

ENGLISH

CL700



### INSTRUCTION MANUAL

### 600A AC Auto-Ranging Digital Clamp Meter

## True RMS Measurement Technology



- NON-CONTACT VOLTAGE METER
- LOW IMPEDANCE
- DATA & RANGE HOLD
- AUDIBLE CONTINUITY
- DIODE TEST
- CAPACITANCE & FREQUENCY

1000V  $\approx$   
 600A  $\approx$   
 60M $\Omega$



ESPAÑOL pg. 17

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**TOUGH METER**

# KLEIN TOOLS



For Professionals... Since 1857™



**Test Equipment Depot**  
  
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99 Washington Street  
 Melrose, MA 02176  
 Phone 781-665-1400  
 Toll Free 1-800-517-8431

## GENERAL SPECIFICATIONS

Klein Tools CL700 is an automatically ranging true root mean square (TRMS) digital clamp-meter that measures AC current via the clamp, and measures AC/DC voltage, resistance, continuity, frequency, capacitance, and tests diodes via test-leads, and temperature via a thermocouple probe. It also features a Low Impedance (LoZ) mode for identifying and eliminating ghost or stray voltages.

- **Operating Altitude:** 6562 ft. (2000m)
- **Relative Humidity:** <80% non-condensing
- **Operating Temp:** 32° to 104°F (0° to 40°C)
- **Storage Temp:** 14° to 140°F (-10° to 60°C)
- **Accuracy:** Values stated at 65° to 83°F (18° 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:** 9.09" x 3.82" x 1.54" (231 x 97 x 39 mm)
- **Weight:** 11.8 oz. (335 g) including batteries
- **Calibration:** Accurate for one year
- **Standards:** Conforms to: UL STD 61010-1, 61010-2-032, 61010-2-033.

Certified to: CSA STD C22.2 # 61010-1,  
61010-2-032, 61010-2-033.  
IEC EN 61010-1, 61010-2-032,  
61010-2-033, 61326-1.

- **Pollution degree:** 2
- **Accuracy:** ± (% of reading + # of least significant digits)
- **Drop Protection:** 6.6 ft. (2m)
- **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.*

Dwg Name: **CL700-1390105ART**

Dwg No: **1390105**

ECO No: **21122** Rev: **B**

Pkg Dwg Ref: **1290186**

Color Reference: **N/A**

## ELECTRICAL SPECIFICATIONS

Function	Range	Resolution	Accuracy (50/60 Hz)
<b>AC Voltage (V AC)</b>	6.000V	1mV	±(1.5% + 5 digits)
	60.00V	10mV	±(1.2% + 5 digits)
	600.0V	100mV	
	1000V	1V	±(1.5% + 5 digits)
<b>DC Voltage (V DC)</b>	600mV	0.1mV	±(1.0% + 8 digits)
	6.000V	1mV	±(1.0% + 3 digits)
	60.00V	10mV	
	600.0V	100mV	
1000V	1V	±(1.2% + 3 digits)	

**Input Impedance:** 10M $\Omega$     **Frequency Range:** 50 to 400Hz  
**Maximum Input:** 1000V AC RMS or 1000V DC

<b>AC Current (A AC)</b>	60.00A	10mA	±(2.0% + 8 digits)
	600.0A	100mA	±(2.0% + 5 digits)

**Frequency Range:** 50 to 60Hz

Function	Range	Resolution	Accuracy
<b>Resistance</b>	600.0 $\Omega$	0.1 $\Omega$	±(1.5% + 5 digits)
	6.000K $\Omega$	1 $\Omega$	
	60.00k $\Omega$	10 $\Omega$	
	600.0k $\Omega$	100 $\Omega$	
	6.000M $\Omega$	1k $\Omega$	
	60.00M $\Omega$	10k $\Omega$	±(2.0% + 10 digits)

**Maximum Input:** 600V AC RMS or 600V DC

<b>Capacitance</b>	60.00nF	0.010nF	±(5.0% + 35 digits)
	600.0nF	0.1nF	±(3.0% + 5 digits)
	6.000 $\mu$ F	0.001 $\mu$ F	
	60.00 $\mu$ F	0.01 $\mu$ F	
	600.0 $\mu$ F	0.1 $\mu$ F	±(5.0% + 5 digits)
	6000 $\mu$ F	1 $\mu$ F	

**Maximum Input:** 600V AC RMS or 600V DC

<b>Temperature (Fahrenheit)</b>	-14° to 32°F	0.1 to 1°F	±(2.0% + 9°F)
	33° to 752°F		±(1.0% + 5.4°F)
	753° to 1000°F		±(2.0% + 9°F)
<b>Temperature (Celsius)</b>	-26° to 0°C	0.1 to 1°C	±(2.0% + 5°C)
	1° to 400°C		±(1.0% + 3°C)
	401° to 538°C		±(2.0% + 5°C)

**ENGLISH****ELECTRICAL SPECIFICATIONS****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	
500.00kHz	100Hz	

**Sensitivity:** >8V RMS**Maximum Input:** 600V DC or 600V AC RMS**DUTY CYCLE**

1% to 99.9%	0.1%	±(1.2% + 2 digits)
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**Pulse width:** 0.1 – 100ms**Frequency width:** 5Hz to 10kHz**Sensitivity:** >8V RMS**Maximum Input:** 600V DC or 600V AC RMS**OTHER MEASUREMENT APPLICATIONS****Maximum Input:** 600V AC RMS or 600V DC

- **Diode Test:** Max. 1.5mA, open circuit voltage ~3.0V DC
- **Continuity Check:** Audible signal <50Ω, test current <0.35mA
- **Sampling Frequency:** 3 samples per second
- **Low Impedance (Low Z):** Input impedance >3kΩ  
Max input 600V RMS
- **Auto Power off:** After ~30 minutes of inactivity
- **Overload:** "OL" indicated on display, overload protection  
1000V in Voltage setting, 600V RMS in all other settings
- **Polarity:** "-" on display indicates negative polarity
- **Display:** 3-5/6 digit, 6000 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 IV rated test leads.

Dwg Name: **CL700-1390105ART**Dwg No: **1390105**ECO No: **21122** Rev: **B**Pkg Dwg Ref: **1290186**Color Reference: **N/A**

## ⚠ WARNINGS

- 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

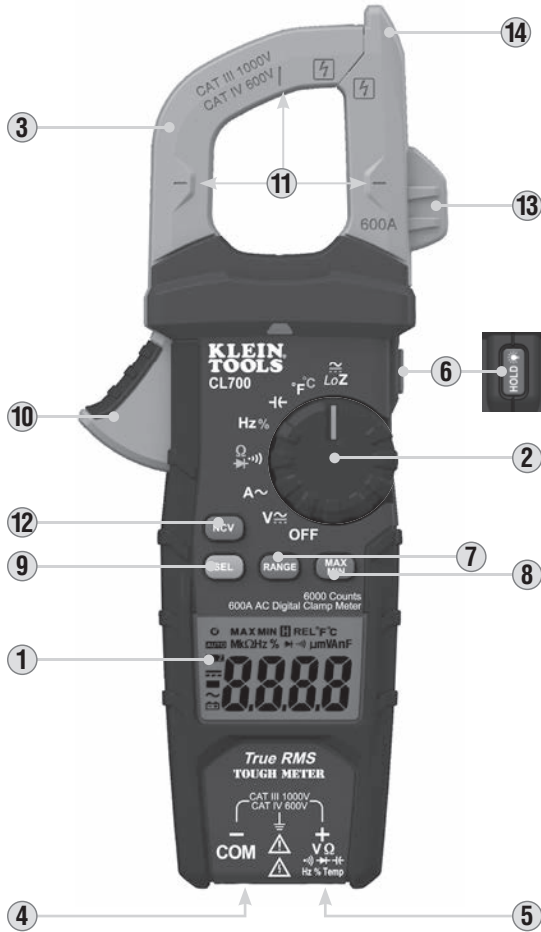
~	AC	⎓	AC/DC
Ω	Resistance (in Ohms)	•))	Audible Continuity
□	Double Insulated Class II	⏏	Ground
▶	Diode	⏏	Capacitance
Hz	Frequency	%	Duty-cycle
°F/°C	Temperature (Fahrenheit / Celsius)	⎓ LoZ	Low Impedance
V	Voltage (Volts)	A	Amperage (Amps)
⚠	Warning or Caution		
	<i>To ensure safe operation and service 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>		
⚡	Risk of Electrical Shock		
	<i>Application around and removal from UNINSULATED HAZARDOUS LIVE conductors is permitted.</i>		

## SYMBOLS ON LCD

~	AC Measurement	⎓	DC Measurement
-	Negative Reading	□	Data Hold
AUTO	Auto Ranging	MAX	Maximum Value Hold
MIN	Minimum Value Hold	⏏	Low Battery
⏏	Auto Power Off	•))	Audible Continuity
▶	Diode Test	k	kilo (value x 10 <sup>3</sup> )
M	Mega (value x 10 <sup>6</sup> )	m	mili (value x 10 <sup>-3</sup> )
μ	micro (value x 10 <sup>-6</sup> )	n	nano (value x 10 <sup>-9</sup> )
Ω	Ohms	V	Volts
A	Amps	F	Farads
Hz	Frequency (Hertz)	%	Duty Cycle
°F	Degrees (Fahrenheit)	°C	Degrees (Celsius)

Dwg Name: **CL700-1390105ART**Dwg No: **1390105**ECO No: **21122**Rev: **B**Pkg Dwg Ref: **1290186**Color Reference: **N/A**

FEATURE DETAILS




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

- |                                 |   |
|---------------------------------|---|
| 1. 6000 count LCD display       | 8. "MAX/MIN" button                     |
| 2. Function selector switch     | 9. "SEL" (select) button                |
| 3. Clamp                        | 10. Clamp trigger (press to open clamp) |
| 4. "COM" jack                   | 11. Arrow markings                      |
| 5. "VΩ" jack                    | 12. Non-contact Voltage Testing Button  |
| 6. Data Hold / Backlight button | 13. Test lead holder for test probe     |
| 7. "RANGE" button               | 14. Non-Contact Voltage Testing 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 30 minutes of inactivity. If the meter automatically powers OFF while in a measurement setting, rotate Function Selector switch ② to any other setting (excluding the OFF setting) to power ON the meter. To deactivate the power OFF functionality press and hold the "SEL" button ⑨ before powering ON from the OFF setting. When auto power OFF is deactivated, the Auto Power Off icon  will not be visible in the display.

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

The "SEL" button ⑨ activates the secondary function for each application accessible by the function selector switch ②. For voltage and low impedance it toggles between AC and DC, for the other functions it switches between °F and °C, between Hz and % Duty-Cycle, and between Continuity, Resistance, and Diode-Test. The default function for each application is printed on the meter in white; the secondary function or functions for each setting is printed on the meter in orange.

### DATA HOLD

Press the Data Hold / Backlight button ⑥ to hold the measurement on the display. Press again to release the display to return to live measuring.

### BACKLIGHT

Press and hold the Data Hold / Backlight button ⑥ for more than one second to turn ON the backlight. The backlight will automatically power OFF after 3 minutes of inactivity.

### RANGE

The meter defaults to auto-ranging mode **AUTO**. This mode 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

## MAX/MIN

When the "MAX/MIN" button **8** is pressed, the meter keeps track of the Maximum and Minimum values and the difference between the Maximum and Minimum values as the meter continues to take samples.

1. When measuring, press "MAX/MIN" button **8** to toggle between the Maximum value (MAX) and the Minimum value (MIN). If a new Maximum or Minimum occurs, the display will update with the new value.
2. Press "MAX/MIN" button **8** for more than one second to return to normal measuring mode.

## NON-CONTACT VOLTAGE TESTING

Press the NCV button **12** to test for AC voltage using the integrated non-contact voltage meter. Approach the conductor under test leading with the sensing antenna **14**. The meter delivers visual warning signals when AC voltage is detected.

## TEST LEAD HOLDER

When working with test leads, one test probe may be mounted in the test lead holder **13** to facilitate natural two-handed operation with the clamp in one hand and a single test probe in the other.



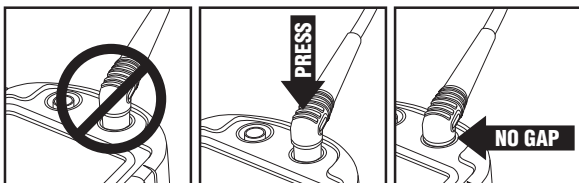
8



## OPERATING INSTRUCTIONS

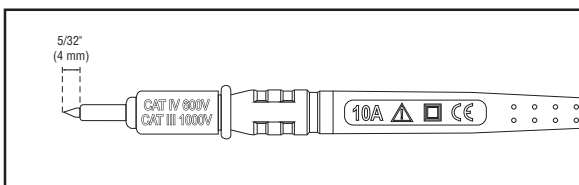
### CONNECTING TEST LEADS

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. Lead guard should be flush with the meter's faceplate.



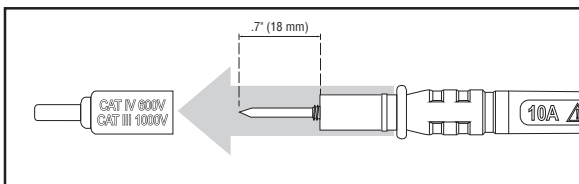
### TESTING IN CAT III / CAT IV MEASUREMENT LOCATIONS

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 CURRENT (LESS THAN 600A)

AC Current is measured by pressing the clamp trigger **10** to open the clamp **3** and placing it around a current-carrying wire. When measuring, care should be taken to ensure that the clamp **3** is completely closed with trigger **10** fully released, and that the wire passes perpendicularly through the center of the clamp **3** in line with the arrow markings **11**.



To measure current:

1. Rotate the Function Selector switch **2** to the AC current **A~** setting.



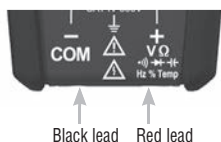
2. Place clamp **3** around wire. The current measurement will be shown in the display. The meter will auto-range to display the measurement in the most appropriate range.

**⚠** *Disconnect test leads when measuring with the clamp.*

## OPERATING INSTRUCTIONS

### AC/DC VOLTAGE (LESS THAN 1000V)

1. Insert RED test lead into V $\Omega$  jack (5), and BLACK test lead into COM jack (4), and rotate function selector switch (2) to the AC/DC voltage V  $\approx$  setting. The meter defaults to AC measurement. To measure DC, press the "SEL" button (9) to toggle between AC and DC modes. The AC or DC icon on the LCD indicates which mode is selected. Note "AC" or "DC" on the display.



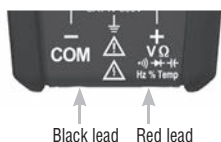
2. Apply test leads to the circuit to be tested to measure voltage. The meter will auto-range to display the measurement in the most appropriate range.

**NOTE:** If "-" appears on the LCD, the test leads are being applied to the circuit in reverse. 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 LoZ VOLTAGE (LESS THAN 600V)

1. Insert RED test lead into V $\Omega$  jack (5), and BLACK test lead into COM jack (4), and rotate function selector switch (2) to the AC/DC LoZ voltage V  $\approx$  LoZ setting. The meter defaults to AC measurement. To measure DC, press the "SEL" button (9) to toggle between AC and DC modes. The AC or DC icon on the LCD indicates which mode is selected. Note "AC" or "DC" on the display.



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.

**⚠ Do not attempt to measure voltages greater than 600V in LoZ setting.**

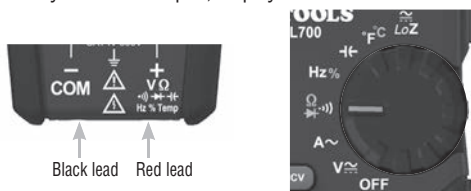
## OPERATING INSTRUCTIONS

## CONTINUITY

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

**NOTE:** The meter defaults to Continuity testing in this mode. Ensure that the Continuity Testing icon  $\Omega$  is visible on the display. If not, press the "SEL" button ⑨ repeatedly until the  $\Omega$  icon is shown.

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



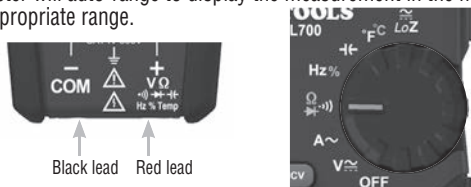
**⚠ DO NOT attempt to measure continuity on a live circuit.**

## RESISTANCE MEASUREMENTS

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

**NOTE:** The meter defaults to Continuity testing in this mode. Press the "SEL" button ⑨ once to enter Resistance testing mode. The Resistance icon  $\Omega$  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.**

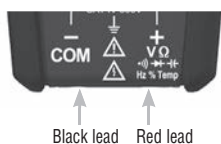
## OPERATING INSTRUCTIONS

### DIODE TEST

1. Insert RED test lead into V $\Omega$  jack (5), and BLACK test lead into COM jack (4), and rotate function selector switch (2) to the Continuity/Resistance/Diode-Test  $\Omega \rightarrow \rightarrow$  setting.

**NOTE:** The meter defaults to Continuity testing in this mode. Press the "SEL" button (9) twice to enter Diode testing mode. The Diode icon  $\rightarrow \rightarrow$  will appear on the display.

2. Touch test leads to diode. A reading of 200-800mV 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.

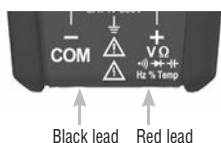


### FREQUENCY / DUTY-CYCLE

1. Insert RED test lead into V $\Omega$  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 (9) once. Ensure that the appropriate icon (either Hz or %) appears on the display.

2. Measure by connecting test leads across the circuit.



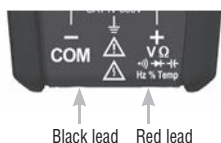
### CAPACITANCE

1. Insert RED test lead into V $\Omega$  jack (5), and BLACK test lead into COM jack (4), and rotate function selector switch (2) to the Capacitance  $\mu F$  setting.

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### OPERATING INSTRUCTIONS

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.



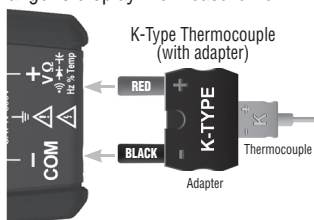
### TEMPERATURE

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 (9) once. Ensure that the appropriate icon (either °F or °C) appears on the display.

**NOTE:** The meter may be set to default to the Celsius scale by powering-ON the meter from the OFF position with the Data Hold & Backlight button (6) depressed. To re-set the default to the Fahrenheit scale repeat the power-ON sequence.

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  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.***

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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.

Test Equipment Depot - 800.517.8431  
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[www.TestEquipmentDepot.com](http://www.TestEquipmentDepot.com)