2% + 2 digits)

Pulse Width: 0.1 – 100ms
Frequency Width: 5Hz to 10kHz
Voltage Range: 2V to 220V RMS
Maximum Input: 600V DC or 600V AC RMS

TEMPERATURE

-40° to 10°F	1°F	±(1.2% + 7°F)
11° to 1832°F	1°F	±(1.2% + 6°F)
-40° to -12°C	1°C	±(1.2% + 4°C)
-11° to 1000°C	1°C	±(1.2% + 3°C)

ELECTRICAL SPECIFICATIONS

OTHER MEASUREMENT APPLICATIONS

Maximum Input: *1000V RMS in Voltage setting,*
600V DC or 600V AC RMS in all other settings

- **Diode Test:** 1.5 mA max, open circuit voltage 3.2V DC
- **Continuity Check:** Audible signal when resistance <50Ω
- **Low Impedence (Low Z):** Input impedence >3kΩ
  Max input 600V RMS
- **Auto Power Off:** After ~5 minutes of inactivity
- **Sampling Frequency:** 3 samples per second
- **Overload:** "OL" indicated on display, 1000V RMS in voltage settings, 600V RMS in all other settings
- **Polarity:** "-" on display indicates negative polarity
- **Display:** 3-5/6 digit, 6000 Count Reverse Contrast Display, TRMS technology

⚠ 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 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.
- Meter is IP42 dust & water resistant. Following any contact with water, thoroughly dry meter and test lead jacks prior to subsequent use.

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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
V	Voltage (Volts)	A	Amperage (Amps)
☼	Backlight	mA	Milliamps
µA	Microamps	Lo Z	Low Impedence
▭	Fuse (with rating below symbol)		
⚠	Warning or Caution	🕮	Read Instructions

To ensure safe operation and service of this meter, follow all warnings and instructions detailed in this manual.

Risk of Electrical Shock

Improper use of this meter can lead to risk of electrical shock. Follow all warnings and instructions detailed in this manual.

SYMBOLS ON LCD

H	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	REL	Relative Mode
ϟ	Hazardous Voltage	LoZ	Low Impedence
A☼	Automatic Backlight Adjustment	M☼	Manual Backlight Adjustment

FEATURE DETAILS

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

1. 6000 count Reverse Contrast Display
2. Function selector switch
3. "10A" jack
4. "COM" jack
5. "VΩ" jack
6. "mA/μA" jack
7. "RANGE" button
8. "REL" (Relative) button
9. "MAX/MIN" button
10. "HOLD"/Backlight button
11. "SEL" (Select) button
12. Optical Sensor

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 5 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.

When the Function Selector switch is rotated to a measurement setting, "**LEAD**" flashes on the display as a reminder to check that test leads are inserted into the appropriate jacks.

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

The "SEL" button (11) activates the secondary functions for each setting accessible by the Function Selector switch (2). For Current, Voltage and Low Z, it toggles between AC and DC. For the other functions, it switches between Continuity, Resistance, Diode-test, and Capacitance. The default function for each application is printed on the meter in white; the secondary functions are printed on the meter in orange.

"HOLD" (DATA HOLD) / BACKLIGHT BUTTON

Press HOLD (10) to hold the measurement on the display. Press again to release the display to return to live measuring.

Press and hold the "HOLD" button (10) for more than one second second to manually adjust the backlight. Meter default is automatic control of backlight based upon an optical sensor. The long presses will scroll between high backlight, low backlight, and back to automatic control. In automatic backlight mode, the "A" and icons will be displayed. For manual backlight mode, the "M" and icons will be displayed

"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).

FUNCTION BUTTONS

"REL" (RELATIVE) BUTTON

Relative measurements are available for Voltage, Current, Resistance, Temperature, Capacitance and LoZ.

1. Perform first measurement.
2. With test leads connected, press REL (8) to set frame of reference.
3. Perform second measurement. The value displayed is the difference between first and second measurements.

"MAX/MIN" BUTTON

When the "MAX/MIN" button (9) is pressed, the meter keeps track of the minimum and maximum value of the measurement as the meter continues to take samples.

1. When measuring, press MAX/MIN (9) and the meter displays the maximum value. If a new maximum occurs, the display updates with that new value. Pressing again reveals the minimum value. If a new minimum occurs, the display updates with the new value.
2. Press MAX/MIN (9) and hold for more than one second to return to normal measuring mode.

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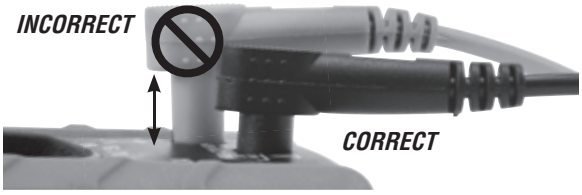
OPERATING INSTRUCTIONS

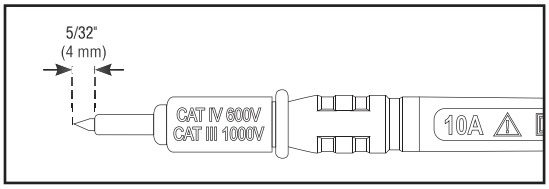
CONNECTING TEST LEADS

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.



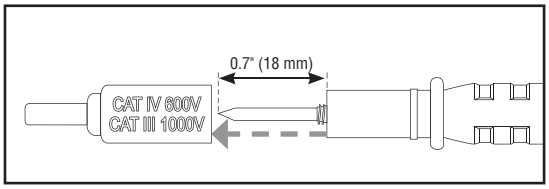
TESTING IN CAT III / CAT IV MEASUREMENT LOCATIONS

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 1000V)

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 V ≂ setting.

NOTE: *The meter defaults to AC measurement. To measure DC, press the "SEL" button (11) to toggle between AC and DC modes. The AC or DC 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: *The hazardous voltage indicator ϟ will appear for voltages >30V.*

NOTE: *If "–" appears on the LCD, the test leads are being applied to the circuit in reverse. 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.*

AC/DC LO Z VOLTAGE (LESS THAN 600V)

Voltage measurements in Low Impedance (Lo Z) setting can be used to identify ghost or stray voltages.

- Follow same procedure for measuring AC/DC Voltage (see above) with Function Selector switch (2) in the Lo Z ≂ Lo Z setting.

⚠ ***DO NOT attempt to measure voltages greater than 600V in Lo Z setting.***

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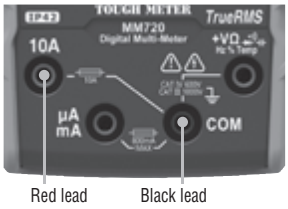
OPERATING INSTRUCTIONS

AC/DC CURRENT

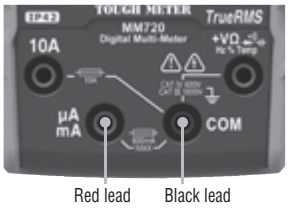
NOTE: *The meter defaults to AC measurement. To measure DC, press the "SEL" button (11) to toggle between AC and DC modes. The* **AC** *or* **DC** *icon on the LCD indicates which mode is selected.*

1. Attach test leads to the appropriate jacks and rotate function selector switch (2) to the appropriate setting as follows:

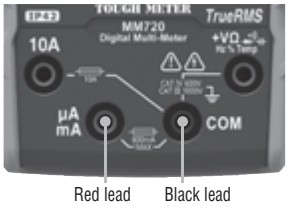
- **For AC/DC currents >600mA and <10A:** Insert RED test lead into 10A jack (3), and BLACK test lead into COM jack (4), and rotate function selector switch (2) to the 10A AC/DC ≂ 10A setting.



- **For mA AC/DC currents <600mA:** Insert RED test lead into mA/μA jack (6), and BLACK test lead into COM jack (4), and rotate function selector switch (2) to the mA AC/DC ≂ mA setting.



- **For μA DC currents <600μA:** Insert RED test lead into μA/mA jack (6), and BLACK test lead into COM jack (4), and rotate function selector switch (2) to the μA AC/DC ≂ μA setting.



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.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.***

CONTINUITY

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/Diode/Capacitance Ω setting.

NOTE: *The meter defaults to Continuity testing in this mode. Ensure that the Continuity Testing icon is visible on the display. If not, press the "SEL" button (11) until the icon appears.*

2. Remove power from circuit.
3. Test for continuity by connecting conductor or circuit with test leads. If resistance is measured less than 50Ω, 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.***

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/Diode/Capacitance Ω setting.

NOTE: *The meter defaults to Continuity testing in this mode. To enter Resistance testing mode, press the "SEL" button (11) once.*

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.

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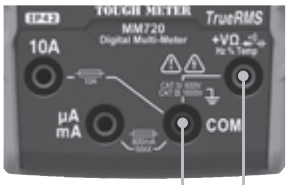
OPERATING INSTRUCTIONS



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.***

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 Continuity/Resistance/Diode/Capacitance Ω setting.

NOTE: *The meter defaults to Continuity testing in this mode. To enter Diode testing mode, press the "SEL" button (11) twice. The Diode icon 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.

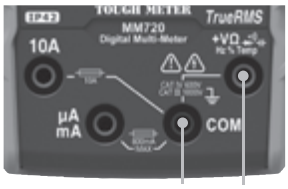
OPERATING INSTRUCTIONS

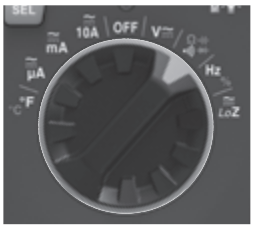
CAPACITANCE

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 Continuity/Resistance/Diode/Capacitance setting.

NOTE: *The meter defaults to Continuity testing in this mode. To enter Capacitance testing mode, press the "SEL" button (11) three times. "**nF**" or "**µF**" will appear on the display.*

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.



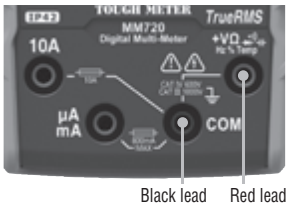


FREQUENCY / DUTY-CYCLE

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 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 (11) once. Ensure that the appropriate icon (either* **Hz** *or* **%***) appears on the display.*

2. Measure by connecting test leads across the circuit.



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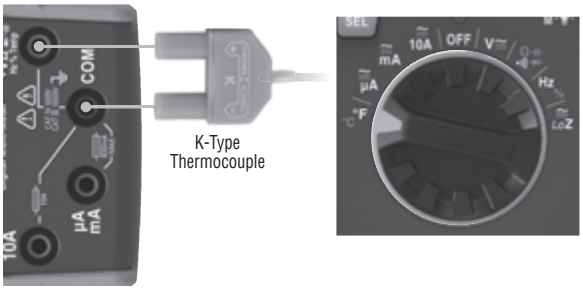
OPERATING INSTRUCTIONS

TEMPERATURE

1. Insert K-type thermocouple with adapter into the VΩ (5) and COM (4) jacks (observe polarity markings on thermocouple and meter), and rotate function selector switch (2) to the Temperature °F°C setting.

NOTE: *The meter defaults to Fahrenheit scale in this mode. To enter Celsius scale, press the "SEL" button (11) once. Ensure that the appropriate icon (either °**F** or °**C**) appears on the display.*

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 the appropriate measurement range should be used.***

MAINTENANCE

BATTERY REPLACEMENT

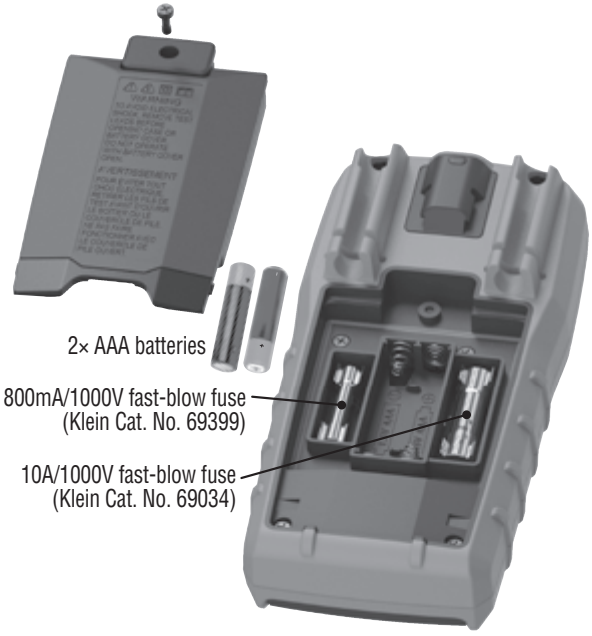
When the ▭ indicator is displayed, the batteries must be replaced.

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

FUSE REPLACEMENT

A fuse may blow if more than 800mA is applied to the µA/mA jack (6), or more than 10A is applied to the 10A jack (3). To access fuses:

1. Remove screw from battery/fuse door.
2. Replace blown fuse(s) with:
   µA/mA jack (6): 800mA/1000V fast-blow (Klein Cat. No. 69399)
   10A jack (3): 10A/1000V fast-blow (Klein Cat. No. 69034)
3. Replace battery/fuse door and fasten securely with screw.



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

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

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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.

FCC & IC COMPLIANCE

for FCC compliance information.

Canada ICES-003 (B) / NMB-003 (B)

WARRANTY

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/recycle** for additional information.